Semi-Annual Environmental Monitoring Report

Project number: 42173-013

Period: January – June 2016

BAN: Dhaka Environmentally Sustainable Water Supply Project

SEMI-ANNUAL ENVIRONMENTAL SAFEGUARD MONITORING REPORT OF ICB-02.7 FOR THE PERIOD OF JANUARY- JUNE 2016

DHAKA ENVIRONMENTALLY SUSTAINABLE WATER SUPPLY PROJECT (DESWSP)- DISTRIBUTION NETWORK IMPROVEMENT (PACKAGE NO. ICB 2.7) (LOAN: 3051-BAN)

Prepared by the Management and Supervision Consultants of DESWSP for Dhaka Water Supply and Sewerage Authority (DWASA) and Asian Development Bank (ADB).

Dhaka Water Supply and Sewerage Authority
Ministry of Local Government, Rural Development and Co-operatives

Government of the People's Republic of Bangladesh

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Prepared by,
Management and Supervision Consultants (Kunhwa-DDC-FCEA JV and in association with Vernacular Consultants Ltd. Bangladesh) for ICB 02.7

Abbreviations

AC:	Asbestos Cement
ADB:	Asian Development Bank
DoE:	Department of Environment
DESA:	Dhaka Electricity Supply Authority
DESWSP:	Dhaka Environmentally Sustainable Water Supply Project
DNCC:	Dhaka North City Corporation
DSCC:	Dhaka South City Corporation
DWASA:	Dhaka Water Supply and Sewerage Authority
DNI:	Distribution Network Improvement
DMA:	District Metering Area
ECC:	Environmental Clearance Certificate
ECA:	Environmental Conservation Act
ECR:	Environmental Conservation Rules
EIA:	Environmental Impact Assessment
EME:	Environmental Management Expert
EMP:	Environmental Management Plan
EMR:	Environmental monitoring Report
EA:	Executing Agency
GoB:	Government of Bangladesh
HDPE:	High Density Polyethylene
HDD:	Horizontal Directional Drilling
IA:	Implementing Agency
IEE:	Initial Environmental Examination
ICB:	International Contract Bidding
MSC:	Management and Supervision Consultants
NGO:	Non-governmental Organization
PPE:	Personal Protective Equipments
PB:	Pipe Bursting
PMU:	Project management unit
SPM:	Suspended Particulate Matter
TOR:	Terms of Reference

Glossary

Important Environmental Components (IEC): Important Environmental Components are features of the biophysical or social or economic environments that are likely to be significantly affected by DESWSP or facilities developments.

Initial Environmental Examination (IEE): The first stage in the environmental assessment undertaken for a regional or pre-feasibility level study for identifying and assessing possible environmental impacts.

Monitoring: Monitoring is the continuous assessment of DESWSP implementation in relation to agreed schedules, the use of inputs, infrastructure, and services by project beneficiaries. Monitoring is undertaken to improve environmental understanding of cause –effect relationship, to provide an early warning of undesirable change in the environment, to verify earlier IEE/EIA

predictions and to check on the effectiveness of environmental management plan.

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I. INTRODUCTION

A. Purpose of the Report

1. This semi-annual environmental monitoring report (EMR) has been prepared by the Management and Supervision Consultants (MSC) for borrower in order to evaluate and assess overall project activities to ensure the effective implementation of the Environmental Management Plan (EMP) for the Dhaka Environmentally Sustainable Water Supply Project (DESWSP) funded by Asian Development Bank, Project Number ADB Loan No 3051-BAN.

2. This report covers contract package ICB 02.7 (MODS Zone 6) in Dhaka city and the management and supervision of these contracts is being implemented by Kunhwa Engineering & Consulting Co. Ltd., Korea in joint venture with Development Design Consultants Ltd. Bangladesh and Farhat Consulting Engineers and Architects Ltd. Bangladesh in association with Vernacular Consultants Ltd. Bangladesh. This report has been prepared in accordance with the environmental monitoring program followed by the updated environmental management plans (EMP) prepared for the contract.

3. The purpose of this second EMR is to document the environmental management activities and compliance with the approved EMP for the period between 1st January 2016 and 30th June 2016. This report is prepared in accordance with the environmental monitoring program as defined in the EMP. In line with targets aimed at reducing the negative environmental impacts of the Project and in accordance with all the relevant specifications and standards of the GOB, as well as the policies of the Asian Development Bank (ADB), this report will emphasize: (i) progress made in implementing the EMP, (ii) implementation of mitigation measures, (iii) Monitoring actions undertaken, as prescribed in the EMP, (iv) environmental compliance and (v) problems that have occurred and corrective actions taken.

4. This EMR has been prepared considering field observations during the visit performed by the Environmental Management Expert, MSC and according to the recommendations stated in the first environmental monitoring report already submitted to ADB in January 2016. The Environmental Inspector of MSC and Environmental Site Supervisors of Contractors are responsible for monitoring the field implementation of environmental management plan (EMP) in different phases of the sub-project works. Environmental Management Expert (EME) of the MSC is mainly overall responsible for Environmental Monitoring.

B. Project Objective

5. The objective of the project is to improve health and quality of life and reduce poverty of the people in the project area by providing access to adequate, sustainable safe water supply facilities. Specific task of the project is to improve the overall distribution network in the project area to ensure 24/7 water Supply with line pressure 1 bar. Also the water supply system will run with minimum system loss within 15% in the DMA areas. Each DMA will be hydraulically isolated from other DMA. Reliable source of safe drinking water should be established in the DMA, the project scopes are:

   i.) Rehabilitation of 376 kms pipeline networking in DMAs.
   ii.) Rehabilitation of 32000 water connections including of new meters.

iii.) Preparation need of DNI Package of ICB 2.9 (MODS Zone-2) and ICB 2.10 (MODS Zone-1) including design and bid documents preparation etc.
iv.) Gender mainstreaming & social development activities in project area.

C. Project Implementation

6. Dhaka Water Supply and Sewerage Authority (DWASA) is both the Executing Agency (EA) and the Implementing Agency (IA). A Project management unit (PMU) has been established. The PMU is being assisted by a Management and Supervision Consultants in (i) distribution system and quality improvement; (ii) capacity building and institutional strengthening; and (iii) project management and implementation support. The project is being implemented under the contract package ICB 02.7 covers the area commonly known as MODS Zone-6 of DWASA comprising of 16 DMAs from 601-616. The project will be implemented during 42 months starting from April, 2015. The contract package of ICB 02.7 was signed on 24th April, 2014.

II. PROJECT LOCATION AND COMPONENTS

A. Location.

7. The project area DWASA operation Zone 6 is under the jurisdiction of both Dhaka North and South City Corporation (DNCC). DWASA has 13 operation zones. See the photo on next page.

B. Project Components

8. The project under the contract package ICB 02.7 is subdivided into 16 district metered areas (DMAs) which will be hydraulically isolated from one to another with at least one water export and import facility between the adjacent DMAs.

9. Package No. ICB 2.7 includes (i) rehabilitation and extension of 376-km (as per outline design) distribution network in 16 DMAs (DMA 601 to 616); (ii) replacement of all fitting of all production tube wells; (iii) service connections including installations of meter chamber, domestic meters and floating valve; and (iv) installations of valves, bulk meters and loggers, etc. For efficient and effective execution, the package will be implemented through a design-built contract, i.e. the civil works contractors will also prepare the detail designs. The main activities (the works) of the contract is expected, as a minimum, to comprise the following steps:

(i) Survey;
(ii) Resettlement plan implementation;
(iii) Design comprising of (a) detailed survey of area (location of water pipes, service connections, valves, tube wells, bulk meters, and other utility lines); (b) detailed network modelling of areas and updating of basic model (outline design) with additional information obtained from survey; and (c) submission of detailed design package of area including design drawings (1:2000) and expected work methodologies for each DMA;
(iv) Pipe works comprising of (a) disconnection of cross connections between DMAs; (b) installation of bulk meters and valves at all needed cross connections between DMAs; (c) repair/rehabilitation or replacement of 305.296 km existing pipes according to outline design; (d) extension of network to areas not adequately served (70.988 km); and (e) pressure testing of each section of repaired/rehabilitated/replaced or new laid pipe.

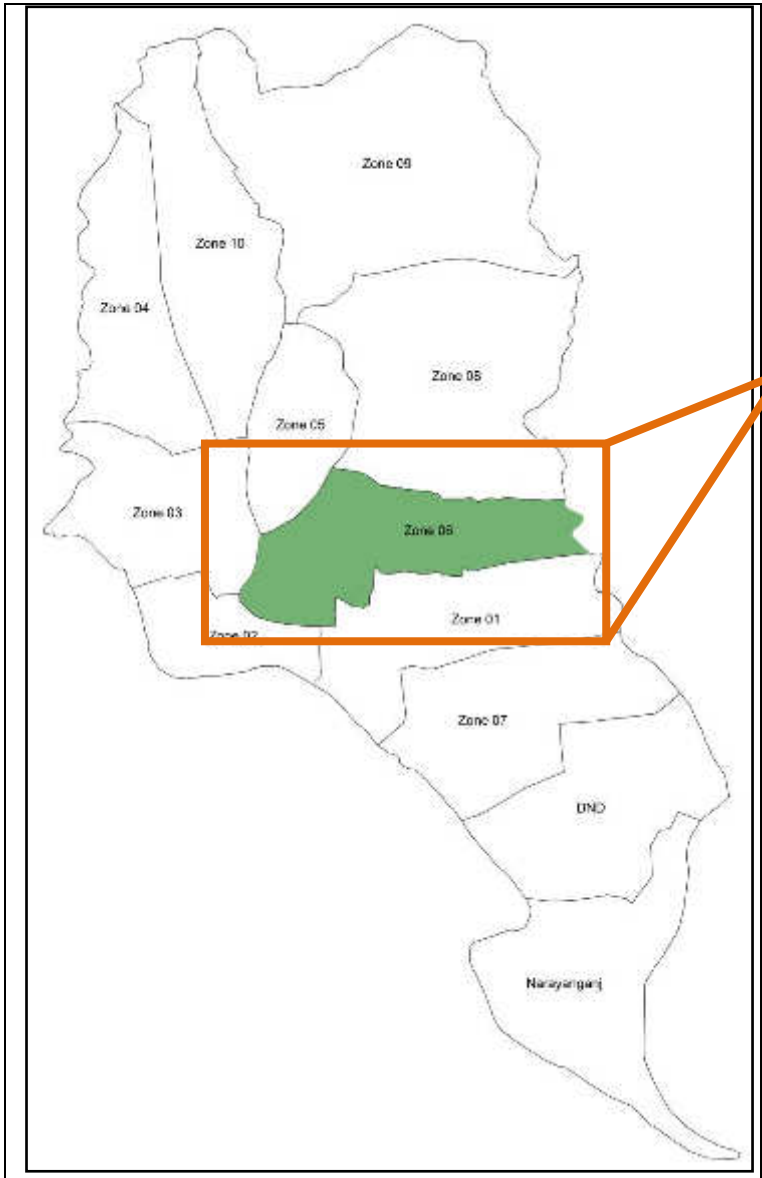

Figure 1: Operational Zones of DWASA

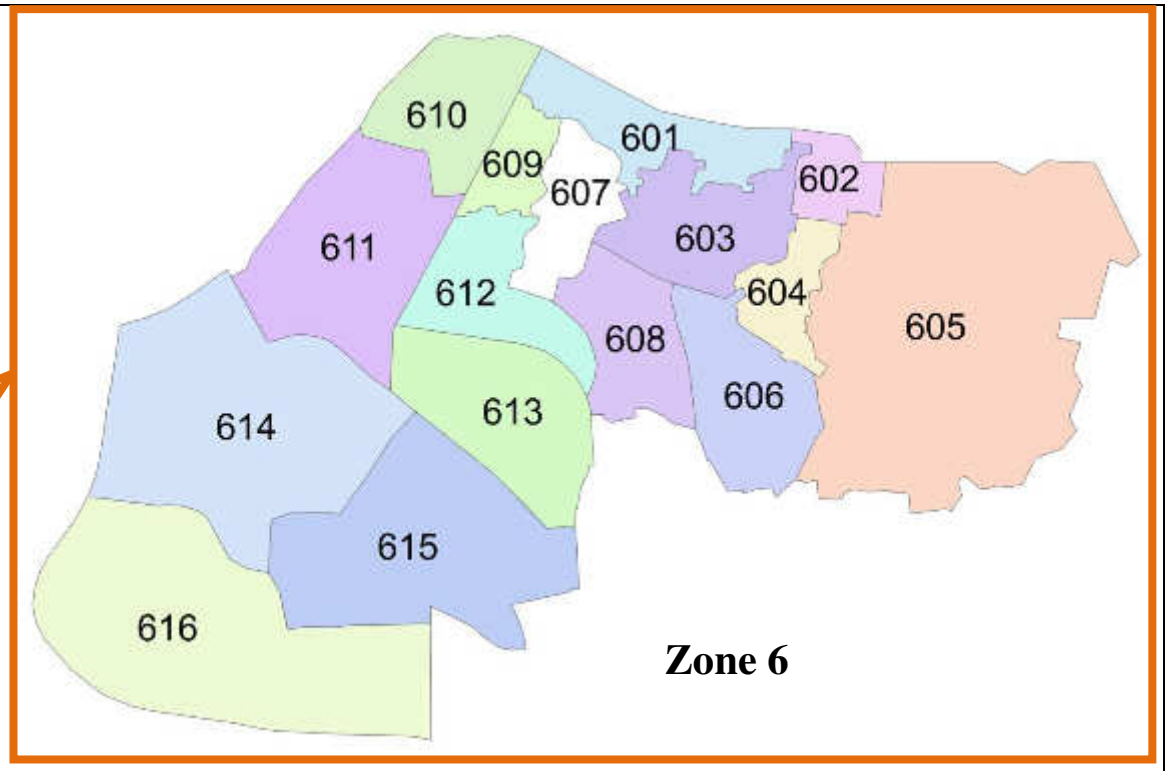

Figure 2: DMAs in Zone 6 (ICB 02.7)

(v) Service connections comprising of (a) installing a meter chamber for each existing connection; (b) connecting the meter chamber with the water pipes, using new materials; (c) installing water meter in meter chamber; (d) pressure testing of each service connection; and (e) installing float valves at the first reservoir of the household.

(vi) Other works such as (a) repair of roads according to given requirements wherever needed; (b) repair of other utility lines in case they are damaged during the work; and (c) provision of alternative sources of water for people while being disconnected from water supply system during the implementation.

III. ENVIRONMENTAL RESPONSIBILITIES AND INSTITUTIONAL SET UP

A. Environmental Category

7. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans.

8. **ADB's Screening and Categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; the sensitivity, scale, nature, and magnitude of its potential impacts; and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts, and are assigned to one of the following four categories:

(i) **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.

(ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.

(iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.

(iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

9. This project, as explained above has been classified by ADB as Category B, because it is not expected to have major negative environmental impacts. Under ADB procedures such projects require an IEE to identify and mitigate the impacts, and to determine whether further study or a more detailed EIA may be required.

10. **GoB's Screening and Categorization.** The implementation of the projects will be governed by Government of Bangladesh environmental acts, rules, regulations, and standards. These regulations impose restrictions on the activities to minimize/mitigate likely impacts on the environment. It is the responsibility of DWASA to ensure projects are consistent with the legal framework, whether national, state, or municipal/local.

Compliance is required in all stages of the project, including design, construction, and operation and maintenance.

11. The main provisions for environmental protection and pollution control in Bangladesh are contained in the Environmental Conservation Rules 1997. This legislation also provides the principal mechanism for assessing and mitigating the environmental impacts of projects, both existing and proposed. Projects are classified as green, orange, or red depending on their location and environmental impacts, and Schedule 1 of the law indicates that "water, power and gas distribution line laying/relaying/extension" are considered as red category activities.

12. Rule 7 states that the proponent of such projects must obtain a Location Clearance Certificate and an Environmental Clearance Certificate (ECC) from the DoE. For proposed Red Category projects this requires submission to the relevant DoE Divisional Officer of the following:

    (i) Completed application for ECC, and the appropriate fee, shown in Schedule 13 of the Rules;
    (ii) Report on the feasibility of the project;
    (iii) Report on the IEE for the project, Terms Of Reference (TOR) for an EIA of the project, and its process flow diagram; or an EIA prepared from a previously approved TOR, layout plan, process flow diagram, and design and time schedule;
    (iv) No objection certificate from the local authority;
    (v) Emergency plan relating adverse environmental impact and plan for mitigation of the effect of pollution; and
    (vi) Outline of the relocation and rehabilitation plan (where applicable).

13. Discussions with DoE in August 2006 suggested that the IEE, Resettlement Framework and other study reports prepared during DWSSDP preparation in 2006 should fulfill a substantial proportion of the national EIA requirements. Upon submission of the necessary documents including a draft IEE for ICB 02.7, Environmental Clearance Certificate is obtained and is available at Project Management Unit (PMU) office.

B. Institutional Setup and Responsibilities

14. Organizational procedures/institutional roles and responsibilities for the safeguards implementation are described in the Table below.

Activities	Agency Responsible
Disclosure of proposed project and anticipated social and environmental impacts on website	ADB, DWASA
Disclosure of proposed project, social/environmental impacts, proposed entitlements/mitigation measures in local languages	DWASA
Disclosure of grievance redress mechanism/process	DWASA (PMU), MSC, PCU, ZLCC, NGO
Finalization of sites and alignments	DWASA (PMU), MSC, Contractors
Identification of roads for closure, existing utilities, road	DWASA (PMU),

Activities	Agency Responsible
conditions	MSC Contractors
Updating of safeguard documents (IEE and RP) based on detailed design	MSC with assistance from contractors and NGO
Review of updated RP/IEE and send to ADB for approval prior to contract award	DWASA (PMU)
Clearance and disclosure of updated safeguard documents	ADB, DWASA
Conducting transect walks through road stretches to identify extent of impacts	MSC, Contractor, NGO
Conducting meetings at community/household level with affected persons (APs)	MSC, Contractor, NGO
Design/implementation of detailed measurement survey (DMS) on roads identified for full/partial closure; identification of poor and vulnerable APs	MSC, NGO
Computation of entitlements	DWASA (PMU), MSC
Categorization of APs for finalizing entitlements	MSC, NGO
Conducting focus group discussions/meetings/consultations/workshops during DMS survey and updating safeguards documents	DWASA (PMU), MSC, NGO
Finalizing entitlements and rehabilitation packages for all APs	DWASA (PMU), MSC NGO
Disclosure of final entitlements and rehabilitation packages	DWASA (PMU), MSC, NGO
Delivery of entitlements/award of checks	DWASA(PMU)
Implementation of mitigation and rehabilitation measures	DWASA (PMU), MSC, Contractor
Consultations with APs during rehabilitation activities	MSC, Contractor, NGO
Grievance redressal	DWASA (PMU), MSC, NGO, Contractor
Internal monitoring	DWASA (PMU), MSC

IV. PROJECT STATUS

A. Implementation Plan

15. The pipe installation work is being done in batch system; each batch consists of at least three DMAs. The following flowchart shows the implementation plan of ICB 02.7.

Photo: Implementation Plan of ICB 02.7.

B. Project Status on 30th June 2016

16. According to the monthly report of June 2016, progress of implementation work is shown in the table below.

Implementation Progress in DMA 602, 603, 604, & 606 up to June 2016 under ICB 02.7 (MODS Zone-6), DESWSP, DWASA.

SL. No.	Description	Group 1									Group 2		
		DMA- 602			DMA- 603			DMA- 604			DMA- 606		
		Contract Quantity	Design Quantity	Progress	Contract Quantity	Design Quantity	Progress	Contract Quantity	Design Quantity	Progress	Contract Quantity	Design Quantity	Progress
01	Installation of Pipeline	9.488	8.800	8.793	8.340	11.475	10.336	13.407	16.246	16.248	27.410	37.079	15.620
02	Pressure Test		8.800	8.662		11.475	5.961		16.246	16.246			
03	Upgradation of PTW	2	2	2		3	2	3	3	3		8	
04	House Connection	393	372	414	658	708	850	1112	1198	1175	3317	2785	
05	Inter DMA Chamber	3	2	1		1	1	3	3	3	5	5	
06	Gate Valve Chamber	2	3	3		6	1	7	8	8		24	
07	Gate Valve capping		17	16		13	10		49	49		96	
08	ARV Chamber	1	2	2		3	3		3	3		4	
09	Wash Out		2	Completed		3	2		3	3		4	
10	End Caps		20	18		110	85		49	53		96	
11	Disinfection			Not Completed			Partly Completed			Completed			
12	Thrust Block		7	6		16	14		13	16		24	
13	Data Logger			Used			Used			Used			
14	Pre Commissioning			Completed			Done			Complete			

Summary: Physical Work: Project Total =376.00 km, Works in DMA- 602, 603, 604 & 606 = 73.60 km, Progress up to June 2016: 50.997 km, Percentage of Progress: in 4 DMAs =69.29%, Over all total = 13.56%

Implementation Progress in other DMAs up to June 2016 under ICB 02.7 MODS Zone-6, DESWSP, DWASA.

SL No	Name of Activities	Group 2		Group 3				Group 4			Group 5		
		DMA 609	DMA 612	DMA 601	DMA 605	DMA 607	DMA 616	DMA 611	DMA 614	DMA 615	DMA 608	DMA 610	DMA 613
1	Survey	Approved	Approved	Approved	Approved	Approved	Going on	Approved	Going on	Going on	Approved	Approved	Approval
2	Model Design	Approved	Approved	Approved	On going	Not done	Not done	On going	Not done	Not done	Going on	On going	Not done
3	Detail Design	Approved	Approved	Submitted	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done
4	Joint verification Survey	Done	Done	Done	Done	Done	On going	Done	On going	Not done	Done	Done	Done
5	Method Selection	Done	Done	Done	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done
6	Road Cutting Permission	On Progress	On Progress	Processing	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done
7	Material Mobilization & Testing	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done	Not done

C. Updating of Environmental Management Plan

17. Contractor prepared and submitted an Environmental Management Plan (EMP) for DMA 606, 609 & 612 on 21st March 2016. The MSC reviewed the report and it required some improvement. After incorporating the comments of MSC, the EMP was approved in May 2016.

D. Updating of Initial Environmental Examination (IEE) Report

18. The IEE prepared during project preparation period has been updated based on the detailed design of DMA 606, 609 & 612. The updated IEE report was submitted on 11th May 2016 through PMU for approval and publishing on ADB website.

E. Implementation of Environmental Management Plan

19. Through the regular site visit by Environmental Inspector of MSC and periodic site visit by Environmental Management Expert (EME) of MSC and Environmental Safeguard Officer of PMU, it is identified that there are some areas where more improvement is needed in terms of compliance with environmental safeguards requirement. In particular the EME noted that the excavated materials were not removed immediately from sites. Having not been removed, the excavated materials/soil become muddy with rain and spreads over surrounding road; causing disturbance to pedestrians and moving vehicles. Furthermore, the mud dries out with sun's heat during the day and creates dust. The EME also noted that the pipes were not necessary handled in proper manner, in particular the pipes were not plugged in while installation. It is often the case that the wastewater runs through the unplugged pipes and contaminates the pipes. The EME requested the contractors to consider the issues with utmost importance as both issues have direct relationship with human health degradation.

20. Considering the importance of proper EMP implementation, an orientation workshop on "Environmental Safeguard Requirements of GOB and ADB" for supervising staffs of PMU, PCU, MSC, Contractors and NGO was conducted by EME of MSC on 26th May 2016. At the end of discussion session of the workshop, some issues and their solutions were brought up. One of the major issues was removal of excavated materials from narrow lanes. The majority of participants supported the solution that some extra workers can be engaged for carrying the excavated soil and waste materials off-site by head load where other means cannot be adopted.

V. COMPLIANCE WITH ENVIRONMENT RELATED PROJECT COVENANTS

A. Compliance with National Environmental Laws

21. At the time of project preparation at feasibility stage, the TAPP consultants were deputed for the survey and preparation of IEE for the DESWSP (Ref: IEE, DWASA, 2006). As part of detailed project preparation, environmental screening and assessment reports, IEEs were prepared by environmental consultant engaged by the DWASA supported by ADB. Further, the consultant suggested to ensure in procurement process that all information required for environmental safeguard stated in the environmental assessment report and its Environmental Management Plan (EMP) which have been prepared earlier under the respective pipeline rehabilitation Contract have to be incorporated in the work schedule so that contractors can adopt mitigation measures associated with construction works. Management and Supervision Consultants (MSC) have to monitor the implementation of EMP which is used to work by contractors; and ensure that the EMP

is implemented throughout project implementation period. Half yearly Environmental Safeguard Report has to be prepared by the Consultant to be forwarded to PMU and ADB. It could be mentioned that IEE with EMP has been prepared according to ECA'95 (Environmental Conservation Act) & ECR'97 (Environmental Conservation Rules) and it is mandatory to follow the rules ordered by GOB and ADB guidelines. To follow the rules, contractors have to collect no objection certificates from local authorities (like DESA, City Corporation and Union Parisad etc.) before starting the works of the sub-projects.

B. Compliance with ADB Guidelines

22. According to the environmental guidelines of ADB the project falls under Category B and hence an IEE is sufficient to meet the environmental requirements. An IEE report was prepared by the consultant engaged by the ADB during appraisal. However during the detailed design stage an updated Environmental Management Plan (EMP) was prepared. The project is also in conformity with the latest Guideline of ADB i.e. Safeguard Policy Statement 2009.

C. Development of Environmental Management Plan

23. The IEE report including EMP that already had been prepared provided necessary recommendations on how the potential environmental hazards' impacts could be mitigated. The IEE guided to develop environmental management plan to provide a set of guidance on what, how, when and where the mitigation measures have to be implemented. It includes also who has to implement and monitor the implementation of mitigation measures in different phases of the project. The Initial Environmental Examination (IEE) report prepared under the feasibility stage included an EMP that:

- Provides the basic information about the environmental conditions of the project areas and what will be the potential environmental impacts;
- Provides the recommendations to mitigate potential environmental impacts and describes on how to implement in the environmental management plan;
- Provides guidance on how the environmental monitoring has to be carried out; and
- Indicates what kind of environmental statutory clearance will need to be obtained.

24. In line with the project implementation plan, the EMP is updated for every DMA in a group as stated in Section A under Chapter IV. The EMP of DMA 606, 609 & 612 has been updated by the contractors and approved by the consultants.

VI. ENVIRONMENTAL MONITORING REQUIREMENTS

A. The Environmental Management Plan

25. The EMP contains 38 mitigation measures and 38 associated monitoring actions, presented in the project work period (planning and design phase, preconstruction phase, construction phase, post-construction phase, and operation & maintenance phase) they would most likely take place in. Each of the tasks is numbered such that any mitigation measure can be cross referenced to the associated monitoring requirement. This same numbering is then extended to the monitoring checklist, permitting an easy confirmation of the entire EMP implementation procedure (see Appendix 1).

26. The potential environmental impacts of the Project and the required mitigation and monitoring measures and the related general timelines are set out in the Environmental Management Plan. The detailed implementation schedule is also found in the EMP, a mandatory document of the Contractor, and provided in Appendix 1.

27. The EMP's mitigation tasks are also defined in the EMP's mitigation table and describe the component of the environment affected, the impact, proposed mitigation action, where it is to take place, when and who will implement and supervise the action.

28. The environmental monitoring requirements are presented in the EMP table. The EMP considers the scope of monitoring; monitoring parameters; time and frequency; the outputs required and implementing and supervising agencies.

B. Environmental Quality Test Program

29. The extent of the impacts of environmental pollution related to water for workers, air quality and noise can be determined in quantitative terms by sampling a range of related parameters. Based on these results the mitigation measures provided for in the EMP can be adjusted accordingly. The field sampling work for each DMA was specified for the pre-construction and construction period. The contractor carried out an environmental quality test program for DMA 602, 603 & 604 during construction period. The test result report is shown in Appendix B.

30. The test result contains ambient air quality and ambient noise level but no water quality test was performed separately as the workers drink the water supplied by DWASA. Therefore, the water quality test result of DWASA will be considered as substitute. However, the contractors did not submit the water quality test from DWASA.

C. Assessment of the results

31. According to the test results, the ambient noise levels at different locations near construction sites were from 71.12 to 74.22 dBa. The allowable limit set by the DoE for ambient noise level in mixed area (mainly residential area and also simultaneously used for commercial and industrial purposes) is 60 bBa and 50 dBa during day and night time respectively. The test result of ambient air quality analysis shows the Suspended Particulate Matter (SPM) in DMA 602, 603 & 604 are 246, 217 & 224 $\mu g/m^3$ respectively. The DoE limit for SPM in residential area is 200 $\mu g/m^3$.

32. Observing the test result, it was clear that both ambient air quality and noise level have increased level of pollution in the construction areas of DMA 602, 603 & 604 under ICB 02.7. Therefore, the contractors were requested to do the followings in order to mitigate the noise and air quality issues.

    1. Excavated materials have to be removed immediately from worksites.
    2. The trucks have to be covered while transporting off excavated materials and transporting in sand for backfilling.
    3. Watering of stockpiles and barren roads has to be done twice a day between 9 PM to 11PM and 2 PM to 4 PM.

4. All equipments and machineries that produce sound e.g. HDD and PB Machine, Generator, etc, have to be equipped with sound reduction box or silencer while operating.
5. No night work to be permitted in areas that are noise sensitive; residential, hospital, educational institution, mosques and temples.

VII. APPROACH & METHODOLOGY FOR ENVIRONMENTAL MONITORING

33. The methodology is a combination of organizational principles and strategies through which responsibility for performing the monitoring process is shared with different stakeholder groups. Methods like site visits, stakeholders consultation, qualitative as well as quantitative analysis of quality parameters, analysis of monitoring reports come from site inspectors, subjective judgment etc. are used for environmental monitoring. Normally, Environmental Inspector of MSC and Contractors' inspector monitor the EMP implementation works at field level in the sub-projects and the results are sent the results to EME of MSC. The EME monitors the construction works and oversees the work of contractors' activities required for environmental requirements. MSC also coordinates with Donor agencies and related Governmental agencies on the issue of environmental requirements and monitoring.

VIII. OBSERVATION & RECOMMENDATION

A. Observation

34. With some exceptions, excavated materials were not removed immediately rather left onsite for several days after work completed. Workers received their required Personal Protective Equipments (PPE) but the PPEs are not being used properly by the workers even after contractor's effort in wearing proper PPEs by conducting campaign in every month. High Density Polyethylene (HDPE) pipes are being used for the Package ICB 02.7. But the pipes are not being handled in proper manner as stated in the contract. The environmental quality test program was not conducted as per EMP; test of ambient air quality and noise level should be carried out twice: before starting field implementation and during implementation.

B. Recommendation

- The contractors must ensure that all excavated materials are removed immediately from the worksites. The trucks carrying excavated materials and sand for backfilling must be covered.
- The overall management of camps and worksite must be further improved in line with the best practices on occupational health and safety so that these areas of the site can be fully compliant.
- The contractors must ensure that all HDPE pipes to be installed are plugged in so that no wastewater can get into the pipes.
- Contractors must take all necessary measures to keep the values of environmental quality parameters within the standard range.

- Drinking water supply and sanitary facilities for laborers should be ensured within the short distance from construction area.

IX. APPENDIXES

A. Environmental Management Plan (EMP)

B. Environmental Quality Test Program

C. Orientation Workshop on Environmental Safeguard

D. Photographs

Appendix A: Environmental Management Plan

ENVIRONMENTAL MANAGEMENT PLAN							
Activity	**Mitigation Measures**	**Responsibl-e for Implement-ation**	**Responsi-ble for Monitori-ng**	**Parameter to Monitor**	**Frequency of Monitoring**	**Guidelines / Standards**	**Compliance Status**
PLANNING AND DESIGN PHASE (Applicable for DMA 601-604, 606, 609 & 612)							
Contractor's responsibility	-Be familiar with the present traffic congestion of Dhaka city,rules and regulation of Dhaka City Corporation (DCC) for preparaton of road cutting plans before execution of works; - Arrange for temporary water supply to every household as and when their water supply is disconnected or disrupted; - Protect all underground and overground utility services viz. telephone, electricity, gas, sewer, drainage, etc. from damage during execution of the contract. Necessary compensation to be paid to the respective organization(s) as per their prevailing rules and regulations.	Contractors	DWASA PMU MSC	- Road Cutting Plan - Arrangement for temporary water supply - Disruption to utilities	Regular site inspection by Environmental Inspector of MSC and Safety Officer of contractors.	Contract Provisions EMP	Temporary water supply arrangement is made to the households disconnected from the regular water supply. Due emphasis is being given to the utility services including protection of the trenches and poles. Necessary compensation is being given to the utility agencies if any damage is caused by installation work. **Complied**
Pipe replacement rehabilitation,[1] and network extension[2]	- In all cases, AC pipes shall be replaced. Existing AC pipes, where intact, shall be left in-situ and not disturbed. Where the AC pipe is damaged and where there is a risk of asbestos particles becoming airborne, the contractor shall follow all necessary procedures, guidelines and laws as laid out locally or by this EMP to contain and remove hazardous material. - The network expansion into different residential / industrial areas will be through trenchless or conventional trenching methods	Contractors	DWASA PMU MSC	- Residual design life and proposed methods of repair - Inventory of AC pipes	As required in the Program of Performance	Contract Provisions EMP USEPA OSHA Guidelines for Asbestos	Some AC pipes have been detected in DMA 606, 609 & 612 during trial pit inspection at some of the roads and kept them as it is untouched. Maintaining minimum coverage 1.00m for all the pipe installation other than the utility Ground problem areas. **Complied**

[1]The term pipe replacement is understood to mean that the existing pipe will be replaced, either by the traditional open trench method, where the existing pipe will be abandoned and a new pipe will be installed or by pipe bursting, where the existing pipe will be used as a host pipe which will be cut open, expanded and a new pipe will be installed inside the old pipe.

[2] The term pipe extension is understood to mean the laying of a new pipe where no distribution pipes previously existed. Laying pipes in un-served and underserved area and replacing spaghetti lines (bunch of small diameter coil pipes) with new reticulation pipe lines will be considered as extension work.

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	whereby the pipelines will be laid with a minimum cover depth of 1.0 metres.						
Working hours and times	- All work in major roads and on minor roads that are heavily used by traffic will only be permitted at night between 7:00 pm and 7:00 am. - All the minor roads and alley with less traffic may be considered for both day and night working provided alternative passageway can be maintained.	Contractors	DWASA PMU MSC	Work hours	As required in the Program of Performance	- Contract Provisions - EMP	With some exceptions working hours is being maintained except places where work is allowed at night time. **Complied**
Road cutting[3]	- Unnecessary road cutting should be avoided. - The contractor has to take all necessary safeguards to avoid accidents at site, prevent loss/damage to all existing utilities like pipelines, telephone/gas/electric cables, poles etc and any government or private property during the contract period. - DWASA will apply for the road cutting permission and the contractor shall give full effort and cost for collection of road cutting permission for required days. Therefore the road cutting plans necessary for the application must be prepared by the contractor. - No temporary or permanent works must proceed before the design and drawings are approved by the Project Manager and road cutting permission obtained from DCC by PMU. - The contractor shall prepare a traffic management scheme (road closure program or diversions) and incorporate detail of traffic diversions and pedestrian routes, all traffic	Contractors for preparation of road cutting plan and payment for pavement restoration Contractor for preparation and implement ation of traffic manageme nt scheme DWASA	DWASA PMU DCC for issuance and monitorin g of pavement compactio n	- Road category along pipe alignments - Budget allocation for pavement restoration - Road cutting plan - Road cutting permission from DCC	Prior to start of civil works After compaction and turn-over to DCC for pavement restoration	- Contract Provisions - EMP	Numbers of Road Blocker, safety items, Divider, Cones and other items are being used at worksite. **Complied**

[3] Most of the roads are owned and maintained by DCC. Some narrow roads having width even less than 2 m are privately-owned.

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	signs (for the regulation and for information) and road markings shall be ensured prior to start of road cutting.	for the road cutting permit DCC for pavement restoration					
Road excavation	- All excavations shall be done to the minimum dimension as required for safety and working facility - The excavation shall not damage or interfere with existing services or structures. If damage or interference is so caused the contractor shall make arrangements with the supply and/or building owner to execute the repairs at the contractor's own cost. - All trench and pit excavations and other work shall be carried out during night time and within the limits of any existing road area shall be completed as rapidly as possible. - Road drains and channels shall be kept free from obstructions at all times. - In case of excavation in VIP and other large roads, the trenches and pits maybe need to be covered by steel plates to allow traffic to pass during non-working periods. The contractor must liaise with the DCC and the responsible police to familiarize themselves and adhere to such rules. All costs involved to adhere to such rules shall be borne by the contractor. - Pits and trenches not backfilled at end of a night shift, the excavation must be covered with steel plates and in alleys with wooden plates. - Where trench excavation or any other part of	Contractors for preparation of road cutting plan and payment for pavement restoration Contractor for preparation and implement ation of traffic manageme nt scheme DWASA for the road cutting permit DCC for	DWASA PMU DCC for issuance and monitorin g of pavement compactio n	- Road category along pipe alignments - Budget allocation for pavement restoration - Road cutting plan - Road cutting permission from DCC	Prior to start of civil works After compaction and turn-over to DCC for pavement restoration	- Bangladesh i Standards and Codes of Practice in their latest version, National Building code and Public Works Departmen t (PWD) specificatio n of the Govt. - Contract provisions - EMP	Long waiting period for road cutting permission from DNCC/DSCC is causing the project in delay. The Flag man with a road supervisor work for traffic diversion when necessary. Pits and trenches are not always covered with steel plates and in alleys with wooden plates. **Partly Complied**

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	the works obstructs any footpath or right-of-way, the contractor shall provide, at his own cost, a temporary footpath around the obstruction to the satisfaction of the Project Manager. - The contractor shall have particular regard to the safety of pedestrian, livestock, and shall ensure that all open excavation, access routes and steep or loose slopes arising from the contractor's operations are adequately fenced and protected.	pavement restoration					
Trenchless pipe installation	- Pipes shall be installed by the horizontal directional drilling (HDD) methods where required. Should survey information indicate that the method is not feasible the contractor shall inform the Project Manager and gain prior approval for an alternative method or for open trench method. - Excavation material shall be removed from the conduit as the work progresses. No accumulation of excavated material within the conduit will be permitted. - The contractor shall provide sediment and erosion control measures to prevent drilling fluid or borehole cuttings from entering water courses or other land adjacent to the site in accordance with local environmental legislation. - The contractor shall supply portable mud tanks or construct temporary mud pits to contain excess drill fluids during construction. Spent drilling fluids and cuttings shall be confined to the entrance and exit pits. - The contractor shall take all necessary	Contractors	DWASA PMU MSC	- Program of Performance - Pipe Bursting Plan - Plan for locating, exposing and re-connecting service connections - Proposed pit size and location - Temporary water supply plan;	As required in the Program of Performance	Contract provisions	Extra care being taken to protect the existing utility services. In case of any damage to the private or organizational utility services or any structures; repairing and rebuilding done with the entire satisfaction of the respective agencies/ person concern. The open trances, access routes and steep or loose slopes are not always being fenced and protected during working period. **Partly Complied**

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	precautions to minimize the damage to the adjacent properties. Any drilling fluid that enters the pipe shall be removed by flushing or other suitable methods. - The contractor shall be responsible for cleanup and restoration - Pits excavated to permit connection of bored pipe shall be backfilled, and disturbed areas shall be restored to their original state or better. Sections of sidewalks, curbs, and gutters or other permanent improvements damaged during HDD operations shall be repaired or replaced at the contractor's expense.			- Plan for consumer notification. - Traffic management plan			
Resettlement Plan	- Implement Resettlement Plans, prepared by DWASA updated by MSC. No civil works will begin until all compensation to affected persons is paid.	PMU DSC Contractors NGO	DWASA ADB	- Number of affected person - Compensation to affected persons - Number and type of information disseminati on activities - Complaints from stakeholders	Prior to start and during civil works	Resettlement Plan	RP of DMA 602, 603, 604, 606, 609 & 612 Prepared and Submitted for approval. RP of DMA 602, 603, 604, & 606 implemented. **Complied**
Preparation of	- The contractor shall supply catalogues and	Contractors	DWASA	- Program	Completion	- Contract	None of the DMAs is in

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catalogues, installation and O&M manuals	installation manuals for each type of pipes to DWASA at the time of submission the Operation and Maintenance manuals. - All catalogues and manuals shall be printed in the English language or accompanied by an English translation.		PMU MSC	of Performanc e	of civil works and decommisio ning	provisions	O&M stage. The O&M manuals have not been supplied yet.
PRIOR TO CONSTRUCTION PHASE (Applicable for DMA 602-604, 606, 609 & 612)							
Preparation of final IEE/EMP	- Revise/update IEE/EMP based on detailed design - Submit to ADB for approval and disclosure	MSC to update DWASA to submit to ADB	DWASA	- Detailed Design	After completion of detailed design and prior to start of civil works	ADB SPS EARF	IEE/ EMP reports have been updated and sent to ADB. **Complied**
Environmenta l Monitoring Report	- Submit to ADB semi-annual environmental monitoring report	MSC to prepare DWASA to submit to ADB	DWASA	- EMP - Contract provisions	Semi-annual	ADB SPS EARF IEE	2nd Semi-Annual report is being prepared. **Complied**
Legislation, permits, and agreements	- In all instances, DWASA, service providers, contractors, and consultants must remain in compliance with relevant local and national legislation. - A copy of the IEE must be kept on-site and disclosed in DWASA and ADB website	Contractor	PMU Environm ent Specialist and MSC Environm ent Monitorin g Specialist	All applicable permits and approvals	Prior to award of contract and as necessary	- Location Clearance - ECC - Road cutting permit	Copy of IEE remain at the site office including the EMPs. **Complied**
Education of site staff on general and environmenta	- Ensure that all site personnel have a basic level of environmental awareness training. - Staff operating equipment (such as excavators, loaders, etc.) shall be adequately	Contractor	PMU and MSC	Records of training	Prior to start of civil works and every new	Environme ntal manageme nt plan	Two trainings on Environment by ADB & MSC and Periodic training on H&S is conducted by contractor.

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l conduct[4]	trained and sensitized to any potential hazards associated with their task. - No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the contractor. - All employees must undergo safety training.				employee	(capacity building)	**Complied**
Safeguards supervisors	- The contractor shall appoint one environment safeguard supervisor and one resettlement supervisor who will be responsible for assisting contractors in implementation of EMP, coordinating with the MSC environment management specialist and resettlement specialist, community liaison, consultations with interested/affected parties, reporting, and grievance redressal on a day-to-day basis.	Contractor	Consultan t	Hiring and actual work	As work progresses	Continuous work output and reporting records	One Environmental and Safety Engineer, Safety supervisor and Resettlement supervisors have been appointed by the contractor. **Complied**
CONSTRUCTION PHASE (Applicable for DMA 602-604 & 606)							
Safety, security and protection of the environment	- Take all necessary precautions against pollution or interference with the supply or obstruction of the flow of, surface or underground water. These precautions shall include but not be limited to physical measures such as earth bunds of adequate capacity around fuel, oil and solvent storage tanks and stores, oil and grease traps in drainage systems from workshops, vehicle and plant washing facilities and service and fuelling areas and kitchens - Establish sanitary solid and liquid waste disposal systems - Should any pollution arise, clean up the affected area immediately at his own cost and to the satisfaction of the Project Manager, and	Contractors	DWASA PMU MSC MoEF	- ECC provisions - Program of Performanc e - Waste Manageme nt Plan - Complaints from stakeholder s	- As required in the Program of Performance - As work progresses	- ECC - Contract provisions - EMP - No complaints received	Safety and precaution measures are being considered to protect the pollution of surface or ground water. Use of petroleum and lubricant done with extra care to avoid any seepage into the ground. **Complied**

[4] These points need to be made clear to all staff on-site before the project begins.

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	pay full compensation to any affected parties.						
Protection of waterways	- Every effort shall be made to ensure that any chemicals or hazardous substances do not contaminate the soil or water on-site. - Care must be taken to ensure that runoff from vehicle or plant washing does not enter the surface/ground water. - Site staff shall not be permitted to use any stream, river, other open water body, or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing, or for any construction or related activities. - All concrete mixing must take place on a designated, impermeable surface. - No vehicles transporting concrete to the site may be washed on-site. - No vehicles transporting, placing, or compacting asphalt or any other bituminous product may be washed on-site. - All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of removed from the site. - Hazardous substance/ materials are to be transported in sealed containers or bags.	Contractor	DWASA MSC	- ECC Provisions - Complaints from community	As work progresses	- No visible increase in turbidity and constructio n materials/ wastes in surface water, any waterways, or drainage channels - Zero complaints from community	Usage of chemicals that will contaminate the soil or water at site is not seen. **Complied**
Construction of temporary structures (such as offices, storages, warehouses, scaffolding,	- Before commencement of the works on the sites submit to the Project Manager the drawings, where the proposed location and general arrangement or site construction survey of the contractor's office premises, workshops, storages, headquarters and other temporary constructions, necessary for adequate and easy execution of the contract.	Contractor	MSC	Location plan	- Prior to start of civil works - As work progresses	- Approved location plan - Constructio n method - No complaints	Necessary offices, storages, warehouses, etc have been established. **Complied**

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etc.)	- Obtain own information about the access to all the parts of the sites and, if the contractor wants to use the roads, going through private properties, he shall complete all the formalities with the owners. - Ensure all necessary precautionary measures to avoid any accident due to traffic. He should ensure that for any activities/temporary or permanent structures, machineries and equipment, scaffolding or shoring should not obstruct free flow of surface runoff towards sewer system or drain. - Under no circumstances may open areas or the surrounding bushes be used as a toilet facility. - Encourage recycling and provide separate waste receptacles for different types of wastes. Ensure that all litter is collected from the work and camp areas daily. Ensure camp and working areas are kept clean and tidy at all times. - No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission of the engineer. - The contractor shall submit a method statement and plans for the storage of hazardous materials (fuels, oils, and chemicals) and emergency procedures. - The contractor shall ensure the material safety data sheets of chemicals are posted in conspicuous areas.					received - No dumped wastes and litter at work sites at all times	
Handling of surface water, flooding	- Protect the working area including pits, trenches, materials, machineries and equipment from any damage due to inundation by	Contractors	DWASA PMU MSC	- Program of Performanc	- As required in the Program	- Contract Provisions - EMP	**Complied**

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event, heavy downpour, etc.[5]	downpour. - Ensure not to make any congestion in the open drains or natural or artificial channels by any of his activity. - Take necessary measure to bring the site to the condition prevailing before the downpour without delay. Necessary measure has to be taken so that storm water does not get into the newly installed pipelines. - Be particular in keeping updated weather forecast and maintain a record book at site in which weather condition is recorded.			e - Bi-weekly 6 weeks running plan - On-site record book	of Performance - As work progresses		
Handling of excavated soil	- Make own arrangements for the temporary storage of any excavated material. Haul away all excavated materials from the excavation site and deposit these in an area designated by DWASA. - Have regard to the working areas available to him for the construction of the pipeline particularly where this is located in roads or in other places to which the public has free access. - Be responsible for removal and disposal of any excavated material required for or not suitable for use as refilling as aforesaid or use elsewhere in the works. The cost of such removal of excess excavated earth shall be deemed to be included in the contract rates. - Hauling vehicles must always be present at the excavation site.	Contractors	DWASA PMU MSC	- Program of Performanc e - Bi-weekly 6 weeks running plan - On-site record book - Complaints from stakeholder s	- Prior to start of civil works - As work progresses	- Contract Provisions - EMP	The arrangements have been made to remove the excavated materials (not suitable for use as refilling) to the designated city corporation dumping ground nearer to the DMA. With some exceptions, excavated materials are not being removed from worksites as per EMP. **Partly Complied**
Minimization	- Restrict his work to the sites allocated to him,	Contractors	DWASA	- Program	- Prior to	- Contract	In case of night works, prior

[5] Water logging problem exists during downpours and monsoon. Portions of roads may be flooded for prolonged periods after heavy downpours. The existing drainage facilities of Dhaka are insufficient. Only about 30% of the city's population is connected to the sewerage system. Dispose of wastewater through surface drains, or in low-lying areas, natural drains, or water bodies that find their way to storm sewers. During monsoon period with medium to heavy downpour the roads are inundated for 1-6 hours.

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of public disturbance	and keep the sites accessible for inspection by competent authority at any time. - Ensure, as far as possible to minimize public disturbance and work during the nights. - Advance road signage indicating the road detour and alternative routes. Provide sign boards for pedestrians to inform them of nature and duration of construction works and contact numbers for concerns/ complaints. - Provide adequately illuminated signs and barriers at night. Ensure these are clean, legible at all times and repositioned as necessary as the work progresses. - For the duration of the works, provide convenient access to paths, steps, bridges, crossings or drives for all entrances to property abutting the site and maintain them clear, tidy, and free from mud and objectionable matter.		PMU MSC	of Performanc e - Inventory of utilities, signs and barriers - access to paths, steps, bridges, crossings or drives for all entrances to property - Complaints from stakeholder s and affected people - Records of disclosure and public consultatio ns	start of civil works (per pipe section) - During pipe laying/ replacement/ bursting - As work progresses	provisions - EMP - No complaints received	information to locals, noise reducers are used at worksites with minimal level of disturbance possible to the locality. **Complied**
Warning of users prior to any disturbance in water supply	- Submit detailed work plan for the particular portion of the work to the Project Manager for approval. - Before setting out for the work, inform the inhabitants, businesses and consumers through	Contractors NGO	DWASA PMU MSC	- Program of Performanc e - Inventory	- Prior to start of civil works (per pipe section) - During	- Contract provisions - EMP - No complaints	NGO and representatives from contractor give the prior information regarding the work to be conducted within next seven days.

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	appropriate means (bill board display, leaflet distribution, using colour papers announcement on radio and TV, publishing in the widely circulated daily newspapers) at least 7 days (or as directed by the Project Manager) before commencement of any work.			of utilities - Liason with utilities owners and operators - Number and type of informatio n disseminati on activities - Complaints from stakeholder s and affected people	pipe laying/ replacement/ bursting	received - 7-day notice to public	**Complied**
Maintaining water supply	- Plan and execute in such a way the water supply shall be kept in operation with maximum disruptions of one working day (12 hours) - Notify existing users about temporary disruption of water supply if unavoidable. - Provide with alternative water source to disconnected consumers to meet their daily requirement. - Ensure only clean water free from deleterious materials and of appropriate quality for its intended use is supplied. - In providing water, ensure that the rights of and supply to existing users are not affected	Contractors	DWASA PMU MSC	- Program of Performanc e - Number of disconnect ed consumers - Quantity of supplied water to affected consumers	- Prior to start of civil works (per pipe section) - During pipe laying/ replacement/ bursting	- Contract provisions - EMP - No complaints received	NGO and representatives from contractor give the prior information regarding probable disruption with water supply. Arrangement is made for temporary water supply when necessary. **Complied**

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	either in quality, quantity or timing. - Inform the Project manager In the event of a dispute over the effect of the contractor's arrangements on the water supply of others.						
Provision for security of the sites	- Be responsible for guarding all utilities, plants equipment, material, etc. delivered on sites and for ensuring that all sign, lights, fences, etc. are in their proper place. - Provide, install and maintain suitable barriers and/or fences to protect the facilities, constructions camp, storage yard, existing facilities and construction and installation operations and to remove same when no longer required by DWASA, or at completion of the project.	Contractors	DWASA PMU MSC	- Program of Performanc e - Signs and barriers - Security measures in place	- Prior to start of civil works (per pipe section) - During pipe laying/ replacement/ bursting - As work progresses	- Contract provisions - EMP - No complaints received	**Complied**
Protection of trees and vegetation	- Ensure that no trees or shrubs are felled or harmed except for those required to be cleared for execution of the works. - Ensure no tree shall be removed without the prior approval of the Project Manager and any competent authorities. - Plant and maintain two trees of the same species for every one that is removed.	Contractors	DWASA PMU MSC MoEF	- Program of Performanc e - Complaints from stakeholder s - Number of trees cut and planted	- As required in the Program of Performance - As work progresses	- ECC - Contract provisions - EMP - No complaints received - 100% survival of trees planted	For being the pipe line alignment along the roads where no trees are present eliminate the chance of trees to be cut. In case of any trees to be cut it is compensated at the rate of double. **Complied**
Use of wood as fuel	- Not use wood as a fuel for the execution of any part of the works, including but not limited to the heating of bitumen and bitumen mixtures and the manufacture of bricks for use in the works. - To the extent practicable, ensure that fuels other than wood are used for cooking, and	Contractors	DWASA PMU MSC	- Program of Performanc e - Complaints from	- As required in the Program of Performance - As work progresses	- Contract provisions - EMP - No complaints received	Usually compressed gas or other type of fuel is used but no wood for cooking is allowed. **Complied**

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	water heating in all his camps and living accommodations.			stakeholders			
Fire prevention	- Take all precautions necessary ensure that no buildings and supply utilities, etc. or vegetation along the line of the road outside the area of the permanent works is affected by fires arising from the execution of the works. - Follow any instructions of the competent authorities with respect to fire hazard when working in the vicinity of gas installations. - Immediately suppress if a fire occur in the natural vegetation or plantations adjacent to the road for any reason. - In areas of forest, shrub or plantation damaged by fire considered by the Project Manager to have been initiated by the contractor's staff or labour, replant and restore to the satisfaction of the Project Manager.	Contractors	DWASA PMU MSC	- Program of Performance - Number of fire occurances	- As required in the Program of Performance - As work progresses	- Contract provisions - EMP - Zero fire occurence	Precautionary measures for such incident have been considered. **Complied**
Handling traffic and access	- Submit to the Project Manager for approval a traffic management plan and detailed work plan showing activities on hourly basis. - Plan and conduct work in such a way that can be completed in 6-8 hours with as little as possible of traffic interruption, so all of this work (and probably most of the daytime work in minor roads) will be conducted by small teams of men, working on short lengths of the network (around 100 -150 m) at a time. - Provide, erect and maintain barricades, signs, markings, flags, lights and flagmen as may be required for the information and protection of traffic. The flagmen shall be equipped with red and green flags and lanterns/lights. - Ensure barricades, signs, marking, and flags	Contractors	DWASA PMU MSC	- Program of Performance - Traffic management plan - Lists and samples of warning signs and barricades	- As required in the Program of Performance - As work progresses	- Contract provisions - EMP - No complaints received	Contractor has a supervisor working with the placing and replacing of the traffic management items including maintenance of Ramps and carriageways. **Complied**

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	are of strong design. All barriers on roads and pedestrian areas shall be lit with warning lights during night time or when there is poor visibility. - Where the diversion or closure of any existing carriageway, walkway or public right of way is temporarily necessitated by the works, provide and maintain an alternative, which shall be operational before interference with the existing way. - Where ramps, temporary carriageways and walkways are required, they shall be provided and maintained to a standard suitable in all respects for the class or classes or traffic or pedestrians. These must be kept usable by women, children, patients and disables.						
Minimizing noise level	- Ensure noise level of the machineries and equipment must not exceed 70dB(A). - Use modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions, and ensure they are maintained to manufacturers' specifications. - Noise-generating equipment must be fitted with silencers. - If a worker is exposed to noise above a noise exposure limit, the contractor must investigate options for engineered noise control such as using low-noise excavators, jackhammers, drills, and power generators. - If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection.	Contractors	DWASA PMU MSC	- Complaints form community - Noise level monitoring record	As work progresses	- Bangladeshi Noise Standards - ECC Provisions	Noise level at some worksites was found higher than allowable limit 70 dB(A). Noise reduction box was not in use while operating machineries. **Partly Complied**

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Activity	**Mitigation Measures**	**Responsibl-e for Implement-ation**	**Responsi-ble for Monitori-ng**	**Parameter to Monitor**	**Frequency of Monitoring**	**Guidelines / Standards**	**Compliance Status**
Minimizing dust generation and air pollution	- Limit dust by removing waste soil quickly, bringing sand to site only when necessary, covering and watering stockpiles, and covering soil and sand when carried on trucks. - Vehicles travelling to and from the construction site must adhere to speed limits so as to avoid producing excessive dust. - Access and other cleared surfaces, including backfilled trenches, must be dampened whenever possible and especially in dry and windy conditions to avoid excessive dust. - Vehicles and machinery are to be kept in good working order and to meet manufacturer's specifications for safety, fuel consumption, etc. - The contractor is to have the equipment seen to as soon as possible should excessive emissions be observed.	Contractors	DWASA PMU MSC	- Program of Performance - Complaints from stakeholders - Vehicle emission testing records	- As required in the Program of Performance - As work progresses	- No visible increase in dust and particulate matters - No complaints received	Excavated soil is not being removed and covered while transporting offsite as stated in the EMP, which promoting dust generation & air pollution. **Partly Complied**
Protecting the community and facilities and locations of social and cultural importance (e.g. schools, hospitals, mosques, museums, etc.)	- Increase the workforce in sensitive areas to complete the work quickly. - Provide wooden walkways for pedestrians and metal sheets for vehicles to allow access across open trenches, where required. - Use directional down-facing lighting, fitted with effective shades at all times when working at night. - Give special attention to the screening of higly reflective materials on site. - Locate storage facilities and other temporary structures on site such that they have as little visual impact on local residents as possible. - Provide screening in areas where the visual environment is particularly important (e.g., along commercial routes) or privacy concerns for surrounding buildings exist. This can be in a	Contractors	DWASA PMU MSC	- Program of Performance - Bi-weekly 6 weeks running plan - On-site record book - Complaints from stakeholders	As required in the Program of Performance	- Contract Provisions - EMP - Zero complaints from the stakeholders	School, College and other educational institutes including mosque, church, pagodas and other religious establishments are taken in to account for disturbance. **Complied**

ENVIRONMENTAL MANAGEMENT PLAN							
Activity	**Mitigation Measures**	**Responsibl-e for Implement-ation**	**Responsi-ble for Monitori-ng**	**Parameter to Monitor**	**Frequency of Monitoring**	**Guidelines / Standards**	**Compliance Status**
	form of shade cloth, temporary walls, or other suitable materials.			- Grievance Redress Mechanism records			
Protecting health and safety of workers	- Ensure continuing health and safety of the employees by producing and applying a Health and Safety (H&S) Plan for all working sites. The H&S plans will include such measures as: (i) excluding the public from construction sites; (ii) ensuring that all workers are provided with and use appropriate Personal Protective Equipment; (iii) health and Safety Training for all site personnel; (iv) documented procedures to be followed for all site activities; (vi) documented procedures to be followed for AC pipes; and (vi) accident reports and records. - Prior to the commencement of any hazardous operation, submit a Safety Method Statement to the Project Manager for his approval. - Ensure all workers have been suitably trained prior to commencing work and are to be adequately supervised whilst carrying it out. - Ensure all plant and equipment are suitable for the task to be undertaken and properly inspected/tested prior to being put into operation. - Maintain records and make reports concerning health, safety and welfare of persons, and damage to property. Take remedial action to prevent a recurrence of any accidents that may occur. - Provide hard hats, boots, other protective equipment and first aid box with all necessary medicines.	Contractors	DWASA PMU MSC	- Program of Performanc e - Number of accidents - On-site Record	As required in the Program of Performance	- Contract provisions - EMP - Zero accident record - No complaints received	Workers have the intention of not wearing the Personal Protective Equipments (PPE) at worksites. But awareness campaign is conducted by contractor to change the practice. **Partly Complied**

ENVIRONMENTAL MANAGEMENT PLAN							
Activity	**Mitigation Measures**	**Responsibl-e for Implement-ation**	**Responsi-ble for Monitori-ng**	**Parameter to Monitor**	**Frequency of Monitoring**	**Guidelines / Standards**	**Compliance Status**
	- Train workers in safety issues. Provide suitable arrangements to cater for emergencies, including: first aid equipment (dressings, etc.); person(s) trained to administer first aid; communication with, and transport to, the nearest hospital with an accident / emergency department; monitoring equipment; rescue equipment; fire fighting equipment; and communication with nearest fire brigade station. - Provide adequate welfare facilities including, as a minimum, drinking water; toilets; washbasins with warm water, soap and towels; and clean/dry/warm area equipped with tables and chairs at which food can be eaten.						
Replacement of asbestos cement (AC) pipes	- Follow the protocol prepared by the design consultants to be applied in any instance that AC pipes are found. - Train all personnel (including manual laborers) to enable them to understand the dangers of AC pipes and to be able to recognize them in situ. - Inform the management immediately if AC pipes are encountered. - Remove all persons to a safe distance. - Delegate trained persons to deal with AC materials and require use of appropriate breathing apparatus and protective equipment - Implement procedures for the safe removal and long-term disposal of all asbestos-containing material encountered.	Contractor MSC to develop AC pipes protocol	DWASA MSC	- H&S plan - Number of accidents and work-related injuries - Complaints from community	As work progresses	- Construction method - Detailed design documents - H&S Plan - AC Protocol - Zero accident and work-related injuries	All AC pipes will be left in situ where intact. In case of need of handling of AC pipes, AC pipe handling protocol will be followed. **Complied**
Cultural and historical	- All the staff and laborers of the contractor be informed about the possible items of historical	Contractor	Consultan	Chance finds	As necessary	All chance finds shall	Noting important is existed nor found in the project area so far

ENVIRONMENTAL MANAGEMENT PLAN							
Activity	**Mitigation Measures**	**Responsibl-e for Implement-ation**	**Responsi-ble for Monitori-ng**	**Parameter to Monitor**	**Frequency of Monitoring**	**Guidelines / Standards**	**Compliance Status**
environment	or archaeological value, which include old stone foundations, tools, clayware, jewelry, remains, fossils, etc. - If something of this nature is uncovered, the Department of Archaeology shall be contacted and work shall be stopped immediately.		t			be reported and turned over to the Department of Archaeology.	that is culturally or historically important. **Complied**
POST-CONSTRUCTION PHASE (PRIOR TO TURNOVER TO DWASA) (Applicable for DMA 602)							
Access	- All excavated roads shall be reinstated to original or better condition.	Contractor	Consultant	Road conditions	Prior to turn-over	Pre-existing conditions	**Complied**
Utilities and other existing infrastructure	- All disrupted utilities restored - All affected structures rehabilitated/compensated	Contractor	Consultant	All affected utilities	Immediately after civil works	All disrupted services restored	**Complied**
Construction camps and storage areas	- After construction work, all structures comprising the construction camp are to be removed from site or handed over to the property owner/community as per mutual agreement (if established on private/community land). - The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. - All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be topsoiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document. - The contractor must arrange the cancellation of all temporary services.	Contractor	Consultant	General condition of the areas	Prior to end of construction period/demobilization	Pre-existing condition	**Complied**
Waste	- All wastes shall be removed from the site and	Contractor	Consultan	General	Prior to end	Pre-	

ENVIRONMENTAL MANAGEMENT PLAN							
Activity	**Mitigation Measures**	**Responsibl -e for Implement -ation**	**Responsi- ble for Monitori- ng**	**Parameter to Monitor**	**Frequency of Monitoring**	**Guidelines / Standards**	**Compliance Status**
management	transported to a disposal site or as directed by the environment management specialist. Waybills proving disposal at each site shall be provided for the environment management specialist's inspection.		t	condition of the areas	of construction period/demo bilization	existing condition	**Complied**
OPERATION AND MAINTENANCE PHASE (INCLUDING DEFECTS LIABILITY PERIOD) (Not applicable during this reporting period)							
Detection and repair of leaks and pipe bursts	- Ensure leak detection and restoration time is minimized to the extent possible.	DWASA	DWASA	Number of reported leaks	As part of operations and maintenance of the improved system	Standards set by DWASA	

Appendix B: Environmental Quality Test Program
(Ambient Noise Level &Ambient Air Quality)

A House of Environmental Monitoring, Research, Pollution Control, Management & Development

GLOBAL ENVIRONMENT
CONSULTANTS LTD.

Global Environment Consultants Ltd. Dhaka Bangladesh

GECL LABORATORY ANALYSIS REPORT
ON
AMBIENT NOISE LEVEL ASSESSMENT REPORT

GECL/Code (TR) : 567
Company Name : RFL-FSL - CRFG JV.
Office Address : House # 1(1st floor) Road # 6, Block G, Rumpura, Banasree, Dhaka, Bangladesh.

Sample Collector : Global Environment Consultants Ltd (GECL Monitoring Team).
Description of Sample : Ambient Noise Level Assessment Report. (ICB 2.7 DWASA MODS Zone - 6 different area).
Sampling date : 31th March, 2016
Reporting date : 04th April, 2016

Description of analysis

SN	Sample Location	Site condition	Concentration present (LA_{eq}) dBA
			Day time
01	South Banasree, Goran, Dhaka, In front of House # L-2, Road # 8 (Near 1st air test location)	Under construction	72.19
02	250 Meter Distance from 1st air test location) In front of Stern Bon Bithee shopping complex	Under construction	73.41
03	Middle Point of 602 and 604, Block # K, Road # 15.	Under construction	72.34
04	Eastern Housing, South Banasree, Goran, Dhaka-1219, In front of House # 54, Road # 4/2, Bloc # C (Near 2nd air test location)	Under construction	71.12
05	DMA 604 area, In front of Peaceful School and Collage	Under construction	71.31
06	200 Meter Distance from 2nd air test location Road # 5, South Banasree, Khilgaon, Dhaka-1219.	Under construction	72.16
07	Block # D, Bhuiyan para Road, Dhaka-1219, Nearby New Idle School. (3rd air test location)	Under construction	74.22
08	Titas Road Balur Math (DMA-603) area.	Under construction	72.13
	Bangladesh (DoE) standard for industrial area		-
	Industrial area		75
	Commercial Area		70
	Mixed Area		60
	Residential Area		55
	World Bank/IFC Standard		-
	Industrial		70
	Residential; Intuitional; Educational		55

All units are in (LA_{eq}) dBA, **Note:** This noise data was usually accomplished by - Lutron Sound Level Meter (Model - 4012)

Comment: According to the Environment Conservation Rules (ECR) "SRO no 212-law/2006" the standard for ambient noise level in the industrial area is 75 decibels (day time) and IFC Standard for ambient noise level in the industrial area is 70 decibels at day time respectively. The results of sound level were varying from 71.12 to 74.22 dB around in the RFL-FSL-CRFG JV working site. The levels of noise were within the Bangladesh limit and also IF/World Bank limit. The level sound has not any detrimental effect to the surrounding of the RFL-FSL-CRFG JV working area.

Md. Golam Mostafa
Chief Executive Officer
Environmental Analysis & Development
Global Environment Consultants Ltd (GECL).

MOHD NUR E ALAM SIDDIQUE
Director (Analysis & Development)
Analytical & Environmental Laboratory (GECL)
B.Sc (Hons) M.Sc (SUST) M. Phil (DU),
PhD Research Fellow (DU)

Photo: Ambient Noise Level Assessment Report of DMA 602, 603 & 604

A House of Environmental Monitoring, Research, Pollution Control, Management & Development

GLOBAL ENVIRONMENT
CONSULTANTS LTD.

Global Environment Consultants Ltd. Dhaka Bangladesh

GECL LABORATORY ANALYSIS REPORT
ON
AMBIENT AIR QUALITY ANALYSIS REPORT

GECL/Code (TR) : 567
Company Name : RFL-FSL - CRFG JV.
Office Address : House # 1(1st floor) Road # 6, Block G, Rumpura, Banasree, Dhaka, Bangladesh.

Description of sample : Ambient air quality analysis report at RFL - FSL- CRFG-JV Working site in DWASA MODS Zone - 6 different area.

Sample Collector : Global Environment Consultants Ltd (GECL Monitoring Team).
Sampling Duration : 08 Hours basis
Sampling date : 31th March, 2016
Reporting date : 04th April, 2016

Description of analysis:

Sample Location with GPS Coordinate	Concentration present of different parameter in ambient air			
	SPM	PM_{10}	SO_2	NO_x
Units	µg/m³	µg/m³	µg/m³	µg/m³
Method of Analysis	Gravimetric (EPA Standard)	Gravimetric (EPA Standard)	West - Geake (EPA Standard)	Jacob and Hochheiser (EPA Standard)
602, In front of House # L-2, Road # 8 (GPS Coordinate : N- 23° 45´32.10´´ & E - 90° 26´30.60´´)	246	129	41	37
604, In front of House # 54, Road # 4/2, Bloc # C, Eastern Housing, South Banasree, Goran, Dhaka-1219 (GPS Coordinate : N- 23° 44´53.50´´ & E - 90° 26´25.50´´)	224	107	26	24
DMA 603 area, Nearby New Ideal School, Bloc# D, Bhuiyan para Road, Dhaka-1219 (GPS Coordinate : N- 23° 45´40.50´´ & E - 90° 25´56.40´´)	217	102	21	23
Bangladesh (DoE) Standard for ambient Air	200	150	365	100
IFC/WB Standard	NF	150	125	200

Weather Condition: Weather was cloudy and some time it was raining

Abbreviation: 1. Suspended Particulate Matter (SPM) 2. Respirable Dust Content (PM_{10}) 3 Oxides of Nitrogen (NO_x). 4. Sulphur Di-Oxide (SO_2), DoE- Department of Environment, NF - Not found, NYS - Not yet set, WB -World Bank, IFC - International Finance Corporation.

Comment : The parameters (SPM, PM_{10}, SO_2, & NO_2) of ambient air quality have been tabulated in above mentioned table. It has been observed from the results of all parameters that the values are under permissible limit of the Department of Environment (DOE), the Govt. of the People's Republic of Bangladesh except SPM. Strong evidence on the effect of long-term exposure to PM_{10} and $PM_{2.5}$ on cardiovascular, but effect of SPM on human health is lower compared the above Particulate matter (10 and 2.5).The concentrations of SPM are higher than DOE limit. The sampling locations were near road side, the road dust might be contributed the higher values of SPM. The concentrations of PM_{10}, SO_2 and NO_x were below from the others standard of different agencies. The total environment is fairly good around the **RFL-FSL-CRFG JV Construction site.**

Md. Golam Mostafa
Chief Executive Officer
Environmental Analysis & Development
Global Environment Consultants Ltd (GECL).

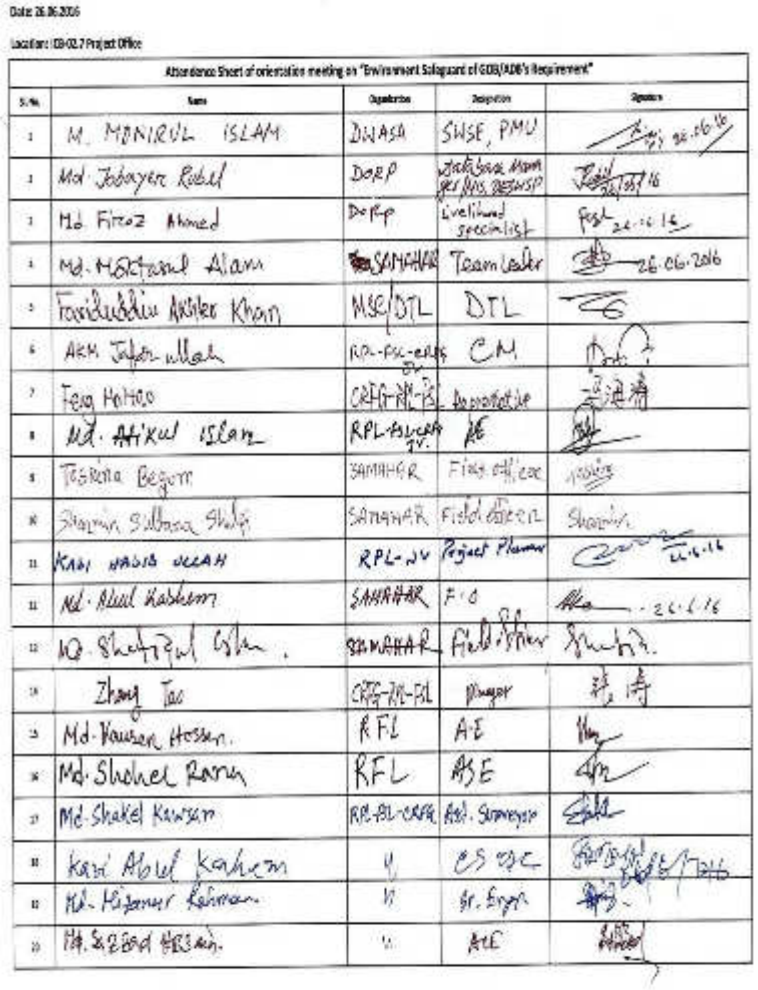
MOHD NUR E ALAM SIDDIQUE
Director (Analysis & Development)
Analytical & Environmental Laboratory (GECL)
B.Sc (Hons) M.Sc (SUST) M. Phil (DU),
PhD Research Fellow (DU).

Photo: Ambient Air Quality Assessment Report of DMA 602, 603 & 604

Appendix C: Orientation Workshop on Environmental Safeguard

Photo: Orientation Workshop on Environmental Safeguard

Photo: Orientation Workshop on Environmental Safeguard



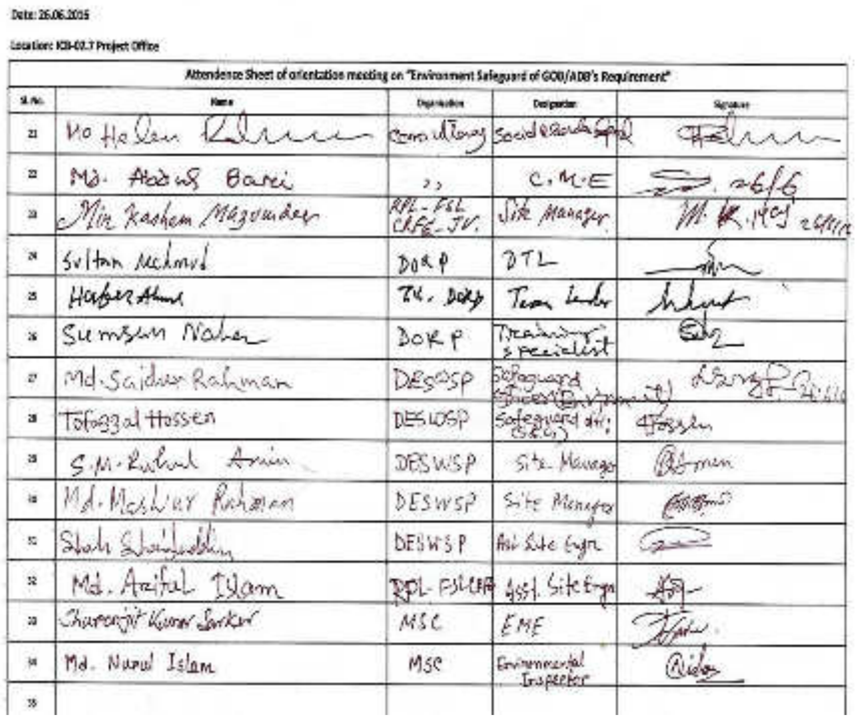
Date: 26.06.2016

Location: ICB-02.7 Project Office

Attendance Sheet of orientation meeting on "Environment Safeguard of GOB/ADB's Requirement"

Sl. No.	Name	Organization	Designation	Signature
1	M. MONIRUL ISLAM	DWASA	SWSE, PMU	26.06.16
2	Md. Jobayer Rubel	DoRP	Social Safeguard Manager, DESWSP	26/06/16
3	Md. Firoz Ahmed	DoRP	Livelihood specialist	26.06.16
4	Md. Mostafa Alam	SAMAHAR	Team Leader	26.06.2016
5	Fariduddin Akhter Khan	MSC/DTL	DTL	
6	AKM Jafar ullah	RPL-FSL-CRFG JV	CM	
7	Feng Haitao	CRFG-RPL-FSL	Representative	
8	Md. Atikul Islam	RPL-FSL-CRFG JV.	PE	
9	Tasrina Begum	SAMAHAR	Field officer	
10	Shamim Sultana Shilpi	SAMAHAR	Field officer	
11	KAZI HABIB ULLAH	RPL-JV	Project Planner	26.6.16
12	Md. Abul Kashem	SAMAHAR	F.O	26.6.16
13	Md. Shafiqul Islam.	SAMAHAR	Field officer	
14	Zhang Tao	CRFG-RPL-FSL	Manager	
15	Md. Kawsar Hossen.	RFL	A.E	
16	Md. Shohel Rana	RFL	ASE	
17	Md. Shakel Kawsar	RPL-FSL-CRFG	Asst. Surveyor	
18	Kazi Abul Kashem	"	ES OSC	26/6/2016
19	Md. Mizanur Rahman	"	Sr. Engr.	
20	Md. Sazzad Hossain.	"	AEE	

Participants in Workshop (page 1)



Date: 26.06.2016

Location: ICB-02.7 Project Office

Attendance Sheet of orientation meeting on "Environment Safeguard of GOB/ADB's Requirement"

Sl. No.	Name	Organization	Designation	Signature
21	Md Helal Rahman	Consultancy	Social Safeguard Specialist	
22	Md. Abdus Bari	"	C.M.E	26/6
23	Mir Kashem Mazumder	RPL-FSL CRFG-JV.	Site Manager	26/6/16
24	Sultan Mahmud	DORP	DTL	
25	Hafez Ahmed	TL, DoRP	Team Leader	
26	Sumsun Nahar	DORP	Training Specialist	
27	Md. Saidur Rahman	DESWSP	Safeguard Officer (Environment)	26.6.16
28	Tofazzal Hossen	DESWSP	Safeguard off. (S&E)	
29	S.M. Ruhul Amin	DESWSP	Site Manager	
30	Md. Mashiur Rahman	DESWSP	Site Manager	
31	Shah Shaifuddin	DESWSP	Asst. Site Engr.	
32	Md. Ariful Islam	RPL-FSL-CRFG	Asst. Site Engr.	
33	Charanjit Kumar Sarker	MSC	EME	
34	Md. Nurul Islam	MSC	Environmental Inspector	
35				

Participants in Workshop (page 2)

Appendix D: Photographs

Photo 1: Removal of Excavated Materials from Worksite

Photo 2: Backfilling of Trenches after Pipe Laying

Photo 3: Pipe Jointing (Butt Fusion Method)

Photo 4: Horizontal Directional Drilling (HDD) Machine in Operation

Photo 5: Mobile Toilet Installed at Worksite

Photo 6: Air Quality Monitoring in DMA 602

Photo 7: Air Quality Monitoring in DMA 603

Photo 8: Air Quality Monitoring in DMA 604