Ministry of Local Government, Rural Development & Cooperatives
Local Government Division
Local Government Engineering Department (LGED)

6.4 Guidelines for Operation and Maintenance

Project Coordination Office (PCO)
City Governance Project (CGP)

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1. General

1.1 Introduction

Rapid urbanization accelerated by industry led economic growth has been taking place in Bangladesh. Potential of economic growth in urban areas is worthy of notice. There are 335 Local Government Institutions which cover 8% of total geographical area of Bangladesh and 30% of total population, while accounting for 60% of total national growth. On the other hand, the negative impact of dramatic change in urban areas is observed. The negative impacts are because the functions of municipalities and city corporations prescribed in Local Government (Pourashava) Act 2009 and Local Government (City Corporation) Act 2009, which are very relevant to the demand of city dwellers and urban development, are not implemented in an appropriate manner. In order to improve the public services provided by urban local governments, several urban development projects are being or were implemented by Local Government Divisions (LGD) and local government and engineering departments (LGED) with financial assistance of different development partners and government's own funds. Based on the experiences gained through implemented projects, effective activities for improvement of urban governance have been formulated as a program that has been well accepted. The urban governance improvement programs have been implemented to ensure good governance of those urban local government institutions namely Paurashava for equal, social harmony and planned development. Initiating urban governance improvement, LGD and LGED with financial support of JICA commenced a project named City Government Project (CGP) in 5 City Corporations.

Operation and Maintenance (O&M) of assets is one of the main concerns of City Corporations (CCs) in delivering adequate services to its citizens. Proper operation and timely maintenance can only ensure effective return on a huge amount of expenditure to acquire CCs' assets including infrastructures, service facilities and equipments. CCs have confronted deterioration of the physical assets and services due to rapid growth in urban population which exceeds designed capacity of the assets. On the other hand, availability of resources, manpower and their capacity, in most cases, are insufficient to manage the issue. Under the circumstance, assets are not likely to be maintained until damage to structure grows to a serious level, and it results in shortening of service life. CCs, however as principal cities, have to control quality of assets and services in order to secure quality of life of city dwellers. Therefore, it is considered as a big challenge for the CC to ensure proper O&M of its assets by establishing effective & efficient management system.

A guideline has been prepared on Operation and Maintenance that will be used for training and implementation of Operation and Maintenance activities in five City Corporations under the project.

1.2 Management System of O&M

Under the constraint of resources in CCs, it is essential to establish a management system to optimize O&M activities. Current practice of O&M in CCs relies on reports of claim and apparent damage to a certain extent, yet it may not be an effective and predictable approach. More preferably, focus should be put on preventive activities based on prospective planning in order to maximize life of assets and benefit to the society. Life Cycle Cost (LCC), which refers to total cost required until demolishing or disposal, is a fundamental concept for planning of optimal O&M activities. Based on the idea timely maintenance works are more desirable than rehabilitation of deteriorated assets in terms of LCC minimization, as shown in Figure 1-2.

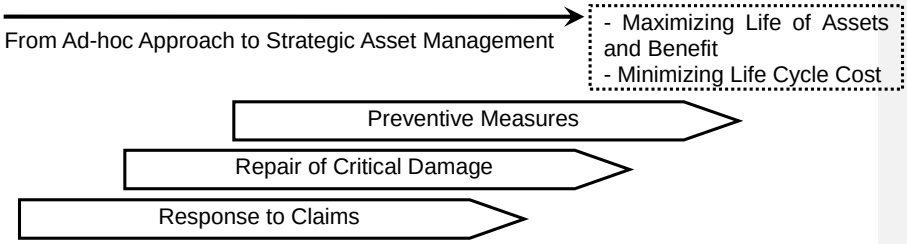
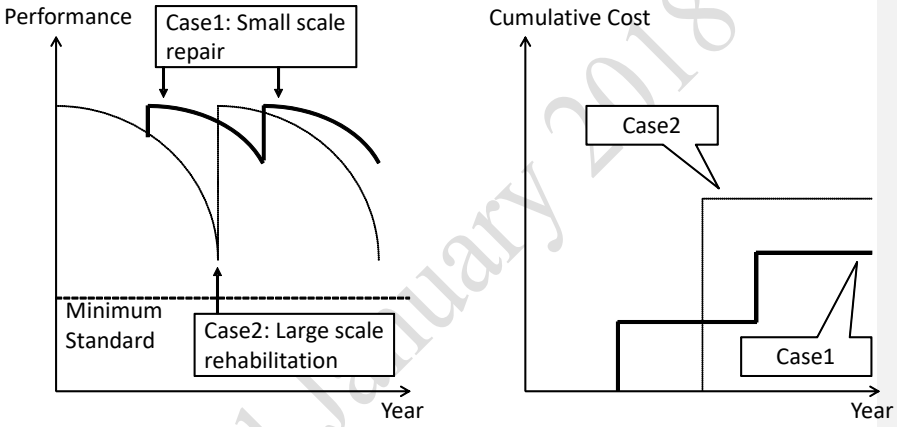


Figure 1-1 Prospective Approach of O&M



(a) Preventive Repair and Performance (b) Life Cycle Maintenance Cost

Figure 1-2 Concept of Life Cycle Cost Minimization

1.3 Elements of O&M

Efficient and effective O&M system functions with presence of management cycle which is backed up by asset inventory data.

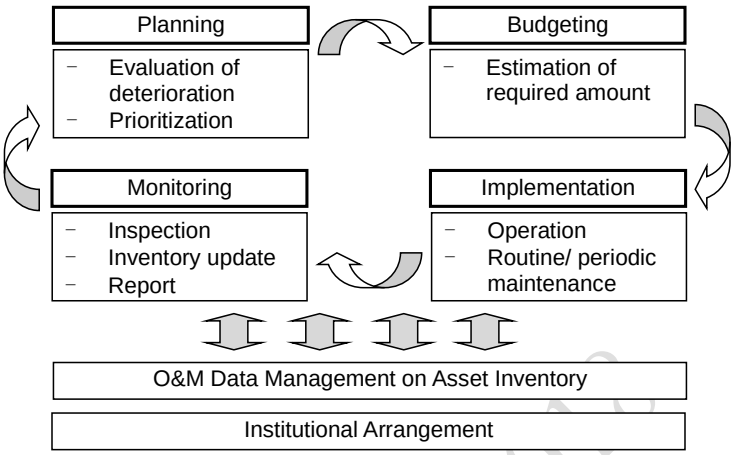


Figure 1-3 Management Cycle of O&M

1.3.1 Planning

Planning of O&M activities is necessary in order to allocate CC's limited resources to prioritized works in the most efficient and effective way. Medium to long term prospect of O&M needs will indicate the required inputs in a single year. For the planning process, asset inventory is an essential tool to keep track of asset conditions, and the data are used to evaluate the level of deterioration. Planning process includes assignment of a responsible body or staff.

1.3.2 Budgeting

O&M plan has to be backed up by a budget for activities after specifying source of budget, which may vary by category of asset or type of activity. One difference is whether an asset is for revenue generating service or not. If so, financially independent accounting system can be applied to realize efficient and accountable budget planning.

1.3.3 Operation

In this document, 'operation' refers to regular manipulation of the components of a system such as plant, machineries, equipment, infrastructure and facilities to deliver the desired service. Operation should be considered as routine work.

1.3.4 Maintenance

'Maintenance' refers to a set of activities to keep the existing system in such a state that it can be operated correctly and with cost effectiveness. Two most commonly accepted maintenance categories are 'routine maintenance' and 'periodic maintenance', whereas more categories could be included under special circumstances, namely; 'emergency (urgent) maintenance'; and 'rehabilitation'. It is necessary to provide due attention to needs for respective types of maintenance while preparing maintenance program of CCs.

(1) Routine Maintenance

Routine maintenance refers to preventive and corrective maintenance activities carried out

continually, largely repetitive basis for any kind of asset. The cost of routine maintenance activities is low compared to periodic maintenance or rehabilitation, and it is usually expended from the revenue budget of CCs. Thus, routine maintenance can be called "recurrent maintenance" from the budgeting perspective. Proper attention will have to be given to allocate funds from maintenance budget for this purpose.

(2) Periodic Maintenance

Periodic maintenance is preventive activities undertaken at intervals, over a period of time. Such intervals of maintenance tasks are often programmed in a pre-determined plan or schedule. Periodic maintenance is distinguished from upgrading of infrastructure to transfer from one stage to the other stage. Examples of periodic maintenance activities are resealing of road surface, painting, etc. carried out once in every two to five years.

Rehabilitation refers to activities carried out to correct major defects in order to restore a facility to its intended operational status and capacity, without significantly expanding it beyond its originally planned and designed function or extent. Rehabilitation activities require higher cost than other categories of maintenance undertaken in a shorter interval of time. As periodic maintenance including rehabilitation work is expended from the development budget of CCs, it can be called "capital maintenance."

(3) Emergency Maintenance

Urgent maintenance is needed to deal with emergencies and problems calling for immediate actions. Emergency maintenance activities cannot be anticipated beforehand like when a bridge is damaged by flood. This type of maintenance is usually undertaken by the revenue budget.

1.3.5 Monitoring

Monitoring activities include inspection of asset conditions, updating of inventories, and reporting the result of maintenance activities. Purpose of monitoring is to keep the asset data up to date in order to assess level of deterioration and conduct preventive measures in a prospective manner. Inspections are planned on a regular, periodic and emergency basis.

1.4 Objectives

An efficient O&M system aims to maximize service life and quality of CC assets including built infrastructure and equipment by providing the most effective use of resources. The specific objective of this Guideline document is to assist CC to prepare and implement CC O&M Action Plan with a view to establish a proper management system for:

- ensuring maximum benefits from the assets through prolonging the life and avoiding downtime;
- ensuring optimum service level from the assets to meet operational requirement;
- minimizing the life time O&M cost through minimizing degree of deterioration of the assets; and
- enhancing efficiency and independence of budgeting structure for O&M activities for sustainable and accountable service delivery.

1.5 Scope of O&M

CCs own a variety of assets including immovable infrastructure, service facilities, equipment and other movable properties. Any type of asset is subject to O&M activities. Concept of O&M management system can be applied to all asset categories, though specific work items vary by

type of asset. Based on the concept, each CC is required to prepare its own O&M Action Plan taking into account of the type, nature and volume of respective assets. Management cycle of O&M determined in the action plan has to be implemented by the CC to meet the objective of this Guideline document.

Process explained in this Guideline will be applied to both operation and maintenance works for CC assets. However, scope of this Guideline does not include improvement works of infrastructure or facilities, which intend to expand an asset beyond its originally planned and designed function or extent. Such improvement type of works will be handled in Infrastructure Development Plan (IDP) of CCs. Scope of O&M works is summarized in the figure below.

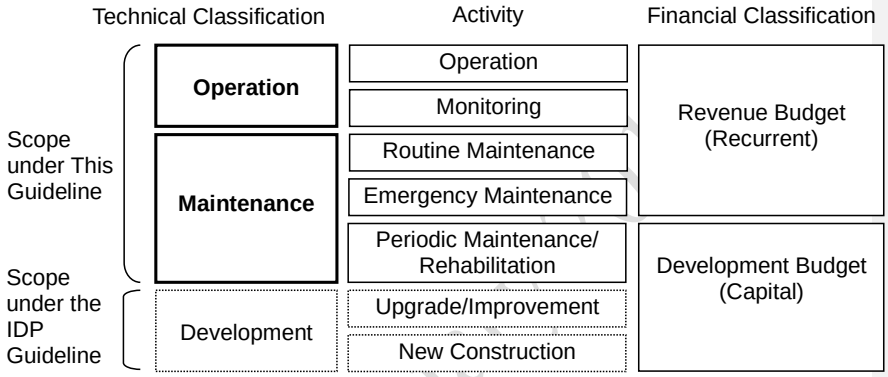
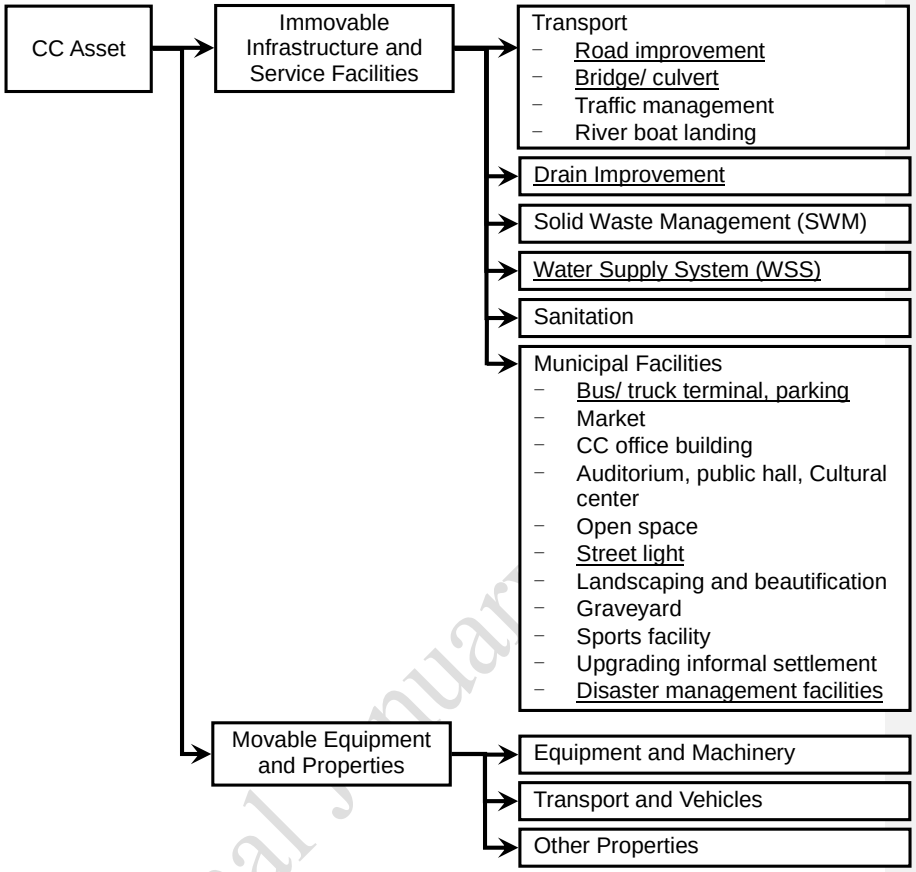


Figure 1-4 Classification of O&M Works



Note: Underlined items are infrastructure and facilities to be constructed under the CGP.

Figure 1-5 Classification of CC Assets

2. O&M Concept in the CGP

2.1 Justification

This Guideline document will cover only O&M of CC assets, both movable and immovable, including infrastructures, service facilities, equipment and so forth. Classification of assets can be easily understood from Figure 1-4. Main focus of this Guideline document is to outline not only the engineering perspective for O&M but the concept of O&M management system and implementation process based on the CC O&M Action Plan.

2.2 Inclusive Governance Improvement Action Program (ICGIAP) and O&M

The CGP has proposed a series of governance improvement activities with defined performance criteria for the target CCs in the form of a tool, named Inclusive City Governance Improvement Action Program (ICGIAP). One of the ICGIAP activities relating to O&M of is to introduce "financially independent accounting system" in water supply and waste management sector. Performance of this activity is a trigger in the 1st and 2nd performance review. Another performance requirement of ICGIAP is to establish O&M Action Plan. Implementation of O&M Action Plan is a mandate requirement for the CCs. This Guideline describes detailed process mainly for the latter ICGIAP activity, while the former is dealt with in another guideline.

Table 2-1 ICGIAP Activities Related to O&M

Activity	Tasks and Performance Criteria	
	1st Performance Review	2nd Performance Review
4.1 Introduce "financially independent accounting system" in water supply and waste management sector	**<Task>** 1) Create financially independent accounting system for two sectors (water supply and waste management) − Develop a computerized system for financially independent accounting system − Open one independent bank account for two sectors respectively − Revenues from holding tax (water rate/conservancy rate) and tariff is earmarked for expenditures of O&M and repair/rehabilitation related to those sectors − Financial control/accounting transaction (management of profit and loss) will be carried out under one independent account **<Performance Criteria>** Preparation of financially independent accounting system initiated	**<Task>** 2) Carry out cost recovery for O&M cost in water supply and waste management by properly adjusted water tariff and conservancy rate respectively **<Performance Criteria>** Proper tariff examined
6.4 Establish O&M Action Plan	**<Task>** 1) Prepare O&M Action Plan based on framework set by PCO 2) Submit draft O&M Action Plan to PCO for	**<Task>** 4) Implement O&M Action Plan

Activity	Tasks and Performance Criteria	
	1st Performance Review	2nd Performance Review
	their approval 3) Submit progress reports to PCO to ensure implementation <**Performance Criteria**> O&M Action Plan prepared	 <**Performance Criteria**> O&M Action Plan implemented

2.3 Principles of O&M in the CGP

Through the activities specified in the ICGIAP, the CGP aims to establish a proper management system of O&M in order to enhance accountability and predictability of services by CC. The O&M system recommended in this Guideline is founded on the following principles:

- Efficient resource allocation to minimize life cycle cost
- Prospective planning to prevent serious defects and prolong service life
- Establishment of management cycle backed up by asset inventory data
- Financial independency in accounting system for water supply and waste management sectors

2.4 Framework of O&M in the CGP

Framework of O&M in the CGP contains every aspect of management cycle described in the Section 1.3. Under the framework, "Operation and Maintenance Action Plan" for CC assets will be formulated by each CC to specify outputs, tasks, responsibilities and schedule in respective stages. Key outputs required in the framework include:

- **Annual O&M Plan:** Plan of prioritized O&M activities for all types of assets owned by CC with identification of estimated work volume, cost, and budget source required in a single fiscal year;
- **Subproject O&M Plan:** Prospective plan of O&M activities for infrastructure constructed as subprojects of the CGP;
- **Medium-term Budgeting Framework:** 5 year prospect of estimated O&M need and budget allocation;
- **Monitoring Report:** Document to assess and report progress of planned activities in the O&M Action Plan for revision in the next term; and
- **Record of Work History:** List of past inspection and maintenance activities with result.

The framework is illustrated in Figure 2-1 below. In addition, O&M Action Plan will include actions to be taken for establishment of essential elements such as institutional arrangement and asset inventory.

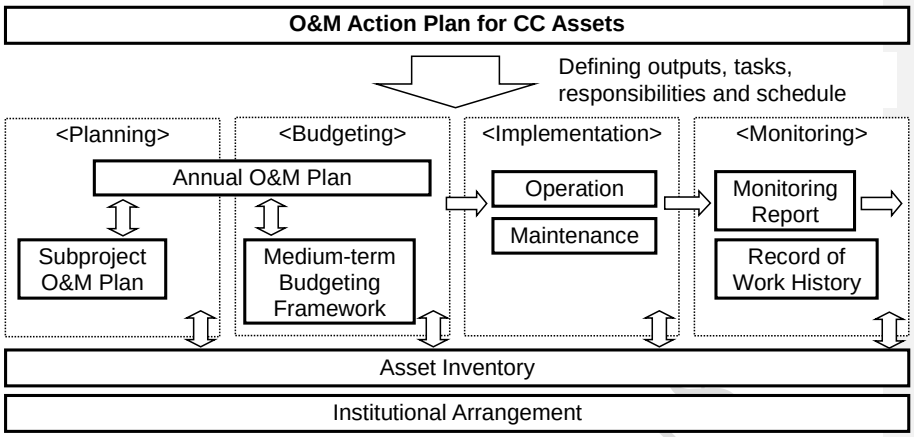


Figure 2-1 Key Outputs under the Framework of O&M in the CGP

2.5 Operation and Maintenance Action Plan

"Operation and Maintenance Action Plan" for CC assets will be a fundamental document for CCs to strengthen their O&M capacity and ensure sustainability of benefits from infrastructure investment, including construction equipment. The O&M Action Plan is supposed to be formulated and implemented by each target CC as one of defined activities under the ICGIAP. Apart from the plan, CCs are required to formulate O&M plans for individual subprojects funded under the CGP.

The following contents are the action areas to be included in the O&M Action Plan.

a) The institutional arrangements for O&M implementation
b) Planning of O&M
   i) Inventories of CC infrastructures
   ii) Prioritizing infrastructure for O&M
   iii) Subproject O&M Plan
   iv) Annual O&M Plan
c) Budget framework for O&M
   i) Budget for O&M allocated in annual budget
   ii) Medium-term Budgeting Framework of O&M
   iii) Establishment and management of Individual bank accounts for water supply sector and waste management sector
d) Implementation of O&M
e) Monitoring
   i) Reporting of the O&M Action Plan
   ii) Inspection and inventory update
f) Citizens' participation in O&M by involving CSCC and WLCC
g) Technical capacity for O&M

The O&M Action Plan will consist of the following items per each action area listed above:

- **Output/Indicator:** Product or status attained as an output through a respective action;
- **Specific Task:** Tasks to be undertaken to carry out a respective action;
- **Organization/Person-in-Charge:** Organization or Person-in-Charge to be selected to implement specific tasks; and
- **Time Schedule:** Planned time of completion of the respective tasks.

2.5.1 Format of the O&M Action Plan

The suggested format of the O&M Action Plan containing all of the fundamental items is presented in Table 2-2.

Table 2-2 Suggested Format of the O&M Action Plan

Name of City Corporation: _____

O&M Action Plan for CC Assets

Action	Output/ Indicator	Specific Task	Organization/ Person in Charge	Time Schedule
a) Institutional arrangements				
A standing committee and councilors are assigned to the O&M.				
An O&M Group consisting of CC officials is established				
b) Planning of O&M				
Inventories of infrastructure and equipment under the responsibility of CC are prepared and updated				
Priority list of O&M of infrastructure is prepared				
Subproject O&M Plan is prepared				
Annual O&M Plan is prepared				
c) Budget framework for O&M				
Budget for O&M is allocated in annual budget				
Medium-term Budgeting Framework for O&M is prepared.				
Individual bank accounts are opened for water supply sector and waste management sector.				
d) Implementation				
Annual O&M Plan is implemented.				
Regular meetings are held among related members.				
e) Monitoring				
PIU submits the progress report to PCO on yearly basis.				
Condition of infrastructure and service performance are monitored and recorded on a regular basis.				
f) Citizens' participation				
CSCC and WLCCs are involved in O&M				
g) Technical capacity for O&M				
CC clarifies training needs.				
Technical skills of concerned persons for O&M are improved				

Note: This table is proposed as a format of the O&M Action Plan; the contents of the action plan should be prepared and determined by CC. However, it is proposed that actions indicated in this table above should be included in the O&M Action Plan of each CC.

2.5.2 Process of Preparation of the O&M Action Plan

Each CC will prepare its O&M Action Plan with support from the PCO and consultants (DSM) in the period of 1st batch of the project. CC should hold discussions on the drafted O&M Action Plan at CSCC and consultation with concerned persons. After the process, the final draft of O&M Action Plan will be submitted to the PCO for approval.

2.5.3 Implementation and Management of the O&M Action Plan

Each CC will implement respective actions defined in the O&M Action Plan. First, it will assign a standing committee and councilors in charge of O&M and establish a group for O&M. Then, this O&M Group will take overall working-level responsibility for the implementation of the O&M Action Plan. The O&M Group may support responsible divisions/sections and persons to perform their tasks written in the O&M Action Plan, monitor the progress of the O&M Action Plan, hold regular meetings among the O&M Group at least once in a month, and report on the implementation of the O&M Action Plan to a standing committee and councilors in charge of O&M. Each CC will submit annual reports on the O&M Action Plan implementation status to the PCO.

The PCO will provide support for CC to facilitate the preparation and implementation of the O&M Action Plan. The PCO with support from the DSM and GICD consultants will provide training courses for CC with regard to overall mechanism and procedures for the O&M Action Plan, technical measures for O&M of each type of infrastructure, and so forth. The PCO will also develop training materials and O&M manuals for CC.

3. Relevant issues of ICGIAP

There is no specific O&M plan. Thus, it is not possible to provide service for repair and rehabilitation of infrastructure timely. O&M plan is to guide CC to reserve budget and to meet needs of timely maintenance.

3.1 Areas/ Activities:

Establish O&M action plan

3.2 Tasks of ICGIAP:

Task-1 Prepare O&M action plan based on framework set by PMO
Task-2 Submit draft O&M action plan to PMO for approval
Task-3 Submit progress reports to PMO to ensure implementation
Task-4 Implement O&M action plan

3.3 Action By:

Mayor, CEO, Head of Engineering Department

3.4 Time Schedule:

Task 1-3 : Within 1st batch of project
Task 4 : Within 2nd batch of project

3.5 Indicators

1st Performance Review (PR) : O&M action plan prepared
2nd Performance Review (PR) : O&M action plan implemented

4. Institutional Arrangement for O&M

4.1 Formation of Key Organizations for O&M

Under the overall project formation of the CGP, a group specified to O&M activities will be established in every CC as a part of Task Team for infrastructure. In addition, one standing committee in each CC will be assigned in order to oversee and provide assistance to the O&M Group in regard to O&M activities. Their activities will be supported by the consultants (DSM and GICD). Details of constitution of the Task Team and standing committee are described in the following subsections.

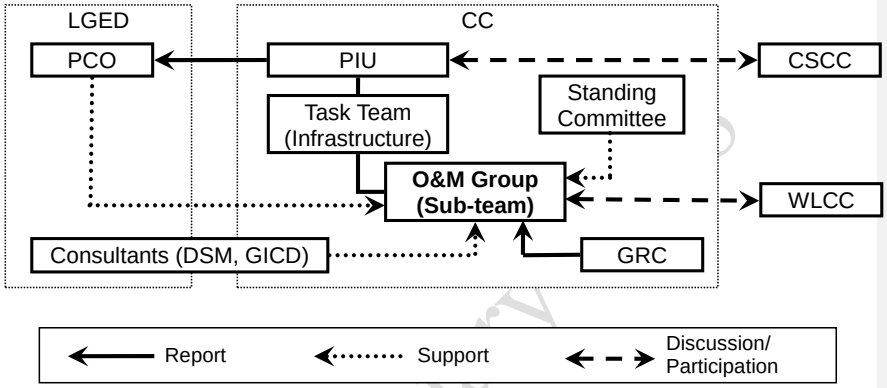


Figure 4-1 Organizational Framework for O&M in the CGP

4.1.1 Group for O&M Activities

CC may establish O&M Group (or sub-team) as a part of Task Team (Infrastructure), which is supposed to manage activities relating to infrastructure component of the CGP. The O&M Group shall consist of Head of Engineering Department and other Task Team members as well as representatives of individual sections to be involved in O&M activities, namely; Electrical Section for street lightning, Water Section for water supply system, Mechanical Section for equipment, and so forth. In addition, it is recommended that CCs involve an officer in charge of collecting opinions of citizens such as public relations officer or member of Grievance-Redress Cell (GRC). The standard formation of the O&M Group will be as shown in the table below.

Table 4-1 Members of O&M Group

	Position in CC	Title
Member of Task Team (Infrastructure)		
1	Head of Engineering Department	Chairperson
2	Zonal Head of Engineering Section (All zones)	Member
3	Architect	Member
4	Urban planner	Member
5	Account Officer	Member
6	Head of Conservancy Section	Member
7	Executive Engineer/Superintending Engineer (Nominated by Mayor)	Member Secretary
Additional Members of O&M Group		
8	Head of Electrical Section	Member

Position in CC		Title
9	Head of Mechanical Section	Member
10	Head of Water Section	Member

Note: O&M Group may co-opt any other representative of any agency, as necessary.

The O&M Group will be the core group for planning and implementation of O&M Action Plan at working level as per the following TOR.

- Design infrastructure inventory and database, identifying the physical features (e.g. length, area, material, etc.) and condition of all infrastructure (e.g., buildings, roads, drains, etc.) in order to judge whether it requires maintenance.
- Identify type of O&M tasks (routine, periodical, emergency, rehabilitation type) to be performed on each infrastructure and specific works to be done (e.g. sweeping road, drain cleaning, road patching, pothole repair, painting, etc.).
- Prioritize infrastructure O&M to be undertaken within available budget considering a set of criteria including social and commercial importance of the infrastructure.
- Support establishment of the financial independent accounting system in water supply and solid waste management sectors.
- Prepare annual O&M budget requirement, submit to the standing committee, and pursue full allocation of O&M fund on time.
- Assign divisions/sections and the persons with responsibilities in performing the tasks relevant to them.
- Support preparation and implementation of physical works for O&M of each type of infrastructure.
- Estimate time required to complete each task including developing an annual work schedule.
- Hold regular meetings at least once in a month, monitor progress of implementation and report to standing committee and Mayor.
- Conduct regular update and management of inventory.
- Plan and implement O&M for equipment of CC.
- Examine effectiveness and operational rules of Mobile Maintenance Team.

4.1.2 Standing Committee for O&M

CC may assign standing committee for city infrastructure construction and maintenance, which has already been established in every target CC, to oversee O&M activities for CC assets. The standing committee may constitute of at least 5 members and the structure is as follows:

Table 4-2 Members of Standing Committee for O&M

Position in CC		Title
1	Councilor (General/Reserved)	Chairperson
2	Mayor (Ex officio)	Member
3	Councilor (General/Reserved)	Member
4	Councilor (General/Reserved)	Member
5	Councilor (General/Reserved)	Member

Note: An expert/engineer experienced in O&M of CC infrastructure and assets shall be included/co-opted as a member to facilitate activities of the standing committee and liaise with the O&M Group. The co-opted member, as a technical advisor, shall not have voting power on the committee's decision.

Functions and tasks of the standing committee may include the following.

- Assist the O&M Group in performing their overall function and oversee the O&M activities.
- Assist the O&M Group in the preparation of inventory and database of CC infrastructure in order to judge whether it requires maintenance.
- Organize awareness campaign to create the "sense of ownership" among the citizens.
- Motivate people through the CSCC and WLCC for participation in planning and implementation of O&M activities of CC infrastructure.
- Hold standing committee meetings at least once in every three months to review and monitor the progress of O&M activities and report to the CSCC and Mayor.
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4.2 Citizens' Participation in O&M

Each CC will involve the CSCC and WLCCs in the preparation and implementation of O&M activities. The CSCC and WLCCs will hold discussions on the inventories of infrastructures, Subproject O&M Plans, Annual O&M Plan, and medium term O&M budgeting program. The CSCC and WLCCs will discuss the status of O&M and make suggestions and recommendations for CC. The O&M Group should report O&M issues to the CSCC at least once in every three months.

Another channel for citizens to convey O&M demands is submitting complaints to GRC. GRC compiles complaints relating to O&M and transfers to the O&M Group.

The O&M Group may involve the WLCC and citizens, such as executive committee members of CBOs and informal group members (if any) in routine O&M activities of infrastructures and facilities (e.g. garbage collection, drainage cleaning, etc.). Another option may be to outsource O&M works to a private entity or individual workers selected through a transparent process. In that case, responsibilities of public asset owner and private contractor shall be clarified in a contract.

4.3 Technical Capacity for O&M

Each CC will implement activities to improve technical skills of the O&M Group members and concerned persons for O&M. Concerned officials of each CC will participate in training courses on O&M provided by the CGP, and disseminate knowledge gained and skills learned to relevant persons in CC. It may be necessary for each CC to provide training on O&M to its contractual labor as well as to the citizens involved in O&M such as CBO members and informal group members (if any). Each CC will also ensure that O&M manuals provided by the project and other related documents will be properly stored at the CC office so that every concerned person is able to access them any time when needed. To this effect, the PCO or Training Unit of the LGED, with support from the DSM and GICD consultants, will provide training courses for CC officials with regard to overall mechanism and procedures for preparation and implementation of O&M Action Plan including management procedure, technical measures for O&M of each type of infrastructure, and so forth. In the process of annual planning, each CC will identify needs of technical capacity development and plan necessary actions.

5. Planning of O&M

5.1 Planning Framework

Proper planning for O&M including realistic budgeting and efficient management plays a very important role in realization of quality services from CC infrastructure and assets. The four (4) major parts of activities related to O&M plan are as follows:

- Inventory of the CC infrastructure;
- Prioritizing CC infrastructure for maintenance;
- Preparation of O&M plan for each subproject under the CGP; and
- Preparation of Annual O&M Plan of CC.

Timely planning of O&M is the key to starting and finishing implementation on time. Therefore, the O&M plan should be done precisely with a distinct time frame.

5.2 Inventories of the CC Infrastructure

The foremost condition to identify the needs of maintenance is to establish an inventory database of all existing CC infrastructure. The inventory database will be a fundamental tool for strategic O&M system in every stage of management cycle. The inventory will provide information on change of conditions of various types of infrastructure and assist in determining priority of O&M works.

Inventories shall be prepared for the major type of subproject/infrastructure listed in Table 1-5 (but not limited to) and recorded in digital format. The inventory database shall include an informative description of such infrastructure including 1) identification code of asset; 2) location; 3) structural dimension; 4) present condition; 5) history of construction and maintenance; and 6) other related data by sector. In addition, it is recommended to combine the data with spatial data in GIS format, so that CC officials and citizens can easily understand status of the infrastructure network and maintenance priority.

The inventory will be constructed and managed following work process below:

1) **Design:** Defining items to be recorded, survey and recording format, management structure, working schedule, etc.;
2) **Survey:** Collecting data of the present condition of subject assets;
3) **Data Registration:** Inputting survey data to the database format;
4) **Utilization:** Referring to the inventory data for analyzing maintenance needs, summarizing annual performance, and so forth; and
5) **Management:** Updating the data through continuous recording of maintenance performed and surveys.

The inventories of infrastructure to be maintained by CC will be prepared in the period of 1st batch and updated periodically. Until the end of the period, CCs shall complete recording of available data of all existing and newly built infrastructure in the provided table format. The data will be linked with GIS database in the following period. Each CC will also be responsible for the preparation of inventories of construction equipment owned by the CC.

5.3 Prioritizing CC Infrastructure for Maintenance

Under limitation of regular funding to fulfill real need for normal maintenance of CC infrastructure, prioritization of significant infrastructure shall be done considering its importance and need for the sake of sustainable maintenance. A priority list of maintenance works for CC infrastructure shall be prepared to determine targets to be covered in an annual budget. The prioritization process shall be based on technical criteria to assess the inventory data and demands from CSCC/WLCCs. With this aim, the CC shall consider some indicators, including but not limited to the following:

a) Maintenance Type
   - Routine maintenance as a preventive measure shall be emphasized more than periodic maintenance.
   - Improvement or upgrade works to change the current physical dimension shall be listed as candidate construction projects in the Infrastructure Development Plan (IDP).

b) Seriousness of Damage
   - Seriously damaged assets which cannot deliver safe and desirable service shall be prioritized.

c) Social and Economic Importance
   - Priority shall be given to infrastructure in higher asset hierarchy which may affect subsequent level of infrastructure; e.g. arterial roads, canal, water production point, etc.
   - Priority shall be given to infrastructure constructed under assured design and management standard such as ones developed under development partners' projects including the CGP.
   - Infrastructure benefitting the larger number of citizens and/or economic activities in CC shall be prioritized.
   - Facilities having a socially or economically important function in CC or network connecting with those shall be prioritized.
   - Assets which have not been maintained for a longer time period shall be prioritized.
   - Priority order given by WLCCs will be considered.

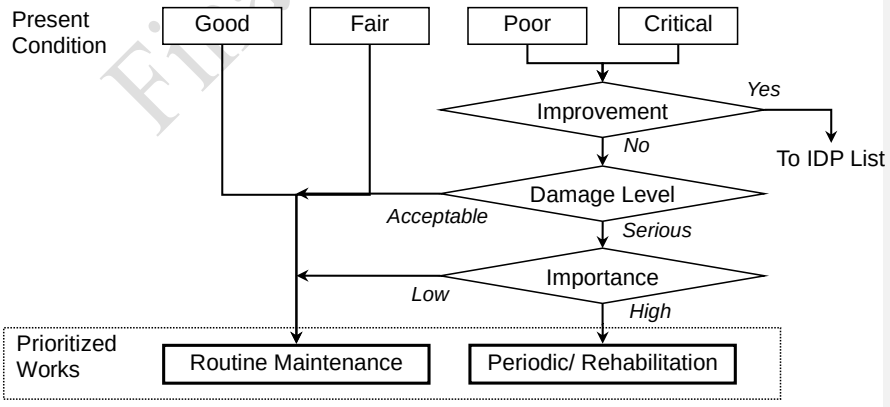

Figure 5-1 Prioritization Process Diagram

This Guideline recommends qualitative prioritization approach described above, as this approach enables priority assessment of every asset type in the basic inventory data. In the primary stage, it is important to collect basic inventory data and utilize it for planning of all sectors. If CC will install a system to analyze future maintenance needs with manpower, the inventory data can be used for advanced forecast in the next stage.

5.4 Preparation of Annual O&M Plan of CC

Each CC will prepare an Annual O&M Plan, which will be the basis for annual budget request. The Annual O&M Plan comprises the following items not only for infrastructure constructed as the CGP subprojects but for every infrastructure registered by a CC: 1) organizations and persons in charge; 2) necessary volume of work; 3) schedule of works; and 4) O&M budget required. The Annual O&M Plan will be discussed at the CSCC and WLCCs. The CC should prepare the Annual O&M Plan by May of each year, since CC's annual budget is prepared and approved by May, and required amount for O&M shall be allocated in annual budget of CC. The Annual O&M Plan will be prepared from that for FY2015/16. Annual O&M Plan of CC shall be prepared following priority list and a suitable format.

Any work items listed in the Annual O&M Plan shall not duplicate with those in the IDP.

5.5 Preparation of O&M Plan for Each Subproject under the CGP

Each CC will prepare an O&M plan for each subproject implemented under Component 2 of the CGP. Purpose of forming this plan is to clarify organizational structure, budget, financial sources, and procedures for O&M of each subproject, so that service life and quality of the subprojects can be maximized. This plan will indicate frequency of O&M activities required in regular and periodic terms, and it enables CCs to predict future O&M programs. CCs will prepare Subproject O&M Plans in the process of subproject planning. The plans will be discussed at the CSCC and WLCCs in the process. If institutional arrangements for O&M implementation involve organizations or persons outside the CC Council, the CC should obtain their commitment to O&M of the subprojects prior to the finalization of the plans.

6. Budget Framework of O&M

6.1 Budget Source for O&M

The budget of each CC consists of two parts; Revenue Account (current budget) financed through CC's own sources; and Development Account (development budget) which is subsidized/funded by the central government/donors. Revenue Account and Development Account separately cover different expenditure items. The costs for regular and small scale O&M activities (cleaning of road and drainage, truck for waste management, etc) are covered by the Revenue Account without earmarking. Daily operation, maintenance and rehabilitation costs for water supply are also paid out from the Revenue Account. Periodic maintenance cost for road and drainage are basically not financed by CCs, and it relies on the funding from the central government and donors.

In order to enhance capability and service of the CCs, the primary goal of reform of O&M budgeting system is set as: "CCs will be financially autonomous in budgeting for O&M including repair and rehabilitation". The following frameworks are proposed and introduced under the Project to achieve the goal.

6.1.1 Financially Independent Accounting System

In order to achieve full cost recovery of at least the O&M activities of the water supply sector and cleaning/waste management, the ICGIAP defines an activity to introduce a "financially independent accounting system" to CCs. Under the system, one bank account will be opened for respective sectors, and the accounting treatment for each sector will be independent from the others. This enables the CC to conduct proper financial management. It is also expected that the introduction of a financially independent accounting system will enhance transparency of financial management for these sectors.

The detailed procedures to establish the system are elaborated in another guideline document.

6.1.2 Reserve Fund for O&M

CCs have no specific revenue sources for O&M of infrastructure except for the water supply and waste management sectors. Funds for periodic maintenance and rehabilitation (i.e. capital maintenance) of non-revenue generating infrastructure are currently allocated by the central government. For CCs to secure funds for capital maintenance by themselves, schemes of "Reserve Fund for O&M" for the non-revenue generating infrastructure should be established in CCs' budget system.

Fund allocation system of "Reserve Fund for O&M" is planned as follows. The surplus from revenue of CCs is allocated in the following order (from ① to ④).

① "1/12 of Revenue Account expenses" is carried forward to the following fiscal year: budgeted Revenue Account expenditures * 1/12 (equivalent to 8%) for 20 years.
② Reserve Fund for capital maintenance cost: sum of depreciation of newly constructed facilities in a year (investment cost * 5% for 20 years: straight line method).
③ Budgeted amount for "Capital maintenance cost" is carried forward to the Development Account of the following fiscal year.
④ Carried forward to the next fiscal year: its amount is valued in proportion to each CC's affordability.

Model structure of Reserve Fund for O&M is summarized in the table below. CCs will

determine operational rules and details (e.g. percentage of annual reserve) of the fund based on financial simulation based on the inventory data.

Table 6-1 Model Structure of Reserve Fund for O&M

Revenue (i)	
Expenditure (ii)	
Surplus (iii) = (i) – (ii)	Surplus allocates the below order (from ① to ④)
→ ① Provision of Revenue A/C expenses to the next year	Total expenditure of Revenue A/C for the next fiscal year * 1/12 (8%)
→ ② Reserve Fund for capital maintenance cost	Depreciation (straight line method): new investment amount * 5% for 20 years
→ ③ Carried forward "capital maintenance cost" to Development A/C for the next year	Budgeted expenditure for capital maintenance in the next fiscal year
→ ④ Carried forward	(iii) - (① + ② + ③)

The item ② in the above list is the core of the Reserve Fund which will be spent for cost of scheduled capital maintenance works in the future. The percentage of annual reserve may be subject to change, depending on medium- and long-term projection of required O&M expenditure. The figure below illustrates model of annual income flow which will be reserved in the Fund.

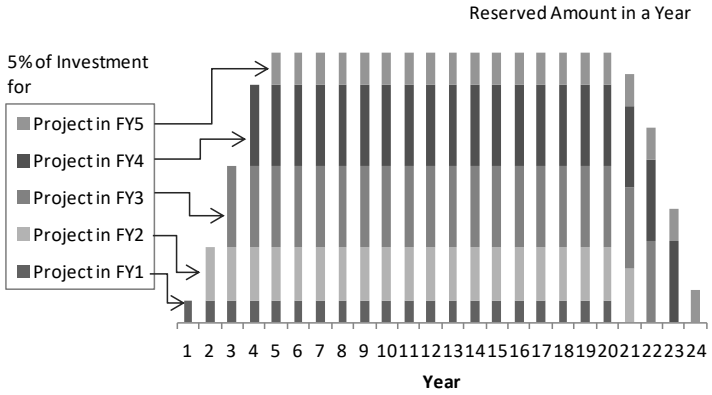

Figure 6-1 Model of Annual Income Flow of Reserve Fund

6.2 Formulation of Budget for O&M

Rough estimation of budget for O&M causes large gaps between the original budget and actual spending or demand of O&M. In order to avoid such circumstances, each CC has to prepare budgeting plans based on projection of O&M demand in yearly and medium term periods.

6.2.1 O&M Annual Budget

Based on an Annual O&M Plan and Subproject O&M Plan, each CC will allocate budget for O&M in the process of annual budgeting that is usually undertaken from May. Implementation of this action will start from the annual budgeting for FY2015/16, with an incremental increase of budget until the financing requirement for sustainable O&M is met. Desirable amount of

financing requirement per annum will be analyzed through formulating Medium-term Budgeting Framework.

6.2.2 Medium-term Budgeting Framework

In order to enhance predictability of budget and sustainability of O&M activities, each CC will prepare a Medium-term Budgeting Framework for O&M activities based on assessment of the inventory data by the end of the second project year. The plan will include estimated cost of O&M by category of asset in each of the next five years from the succeeding year of formulation. This Medium-term Budgeting Framework is aimed to help CCs understand the gaps between estimated cost and available budget, and undertake systematic efforts to increase O&M budget in CC including establishment of the Reserve Fund for O&M. Annual O&M Plan should reflect the result of medium term estimation in order to respond to prospective demand of O&M.

Appendix E explains detailed steps to formulate Medium-term Budgeting Framework with calculation format. The result of estimated O&M budget prospect will be reviewed and discussed in the standing committee and the CSCC meeting.

7. Implementation and Monitoring

7.1 Implementation of the O&M Action Plan

7.1.1 General Process of Implementation

Each CC will implement respective actions in the O&M Action Plan. It will assign a standing committee and councilors in charge of O&M and establish an O&M Group at the working level. The O&M Group in each CC will monitor and supervise activities of the Annual O&M Plan to ensure implementation. The O&M Group will: 1) examine reports on O&M from department/sections and persons in-charge once in every month; 2) hold a regular meeting at least once in a month to discuss progress of the Annual O&M Plan and results of O&M; and 3) report on O&M to the standing committee and councilors in charge of O&M at least once in every three months. The standing committee and councilors will hold a meeting at least once in every three months.

Each CC shall implement budgeted physical O&M works following task schedule specified in the Annual O&M Plan. Typical works of O&M for major asset types are summarized in Appendix F, while technical detail of specific work items will be described in separate documents.

7.1.2 Mobile Maintenance Team

Scheme of Mobile Maintenance Team (MMT) is utilized for routine maintenance activities of rural roads in order to realize frequent and preventive repair. MMT consisting of skilled/semi-skilled labourers detects deficits of infrastructure through regular monitoring and repairs those by using materials and light equipment supplied by Local Government Institutions (LGIs). LGIs allocate a certain amount of annual revenue budget for materials, equipment and wages for MMT. Records of regular inspection and performed work have to be submitted from MMT to a responsible engineer in LGI.

This practice can be extended to CCs for regular monitoring and routine maintenance works of road and other types of infrastructure. When a CC plans to adopt this system, O&M Group has to stipulate operational rules of MMT including; i) composition of MMT; ii) scope of work (i.e. covered area, target infrastructure and subject work items); iii) management of materials and equipment; procedures for contract and supervision; iv) procedures for budgeting and payment; and v) reporting procedures.

7.2 Monitoring Process

Monitoring process of O&M includes progress monitoring of O&M Action Plan, progress monitoring of physical O&M works, updating of inventories through inspection of asset conditions, and reporting the result. These activities aim to assess maintenance needs correctly and to provide feedback information for improvement of the next term planning.

O&M Action Plan in CCs will be subject to periodic monitoring and revision. Executive Engineer in PIU will finalize necessary documents on O&M activities and report achievement of planned outputs to PCO on a yearly basis by using the format of the action plan. Progress monitoring report of physical O&M works shall be also submitted at the same time. These documents shall be also reported to the standing committee periodically as specified in the above section 6.1. O&M Action Plan will be updated annually by each CC to reflect feedbacks from PCO and loan consultants, the latest infrastructure conditions and availability of financial/ institutional resources.

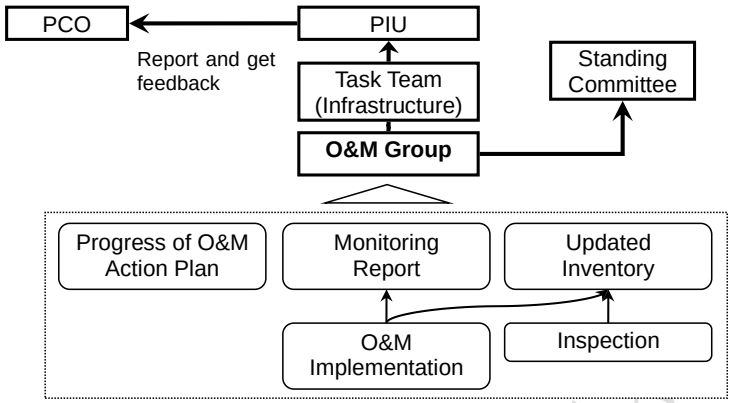

Figure 7-1 Monitoring Process of O&M Activities

7.3 Inspection

Conditions of every CC asset shall be inspected in regular and periodic terms, so that CCs can assess necessity of maintenance properly by tracking objective data on degree of deterioration and service performance. There are following types of inspection by frequency and level of detail:

- **Regular Inspection:** shall be conducted once a year or more by visual observation of structures of all CC assets in general. Regular patrol is an example of this inspection type.
- **Periodic Inspection:** shall be conducted once every 5 years or more depending on conditions. Engineers shall inspect by detailed visual observation of individual elements of structures.
- **Detailed Inspection:** shall be conducted when detailed information on deterioration is needed. Non-destructive test and/or sampling test may be adopted by qualified engineers.
- **Emergency Inspection:** shall be conducted after emergency occasion to check damage to structures.

Basic viewpoints of inspection for major asset types are as shown in Appendix G2, while technical detail of specific work items will be described in separate documents. “History of inspection and maintenance” is a form to record the result of inspection as well as information of implemented maintenance works. This form can be used for tracking change of asset conditions and investment made for individual assets. The record shall be kept after the start of the Project, while it is also important to record the past information of construction and maintenance as much as possible. This history of works enables CCs to assess appropriate timing and volume of maintenance work.

7.4 Management of Inventories

Result of inspections shall be recorded in a formatted sheet with description of conditions, photo, and illustrated figure, and assessment of condition level, namely:

- **Good** = No damage
- **Fair** = Minor damage
- **Poor** = Major elemental damage
- **Critical** = Major structural damage

These inspection sheets will be managed by the same ID code in the inventory system, and the assessment result shall be reflected into the history of inspection and maintenance as well as the inventory database to identify up-to-date asset conditions for maintenance planning. Regarding the CGP subprojects, photos should be taken at fixed locations corresponding to subproject completion reports for time series comparison, in addition to locations where new damages are observed.

Appendix-A: List of Forms

This Guideline contains forms to be used in the process of O&M activities. List below summarizes title of the forms, reference section in the main text of the Guideline, and coverage items in respective forms. CC cannot change headline items in the forms in principle, while cells shall be filled with record and data produced by each CC.

Table A-1 List of Forms

Form No.	Form Title	Reference Section	Coverage
1	O&M Action Plan for CC Assets	2.5	All actions relating O&M
2	Meeting Minutes of O&M Group/ Standing Committee	3.1	Discussion made in respective meetings
3	City Corporation Asset Inventory	4.2	All existing CC assets
4	Priority Assessment Score Sheet	4.3	For prioritization of periodic maintenance/ rehabilitation
5	Annual O&M Plan	4.4	All CC assets for a single financial year
6	Subproject O&M Plan	4.5	CGP subprojects for five years after construction
7	Medium Term O&M Budget Framework	5.2	All CC assets for five years
8	Progress Monitoring Sheet of Works	6.2	All CC assets listed in the Annual O&M Plan
9	Inspection Sheet	6.3	Recording in field inspection
10	History of Inspection and Maintenance	6.3	All CC assets

Appendix-B: Sample O&M Action Plan

Each CC under the CGP is supposed to prepare the O&M Action Plan in the first fiscal year of project implementation. The O&M Action Plan will be submitted to Project Director of the CGP for consideration. O&M Group of CC, with assistance and support from respective CC standing committee, will be responsible for preparation and implementation of the O&M Action Plan with inclusion of all the contents discussed in this Guideline. Accordingly a sample O&M Action Plan is framed and attached in the next page. However, the actual contents of the action plan shall be determined by the concerned CC with including key actions indicated in the format.

Name of City Corporation: ---------- < Form-1 >

Sample Format of O&M Action Plan

Action	Output/ indicator	Specific task	Organization/ person in charge	Time schedule/ Progress
Institutional arrangements				
A standing committee and councilors are assigned to the O&M.	• **Assignment of Standing Committee with specific responsibilities of O&M** • List of Councilors involved with O&M • Minutes of Standing Committee meeting	• Define tasks and assign those to the standing committee: – Assist O&M Group in performing their overall function and oversee the O&M activities; – Assist O&M Group in preparation of inventory and database of CC assets, those requires maintenance; – Organize awareness campaign to create "sense of ownership" among the citizen; – Motivate the people through CSCC and WLCC for participation in planning and implementation of O&M activities of CC assets; • Hold standing committee meeting at least once in every three months to review and monitor progress of O&M activities and report to CSCC and Mayor.	• Mayor • Standing Committee	• Assignment within 30 days after the Implementation Agreement • Meeting at least once in every three months
An O&M Group consisting of CC officials is established.	• **Establishment of O&M Group with specific responsibilities for O&M** • List of officials with assigned responsibilities • Meeting minutes	• Establish O&M Group and assign members • Define tasks of the O&M Group including: – Advise in preparation of infrastructure inventory and database, identifying the physical features (e.g. length, area, material, etc.) of all infrastructure (e.g. buildings, roads, drains, etc.) which require maintenance; – Identify O&M tasks defining type of maintenance (routine, periodical, emergency, rehabilitation type) to be performed on each infrastructure and works to be done (e.g. sweeping road, drain cleaning, road patching, pothole, painting, etc.) – Prioritize infrastructure to be undertaken for O&M within available budget considering set of criteria including social and commercial importance of the infrastructure; – Prepare annual O&M budget requirement, submit to the standing committee and pursue full allocation of O&M fund on time; – Assign division/sections and the persons with responsibilities in performing the tasks relevant to them; – Support preparation and implementation of subproject for O&M of each type of infrastructure including setting technical specification, tendering, contracting, supervision of implementation, etc.; – Estimate time required to complete each tasks including developing an annual work schedule; • Hold regular meeting at least once in a month, monitor progress of implementation and report to standing committee and Mayor.	• CC Mayor • O&M Group members	• Assignment within 30 days after the Implementation Agreement • Meeting at least once in a month

Action	Output/ indicator	Specific task	Organization/ person in charge	Time schedule/ Progress
Planning of O&M				
O&M Action Plan is formulated.	• **O&M Action Plan**	• List up O&M actions and determine output/ indicator, specific task, organization/ person in charge, and time schedule. • Submit the plan of the upcoming financial year o PCO after discussion with stakeholders in CC.	• O&M Group • Standing committee and councilors	• By May each year
Inventories of infra-structure and equipment under the responsibility of CC are prepared and updated.	• **Inventories of infrastructure** (periodically updated)	• Prepare Inventories of infrastructure by CC using formats designed for the purpose which may include 1) identification of asset; 2) location; 3) structural dimension; 4) present condition; 5) history of construction and maintenance; and 6) other related data by sector. • Update the inventories of each infrastructure periodically	• Engineering Division with support from O&M Group	• Preparation at the end of first project year, update periodically in the following years
Priority assessment sheet of O&M of infrastructure is prepared.	• Priority assessment sheet for O&M	• Consider/determine some indicators including social and commercial importance for analyzing priority needs. • Prepare priority list of CC infrastructure for O&M based on the predetermined criteria/indicator and analysis.	• Engineering Division with support from O&M Group	• By the end of 2014
Subproject O&M Plan is prepared.	• **Subproject O&M Plan**	• Prepare an O&M plan for each subproject to be implemented under Component 2 of the CGP clarifying organizational structure, budget, financial sources and procedures for O&M. • Discuss the O&M plans at CSCC and WLCCs to determine status of O&M and to make suggestions and recommendations to CC.	• O&M Group	• At the time of subproject preparation • Review once in a year
Annual O&M Plan is prepared.	• **Annual O&M Plan**	• The CC prepares the Annual O&M Plan by April each year. • Annual O&M Plan of CC will be prepared in each year following the priority assessment.	• Engineering Division with support from O&M Group	• By May each year
Budget framework of O&M				
Budget for O&M is allocated in annual budget.	• Amount earmarked for O&M	• Allocate budget for O&M in the process of annual budgeting that is usually undertaken from April to May. • Estimate and apply sufficient amount of budget for O&M based on priority assessment and projection.	• Standing Committee in cooperation and coordination with Mayor	• By May each year
Medium-term Budgeting Framework for O&M is prepared.	• **Five years budget plan**	• Prepare a Five-year Budget Plan for O&M based on the updated inventory data. • Involved CSCC and WLCCs in the process of this preparation.	• CC Engineering Division/ O&M Group with involvement of CSCC and WLCC	• By the end of first project year

Action	Output/ indicator	Specific task	Organization/ person in charge	Time schedule/ Progress
Individual bank accounts are opened for water supply sector and waste management sector.	• **Account for water supply sector and waste management sector**	• Review the current accounting items on the related sector and separate those from the main account. • Establish independent accounts and management rules	• Accounting section with support from O&M Group	• By the end of first project year
System of O&M reserve fund is established.	• Management rule of O&M reserve fund	• Design management rule of O&M reserve fund • Estimate amount of fund collection and expenditure	• Accounting section with support from O&M Group	• By the end of first project year
Implementation				
Annual O&M Plan is implemented.	• Physical O&M works • Monthly O&M implementation monitoring reports	• The O&M Group receives monitoring reports on O&M implementation from department /sections and persons in charge at least once in every three months; • O&M Group follow-up administrative and technical actions if any issues are found in the monitoring.	• Departmental / sectional heads/ person in charge • O&M Group	• Throughout the year following the schedule in the Annual O&M Plan
Regular meetings are held among related members.	• **Minutes of monthly O&M Group meeting;** • **Minutes of standing committee meeting every quarter**	• The O&M Group holds regular meeting at least once in a month to discuss progress of the Annual O&M Plan and results of O&M • O&M Group follow-up implementation of decision in the subsequent meeting; • O&M report on the meeting result to standing committee and councilors in charge of O&M at least once every three months. • The standing committee and councilors hold meeting and have discussions on O&M at least once every three months, monitor progress identify problems, suggest wage and means for way forward • The standing committee follows up implementation of decisions in the subsequent meeting	• O&M Group • Standing committee and councilors	• O&M Group meeting on a monthly basis • Standing committee meeting on a quarterly basis
Monitoring				
PIU submits the progress report to PCO in yearly basis.	• **Progress report of O&M Action Plan**	• Review progress of the O&M Action Plan and examine actions to be done • Discuss the progress and issues among the stakeholders to assure timely implementation of the plan	• O&M Group • Standing committee and councilors	• By May each year
Condition of infra-structure and service performance are monitored and recorded in regular basis.	• **Inspection sheet** • **History of inspection and maintenance** • Updated inventory	• Determine cycle of routine and periodic inspections and conduct inspections following the schedule • Record the inspection result in a formatted sheet with description of condition, photo, drawing, and recommended action. • Update history record sheet and condition data in the inventory	• Engineering Division with support from O&M Group	• Throughout the year
Citizens' participation				
CSCC and WLCCs are involved in O&M.	• Citizens participation in O&M planning &	• CSCC and WLCCs have discussions on inventories of infrastructure, annual O&M Plan, Subproject O&M Plan, and five-year Budget Plan.	• O&M Group • Convenor	• Once in every three months

Action	Output/ indicator	Specific task	Organization/ person in charge	Time schedule/ Progress
	implementation process • Meeting minutes • Recommendations for CC	• CSCC and WLCCs have discussions on the status of O&M and make suggestions and recommendations for CC. • WG involves citizens such as members of WLCC, CBOs, and informal group (if any) in routine O&M of infrastructure & facilities. • O&M group reports O&M issues to CSCC at least once in every three months.	CSCC and WLCC	
Technical capacity for O&M				
CC clarifies training needs.	• Assessment of capacity of CC • Needs specification of training	• Assess present level of CC's capacity to handle O&M • Specify knowledge and skill which CC have to acquire to improve process of O&M	• O&M Group • Standing committee and councilors	• By the end of first project year
Technical skills of concerned persons for O&M are improved.	• Participation in training provided by the Project • Participation of CC Officials in O&M training • CBO members & contractual labours receive training on O&M	• CC officials participate in training courses on O&M provided by the Project. • Officials participated in the training courses disseminate, what they learn, in the training to relevant persons. • CC provides training to citizens involved in O&M such as members of CBOs as well as to contractual labours.	• Engineering Division and O&M Group	• Throughout the project period

Note: This table is proposed as a format of the action plan; the contents of the action plan should be prepared and determined by CC. However, it is proposed that actions indicated in this table should be included in the action plan.

Appendix-C1: Work Process of O&M Group

General work process of O&M Group in each CC will follow the steps below:

Step-1: CC Mayor will form an O&M Group with head of engineering division as chairperson. Other members will be members of Task Team (Infrastructure) and engineers/officers from the relevant sections. To this effect an official notification will be issued stating its formation, functions and responsibilities.

Step-2: The chairperson will hold an O&M Group meeting at least once in every month of the year. In the 1st meeting, the O&M Group will review existing O&M practices and decides issues to be included as agenda of the meeting.

Step-3: O&M Group will collect information about requirements for operation of services and maintenance in the concerned Ward through coordination with WLCC.

Step-4: Agenda of the WG meeting will be decided based on analysis of the existing O&M practices and the tasks as delineated in the O&M Action Plan. Following are some examples of agenda.

(1) Analysis and decision on process to update existing O&M practices
(2) Preparation of inventories database of each asset for O&M and structure to manage the data
(3) Preparation of asset list requiring O&M and assignment of responsibilities to the division/person-in-charge
(4) Prioritization of infrastructure and type of work (routine/periodic) to be undertaken for O&M with budget
(5) Support to preparation of O&M schemes, tendering, contracting implementation and payment
(6) Support to preparation of Subproject O&M Plan, Annual O&M Plan and their implementation
(7) Preparation of annual O&M budget and pursue budget allocation
(8) Preparation of medium term O&M budgeting framework and discussion on approach to ensure sustainable O&M of CC assets
(9) Report of progress of O&M implementation from division/sections/person-in-charge

Step-5: Notice of invitation for O&M Group meeting will be prepared with predetermined and miscellaneous agenda for discussion and decision.

Step-6: O&M Group will hold at least once in every month, write meeting minutes and distribute among its members, Mayor and the chairperson of standing committee for O&M, review progress of implementation in the subsequent meeting and so on. Sample format for meeting minutes is as follows:

< Form-2a >

_____ City Corporation

Meeting Minutes of O&M Group

Date : _____ Time : _____ Attendance : __(Annex--____)_____

Chairperson of Meeting : _____

Agenda-1: Read & Confirm Last Meeting Minutes

Read by	Discussion on Proper Recording of Meeting Minutes	Necessary Correction/ Changes (if any)	Discussion

Agenda-2: Review of Progress of Implementation of Last Meetings Discussion

Sl. No.	Decision/Recommendations of Last Meeting	Review of Progress/ Present Condition	Decision/ Recommendation (with time schedule)	Responsible Section/ Person in-charge
1.				
2.				
3.				
4.				
5.				

Agenda-3: Pre-selected Issues/Agenda

Sl. No.	Agenda/Issues	Detail Discussion	Decision/ Recommendation (with time schedule)	Responsible Section/ Person in-charge
1.				
2.				
3.				
4.				
5.				

Agenda-4: Miscellaneous

Sl. No.	Agenda/Issues	Detail Discussion	Decision/ Recommendation (with time schedule)	Responsible Section/ Person in-charge
1.				
2.				
3.				
4.				
5.				

Appendix-C2: Work Process of Standing Committee for O&M

General work process of Standing Committee for O&M in each CC will follow the steps below:

Step-1: CC Mayor will assign sufficient number of members to the standing committee for city infrastructure construction maintenance with overall responsibility of supervising O&M of CC infrastructure (see 3.1.2). An official notification shall be issued in this context.

Step-2: The chairperson will hold an initial standing committee meeting, in which the standing committee can review its Terms of Reference (ToR) and existing situation of O&M activities including setting agenda for the subsequent meeting.

Step-3: Agenda of standing committee meeting will be decided through analysis of the assigned functions/tasks of standing committee for O&M. Following are some examples of agenda.

(1) Decision on process to assess the assigned function of O&M Group in performing their activities
(2) Determination on the ways and means to oversee O&M activities
(3) Decision on the way to organize awareness campaign to create 'sense of ownership' among the citizens
(4) Determination on process of involving CSCC, WLCC and citizens in O&M activities
(5) Monitor progress of O&M activities performed by the O&M Group

Step-4: The standing committee will summarize findings from inspection and monitoring of all infrastructure based on report submitted by O&M Group, discuss issues as agenda of the meeting, give feedback to O&M Group and follow-up actions in the subsequent meeting.

Step-5: The standing committee will prepare notice of invitation for the standing committee meeting with predetermined and miscellaneous agenda for discussion and decision. O&M Group members should also be invited to attend the meeting.

Step-6: The standing committee will hold a meeting at least once in 3 months, write meeting minutes, and distribute the minutes among members of standing committee, Mayor and O&M Group members for implementation of decision and follow up action. Following format can be used for writing meeting minutes.

< Form-2b >

_____ City Corporation

Meeting Minutes of Standing Committee Responsible for O&M

Date : _____ Time : _____ Attendance : __(Annex--____)_____

Chairperson of Meeting : _____

Agenda-1: Read& Confirm Last Meeting Minutes

Read by	Discussion on Proper Recording of Meeting Minutes	Necessary Correction/ Changes (if any)	Discussion

Agenda-2: Review of Progress of Implementation of Last Meetings Discussion

Sl. No.	Decision/Recommendations of Last Meeting	Review of Progress/ Present Condition	Decision/ Recommendation (with time schedule)	Responsible Section/ Person in-charge
1.				
2.				
3.				
4.				
5.				

Agenda-3: Pre-selected Issues/Agenda

Sl. No.	Agenda/Issues	Detail Discussion	Decision/ Recommendation (with time schedule)	Responsible Section/ Person in-charge
1.				
2.				
3.				
4.				
5.				

Agenda-4: Miscellaneous

Sl. No.	Agenda/Issues	Detail Discussion	Decision/ Recommendation (with time schedule)	Responsible Section/ Person in-charge
1.				
2.				
3.				
4.				
5.				

Appendix-C3: Process of Citizens Participation in O&M

Each CC will design its own process and mechanism to ensure citizens participation in O&M planning and implementation. The standard setting, so far in practice, of citizens' participation forum in CCs are CSCC, WLCC, and CBOs. CSCC at central level, WLCCs at ward level and CBOs are the community level citizen's forums. The process of involvement of these forums in O&M activities of CC will depend on its social, economical, political and other local conditions. However, following steps may be helpful to citizens' participation in O&M at CC level:

Step-1: O&M Group will prepare inventory of infrastructure with involvement of members of WLCCs and CBOs.

Step-2: O&M Group will prepare draft Annual O&M Plan, Subproject O&M Plan and medium term O&M budget plan and share those with WLCC member in WLCC meeting and improve the same incorporating suggestions and recommendations.

Step-3: O&M Group will place the draft to CSCC for holding discussion on the draft inventories, Annual O&M Plan, Subproject O&M Plan and medium term budget framework and finalize those based on suggestions/recommendations of CSCC.

Step-4: O&M Group will examine possible activities suitable for involvement of CBO members in O&M implementation level, particularly, with respect to routine maintenance.

Step-5: O&M Group also involves WLCC to oversee implementation of both routine and periodic O&M activities within boundary of the ward.

Step-6: O&M Group reports O&M issues to CSCC at least once in every quarter.

Step-7: CSCC will hold discussion on the O&M report received from O&M Group, in the quarterly meeting and document recommendations in the form of meeting minutes and suggest action for consideration of CC authority towards implementation.

Appendix-C4: Technical Capacity for O&M

1. Technical capacity development efforts for O&M under CGP shall be considered as joint responsibility of central and CC level (i.e. PCO and PIU). The project authority, PCO, with assistance and cooperation from consultants and UMU will prepare O&M manuals and provide training courses on O&M. Training of Trainers (TOT) Course for the senior officials, responsible for O&M, can also be considered important.

2. It is the responsibility of CC authority to make sure that all the relevant officials participate in the training courses on O&M and disseminate, what they learned, to relevant persons.

3. All the manuals and other related documents are to be properly stored at CC for study and conducting training courses.

5. O&M Group should organize training programs for CBO members as well as for the contractual labours engaged for routine maintenance. A training plan will be prepared at the beginning of financial year and implemented as planned. On job training procedure is preferred in this case.

Appendix-D1: Planning O&M (Asset Inventories)

Inventories may include information such as 1) identification of asset; 2) location; 3) structural dimension; 4) present condition; 5) history of construction and maintenance; and 6) other related data by sector. However, required details of information vary from component to component.

Sample formats are given below for preparation of inventories:

CITY CORPORATION ASSET INVENTORY

< FORM-3a >

Name of City Corporation

Sector Road

Responsible Section

Last Update dd/mm/yyyy

Updated by

* * * * * * * * * * * * * * * *

Identification		Location		Dimension					Carriageway Condition				Shoulder/Footpath			Construction and Maintenance History					Others		
ID No.	Name	Ward	Chainage From-To (km)	Total Length (m)	ROW Width (m)	Crest Width (m)	Classification	Crest Level (m)	Carriageway Width (m)	Surface Type	Condition	Average IRI (m/km)	Shoulder Width (m)	Shoulder Type	Condition	Date of Construction (dd/mm/yyyy)	Design Life (year)	Cost of Construction (Lakh Taka)	Last Repair Type	Last Repair Date (dd/mm/yyyy)	Traffic Volume (pcu/day)	Last Survey Date (dd/mm/yyyy)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Note: Items with " * " are given first priority of input. CC may add items to the format with keeping the original ones listed above.

Input Confugurations

All data input shall follow pre-determined attributes.

<1: ID No.>
Code should be given by reflecting hierarchy and linkage in order to make it organized

Ex.) Sector code + Classification code + Road no. + Link no.
RO-01.001.01 = Primary road #1, link #1
RO-02.022.02 = Secondary road #22, link2
RO-03.033.03 = Tertiary road #33, link3

<8: Classification>
Classification based on crest width of road
1. Primary Road (wider than 100 ft)
2. Secondary Road (60 - 100 ft)
3. Tertiary Road (20 - 60 ft)
4. Goli Road (less than 20 ft)
5. Pedestrian

<11: Surface Type>
1. Bituminous
2. HBB
3. Gravel
4. Earth
5. Cement Blocks
6. Cement Concrete
7. Others

<12 & 16: Condition>
1. Good (IRI less than 6)
2. Fair (IRI 6 - 8)
3. Poor (IRI 8 - 10)
4. Critical (IRI larger than 10)

<15: Shoulder Type>
1. None
2. Earth
3. Bituminous
4. HBB
5. WBM
6. Others

<20: Last Repair Type>
1. Routine Repair
2. Periodic: Elemental
3. Periodic: Structural
4. Emergency
5. Improvement/Upgrade
6. No Repair

<22: Traffic Volume>
Counted number of vehicle should be converetd into PCU (passenger car unit) by multiplying the factors below:
3.0 for truck, bus and minibus
1.0 for passenger and utility vehicles
0.75 for three wheelers and motorcycle
0.5 for bicycle
2.0 for cycle rickshaw
4.0 for animal cart

CITY CORPORATION ASSET INVENTORY

< FORM-3b >

Name of City Corporation			
Sector	Bridge	**Responsible Section**	
Last Update	dd/mm/yyyy	**Updated by**	

* * * * * * * * * * * * * * *

Identification		Location			Dimension					Condition		Construction and Maintenance History					Others		
ID No.	Name	Road ID	Chainage From-To (km)	Ward	Total Length (m)	Width (m)	Top Road Level (m)	Bottom Road Level (m)	Classification	Structure Type	Structure Condition	Date of Construction (dd/mm/yyyy)	Design Life (year)	Cost of Construction (Lakh Taka)	Last Repair Type	Last Repair Date (dd/mm/yyyy)	Traffic Volume (pcu/day)	Last Survey Date (dd/mm/yyyy)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Note: Items with " * " are given first priority of input. CC may add items to the format with keeping the original ones listed above.

Input Confugurations

All data input shall follow pre-determined attributes.

<1: ID No.>
Code should be given by reflecting hierarchy and linkage in order to make it organized

Ex.) Sector code + Classification code + Bridge no.
BR-01.001= Bridge #1
BR-02.002= Foot over bridge #2

<10: Classification>
1. Bridge
2. Foot Over Bridge
3. Flyover / Overpass
4. Underpass
5. Culvert

<11: Structure Type>
1. Box Culvert
2. Slab Culvert
3. Pipe Culvert
3. Arch Masonry
4. RCC Bridge
5. RCC Girder Bridge
6. Steel Beam & RCC Slab
7. PC Girder Bridge
8. PC Box
9. Truss with RCC Slab
10. Truss with Steel Deck
11. Truss with Timber Deck
12. Bailey with Steel Deck
13. Bailey with Timber Deck
14. Others

<12: Condition>
1. Good (No damage)
2. Fair (Minor damage)
3. Poor (Major elemental damage)
4. Critical (Major structural damage)

<16: Last Repair Type>
1. Routine Repair
2. Periodic: Elemental
3. Periodic: Structural
4. Emergency
5. Improvement/Upgrade
6. No Repair

<18: Traffic Volume>
Counted number of vehicle should be converetd into PCU (passenger car unit) by multiplying the factors below:
3.0 for truck, bus and minibus
1.0 for passenger and utility vehicles
0.75 for three wheelers and motorcycle
0.5 for bicycle
2.0 for cycle rickshaw
4.0 for animal cart

CITY CORPORATION ASSET INVENTORY

< FORM-3c >

Name of City Corporation

Sector Drain

Responsible Section

Last Update dd/mm/yyyy

Updated by

Identification		Location			Dimension				Condition		Outfall		Construction and Maintenance History					Others		
ID No.	Name	Road ID	Chainage From-To (km)	Ward	Section Length (m)	Width (m)	Depth (m)	Classification	Structure Type	Condition	Avg. Flood Level (m)	Outfall Type	Date of Construction (dd/mm/yyyy)	Design Life (year)	Cost of Construction (Lakh Taka)	Last Repair Type	Last Repair Date (dd/mm/yyyy)	Service Area Population (No.)	Last Survey Date (dd/mm/yyyy)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Note: Items with " * " are given first priority of input. CC may add items to the format with keeping the original ones listed above.

Input Confugurations

All data input shall follow pre-determined attributes.

<1: ID No.>

Code should be given by reflecting hierarchy and linkage in order to make it organized

Ex.) Sector code + Classification code + Drain no. + Link no.

DR-01.001.01 = Khal #1, link #1

DR-02.022.02 = Primary drain #22, link2

DR-03.033.03 = Secondary drain #33, link3

<15: Classification>

Classification based on width and connectivity

1. Khal/Canal/Outfall Drain
2. Primary Drain
3. Secondary Drain
4. Tertiary Drain

<16: Structure Type>

1. Concrete
2. Block
3. Pipe
4. Earth
5. Others

<11: Condition>

1. Good (No Damage/ Smooth Water Flow)
2. Fair (Minor Damage/ Smooth Water Flow)
3. Poor (Major Elemental Damage/ Interrupted Water Flow)
4. Critical (Major Structural Damage/ Blockage and Over-Flooding)

<17: Last Repair Type>

1. Routine Repair
2. Periodic: Elemental
3. Periodic: Structural
4. Emergency
5. Improvement/Upgrade
6. No Repair

CITY CORPORATION ASSET INVENTORY

< FORM-3d >

Name of City Corporation

Sector Water Supply Pipelines **Responsible Section**

Last Update dd/mm/yyyy **Updated by**

* * * * * * * * * * * * * *

Identification		Location			Dimension			Condition		Construction and Maintenance History					Others		
ID No.	Name	Road ID	Chainage From-To (km)	Ward	Pipe Length (m)	Pipe Diameter (mm)	Depth from Road Level	Material Type	Condition	Date of Construction (dd/mm/yyyy)	Design Life (year)	Cost of Construction (Lakh Taka)	Last Repair Type	Last Repair Date (dd/mm/yyyy)	Service Area Population (No.)	Last Survey Date (dd/mm/yyyy)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Note: Items with " * " are given first priority of input. CC may add items to the format with keeping the original ones listed above.

Input Confugurations

All data input shall follow pre-determined attributes.

<1: ID No.>

Code should be given by reflecting hierarchy and linkage in order to make it organized

Ex.) Sector code + Facility no. + Link no.
PL-033.03 = Pipeline #33, link3

<9: Material Type>

1. Plastics
2. Steel
3. Concrete
4. Others

<10: Condition>

1. Good (No damage/ No leakage nor contamination)
2. Fair (Minor damage/ No leakage nor contamination)
3. Poor (Major elemental damage/ Leakage and probability of contamination)
4. Critical (Major structural damage/ Leakage and contamination)

<14: Last Repair Type>

1. Routine Repair
2. Periodic: Elemental
3. Periodic: Structural
4. Emergency
5. Improvement/Upgrade
6. No Repair

CITY CORPORATION ASSET INVENTORY

< FORM-3e >

Name of City Corporation

Sector Water Supply Facilities **Responsible Section**

Last Update dd/mm/yyyy **Updated by**

Identification		Location			Dimension				Condition	Construction and Maintenance History					Others		
ID No.	Name	Road ID	Chainage From-To (km)	Ward	Facility Type	Well Diameter (mm)	Production Capacity (cu.m/h)	Storage Capacity (cu.m)	Condition	Date of Construction (dd/mm/yyyy)	Design Life (year)	Cost of Construction (Lakh Taka)	Last Repair Type	Last Repair Date (dd/mm/yyyy)	Service Area Population (No.)	Last Survey Date (dd/mm/yyyy)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Note: Items with " * " are given first priority of input. CC may add items to the format with keeping the original ones listed above.

Input Confugurations

All data input shall follow pre-determined attributes.

<1: ID No.>

Code should be given by reflecting hierarchy and linkage in order to make it organized

Ex.) Sector code + Classification code + Facility no. + Link no.
- WS-01.001 = Production well #1
- WS-02.022 = Treatment plant #22

<6: Facility Type>
1. Production Well
2. Treatment Plant
3. Overhead Tank
4. Hand Tube Well
5. Public Stand Pipe (Street Hydrant)
6. Meter
7. Iron and Arsenic Removal Plant
8. Rain Water Havesting System
9. Others

<10: Condition>
1. Good (No damage/ No leakage nor contamination)
2. Fair (Minor damage/ No leakage nor contamination)
3. Poor (Major elemental damage/ Leakage and probability of contamination)
4. Critical (Major structural damage/ Leakage and contamination)

<14: Last Repair Type>
1. Routine Repair
2. Periodic: Elemental
3. Periodic: Structural
4. Emergency
5. Improvement/Upgrade
6. No Repair

CITY CORPORATION ASSET INVENTORY

< FORM-3f >

Name of City Corporation			
Sector	Street Light	**Responsible Section**	
Last Update	dd/mm/yyyy	**Updated by**	

*	*	*	*	*	*	*		*	*	*	*				*	
Identification		**Location**			**Dimension**			**Condition**	**Construction and Maintenance History**					**Others**		
ID No.	Name	Road ID	Chainage (km)	Ward	Distance from Center of the Road (m)	Light Type	No. of Light (No.)	Condition	Date of Construction (dd/mm/yyyy)	Design Life (year)	Cost of Construction (Lakh Taka)	Last Repair Type	Last Repair Date (dd/mm/yyyy)	Service Area Population (No.)	Last Survey Date (dd/mm/yyyy)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Note: Items with " * " are given first priority of input. CC may add items to the format with keeping the original ones listed above.

Input Confugurations

All data input shall follow pre-determined attributes.

<1: ID No.>

Code should be given by reflecting hierarchy and linkage in order to make it organized

Ex.) Sector code + Line no. + Link no.
SL-001.01 = Line #1, link #1
SL-022.02 = Line #22, link2

<7: Light Type>

1. Bulb
2. Tube
3. Mercury
4. LED
5. Others

<9: Condition>

1. Good (No damage)
2. Fair (Minor damage)
3. Poor (Major elemental damage)
4. Critical (Major structural damage)

<14: Last Repair Type>

1. Routine Repair (Replacement)
2. Periodic: Elemental
3. Periodic: Structural
4. Emergency
5. Improvement/Upgrade
6. No Repair

CITY CORPORATION ASSET INVENTORY

< FORM-3g >

Name of City Corporation

Sector Solid Waste Management

Last Update dd/mm/yyyy **Updated by**

Identification		Location			Dimension			Condition		Construction and Maintenance History						Others		
ID No.	Name	Road ID	Plot No.	Ward	Facility Type	Land Area (sq.m)	Design Capacity (cu.m)	Type of Structure	Condition	Date of Construction (dd/mm/yyyy)	Design Life (year)	Cost of Construction (Lakh Taka)	Last Repair Type	Last Repair Date (dd/mm/yyyy)	Responsible Section	Service Population (No.)	Last Survey Date (dd/mm/yyyy)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Note: Items with " * " are given first priority of input. CC may add items to the format with keeping the original ones listed above.

Input Confugurations

All data input shall follow pre-determined attributes.

<1: ID No.>

Code should be given by reflecting hierarchy and linkage in order to make it organized

Ex.) Sector code + Classification code + Facility no.
SW-01.001 = Transfer station #1
SW-02.002 = Dumping ground #2

<6: Facility Type>

1. Transfer Station
2. Dumping Ground / Land Fill Site
3. Compost Plant
4. Road Side Movable Dustbin
5. Recycle Plant
6. Facility for CDM Activities
7. Medical Waste Disposal Facility
8. Electronic Waste Disposal Facility
9. Bio Gas Plant
10. Others

<9: Type of Structure>

1. Pucca
2. Semi-Pucca
3. Katcha
4. Others

<10: Condition>

1. Good (No damage)
2. Fair (Minor damage)
3. Poor (Major elemental damage)
4. Critical (Major structural damage)

<14: Last Repair Type>

1. Routine Repair
2. Periodic: Elemental
3. Periodic: Structural
4. Emergency
5. Improvement/Upgrade
6. No Repair

CITY CORPORATION ASSET INVENTORY

< FORM-3h >

Name of City Corporation

Sector Municipal Facilities

Last Update dd/mm/yyyy **Updated by**

Identification		Location			Dimension				Condition		Construction and Maintenance History						Others		
* ID No.	* Name	* Road ID	* Plot No.	* Ward	* Facility Type	* Land Area (sq.m)	Floor Area (sq.m)	No. of Stories	* Type of Structure	* Condition	* Date of Construction (dd/mm/yyyy)	* Design Life (year)	* Cost of Construction (Lakh Taka)	Last Repair Type	Last Repair Date (dd/mm/yyyy)	* Responsible Section	* Service Population (No.)	Last Survey Date (dd/mm/yyyy)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Note: Items with " * " are given first priority of input. CC may add items to the format with keeping the original ones listed above.

Input Confugurations

All data input shall follow pre-determined attributes.

<1: ID No.>

Code should be given by reflecting hierarchy and linkage in order to make it organized

Ex.) Sector code + Classification code + Facility no.
MF-01.001 = Traffic management facility #1
MF-02.002 = Boat landing #2

<6: Facility Type>

1. Traffic Management Facility
2. Boat Landing
3. Slaughter House
4. Bus Terminal
5. Truck Terminal
6. Vehicle Parking
7. Market
8. Public Office Building
9. Public Hall / Cultural Center
10. Open Space
11. Grave Yard
12. Sports Facility
13. Public Housing
14. Disaster Management
15. Others

<10: Type of Structure>

1. Pucca
2. Semi-Pucca
3. Katcha
4. Others

<11: Condition>

1. Good (No damage)
2. Fair (Minor damage)
3. Poor (Major elemental damage)
4. Critical (Major structural damage)

<15: Last Repair Type>

1. Routine Repair
2. Periodic: Elemental
3. Periodic: Structural
4. Emergency
5. Improvement/Upgrade
6. No Repair

CITY CORPORATION ASSET INVENTORY

< FORM-3i >

Name of City Corporation

Sector Equipment

Last Update dd/mm/yyyy **Updated by**

* * * * * * * * * *

Identification		Product Information				Acquiisition and Maintenance History						Others	
ID No.	Name	Product Name	Product No.	Type	Condition	Date of Acquisition (dd/mm/yyyy)	Asset Life (year)	Cost of Acquisition (Lakh Taka)	Last Repair Type	Last Repair Date (dd/mm/yyyy)	Responsible Section	Last Survey Date (dd/mm/yyyy)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Note: Items with " * " are given first priority of input. CC may add items to the format with keeping the original ones listed above.

Input Confugurations

All data input shall follow pre-determined attributes.

<1: ID No.>

Code should be given by reflecting hierarchy and linkage in order to make it organized

Ex.) Sector code + Classification code + Equipment no.
EQ-01.001 = Construction equipment #1
EQ-02.022 = Vehicle #22

<5: Type>

1. Construction Equipment
2. Transport/Vehicles
3. Other Properties

<6: Condition>

1. Good (No damage)
2. Fair (Minor damage)
3. Poor (Major elemental damage)
4. Critical (Major structural damage)

<10: Last Repair Type>

1. Routine Repair
2. Periodic: Elemental
3. Periodic: Structural
4. Emergency
5. No Repair

Appendix-D2: Planning O&M (Prioritization)

Points in the following table shall be considered as indicator to prioritize importance of periodic maintenance and rehabilitation works for infrastructure/facilities

Table D-1 Prioritization Assessment Score Sheet

< Form-4 >

Indicator	Attribute	Definition	Score	Evaluation
Asset Hierarchy	Primary Level	Arterial link in network or facility serving to the whole CC area	20	
	Secondary Level	Link connected to primary level or zonal level facility	15	
	Tertiary Level	Link connected to secondary level or ward level facility	10	
	Minor Level	Other than above	5	
Number of Beneficiary	Very High	1000 ~ (service area population or daily traffic)	20	
	High	500 ~ 1000	15	
	Middle	100 ~ 500	10	
	Low	0 ~ 100	5	
Social and Economic Importance	High	Socially or economically important facilities (e.g. hospital, school, market, industry, etc.) or network connecting to those	10	
	Low	Other than above	0	
Donor Funded Project	Yes		10	
	No		0	
Year after the Last Repair/ Construction	10 Years ~		20	
	5 ~ 10 Years		15	
	3 ~ 5 Years		10	
	0 ~ 3 Years		5	
			Total	

Appendix-D3: Planning O&M (Annual O&M Plan)

Annual O&M Plan comprises the items such as organization/person-in-charge, necessary manpower to be contracted/hire, schedule of works, O&M budget requirement, implementation schedule, etc.

Step-1: Review inventory of infrastructure and understand present situation.

Step-2: Conduct regular field visit to infrastructure (by person/engineer-in-charge) and update inventories.

Step-3: Assess O&M needs for routine maintenance and prepare fund requirement as fixed cost O&M item in the annual budget.

Step-4: Conduct survey for defect analysis and to specify required maintenance work.

Step-5: Assess financial needs for maintenance based on physical condition from field visit and survey reports.

Step-6: Review and discuss all such assessments, received from different engineers/persons-in-charge for O&M, in the working group meeting, compile and submit total O&M needs to standing committee including proposal for budget allocation by end March every year so that standing committee can place the same for discussion in CSCC held in 4th quarter of financial year.

Step-7: Review and discuss O&M budget proposal in the standing committee, arrange discussion in the CSCC meeting and pursue allocation as clearly defined item for O&M in the annual budget.

The format given below may be used for preparation of Annual O&M Plan.

ANNUAL OPERATION PLAN

< FORM-5a >

Name of City Corporation

Financial Year

Subject Asset			Work Specification				Management	
ID No.	Name	Asset Type	Item	Volume of Work/ Input	(Unit)	Estimated Cost (Lakh Taka)	Source of Fund	Responsible Section
1	2	3	4	5	6	7	8	9
					Total			

Prepared by:
Date

Approved by:
Date

ANNUAL MAINTENANCE PLAN

< FORM-5b >

Name of City Corporation

Financial Year

Subject Asset				Work Specification						Schedule		Management		
ID No.	Name	Asset Type	Present Condition	Type of Work	Detail of Work	Location/ Chainage From-To (km)	Required Work Volume	(Unit)	Estimated Cost (Lakh Taka)	Work Start From (dd/mm/yyyy)	Work End At (dd/mm/yyyy)	Priority Rank	Source of Fund	Responsible Section
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
								Total						

Prepared by:
Date

Approved by:
Date

Input Configurations

<1: ID No.>
To be correspondent with that in the asset inventory

<3: Asset Type>
1. Road/Brdige
2. Drain
3. SWM
4. WSS
5. Sanitation
6. Municipal Facilities
7. Equipment

<4: Present Condition>
1. Good
2. Fair
3. Poor
4. Critical

<5: Type of Work>
1. Routine Repair
2. Periodic: Elemental
3. Periodic: Structural
4. Emergency

<6: Detail of Work>
Describe planned work item

<7: Location/ Chainage From>
Specify location on link as distance from the starting point.
(For road, drain, water pipe, etc.)

<8&9: Required Work Volume>
Number has to be filled with suitable measurement unit.

<13: Priority Rank>
Fill result of priority assessment

Appendix-D4: Planning O&M (Subproject O&M Plan)

Subproject O&M Plan is to set maintenance cycle and estimate budget for 5 years after completion of the CGP subprojects. Appropriate timing of periodic maintenance shall be assumed by type of asset, while operation and routine maintenance will require a certain amount of cost every year. CC is required to commit this amount to allocate for implementation of Subproject O&M Plan, and this O&M cycle should be carried on during the design life of the facility. Format as given below may also be used for preparation of Subproject O&M Plan for each cycle:

SUBPROJECT O&M PLAN

< FORM-6 >

Name of City Corporation [ ]

Target Year 2015/16 ~ 2019/20

Subproject No.	ID No. (Inventory)	Name	Asset Type	Date of Construction	Design Life	Cost of Construction	Type of Work	Estimated Fund Requirement (Lakh Taka)					Source of Fund	Responsible Section
								2015/16	2016/17	2017/18	2018/19	2019/20		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
							Operation							
							Routine							
							Periodic							
							Operation							
							Routine							
							Periodic							
							Operation							
							Routine							
							Periodic							
							Operation							
							Routine							
							Periodic							
							Operation							
							Routine							
							Periodic							
							Operation							
						Total by Type	Routine							
							Periodic							
							Total							

Prepared by: ____________________
Date

Approved by: ____________________
Date

Appendix-E: Medium-term Budgeting Framework

Medium-term Budgeting Framework is a tool to enhance predictability of budget and sustainability of O&M activities. Format for the Medium-term Budgeting Framework is designed to estimate cost of O&M by sector for 5 years. CC can use a form for break down (Form-7a) if detailed analysis by type of structure in a specific sector. Total O&M budgeting requirement for all sectors shall be compiled in a summary form (Form-7b). Analysis of medium term budgeting follows steps below:

Step-1: Fill physical stock volume data of asset by condition based on the inventory data. Appropriate measurement unit shall be selected and filled in the cell for the sake of simplicity in calculation. Use separate columns if detailed analysis by type of structure is needed, otherwise use only the "Total" column.

Step-2: Input assumption of average O&M cost per unit of asset volume corresponding to the unit given in the step-1. The assumed cost can be rough estimation as average based on past data or schedule of rates.

Step-3: Set years to complete all periodic maintenance works for assets in poor condition and rehabilitation works for ones in critical condition.

Step-4: Calculate total amount of O&M required for five years following formula shown in the form.

Step-5: Assume percentage of annual increment of O&M budget and fill it in the cell.

Step-6: Allocate the total amount of five years to each financial year following computed proportion.

Step-7: Estimate budget for all sectors and record the total amount of each on the summary sheet (Form-7b). Graphs will be generated on the sheet.

Step-8: Review and discuss the estimated O&M budget prospect in the standing committee, arrange discussion in the CSCC meeting.

MEDIUM TERM O&M BUDGET FRAMEWORK (BREAK DOWN)

< FORM-7a>

Name of City Corporation	
Sector	
Target Year	2015/16 – 2019/20

1. Stock Volume

Physical stock break down

	Structure	Total					
	(Unit)						
1a	Good						
1b	Fair						
1c	Poor						>> Periodic
1d	Critical						>> Rehabilitation
1e	No Data						
1f	TOTAL	0	0	0	0	0	0 >> Routine

Break down by type of structure following classification in the inventory (e.g. BC, RCC for road)
If there is no need or data of classification, only total volume should be filled.

Suitable unit for calcuration (e.g. m, sq.m, no., etc.)

2. Assumption

Average O&M cost per unit of asset volume (Taka/unit)

		Average					
2a	Routine						
2b	Periodic						
2c	Rehabilitation						

Rough estimation as average based on past data or schedule of rates

Maintenance cycle: time period to address to the existing major maintenance needs (Year)

		Average					
2d	Periodic						
2e	Rehabilitation						

3. Budget Requirement Estimation

Yearly requirement (Lakh Taka)

		Total					
3a = 1f * 2a	Routine	0	0	0	0	0	0

Total requirement (Lakh Taka)

		Total					
3b = 1c * 2b	Periodic	0	0	0	0	0	0
3c = 1d * 2c	Rehabilitation	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0

Five years maintenance requirement (Lakh Taka)

		Total					
3d = 3a * 5	Routine	0	0	0	0	0	0
3e = 3b * 5 / 2d	Periodic	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3f = 3c * 5 / 2e	Rehabilitation	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3g	TOTAL	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

(If 3e or 3f derived from this formula is larger than 3b or 3c respectively, the smaller amount will be shown in the cells.)

Input assumed annual growth rate of maintenance budget

Rate of annual increment
5%

Requirement for rehabilitation works by year (Lakh Taka)

	Total					
2015/16	0	0	0	0	0	0
2016/17	0	0	0	0	0	0
2017/18	0	0	0	0	0	0
2018/19	0	0	0	0	0	0
2019/20	0	0	0	0	0	0

Allocation	
18%	0.81
19%	0.86
20%	0.90
21%	0.95
22%	1.00

MEDIUM TERM O&M BUDGET FRAMEWORK (SUMMARY)

< FORM-7b>

Name of City Corporation

Target Year 2015/16 ~ 2019/20

Physical stock by sector

Structure	Road	Bridge	Drain	WS Pipeline	WS Facilities	Street Light	Facilities	Equipment
(Unit)								
Good								
Fair								
Poor								
Critical								
No Data								
TOTAL	0	0	0	0	0	0	0	0

Five years maintenance requirement (Lakh Taka)

	Road	Bridge	Drain	WS Pipeline	WS Facilities	Street Light	Facilities	Equipment	TOTAL
Routine									0
Periodic									0
Rehabilitation									0
TOTAL	0	0	0	0	0	0	0	0	0

Requirement for rehabilitation works by year (Lakh Taka)

	Road	Bridge	Drain	WS Pipeline	WS Facilities	Street Light	Facilities	Equipment	TOTAL
2015/16									0
2016/17									0
2017/18									0
2018/19									0
2019/20									0

Appendix-F: Sector-wise O&M Activities

The following subsections summarize typical works of O&M for major sectors. These activities shall be planned and implemented properly to address to maintenance needs. Technical detail of specific work items will be described in separate documents.

(1) Road and Bridge

Maintenance works for road and bridge infrastructure include items in the table below (but not limited to).

Table F-1 Typical O&M Works for Road

Routine Maintenance	Periodic Maintenance
- Shoulder repairs - Side drain repairs and cleaning - Manual reshaping of earth roads - Pothole repairs on asphalt & HBB roads - Surface treatment for cracked areas - Repair raveling, depression, rutting, etc. - Broken edge repair - Side slope repair - Restore camber and profiles - Road marking & sign minor maintenance - Care taking and cleaning of road side plantation	- Treatment of bitumen surface - Carpeting with seal coat - Overlaying on bituminous road - Restore damaged shoulders - Restore damaged slopes - Restore longitudinal profile - Restore shoulders and slopes - Replace damaged part

Table F-2 Typical O&M Works for Bridge and Culvert

Routine Maintenance	Periodic Maintenance
- Remove vegetation - Clean waterways - Repair minor defects of structure - Surface treatment of structure - Retention of joints - Repair damaged pavement - Maintain slope - Protect foundation - Repair sidewalk - Repair railing	- Strengthening of structure - Replace/ rebuild damaged parts - Refurbish pavement - Reinforce slope - Reinforce foundation

For more technical details, CC engineers may refer the "Guideline for Implementation of Rural Roads and Culverts Maintenance Program" issued by Rural Infrastructure Maintenance Management Unit of LGED on 2010.

(2) Drainage

Maintenance works for drainage infrastructure include items in the table below (but not limited to).

Table F-3 Typical O&M Works for Drainage

Routine Maintenance	Periodic Maintenance
- Sediment clearing from bed of drain - Obstacle clearing - Wall plaster repairing - Wall crack repairing - Cover slab repairing	- Large scale clearing - Wall rebuilding - Cover slab replacement

(3) Water Supply System

The following tasks are necessary for daily operation of water supply system so that it delivers desired level of service to users.

Table F-4 Typical Operation Works for Water Supply System

− Operation and monitoring of pump − Operation and monitoring of iron removal plant and treatment facilities − Inspection of water quality − Control of pressure and flow − Recording of operational data	− Inspection and monitoring of well, tank, and other facilities − Check of leakage and connection − Billing and tariff collection − Communication with customers

Maintenance works for water supply infrastructure include items in the table below (but not limited to).

Table F-5 Typical Maintenance Works for Water Supply Infrastructure

Routine Maintenance	Periodic Maintenance
- Cleaning sediment of iron removal plant - Cleaning sediment of overhead water tank - Greasing gate valves - Repairing leakage from pipeline	- Refreshment of filter - Structure reinforcement of tank - Replacement/reinforcement of pipeline

(4) Bus and Truck Terminal

The following tasks are necessary for daily operation of bus and truck terminal so that it delivers desired level of service to users.

Table F-6 Typical Operation Works for Bus and Truck Terminal

− Lease out of terminal − Deploy terminal inspector − Maintain terminal operation committee − Check and maintain the scheduled works − Ensure utility provision	− Manage budget and expenditure − Fix tariff rate of service − Maintain compliance with laws and orders for security − Communication with customers

Maintenance works for bus and truck terminal facilities include items in the table below (but not limited to).

Table F-7 Typical Maintenance Works for Bus and Truck Terminal

Routine Maintenance	Periodic Maintenance

- Cleaning of terminal yard - Pothole repairing of terminal yard - Water tap repairing for vehicle wash - Replacement of electric lamp - Cleaning and repair of terminal building - Cleaning of drainage	- Pavement rehabilitation of terminal yard - Renewal of road marking and sign - Rehabilitation of building structure

(5) Street Lighting

The following tasks are necessary for daily operation of street lightning so that it delivers desired level of service to users.

Table F-8 Typical Operation Works for Street Lighting

− Maintain inventory for changing bulb − Maintain equipment and spare bulbs − Control of switch	− Fix tariff for lighting − Secure budget for procurement − Communication with customers

Maintenance works for street lightning infrastructure include items in the table below (but not limited to).

Table F-9 Typical Maintenance Works for Street Lighting

Routine Maintenance	Periodic Maintenance
- Replacement of fuse bulb - Replacement of damage holder and shade - Replacement of cable - Painting of light post	- Renewal of fuse bulbs - Replacement of cable - Restoration of light post

(6) School cum Cyclone Shelter

Maintenance works for school cum cyclone shelter include items in the table below (but not limited to).

Table F-10 Typical Maintenance Works for School cum Cyclone Shelter

Routine Maintenance	Periodic Maintenance
- Cleaning of floors and yard - Electric system maintenance - White washing/ Painting of shelter - Plaster repairing - Cleaning of water storage tank	- White washing/ Painting of shelter - Plaster repairing and reinforcement - Electric system rehabilitation - Water tank rehabilitation

(7) Other Municipal Facilities

The following tasks are necessary for daily operation of municipal facilities, when facilities invite tenants or collect fee from users (i.e. revenue generating facilities.

Table F-11 Typical Operation Works for Revenue Generating Facilities

− Lease out to tenants − Deploy facility inspector	− Manage budget and expenditure − Fix tariff rate of service

– Maintain operation committee – Check and maintain the scheduled works – Ensure utility provision	– Maintain compliance with laws and orders for security

Maintenance works for other municipal facilities include items in the table below (but not limited to).

Table F-12 Typical Maintenance Works for Other Municipal Facilities

Routine Maintenance	Periodic Maintenance
- Cleaning of office building - Fire fighting system maintenance - Electric system maintenance - Water supply system maintenance - White washing/ Painting - Plastering repairing	- White washing/ Painting - Plastering repairing and reinforcement - Electric system rehabilitation - Water tank rehabilitation

(8) Construction Equipment

Operation and maintenance of construction equipment is equally important as the O&M of infrastructure assets. Each CC will be responsible for the proper O&M of construction equipment.

The following tasks are necessary for daily operation of construction equipment so that it delivers desired level of service.

Table F-13 Typical Operation Works for Construction Equipment

– Maintain log book – Maintain chart for changing spare parts – Keep equipment inside garage	– Prepare budget for expenditure – Deploy night guard for security – Prepare lubricant and spare parts

Maintenance works for construction equipment include items in the table below (but not limited to).

Table F-14 Typical Maintenance Works for Construction Equipment

Routine Maintenance	Periodic Maintenance
- Change the oil filter of vehicles - Lubricate the essential parts of vehicles - Denting & painting of vehicles as needed - Change the mobile of the vehicle - Change the tire & tube of vehicle - Wash the vehicle after use	- Replace the essential parts of vehicles - Overhaul of the equipment - Denting & painting of vehicles as needed

Appendix-G1: Progress Monitoring of Works

Section or person in charge of implementation of the Annual O&M Plan will undertake the planned works and will report to the O&M Group. The O&M Group members will monitor progress of maintenance works, discuss in the group meeting, undertake remedial action, prepare status report and submit to standing committee with recommendations. For this purpose the O&M Group can use the following format for collection of information from the person-in-charge.

PROGRESS MONITORING SHEET OF WORKS

< FORM-8 >

Name of City Corporation

Monitoring Period Month - Year

Subject Asset			Work Specification						Schedule		Progress			
ID No.	Name	Asset Type	Type of Work	Detail of Work	Location/ Chainage From (km)	Required Volume	(Unit)	Estimated Cost (Lakh Taka)	Work Start From (dd/mm/yyyy)	Work End At (dd/mm/yyyy)	Status	Revised Cost (Lakh Taka)	Revised Date of Start (dd/mm/yyyy)	Revised Date of End (dd/mm/yyyy)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
							Total				Total			

Prepared by:
Date

Approved by:
Date

Input Configurations

<1: ID No.>
To be correspondent with that in the asset inventory

<3: Asset Type>
1. Road/Brdige
2. Drain
3. SWM
4. WSS
5. Sanitation
6. Municipal Facilities
7. Equipment

<4: Type of Work>
1. Routine Repair
2. Periodic: Elemental
3. Periodic: Structural
4. Emergency

<5: Detail of Work>
Describe planned work item

<6: Location/ Chainage From>
Specify location on link as distance from the starting point.
(For road, drain, water pipe, etc.)

<7&8: Required Work Volume>
Number has to be filled with suitable measurement unit.

<12: Status>
1. Preparation
2. Procurement
3. Working
4. Finished

Appendix-G2: Major Inspection Check Points

CC engineers will conduct physical inspection of assets in regular and periodic terms. Major viewpoints of inspection for major asset types are as shown in the table below (but not limited to). Further detail of inspection methodology will be described in separate documents.

Table G-1 Major Inspection Items for Road and Bridge

Items	Viewpoints
Pavement	− Surface damage (pothole, cracking, rutting, raveling, etc.) − Depression of road foundation or embankment
Shoulder/ Side Structure	− Damage on edge, material loss, erosion − Depression of footpath − Damage and clogging of side drain
Concrete Structure	− Surface damage (cracking, spalling, honey combing, etc.) − Fatigue of structure
Steel Structure	− Cracking, breaking, corrosion, etc. − Loose or lost of bolts − Fatigue of structure
Others	− Damage of joint, guardrail, sign boards, etc.

Note: For more technical details, CC engineers may refer the following documents:

- "Road Condition Survey Manual" issued by Roads and Highways Department on 2001; and
- "Bridge Condition Survey Manual" issued by Roads and Highways Department on 2005.

Table G-2 Major Inspection Items for Drainage

Items	Viewpoints
Vertical wall	− Vertical wall sway, crack , damage
Bottom bed	− Bottom surface damage
Top slab	− Cover slab crack, damage
Others	− Sedimentation

Table G-3 Major Inspection Items for Water Supply Infrastructure

Items	Viewpoints
Production Well	− Electrical and mechanical system check − Corrosion of pipe
Water Tank	− Sedimentation inside tank − Damage of plaster − Corrosion of pipe
Pipeline	− Damage due to soil erosion − Corrosion of pipe
Others	− Damage of valve pit slab

Table G-4 Major Inspection Items for Bus and Truck Terminal

Items	Viewpoints
Terminal Space	− Sufficient light in night time − Crack /damage in parking area
Facilities	− Utility services checking

Table G-5 Major Inspection Items for Street Lightning

Items	Viewpoints
Pole and Light	− Sufficient function of fuse light − Damage of pole
Cable	− Damage of cable

Table G-6 Major Inspection Items for School cum Cyclone Shelter

Items	Viewpoints
Building	− Damage of concrete, honey comb in concrete − Erosion of plaster − Damage of window and door
Utility	− Lack of water supply and electricity − Function of water tank and pipe

Table G-7 Major Inspection Items for Other Municipal Facilities

Items	Viewpoints
Building	− Damage of concrete, honey comb in concrete − Erosion of plaster − Damage of window and door
Utility	− Supply of water and electricity − Function of water tank and pipe − Check of fire fighting system
Open Space	− Check for squatter settlement

Table G-8 Major Inspection Items for Construction Equipment

Items	Viewpoints
Road roller and vehicles	− Wearing of tire − Hydraulic oil and mobile − Corrosion in roller − Damage of Electrical and mechanical system − Damage of frame and structure − Detachment of painting and rusting

Appendix-G3: Inspection Recording Sheet

A sample O&M inspection format is given below:

INSPECTION SHEET

Sheet No. : _____

ID No.		**Name**			
Ward		**Location (Chainage/Plot)**			
Asset Type			**Inspection Type**	☐ Regular ☐ Periodic ☐ Detailed ☐ Emergency	
Condition	☐ Good	☐ Fair	☐ Poor	☐ Critical	
Description of Condition					
Explain about damaged part, type of damage, cause, influence to service delivery, etc.					
Photo and Drawing					
With specific location on map, scale and explanation					
Recommended Action					

Inspected by : _____ Date : _____

Appendix-G4: Recording History of Inspection and Maintenance

"History of inspection and maintenance" is a form to record the result of inspection as well as information of implemented maintenance works. This form can be used for tracking change of asset conditions and investment made for individual assets, while the asset inventory shows only the latest condition. Steps of inspection and recording are as follows:

Step-1: Conduct inspection (or maintenance work) and record the present condition in the inspection sheet (Form-9) during field survey.

Step-2: Report the inspection result to the O&M Group and discuss it to take recommended actions in the O&M Group meeting as well as in the standing committee meeting.

Step-3: Add information on the inspection sheet to the history of inspection and maintenance data table (Form-10).

Step-4: Replace condition data on the inventory with the latest inspection result.

Step-5: Utilize the data for planning of O&M activities, assessment of asset value, etc.

HISTORY OF INSPECTION AND MAINTENANCE

< FORM-10 >

Name of City Corporation

Last Update

Updated by

ID No.	Name	Asset Type	Location/ Chainage From-To (km)	Type of Activity	Condition	Condition Details	Date of Work (dd/mm/yyyy)	Inspection Sheet Reference No.
1	2	3	4	5	6	7	8	9

Input Configurations

<1: ID No.>
To be correspondent with that in the asset inventory

<3: Asset Type>
1. Road/Brdige
2. Drain
3. SWM
4. WSS
5. Sanitation
6. Municipal Facilities
7. Equipment

<4: Location/ Chainage From>
Specify location on link as distance from the starting point. (For road, drain, water pipe, etc.)

<5: Type of Activity>
1. Regular Inspection
2. Periodic Inspection
3. Detailed Inspection
4. Emergency Inspection
5. Routine Repair
6. Periodic Repair: Elemental
7. Periodic Repair: Structural
8. Emergency Repair
9. Improvement/Upgrade
10. Demolition

<6: Condition>
Condition after the work
1. Good (No Damage)
2. Fair (Minor Damage)
3. Poor (Major Elemental Damage)
4. Critical (Major Structural Damage)

<9: Inspection Sheet Reference No.>
Reference no. of the corresponding inspection sheet