

## Draft

### **Term of Reference For Preparation of Urban Area Geodatabase for Choudwar Town**

#### **1. Background**

With urban expansion and on-site sanitation facilities, FSM is getting more and more recognition. It is now being incorporated in city-wide planning in India where there is an incredible opportunity for scaling-up any successful interventions. This agenda is supported by the National Sanitation Urban Policy (NSUP) and the recently launched Swachh Bharat Mission (SBM – cf. Clean Cities Mission) which aim to trigger the scaling-up of city approaches to FSM all over India but which recognises there is a gap in providers and knowledge in the sector.

**Ruchika Social Service Organization (RSSO), Odisha** started its program in April 1985 for children in and around the railway station with a station platform education centre and gradually moved on to cover related facets like nutrition, medical and maternal care, hygiene, personal cleanliness, sponsorship of girls to the school, Vocational training to the unemployed disadvantaged slum youths, awareness of HIV/AIDS among the slum/street adolescents, providing 24 hrs telephonic outreach for children in distress and crisis, shelter for the homeless/orphan children, water and sanitation program for slum community etc. The ideology and overwhelming credo is "if the child cannot come to the school then the school must go to the child"

RSSO has signed MoU with Practical Action to implement the Swachh Samudai Project in Choudwar Municipality of Odisha State.

The project intends to prepare urban area geodatabase which are comprehensive and having integrated data sets through GIS application to develop city sanitation strategy/plan (CSP) and DPR for Choudwar Municipality so as to facilitate implementation of Swachh Samudai.

It is in this backdrop that Ruchika Social Service Organization, Bhubaneswar intends to develop GIS base maps for Municipality and hence has planned to hire a consultant.

#### **2. Project Introduction**

The Project envisages demonstration of sustainable sanitation service delivery for small towns leading to increased coverage of households through enabling institutional and financial arrangements and increased private sector participation. The project will aim to achieve the following objectives:

- Demonstrated State Government and Urban Local Body (ULB) commitment towards sanitation and water service delivery in small cities;
- Long-term sustained capacity development of states and cities for effective sanitation service delivery;
- Increased number of people in pilot cities has access to better sanitation and water services
- Improve city-wide planning approaches for water and sanitation
- Demonstrate FSM models for next phase of SBM(U)

Choudwar with about 70000 population in the block houses about 43000 people in the municipality alone (Census-2011) with a population density of 1466/Sq Km. Males constitute 54% of the population and females 46%. Choudwar has an average literacy rate of 77%, higher than the national average of 59.5%: male literacy is 83% and, female literacy is 71%. In Choudwar, 10% of the population is under 6 years of age.

The municipality has 30 wards in which 11 are industrial area wards. The unique identity of the town unlike any other coastal towns is the presence of more than 96% joint or extended families among all habitations. With an area of 35.82 sq KMs, the town has 81% pucca & 10% semi pucca houses. About 78% houses are owned by the inhabitants.

### 3. Objective of the Study

The objective of the assignment is to prepare Urban Area Geodatabase for Choudwar Municipality in Odisha using Geospatial technologies to assist the ULB in preparing GIS based City Sanitation Plan and to develop GIS based sanitation solutions.

### 4. Scope of Work

The selected Consultant will prepare Urban Area Geodatabase for Choudwar Municipality of Odisha” in 1:1000 scale using high resolution google satellite imagery and survey of all physical features of the town, collection and superimposition of town survey maps / cadastral maps, existing administrative boundaries, slum boundaries, infrastructure details, water bodies, landmarks and contours at 1.0 meter interval etc. The consultant shall be required to generate all the data sets as per the design standards of **National Urban Information System (NUIS)**. The consultant shall perform the following activities:

1. Preparation of Urban Area Geodatabase shall include the followings (as per the indicators placed in **Annexure**):
  - Review of existing situation, collection of all available data from ULB, in soft copy and or hard copy including municipal boundary, Town survey maps, Cadastral maps, ward boundary maps, slum related data , and Environment data.

- Land cover- All the geographical features categorised into- built mass, agricultural land, fallow land, forest area, grazing ground, water bodies, open green areas, roads etc.)
  - Land-use pattern- land use distribution (Residential, slum areas, commercial, institutional, industrial, recreational, health, religious, community spaces etc.), spatial growth patterns, urban sprawl, identification of core city/Central Business District (CBD).
  - Mapping of Industrial locations, classification of industries, indicative industrial waste disposal locations, Water Logging areas, Water bodies, Slums (Notified and Non-notified)
  - Location of markets
  - Housing-typology, slum housing
  - Roads, Traffic & Transportation-connectivity, road/rail network, Parking facilities, street infrastructure
  - Physical Infrastructure-Water Supply, Sewerage network, Storm Water Drainage, Solid Waste disposal/management, electricity, telecommunication, faecal disposal/management
  - Sanitation Hot spots- water logged area, area used for dumping of - industrial pollutants, solid waste, liquid waste, biomedical waste and open defecation locations etc.
  - Social Infrastructure-location of institution, education, health, religious, cultural and recreation activities, PDS, community facilities
  - Heritage conservation & tourism-location of heritage and tourism centres
  - Environmental sensitive areas (Green cover, Water Logging areas, water bodies, eco-zones)
2. Data evaluation: Source and reliability, positional accuracy, attribute authenticity; Data validation workshop with ULB authorities.
  3. Geo-referencing of satellite imagery using sufficient number of Ground Control Points (GCPs) (at least 1 GCP per sq. km) collected through Differential Global Positioning System (DGPS) survey;
  4. Design of proper grid and projection (UTM-WGS 84) for the whole town;
  5. Interpretation and digitization of all physical features from satellite imagery. The digitization process shall include vectorisation, symbolization, layering, edge matching, topological integrity, and data base linking;
  6. Geo-referencing and digitization of cadastral maps;
  7. Generation of contour overlay at 1.00 meter interval with construction of Permanent Benchmark (PBM) at 2 km interval;

8. Incorporation of ward, zone and municipal boundaries;
9. Database structure and design;
10. Integration of existing environmental, slum related and other data with base map. The preliminary interpreted map should be ground verified and the final map is to be prepared by incorporating the ground truth data;
11. GIS based physical and financial monitoring and evaluation of implementation scheme.
12. Selected agency would train the project staff for management of the GIS database.

## **5. Deliverables:**

The consultant would submit all deliverables to the client both in soft and hard version. Deliverables will be considered drafts upon initial receipt. Drafts will be reviewed and comments provided within one week of receipt, unless otherwise specified. The selected consultant shall appropriately address the client's concerns and provide final deliverables within one week of receiving client's response. All datasets will be shared with relevant stakeholders.

The desired deliverables under this contract are as shown below.

- **Deliverable- I: Submission of Inception Report**

This may include methodology for data collection, interpretation, team composition and time line for completion of the assignment.

- **Deliverable-II: Submission of Data and Geo-reference image**

The consultant is required to submit all the data collected from both the primary and secondary sources and geo-referenced google images in both soft and hard copies.

- **Delivery-III: Submission of digitised maps:**

The consultant is required to submit digitised maps including the cadastral maps collected from the Municipality both in soft and hard copies.

- **Deliverables-IV: Submission of draft base maps:**

1. Digital base map of all the thematic layers in 1:1000 scales in 2 sets in hard copy (A0 Paper) and one set in soft copy in GIS format.
2. Digital data of base map in DXF, SHP file format along with soft copy of base map to a scale of 1:5000 and 1:10000 (soft copy) for the total town area in DXF, SHP format which shall contain all the attributes as explained in the task.

- **Deliverable- V: Submission of Final Base maps:**

Based on inputs given by the Client, the consultant is required to modify the draft base map and submit the final one on 1:1000 in hard copy (Five sets of multi color plotted maps on A0 Paper) and one soft copy.

- **Deliverable- VI: Physical and financial monitoring plan.**

The consultant is required to develop a monitoring plan for tracking the physical and financial progress/targets of the project.

- **Deliverable-VII: Training to Project Staff**

The consultant is required to impart necessary training to the project staff for management of the GIS database.

## **6. Acceptance criteria/Performance Requirement**

The deliverables will be evaluated according to the following criteria:

- Thoroughness and timeliness of all the elements identified in the scope of work and tasks and the documented final agreement between the selected consultant and client. A detailed timeline for task completion and deliverables will be established when the Consultant begins the work.
- Quality and clarity of the analysis and work produced. More specifically, quality and clarity will be assessed against the following:
  - ✓ extent to which deliverables conform to the instructions and standards outlined in the scope of work and the relevant annexes,
  - ✓ depth and quality of analysis and effort,
  - ✓ quality and extent of communication between client and the selected consultant while the work was undertaken,
  - ✓ any other criteria agreed upon between the two parties at the start of the work period.

## **7. Responsibilities for the Consultant**

The consultant will work closely with policy and practice unit and Project Manager, Swachh Samudai Project. The selected Consultant will be responsible for the following:

- Designing, implementing, and managing the study
- Submit inception report before field works which will be the basis for whole study
- Developing and pre-testing survey instruments before the field work
- Logistics arrangements and expenses, i.e., transportation, accommodation, allowances, communications, and stationery
- Recruiting, training and supervising a suitable team of field workers, including interviewers and field supervisors.
- Developing an appropriate database for data entry
- Ensuring quality of field work/data collection and data entry

## 8. Responsibilities of RSSO

RSSO will be closely involved in reviewing, advising, and providing technical recommendations to the firm at each stages of the assignment and not limited to:

- Provide inputs on the methodology for finalization;
- Provide inputs on data tables and its design
- Monitor quality of the on-going work
- Provide inputs and comments on the base map prepared
- Connect the Consultant to various stakeholders at State and City levels

## 9. Consultant Qualifications

The selected Consultant must have a track record of at least 5years of experience in the relevant areas. The selected consultants' team must have experience on GIS based projects. Experience of working with ethnically diverse and managing urban population-based projects is essential.

Special attention would be given for the development of a detailed work plan including quick mobilization and transportation into the field of field staff, management and quality assurance of the study and complete CVs of the proposed staffing for key personnel.

Preference will be given to agencies that have successfully done similar kind of assignments

## 10. Expertise and Inputs

The professional requirements of personnel to be provided by the selected Consultant for the assignment are given in the following table detailing type of expertise, required skills and experience. The criteria are desirable and not restrictive, such as stating an exact degree might preclude other good candidates from the job. The bidder needs to provide the CVs of its proposed team in the prescribed format.

Sl. No.	Key Position	No. of Persons	Area of Specific Expertise desired	Minimum Qualifications and professional experience desired
1	Team Leader	1	Experience in Urban planning and related fields like GIS, Remote Sensing Utility maps etc. with leadership qualities to lead the team effectively is desirable.	Masters in Geography / Remote sensing / Geology / Urban planning with 10 years of experience
2	Urban Planner	2	Experience in Planning with GIS expertise,Preparation of Base Maps, Master Plans, Area Plans, Urban Town Planning schemes.	Masters in Urban Planning with 5 years of experience
3	GIS / Remote	2	Experience in managing or	A GIS Specialist having at

	Sensing Specialist		developing databases including data collection, entry and maintenance is desirable.	least 5 years of working experience in using latest GIS software's in developing city maps showing various functional attributes of city planning. The candidate should have a Bachelor's Degree in Geography, Cartography, Geodetic Science, and have direct experience of editing in ArcGIS and Geodatabase environment. Must be familiar with ArcObjects, and ArcSDE in a SQL Server environment.
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### 11. Duration of the assignment

The firm is expected to complete the work in 2 months from the date of receipt of the work order.

### 12. Payments schedule

Under this contract, the Consultant's payments will be deliverable based as per the following schedule:

S.No	Deliverable/Outputs	Timeline from the date of Contract	Payment Terms (% of Admissible Consultancy Fee)
1	Acceptance of Inception Report	07 days	10%
2	Submission of Data and Geo-reference image	25 days	20 %
3	Submission of digitised maps	40 days	20 %
4	Submission of draft Base maps:	50 days	20 %
5	Submission of Final Base maps	55 days	10%
6	Monitoring Plan	60 days	10%
7	Training to Project staff		10%

## Annexure

### List of Indicators:

Layer	Broad Head	Sub-Items
Layer 1	Boundaries	City Boundary
		Ward boundary
		Any other boundary (can you specify? Example-Property Zone boundary or any Tax zone (depends up availability)
Layer 2	Transport	Railway Line
		Roads (with different category including width, centre line and polygon)
		Bus stops, taxi stand, auto stand
		Other
Layer 3	Land Use Pattern	Residential - showing slum and non-slum area (in polygon)
		Commercial
		Agricultural
		Industrial
		Open Spaces - parks, playground
		Recreational
Layer 4	Slums (with boundaries)	Notified
		Non-notified
Layer 5	Economic Profile	Location of markets - (local shops, HAATs, weekly markets in polygon)
		Business centres/industries
		Malls / Restaurants / Marriage Halls / Kalyan Mandaps
Layer 6	Social Profile	Community halls
		Public gathering locations
Layer 7	Housing Typology (slums)	Pucca
		Semi-pucca
		Kutchra
Layer 8	Water Bodies (with Boundary)	Rivers
		Lakes
		Canals
		Ponds
Layer 9	Public Drinking Water Sources	Lakes, Rivers, Ponds
		Public/Community tap stands
		Bore-wells
		Public Open Wells
		Others
Layer 10	Water Supply Infrastructure	WTPs
		Pumping Station
		Overhead Tank
		Underground Reservoir
		Others
		existing Pipe Network



		Hand Pumps
		Public Stand Post
Layer 11	Public Toilets (point and polygon)	Municipal
		PPP
Layer 12	Community Toilets (point and polygon)	Municipal
		Other
Layer 13	Storm Water Drains	
	a. Categorization 1	Primary
		Secondary
		Tertiary
	b. Categorization 2	Pucca
		Kuccha
	c. Categorization 3	One-sided
		Two-sided
Layer 14	Sewerage Infrastructure	Sewage Treatment Plant (STP)
		Pumping Stations (Sewerage)
		Lifting Stations (Sewerage)
		Trunk Sewer
		Branch Sewer
Layer 15	Hotspots	Open Defecation
		Water Logged Areas (in polygon)
		River Flood Plains and Flood Prone Areas
		Solid Waste Dumping Sites
		Garbage Bins and Collection Points
		Faecal Sludge Dumping points
		Primary Storm Water Drains Blockage Sites
		Waste Entry Points to Water Bodies
		Storm water drains outfalls into water body, streams or canals
Layer 16	Solid Waste Management System	Municipal Garbages (Dustbin)
		Solid Waste Transit Station
		SWM Facility/ Plant (Solid waste dumpyard site)
		Bio-waste and Hazardous Waste Facility
		Landfill
		Others
Layer 17	Welfare Scheme Benefit Areas (Proposed and Implemented) not required	UIDSSMT
		RAY
		IHSDP
		ILCS
		Others
	Health Facilities	District Hospital
		Medical Colleges (private)
		Major Clinics
		Other Hospitals (Public)
		Other Hospitals including nursing homes(Private)

		Health Post, D Health Post, PHC (Urban)
		Dispensary (Public)
		MCWC/PPC/UFWC
		Anganwadi Centres
		Community Health Centres
Layer 19	Mapping Areas with major outbreaks in the last 5 years (where to show? Is in polygon or point format)	Water borne diseases (typhoid, any cholera case, major diarrhoea outbreak, dysentery etc)
		Vector borne diseases (malaria, dengue, chikungunya, JE)
Layer 20	Educational Institutions (in point and polygon)	Public Schools
		Private Schools
		Public Colleges
		Private Colleges
Layer 21	Public & Religious Institutions (in point and polygon)	Police Station, Fire Station, Municipal Office, Court, District headquarters, Jail, religious places, PHEO, Tehsil etc.
Layer 22	Market and commercial places	
Layer 23	Contour line	