

Terms of Reference (TOR)

For

Environmental Impact Assessment (EIA) of Proposed Waste Management Center (including MRF, Sanitary Landfill, compost plant as required) of Bharatpur Metropolitan City

And

Initial Environmental Examination (IEE) of Proposed Waste Management Center (including MRF, Sanitary Landfill, compost plant as required) of Hariwan, Triyuga and Narayani Municipalities

Contract ID No. SWMTSC/S/QCBS-073/74-VI



**Ministry of Federal Affairs and Local Development
Solid Waste Management Technical Support Centre (SWMTSC)
Lalitpur, Nepal**



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1. Background:

Increase in generation of solid waste has been common phenomena in many urban and semi-urban areas of Nepal due to rapid population growth and increase in urbanization. Proper solid waste management is innermost important in order to maintain clean and health environment in the city. However, due to poor and improper solid waste management, urban environment is rapidly deteriorating in most of cities of Nepal in terms of air, soil and water pollution. With increase in living standard and rapid change in pattern of living, various types of wastes have been generated in the Nepal that made its management more challenging. Thus, the government of Nepal and respective local bodies has to prioritize this issue and its solution urgently for development of clean and healthy urban environment.

Whereas, Solid Waste Management Technical Support Centre (SWMTSC), a national entity established as technical department of Ministry of Federal Affair and Local Development under SWM Act 2011 whose main objective is to assist local bodies in sustainable solid waste management, improve environment and public health through technical assistance, research and development. SWMTSC has been providing technical support in capacity building, developing baseline study and strategy and action plan, infrastructure development for waste processing and final disposal.

Basically, waste composition of most of municipalities shows 60% of biodegradable waste, 25-30% recyclable wastes and 10-15% is landfill waste. 80% of waste can be recovered as resources in the municipality and that does not necessary to carry them in landfill site. But in contrary, besides few municipalities, most of municipalities recovered 10-15% of waste while rest 80% of waste were dumped in haphazardly in bank of river, forest or barren land. Since waste is mixed type combined with biodegradable waste, bad odour from dumping site due to anaerobic decomposition raise social unacceptance for dumping site. Thus, due to such poor solid waste management, 'Not in My Backyard' (NIMBY) syndrome has raised among people's mind. That's reason the municipality face social conflict that made difficulties in selection of land for sanitary landfill site.

Bharatpur Metropolitan City is the newly established metropolitan city of Nepal among 4 metropolitan city of the country which situated at mid of Nepal in Chitwan District . Bharatpur metropolitan city generate more than 60 tons of municipal waste per day and have been facing the big challenge of waste management due to lack of appropriate waste management facility. They don't have appropriate final disposal site and processing facility as well. They are finally disposing waste in



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control dump site near bank of Narayani River. Bharatpur metropolitan city has selected land for waste management center with material recovery facility. Thus, SWMTSC is going to provide technical support through conducting Environment Impact Assessment (EIA) study for proposed waste management Center (including MRF, Sanitary Landfill, compost plant as required). Therefore SWMTSC intend the consulting service from eligible national consulting firms for conducting EIA study of proposed waste management center at Bharatpur metropolitan city and initial environment examination (IEE) of proposed waste management center of Hariwan, Triyuga and Narayani Municipalities.

2. Objectives of the project:

The main objectives of this assignment is to conduct Environmental Impact Assessment (EIA) of Proposed waste management center of Bharatpur Sub-Metropolitan City and Initial Environmental Examination (IEE) of Proposed waste management center of Hariwan, Triyuga and Narayani Municipalities.

3. Specific Objectives:

Specific Objectives:

The specific objectives of this assignment are:

- To prepare TOR and Scoping document of EIA /IEE of proposed waste management center format given by EPA/EPR.
- To determine the major physical, biological and socio-economic impacts of the proposed waste management center
- To assess the waste generation situation at Bharatpur metropolitan city, Hariwan, Triyuga and Narayani Municipalities.
- To identify the potential environmental impacts from proposed waste management center during construction, operational and post operational stages
- To formulate mitigation measures for avoiding adverse impacts and enhance beneficial effects.
- To prepare environment management and monitoring plan
- To prepare and submit the EIA report of proposed waste management center of Bharatpur metropolitan city and IEE report of proposed waste management center of Hariwan, Triyuga and Narayani Municipalities.

4. Scope of works:

For EIA study

Based on above mentioned objective of the consultant's services, the detail scope of services will be as follows:

- Review previous reports related with solid waste management activities, including EIA studies report on sanitary landfill sites, compost plant, MRF and other waste management facilities.
- Review the different Acts and Regulations including Local Self Governance Act, 2055 and Local Self Governance Regulations, 2056, Solid Waste Management Act, 2068, Solid Waste Management Rules 2070, Environment Protection Act, 2053 and Environment Protection Regulation, 2054, National EIA Guidelines, Solid Waste Management National Policy, 2053 and other SWM related policies, plan and strategies.



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- Carry out the field survey for physical , biological , socio-economic situation of project area,

Physical Issues

Construction Stage

- Landscape disturbance, land stability, landslide, soil erosion, etc, due to the topographic change;
- Change in air quality due to dust and exhaust emission, change in water quality due to civil/concreting works sedimentation, and noise level;
- Location and operation of quarries and borrow pits;
- Drainage alteration and associated erosion and sediment; Hydraulic change and river bank protection due to the river diversion works;
- Safety measures;

Operation and Maintenance Stage

- Land stability, landslide, and soil erosion, including geological hazard as the local fault passes through northern edge of the proposed site;
- Surface water hydrology;
- Air quality;
- Bad smell;
- Water quality (both surface and ground water) related to leachate generation and control
- Noise and vibration;
- Leachate generation and control
- Gas generation, emission and migration;
- Availability of cover material
- Human health associated with the change in air quality and noise level along the road alignment.

Biological Issues

Construction Stage

- Loss of agricultural area as a part of land acquisition;
- Possible impact on flora, fauna (biodiversity);
- Disturbance to wildlife movement, and possible hunting and poaching;
- Use of forest products by the construction workers and construction activities;

Operation and Maintenance Stage

- Birds hazard;
- Impact on and growth of community forest;
- Loss of aquatic life.
- Disturbance to the wild life

Socio-economic and Cultural Issues

Construction Stage

- Loss of agricultural land;
- Loss of agricultural products;
- Effect on irrigation schemes;
- Effect on health, sanitation and safety of local people and workers;
- Availability of local construction workers, employment opportunities and
- Mobilization of local people for construction.



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Operation and Maintenance Stage

- Impact on local economy including the issues on the waste pickers;
 - Community infrastructures;
 - Aesthetic values;
 - Public health hazard and Quality of life values.
- Develop or design environmental mitigation measures to minimize adverse impact
- Develop environmental management and monitoring plan for proposed sanitary landfill site.
- Prepare and submit EIA report on proposed waste management center for Bharatpur MC.
- Review and incorporate comments given from EIA Review committee from concerned stakeholder to finalize EIA report.

For IEE study

- Review previous reports related with solid waste management activities, including EIA studies report on sanitary landfill sites, compost plant and MRF etc.
- Review the different Acts and Regulations including Local Self Governance Act, 2055 and Local Self Governance Regulations, 2056, Solid Waste Management Act, 2068, Solid Waste Management Rules 2070, Environment Protection Act, 2053 and Environment Protection Regulation, 2054, National EIA Guidelines, Solid Waste Management National Policy, 2053 and other SWM related policies, plan and strategies.
- Carry out environmental and social baseline survey of the project area
- Identify and describe potential environmental and social impacts in project area.
- Develop or design environmental mitigation measures to minimize adverse impact
- Develop environmental management and monitoring plan for proposed waste management center.
- Prepare and submit IEE report on proposed waste management center of Hariwan, Triyuga and Narayani Municipalities
- Review and incorporate comments given from IEE Review committee from concerned stakeholder to finalize IEE report.

5. Methodology:

The consultant shall review literature(s), collect and analyze primary and secondary information on physical, biological and socio-economic and cultural resources within the Project area. Available data from proposed site shall be reviewed. The consultant shall focus, but not limited to, the information collection on local physiographic, geology/hydro geology, watershed condition, hydrology (surface/groundwater), soil condition and environmental Condition such as water quality, air pollution and noise, major elements of physical environment for both construction and operational stages of the Project. The consultant shall also estimate the loss of different land uses as a part of site clearance.

The Proponent has an intention to include the following studies into the data collection and analysis:

- Water quality shall have to be analyzed in and around the proposed landfill site including the river and groundwater. At least 2 samples from the nearby deep well at the village shall also have to be analysed. This information will be useful for examining the future environmental conditions in and around the proposed site.



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- The operational condition of the existing dump Sites will be reviewed based on the site observation, hearing to the officials, and/or the records/reports related to the site operation, in order to have a supportive information for examining the likely impacts as well as for developing the mitigation measures and management plan. The review will include the odor, cover soil, landfilling activities and conditions, performance, in-coming waste volume and characteristics, traffic volume generation due to the waste transportation, status of complaints/grievances from the local, status of waste picking, animal/bird attracting, etc.
- The data/information such as rainfall and other meteorological aspects will be also collected from the existing observation station(s) and used for analysis. EIA team will have a careful discussion and study of runoff/flood analysis based on the above data/information.
- The consultant shall estimate the approximate loss of different categories of agricultural products. Approximate quantity of agricultural products shall be calculated and environmental and social impacts shall be predicted and evaluated. Information and possible impacts on mammals, birds and fishes shall also be assessed and evaluated.
- Baseline information on socio-economic information such as population, major economic activities, loss of agriculture produces, and social services facilities etc. shall be well documented in the EIA report. The report shall also include information on land acquisition, compensation and rehabilitation issues. Existing cultural heritage within the Project area if any shall also be documented along with impact evaluation and prediction.
- The baseline information shall be quantified to the extent possible. Similarly, impacts identified, evaluated and predicted shall be quantified to the extent applicable. Each impact shall be examined along with its significance. The consultant shall recommend benefit augmentation measures and adverse impacts mitigation measures for each impact identified and predicted.
- Review geological investigation of proposed location to determine the geological structure and soil characteristics conducted for detail design of proposed landfill site. Conduct geo-technical test if required.
- In order to meet the above objectives, the consultant may use different methods for information collection and impact assessment. The consultant may also use secondary information through published and unpublished reports, and maps and photographs interpretation. Information on physical environment can be collected through literatures, maps and field measurement. Calibrated equipment to be used to quantify information and standard methods shall be used for the field testing and laboratory testing. The consultant may use data sheets to collect the field level information.
- Socio-economic information can be collected by using questionnaire, checklists, observation, interviewing with the local people, focus group discussion, and participatory rural appraisal (PRA), discussion with district level offices, municipality and community groups. The consultant shall collect information on possible damage of infrastructures, and community services through checklists and focus group discussion. Information on land acquisition and compensation issues shall be collected through household survey of the households located within project area.
- The consultant may use the standard methods and techniques for impact identification, prediction and evaluation as also included in the National EIA Guidelines 1993 and Guideline for Solid Waste Management Project in the Municipalities of Nepal. These data shall be



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analysed and interpreted in narrative form as appropriate, and they should be included at appropriate places in the EIA report and the appendices.

6. TimeSchedule:

The consultancy service is expected to be accomplished within 6months from the date of signing of agreement. The consulting firm is required to develop the work schedule reflecting the tasks of each of the study experts/members to meet the target. Draft EIA shall be submitted within 5 months and Draft IEE reports within 4 months. If EIA or IEE approval from MOFALD needs more time assignments, duration shall be extended as per time taken for approval from MFALD and MOPE .

7. Team Composition and time impute:

The consultant team should comprise at least of the following personnel as shown below:

SN	Designation	Basic Requirements	Input (man-months)
1	Team Leader/IEE/EIA Expert	Should hold at least Master's Degree in Civil/Environmental Engineering with at least 15 years of general experience including 10 years specific work experience in assignment related works.	5
2	Solid Waste Management Expert	Should hold at least Master's Degree in Civil Engineering, Environmental Engineering with at least 10 years of general experience including 5 years of specific experience in solid waste management projects	4.5
3	Environmentalist	Should hold at least Master's Degree in Environmental Engineering/science /management with at least 10 years of general experience including 5 years of specific experience in solid waste and environment sector.	4.5
4	Hydro-geologist	Should hold at least Master's Degree in Hydrology/Geology with at least 10 years of general experience including 5 years of specific experience on hydrological studies.	3
5	Socio-economist	Master's Degree in sociology /economics with at least 10 years of general experience including 5 years of specific experience in related field.	4
6	Legal expert	Master's degree in law with at least 5 years of general experience and 3 years of specific experience	3.5
7	Surveyor	Should hold at least Bachelor's Degree in Survey Engineering with at least 7 years of general experience including 5 years of specific experience on surveying of infrastructure projects. Experience of working on solid waste management is preferred.	2



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8. Management Issues

After detail analysis of likely impacts of the project on the local environment, attempts should be made to manage both beneficial and adverse environmental impacts. Environmental management issues should be dealt with in detail during the EIA study for both construction and operational stages. The environmental management plan should take into account the mitigation measures for each impact identified, monitoring of impacts and environmental auditing components with environmental management responsibilities. The study should also highlight the reinstatement of public services likely to be affected by the project during its construction. Furthermore, the EIA study should take into account the project execution issues, as appropriate, strict management of contractor's work and use of appropriate technologies for construction. The EIA report should address the other issues raised during scoping notice.

9. Environmental Impacts:

The consultant shall elaborately identify, predict and evaluate each impact of the Project activities on the environment quantitatively, to the extent possible, for both construction and operational stages. The lessons and experience of existing dump Sites shall be considered. Each impact identified, predicted and evaluated by using standard methods and techniques on physical, biological, socio-economic and cultural aspects shall be documented in the final EIA report. The impacts should mention its nature, magnitude, extent and duration using appropriate symbols and definitions with due consideration on the Guidelines for Solid Wastes Management Project in Municipalities of Nepal with similar other reference materials. Magnitude of the impact shall further be classified into site specific, local and regional; and the duration of impact shall be further classified into short term, medium term and long term. Environmental impacts should be presented in the matrix form.

10. Alternative Analysis

Alternative analysis should be an integral part of the EIA report. The Proponent shall analyze the likely environmental impacts of project activities in each possible alternatives with due consideration on.

- design
- project site
- technology management methods, schedule, required raw materials
- acceptability;
- other relevant points

Each alternative should be compared in terms of environmental impacts and benefits, and the best alternative should be recommended for project construction and mitigation measures should be proposed.

In addition No Action Option shall be compared with implementing variations in the design of the proposed project.

11. Mitigation Measures

In order to avoid and/or minimize adverse environmental impacts, cost effective and locally implementable mitigation measures should be included in the EIA and IEE report. The adverse impacts mitigation measures shall be categorized as preventive, corrective (curative/rehabilitative), and compensatory measures. The Proponent shall include environmental protection measures (EPMs)



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in the final EIA and IEE report. The EPMs shall be included for both construction and operational stages. It is essential to integrate the experiences and lessons obtained through the successfully operated Landfill Site into the examination of mitigation measures. Cooperation and consultation mechanism involving the local communities are also to be discussed as a part of mitigation measures and/or environmental management plan (EMP) in order to have a good implementation and operation of the project as well as a mutual understanding and consensus among the stakeholders.

12. Costs and Benefits of the Project

The consultant shall include analysis-based cost for benefits augmentation and adverse impacts mitigation measures to the extent possible in the EIA report. The environmental cost sharing, if any, should also be included in the main EIA report.

13. Environmental Management Plan

The environmental management plan (EMP) shall be an integral part of the EIA and IEE report. The cost of mitigation measures, manpower and organizational requirement to implement the mitigation measures will be discussed with the responsible agencies and their consent will be enquired. Monitoring of the implementation of proposed mitigation measures shall be the part of EMP.

The consultant shall include monitoring parameters for both construction and operational stages in the main EIA report. It should also include schedule of monitoring, methods and primary responsible agency for monitoring in the matrix form. The primary responsible agencies will be consulted before assigning the responsibility. Monitoring activities will be classified in terms of baseline, impact and compliance monitoring. Manpower requirement for the monitoring activities will be listed out. Estimated cost for environmental monitoring should be included in the main report.

Similarly EMP shall comprise of environmental auditing. The environmental auditing is the integral part of EPR, 1997. It obliges MOE to conduct environmental auditing two years after the project is completed. During the study, an auditing plan should be prepared to assess the effectiveness of the implemented mitigation and compensatory measures. The study identifies the auditing parameters clearly for the major environmental issues identified in the EIA study. The study will prepare the cost for auditing works including requirement of the manpower.

14. Other Information

The EIA and IEE report should also include relevant information, references, annexes, map, photo, tables, charts, graphs and questionnaires, as applicable. Relevant information should be concisely presented in the main report and detail information can be given in annexes. The reference should follow the format as indicated in Schedule 6 of EPR 1997 i.e. Author, date of publication, title of materials, name of publication or journal, year, volume, number, page number as appropriate.

15. The Report Format

The consultant shall prepare the final EIA report based on the Schedule 6 of the EPR 1997. The consultant, however, may rearrange and group ingredients listed in the Schedule 6 while preparing the final EIA report. In any case, the EIA report shall not omit any components as mentioned in this TOR and the Schedule 6 of the EPR 1997.



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The EIA report may be formatted as follows:

Name and address of the individual or institution preparing the report
Executive summary of the report (both in English and Nepali languages)

- Background of the proposal
- Objective of the EIA study and relevancy of the proposal
- Methodology
- Brief Description of the proposal
- Existing environmental condition of the proposal
- Beneficial and adverse Impacts on environment, effects on people's livelihood
- Main mitigation measures
- EMP and its implementation
- Conclusions and recommendations

Acronyms

Table of content

1. **Chapter 1 : Introduction**
 - background
 - rationality for conducting EIA
 - objectives of EIA study
 - the project proponent
 - organization responsible for carrying out the study
2. **Chapter 2 : Methodology**
 - Introduction
 - Study team
 - project area delineation
 - Methods(desk study, field study, impact assessment methods, interim report, public consultation, public hearing, draft report preparation, finalization of EIA report etc.)
3. **Chapter 3: Project Description**
 - Project location
 - policy for development of landfill site
 - waste generation quantity
 - disposal system
 - leachate quantity and quality
 - effluent standard
 - leachate treatment
 - general concept of the project and component description
4. **Chapter 4: Review of Policies, Plans , Law and Guidelines**
5. **Chapter 5: Existing Environmental Condition**
 - **Physical environment**
 - Location and access, topography, climate, hydrology, sediment, geology, slope stability, water quality, air quality, noise level , odour level, Seismic zone
 - **Biological Environment**
 - Forests and vegetation, Non-timber forest products, wild life, aquatic life, Endemic, threatened, Rare and protected species;
 - **socio-economic and cultural environment**
 - **District profile**



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- **project area profile**
 - Population and demographic pattern, ethnicity, settlement patterns, cultural and religious activities, status of women, social service, economic status
 - **socio economic status of project affected peoples**
6. **Chapter 6: Potential environmental Impact**
 - Beneficial Impact
 - Adverse impact
 - Physical environment (construction and operation stage)
 - Biological environment (construction and operation stage)
 - Socio-Economic and cultural environment (construction and operation stage)
 - Evaluation of impacts
 7. **Chapter 7: Alternative Analysis**
 - Analysis of the alternatives for the proposal
 8. **Chapter 8: Mitigation Measures**
 - Measures to reduce environmental impact
 9. **Chapter 9: Environmental management plan**
 - Matters concerning environmental management plan such as
 - Implementation plan of Environmental protection measures,
 - Environmental monitoring,
 - Framework of environmental auditing,
 - Organization and staffing for EP implementation,
 - Directives and coordination aspects, reporting requirements and
 - Estimated budget for EMP implementation
 10. **Chapter 10: Conclusion and Recommendation**
 11. **References**
 12. **Annexes**
 - Figures
 - Tables

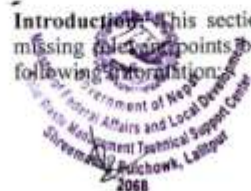
The IEE report should present with following contents:

I. Executive Summary that includes:

- Background of the proposal
- Objective of the IEE study and relevancy of the proposal
- Brief Description of the proposal
- Existing environmental condition of the proposal
- Beneficial and adverse Impacts on environment, effects on people's livelihood
- Main mitigation measures
- EMP and its implementation
- Conclusions and recommendations

If the IEE report is prepared in English, executive summary will be given in Nepali also.

- II. Introduction** This section shall describe the project in simple terms and concisely, without missing the key points but avoiding unnecessary details. The project description shall provide following information:



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- Background
 - Name of the proponent
 - Description of proposal
 - Objective of IEE the study
 - Methodology adopted for IEE study
- III. **Review of related policy, legislations, standards, guidelines and institutions:** During the study relevant policies, legislations and guidelines shall be reviewed and their salient features shall be mentioned in this section.
- IV. **Existing Environmental condition:** Baseline information on the existing physical, biological as well as socio-economic and cultural resources of the proposal shall be described here.
- V. **Project Alternatives:** This section summarizes the alternatives by environmental comparison. This may include the following sub-headings if very rarely required.
- No action option
 - Project alternatives
 - Alternative project site
 - Alternative design and construction approach
 - Alternative schedule and process
 - Alternative resources, and
 - Any other alternatives
- VI. **Identification and Assessment of Impacts and Mitigation Measures:** This section contains the process, findings and conclusions of analysis and interpretations. The criteria for significance assessment shall be summarized with the results of assessment. This may be presented and discussed in the following:
- VII. **Physical and Chemical Impacts:** such as land, air, water, noise, infrastructure impacts and other factors.
- VIII. **Biological Impacts:** such as flora and fauna, natural habitats and ecosystems.
- IX. **Socio-economic-cultural impacts:** such as agricultural land, human health, social, cultural and religious values, implications of physical and biological impacts and other relevant socio-cultural-economic impacts.
- This section also summarizes the recommended mitigation measures including basis for selection and cost if possible.
- X. **Environmental Monitoring and Management Plan-** This section summarizes the recommended monitoring parameters/indicators, activities, methods and responsibilities. Environmental Monitoring and management plan for renewable and non-renewable natural resources and others shall be EIA guidelines and rules for this to be implemented during the construction and operation period because bad or incomplete management plan may deplete both the resource and the non-resource environment.
- XI. **Conclusion and Recommendations-** This section shall clearly indicate whether IEE report is sufficient or further assessment is needed. Likewise, it shall also recommend the aspects that should be covered if further environmental assessment is needed.
- XII. **Miscellaneous-** Reference materials shall be mentioned here if used during IEE report preparation in standard format.
- XIII. **Annex**
- ToR of IEE
 - Summary of consultations and meetings
 - Deed of consultancy (muchulka)



- Notices published and pasted
- Recommendations from the concerned Municipality
- Photographs, Maps, Drawings, Checklists, Questionnaires
- List of persons and institutions consulted

17 Deliverables:

S.No.	Particular (report on both soft and hard copy)	No. of Copies EIA report
1	Inception report	3 copies
2	Scoping report and TOR	5 copies for each municipality
3	Draft EIA report	5 copies of each municipality
4	Draft IEE report of each municipalities	5 copies of each Municipality
5	Final EIA/IEE	5 copies of each Municipalities

16. General Requirement of Consultant's Services:

The consultant will perform the service to the satisfaction of SWMTSC and will provide all the requisite staffs, equipment, supplies, and logistic supports for the performance of the work. During the service, the consultant will cooperate fully with SWMTSC and also work in close coordination and consultation with other stakeholders, and The consultant shall always respect the interest of the client and shall carry out the services with due diligence and efficiency.

17. Mode of Payment:

The consultant shall be paid as per the following schedule.

- 20% after the submission and approval of inception report.
- 30% after submission and approval of TOR and Scoping of EIA report
- 30% after the submission and approval of draft EIA and IEE report.
- 20 % after the submission and approval of final EIA and IEE report.

18. Facilities to be provided by the Client

SWMTSC will provide all relevant background information, including previous studies and reports, project documents, including project commitment paper and project operational manual as required. SWMTC will also facilitate the consultant in obtaining relevant reports and data from municipalities, and in organizing stakeholder workshops. The consulting firm is required to manage all the arrangements with sufficient logistics, staff and infrastructure. No cost for such arrangements shall be borne by the Client.

19. Selection Method

The consulting firm shall be selected under Quality and Cost Based Selection (QCBS) methods set forth in Public Procurement Act, 2007 and Public Procurement Regulations, 2007. Maximum 6 firms shall be shortlisted based on the firm's qualification and experience and only to those shortlisted firms shall be required to submit their technical and financial proposal.

