BANGLADESH UNIVERSITY OF ENGINEERING & TECHNOLOGY

Technical Proposal on

Feasibility Study (Proposed Conservation of Flood Zone of Turag River and Compact Township Development Project)

Course No: PLAN 402

Course Name: Project Planning Studio

Submitted by: **Group 8**

Maliha Nowshin Anita (1815023);

Rafiul Ibna Sarowar (1815028);

Khalid-Bin-Shafiq (1815029)

Level-4, Term-2

Department of URP, BUET

Submitted to:

Dr. Md. Musleh Uddin Hasan

Professor, DURP, BUET

Mrs. Sadia Afroze

Assistant Professor, DURP, BUET

Sayeda Laizu Akter

Lecturer, DURP, BUET

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1.INTRODUCTION

1.1 Background:

Dhaka, a rapidly expanding metropolis, grapples with the pressing challenges of accommodating its burgeoning population as housing and infrastructure struggle to keep pace with urban expansion. Presently, about 1.6 crore people reside permanently in Dhaka metro for service, business and other purposes. This unbridled growth has led to a critical shortage of breathing and living spaces, triggering the unauthorized encroachment of preserved water retention areas, water bodies, and flood flow zones. Wetland has been reduced from 14% to 4% over the period of 1967 to 2010 (Rajuk, 2016). The consequence is a recurring challenge of flooding during the rainy season, disrupting not only the urban life system but also posing a significant threat to the city's ecology. More than 60% of the city is under constant risk of flooding (Rajuk,2016). The illegal grabbing of vital ecological zones exacerbates the vulnerability of Dhaka, necessitating immediate intervention to rescue the city from the escalating threats of inundation and environmental degradation.

In response to the complex urban challenges, it is paramount to initiate a project that preserves the flood flow zones and water retention areas. This imperative aligns with both the historical experiences of Dhaka and the directives of the Prime Minister articulated during a crucial ECNEC meeting, emphasizing the conservation of wetlands and agricultural lands. These directives underscore the critical need for a comprehensive solution to address the escalating risks faced by Dhaka. The urgency of initiating the proposed project is underscored by the consistent threats posed by illegal encroachments and the dire consequences of unchecked urbanization. The feasibility study, as a crucial component of this initiative, will meticulously evaluate the project's optimum compliance with pertinent land use and hydrologic policies. It will serve as the bedrock for informed decision-making, ensuring that the proposed solutions not only align with regulatory frameworks but also contribute effectively to the sustainable development and resilience of Dhaka.

In essence, the proposed project emerges as a timely and imperative response to the multifaceted challenges facing Dhaka. By strategically conserving vital ecological zones, the project aims to not only address the immediate threats of flooding but also lay the foundation for a resilient and sustainable urban future for the residents of Dhaka.

1.2 Objective of the Project:

- To demonstrate the need for developing a compact township on the Turag River
- To investigate the compliance of the proposed Project with Detailed Area Plan (2010-2015) and Draft Dhaka Structure Plan (2016-2035)
- To review the 'Draft Final Report on Flood Hydrology Study for the Western Part of Dhaka Metropolitan Area' and investigate its compliance with the proposed project
- To identify the land cover change pattern of the project area at "Business as Usual" contex
- To investigate prospects and constraints of the proposed project
- To analyze economic, financial and social feasibility of the proposed project

1.3 Site Description:

The project site is located at the Westside of Turag River from Hemayetpur-Gabtoli Road to Northside of Ashulia-Gabtoli Beribadh.

Division	District	Upazila/Thana	Area (acre)
Dhaka	Dhaka and Gazipur	Mirpur, Savar, Tongi	9116.4

1.4 Comments on TOR (Terms of Reference)

It covers all the basic components of the TOR but there are some drawbacks and loopholes in the components.

Explanation for initiating the project: The TOR does not explicitly convey the future inadequacy of core Dhaka city to accommodate its population. Nevertheless, it suggests the imperative for developing the flood flow zone of the Turag River, acknowledging the associated risks despite the potential challenges in handling such vulnerable areas. The TOR describes why it is necessary to conserve flood flow zone/ water retention area to save Dhaka but misses out the need of Compact Township Development Project on flood flow zone and with the integration of this project how is it going to save the flood flow zone/ water retention area in detail. Statistical evidences about flood risks, health hazards could emphasize more the rationale of the study.

Objectives of the Project: The TOR outlines five measurable objectives that directly relate to the project and address the current issues in Dhaka city, establishing a clear connection between the

project's goals and the existing challenges. But the temporal dimension of the objectives of this TOR is not mentioned.

Site Description of the Project: Site description is clear and specific. Spatial dimension of the project area is mentioned in the TOR.

Scope of the project: Scope of work is written component wise but there are some drawbacks. The TOR omits crucial information on key evaluation questions aligned with criteria such as relevance, effectiveness, efficiency, sustainability, and impact.

Methodology of the activities:

- Component 1: Compliance with relevant documents

The task involves a comprehensive review of key documents such as the Detailed Area Plan (2010-2015), Draft Dhaka Structure Plan (2016-2035), and flood hydrology study for the Western part of Dhaka Metropolitan Area. This ensures that the proposed projects are evaluated against a range of relevant and established documents and encourages a holistic view by incorporating both short-term (Detailed Area Plan) and long-term (Draft Dhaka Structure Plan) perspectives. By examining compliance with specific documents, the consulting team aims to ensure that proposed projects adhere to the legal and regulatory frameworks set out in the Detailed Area Plan and the Draft Dhaka Structure Plan. Moreover, considering the flood hydrology study for the Western part of Dhaka Metropolitan Area demonstrates a commitment to addressing environmental challenges and potential risks. The task, while comprehensive in reviewing specific documents, might still have a limited scope in capturing all relevant aspects. There could be other critical documents or factors not explicitly mentioned in the TOR that could impact the compliance of proposed projects. But relying solely on pre-existing documents may hinder the flexibility required for future adjustments in response to emerging challenges or opportunities as urban development is dynamic, and plans may need to adapt to changing circumstances. The TOR does not address how the consulting team will assess the feasibility and potential obstacles to implementing the proposed projects as per the identified compliance standards.

- Component 2: Site Profile

Utilizing high-resolution satellite images for land cover trend analysis enhances the objectivity and accuracy of the assessment, providing valuable insights into changing landscapes but time frame is missing here. Conducting Focus Group Discussions to identify socio-economic characteristics demonstrates a commitment to understanding the local context and considering the community's perspective.

- Component 3: Critical Review of the Project

The identification of "Eco-friendly" criteria specific to the local context and a comprehensive examination of the proposed site plan's compliance with "Eco-friendly Compact Township" criteria, demonstrates an effort to align the project with environmental sustainability goals. But how the 'eco-friendly' criteria will be identified is not mentioned and the involvement of stakeholders in identifying eco-friendly criteria is potentially overlooking valuable community input.

- Component 4: Financial and Economic Analysis

The inclusion of financial and economic modeling, along with sensitivity analysis and the output, including recovery schedules, cash flow projections, IRR, ERR, and detailed worksheets, provides a transparent and comprehensive view of the financial and economic aspects of the project. While financial and economic aspects are considered, the analysis may not capture non-monetary factors contributing to the project's overall success, such as social or environmental benefits.

- Component 5: Recommendation and Policy Guidelines

The provision of recommendations and policy guidelines adds a value to the evaluation by guiding decision-makers on critical issues and project suitability. But the task is vague and did not specificity of the recommendations and policy guidelines. Providing more clarity regarding these recommendations would enhance their utility. Moreover, the TOR does not mention involving stakeholders in formulating recommendations and policy guidelines. Incorporating diverse perspectives could enrich the output.

Deliverables and Schedule: The TOR provides a well-structured timeline, outlining key milestones and deadlines for each phase of the feasibility study. Beside this, the inclusion of workshops/presentations at different stages (data collection method and output) promotes ongoing communication and collaboration between RAJUK and the consulting team. While the timeline includes major milestones, there is a lack of interim deadlines for smaller deliverables such as survey report (FGD, reconnaissance survey), hydrological study report, submission of different maps etc. Frequency of progress reporting, if required (e.g., weekly, monthly, fortnightly, etc.) is also not mentioned here. Incorporating intermediate checkpoints could ensure continuous progress monitoring and reduce the risk of delays. The specific format and media needed to be followed for the deliverables are not included in the TOR. The number of copies to be submitted of each report and map are not mentioned. Moreover, the scale of the maps is not specified.

Key Experts: The minimum qualification and year of experiences of key experts have been mentioned clearly in this TOR. But the role and responsibilities of the experts and other members along with their work duration in man month is not mentioned in this TOR. GIS specialist, and surveyors were required for this project which is not mentioned here. The team formation of the surveyors needed to be mentioned in detail i.e., number of surveyors for physical survey, social survey etc.

Specification about Payment Schedule: Percentage of estimated budget is allocated in each section of work. Budgets are not specifically defined or approximately defined which is required for the consultant/ contractor so that they can specify the costs or design the process based on the available budget more precisely.

Institutional Arrangement: Institutional arrangement to identify the specific authority who will directly supervise the contractor, and to whom the contractor will be directly responsible to, reporting to, seeking approval/acceptance of output from (e.g, the Project Manager, or National Project Director, etc.) is missing in this TOR.

2. TECHNICAL APPROACH AND METHODOLOGY

2.1 Need Assessment for developing a compact township on the Turag River:

This feasibility study will try to make a strong case for the development of a compact township on the Turag River as a proactive response to the anticipated population demands in Dhaka City's core areas by comparing the projected population demand with the existing and projected capacity of core areas. After that, the study will try to evaluate the Compact Township as a Solution.

2.1.1 Population Growth, and Housing Demand Analysis for core Dhaka city:

- ✓ Population forecasting: Population growth of the core Dhaka city will be projected using arithmetic method for the next 20 years. In this method, the average increase in population per decade will be calculated from the past census reports. This increase will be added to the present population to find out the population of the next decade. Thus, it is assumed that the population is increasing at constant rate. Hence, dP/dt = C (i.e., rate of change of population with respect to time) is constant. Therefore, Population after nth decade will be Pn= P + n.C Where, Pn is the population after 'n' decades and 'P' is present population. Results from this projection will be utilized in the analysis of housing demand and supply using the demographic and socio- economic information.

2.1.2 Traffic and Transportation Analysis for core Dhaka city:

- ✓ Traffic trend analysis and projection*:* Traffic trend analysis of the core Dhaka city will be done using previous data of AADT of different months of a route through regression analysis method. Future trip generation, trip pattern and modal split of passengers of core Dhaka will be projected by Travel Demand Model using TransCAD 8.0 software.
- ✓ The potential for improved transportation along the Turag River will be assessed by evaluating the condition, capacity, and efficiency of the existing transportation infrastructure along the river, including ports, jetties, bridges, and road networks connecting to the riverbanks.

2.1.3 *Evaluating Compact Township as a solution:*

- ✓ At first, a scenario will be introduced that involves the development of a compact township on the Turag River. After that, how this scenario will address the challenges posed by population growth in core areas will be assessed. The potential for improved infrastructure along the Turag

River will be examined by evaluating the condition, capacity, and efficiency of the existing infrastructure to support the anticipated population growth.

2.2 Compliance with relevant documents

The consulting team of hydrology expert and urban planners will check compliance of the proposed project with Detailed Area Plan (2010-2015), Draft Dhaka Structure Plan (2016-2035) and Flood Hydrology Study for the Western Part of Dhaka Metropolitan Area.

- ✓ Review of relevant policy documents: Detailed Area Plan (2010-2015), Draft Dhaka Structure Plan (2016-2035) and Flood Hydrology Study will be collected preferably in soft copy or hard copy. The existing planning process, policies and guidelines of these documents will be critically reviewed. Moreover, plans, proposal, programs of relevant agencies functioning inside RAJUK jurisdiction area will be reviewed and analyzed.
- ✓ Identifying non-compliant elements: The project's plan and processes against the policy documents will be compared to identify any non-compliant elements.
- ✓ The project will be monitored and evaluated regularly in align with the policy documents to ensure continuous compliance.
- ✓ Comprehensive records of the compliance procedure, documenting all modifications to the project along with the rationale behind each change will be maintained.

Table 1: Collected Documents and their sources

Documents	Sources
Detailed Area Plan (2010-2015)	Website of RAJUK
Draft Dhaka Structure Plan (2016-2035)	Website of RAJUK
Flood Hydrology Study Report	Bangladesh Water Development Board (BWDB)
All plans, proposals, programs, etc. of relevant line agencies functioning inside RAJUK jurisdiction area.	Website of RAJUK

2.3 Reconnaissance survey

The reconnaissance survey is a study to get preliminary idea about the entire area. Surveyors will be divided into teams and a rapid reconnaissance survey will be conducted. Basic features, issues and potential of the area will be revealed to the surveyors and help them understanding the character and quality of the study area.

2.4 Preparation of site profile

The consulting team of GIS-expert and Urban Planners will provide an overview of the land-use trend and socio-economic condition of the proposed site. Due to limited time, it would not be possible to assess the environmental impact of the project but a study outlining socio-economic condition of the project area will be carried out.

2.4.1 Land cover trend analysis using high resolution satellite image

Land Cover trend analysis will be done in ArcGIS.

Steps of Land Cover Trend analysis**:**

- ✓ Data Collection: A series of satellite images from WorldView-3 1.84 8 band multispectral for the year 2000 to 2018 will be collected. These images will be of very high resolutions to enable analysis of high-density urban areas having fine grain morphology. This imagery will be stored and backed up in several devices.
- ✓ Image Preprocessing: There are a numerous number of Image processing methods and algorithms available. The satellite image will be processed through Epipolar correction, color balance, contrast adjustment, sharpening, pyramid, bit rate setting, enhancement, feature extraction, segmentation, fusion, change detection, compression, classification, feature detection etc. to improve image quality.
- ✓ Ground Control Points (GCP) collection: GCP will be selected by image identification of existing ground features. At least four features, that are clearly visible and easily identifiable, will be selected. As instructed, all GCP Will be collected by conducting field survey using HIK-GPS method.

- ✓ Land Cover Classification: The satellite images will be classified into different land cover classes using a supervised or unsupervised classification. Common classification algorithms include maximum likelihood, decision tree, and support vector machine.
- ✓ Temporal Analysis: The land cover changes will be analyzed over time by comparing the classified images from different time periods. This can be done using change detection techniques such as image differencing, post-classification comparison, and the combination of both. Moreover, the changes in land cover will be quantified over time by calculating the area and proportion of each land cover class. This will help to identify the land cover trends and patterns in the study area.
- ✓ Validation: The results will be validated using ground truth data, and make necessary adjustments to improve accuracy.
- ✓ Reporting: The findings will be summarized and the results will be presented in a clear and concise manner.

2.4.2 Identification of socio-economic characteristics of people currently residing in project area through social survey:

Social survey is necessary to gather information of population characteristics in terms of size, structure, socio-economic condition. The assessment of the socio-economic conditions surrounding the Turag River can be conducted through various criteria, encompassing income and employment, education and health, infrastructures and services, livelihood diversity, social capital, and cultural different factors. Additionally, input from key stakeholders such as government agencies (Ministry of Water Resources, Department of Environment, local government bodies), NGOs, Private Sectors, and Academic and research institutes is crucial for policy formulation and implementation in river conservation efforts. Incorporating their insights and expertise into this feasibility study is essential for this project.

2.4.2.1 Questionnaire survey:

Questionnaire survey will be conducted to collect the primary data. Random sampling method will be used to select respondent. At 99% confidence interval and 3% margin of error, sample size for

the three upazila/thana is 1849. The survey will cover every ward of the three upazila /thana. The information collected through questionnaire survey will be as following table:

Table 2: Information to be collected through questionnaire survey

Information	**Description**
Demographic	Age, sex, household size, religion. Migration etc.
Economic	Income level, house rent, financial stress etc.
Occupational	Government, private, formal, informal and others.
Educational	Primary, secondary, higher and others.
Health	Healthcare Infrastructures, accessibility to health care facilities etc.
Cultural	Historical sites, landmarks, social practices, cultural diversity and inclusivity etc.

2.4.2.2 Participatory Rural Appraisal:

PRA is a participatory research method that involves the community in the process of gathering information. Community members are involved in the collection and analysis of data, which can provide a more comprehensive understanding of the socio-economic status of the people in the area. PRA tools will be specifically crafted for efficiently collecting information about local communities in project areas.

- **PRA with public agencies (concerned ministries, semi-government, service and utility agencies and companies and local government etc.):** This necessitates engaging in discussions with governmental entities, including but not limited to the Ministry of Water Resources and the Department of Environment, as well as collaborating with local government bodies, academic and research institutes, service and utility agencies, and other experts. These interactions aim to facilitate a thorough comprehension of the project's implications for the local community.
- **PRA with local people:** Direct consultations and meetings will be held with local communities to make them understand about the purpose of the project. Participants will be asked about their socio-economic status and the impact of the project on them. At least, two focus group

discussions (FGD) in each upazila and stakeholder meetings will be held with the communities and their leaders to ask which of their problems they can solve by themselves and in which the need assistance. Problems will be identified and prioritized with Pair-wise ranking method.

- **Transect Walks:** Transect walks will involve walking through the area, observing and talking to people about their socio-economic status and the impact of local projects and programs.
- **Matrix Scoring:** This tool will involve rating different factors or indicators of socio-economic status, such as household income, employment, health, access to resources, etc. on a scale. This will identify the strengths and weaknesses of the community and can inform the project planning and implementation.

2.5 Critical Review and evaluation of the Project:

The consulting team will examine proposed site plan (detailed area allocation) and its compliance with "Eco-friendly Compact Township" in local context.

2.5.1 Identification of 'eco-friendly' criteria of 'Compact Township Development' in local context of the project area

2.5.1.1. Site Assessment

- ✓ Topography, soil composition, and existing hydrological conditions of the study area will be assessed using secondary data. This data is crucial for flood-resilient design and green infrastructure planning.
- ✓ Geo-physical maps and reports collection: The required data will be collected from secondary sources as shown in following table 1.

Table 3: Collection of geo-physical data

Data	Sources
Geology (sedimentation, stratification, lineaments etc.)	Geological survey of Bangladesh
Soil classification	Geological survey of Bangladesh
Hydrology (contour lines, drainage pattern in the study area, water areas/watersheds, flood levels for different return periods)	Bangladesh Water Development Board (BWDB)

Depth of water table, aquifer characteristics	

2.5.1.2 Government Regulations and Guidelines:

- ✓ Local Building Codes: Local building codes and regulations that govern construction in flood-prone areas will be referred. Specific requirements and recommendations related to eco-friendly and flood-resilient development will be identified.

2.5.1.3 Community Engagement:

- ✓ Community Workshops: Local communities will be engaged through workshops and meetings to understand their needs, concerns, and preferences. Residents will be involved in the decision-making process to ensure that the development aligns with community values.

2.5.1.4 Research on Best Practices:

- ✓ Literature Review: A literature review will be conducted on eco-friendly compact development in flood-prone areas. Successful case studies, best practices, and lessons learned from similar projects worldwide will be identified.

2.5.1.5 Stakeholder Consultation:

- ✓ Consultation with Experts: Consultation with environmental scientists, hydrologists, and urban planners will be conducted to gain insights into the specific challenges and opportunities for eco-friendly development in flood flow zones.
- ✓ Government Agencies: Relevant government agencies such as the Ministry of Water Resources, Department of Environment, and local planning authorities will be consulted and their input on eco-friendly guidelines and policies will be obtained.
- ✓ LEED and Green Building Councils: Guidelines and certifications provided by organizations such as the Leadership in Energy and Environmental Design (LEED) and local green building councils will be referred. These can offer benchmarks for sustainable development.

2.5.2 The evaluation of the project

This evaluation should be based on some criteria including:

2.5.2.1 Relevance:

- ✓ Here, relevance represents whether the project purpose is linked to the current issues or not. The TOR is on the Conservation of Flood Zone of Turag River and Compact Township Development Project. In Dhaka, the wetland has been reduced from 14% to 4% over the period of 1967 to 2010. So, this project is very relevant according to the condition of Dhaka city. Moreover, the project operators must be careful about the externalities related to this project.

2.5.2.2 Efficiency:

- ✓ The project operators should have a clear idea about the cost during implementation and how much time it will take to implement. If the operators can implement the project within the due time and with minimum cost, then the project can have high efficiency.

2.5.2.3 Effectiveness:

- ✓ Here, it should be checked whether the outcome of the project is effective or not. If after the implementation of this project, the wetland of Dhaka city does not reduce and starts to increase, then it can be said that this project is effective to improve the situation.

2.5.2.4 Sustainability:

- ✓ Wetland ecosystems are vital parts of the hydrological cycle, biologically diverse systems performing different tasks such as purification and storage of water, flood, and erosion control, recharge of aquifers, etc. In addition to the above, they act as microclimate regulators and enhance the aesthetic beauty of landscapes. So, we need to have proper management of them for the future generation so that natural losses can be minimized. This can be achieved by taking sustainable interventions like waste and recycling, reducing pollution, healthy wetland vegetations etc.

2.6 Financial, Economic and Social cost-benefit Analysis

The consulting team will examine the financial and economic viability of the proposed project. The purpose of the exercise is to find out whether the project will be financially feasible and economically sustainable and how can the authority maximize the project IRR.

- ✓ Financial statement analysis - The balance sheet, income statement, and cash flow statement to assess the financial health of a company will be assessed and financial assumptions for the project will be identified.

- ✓ A flexible financial model and Economic model will be designed.
- ✓ Econometric analysis - Statistical methods will be used to analyze economic data and make predictions about future economic conditions.
- ✓ Sensitivity analysis will be conducted.
- ✓ Social cost-benefit analysis will be conducted through UNIDO approach:

Stages of UNIDO approach:

- Stage 1: Financial profitability: Calculation of the financial profitability of the project measured at market prices.
- Stage 2: Shadow pricing: Obtaining the net benefit of the project measured in terms of shadow (efficiency) prices.
- Stage 3: Savings and investment: Adjustment for the impact of the project on savings and investment.
- Stage 4: Income distribution: Adjustment for the impact of the project on income distribution.
- Stage 5: Merit and demerit goods: Adjustment for the impact of the project on merit and demerit goods whose social values differ from their economic values.

2.7 Recommendation: The consulting team will provide necessary recommendations and policy guidelines related to the proposed project.

3. WORK PLAN

3.1 Project team and manning schedule:

The project team and their responsibilities are summarized in Table 4. The manning schedule contains the expert's and professional's involvement time period in the project. The number of key experts and professional staffs required during project timeframe is presented in the manning schedule (Table 5)

3.2 Activity schedule:

The work schedule has been prepared using MS Project 2016. The Project starts on April 15, 2018 and ends on July 7, 2018. Total 57 working days are required for the project. The work program is divided into tasks and subtasks.

Table 4: Project Team Formation and qualification and responsibilities of key person

Key Personnel	No. of Person	Qualification	Experience	Responsibility
Team Leader	1	Ph.D. in Urban and Regional Planning.	Over 15 years' experience in Compact Township Development project specifically in flood prone areas.	1.Project Management, Coordination and supervision of the input, design work and output of the team. 2. Overall liaison with the executing and implementing agencies. 3. Final review of the Report writing and Presentation.
Senior Urban Planners	2	Masters' degree in urban and Regional Planning	Over 10 years' experience in Compact Township Development project.	1. Critical Review of the project. 2. Community engagement and participation. 3. Quality control of work carried out and delivered by

				the team with close collaboration with individuals and project stakeholders. 4. Reviewing the Report writing and presentation
Junior Urban Planners	3	Minimum Bachelor's and Master's degree in Urban and Regional Planning	At least 5 years of experience in infrastructural development project.	1. To check the compliance with the relevant documents 2. Land cover trend analysis 3. Housing and transportation demand analysis.
Drainage and Hydrology Experts	2	Ph.D. in Water Resource Management	Over 10 years' experience in working flood prone areas.	1. Flood risk management 2. Integrated water resource management 3. Hydrological analysis: Water flow modeling, Floodplain mapping 4.Drainage network analysis
Financial Expert	2	MBA. Background in Engineering or urban planning would add advantage	Over 5 years' experience in evaluating the financial and cost aspects of an infrastructural project.	1.Cost analysis 2.Funding sources 3.Financial sustainability And Project Financing 4.Performance monitoring 5.Calculating the non-monetary social benefits from shadow pricing of the proposed development.

GIS Analyst	2	Master's Degree on Urban Planning, Geology	Over 5 years' experience working in GIS and Remote sensing.	1.Land cover trend analysis. 2. Using future predicting model to analyze the trend.
Sociologist	1	Master's degree in Sociology	Over 5 years	Examines social dynamics, cultural consideration and community impacts.
Environmental Expert	1	Master's degree on environmental science	Over 5 years	Conducting ecological study, helping in other environment and hazard Environment related studies.

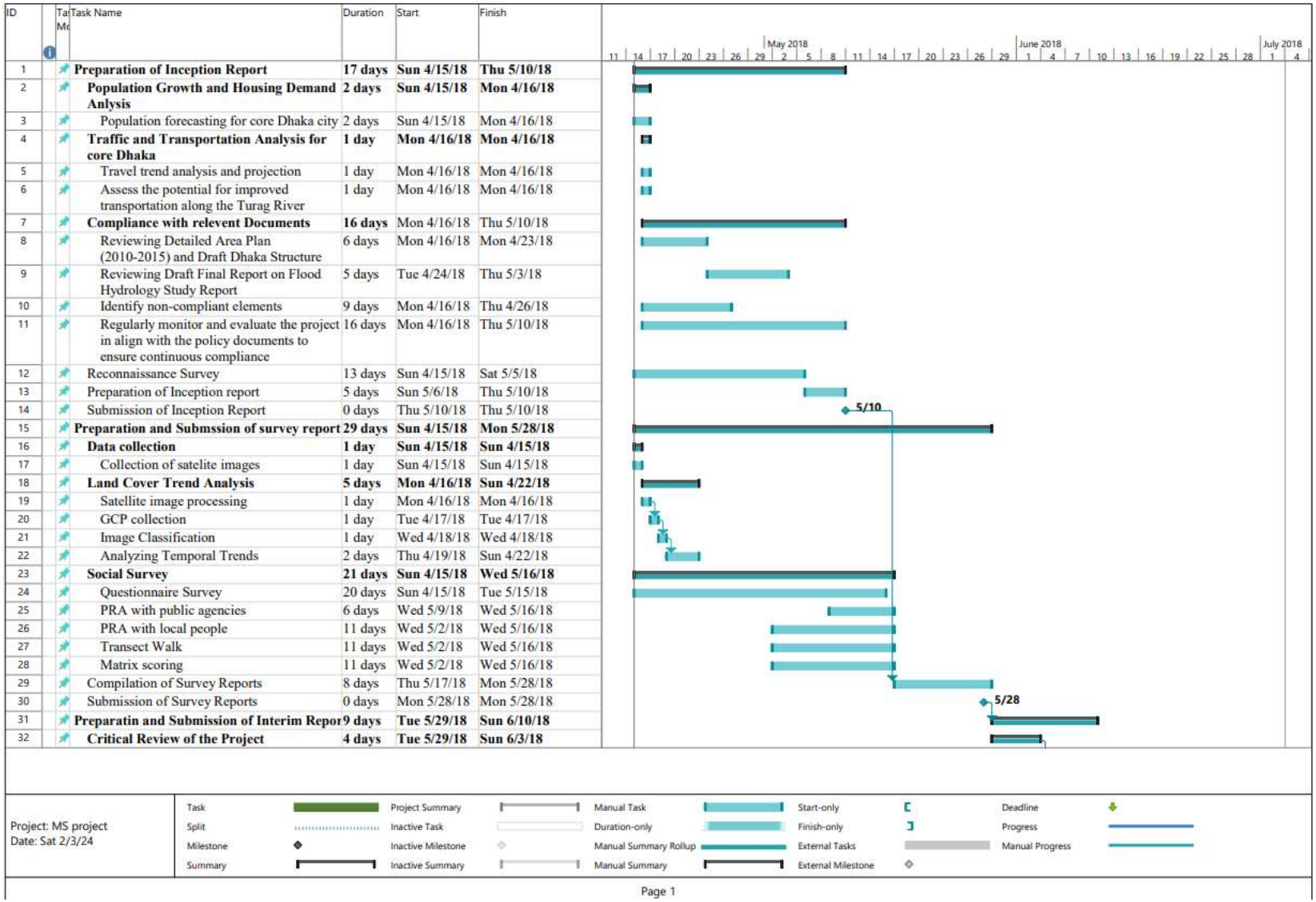
Table 5: Manning Schedule

Key Personnel	**No. of Persons**	**Working Days**	**Total Working Days**
Expert Professional			
Team Leader	1	57 days	57 days
Senior Urban Planners	2	57 days	114 days
Junior Urban Planners	3	57 days	171 days
Drainage and Hydrology Experts	2	8 days	16 days
Financial Expert	2	8 days	16 days
GIS Analysist	2	6 days	12 days
Sociologist	1	8 days	8 days
Environmental Expert	1	8 days	8 days
Supporting Staff			
Computer Operator	1	57 days	57 days
Engineering Surveyor	3	17 days	51 days
Social Surveyor	6	24 days	144 days

3.3 Manning Schedule:

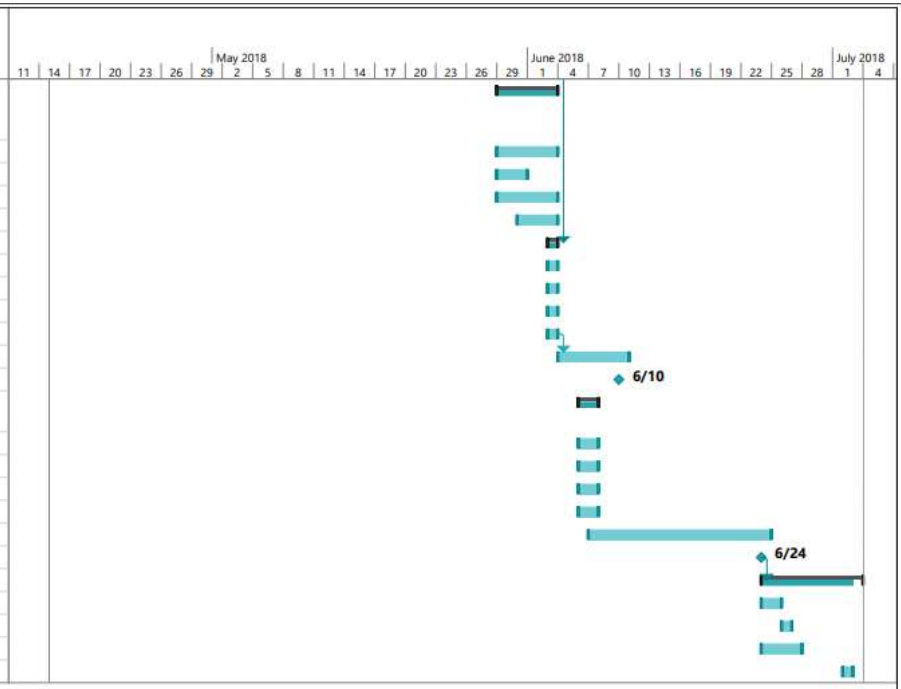
ID	Task Mode	Task Name	Duration	Start	Finish
1		Team Leader	57 days	Sun 4/15/18	Mon 7/2/18
2		Senior Urban Planner	57 days	Sun 4/15/18	Mon 7/2/18
3		Junior Urban Planners	57 days	Sun 4/15/18	Mon 7/2/18
4		Drainage and Hydrology Experts	8 days	Tue 4/24/18	Thu 5/3/18
5		Financial Expert	8 days	Mon 6/11/18	Wed 6/20/18
6		GIS Analysist	6 days	Mon 4/16/18	Sun 4/22/18
7		Sociologist	8 days	Thu 6/21/18	Sun 7/1/18
8		Environmental Expert	8 days	Thu 6/21/18	Sun 7/1/18
9		Computer Operator	57 days	Sun 4/15/18	Mon 7/2/18
10		Engineering Surveyor	17 days	Sun 4/15/18	Sat 5/5/18
11		Social Surveyor	24 days	Sun 4/15/18	Wed 5/16/18

3.4 Gantt Chart



ID	Task Mode	Task Name	Duration	Start	Finish
1		**Preparation of Inception Report**	**17 days**	**Sun 4/15/18**	**Thu 5/10/18**
2		**Population Growth and Housing Demand Anlysis**	**2 days**	**Sun 4/15/18**	**Mon 4/16/18**
3		Population forecasting for core Dhaka city	2 days	Sun 4/15/18	Mon 4/16/18
4		**Traffic and Transportation Analysis for core Dhaka**	**1 day**	**Mon 4/16/18**	**Mon 4/16/18**
5		Travel trend analysis and projection	1 day	Mon 4/16/18	Mon 4/16/18
6		Assess the potential for improved transportation along the Turag River	1 day	Mon 4/16/18	Mon 4/16/18
7		**Compliance with relevent Documents**	**16 days**	Mon 4/16/18	Thu 5/10/18
8		Reviewing Detailed Area Plan (2010-2015) and Draft Dhaka Structure	6 days	Mon 4/16/18	Mon 4/23/18
9		Reviewing Draft Final Report on Flood Hydrology Study Report	5 days	Tue 4/24/18	Thu 5/3/18
10		Identify non-compliant elements	9 days	Mon 4/16/18	Thu 4/26/18
11		Regularly monitor and evaluate the project in align with the policy documents to ensure continuous compliance	16 days	Mon 4/16/18	Thu 5/10/18
12		Reconnaissance Survey	13 days	Sun 4/15/18	Sat 5/5/18
13		Preparation of Inception report	5 days	Sun 5/6/18	Thu 5/10/18
14		Submission of Inception Report	0 days	Thu 5/10/18	Thu 5/10/18
15		**Preparation and Submssion of survey report**	**29 days**	**Sun 4/15/18**	**Mon 5/28/18**
16		**Data collection**	**1 day**	**Sun 4/15/18**	**Sun 4/15/18**
17		Collection of satelite images	1 day	Sun 4/15/18	Sun 4/15/18
18		**Land Cover Trend Analysis**	**5 days**	**Mon 4/16/18**	**Sun 4/22/18**
19		Satellite image processing	1 day	Mon 4/16/18	Mon 4/16/18
20		GCP collection	1 day	Tue 4/17/18	Tue 4/17/18
21		Image Classification	1 day	Wed 4/18/18	Wed 4/18/18
22		Analyzing Temporal Trends	2 days	Thu 4/19/18	Sun 4/22/18
23		**Social Survey**	**21 days**	**Sun 4/15/18**	**Wed 5/16/18**
24		Questionnaire Survey	20 days	Sun 4/15/18	Tue 5/15/18
25		PRA with public agencies	6 days	Wed 5/9/18	Wed 5/16/18
26		PRA with local people	11 days	Wed 5/2/18	Wed 5/16/18
27		Transect Walk	11 days	Wed 5/2/18	Wed 5/16/18
28		Matrix scoring	11 days	Wed 5/2/18	Wed 5/16/18
29		Compilation of Survey Reports	8 days	Thu 5/17/18	Mon 5/28/18
30		Submission of Survey Reports	0 days	Mon 5/28/18	Mon 5/28/18
31		**Preparatin and Submission of Interim Repor**	**9 days**	**Tue 5/29/18**	**Sun 6/10/18**
32		**Critical Review of the Project**	**4 days**	**Tue 5/29/18**	**Sun 6/3/18**

ID	Task Mode	Task Name	Duration	Start	Finish
33		**Identifying 'Eco-friendly' criteria of 'Compact Township Development' in local context of project area**	**4 days**	**Tue 5/29/18**	**Sun 6/3/18**
34		Site assessment	4 days	Tue 5/29/18	Sun 6/3/18
35		Government regulations and guidelines	3 days	Tue 5/29/18	Thu 5/31/18
36		Consultation with expert	4 days	Tue 5/29/18	Sun 6/3/18
37		Research on best practices	2 days	Thu 5/31/18	Sun 6/3/18
38		**Evaluation of the project**	**1 day**	**Sun 6/3/18**	**Sun 6/3/18**
39		Relevancy check	1 day	Sun 6/3/18	Sun 6/3/18
40		Efficiency check	1 day	Sun 6/3/18	Sun 6/3/18
41		Effectiveness check	1 day	Sun 6/3/18	Sun 6/3/18
42		Sustainibility check	1 day	Sun 6/3/18	Sun 6/3/18
43		Preparation of Interim Report	5 days	Mon 6/4/18	Sun 6/10/18
44		Submission of Interim Report	0 days	Sun 6/10/18	Sun 6/10/18
45		**Financial, Economical and Social cost-benefit Analysis**	**2 days**	**Wed 6/6/18**	**Thu 6/7/18**
46		Design a flexible financial Model	2 days	Wed 6/6/18	Thu 6/7/18
47		Design a flexible economic Model	2 days	Wed 6/6/18	Thu 6/7/18
48		Conuduct sensitivity analysis	2 days	Wed 6/6/18	Thu 6/7/18
49		Designing a social cost-benefit model	2 days	Wed 6/6/18	Thu 6/7/18
50		Preparation of Draft Report	10 days	Thu 6/7/18	Sun 6/24/18
51		Submission of Draft Report	0 days	Sun 6/24/18	Sun 6/24/18
52		**Final Report Preparation**	**8 days**	**Sun 6/24/18**	**Tue 7/3/18**
53		Evaluation of Draft Report	2 days	Sun 6/24/18	Mon 6/25/18
54		Public Hearing	1 day	Tue 6/26/18	Tue 6/26/18
55		Preparation of Final Report	4 days	Sun 6/24/18	Wed 6/27/18
56		Submission of final Report	1 day	Mon 7/2/18	Mon 7/2/18



Project: MS project
Date: Sat 2/3/24

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

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Financial Proposal

Table 1: Project Stuff Remuneration

Sl. No.	Designation	No. of Person	Working day	Salary per day	Total (BDT)
A. Key Personnel					
1	Team Leader	1	57	15,000	855,000
2	Senior Urban Planners	2	57	5,000	570,000
3	Junior Urban Planners	3	57	2,000	342,000
4	Drainage and Hydrology Experts	2	8	10,000	160,000
5	Financial Experts	2	8	10,000	160,000
6	GIS analyst	2	6	8,000	96,000
7	Sociologist	1	8	3,000	24,000
8	Environmental Expert	1	8	7,000	56,000
	Sub Total (A)	14	209		**2,103,000**
B. Supporting Staff					
8	Computer operator	1	57	1,500	85,500
9	Engineering Surveyor	3	17	1,000	51,000
10	Social Surveyor	6	24	1,000	144,000
	Sub Total (B)	9	46		**280,500**
	Total (A+B)	**23**	**312**		**2,383,500**

Table 2: Reimbursable Cost

SL No.	Item	Unit	Quantity	Unit Rate (BDT)	Total Cost (BDT)
C. Office Management expense					
1	Office Space Rent	Month	3	30,000	90,000
2	Electricity	Month	3	10,000	30,000
3	Food	Month	3	15,000	45,000
4	Broadband bill	Month	3	3,000	9,000
5	Transport	Month	3	25,000	75,000
				Sub Total (C)	**249,000**
D. Satellite image Collection					
6	Worldview-3 1.24m 8 band Multispectral	Grid	5	3,500	17,500
E. Surveys					
SL No.	**Item**	**Unit**	**Quantity**	**Unit Rate (BDT)**	**Total Cost (BDT)**
9	Reconnaissance Survey	Per acre	9116.64	100	911,664

10	Socio-economic survey	Per Household	1864	150	279,600
11	Traffic and transportation survey	Package			100,000
12	Conducting PRA sessions	Package	6	25,000	150,000
				Sub Total (E)	**1,291,264**
		F. Report and Questionnaire Printing			
13	Questionnaire Printing and Photocopy	Number	1864	15	27,960
		G. Reports			
14	Inception report	Number	5	500	2,500
	Survey report	Number	5	1000	5,000
	Interim report	Number	5	700	3,500
	Financial Feasibility report	Number	5	500	2,500
	Draft final report	Number	5	800	4,000
	Final report	Number	10	1500	15,000
				Sub Total (H)	**32,500**
				Total (A+B+C+D+E+F+G+H)	**4,001,724**

1. Summary of Costs

The following table 03 shows the overall cost of the project along with additional expenses

Table 03: Summary of Expenses

Expense Type		**Expense**
A	Remuneration of professionals and supporting staffs (non-reimbursable)	2,383,500
B	Reimbursable expenses	1,618,224
C	Miscellaneous (5.5% of A+B)	200,086
D	VAT (4.5% of A+B+C)	189081
E	Advance Income Tax (10% of A)	238350
	Total	**4,629,241**

	1st month Month (April 15- May 14)																													Total
Cost item	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16	Day 17	Day18	Day19	Day20	Day21	Day22	Day23	Day24	Day25	Day26	Day27	Day28	Day29	Day30	
Reimbursable cost																														
Office Space Rent	30,000																													30000
Electricity	10,000																													10000
Food	15,000																													15000
Broadband Connection	3,000																													3000
Transport	25,000																													25000
Reconnaissance Survey	911664																													911664
Satellite Image Collection	17500																													17500
Questionnaire Printing and Photocopy	27960																													
Ground control point collection	10000																													
Socio-economic survey																34950			34950			34950	34950	34950	34950	34950			34950		279600
Conducting PRA sessions																25000								25000							50000
Project Key Personnel Remuneration																															
Team Leader	15000	15000	15000	15000	15000			15000	15000	15000	15000	15000				15000			15000			15000	15000	15000	15000	15000			15000	15000	285000
Senior Urban Planner 1	5000	5000	5000	5000	5000			5000	5000	5000	5000	5000				5000			5000			5000	5000	5000	5000	5000			5000	5000	95000
Senior Urban Planner 2	5000	5000	5000	5000	5000			5000	5000	5000	5000	5000				5000			5000			5000	5000	5000	5000	5000			5000	5000	95000
Junior Urban Planner 1	2000	2000	2000	2000	2000			2000	2000	2000	2000	2000				2000			2000			2000	2000	2000	2000	2000			2000	2000	38000
Junior Urban Planner 2	2000	2000	2000	2000	2000			2000	2000	2000	2000	2000				2000			2000			2000	2000	2000	2000	2000			2000	2000	38000
Junior Urban Planner 3	2000	2000	2000	2000	2000			2000	2000	2000	2000	2000				2000			2000			2000	2000	2000	2000	2000			2000	2000	38000
Drainage and Hydrology Experts 1										10000	10000	10000				10000			10000			10000	10000	10000							80000
Drainage and Hydrology Experts 2										10000	10000	10000				10000			10000			10000	10000	10000							80000
Financial Experts 1																															
Financial Experts 2																															
GIS analyst 1		8000	8000	8000	8000			8000	8000																						48000
GIS analyst 2		8000	8000	8000	8000			8000	8000																						48000
Sociologist																															
Environmental Expert																															
Project Supporting Staff Remuneration																															
Computer operator	1500	1500	1500	1500	1500			1500	1500	1500	1500	1500				1500			1500			1500	1500	1500	1500	1500			1500	1500	28500
Engineering Surveyor 1	1000	1000	1000	1000	1000			1000	1000	1000	1000	1000				1000			1000			1000	1000	1000	1000	1000					17000
Engineering Surveyor 2	1000	1000	1000	1000	1000			1000	1000	1000	1000	1000				1000			1000			1000	1000	1000	1000	1000					17000
Engineering Surveyor 3	1000	1000	1000	1000	1000			1000	1000	1000	1000	1000				1000			1000			1000	1000	1000	1000	1000					17000
Social Surveyor 1	1000	1000	1000	1000	1000			1000	1000	1000	1000	1000				1000			1000			1000	1000	1000	1000	1000			1000	1000	19000
Social Surveyor 2	1000	1000	1000	1000	1000			1000	1000	1000	1000	1000				1000			1000			1000	1000	1000	1000	1000			1000	1000	19000
Social Surveyor 3	1000	1000	1000	1000	1000			1000	1000	1000	1000	1000				1000			1000			1000	1000	1000	1000	1000			1000	1000	19000
Social Surveyor 4	1000	1000	1000	1000	1000			1000	1000	1000	1000	1000				1000			1000			1000	1000	1000	1000	1000			1000	1000	19000
Social Surveyor 5	1000	1000	1000	1000	1000			1000	1000	1000	1000	1000				1000			1000			1000	1000	1000	1000	1000			1000	1000	19000
Social Surveyor 6	1000	1000	1000	1000	1000			1000	1000	1000	1000	1000				1000			1000			1000	1000	1000	1000	1000			1000	1000	19000
																														2380264
Miscellaneous (5.5%)																														130914.52
VAT (4.5%)																														107111.88
Advance income tax (10%)																														238026.4
Grand total																														5236580.8

	2nd month Month (May15- June15)																																				Total
Cost item	Day 31	Day 32	Day 33	Day 34	Day 35	Day 36	Day 37	Day 38	Day 39	Day 40	Day 41	Day 42	Day 43	Day 44	Day 45	Day 46	Day 47	Day 48	Day 49	Day 50	Day 51	Day 52	Day 53	Day 54	Day 55	Day 56	Day 57	Day 58	Day 59	Day 60	Day 61						
Reimbursable cost																																					
Office Space Rent																30,000																					30,000
Electricity																10,000																					10,000
Food																15,000																					15,000
Broadband Connection																3,000																					3,000
Transport																25,000																					25,000
Conducting PRA sessions		25000				25000		25000				25000																									100,000
Project Key Personnel Remuneration																																					
Team Leader	15000	15000			15000	15000	15000	15000	15000			15000	15000	15000	15000	15000			15000	15000	15000	15000	15000			15000	15000	15000		15000						315000
Senior Urban Planner 1	5000	5000			5000	5000	5000	5000	5000			5000	5000	5000	5000	5000			5000	5000	5000	5000	5000			5000	5000	5000		5000						105000
Senior Urban Planner 2	5000	5000			5000	5000	5000	5000	5000			5000	5000	5000	5000	5000			5000	5000	5000	5000	5000			5000	5000	5000		5000						105000
Junior Urban Planner 1	2000	2000			2000	2000	2000	2000	2000			2000	2000	2000	2000	2000			2000	2000	2000	2000	2000			2000	2000	2000		2000						42000
Junior Urban Planner 2	2000	2000			2000	2000	2000	2000	2000			2000	2000	2000	2000	2000			2000	2000	2000	2000	2000			2000	2000	2000		2000						42000
Junior Urban Planner 3	2000	2000			2000	2000	2000	2000	2000			2000	2000	2000	2000	2000			2000	2000	2000	2000	2000			2000	2000	2000		2000						42000
Drainage and Hydrology Experts 1																																					
Drainage and Hydrology Experts 2																																					
Financial Experts 1																											10000	10000		10000							30000
Financial Experts 2																											10000	10000		10000							30000
GIS analyst 1																																					
GIS analyst 2																																					
Sociologist																																					
Environmental Expert																																					
Project Supporting Staff Remuneration																											7000	7000		7000							21000
Computer operator	1500	1500			1500	1500	1500	1500	1500			1500	1500	1500	1500	1500			1500	1500	1500	1500	1500			1500	1500	1500		1500						31500
Engineering Surveyor 1																																					
Engineering Surveyor 2																																					
Engineering Surveyor 3																																					
Social Surveyor 1	5000	5000			5000	5000	5000																														25000
Social Surveyor 2	5000	5000			5000	5000	5000																														25000
Social Surveyor 3	5000	5000			5000	5000	5000																														25000
Social Surveyor 4	5000	5000			5000	5000	5000																														25000
Social Surveyor 5	5000	5000			5000	5000	5000																														25000
Social Surveyor 6	5000	5000			5000	5000	5000																														25000
Total																																					1,096,500
Miscellaneous (5.5%)																																					60307.5
VAT (4.5%)																																					49342.5
Advance income tax (10%)																																					109650
Grand total																																					1,315,800

	1st month Month (June16- July 02)																	Total
Cost item	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16	Day 17	
Reimbursable cost																		
Office Space Rent																		
Electricity																		
Food																		
Broadband Connection																		
Transport																		
Project Key Personnel Remuneration																		
Team Leader			15000	15000	15000	15000			15000	15000	15000	15000	15000			15000	15000	165000
Senior Urban Planner 1			5000	5000	5000	5000			5000	5000	5000	5000	5000			5000	5000	55000
Senior Urban Planner 2			5000	5000	5000	5000			5000	5000	5000	5000	5000			5000	5000	55000
Junior Urban Planner 1			2000	2000	2000	2000			2000	2000	2000	2000	2000			2000	2000	22000
Junior Urban Planner 2			2000	2000	2000	2000			2000	2000	2000	2000	2000			2000	2000	22000
Junior Urban Planner 3			2000	2000	2000	2000			2000	2000	2000	2000	2000			2000	2000	22000
Drainage and Hydrology Experts 1																		
Drainage and Hydrology Experts 2																		
Financial Experts 1			10000	10000	10000	10000			10000									50000
Financial Experts 2			10000	10000	10000	10000			10000									50000
GIS analyst 1																		
GIS analyst 2					Ends													
Sociologist					Ends													
Environmental Expert			7000	7000	7000	7000			7000									
Project Supporting Staff Remuneration																		
Computer operator			1500	1500	1500	1500			1500	1500	1500	1500	1500			1500	1500	16500
Engineering Surveyor 1																		
Engineering Surveyor 2																		
Engineering Surveyor 3																		
Social Surveyor 1																		
Social Surveyor 2																		
Social Surveyor 3																		
Social Surveyor 4																		
Social Surveyor 5																		
Social Surveyor 6																		
Reports																		
Inception Report									2500									2500
Survey Report									5000									5000
Interim Report									3500									3500
Financial Feasibility Report									2500									2500
Draft Final Report									4000									4000
Final Report									15000									15000
Total																		490000
Miscellaneous (5.5%)																		26950
VAT (4.5%)																		22050
Advance income tax (10%)																		49000
Grand total																		588000