CHAPTER 5. ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

5.1 Introduction

The ISWM Master Plan is formulated by using the Strategic Environmental Assessment (SEA) technique. Environmental and social issues are taken into consideration to select the preferable options of each technical sector (collection & transportation, 3R & intermediate treatment, and final disposal) in the ISWM for mitigating the probable impacts to the neighbouring area in the course of project implementation. Furthermore, in the formulation of the Master Plan which is a combination of the selected technical options, the environmental and social perspectives are taken into account in addition to the factors of technology, economy and finance, institutional and organizational aspects for selecting the best combination for Option B.

In this **Chapter 5**, the qualitative impacts to the environment and society are discussed in practicing the construction project of the technical sector of the selected master plan Option B and in the scoping for implementing the Environmental Impact Assessment (EIA) or IEE (Initial Environmental Examination) for the project(s) is prepared.

5.2 Planning Procedures and Selection of Optimum Master Plan

5.2.1 Planning Procedures for Development of the Master Plan

The SEA principle is conducted on the IEE level (Category B of the JICA Guidelines) to apply for decision-making of planning in the formulation of the master plan. Though both EIA and SEA are the tools for assessment of environmental and social impacts, in most cases, EIA deals with impacts from a single project. On the other hand, SEA deals with the comprehensive impacts of projects which cover a wide area (such as the master plan), and complicated impacts from a combination of plural projects, so that public consultation is significant.

One of the important principles in SEA is the "Zero Option". SEA provides an alternative option for the project, and it always has to take into account the case of "no project" implemented in the process of preparing the alternatives.

Figure 5.2.1 shows the planning procedures of the master plan of this project. In the whole process, selection and decision-making, environmental and social considerations are carried out using the JICA Environmental Checklist for Waste Management.

Firstly, possible options are listed in each technical sector; namely, Collection and Transportation, Intermediate Treatment and 3R, and Final Disposal. According to the SEA strategy, each approach must have a "Zero Option" which means no action will be made. For example, "Collection and Transportation" has the options of "Present Level Collection and Transport", "Direct Transport", "No Transfer Station for Mini-dumpers," and "No Intermediate Treatment Facilities and No 3R activities by GWMC", and so on.

Secondly, the best options are selected from each sector in terms of SEA. All the selected options shall satisfy the check items in the Environmental and Social Considerations. Thirdly, some drafts of the Master Plan are formulated in combination with the options selected by the previous process. Needless to say, one of the drafts of the Master Plan is "Zero Option". Fourthly, the best Master Plan is formed. Finally, the "Action Plan", which is defined as priority projects to be implemented in the short-term period, is prepared, i.e., from year 2016 to year 2018 in this project. The Master Plan includes many main- and sub-projects which break the components of the Master Plan down to the feasible action level. Therefore, a schedule of timing, cost and executing agencies is necessary for the implementation of these main- and sub-projects, and the projects showing these details are called "Action Plan".

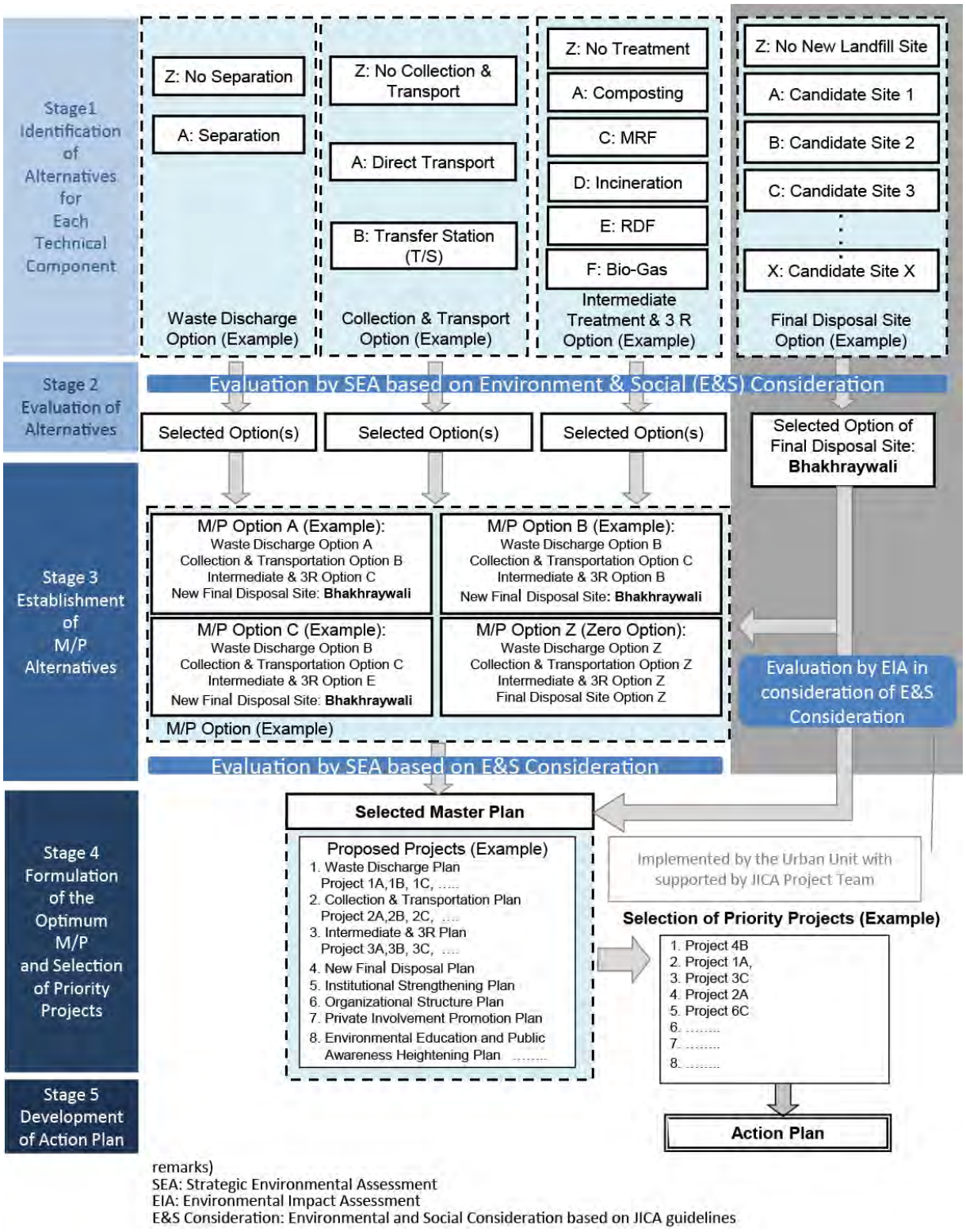


Figure 5.2.1 Planning Procedure of the Master Plan with Environmental and Social Considerations

5.2.2 Selection of Optimum Master Plan

The master plan study options including the selection of Option B as the optimum combination from the technical, environmental, social, financial, institutional and organizational viewpoints have been

discussed in the preceding **Chapter 4**. This Option B consists of the development plans, programmes and projects listed below.

(1) Proposed Development Plans and Programmes

The environmental and social considerations should be carried out in the course of formulation of the Gujranwala Integrated Solid Waste Management Master Plan. The Master Plan is composed of the following seven programmes which are described in detail in **Chapter 4**.

Programme 1: Waste Collection and Transportation Plan

Programme 2: Final Disposal Plan

Programme 3: Intermediate Treatment and 3R Promotion Plan

Programme 4: Environmental Education and Public Awareness Raising Plan

Programme 5: Economic and Financial Plan

Programme 6: Environmental Monitoring Plan

Programme 7: Institutional Strengthening and Organizational Plan

(2) Proposed Technical Options for Achieving Targets of the Master Plan

The technical options that shall be implemented to achieve the targets for setting the master plan are as follows:

- Separate collection;
- Construction and operation of a new final disposal site at Bhakhraywali;
- Improvement work and closure of the existing landfill site in Gondlanwala;
- Closure of the former landfill site in Chianwali;
- Construction and operation of a central compost plant; and
- Construction and operation of a RDF plant.

5.3 Baseline of Environmental and Social Condition

It is essentially required to consider the utmost mitigation of probable impacts to the environmental and social aspects in practicing the projects of the selected technical option indicated in **Section 5.2**. Under this **Section 5.3**, the natural and social conditions of the project site and the vicinities are collected and outlined for the baseline information taken into consideration for carrying out the EIA or IEE for the project(s).

The baseline of environmental and social considerations in this project is summarised based on the EIA report on the construction of a new final disposal site at Bhakhraywali and the result of the Environmental and Social Consideration Survey (E&S Survey).

The EIA report was drafted in February 2015 by the Urban Unit and submitted to the Federal Agency in March 2015. After the submission, the Public Hearing and Review was carried out on 17 August 2015, and Decision will be made by the Federal Agency. The EIA and the details of the EIA of the project are described in the following **Section 5.4**. On the other hand, the E&S survey was carried out in November 2014.

5.3.1 Natural Condition

(1) Climate

Gujranwala has a tropical hot dry climate with long summers when temperature rises to maximum up to 48 degrees Celsius in the months of June and July, and 4 degrees Celsius in the months of December and January. The summer season starts from April and continues until the end of September, the winter season starts from November and continues until February, and Monsoon starts from the later part of June and lasts over the period of two-and-a-half months.

(2) Water

Surface water: The *Chenab* River is the only river in the district. The *Chenab* River forming the northern boundary has been described as a broad shallow stream. There are several *nullahs* (canals) in the district which form channels for floodwater in the rainy season. The most important of them are *Palkhu, Aik, Khot, Beghwala* and *Dekh*.

Groundwater: Groundwater is mainly used for drinking and irrigation in Gujranwala. For drinking, the local population is generally reliant on supply from the hand pumps in rural areas while in urban areas population use drinking water from the piped water supply scheme.

(3) Fauna and Flora

Fauna: Due to the extensive cultivation, high population and human activities, there is little wildlife in the project area. However, the Wildlife Department has reported some fauna.

Flora: The project area, which is an agricultural land, is the habitat of several flora species. Common floral species with rooted vegetation are also present near most of the water bodies of the area.

(4) Land-use

The project site of the proposed landfill is an agricultural land with 10-15% uneven land left after the excavation activities.

(5) Air and Noise

During the survey at the site, no air pollution or generation of noise was noted.

5.3.2 Socio-economic Condition

(1) Population

The total population of Gujranwala District is 3,400,940 as estimated in March 1998. The 1998 Census shows that the population of the district consists of Muslims (95%), Christians (4%), and Hindu and others (less than 1%).

(2) Economic Activities

Gujranwala is a vibrant economic city of the Punjab with palpable contribution in agriculture and the industrial sector. It is one of the major wheat and rice producers in the Punjab. In terms of industrial sector, Gujranwala is one of the important commercial and industrial nerve centres of Pakistan. Production of good quality ceramics is also one of the most important sectors in Gujranwala.

(3) Sanitation

Thirty-five point three percent (35.3%) of households have no sanitation facility, and 42.8% have flush toilet in dwelling while 21.9% have flush toilet in premises. Infant morbidity rate is 67/1,000 live births.

(4) Health Condition

Acute respiratory infection is the frequent health problem.

5.3.3 Public Consultation

As a component of public consultation, 74 stakeholders were interviewed. As many as 11 stakeholders selected from public institutions, such as the Irrigation Department, Agriculture Department, Environment Protection Department, City District Government Gujranwala, Gujranwala Environmental Organization, and Chaon Foundation, were interviewed, and the remaining 63 residents/landowners were interviewed as well.

Positive Perceptions: Stakeholders showed affirmative standpoint for the sanitary landfill in Bhakhraywali in terms of public health and environmental benefit.

Negative Perceptions: The common viewpoint is GMWC's negligence of required procedures and the guidelines create new environmental constraint and hazards. Lack of community inclusion and public disclosure is pointed out as well.

5.4 Confirmation of Environmental and Social Considerations Systems and Organizations in Pakistan

5.4.1 Laws and Regulations Related to Environmental and Social Considerations

Table 5.4.1 specifies the Pakistan laws related to comprehensive environmental issues and **Table 5.4.2** shows the policy, guidelines, and rules of solid waste management nationwide/provincial-wise.

Table 5.4.1 Environmental Laws in Pakistan

Title of the Law	Contents
Pakistan Environmental Protection Act	This act provides for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development. EIA is mentioned in Section 12.
National Environmental Quality Standards (NEQS)	NEQS consists of two parts: • List of laws and regulations in 14 sectors such as Environmental Protection, Land Use, Water Quality and Resource, Solid Waste Management, and so on. • Description of National standards
Pakistan Environmental Protection Agency (Review of IEE & EIA) Regulations 2000	Process of IEE and EIA is described.
National Environmental Policy	The Policy provides an overarching framework for addressing the environmental issues facing Pakistan, particular pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural disasters and climate change. Guidelines are shown in each sector, and one of such sector is "Waste Management".

Table 5.4.2 Policy, Guidelines, and Rules on Solid Waste Management Nationwide/Provincial-Wise

Name	Contents
National Sanitation Policy 2006	The policy stipulates that one of its objectives is to develop and implement strategies for integrated management of municipal, industrial, hazardous and hospital and clinical wastes of national, provincial and local level.
Punjab Municipal Solid Waste Management Guidelines 2011	Various issues in waste management are covered.
Hospital Waste Management Rules 2005	Rules for the management of medical waste generated in hospital are described.

5.4.2 Organizations and Functions Related to Environmental and Social Considerations

The Ministry of Climate Change is the main government organization responsible for protection of the environment and conservation of resources. There are many governmental institutions organized and

enforcing the laws and regulations together with the Ministry of Climate Change as shown in the following **Table 5.4.3**.

Table 5.4.3 Framework of Environmental Institutions in Pakistan

Functions, Policy, Plans, Strategies and Programmes	Status (as of February 2015)
Environmental pollution, ecology, forestry, wildlife, biodiversity, climate change and desertification	Assigned to the Planning and Development (P&D) Department, but the function was later absorbed by the Ministry of Environment (MoE). The MoE is named as the Ministry of Climate Change with the same functions at present.
Improvement in environmental conditions of air, water and land	Devolved
Incorporation of environmental concerns in development schemes and energy conservation	Devolved
Coordination, monitoring and implementation of environmental agreements with other countries, international agencies and forums	Assigned to the Planning and Development (P&D) Department, but the function was later absorbed by the Ministry of Environment (MoE). The MoE is named as the Ministry of Climate Change with the same functions at present.
Pakistan Environmental Protection Agency (Federal EPA)	Assigned to the Capital P&D Department, but the function was later absorbed by the Ministry of Environment (MoE). The MoE is named as the Ministry of Climate Change with the same functions at present and the domain of the Federal EPA is limited to the Federal Area.
Secretariat of Pakistan Environmental Protection Council established under the PEPA97 (XXXIV of 1997)	Assigned to the Inter-Provincial Coordination (IPC) Department, but the function was later absorbed by the Ministry of Environment (MoE). The MoE is named as the Ministry of Climate Change with the same functions at present.
National Council for Conservation of Wildlife (NCCW)	Devolved; the council members were transferred to the P&D Department and later to the Ministry of Environment which is named as the Ministry of Climate Change at present. The staff members of the defunct NCCW work in the Forestry Wing of MoE.
National Energy Conservation Centre (ENERCON)	Assigned to the Ministry of Water and Power.
Zoological Survey Department (ZSD)	Assigned to Ministry of Science and Technology, but the function was later absorbed by the Ministry of Environment (MoE). The MoE is named as the Ministry of Climate Change with the same functions at present.
Forestry Wing of MoE	Staff members were transferred to the P&D Department and later to the new Ministry of Environment (MoE). The MoE is named as the Ministry of Climate Change with the same functions at present.

5.4.3 Projects Requiring an EIA in Pakistan

The Environmental Protection Act of 1997 and the Pakistan Environmental Assessment Procedures of 1997 stipulate the conditions that would require EIA for the project site. The process of EIA is described in "Pakistan Environmental Protection Agency (Review of IEE & EIA) Regulations 2000." The case is filed in the Federal Agency, and the Agency decides whether the case is IEE (Initial Environmental Evaluation) or EIA. According to the Regulations, EIA is required in view of waste management as follows:

- Waste disposal and/or storage of hazardous or toxic wastes (including landfill state, incineration of

hospital toxic waste) (for EIA)

- Waste disposal facilities for domestic or industrial wastes, with annual capacity more than 10,000 cubic metres (for EIA)
- Waste disposal facilities for domestic or industrial wastes, with annual capacity less than 10,000 cubic metres (for IEE)
- Waste-to-energy generation projects (for IEE)

5.4.4 EIA Process in Pakistan

Figure 5.4.1 shows the process of EIA in Pakistan. Once the report is submitted, within 10 working days of application for EIA, the Federal Agency proceeds to the "Preliminary Scrutiny." After "Public Participation" is done, the Federal Agency will carry out its "Review" within 90 days of application for EIA. Upon completion of the Review, the "Decision" of the Federal Agency will be communicated to the proponent.

5.4.5 EIA of this Project

The Urban Sector Planning and Management Services Unit Ltd. (The Urban Unit) in partnership with the Gujranwala Waste Management Company (GWMC) conducted the Environmental Impact Assessment (EIA) for the proposed Bhakhraywali landfill site. The actual survey was carried out by local consultants from 15 August 2014 and the final EIA Public Hearing was carried out on 17 August 2015. The major contents of the report are shown in **Figure 5.4.2**.

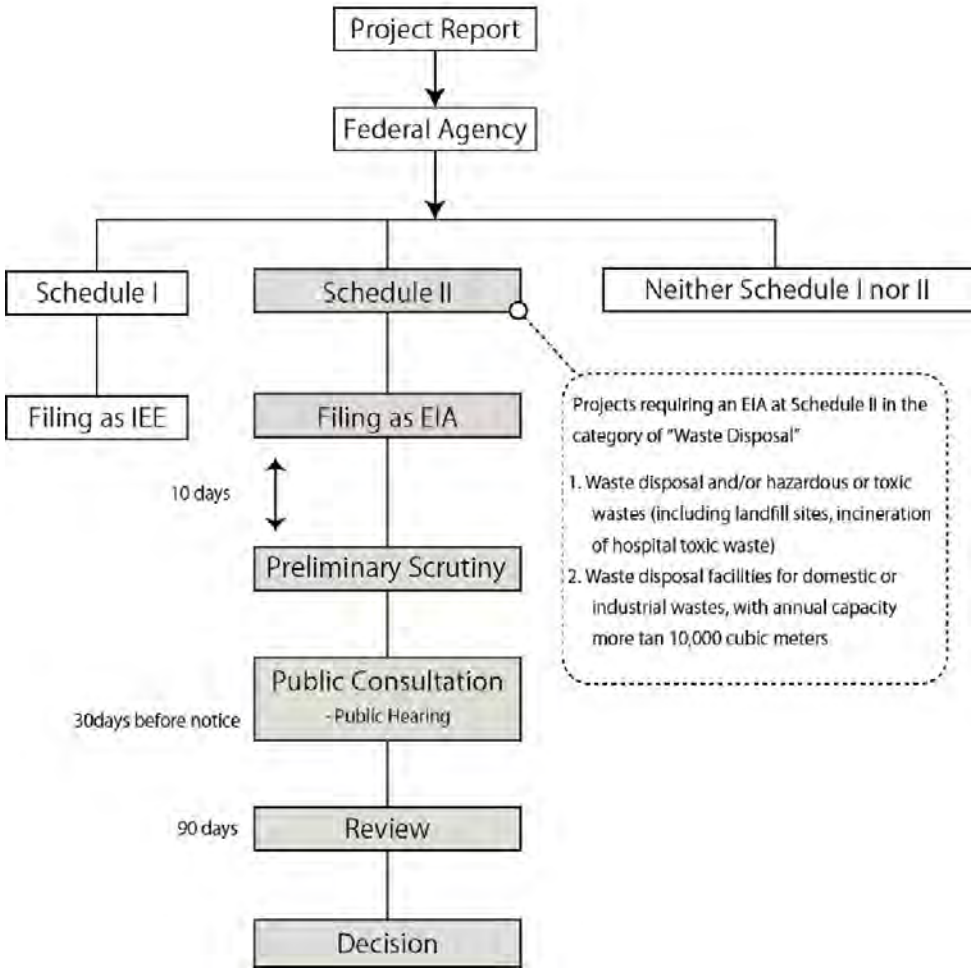


Figure 5.4.1 Process of EIA in Pakistan by the "Pakistan Environmental Protection Agency (Review of IEE & EIA) Regulations 2000"

Chapter 1: Introduction
Chapter 2: National and International Policy, Legal and Institutional Framework
Chapter 3: Project Description
Chapter 4: Analysis of the Alternatives
Chapter 5: Baseline Environment and Social Conditions
Chapter 6: Stakeholder Consultation
Chapter 7: Impact Assessment and Mitigation Measures
Chapter 8: Environmental Management Monitoring Plan
Chapter 9: Conclusion

Figure 5.4.2 Major Contents of EIA Report (Planned)

5.4.6 JICA Environmental Checklist for Waste Management

This project which is categorised as "Category B" based on the JICA Guidelines follows the JICA Guidelines for Environmental and Social Considerations as well as the Pakistani laws and regulations. Categorisation is made based on sector, scale, characteristics and location of the project, and "Category B" is defined as "Less adverse impact than "Category A" (significant adverse impact)".

The JICA Environmental Checklist is issued under the JICA Guidelines, and the Checklist mentions detailed issues and items for avoiding negative impacts to community from the project. The JICA Checklist is a list of conditions which a JICA-funded project needs to follow so as to satisfy the desired quality of the project. For this project, the JICA Environmental Checklist for Waste Management is applied. The Checklist consists of six categories: Permits and Explanation, Pollution Control, Natural Environment, Social Environment, Others, and Note.

According to the comparison between the Pakistani laws and the JICA Environmental Checklist for Waste Management (see **Table 5.4.4**), some issues show that there is no conflict between the JICA Checklist and Pakistani laws; for example, both require EIA for project implementation. On the other hand, some differences are identified in the category; for example, "Social Condition" of the JICA Checklist. "Social Conditions" in the JICA Checklist requires consideration of living and livelihood of stakeholders and working condition at the project site. These issues are not clearly mentioned in the Pakistani laws.

Application of the JICA Checklist to the project will make a better situation for the future waste management in Gujranwala. The Checklist will contribute especially in the field of social consideration.

Table 5.4.4 Comparison of Pakistani Laws and Regulations Related to Environmental Protection and Waste Management and JICA Environmental Checklist for Waste Management

Category Environmental Item in JICA Environmental Checklist for Waste Management	Comparison with Pakistan Laws and Regulations
1. Permits and Explanation 1) EIA and Environmental Permits 2) Explanation to the Local Stakeholders 3) Examination of Alternatives	**[Result of Comparison]** ・ No Major Conflict between the JICA Checklist and Pakistan laws and regulations **[Related Laws/Regulations]** ・ Guidelines for the Preparation and Review of Environmental Reports (1997) ・ Pakistan Environmental Protection Agency (Review of IEE & EIA) regulations 2000 ・ National Environmental Quality Standards (NEQS) ・ Building Regulation (2007) ・ Punjab Municipal Solid Waste Management Guidelines 2011 ・ Guidelines for Public Consultation (1997)
2. Pollution Control 1) Air Quality 2) Water Quality 3) Wastes 4) Soil Contamination 5) Noise and Vibration 6) Odour	**[Result of Comparison]** ・ Treatment and disposal process of other hazardous and dangerous waste may not be defined. ・ Noise generated by vehicles shall comply with the National Environmental Quality Standard. Noise generated by Facility operation may not be defined. Vibration level by vehicles or facility operation may not be defined. **[Related Laws/Regulation]** ・ National Environmental Quality Standards (NEQS) ・ Punjab Municipal Solid Waste Management Guidelines 2011 ・ Hospital Waste Management Rules (2005)
3. Natural Environment 1) Protected Areas 2) Ecosystem 3) Management of Abandoned Site	**[Result of Comparison]** ・ No Major Conflict between the JICA Checklist and Pakistan laws and regulations **[Related Laws/Regulation]** ・ Guidelines for Sensitive and Critical Area (1997) ・ Punjab Municipal Solid Waste Management Guidelines 2011
4. Social Environment 1) Resettlement 2) Living and Livelihood 3) Heritage 4) Landscape 5) Ethnic Minorities and Indigenous People 6) Working Conditions	**[Result of Comparison]** ・ No conflict, basically, but social and environmental considerations shall be accorded to waste pickers in the existing system in accordance with the JICA guidelines. ・ Measures for local landscape protection are not defined in Pakistani laws and regulations. ・ Working condition and environment is not clearly defined in Pakistani laws and regulations although the Labour Policy (2010) mentions labourers' human rights, health and social welfare. **[Related Laws/Regulation]** ・ Guidelines for the Preparation and Review of Environmental Reports (1997) ・ Labour Policy (2010) ・ Antique Act (1975) ・ Punjab Special Premises (Preservation) Ordinance (1985) ・ Guidelines for Sensitive and Critical Area (1997) ・ Punjab Municipal Solid Waste Management Guidelines 2011 ・ National Environmental Policy ・ The World Bank Environmental Assessment Sourcebook Volume I
5. Others 1) Impacts during Construction 2) Monitoring	**[Result of Comparison]** ・ No Major Conflict between the JICA Checklist and Pakistani laws and regulations **[Related Laws/Regulations]** ・ Guidelines for the Preparation and Review of Environmental Reports (1997) ・ Punjab Municipal Solid Waste Management Guidelines 2011
6. Note 1) Reference to Checklist of Other Sectors 2) Note on Using Environmental Checklist	**[Situation]** ・ This issue is not mentioned in Pakistani laws; therefore, The World Bank Environmental Assessment Sourcebook, Volume I, shall be applied, if necessary. **[Related Laws/Regulations]** ・ Guidelines for the preparation and review of Environmental Reports (1997) ・ The World Bank Environmental Assessment Sourcebook, Volume I

5.5 Scoping for Consideration of EIA or IEE Study

The environmental and social impact elements and the degree for the projects are clarified in this **Section 5.5**. The results are summarised as scoping for consideration to carry out the projects requiring EIA or IEE.

The target project for scoping and its contents are set up based on the information in **Section 5.3** and **Section 5.4**. Accordingly, the scoping is carried out for the intermediate treatment facilities (Compost Plant and RDF Plant) and the final disposal site (new sanitary landfill facilities, improvement of the existing landfill site and safe closure of the former landfill site) that are integral components of the Option B Master Plan.

The results of the scoping tables shown below are made as reference as the EIA/IEE of the respective project is carried out to ensure the appropriateness of Option B projects in terms of environmental and social aspects.

5.5.1 Scoping of EIA or IEE for Composting and RDF Projects

Table 5.5.1 indicates the results of preliminary evaluation of probable environmental and social impacts of composting and RDF projects, which are used as the basic scoping to carry out the EIA or IEE for the project concerned.

Table 5.5.1 Scoping of Composting and RDF Projects

Category	Environmental Item	Compost Plant		RDF Plant		Check Item
		CON	OPE	CON	OPE	
1. Pollution Control	(1) Air Quality	B	C	B	C	Construction Phase: Generation of dust in construction work Operation Phase: Dust in workplace
	(2) Water Quality	B	B	B	B	Construction Phase: Wastewater from construction staff quarters Operation Phase: Wastewater from plant office
	(3) Wastes	C	C	C	C	Construction Phase: Construction waste and garbage Operation Phase: Garbage from plant office
	(4) Soil Contamination	C	C	C	C	Not applicable
	(5) Noise and Vibration	C	B	C	B	Construction Phase: Construction work by heavy machinery Operation Phase: Noise of plant machinery and incoming vehicles
	(6) Odour	C	A	C	B	Construction Phase: Not applicable Operation Phase: Odour from incoming raw material
2. Natural Environment	(1) Protected Areas	C	C	C	C	No protected area in the neighbouring area
	(2) Ecosystem	C	C	C	C	Construction Phase: Conversion of agricultural land Operation Phase: Not applicable
	(3) Management of Abandoned Sites	C	C	C	C	Not applicable
3. Social Environment	(1) Resettlement	C	C	C	C	No residents in the site
	(2) Living and Livelihood	C	C	C	C	No residents in the neighbouring area
	(3) Heritage	C	C	C	C	No heritage in the neighbouring area
	(4) Landscape	C	C	C	C	Appearance of plant building
	(5) Ethnic Minorities and Indigenous Peoples	C	C	C	C	Not applicable
	(6) Working Conditions	B	B	B	B	Construction Phase: Accidents in construction work Operation Phase: Accidents and insanitation to plant staff in operation

Notes:
1) Phase of Project Activity: CON: During Construction, OPE: During Operation
2) Impact Level: Negative Impact: A: Serious, B: Some, C: Negligible, Positive Impact: P, - : Not applicable

5.5.2 Scoping of EIA or IEE for Waste Disposal Projects

Table 5.5.2 shows the results of preliminary evaluation of probable environmental and social impacts of the final disposal projects at Bhakhraywali, Gondlanwala and Chianwali, which are used for the basic scoping to carry out the EIA or IEE of the project concerned.

Table 5.5.2 Scoping of Bhakhraywali, Gondlanwala and Chianwali Landfill Projects

Category	Environmental Items	Bhakhraywali Sanitary Landfill		Gondlanwala Improvement of Existing Landfill		Chianwali Closure of Former Landfill		Check Items
		CON	OPE	CON	OPE	CON	OPE	
1. Pollution Control	(1) Air Quality	B	B	B	B	B	B	Construction Phase: Generation of dust in construction work Operation Phase: Generation of dust in landfill work. Generation of landfill gases.
	(2) Water Quality	B	A	B	A	B	B	Construction Phase: Wastewater from construction staff quarters Operation Phase: Wastewater from plant office; Leachate from the landfill area
	(3) Wastes	C	C	C	C	C	C	Construction Phase: Construction waste and garbage Operation Phase: Garbage from plant office
	(4) Soil Contamination	C	C	C	B	C	B	Operation Phase: Contamination by heavy metals in waste.
	(5) Noise and Vibration	B	B	B	B	B	C	Construction Phase: Construction work by heavy machinery Operation Phase: Noise of landfill machine and incoming vehicles
	(6) Odour	C	A	B	A	B	B	Construction Phase: Odour from the existing landfill site Operation Phase: Odour from incoming waste
2. Natural Environment	(1) Protected Areas	C	C	C	C	C	C	No protected area in the neighbouring area
	(2) Ecosystem	C	C	C	C	C	C	Construction Phase: Conversion of agricultural land Operation Phase: Not applicable
	(3) Management of Abandoned Sites	-	B	-	B	-	B	Operation Phase: Safe closure and post-closure management and monitoring of the landfill site.
3. Social Environment	(1) Resettlement	C	C	C	C	C	C	No residents in the site
	(2) Living and Livelihood	C	C	A	A	C	C	Measures for two residential houses at Gondlanwala landfill site.
	(3) Heritage	C	C	C	C	C	C	No heritage in the neighbouring area
	(4) Landscape	C	B	B	B	B	P	Appearance of the landfill site to the passersby.
	(5) Ethnic Minorities and Indigenous Peoples	C	C	C	C	C	C	Not applicable
	(6) Working Conditions	B	A	B	A	B	C	Construction Phase: Accidents in construction work Operation Phase: Accidents and insanitation to landfill operation staff
	(7) Waste Pickers in Landfill Site	-	A	B	A	-	-	Construction Phase: Accidents in construction work Operation Phase: Accidents and insanitation to landfill operation staff

Notes:
1) Phase of Project Activity: CON: During Construction, OPE: During Operation
2) Impact Level: Negative Impact: A: Serious, B: Some, C: Negligible, Positive Impact: P: Not applicable

5.6 Impact Forecast

Prior to the forecasting of potential environmental impact of the projects, field surveys were conducted in addition to collection of the baseline data described in **Section 5.3** for clarifying the background conditions of the candidate sites and the surrounding areas. Those surveys include the impacts caused in the construction and operation phases of the facilities by factors influencing daily life (e.g., bad odour,

flies and vectors, traffic jam caused by garbage collection vehicles, garbage falling down from collection vehicles without cover on the way to the landfill site) and environmental issues (e.g., water quality, air quality, hydrogeological situation, soil contamination, noise and vibration). In addition to the environmental factors, the opinions of neighbouring residents and waste pickers who are the "key stakeholders" in the waste management system were collected for analysing the impacts to the communities.

Based on the data and information gathered through the surveys, this section examines the impacts of major influencing factors among the impacts to the environment and social aspects, which are clarified in the scoping of each facility in the preceding **Section 5.5**.

5.6.1 Construction and Operation of Central Compost Plant

(1) Outline of Compost Plant Project

Location of Construction Site	: East side of Bhakhraywali Landfill Site
Site Area	: 5ha
Plant Capacity	: 250t/day
Plant System	: Pre-treatment and windrow type composting process
Input Material	: Separated organic waste

(2) Environmental and Social Impact Elements of Compost Plant Project

Air Quality

Similar to other construction projects, dust is generated during the construction work. The construction work, especially earth work for foundation will cause a dust problem. The surface soil in the project site consists of sandy silt to silty sand, and the small particles of surface soil are easily blown by wind and suspended in the air.

The compost plant does not have a process to exhaust air pollutants. However, during operation, dust could be generated in the segregation of raw materials and turning them into compost. The dust problem during operation will result in insanitary conditions to the operation staff of the plant.

Water Quality

Generally, a camp or quarters for the construction workers is built in or nearby the construction site. During the construction phase, wastewater discharge from kitchen, toilet and bath become a potential source for water pollution in the neighbouring area. In the operation phase, conditions similar with the construction phase can be seen, so that the wastewater discharged from toilet and bath by plant operation staff is a potential source of water contamination.

Odour

The construction work does not cause odour. Raw materials for composting are derived from organic waste of municipal waste mostly consisting of fresh market waste, kitchen waste, garden waste, etc., which generate odour especially under the anaerobic decomposition process.

Working Conditions

Risk of accidents such as falling of objects, collapse of temporary work, and miss-operation of construction machinery always exists among the construction workers and the passersby. During operation of the compost plant, the risks exist in the operation of machinery and sanitation or health risk also exists among the plant staff handling the raw materials.

5.6.2 Construction and Operation of Compost/RDF Plant

(1) Outline of Compost/RDF Plant Project

Location of Construction Site	: East side of Bhakhraywali Landfill Site
Site Area	: 7ha

Plant Capacity (Compost Plant)	: 250t/day
Plant Capacity (RDF Plant)	: 250t/day
Plant System (Compost Plant)	: Pre-treatment and windrow type composting process
Plant System (RDF Plant)	: Pre-treatment and bailing process
Input Material (Compost Plant)	: Separated organic waste
Input Material (RDF Plant)	: Separated combustible waste (plastics &Paper)

(2) Environmental and Social Impact Elements of Compost/RDF Plant

Air Quality

Similar conditions with the construction of compost plant.

Water Quality

Similar conditions with the construction of compost plant.

Odour

Similar conditions with the construction of compost plant. Input raw materials to the RDF and segregated combustible materials have less impact of odour compared with the raw material of compost plant.

Working Conditions

Similar conditions with the construction of compost plant. Segregated combustible materials have less odour impact compared with the raw material of compost plant.

5.6.3 Construction and Operation of New Final Disposal Facility at Bhakhraywali

(1) Outline of New Final Disposal Facility at Bhakhraywali

Location of Construction Site	: Bhakhraywali, Northwest of the city, approximately 11km from the city centre
Site Area	: 26ha (First phase)
Incoming Waste Amount	: 1,000t/d in 2018, 1,500t/d in 2024 and 2,000t/d in 2030
Type of Incoming Waste	: Municipal solid waste (Residual waste)
Type of Landfill	: Semi-aerobic type sanitary landfill

(2) Environmental and Social Impact Elements of New Final Disposal Facility at Bhakhraywali

Air Quality

Similar to other construction projects, dust is generated during the construction work. The construction work, especially earth work for the construction of waste containment and roads will cause a dust problem, since surface soil in the project site consists of sandy silt to silty sand, and the small particles of surface soil are easily blown by wind and suspended in the air.

The landfill facility does not have a process of exhausting air pollutants. However, the biodegradable wastes in filled waste turn to landfill gas in the course of degradation. Landfill gas includes carbon dioxide and/or methane gas, which is a cause of global warming.

Water Quality

During the construction phase, wastewater discharged from kitchen, toilet and bath become a potential source for water contamination in the neighbouring area. In the operation phase, similar condition with the construction phase can be seen, so that wastewater discharged from toilet and bath by plant operation staff is a potential source of water contamination. In addition, wastewater or leachate is generated from the waste layer and this may also bring water pollution.

Soil Contamination

In the operation phase, domestic hazardous waste mixed in municipal solid waste has a potential to cause underground soil contamination.

Noise and Vibration

A large number of construction machines and vehicles are deployed during the construction period. These machines and vehicles will be the sources of noise and vibration in daytime. In the operation phase, collection vehicles in/out of the disposal site and landfill machines will be potential sources of noise and vibration problems.

Odour

The construction work will not be an odour source. In the operation phase, the decomposition of organic waste in incoming disposal waste becomes a potential cause of odour generation.

Management of Abandoned Site

Even after completion of the landfill, the environmental impact elements represented by leachate and landfill gas remain for years.

Landscape

Configuration of the land will change from cultivated land to landfill site. Upon completion of the landfill, the landfill area will become higher than the surrounding area.

Working Conditions

Accidents involving the construction workers and the passersby such as falling of objects, collapse of temporary work and miss-operation of construction machinery always exist during the construction work. In the landfill operation, there also exist the risks of accidents by landfill machines and health and sanitation risks to the operation staff in handling waste.

Waste Pickers in Landfill Site

If the waste pickers are allowed access to the landfill area, work accidents and health risks are assumed causes by poor working environment in the working area.

5.6.4 Improvement Work of the Existing Landfill Facility in Gondlanwala

(1) Outline of Existing Landfill Facility in Gondlanwala

Location of Construction Site	: Gondlanwala, North of the city, approximately 10km from the city centre
Site Area	: 5ha
Incoming Waste Amount	: 660t/d in 2016, 830t/d in 2017
Type of Incoming Waste	: Municipal Solid Waste
Type of Landfill	: Controlled open dumping

(2) Environmental and Social Impact Elements of the Existing Disposal Facility in Gondlanwala

Air Quality

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Water Quality

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Soil Contamination

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Noise and Vibration

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Odour

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Management of Abandoned Site

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Living and Livelihood

There are two residential houses located in the adjacent area of landfill site. Families residing in the houses will suffer to some extent from the construction work and landfill operation.

Landscape

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Working Conditions

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Waste Pickers in Landfill Area

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

5.6.5 Closure of the Former Landfill Site in Chianwali

(1) Outline of Former Landfill Site in Chianwali

Location of Construction Site	: Chianwali, South of the city, approximately 14km from the city centre
Site Area	: 5ha
Incoming Waste Amount	: Landfill finished
Type of Filled Waste	: Municipal Solid Waste
Type of Landfill	: Open dumping

(2) Environmental and Social Impact Elements of Former Landfill Site in Chianwali

Air Quality

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Water Quality

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Soil Contamination

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Noise and Vibration

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Odour

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Management of Abandoned Site

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

Landscape

Positive effect is foreseen due to final earth cover and safe closure work.

Working Conditions

Similar conditions with the construction work of new landfill facility in Bhakhraywali.

5.7 Impact Assessment and Review of the Proposed Project

Under this **Section 5.7**, the preliminary impact assessment is carried out for the environmental impact elements discussed in **Section 5.6**, and the appropriateness of the selected Master Plan Option B in the environmental and social consideration aspects is described.

5.7.1 Impact Assessment of Each Project

Impact from the project in the construction phase and the operation phase is evaluated. Impact in the current situation as well as in the situation that possible measures are implemented is also considered. Major residual impacts of negative and positive aspects are summarised below.

(1) Construction and Operation of Central Compost Plant

Construction Phase: Similar to the construction work of compost plant, the most negative impacts is the dust problem. Surface water contamination by staff quarters and the working condition of construction workers will also cause the impacts of the project. On the other hand, the increase of employment opportunity and community development will be counted as positive impact.

Operational Phase: Odour, noise and vibration problem due to incoming vehicles to the plant will also be the cause of environmental impacts of plant operation. On the other hand, employment opportunity will be the positive impact.

(2) Construction and Operation of Central Compost/RDF Plant

Construction Phase: The most negative impact will be the dust problem. In addition, surface water contamination and working condition of the construction workers will also be cause of impacts of the project. On the other hand, the increase of employment opportunity and community development will be counted as positive impact.

Operational Phase: Odour problem due to handling of organic waste is the most negative impact. In addition, noise and vibration problem due to incoming vehicles to the plant will also be the cause of environmental impacts of plant operation. On the other hand, employment opportunity will be the positive impact.

(3) Construction and Operation of New Final Disposal Facility at Bhakhraywali

Construction Phase: The most negative impact is the dust problem. In addition, surface water contamination by staff quarters, noise and vibration by construction machinery, and working condition of workers will become cause of environmental and social problems. On the other hand, the increase of employment opportunity and community development are counted as positive impact.

Operational Phase: Leachate and odour will become the most concerned environmental impact elements for taking appropriate measures. Working at the disposal site increases risks of accidents and health problems to the landfill operation workers and the waste pickers. On the other hand, employment opportunity will be the positive impact.

(4) Improvement Work of the Existing Landfill Facility in Gondlanwala

Construction Phase: Similar to the construction work of new landfill facility in Bhakhraywali, the negative impact will be the dust problem, surface water contamination, noise and vibration, and working condition of the construction workers. On the other hand, the increase of employment opportunity and community development are counted as positive impact.

Operational Phase: Similar to the landfill operation at the new landfill facility in Bhakhraywali, the major environmental and social impacts will be generated from leachate, odour, risks of

accidents, and health of the landfill operation staff and waste pickers. On the other hand, employment opportunity will be the positive impact.

(5) Closure of the Former Landfill Site in Chianwali

Construction Phase: The most negative impacts are the dust problem. In addition, surface water contamination, noise and vibration, working condition of the construction workers will also become impacts to the environment and to human beings. On the other hand, the increase of employment opportunity is counted as positive impact.

Post-closure Phase: Groundwater contamination by leachate will be the most negative impact. In addition, the generation of landfill gasses and soil contamination by domestic hazardous waste will be considered as the environmental and social impact elements. On the other hand, safe closure with final earth cover and fencing will be the positive impact.

5.7.2 Review of the Impact Assessment in Environmental and Social Aspects

In this subsection, environmental and social considerations are carried out for the Master Plan Option B that was selected as the optimum option by evaluating technical, economic and financial aspects. Firstly, the components of Option B, specifically Composting, RDF and Final Disposal, are evaluated in environmental and social aspects. Secondly, evaluation of Option B in terms of environmental and social considerations is summarised.

(1) Construction and Operation of Central Compost Plant

Composting has good features for natural and social environment. Since organic waste is biodegraded by the composting procedure, the amount of waste will be reduced. Reduction of the amount of organic waste contributes to the reduction of negative environmental impact and environmental load in the landfill site. Less amount of organic waste means less generation of odour, vectors and methane gas in the landfill site. These make the lifetime of landfill site longer.

Other feature of composting is utilisation of local resource. Currently, it is planned that 125 tons of compost will be produced by 250 tons of organic waste in the proposed compost facility. Using natural compost is environmental friendly and it may avoid soil contamination by agricultural activities compared to chemical fertilizer. However, using natural compost in agriculture is not popular in Gujranwala currently, so that awareness campaign and development of end-market are necessary to be developed.

Basically, compost facilities are environmentally safe and have no specific risk in the working process, but odour, especially ammonia odour, would be a problem. This problem must be carefully considered in case a compost facility is to be constructed in a residential area. However, in the proposed Option B, the composting facility is constructed in the compound of the landfill site, and the site is distant from the neighbouring community. Therefore, odour from the compost facility would not be a problem to residents' life in the situation of Option B.

For the application of compositing in ISWM, the separate collection at waste generation point is preferably applied in advance. Organic waste that is collected separately could apply for composting process directly. On the other hand, collecting organic waste in mixed waste is time-taking and requires additional working process and labour force. Mixed waste wait-to-be-separated have to be carefully controlled; otherwise, odour and dirty environment will be a problem.

(2) Construction and Operation of RDF Plant

RDF has a good feature for waste management. It has a positive impact to waste management and contributes to utilisation of local resource because the RDF process transforms useless material to solid fuel. In addition, introducing a new system like RDF may stimulate residents' interest on solid waste management. RDF also requires separate collection in advance because the production of RDF utilises the waste that organic materials are separated.

There are some difficulties in the operation of RDF facilities. Since RDF is a relatively new technology, producing RDF is high-cost and quality of RDF is relatively low compared to other solid fuels. The end market where the RDF could be sold and who will buy RDF must be carefully considered because RDF is not competitive in the market with regard to solid fuel quality. Storage of RDF must be carefully controlled because of the possibility of fire accident. Once fire accident happens in the storage, fire extinction takes a long time and dangerous since RDF is a type of fuel. It is strongly recommended that difficulties are discussed with Lahore Compost, the compost company operating the RDF in Lahore, before the implementation of RDF starts in Gujranwala.

(3) Construction and Operation of New Final Disposal Site at Bhakhraywali

Although the proposed construction site is surrounded by farmland, the site is located in a remote area far away from the residential area, which is the most important factor for siting the construction site. The landfill facility is designed as what is called sanitary landfill. The sanitary landfill is superior to the conventional landfill types practiced in Pakistan. While the introduction of sanitary landfill is required to minimise the environmental and social impacts, it becomes possible to realise the functions of the facilities and to practice suitable landfill management.

The design of the proposed sanitary landfill facility shall have the following basic requirements to mitigate the impacts caused by the project:

- Waste containment, approach road and unloading platform for waste vehicles;
- Perimeter road for monitoring, inspection and maintenance of the facilities;
- Perimeter drainage to prevent surface runoff entering to the landfill containment;
- Liner system to prevent leachate infiltration into the groundwater aquifer;
- Leachate collection and circulation system for evaporation within the landfill area;
- Buffer zone and peripheral wall to isolate the landfill area from the public road, and
- Buildings for site office, weighbridge equipment, parking, etc.

The landfill operation is carried out in accordance with the requirements in the Operation Manual to be prepared by GWMC and regulated on a daily, weekly and monthly basis. The contents of the Operation Manual shall include, at least, the following:

- Incoming waste control for measuring, recording and analysis of waste disposal;
- Designation of landfill area for the day, week and month;
- Regular earth covering work;
- Control of leachate circulation system;
- Control of odour;
- Control of landfill gases;
- Regular health check of the landfill operation staff;
- Regular monitoring and maintenance of the facilities, and
- Environmental monitoring in the site and the surrounding area.

These functions and operation works shall be assured by at least a supervisor and inspector(s) deployed for monitoring, inspection and restoration of defective works and operation to meet the requirements for a sanitary landfill.

By fulfilling the proposed means, the sanitary landfill in Bhakhraywali will become a successful model for publicising this type to the other municipalities in the Punjab and in Pakistan.

(4) Improvement Work and Closure of the Existing Landfill Site in Gondlanwala

According to the result of the interview survey conducted in the E&S Survey, the opinion of stakeholders in the vicinity of Gondlanwala and Chianwali disposal sites are similar. The opinion

of the stakeholders represented by the neighbouring residents, GWMC staff and the waste pickers are summarised in the following paragraphs.

All the stakeholders in both sites answered that they have experienced problems related to the disposal site. Dirty access roads, odour and flies, and environmental pollution especially groundwater degradation are the common responses. In terms of benefit of waste collection system, a majority of them recognise that the disposal site is beneficial for Gujranwala, and the benefit is "Collection system keeps avoiding the waste from spreading around" and "Waste does not have to be treated or carried to any disposal point by each household separately." On the other hand, some negative opinions are also recorded such as "It (disposal site) creates environmental problems."

About the management staff of GWMC, the major opinion is addressed to the current situation that there is no soil cover to the site resulting in landscape deterioration and that the sprayed for insecticide is of bad quality.

The issue on waste pickers is a common in solid waste management in developing countries*. (Note:* World Bank (1999), What a Waste: Solid Waste Management in Asia. http://web.mit.edu/ urbanupgrading/ urbanenvironment/ resources/references/pdfs/ What A Waste Asia. pdf [Last visit: August 20, 2015]) It is estimated that 35 to 40 waste pickers work regularly in the current disposal site at Gondlanwala. Their working environment is dangerous: They do not have any protective gear, such as gloves and proper shoes, and dirty environment increases their health risk. Since the waste pickers do not have an alternative way to earn, they go back to the disposal site although the authorities prohibit their activity. The efforts trying to drive them away without giving alternative income sources has resulted in failure in other developing countries. Therefore, in order to consider a long-term solution, supporting efforts are required to cope with the waste pickers issue instead of just trying to drive them away from the project site.

In fact, there are many difficulties toward the satisfactory improvement of the existing landfill due to the current situation of the widely spread landfill area. However, the proposed improvement plan will be effective to mitigate the environmental and social impacts to the minimum. The improvement plan is to be carried out similarly as the development plan of the Bhakhraywali sanitary landfill system. The basic measures with the improvement or construction of the facilities are outlined as follows:

- Prevention of surface runoff entering the landfill containment;
- Collection of leachate and circulation within the landfill area for evaporation, and
- Installation of landfill gas vent.

Similar to the landfill operation proposed for Bhakhraywali, the landfill operation shall be improved through regulating the daily, weekly and monthly operation, monitoring and maintenance.

By those technical and operational measures, the Gondlanwala landfill site will revive the environment and erase the complaints of the stakeholders described above.

The improvement work of the existing landfill to mitigate the environmental and social problems in Gondlanwala could be a model case for the other municipalities in the Punjab and in Pakistan.

(5) Closure of the Former Landfill Site in Chianwali

The site is situated along the G.T. Road that enters the city area of Gujranwala. Heaps of discarded waste heaps were easily visible from the cars and the passers. Although the odour problem from the disposal site has decreased since the suspension of waste dumping, organic matter in the filled waste layer has not completely decomposed and still cause odour and leachate problems to the surrounding area. In order to mitigate the problems, the site has to be closed properly by constructing/installing major facilities to prevent it from generating any pollution source, as follows:

- Grading and final earth covering of the site;

- Installation of landfill gas vents;
- Construction of premise road for maintenance and monitoring;
- Installation of leachate collection pipes, leachate pump well and leachate circulation piping; and
- Improvement of peripheral wall.

Regular environmental monitoring is to be carried out to check the degree of environmental impacts for consideration of the necessary countermeasures for the repair and restoration of installed facilities.

Appearance of the site has to be improved through the safe closure of the abandoned landfill site and maintained through the monitoring plan.

5.7.3 Overall Evaluation of Selected Master Plan Option B

Option B has a great combination of the processes involved in waste management; namely, separate collection, composting and RDF. In this combination of the three processes, the following good features are expected, and some issues need to be considered for reducing negative impacts in future.

(1) Expected Positive Impact

- The technical process mutually contributes to each other in that separate collection contributes to the easiest application of waste to Composting/RDF, and Composting/RDF utilises separated waste to make useful materials such as natural compost and one type of fuel;
- This combination effectively contributes to reduce the amount of waste;
- It reduces negative environmental impact, such as odour, vectors and methane gas;
- It makes life longer for the final disposal site;
- Separate Collection and Composting are not environmentally harmful and have no serious negative impact;
- Composting/RDF contributes to utilisation of local materials;
- Using natural compost in agriculture will contribute to reduce environmental load compared to chemical fertilizers; and
- Separated waste is easy to control compared to mixed waste; and
- Separated organic waste reduces generation of odour and vectors.

(2) Issues for Consideration

- The effectiveness of the combination depends on the residents' cooperation regarding waste separation at household level. Awareness and environmental education become very important;
- Development of end-market of natural compost produced by the compost facility and RDF is necessary; and
- Generation of dioxin and other difficulties in the production of RDF are to be controlled before the implementation of RDF in Gujranwala.

5.8 Stakeholder Meeting

5.8.1 First Stakeholder Meeting

The first stakeholder meeting was held on 23 September 2014 at Mugal Mahal Hotel in Gujranwala (**Photo 5.8.1**).

A summary of the meeting is shown in **Table 5.8.1**. In addition to the major stakeholders who are landowners and residents in the project site, related organizations participated in the meeting. Contents of the Project, current situation of waste management in Gujranwala, and point of environmental and social considerations in the Project were discussed at the meeting. According to the discussions, stakeholders are interested in the direction of waste management in Gujranwala.

Photo 5.8.1 First Stakeholder Meeting (23 September 2014)

Table 5.8.1 Summary of the First Stakeholder Meeting

Date and Venue	23 September 2014 Mugal Mahal Hotel, Gujranwala
Participants (Participating Organizations)	Residents/Landowners in the project site, Gujranwala Waste Management Company (GWMC), JICA Pakistan Office, City District Government Gujranwala (CDGG), Local NGOs
Number of Participants	32 persons
Presentation Title	- Project Introduction by the Managing Director of GWMC (Dr. Haq, Managing Director of Gujranwala Waste Management Company) - Brief Overview of the JICA Project for Integrated Solid Waste Management in Gujranwala (Mr. Takasugi, JICA Expert for Final Disposal Plan) - Applying JICA Environmental Checklist for Waste Management (Ms. Tsutsui, JICA Expert for Environmental and Social Considerations)
Discussion/List of questions from the participants (selected)	- Will GWMC implement the JICA Master Plan & what can be the constraints for its implementation? - What is the status of dump sites? - How will GWMC utilise waste in future? - What is the plan of GWMC for at source separation? - Which step has GWMC taken for better unloading of waste by handcarts into the waste containers? - What is GWMC's strategy to avoid waste littering during its transportation and to guide the sanitary workers at their assigned duty place? - What are the plans to monitor sanitary workers by operational staff?

5.8.2 Second Stakeholder Meeting

The second stakeholder meeting was held on the 9th of June 2015 at Rachna Hotel in Gujranwala (**Photo 5.8.2**). A summary of the meeting is shown in **Table 5.8.2.** Contents of the Project, collection and transportation plan, and disposal plan in the Project were discussed at the meeting.

Photo 5.8.2 Second Stakeholder Meeting (9 June 2015)

Table 5.8.2 Summary of the Second Stakeholder Meeting

Date and Venue	9 June 2015 Rachna Hotel, Gujranwala
Participants (Participating Organizations)	- Gujranwala Waste Management Company (GWMC) - Landowners and residents - JICA Pakistan Office - Lahore Waste Management Company (LWMC) - Urban Unit - City District Government Gujranwala (CDGG) - Local NGOs, Consulting companies, etc.
Number of Participants	79 persons
Presentation Title	- Outline of the project (Mr. Maeda) - Collection and transportation plan presentation (Mr. Nakamura) - Disposal Plan Presentation (Mr. Takasugi)
Discussion/List of questions from the participants (selected)	- Would the JICA Project be sustainable with political influence? - How the involvement of the sanitary workers, being the basic unit of SWM system, will be ensured? - What procedure is being followed by GWMC?

CHAPTER 6. PROPOSAL FOR THE ACTION PLAN

6.1 Introduction

In **Chapter 4**, the ISWM Master Plan has been formulated and evaluated in consideration of technical, economic and financial, institutional and organizational aspects while the environmental and social issues have been presented separately in **Chapter 5**.

The Master Plan is composed of three staged plans; namely, Short-Term Plan, Mid-Term Plan and Long-Term Plan. The Short-Term Plan covering the period between 2016 and 2018 has been formulated as the priority projects and each priority project is to be developed into an action plan. In this **Chapter 6** the action plan proposed for each component of the Master Plan is presented in more details, including the "what", "when", "how" and "who" are going to carry out the projects, as well as the required costs.

6.2 Action Plan for Waste Collection and Transportation

6.2.1 Priority Projects of Waste Collection and Transportation

Priority projects are defined as the projects proposed for the short-term period of the Master Plan and they will be developed into the action plans in this chapter. Based on the discussions in **Chapter 4,** the following are selected as the priority projects of waste collection and transportation:

- Project for Introduction of Separate Collection through Implementation of a Pilot Project
- Project for Increase of Waste Collection Rate in 64 UCs up to 100% in 2018
- Project for Conducting Street Cleaning in 64 UCs
- Project for Collection of Bulky Waste
- Project for Cleaning up of Illegal Dumping Sites in 64 UCs
- Project for Construction and Demolition Waste Collection
- Project for Construction of Parking Area

6.2.2 Project for Introduction of Separate Collection and Alternate-Day Collection through Implementation of a Pilot Project

(1) Formulation of Detailed Plan for the Pilot Project Area

As mentioned in **Section 4.2**, separate waste collection and alternate-day collection are to be applied as the pilot project. One of the eight zones in the 64 UCs has been selected as the pilot project area and a detailed plan is formulated for the implementation. Separation at source and alternate-day collection are to be introduced for the first time in the city and it takes some time for the residents to acknowledge the conduct of these new activities. GWMC needs to establish an optimum promotion method through operation in the pilot project area. The detailed plan should thus include a) the necessary number of collection vehicles and containers, b) the allocation of vehicles and containers, c) specifications of required vehicles and containers, d) organization for operation and management, and e) method of monitoring and feedback of the operations.

Commencement of separate collection and alternate-day collection all over the city, i.e., in 98 UCs, are planned to start in 2019 in order to prepare for operation of the composting facility that has to be started in 2020. Based on the lessons learned from the result of the pilot project, the method of promoting the new activities in the pilot project zone shall be disseminated to the other zones in order to spread the practice of separation at source and alternate-day collection throughout the whole city.

(a) Selection of Pilot Project Area

The candidate zone for the pilot project should contain various types of land use and the city of Gujranwala as a whole has various types of land use. Zone 6 is selected as a pilot project zone

because this zone is congested with both residential and vacant areas such as farmland, i.e., several land use types can be seen in the zone.

(b) Method of Separate Collection and Alternate-Day Collection

Several units of waste containers are to be placed in each container location to conduct the separate collection of waste. If a total of four containers are required to be placed at one site, two containers shall be utilised for organic waste and the other two for the other wastes such as paper or plastic waste etc. These two types of containers should be painted with different colours to distinguish the type of waste to be discharged; for instance, a container for organic waste is painted green and the other is painted yellow.

Simultaneously, alternate-day waste collection is also proposed in the waste collection and transportation action plan. The alternate-day collection starts in Zone 6 as a pilot case in 2016 for establishing a good practice model. For example, the alternate-day collection will be started by dividing the collection zone into two collection areas: one for the collection service on Monday, Wednesday and Friday, and the other area on Tuesday and Thursday. After establishing a good practice model by the operation in Zone 6, this model will be duplicated in other waste collection zones from year of 2019.

In the alternate-day collection, the discharged waste which varies in amount is stored at the container for two days. It is therefore necessary to check the waste storage condition of the containers for adjusting the number of containers placed at each container location to meet the actual condition.

Public announcements and public awareness campaigns on the new system are crucial to promote acknowledgement of all the waste generators including residents and commercial establishments. Public acknowledgement by the residents is inevitable especially for people residing along the narrow streets where door-to-door collection is practiced for achieving the alternate-day collection and separate collection. Once the separate waste collection is established in Zone 6, it could be promoted easily in the other waste collection zones.

(c) Placement of Waste Collection Containers in the Pilot Project

Two sizes of waste containers, i.e., $5m^3$ and $0.8m^3$ containers, are to be used in the pilot project. Each container is set to have the optimum waste collected from the source. Since the purpose of posting the $5m^3$ container is to collect a large amount of waste from the source, they are placed in a large waste discharge point such as a shopping mall, shopping centre, school, public office and market. The purpose of the $0.8m^3$ container, on the other hand, is to collect waste from households. Based on the detailed design formulated in **Item (1)**, the necessary number of waste containers needs to be allocated in Zone 6 by GWMC.

Zone 6 consists of farmland and residential areas and it is difficult to find an open space for the installation of containers. Therefore, it is recommended that a large number of containers shall be allocated at each site. In consideration of accessibility to the containers and the required area for their placement, four units are to be installed at each site in the plan. **Table 6.2.1** shows the necessary number of waste collection vehicles and containers; that is, 240 units of containers are necessary for Zone 6 in 2018. The detailed discussion is made in ***Volume 3, Supporting Report, Section B: Waste Collection and Transportation, Subsection 5.2.3.***

Table 6.2.1 Necessary Number of Waste Collection Containers in Zone 6

Item	2016	2017	2018
$5m^3$ Container	24	24	24
$0.8m^3$ Container	110	170	240

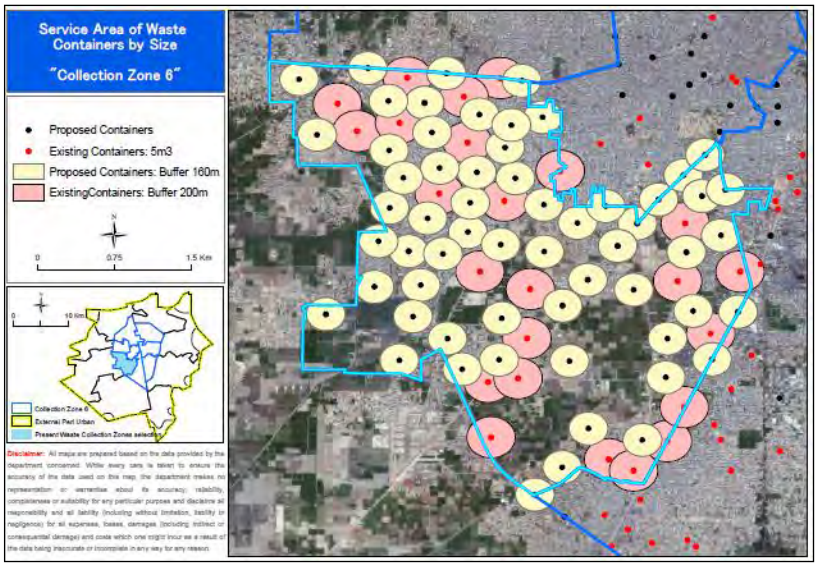


Figure 6.2.1 shows the allocation plan of waste containers in Zone 6. Since 4 units of containers are to be dispatched in one location, the waste containers are located in 60 locations (240/4=60 locations). These container locations need to be relocated flexibly during the operation if there are requests from the residents or an optimal container location is found during the waste collection operation.

Figure 6.2.1 Waste Container Allocation Plan in Zone 6

(d) Waste Collection Vehicle Fleet Allocation in the Pilot Project

For secondary collection, a combination of $13m^3$ compactor, $7m^3$ compactor and $4m^3$ compactor is to be utilised to support a $1m^3$ mini-dumper. The area for each collection vehicle is defined as follows:

- $13m^3$ compactor: these vehicles are dispatched for large streets such as Bypass Road and other major streets.
- $7m^3$ compactor: these vehicles are dispatched for wide streets and major streets except the above.
- $4m^3$ compactor: these vehicles are dispatched for narrow streets.
- $1m^3$ mini-dumper: these vehicles are dispatched for narrow streets to assist in the secondary collection.
- $5m^3$ arm-roll truck: these vehicles are dispatched for collecting waste from markets and shopping centres.
- Tractor trolley: these vehicles are dispatched for narrow streets.

Based on the detailed design formulated in the above **Item (1)**, the necessary number of waste collection vehicles need to be allocated in Zone 6 by GWMC.

Zone 6 consists of main streets such as Bypass Road, wide streets and narrow streets. Considering these street conditions, adequate type of vehicles has to be dispatched to the zone. **Table 6.2.2** shows the necessary number of waste collection vehicles for Zone 6 (see detail in ***Volume 3, Supporting Report, Section B: Waste Collection and Transportation, Subsection 5.2.4.***). As many as 37 units of waste collection vehicles are required in 2018.

Table 6.2.2 Necessary Number of Waste Collection Vehicles in Zone 6

Item	2016	2017	2018
$5m^3$ Arm-Roll Truck	3	3	3
Tractor Trolley	4	4	4
$13m^3$ Compactor	2	2	10
$7m^3$ Compactor	5	8	10
$4m^3$ Compactor	-	-	5
$1m^3$ Mini-Dumper	5	5	5
Total	19	22	37

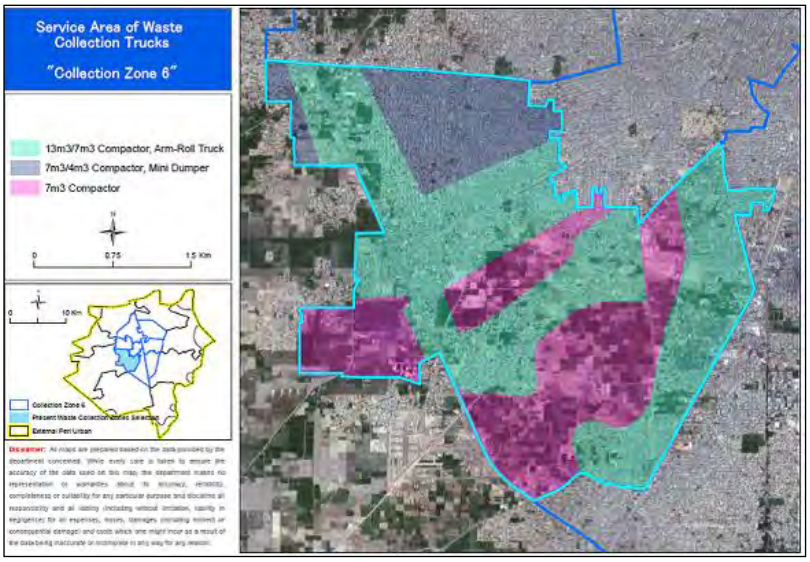


Figure 6.2.2 Vehicle Fleet Allocation Plan in Zone 6

Figure 6.2.2 shows the dispatch of waste collection vehicles in Zone 6. The 13m^3 and 7m^3 compactors are dispatched on the main street (green zone). In addition, since most of the markets or shopping centres are situated along the main street, arm-roll trucks are also allocated.

On the other hand, most parts of the residential area are congested and the streets consist of wide and narrow streets. It is, therefore, difficult to dispatch a specific type of waste collection vehicle and hence 7m^3 compactors, 4m^3 compactors and mini-dumpers are applied in the area (blue zone).

Moreover, there are some vacant areas in Zone 6, and houses are sparsely-distributed. Besides, the width of road is relatively wide in these areas and hence 7m^3 compactors are dispatched (red zone). The allocation plan should be modified from time to time to obtain the optimum efficiency during operation.

(2) Procurement of Waste Collection Vehicles and Containers for the Pilot Project

Based on the detailed waste collection and transportation plan formulated in **Item (1)**, the necessary number of waste collection vehicles and containers needs to be procured by GWMC. Some 13m^3 compactors, 7m^3 compactors, 4m^3 compactors are utilised for waste collection and mini-dumpers are utilised to assist in the primary collection. Additionally, 5m^3 containers and 8m^3 containers are utilised for waste collection. For reference, the general specifications of each vehicle and container coming from local manufacturers are presented in ***Volume 3, Supporting Report, Section B: Waste Collection and Transportation, Subsection 5.2.2***.

GWMC shall procure the equipment from 2016 up to 2018 based on the plan. For this purpose, GWMC has to prepare documents and submit them to the Provincial Government for the annual budgetary arrangement for procurement of waste collection vehicles and waste containers.

(3) Operation of Waste Collection and Transportation Services in the Pilot Project

For implementing the waste collection and transportation work in the pilot project, the task of each staff must be defined clearly. The job description for each appointment is as follows:

General Manager Operation: The General Manager Operation is responsible for the overall operation of the waste collection and transportation services. The General Manager receives reports from the Senior Manager and submits them to the Managing Director. He is also responsible for giving instructions to the Senior Manager for solving problems on daily waste collection and transportation operation.

Senior Manager: The Senior Manager is responsible for receiving the reports from the Assistant Manager and forwards them to the General Manager Operation. The Senior Manager also gives instructions to the Assistant Manager for solving problems on the matter concerned.

Assistant Manager: The Assistant Manager is responsible for reporting the situation to the General Manager Operation once the Assistant Manager receives the report from the Inspector(s). In addition, the Assistant Manager conveys the instructions from the General Manager Operation to the Inspector(s).

Inspector: The Inspector is responsible for grasping the condition of waste collection and transportation on each waste collection zone reported by the Supervisor, and reports it to the Assistant Manager. The Inspector consults with the Assistant Manager and obtains direction from the Assistant Manager over field work problems encountered at site. The Inspector together with the Supervisor solves the problems through instruction and guidance to the Supervisor.

An operation manual of waste collection and transportation should be prepared by a task force organized by the representative staff of GWMC. The manual must be completed by the beginning of 2016. The manual may be revised as necessary to meet the actual condition in consideration of effectiveness and efficiency of the work. The contents of the waste collection and transportation manual are described in ***Volume 3, Supporting Report, Section B: Waste Collection and Transportation, Subsection 5.2.7.***

The manual has to be compiled in a booklet form and copies of the manual provided to all waste collection workers. All waste collection workers have to follow the work procedures stated in the manual to carry out the services more efficiently. In addition, regular training sessions for workers must be conducted for assuring/enhancing the knowledge on waste collection operation under the Comprehensive Capacity Development Programme (CCDP) proposed in ***Volume 3, Supporting Report, Section H: Institutional Strengthening and Organizational Restructuring, Subsection 4.3.2***.

(4) Monitoring and Feedback of Pilot Project Operation

Regular monitoring of waste collection amount and waste collection rate must be carried out by GWMC for evaluating performance of the waste collection and transportation service in the pilot project. The monitoring of waste collection vehicles and waste containers is not only to check the operation status of daily waste collection work, but also to improve the waste collection efficiency and effectiveness by feedback from the information on the daily work. Especially, the allocation of waste collection vehicles and waste collection containers should be monitored carefully since it is linked with the waste collection efficiency and effectiveness.

Monitoring items are stipulated in the operation manual prepared under the activities of the above **Item (3)**, and the monitoring items and method must be established in the beginning of 2016. The required minimum monitoring items for waste collection and transportation are proposed as follows:

- Weighbridge record for analysis of waste collection amount and collection service rate;
- Sanitation condition around the waste containers;
- Status of operation condition of separate collection;
- Status of operation condition of regular time collection and alternate-day collection;
- Working status of waste collection vehicles and waste containers; and
- Allocation of waste collection vehicles and waste collection containers.

6.2.3 Project for Increase of Waste Collection Rate in 64 UCs up to 100% in 2018

(1) Formulation of Detailed Waste Collection and Transportation Plan for Waste Collection Rate in 64 UCs up to 100% in 2018

Increasing the waste collection rate in 64 UCs up to 100% in 2018 is the ultimate target for the short-term period of the Master Plan. To achieve the target, it is necessary to formulate a detailed waste collection and transportation plan in the early part of 2016. The contents of the detailed plan should include an allocation plan for the adequate number of waste collection vehicles, waste containers and sanitary workers on each zone in 64 UCs. Once the waste collection vehicles, waste containers and sanitary workers are in operation on site based on the plan, GWMC needs to acquire feedback and update the allocation of equipment and human resources on each zone if something

has to be improved. The optimum waste collection and transportation plan, therefore, shall be established during the operation phase.

(2) Necessary Number of Waste Collection Vehicles and Containers in 64 UCs

For allocating the waste collection vehicles and waste collection containers, necessary number of waste collection vehicles and waste collection containers are distributed based on the waste generation amount in each zone and the total number of waste collection vehicles and waste collection containers except Zone 6. **Table 6.2.3** shows the necessary number of waste collection vehicles and containers in other zones from 2016 to 2018. The actual number/type of waste collection vehicles and containers for the respective zones except Zone 6 shall be distributed and adjusted in consideration of the site conditions, such as road width and surrounding land use, etc., although the required number of waste collection vehicles and containers for each zone is presented in ***Volume 3, Supporting Report, Section B: Waste Collection and Transportation, Subsection 5.3.1.***

Table 6.2.3 Necessary Number of Waste Collection Vehicles and Containers in Other Zones (2016-2018)

Item		2016	2017	2018
Vehicle	10m^3 Arm-Roll Truck	4	4	4
	5m^3 Arm-Roll Truck	19	19	19
	Tractor Trolley	33	33	33
	13m^3 Compactor	12	27	67
	7m^3 Compactor	33	49	89
	4m^3 Compactor	0	0	35
	1m^3 Mini-Dumper	30	30	30
Container	10m^3 Container	10	10	10
	5m^3 Container	171	171	171
	0.8m^3 Container	850	1,490	2,010

(3) Procurement of Waste Collection Vehicles and Containers in 64 UCs

Based on the distribution of waste collection vehicles and containers shown in the above **Item (2)**, the necessary number of waste collection vehicles and containers needs to be procured by GWMC between 2016 and 2018. The general specifications of each vehicle and container are the same as those of Zone 6 (see detail in ***Volume 3, Supporting Report, Section B: Waste Collection and Transportation, Subsection 5.2.2.***).

(4) Operation of Waste Collection and Transportation Services in 64 UCs

GWMC also requires commencement of the waste collection and transportation operation not only in Zone 6 but also in other zones in 2016. The operation and management of waste collection and transportation services are the same as those of Zone 6 mentioned in **Subsection 6.2.2, Item (3)**. However, separation at source starts in the other zones from 2019, so that items required for separation at source are not needed to be included during the operation in other zones until end of 2018.

(5) Monitoring and Feedback of Operation in 64 UCs

Monitoring and feedback of the waste collection and transportation work are conducted in other zones. As mentioned in **Subsection 6.2.2, Item (4)**, regular monitoring of waste collection amount and waste collection rate is also necessary to be carried out by GWMC for evaluating performance of the waste collection and transportation service. The contents of monitoring items are the same as those of Zone 6; however, items required for separation at source are not needed to be monitored on site as mentioned in **Subsection 6.2.2, Item (4)**.

6.2.4 Project for Conducting Street Cleaning in 64 UCs

(1) Plan for Conducting Street Cleaning

The necessary length for street cleaning is determined at 2,600 km based on the measurement by using a satellite map, as presented in **Subsection 4.4.1, Item (8)**. Also, as mentioned in the same subsection, the street sweeper is applied for major roads like G.T. Road and Bypass Road in Zones 9 and 10 while the road washing machine is applied for roads in the other zones.

The speed of the street sweeper is assumed to be 6 km per hour in average and the vehicle travels 8 hours per day. Thus, total travel distance of a street sweeper in a day is 48km per vehicle per day. If GWMC covers Zones 9 and 10 with a total road length of 665 km for street cleaning, one vehicle shall be dispatched on each zone and two vehicles are necessary for the street cleaning in total.

Calculation of the street cleaning frequency by street sweepers is as follows:

665 km / 48 (km/day) / 2 vehicles = 6.9 days = 7 days (once a week)

Therefore, the street cleaning on the same place in Zones 9 and 10 is conducted once a week.

If GWMC dispatches four vehicles for street cleaning by road washers, calculation of the street cleaning frequency is as follows:

2,600 km / 48 (km/day) / 4 vehicles = 13.5 days = 14 days (once in two weeks)

Therefore, the street cleaning on the same place in the other zones is conducted once in two weeks.

(2) Necessary Number of Vehicles for Street Cleaning

GWMC is obliged to conduct street cleaning in all the 64 UCs within the short-term period. The necessary number of vehicles in this period is estimated at two street sweepers and four road washers.

(3) Specifications of Street Cleaning Vehicles

The street sweeper is a truck of 8.8 gross tonnes with a $4m^3$ of waste storage tank and a 1,000 litre water tank. Brushes are equipped at both sides of the body for cleaning road surfaces and curbs by sprayed water. The road washer is larger than the street sweeper. The general specifications of each street cleaning vehicle are presented in ***Volume 3, Supporting Report, Section B: Waste Collection and Transportation, Subsection 5.4.3***, and the typical shape of each vehicle is as shown in **Photo 6.2.1** below.

Street Sweeper

Road Washer

Photo 6.2.1 Typical Shape of Street Cleaning Vehicles

6.2.5 Project for Collection of Bulky Waste

(1) Plan for Conducting Bulky Waste Collection

The purpose of the project for collection of bulky waste is the collection of green waste from parks in the city and old furniture from households. There are 36 public parks in Gujranwala and the total

area is approximately 580,000 square metres (m^2). All parks are shown in ***Volume 3, Supporting Report, Section B: Waste Collection and Transportation, Table B.5.15.*** The largest park in the city is the Gulshan-e-Iqbal Park (106,000 m^2) abutted on G.T. Road. There are also trees along the streets. Green waste is generated from the parks and the streets. The project is to start in 2016 and it continues until 2030.

Bulky waste is not occasionally generated from the source so that necessary vehicles and workers for these wastes are deployed separately from the regular collection by GWMC. GWMC needs to travel and collect green waste from parks in the city on regular basis starting from 2016. However, old furniture is collected by GWMC when a concerned resident calls up for the waste collection. GWMC should set the price schedule for bulky waste collection such as old furniture, etc.

GWMC operates 6 days in a week, so that 36 parks/ 6 days = 6 parks/day. GWMC is able to collect green waste from 6 parks in a day. If a resident needs to dispose bulky waste, GWMC also collects the waste during the operation.

(2) Necessary Number of Vehicles for Bulky Waste

As planned in the master plan stated in **Chapter 4**, two units of 5-ton trucks and one wheel loader are deployed for the collection of bulky wastes. The workers are deployed as one team comprised of one driver and one sanitary worker per 5-ton truck and one driver for a wheel loader. The team works in 6 days from Monday to Saturday.

(3) Specifications of the Bulky Waste Collection Vehicles

The maximum lifting capacity of 8 to 10 ton and 2,800 to 3,000 kg is required for a 5-ton truck and a wheel loader for the bulky waste collection and transportation, respectively. The general specifications of each vehicle are presented in ***Volume 3, Supporting Report, Section B: Waste Collection and Transportation, Subsection 5.5.3***.

6.2.6 Project for Cleaning Up of Illegal Dumping Sites in 64 UCs

(1) Plan for Cleaning Up the Illegal Dumping Sites

GWMC needs to eliminate all illegal dumping sites in the city between 2016 and 2018. To achieve this goal, GWMC should firstly examine all locations of illegal dumping sites in the city.

(a) Planning the Clean-Up Schedule and Formation of Clean-Up Team

The number of illegal dumping sites is estimated at 799 locations as of August 2014 based on the survey conducted by GWMC Waste Managers. The number of illegal dumping sites to be cleaned is set as follows:

799 locations / 6 days /4 weeks /12 months / 3years = 0.9 location/day; that is, GWMC has to clean one illegal dumping site per day if GWMC considers to eliminate all the illegal dumping sites in the city in three years. However, GWMC has to provide ordinary waste collection services for households and commercial establishments on a daily basis so that a clean-up team is to be established exclusively for cleaning the illegal dumping sites in this action plan. The composition and capacity of the clean-up team are determined under the following procedures:

Step 1: The number of trips for a 5-ton truck is set at 5 based on the number of trips of arm-roll truck in the result of Time and Motion Study because both types of truck are similar in machinery.

Step 2: Two units of 5-ton truck are dispatched for cleaning up the illegal dumping sites because one truck is loaded with waste while the other truck hauls the waste to the landfill site. For loading waste to a 5-ton truck, one wheel loader is deployed.

Step 3: The loading capacity is assumed to be 5 tons per vehicle. Therefore, 5 tons × 5 trips/day × 2 vehicles = 50 ton/day = 1,200 ton/month (6 working days, 4 weeks).

Step 4: Minimum waste collection amount is calculated at 604 ton/month (remaining waste: 21,739 tons/36 months).

Step 5: If only one 5-ton truck is deployed for the work, the waste collection amount per month is 600 ton/month (5 ton × 5 trips/day × 1 vehicle = 25 ton/day = 600 ton/month (6 working days, 4 weeks). This amount is less than the required minimum amount.

Step 6: Therefore, the clean-up vehicles should be composed of two 5-ton trucks and one wheel loader.

Step 7: In this case, the duration of clean-up is 21,739 (ton) /1,200 (ton/month) = 18 months. The clean-up work is finished in around one-and-a-half year.

(b) Monitoring the Cleaned Sites after Conducting the Activity

Once the cleaning activity is conducted on a site, GWMC should monitor the site consistently through patrol by an inspector and/or a sanitation supervisor. If illegal dumping activity is seen on site, they have to stop the activity.

(c) Conducting Public Awareness Campaign and Posting of Signboard

Not only patrol of the site but also public awareness campaign is indispensable for keeping cleanliness at the site. For instance, a signboard is installed to warn that illegal dumping of waste is prohibited at the site.

(2) Necessary Number of Vehicles for the Clean-Up of Illegal Dumping Sites

Two units of 5-ton trucks, one wheel loader and two workers are required for the work. The assigned vehicles and workers conduct only the cleaning work and are excluded from the regular waste collection work.

(3) Specifications of Vehicles for Clean-Up of Illegal Dumping Sites

The specifications of 5-ton truck and wheel loader are the same as those in the preceding **Subsection 6.2.5, Item (3)**.

6.2.7 Project for Construction and Demolition Waste Collection

(1) Plan for C&D Waste Collection

As mentioned in **Subsection 4.4.1, Item (11)**, the collection and disposal of construction and demolition waste (C&D waste) is a part of GWMC's obligation according to the survey conducted by the JICA Project Team, while disposal is the responsibility of generators of C&D waste. Necessary number of C&D waste collection vehicles is taken into account for the action plan starting from 2016 and it continues until 2030 in the master plan. Since C&D waste is consisted of construction materials such as rocks, sand, concrete, reinforcement bar, brick, etc., a waste compactor is not suitable for the collection work and the work is to be carried out separately from the ordinary waste collection services.

In addition, C&D waste is generated from commercial activity and its collection should be conducted primarily by private waste collection companies with GWMC's supervision, if necessary. However, the current situation demands that GWMC has to conduct the work immediately. Thus, the schedules of collection charges by GWMC should be determined based on the estimation of costs of operating and maintaining the vehicles and manpower.

(2) Necessary Number of Vehicles for C&D Waste Collection

Target waste is so heavy that it is difficult for a sanitary worker to load the waste. Thus, one unit of wheel loader is deployed for C&D waste loading and three units of 5-ton trucks are also deployed for the transportation of waste.

(3) Specifications of Vehicles for C&D Waste Collection

The specifications of the 5-ton truck and wheel loader are the same as those of the preceding **Subsection 6.2.5, Item (3)**.

6.2.8 Project for Construction of Parking Area

(1) Plan for Construction of Parking Area

The function of a parking area is to store collection vehicles at night after waste collection and transportation work. The number of collection vehicles has been increasing and the collection rate has improved, so that additional parking areas for procured vehicles are necessary in the future. The project starts in 2016 and it continues until 2030.

The parking area does not have the minimum function of repair work because the garage has the capability of repair work and it is centralised for efficiency.

(2) Necessary Number of Parking Areas

In 2030, the total number of vehicles becomes 612 vehicles. However, the existing garage could accommodate only approximately 100 vehicles. Hence, the designated number of vehicles in one parking area is set as 100 vehicles. This number has the same capacity as the existing parking area. Necessary number of parking areas is calculated as follows:

Total number of vehicles 612 / 100 vehicles per parking area = 6 parking areas.

Therefore, 612/6 = 102 vehicles per parking area.

Based on the calculation, the capacity of parking area is designed for the parking capacity of 102 vehicles. The function of the parking area is only to park vehicles. The repair work is performed in the existing garage.

Table 6.2.3 shows the annual number of vehicles (for years 2016 to 2018). As mentioned in **Subsection 4.1.10, Construction of Parking Area**, parking area needs to accommodate 100 vehicles and the average parking area is set as 6,000 sq. metres. However, the total area varies depending on the acquisition and/or location of the area.

Table 6.2.4 Annual Number of Vehicles (Year 2016-2018)

Year	2016	2017	2018
Number of Waste Collection Vehicles	161	196	316
Number of Parking Area	2	2	4

The existing garage has a limited roofed area so that most of the vehicles are soaked with rainwater, especially in the monsoon season. To prevent the situation, roofing is set for the parking area. In addition, installation of roofing is required for the existing garage.

Pavement is also required for the new parking area and existing garage to improve work efficiency and condition.

(3) Specifications of the Parking Area

Based on the following specifications of the new parking, GWMC needs to build new parking areas for waste collection vehicles:

- Size of the area: 6,000m^2
- Parking area: The area could accommodate 102 vehicles.
- Roofing: Steel skeleton structure
- Pavement: Asphalt-paved, 30mm thick
- Security system: 1 unit of guardhouse; fencing around the parking area

For security reasons, one guardhouse is built and steel fence is installed around the facility. The place where vehicles are parked is covered with a steel skeleton building for protection against rain. The existing garage has no pavement and no roofing in parking area. The cost for improvement of the garage is included in the plan.

- Necessary pavement area on existing garage: 30mm thick, 3,735m^2
- Necessary roofing area on existing garage: steel skeleton structure, 1,344m^2

6.2.9 Implementation Schedule and Costs

Actions and costs required for the implementation of the Action Plan for Waste Collection and Transportation are summarised in **Figure 6.2.3 and Table 6.2.5**.

Time Framework of the Master Plan		Short-Term Plan Period											
Year		2016				2017				2018			
Quarter		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WBS for Short-Term Plan													
S-1-1	Introduction of Separate Collection and Alternate day collection through implementation of Pilot Project												
S-1-1-1	Formulation of Detailed Plan for the Pilot Project Area												
S-1-1-2	Procurement of Waste Collection Vehicles and Containers for Pilot Project												
S-1-1-3	Operation of Waste Collection and Container												
S-1-1-4	Monitoring and Feedback of the Pilot Project Operation												
S-1-2	Increasing of Waste Collection Ratio in 64 UCs up to 100% in 2018												
S-1-2-1	Formulation of Detailed Design for Waste Collection Ratio in 64 UCs up to 100% in 2018												
S-1-2-2	Procurement of Waste Collection Vehicles and Containers in 64UCs												
S-1-2-3	Operation of Waste Collection and Container												
S-1-2-4	Monitoring and Feedback of the Operation												
S-1-3	Conducting Street Cleaning in 64UCs												
S-1-3-1	Plan for conducting Street Cleaning in 64UCs												
S-1-3-2	Procurement of Waste Collection for Street Cleaning												
S-1-3-3	Conducting Street Cleaning in 64UCs												
S-1-4	Collection of Bulky Waste												
S-1-4-1	Procurement of Waste Collection for Bulky Waste												
S-1-4-2	Collection of Bulky Waste												
S-1-5	Cleaning up of Illegal Dumping Sites in 64 UCs												
S-1-5-1	Procurement of Waste Collection Illegal Dumping Sites in 64UCs												
S-1-5-2	Cleaning up of Illegal Dumping Sites in 64 Ucs												
S-1-6	Collection of Construction and Demolition Waste												
S-1-6-1	Plan for Collection of Construction and Demolition Waste												
S-1-6-2	Collection of Construction and Demolition Waste												
S-1-7	Construction of Parking Area												
S-1-7-1	Construction of Paking Area												

Figure 6.2.3 Implementation Schedule of the Action Plan for Waste Collection and Transportation

Table 6.2.5 Implementation Cost of the Action Plan for Waste Collection and Transportation

WBS No.	WBS	Total Budget (Thousand Rs.)	Annual Cost		
			2016	2017	2018
Programme 1: Waste Collection and Transportation Plan					
Short-Term Plan					
S-1-1	Introduction of Separate Collection and Alternate day collection through Implementation of Pilot Project	143,525	52,343	40,523	50,659
S-1-1-1	Formulation of Detailed Plan for the Pilot Project Area	GWMC			
S-1-1-2	Procurement of Waste Collection Vehicles and Containers for Pilot Project	78,420	34,500	19,680	24,240
S-1-1-3	Operation of Waste Collection and Container	65,105	17,843	20,843	26,419
S-1-1-4	Monitoring and Feedback of the Pilot Project Operation	GWMC			
S-1-2	Increasing of Waste Collection Ratio in 64 UCs up to 100% in 2018	1,649,399	288,028	394,639	966,732
S-1-2-1	Formulation of Detailed Design for Waste Collection Ratio in 64 UCs up to 100% in 2018	GWMC			
S-1-2-2	Procurement of Waste Collection Vehicles and Containers in 64UCs	998,675	137,457	207,077	654,141
S-1-2-3	Operation of Waste Collection and Container	650,724	150,571	187,562	312,591
S-1-2-4	Monitoring and Feedback of the Operation	GWMC			
S-1-3	Conducting Street Cleaning in 64UCs	80,384	67,328	6,528	6,528
S-1-3-1	Plan for conducting Street Cleaning in 64UCs	GWMC			
S-1-3-2	Procurement of Waste Collection for Street Cleaning	60,800	60,800		
S-1-3-3	Conducting Street Cleaning in 64UCs	19,584	6,528	6,528	6,528
S-1-4	Collection of Bulky Waste	31,990	23,730	4,130	4,130
S-1-4-1	Procurement of Waste Collection for Bulky Waste	19,600	19,600		
S-1-4-2	Collection of Bulky Waste	12,390	4,130	4,130	4,130
S-1-5	Cleaning up of Illegal Dumping Sites in 64 UCs	23,773	22,382	1,391	
S-1-5-1	Procurement of Waste Collection Illegal Dumping Sites in 64UCs	19,600	19,600		
S-1-5-2	Cleaning up of Illegal Dumping Sites in 64 Ucs	4,173	2,782	1,391	
S-1-6	Collection of Construction and Demolition Waste	23,070	7,690	7,690	7,690
S-1-6-1	Plan for Collection of Construction and Demolition Waste	GWMC			
S-1-6-2	Collection of Construction and Demolition Waste	23,070	7,690	7,690	7,690
S-1-7	Construction of Parking Area	523,480	126,424	3,546	393,510
S-1-7-1	Construction of Paking Area	523,480	126,424	3,546	393,510
	Total (Short-Term)	2,475,621	587,925	458,447	1,429,249

6.3 Action Plan for Final Disposal

6.3.1 Priority Projects of Final Disposal

Priority projects are defined as the projects proposed for the short-term period of the Master Plan and they are to be developed as action plans in this chapter. Based on the discussions in **Chapter 4,** the following are selected as the priority projects of final disposal:

- Project for Procurement of Sanitary Landfill Site
- Project for Engineering Service for Sanitary Landfill Facilities (Stage 1)
- Project for Construction of Sanitary Landfill Facilities (Stage 1) in Bhakhraywali
- Project for Procurement of Landfill Machinery
- Project for Operation and Maintenance of Landfill Facilities
- Project for Improvement Work of the Existing Landfill in Gondlanwala
- Project for Safe Closure of the Landfill Site in Gondlanwala
- Project for Safe Closure of the Landfill Site in Chianwali
- Project for Monitoring of Final Disposal in Bhakhraywali

- Project for Post-Closure Monitoring of Gondlanwala and Chianwali Landfill Sites

6.3.2 Project for Procurement of Sanitary Landfill Site

Negotiation for the acquisition of construction site has been made and agreement has almost been reached. However, the boundary line shown in **Figure 4.5.3** is suspected to lack credibility because there is a part that is not along the existing farmland. Confirmation of the boundary line shall thus be carried out again in the presence of the landlords, because acceptance of the site boundary is necessary as advance preparation before proceeding with the signing of acquisition contract and payment immediately after approval of the 2015/2016 budget.

The road at both side banks along the irrigation canal (canal bank road) from Ali-Pur Chatha Road as shown in **Figure 4.5.4** is used for access road. One-way traffic will be imposed, using the south-side road for access and the north-side road for exit. Since the width of the existing bridge over the irrigation canal is narrow and not suitable for passage of large vehicles, a new bridge with a minimum 40-ton traffic load is constructed across the irrigation canal. In addition, since several sections of the north-side road are narrow, a field survey shall be carried out carefully to determine the boundary for the road improvement work. Approval of the Irrigation Department is a must for the road improvement work, including the construction of bridge and use of the road for the purpose of waste management services. By the end of July 2015, an application has been submitted to obtain the approval. All the processes for the approval and/or agreement have to be completed as the requirement for allocation of the project budget.

6.3.3 Project for Engineering Service for Sanitary Landfill Facilities (Stage 1)

GWMC shall organize a project management unit (PMU) with the deployment of one chief engineer, two assistant engineers and two office clerks. The PMU shall firstly enter into a consulting service contract with an engineering service company for performing the role of project consultant which will conduct on behalf of the project proponent a series of step-wise works required for implementation and management of the construction project of Bhakhraywali sanitary landfill (SLF) facilities. The consultant will also advice, assist and support the project proponent to make timely and appropriate approval required from time to time in the course of implementation of the project. The construction project of Bhakhraywali will be implemented mainly by three parties: GWMC, consultants and contractors.

Major activities in this Project are described below and details of each component are presented in ***Volume 3, Supporting Report, Section C: Final Disposal, Section 5.3.***

(1) Preliminary and Detail Design Works

The consultant shall perform the preliminary design based on the conceptual design of the Action Plan that is presented in detail in ***Volume 3, Supporting Report, Section C: Final Disposal.*** The preliminary design must be subject to approval by the project proponent, GWMC. Based on the approved preliminary design drawings, the consultant will prepare the detail design drawings that make up the tender document to facilitate accurate cost estimates for the construction contract tender. The detail design work shall include preparation of quantity take-off, unit cost analysis, priced bill of quantities, design criteria, report and calculation in addition to the tender drawings. The conceptual design drawings of Bhakhraywali SLF facilities are presented from **Figure 6.3.1** to **Figure 6.3.3**.

(2) Preparation of Tender Document

The consultant is to prepare the document for competitive bidding of the construction of Bhakhraywali sanitary landfill facilities in the final stage of the design work. With regard to the preparation of contract documents and general conditions of contract, it is preferable to take into consideration the conditions of standard contract of GWMC as much as possible.

(3) Preparation of Bill of Quantities

Calculation of the Bill of Quantities shall commence with the preparation of construction quantity take-off sheets of the facilities, equipment, devices and temporary works required to construct, install and procure for completing the construction work as intended in the design. Each item composing the Bill of Quantities shall be itemised to coincide with the regular payment items for the work done. The consultant will also prepare the unit cost analysis/estimates for each item of the Bill of Quantities with reference to the latest market price announced by the government and the quotation from the manufacturers.

(4) Support for Tender Evaluation

The consultant shall support the tender evaluation in each process from pre-qualification of the interested bidders until signing of the construction work contract.

(5) Construction Supervision

The consultant shall supervise the construction work in the construction stage and to assist/advice GWMC and the contractor to perform the construction work in accordance with the drawings, specifications and the construction time schedule.

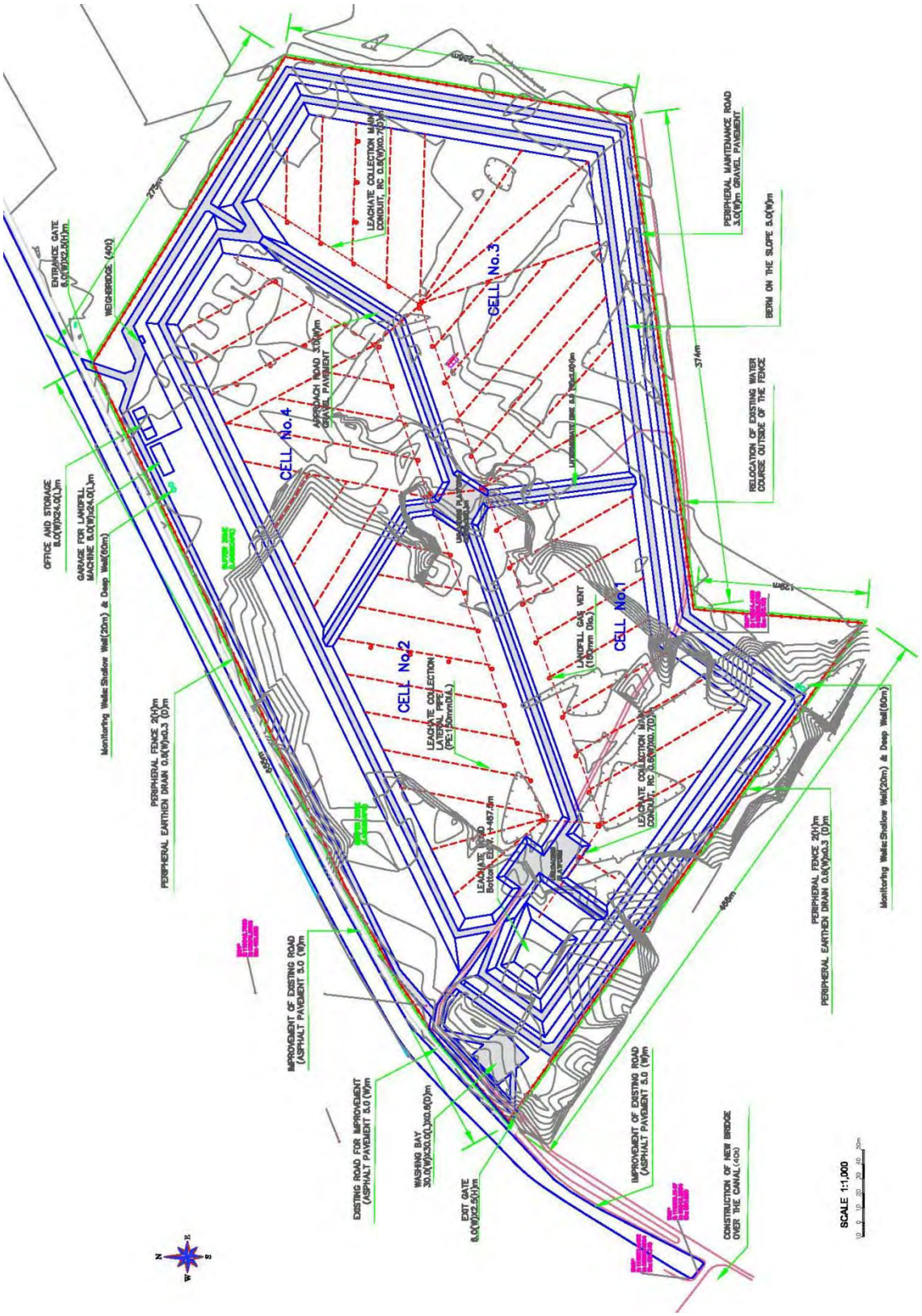


Figure 6.3.1 Layout Plan of Bhakhraywali SLF Facilities

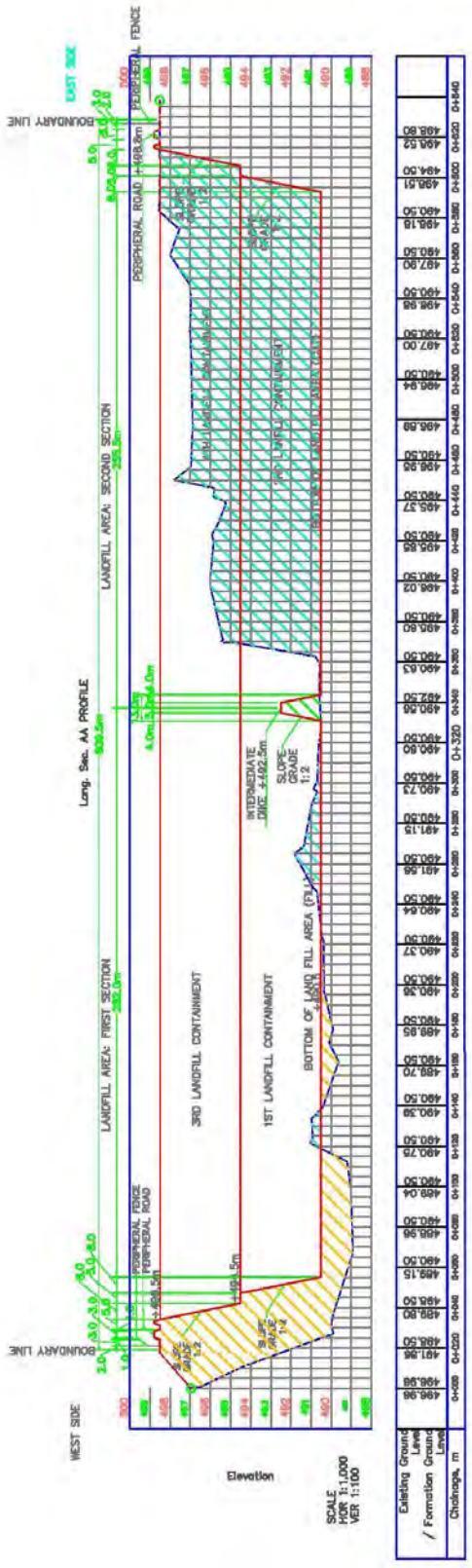


Figure 6.3.2 Profile of Bhakhraywali SLF Facilities

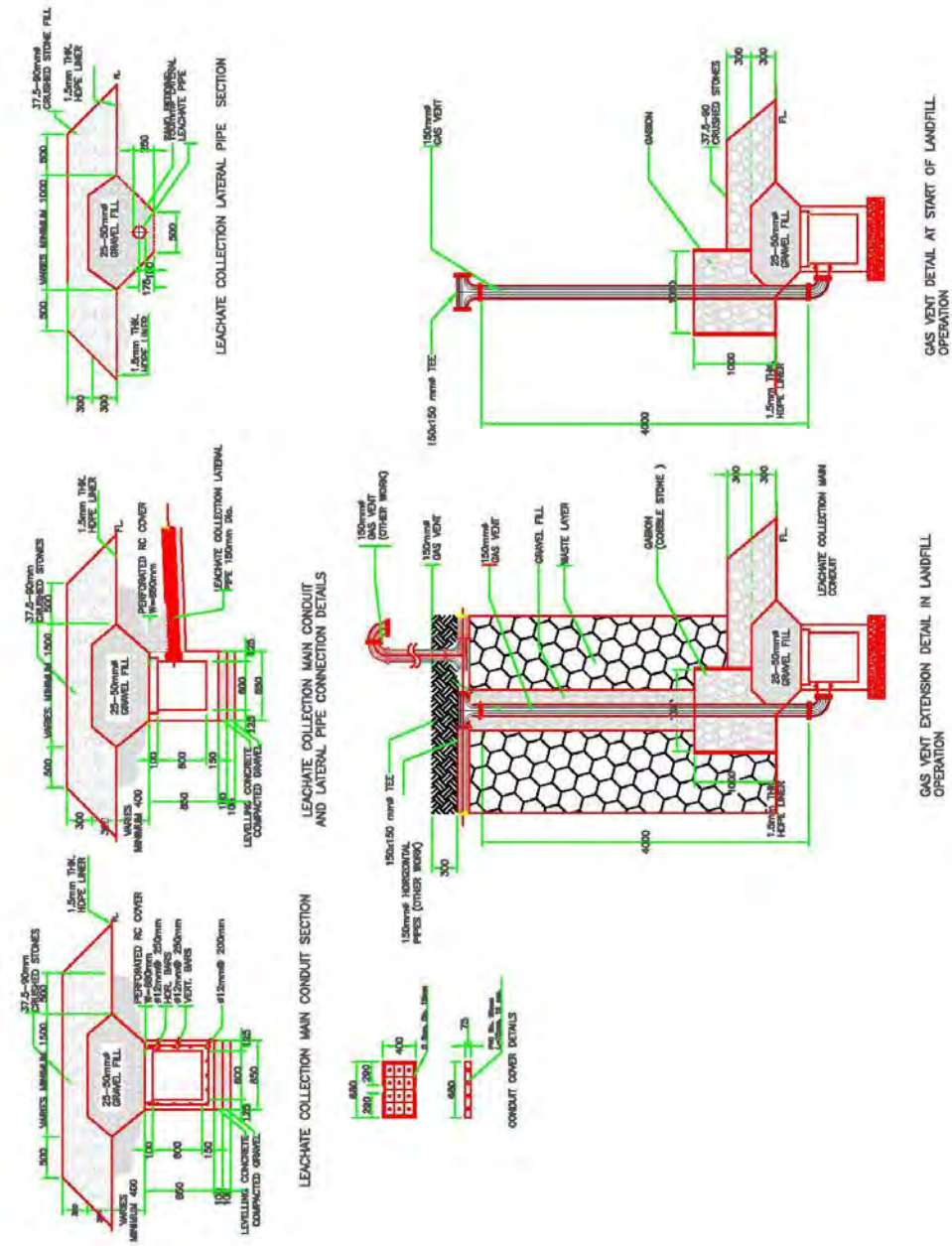


Figure 6.3.3 Details of Major Facilities of Bhakhraywali SLF Facilities

6.3.4 Project for Construction of Sanitary Landfill Facilities (Stage 1) in Bhakhraywali

Development of sanitary landfill facilities is divided into three (3) stages under the Master Plan period from 2016 to 2018. In the first stage of development or the action plan, the landfill containment of 20 hectares is constructed together with the associated facilities. In addition, improvement of the existing canal bank road on both sides of the main irrigation canal and construction of the new bridge are included in the first stage of development work. The construction work period will take 15 to 18 months and the contractor shall complete the construction work by the end of 2017 or at the latest in early 2018. The contractor shall construct, install and procure all the works in consideration of the items described in ***Volume 3, Supporting Report, Section C: Final Disposal, Section 5.4.***

6.3.5 Project for Procurement of Landfill Machinery

(1) Preparation of Tender Document

In total, seven (7) units of landfill machine are required in 2018. Since three (3) units of bucket tractors exist as of May 2015, an additional of four (4) units shall be procured by 2018. Preparation of the tender documents will be carried out by the consultant hired for the procurement of landfill machine. The required tender document will be similar to the document prepared for the construction work of Bhakhraywali SLF facilities presented in ***Volume 3, Supporting Report, Section C: Final Disposal, Section 5.5.***

(2) Procurement and Inspection

During the short-term period from 2016 to 2018, the procurement of landfill machinery will be executed twice in 2016 and in 2017 as listed in **Table 6.3.1**. The landfill machinery shall be inspected upon delivery at site and operation instructions shall be provided by the supplier/manufacturer.

Table 6.3.1 Landfill Machine Procured in the Short-Term Period

Landfill Machine	Procurement Year		Specifications
	2016	2017	
Wheel Loader	1		Bucket Size 3.3m^3, Output Capacity 149kW or 202hp
Excavator	1		Bucket Size 1.5m^3, Output Capacity 200kW or 272hp
Bulldozer		2	Chain Dozer, Blade Width 3.9m or wider, Output Capacity 165kW or 220hp

6.3.6 Project for Operation and Maintenance of Landfill Facilities

(1) Preparation of Operation and Maintenance Manual

Landfill operation is scheduled to start in the beginning of 2018 at Bhakhraywali. Accordingly, a landfill plan and a landfill operation and maintenance manual shall be prepared in advance of the commencement of landfill operation. The manual shall be prepared based on the relevant rules, regulations and guidelines in consideration of the specific conditions of the Bhakhraywali landfill site. The contents of Landfill Operation and Maintenance Manual are shown as example in ***Volume 3, Supporting Report, Section C: Final Disposal, Subsection 5.6.1.***

(2) Operation and Maintenance of Landfill Facilities

In order to carry out appropriate landfill operation and maintenance of the landfill facilities, the key issues are input with capable human resources, sufficient number of staff and landfill machine/equipment and adequate financing for operation and management. Some of the key factors and major activities for the landfill operation and maintenance of Bhakhraywali landfill facilities are as follows and the detailed discussion of each factor are made in ***Volume 3, Supporting Report, Section C: Final Disposal, Subsection 5.6.2.***

- Staffing for Operation and Maintenance of Bhakhraywali SLF Facilities
- Basic Conditions of Landfill Operation
- Measuring Incoming Waste Amount
- Management of Landfill Work in General
- Landfill Operation
- Landfill Operation Records and Reports
- Regular Monitoring, Inspection, Maintenance and Repair of Facilities

6.3.7 Project for Improvement Works of the Existing Landfill in Gondlanwala

(1) Design of Improvement Works

Improvement works are carried out to provide the required minimum functionality to the existing disposal site for upgrading the landfill work. The main purpose of the improvement works is to change the existing open dumping method from the top of the landfill area to the method of unloading waste in the bottom of the landfill area and piling up of the waste layer. The improvement works will be carried out mainly by GWMC and partly by the hired contractor for some special works. Based on this concept, the consultant shall prepare the work drawings in accordance with the conceptual design of the Action Plan which is presented in **Figure 6.3.4**. The other details, such as hydraulic profile for leachate circulation system, required facilities, specifications and dimension for improvement of the current landfill operation are described in ***Volume 3, Supporting Report, Section C: Final Disposal, Subsection 5.7.1.***

(2) Implementation of Improvement Works

The improvement works will be carried out mainly by GWMC staff responsible for landfill operation. The works will be carried out as free time or idling time and extra work of the staff. Some of the special works such as installation of leachate collection conduit, leachate pump well, piping, power supply, landfill gas venting system, etc. may be carried out by the construction contractor hired by GWMC as required. The improvement work to be conducted by the contractor(s) shall follow the requirements similar to the description in ***Subsection 6.3.4, Project for Construction of Sanitary Landfill Facilities (Stage 1) in Bhakhraywali***. Funding of this project shall be secured by the annual budget of GWMC or the project funding by the Government of the Punjab.

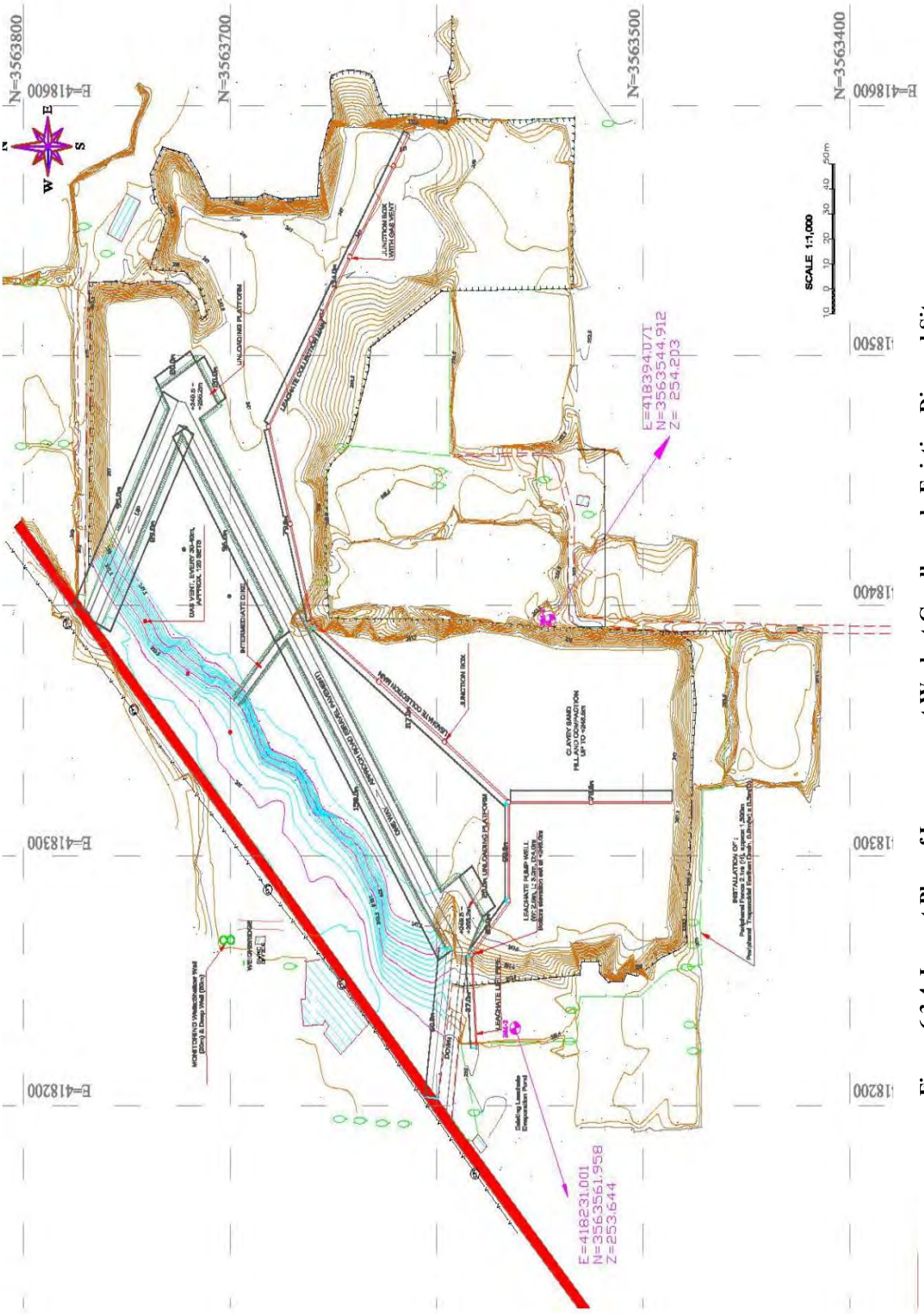


Figure 6.3.4 Layout Plan of Improvement Work at Gondlanwala Existing Disposal Site

6.3.8 Project for Safe Closure of Landfill Site in Gondlanwala

(1) Design of Safe Closure Work of Gondlanwala Disposal Site

Safe closure work of Gondlanwala is scheduled in 2018 after the Bhakhraywali SLF facilities become operational. If the proposed improvement work is carried out properly, it is not necessary to implement a special safe closure work except the requirement for final soil cover and extension of gas vent pipes. Accordingly, the design of safe closure work of Gondlanwala will be carried out by GWMC with reference to the description, specifications and dimension as shown in ***Volume 3, Supporting Report, Section C: Final Disposal, Subsection 5.8.1***.

(2) Implementation of Safe Closure Work of Gondlanwala Disposal Site

The safe closure work of Gondlanwala will be carried out mainly by the landfill operation staff of GWMC as free time or idling time and extra work. Some of the special works such as extension of gas vent pipes may be carried out by the construction contractor hired by GWMC as required. The closure work to be conducted by the contractor(s) shall follow the requirements similar to the description in ***Subsection 6.3.4, Project for Construction of Sanitary Landfill Facilities (Stage 1) in Bhakhraywali***. Funding of this project shall be secured under the annual budget of GWMC or the project funding by the Government of the Punjab.

6.3.9 Project for Safe Closure of Landfill Site in Chianwali

(1) Design of Safe Closure Work of Chianwali Disposal Site

Safe closure work is carried out to provide the required minimum facilities and work to the former Chianwali landfill site. The main purpose of this closure work is to facilitate safe closure of the former landfill site to mitigate the probable negative environmental impacts in the surrounding area. The closure work will be carried out mainly by GWMC and partly by the hired contractor for some special works. The consultant shall prepare the work drawings based on this conceptual design of the Action Plan which is presented in the following subsections together with the descriptions of required facilities, specifications and dimensions for safe closure of the former landfill site in Chianwali. The conceptual design drawings of safe closure work of the former Chianwali disposal site are presented in **Figure 6.3.5**. (See detail in ***Volume 3, Supporting Report, Section C: Final Disposal, Subsection 5.9.1***.)

(2) Implementation of Safe Closure Work of Chianwali Disposal Site

The closure work will be carried out mainly by GWMC staff responsible for landfill operation. The work will be carried out as free time or idling time and extra work of the staff. Some of the special works such as installation of leachate collection pipes, leachate pump well, leachate circulation force main, power supply, landfill gas venting system, etc. shall be carried out by the construction contractor hired by GWMC as required. The closure work to be conducted by the contractor(s) shall follow the requirements similar to the description in ***Subsection 6.3.4, Project for Construction of Sanitary Landfill Facilities (Stage 1) in Bhakhraywali***. Funding of this project shall be secured under the annual budget of GWMC or the project funding by the Government of the Punjab.

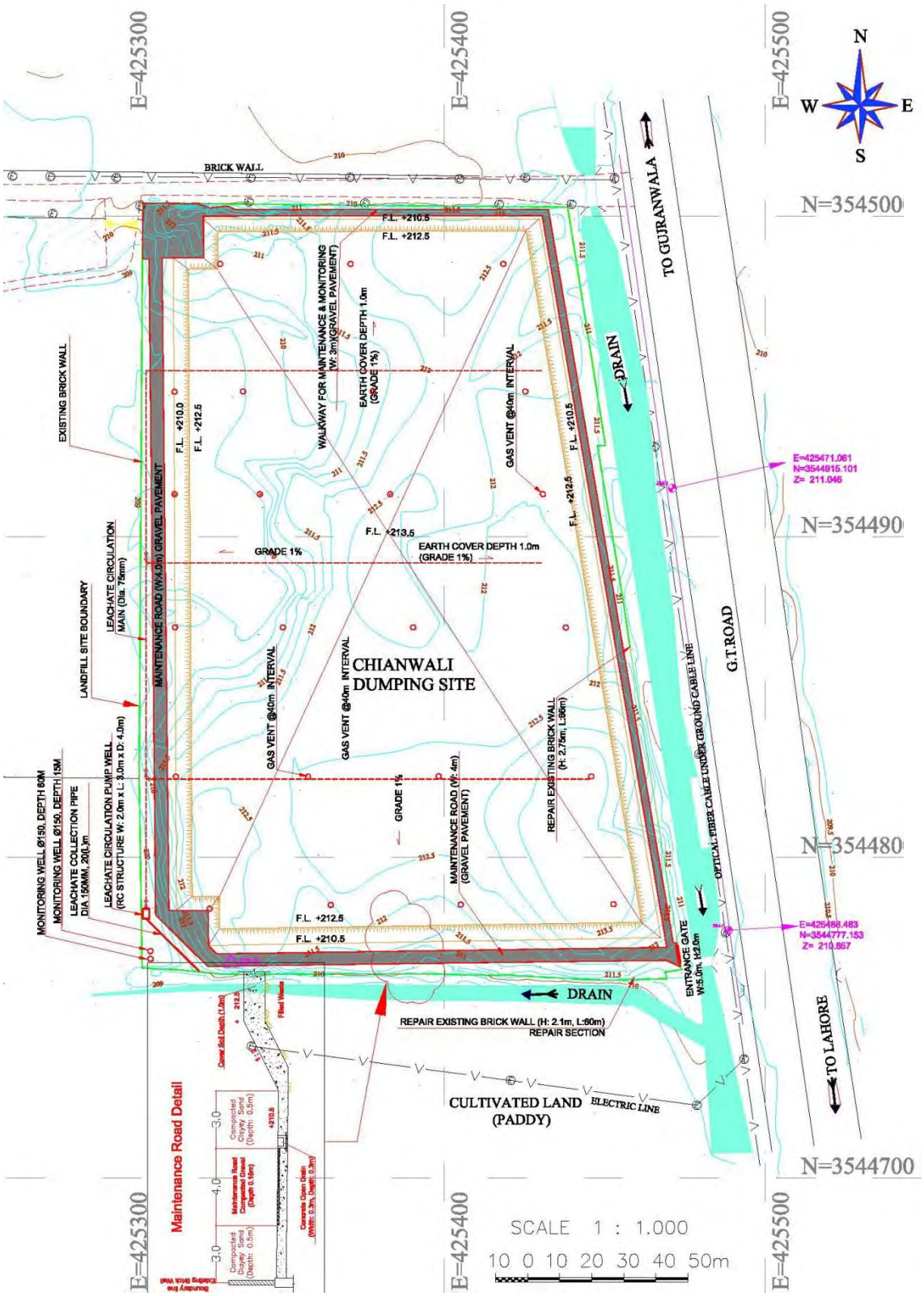


Figure 6.3.5 Layout Plan of Safe Closure Work at Chianwali Former Disposal Site

6.3.10 Project for Monitoring of Final Disposal in Bhakhraywali

Monitoring of landfill work and waste disposal facilities is an integral part of operation and maintenance of final disposal activities. The series of activities for monitoring, inspection and restoration work plays an important role in practicing the sanitary landfill operation. The monitoring plan being proposed hereunder consists of monitoring of landfill facilities and the environmental elements closely related with conducting waste disposal operation and evaluating the stability of landfill layer. The environmental monitoring related with compliance of EIA and the relevant laws, rules and regulations will be stated separately under **Section 5.4**.

(1) Preparation of Monitoring Plan of Landfill Facilities

GWMC shall prepare a monitoring plan having items of regular monitoring and inspection for the main landfill facilities and associated facilities, such as access road, waste containment facility, stormwater drainage, impermeable liner system, leachate collection and circulation system, landfill gas vent, weighbridge, power supply and so on. The actual monitoring/inspection plan of each facility stated above shall also be prepared. In addition, landfill status shall be monitored by the major parameters like incoming waste amount, rate of subsidence, leachate quality, and temperature of landfill layer. (See detailed in ***Volume 3, Supporting Report, Section C: Final Disposal, Subsection 5.10.1***.)

(2) Monitoring of Landfill Facilities and the Environment

Monitoring/Inspection of the landfill facilities, status of landfill and environmental monitoring will be carried out under the responsibilities of assistant landfill manager and landfill supervisors. Conducting facility monitoring and inspection is an essential part of maintaining the function of sanitary landfill facilities. All facilities and equipment comprising the waste disposal facility shall be monitored/inspected/checked regularly, daily, weekly or monthly depending on the facility, and measures evaluated repaired and/or restored to maintain the functionality of facilities and for preventive measures. Environmental and social impacts caused by the landfill facilities and landfill work will be monitored and evaluated separately under the activities of ***Volume 3, Supporting Report, Section G: Environmental and Social Considerations, Section 5.3***.

6.3.11 Project for Post-Closure Monitoring of Gondlanwala and Chianwali Disposal Sites

After the completion of safe closure work, the assistant landfill manager and his team members will carry out the post closure monitoring based on the requirements stated in the Landfill Operation and Maintenance Manual in which some of the details are described in ***Volume 3, Supporting Report, Section C: Final Disposal, Section 5.11***. In addition, the post closure monitoring of environmental and social impacts will be carried out in accordance with the requirements proposed under ***Volume 3, Supporting Report, Section G: Environmental and Social Considerations, Section 5.4***.

(1) Overview of Management of Post Closure Landfill Site

Post closure monitoring is carried out for the purpose of avoiding the negative environmental impacts and risks attributed to the closed landfill site. Accordingly, the administrator of the site must ensure that public health and the environment are protected by instituting appropriate measures in monitoring, analysing problems and restoration work of the abandoned landfill site. The overview for management of post closure monitoring will include but not limited to the following items:

- Basic Concepts of Safe Closure;
- Disposal Site Stability Indicator;
- Utilisation of Post-Closure Land;
- Legal Process of Safe Closure of Disposal Sites; and

- Roles of Stakeholders.

(2) Control of Leachate and Landfill Gas

Generation of leachate and landfill gas will continue for a considerably long period after closure of the landfill site. Operation, maintenance, monitoring and restoration work will be required for the purpose of limiting and controlling the negative impacts of the closed site. The post monitoring team will be required to carry out the activities, at least, of the following items:

- Operation and maintenance of leachate circulation system;
- Maintenance of stormwater drainage system and restoration as required;
- Maintenance of landfill gas vent system and repair as required; and
- Monitoring of leachate quality and landfill gas concentration (Refer to ***Volume 3, Supporting Report, Section G: Environmental and Social Considerations, Table G.5.4***).

(3) Control of Land Subsidence

Monitoring the status of the facility and final soil cover and the measures shall be taken against the influence of subsidence caused by decomposition of the waste layer. The major activities include the following:

- Monitoring and analysis of subsidence of original ground;
- Monitoring and analysis of subsidence of waste/final cover layer; and
- Restoration of subsidence to meet the requirements of post closure use of the site.

(4) Monitoring the State of Stabilisation of Landfill

Several parameters must be determined for evaluating the stabilisation status of the landfill site. Site abolition procedures will be made after ensuring the stabilisation of the landfill site. The main parameters and activities for monitoring and evaluating the status of stabilisation are listed below:

- Preparation of closure criteria of landfill site;
- Determination of parameters for monitoring the stabilisation (leachate quality, groundwater quality, landfill gas concentration, rate of subsidence of landfill site, etc.);
- Monitoring and analysis of the parameters; and
- Evaluation of the annual trends of monitoring record of the parameters.

(5) Utilisation and Management of Safe Post-Closure of Landfill Site

Safe closure and maintenance plan is formulated in response to the purpose of utilisation of the disposal site in addition to closing the site safely against the probable pollution source. With regard to the post closure site use planning, as well as the maintenance work until ensuring the site stability, the management work during the period shall be carried out based on the following key activities:

- Preparation of post closure site plan in compliance with the land use plan of CDGG;
- Evaluation of stabilisation parameters monitored;
- Development of the site to meet with the post closure utilisation plan.

6.3.12 Implementation Schedule and Costs

Actions and costs required for the implementation of the Action Plan for Final Disposal are summarised in **Figure 6.3.6 and Table 6.3.2**.

Time Framework of the Action Plan		Short-Term Plan Period											
Year		2016				2017				2018			
Quarter		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WBS for Short-Term Plan													
S-2-1	Procurement of Sanitary Landfill Site												
S-2-2	Engineering Service for Sanitary Landfill Facilities (Stage 1)												
S-2-2-1	Preliminary Design & Detail Design												
S-2-2-2	Preparation of Tender Document												
S-2-2-3	Preparation of Bill of Quantities												
S-2-2-4	Support for Tender Evaluation												
S-2-2-5	Construction Supervision												
S-2-3	Construction of Sanitary Landfill Facilities (Stage 1) in Bhakhraywali												
S-2-3-1	Implementation of Construction Work												
S-2-3-2	Management of Construction Work and Workmanship												
S-2-4	Procurement of Landfill Machinery												
S-2-4-1	Preparation of Tender Document												
S-2-4-2	Procurement and Inspection												
S-2-5	Operation and Maintenance of Landfill Facilities												
S-2-5-1	Preparation of Operation and Maintenance Manual												
S-2-5-2	Landfill Operation and Maintenance of Landfill Facilities												
S-2-6	Improvement Work of the Existing Landfill in Gondianwala												
S-2-6-1	Design of Improvement Work of Gondianwala Disposal Site												
S-2-6-2	Implementation of Improvement Work of Gondianwala Disposal Site												
S-2-7	Safe Closure of Landfill Site in Gondianwala												
S-2-7-1	Design of Safe Colosure Work												
S-2-7-2	Implementation of Safe Closure Work												
S-2-8	Safe Closure of Landfill Site in Chianwali												
S-2-8-1	Design of Safe Colosure Work of Chianwali Disposal Site												
S-2-8-2	Implementation of Safe Closure Work of Chianwali Disposal Site												
S-2-9	Monitoring of Final Disposal in Bhakhraywali												
S-2-9-1	Preparation of Monitoring Plan of Landfill Facilities												
S-2-9-2	Monitoring of Landfill Facilities and the Environment												
S-2-10	Post-Closure Monitoring of Gondianwala and Chianwali Disposal Sites												

Figure 6.3.6 Implementation Schedule of the Action Plan for Final Disposal

Table 6.3.2 Implementation Cost of the Action Plan for Final Disposal

WBS No.	WBS	Total Budget (Thousand Rs.)	Annual Cost		
			2016	2017	2018
Programme 2: Final Disposal Plan					
Short-Term Plan					
S-2-1	Procurement of Sanitary Landfill Site	150,000	150,000		
S-2-2	Engineering Service for Sanitary Landfill Facilities (Stage 1)	99,680	49,840	49,840	
S-2-2-1	Preliminary Design & Detail Design	49,840	24,920	24,920	
S-2-2-2	Preparation of Tender Document				
S-2-2-3	Preparation of Bill of Quantities				
S-2-2-4	Support for Tender Evaluation				
S-2-2-5	Construction Supervision	49,840	24,920	24,920	
S-2-3	Construction of Sanitary Landfill Facilities (Stage 1) in Bhakhraywall	996,802	492,751	504,051	
S-2-3-1	Implementation of Construction Work	897,122	443,476	453,646	
S-2-3-2	Management of Construction Work and Workmanship	99,680	49,275	50,405	
S-2-4	Procurement of Landfill Machine	70,350	31,500	38,850	
S-2-4-1	Preparation of Tender Document	3,350	1,500	1,850	
S-2-4-2	Procurement and Inspection	67,000	30,000	37,000	
S-2-5	Operation and Maintenance of Landfill Facilities	72,151	18,669	21,859	31,623
S-2-5-1	Preparation of Operation and Maintenance Manual	72,151	18,669	21,859	31,623
S-2-5-2	Landfill Operation and Maintenance of Landfill Facilities				
S-2-6	Improvement work of the Existing Landfill in Gondianwala	55,902	55,902		
S-2-6-1	Design of Improvement Work of Gondianwala Disposal Site	5,082	5,082		
S-2-6-2	Implementation of Improvement Work of Gondianwala Disposal Site	50,820	50,820		
S-2-7	Safety Closure of the Landfill Site in Gondianwala	26,196			26,196
S-2-7-1	Design of Safety Closure Work	2,381			2,381
S-2-7-2	Implementation of Safety Closure Work	23,815			23,815
S-2-8	Safety Closure of the Landfill Site in Chianwali	34,544			34,544
S-2-8-1	Design of Safety Closure Work of Chianwali Disposal Site	3,140			3,140
S-2-8-2	Implementation of Safety Closure Work of Chianwali Disposal Site	31,404			31,404
S-2-9	Monitoring of Final Disposal in Bhakhraywall	GWMC			
S-2-9-1	Preparation of Monitoring Plan of Landfill Facilities	GWMC			
S-2-9-2	Monitoring of Landfill Facilities and the Environment	GWMC			
S-2-10	Post-closure Monitoring of Gondianwala and Chianwali Disposal Sites	GWMC			
	Total (Short-Term)	1,505,625	798,662	614,600	92,363

6.4 Action Plan for Intermediate Treatment and 3R Promotion

6.4.1 Priority Projects of Intermediate Treatment and 3R Promotion

Priority projects are defined as the projects proposed for the short-term period of the Master Plan and they will be developed into the action plans in this chapter. Based on the discussions in **Chapter 4,** the following are selected as the priority projects of intermediate treatment and 3R promotion:

- Project for Awareness and IEC (Information, Education and Communication) Campaign on Resource Recovery
- Project for Implementation of Simplified WACS
- Project for Preparation for PPP and Formation of a Committee of the BOD of GWMC

- Project for Implementation of Land Preparation by GWMC
- Project for Engineering Service for Detailed Design of a Compost Plant by SPV

6.4.2 Project for Awareness and IEC Campaign on Resource Recovery

During the Short-Term Plan (2016-2018), awareness raising and IEC (Information, Education and Communication) campaign on 3R (Reduce, Reuse, Recycle) is to be conducted together with the action plan project for development and implementation of educational programmes to enhance knowledge/awareness on solid waste management (SWM) and 3R promotion. These programmes are to target primary school teachers, students, and the general public in Gujranwala under the Environmental Education and Public Awareness Raising Plan presented in the following **Section 6.5**.

GWMC has the important role of 3R resource recovery during not only the Short-Term Plan (2016-2018), but also the Mid-Term Plan (2019-2024) and the Long-Term Plan (2025-2030). The Communication Unit will be the focal point of GWMC when it comes to public relations. This unit will serve as the information dissemination point and where the general public makes inquiries about SWM in GWMC. The staffing of the Communication Unit is discussed in more detail in ***Volume 3, Supporting Report, Section E: Environmental Education and Public Awareness Raising Plan, Section 5.2***.

Proposed activities such as 1) development of manual for environmental education programmes at schools; 2) development of educational materials for school programmes; 3) selection of target schools; and 4) implementation of the environmental education programmes at schools, are presented in more detail in ***Volume 3, Supporting Report, Section E: Environmental Education and Public Awareness Raising Plan, Section 5.3***.

6.4.3 Project for Implementation of Simplified WACS

The Solid Waste Amount and Composition Survey (WACS) was conducted in 2014 and 2015 as a part of the project to identify the amounts and composition of different types of waste generated in Gujranwala City. The results and analysis of the WACS are to be used for the basic data to formulate the waste collection, 3R, intermediate treatment and waste disposal plans for the review, updating and formulation of the SWM Master Plan.

The WACS is to be conducted once a year during the Short-Term Period (2016-2018) by GWMC. GWMC has a number of experienced staff for WACS who worked with the JICA Project Team in 2014 and 2015; for instance, 5 waste managers and 3 research assistants have had experiences and possess the knowhow to conduct the survey and to compile the data. They will be the main members of the team to conduct the WACS three times during the Short-Term Period (2016-2018). The survey items and contents are also basically the same as the WACS conducted during the JICA Study in 2014 and 2015 as follows:

- Waste Amount Survey;
- Waste Composition Survey; and
- Three (3) Component Analysis, Carbon and Nitrogen Analysis, and Moisture Contents Analysis.

6.4.4 Project for Preparation for PPP and Formation of a Committee of the BOD of GWMC

A new compost company which is tentatively called "Gujranwala Central Compost and RDF Plant" is proposed to start its operation in 2020 during the mid-term period (2019 to 2024). The new company which is under the PPP (Public-Private-Partnership) scheme, BOT (Build-Operate-Transfer) basis is recommended in the Master Plan.

In order to establish the new compost company in Gujranwala, it is necessary for the SPV (Special Purpose Vehicle) to ensure the steps of preparing for the private service contract under BOT basis during the short-time period (2016-2018) as follows:

Step 1: Approval by the Board of Directors (BOD) of GWMC on the advertisement and the Terms of Reference (TOR) for PPP and formation of the BOD committee (one month);

Step 2: Invitation for Expression of Interest (EOI) to participate in the PPP, formation of the Committee and pre-qualification of companies/bidders;

Step 3: Shortlisting and verification of credentials of participating companies/bidders; preparation of tender documents;

Step 4: Bidding necessary for the SPV;

Step 5: Holding of committee meeting to discuss and approve the shortlisted companies;

Step 6: Presentation of shortlisted companies to the BOD of GWMC;

Step 7: Finalisation of an approved company;

Step 8: Award of Contract; and

Step 9: Conduct of TOR by awarded SPV.

According to the MD of GWMC, the whole process will take about 6 months (Step 1 to Step 7) and finished by the year 2017 before the preparation for procurement of the land (7 ha) for the compost plant and the engineering detailed design of the plant. The awarded company will thus be the SPV during the contract period and hence the owner of the compost plant in the project. All the required terms for the awarded SPV are to be stipulated in the TOR signed between GMWC and SPV, as shown in detail in ***Volume 3, Supporting Report, Section D: Intermediate Treatment and 3R Promotion Plan, Section 5.4.***

6.4.5 Project for Implementation of Land Preparation by GWMC

The committee formulated by BOD of GWMC will prepare the plan for the procurement of the land for the compost plant project based on the TOR. The TOR shall specify that the required land is to be procured and provided for the SPV before the start of construction of the compost plant project in 2019 and the start for the detailed design engineering services in 2018. The land area of approximately 7 ha shall be located in flat fields and adjacent to the first phase compound of the final landfill site at Bhakhraywali in accordance with the master plan. So far, there has been no actual action taken by GWMC for the land yet, because preparation of the development plan of the final landfill site is still in progress.

6.4.6 Project for Engineering Services for the Detailed Design of a Compost Plant by SPV

(1) Assumed General Arrangement and Detailed Design of the SPV Project

The detailed design of the compost plant by SPV is to be started and completed within 2018. Effective performance monitoring requires that the SPV is responsible for the operation and management of the compost plant project and the BOD of GWMC may also be required to conduct joint monitoring, whether or not the service contract is actually and properly delivered financially. This matter has to be stipulated in the TOR.

Although the contents of the TOR are not available at this moment and no award has yet been made to the SPV, general requirements for preparation of the tender documents, bill of quantities, tender evaluation, and construction supervision are required for the SPV's project in general. Some points for each issue are addressed in ***Volume 3, Supporting Report, Section D: Intermediate Treatment and 3R Promotion Plan, Subsection 5.6.1.***

(2) Quality Control of SPV's Compost

As mentioned in **Section 2.4**, the quality control of compost production of the SPV's project is not satisfactory for the farmers' requirement. In this context, compost production by the SPV should be satisfactory for the farmers' needs and the following should be described clearly in the contract and the technical specifications between the SPV and the committee of BOD of GWMC as mentioned in the TOR:

- Organic matters of compost from the SPV should be 35%~45% or more, and the bulk density of compost produced by Gujranwala Compost Company should be generally about 0.5~0.8 t/m^3;
- A mix of organic matters and cow-dung should be used for the SPV's mature compost and the SPV should search for a proper mix proportion of compost. Cow-dung is more available in Gujranwala City and its surrounding areas than in Lahore. It is therefore expected that better mature compost production with more organic contents in Gujranwala can be produced;
- It is also advised that the expected pilot farm in the complex of the SPV's plant area should be managed and be well-organized by SPV, and be open to the public for revealing the effective result of compost at the field;
- The SPV shall get a licence for compost production from the Agricultural Department Directorate of Soil Fertility, Lahore, Government of the Punjab. However, it is recommended that quality control of the SPV's compost should be maintained and improved effectively;
- Compost production should be recorded properly to measure how much kilogramme of compost is sold or unsold daily, including searching for a good market of compost; and
- Besides being required for the quality control of SPV's compost, IEC programmes on effectiveness and safety of SPV's compost is further needed for the famers/residents.

6.4.7 Implementation Schedule and Costs

Actions and costs required for the implementation of the Action Plan for Intermediate Treatment and 3R Promotion are summarised in **Figure 6.4.1 and Table 6.4.1**.

Time Framework of the Master Plan		Short-Term Plan Period											
Year		2016				2017				2018			
Quarter		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WBS for Short-Term Plan													
S-3-1	Awareness & IEC Campaign on Resources Recovery												
S-3-1-1	Development of Material for Environmental Education Programme in Schools (refer to S-4-2-1 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)												
S-3-1-2	Development of the Educational Materials for School Programme (refer to S-4-2-2 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)												
S-3-1-3	Selection of Target Schools (refer to S-4-2-3 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)												
S-3-1-4	Implementation of the Environmental Education Programme at Schools (refer to S-4-2-4 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)												
S-3-1-5	Development of Guideline for Environmental Education Programmes for General Public (refer to S-4-3-1 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)												
S-3-1-6	Development of the Education Materials for General Public (refer to S-4-3-2 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)												
S-3-1-7	Implementation of the Environmental Education Programmes in Periodical Events (refer to S-4-3-3 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)												
S-3-2	Conduct of Simplified WACS Implementation												
S-3-2-1	Waste Amount Survey												
S-3-2-2	Waste Composition Survey												
S-3-2-3	Three Component Analysis, Carbon and Nitrogen Analysis, and Moisture Contents												
S-3-3	Setting up for PPP & Formation of a Committee of the BOD of GWMC												
S-3-3-1	Approval by the Board of Directors (BOD) of GWMC to Advertise and Approve the Terms of Reference (TOR) fro PPP and Formation of a Committee												
S-3-3-2	Invitation of Expression of Interest (EOI) for Participating in PPP & Formulation of a Committee and Pre-qualification of Bidder												
S-3-3-3	Shortlisting and verification of credentials of participating companies / preparation of tender documents												
S-3-3-4	Necessary Bidding for SPV												
S-3-3-5	Holding a Committee Meeting to Discuss and Approve Shortlisted Companies												
S-3-3-6	Presentation by an Approved Company												
S-3-3-7	Finalisation of an Approved Company												
S-3-3-8	Award of Contract												
S-3-3-9	Contract of TOR by Awarded SPV												
S-3-4	Implementation of Land Preparation by GWMC												
S-3-5	Engineering Service for Detailed Design of the Compost Plant by SPV												
S-3-5-1	Assumed General Arrangement and Detailed Design of the SPV Project												
S-3-5-2	Quality Control of SPV's Compost												

Figure 6.4.1 Implementation Schedule of the Action Plan for Intermediate Treatment and 3R Promotion

Table 6.4.1 Implementation Cost of the Action Plan for Intermediate Treatment and 3R Promotion

WBS No.	WBS	Total Budget (Thousand Rs.)	Annual Cost		
			2016	2017	2018
Programme 3: Intermediate Treatment and 3R Promotion Plan					
Short-Term Plan					
S-3-1	Awareness & IEC Campaign on Resources Recovery	GWMC	0	0	0
S-3-1-1	Development of Material for Environmental Education Programme in Schools (refer to S-4-2-1 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)		0	0	0
S-3-1-2	Development of the Educational Materials for School Programme (refer to S-4-2-2 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)		0	0	0
S-3-1-3	Selection of Target Schools (refer to S-4-2-3 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)		0	0	0
S-3-1-4	Implementation of the Environmental Education Programme at Schools (refer to S-4-2-4 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)		0	0	0
S-3-1-5	Development of Guideline for Environmental Education Programmes for General Public (refer to S-4-3-1 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)		0	0	0
S-3-1-6	Development of the Education Materials for General Public (refer to S-4-3-2 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)		0	0	0
S-3-1-7	Implementation of the Environmental Education Programmes in Periodical Events (refer to S-4-3-3 of WBS for Short-Term Plan, Environmental Education & Public Awareness Raising Plan)		0	0	0
S-3-2	Conduct of Simplified WACS Implementation	GWMC	0	0	0
S-3-2-1	Waste Amount Survey		0	0	0
S-3-2-2	Waste Composition Survey		0	0	0
S-3-2-3	Three Component Analysis, Carbon and Nitrogen Analysis, and Moisture Contents		0	0	0
S-3-3	Setting up for PPP & Formation of a Committee of the BOD of GWMC	BOD/GWMC	0	0	0
S3-3-1	Approval by the Board of Directors (BOD) of GWMC to Advertise and Approve the Terms of Reference (TOR) fro PPP and Formation of a Committee		0	0	0
S3-3-2	Invitation of Expression of Interest (EOI) for Participating in PPP & Formulation of a Committee and Pre-qualification of Bidder		0	0	0
S3-3-3	Shortlisting and verification of credentials of participating companies / preparation of tender documents		0	0	0
S3-3-4	Necessary Bidding for SPV		0	0	0
S3-3-5	Holding a Committee Meeting to Discuss and Approve Shortlisted Companies		0	0	0
S3-3-6	Presentation by an Approved Company		0	0	0
S3-3-7	Finalisation of an Approved Company		0	0	0
S3-3-8	Award of Contract		0	0	0
S3-3-9	Contract of TOR by Awarded SPV		0	0	0
S-3-4	Implementation of Land Preparation by GWMC	BOD/GWMC	0	0	0
S-3-5	Engineering Service for Detailed Design of the Compost Plant by SPV	40,000	0	0	40,000
S-3-5-1	Assumed General Arrangement and Detailed Design of the SPV Project	40,000	0	0	40,000
S-3-5-2	Quality Control of SPV's Compost				
	Total (Short-Term)	40,000	0	0	40,000

6.5 Action Plan for Environmental Education and Public Awareness Raising

6.5.1 Priority Projects of Environmental Education and Public Awareness Raising

Priority projects are defined as the projects proposed for the short-term period of the Master Plan and they will be developed into the action plans in this chapter. Based on the discussions in **Chapter 4,** the following are selected as the priority projects of environmental education and public awareness raising:

- Project for Capacity Development of Communication Unit to Strengthen the Coordination among Relevant Bodies
- Project for Development and Implementation of Educational Programmes Targeting Primary School Teachers and Students to Enhance Knowledge/Awareness on SWM and 3R Promotion
- Project for Development and Implementation of Educational Programmes Targeting the General Public to Enhance Knowledge/Awareness on SWM and 3R Promotion

6.5.2 Project for Capacity Development of Communication Unit to Strengthen the Coordination among Relevant Bodies

(1) Establishment of the Communication Unit

The Communication Unit will be the focal point of GWMC when it comes to public relations. This unit will serve as the information dissemination point and where the general public can make inquiries about solid waste management in GWMC. The Unit will work closely with the Waste Managers of GWMC.

The Communication Unit should be composed of eight (8) staff of GWMC; namely, one (1) Senior/Manager Communication; one (1) Assistant/Deputy Manager Public Relations; one (1) Assistant/Deputy Manager Environmental Education, and a team of five (5) officers for field operations with diploma as environmentalist, sociologist or public health. It should be noted, however, that the staff in this unit should not only have environmental/hygienic background but also have good people's skill. The team of field officers should be increased as activity areas expand in the future.

As mentioned above, the Communication Unit is the unit which goes out from the GWMC office and disseminates various types of information, i.e., implementing body of environmental communication. In the short-term period, the Unit will implement environmental education programmes in elementary schools targeting small children and their teachers, and environmental programmes targeting the general public in periodical events. In order to mobilise this, the Unit will need vehicles and subsequent drivers. **Table 6.5.1** below shows the estimated salary cost for the Communication Unit for this period.

Table 6.5.1 Estimated Salary for Newly Recruited Staff of the Communication Unit in the Short-Term Period

Unit: Rs./year

Position	Number of Staff	2016	2017	2018
Field officers*	4	960,000	1,036,800	1,113,600
Drivers	2	792,000	792,000	792,000
Total		1,752,000	1,828,800	1,905,600

Note:* Initially, one of the current waste managers will lead the team due to their experience; therefore, the number of first recruits will be 4.

(2) Strengthening of Coordination among Relevant Bodies

An important role of the Communication Unit is to coordinate the programme with relevant bodies. In the school programme, for example, the Unit needs to coordinate not only with target schools but also all the authorities concerned. Likewise, the coordination in implementing the environmental programmes targeting the general public requires careful coordination with community groups, labour union, NGOs for collaboration efforts, TV / radio stations or various advertising media on bus or street billboards, etc., for publicity purpose, and editors and printing companies for preparing these materials to be used in the programmes. In order to facilitate these, the Unit must develop a list of contact information and mechanisms to maintain and update the list.

6.5.3 Project for Development and Implementation of Educational Programmes Targeting Primary School Teachers and Students

(1) Development of Manuals for Environmental Education Programme in Schools

It is proposed to develop manuals for the environmental education programme in schools. This manual will be used by the field personnel who go out and give lectures to the elementary students and teachers. The contents of the manual shall include a) purpose of the manual and objective of the programme, b) planning the programme, c) carrying out the programme, and d) reference data.

The manual should be written in a way that the Communication Unit staff can learn how to develop or modify an attractive programme for elementary schools and carry out lectures attractive to the students. It should also include background information on proper SWM practices or 3R, so that the staff can easily find the right information. The manual should be prepared by the Waste Managers led by the Communication Unit.

(2) Development of Educational Materials for the School Programme

It is proposed to produce a short video clip, explaining the overall SWM and 3R efforts in Gujranwala. The production of the video should be entrusted to a production company specialising in PR material production under the supervision of the Communication Unit. The video should cover the current SWM in Gujranwala and the issues to be solved.

Besides the video clip, a printed material should be developed to be used and distributed during the programme. The contents of the printed material should include proper SWM practices and promotion of 3R. Topics should be dealt from the viewpoint of everyday life of target students/teachers. For the Short-Term Period, a total of 75,000 copies will be necessary.

(3) Selection of Target Schools

The Communication Unit should select a target area or UC to implement the school environmental education programme. The area should preferably be coincided with other programmes, such as, the separate collection pilot project in Zone 6, to implement the programme effectively.

Firstly, all public and private elementary schools in the area should be listed, together with the number of students and contact information. Secondly, target schools should be selected in consideration of the number of students and the degree of cooperativeness of the schools. Then with careful coordination with school representatives, a schedule to visit is planned. The number of expected target schools and students for the Short-Term Period is as shown below.

Table 6.5.2 Number of Schools and Students Targeted for the Environmental Education Programme in the Short-Term Period

Year	2016	2017	2018
No. of Schools	70	80	100
No. of Students	2,100	2,400	3,000

(4) Implementation of the Environmental Education Programme at Schools

Based on the list of schools and schedule of the programme developed in **Item (3)** above, coordination with the school principal or teacher in charge prior to implementation of the programme is indispensable to confirm how will be carried out, including, but not limited to, size of room, availability of power and lights, space to display materials, etc. For example, depending upon the school condition, a large number of students may be given the programme in the same room, but later divided into 5 smaller groups for more detailed discussions. In general, it is more effective to have an environmental programme in smaller groups for better control and enough attention to each student and thus bring a more meaningful programme than in a large group.

6.5.4 Project for Development and Implementation of Educational Programmes Targeting the General Public

Following activities are proposed: 1) development of guideline for environmental education programmes for the general public; 2) development of educational materials; 3) development of schedule for public environmental education; and 4) implementation of the environmental education programmes for the public. Explanation of each activity is presented below.

(1) Development of Guideline for Environmental Education Programmes for the General Public

A guideline for the environmental education programme for the general public is proposed to be developed. This guideline will be used by the field staff that go out and raise awareness among the public in periodical events like the Earth Day and Eid-ul-Fitr Day. The contents of the guideline shall include a) purpose of the guideline and objective of the programme, b) planning of the programme, c) carrying out of the programme, and d) references including data and contacts information about possible collaborating partners.

The programme should be written in a way that staff of the Communication Unit can plan how to develop or modify the programme to make it attractive to the general public. It should also include background information on proper SWM practices or 3R, so that the staff can easily find the right information. The target population is different from that of the school educational programme; therefore, broader viewpoints are necessary when developing this guideline. For instance, budget allocation and how they are used in GWMC operation is good information for adults who pay for his/her SWM. The manual should be prepared by the Waste Managers led by the Communication Unit.

(2) Development of Educational Materials for the General Public

Some printed materials should be developed for use and distribution during implementation of the programme. Contents of the printed materials should include proper SWM practices and promotion of 3R, as well as information necessary to gain confidence among the general public on the GWMC's operation. Such information shall include budget allocation and how they are used in GWMC operations since it is vital information to gain confidence from the adults who pay for his/her SWM. For the Short-Term Period, a total of 5,000 copies will be necessary.

Besides the printed materials, some displays which show waste flow in Gujranwala or items which can be recycled should be prepared, along with actual recyclable or recycled materials so that the general public can touch and easily understand them.

(3) Implementation of Environmental Education Programmes in Periodical Events

In the implementation of the programme, close coordination should be made among the other relevant bodies listed in the guideline prepared in **Item (1)** above. Coordination may include co-hosting awareness raising programmes activities. It can be worth considering to have support from local and influential leaders, such as religious leaders, head of labour union, and neighbourhood groups and alike. This gives the residents additional reasons why their cooperation in SWM makes sense.

6.5.5 Implementation Schedule and Costs

Actions and costs required for the implementation of the Action Plan for Environmental Education and Public Awareness Raising are summarised in **Figure 6.5.1 and Table 6.5.3**.

Time Framework of the Master Plan		Short-Term Plan Period											
Year		2016				2017				2018			
Quarter		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WBS for Short-Term Plan													
S-4-1	Capacity Development of Communication Unit to Strengthen the Coordination among Relevant Bodies												
S-4-1-1	Preparation of New Staff Recruitement												
S-4-1-2	Listing of All Relevant Bodies and Formulation of Mechanism to Maintain/Update the Listing												
S-4-1-3	Procurement of New Vehicle												
S-4-2	Development and Implementation of Educational Programmes Targeting Primary School Teachers and Students												
S-4-2-1	Development of Manuals for Environmental Education Program in Schools												
S-4-2-2	Development of the Educational Materials for School Program												
S-4-2-3	Selection of Target Schools												
S-4-2-4	Implementation of the Environmental Education Programs at Schools												
S-4-3	Development and Implementation of Educational Programmes Targeting General Public												
S-4-3-1	Development of Guideline for Environmental Education Programs for General Public												
S-4-3-2	Development of the Educational Materials for General Public												
S-4-3-3	Implementation of the Environmental Education Programs in Periodical Events												

Figure 6.5.1 Implementation Schedule of the Action Plan for Environmental Education and Public Awareness Raising

Table 6.5.3 Implementation Cost of the Action Plan for Environmental Education and Public Awareness Raising

WBS No.	WBS	Total Budget (Thousand Rs.)	Annual Cost		
			2016	2017	2018
Programme 4: Environmental Education and Public Awareness Raising Plan					
Short-Term Plan					
S-4-1	Capacity Development of Communication Unit to Strengthen the Coordination among Relevant Bodies	6,736	3,002	1,829	1,906
S-4-1-1	Preparation of New Staff Recruitement	5,486	1,752	1,829	1,906
S-4-1-2	Listing of All Relevant Bodies and Formulation of Mechanism to Maintain/Update the Listing				
S-4-1-3	Procurement of New Vehicle	1,250	1,250		
S-4-2	Development and Implementation of Educational Programmes Targeting Primary School Teachers and Students	1,730	965	349	416
S-4-2-1	Development of Manuals for Environmental Education Program in Schools	740	675.2	28.8	36
S-4-2-2	Development of the Educational Materials for School Program				
S-4-2-3	Selection of Target Schools				
S-4-2-4	Implementation of the Environmental Education Programs at Schools	990	290	320	380
S-4-3	Development and Implementation of Educational Programmes Targeting General Public	903	287	301	315
S-4-3-1	Development of Guideline for Environmental Education Programs for General Public	258	72	86	100
S-4-3-2	Development of the Educational Materials for General Public				
S-4-3-3	Implementation of the Environmental Education Programs in Periodical Events	646	215	215	215
	Total (Short-Term)	9,370	4,254	2,479	2,637

6.6 Action Plan for Economic and Financial Aspect

6.6.1 Priority Projects of Economic and Financial Aspect

Priority projects are defined as the projects proposed for the short-term period of the Master Plan and they will be developed into the action plans in this chapter. Based on the discussions in **Chapter 4,** the following are selected as the priority projects of economic and financial aspect:

- Project for Establishment of Sustainable Cost Recovery
- Project for Implementation of Accurate Total Costing
- Project for Introduction of Proper Tariff System
- Project for Implementation of Financially Efficient Private Sector Involvement

6.6.2 Project for Establishment of Sustainable Cost Recovery

During the Short-Term Period from 2016 to 2018, in order to prepare for the establishment of the future sustainable cost recovery, a wide spectrum of below actions shall be carried out:

- To establish the long-term cost recovery strategies for the operation and maintenance costs to provide SWM services;
- To establish the financial monitoring system through a wide range of financial key performance indicators (KPI) related to cost recovery;
- To establish the standard procedure for monitoring the cost recovery;
- To prepare a manual for the management of cost recovery;
- To train GWMC's staff in charge of managing the cost recovery;
- To prepare a 3-year recurrent cost rolling plan to request CDGG for budgetary arrangement; and
- To prepare a 3-year capital investment cost rolling plan to request the provincial government for the budgetary arrangement.

The above preparatory actions for the establishment of sustainable cost recovery will start from the first quarter of 2016 with the more detailed plan of operations indicated in ***Volume 3, Supporting Report, Section F: Economic and Financial Aspect, Figure F.5.1***.

6.6.3 Project for Implementation of Accurate Total Costing

Although tariff will not be charged during the Short-Term Period from 2016 to 2018, it is absolutely necessary to grasp the total cost accurately based on the selected methodologies for the future monitoring of cost recovery after full-scale introduction of the tariff system from 2025. There is a wide range of actions to be taken for grasping the total cost as well as the cost structure of providing SWM services, as follows:

- To establish the cost centre inside the financial department of GWMC;
- To monitor and streamline the latest operating and maintenance costs for SWM services;
- To carry out the break-even point analysis as well as the breakdown of operation and maintenance costs by fixed costs and variable costs;
- To estimate the average cost and the marginal cost per unit amount of the disposed wastes;
- To prepare and start the cost minimisation plan for SWM services;
- To prepare the operation manual for standard procedures for the Cost Centre; and
- To train the staff of the Cost Centre in the estimation of various costs for SWM services.

The Cost Centre shall be established under the Financial Department of GWMC. It shall manage the GWMC under a convenient mechanism to determine the proper tariff level to recover the total operation and maintenance costs required for providing the SWM services.

Another important action to be taken is to minimise the cost of providing SWM services by the financially efficient manner under the cost minimisation plan of GWMC. The organizational assessment

has been carried out in the master plan, and the most efficient organizational structure was proposed. The purpose of organizational assessment is to realign the organization's resources in a way that GWMC will be able to achieve the best performance and SWM services and thus minimising the operating costs.

The cost minimisation plan being jointly prepared by the Financial Department and the Human Resources Development Department of GWMC will include a series of actions to significantly reduce operating costs and bring improvements in service delivery efficiency such as the operation of sanitary landfill, the operation of collection and transport, billing and collection, and fuel and repair of collection vehicles, the overhead cost of the headquarters, etc.

In addition, the preventive maintenance programme will help identify possible inefficiency in the operation of the sanitary landfill as well as the collection and transport of wastes with minimum expenses and thus saving major repairs and maintenance costs. The efficient collection route should be continuously reviewed in each service zone to bring more efficiency in the operations and thus reduce costs.

The above preparatory actions for the implementation of the accurate total costing will start from the first quarter of 2016 with the more detailed plan of operations indicated in ***Volume 3, Supporting Report, Section F: Economic and Financial Aspect, Figure F.5.1***.

6.6.4 Project for Introduction of Proper Tariff Charging System

During the Short-Term Period from 2016 to 2018, the tariff system will not be introduced. Therefore, cost recovery for the SWM services through introduction of the tariff system will not be actually started. However, there is a wide spectrum of activities in the field of preparatory activities for introduction of the tariff system as given below. The partial establishment of cost recovery through introduction of the optimum tariff system will be commenced from 2022 in high and middle income areas during the Mid-Term Period. For the time being, the absence of cost recovery will be replenished by the CDGG's financial support for the recurrent costs and the provincial government's subsidies for the investment and replacement of facilities and equipment required for the SWM services:

- To forecast the cost recovery rate and the optimum tariff level as well as the required amount to be covered by the provincial property tax;
- To roughly establish the tariff table in low-income, middle-income and high-income areas;
- To establish the standard procedure for the tariff setting;
- To carry out the survey on customers' willingness to pay by income group;
- To carry out the survey on customers' affordability to pay by income group;
- To train the staff in charge of establishing and operating the financial monitoring system; and
- To start the negotiation with the provincial government for exploring the required legal actions for introduction of the additional surcharge of the provincial property tax.

It is essential to set the SWM tariff at the level for which users can actually afford to pay. In this connection, the concept of ATP (Affordability to Pay) is frequently used. ATP is defined as the amount which beneficiaries can pay for certain public utility services, being calculated with reference to household income and composition of household expenditures in the service areas. There are various methodologies employed for estimating ATP. A typical methodology is to determine ATP as a certain share of a household's disposable income based on a household economy survey. The survey on the household economy for estimating ATP should be periodically carried out during the early stage of the short-term period.

WTP (Willingness to Pay) is another consideration factor of the demand side, which is the amount expressed by respondents on the monetary value on users' degree of payment willingness for SWM services. WTP can be measured through a questionnaire survey such as CVM (Contingent Valuation Method).

Based on the survey results of the updated level of ATP and WTP, the optimum level of tariff as well as the required revenue to be covered by the provincial property tax will be estimated.

Although the actual tariff charging system is introduced from 2022 which is the fourth year of the mid-term period, the above preparatory actions for introduction of the proper tariff charging system will start from the first quarter of 2016 with the detailed plan of operations indicated in ***Volume 3, Supporting Report, Section F: Economic and Financial Aspect, Figure F.5.1***.

6.6.5 Project for Implementation of Financially Efficient Private Sector Involvement

During the Short-Term Period from 2016 to 2018, private sector involvement will not be started. However, there is a wide range of preparation activities for the future commencement of efficient private sector involvement for the collection and transport as below. The outline of the service contract to be outsourced including area, scope and criteria to select the private service providers will be clarified.

- To study the tender procedure for the service contract;
- To study the area and scope of the service contract; and
- To review the unit cost of outsourcing.

Although actual private sector involvement through the service contract will be introduced from 2025 which is the first year of the long-term period, the above preparatory actions for the implementation of financially efficient private sector involvement will start from the first quarter of 2018 with the detailed plan of operations indicated in ***Volume 3, Supporting Report, Section F: Economic and Financial Aspect, Figure F.5.1.***

6.6.6 Implementation Schedule and Costs

Actions and costs required for the implementation of the Action Plan for Economic and Financial Aspect are summarised in **Figure 6.6.1 and Table 6.6.1**.

Time Framework of the Master Plan		Short-Term Plan Period											
Year		2016				2017				2018			
Quarter		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WBS for Short-Term Plan													
S-5-1	Establishment of Sustainable Cost Recovery (Preparatory Phase)												
S-5-1-1	Establishment of Long-term Cost Recovery Strategies	■	■	■	■	■	■	■	■				
S-5-1-2	Establishment of Financial Monitoring System through KPIs	■	■	■	■								
S-5-1-3	Establishement of Standard Procedures for Monitoring Cost Recovery	■	■	■	■								
S-5-1-4	Preparation of Manual for Management of Cost Recovery	■	■	■	■								
S-5-1-5	Training of GWMC's Staff in Charge of Management of Cost Recovery	■	■			■	■			■	■		
S-5-1-6	Preparation of 3-Year Recurrent Cost Rolling Plan for Budgetary Arrangement by CDGG			■	■			■	■			■	■
S-5-1-7	Preparation of 3-Year Capital Investment Cost Rolling Plan for Budgetary Arrangement by GOPb.			■	■			■	■			■	■
S-5-2	Implementation of Accurate Total Costing (Preparatory Phase)												
S-5-2-1	Establishment of Cost Centre inside Financial Department of GWMC	■	■										
S-5-2-2	Monitoring and Streamlining of Latest Operating and Maintenance Cost for SWM Services			■	■	■	■	■	■	■	■	■	■
S-5-2-3	Implementation of Break-even Point Analysis				■				■				■
S-5-2-4	Estimation of Average and Marginal Costs per Unit Amount of Wastes				■				■				■
S-5-2-5	Preparation of Cost Minimisation Plan	■	■	■	■								
S-5-2-6	Preparation of Operation Manual for Standard Procedure for Cost Centre	■	■	■									
S-5-2-7	Training of Staff of Cost Centre		■		■		■		■		■		■
S-5-3	Introduction of Proper Tariff Charging System (Preparatory Phase)												
S-5-3-1	Forecasting Cost Recovery Level, Optimum Tariff Level and Required Amount of Subsidies	■	■										
S-5-3-2	Establishment of Draft Tariff Table for SWM Services									■	■		
S-5-3-3	Establishment of Standard Procedure for Tariff Setting							■	■				
S-5-3-4	Implementation of Customers' Willingness to Pay (WTP) Survey			■	■	■	■						
S-5-3-5	Implementation of Customers' Affordability to Pay (ATP) Survey			■	■	■	■						
S-5-3-6	Training of GWMC's Staff for Tariff Management		■		■		■		■		■		■
S-5-3-7	Negotiation with GOPb for Exploring Additional Surcharge of Provincial Property Tax											■	■
S-5-4	Implementation of Financially Efficient Private Sector Involvement (Preparatory Phase)												
S-5-4-1	Study of Tender Procedures for Service Contract									■	■	■	■
S-5-4-2	Study of Area and Scope of Service Contract									■	■	■	■
S-5-4-3	Review of Unit Cost of Outsourcing									■	■	■	■

Figure 6.6.1 Implementation Schedule of the Action Plan for Economic and Financial Aspect

Table 6.6.1 Implementation Cost of the Action Plan for Economic and Financial Aspect

WBS No.	WBS	Total Budget (Thousand Rs.)	Annual Cost		
			2016	2017	2018
Programme 5: Economic and Financial Plan					
Short-Term Plan					
S-5-1	Establishment of Sustainable Cost Recovery (Preparatory Phase)				
S-5-1-1	Establishment of Long-term Cost Recovery Strategies	GWMC			
S-5-1-2	Establishment of Financial Monitoring System through KPIs	GWMC			
S-5-1-3	Establishement of Standard Procedures for Monitoring Cost Recovery	GWMC			
S-5-1-4	Preparation of Manual for Management of Cost Recovery	GWMC			
S-5-1-5	Training of GWMC's Staff in Charge of Management of Cost Recovery	GWMC			
S-5-1-6	Preparation of 3-Year Recurrent Cost Rolling Plan for Budgetary Arrangement by CDGG	GWMC			
S-5-1-7	Preparation of 3-Year Capital Investment Cost Rolling Plan for Budgetary Arrangement by GOPb.	GWMC			
S-5-2	Implementation of Accurate Total Costing (Preparatory Phase)				
S-5-2-1	Establishment of Cost Centre inside Financial Department of GWMC	GWMC			
S-5-2-2	Monitoring and Streamlining of Latest Operating and Maintenance Cost for SWM Services	GWMC			
S-5-2-3	Implementation of Break-even Point Analysis	GWMC			
S-5-2-4	Estimation of Average and Marginal Costs per Unit Amount of Wastes	GWMC			
S-5-2-5	Preparation of Cost Minimisation Plan	GWMC			
S-5-2-6	Preparation of Operation Manual for Standard Procedure for Cost Centre	GWMC			
S-5-2-7	Training of Staff of Cost Centre	GWMC			
S-5-3	Introduction of Proper Tariff Charging System (Preparatory Phase)				
S-5-3-1	Forecasting Cost Recovery Level, Optimum Tariff Level and Required Amount of Subsidies	GWMC			
S-5-3-2	Establishment of Draft Tariff Table for SWM Services	GWMC			
S-5-3-3	Establishment of Standard Procedure for Tariff Setting	GWMC			
S-5-3-4	Implementation of Customers' Willingness to Pay (WTP) Survey	GWMC			
S-5-3-5	Implementation of Customers' Affordability to Pay (ATP) Survey	GWMC			
S-5-3-6	Training of GWMC's Staff for Tariff Management	186 (Included in GWMC's Staff Training Budget: Module 6)	62	62	62
S-5-3-7	Negotiation with GOPb for Exploring Additional Surcharge of Provincial Property Tax	GWMC			
S-5-4	Implementation of Financially Efficient Private Sector Involvement				
S-5-4-1	Study of Tender Procedures for Service Contract	196 (Included in GWMC's Staff Training Budget: Module 5)			196
S-5-4-2	Study of Area and Scope of Service Contract	GWMC			
S-5-4-3	Review of Unit Cost of Outsourcing	GWMC			
	Total (Short-Term)	382 (Included in GWMC's Staff Training Budget: Module 5 and 6)	62	62	258

6.7 Action Plan for Environmental Monitoring

6.7.1 Priority Projects of Environmental Monitoring

Priority projects are defined as the projects proposed for the short-term period of the Master Plan and they will be developed into the action plans in this chapter. Based on the discussions in **Chapter 4,** the following are selected as the priority projects of environmental monitoring:

- Project for Environmental Monitoring for the Collection and Transportation Work
- Project for Environmental Monitoring for the Final Disposal Site in Bhakhraywali

- Project for Environmental Monitoring for the Safe Post-Closure of Final Disposal Sites in Gondlanwala and Chianwali

6.7.2 Project for Environmental Monitoring for the Collection and Transportation Work

(1) Monitoring of Cleanness of Garbage Container

(a) Objectives of the Monitoring

This monitoring is carried out for making well-organized waste collection spaces and keeping clean environment for the following purposes:

- To avoid vector and odour;
- To keep the clean and aesthetic view of the vicinity; and
- To avoid dirty environment with garbage scattered around the containers.

(b) Methodology of the Monitoring

Location of Monitoring

This monitoring is to be carried out all over Gujranwala City, but it is actually made at the locations of containers. For example, nearly 60 container locations have been identified in Zone 6 and they should be targeted for monitoring. The container locations in Zone 6 are as indicated in **Figure 6.2.1 of Section 6.2**.

Monitoring Items

Following items will be monitored:

- Cleanness of container;
- Whether or not any waste is scattered around the container; and
- Whether waste is separately collected or mixed.

Monitoring Data Collection System

Data shall be collected through everyday inspection of containers by sanitary workers who shall record the situation in a monitoring format prepared by the Operation Unit of GWMC. This activity will start by the beginning of 2016.

Monitoring Feedback System

Everyday sanitary supervisors shall monitor the area served by the sanitary workers. Supervisors shall check the garbage containers in their individual working areas and record the situation in the monitoring format. Inspectors will check the record, and the record will be submitted to the Assistant Manager Operation who should file and control the data. In case the dirty situation of garbage container and its environment is serious, the case shall be reported to the Manager Operations, and immediate measures should be implemented on a timely manner.

(c) Cost of Monitoring

The monitoring work will be carried out as a part of daily work for sanitary supervisors so that no extra cost is required for the implementation of monitoring.

(2) Monitoring of Waste Separation at Household Level

(a) Objectives of the Monitoring

Waste separation at household level is an essential issue for building the 3R system that will result in the efficient and effective waste collection and transportation work. However, currently, residents do not have the custom of waste separation and implementation may have some difficulties and confusion. Therefore, this monitoring shall be conducted with the following objectives:

- To keep records on how households separate wastes in daily life;
- To evaluate the degree of diffusion of waste separation at household level; and
- To utilise the result of the evaluation for the awareness programme formulation.

(b) Methodology of the Monitoring

Location of Monitoring

Targets of household monitoring will be selected in all Gujranwala. As the first stage of monitoring, 100 households will be selected as monitoring samples from the 64 Urban Union Councils (UCs) that belong to the four major towns, Qila Didar Signh, Khiali Shah Pur, Aroop and Nandi Pur, and 25 households in each town will be selected.

Monitoring Items

The situation of residents' waste separation at households shall be monitored. In the Short-Term Period, the monitoring shall focus on three items; namely, (1) Kitchen waste; (2) Paper and plastic bags; and (3) Recyclable waste (e.g. valuable metal).

Monitoring Data Collection System

This monitoring shall be carried out once a year. The Assistant Manager Environmental Education will select the respondents and prepare the questionnaire, and field operation staff members will conduct the interviews. Data will be compiled and summarised by the Assistant Manage Environmental Education and the result will be submitted to the Senior Manager Communication. The result of monitoring will be utilised for public awareness activities to improve the achievement of separate waste collection.

Since one of the major public awareness programmes is planned in every April, the preparation for monitoring will be started in January 2016 and the interviews will be carried out in January. A summary of the results shall be submitted by the middle of March.

Monitoring Feedback System

Monitoring results will be filed in the section of Environmental Education under the Communication Unit for utilisation in the awareness programmes. After the results are summarised by the Assistant Manager of the Environmental Education Section, Manager Communication and Assistant Manager Communication in GWMC will review the result and feedback some of the results to the contents of public awareness programmes.

(c) Cost of the Monitoring

This monitoring will be carried out by GWMC employees, so that no extra cost is required for the implementation of monitoring.

6.7.3 Project for Environmental Monitoring for Final Disposal Site in Bhakhraywali

(1) Objectives of the Monitoring

The objectives of the monitoring are as follows:

- To monitor and record the environmental situation in Bhakhraywali site; and
- To take countermeasures in case any negative impact is recorded to reduce environmental damage.

(2) Methodology of the Monitoring

Since GWMC does not have facility for the measurement and analysis of environmental quality, the actual monitoring will be outsourced to an environmental monitoring laboratory (a private company). GWMC shall manage the contract for the monitoring work, the feedback of monitoring results and documentation.

(a) Location of Monitoring

Leachate in leachate pond shall be monitored. Two kinds of groundwater will be monitored: groundwater from shallow aquifer of about 20m in depth and from deep aquifer of about 60m in depth. Considering the water flow of a canal at the north side of the Bhakhraywali site, groundwater may flow from north to south. Therefore, one pair of sampler will be set at the north side of the disposal site, around the office and storage, and another pair will be set at the south side of the site. In the north side, the sampling location will be set at 50m distance from the office and storage because human drainage water from the office will be mixed in shallow aquifer. Monitoring for vegetation and plantation will be carried out in the Bhakhraywali site and its vicinity, and monitoring for safety and traffic will be targeted to access roads into the Bhakhraywali site. Location of the monitoring is shown in ***Volume 3, Supporting Report, Section G: Environmental and Social Considerations, Figure G.5.2***.

(b) Monitoring Items

The monitoring items together with their frequency and location in the project are summarised in **Table 6.7.1** below.

Table 6.7.1 Monitoring Items with Their Frequency and Location for Final Disposal Site in Bhakhraywali

Type of Monitoring	Frequency of Monitoring	Location of Monitoring	Parameters (Monitoring Items)
Ambient Air Quality	4 times in a year (January, April, July and October)	Four corners of the site	SPM, PM_{10}, SO_2, NO_2, CO, CO_2, Vapours
Groundwater Quality		North side of the disposal site around the office and storage; and South side of the site	pH, Temperature, TDS, Conductivity, Fluoride, Nitrate, DO, Hardness, Turbidity, Colour, Chloride, Arsenic, etc.
Noise Level		Four corners of the site	dB(A)
Smelly Gas Quality (Landfill Gasses)		At the pit in the pump station	SO_2, H_2S, CH_4
Treated Wastewater Effluent (Leachate Pond Effluent) Quality		At the exit of leachate pond	BOD, COD, TOC, TSS, DO, Chloride, Sulphate, Turbidity, Conductivity, Oil and Grease, Colour, TIN, Heavy metals
Leachate (Leachate Pond Influent) Quality		At the pit in the pump station	BOD, COD, TOC, TSS, DO, Chloride, Sulphate, Turbidity, Conductivity, Oil and Grease, Colour, TKN, Heavy metals
Situation of Vegetation and Plantation	Once a year (April)	Vicinity of the site	Visual inspection of plant species survival rate and status of maintenance
Situation of Safety and Traffic		Vicinity of the site	1) Inspection of Signage 2) Faulty, overloaded and speeding of vehicles

(c) Monitoring Data Collection System

Data will be collected by a private environmental laboratory, and the report is submitted to the Senior Manager Operations of GWMC. Frequency of the monitoring of data collection system is 4 times in a year (quarterly) except the "Situation of Vegetation and Plantation" and "Situation of Safety and Traffic". These two items will be carried out only once a year since these situations may not change drastically and therefore annual measurement will be enough. All monitoring in the year 2016 will be half since the construction work will start in Bhakhraywali from the second half of 2016.

(d) Monitoring Feedback System

After the result of monitoring is sent to GWMC, the Assistant Manager Operations shall check the results. If any serious environmental problem is found in the results, the Assistant Manager Operations will inform the Senior Manager Operations of the problems and provide solutions in consultation with the Senior Manager Operations and other related managers. In case no

major problem is reported, the results shall be reviewed by the Managing Director and filed in the Operation Section.

(3) Cost of Monitoring

The total cost of the project is estimated at Rs. 2,455,000. Cost estimate for the project is shown in ***Volume 3, Supporting Report, Section G: Environmental and Social Considerations, Table G.5.3*** while the unit price of each monitoring item is referred to Environmental Monitoring Plan in the EIA report (Source: Urban Unit, *"Environmental Impact Assessment (EIA) of Proposed Landfill Site at Gujranwala"*, 2015, Table 8-2: Environmental Monitoring Plan, pp. 223-225.). Monitoring items in the construction stage are different from those of the operation stage. The monitoring items in the construction stage are "Ambient Air Quality", "Groundwater Quality", "Noise Level", "Situation of Vegetation and Plantation", and "Situation of Safety and Traffic". On the other hand, the item of "Smelly Gas Quality", "Treated Wastewater Effluent Quality", and "Leachate Quality" will be additionally measured in the operation stage.

6.7.4 Project for Environmental Monitoring for Safe Post-Closure Final Disposal Sites in Gondlanwala and Chianwali

(1) Objectives of the Monitoring

There are three objectives of the monitoring:

- To record the environmental situation for the safe post-closure of disposal sites;
- To monitor safety of the closure process; and
- To take countermeasures in case any negative impact is recorded to reduce environmental damage.

(2) Methodology of the Monitoring

As in the previous project, the monitoring will be outsourced to an environmental monitoring laboratory (private company) due to lack of measurement equipment in GWMC. GWMC shall supervise the monitoring, feedback and documentation.

(a) Location of Monitoring

Two kinds of groundwater will be monitored: groundwater from shallow aquifer of about 20m in depth and deep aquifer of about 60m in depth. Regarding landfill gas and leachate, construction of a pumping station with a man-hole is to be planned for the clearing purpose and landfill gases and leachate is collected from the man-hole. Therefore, the sampling point of landfill gases and leachate is the same as the location of pump station. All the sampling locations in Gondlanwala and Chianwali are shown in ***Figure G.5.3 and Figure G.5.4***, respectively in ***Volume 3, Supporting Report, Section G: Environmental and Social Considerations***.

(b) Monitoring Items

For the safe post-closure monitoring, "Groundwater Quality", "Smelly Gas Quality" and "Leachate Quality" are selected since the impact to environment will be low compared to the operation stage of disposal site. **Table 6.7.2** shows the monitoring items of the project.

Table 6.7.2 Monitoring Items with Their Frequency and Location for Post-Closure Final Disposal Site in Gondlanwala and Chianwali

Type of Monitoring	Frequency of Monitoring	Location of Monitoring		Parameters (Monitoring Items)
		Gondlanwala	Chianwali	
Groundwater Quality	Once a year (April)	Around the office/weight bridge	At the north-west corner of the site	pH, Temperature, TDS, Conductivity, Fluoride, Nitrate, DO, Hardness, Turbidity, Colour, Chloride, Arsenic, etc.
Smelly Gas Quality (Landfill Gasses)		At the leachate pump station	At the leachate pump station	SO_2, H_2S, CH_4
Leachate Quality	4 times in a year (January, April, July and October)	At the leachate pump station	At the leachate pump station	BOD, COD, TOC, TSS, DO, Chloride, Sulphate, Turbidity, Conductivity, Oil and Grease, Colour, TKN, Heavy metals

(c) Monitoring Data Collection System

Data will be collected by a private environmental laboratory, and the report is submitted to the Senior Manager Operations of GWMC. The monitoring will be carried out in April since this month is between the dry season and the rainy season. This monitoring will start in April 2016.

(d) Monitoring Feedback System

The monitoring feedback system follows the same procedures as the previous project (see **Item (d), Subsection 6.7.3**).

(3) Cost of Monitoring

The total cost of the project is estimated at Rs. 2,595,000. The breakdown of cost estimate for the project is shown in ***Volume 3, Supporting Report, Section G: Environmental and Social Considerations, Table G.5.5*** while the unit price of each monitoring item is referred to the Environmental Monitoring Plan in the EIA report.

6.7.5 Implementation Schedule and Costs

Actions and costs required for the implementation of the Action Plan for Environmental Monitoring are summarised in **Figure 6.7.1 and Table 6.7.3**.

Time Framework of the Master Plan		Short-Term Plan Period											
Year		2016				2017				2018			
Quarter		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WBS for Short-Term Plan													
S-6-1	Environmental Monitoring for Collection and Transport Work												
S-6-1-1	Monitoring of Cleanness of Garbage Container												
S-6-1-2	Monitoring of Waste Separation at Household Level												
S-6-2	Environmental Monitoring for Final Disposal Site in Bhakhraywall												
S-6-2-1	Monitoring of Ambient Air Quality												
S-6-2-2	Monitoring of Groundwater Quality												
S-6-2-3	Monitoring of Noise and Vibrations												
S-6-2-4	Monitoring of Smelly gases												
S-6-2-5	Monitoring of Treated Waste Water Effluent												
S-6-2-6	Monitoring of Leachate												
S-6-2-7	Monitoring of Vegetation Plantation												
S-2-6-8	Monitoring of Safety and Traffic												
S-6-3	Environmental Monitoring for Post-Closure Final Disposal Sites In Gondlanwala and Chianwali												
S-6-3-1	Monitoring of Leachate and Surface Water												
S-6-3-2	Monitoring of Groundwater Quality												
S-6-3-3	Monitoring of Landfill Gases												

Figure 6.7.1 Implementation Schedule of the Action Plan for Environmental Monitoring

Table 6.7.3 Implementation Cost of the Action Plan for Environmental Monitoring

WBS No.	WBS	Total Budget (Thousand Rs.)	Annual Cost		
			2016	2017	2018
Programme 6: Environmental Monitoring Plan					
Short-Term Plan					
S-6-1	Environmental Monitoring for Collection and Transport Work	0	0	0	0
S-6-1-1	Monitoring of Cleanness of Garbage Container	0	0	0	0
S-6-1-2	Monitoring of Waste Separation at Household Level	0	0	0	0
S-6-2	Environmental Monitoring for Final Disposal Site in Bhakhraywall	2,455	435	870	1,150
S-6-2-1	Monitoring of Ambient Air Quality	400	80	160	160
S-6-2-2	Monitoring of Groundwater Quality	300	60	120	120
S-6-2-3	Monitoring of Noise and Vibrations	100	20	40	40
S-6-2-4	Monitoring of Smelly gases	40	0	0	40
S-6-2-5	Monitoring of Treated Waste Water Effluent	120	0	0	120
S-6-2-6	Monitoring of Leachate	120	0	0	120
S-2-6-7	Monitoring of Vegetation Plantation	1,250	250	500	500
S-2-6-8	Monitoring of Safety and Traffic	125	25	50	50
S-6-3	Environmental Monitoring for Post-Closure Final Disposal Sites In Gondlanwala and Chianwali	140	0	0	140
S-6-3-1	Monitoring of Leachate and Surface Water	60	0	0	60
S-6-3-2	Monitoring of Groundwater Quality	20	0	0	20
S-6-3-3	Monitoring of Landfill Gases	60	0	0	60
	Total (Short-Term)	2,595	435	870	1,290

6.8 Action Plan for Institutional Strengthening and Organizational Restructuring

6.8.1 Priority Projects of Institutional Strengthening and Organizational Restructuring

Priority projects are defined as the projects proposed for the short-term period of the Master Plan and they will be developed into the action plans in this chapter. Based on the discussions in **Chapter 4,** the following are selected as the priority projects of institutional strengthening and organizational restructuring:

- Project for Organizational Restructuring of GWMC;
- Project for Capacity Development of GWMC Staff; and
- Project for Establishment of Gujranwala Solid Waste Management By-Law.

6.8.2 Project for Organizational Restructuring of GWMC

As shown in **Subsection 4.10.3**, the organizational restructuring realises the creation of new departments and the reinforcement of personnel. The required actions are presented as follows:

- To strengthen the Operation (Field) Unit by allocating 7 additional Assistant Managers Operations until 2018;
- To establish the Manager Complaint Management post under GM Operations and allocate the manager until 2018;
- To establish the Intermediate Treatment Unit under the Operations Department and allocate an Assistant Manager Intermediate Treatment until 2018;
- To establish the Communication Unit under the GM Operations by shifting the Manager Communication and the Assistant Manager Communication from the Human Resources and Administration Department;
- To strengthen the Procurement and Contract Department for PPP Introduction of Collection and Transport; and
- To establish the Monitoring and Evaluation Department under the GM Operations and allocate the General Manager Monitoring and Evaluation and 3 Managers Monitoring and Evaluation (KPI, Finance and Environment) until 2018.

As shown in **Table 4.10.4 of Subsection 4.10.3**, the required number of GWMC staff in the first three years of the short-term period is estimated at 66 or an increase of 20 personnel from the current number, 46.

GWMC should ensure the budget to cover the whole activities of recruitment, such as publicity, selection and employment, and shall carry out a series of adoption continuously. At the same time, it is necessary that GWMC shall plan the layout of office spaces and equipment with the increase in the number of staff. In addition, the compensation structure which depends on individual title, capacity and job tenure, and welfare should be reviewed from time to time.

6.8.3 Project for Capacity Development of GWMC Staff

Detail of eight (8) modules for capacity development programmes as the human resources development is discussed in **Subsection 4.3.2**. In this project, it is recommended that all the modules should start from the beginning of the short-term period as the following activities for three years:

- Two (2) 2-day sessions of *Overall Management Capacity for SWM* programme (Module 1) for GWMC managerial staff in 2016;
- Four (4) 1-day sessions of *Capacities for Collection and Transport* programme (Module 2) for GWMC managerial staff from 2016 to 2017;
- One (1) 1-day session of *Seminar for Sanitary Worker* programme (Module 1&2) for sanitary workers in 2016;

- Two (2) 2-day sessions of *Capacity on Intermediate Treatment and 3R Promotion* programme (Module 3) for GWMC managerial staff in 2018;
- Twelve (12) 2-day sessions of *Sanitary Landfill Site Management* programme (Module 4) for GWMC managerial staff from 2016 to 2018;
- Four (4) 1-day sessions of *Public-Private Partnership* programme (Module 5) for GWMC managerial staff and personnel of private sector from 2017 to 2018;
- Four (4) 2-day sessions of *Financial Management* programme (Module 6) for GWMC managerial staff from 2017 to 2018;
- Two (2) 2-day sessions of *Organizational and Legal Improvement* programme (Module 7) for GWMC managerial staff in 2017; and
- Six (6) 2-day sessions of *Community Participation* programme (Module 8) for GWMC managerial staff, personnel of the private sector, personnel of CBO and personnel of NGO from 2016 to 2018.

GWMC is going to entrust a part of the business to the private sector; therefore, its participation in some training programmes is necessary. Additionally, some training programmes which will invite many participants and the training programme for managers should be scheduled not to disturb the daily operations.

6.8.4 Project for Establishment of Gujranwala Solid Waste Management By-Law

CDGG/GWMC had already embarked on drafting the by-law and shall continue the task towards its enactment. In the process of finalising of the by-law, a series of public hearings will be held in the 8 districts of Gujranwala City to exchange opinions about the contents to be included in the by-law. Since the current by-law is in English, it should be translated into Urdu language for easier understanding of Gujranwala citizens.

The approved by-law can be an important official document to support the implementation of the Master Plan. In the meantime and since it might take a long time to establish the by-law, GWMC has to manage all the related organizations, especially the CDGG side schedule towards the establishment. However approval of the by-law is not expected during the short-term. Therefore, the first three years of this project does not need a budget.

6.8.5 Implementation Schedule and Costs

Actions and costs required for implementation of the Action Plan for Institutional Strengthening and Organizational Restructuring are summarised in **Figure 6.8.1 and Table 6.8.1**.

Time Framework of the Master Plan		Short-Term Plan Period											
Year		2016				2017				2018			
Quarter		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
WBS for Short-Term Plan													
S-7-1	Improvement of Organisational Restructuring of GWMC												
S-7-1-1	Establishment of New Posts (Mgr. Complaint Management, Intermediate Treatment Unit, Communication Unit and Monitoring & Evaluation Dept.)												
S-7-1-2	Public Offering the Posts												
S-7-1-3	Selection and Adoption												
S-7-1-4	Orientation and OJT												
S-7-2	Capacity Development of GWMC Staff												
S-7-2-1	Training Programme of Overall Management Capacity for SWM												
S-7-2-2	Training Programme of Capacities for Collection and Transport												
S-7-2-3	Training Programme of Capacity on Intermediate Treatment and 3R Promotion												
S-7-2-4	Training Programme of Sanitary Landfill Site Management												
S-7-2-5	Training Programme of Public-Private Partnership												
S-7-2-6	Training Programme of Financial Management												
S-7-2-7	Training Programme of Organisational and Legal Improvement												
S-7-2-8	Training Programme of Community Participation												
S-7-3	Establishment of Gujuranwala Solid Waste Management By-Law												
S-7-3-1	Finalisation of Draft By-Law												
S-7-3-2	Establishment of Related Regulation												

Figure 6.8.1 Implementation Schedule of the Action Plan for Institutional Strengthening and Organizational Restructuring

Table 6.8.1 Implementation Cost of the Action Plan for Institutional Strengthening and Organizational Restructuring

WBS No.	WBS	Total Budget (Thousand Rs.)	Annual Cost		
			2016	2017	2018
Programme 7: Institutional Strengthening and Organizational Plan					
Short-Term Plan					
S-7-1	Improvement of Organisational Restructuring of GWMC	38,858	8,180	13,234	17,443
S-7-1-1	Establishment of New Posts (Mgr. Complaint Management, Intermediate Treatment Unit, Communication Unit and Monitoring & Evaluation Dept.)	GWMC			
S-7-1-2	Public Offering the Posts	GWMC			
S-7-1-3	Selection and Adoption	GWMC			
S-7-1-4	Orientation and OJT	38,858	8,180	13,234	17,443
S-7-2	Capacity Development of GWMC Staff	8,695	6,109	1,284	1,302
S-7-2-1	Training Programme of Overall Management Capacity for SWM	679	679	0	0
S-7-2-2	Training Programme of Capacities for Collection and Transport	5,065	4,740	173	153
S-7-2-3	Training Programme of Capacity on Intermediate Treatment and 3R Promotion	309	0	0	309
S-7-2-4	Training Programme of Sanitary Landfill Site Management	896	312	292	292
S-7-2-5	Training Programme of Public-Private Partnership	196	0	98	98
S-7-2-6	Training Programme of Financial Management	186	0	93	93
S-7-2-7	Training Programme of Organisational and Legal Improvement	270	0	270	0
S-7-2-8	Training Programme of Community Participation	1,094	378	358	358
S-7-3	Establishment of Gujuranwala Solid Waste Management By-Law	0	0	0	0
S-7-3-1	Finalisation of Draft By-Law	GWMC			
S-7-3-2	Establishment of Related Regulation	Gov. of the Punjab			
	Total (Short-Term)	47,552	14,289	14,518	18,745

CHAPTER 7. CONCLUSION

The Vision of solid waste management for Gujranwala City, i.e., *"Transformation of Gujranwala to the Cleanest City of Punjab"*, is the ultimate goal for all the residents of Gujranwala. To realise it, the target collection rate of 100% for the area of 64 urban UCs in year 2018 and for the area of 34 peri-urban UCs in addition to the 64 UCs in 2030 should firstly be achieved with dedication and dispatch. For pursuing this goal, the proposed projects in the Master Plan should be carried out as well since implementation of these projects will bring large benefits to the Gujranwala residents.

The total project cost of the Master Plan is Rs. 20,497 million for the period of 15 years from 2016 to 2030, summing up the investment cost of Rs. 10,848 million, the operation and maintenance cost of Rs. 8,490 million and the replacement cost of Rs. 1,158 million for all project components. Although the project cost seems to be huge, the total benefit of the Master Plan is estimated at Rs. 25,139 million for the 15 years, which is larger than the project cost, and the results of the economic evaluation show that implementation of the Master Plan is economically feasible and financially viable.

Introduction of the proposed waste collection and transportation system is based on the waste separation at source and requires the residents' understanding of the importance of 3R and their cooperation. Considering the low level of public awareness on integrated solid waste management (ISWM) of the residents in Gujranwala, public awareness raising and the implementation of environmental education are indispensable for the promotion of 3R even if the visible effects of the ISWM will take quite a long time to appear.

Since any kind of waste of whatever disposal method is adopted should finally go to a final disposal site, the new landfill site in Bhakhraywali shall be secured appropriately before the existing disposal site in Gondlanwala is filled up. In accordance with the increase of waste collection amount, however, the life of the Bhakhraywali site will be shortened; that is, construction of another new disposal site is additionally necessary by the end of 2023.

With regard to sustainability of the ISWM, the Master Plan proposes the introduction of an appropriate tariff charging system. Since there is currently no official tariff system for ISWM services in Punjab and this seems to be a political issue to some extent, it is suggested that tariff shall be partially charged in high-income and middle-income areas from 2022 and extended to the low-income areas from 2025. To enable the collection of user charges, the residents should fully understand the necessity of proper ISWM.

One of the integral parts of the ISWM in Gujranwala through the PPP scheme is to introduce the service contract system of waste collection and transportation from 2025 and establish and operate a central compost plant managed by the SPV (Special Purpose Vehicle) from 2020. As long as the outsourcing of waste collection and transportation services and operation of the compost plant in Lahore are properly observed, this private sector involvement option will be workable in Gujranwala.

Simultaneously, the Government of the Punjab, including the City District Government Gujranwala (CDGG) and the Gujranwala Waste Management Company (GWMC), should consider that some financial arrangements are indispensable for the implementation of the action plans. It should also be recognised that the implementation of proper ISWM requires a financial burden primarily from the government, but the responsibility should be shared equally by the government or public sector, the private collectors or private sector, and the residents or people. In this sense, the environmental education and public awareness raising on the ISWM is crucial to the success of the projects.

CHAPTER 8. RECOMMENDATIONS

The JICA Project Team recommends that the Government of the Punjab (GOPb), the City District Government Gujranwala (CDGG) and the Gujranwala Waste Management Company (GWMC) should carry out the action plans in the ISWM Master Plan from year 2016. To achieve 100% waste collection firstly for the area of the 64 UCs, the required number of waste collection vehicles and containers shall be procured appropriately. Also, since the waste collection and transportation system is proposed based on the waste separation at source, the project for the introduction of separate collection through the implementation of a pilot project shall be carried out simultaneously.

The construction of a new final disposal site is inevitable by 2018, so that the land acquisition at Bhakhraywali should be completed immediately and the design and engineering works should be started accordingly. Safe post-closure work for the former landfill site in Chianwali and improvement work for the existing landfill site in Gondlanwala should also be conducted by using the Government and GWMC's own budget to mitigate the negative impacts on the surrounding environment.

In addition, the GOPb, the CDGG and the GWMC should commence the environmental education programmes and public awareness raising campaigns that are the bottom line of the ISWM in order to disseminate the waste separation at source and to proceed to the next stage of project implementation smoothly such as the construction of compost plant and the introduction of waste charges.

With regard to project implementation apart from the one mentioned above, a more detailed study including situation analysis should be carried out in terms of hospital, industrial, and construction and demolition waste management, since it is out of the scope of this project but closely related to the current operation by GWMC.

ANNEXES

ANNEX 1

RECORD OF DISCUSSIONS

ON

PROJECT FOR INTEGRATED SOLID WASTE MANAGEMENT MASTER PLAN IN GUJRANWALA

IN

THE ISLAMIC REPUBLIC OF PAKISTAN

AGREED UPON BETWEEN

THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF PAKISTAN

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Lahore, 20 February, 2013

Mr. Takatoshi Nishikata
Chief Representative
JICA Pakistan Office

Mr. Afzal Latief
Joint Secretary(ADB/Japan)
Economic Affairs Division
Government of Pakistan

Mr. Sikandar Sultan Raja
Secretary
Local Government &
Community Development
Department
Government of the Punjab

Mr. Arif Anwar Baloch
Secretary
Planning & Development
Department
Government of the Punjab

Mr. Najam Ahmad Shah
District Coordination Officer
City District Government
Gujranwala

Based on the minutes of meeting on the Detailed Planning Survey on the Project for Integrated Solid Waste Management Master Plan in Gujranwala (hereinafter referred to as "the Project") signed on October 11, 2011 between the authorities concerned of the Islamic Republic of Pakistan (hereinafter referred to as "Pakistan") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), and the PC-II which was approved by Central Development Working Party (hereinafter refereed to CDWP) on 22nd November 2012, Both parties agreed the details of the Project and the main points discussed as described in Appendix 1 and Appendix 2, respectively.

Both parties also agreed that City District Government Gujranwala ((hereinafter referred to as "CDGG") the counterpart to JICA, will be responsible for the implementation of the Project in cooperation with JICA, coordinate with other relevant organizations and ensure that the self-reliant operation of the Project is sustained during and after the implementation period in order to contribute toward social and economic development of Pakistan.

The Project will be implemented within the framework of the Agreement on Technical Cooperation signed on April 30, 2005 (hereinafter referred to as "the Agreement") and the Note Verbales is exchanged between the Government of Japan (hereinafter referred to as "GOJ") and the Government of Pakistan (hereinafter referred to as "GOP").

Appendix 1: Project Description
Appendix 2: Main Points Discussed

RECEIVED
26 FEB 2013
BY: 4

Appendix 1

PROJECT DESCRIPTION

I. BACKGROUND

Solid Waste Management (hereinafter referred to as "SWM") has become a serious problem in Punjab due to rapid urbanization, uncontrolled population growth, lack of resources, institutional weaknesses and lack of civic sense towards solid waste disposal.

The average solid waste collection efficiency in Punjab is only around 50% causing spread of multiple diseases such as diarrhea and dengue fever. Whatever quantity of waste is collected, it is normally dumped in open areas along the roadsides, canal banks and low lying areas. The land contamination is affecting the quality of groundwater from shallow depth. Un-collected waste is illegally piled on sidewalks, in open spaces, sewer lines, or even in canals, and blockages of waste water flow in the sewers are seen and cause additional load for the local government.

In the Punjab Vision 2020, waste management is located under the priority area of water supply, sewerage and sanitation (WSS), and through the Urban Unit (hereinafter referred to as "UU") of the Government of the Punjab (hereinafter referred to as "GOPb"), solid waste management strategy was developed as the Guidelines of Solid Waste Management issued in 2007. GOPb has been tackling the issues which contribute to an improvement of solid waste management based on the guidelines.

However, the budget for SWM in Punjab is restrictive, and about 80% of the budget is spent on personnel expenses or institutional administrative expenses.

Moreover, although SWM is to be performed on the responsibility of each district government under the law, since the laws or the guidelines on SWM are not fully implemented, how to conduct SWM effectively and efficiently under the limited human resources and budget in each local government has been an important issue to be solved.

In 2009, JICA commissioned a sector study to take stock of the current status, problems, and necessity of the assistance in SWM sector in seven (7) major cities of Punjab Province. Through the study, the degree of assistance needs for SWM, SWM related budget, the number of the related department personnel, existence of master plan, existence of other donor support, existence of self-financed activities, motivation/commitment of top management, etc. were investigated. Based on the results of the study, followed by a series of discussion made by GOPb and JICA, the necessity of the assistance for SWM sector was ascertained, and in addition, Gujranwala city was identified as the highest priority among the surveyed cities considering the highly motivated top management and SWM related staff, no existence of donor support ever, conducting waste collection under the limited budget and etc.

Government of Japan received the official request, submitted by CDGG through UU, from Economic Affairs Division on July 30, 2010 for the Technical Cooperation to formulate the Master Plan to address improvement of SWM in Gujranwala. GOPb has also a plan to replicate the results of the Project to other major cities in Punjab.

In response to the request form GOP, the Japanese Detailed Planning Study Team (hereinafter referred to as "the Team") headed by Ms. Hiroko Kamata was sent to Pakistan by JICA from September 28 to October 19, 2011 for the purpose of discussing and confirming the scope of work for the Project for Integrated Solid Waste Management Master Plan in Gujranwala (hereinafter referred to as "the Project").

II. OUTLINE OF THE PROJECT

1. Title of the Project

Project for Integrated Solid Waste Management Master Plan in Gujranwala

2. Objectives of the Project

(1) To develop a Master Plan of Integrated Solid Waste Management for Gujranwala City
(2) To enhance the Institutional Capacity for Implementation of the SWM Master Plan
(3) To draw lessons and best practices for replication of the master plan in other major cities of Punjab

3. Target year of the Master Plan

The Master Plan will be developed from 2013 to 2015 through the technical assistance from JICA. The implementation period of the master plan is from 2015 to 2025. Both sides agreed that the scope of the master plan is from 2015 to 2025.

4. Activities to be done by PMU

Phase 1: Review and analysis of the present situation

(1) Establishment of Project Management Unit (PMU)
(2) Collection and review of relevant data and reports on solid waste management (solid waste discharge, collection, intermediate treatment, existing recycling firms for municipal solid waste, illegal dumping sites, final disposal, medical and industrial waste, institutional systems, and privatization schemes)
(3) Review of past and on-going studies and development projects related to solid waste management
(4) Capacity Assessment of Individuals and Institutions
(5) Survey of the present conditions
    i) Social and economic analysis
    ii) Review of existing laws, regulations, policies and institutional arrangements related to solid waste management
    iii) Financial and managerial conditions
(6) Field survey and investigation

i) Characterization Study (Quantitative/Qualitative, 3 times seasonally, April-May, Aug-Sep., Jan-Feb, including public awareness)
ii) Time and Motion Study
iii) Measurement of waste volume/weight of waste collection vehicle

(7) Survey of the Final Disposal Site
i) Survey on candidate sites for final disposal
ii) Selection of Final Disposal Site
iii) Environmental Impact Assessment for candidate site(s) by CDGG
iv) Social consideration around candidate site(s) (surrounding residents or natural environment)
v) Geological Survey of existing dumpsite
vi) Topographic Survey of existing dump site
vii) Water Quality Survey around existing dump site and candidate site(s)

Phase 2: Formulation of a Master Plan

(1) Formation of basic strategy (setting up future socio-economic framework)
(2) Estimation of prospective amount of generated solid waste
(3) Estimation of resources, equipment and machinery, human resource, method of waste disposal
(4) Planning of how to procure resources in different stages according to the geographical zoning
(5) Formulation of an integrated master plan (strategy, dimensions of the plan and projects, financial and management plan, institution and organization plan, facility plan, operation and maintenance plan, and human resources development plan)
(6) Selection of priority project(s)
(7) Seminars, Trainings and workshops
(8) Environmental and social consideration study; and
(9) Cost estimation of projects under Integrated Solid Waste Master Plan and formulate implementation plan

Phase 3: Action Plans for the target year 2025

(1) Selection of priority projects for Grant Aid and/or Technical Cooperation Project and/or Loan
(2) Clarification of approximate costs for the priority projects; and
(3) Formulation of action plans and a road map for implementation

5. Input

(1) Input by JICA

(a) Dispatch of Mission
i) Solid Waste Management (1)
ii) Final Disposal Plan (1)
iii) Waste Collection and Transport Plan (1)
iv) Intermediate Treatment and 3R Plan (1)
v) People's Participation / Environmental Education (1)
vi) Financial affairs and business management analysis (1)
vii) Environmental impact assessment and social consideration (1)

viii) Institutional Strengthening and Restructuring Plan (1)
Input other than indicated above will be determined through mutual consultations between JICA and GOPb during the implementation of the Project, if necessary.

(2) Input by CDGG and GOPb

CDGG and GOPb will take necessary measures to provide at its own expense:

(a) Services of CDGG and GOPb counterpart personnel and administrative personnel as referred to in II-6;
(b) Suitable office space with necessary equipment;
(c) Supply or replacement of machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the equipment provided by JICA;
(d) Information as well as support in obtaining medical service;
(e) Credentials or identification cards;
(f) Available data (including maps and photographs) and information related to the Project;
(g) Running expenses necessary for the implementation of the Project;
(h) Expenses necessary for transportation within Pakistan of the equipment referred to in II-6 as well as for the installation, operation and maintenance thereof; and
(i) Necessary facilities to members of the JICA missions for the remittance as well as utilization of the funds introduced into Pakistan from Japan in connection with the implementation of the Project.

6. Implementation Structure

The proposed implementation structure, described below, will be discussed again and confirmed in the Joint Coordination Committee (JCC) meeting to be held at the start of the project as and when deemed appropriate.

The roles and assignments of relevant organization's staff are as follows:

(1) City District Government Gujranwala (CDGG)

1-1 District Coordination Officer (DCO) — Deputy Project Director
Incharge of liaison with Project Director on important project related matters (financial, interdepartmental coordination, staff recruitment & retention, addressing of bottlenecks & challenges that may cause potential delay in smooth implementation of the project etc.)

1-2 Executive District Officer (EDO) (MS: Municipal Services) Project Manager;
Responsible for overall

		project administration and implementation in line with RD & in cooperation with JICA project Team.
1-3 Executive District Officer (EDO) (F&P)		Incharge of overseeing the implementation (activities and funds disbursements etc.) of PC-[1]I & PC-II [2]approved by the competent authorities and their alignment with agreed Record of Discussion (RD) & JICA supported project.
1-4	District Officer (DO) (SWM)	Project Team Member
1-5	District Officer (DO) (Environment)	Project Team Member
1-6	Chief Sanitary Inspector (Zone 1)	Project Team Member
1-7	Chief Sanitary Inspector (Zone 2)	Project Team Member
(2) The Urban Unit (UU)		
2-1	Chief Executive Officer	Incharge of project knowledge management and its further utilization in other cities/districts of Punjab.
2-2	Urban Planner	Incharge of ensuring Integration of project knowledge management in overall Urban Planning of Punjab province
2-3	Sr. SWM Specialist	Project Focal Person
2-4	SWM Professional	Project Focal Person
2-5	Senior GIS Specialist	Project Team Member
2-6	Senior M&E Specialist	Project Team Member
2-7	Research Associate	Project Team Member
2-8	Research Assistant	Project Team Member

[1] Waste Managers for Integrated Solid Waste Management Master Plan in Gujranwala City Estimated Cost: Rs. 41.71 Million

[2] Integrated Solid Waste Management Master Plan Study in Gujranwala Study Estimated Cost: Rs 276.39 million

(3) Members of the JICA missions
Members of the JICA missions will give necessary technical guidance, advice and recommendations to CDGG and UU on any matters pertaining to the implementation of the Project.

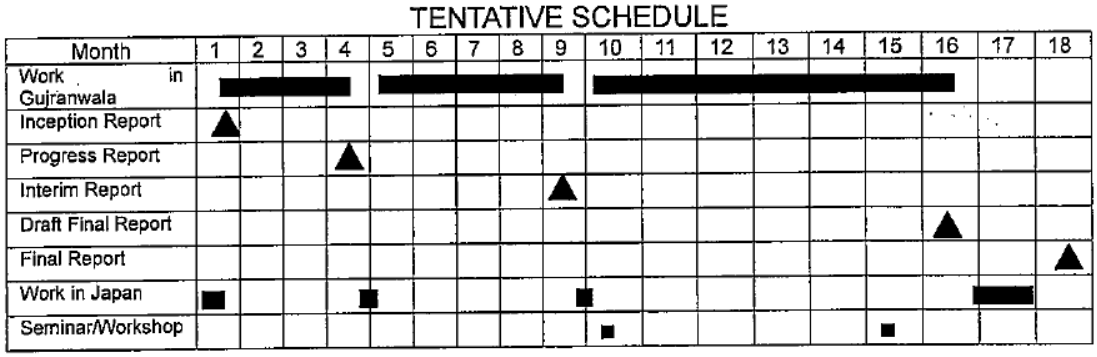
(4) Project Management Unit (PMU)
JICA Project Team, CDGG and GOPb will create a Project Management Unit (PMU) that will implement and manage the Project. During the Project, four (4) research assistants/associates from UU and eight (8) solid waste managers from CDGG will acquire On-The-Job-Training from the JICA Project Team. The implementation structure of PMU is shown in Annex 1.

(5) Joint Coordination Committee
Joint Coordination Committee (hereinafter referred to as "JCC") will be established in order to facilitate inter-organizational coordination. JCC will be held whenever deems it is necessary. A list of proposed members of JCC is shown in Annex 2.

7. Project Site(s) and Beneficiaries
Gujranwala City and its people

8. Duration
The duration of the Project would be eighteen (18) months from the date when the JICA Project Team member(s) arrives. The Project will be carried out in accordance with the tentative schedule as below. The schedule is tentative and subject to change when both parties agree upon any necessity that will arise during the course of the Project.

TENTATIVE SCHEDULE



9. Reports
JICA will prepare and submit the following reports to CDGG and UU in English.
(1) Thirty (30) copies of Inception Report at the commencement of the first work period in Pakistan
(2) Thirty (30) copies of Progress Report three (3) months after the commencement of the first work period in Pakistan
(3) Thirty (30) copies of Interim Report about eight (8) months after the commencement of the first work period in Pakistan
(4) Fifty (50) copies of Draft Final Report at the end of the last work period in

Pakistan

(5) Fifty (50) copies of Final Report within one (1) month after the receipt of the comments on the Draft Final Report

10. Environmental and Social Considerations

CDGG and UU agreed to abide by 'JICA Guidelines for Environmental and Social Considerations' in order to ensure that appropriate considerations will be made for the environmental and social impacts of the Project.

III. UNDERTAKINGS OF CDGG, GOPb AND GOP

1. CDGG, GOPb and the Government of Pakistan will take necessary measures to:

(1) ensure that the technologies and knowledge acquired by the Pakistan nationals as a result of Japanese technical cooperation contributes to the economic and social development of Pakistan, and that the knowledge and experience acquired by the personnel of Pakistan from technical training as well as the equipment provided by JICA will be utilized effectively in the implementation of the Project; and

(2) grant privileges, exemptions and benefits to members of the JICA missions referred to in II-5 (1) above and their families, which are no less favorable than those granted to experts of third countries performing similar missions in Pakistan under the Colombo Plan Technical Cooperation Scheme.

2. CDGG, GOPb and the Government of Pakistan will take necessary measures which are agreed on the Agreement of Technical Cooperation between the Government of Pakistan and Japan (Annex 3).

IV. PROMOTION OF PUBLIC SUPPORT

For the purpose of promoting support for the Project, CDGG and GOPb will take appropriate measures to make the Project widely known to the people of Pakistan.

V. MUTUAL CONSULTATION

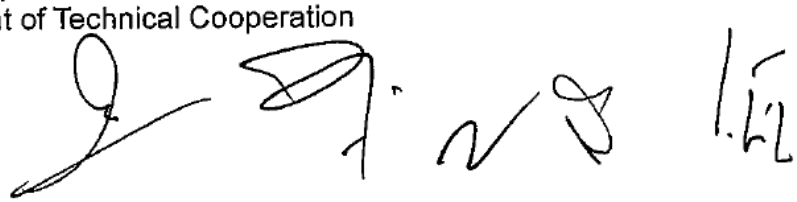
JICA, CDGG and GOPb will consult each other whenever any major issues arise in the course of Project implementation.

VI. AMENDMENTS

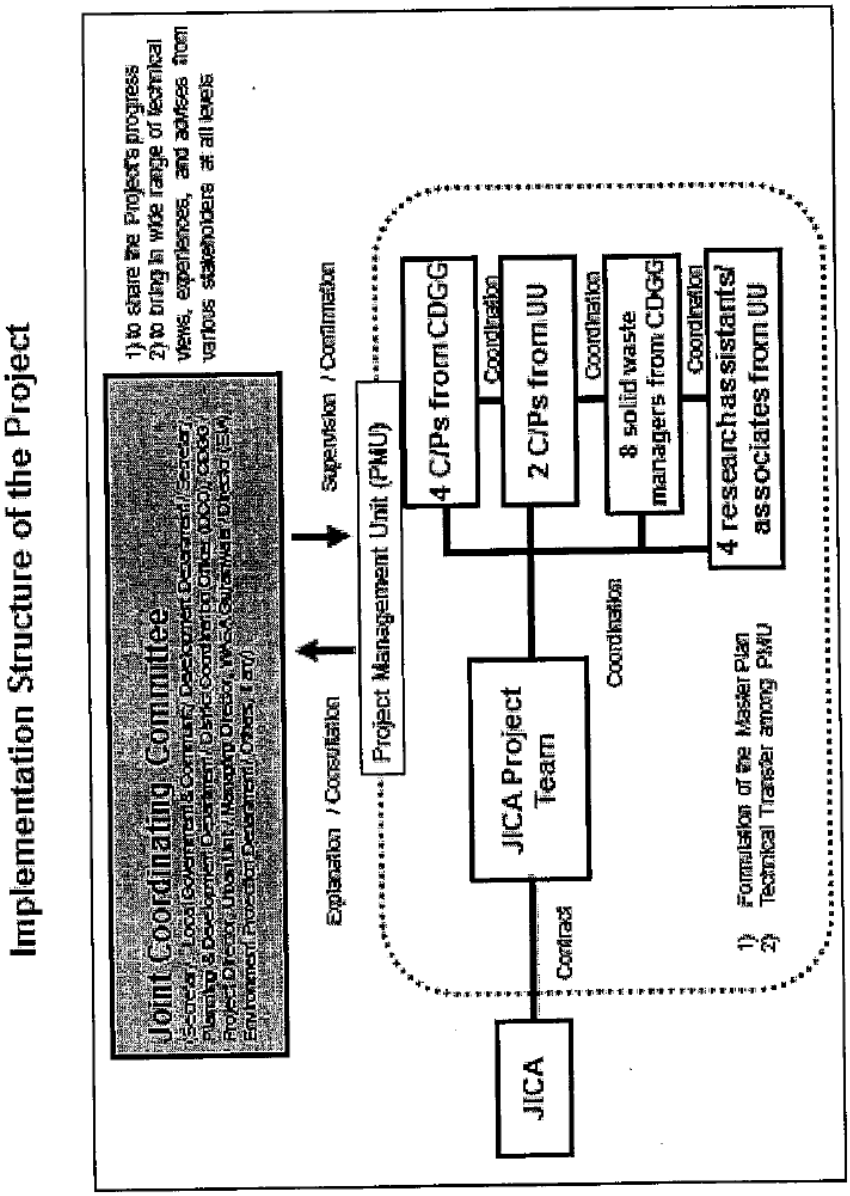
The record of discussions may be amended by the minutes of meetings among JICA, CDGG, GOPb, and EAD if necessary.

The minutes of meetings will be signed by authorized persons of each side who may be different from the signers of the record of discussions.

Annex 1 Implementation Structure of the Project
Annex 2 List of Proposed Members of Joint Coordinating Committee
Annex 3 Agreement of Technical Cooperation



Annex 1 Implementation Structure of the Project



Annex 2 List of Proposed Members of Joint Coordinating Committee

The proposed Joint Coordination Committee (JCC) structure, described below, will be discussed again and confirmed in the JCC meeting to be held at the start of the project as and when deemed appropriate.

A: Government of the Punjab (GOPb)

1. Planning & Development (P&D) Department

1-1 Secretary

2. Local Government & Community Development Department

2-1 Secretary — Project Director

3 The Urban Unit (UU)

3-1 Chief Executive Officer (CEO)

3-2 Urban Planner

4 Water and Sanitation Agency (WASA), Gujranwala

4-1 Managing Director

5 Environment Protection Department

5-1 Director (EIA), Environmental Impact Assessment

6 City District Government Gujranwala (CDGG)

6-1 District Coordination Officer (DCO) — Deputy Project Director

6-2 Executive District Officer (Municipal services) — Project Manager

7 Economic Affairs Division (EAD)

7-1 Deputy Secretary-Japan — Incharge of Japan affairs in EAD

B: Government of Japan

1 JICA Pakistan Office

1-1 Senior Representative or/and Resident Representative

1-2 National Staff incharge of Environment Sector

2 JICA Study Team

2-1 Team Leader

2-2 Team Members (All those working in the project)

Annex 3 Agreement of Technical Cooperation

AGREEMENT ON TECHNICAL COOPERATION BETWEEN THE GOVERNMENT OF THE ISLAMIC REPUBLIC OF PAKISTAN AND THE GOVERNMENT OF JAPAN

The Government of the Islamic Republic of Pakistan and the Government of Japan,

Desiring to strengthen further the friendly relations existing between the two countries through the promotion of technical cooperation, and

Considering mutual benefits derived from promoting the economic and social development of their respective countries,

Have agreed as follows:

Article I

The two Governments (hereinafter referred to as "the Parties") shall endeavor to promote technical cooperation between the two countries.

Article II

Separate arrangements which govern specific technical cooperation programs carried out under this Agreement shall be agreed upon between the competent authorities of the Parties. The competent authority of the Government of the Islamic Republic of Pakistan is the Ministry of Economic Affairs and Statistics (Economic Affairs Division), and the competent authority of the Government of Japan is the Ministry of Foreign Affairs.

Article III

The following forms of technical cooperation will be carried out by the Japan International Cooperation Agency (hereinafter referred to as "JICA") at its own expense in accordance with the laws and regulations in force in Japan as well as with the arrangements referred to in Article II:

(a) Providing technical training to Pakistani nationals;

(b) dispatching experts (hereinafter referred to as the "Experts") to the Islamic Republic of Pakistan;

(c) dispatching Japanese volunteers with a wide range of technical skills and abundant experience (hereinafter referred to as the "Senior Volunteers") to the Islamic Republic of Pakistan;

(d) dispatching Japanese missions (hereinafter referred to as the "Missions") to the Islamic Republic of Pakistan to conduct surveys of economic and social development projects of the Islamic Republic of Pakistan;

(e) providing the Government of the Islamic Republic of Pakistan with equipment, machinery and materials; and

(f) providing the Government of the Islamic Republic of Pakistan with other forms of technical cooperation as may be decided upon by mutual consent between the Parties.

Article IV

The Government of the Islamic Republic of Pakistan shall ensure that the techniques and knowledge acquired by Pakistani nationals as well as the equipment, machinery and materials provided as a result of the Japanese technical cooperation as set forth in Article III contribute to the economic and social development of the Islamic Republic of Pakistan, and are not utilized for military purposes.

Article V

In case JICA dispatches the Experts, the Senior Volunteers and the Missions, the Government of the Islamic Republic of Pakistan shall:

1. (1) (a) exempt the Experts, the Senior Volunteers and members of the Missions from taxes including income tax, and fiscal charges imposed on or in connection with salaries and any allowances remitted to them from abroad ;

(b) exempt the Experts, the Senior Volunteers, members of the Missions and their families from taxes including customs duties and fiscal charges in respect of the importation of:

(i) personal effects, household effects and consumer goods; and

(ii) one motor vehicle per Expert and per Senior Volunteer assigned to stay in the Islamic Republic of Pakistan;

(c) exempt the Experts and the Senior Volunteers who do not import any motor vehicle into the Islamic Republic of Pakistan from taxes including all indirect taxes and fiscal charges in respect of the local purchase of one motor vehicle per Expert and per Senior Volunteer; and

(d) exempt the Experts and the Senior Volunteers from the registration fee of the motor vehicles mentioned in (b)(ii) and (c).

(2) (a) provide, at its own expense, suitable office and other facilities including telephone and facsimile services necessary for the performance of the duties by the Experts, the Senior Volunteers and the Missions as well as to bear the expenses for their operation and maintenance;

(b) provide, at its own expense, the local staff (including adequate interpreters, if necessary) as well as Pakistani counterparts to the Experts, the Senior Volunteers and the Missions necessary for the performance of their duties;

(c) bear expenses of the Experts and the Senior Volunteers for:

(i) daily transportation to and from their place of work;

(ii) their official travels within the Islamic Republic of Pakistan whenever local conditions and financial possibilities of authorities concerned of the Government of the Islamic Republic of Pakistan may permit; and

(iii) their official correspondence;

(d) provide the assistance for the acquisition of appropriate housing accommodation for the Experts, the Senior Volunteers and their families; and

(e) provide the assistance for receiving medical care and facilities for the Experts, the Senior Volunteers, members of the Missions and their families.

(3) (a) permit the Experts, the Senior Volunteers, members of the Missions and their families to enter, leave and sojourn in the Islamic Republic of Pakistan for the duration of their assignment therein, offer them the assistance for completing the procedures of alien registration requirements, and exempt them from consular fees;

(b) issue identification cards to the Experts, the Senior Volunteers and members of the Missions to secure the cooperation of all governmental organizations necessary for the performance of their duties;

(c) offer the Experts, the Senior Volunteers and their families the assistance for the acquisition of car driving license; and

(d) carry out other measures necessary for the performance of the duties by the Experts, the Senior Volunteers and the Missions.

2. The motor vehicles mentioned in paragraph 1 shall be subject to payment of taxes including customs duties if they are subsequently sold or transferred within the Islamic Republic of Pakistan to individuals or organizations not entitled to exemption from such taxes or similar privileges.

3. The Government of the Islamic Republic of Pakistan shall accord the Experts, the Senior Volunteers, members of the Missions and their families such privileges, exemptions and benefits as are no less favorable than those accorded to experts, senior volunteers, members of missions and their families of any third country or of any international organization performing a similar mission in the Islamic Republic of Pakistan.

Article VI

The Government of the Islamic Republic of Pakistan shall bear claims, if any arises, against the Experts, the Senior Volunteers and members of the Missions resulting from, occurring in the course of, or otherwise connected with, the performance of their duties, except when the Parties agree that such claims arise from gross negligence or willful misconduct on the part of the Experts, the Senior Volunteers or members of the Missions.

Article VII

1. (1) In case JICA provides the Government of the Islamic Republic of Pakistan with equipment, machinery and materials, the Government of the Islamic Republic of Pakistan shall exempt such equipment, machinery and materials from taxes including customs duties and fiscal charges in respect of the importation. The equipment, machinery and materials mentioned above shall become the property of the Government of the Islamic Republic of Pakistan upon being delivered c.i.f. at the port of the disembarkation to competent authorities of the Government of the Islamic Republic of Pakistan.

(2)In case JICA provides the Government of the Islamic Republic of Pakistan with equipment, machinery and materials, the Government of the Islamic Republic of Pakistan shall exempt such equipment, machinery and materials from taxes including all indirect taxes and fiscal charges in respect of the local purchase.

(3)The equipment, machinery and materials mentioned in sub-paragraph (1) and (2) shall be utilized for the purpose specified in the arrangements referred to in Article II unless otherwise agreed upon between the competent authorities of the Parties.

(4)The expenses for the transportation within the Islamic Republic of Pakistan of the equipment, machinery and materials mentioned in sub-paragraph (1) and (2) and the expenses for their replacement, maintenance and repair shall be borne by the Government of the Islamic Republic of Pakistan.

2. (1) The equipment, machinery and materials, prepared by JICA, necessary for the performance of the duties by the Experts, the Senior Volunteers and members of the Missions shall remain the property of JICA unless otherwise agreed upon between the competent authorities of the Parties.

(2) The Government of the Islamic Republic of Pakistan shall exempt the Experts, the Senior Volunteers and members of the Missions from taxes including customs duties and fiscal charges in respect of the importation of the equipment, machinery and materials mentioned in sub-paragraph (1).

(3) The Government of the Islamic Republic of Pakistan shall exempt the Experts, the Senior Volunteers and members of the Missions from taxes including all indirect taxes and fiscal charges in respect of the local purchase of the equipment, machinery and materials mentioned in sub-paragraph (1).

Article VIII

The Government of the Islamic Republic of Pakistan shall maintain close contact, through organizations designated by it, with the Experts, the Senior Volunteers and members of the Missions.

Article IX

1. It is confirmed that JICA may maintain its overseas office in the Islamic Republic of Pakistan(hereinafter referred to as the "Office") with a resident representative and his/her staff to be dispatched from Japan (hereinafter referred to as the "Representative" and the "Staff" respectively) who shall perform the duties to be assigned to them by JICA relative to the technical cooperation programs under this Agreement in the Islamic Republic of Pakistan.

2. The Government of the Islamic Republic of Pakistan shall:

(1)(a) exempt the Representative, the Staff and their families from taxes including income tax and fiscal charges imposed on or in connection with salaries and any allowances remitted to them from abroad;

(b) exempt the Representative, the Staff and their families from taxes including customs duties and fiscal charges in respect of the importation of:

(i) personal effects, household effects and consumer goods; and

(ii) one motor vehicle per Representative and per Staff assigned to stay in the Islamic Republic of Pakistan;

(c) exempt the Representative and the Staff who do not import any motor vehicle into the Islamic Republic of Pakistan from taxes including all indirect taxes and fiscal charges in respect of the local purchase of one motor vehicle per Representative and per Staff;

(d) exempt the Representative and the Staff from the registration fee of the motor vehicles mentioned in (b)(ii) and (c);

(e) permit the Representative, the Staff and their families to enter, leave and sojourn in the Islamic Republic of Pakistan for the duration of their assignment therein, offer them the assistance for completing the procedures of alien registration requirements, and exempt them from consular fees;

(f) issue identification cards and special passes to the Representative and the Staff to enter airport/seaport beyond passport control point to receive and send off the Experts, the Senior Volunteers and members of the Missions;

(g) offer the Representative, the Staff and their families the assistance for the acquisition of car driving license; and

(h) carry out other measures necessary for the performance of the duties by the Representative and the Staff.

(2)(a) exempt the Office from taxes including customs duties and fiscal charges in respect of the importation of the equipment, machinery, motor vehicles and materials necessary for activities of the Office;

(b) exempt the Office from taxes including all indirect taxes and fiscal charges in respect of the local purchase of the equipment, machinery, motor vehicles and materials necessary for the functions of the Office; and

(c) exempt the Office from taxes including income tax and fiscal charges imposed on or in connection with office expenses remitted from abroad.

3. The motor vehicles mentioned in paragraph 2 shall be subject to payment of taxes including customs duties if they are subsequently sold or transferred within the Islamic Republic of Pakistan to individuals or organizations not entitled to exemption from such taxes or similar privileges.

4. The Government of the Islamic Republic of Pakistan shall accord the Representative, the Staff and their families as well as the Office such privileges, exemptions and benefits as are no less favorable than those accorded to representatives, staff and their families as well as offices of any third country or of any international organization performing a similar mission in the Islamic Republic of Pakistan.

Article X

The Government of the Islamic Republic of Pakistan shall take necessary measures to ensure security of the Experts, the Senior Volunteers, members of the Missions, the Representative, the Staff and their families staying in the Islamic Republic of Pakistan.

Article XI

The Government of the Islamic Republic of Pakistan and the Government of Japan shall consult with each other in respect of any matter that may arise from or in connection with this Agreement.

Article XII

1. The provisions of this Agreement shall also apply, after the entering into force of this Agreement, to the specific technical cooperation programs which have commenced prior to the entering into force of this Agreement, and to the Experts, the Senior Volunteers, members of the Missions, the Representative, the Staff and their families staying in the Islamic Republic of Pakistan as well as to the equipment, machinery and materials related to the said programs.

2. The termination of this Agreement shall neither affect the specific technical cooperation programs being carried out until the date of the completion of the said programs, unless otherwise decided upon by mutual consent between the Parties, nor affect the privileges, exemptions and benefits accorded to the Experts, the Senior Volunteers, members of the Missions, the Representative, the Staff and their families staying in the Islamic Republic of Pakistan for the performance of their duties in connection with the said programs.

Article XIII

1.This Agreement shall enter into force on the date of the signature thereof.

2.This Agreement shall remain in force for a period of one year, and shall be automatically renewed every year for another period of one year each, unless either Government has given to the other Government at least six months' written advance notice of its intention to terminate this Agreement.

Article XIV

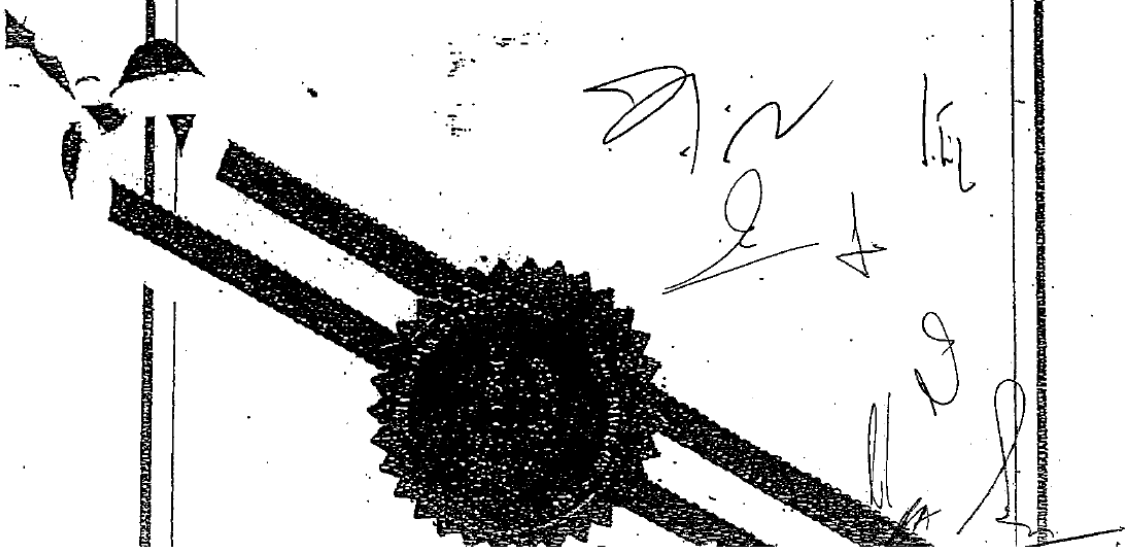
The Annex to this Agreement forms an integral part of this Agreement, and all reference to the "Agreement" shall include reference to the Annex.

IN WITNESS WHEREOF the undersigned, duly authorized thereto, have signed this Agreement.

DONE in duplicate, in Japanese and English languages, both texts being equally authentic, at Islamabad on 30th April, 2005.

For the Government of
the Islamic Republic of Pakistan:

For the Government of Japan:



ANNEX

In case the Government of the Islamic Republic of Pakistan should impose consular fees or require the obtainment of import license or certificate of foreign exchange coverage in respect of the importation of items in the future, the Experts, the Senior Volunteers, members of the Mission, the Representative ,the Staff and their families as well as the Office shall be exempted from such consular fees or such requirement, in respect of the importation of the items referred to in Article V.1.(1)(b), Article VII.1.(1) and 2.(2), and Article IX.2.(1)(b) and 2.(2)(a).

Appendix 2

MAIN POINTS DISCUSSED

1. Counterpart Personnel

GOPb will complete the recruitment of eight (8) new solid waste managers and four research associates/assistants who will be associated with the JICA Project Team in order to develop capacities to formulate a master plan of solid waste management at latest by the end of February 2013. Those eight (8) solid waste managers will be trained by UU in March 2013 and be dispatched to CDGG from April 2013.

2. Seminar and/or Workshops

Both sides agreed that seminars and/or workshops would be jointly held by CDGG, UU and JICA Project Team to provide opportunities of dialogue with stakeholders and technology transfer to the Pakistani counterparts. Especially, considering the intention to replicate the outcomes from the Project to other cities, it is preferable to invite relevant personnel from other major cities engaged in solid waste management, such as from Faisalabad, Rawalpindi, Multan, Sargodha, Bahawalpur or Sialkot, and/or other districts within Gujranwala division, and other related stakeholders. CDGG, UU, eight (8) solid waste managers and four (4) research assistants/associates shall use the opportunities to take lead on planning for replication to other cities in Punjab and/or districts in Gujranwala division. Cost for holding seminars/workshops will be mainly borne by JICA.

3. Necessary Equipment and Facilities for the Project

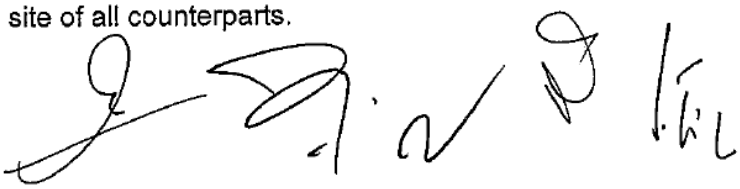
GOPb and CDGG agreed to provide the PMU with suitable office space, furniture, air conditioners, and communication facilities in the Solid Waste Management Office of CDGG during the Project.

Both sides agreed that CDGG shall provide the communication facilities and that the bills for the use of the communication would be paid by JICA Project Team.

About the vehicles one vehicle with a driver will be allocated to each of eight (8) waste managers starting from Fiscal Year (FY) July 2013. During the current Pakistani FY (July 2012-June 2013) the waste managers will use the existing vehicles on sharing basis with other CDGG staff. And transport for four (4) research associates from UU, UU will bear the cost of its staff transportation.

4. Reports

Both sides agreed that the reports of the Project shall be made available to stakeholders and open to the public. CDGG and GOPb agreed to make sure of disclosing the reports on web site of all counterparts.



5. Utilization of PC-I titled Institutional Capacity Building of Urban Solid Waste Management System in Punjab (Pilot Phase)

The approved PC-I budget will cover necessary expenses for eight (8) solid waste managers including staff salary, travel expenses for training, daily consumptions for the Project.

6. Environmental and Social Considerations

JICA provided JICA's Guidelines for environmental and social considerations (2010), (hereinafter referred to as the JICA guidelines) and explained that it would be applied to the project. The Pakistani side understood the policy of the JICA guidelines and agreed in principle as follows:

(1) The Pakistani side will follow EIA regulations in Pakistan for project activities at final disposal site and take appropriate measures, if necessary. The JICA Project Team will provide the technical support to do it.

(2) The information disclosure such as opening the study report shall be made in order to ensure the participation and dialogues with various stakeholders, in order to achieve appropriate environmental and social considerations.

(3) In the course of implementation of the Project, public consultation with communities and stakeholders shall be included if necessary.

(4) In view of the Project objectives, both side agreed the Project to follow the laws and regulations in force in Pakistan and the JICA guidelines.

7. Continuous support for the Project

Both sides agreed that through the Project, capacity for formulation of a master plan in the field of solid waste management at city level will be developed and the capacity should be accumulated and transferred to GOPb for future extension of the master plan formulation to other major cities in Punjab.

Both sides agreed that UU and Department of Local Government will make every effort to retain professionally competent solid waste managers for the replication stage of the Project in other district(s) of Gujranwala and in other major cities in Punjab.

CDGG, GOPb and JICA will cooperate for the implementation of the master plan that will be developed as the outcome of the Project by conducting Grant Aid and/or Technical Cooperation.

GOPb expects next implementation phase of the Project for extension of the scope of capacity development by Grant Aid and/or Technical Cooperation

Project. GOPb through CDGG shall secure continuous engagement of solid waste managers as per decided number. Actions for further steps for Grant Aid and/or Technical Cooperation Project would be discussed between Pakistani side and Japanese side as the Project progresses as well as the monitoring and evaluation stage of the Project.

8. Others

(1) Office Space for the Project

CDGG confirmed the office space for the JICA Project Team located at the CDGG building. Necessary arrangement such as partition, desks, chairs, bookshelves, internet facility, telephone, air conditioners, etc, shall be made available before the commencement of the Project.

(2) Selection of the candidate areas of the new final disposal site in Gujranwala

CDGG and GOPb will select candidate areas of a new final disposal site and inform JICA of the result of selection before the commencement of the Project and during the Project, the candidate sites will be compared and examined to determine the best new final disposal site in the master plan. Consequent upon the selection of final disposal site, CDGG will take up the process of EIA. Cost for EIA will be made available by Pakistani side.

The Team requested to include following into the selection criteria for the candidate areas;

i) Accessibility
ii) Environmental and Social Consideration based on JICA Guidelines
iii) Consideration of the location of the existing dump site as it will be used for future transfer station/material recovery facilities (MRF)
iv) Sufficient land size to accept the waste at least for another 10 years

CDGG and GOPb agreed that the selection criteria will be prepared and shared with JICA by the end of December 2011, and the candidate areas will be identified and informed to JICA before the commencement of the Project.

(3) Collaboration with WASA

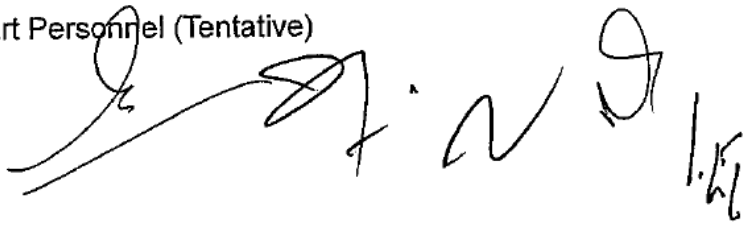
CDGG explained that there occurs blockage of sewers by solid waste in Gujranwala that causes less efficiency of waste water flow, on the other hand, when rainy season, waste water from canals overflow and wash out the waste

compiled along the road. Likewise, waste water management and solid waste management are inter-related. Therefore, both sides agreed that the collaboration with WASA shall benefit mutually contributing to the better efficiency of collection of waste and sewage management. To support this collaboration, MD WASA Gujranwala shall be the member of JCC.

(4) Target waste

CDGG requested to include industrial waste and medical waste within the scope of the Project. Although the industrial waste is supposed to be properly treated by industries, and medical waste is to be segregated at source and treated properly by hospitals under Health Department, but in reality, those wastes are disposed mixed with other municipal solid waste, and this problem has to be addressed and improved. In this context, the JICA Project Team will propose the policy recommendation for the industrial waste and medical waste.

Annex 1: List of Counterpart Personnel (Tentative)



Annex 1 List of Counterpart Personnel (Tentative)

The proposed composition of project Counterpart Personnel, described below, will be discussed again and confirmed in the Joint Coordination Committee (JCC) meeting to be held at the start of the project as and when deemed appropriate.

The Urban Unit (UU), Government of the Punjab (GOPb)

Designation	Number
1. Sr. SWM Specialist	1
2. Research Associate	5

City District Government Gujranwala (CDGG)

Current Staff (Permanent Staff):

1	Executive District Officer (EDO) (MS)	1
2	District Officer (DO) (SWM)	1
3	District Officer (DO) (Environment)	1
4	Chief Sanitary Inspector (Zone 1)	1
5	Chief Sanitary Inspector (Zone 2)	1

New Staff:

(Contract staff to be appointed under PC-I contract with a possibility of regularization depending on the staff performance and funds availability)

The following staff has been shortlisted and is expected to join CDGG in March 2013, after which they will receive training in UU until April and dispatched to CDGG in May 2013.

1. Solid Waste Manager 8

ANNEX 2

MINUTES OF MEETINGS
ON
AMMENDMENT OF RECORD OF DISCUSSIONS
ON
PROJECT FOR INTEGRATED SOLID WASTE MANAGEMENT MASTER PLAN IN GUJRANWALA
IN
THE ISLAMIC REPUBLIC OF PAKISTAN
AGREED UPON BETWEEN
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF PAKISTAN
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Lahore, 23 August, 2013

Mr. Mitsuyoshi Kawasaki
Chief Representative
JICA Pakistan Office

Mr. Iftikhar Amjad
Deputy Secretary(Japan)
Economic Affairs Division
Government of Pakistan

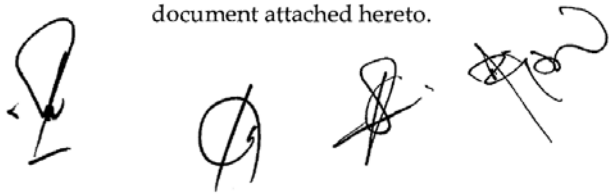
Mr. Jawad Rafiq Malik
Secretary
Local Government & Community Development Department
Government of the Punjab

Mr. Arif Anwar Baloch
Secretary
Planning & Development Department
Government of the Punjab

Mr. Tariq Javed
District Coordination Officer
City District Government
Gujranwala

Japan International Cooperation Agency (hereinafter referred to as "JICA") held a series of discussion with the authorities concerned of the Government of Pakistan (hereinafter referred to as "GOP") including the Government of Punjab (hereinafter referred to as "GOPb") and City District Government Gujranwala ((hereinafter referred to as "CDGG") regarding the amendment of the Record of Discussions (hereinafter referred to as "R/D") on the Project for Integrated Solid Waste Management Master Plan in Gujranwala (hereinafter referred to as "the Project") signed on 20 February, 2013.

As a result of the discussion, both sides agreed the matters referred to in the document attached hereto.



THE ATTACHED DOCUMENT

I. Amendment of R/D

1. Appendix 2 Main Points Discussed, "7. Continuous support for the Project"
JICA explained that the only authority which is entitled to make a commitment to implement future projects is the Government of Japan, not JICA. On the basis of the fact, JICA sincerely apologized to GOP that R/D gave a false impression that JICA was entitled to decide on future assistance. Finally, both sides agreed to add a sentence in the article of "7. Continuous support for the Project" in the Appendix 2 as follows, to avoid the misunderstanding;

(Original Article) Both sides agreed that UU and Department of Local Government will make every effort to retain professionally competent solid waste managers for the replication stage of the Project in other district(s) of Gujranwala and in other major cities in Punjab.

(Amended Article) Both sides agreed that UU and Department of Local Government will make every effort to retain professionally competent solid waste managers for the replication stage of the Project in other district(s) of Gujranwala and in other major cities in Punjab if the funds are available.

(Original Article) CDGG, GOPb and JICA will cooperate for the implementation of the master plan that will be developed as the outcome of the Project by conducting Grant Aid and/or Technical Cooperation.

(Amended Article) CDGG, GOPb and JICA will cooperate for the implementation of the master plan that will be developed as the outcome of the Project by conducting Grant Aid and/or Technical Cooperation, if the Government of Japan approves.

(Original Article) GOPb through CDGG shall secure continuous engagement of solid waste managers as per decided number.

(Amended Article) GOPb through CDGG shall secure continuous engagement of solid waste managers as per decided number if the funds are available.

2. Background
(Original Article) GOPb has also a plan to replicate the results of the Project to other major cities in Punjab.

(Amended Article) GOPb has also a plan to replicate the results of the Project to other major cities in Punjab if the funds are available.

3. Evaluation
Both sides agreed to add "IV. EVALUATION" after the article of "III. UNDERTAKINGS OF CDGG, GOPb AND GOP" in the Appendix 1 as follows:

IV. EVALUATION
JICA will conduct the following evaluations and surveys to mainly verify sustainability and impact of the Project and draw lessons. The CDGG, GOPb and the GOP are required to provide necessary support for them.

1. Ex-post evaluation three (3) years after the project completion, in principle
2. Follow-up surveys on necessity basis

II. Others

All matters other than those mentioned above will be treated in the same manner as prescribed in the Articles of R/D.

END

ANNEX 3

MINUTES OF MEETINGS
ON
THE SECOND AMMENDMENT
OF
RECORD OF DISCUSSIONS
ON
PROJECT FOR INTEGRATED SOLID WASTE MANAGEMENT MASTER PLAN IN GUJRANWALA
IN
THE ISLAMIC REPUBLIC OF PAKISTAN
AGREED UPON BETWEEN
THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF PAKISTAN
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Lahore, May 14, 2014

Mr. Mitsuyoshi Kawasaki
Chief Representative
JICA Pakistan Office

Mr. Shahid Ahmed Vakil
Deputy Secretary(Japan)
Economic Affairs Division
Government of Pakistan

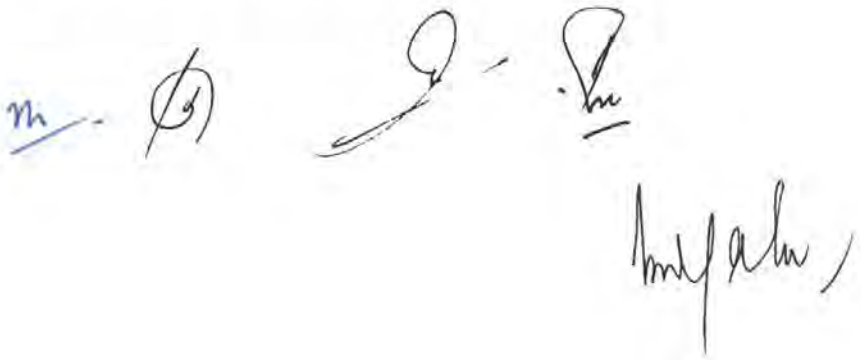
Mr. Jawad Rafiq Malik
Secretary
Local Government & Community Development Department
Government of the Punjab

Mr. Arif Anwar Baloch
Secretary
Planning & Development Department
Government of the Punjab

Mr. Azmat Mehmood
District Coordination Officer
City District Government
Gujranwala

Japan International Cooperation Agency (hereinafter referred to as "JICA") held series of discussion with the authorities concerned of the Government of Pakistan (hereinafter referred to as "GOP") including the Government of the Punjab (hereinafter referred to as "GOPb") and City District Government Gujranwala (hereinafter referred to as "CDGG") regarding the second amendment of the Record of Discussions (hereinafter referred to as "R/D") on the Project for Integrated Solid Waste Management Master Plan in Gujranwala (hereinafter referred to as "the Project") signed on 20 February, 2013, based on the first amendment of R/D of the Project signed on 23 August, 2013.

As a result of the discussion, both sides agreed the matters referred to in the document attached hereto.



THE ATTACHED DOCUMENT

I. Amendment of R/D

1. Appendix 1 Project Description, "II. Outline of the Project, 2. Objectives of the Project, (1)"

The Pakistani side requested to modify the Project Site from Gujranwala City to peri-urban area of Gujranwala because peri-urban area has been notified as City limits for integrated planning purposes under the "Peri Urban Structure Plan of Gujranwala City", as has been communicated through the notification No.SO(UD)1-34/2011 dated 5 April, 2012. Both sides agreed to change the phrase in the article of "II. Outline of the Project, 2. Objectives of the Project, (1)" in the Appendix 1 as follows:

(Original Article) (1) To develop a Master Plan of Integrated Solid Waste Management for Gujranwala City

(Amended Article) (1) To develop a Master Plan of Integrated Solid Waste Management for Gujranwala City including peri-urban area of Gujranwala

2. Appendix 1 Project Description, "II. Outline of the Project, 3. Target year of the Master Plan"

The Pakistani side requested to modify the target year of the Project from 2025 to 2030 as 2030 has been adopted, by Punjab Government, as target year for uniform planning of all urban development activities including Solid Waste Management (SWM) within Punjab province. Both sides agreed to incorporate this change in article "II. Outline of the Project, 3. Target year of the Master Plan" in the Appendix 1 as follows:

(Original Article) The Master Plan will be developed from 2013 to 2015 through the technical assistance from JICA. The implementation period of the master plan is from 2015 to 2025. Both sides agreed that the scope of the master plan is from 2015 to 2025.

(Amended Article) The Master Plan will be developed from 2013 to 2015 through the technical assistance from JICA. The implementation period of the master plan is from 2015 to 2030. Both sides agreed that the scope of the master plan is from 2015 to 2030.

3. Appendix 1 Project Description, "II. Outline of the Project, 4. Activities to be done by PMU, Phase 3: Action Plans for the target year 2025".
Both sides agreed to extend the year from 2025 to 2030 due to the same reason mentioned above:

(Original Article) Phase 3: Action Plans for the target year 2025

(Amended Article) Phase 3: Action Plans for the target year 2030

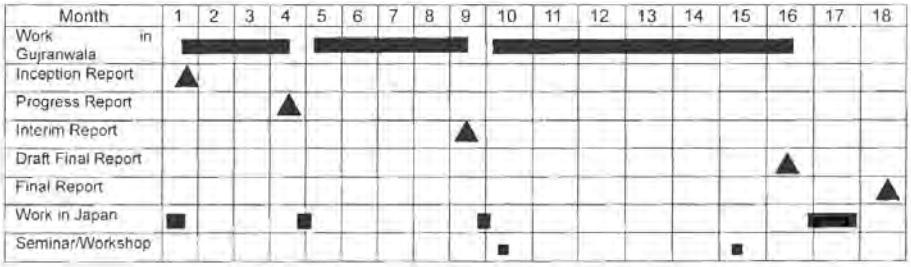
4. Appendix 1 Project Description, "II. Outline of the Project, 8. Duration,
Both sides agreed to extend the duration from eighteen (18) months to twenty-two (22) months due to change of the survey contents on the final disposal site.

(Original Article) The duration of the Project would be eighteen (18) months from the JICA Project Team member(s) arrives.

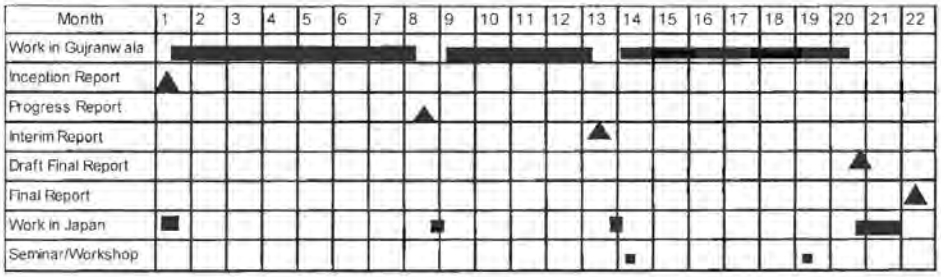
(Amended Article) The duration of the Project is twenty-two (22) months from the JICA Project Team member(s) arrives.

5. Appendix 1 Project Description, "II. Outline of the Project, 8. Duration, TENTATIVE SCHEDULE"
Both sides agreed to extend the duration from eighteen (18) months to twenty-two (22) months due to the same reason mentioned above:

(Original Article)TENTATIVE SCHEDULE



(Amended Article)TENTATIVE SCHEDULE



II. Others

All matters other than those mentioned above will be treated in the same manner as prescribed in the Articles of R/D.

END

ANNEX 4

THE URBAN UNIT
Urban Sector Planning & Management Services Unit (Pvt.) Ltd.
A Public Sector Company.

No: 9306

Date: 08-01-2015

1. The Secretary, LG&CD Department, Govt. of the Punjab, Lahore
2. The Managing Director, Gujranwala Waste Management Company (GWMC), Gujranwala
3. The Director (EIA), Environment Protection Department, Lahore
4. The Deputy Secretary, Local Government and Community Development, Lahore
5. The National Staff In-charge of Environment Sector, JICA Pakistan Office, Islamabad
6. Team Lead, JICA Study Team, JICA Pakistan Office, Govt. of Japan, Islamabad

Subject: **SECOND JCC MEETING ON PROJECT PROGRESS OF INTEGRATED SOLID WASTE MANAGEMENT MASTER PLAN STUDY IN GUJRANWALA CITY**

Japanese International Cooperation Agency (JICA), in collaboration with City District Government Gujranwala (CDGG) and the Urban Unit, is in process of conducting integrated solid waste management master plan study for Gujranwala. The JICA project team prepared a progress report on the subject project, for review of the said report by the Joint Coordination Committee (JCC). The meeting of JCC was held on **December 19, 2014** under the chairmanship of **Secretary P & D Department** in **Committee Room No. 1 of P & D Department.** The minutes of meeting are attached herewith for circulation among the JCC members for record keeping.

Regards,

DR. NASIR JAVED
CHIEF EXECUTIVE OFFICER

Copy:

The Secretary, P&D Department, Govt. of Punjab

503 - Shaheen Complex, Egerton Road, Lahore, Pakistan | Ph: 042 - 99205316 - 22 Fax: 042 - 99205323 | E-mail: uspmu@punjab.gov.pk www.urbanunit.gov.pk

All correspondence must be addressed to the **Chief Executive Officer**

The Urban Unit

Record of Meeting

Subject:	Second Joint Coordinating Committee (JCC) Meeting on Project Progress of Integrated Solid Waste Management Master Plan Study for Gujranwala		
Date:	December 19, 2014	**Time:**	02:00 pm – 03:00 pm
Venue:	CR-1 of P&D Department		
Participants:	JCC Members, JICA Project Team, Urban Unit Team, GWMC Project Team, MD PMDFC, MD LWMC		

Sr. No.	Discussion/Decision
1.	Mr. Waseem Ajmal, Secretary P&D Department, Government of Punjab, chaired the meeting. The meeting started with the introduction of the Secretary P&D Department followed by all the participants. Dr. Nasir Javed highlighted the importance of first Solid Waste Management Master Plan in Punjab and Mr. Taki described JICA's Support for the project. Dr. Kiran Farhan, Sr. SWM Specialist, the Urban Unit, thanked all the participants and asked JICA team to present progress report of the Project. The JICA Project Team Leader, Mr. Masakazu Maeda gave a brief presentation on the progress of different activities designed for Integrated SWM Master Plan for Gujranwala. After the presentation the meeting was opened for discussion.
2	Dr. Nasir Javed, CEO, the Urban Unit, said that JICA was asked to install pilot scale Resource Recovery Facility that can be replicated to other areas. The Pilot Project has estimated cost of PKR 90 million for 200 tons/day. As financial assistance to the facility is out of scope of JICA side, it is therefore requested to the Government of Punjab to provide requisite finances if GWMC develops a PC-1 for this project as it will lead toward CM vision for improvement of SWM in Punjab. He also informed the chair that once the Master Plan is prepared; the implementation of Mater Plan will require additional finances. Mr. Waseem Ajmal said that one option is to develop the project on Public Private Partnership (PPP) whether outsourcing model, management contract with capital investment from the government or other options. The resource recovery project can become part of waste disposal plan and also fit in a long term plan of the GWMC. Mr. Shahid Fareed, Deputy Secretary LG, said that the government has initiated pilot projects for SWM in rural area. He further informed that LG have submitted a concept note on SWM to P&D for Punjab Municipal Services Improvement Project Phase II. He suggested that if the Urban Unit comes up with such proposal and if it qualifies the criteria LG will definitely support it. He added that additional finances are always required for the action plan and any such proposal will be supported by the department.

3.	Mr. Asif Iqbal, Sr. Manager LWMC, pointed out that presentation on the Master Plan did not cover the Construction and Demolition (C&D) Waste, Green Waste, Hospital and Industrial Waste and only give recommendations on it. Dr. Ata ul Haq, MD GWMC, said that they already have a separate consultancy agreement with LWMC for various studies of SWM. GWMC team discussed item wise scope of work with LWMC and all those works that were not included in JICA scope are to be done by LWMC. Mr. Waseem Ajmal said that the Master Plan has to cater the need of all and later on the government can decide the roles and responsibilities. This is the good opportunity that we can collect data from all the sources. He said that the cantonment area, private housing schemes and railway areas should also be reflected in the Master Plan. Dr. Kiran explained that population projection is for whole 98 UCs and waste generation will be calculated for all and then waste characterization will lead to some suggestions which will cover all the population.
4.	On question related to line of action for informal sector, Dr. Kiran replied that the survey has been conducted and that is already part of the Master Plan.
5.	Mr Waseem Ajmal, asked the JICA team that 100% collection efficiency will be achieved by the year 2030, which is a very long time. He suggested that different models can be presented on how to reduce that time by providing short term and medium term plans. Mr. Masakazu Maeda replied that it can be done but the selection of best suited option depends on the budget. He agreed that such implementation models will be part of the Master Plan. Dr. Kiran highlighted that one of the objectives of this meeting is to decide on which lines the short and medium term plans will be developed and the JICA Project Team should opt for 100% collection efficiency for the short term plan. She requested JICA team to incorporate all these points in the interim report that will eventually reflect in the Master Plan.
6.	On question related to a landfill candidate site, Dr. Ata ul Haq told the committee that the site has been selected and Environmental Impact Assessment (EIA) is in process. GWMC has requested LG Department to provide funds to acquire the land.
7.	Dr. Kiran requested all the JCC members to provide valuable comments on the Progress Report, so if any improvement is required it may be incorporated in the Interim Report.
8.	Mr. Taki, Sr. Representative JICA, concluded the meeting and thanked all the participants for this interactive session.

DR. NASIR JAVED
CHIEF EXECUTIVE OFFICER

List of Participants:-

Sr. No	Name	Designation	Organization
1	Mr. Waseem Ajmal Chaudhary	Secretary	Planning and Development Department
2	Dr. Nasir Javed	CEO	The Urban Unit
3	Mr. Motoo Taki	Senior Representative	JICA Pakistan Office
4	Ms. Nazia Saher	Program Officer	JICA Pakistan Office
5	Mr. Masakazu Maeda	Team Leader	JICA Project Team (JPT)
6	Dr. Ata ul Haq	MD	GWMC
7	Dr. Kiran Farhan	Sr. Specialist SWM	The Urban Unit
8	Mr. Murad Khan Rana	Sr. Manager Ops	GWMC
9	Mr. Masaharu Takasugi	Final Disposal Expert	JPT
10	Mr. Kazuhiko Nakamura	Collection and Transportation Expert	JPT
11	Mr. Aamer Nazeer	MD	PMDFC
12	Mr. Shahid Fareed	Deputy Secretary	LG&CDD
13	Mr. Nasim ur Reham	Director (EIA)	EPD
14	Mr. Asif Iqbal	Sr. Manager Ops	LWMC
15	Mr. Sohail Malik	Sr. Manager	LWMC
16	Mr. Hassan Illyas	Research Analyst	The Urban Unit
17	Mr. Sami Ullah	Research Associate	The Urban Unit
18	Mr. Umama Saleh	Research Associate	The Urban Unit
19	Mr. Arkham Wahid	Research Assistant	The Urban Unit
20	Ms. Hina Aslam	Waste Manager	GWMC
21	Ms. Hina Ishaque	Waste Manager	GWMC
22	Ms. Ambreen Ghazanfar	Waste Manager	GWMC
23	Ms. Aqsa Sadiq	Waste Manager	GWMC
24	Ms. Fatima Zia	Waste Manager	GWMC

ANNEX 5

NO.P&D/DP/62-SWMS/2015
GOVERNMENT OF THE PUNJAB
PLANNING AND DEVELOPMENT DEPARTMENT
Dated Lahore the, 29th, June, 2015

To

1. The Secretary, LG&CD Department, Govt. of the Punjab, Lahore
2. The District Coordination Officer, City District Government, Gujranwala
   District Coordination Office, Sialkot Road, Gujranwala
3. The Managing Director, Gujranwala Waste Management, Company (GWMC)
   2nd Floor, GCCI Building, Trust Plaza, Aiwan-e-Tajarat Road, Gujranwala
4. Chief Executive Officer, The Urban Unit
   Office 503, 5th Floor, Shahen Complex, Egerton Road, Lahore
5. The Managing Director, Lahore Waste Management, Company (LWMC), Lahore
   4th Floor, Shahen Complex, Egerton Road, Lahore
6. The Managing Director, Water & Sanitation Agency (WASA), Gujranwala
   WASA Complex, Jinnah Rd, Gujranwala, Punjab
7. The Managing Director, Punjab Municipal Development Fund Company, Lahore
8. The Director (EIA), Environment Protection Department, Lahore
   Zila Council Complex, Kachehri road, Gujranwala
9. The Sr. Representative / Resident Representative, JICA Pakistan Office, Islamabad
   4th floor, Sarena Office Complex, plot 17, Ramna 5, Khayaban-e-Suharwardi, G5/1, Islamabad
10. Team Lead, JICA Study Team, JICA Pakistan Office, Govt. of Japan, Islamabad
    Attention: Mr Maeda Masakazu
    GWMC Office, 2nd Floor, GCCI Building, Trust Plaza, Aiwan-e-Tajarat Road, Gujranwala

SUBJECT:- **PRESENTATION ON JOINT COORDINATION COMMITTEE (JCC) MEETING HELD UNDER THE CHAIRMANSHIP OF SECRETARY, P & D ON 8-6-2015 AT 2:00 PM IN CR-I OF P&D D ON REVIEW OF INTERIM REPORT FOR INTEGRATED SOLID WASTE MANAGEMENT MASTER PLAN IN GUJRANWALA**

I am directed to enclose herewith a copy of minutes of the subject meeting duly approved by the competent authority for your information and further necessary action.

Gujranwala Waste Management Co. (Pvt.) Ltd. Diary No. 1148 Dated 02/07/15

SMO 02/07/15

Planning Officer (District Program)

NO. & DATE EVEN:

A copy is forwarded for information to:-

1. PSO to Chairman P&D Board.
2. P.S to Secretary P&D Department.
3. P.S to Sr.Chief (UD/DP) P&D Department.
4. P.A to Chief (ECA) P&D Department.

Planning Officer (District Program)

GOVERNMENT OF THE PUNJAB
PLANNING & DEVELOPMENT DEPARTMENT
(DISTRICT PROGRAMME SECTION)

SUBJECT: **MINUTES OF THE THIRD (3rd) JOINT COORDINATION COMMITTEE (JCC) MEETING HELD ON 08.06.2015 UNDER THE CHAIRMANSHIP OF SECRETARY P&D IN COMMITTEE ROOM NO. I OF PLANNING AND DEVELOPMENT DEPARTMEN "REVIEW OF INTERIM REPORT FOR INTEGRATED SOLID WASTE MANAGEMENT MASTER PLAN IN GUJRANWALA"**

(List of participants attached)

The Chair welcomed the participants and desired that the representative may give the brief detail of the study conducted by the JICA. Accordingly the Team Leader of JICA Project Team (JPT) gave a presentation on the subject project progress. He informed that most of the tasks have been completed and detailed interim report has been shared with all the stakeholders for any comments and suggestions. He further explained that 2nd stakeholders meeting will be held in Gujranwala on 9th June 2015 and the purpose of it is to give awareness to the local residents and the stakeholder of Gujranwala about the project progress and incorporate their suggestions and comments in the final report. On the enquiry by the Chair about the time line of the Project, the representative informed that the draft final report will be submitted in October and it will be circulated among all stakeholders for final comments. Meanwhile training for the counterparts will be held in September and the 3rd JCC is proposed at the end of August 2015. After the comments and suggestions on the draft final report by key stakeholders, the final report will be submitted in December 2015. Finally the representative

of JICA thanked all the Pakistani counterparts for giving support during their stay in Pakistan and appreciated the hospitality and cooperation from all stakeholders.

The Chair further inquired about the option to use mechanical sweepers for Gujranwala city roads as no mechanical sweepers has been mentioned in the presentation. The representative of JICA responded that the whole report reflects only Municipal Solid Waste (MSW) and hospital waste and industrial waste are not included in it.

He further added that numbers of mechanical sweepers are mentioned in the interim report. The detailed data of C&D waste and hospital waste have been considered a secondary component because it is not covered in the scope of the study. Managing Director of GWMC added that another consultancy with the Lahore Waste Management Company is under consideration which includes Hospital Waste Management Plan and Construction and Demolition Waste Plan of Gujranwala City.

On the enquiry by the Chair regarding the application of waste tariffs on the residents of the area, DCO Gujranwala informed that the tariff on SWM services should be introduced before 2025 and they will get full support in this regard from the City District Government Gujranwala.

The Chair also inquired about the loans for implementation of this project and is there any policy available for loans from JICA. The representative of JICA responded that at this moment no policy is available for loan, however the policy may be revised with time.

The Chair advised to Managing Director, GWMC about exploring the possibility of business investment proposal (on PPP mode) on the basis of this report so that options for funding can be evaluated as many internationals banks are interested in financing such projects like Turkish banks, Chinese banks etc. Many PPP options can be considered but first the business plan should be made.

The meeting ended with a vote of thanks by the Chair

LIST OF MAIN PARTICIPANTS (3rd JCC MEETING)

Sr.#	Name of Officer / Designation
P&D DEPARTMENT	
1	Mr. Waseem Ajmal, Ch. Secretary P&D, In Chair
2	Mr. Amjad Duraz, Chief (ECA)
3	Miss Bushra Yasmeen, Chief (DP)
4	Musa Raza, Planning Officer (DP)
LG&CD DEPARTMENT	
5	Mukhtar Ahmad, SO(FP)
6	Talal Ahmed Khan, PMDFC
7	Dr. Kiran Farhan, Urban Unit
8	Mr. Asif Iqbal, LWMC
ENVIRONMENT DEPARTMENT	
9	Mian Sami Ullah, Dy.Director (R&I) EPA
CDG, GUJRANWALA	
10	Mr. Azmat Mehmud, DCO
11	Mr. Imtiaz Malik, EDO(MS)
JICA PAKISTAN OFFICE	
12	Mr. Ken Okummura, JICA Pakistan Office
13	Ms. Nazia Seher, JICA Pakistan Office
14	Mr. Kosuke Tomoshige, JICA Pakistan Office
JICA PROJECT TEAM	
15	Mr. Masakazu Maeda, JICA Project Team (JPT)
16	Mr. Masaharu Takasugi, JPT
17	Mr. Kazuhiko Nakamura, JPT
18	5-Waste Managers-GWMC, 3-Research Assistance-UU
Gujranwala Waste Management Company (GWMC)	
19	Dr. Ata ul Haq, MD
20	Mr. Murad khan Rana, Sr. Manager Ops.
The Urban Unit	
21	Dr. Kiran Farhan, Sr. Specialist SWM
22	Mr. Hassan Illyas, Research Analyst