Capacity Development of the National Capital Region Planning Board

TA No. 7055-IND

Package 2 : Component B

INCEPTION REPORT

October 2008
NCR Planning Board
Asian Development Bank

Capacity Development of the National Capital Region Planning Board (NCRPB) – Component B (TA No. 7055-IND)

INCEPTION REPORT

OCTOBER 2008

Wilbur Smith Associates Private Limited
### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>BPL</td>
<td>Below Poverty Line</td>
</tr>
<tr>
<td>BMTPC</td>
<td>Building Materials Technology Promotion Council</td>
</tr>
<tr>
<td>CRRI</td>
<td>Central Road Research Institute</td>
</tr>
<tr>
<td>CMA</td>
<td>Counter Magnet Areas</td>
</tr>
<tr>
<td>DPR</td>
<td>Detailed Project Report</td>
</tr>
<tr>
<td>DA</td>
<td>Development Authority</td>
</tr>
<tr>
<td>DFR</td>
<td>Draft Final Report</td>
</tr>
<tr>
<td>EIRR</td>
<td>Economic Internal Rate of Return</td>
</tr>
<tr>
<td>ENPV</td>
<td>Economic Net Present Value</td>
</tr>
<tr>
<td>EIL</td>
<td>Engineers India Limited</td>
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<tr>
<td>EAF</td>
<td>Environmental Assessment Framework.</td>
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<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>FIAp</td>
<td>Financial Implementation Action Plan</td>
</tr>
<tr>
<td>FIRR</td>
<td>Financial Internal Rate of Return</td>
</tr>
<tr>
<td>FGD</td>
<td>Focus Group Discussions</td>
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<tr>
<td>GoI</td>
<td>Government of India</td>
</tr>
<tr>
<td>HUDA</td>
<td>Hapur Urban Development Authority</td>
</tr>
<tr>
<td>HSICC</td>
<td>Hospital Services Consultancy Corporation</td>
</tr>
<tr>
<td>IA</td>
<td>Implementing Agencies</td>
</tr>
<tr>
<td>IDFC</td>
<td>Infrastructure Development Finance Corporation</td>
</tr>
<tr>
<td>IL&amp;FS</td>
<td>Infrastructure Leasing and Financial Services</td>
</tr>
<tr>
<td>IPDP</td>
<td>Indigenous People Development Plan</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>IEE</td>
<td>Initial Environmental Examination</td>
</tr>
<tr>
<td>IPT</td>
<td>Intermediate Public Transport</td>
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<tr>
<td>IRC</td>
<td>Indian Road Congress</td>
</tr>
<tr>
<td>LFS</td>
<td>Land Fill Site</td>
</tr>
<tr>
<td>MLD</td>
<td>Million Liters per Day</td>
</tr>
<tr>
<td>MORTH</td>
<td>Ministry of Road Transport and Highways</td>
</tr>
<tr>
<td>MOUD</td>
<td>Ministry of Urban Development</td>
</tr>
<tr>
<td>MFF</td>
<td>Multi-tranche Financing Facility</td>
</tr>
<tr>
<td>NBCC</td>
<td>National Building Construction Corporation</td>
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<tr>
<td>NCR</td>
<td>National Capital Region</td>
</tr>
<tr>
<td>NCRPB</td>
<td>National Capital Region Planning Board</td>
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<tr>
<td>NEERI</td>
<td>National Environment Engineering Research Institute</td>
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<tr>
<td>NH</td>
<td>National Highway</td>
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<tr>
<td>NHAI</td>
<td>National Highway Authority of India</td>
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<tr>
<td>NI</td>
<td>National Institutions</td>
</tr>
<tr>
<td>O &amp; M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>RF</td>
<td>Resettlement Framework</td>
</tr>
<tr>
<td>PSMG1</td>
<td>Project Sanctioning and Monitoring Group1</td>
</tr>
<tr>
<td>PHED</td>
<td>Public Health Engineering Department</td>
</tr>
<tr>
<td>PSP</td>
<td>Public Stand Post</td>
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<tr>
<td>QAP</td>
<td>Quality Assurance Plans</td>
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<tr>
<td>R &amp; R</td>
<td>Resettlement and Rehabilitations</td>
</tr>
<tr>
<td>RP</td>
<td>Resettlement Plan</td>
</tr>
<tr>
<td>ROB</td>
<td>Road Over Bridge</td>
</tr>
<tr>
<td>Rs.</td>
<td>Rupees</td>
</tr>
<tr>
<td>STP</td>
<td>Sewerage Treatment Plant</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>--------------------------------------</td>
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<tr>
<td>SIA</td>
<td>Social Impact Assessment</td>
</tr>
<tr>
<td>SWM</td>
<td>Solid Waste Management</td>
</tr>
<tr>
<td>SADA</td>
<td>Special Area Development Authority</td>
</tr>
<tr>
<td>SH</td>
<td>State Highway</td>
</tr>
<tr>
<td>SIEE</td>
<td>Summary Initial Environmental Examination</td>
</tr>
<tr>
<td>TA</td>
<td>Technical Assistance</td>
</tr>
<tr>
<td>TNUDF</td>
<td>Tamil Nadu Urban Development Fund</td>
</tr>
<tr>
<td>TOR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>ULB</td>
<td>Urban Local Body</td>
</tr>
<tr>
<td>UP</td>
<td>Uttar Pradesh</td>
</tr>
<tr>
<td>WAPCOS</td>
<td>Water and Power Consultancy Services</td>
</tr>
<tr>
<td>WTP</td>
<td>Water Treatment Plant</td>
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</tbody>
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I. INTRODUCTION

A. Overview

1. On Government of India’s request, Asian Development Bank (ADB) has formulated the technical assistance (TA) to enhance the capacities of National Capital Region Planning Board (NCRPB) and its associated implementing agencies. The TA has been designed in three components: Component A relates to improving the business processes in NCRPB; Component B relates to improving the capacity of the implementing agencies in project identification, feasibility studies and preparing detailed engineering design; and Component C relates to urban planning and other activities.

2. Asian Development Bank has selected Wilbur Smith Associates Private Limited to perform consultancy services envisaged under Component B. In the context of this contract, this inception report was prepared.

B. NCRPB and Implementing Agencies

3. The National Capital Region Planning Board (NCRPB), constituted in 1985 under the provisions of NCRPB Act, 1985, is a statutory body functioning under the Ministry of Urban Development, Government of India. NCRPB has a mandate to systematically develop the National Capital Region (NCR) of India. Lying between 27°03’-29°29’ North latitude and 76°07’-78°29’ East longitude, the NCR spreads over an area of 33,578 sq. km. The constituent areas of the National Capital Region are:

   (i) National Capital Territory Delhi (constitutes 4.4 percent of NCR area);
   (ii) Haryana Sub-region – Faridabad, Gurgaon, Rohtak, Sonepat, Rewari, Jhajjar, Mewat and Panipat districts of Haryana (40.0 percent of NCR area);
   (iii) Rajasthan Sub-region – Alwar district of Rajasthan (23.3 percent of NCR area);
   (iv) Uttar Pradesh Sub-region – Meerut, Ghaziabad, Gautam Buddha Nagar, Bulandshahr and Baghpat districts of UP (32.3 percent of NCR area)

4. **Counter Magnet Areas.** In addition to the NCR, the NCRPB has also selected, in consultation with the respective state governments, following Counter Magnet Areas (CMA), considering their location, population and potential growth for implementing development programs, in order to achieve the objectives of the regional plan: (i) Gwalior (Madhya Pradesh State); (ii) Patiala (Punjab); (iii) Hisar (Haryana); (iv) Kota (Rajasthan); and (v) Bareilly (Uttar Pradesh).

5. **Figure 1** shows location and jurisdiction map of NCRPB
6. **Area and Population.** According to Census 2001, the total population of NCR is 37.1 million, housing in a total area of 33,578 sq. km, with an average gross density of 1,104 persons per sq. km.

<table>
<thead>
<tr>
<th>Sub-region</th>
<th>Area (Sq. km)</th>
<th>%</th>
<th>Population (2001)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCT</td>
<td>1,483</td>
<td>4.42</td>
<td>13,850,507</td>
<td>37.33</td>
</tr>
<tr>
<td>Haryana</td>
<td>13,413</td>
<td>39.95</td>
<td>8,687,050</td>
<td>23.42</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>7,829</td>
<td>23.32</td>
<td>2,992,592</td>
<td>8.07</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>10,853</td>
<td>32.32</td>
<td>11,570,117</td>
<td>31.19</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>33,578</strong></td>
<td><strong>100.00</strong></td>
<td><strong>37,100,266</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Source: Regional Plan 2021
NCT – National Capital Territory

7. **NCRPB Act, 1985** stipulates various functions of the Board as under:

(i) Preparation of the Regional Plan and Functional Plans;
(ii) Arrange for the preparation of Sub-regional Plans and Project Plans by each of the participating States and National Capital Territory (NCT);
(iii) Coordinate enforcement and implementation of the Regional Plan, Functional Plans, Sub-regional Plans, and Project Plans through the participating states and NCT;
(iv) Ensure proper and systematic programming by the participating states and the NCT in project formulation, determination of priorities in NCR or Sub-regions and phasing of the development of NCR in accordance with the stages indicated in regional plan; and,
(v) Arrange and oversee the financing of selected development project in the NCR through Central and State Plan funds and other sources of revenue.

8. **NCRPB** has prepared regional plan for NCR area with the perspective year 2021. Further, the Board also initiated preparation of functional plans to elaborate one or more elements of the Regional Plan. Accordingly the study groups have been constituted for preparation of functional plans of drainage and power. Consultancy services have been awarded for water and transportation which would assist in preparation of functional plan for these sectors.
9. The NCRPB Act also defines the roles of State Governments/State NCR Cell, which includes the following:

   (i) Preparation of the Sub-regional Plan and Master Plans;
   (ii) Ensure/coordinate preparation of District Plans as per the provisions of Regional Plan;
   (iii) Ensure preparation of Master Plans for water, sewerage, solid waste management and drainage for all the towns in the sub-regions;
   (iv) Project Planning and Monitoring of NCRPB funded projects;
   (v) Ensure implementation of Regional Plan policies and proposals;
   (vi) Ensure preparation of Sub-component plans for various sectors
   (vii) Ensure preparation and implementation of Rural Development Plans;
   (viii) Creation of database, creation of Policy and Planning Group etc.

10. As it is stated above, each participating State is required to prepare a sub-regional plan for the sub-region within the state. On request of Rajasthan and Haryana states the Project Sanctioning & Monitoring Group (PSMG) has allowed these states to outsource preparation of sub regional plan. No sub regional plan has been completed till date.

11. The role of state departments, ULBs and agencies, which are primarily responsible for provision of basic services, include:

   (i) To get the District Plans prepared in consonance with the Regional Plan and Sub-regional Plans;
   (ii) To ensure preparation of Master Plans for all towns
   (iii) Prepare Master Plans for water supply, sewerage and solid waste management at town level;
   (iv) To prepare projects and proposals and implement the same.

C. Project Financing by NCRPB

12. As defined by the NCRPB Act, one of the functions of the Board is to arrange and oversee the financing of selected development projects in the NCR through Central and State Plan funds and other sources of revenue. For this purpose NCRPB Fund has been created. Board may finance development projects implemented in national capital region (NCR) and counter magnet areas (CMAs), which are identified by Board, participating state governments and their implementing agencies including Urban Local Bodies (ULBs), Development Authorities (DAs), Housing Boards, Industrial Development Corporations or other agencies of the State governments. NCRPB gives significant emphasis for building water supply and sanitation infrastructure. The Board provides loan for a project up to 75 percent of the estimated cost and the balance needs to be contributed by the State Government and their Implementing Agency.
13. Depending on the availability of resources, the following types of projects are considered for financing by the Board:

(i) Land acquisition and development for social and physical infrastructure projects for industrial, institutional, residential and commercial uses;

(ii) Upgrading and augmentation of existing infrastructure like water supply, sewerage, sewage disposal, drainage, solid waste management, power supply, expressways, railways, regional/sub-regional/master plan roads & bridges, milk dairies, fire services, parks & playgrounds, stadiums, etc;

(iii) Development of art & cultural centers having facilities like theatres, auditorium, conference/exhibition halls, handicraft/haat bazaars, etc;

(iv) Infrastructure and other development projects in the Counter Magnet Areas;

(v) Pilot projects on rural development;

(vi) Development of new townships; and

(vii) Such other projects with the approval of the Project Sanctioning and Monitoring Groups which are in conformity with the objectives of the Regional Plan

14. NCRPB has been providing financial assistance to the participating state governments, ULBs, and other IAs in the NCR and in counter magnet towns. Till March 2008, NCRPB has financed 214 infrastructure projects involving total project outlays exceeding Rs. 139 billion. It has sanctioned loans amounting to Rs. 53 billion and disbursed Rs. 33.3 billion (Source: Annual Report 2007-2008, NCRPB). Type of projects funded and total project outlay is presented in the following figures.

Figure 2: Number of Projects Financed by NCRPB

Figure 3: Project Funding in Rupees Million
15. **Project Implementation Cycle of NCRPB.**

(i) **Project proposal for funding.** Implementing agencies (IAs) prepare the Detailed Project Reports (DPRs) as per standard format prescribed and submit to NCRPB through concerned department of state government/state NCR cell for approval of loan.

(ii) **Appraisal.** Preliminary examination of proposal is done with respect to, (i) availability of funds, (ii) conformity to Regional Plan/Functional plan/Master Plan and (iii) importance and priority of work. Thereafter a detailed examination about technical feasibility, cost reasonability, financial viability and good engineering design etc is done by one of the following National Institutions (NIs) empanelled by NCRPB on annual contract basis for appraisal.

- National Building Construction Corporation (NBCC): Land Development, Social Infrastructure, IT Parks, Informal Sector
- BMTPC: Land Development, Social Infrastructure
- HSCC: Land Development, Social Infrastructure
- Central Road Research Institute (CRRI): Transport

NIs review DPR, may make site visits if necessary and interacts with IA through NCRPB and ensure necessary modifications are effected by IA and then prepare and submit appraisal report. NCRPB will review appraisal report and comment if any and then NI will prepare final appraisal report.

(iii) **Approval.** Project Sanctioning and Monitoring Group1 (PSMG1) under the chairmanship of Secretary Ministry of Urban Development (MOUD) GoI will consider loan proposal and has authority to sanction loans more than Rs. 50 million. PSMG2 under the chairmanship of Member Secretary NCRPB has authority to sanction loans up to Rs. 50 million. NCRPB gives loan up to a maximum of 75 percent of project cost and balance cost is shared by state/IA.

(iv) **Disbursement and Project Implementation Monitoring.** After approval of loan by PSMG, administrative and financial sanction is issued along with terms and conditions and the loan agreement is signed. Thereafter the first installment of loan as per cash flow requirement approved under DPR is released. After utilization of amount, IA submits utilization certificate of loan amount and utilization of own share amount and make request for second installment. NCRPB deputes a team for physical verification of works and second installment is released on basis of verification report. On completion of work final utilization certificate (UC) is submitted along with detail of physical infrastructure created. Monitoring of works is done through monthly and quarterly progress reports in prescribed formats and in PSMG meetings.
(v) **Loan repayment.** Loan repayment period is generally 10 years with a 2 year moratorium on principal amount. Incentive in interest rate, maximum of 1.5 percent is given based on different performance indicators. Each loan installment is treated as separate loan and separate loan folio is maintained. Annual repayment schedule is prepared by NCRPB at beginning of financial year and conveyed to state/IA.

D. **About this TA**

1. **TA Objectives**

16. The objective of this technical assistance (TA) is to strengthen the capacity at NCRPB, state-level NCR cells, and other implementing agencies in the area of planning for urban infrastructure and to impart necessary skills to conceive, design, develop, appraise and implement good quality infrastructure projects for planned development of NCR. The increased institutional capacity of the NCRPB and the implementing agencies will lead to effective and time scaling-up of urban infrastructure to (i) improve quality of basic urban services in the NCR; (ii) develop counter magnet towns; (iii) reduce in migration into Delhi and orderly development of NCR; and (iv) accelerate economic growth in the NCR.

17. This TA is designed in three components: A, B and C. Component B focuses on strengthening the capacities of NCRPB and implementing agencies relating to project feasibility studies and preparation, and detailed engineering design in the implementing agencies. Specifically this component B of the TA will support the project preparation efforts of the implementing agencies by preparing demonstration feasibility studies that include all due diligence documentation required for processing of the project in accordance with best practices, including ADB’s policies and guidelines.

2. **Scope of Work**

18. According to the terms of reference (TOR), the following activities are envisaged in component B of the TA:

(i) Conduct technical, institutional, economic and financial feasibility analysis of identified subprojects in the six sample implementing agencies;

(ii) Conduct safeguards due diligence on the subprojects, including environmental assessment report and resettlement plan for all subprojects covered in the sample implementing agencies;

(iii) Prepare environmental assessment framework and resettlement framework; and

(iv) Develop a capacity building and policy reform program for the implementing agencies, including governance strengthening, institutional development and financial management.
19. Besides, this component of the TA will also:

(i) help in assessing the current practices and procedures of project identification and preparation of detailed project reports including technical, financial, economic and social safeguard due diligence;

(ii) support preparation of standard procedure manuals for project identification and preparation of detailed project reports including technical, financial, economic and social safeguard due diligence;

(iii) train the implementing agencies in the preparation of detailed project reports by using the sample subprojects, reports on deficiency of current practices and standard protocol manuals; and

(iv) help in developing a user-friendly web-page where different manuals and guidelines for preparation of DPRs will be made available for the implementing agencies.

3. Outputs

20. This component of the TA will produce the following outputs:

(i) Detailed Feasibility Study Reports of identified subprojects including all due diligence documentation required for processing of projects;

(ii) Technical Appraisal Report on current practices and procedures of implementing agencies in project identification and preparation

(iii) Standard Procedure Manuals for project identification and preparation including economic and financial due diligence;

(iv) Environmental Assessment Framework (EAF) and Resettlement Framework (RF)
II. APPROACH

A. Overview

21. Aiming at the strengthening and capacity building of NCRPB, state-level NCR Cells and other implementing agencies in the area of planning for urban infrastructure, this TA will prepare feasibility studies for the identified sample subprojects in six implementing agencies including all due diligence documentation required for processing under different sectors in accordance with best practices, including ADB’s polices and guidelines.

22. During the inception stage, WSA Team held discussions with the NCRPB officials and implementing agencies that have shown interest in taking up sample subprojects in their respective jurisdictions. The Team has reviewed some of the available Detailed Project Reports submitted by Implementation Agencies to NCRPB to understand the current project preparatory activities. The Team also discussed with concerned officials of the NCRPB to understand the project implementation cycle in place at NCRPB—receiving project proposals, appraisal, loan sanctioning and funding, monitoring of implementation and recovery mechanism.

23. This Inception Report is the first report/deliverable under the TA Component B, and was prepared between September 15, 2008 and October 15, 2008. During this stage, ADB in consultation with ADB has identified and finalized the sample implementing agencies and subprojects for preparation under this TA. This section on the Approach and the next section on the Methodology is to be reviewed in conjunction with Appendix 1 – Work Schedule and Appendix 2 – Staffing Schedule attached to this report.

B. Approach to the TA

24. The WSA Team will draw extensively from its ongoing projects – preparation and implementation, for multilateral developmental banks and line utilities to meet the objectives of the Component B (TA 7055-IND). The WSA Team comprises of members with extensive experience in project preparation and implementation and also has profound knowledge of ADB’s guidelines having worked on the first set of ADB projects in the country and more recently in developing multi-tranche financing facility (MFF) based projects.

25. WSA Team’s approach to the assignment is premised on comprehensive project preparatory method:

```
Service Area ➔ Sector & Investments
  ➔ Subproject Alternatives
  ➔ Subproject & Components
                Sector-Level
                Feasibility Studies
                Detailed Studies
```
26. The TA envisages demonstration feasibility and detailed studies in sectors of water supply, sewerage, storm water drainage, solid waste management and roads and transportation sectors. In its comprehensive approach the Team will first focus on sector level analysis limiting to the service area (city/development authority area), appraising the existing system performance and identifying the problems, projecting the future demands and improvements/augmentations required to achieve the acceptable levels. Subsequently, the Team will identify subproject and components for detailed studies. Detailed surveys and investigation necessary for detailed studies will be conducted. All the required due diligence documents for the processing of subprojects will be prepared. Also as part of capacity building task, standard procedures, manuals will be prepared along with carrying out of training activities.

27. During the initial stages of TA, as envisaged by ADB/NCRPB, the WSA Team will also discuss with financial institutions involved in urban infrastructure financing like Infrastructure Leasing and Financial Services (IL&FS), Infrastructure Development Finance Corporation (IDFC) and Tamil Nadu Urban Development Fund (TNUDF) to understand their requirements of feasibility/detailed studies for project financing.

C. Project Appreciation

1. Identification of Sample Subprojects

28. NCRPB has requested its Implementing Agencies to identify cities/projects for which sample project reports are to be prepared by TA consultants under component B. Subsequently, the NCRPB/ADB has finalized the following subprojects and components for preparation under the present TA.

Table 2: Identified Sample Subprojects

<table>
<thead>
<tr>
<th>S. No</th>
<th>Implementing Agency</th>
<th>Town</th>
<th>Subprojects &amp; components</th>
</tr>
</thead>
</table>
| 1     | Public Health Engineering Department, Haryana | Panipat | Water supply  
|       |                     |      |   o Trunk mains  
|       |                     |      |   o Water Treatment Plant |
| 2     | Gaziabad Development Authority/Gaziabad Municipal Corporation | Gaziabad | Solid Waste Management  
|       |                     |      |   o Collection  
|       |                     |      |   o Transportation  
|       |                     |      |   o Sanitary Landfill  
|       |                     |      |   Storm Water Drainage  
|       |                     |      |   o Major drains  
|       |                     |      |   o Minor drains  
|       |                     |      |   Transportation  
|       |                     |      |   o Bus terminal  
|       |                     |      |   o Parking  
|       |                     |      |   o ROB  
|       |                     |      |   o Road widening |
| 3     | Hapur-Pilkhua Development Authority | Hapur | Sewerage system  
|       |                     |      |   o Trunk mains  
|       |                     |      |   o Sewage Treatment Plant |

29. A brief discussion on the sample subprojects is provided in the next section. It may be noted that as this is mainly based on the visits and available data at the time of preparing this report, the depth of data and analysis presented under each subproject vary from one subproject to another.
2. **Sample Subproject Town - Panipat**

30. **Water Supply.** Population of Panipat is 3.54 lakhs as per 2001 census. PWD (Public Health) is responsible for providing water supply and sewerage facilities in all urban areas and water supply services in rural areas. Water supply in sectors developed by HUDA is provided by HUDA. The water supply is ground water based and there are 114 tube wells with PWD PH and 45 tube wells with HUDA for providing water supply. Discharge of tube wells vary from 300 to 800 LPM. The Static Water Level (SWL) in TWs was about 20m about 5 years back but it has now gone down to about 40m. This indicates a sharp depletion in ground water table during last 5 years implying heavy overdraft of ground water. Water from the tube wells is generally pumped direct into the distribution system except for the old town area, where water is collected in an underground tank and then pumped to distribution network. Water supply in the outer area is reported to be for 8-10 hours daily with pressures adequate to reach first floor and reported to be satisfactory. However, in the main town area, water is supplied once in a day for 2 hours only and there are low pressure and inadequate supply problems. Disinfection of water is done by online equipment using some imported chemical. The tube wells are reported to be operated 10 hours daily on an average. The average power availability was informed to be around 16 to 20 hours daily. However, during peak season, the power availability reduces to 12 hours in a day.

31. There are about 200 dyeing and printing units in the town located in different parts. While these units are the back bone of local economy, they are also the major source of ground water pollution. None of these textile units treat its waste water before releasing into the municipal sewer or discharging in open or in some cases injecting into the ground through bore wells.

32. PWD PH officials informed that looking to sharp depletion in water table and reduction in discharge of tube wells during last 5 years, there is strong demand of public for providing canal water. Main canal is passing just one KM from the town. This canal is reported to be flowing round the year and adequate water is available in the canal.

33. There are only flat rate connections in the town numbering about 27,000. There are large numbers of illegal connections in the town. They have recently started giving metered connections for commercial and Industrial consumers. The tariff for domestic flat rate consumers is Rs.25 per month for one tap connections and Rs.48 per month for connections having more than one tap in the house. A surcharge of 10 percent is levied annually for unpaid amount. The bills are sent either 6 monthly or on yearly basis.

34. The town has sewerage system, which was provided mostly under Yamuna Action Plan. Around 70 percent area of the town has sewerage network. There are two USB Sewage Treatment Plants, one of 10 MLD and another of 35 MLD capacity and both are working. The effluent of the STPs is discharged into the stream and used by farmers. These STPS also caters to the sewage being discharged by HUDA residential and industrial areas and also sewage generated by individuals and small industries from the ground water directly drawn by them through private tube wells. These results in STPs receiving more sewage than their designed capacity and are thus over loaded. The department is therefore
upgrading the capacity of existing STPs from existing 45 MLD to 70 MLD to meet with the immediate requirements. In addition, 2 more STPs are proposed to be constructed under JBIC assistance to take care of future requirements.

35. The area under HUDA is not fully developed and presently only have a population of around 0.1 million against proposed population of 0.3 million. There are 8000 water connections in HUDA colonies. HUDA operates, maintains water supply and sewerage systems in its area and also collects revenue. Presently they are charging Rs. 4 per KL of water consumed. All connections are metered. They are developing some sectors for accommodating about 500 textile dyeing units. HUDA area is fully sewered and sewage is taken to STPs of PWD PH department for treatment and final disposal. They are also in the process of providing raw canal water to industries for which 800mm pipe line has been laid from the canal. HUDA officials also informed that Panipat water supply cannot be sustained on ground water and that HUDA may also be willing to join the proposed canal project and that their water requirement may be taken as 42 MLD.

3. **Sample Subproject Town - Gaziabad**

36. **Solid Waste Management.** As per census 2001, population of Gaziabad-Loni complex is 10.89 lakhs. Gaziabad Municipal Corporation (GMC) is responsible for solid waste management in Gaziabad City. The operations are supervised by Senior Health Officer and Medical Health Officer. Master Plan of Gaziabad has identified ten sites for STP/LFS/WTP and defined land use accordingly. However, GMC has not been able to acquire land for LFS and efforts done in past have not been successful. Detailed planning and design of SWM system is possible if land location for LFS is known.

4. **Sample Subproject Town – Hapur**

37. **Sewerage.** As per census 2001, population of Hapur-Pilkhua complex is 2.12 lakhs. Sewerage system in Hapur was laid about 30 years back. It covers about 20 percent of the area and mainly available in the old city. Main sewer line has been laid along Bulandsahar road and branch sewer line exists on Station Road, Garh Road and Circular Road. Length of sewer lines is 4.6 KM. Earlier two flushing pumping stations were provided but now these are not functional. One Sewage Pumping Station at discharge point of outfall sewer has been provided. Sewage treatment plant is not available. Sewage was used to be pumped to the fields for agricultural use. Now due to urbanization the agricultural use no more exists and no takers for sewage. UP Jal Nigam responsible for capital works has prepared DPR for sewerage to cover remaining part of city. Municipal Corporation is responsible for operation and maintenance of sewerage system.
III. METHODOLOGY

A. Activity 1: Mobilization and Inception

**Background:** The activity on Inception and Mobilization comprises the WSA Team’s assignment preparatory tasks and focusing on mobilizing team members and finalizing the Work Plan for assignment implementation. During this period, the team held regular interactions with the NCRPB officials, and made reconnaissance visits to the likely sample towns as identified by NCRPB. During the visits, the Team held discussions with the concerned officials of the Implementing Agencies (IAs) to understand the proposed subprojects.

38. *Mobilization and Office Set-up (ID2).* This task covers establishment of the office for TA operations – the TA office is housed within the NCRPB office at Delhi. Further to the Notice to Proceed from the Asian Development Bank for this assignment, the following team members were mobilized on September 15, 2008 as scheduled:

- N S Shekhawat – Team Leader and Water Supply Specialist
- M Boominathan – Deputy Team Leader and Economist/Financial Expert
- Harsh Vardhan Sharma – Drainage Specialist

Subsequently, the following team members were mobilized during last week of September and first week of October:

- Achyutha Rao Aleti – Environmental Specialist (September 22, 2008)
- M N Sheshadri – Transport Specialist (October 7, 2008)
- Arup Khan – Social Development and R & R Specialist (October 18, 2008)

TA team requests for close association of NCR cell of concerned state and the participation of implementing agency in preparation of project reports. Roles and responsibilities of IA/State NCR cell/TA team/counterpart staff shall be determined. Counterpart staff made available shall be fully involved in preparation of project reports, such that afterwards project reports can be prepared by them independently.

39. *Collate of Data and Conduct Reconnaissance Survey (ID3).* The Team held detailed discussion with concerned officials of the NCRPB in order to identify sample subprojects to be prepared under this TA component. Prior to mobilization of TA Team, the NCRPB, showing its keen interest in this TA implementation, had already requested its Implementing Agencies to express interest in participating in the TA actively and identify sample subprojects for preparation under the TA. Accordingly, the team has made reconnaissance survey of identified ULBs (Gaziabad, Hapur, Panipat, Rohtak and Jajjar)
along with officials of NCRPB, and held discussions with concerned officials of the IAs to understand the proposed subprojects, assess present status of infrastructure, understand deficiencies, needs and institutional arrangements etc (List of persons met during the Inception stage is presented in Appendix 3). The team has collected and reviewed the following documents available with NCRPB and IAs: Regional Plan 2021 of NCR (published September 2005), NCR Directory, (published July 2000), Hapur Master Plan 2005, DPR Sewerage Gwalior, DPR of four laning Gurgaon-Nuh Road. The subprojects to be taken up for preparation under this TA were finalized during the inception stage in discussion with NCRPB and ADB. The Team also held detailed discussions with the NCRPB officials about the current project implementation cycle followed at NCRPB, and also collected information of type of projects funded by NCRPB to understand the scope of its operations.

40. **Finalize Methodology and Work Plan (ID4).** The methodology and work plan for implementation of the TA assignment is updated and finalized based on the discussions with the NCRPB and likely sample IAs, and reconnaissance visits of project towns and tentative subprojects to be prepared under the TA.

41. **Finalize Sample Subprojects (ID5).** During the inception stage, the subprojects to be considered for preparation under this TA component will be finalized.

**Outputs:** The task on Inception and Mobilization will result in an **Inception Report** indicating approach, methodology, detailed work plan and staffing schedule for implementation of the TA. The work plan will detail out all activities with timelines for each task with defined outputs and deliverables.

**Staff Involved:** All Team Members

**B. Activity 2: Sector Review and Assessment**

**Background.** This activity on Sector Review and Analysis will conduct a sector specific analysis of each infrastructure component in respective towns identified under the assignment, i.e. water supply, sewerage, storm water drainage and solid waste management. The strategic development objective of urban infrastructure projects is to provide adequate environmental and institutional conditions that will permit and encourage sustainable economic growth and targeted development in the cities, and thereby contribute to the reduction of urban poverty. Sector review starts from the review and assessment of the sector in which the subprojects to be identified, with a macro level approach and further leads to the area where the potential subprojects to be identified. It then includes technical choices, in the selection of standards and alternative technology options – and a weighing-up of what is affordable. In addition - and possibly more importantly - it covers policy choices on the type and level of urban services and the management of such services. The section further formulates recommendations on principles of implementing, managing and financing these services by subprojects at pre-feasibility level. This activity is organized into following seven tasks:
42. **Define Service Area and Characteristics (ID7).** Subsequent to the finalization of towns/samplesubprojects for preparation under the TA, service areas for each component will be delineated in discussion with NCRPB and implementing agencies. This will be done in line with the approved plans (Regional Plan, Master Plans etc). Depending on the current population and growth prospects as defined by the Master Plan, the service area would be delineated. Focusing on the sector(s) under consideration in each of the sample towns, necessary data and information on demography, social and economic development, and spatial growth pattern will be collated from secondary sources.

43. **Conduct Socio Economic Baseline Survey (ID8).** Public participation and acceptability is of basic requirement in successful implementation of urban infrastructure projects, especially where cost recovery is involved. Stakeholders concern would be integrated into the project preparatory study, by various methods, important of which is the household socio-economic survey. A household survey will be conducted covering demographic, socio-economic, health characteristics, to be disaggregated by income group, ethnic group, and gender, to serve as the baseline for poverty and social monitoring. The survey will also identify households’ access to services, coping strategies adopted by households to overcome the shortfall in public basic services, and determine the affordability and willingness to pay (WTP) for improved services. The survey sample will adopt a stratified sampling process to cover the population cross-section and the sample size would be selected appropriately. The sample will cover all income levels including the poor/below poverty line (BPL) households. Focus Group Discussions (FGDs) will strengthen the infrastructure service assessment and identify tariff structures based on affordability/willingness to pay (WTP) analysis. The survey questionnaire is appropriately designed to capture household responses for inputs to the economic analysis (questionnaire is appended at Appendix 4).

44. **Collate Data/Maps and Conduct Surveys (ID9).** Initially the Team will gather all available information on existing system components and institutional aspects, and also reviews available plans and proposals prepared for the sector in the respective town. Team will collate this data/information mainly based on (i) secondary sources of data and information, and (ii) visits to the infrastructure facilities; and (ii) detailed discussions with the technical staff. Necessary surveys as required for sector-level analysis will also be conducted as part of this task (these surveys may include water and waste water quality surveys, solid waste quantification and characterization studies etc). Sector-wise data requirement is as follows:

(i) **Water Supply.** Information on existing water supply system such as source, treatment plants, reservoirs, pumping stations and pipe lines shall be taken from IA. The details of existing pipes such as alignment, size, condition, type of material, life etc of pipe line are not available with IA and as such lot of efforts will be required by IA to compile this information. In case information of all pipe lines is not available then at least information about all rising mains and higher size distribution pipes shall be taken. All other relevant information such as area covered with water supply, water production, hours of water supply, water quality in source and at consumer end, problems in water supply, O & M systems, chlorination, expenditure on O & M on power, staff, chemicals, repairs, number of connections, losses in system, revenue etc shall be collected.
(ii) **Sewerage.** Information on existing sewerage system such as sewage treatment plants, sewage pumping stations and sewer lines shall be collected from IA. The details of existing sewer lines such as alignment, size, condition, type of material, invert levels, location and size of man holes etc are generally not available with IA and as such lot of efforts will be required by IA to compile this information. In case information of all sewer lines is not available then at least information about trunk sewers, branch sewers and outfall sewers shall be taken. All other relevant information such as area covered with sewerage system, problems in sewerage system, O & M systems, expenditure on O & M on power, staff, repairs, number of sewer connections, revenue etc shall be collected.

(iii) **Drainage.** Information on existing drainage system such as existing drains, alignment size, condition etc shall be taken from IA. Problems in drainage system, O & M systems, expenditure on O & M on staff, repairs etc shall be collected. Rainfall data (daily, yearly, intensity of rainfall, etc) shall be collected. Condition assessment of drains shall be done visually. Extent and coverage, type of drains, encroachments of drains shall be reviewed.

(iv) **Solid Waste Management.** For SWM sector the following data/information will be collected from IA (ULB) regarding solid waste management: total waste generation quantity, waste sources and quantity from each source, collection system – bins and door-to-door collection system, temporary storage and collection (type and equipments), transportation (type and equipments), and disposal sites and methods. Besides, the information on biomedical waste will also be collated. Institutional setup in the ULB of Solid Waste Management, staff availability and expenditure on SWM will be collated.

45. **Evaluate Sector Performance and Deficiencies (ID10).** The system deficiency analysis will mainly be based on the comparison with the best practices, applicable standards and mandatory requirements. The deficiency analysis would also consider respective infrastructure elements that are built but not commissioned due to various reasons. This review will also include city development and growth management based on the approved Master Plans, which will form a base for future development of infrastructure. During the review and assessment, the Team will identify “service-level indicators” for each sector under consideration to determine the system operations and performance efficiency. Design standards adopted, practices followed, institutional capacity, institutional arrangement, operation and maintenance systems, expenditures and recoveries, metering, etc shall be studied. A brief of sector-wise focus of the analysis is presented below:

(i) **Water Supply.** Existing water supply system in the select town shall be evaluated in respect of service access including pro poor, service reliability, service efficiency and service fiscals. Energy consumption shall be evaluated and reasons of more consumption shall be found out. Depending on availability of information major water losses and major source of non revenue water shall be found out. Rising main pipe line system shall be evaluated with respect to size. Capacity of reservoirs, source and treatment plant shall be evaluated with respect to requirement.
Distribution pipe length versus total road length shall be compared. Based on the availability of maps and data, a computer based water distribution network analysis will be conducted using Water CAD software. Quality of O & M, quality of mechanical & electrical equipment and quality of new constructions shall be adjudged. Service standards shall be compared with those stipulated in NCR regional plan. System deficiencies shall be identified considering present demand and projected demand.

(ii) **Sewerage.** Existing sewerage system in the select town shall be evaluated in respect of service access including pro poor, service reliability, service efficiency etc. Energy consumption in sewage treatment plant and sewage pumping stations shall be evaluated and reasons of more consumption shall be found out. Performance of sewage treatment plant shall be evaluated. Quality of O & M, quality of mechanical & electrical equipment and quality of new constructions shall be adjudged. Service standards shall be compared with those stipulated in NCR regional plan. System deficiencies shall be identified.

(iii) **Storm Water Drainage.** Existing drainage system in the select town shall be evaluated in respect of service access including pro poor, service reliability. Quality of maintenance and quality of new constructions shall be adjudged. System deficiencies shall be identified.

(iv) **Solid Waste Management.** Existing solid waste management system in the town shall be evaluated with respect to the collection system followed, coverage, collection efficiency, transportation method and disposal practices and availability of facilities. The system’s consistency with the applicable laws like Solid Waste Management Rules, 2000 will be reviewed.

46. **Review Institutional and Regulatory Framework (ID11).** The Team will hold discussions with various stakeholders at the local-government level and at the state-government level (line departments) to determine the approach and broad institutional responsibilities in service provision in a particular sector. In addition, the institutional set-up of the concerned Implementing Agency and its relationship with other State Line Departments and Parastatals will be ascertained. The Team will also review various policies including that related to empowerment of urban local bodies through decentralisation of powers to develop and maintain basic urban services. The existing government policies (both state and centre) and further related legalisations in place, standing guidelines that together govern the service delivery parameters / design parameters will be considered. This will help to understand the existing and required levels in the service delivery of a particular sector and the deficiency areas with regard to the existing policy/guidelines. Broad areas of economic policies relevant to the sector like user charges for the sustainability of the systems will be reviewed.

47. **Project Future Demand and Develop Infrastructure Plans (ID12).** Besides evaluation of existing system performance and identification of deficiencies in the current service levels in the previous tasks, this task will conduct demand analysis for particular infrastructure considering the future population and as well as spatial growth of the town. NCR Regional
Plan 2021 has projected population for years of 2011 and 2021 and therefore same will be adopted in demand estimations. However many elements for urban infrastructure systems will be required to be designed for 30 year design horizon. The team will work closely with the NCRPB planning officials to develop appropriate population projections for the 30 year horizon period. Based on the project population and considering the standard and best practices for infrastructure service provision demand will be estimated, and augmentation required for each sector will be analysed. In assessing the demand for the urban infrastructure services for the identified horizon year in subproject towns, following will be considered:

- Present policy that governs the specific service delivery and the implementing agency including its delivery system;
- Design criteria / service delivery target parameters;
- Future demand in conformity to the urban strategy and approved Regional Plans/Master Plans;
- Existing service levels and adequacy, key issues and additional needs to achieve the service delivery level targets/objectives;
- Compatibility with committed or on-going augmentation/improvement projects;
- Stakeholders demand for infrastructure

The above analysis will identify subprojects, and based on the priority the subprojects with their broad cost implications will be phased and investment requirements will be estimated over planning horizon year. The TA team will identify items and components for immediate needs i.e. items which are to be taken up in first phase as per the available financial resources, feasibility, acceptability, land availability etc. Components required in second phase and in third phase if any would also be identified. It will be ensured that immediate investment proposed under first phase integrates with the comprehensive proposals at the macro level for the whole town.

48. **Finalize Subproject for Detailed Studies (ID13).** From the above list of subproject identified to improve the service levels to an acceptable level by the design horizon year, the team will select and finalize a subproject for detailed studies to be conducted in the next phase. This selection of subproject will be done based on a number of parameters, which will inter alia include the following:

a) **Technical Criteria**
   - Priority to improve the service levels or maintain acceptable service levels
   - Will help in achieving the overall sector goals

b) **Social and Poverty Criteria**
   
   **Overall Social Criteria**
   - Project meets GoI / participating State/ADB/NCRPB social policy objectives;
   - Project is affordable / accessible by the poor; and
   - Project meets expressed needs of community.
   
   **Maximizing Social Benefits**
   - Project maximizes numbers of BPL beneficiaries.
Project extends or improves service delivery to previously un-served or under-served areas, particularly for poor settlements;

Project leads to sustained poverty reduction through demonstrable health, livelihood benefits;

Project empowers and leads to demonstrable improvement in Quality of Life for women; and

Project enables participation of community (especially poor communities) in planning, construction and Operation and Maintenance (O&M).

**Minimizing Negative Social Impacts**

Project requires minimum resettlement (or loss of productive / non-productive assets). Full Resettlement Plans are required if there are more than 200 affected persons or 100 most poor and vulnerable persons affected. If less, a short Resettlement Plan will be required;

Resources are available to compensate for loss of housing, land, productive assets, cultural sites, social networks etc, including for most poor and vulnerable; and

Project minimizes other negative impacts on poor men and women, e.g. increased costs for services (time and money), unemployment, and health risks.

c) **Financial Criteria**

Components should ideally produce direct revenue. Non or indirect revenue generating projects should demonstrate absolute need – social or otherwise – and augment indirect revenue resources of the ULB (i.e. increase the tax base of the ULB on account of the better service provided by it);

Capital costs are based on least per capita cost option considering the area, population and benefits, and designed for 15-20 years;

Components should demonstrate best possible maintenance and management option;

As far as possible the projects generate revenues sufficient to meet O&M costs and debt service without government subsidy;

Components should result in no (or minimal) resettlement / relocation; and

Land acquisition should be considered only where it is absolutely necessary / unavoidable.

d) **Economic Criteria**

For economic viability the Project should:

Demonstrate significant improvement over the “without project” situation;

Demonstrate thorough assessment and quantification of effective demand;

Demonstrate demand and supply management as an integral part of design;

Be the most cost effective (least cost) solution. Technical and institutional alternatives must be considered as an integral part of design; and

Demonstrate low risk from technical, social, environmental, financial and institutional perspectives.

For economic development the project should have potential to:

Maximize the removal of constraints on economic activity, sectors ranked as negatively affecting business performance will be preferred;

Maximize economic growth, projects ranked as contributing to improving business
performance and prospects will be preferred;
  - Act as a catalyst to economic growth, projects which will affect industrial sectors identified as having growth potential will be preferred (e.g. agro-business); and
  - Act as a catalyst for pro-poor economic growth; projects which affect industrial sectors, which have high local employment and income generating effects, will be preferred (e.g. tourism).

e) Environmental Screening Criteria: The overall environmental criterion shall be that the subproject components should maximize improvements to the urban environment and living conditions while, at the same time, minimizing the environmental impact of their implementation.

f) Institutional Criteria
  - Sufficient management, technical and financial resources are available within the ULB or other implementing agency to execute the project;
  - The implementing agency is of the right size, with the right skills and with the appropriate organizational structure to execute the project;
  - The implementing arrangements of the project meet the objectives of decentralizing authority to as low a level of government as possible;
  - Financial management systems are adequate to accommodate requirement of project financial flows, accounting and reporting;
  - Training facilities are available to upgrade the skills needed to run the project;
  - There is sufficient flexibility to allow for skill enhancement and appropriate job allocation;
  - Sufficient mechanisms are in place to provide accountability to users for the operation of the project;
  - Management information systems are in place to enable ULBs to manage a decentralized project effectively; and
  - Legal and managerial enablement is available to the ULBs for private sector partnerships, if appropriate.

**Outputs:** The output of this Activity will be city level sector plans with macro approach for the planning horizon year, which will aim to provide the service at the required level with its technical, financial and implementing detailing. From the sector level plans, this Activity will also identify subprojects, based on a number of criteria, for further detailed studies.

**Staff Involved:** All Team Members

C. **Activity 3: Feasibility Studies**

**Background.** This activity on Feasibility Studies will develop subproject components identified during the sectoral analysis for detailed studies, and conduct feasibility studies in terms of technical options, least-cost analysis and integration of social and environmental issues in the subproject development. This activity is organized into following four tasks:
Conduct Surveys & Develop Subproject Components (ID15). With identification and finalization of a subproject for detailed feasibility studies in the previous phase, the Team will study the subproject in detail and will develop components of that subproject. For example, in case it is identified in the previous activity that water supply augmentation subproject shall be taken up for detailed feasibility studies, this task will identify the components required for supply augmentation, per say, source improvement, augmentation of storage capacity, augmentation of transmission and distribution lines and etc.. Conceptual designs will be produced for all proposed subproject components indicating layout of infrastructure components like solid waste processing and disposal facilities, routes of water distribution lines, sewers and drains, location of water services reservoirs, pumping stations, width and length of bridges and roads. The preliminary design will also include a cost estimate based on block costs. Surveys required for selected subprojects shall be identified. Necessary surveys shall be conducted as required.

Conduct Alternative Analysis – Technical and Least Cost (ID16). In formulating subproject components, the preferred option will be evaluated based on the alternative analysis considering various parameters such as techno-economic feasibility, least-cost options, and environmental and social suitability. Least cost analysis will take into service delivery targets and life-cycle costs, including considerations on achievable operation and maintenance arrangements, given available resources in terms of skills and facilities.

Screening for Social and Environmental Issues (ID17). During the initial phase, this screening exercise will integrate the social and environmental concerns into the identification and finalization of subproject components, which will result into avoiding/minimizing the likely social and/or environmental impacts. The Safeguards Specialists will closely work with the Team, and likely issues will be discussed with specialists responsible for the engineering aspects, and appropriate measures will be included in location and outline designs for the infrastructure, which will result in minimizing/avoiding a number of likely impacts.

Select Feasible Alternative for Detailed Studies (ID18). The above alternative analysis and screening of likely social and environmental issues of each of the subproject components will result into identification of most feasible subproject component alternative, which will be technically feasible, easy to operate and maintain, financially viable, and socially and environmentally acceptable.

Outputs: This Activity on pre-feasibility will result in finalization of subproject and its components for detailed design in the next phase. This will include alternative analysis, screening for social and environmental issues, and etc.

Staff Involved: All Team Members
D. **Activity 4: Traffic and Transportation**

**Background:** The first step in formulating transportation proposals is to study the existing transport scenario in the area under consideration and identify the transport deficiencies. There are several problems that reduce the efficiency of the transport system. Congestion is indicative of such problems, whereby an increased travel time and a reduction in efficiency, primarily during the peak period, is felt. This activity will study the existing traffic and transportation scenario in the town with necessary surveys and investigations, and will provide improvement measures for both short-term and long-term planning. This activity is organized into following five tasks:

55. **Collect and Appraise of Data and Reports (ID20).** Past accident, traffic and inventory data will be collected. Reports on relevant traffic and transportation studies conducted in the town, including roads and other infrastructure development proposals within the study area will be collected. This would include: Master Plan for the town; studies carried out for flyovers etc; database and information on Public transport system in the town; and any other relevant study reports, as available from planning agencies in the city. The secondary sources of information will include various government departments responsible for planning, implementation and operation of transportation systems in the region. The relevant data available from these reports will be identified and documented. Planning data of the study area will be collected and compiled. This would include: population; employment details; per capita income; vehicle registration, and land use distribution.

56. **Carry Out Engineering Studies and Surveys (ID21).** Based on the requirement, following traffic and transportation surveys shall be undertaken to develop/update the traffic and transportation data for the study:

(i) **Road Side Interviews.** The main objective of the survey is to derive the passenger and freight travel pattern by road. Interviews will be conducted at selected locations in the study area and along the boundary of the study area. These locations shall include locations on selected screen lines, all cordon lines surrounding the study area. Traffic analysis zones adopted will be utilized to establish the travel pattern. Interviews will be carried out on a sample basis for 24 hours on a typical working day by stopping the vehicles with the help of police. Classified volume counts shall be carried out along with the interviews in order to calculate expansion factors. The information collected will include origin and destination of trip, occupancy, trip purpose and in the case of goods vehicles their type and tonnage.

(ii) **Classified Turning Volume Counts.** The main objective of the survey is to establish peak hour turning movements at critical intersections in the study. These surveys shall be conducted at identified junction locations during peak hours. The surveys shall be conducted for duration of 8 hrs (4 hrs in the morning & 4 hrs in the evening) to establish the peak to daily flow ratios. Volume counts shall also be conducted at all the entry/exit locations of the study area for 8 hours duration. The peak hour traffic volume, percentage composition of traffic and volume of motorised and non-motorised vehicles can be calculated.
(iii) **Speed-Delay Surveys.** The purpose of this survey is to evaluate the existing speeds on the network and to identify any major delays. The speeds evaluated would be used to develop speed delay function. The survey will be conducted during peak and off-peak hours on any normal day using moving observer method. The survey vehicle will be moved in stream of the traffic at the speed as of other traffic during different times of the day in both peak and off peak times. The delays and corresponding causative factors at intersections / major activity centres etc., would be collected to identify major bottlenecks on the road. This data will be used to evaluate congestion levels in the influence area with and without the improvement measures. Speed at all the roads covered and stopped delay at intersections covered will be determined. This will help in identifying congested links in the study area.

(iv) **Parking Survey.** This survey will be conducted to estimate the alternate parking demand schemes. The parking demand will be obtained by manual count of different category of vehicles along the major road stretches where significant on-street parking occurs. It will be conducted for a period of 12 hrs continuously on all major corridors.

(v) **Vehicle operator’s Survey.** This will be conducted to establish the socio – economic characteristics of private vehicles like taxis, goods vehicles etc. within the city. A sample survey of vehicle operators of taxi, auto rickshaws, and goods vehicles along with slow moving goods vehicle operators will be conducted inside the town/city area with the assistance from the vehicle owners associations. This survey will assess the cost of operation, socio economic characteristics of the operators, maintenance details, general routes of operation.

(vi) **Topo Survey.** The main purpose of the Topo Survey is to analyse the geographical features of specific junctions in the project area. The reconnaissance is the first phase of the survey. Plane table surveys are conducted at critical junctions (if required). Based on the prevailing traffic circulation pattern, suitable improvement proposals will be worked out for junctions.

(vii) **Road Network Inventory.** The main purpose of the field inventory will be to make a record of the existing conditions of the road network to be considered as base year transport network. After having studied the existing available data and in depth discussions with relevant officials in concern with the study area and a detailed reconnaissance undertaken, a field inventory of the road network in the study area will be carried out. Consultants propose to use majority of this data from the past study reports and available commercial maps.

(viii) **Mass Transport and IPT Passengers survey.** This survey will estimate travel and traffic characteristics of the intra-city travelers. The random survey sampling technique will be adopted for a period of 12 hrs to survey the passengers covering all modes like taxies, auto-rickshaws etc.
57. *Plan & Design for Short-term Measures (ID22).* Short term measures will be planned for maximum utilization of the existing facilities, thereby providing low-cost traffic solutions. Based on the study of the existing traffic conditions from surveys, we can identify the problematic areas. Hence short term solutions for those recognized areas can be suggested, based on the kind of problems. These could include:

- Improvements to pedestrian facilities
- Intersection improvements
- Parking facilities
- Traffic segregation
- Improvements at accident prone locations
- Provision of traffic control devices such as traffic signals, traffic signs/markings
- Traffic management measures such as one way streets
- Movement restrictions over time and space.
- Shifting bus stops, on street auto stands etc;

The identified subprojects of short terms measures will be designed as per the specification and available guidelines with Indian Road Congress (IRC) and Ministry of Road Transport and Highway (MoRTH). Wherever necessary, appropriate typical designs will be followed.

58. *Conduct Travel Demand Forecasting (ID23).* The main purpose is to predict the travel patterns and modal shares under different land-use and transport scenarios in the study area. The projections shall be used to estimate the traffic on important project corridors. This will involve:

(i) Traffic forecasts for study areas will be developed based on data collected from primary and secondary sources. The secondary sources include various government departments responsible for planning, implementation, and operation of transportation systems in the region. The primary sources include different traffic surveys conducted in the study area including volume counts, speed – delay surveys etc.

(ii) Possible traffic growth rates will be established in respect of all categories of vehicles, taking into account the past trends, annual population and real per capita growth rate, elasticity of transport demand in relation to income and estimated annual production increase. The other aspects including socio-economic development plans and the land use patterns of the region having impact on the traffic growth, the projections of vehicle manufacturing industry in the country, development plans for the other modes of transport, O-D and commodity movement behavior will also be taken into account while working out the traffic demand estimates. The values of elasticity of transport demand shall be based on the prevailing practices in the country.

(iii) The traffic demand estimates shall be done for up to 20 years. The growth factors shall be worked out for five-yearly intervals. The overall traffic forecast thus made shall form the basis for the medium and long term proposals.
59. **Plan & Design for Long-term Measures (ID24).** Once the traffic modeling stage is complete, the total transportation demands, both for Passengers & Goods traffic (intra & inter zonal traffic) can be estimated. This will also constitute the through traffic which passes the town. Based on this, we can identify the deficiencies in the road network. Medium term measures mean a proposal which would last for about 5-10 years time duration and this may involve land acquisition, relocation etc. Long term measures are the developments that are required beyond the horizon period of 20 years based on the project demand. Based on the proposals recommended, the Consultants would come up with the phasing of the initiatives and block cost estimates for the same.

(i) **Medium term Measures.** To minimize land acquisition and moderate the investment plans, medium range measures will be proposed. These may include – widening & strengthening of existing road network; identify the existing road links, which can help to ease the traffic movement; propose off street parking lots; proposing ring roads; improvements to public transport, and etc.

(ii) **Long Term Measures.** The long term proposals covers planning of future transport development & network improvements such as development of parallel & transverse road corridors, bypasses for inter-city key corridors. It also will concentrate on pedestrian facilities like underpasses, grade separated interchanges, integrated terminals for passengers & goods etc. These may include: proposing bus system; proposing new road links; shifting of major activities from city centre to peripheral locations.

The identified subprojects of medium/long-term measures will be designed as per the specification and available guidelines with Indian Road Congress (IRC) and Ministry of Road Transport and Highway (MoRTH), GoI. The designs will be restricted to typical design concepts and block cost estimates.

**Outputs:** This activity will result in (i) assessment of existing traffic scenario and its characteristics; (ii) a city-level traffic and transportation plan; and (iii) identifying and designing of short-term and well as long term traffic improvement measures.

**Staff Involved:** Transport Specialist, Road and Bridge Specialist, Deputy Team Leader and Team Leader

E. **Activity 5: Detailed Design**

**Background:** Detailed design of finalized subprojects and components will be taken up in this activity. At the outset design criteria and standards/codes to be followed in the infrastructure designs will be established. Subsequently site specific surveys and detailed investigation requires for subproject design will be carried out. Conceptual designs followed by detailed designs will be prepared including detailed drawings and technical specifications will be prepared. This activity is organized into following six tasks:
60. **Establish Design Criteria and Standards (ID26).** The Team will lay out broad design criteria for urban infrastructure sectors under consideration (water supply, sewerage, storm water drainage, solid waste management and transport) The design criteria in consultation with relevant stakeholders (for example, concerned departments like state PHED, Jal Nigam, Delhi Jal Board, Public Works Department and ULBs) will establish broad guidelines based on Indian design standards.

For example, the design criteria for sewerage systems would cover: (i) design horizon year; (ii) population projection for horizon year; (iii) design flow, peak and average; (iv) pipe material and material for manholes, specifically with reference to the soil conditions; (v) social acceptability of pumping / lifting stations; (vi) minimum velocity in the sewer main; (vii) minimum diameter of pipe; (viii) minimum cover to the crown of pipe; (ix) material for manhole construction; (x) software to be used for sewerage design; and (xi) norms for design of pumping stations. Similarly the process technology for sewage treatment will consider the following design criteria/rational: (i) nature of sewerage system adopted (conventional or small bore systems) and separation of grey water for selective local groundwater recharge; (ii) magnitude of flows and pollution loads to be treated; (iii) disposal location for treated sewage and associated effluent quality requirements; (iv) salinity of sewage to be treated; (v) land available for treatment facility and safeguard impacts; (v) options for disposal or reuse of sludge; (vi) minimization of energy and chemical requirements where possible; and (vii) availability of skilled or semi-skilled personnel for operation and maintenance.

The team will also develop Quality Assurance Plans (QAPs), which will inter alia focus on issues inter alia comprising health and safety provisions associated with construction workers, material standards, rate analysis (based on approved Schedule of Rates), and environmental and social impact mitigation measures.

This criteria establishment will be critical and will feed into project preparatory manual being prepared in the subsequent phases of the assignment.

61. **Plan Surveys and Finalize Survey Agencies (ID27).** A detailed plan for the surveys/investigations/ sampling activities will be prepared under this task for all subproject components taken up for detailed designs. Terms of reference (TOR) will be prepared for conducting the surveys and investigation and proposals/budget quotations from agencies will be requested to conduct the same. The Team in consultation with NCRPB and ADB will finalize the survey agencies.

62. **Conduct Surveys and Investigations (ID28).** According to the detailed plan developed in the above task, the Team will conduct the surveys and investigations with the assistance of the survey agencies. Considering the expert man-power available, the Team in consultation with NCRPB and the respective implementing agencies will put in place a supervising and monitoring mechanism to ensure the quality of surveys to desirable extent. These detailed surveys/investigations shall comprise: topographic surveys, hydro-geological investigations, soil and geotechnical investigations, baseline water and wastewater quality surveys, and etc.
63. **Develop Typical Designs (ID29).** A preliminary design will be produced for all proposed subproject components indicating layout of infrastructure components. Preliminary designs will be prepared using appropriate methods or using approved software (like SewerCAD for sewer design and WaterCAD for water supply system design). The preliminary design will also include a cost estimate based on block costs.

64. **Prepare Detailed Designs, Drawings and Costs (ID30).** Detailed designs will include development of standard details, alignment plans including profiles of pipelines and drains and dimensions, levels and capacities of all subproject components. Detailed design will also include construction drawings and construction methods for all components. Life-cycle analysis of components like STPs and solid waste disposal facilities will be incorporated in design reports. Technical specifications for all components of civil, mechanical and electrical works will be developed. Based on finalized designs and specifications, Bill of quantities will be prepared for various components. Based on schedules of rates and bill of quantities and detailed costing will be prepared.

65. **Prepare Project Implementation Plan (ID31).** Construction schedule of each subproject will be drawn up and a city-level Project Implementation Plan will be prepared sample subprojects. This plan will indicate schedules for invitation of bids, contract award, start of construction etc. O&M measures for various infrastructure components such as water supply system, sewerage system, solid waste management, drainage and etc will be prepared for all sample subprojects.

**Outputs:** The detailed engineering design will be organized to form the Draft Final Report. In addition to design calculations, the DFR will comprise drawings and technical specifications for all components. Survey information utilized for designing the system will form part of the DFR.

**Staff Involved:** Team Leader, Water Supply & Sewerage Specialist, Drainage Specialist, SWM Specialist, and Roads and Bridges Specialist

**F. Activity 6: Economic Analysis**

**Background.** The main objective of subproject evaluation is to determine various aspects of economic feasibility including an analysis of rational use of resources and the expected benefits. Urban local bodies (ULBs), on selective basis, are considered for infrastructure development and/or capacity development programme under different sectors, viz., water supply, drainage, sewerage, solid waste management and urban transport. Following ADB’s guideline for non-revenue earning projects, an economic analysis will be carried out for subprojects under environmental sanitation improvements and urban roads improvement; and a separate economic analysis will be carried out for the water supply subproject. This activity is organized into following two tasks (detailed methodology for economic analysis is presented in Appendix 5):
66. **Conduct Sector Review (ID33).** A sector investment plan is a general description of a set of similar, potential investments. The investments or "subprojects" in the plan may be similar to each other, or they may be different but have the same goals. The analysis will identify key economic issues in executing the plan, and describes how ADB or similar agency can support the government in addressing those issues. The analysis also will identify appropriate economic selection criteria, including analysis of subprojects following ADB's Guidelines. According to the ADB ‘s Guideline on Sector Loan analysis, economic analysis will cover the following areas, apart from the subproject analysis.

- Economic rationale for government involvement
- Goals of the plan
- The plan to reach the goals
- Associated economic policies
- Economic risks to the plan and goals
- Government's capacity to execute the plan
- Government's commitment to the plan and goals
- Coordination of foreign aid

67. **Conduct Economic Analysis of Subprojects (ID34).**

(i) **Economic Cost.** The economic costs of capital works and annual operation and maintenance will be calculated from the financial cost estimates which will exclude price contingencies, import duties and taxes, consideration of shadow wage rate for unskilled labourers where the existence of unemployment and under-employment and consideration of market wage rate for skilled labour and the acquisition cost of land.

(ii) **Beneficiaries and Benefits of the Subprojects.**

- **Sewerage Improvements:** Project beneficiaries will be households getting new connections through proposed sewer lines. The households will gain from improved environmental sanitation conditions that a properly functioning sewerage system provides.

- **Drainage Improvements:** As drainage improvement is mostly linked to the sewerage improvements, the entire Project beneficiaries of sewerage will be benefited by the drainage improvement in general. Beneficiaries will comprise the households located within the sewerage catchments areas with the improved environment and amenity provided by a proper functioning drainage system.

- **Solid Waste Management Subproject:** Project beneficiaries will comprise households in both high-density and low-density areas across the city, which will gain from the improved environmental sanitation, living conditions and amenity that

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1 Assessing Aid for a Sector Investment Plan: Economic Analysis of a Sector Loan, David Dole, Economics Research Department, Asian Development Bank
a properly functioning solid waste collection and disposal system will provide. Those households who currently spend time disposing of their solid waste will receive additional benefits from receiving primary waste collection.

Urban Road Improvement: Project beneficiaries will be those travellers for whom accessibility to economic and social activities will be improved through better road conditions and traffic flows brought about by the subproject. This improvement is achieved by reducing the effort or inconvenience of travel between the origin of the traveller and the destination offering these activities.

Identified project benefits likely to accrue to the beneficiaries discussed above will be quantified through appropriate mechanism under different sectors for the analysis period. Thus estimated annual project benefit stream during the analysis period will be used as input for economic analysis.

68. **Conduct Economic Cost Benefit Analysis (ID35).** Main evaluation of economic cost-benefit analysis will be carried out on subproject basis to estimate the following economic feasibility indicators: (i) Economic Internal Rate of Return (EIRR); and (ii) Economic Net Present Value (ENPV). The EIRR is the discount rate that equalizes the present value of economic cost and project benefit stream during the analysis period, while the opportunity cost of capital is the shadow factor of the cost involved in raising the required capital by the government. Considering the opportunity cost of capital (normally 12 percent), along the EIRR result arrived for subprojects, the feasibility and selection of subprojects on economic ground will be established. All subprojects with EIRR less than 12 percent will not be recommended.

**Output.** This activity on economic analysis of sample subprojects will result in establishing (i) sectoral analysis justifying subprojects; (ii) economic analysis for subprojects including sensitivity analysis to the feasibility results; and (iii) distribution of project effect in poverty reduction.

**Staff Involved:** Economist and Finance Specialist/ Deputy Team Leader and Team Leader

G. **Activity 7: Financial Analysis**

**Background.** Financial analysis will be carried out for urban infrastructure subprojects that are amenable to user charges and as stand alone sector projects e.g; water supply, sewerage, solid waste management and urban transport (vehicular parking, toll roads). Subprojects that can not be amenable for user charges under revenue stream will not considered for financial analysis. This activity is organized into following four tasks (detailed methodology for economic analysis is presented in Appendix 4)

69. **Conduct Analysis of Implementing Agencies (ID37).** Implementing Agencies relevant to the identified subprojects will be subjected to review of existing financial performance. Review of existing scenario will be focussed on the following areas:
70. **Conduct Financial Analysis of Subprojects (ID38)**. The subprojects for the purpose of financial analysis will be categorized as Service, Cost Recovery and Remunerative. The initial pipeline subprojects consist of Sewerage (Service/ Cost Recovery), Solid Waste Management Project, Water Supply Project, Dedicated Vehicular Parking, Toll Roads (Cost Recovery), and pedestrian Subways, drainage, road improvement projects (service).

(i) **Weighted Average Cost of Capital**: The financial viability of subprojects will be assessed by comparing the subproject’s financial internal rate of return (FIRR) with the financial opportunity cost of capital. As proxy for the financial opportunity cost of capital, the weighted average cost of capital (WACC) of the subprojects in real terms will be used. The FIRR is the discount rate that equalizes the present values of costs and revenues over the subproject life, while the WACC represents the cost incurred by the government in raising the capital necessary to implement the subprojects.

(ii) **Financial Implementation Action Plan (FIAP)**: Based on the discussions of the above analysis, an appropriate Financial Implementation Action Plan (FIAP) will be outlined for each subproject/sector and that will provide the base for the subprojects financial analysis. Generally, this FIAP will define time lines for deliverables, tariff structure, tariff revisions, policy reform agenda etc.

(iii) **Financial Analysis**. The revenue streams for the financial analysis of subprojects include a property tax based levy and a monthly charge; or an upfront deposit and a monthly charge. A decision on implementing the above discussed revenue stream (property tax based levy and monthly charge) will be critical to project sustenance. Apart from a revision on completion of the capital works, it would be necessary to revise the water charges, sewer levy / SWM user charges periodically so as to compensate the increasing O&M cost.

71. **Formulate Appropriate User Charges (ID39)**. To achieve the required feasibility level on WACC basis for the proposed investment, the monthly charge will need to be worked out for different subprojects and this will be compared to the existing user charges structure. The results of the analysis will throw lights on the required agenda for user charge reform and policy related issues. Keeping these in mind, the cost recovery policy target can be shifted to cover at least 100% of O&M cost by the end of the project implementation period for certain urban infrastructure subprojects like sewer and full cost recovery for the remaining cost recovery subprojects and remunerative subprojects.
72. *Conduct Affordability Analysis and Cost Recovery Mechanism (ID40).* With the backdrop of the willingness to pay survey results for the identified subprojects, the existing/proposed tariff rates (user charges and taxes) will be compared to ascertain their reasonableness and the affordable level. This will underlie the ‘effective demand’ for the proposed urban infrastructure services, backed-up with affordability from the consumers. This will form as a major input to prepare an appropriate ‘Financial Improvement Action Plan’ (FIAP). Considering the on-going policy reform agenda/policy guidelines, the cost recovery norms will be formulated and that will appear in the FIAP.

**Outputs.** This activity on financial analysis will result in subproject-wise formulation of (i) Financial Implementation Plan; (ii) proposed user charge structure and cost recovery mechanism, and (iii) recommendation for sustainability of subprojects and the required financial management reform rational for the IAs.

**Staff Involved:** Economist and Finance Specialist/ Deputy Team Leader and Team Leader

H. **Activity 8: Social Safeguard Analysis**

**Background:** This activity will look into the social safeguard issues like land acquisition and resettlement, and impacts on indigenous people, if any. This activity will entail screening of sample subprojects to identify the significance of likely impacts, and accordingly the social assessment requirements. This screening will follow the national policies/acts and as well as the ADB policies and guidelines.

73. *Screen Sub-Projects for Resettlement and Indigenous People (ID41).* Subprojects identified for detailed feasibility will be screened for resettlement² and impacts on indigenous people in lines with government acts/policies and ADB’s policies on Involuntary Resettlement and Section F3 on Indigenous People. The screening will be conducted on ADB’s Handbook on Resettlement: A Guide to Good Practice, existing legal frameworks, and applicable government laws, regulations and policies. The screening process will identify the Resettlement Plan (RP) and Indigenous People Development Plan (IPDP) requirements of subprojects. According to ADB Guidelines, subprojects will be classified into one of the following three categories based on impacts:

(i) Category A: subprojects with significant impacts on 200 or more people – these subprojects require preparation of full Resettlement Plan;
(ii) Category B: subprojects with impacts that are not deemed significant – require short Resettlement Plan; and
(iii) Category C: subprojects with no impacts

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² Resettlement is a general term related to land acquisition and compensation for loss of asset whether it involves actual relocation, loss of land, shelter, assets or other means of livelihood.
74. **Prepare Resettlement Plan & Indigenous People Development Plan (ID42).** Based on the above category, for proper rehabilitation of Affected Persons (APs) in sample sub-projects, draft Resettlement Plans (RPs)/Indigenous People’s Development Plan (IPDPs) will be prepared. To initiate RP/IPDP preparation, social impact assessment (SIA) surveys will be undertaken based on preliminary technical designs. The SIA will assist in determining the magnitude of displacement, prospective losses, better targeting of vulnerable groups, ascertaining actual costs of resettlement and rehabilitation (R&R), preparing and implementing a rehabilitation program. The SIA surveys shall comprise a Census (of 100% Affected Persons) and Baseline Socio-economic Sample Survey (10% Affected Persons or 20% seriously Affected Persons). The purpose of the census is to register and document the status of the potentially affected population within the sub-project impact area/Impact Zone. The draft RP/IPDP will include the census of AP, and their entitlements to restore losses, budget, institutional mechanisms and schedules, assessment of feasible income restoration mechanisms, avenues for grievance redressal, and participatory results monitoring mechanism.

75. **Prepare Resettlement Framework and IP Development Framework (ID43).** These frameworks will guide the NCRPB and its implementing agencies in addressing the involuntary resettlement impacts and impacts on indigenous people of subprojects implemented by them. Based on the impacts identified during the sample subprojects and other range of IR and IP impacts likely to result from the infrastructure development by implementing agencies, a resettlement framework, and indigenous people development framework will be formulated in line with applicable national legislations/policies and ADB Policies. Some inferences will also be drawn from the Resettlement Frameworks created under other ADB TAs/Loans.

**Output:** This activity will result into reparation of Resettlement Plans for all sample subprojects and Indigenous Peoples Development Plan (IPDP), if required based on the screening. This activity will also prepare a Resettlement Framework, which will include an entitlement matrix for all likely R & R impacts. Based on the necessity, an Indigenous People Development Framework will also be prepared.

**Staff Involved:** R & R Specialist and Team Leader

I. **Activity 9: Environmental Assessment**

**Background:** This activity will look into the environmental safeguard issues like impacts of subproject development and implementation on environment and its mitigation to acceptable levels. This activity will entail screening of sample subprojects to identify the significant likely impacts, regulatory requirements (government and ADB) and accordingly the environmental assessment requirements. Accordingly environmental assessment of sample subprojects will be conducted.

76. **Screen Sub-projects for Environmental Impacts (ID45).** Subprojects identified for detailed feasibility will be screened for environmental impacts in line with EIA Notification, 2006 of Government of India and ADB Environmental Policy, 2002. The screening process will identify environmental assessment requirements of subprojects.
77. **Conduct Environmental Assessment (ID46).** Based on the screening, subprojects will be classified into A or B (according to EIA Notification, 2006) and A or B or C (according to ADB Environmental Policy, 2002). Accordingly based on the identified environmental category of each subproject, environmental assessment (IEE for A category and EIA for B category) will be conducted. IEE/EIA studies will be conducted in compliance with the Government procedures and based on ADB’s Environmental Assessment Guidelines (2003), ADB’s Environmental Policy (2002). A summary initial environmental examination (SIEE) and/or summary environmental impact assessment (SEIA), as required will be prepared. For Category A subprojects, an Environmental Management Plan (EMP) will be prepared. Public consultation and information disclosure will be conducted as per the ADB Guidelines.

78. **Develop Environmental Assessment Framework (ID47).** EAF will guide the NCRPB and its implementing agencies in identifying the environmental assessment requirements of subprojects. Based on the impacts identified during the sample subprojects and other range of impacts likely to result from the future subprojects by implementing agencies, an Environmental Assessment Framework (EAF) will be formulated in line with applicable national legislations/policies and ADB Policies. Some inferences will also be drawn from the EAFs formulated under other ADB TAs/Loans.

**Output:** This activity will result into reparation of Environmental Assessment Reports for all sample subprojects, as required based on the screening. This activity will also prepare an Environmental Assessment Framework (EAF).

**Staff Involved:** Environmental Specialist and Team Leader

J. **Activity 10: Institutional Capacity Building**

**Background.** Regarding project identification, preparation and implementation activities of urban infrastructure mostly ad-hoc procedures are followed. Also as major infrastructure projects are prepared by the line departments or outsourced, the ULBs have very little active participation in the project preparation. Moreover there is a considerable difference between their requirements of international funding agencies and present practice followed in project preparation. Inadequacy of staff with appropriate skills adds the problem. All these deficiencies together results in weak planning and waste of available scarce financials resources with ULBs/IAs. Above problems faced by IAs/ULBs underlines the need for improving their capacities in carrying out their roles and responsibilities especially related to conceiving and preparing projects. This Activity on Institutional Capacity Building is organized in the following three tasks:

79. **Assess Institutional Arrangements and Capacities (ID49).** The Team will review the roles and responsibilities of various institutions/stakeholders involved in service delivery, resource availability and determine inter-agency coordination issues. With respect to the Government policies and programs, the WSA Team will identify policy, institutional, and human resource constraints facing NCRPB/IAs with respect to project preparation and implementation. During the assessment of implementing agencies for their institutional capacity, a series of following activities will be performed:
o carry out sector review and analysis along with any relevant information needed for project preparation work for the investment loan;

o review current (both formal and actual) practice in project identification and recommend how the process can be improved to ensure that all stakeholders input is genuinely incorporated and institutionalized within the project identification process;

o review current practice (both formal and actual) in project selection and recommend a project selection methodology to ensure that selected projects, while satisfying economic viability criteria, maximize the potential for poverty reduction;

o document the project selection methodology in a Project Selection Manual for use by relevant government agencies to select projects for the investment loan, prepare training material and train key IAs / NCRPB staff to be trainers in the use of the manual;

o review current practice (both formal and actual) in project preparation, design, implementation and monitoring and, using the results of the review and inputs from the present study and the sector review of IAs;

o assess the capability of implementation agencies at the state level and NCRPB level to implement programs and recommend institutional strengthening measures in agencies responsible for delivering the program including:
  o technical skill levels,
  o data collection procedures including primary surveys,
  o organizational structure,
  o database management,
  o monitoring mechanism,
  o financial management,
  o contract management from financial and technical viewpoints.

80. **Prepare Institutional Development Plan (ID50).** Present Technical Assistance (TA) will support the IAs and NCRPB to enhance their capacity in the activities related to project identification, selection, preparation, design, and detailed project report for funding purpose. The TA will use the sample subprojects, results of the sector review analysis, report on deficiencies on current practices to prepare a standard manual or guidelines and subsequently a tool kit format that will help the implementing agencies in the preparation of future DPRs. Adequate training to the designated resource persons on the preparation and use of tool kits etc will be part of the capacity building component. Finally the present TA will help in developing a user friendly web-page where all relevant documents including sample subprojects, guidelines, tool kits that will help in the preparation of project selection, preparation and DPRs will be made available for the implementing agencies for their future use. Capacity building under the present TA will have the following major components:

  o Assessment of institutional capacity building requirements for project preparations
  o Data collection and management aspects
  o Project preparation and design aspects
81. **Prepare Standard Project Preparatory Toolkits (ID51).** Comprehensive guidelines/toolkits will be prepared that will help the officials of IAs and NCRPB in preparing an appropriate subproject feasibility reports required for funding from international funding agencies. The Guidelines will cover the different areas of project identification, project preparation, and different feasibility aspects. This will be prepared subsequent to the DPR preparation, considering the procedures followed for the preparation of sample subprojects.

**Outputs:** This activity of capacity building will result in (i) identify the deficiency in the present system for carrying out the project preparatory responsibilities; (ii) formulation of recommendation to improve their capacity to required level in project preparation; (iii) preparation of project preparatory guidelines/toolkits to facilitate future project identification and preparation.

**Staff Involved:** Team Leader, Deputy Team Leader and All other Key persons

K. **Activity 11: Training Programs**

**Background.** The objective of all the training programs is to enable the staff of NCRPB and other projects implementing agencies to perform their tasks in accordance with their responsibilities in the project preparation activities including project design. This will ensure that the preparation / implementation of the subprojects will not be handicapped through lack of trained staff. The three basic topics to be addressed in the training program are: (i) Project Identification Process; (ii) Project Feasibility and Preparation; and (iii) Safeguard Due Diligences. The training as part of the capacity building to be provided will be tailored to suit the different management levels at NCRPB and Implementing Agencies (IAs).

In the existing organisation structure of IAs, mostly their internal staff carries out a critical role of project identification and preparation and few cases outside experts will be involved under the supervision of internal staff. The role of the senior level staff will be mostly in identification of subprojects and supervision of project preparation. In NCRPB, the technical proposals seeking fund assistance need to be scrutinized before loan sanction stage and the implementation of subprojects need to be monitored after the loan sanction. In scrutinizing the technical proposals from IAs, technical advises of specialized national institutions are utilised. Any training that is given must reflect the use and application that will be made of the topics covered in accordance with the staff level within the organisations and their responsibility in project preparation. This Activity on Training Programs is organized into the following three tasks (detailed approach for training activity is provided at Appendix 6):

82. **Training Needs Assessment (ID53).** The training needs assessment will be based on the anticipated duties and responsibilities of NCRPB and Implementing Agencies staff with respect to subprojects identification, preparation including feasibility requirements. Indicative training requirements, based on the identified sample subprojects, are given in the following Table.
Table 3: Indicative Training Requirements

<table>
<thead>
<tr>
<th>Approximate Number Positions in NCRPB</th>
<th>Approximate Number of Positions in IAs Requiring Training</th>
<th>Likely Skills Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Management Level (1)</td>
<td>Senior Management Level (1)</td>
<td>Project identification and preparation monitoring and decision making using the proposed project guidelines</td>
</tr>
<tr>
<td>Senior Technical Level (1)</td>
<td>Senior Technical Level (1)</td>
<td>Project identification, preparation procedures and techniques for better monitoring and reporting</td>
</tr>
<tr>
<td>Junior / Middle Technical Level (2)</td>
<td>Junior / Middle Technical Level (2)</td>
<td>Data requirements &amp; collection, planning, carrying out project identification, design and preparation activities</td>
</tr>
</tbody>
</table>

83. **Identify Resource Persons(ID54).** Identification of the Resource Persons is a critical one as they will act as the future trainers to enhance the capacity building in the project preparation process in IAs and better supervision in NCRPB. As indicated earlier, any training that is given must reflect the use and application that will be made of the topics covered in accordance with the staff level within the organisations. Also they must have the required minimum skill level to absorb the preparation process. Ideally the following proposals are put forth identifying the Resource Persons:

   - Sample Implementing Agencies
     - **Lower Management Level**
       - At least two officials
       - With technical knowledge and skills relevant to the identified subproject
       - Involved with the responsibilities with respect to the sector in which the subproject falls
       - Required computer literacy
     - **Middle / Senior Management Level**
       - At least one official
       - With technical knowledge and skills relevant to the identified subproject
       - Involved with the management responsibilities with respect to the sector in which the subproject falls
     - **NCRPB**
       - **Technical and Planning Level**
         - At least two officials
         - With technical knowledge and skills relevant to the identified subprojects
         - Involved with the technical evaluation responsibilities with respect to the sector in which the subproject falls
       - **Management Level**
         - At least one official involved in management responsibilities with respect to the sector in which the subproject falls
84. **Conduct Training Programs (ID55).**

(i) Training activities in project preparations and design. Present project plans to have two types training modules as follows (detailed training methods and program is presented in Figure 6 and Tables 4, 5 & 6):

- **On-job Training**
- **Structured Training through Workshops etc**

  **On-Job Training.** In this module, identified ‘Resource Persons’ from the Sample Implementing Agencies / NCRPB will be involved in the sample subproject preparation and work along with the TA Consultant during the present study, at all stages.

  **Structured Training through Workshops, Lectures etc.** In this module, identified ‘Senior / Middle Management Staff” from the Sample Implementing Agencies NCRPB will be given training through workshop, presentations etc along with important deliverables. This will aim at appraising the procedures involved in the preparation of project identification and preparation so as to help them in taking management decisions along with better supervision control.

  **Site visits/study tours.** In addition to the above, site visits and study tours will be organized to the administrators, elected representatives, technical and other staff to familiarize them with the best practices in urban infrastructure. The team in discussion with NCRPB/ADB will identify projects/sites for visit – best practice projects, PPP projects, and on-going projects.

**Outputs:** This activity on training will result in (i) preparation of a training plan; (ii) identification of resource persons in IAs and NCRPB, (iii) organizing training programs in project identification and preparation, and (iv) site visits and study tours

**Staff Involved:** Team Leader, Deputy Team Leader and All other Key persons
Figure 6: Detailed Methodology and Program for Training

- **On Job Training**
  - Involvement in TA activities
    - Resource persons (middle & junior level technical officials) of
      - State NCR Cells
      - ULB/DAs
      - Line Departments

- **Structured Training**
  - Workshops
    - WS 1: Introductory
    - WS 2: Master Plan Preparation
    - WS 3: Project Design & Due diligence activities
    - WS 4: Use of tool kits & sample project for preparation

  - Lectures – case studies
    - LR 1: Data requirements & collection procedures
    - LR 2: Project design & quality assurance
    - LR 3: Procurement procedures

- **Best Practice Field Visits**
  - (best practice projects; PPP projects & on-going projects)

**Target Groups**
- Elected representatives of ULBs
- Administrators
- All technical officers
- Accounts officials

**Focus Area of Training**
- On Job Training
- Structured Training

**Training Activities**
- LR – Lecture/case study; TA – Technical Assistance, and WS – Workshop;
- Stage 1 – During project preparation (before Draft Final Report submission); Stage 2 – After DFR
### Table 4: Workshop Activities

<table>
<thead>
<tr>
<th>Description</th>
<th>Objective</th>
<th>Focus area</th>
<th>Likely Schedule &amp; Location</th>
<th>Likely participants</th>
<th>Resource persons/trainers</th>
</tr>
</thead>
</table>
| Workshop 1                         | To introduce NCRPB activities & the present ADB TA                        | ✓NCRPB funding  
✓ADB TA objectives  
✓Project preparatory process for funding | 1 day; December 2008; Delhi | 75 – 100 no,s  
○ Elected representatives  
○ Administrators  
○ All technical officers  
○ Accounts officials | ○ NCRPB Officials  
○ TA Team |
| Workshop 2                         | To apprise master plan need and preparation process                      | ✓Water supply master plan  
✓Sewerage & drainage  
✓Solid waste management  
✓Transport plan | 1 day; February 2009; Delhi | 50 no,s  
○ All technical officers | ○ TA Team |
| Workshop 3                         | To apprise on project design & due diligence                             | ✓Data requirements  
✓Design criteria  
✓Software applications  
✓Economic analysis  
✓Financial analysis  
✓Environment assessment  
✓Social assessment | 2 days; June 2009; Delhi | 50 no,s  
○ All technical officers  
○ Finance & accounts officials  
○ Environment & social officers | ○ TA Team |
| Workshop 4                         | To familiarize tool kits                                                  | ✓Use of toolkits for preparation of projects for funding  
✓Case study – subprojects prepared under TA | 1 day; October 2009 Delhi | 50 no,s  
○ All technical officers  
○ Finance & accounts officials  
○ Environment & social officers | ○ TA Team |
### Table 5: Technical Lecture/Case Study Activities

<table>
<thead>
<tr>
<th>Description</th>
<th>Objective</th>
<th>Focus area</th>
<th>Likely Schedule &amp; Location</th>
<th>participants</th>
<th>Resource persons/trainers</th>
</tr>
</thead>
</table>
| Lecture 1   | To train in project preparation | ✓ Data requirements  
✓ Data sources & collection  
✓ Surveys & investigations | 1 day; March 2009; 2/3 locations outside Delhi | 25 nos  
○ All technical officers | ○ TA Team |
| Lecture 2   | To train in project preparation | ✓ Design criteria & best methods  
✓ Software applications  
✓ Quality aspects | 1 day; September 2009; 2/3 locations outside Delhi | 25 nos  
○ All technical officers | ○ TA Team  
○ External trainer |
| Lecture 3   | To train in procurement procedures | ✓ Procurement packages  
✓ Tender preparation  
✓ Specifications  
✓ Bidding process | 1 day; October 2009; Delhi | 50 nos  
○ All technical officers  
○ Finance & accounts officials | ○ TA Team  
○ External trainer |

### Table 6: Best Practice Field Visit/Study Tours

<table>
<thead>
<tr>
<th>Description</th>
<th>Focus area</th>
<th>Likely Schedule &amp; Location</th>
<th>Participants</th>
</tr>
</thead>
</table>
| Visit 1     | Best practice, PPP projects & on-going projects in  
✓ SWM (collection to landfill)  
✓ Water supply (WTP, leak detection, etc)  
✓ Sewerage (STP, pumping stations, etc)  
✓ Urban transport (bus terminals, multilevel parking, ROB, etc), | 3-4 days; October 2009; within the country | 20 nos  
○ Elected representatives (ULBs)  
○ Administrators |
| Visit 2     | ✓ Water supply (WTP, leak detection, etc)  
✓ Sewerage (STP, pumping stations, etc)  
✓ Urban transport (bus terminals, multilevel parking, ROB, etc), | 5-6 days; December 2009; within the country | 25 nos  
○ Technical officers |
| Visit 3     | ✓ Urban transport (bus terminals, multilevel parking, ROB, etc), | 5-6 days; February 2010; within the country (optional – oversees) | 10-15 nos  
○ Technical & administrative officers |
L. **Activity 12: Deliverables**

Table 7: TA Component B Deliverables

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Likely contents</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inception Report</td>
<td>o Approach, methodology, detailed work plan, and staffing schedule o Identification of sample subprojects for preparation under TA Component B</td>
<td>October 15, 2008</td>
</tr>
<tr>
<td>Interim Report</td>
<td>o Sector review with assessment of existing situation of all sample subprojects and sector-level plans o Economic analysis – sector review o Financial analysis – analysis of implementation agencies o Review of institutional arrangements and capacities o Training needs assessment</td>
<td>January 16, 2009 (It is proposed to reschedule the submission of interim report from December 22, 2008 (as per contract) to January 16, 2009 considering the time requirement for sector review and assessment)</td>
</tr>
<tr>
<td>Draft Report</td>
<td>o Feasibility studies o Detailed project reports o Environmental assessment reports o Resettlement plans o Economic analysis o Financial analysis o Capacity development plan o Training plan</td>
<td>August 31, 2009</td>
</tr>
<tr>
<td>Final Report</td>
<td>o Update draft report o Project preparatory toolkits o Report of training programs conducted</td>
<td>March 15, 20010</td>
</tr>
</tbody>
</table>
Capacity Development of the National Capital Region Planning Board (NCRPB) – Component B (TA No. 7055-IND)

INCEPTION REPORT
APPENDIX

OCTOBER 2008

Wilbur Smith Associates Private Limited
## Task Name

1. **Activity 1: Inception and Mobilization**
   - Mobilization & office Set Up
   - Collate Data & Conduct Reconnaissance Surveys
   - Finalize Methodology & Work Plan
   - Finalize Sample Subprojects

2. **Activity 2: Sector Review & Analysis**
   - Define Service Area & Characteristics
   - Conduct Socio-economic Baseline Survey
   - Collate Data/Maps & Conduct Surveys
   - Evaluate Sector Performance & Deficiencies
   - Review Institutional & Regulatory Framework
   - Project Future Demand & Develop Infra. Plans
   - Finalize Subprojects for Detailed Studies

3. **Activity 3: Feasibility Studies**
   - Conduct Surveys & Develop Subproject Components
   - Conduct Alternative Analysis
   - Screen for Social & Env Issues
   - Select Feasible Alternative for Detailed Studies

4. **Activity 4: Traffic & Transportation Studies**
   - Collect & Apprise Data & Reports
   - Carry out Engineering Studies and Surveys
   - Plan & Design for Short-term Measures
   - Conduct Travel Demand Forecasting
   - Plan & Design for Long-term Measures

5. **Activity 5: Detailed Studies**
   - Establish Design Criteria & Standards
   - Plan Surveys & Finalize Survey Agencies
   - Conduct Surveys & Investigations
   - Conduct Surveys & Investigations

6. **Activity 6: Economic Analysis**
   - Conduct Sector Review
   - Conduct Economic Analysis of Subprojects

7. **Activity 7: Financial Analysis**
   - Conduct Analysis of Implementing Agencies
   - Conduct Financial Analysis of Subprojects
   - Formulate Appropriate User Charges
   - Conduct Affordability Analysis & Cost Recovery Mechanism

8. **Activity 8: Social Safeguard Analysis**
   - Screen Subprojects for Resettlement and IP impacts
   - Prepare RP & IPDP
   - Develop RF & IPDF

9. **Activity 9: Environmental Assessment**
   - Screen Subproject for Environmental Impacts
   - Conduct Environmental Assessment
   - Develop EA Framework

10. **Activity 10: Institutional Capacity Building**
    - Assess Institutional Arrangements & Capacities
<table>
<thead>
<tr>
<th>ID</th>
<th>Task Name</th>
<th>Progress</th>
<th>Summary</th>
<th>Deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>Prepare Institutional Development Plan</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>Prepare Standard Project Preparatory Toolkits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>Activity 11: Training Programs</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>53</td>
<td>Training Needs Assessment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Identify Resource Persons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>Conduct Training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>Activity 12: Deliverables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>Inception Report</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>Interim Report</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>Draft Final Report</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Final Report</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The table and diagram provide a visual representation of the tasks and their timelines, indicating milestones and deadlines.
# APPENDIX 2: STAFFING SCHEDULE

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Firm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shekhwat NS</td>
<td>Team Leader &amp; WS Spl</td>
<td>WSAPl</td>
</tr>
<tr>
<td>M Bohminiathan</td>
<td>Dy TL &amp; Financial Spl/ Economist</td>
<td>WSAPl</td>
</tr>
<tr>
<td>Goyal, OP</td>
<td>Water Supply and Sewerage Spl</td>
<td>WSAPl</td>
</tr>
<tr>
<td>Goyal, SK</td>
<td>Solid Waste Management Spl</td>
<td>WSAPl</td>
</tr>
<tr>
<td>Seshadri, N</td>
<td>Transport Planning Spl</td>
<td>WSAPl</td>
</tr>
<tr>
<td>Harsha Vardhan</td>
<td>Roads &amp; Drainage Spl</td>
<td>WSAPl</td>
</tr>
<tr>
<td>Prerna Kumar, A</td>
<td>Roads &amp; Bridge (Transport) Spl</td>
<td>WSAPl</td>
</tr>
<tr>
<td>Arup Khan</td>
<td>Social &amp; Resettlement Spl</td>
<td>WSAPl</td>
</tr>
<tr>
<td>Achyutha Rao</td>
<td>Environment Spl</td>
<td>WSAPl</td>
</tr>
<tr>
<td>TBN</td>
<td>IT Specialist</td>
<td>WSAPl</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Support Design Engineers</th>
</tr>
</thead>
<tbody>
<tr>
<td>TBN Support Engineer (Water Supply)</td>
</tr>
<tr>
<td>TBN Support Engineer (Sewerage)</td>
</tr>
<tr>
<td>TBN Support Engineer (Traffic)</td>
</tr>
<tr>
<td>TBN Support Engineer (Roads/Bridges)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Month Input (Existing)</th>
<th>Month Input (proposed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb-10</td>
<td>100.0</td>
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<tr>
<td>Dec-09</td>
<td>89.5</td>
</tr>
<tr>
<td>Nov-09</td>
<td>16.5</td>
</tr>
<tr>
<td>Oct-09</td>
<td>106.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field Office</th>
<th>Home Office</th>
<th>Intermittent Input</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Field Office" /></td>
<td><img src="image2" alt="Home Office" /></td>
<td><img src="image3" alt="Intermittent Input" /></td>
</tr>
</tbody>
</table>
Appendix 3: List of Persons Met

Mr R K Karna  Director (A&F) NCRPB
Mr Rajeev Malhotra  Chief Regional Planner NCRPB
Mr P K Jain  FAO NCRPB
Mr Abhijeet Samanta  AD (PMC) NCRPB
Mr S K Dwivedi  Vice Chairman Gaziabad Development Authority (GDA)
Mr S K Zaman  CCP (NCR) & CTCP Gaziabad Development Authority (GDA)
Mr S C Gaur  STP GDA
Mr B N Mishra  Chief Engineer Gaziabad Nagar Nigam
Mr A K Tyagi  ATP NCR Cell Gaziabad
Mr N K Joshi  ATP NCR Cell Gaziabad
Mr J C Adarsh  Vice Chairman HPDA
Mr D R Yadawa  CE HPDA
Mr Tribhuwan Singh  CTP HPDA
Mr Indushekar Singh  EE HPDA
Mr Ashok Kumar  AE Municipal Council Hapur
Mr I P Singh  JE Municipal Council Hapur
Mr Y P Singh  EE Project Division UP Jal Nigam Bulandsahar
Mr Jitendra Mittal  EE B & R Rohtak Haryana
Mr Kapoor Singh  Head Draughts Man B&R Dn Jajjhar Haryana
Mr. Randheer Singh  Superintending Engineer, PWD (Public Health)
Mr. Ashem Khanna  Executive Engineer, PWD (Public Health)
Mr. H.S. Bhatti  SDO PWD (Public Health)
Mr. Karamveer Singh  Junior Engineer PWD (Public Health)
Mr. Ravinder Singh  Junior Engineer PWD (Public Health)
Mr. A.K. Mittal  Executive Engineer, HUDA
## Draft Household Questionnaire for Socio Economic Base Line

<table>
<thead>
<tr>
<th>Name of Surveyor:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of Head of the Household:</td>
<td></td>
</tr>
<tr>
<td>Relationship of respondent to the Head:</td>
<td></td>
</tr>
<tr>
<td>Years of Stay in the town</td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td></td>
</tr>
<tr>
<td>Settlement:</td>
<td></td>
</tr>
<tr>
<td>City:</td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
<tr>
<td>Name of respondent:</td>
<td></td>
</tr>
</tbody>
</table>

### Section II- Water Supply

1. What is the main source of drinking water used by the household?
   - a. Piped Water
   - i. Community Point
   - ii. Within the House
   - b. Protected well
   - d. Unprotected well
   - f. Surface water such as river/ponds etc
   - g. Ground water
   - i. Tube well in the community
   - ii. Tube well within the house
   - h. Water vendor

If yes, then do you know source of water from vendor (specify)
How long does it take you to fetch water from the main drinking water source in case you are
using a community point (to go, wait, and collect water and return)?

Dry Season (time taken in minutes) □

Wet Season (time taken in minutes) □

3. How many such trips do you need to take in a day?
   a. Dry Season □
   b. Wet Season □

4. What alternative source does your household use for drinking during periods of shortage?
   a. Piped Water □
   i. Community Point □
   ii. Within the House □
   b. Protected well □
   f. Surface water such as river/ponds etc □
   g. Ground water □
   i. Tube well in the community □
   ii. Tube well within the house □
   iii. Protected hand pump in the community □
   iv. Protected hand pump in the house □
   h. Water vendor □

If yes, then do you know source of water from vendor (specify)

5. When does your household use these sources?
   a. When the main source dries up □
   b. When main source breaks down □
   c. During times of low household income □
   d. Others (specify) □

6. How often does this happen?

7. How long does it take you to fetch water from the alternative drinking water source (to
go, wait, and collect water and return)? **In Minutes**

8. Do you need to pay money to get water from the alternate source?
   a. Yes
   b. No

9. Are you satisfied with the quality of water that you get from the main source?
   a. Yes
   b. No

10. If not, what are the water quality problems in the dry/wet season?
    a. Bad smell
    b. Bad taste
    c. Dirty
    d. Bad colour
    e. Hardness
    f. Floating particles
    g. Causes illness
    h. Others

11. Are you satisfied with the quality of water that you get from the alternate source?
    a. Yes
    b. No

12. If not, what are the water quality problems in the dry/wet season?
    a. Bad smell
    b. Bad taste
    c. Dirty
    d. Bad colour
    e. Hardness
    f. Floating particles
    g. Causes illness
    h. Others

**Present level of water supply system**

(Note: There may be multiple sources, please put the ‘X’ mark in appropriate boxes)
## Questions for HHs using piped water supply at home or community point or community supply through tube wells

13. Is the present water supply sufficient to meet the different needs of the household?  
   a. Yes  
   b. No  

14. Tick those activities for which you do not have sufficient water supply?  
   a. Drinking  
   b. Preparing and cooking food  
   c. Religious purposes  
   d. Bathing/flushing  
   e. Drinking water for cattle  
   f. Washing clothes  
   g. Washing utensils  
   h. Economic (specify)  
   i. Others (specify)  

15. Does the present piped water supply have adequate pressure?  
   a. Yes  
   b. No  
   c. Don’t know  
   d. Others  

16. Is the water supply time convenient for
you?
  a. Yes
  b. No
  c. Don’t know
  d. Others
17. Reasons for inconvenience
  a. Water comes during night
  b. Water comes early in the morning
  c. Water comes in the day while people are at work
  d. Others
18. Overall (considering quality, quantity, accessibility, reliability), are you satisfied with the water supply?
  a. Yes
  b. No
19. Satisfaction level for the current level of services
20. Awareness of waterborne diseases or other areas
21. Expenditure on waterborne diseases.

<table>
<thead>
<tr>
<th>Type of disease (tick)</th>
<th>Frequency</th>
<th>Cost per annum for family – In Rs. *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of Persons</td>
<td>(No. of episode last year)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cholera</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typhoid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jaundice</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* 1. < 1500, 2. 1500 – 2500, 3. 2500 – 5000, 4. 5000 – 10000, 5. 10000 – 15000, 6. > 15000

22. Willingness to pay for the new connection?
23. Preferred Source

<table>
<thead>
<tr>
<th>Preferred source</th>
<th>Willingness to pay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New connection (as Deposit)</td>
</tr>
<tr>
<td></td>
<td>Willing*</td>
</tr>
</tbody>
</table>
24. Would you be willing to pay more, if the HSC water supply service is improved (duration of supply, quantity, water pressure etc)

25. How much would you like to pay for better level of service per month?

<table>
<thead>
<tr>
<th>Percentage Increase</th>
<th>Willingness to pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>20% more than the current rate</td>
<td>Yes</td>
</tr>
<tr>
<td>20-30% more than the current rate</td>
<td>No</td>
</tr>
<tr>
<td>More than 30% but less than 50% from than the current rate</td>
<td></td>
</tr>
</tbody>
</table>

Section III- SEWERAGE

26. Present Level of Service

<table>
<thead>
<tr>
<th>Type of access</th>
<th>Type of system using</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Open Defecation</td>
<td>1. Underground Drainage</td>
</tr>
<tr>
<td>2. Neighbour's Toilet</td>
<td>2. Septic Tank</td>
</tr>
<tr>
<td>3. Public Toilet</td>
<td>3. Low-cost Sanitary Toilets</td>
</tr>
<tr>
<td>4. Any Other</td>
<td>4. Dry Latrine</td>
</tr>
</tbody>
</table>

Where the wastewater is disposed

1. UGD 2. Road side drains 3. Soak Pit 4. None

27. Satisfaction for current level of service?

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>Willing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly Satisfied</td>
<td>Yes</td>
</tr>
<tr>
<td>satisfied</td>
<td>No</td>
</tr>
<tr>
<td>Moderately Satisfied</td>
<td></td>
</tr>
<tr>
<td>Dissatisfied</td>
<td></td>
</tr>
</tbody>
</table>

28. Preferred source

<table>
<thead>
<tr>
<th>Preferred source</th>
<th>Willingness to pay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New connection (as Deposit)</td>
</tr>
<tr>
<td></td>
<td>Willing*</td>
</tr>
</tbody>
</table>

1. UGD
2. Septic tank
3. LCS
4. Public convenience

* 1. Yes 2. No
Section IV DRAINAGE

29. Details of Flooding

Does flooding affect your property / approach road? 1. Yes  2. No

If yes, provide following details

<table>
<thead>
<tr>
<th>Reason for flooding</th>
<th>Months</th>
<th>Frequency of flooding</th>
<th>Depth of flooding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If there is flooding what is the cost of damage each time?

If not satisfied suggestions for improvement?

30 Are you satisfied with the present drainage system?

Highly Satisfied | satisfied | Moderately Satisfied | Dissatisfied
-----------------|-----------|----------------------|-----------------|

Section V SOLID WASTE MANAGEMENT

31. What does your household do with garbage?
   a. Thrown outside and left
   b. Thrown outside and burnt
   c. Stored for collection to communal dump
   d. Put in pit and left
   e. Put in pit and burned
   f. Put in pit and covered
   g. Put in pit and left

32. Distance for solid waste disposal is ___________ m

33. Who disposes the waste from house

34. Time spent for disposal is _______________ hours per day

35. Segregation of waste:

36. Any expenses incurred on solid waste disposal. 1. Yes  2. No
   If yes, money spend is Rs._________ per_________ (as per the respondents answer)

37. Level of satisfaction for the current services
   5. Highly Dissatisfied

38. Willingness to Pay
   Are you willing to pay for improved service? 1. Yes  2. No
   How much you are willing to pay for improved level of service per month
   1. > 100,  2. 50-100,  3. 25-50,   4. < 25

Section VI ROADS AND TRANSPORT

39. Household Vehicle ownership i.e., number of vehicles owned by type.
40. Monthly expenditure on fuel and vehicle maintenance Rs. ______________

41. Travel Characteristics (Only for Work and Educational Trips)

<table>
<thead>
<tr>
<th>Household Member</th>
<th>Purpose of Travel</th>
<th>Mode</th>
<th>Distance</th>
<th>Time</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
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</tr>
</tbody>
</table>

42. Are you satisfied with the road conditions?  1. Yes  2. No
If not satisfied, your suggestions?

43. Do you have street lights?  1. Yes  2. No

44. Is there drainage in your roads?  1. Yes  2. No

PARKING FACILITIES

44. If provided with a designated parking space how much do you wish to pay for the service?
1. Less than Rs. 2 per Hour,  2. Rs. 2 to Rs. 3 per Hour,  3. More than Rs. 3 per Hour
If not satisfied, your suggestions for improvement?

45. PUBLIC TRANSPORT

How is current public transport system in your area?
If you are not satisfied with the public transport services, list the reasons for your dissatisfaction:
If not satisfied, your suggestions for improvement?

Would you pay more fare if provided with a better quality of service?
1. Yes  2. No  3. Can’t Say

How much more fare can you pay for a better Frequency of public transport service?
1. 5% More  2. 10% More  3. 15% More

How much more fare can you pay for a better Comfort of public transport service?
1. 5% More  2. 10% More  3. 15% More

How much more fare can you pay for a better Coverage of public transport service?
1. 5% More  2. 10% More  3. 15% More

Section VII Capacity to pay

45. What is your monthly family income now? In Rs. ______________

46. What was your monthly family income last year? In Rs. ______________

47. Is the increase due to
   a. More members of family now working
   b. More time available for income generation activities to the existing members
   c. Others (specify)

48. What is the occupation of main earning member in the family?

49. Are you being charged for water?
   Yes
50. If yes then how much do you pay per month?
51. How much did you pay per month last year?
52. Did you pay for getting a household water connection? How much?
53. Do you have a metered supply or pay by flat rate?
54. Do you face problem in paying for water?  
   a. Yes  
   b. No  

55. If yes then, what is the problem?  
   a. Too expensive  
   b. Unwilling to pay for low service level  
   c. Unable to pay regularly  
   d. Others  

55.1 Do you ration water if you find it expensive?  
   a. Yes  
   b. No  
   c. Don’t know  

56. Do you pay for latrine, sewerage, garbage collection? (separately for each)  
   a. Latrine  
      i. Yes  
      ii. No  
   b. Sewerage  
      i. Yes  
      ii. No  
   c. Garbage collection  
      i. Yes  
      ii. No  
   d. Drainage  
      i. Yes  
      ii. No  

57. How much do you pay for each?  
   a. Latrine  
      i. Per Use  
      ii. Monthly  
   b. Sewerage  
      i. One time charge  
      ii. Monthly  
   c. Garbage collection  
      i. Monthly  

58. Do you face problem in paying for sewerage/garbage collection?  
   a. Yes
b. No
59. What is the problem? (specify)
a. Yes
60. Did you need to borrow to pay for connection charges or make a latrine?
a. Yes
b. No
61. How much did you borrow and from whom and at what interest rate?
a. Yes
b. No
62. Have you been responsible for construction of your own toilets/drains or Water pipelines in the community/extensions into households?
a. Yes
b. No
63. If you are part of the construction work, is your connection cost lower than for the others or were you paid for your labour?
a. Yes
b. No

Section VIII Community Participation and Management

64. Did you participate in the following stages of project earlier:
a. Design (Planning)

<table>
<thead>
<tr>
<th>Yes</th>
<th>NO</th>
</tr>
</thead>
</table>

b. Choice of technology

<table>
<thead>
<tr>
<th>Yes</th>
<th>NO</th>
</tr>
</thead>
</table>

c. Location of installation

<table>
<thead>
<tr>
<th>Yes</th>
<th>NO</th>
</tr>
</thead>
</table>

d. Day-to-day operation

<table>
<thead>
<tr>
<th>Yes</th>
<th>NO</th>
</tr>
</thead>
</table>

e. Maintenance

<table>
<thead>
<tr>
<th>Yes</th>
<th>NO</th>
</tr>
</thead>
</table>

f. Monitoring

<table>
<thead>
<tr>
<th>Yes</th>
<th>NO</th>
</tr>
</thead>
</table>

g. Evaluation
h. Information dissemination

<table>
<thead>
<tr>
<th>Yes</th>
<th>NO</th>
</tr>
</thead>
</table>

65. Who interacted with you during the above?

a. Local Government

<table>
<thead>
<tr>
<th>Yes</th>
<th>NO</th>
</tr>
</thead>
</table>

b. Others

<table>
<thead>
<tr>
<th>Yes</th>
<th>NO</th>
</tr>
</thead>
</table>

66. What are the areas (component of project cycle) on which the executing agency/local officials sought more participation of the community, especially of the poor?

67. Do you know that access to safe clean drinking water is a right?

a. Yes
b. No

68. If yes then how do you know? Who told you?

69. Were the project activities disseminated before hand and during the project? What was disseminated? Who did that (NGO, CBO, govt. etc)

70. Who, according to you, are the people in the community who know less or have less access to sources of information? (ranking needs to be done)

71. Are you a member of any user group?

a. Yes
b. No

72. Does the group participate in water and sanitation activities of the project?

a. Yes
b. No

73. What do you do in the group?

74. Do you think that your point of view is considered in the group discussions?

a. Yes
b. No (Why)

75. Do poor people participate actively in the group?

a. Yes
b. No

76. If no, then why not?

77. What is the problem?
Section IX GENDER

78 Decision to Invest In Major Investments by Gender

<table>
<thead>
<tr>
<th>Area of Investment</th>
<th>Decision taken by</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
</tr>
<tr>
<td>Housing Construction</td>
<td></td>
</tr>
<tr>
<td>Construction of Toilet</td>
<td></td>
</tr>
<tr>
<td>Investment in children’s higher education</td>
<td></td>
</tr>
<tr>
<td>Marriage / Social function</td>
<td></td>
</tr>
<tr>
<td>Investment in Business</td>
<td></td>
</tr>
<tr>
<td>Purchasing Productive assets</td>
<td></td>
</tr>
</tbody>
</table>

79. Utilization of Income by Gender

<table>
<thead>
<tr>
<th>Expense Heads</th>
<th>Men</th>
<th>Women</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Expenditure</td>
<td></td>
<td></td>
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<tr>
<td>Children’s education</td>
<td></td>
<td></td>
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<tr>
<td>Health</td>
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<tr>
<td>Food</td>
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<tr>
<td>Social Expenditure</td>
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<td></td>
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<tr>
<td>Savings</td>
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<tr>
<td>Major Investments</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

80. Who is preferred to have a better education?
   1. Boy(s),  2. Girl(s),  3. Both

81 Do the children study at the same school? 1. Yes 2. No

If no, the reasons?

82 Tuition facilities are arranged for
   1. Boy(s),  2. Girl(s),  3. Both

In serving of food preference is given to
   1. Boy(s),  2. Girl(s),  3. Both
83 For providing higher education preference is shown to
1. Boy(s), 2. Girl(s), 3. Both

84 Involvement in household chores
1. Boy(s), 2. Girl(s), 3. Both

85 In provision of clothing preference is shown to
1. Boy(s), 2. Girl(s), 3. Both

86 Pocket money is provided to
1. Boy(s), 2. Girl(s), 3. Both

87 Preference for providing co-curricular & extra-curricular activities are given to
1. Boy(s), 2. Girl(s), 3. Both
### HOUSEHOLD PARTICULAR
Kindly give the following details: (Start with Head of the Household)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the family members</th>
<th>Age</th>
<th>Relation with Head of HH</th>
<th>Sex 1. Male</th>
<th>Sex 2. Female</th>
<th>Marital Status</th>
<th>Education</th>
<th>Monthly Income in Rs.</th>
<th>Occupation</th>
<th>Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tr>
</tbody>
</table>

* Head of the Household is the oldest person in household irrespective of sex and earning status.

** If any person in the family is handicapped, please specify along with the name with \(H\).
### 89 Monthly Household Expenditure : (Average)

<table>
<thead>
<tr>
<th>Items</th>
<th>Average Expenses per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td></td>
</tr>
<tr>
<td>Health Care</td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
</tr>
<tr>
<td>Children’s education</td>
<td></td>
</tr>
<tr>
<td>Fuel (specify for gas, kerosene, fuel wood, etc.)</td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td></td>
</tr>
<tr>
<td>Entertainment</td>
<td></td>
</tr>
<tr>
<td>Rent / Housing Loan Payments</td>
<td></td>
</tr>
<tr>
<td>Clothing</td>
<td></td>
</tr>
<tr>
<td>Telephone</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
</tr>
<tr>
<td>Waste Disposal</td>
<td></td>
</tr>
<tr>
<td>Newspaper &amp; other periodicals</td>
<td></td>
</tr>
<tr>
<td>Other Expenses (Specify)</td>
<td></td>
</tr>
</tbody>
</table>

### 90. Household assets

<table>
<thead>
<tr>
<th>Refrigerator</th>
<th>TV</th>
<th>Computer</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>wheeler</td>
<td>wheeler</td>
<td>Fishing Boat</td>
<td>Bicycle</td>
</tr>
<tr>
<td>Auto rickshaw</td>
<td>Ornaments</td>
<td>Land/Property</td>
<td>Sewing machines</td>
</tr>
</tbody>
</table>

### 91 Housing Details

- **Housing typology**: 1. Individual, 2. Flats, 3. Row houses, 4. Slum
- **Tenure status**: 1. Owner, 2. Tenant

**Built-up area of the house in sq. ft.**

## Coding Sheet

### Relationship

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>Sister</td>
<td>Grandfather</td>
<td>Brother-in-law</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td>13</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wife</td>
<td>Brother</td>
<td>Grandmother</td>
<td>Sister in law</td>
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<td>14</td>
<td>20</td>
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</tr>
<tr>
<td>Son</td>
<td>Daughter in law</td>
<td>Uncle</td>
<td>Others (specify)</td>
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<td>9</td>
<td>15</td>
<td>21</td>
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</tr>
<tr>
<td>Daughter</td>
<td>Brothers Wife</td>
<td>Auntie</td>
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</tr>
<tr>
<td>Father</td>
<td>Grandson</td>
<td>Nephew</td>
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<td></td>
<td></td>
<td></td>
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<td>5</td>
<td>11</td>
<td>17</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>Granddaughter</td>
<td>Niece</td>
<td></td>
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</table>

### Marital Status

<table>
<thead>
<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>Widower</td>
<td>Deserted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>7</td>
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<td></td>
</tr>
<tr>
<td>Unmarried</td>
<td>Divorced</td>
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<tr>
<td>2</td>
<td>5</td>
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<tr>
<td>Widow</td>
<td>Separated</td>
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</table>

### Education

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<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>Non-School going age child (Less than 6 Years)</td>
<td>Middle</td>
<td>7</td>
<td>14</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>School going age child but not going to school (Above 6 Years and up to 14 years)</td>
<td>Higher School</td>
<td>8</td>
<td>15</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Illiterate</td>
<td>Intermediate/ matriculation</td>
<td>9</td>
<td>Professionals</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Literate (NFE)</td>
<td>General Graduate</td>
<td>10</td>
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<td></td>
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<tr>
<td></td>
<td>Primary</td>
<td>Technical graduate</td>
<td>11</td>
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</tr>
<tr>
<td></td>
<td>Lower</td>
<td>Diploma graduate</td>
<td>13</td>
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### Occupation

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</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>Agriculture</td>
<td>Trade &amp; Business</td>
<td>Non Agri. Labour</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5</td>
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</tr>
<tr>
<td>Agriculture labour</td>
<td>Private Service</td>
<td>Transport Sector</td>
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<td>2</td>
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<tr>
<td>Allied Agriculture (Livestock)</td>
<td>Govt. Service</td>
<td>Others (Sp.)</td>
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<tr>
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<td>7</td>
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<tr>
<td>Industry</td>
<td>Service Sector</td>
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### Disease

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<tbody>
<tr>
<td>Self</td>
<td>Typhoid</td>
<td>Cholera</td>
<td>Jaundice</td>
<td>Diarrhea</td>
<td>Dengue</td>
<td>Filarisis</td>
<td>Asthma</td>
<td>AIDS</td>
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<td>Polio</td>
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<td>Fever</td>
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<tr>
<td>Pneumonia</td>
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<td>Viral Fever</td>
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<tr>
<td>Malaria</td>
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<td>Bronchitis</td>
<td>Viral Fever</td>
<td>Thyroid</td>
<td>Tonsillitis</td>
<td>Epilepsy</td>
<td>Cardiac</td>
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Appendix 4: Detailed Approach and Methodology for Economic and Financial Analysis

1. **ECONOMIC ANALYSIS**

1.1 **Introduction**


2. The main objective of subproject evaluation is to determine various aspects of economic feasibility including an analysis of rational use of resources and the expected benefits. In principle, following aspects of the proposed subprojects have been considered:
   
   i. Consistency of the subprojects with NCRPB / Constituent State’s sector policies and priorities and within the overall infrastructure development plan for the specific ULB;
   
   ii. Consistency with the overall broad strategies of the Bank (ADB) in environmental protection, poverty alleviation and social protection in urban development sectors;
   
   iii. Review of proposed investments, life-cycle cost, phasing, implementation schedules and determination of economic costs;
   
   iv. Analysis of potential economic benefits; and
   
   v. Overall economic cost-benefit analysis.

3. Urban local bodies (ULBs), on selective basis, are considered for infrastructure development and / or capacity development programme under different sectors, viz., water supply, drainage, sewerage, solid waste management and urban transport. From these sectors, few sample subprojects are identified, representing all sectors, for detailed economic analysis. This selection was to determine the methodology and selection criteria for future of subproject selection under the urban sector development loan to be financed under ADB or similar other funding agencies. Selected subprojects for detailed economic analysis include:

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<th>Identified Sample Subprojects</th>
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4. The costs and benefits of the infrastructure improvement components of the Project will be quantified using resource cost and ‘willingness to pay’ measures incremental to a ‘base case’, defined as the situation without the Project improvements. The analysis will be undertaken over a 20-year operational period from completion of the Project Component. As project components have different completion years, the last completion year will be taken as the completion year for uniformity and following 20 years will be taken as the operational period for economic feasibility analysis.

5. Following ADB’s guideline for non-revenue earning projects, an economic analysis will be carried out for subprojects under environmental sanitation improvements and urban roads improvement; a separate economic analysis will be carried out for the water supply subproject.

6. The institutional development component of the Project, if any, will not be subjected to economic appraisal due to the difficulties of measuring their economic benefits.

7. The economic analysis will be based on information from the Socio-Economic Surveys undertaken as part of the study, on the engineering, environmental, social, financial and other investigations and on economic evaluation parameter values relevant to the Project Cities / Towns gathered from secondary sources and informal discussions. Data requirement will be in the following areas:
   i. Capital costs of improvement;
   ii. Annual operating and maintenance (O&M) costs of the improved infrastructure;
   iii. Forecasts of demand for/usage of infrastructure services; and
   iv. Supply characteristics of infrastructure networks and services delivery.

1.2 Economic Rationale and Selection Approach

8. Economic Rationale: The economic rationale of the Project is based on two rationales:
   (i) Urban areas in India as net contributors to the Gross Domestic Product (GDP), where: (i) estimates of the contribution of urban areas to GDP are in the order of 50 to 60%\(^1\) well above the level of urbanization of 28% of the population; and (ii) the estimated per capita productivity ratio between the urban and rural populations in India is 7:2\(^2\). Economic growth in India is thus dependant on the wealth creation of urban areas and their ability to attract investment, increase productivity and continue to provide the focus for service sector activity. This in turn depends on the ability of cities to deliver infrastructure services to provide an appropriate urban environment,

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\(^2\) HUDCO, Indian Experience in Urban Water Supply and Sanitation, presented by V Suresh, Chairman & Managing Director, 1998.
amenity and quality of life.

(ii) The second economic rationale of the Project is to provide basic urban services to ensure acceptable environmental and living conditions, not only for social development but also to enable access to economic opportunities (i.e. income and employment), particularly by the poor.

1.3 Selection Approach

9. The process of selecting the subprojects is already described in this Report. The process included three concepts of particular importance to the economic evaluation of the proposed improvements:

   (i) Consistency with effective demand – the services provided by the improved infrastructure must be consistent with the ability and willingness of users or beneficiaries to pay for them, which will likely be different from the ‘need’ for such services. (Need and demand analysis for each component will be carried out through the socio-economic survey in which the willingness to pay component will be dealt with in detail);

   (ii) The least cost or most cost effective way of meeting effective demand, in terms of scale, location, technology and timing, will be considered (in the process of subproject selection on technical basis, the cost effectiveness will be taken as the main objective to serve the identified ‘demand’ backed up with willingness to pay within a reasonable design period); and

   (iii) Economic benefits are likely to exceed economic costs.

10. The purpose of the economic analysis is to achieve subproject’s main objective of ‘to assess whether resources are being allocated efficiently’ (i.e. whether a subproject’s economic internal rate of return benefits exceed the economic opportunity cost of capital).

1.4 Sector Review

11. A sector investment plan is a general description of a set of similar, potential investments. The investments or "subprojects" in the plan may be similar to each other, or they may be different but have the same goals. For example, a plan to improve the urban environments may involve a variety of subprojects each focused on environmental improvement, such as traffic control, drainage, sewers, and garbage collection. A sector loan is the ideal way for the Asian Development Bank (ADB) to support a government's sector investment plan.

12. Economic analysis of sector loans usually consists of benefit-cost analysis of "representative" subprojects. The purpose of analyzing a representative subproject should be to provide a model for the analysis of other subprojects. Another problem with focusing on subprojects is that it doesn't establish the whether the plan is economically sound when the plan aims to meet broad social goals. Economic analysis should also go beyond establishing only whether the government's investment plan is economically sound. The purpose of economic analysis should be to improve the both the plan and ADB's development effectiveness. Economic analysis can help improve the government's plan and ADB's development effectiveness if it takes a broad view and does not focus only on subprojects.
13. The analysis will identify key economic issues in executing the plan, and describes how ADB can support the government in addressing those issues. The analysis also will identify appropriate economic selection criteria, including analysis of subprojects following ADB's Guidelines. According to the ADB’s Guideline on Sector Loan analysis, economic analysis will cover the following areas, apart from the subproject analysis.

- Economic rationale for government involvement
- Goals of the plan
- The plan to reach the goals
- Associated economic policies
- Economic risks to the plan and goals
- Government's capacity to execute the plan
- Government's commitment to the plan and goals
- Coordination of foreign aid
- Fungibility of government funds

1.5 Economic Analysis of Subprojects

1.5.1 Economic Cost

14. The economic costs of capital works and annual operation and maintenance will be calculated from the financial cost estimates on the following basis:

(i) Price contingencies are excluded but physical contingencies are included because they represent real consumption of resources;

(ii) Import duties and taxes are excluded because they represent transfer payments;

(iii) The existence of unemployment and under-employment for unskilled workers within the Indian economy means that the opportunity cost of unskilled labour can be considered to be lower than its wage rate – a conversion factor of 0.75 of the market wage rate is used to estimate the shadow wage rate;

(iv) The market wage rate for skilled labour and the acquisition cost of land are considered to represent opportunity costs, as both factors are in demand;

(v) All costs are valued using the domestic price numeraire, to enable an easier comparison with the information used to measure benefits (e.g. a significant component of benefit is the savings in resources, which would be used in the without project situation).

1.5.2 Beneficiaries of the Subprojects

Sewerage Improvements

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3 Assessing Aid for a Sector Investment Plan: Economic Analysis of a Sector Loan, David Dole, Economics Research Department, Asian Development Bank
15. Project beneficiaries will be households getting new connections through proposed sewer lines. The households will gain from improved environmental sanitation conditions that a properly functioning sewerage system provides. The Socio-Economic/Baseline Survey results will indicate that poor households (core poor, intermediate poor and LIG) will benefit relatively more than non-poor (MIG/HIG) households from sewerage subprojects.

Drainage Improvements

16. As drainage improvement is mostly linked to the sewerage improvements, the entire Project beneficiaries of sewerage will be benefited by the drainage improvement in general. Beneficiaries will comprise the households located within the sewerage catchments areas with the improved environment and amenity provided by a proper functioning drainage system. Those households who live in flood-prone areas will receive direct benefits from avoided flood damage costs and work time lost.

Solid Waste Management Subproject

17. The SWM subprojects will be designed to hygienically and aesthetically dispose of the segregated solid waste from the city and provide treatment to the leachates before disposal at the proposed Landfill site. This subproject shall also lengthen the life of the Landfill site.

18. Project beneficiaries will comprise households in both high-density and low-density areas across the city, which will gain from the improved environmental sanitation, living conditions and amenity that a properly functioning solid waste collection and disposal system will provide. Those households who currently spend time disposing of their solid waste will receive additional benefits from receiving primary waste collection.

Urban Road Improvement

19. Project beneficiaries will be those travellers for whom accessibility to economic and social activities will be improved through better road conditions and traffic flows brought about by the subproject. This improvement is achieved by reducing the effort or inconvenience of travel between the origin of the traveller and the destination offering these activities.

20. Junction improvements/pedestrian subways related subprojects will benefit the vehicular traffic on these road junctions with less pedestrian related traffic congestion, less traffic conflict at junctions, increase the travel speed resulting in savings in travel time, accommodate the fast growing vehicular traffic, pedestrian safety including reduced road crossing time for the people who cross the road at the three junctions etc.

21. Parking improvements related subprojects will benefit the vehicular traffic on the road junctions around the parking locations with less parking related traffic congestion, increase the travel speed resulting in savings in VOC and travel time, accommodate the required parking demand etc.
1.5.3 Valuing Economic Benefits

Environmental Sanitation Improvements

22. The benefits arising from improved sewerage or sanitation, solid waste management, and storm water drainage results in improved environmental and living conditions and public health in the Project city / town. Benefits will be achieved through more effective removal of sewage, solid waste and stagnant water from in and around living areas and prevention of sewage, solid waste leachate and stagnant water from entering drains and waterways and, in some areas, broken water supply pipelines. Improved disposal of sewage, solid waste and stagnant water will result also in more pleasant surroundings through a reduction in odour and an improvement in the aesthetic quality of drains, waterways, low-lying areas and other areas where solid waste is dumped.

23. However, quantifying environmental and health benefits is difficult because of the need for data to establish the magnitude of impacts of the improvements and to separate out the effects of an improved sewerage, solid waste collection or drainage system from other factors such as personal hygiene habits, housing standards, water quality, etc.

24. Difficulties in estimation have meant that benefits that are more readily valued have been used in the economic evaluation of environmental improvements – for example, revenues from service tariffs or charges (as indicators of willingness to pay) and avoided economic costs for households or businesses from not having to take alternative actions because of the poor delivery by government agencies of environmental services.

25. The economic benefits considered in the present analysis for different components will include:
   (i) Cost of savings for residential and non-residential sewage generators, which are no longer required to operate on-site disposal systems;
   (ii) Reduction of household medical cost due to wastewater related disease;
   (iii) Reduction in flood damage and related earnings lost due to the Project, and
   (iv) Savings in time cost for the disposal of solid waste due to the Project.

26. Willingness to Pay (WTP). Broad information on willingness to pay for improved facilities will be collected during the socio-economic/baseline survey. Presently there will be no sewer facilities or sewer functioning only in limited areas and the HHs from the remaining unserved area will be willing to avail the services if provided. For water supply, SWM and sewerage components, the response from this survey will be a clear input with regard to the ‘effective demand’ estimation for these services, who will be willing to avail the proposed services along with the payment of ‘required’ user charges. Broadly, this is considered as the ‘effective demand’ for the project components design.

27. Avoided Economic Costs. However, the baseline/socio-economic survey collected information on a number of household economic costs that would be avoided with improved infrastructure services. These costs are:
(i) Expenditure on disposing of sewage on-site;
(ii) Expenditure on treating environmental sanitation-related diseases;
(iii) Expenditure on repairing flood damage;
(iv) Loss of earnings due to flooding; and
(v) Time spent in disposing of solid waste.

28. **On-site Sewage Disposal Costs.** Households receiving connections to the sewerage system with the Project would otherwise need to dispose of sewage on-site, by installing septic tanks or low cost sanitary toilets such as twin pit pour flush latrines or dry pit latrines. The cost savings of not having to undertake on-site treatment will be taken as an economic benefit of the Project. For calculation of economic benefits, the avoidance of on-site sewage disposals cost for those who are going to avail new connections will be considered. For these households, capital cost and the future O&M cost of existing on-site disposal facilities (collected from socio-economic survey), discounted at 9% for 15 years are considered as Project benefits. These cost savings will be applied to the beneficiaries of the sewerage system, distributed by socio-economic category. The percentages of households in each socio-economic category using septic tank and other on-site disposal types in the without Project situation will be assumed to be the same as currently exists.

29. **Health Care Costs.** Research findings indicate that sanitation improvements result in more health benefits, mainly in terms of reducing the waterborne diseases.

“The regression results reported, show that expenditures on sanitation had a large impact on reducing the waterborne disease death rate. Sewage capital (particularly the initial sewage treatment works) and refuse collection and disposal had particularly large effects”.

“Over all the cities in the pooled sample, a one percent increase in each of the six categories would have saved 18 lives annually in the average-sized city”.

30. According to the National Sample Survey Organisation survey findings, the monthly per capita expenditure on non-institutional medicine in urban areas was Rs 32.30 (2004-05) and estimated to Rs 41 for 2008-09. If one include the institutional medical expenditure, the total household medical annual medical expenditure will be high and at national level this is estimated to be Rs 5000 – Rs 6000. Sanitation improvements in urban areas will help to reduce this high incidence of annual household medical expenditure by reducing the impact of waterborne diseases considerably. This will apply to the present project cities also.

31. The avoided health care costs per household will be applied in full to the number of households benefiting from both sewerage and solid waste management improvement. The inadequacies of the sewerage and solid waste management systems will be considered major contributing factors to personal hygiene and public health conditions. The risk of environmental sanitation-related diseases would be reduced with properly maintained and functioning sewerage and solid waste collection and disposal systems, together with increased public awareness on the effects of indiscriminate disposal of wastes into waterways and dumping of rubbish in open areas.

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4 DEATH AND SPENDING: URBAN MORTALITY AND MUNICIPAL EXPENDITURE ON SANITATION, Louis Cain
Department of Economics Loyola University Chicago & Elyce Rotella, Economics Department 105 Wylie Hall Indiana University

32. **Flooding costs-Damage and Time Lost.** Results of the socio-economic/baseline survey along with local enquires in the project cities will be the information sources to arrive the average annual damage costs per household and also to estimate the value of household earnings lost per household due to coping with flooding.

33. **Solid Waste Disposal Time Costs.** Respondents to the baseline/socio-economic survey will be asked how long they spent each day on disposing solid waste. The same economic value of time as spent in collecting water per hour will be used to calculate the time savings in waste disposal for the project beneficiaries.

34. **Exclusions.** The following benefits of reduced pollution, a cleaner city and improved waterway environment will not be quantified:
   
   (i) Public cost of treating diseases due to poor environmental sanitation;
   
   (ii) Private and public costs of mosquito control;
   
   (iii) Avoided costs of on-site sewage/wastewater disposal by commercial, industrial and institutional premises;
   
   (iv) Public costs of flooding, including traffic disruption, road repair and building repair;
   
   (v) Possible appreciation to property values due to the project improvements;
   
   (vi) Effects on businesses and industries, such as aquaculture and fisheries, agriculture and washing; and
   
   (vii) Effects on tourism and tourist-related businesses.

**Urban Roads Improvement**

35. The economic benefits of the improvement in accessibility brought about by reduced traffic congestion and improved traffic flow for the subproject have been measured, and contribute to reduction in travel costs. These comprise (i) savings in vehicle operating costs; and (ii) passenger travel time costs. For pedestrian traffic using the subway, travel time cost savings is measured as project benefit.

36. **Vehicle Operating Cost Savings.** The approach that will be adopted in this analysis is to estimate unit vehicle operating cost differentials for different vehicle types operating at a range of average low speeds in urban conditions. In the absence of such a detailed model for urban roads in India, the outputs of a generalized model based on the guidelines by Indian Roads Congress (IRC) will be adopted. There is the potential for savings in vehicle operating costs due to the improved service level in the sub-project impact roads. The existing congested traffic in the Project city/towns will be affected by interference with on-street parking and frequent pedestrian crossings. Higher fuel consumption plus vehicle wear and tear with repair costs result from frequent change in vehicle acceleration. Based on the reconnaissance survey and other primary traffic surveys, the existing travel speed and the proposed speed after improvement will be

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*Savings in accident costs and road maintenance costs are often included as benefits from road improvements. These have been excluded from the current analysis because: (i) it is difficult to predict the impact of the subprojects on the number and type of accidents; and (ii) the major thrust of the subproject is to improve accessibility in the towns/cities and their impact on road maintenance costs is considered to be minor.*
arrived/assumed. Vehicle operating cost (VOC) savings due to this change in speed was estimated using the IRC guidelines. Main facts considered in the analysis include:

(i) VOC savings for the traffic using improved Project roads, considering the updated unit rates for different vehicle categories were calculated.

(ii) Based on similar traffic study results and prevailing vehicle registration trends in the project town/region, a suitable annual growth rate in traffic will be adopted.

37. **Value of Passenger Travel Time Savings.** A weighted average value of travel time savings per vehicle hour will be estimated from the following town/city-wide data:

(i) Average vehicle occupancy – the number of passengers by vehicle type, plus paid driver and crew where applicable;

(ii) Traffic composition – the percentage of each vehicle type in the traffic stream;

(iii) Passenger composition – the percentage of each socio-economic category using each vehicle type and the percentage of passengers who are in the workforce;

(iv) Savings in travel time cost attributable to Project road improvement and increase in their speed levels were estimated using the updated time value for different vehicle types.

(v) For simplicity purpose, uniform level of service will be assumed during the analysis period, even though there will be variations. However, in order to accommodate this constraint, only reduced level of benefit will be considered. For example, for the proposed improvements comprising improvement in surface quality, road side drainage, and pedestrian facilities, only 30% improvement in speed will be considered throughout the analysis period.

38. **Time Savings for Crossing Pedestrians:** Pedestrians who cross the busy junction during the peak hours in morning and evening are subjected to inordinate delay. Proposed pedestrian subways, if any, under the subproject will help to reduce this time delay and enhance safety for the crossing pedestrians. Using the average time savings, the average time value and the estimated pedestrian traffic, time savings for crossing pedestrian traffic will be estimated.

### 1.5.4 Economic Cost-Benefit Analysis

39. Each subproject component proposal will be compared to the without Project situation, using the discounted cash flow technique and economic opportunity costs of capital of 12% for environmental sanitation improvement and urban roads improvement. The evaluation period allowed for 20 years from the first full year of benefits; partial years of benefit (and O&M costs) during the Project implementation period will be determined from the implementation schedule.
for each subproject. The analysis will be conducted at domestic prices and the discount year will be taken as 2009. All values in the following tables will be expressed in 2009 prices. Main evaluation of economic cost-benefit analysis will be carried out on subproject basis to estimate the following economic feasibility indicators;

- Economic Internal Rate of Return (EIRR)
- Economic Net Present Value (ENPV)

40. **Sensitivity Analysis.** Sensitivity analysis will be undertaken in order to test the robustness of the economic results. The following changes in parameters and assumptions will be analyzed:
   
   (i) A capital and O&M cost overrun of 20 percent;
   (ii) Decrease in subproject benefits by 20 percent;
   (iii) One year delay in implementation; and
   (iv) Worst case scenario of combined effect with cost (capital and O&M) increase by 20 percent, all benefit decrease by 20 percent and one year delay in implementation.

1.6 **Distribution of Project Effects and Poverty Reduction Impact**

41. Distributional analysis, which leads into calculation of the Poverty Impact Ratio (PIR) i.e., the proportion of project net benefits accruing to the poor, will be carried out on subproject basis or implementing agency basis and that will include the following assumptions:

   (i) The financial effects statement for the Project will be adjusted by non-monetized outputs, resource cost savings and user charges revenue. Appropriate factors for converting financial prices of resource cost savings and user charges revenue to economic prices will be used (to adjust to taxes, unskilled labour wage rate and shadow exchange rate);
   
   (ii) Economic values will be expressed in domestic price numerarie;
   
   (iii) The economic benefits of the poverty alleviation component equal to the cost of providing the component;
   
   (iv) The effect of Project financing will be excluded;
   
   (v) The effects of loss of access and other types of disruption to residents and business due to works during the construction will be excluded; and
   
   (vi) All values will be presented in the net present value (NPV) at 12% discount rate and calculated for the year 2009.

The analysis will attempt to estimate the total project economic impact and its distribution among the major stakeholders and the likely project impact reaching the urban poor. For the analysis purpose, urban poor households will be defined in terms of those living Below Poverty Line (BPL) with appropriate average monthly household income.

2. **Financial Analysis**

2.1 **Background**
42. Financial analysis will be carried out for urban infrastructure subprojects that are amenable to user charges and as stand alone sector projects e.g; sewerage, solid waste management and urban transport (vehicular parking) Subprojects that can not be amenable for user charges under revenue stream will not considered for financial analysis.

43. The investment will be substantial for these subprojects and these projects will be analysed as stand alone sub projects. Sewerage in the current form in a limited way is financed out of the State budget and there exists no levy for the service, except for cost of connection on actual. Similarly for the SWM, user charges collection is in a limited or partial manner and underground parking it has adequate experience in the form of parking fee collection for designated off-street parking at selected areas of ULB.

44. Proposed subprojects financial analysis will be structured as follows:
   • Existing scenario in different sub sectors in which the subprojects are considered for analysis that include implementing agencies, user charges, O&M practice etc;
   • Project level financial sustainability and viability analysis;
   • Discussion on user charge options; and
   • Affordability analysis with respect to the recommended user charges through WTP approach.

2.2 Analysis of Implementing Agencies

2.2.1 Review of Existing Scenario

45. Appropriate Implementing Agencies relevant to the subprojects will be subjected to review of existing scenario. Review of existing scenario will be focussed on the following areas:
   • Budgetary allocations
   • Accounting system
   • Tariff structure including provision for revision
   • Revenue collection efficiency
   • Operation and Maintenance
   • Cost recovery
   • Major issues

2.2.2 Policy Approach and Initiatives:

46. With respect to the review analysis of existing scenario for implementing agencies, additional probe will be attempted in the following areas:
   • Existing policies with respect to service providence, project selection, O&M, tariff system, cost recovery etc
   • Policy reforms in the agenda
   • Initiatives towards the defined policy reforms
2.2.3 Guiding Principles for Subproject Selection:

47. The lessons from the sub project analysis forms the basic principles of financial appraisal of using balance sheet based financial analysis for service projects with no cash streams and for cost recovery / remunerative on the financial returns at a rate not less than benchmark rate of weighted average cost of capital (WACC). The general principles of engagement on a sub project are that:

- It should be part of the Sector Master Plan/ Town Development Plan;
- Commitment to conduct an audit of existing situation;
- Development of a business plan by the service provider, addressing costs, revenues, assets, demand assessment, investment needs and tariff adjustments over a Seven-year time horizon. The business plan should include measurable indicators of performance to be updated and approved by the ULB council annually;
- Improvements in financial management, particularly billing and collection, and
- Tariffs set at a level sufficient to cover O&M costs during the implementation period.

2.3 Financial Analysis of Subprojects:

48. The subprojects for the purpose of financial analysis will be categorized as Service, Cost Recovery and Remunerative. The initial pipeline subprojects consists of Sewerage (Service/ Cost Recovery), Solid Waste Management Project, Water Supply Project, Underground Parking, Toll Roads (Cost Recovery), and pedestrian Subways, drainage, road improvement projects (service).

2.3.1 Weighted Average Cost of Capital:

49. The financial viability of subprojects will be assessed by comparing the subproject’s financial internal rate of return (FIRR) with the financial opportunity cost of capital. As proxy for the financial opportunity cost of capital, the weighted average cost of capital (WACC) of the subprojects in real terms will be used. The FIRR is the discount rate that equalizes the present values of costs and revenues over the subproject life, while the WACC represents the cost incurred by the government in raising the capital necessary to implement the subprojects. The WACC will be estimated based on the central government’s on lending policy to the participating states.

2.3.2 Financial Implementation Action Plan (FIAP):

50. Based on the discussions of the above analysis, an appropriate Financial Implementation Action Plan (FIAP) will be outlined for each subproject/sector and that will provide the base for the subprojects financial analysis. Generally, this FIAP will define time lines for deliverables, tariff structure, tariff revisions, policy reform agenda etc.
51. The revenue streams for the financial analysis of sub projects include a property tax based levy and a monthly charge; or an upfront deposit and a monthly charge. A decision on implementing the above discussed revenue stream (property tax based levy and monthly charge) will be critical to project sustenance. Apart from a revision on completion of the capital works, it would be necessary to revise the water charges, sewer levy / SWM user charges periodically so as to compensate the increasing O&M cost.

52. The key assumptions generally used for analysis include:
- levy of property tax;
- revision to the property tax;
- maintain tax collection percentages at least 80% of the demand, and
- implementing the project on schedule

53. On the user charge front, the key assumptions will include
- levy of property tax based levy and/or connection fees;
- a monthly user charge option irrespective of above;
- non domestic rates at least 2.5% times that of domestic
- revision to the property tax base periodically;
- Maintain tax collection percentages at least 80% of the demand,
- implementing the project on schedule

54. Main evaluation of financial analysis will be carried out on subproject basis to estimate the following financial feasibility indicators;
- Financial Internal Rate of Return (FIRR)
- Financial Net Present Value (FNPV)

55. Sensitivity Analysis: Sensitivity analysis will be undertaken in order to test the robustness of the financial results. The following changes in parameters and assumptions will be analyzed:
   (i) A capital cost overrun of 10 percent;
   (ii) O&M cost overrun of 10 percent;
   (iii) Decrease in project revenue by 10 percent; and
   (iv) Project revenue delay by one year.

2.4 User Charges

56. To achieve the required feasibility level on WACC basis for the proposed investment, the monthly charge will need to be worked out for different subprojects and this will be compared to the existing user charges structure. The results of the analysis will throw lights on the required agenda for user charge reform and policy related issues. The concept of user charges in general is a recent concept and there is no history of user charges in India for Sewerage except for a surcharge on water. To achieve WACC level of rate of return, the required user charge rates will be generally steep. Keeping these in mind, the cost recovery policy target will be shifted to cover at least 100% of O&M cost by the end of the project implementation period for certain urban infrastructure subprojects like sewer and full cost recovery for the remaining cost recovery
subprojects and remunerative subprojects. Hence selection of project specific user charges will be driven by the following factors:

- 100% O&M cost recovery by the end of project implementation period
- 100% O&M cost recovery in addition to partial or full capital cost recovery, in possible cases, guided by WACC analysis
- Affordability approach, as revealed through WTP analysis

2.5 Affordability Analysis and Cost Recovery Mechanism

With the backdrop of the willingness to pay survey results for the identified subprojects, the existing / proposed tariff rates (user charges and taxes) for the year 2010-11 will be compared to ascertain their reasonableness and the affordable level. This will underline the ‘effective demand’ for the proposed urban infrastructure services, backed-up with affordability from the consumers. This will form as a major input to prepare an appropriate ‘Financial Improvement Action Plan’ (FIAP). Considering the on-going policy reform agenda/policy guidelines, the cost recovery norms will be formulated and that will appear in the FIAP.