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F3 (106) (32)/RUSDIP/PMU/CMS/2007/

Dated 04.2010 *JP-11*  
*13-4-10*

**Sub: Construction Management System - Circular – 47.**

**Ref: Guidelines for developing GIS Infrastructure Maps under RUSDIP- (RUIDP - Phase II).**

The objective is to develop GIS for each town in the RUSDIP (RUIDP Phase-II) for infrastructure mapping in priority areas for efficient planning and management. The need for such a GIS database is widely recognized which emphasizes the advantages of visualization, updating, querying of spatial data and instant reproduction of maps. This would also reduce redundancy of data, reduce problems of storing, facilitate reproduction of paper maps at any scale, and carry out analysis for planning and decision making.

The GIS maps should be prepared based on following essential features/guidelines:-

1. Various drawings of the same ULB should be on a common reference system so as to be superimposed in perfection.
2. The detailed maps provided by SRSAC on Quick bird method for all the project cities should be used as base maps for GIS mapping.
3. The spatial data with its attribute data should be on a common platform so as to be compatible with GIS software in all ULBs.
4. All the maps prepared in RUSDIP shall be in AutoCAD Map as drawing files.
5. The spatial data should be on real world coordinates where actual measurements are possible. The unit of the drawing should be meters and drawings scale should be in 1:1000, so that when any distance or area is measured on the softcopy the distance is in meters. Maps may be printed in any desired scale.
6. The initial geographical framework and data standards should be adhered as far as possible. The base map should be developed on the basis of SRSAC data with addition of required features upon which the various layers of infrastructure shall be incorporated.
7. One should be able to visualize and work upon (query and retrieve) data related to various features, hence attribute (related) data should be entered in the prescribed format. The data dictionary and template shall be provided shortly.
8. Some of the spatial data with their attribute data shall be provided initially and the remaining are to be entered and edited by the ULBs on establishment of GIS facility in each ULB. The details of such GIS database are given below.

**Spatial Database:**

- 9 The GIS database shall focus on the priority areas viz. (i) Water Supply, (ii) Sewerage & sanitation (incl. solid waste management), (iii) Urban Drainage, (vi) Urban Transport, (v) Social Infrastructure (including fire fighting, health facility and heritage site) and the Base map. A suggested list of features with its attribute (related) data is given.
10. Prior to integration into the GIS database, all spatial data, so far created as AutoCAD drawings, should be checked for logical representation of area (Ward/Zone/Sub-zone etc.) and features should be in proper layer.
11. The GIS database shall be in AutoCAD Map whereby attribute data can be attached to features as Object data. The rationale behind selecting AutoCAD Map is that persons accustomed to AutoCAD in ULBs can easily adopt to the software to meet requirements of the GIS database. Moreover, CAD operators are more easily available than GIS operators and GIS analysts. However, at a later date, a suitable GIS software having better spatial analysis, query and map design facility may be used by the line agencies when the present database can be converted to the other format with ease. It should be ensured that the spatial features and attribute

- data are entered in GIS compatible format, keeping in mind the logical correctness of spatial and attribute data.
- 12 The length and area of features shall be derived from detail data (available in Excel files). Nevertheless an approximate length and area would be available for every line and polygon feature in AutoCAD map.
  - 13 The database should be open for editing and adding features with ease in future within the line agencies.
  - 14 The assigned persons at the DSC, IPIU & line agencies should be trained so as to work independently with the GIS database for sustainable and efficient use for all concerned persons in the line agencies.
  - 15 The spatial database may be prepared in Microsoft Excel for the major infrastructure facilities in the following manner: -

### I. Water Supply

Feature	Entity Type	Attributes
1 Pipelines	Single line with connectivity	Type (Rising/Distribution), type of pipe material, Diameter, year of installation, Position in respect of road (N/S/E/W/C), Status (existing/under-execution), Executing Department
2 Valves	Point data	Identification, Location, size, Type (i.e. scour/ air/ sluice)
3 Flow meter	Point data	Identification, Location, Type (i.e. mechanical / electromagnetic / ultra-sonic)
4 Reservoirs	Point data	Identification, Type (OHSR/ CWR/ GLSR) staging, Capacity, Year of completion, Status (existing/under-execution), Executing Department, Ref. of Detail Drawing
5 Pump house	Point data	Identification, Motor make, Pump make, Year of completion, Capacity (kW), Head, Capacity (Discharge), Type (Online boosting/Intake /Intermediate), Source, Status (existing/under-execution), Executing Department Ref. of Detail Drawing
6 Water Treatment Plant	Polygon with data attached to centroid	Identification, Capacity, Source, Year of Completion, Constructing Firm, Status (existing/under-execution), Executing Department, Ref. of Detail Drawing
7 Chlorinators	Point data	Identification, Location, Capacity, Make, Executing Department
8 Tube Well	Point Data	Identification, Motor make, Pump make, Year of constructing, yield, total depth, depth of casing pipe, water table, connected to which headwork, Executing Department.

### II Sewerage, Sanitation & Solid Waste Management

Feature	Entity Type	Attributes
<b>II-A Sewerage &amp; Sanitation</b>		
1 Sewer Pipes	Single line with connectivity	Type (Gravity/pumping main), pipe material, diameter, Position in respect of road (N/S/E/W/C), Status (existing/under-execution), Executing Department
2 Manholes	Point	Identification, Invert levels at least of junctions
3 Drop manholes	Point	Identification, Invert levels at least of junctions
4 Alternative line manholes	Point	Identification, Invert levels at least of junctions
5 S.T.P.	Polygon	Description, Capacity, Year of completion, Status (existing/under-execution), Executing Department, Ref. of Detail Drawing
6 Sewerage Pumping Station	Point	Identification, Capacity (in m3/sec), Constructing Firm, Coverage area, Year of completion, Status (existing/under-execution), Executing Department, Ref. of Detail Drawing, Discharge Point (to network/STP)
7 Effluent Discharge Point	Point	Description, Type (Pipeline/Drain)

<b>II-B Solid Waste Management</b>			
1	Landfill Site	Polygon	Identification/Name, Capacity(volume), Year of Constructing, Area, Status (existing/under-execution), Executing Department, Construction Firm, Ref. of Detail Drawing
2	Compost Plant	Polygon	Identification/Name, Capacity (in tonne/day), Year of Construction, Status (existing/under-execution), Executing Department, Construction Firm, Ref. of Detail Drawing
3	Collection Point	Point	Location, Ward, Type (if any), Department

<b>III. Urban Drainage</b>			
	Feature	Entity Type	Attributes
1	Drains	Single line with connectivity	Structure (open/covered/conduit), Type (micro drain/network drain), width, depth, slope, inlet, connectivity with existing drains, Start point, End Point, Position in respect of road (N/S/E/W/C), Status (existing/under-execution), Executing Department,
2	Recharge Basin	Polygon	Name, area, Status/Type
3	Pumping Station	Point	Identification/Name, Capacity (in m3/sec), Year of completion, Coverage area, Status (existing/under-execution), Executing Department, Ref. of Detail Drawing, Discharge Point, Status (existing/under-execution), Executing Department,
4	Discharge Point	Point	Description

<b>IV. Urban Transport</b>			
	Feature	Entity Type	Attributes
1	Roads	Centre line	Surface type, name or status (NH/SH/MDR), Number of lanes, Street lighting, Speed limit, Emergency Route, One-Way, Duration, Status (existing/under-execution), Executing Department
2	ROB	Line	Length, Width, Year of construction, Ref. of GAD
3	Bridges,	Line	Length, Width, Year of construction, Status (existing/under-execution), Executing Department, Ref. of GAD
4	Flyovers	Line	Length, Width, Year of construction, Ref. of GAD, Status (existing/under-execution), Executing Department
5	Subway	Line	Length, Width, Year of construction, Ref. of GAD, Status (existing/under-execution), Executing Department,
6	Culvert	Point	Type, Length, Width, Year of construction, Type of culvert, Status (existing/under-execution), Executing Department, Ref of GAD
7	Level Crossing	Point	Type (manned/unmanned), Number of closures in 24 hours
8	Junction	Point	Name, Type (Roundabout /Signalized /Non- Signalized without Roundabout), number of Connecting roads(3/4/5 etc), Link to Traffic data
9	Parking Area	Polygon	Name/Identification, Ownership (Govt. Dept./Private Co.), storeys/Levels, Capacity, Status (existing/under-execution)
10	Truck Terminals	Polygon	Name/Identification, Ownership (Govt. Dept./Private Co.), Capacity, Status (existing/ under-execution), Executing Department
11	Bus Bays	Line	Name/Identification, Location, Ownership (Govt. Dept./Private Co.) Status (existing/under-execution), Executing Department
12	Truck Bays	Line	Name/Identification, Location, Ownership (Govt. Dept./Private Co.) Status (existing/under-execution), Executing Department




## V. Social Infrastructure

	Feature	Entity Type	Attributes
1	Fire Stations	Point	Identification, Location, Address, facility available, telephone number, Status (existing / under-execution), Executing Department
2	Hospital	Point	Name, Identification, Location
3	Heritage Area	Polygon	Name, description, infrastructure & facility for tourists

## Features To Be Included In Base Map

	Feature	Entity Type	Attributes
1	Urban area boundary, Municipal boundary, UIT boundary, Ward Boundary,	polygon	Ward number, area, population (2001)
2	Water body (river & lakes)	polygon	Name, area
3	Streams / Natural drain	lines	Name, type (clear/sewer)
4	Canal (irrigation)	lines	Name
5	Railway lines	Single Line	Name, type (gauge), Number of lines
5	Railway Station	point	Name
6	Hills / hillock / Rocky waste (from Land use map or general information)	polygon	Name (if any), area
7	Levels (from new survey)	point	Z value (in meters), if BM/triangulation point
8	Contours (generated from new survey)	line	Z value (in meters)
9	Forest or National park (from Land use map)	polygon	Name & status (RF/PF)
10	Habitation (from SRSAC map, may be updated from new satellite image)	polygon	Name
11	Landmarks (important building, structure, Petrol pump, bank, markets etc.)	point	Name, Description,
12	Police Station	point	Name, Description, Jurisdiction
13	Electrical Substation	polygon	Name, Description, Capacity, Input, Output
14	Parks & playgrounds	polygon	Name
15	Crematorium & Burial Grounds	polygon	Name, Description, Type
16	Existing Land use (from SRSAC map may be updated)	polygon	Class, Description
17	Proposed Land use (from UD Town Planning map)	polygon	Class, description
18	Bus terminals	polygon	Name, description

This circular is equally applicable to all members of PMU, IPIU, IPMC & DSC.

  
(Dr. R. Venkateswaran)  
Project Director

Dated: 04.2010

F3 (106) (32)/RUSDIP/PMU/CMS/2007/

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Copy to following for information and necessary action:

1. Addl. PD / FA/ Dy. PD (T)/ Dy. PD (Adm.)/SE (Co-ord)/ SE (WW)/ (WS) / (R&B)/ PO (all)/ Sr. AO / All APOs / AAO/ PA to PD PMU, RUIDP, Jaipur.
2. Executive Engineer, IPIU, RUSDIP (Concerned), Alwar, Baran, Barmer, Bharatpur, Bundi, Chittorgarh, Churu, Dhaulpur, Jaisalmer, Jhalawar-Jhalarapatan, Karauli, Nagaur, Rajsamand, Sawai Madhopur and Sikar.
3. Team Leader IPMC, CAPP, DSC-I, Bharatpur, DSC-II, Nagaur, DSC-III, Jhalawar, RUSDIP.
4. DSC-I, Alwar/ Dhaulpur/ Karauli/ Sawai Madhopur, DSC-II, Churu/ Jaisalmer/ Barmer/ Sikar and DSC-III, Chittorgarh/ / Rajsamand/ Bundi/ Baran, RUSDIP.
5. ACP, RUIDP, Jaipur to send by e-mail and put up the CMS Circular on the website.

  
Dy. Project Director (T)