付属資料-4：　構造物調査仕様書（案）

Terms of Reference
on
Inventory Survey of Hydraulic Structures
in
Moulvibazar O&M Division, Chittagong O&M Division-1, Chittagong O&M Division-2, and Cox's Bazar O&M Division, BWDB

1. General

Bangladesh Water Development Board (hereinafter referred to as "BWDB" is the main organization responsible for the water resources development and management of the People's Republic of Bangladesh. BWDB has implemented over 700 large and small projects for the water resources management and development in the country, and operation and maintenance of the constructed structures become the main issue of BWDB.

Inventory survey of the hydraulic structures managed by BWDB is conducted with the purpose of preparation of the ledgers of the managed structures as the basic data for preparation of efficient operation and maintenance plans in the O&M divisions.

Objective O&M divisions of the inventory survey are the following four divisions:

(1) Moulvibazar O&M Division,
(2) Chittagong O&M Division-1,
(3) Chittagong O&M Division-2, and
(4) Cox's Bazar O&M Division.

Completed water development schemes in the above divisions are listed in Table 1, Table 2, Table 3 and Table 4, respectively.

In addition, district maps of Moulvibazar, Chittagong and Cox's bazar, which are related to the above O&M divisions, are presented in Figure 1, Figure 2 and Figure 3, respectively.

2. Scope of Works

(1) Objective Area:
Jurisdictional areas of the Moulvibazar O&M division (Figure 1), Chittagong O&M Division-1 (Figure 2), Chittagong O&M Division-2 (Figure 2), and Cox's Bazar O&M Division (Figure-3)

(2) Objective Hydraulic Structures
Objective hydraulic structures are the hydraulic structures developed by the BWDB, as followed:
- River channel
- Drainage channel
- Irrigation canal
- Appurtenant Structure
  Embankment, Bank and foot protection work, groin/ spur dike, road, bridge/culvert,
- Water Control Structures
  Barrage/large regulator, sluice/escape, aqueduct, siphon, pump station

(3) Scope of the Works

Scope of the works of each O&M Division is as follows:

a. To clarify the approximate locations of all hydraulic structures constructed and maintained by the O&M Division Office (the O&M office) through the interviews with the officials of the O&M office and local peoples.
b. To conduct the field investigation of the hydraulic structures in the jurisdictional area of the O&M office, in order to clarify the precise location, basic dimensions and existing condition of the structures.
c. To summarize the field data and records and to provide report.

(4) Coordination System

Coordination system of the Services shall refer to WGS84.

(5) Equipment for Inventory Survey

During the inventory survey in the field, the following equipment shall be applied:

a. Portable GPS (or mobile phone with the GPS function and the GPS application)
b. measurement tape
c. Ranging rod (red and white rod) or equivalent
d. Digital camera

(6) Data provided by the Project

Regarding the Moulvibazar O&M Division, the preliminary GIS data including the maps with a scale of 1:25,000 are provided by the JICA Expert Team of the Project for Capacity Development of Management of Sustainable Water Related Structure.

3. Specification of the Services

3.1 Collection of data and information in Each O&M Office and Local Peoples

Through the interview with the officials of each O&M office and the local peoples in each O&M division, the following data and information shall be collected as much as possible:

a. Boundary of water resources management schemes: approximate boundaries of respective schemes, except the boundaries of the schemes investigated by IWM/WMIP.
b. Channel (river channel, drainage channel, irrigation canal): Name, jurisdictional extent, management body of ordinary O&M
c. Appurtenant Structure (embankment, bank and foot protection work, groin/ spur dike, road, bridge/culvert): Approximate location and dimension, present condition of the structures
d. Water control structures (Barrage/large regulator, sluice/escape, aqueduct, siphon, pump station): Approximate location and dimension, present condition of the structures.

If there are preliminary rehabilitation plans in the O&M offices, information related to the preliminary rehabilitation plans shall be collected and shall be included in the report.

3.2 Inventory survey in the field

Referring the data and information collected, the inventory survey of each O&M Division shall be conducted. The inventory surveys of the structures include recording the location, measurement and sketch, and taking the pictures through the following manners, and Form 1 shall be applied to recording the survey data:

a. Channel (river channel, drainage channel, irrigation canal):
As for the channels, the following item shall be surveyed at the upstream end and the downstream end of the jurisdiction of the O&M Office, and at the major bridge sites crossing the channels:

Channel (river channel, drainage channel, irrigation canal)

Coordinates	Layout/sketch	Picture
N XX YY ZZ.Z E XX YY ZZ.Z	Location map (sketch)	Upstream view of the channel Downstream view of the channel * Ranging rod shall be included in the pictures

b. Appurtenant structures

Embankment:

The following items shall be clarified at every about 2.0 km and the damaged site of embankment.

Embankment (every about 2.0 km)

Coordinates	Layout/sketch	Picture
N XX YY ZZ.Z E XX YY ZZ.Z	Cross section profile with crest width, Slope gradient (river side, land side), height, and berm width if exist (river side, land side)	Upstream view of the embankment (inland side, crest, river-side) Downstream view of the embankment (inland side, crest, river-side) * Ranging rod shall be included in the pictures

Embankment (damaged site)

Coordinates	Layout/sketch	Picture
N XX YY ZZ.Z E XX YY ZZ.Z (at the center of damaged site)	Plan with damaged extent (length) Cross-section with remained crest width	View from downstream site View from upstream site * Ranging rod shall be included in the pictures

Bank and foot protection work:

Coordinates	Layout/sketch)	Picture
Downstream site N XX YY ZZ.Z E XX YY ZZ.Z Upstream site N XX YY ZZ.Z E XX YY ZZ.Z	Cross section profile with slope gradient, slope length, and materials of the bank and foot protection.	View from the upstream site, View from the downstream site, Partial views for the materials of the works. * Ranging rod shall be included in the pictures
In case of damage	Damage location, length and width shall be indicated in the above plan	View of damaged site.

Groin/ spur dike:

Coordinates	Layout/sketch)	Picture
N XX YY ZZ.Z E XX YY ZZ.Z (at the river bank site of each groin)	Pan of alignment including length and direction, Cross section profile with crest width, height and slope gradients of both sides.	Full view from the river bank, Partial view for the materials of the work * Ranging rod shall be included in the pictures
In case of damage -	Damage location, length and width shall be indicated in the above plan	View of damaged site.

Road:

Coordinates	Layout/sketch	Picture
Downstream site N XX YY ZZ.Z E XX YY ZZ.Z Upstream site N XX YY ZZ.Z E XX YY ZZ.Z	Pan of alignment with direction Cross section profile with road width, height, slope gradients of both sides, existence of the pavement and its materials.	Views from the upstream and downstream ends, * Ranging rod shall be included in the pictures
In case of damage N XX YY ZZ.Z	Damage location, length and width shall be indicated in the above plan	View of damaged site.

E XX YY ZZ.Z (at the center of damaged site)		

Bridge/culvert:

Coordinates	Layout/sketch	Picture
N XX YY ZZ.Z E XX YY ZZ.Z (at the center of the bridge/culvert)	Pan with length and width, Section including connection with both bank	view from the river bank, sectional view of the bridge/ culvert * Ranging rod shall be included in the pictures
In case of damage	Damage location, length and width shall be indicated in the above plan	view of damage

c. Water control structures

Barrage/large regulator:

Coordinates	Layout/sketch	Picture
Right bank N XX YY ZZ.Z E XX YY ZZ.Z Left bank N XX YY ZZ.Z E XX YY ZZ.Z	Layout plan with width of gates, Section including width and height of each gate.	Full view of the barrage/large regulator, sectional view of the barrage/ large regulator Picture of guide plate/nameplate (if exist) * Ranging rod shall be included in the pictures
In case of damage	Damage location, length and width shall be indicated in the above plan	view of damage

Regulator/sluice/escape:

Coordinates	Layout/sketch	Picture
N XX YY ZZ.Z E XX YY ZZ.Z (at the center of the structure)	Layout plan with the inlet, outlet and gate Section including width and height of vent.	Full view of the structure, view of inlet, view of outlet. * Ranging rod shall be included in the pictures
In case of damage	Damage location, length and width shall be indicated in the above plan	view of damage

Aqueduct:

Coordinates	Layout/sketch	Picture
N XX YY ZZ.Z E XX YY ZZ.Z (at a bank)	Layout plan of structure Section including dimensions of the water way.	Full view of the structure, Sectional view of the structure * Ranging rod shall be included in the pictures
In case of damage	Damage location, length and width shall be indicated in the above plan	view of damage

Siphon:

Coordinates	Layout/sketch	Picture
N XX YY ZZ.Z E XX YY ZZ.Z (at the inlet or outlet of the structure)	Layout plan of the structure Section including dimensions of the water way.	Full view of the structure View of the inlet, view of outlet. * Ranging rod shall be included in the pictures
In case of damage	Damage location, length and width shall be indicated in the above plan	view of damage

Pump station:

Coordinates	Layout/sketch	Picture
N XX YY ZZ.Z E XX YY ZZ.Z (at the center of the embankment)	Layout plan of the structure, buildings with the number of the pumps, the capacity of each pump, If there is other appurtenant structure, the appurtenant structure shall be surveyed in accordance with the guidance of the structure.	Full view of the pump station, sectional view of the inlet and outlet, view of pump 8if possible) * Ranging rod shall be included in the pictures
In case of damage	Damage shall be indicated in the above plan	view of damage

3.3 Summary of field data and records and Reporting

Location of hydraulic structures in respective water management schemes shall be plotted in the maps. All of data and records collected in the field shall be arranged by use of the Form 2.

The reports shall be compiled as the following volumes:

Vol. 1: Inventory Survey of Hydraulic Structures in Schemes related to Manu River in Moulvibazar O&M Division
Vol. 2: Inventory Survey of Hydraulic Structures in Other Schemes in Moulvibazar O&M Division
Vol. 3: Inventory Survey of Hydraulic Structures in Chittagong O&M Division-1
Vol. 4: Inventory Survey of Hydraulic Structures in Chittagong O&M Division-2
Vol. 5: Inventory Survey of Hydraulic Structures in Cox's Bazar O&M Division

The Reports shall be included:

- Location maps of the hydraulic structures of respective schemes including the boundaries of schemes.
- List of schemes including the numbers of the structures.
- Records (Form 2) of the investigated structures.
- Other information from the office and field, if any.

4. Quantity and Schedule of the Services (Tentative)

(1) Quantity of the Services
The quantity of the services is shown in Table 5.

(2) Schedule of the Services
Draft schedule of the Services are shown in Table 6.

Table 1 Completed Water Resources Development Schemes
in Moulvibazar O&M Division Office

No.	Scheme Name	Project Type	Location (Upazilla/District)	Gross Area/ Net Area (ha)	Imple. Period	Direct Cost (Lakh Tk)
1 *1	Barachara Irrigation Project	DI	Kulaura/ Moulvibazar	2,000/ N.A.	1999-2000	212.00
2 *1,*2	Dewarachara FCD Sub-Poject	FCD	Kamalganj/ Moulvibazar	4,450/ 4,450	1998-2004	255.18
3 *1	Hail Haor Project	FCD	Moulvibazar Sadar & Sreemangal/ Moulvibazar	24,372/ 18,176	1981-1989	1,069.42 & Wheat 1,500MT
4 *1,*2	Hamhami Chara Sub-Project	FCD	Moulvibazar Sadar, Kamalgonj/ Moulvibazar	2,594/ 1,294	1988-1991	145.10 & Wheat 490 MT
5 *1	Manu Left Embankment Project	FCD	Moulvibazar Sadar/ Moulvibazar	16,000/ 16,000	1982-1986	408.24
6 *1,*2	Manu River FCD Project Phase-I	FCD	Kulaura/ Moulvibazar	3,075/ 2,567	1989-1993	159. 00 & Wheat 4480 MT
7 *1,*2	Manu River FCD Project Phase-II	FCD	Kulaura & Rajnagar/ Moulvibazar	5,200/ 1,500	1994-1998	201.53 & Wheat 4563 MT
8 *1	Manu River Project	FCDI	Rajnagar & Moulvibazar Sadar/ Moulvibazar	24,178/ 19,028	1975-1983	7,258.00
9 *1	Phanai River WCS (not functioning)	I	Kulaura/ Moulvibazar	1,500/ 1,200	1983-1985	157.89
10 *1,*2	Shaka Borak Project	FCD	Moulvibazar Sadar/ Moulvibazar	4,520/ 3,800	1988-1993	113.87 & Wheat 390 MT
11 *1,*2	Sharifpur FCD System	FCD	Kulaura/ Moulvibazar	1,822/ 1,214	1987-1995	145.00 & Wheat 1100 MT
12 *1	Tarapasa Premnagar Flood Control Embankment Project	FC	Rajnagar/ Moulvibazar	8,000/ 6,500	1994-1996	211.50
13 *3	Bank Protection Work for Manu River Left Bank from bashat to Manumukh	BP	Moulvibazar Sadar/ Moulvibazar	11,480/ -	1982-1999	751.58
14 *3	Moulvibazar Town Protection Project	TP	Moulvibazar Sadar/ Moulvibazar	1,500/ -	1992-1999	1618.38
15 *3	Protection Work of Area adjacent to Manu Mukh Bazar	BP	Moulvibazar Sadar/ Moulvibazar	8,000/ -	1994-1999	110.81
16 *3	Bank Protection Work of Manu River up to Balikandhi Palpur in the Right Bank	BP	Moulvibazar Sadar/ Moulvibazar	1,500/ -	1995-1998	303.00
17 *3	Protection of Territory of Bangladesh from erosion of Juri River	BP	Juri/ Moulvibazar	2,470/ -	2003-2005	551.90
18 *3	Kaminiganj Bazar Protection Project from erosion of Juri River	BP	Juri/ Moulvibazar	1,422/ -	2002-2004	195.88
19 *3	Early Flood Control and Drainage Project in Haor Area	FCD	Moulvibazar Sadar, Rajnagar/ Moulvibazar	22,672/ 11,578	2011 – On going	1,452.98

Source:

*1: Scheme Database Inventory and Mapping (contract package No: BWDB/S4), Water Management Improvement Project (WMIP), IWM

*2: Database and mapping already conducted by WMIP/IWM

*3: Information from the Moulvibazar O&M Division Office

Note:

DI: Drainage and Irrigation, FCD: Flood control and drainage, FCDI: Flood control, drainage and irrigation, I: Irrigation, FC: Flood Control, BP: Bank protection, TP: Town protection

Table 2 Completed Water Resources Development Schemes in Chittagong O&M Division-1

No.	Scheme Name	Project Type	Location (Upazilla/District)	Gross Area/ Net Area (ha)	Imple. Period	Direct Cost (Lakh Tk)
1	CEP-Polder 62	FCD	Patenga, Pahartali, Bandar/ City Corporation & Sitakundu/ Chittagong	5,600/ 5,600	1965-1996	11,300.00
2	CEP-Polder 63/1A	FCD	Anwara/ Chittagong	6,560/ 6,560	1967-1970	427.00
3	CEP-Polder 63/1B	FCD	Anwara/ Chittagong	6,030/ 6,030	1980-1981	176.00
4	Bhellapara Sub-Project	FCDI	Patiya/ Chittagong	1,100/ 800	1986	
5	Halda Extension irrigation Project	I	Hathazari/ Chittagong	2,820/ 1,820	1986-2005	4,137.64
6	Fatikchari Flood Control and Irrigation Project	FCDI	Fatikchari/ Chittagong	11,000/ 9,500	1980-1985	998.00
7	Dhurang Irrigation Project	DI	Fatikchari/ Chittagong	1,680/ 1,020	1953-1963	
8	Mondakani Irrigation Project	DI	Fatikchari, Hathazari/ Chittagong	390/ 290	1981-1983	73.00
9	Sialbukka Khal WRS	I	Fatikchari/ Chittagong	1,625/ 1,200	1981-1983	26.00
10	Katakhali Hilimili Irrigation Project	FCDI	Satkania, Lohangora/ Chittagong	1,625/ 1,200	1981-1983	39.00
11	Sobhandandi Flood Control, Drainage and Irrigation Project	FCDI	Patiya, Dhandanaish/ Chittangong	7,500/ 5,500	1975-1982	805.05
12	Nitchintapur Irrigation project	I				
13	Lalotia Irrigation Project	I				
14	Madachara WCS Project	DI	Stkania/ Chittagong	1,000/ 720	1986-1987	37.00
15	Dalu Khal FC Project	FCDI	Lohagora/ Chittagong	6,000/ 6,000	1980-1990	
16	Tankabati Khal Embankment	I	Lohagora/ Chittagong	4,000/ 800	1987-1988	
17	Srimal Khal Embankment	I		2,000/ 1,700	1988-1989	
18	Soalock Khal WRS	I		650/ 650	1982-1984	26.00
19	Hangar Khal Fllod Control & Irrigation Project	FCDI	Satkania & Lohagora/ Chittagong	4,300/ 2,500	1983-1988	112.00
20	Sangu River Project	FCDI	Satkania, Chandraniah & Lohagora/ Chittagong	8,500/ 7,000	1988-1989	
21	Fllod Control Embankment on both banks of Srimai Khal	FCD	Patiya/ Chittagong	5,900/ 5,000	1989	

Source:

*1: Scheme Database Inventory and Mapping (contract package No: BWDB/S4), Water Management Improvement Project (WMIP), IWM

Note:

DI: Drainage and Irrigation, FCD: Flood control and drainage, FCDI: Flood control, drainage and irrigation, I: Irrigation,

Table 3 Completed Water Resources Development Schemes
in Chittagong O&M Division-2

No.	Scheme Name	Project Type	Location (Upazilla/District)	Gross Area/ Net Area (ha)	Imple. Period	Direct Cost (Lakh Tk)
1	CEP Polder 61/ 1 (Sitiakundu)	FCD	Sitakunda/ Chittagong	7,600/ 6,300	1962-1970	500.00
2	CEP Polder 61/ 2	FCD	Misarai/ Chittagong	17,000/ 15,500	1969-1987	291.00
3	CEP Polder 64/ 1A (Bashkhali)	FCD	Banshkahli/ Chittagong	5.600/ 4,700	1963-1987	352.00
4	CEP Polder 64/ 1B (Bashkhali)	FCD	Banshkahli/ Chittagong	8,000/ 7,200	1963-1987	240.00
5	CEP Polder 64/ 1C (Bashkhali) (Part)	FCD	Banshkahli/ Chittagong	1,800/ 1,450	1963-1987	139.00
6	CEP Polder 64/ 2A (Sandwip)	FCD	Banshkahli/ Chittagong	3,750/ 3,750	1963-1987	100.00
7	CEP Polder 72 (Sandwip)	FCD	Sandwip/ Chittagong	18,000/ 16,500	1963-1987	826.00
8	Prevention of Saline Water Intrusion and Drainage Project neat Sonaichari Area	FCD	Sitakunda/ Chittagong	1,160/ 1,335	2002-2007	1,998.38
9	Mohamaya irrigation Project	I	Misarai/ Chittagong	4,800/ 3,360	2001-2010	2,623.23 & Wheat 732 MT
10	Hinguli Chara Irrigation Project	I	Misarai/ Chittagong	600/ 500	1984-1986	32.00
11	Laximichara Irrigation Project	I	Misarai/ Chittagong	400/ 300	1983-1986	16.00
12	Gobaniachara WSC		Misarai/ Chittagong	400/ 400	1984-1985	26.00
13	Sonaichari WCS	DI	Ramgarh/ Khagrachari	200/ 180	1982-1986	38.00

Source:
*1: Scheme Database Inventory and Mapping (contract package No: BWDB/S4), Water Management Improvement Project (WMIP), IWM

Note:
DI: Drainage and Irrigation, FCD: Flood control and drainage, I: Irrigation,

Table 4 Completed Water Resources Development Schemes
in Cox's Bazar O&M Division-2

No.	Scheme Name	Project Type	Location (Upazilla/District)	Gross Area/ Net Area (ha)	Imple. Period	Direct Cost (Lakh Tk)
1	CEP Polder 64/ 2A (Pekua)	FCD	Pakua/ Cox's Bazar	3,750/ 3,750	1961-1967	100.00
2	CEP Polder 64/ 2B (Pekua)	FCD	Pakua/ Cox's Bazar	7,736/ 5,974	1961-1967	160.00
3	CEP Polder 65	FCD	Chakaria/ Cox's Bazar	6,649/ 6,649	1961-1967	145.00
4	CEP Polder 65/A	FCD	Chakaria/ Cox's Bazar	806/ 806	1985-1986	34.00
5	CEP Polder 65/A-1	FCD	Chakaria/ Cox's Bazar	2,800/ 2,280	1988-1994	1,391.00
6	CEP Polder 65/A-3	FCD	Chakaria/ Cox's Bazar	604/ 604	1982-1984	124.00
7	CEP Polder 66/1 (Kurushkul)	FCD	Cox's Bazar Sadar/ Cox's Bazar	4,930/ 2,852	1962-1967	599.00
8	CEP Polder 66/2	FCD	Cox's Bazar Sadar/ Cox's Bazar	2,621/ 2,400	1962-1969	239.00
9	CEP Polder 66/3 (Cox's Bazar)	FCD	Cox's Bazar Sadar/ Cox's Bazar	4,832/ 3,719	1963-1969	237.00
10	CEP Polder 66/4 (Chakaria)	FCD	Cox's Bazar Sadar/ Cox's Bazar	4,120/ 4,120	1978-1994	54.00

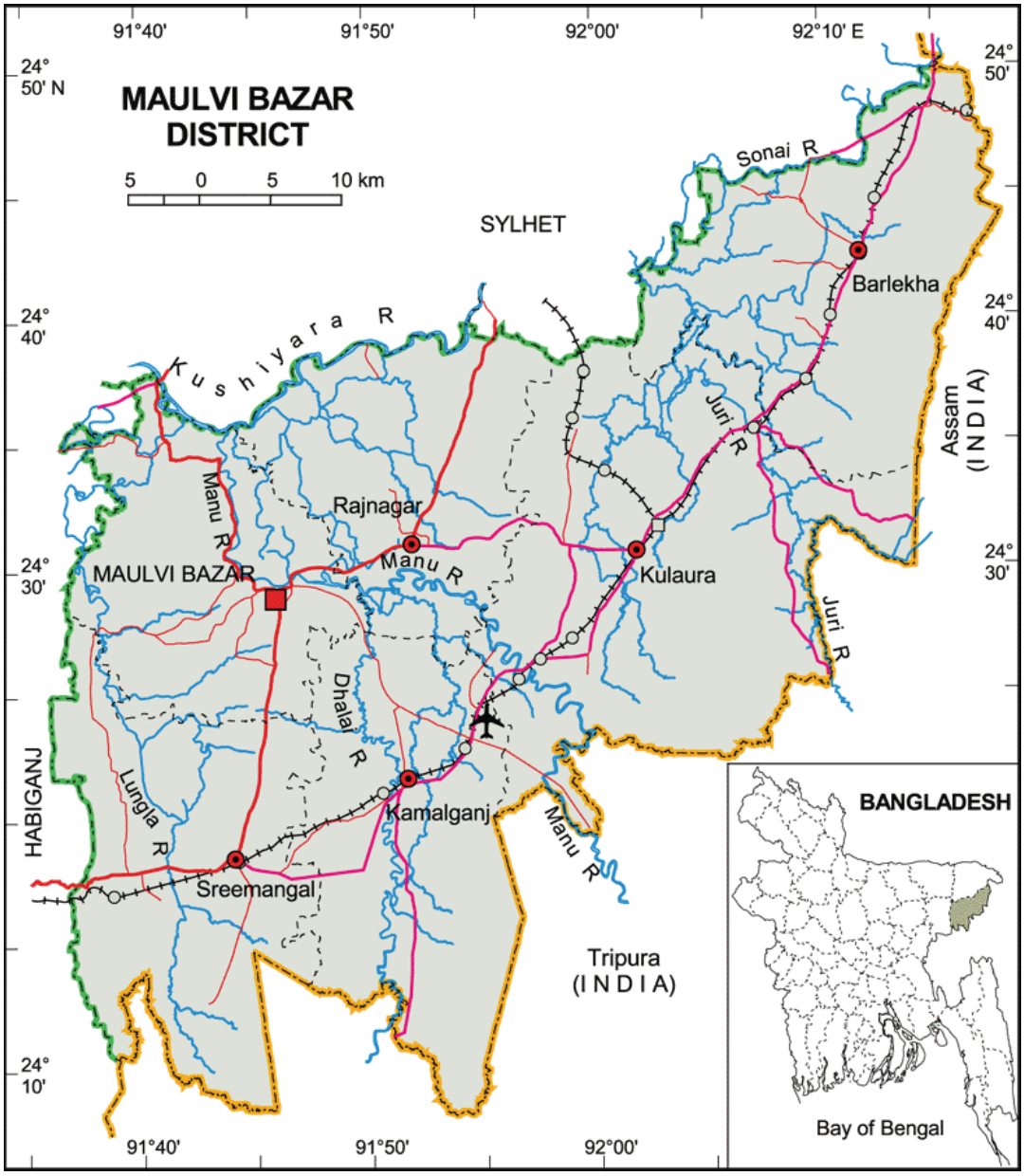
No.	Scheme Name	Project Type	Location (Upazilla/District)	Gross Area/ Net Area (ha)	Imple. Period	Direct Cost (Lakh Tk)
11	CEP Polder 67 (Knila)	FCD	Taknaf/ Cox's Bazar	1,680/ 1,600	1969-1973	54.00
12	CEP Polder 67/A (Teknaf)	FCD	Taknaf, Ukhiya/ Cox's Bazar	1,500/ 1,320	1986-1989	80.00
13	CEP Polder 67/B (Hnla)	FCD	Taknaf/ Cox's Bazar	900/ 900	1984-1989	62.00
14	CEP Polder 68 (Extension)	FCD	Taknaf/ Cox's Bazar	3,500/ 3,000	1967-1974	108.00
15	CEP Polder 69 (Phase-1)	FCD	Moheshkhali/ Cox's Bazar	1,800/ 1,200	1981-1984	1,626.00
16	CEP Polder 69 (Phase-2)	FCD	Moheshkhali/ Cox's Bazar	1,780/ 1,780	1963-1966	45.00
17	CEP Polder 69 (North East)	FCD	Moheshkhali/ Cox's Bazar	860/ 558	1981-1984	54.00
18	CEP Polder 70 (Matherbari)	FCD	Moheshkhali/ Cox's Bazar	3,023/ 3,023	1962-1965	186.00
19	CEP Polder 71 (Kutubdia)	FCD	Kutubdia/ Cox's Bazar	6,694/ 5,444	1961-1966	143.00
20	Matamuhuri Irrigation Project (Pilot)	I	Chakaria/ Cox's Bazar			
21	Harbangchara Irrigation Project	DI	Chakaria/ Cox's Bazar	2,200/ 2,200	1989-1992	94.00

Source:

*1: Scheme Database Inventory and Mapping (contract package No: BWDB/S4), Water Management Improvement Project (WMIP), IWM

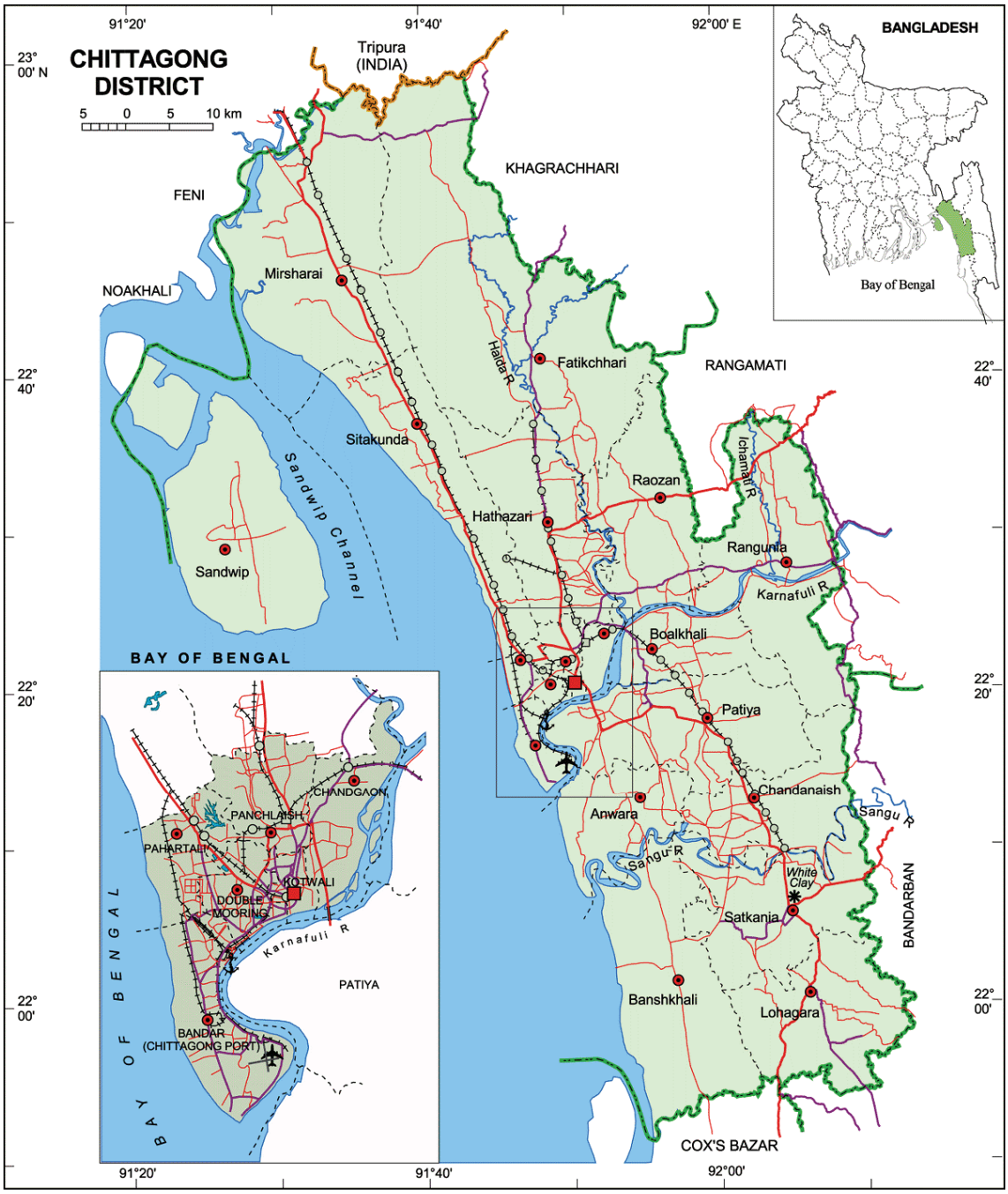
Note:

DI: Drainage and Irrigation, FCD: Flood control and drainage, I: Irrigation,



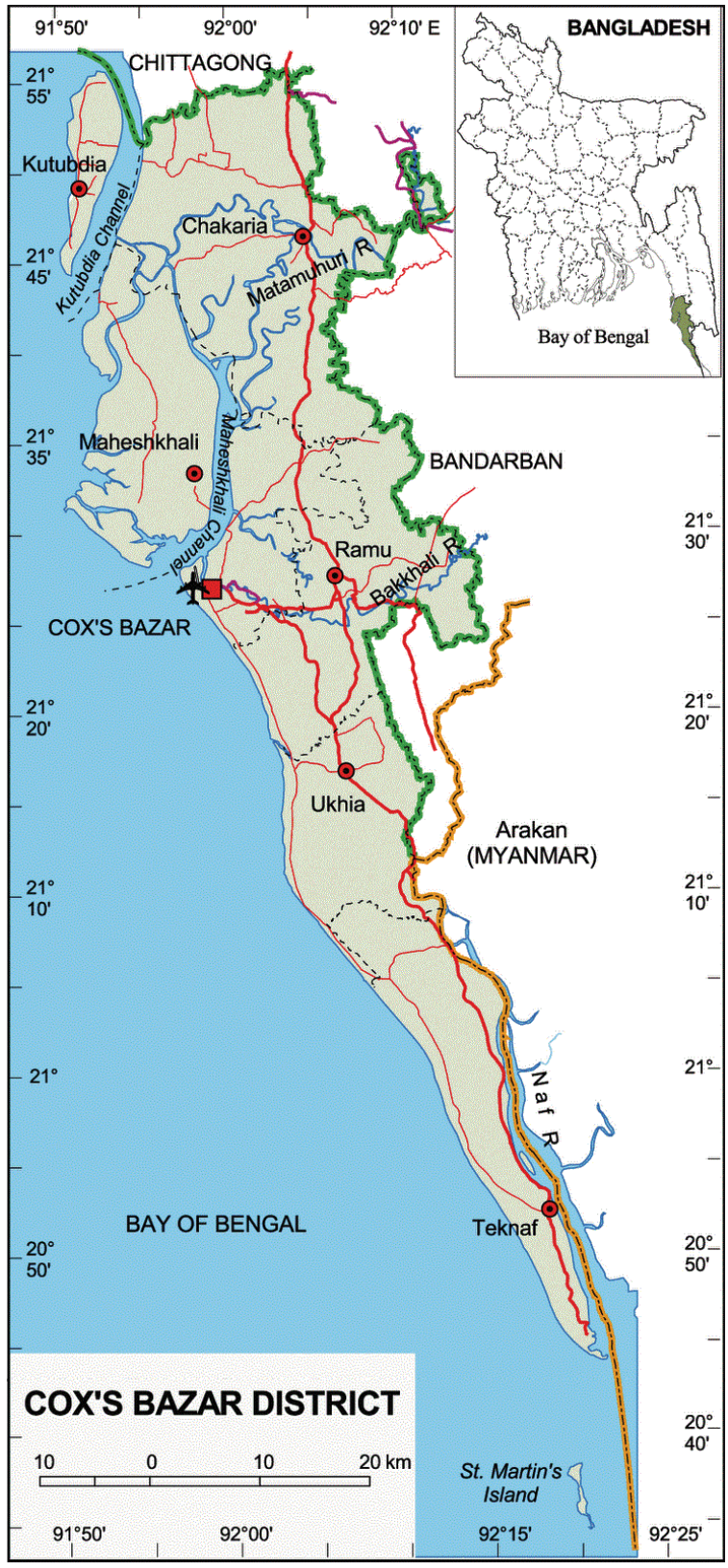
Source: BWDB

Figure 1 Map of Moulvibazar District



Source: BWDB

Figure 2 Map of Chittagong District



Source: BWDB

Figure 3 Map of Cox's Bazar District

FORM 1 (Field Datasheet)

Sheet No.:

Scheme Name:	Kind of Structure
Structure Name	Location(Coordinates): N , E
Layout/Sketch/, Dimensions, etc.	

FORM 2 (for Report: A3 size)

Sheet No.:

Scheme Name:	Kind of Structure
Structure Name	Location(Coordinates): N , E

Layout/Sketch/, Dimensions, etc.	Photographs

Table 5 Quantities of the Services

Item	Unit	Amount	Remarks
1. Inventory Survey in Moulvibazar O&M Division			
1.1 Collection of Data & Information	LS		
1.2 Inventory Survey in the Field	LS		
1.3 Summary of Field Data & Record/ Reporting	LS		
1.4 Direct Cost	LS		
1.5 Sub-total of 1			
2. Inventory Survey in Chittagong O&M Division-1			
2.1 Collection of Data & Information	LS		
2.2 Inventory Survey in the Field	LS		
2.3 Summary of Field Data & Record/ Reporting	LS		
2.4 Direct Cost	LS		
2.5 Sub-total of 2			
3. Inventory Survey in Chittagong O&M Division-2			
3.1 Collection of Data & Information	LS		
3.2 Inventory Survey in the Field	LS		
3.3 Summary of Field Data & Record/ Reporting	LS		
3.4 Direct Cost	LS		
3.5 Sub-total of 3			
4. Inventory Survey in Cox's Bazar O&M Division			
4.1 Collection of Data & Information	LS		
4.2 Inventory Survey in the Field	LS		
4.3 Summary of Field Data & Record/ Reporting	LS		
4.4 Direct Cost	LS		
4.5 Sub-total			
Total of 1 - 4			

Table 6 Schedule of the Services

No.	Survey								
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	Inventory Survey in Moulvibazar O&M Division	■				■			
2	Inventory Survey in Chittagong O&M Division-1		■	■					
3	Inventory Survey in Chittagong O&M Division-2		■	■					
4	Inventory Survey in Cox's Bazar O&M Division				■				
	Report		▲ MB(Manu)		▲ CG-1&2	▲ CB	▲ MB(other)		

付属資料-5：　河川構造物台帳に関する指導・説明資料

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

O&M Manual and Inventory

March 20, 2017
JICA Team Makoto KODAMA

Contents

2

1. Progress of Preparation of O&M Manual (1)

November 2015 1st Draft O&M Manual was submitted

June 2016 2nd Draft O&M Manual was submitted

For finalization;

- To add description how the structures are destroyed due to inadequate O&M in Chapter 5 “Maintenance Manual”, and
- To increase description in Chapter 6 “Budgeting of O&M.”

May 2017 Final version of O&M Manual will be submitted to be approved

July 2017 O&M Manual will be disseminated

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1. Progress of Preparation of O&M Manual (2)

Contents of O&M Manual

No.	Chapter	Contents
1	Introduction	Scope and application of the draft manual and definition of water related infrastructures.
2	Concept of O&M	Scope, present situation, four pillars concepts of O&M.
3	Basic Scheme Data	Preparation of basic scheme data of O&M
4	Operational Manual	Planning and actual work of operation
5	Maintenance Manual	Planning and actual work of maintenance
6	Budget of O&M	Budget planning of O&M works
7	Implementation and Monitoring of O&M	Implementation and monitoring of O&M including the organizations.
8	Flood Fighting	Flood fighting during floods as important part of operation works.

4

2. Inventory of River Structures (1)

O&M system using GIS has been developed in this project.
It consists of GIS and inventory sheets.

This system will be utilized for O&M activities.
- Did you obtain enough skill to operate the system?
- Were the inventory sheets already prepared?
- Is the information described in inventory sheet adequate?

Do you remember the purpose of preparing the inventory sheet, that Mr. Saito explained you on February?

- The information of Hydraulic Structures are stocked as integrated manner and anyone can get the information .
- The damaged point can be monitored and updated by Inventory sheet.

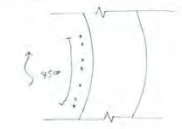
5

2. Inventory of River Structures (2)

Sheet No.: RVT01RS000400

Scheme Name: Manu Right Embankment (secondary) Kind of Structure: Revetment Work (secondary) Date:15-09-2015

Structure Name: Manu Right Embankment Chainge (km) 11+120 Location(Coodinat:N 24. 29 . 17.9 E 91. 49 . 49.8

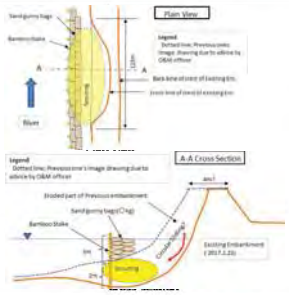
Layout/Sketch/. Dimensions,etc.	Photographs	Remarks/Condition of Structure
 Plan view  Cross section	 Existing Revetment Work Manu Right	Temporary protection work . needs revetment

Structure of the work is not clear.
This sheet shows there is no damage here.
Is it right?

If bank erosion is confirmed …

6

2. Inventory of River Structures (3)

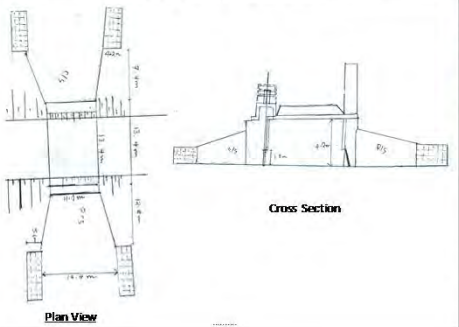
Sheet No.: RVT01RS000400		
Scheme Name: Manu Right Embankment (secondary)	Kind of Structure: Revetment Work (secondary)	Date:15-09-2015
Structure Name: Manu Right Embankment	Chainge (km) 11+120	Location(Coodinat:N 24. 29 . 17.9 E 91. 49 . 49.8
Layout/Sketch/. Dimensions,etc.	Photographs	Remarks/Condition of Structure
	 Existing Revetment Work Manu Right	Temporary protection work , needs revetment

We should do the followings from the information provided by the inventory sheet;

- Understand the structure of the facility,
- Confirm whether the facility is functioned or not,
- Judge the urgency of repair work,
- Estimate quantity and cost of repair work roughly.

7

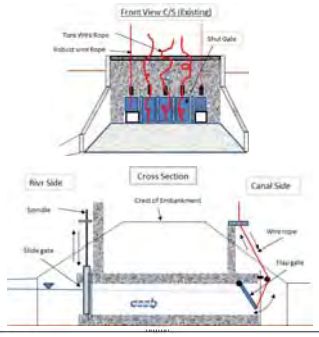
2. Inventory of River Structures (4)

Sheet No. : RG01L000900		Date: 14/09/20
Scheme Name : Manu left Embankment	Kind of Structure: Regulator 5V-1.5m x 1.5m	
Structure Name: Hamhami Chhara Regulator (Hamhami Chhara Sinage (km) : 48+854.8	Location(Coodinates) : N 24.29. 21.1 E 91. 47. 39.0	
Layout/Sketch/. Dimensions,etc	Photographs	Remarks
 Cross Section Plan View	 Hamhami Chhora Regulator R/S  Hamhami Chhora Regulator C/S View	Gate: R/S steel rope and pulleys damaged Structure: Good

The sheet should mentions how many gates it has on R/S and C/S respectively.
Which gate is malfunctioned due to damage of wires and pulleys?

8

2. Inventory of River Structures (5)

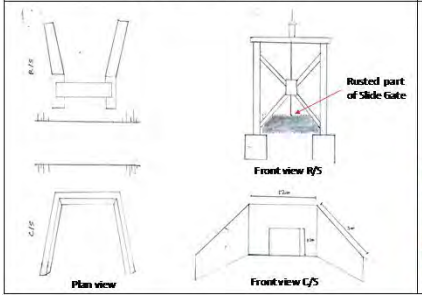
Sheet No. : RG01L000900		Date: 14/09/20
Scheme Name : Manu left Embankment	Kind of Structure: Regulator 5V-1.5m x 1.5m	
Structure Name: Hamhami Chhara Regulator (Hamhami Chhara Stinge (km) : 48+854.8	Location(Coodinates) : N 24.29. 21.1 E 91. 47. 39.0	
Layout/Sketch/. Dimensions.etc	Photographs	Remarks
	 Hamhami Chhora Regulator R/S  Hamhami Chhora Regulator C/S View	Gate: R/S steel rope and pulleys damaged Structure: Good

Inventory sheet should describe which parts are damaged and what is the effect.
For instance;

- 2 gates remain opening so flood water come into the landside from the river,
- This regulator can't control water because all gates are closed.

9

2. Inventory of River Structures (6)

Sheet No.: RG01R001100		
Scheme Name: Manu Right Embankment (Manu River project)	Kind of Structure: Regulator: 1 v Date: 10-09-2015	
Structure Name: outlet Chainge :36+941	Location(Goodina N 24 . 29.681 E 91. 48.537	
Layout/Sketch/. Dimensions.etc.	Photographs	Remarks/Condition of Structure
		Gate : Ok Structure: Good

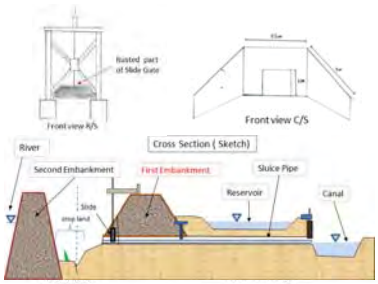
This regulator is not located along the river course. So the inventory sheet should illustrate the positional relation.

10

2. Inventory of River Structures (7)

11

2. Inventory of River Structures (8)

Sheet No.: RG01R001100		
Scheme Name: Manu Right Embankment (Manu River project)	Kind of Structure: Regulator: 1 v Date: 10-09-2015	
Structure Name: outlet Chainge : 36+941	Location(Goodina N 24 . 29.681 E 91. 48.537	
Layout/Sketch/, Dimensions,etc.	Photographs	Remarks/Condition of Structure
		Gate : Ok Structure: Good

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Thank you very much

付属資料-6：　施設台帳の整理に関する技術指導資料

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

O&M Manual

May 21, 2017
JICA Team Makoto KODAMA

Project outline

Project Title:	The Project for Capacity Development of Management for Sustainable Water Related Infrastructure
Period:	August 2013 – August 2017 (in the process of revising from Aug. 2017 to Oct. 2017)
Project purpose:	To improve the capacities of BWDB on embankment engineering in terms of design, construction and operation & maintenance methods
Output:	1. Design for sustainable river embankment is introduced. 2. Construction method and procedure of river embankment is improved. 3. Operation and maintenance system for the river infrastructures is ensured → - O&M manual - GIS database of damage and maintenance

2

Contents

3

1. Outline of O&M manual
2. Points of revise from 2nd draft manual to Final draft one
3. Inventory of river structures

4

1. Outline of O&M Manual

November 2015	1st Draft O&M Manual was submitted
June 2016	2nd Draft O&M Manual was submitted

⬇

May 2017	Draft final O&M Manual is submitted to be approved
July 2017	O&M Manual will be disseminated

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1. Outline of O&M Manual

Contents of O&M Manual

Chapter	Contents
1. Introduction	Scope and application of the manual and definition of water related infrastructures.
2. Concept of O&M	Scope, present situation, four pillars concepts of O&M.
3. Basic Scheme Data	Preparation of basic scheme data of O&M
4. Operational Manual	Planning and actual work of operation
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7. Implementation and Monitoring of O&M	Implementation and monitoring of O&M including the organizations.
8. Flood Fighting	Flood fighting during floods as important part of operation works.

6

1. Outline of O&M manual
2. Points of revise from 2nd draft manual to Final draft one
3. Inventory of river structures

7

2.1 River/channel

River/channel is a watercourse.

River/channel transports not only water but also… sediment.

8

2.1 River/channel

Water flow has 3 function regarding sediment.

1. Erosion

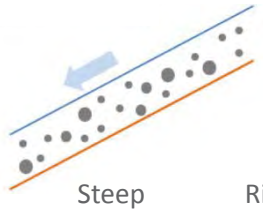
2. Transportation

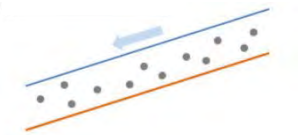
3. Sedimentation

9

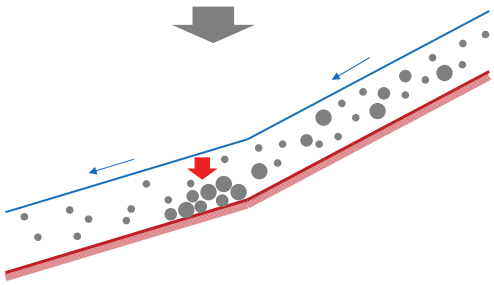
2.1 River/channel

Sediment carrying capacity



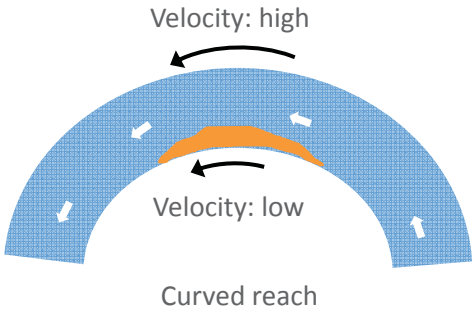


Steep	Riverbed gradient	Gentle
High	Flow velocity	Low
High	Sediment carrying capacity	Low



10

2.1 River/channel



Curved reach

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River structure

2.2 Embankment (dike, levee)

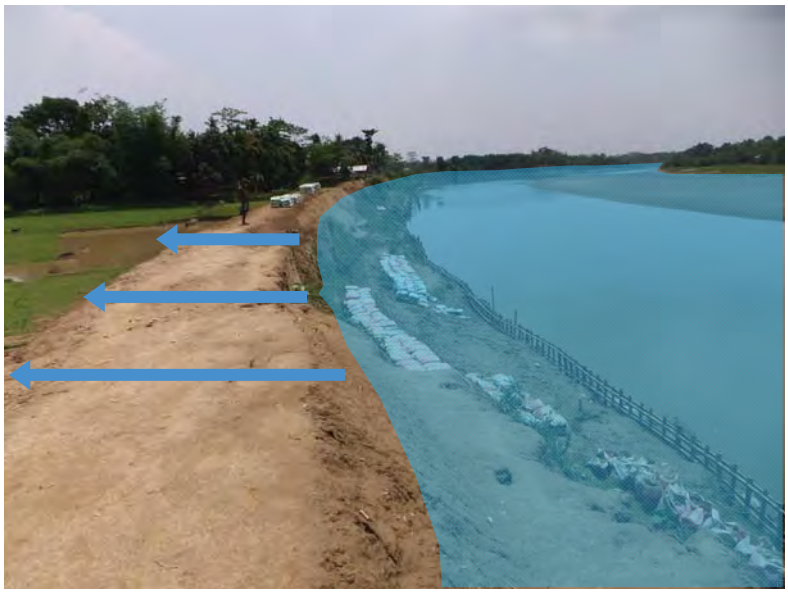
2.3 Slope protection work

2.4 Groyne/super dike

2.5 Sluice

12

2.2 River structure: Embankment (dike, levee)



13

2.2 River structure: Embankment (dike, levee)

Embankment is generally made of soil.

There are some merits in making of soil.

For construction

- Low construction cost
- Availability of material
- Workability for extension, widening, heightening

For material

- Durability
- Adjustability for deformation of ground

For O&M

- Easy rehabilitation against sinking
- Quick response after damage

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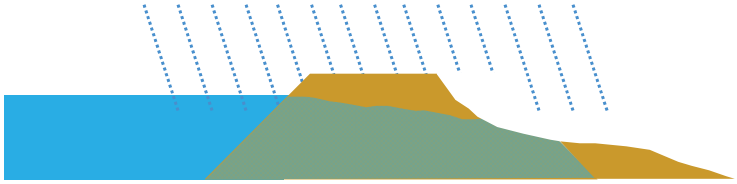
2.2 River structure: Embankment (dike, levee)

What is the demerit in making embankment of soil?

- Quality of material is not homogeneous compared with concrete and metal structures.
- Stability against slide decreases if river water/rainwater permeates inside embankment.



15

2.2 River structure: Embankment (dike, levee)

- Embankment is eroded by flood flow.

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2.2 River structure: Embankment (dike, levee)

- It is easily collapsed by overflow.

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2.3 River structure: Slope protection work

Function of slope protection work is

to protect the embankment or channel/canal banks from scouring by water flow and other objects transported by the flow

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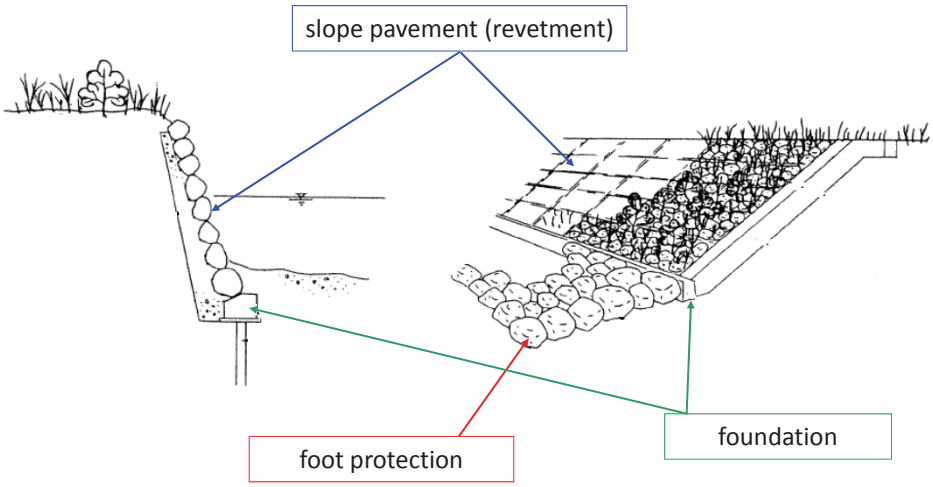
2.3 River structure: Slope protection work

Structure of slope protection work

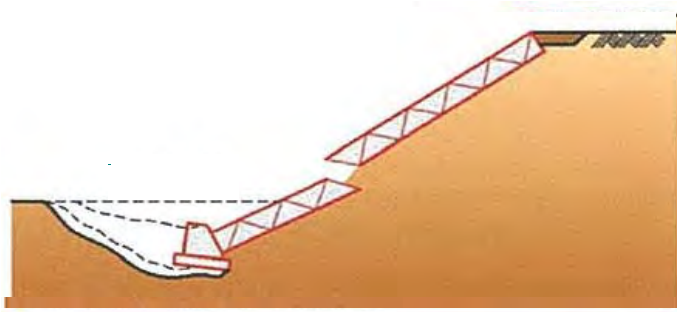


19

2.3 River structure: Slope protection work

Damage type of slope protection work

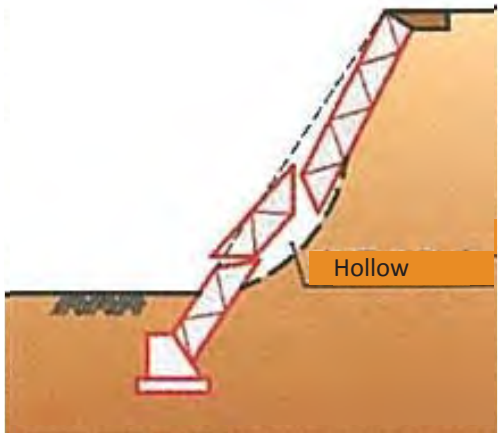
- Riverbed degradation



20

2.3 River structure: Slope protection work

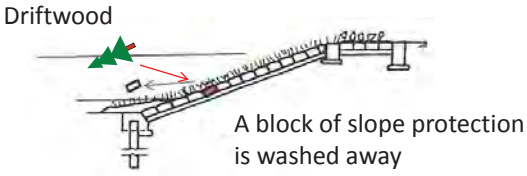
- Suction of backfill material



21

2.3 River structure: Slope protection work

- Collision of driftwood



22

2.4 River structure: Groyne/super dike

Function of groyne/super dike is …

to reduce the flow velocity near the bank by directing the flow away from the bank.

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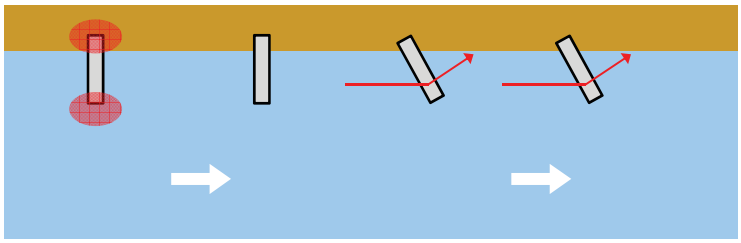
2.4 River structure: Groyne/super dike

Deformations causing damage are listed as follows.

- Inclination, sliding/overturning, outflow of groyne/super dike
- Sliding, outflow of material, e.g. gabion, block and stake
- Erosion at joint between groyne/super dike and the bank
- Wear of concrete, decay of timber
- Floating up of a stake



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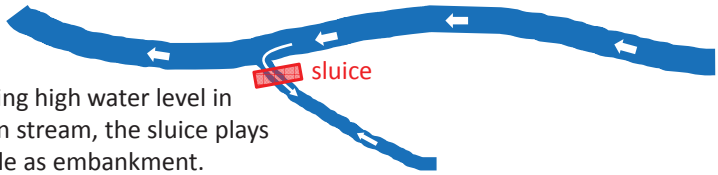
2.5 River structure

Sluice and regulator



During high water level in main stream, the sluice plays a role as embankment.

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1. Outline of O&M manual
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26

3. Inventory of River Structures

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This system will be utilized for O&M activities.
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3. Inventory of River Structures

Sheet No.: RVT01RS000400

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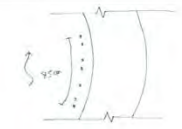
Structure Name: Manu Right Embankment Chainge (km) 11+120 Location(Coodinat:N 24. 29 . 17.9 E 91. 49 . 49.8

Layout/Sketch/. Dimensions,etc.	Photographs	Remarks/Condition of Structure
 Plan view  Cross section	 Existing Revetment Work Manu Right	Temporary protection work . needs revetment

Structure of the work is not clear.
This sheet shows there is no damage here.
Is it right?

If bank erosion is confirmed …

28

3. Inventory of River Structures

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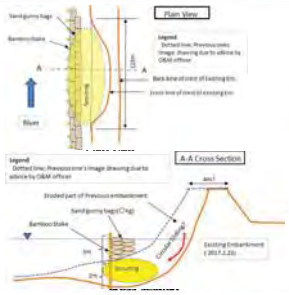
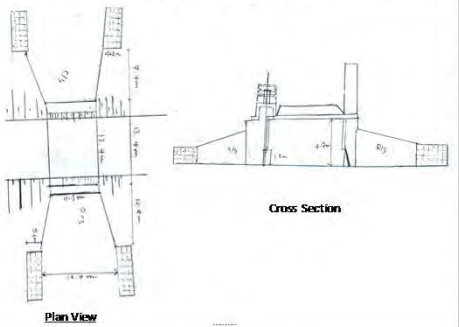
	 Existing Revetment Work Manu Right	Temporary protection work , needs revetment

We should do the followings from the information provided by the inventory sheet;

- Understand the structure of the facility,
- Confirm whether the facility is functioned or not,
- Judge the urgency of repair work,
- Estimate quantity and cost of repair work roughly.

29

3. Inventory of River Structures

Sheet No. : RG01L000900		Date: 14/09/20
Scheme Name : Manu left Embankment	Kind of Structure: Regulator 5V-1.5m x 1.5m	
Structure Name: Hamhami Chhara Regulator (Hamhami Chhara Sinage (km) : 48+854.8	Location(Coodinates) : N 24.29. 21.1 E 91. 47. 39.0	
Layout/Sketch/. Dimensions,etc	Photographs	Remarks
 Cross Section Plan View	 Hamhami Chhora Regulator R/S  Hamhami Chhora Regulator C/S View	Gate: R/S steel rope and pulleys damaged Structure: Good

The sheet should mentions how many gates it has on R/S and C/S respectively.
Which gate is malfunctioned due to damage of wires and pulleys?

30

3. Inventory of River Structures

Sheet No. : RG01L000900		Date: 14/09/20
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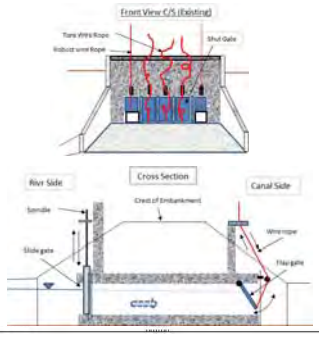

Hamhami Chhora Regulator R/S

Hamhami Chhora Regulator C/S View

Gate: R/S steel rope and pulleys damaged
Structure: Good

Inventory sheet should describe which parts are damaged and what is the effect.
For instance;

- 2 gates remain opening so flood water come into the landside from the river,
- This regulator can't control water because all gates are closed.

31

3. Inventory of River Structures

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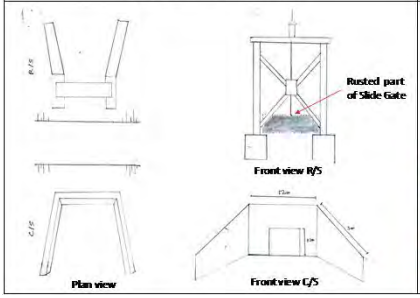

Gate : Ok
Structure: Good

This regulator is not located along the river course.
So the inventory sheet should illustrate the positional relation.

32

3. Inventory of River Structures

33

3. Inventory of River Structures

Sheet No.: RG01R001100		
Scheme Name: Manu Right Embankment (Manu River project)	Kind of Structure: Regulator: 1 v Date: 10-09-2015	
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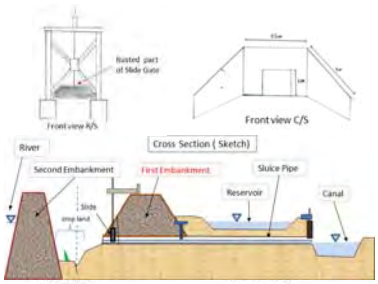		Gate : Ok Structure: Good

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Thank you very much

付属資料-7：　開催ワークショップのプログラム、議事録、参加者リスト

付属資料-7.1：2015 年 10 月 26 日　物理探査ワークショップ
付属資料-7.2：2015 年 11 月 16 日　マニュアル（案）ワークショップ
付属資料-7.3：2016 年 02 月 23 日　パイロット工事現場ワークショップ
付属資料-7.4：2016 年 04 月 02 日　パイロット工事現場ワークショップ
付属資料-7.5：2017 年 03 月 12 日　第 1 次竣工検査
付属資料-7.6：2017 年 04 月 27 日　合同現場視察
付属資料-7.7：2015 年 05 月 20 日　竣工検査、建設マニュアル（案）ワークショップ
付属資料-7.8：2017 年 07 月 13 日　マニュアルおよび行動計画セミナー（未）

Explanation and Demonstration
On
Geophysical Exploration of Embankment
for
The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: October 26, 2015
Time: 15:00 – 16:30
Venue: Training/Library Room, Design Circle, BWDB, Green Road, Dhaka

AGENDA

14:30 – 15:00	Arrival and Registration
15:00 – 15:10	Opening Remarks by Director Planning-1
15:10 – 16:00	Presentation/Demonstration of Geophysical Exploration of Embankment by Mr. Kobayashi • Presentation: Applied Methods (10 min) • Demonstration: Applied Methods (30 min) 2D Resistivity Method, Surface Wave Method • Presentation: Field Investigation Result (10min) Comilla & Moulvibazar
16:00 – 16:20	Q & A (20 min)
16:20 – 16:30	Closing Remarks: Additional DG Planning Chief Engineer Design/Planning
16:30 – 17:00	Adjourn and Tea

Participant List of the Workshop

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: October 26, 2015, Time: 03:00 pm – 04:30 pm

Venue: Training/Library Room, Design Circle, BWDB, Green Road, Dhaka

No	Name	Title/Organization	Phone No Email Address	Signature
1	Provati Mukherjee	CE / BWDB		
2	Md. Abdul Hye	SE/Director Dt. of Planning-1 BWDB		
3	KAZI TOFAIL HOSSAIN	SE/DESIGN CIRCLE-2 BWDB		
4	FAZLUR RASHID	SE Director/Staff Dev.		
5	Nalik Sumaia Hussain	AE / Design Circle -1, BWDB		
6	YASMIN BEGUM	SE, CHIEF ENGINEER DESIGN. BWDB.		
7	Md. Asaduzzaman	E.E. Planning-1 BWDB.		
8	Md. Shahidul Alam	Director Ground Water Hydrology		

No	Name	Title/Organization	Phone No Email Address	Signature
9	Nasima Jahan	EE/BWDB		
10	Shamad Mahmuda Fatima	Assistant Engr. (BWDB)		
11	Nasrin Jahan	Project officer (JICA)		
12	Md. Enayet Ullah.	EE/BWDB		
13	Md. Mainul Islam	Sr. Expert-2/ CDMSWR1		
14	Md. Abdul Basit	E.E/BWDB		
15	A.K. Manzur Hasan	SE/BWDB		
16	Md. Harunur Rasheed	SE, Design Circle-1 BWDB		
17	Md. Abul Kausar	SE Design circle-4 BWDB, Dhaka		
18	B. M. Nath	SE, Design Circle-5, BWDB, Dhaka.		

No	Name	Title/Organization	Phone No Email Address	Signature
19	MOTAHER HOSSAIN	SE, Design circle-6 BWDB		
20	Dr. ANWAR ZAHID	DD, GWH BWDB		
21	Kazumitsu MURAOKA	JICA Expert to BWDB		
22	Md. Mahfuzur Rahman	Executive Engineer Design Circle-5 BWDB, Dhaka		
23	Md. Saif Ubbli	XEN, Design-II		
24	Md. Majadur Rahman	XEN, Design-IV		
25	Md. Shohiduzzaman	SDE, Design-V		
26	Mahid-Al-Hasan	AE, Design-I		
27	Md. Asif hossain	AE, Design-I		
28	AFM Tauhid Jaman	AE, Design-I		

No	Name	Title/Organization	Phone No Email Address	Signature
29	Md. Abdul Malek	AE, Design-6, BWDB		
30	Md Maiuuddin	XEN, Gopalganj O&M Division, BWDB, Gopalganj		
31	Engr. Md. Halim Shaky	Sub-Divisional Engr. Kashiani O&M Sub-Division, BWDB, Gopalganj		
32	Hasan Zubaer	Senior Local Expert JICA		
33	Toshimasa Kobayashi	JICA Expert		
34	Yosuke USUI	〃		
35	Muntasir Ibn Mohsin	Administrator JICA Expert Team CDMSWRI		
36				
37				
38				

Proceeding of the Workshop on the Project **"Capacity Development of Management for Sustainable Water Related Infrastructure"** held in the BWDB Conference Room on 16th November, 2015

A half day workshop was held on the activities of the Project "Capacity Development of Management for Sustainable Water Related Infrastructure on 16th November, 2015 in BWDB Conference Room, 3rd Floor, WAPDA Building.

The workshop was conducted in 5 (five) sessions as described below.The Program and Participant list in the workshop areattached in Annexure-1 and Annexure-2, respectively.

Opening Session: In this session Mr. Abdul Latif Miah,ADG (East) in charge of DG,BWDB presided over. With recitation form the holy Quran the session started. Mr. Mahfuzur Rahman, Chief Planning in his opening speech described the purpose of the project and activities so far done.He mentioned that the project has started for more than 2 years ago and it will be continued till September 2017. The JICA expert team have prepared Draft Design Manual for embankment, Draft Construction Manual, andDraft O & M Manual, and tendered for pilot repair work. The contract of which will be signed on 16th November 2015. He also mentioned that the project is JICA and BWDB joint venture Project by which BWDB will be benefitted. The project also will conduct on job training in Japan and Bangladesh. Two batches of trainees from Bangladesh have already been trained in Japan.

Mr. USUI,team leader of the JICA expert team stated about the outline the project activities through power point presentation.

Then Mr. Koichi Kitamura, JICA Representative Bangladesh expressed his views about the project and workshop. He mentioned that he thinks this workshop is a good opportunity to know about what JICA is performing with BWDB in the project. He pointed out that JICA & BWDB are working together for the overall development of the capabilities development of management for sustainable water related infrastructure and this workshop will help in enriching the efforts in the days to come. He expressed satisfaction about the response of BWDB and JICA experts regarding the project.

Then DG (incharge) BWDB in his speech stated that this joint venture project is for Capacity Development of Management for sustainable water related infrastructure though updated Design Manual, preparation of Construction Manual,O & M Manual, and GIS data base,and on job training in Japan & Bangladesh. This workshop will help us a lot in our future development. He expressed gratitude to everybody attending the workshop & he declared the workshop open wishing for its success.

Session 2: Present condition of embankment. It was chaired by Mr. Mahfuzur Rahman, Chief Planning, BWDB. In this session 2 papers were presented by Mr. Harun-ur-Rashid, SE, Design Circle-1, on outline of Embankment work of BWDB & another by Mr. Tatsuya MOCHIZUKI, JICA expert team member on Rough Assessment in Current Status of River Embankment in Bangladesh.

Mr. Harun through power point presentation describe about the types BWDB embankment. Design parameter of BWDB embankment, Failure nature,specification of embankment

Construction and challenges that BWDB face regarding the embankment construction and maintenance. He also mentioned about slope stability analysis, seepage analysis, sheer strength analysis etc.

Chairman of the session thanked Mr. Harun for nice presentation and appreciated some comments from the audience. He gave emphasis on personal communication with the presenter regarding any clarification.

Mr. Mochizuki in his presentation through power point stated about the causes of embankment failure in Bangladesh. He mentioned about 14 investigation sites throughout the country for the assessment of failure. He pointed out that from all the investigation report in his opinionerosion is the main cause of failure of embankment in Bangladesh.

He also spoke about the impact of expansion of erosion at Moulvibazar and embankment condition& analysis in Khulna.

Mr. SajedurRahman, SE/Ganges Barrage Circle, Commented that for Different soil condition embankment design will vary, which should be clarified in Mr. Harun's presentation. He also pointed out that a data bank on soil condition may be created in Design Circle for ready information of soil condition in a area from the facility of speedy design preparation pending investigation at site.

Then Dr. Jiban Kumar Sarker, EE pointed about the d value andhe said that d value will be different for different place as a comment to Mr. Mochizuki's presentation.

Session 3: Preparation of Manuals and pilot project works. This session was presided over by Mr. Jahangir Kabir, Chief Engineer, Design, BWDB. In this session 4 (four) Papers were presented.

1st Paper: Outline/ Basic Consideration of Draft Design Manual for Embankment Presented by Mr. Tatsuya MOCHIZUKI, JICA Expert Team member. Mr. Mochizuki through power point presentation mentioned about Design Consideration, Bearing Capacity, Circular sliding,toe protection, & Design Speciation. Participants wanted to comment. But the Chairman of the session opined that a committee may be formed to review all comments on the Draft Design Manual Circulated to concerned offices and comments may be given to the committee.

ADG, Planning Present in the meeting agreed in this matter.

2nd Paper: Basic Consideration on Draft Construction Manual for Embankment presented by Mr. Koizumi, JICA Expert Team Member.

He spoke on the Density test by Sand replacement method and Safety measures. He alsospoke about the progress charts and field soil test for determination of water content. Chairman of the session told that it will take time to understand the safety measures and review the manual now,so it can be finalized through a committee getting comments afterwards.

3rd Paper: Basic Consideration of Draft O & M Manual for Hydraulic Structure, presented by Mr. USUI, Team Leader, JICA Expert Team.

He spoke about the O & M Guideline, National Work Policy, Nation water Act, SWAT Analysis. He also spoke about the Four pillar of O & M Such as:-

-Basic Scheme Data
-Planning O & M
- Budgeting of O & M works
- Monitoring of O & M works

He spoke about the Eight Chapter of O & M Manual. He also requested for comments on Draft O & M Manual.

XEN Amirul Hossain, FFCW Comment on O & M Manual as follows:

(1) Zonal map should be updated
(2) Summary should be given
(3) Peoples participation in CDSP, EIP, CPP may be mentioned
(4) IPSWAM guideline may be mentioned
(5) Water Resource Project <1000hd either FCD & FCDI should be clarified
(6) Central Data Base in BWDB may be established.

Chairman of the session opined that the O&M Manual may also be finalized through a committee.

4th Paper: Outline of Pilot Project Work. The paper was presented by Mr. Nakazawa,JICA expert team member. He spoke about the site of pilot repair works, its present condition & failure pattern, characteristics of the surrounding area, establishment in the pilot repair work area. He mentioned that meeting withthe land owner to allow the pilot repair work and their help in all respect for the work was held. There was FGD atwork site and environmental assessment report has been made and the pilot repair work is environmental friendly. Some little adverse effects can be mitigated by EMMP. The land owners agreed to provide land and other assistance. He spoke that work will start soon and will be completed by mid-May,2016 He gave emphasis on Environmental aspects and it should be taken care of by everybody during the execution of work and during the maintenance period. He also mentioned that the pilot work is for a length of 265m.

4th Session: Report in Training in Japan.

This session was chaired by Chief Engineer Design, BWDB

Mr. Khalequzzaman, Chief Monitoring, BWDB and Ms.Fatema, Assistant Engineer presented their experience of training in Japan from 4th to 17th October, 2015.Mr.Khalequzzaman said that there is difference of all the features like topography, river characteristics,culture etc. in Japan than those in Bangladesh. But the trainees have learnt a lot from this training about advanced engineering.Then Ms. Shamsad Mahmuda Fatima gave brief review of the training such as orientation, lecture attendance, field visits, concluding session, etc. in the presentation. She also showed one video on how to stay during earth quack of 9 magnitude for 30 second.

Also one of the training participants in Japan Mr. Hiruzzaman, Deputy Secretary, MoWR spoke about the nice culture, hospitality, helping attitude, neat and cleanliness and very gentle behavior of Japanese. He mentioned that his ideas and views about life have changed a lot after this training. Chairman of the session concluded the session thanking all participants.

5th Session:Concluding Session

In this session ADG(Planning),BWDB delivered his concluding speech. He mentioned that he is very happy for remaining present in the workshop. He appreciated the actions and interaction of the workshop. He hoped that this workshop will help the JICA experts and BWDB to achieve the outputs of the project. He also mentioned that committees will be formed soon and it will act to finalize the issues as mentioned in the proceeding. Finally he wished good health and peace of everybody.

At the end Mr. Abdul Hye, DirectorPlanning-1 thanked all participants for attending the workshop and their patient hearing and comments.

The workshop thus ended following a Lunch.

23.11.2015

(Md. Mahfuzur Rahman)
Chief Planning
BWDB, Dhaka.

Memo No. BWDB/P-1/735(40) Date: 23.11.2015.

Distribution: (Not as per seniority)

1. Additional Director General (Planning), BWDB, Dhaka.
2. Additional Director General (Eastern Region), BWDB, Dhaka .
3. Additional Director General (Western Region), BWDB, Dhaka.
4. Chief Planning, BWDB, Dhaka.
5. Chief Monitoring, BWDB, Dhaka.
6. Chief Engineer, Hydrology, BWDB, Dhaka.
7. Chief Engineer, Design, BWDB, Dhaka.
8. Chief Engineer, North-Eastern Zone, BWDB, Sylhet.
9. Chief Engineer, Northern Zone, BWDB, Rangpur.
10. Chief Engineer, North-Western Zone, BWDB, Rajshahi.
11. Chief Engineer, Southern Zone, BWDB, Barishal.
12. Chief Engineer, South-Western Zone, BWDB, Khulna.
13. Chief Engineer, Western Zone, BWDB, Faridpur.
14. Chief Engineer, South-Eastern Zone, BWDB, Chittagong.
15. Chief Engineer, Central Zone, BWDB, Dhaka.
16. Chief Engineer, Eastern Zone, BWDB, Comilla.
17. Chief Engineer, O & M, BWDB, Dhaka.
18. Chief, Training & Staff Development, BWDB, Dhaka.
19. Mrs. Hamida Chowdhury, Deputy Secretary, MoWR, Dhaka.
20. Mr. Muhammad Hiruzzaman, Deputy Secretary, MoWR, Dhaka.
21. Director, Planning-1 Directorate, BWDB, Dhaka.

22. Director, Planning-2 Directorate, BWDB, Dhaka.
23. Director, Planning-3 Directorate, BWDB, Dhaka.
24. Superintending Engineer, Design Circle-1, BWDB, Dhaka.
25. Superintending Engineer, Design Circle -2, BWDB, Dhaka.
26. Superintending Engineer, Design Circle -4, BWDB, Dhaka.
27. Superintending Engineer, Design Circle -5, BWDB, Dhaka.
28. Superintending Engineer, Design Circle -6, BWDB, Dhaka.
29. Superintending Engineer,Surface Water Hydrology Circle, BWDB, Dhaka.
30. Superintending Engineer, Moulovibazar O&M Circle, BWDB, Moulovibazar.
31. Director, Programme, BWDB, Dhaka.
32. Director, Contract & Procurement Cell, BWDB, Dhaka.
33. CSO to Director General, BWDB, Dhaka.
34. Director, Processing, BWDB, Dhaka.
35. Executive Engineer, Moulvibazar O&M Division, BWDB, Moulvibazar.
36. Mr. Shamal Chandra Das, Executive Engineer, Office of the Chief Planning, BWDB, Dhaka.
37. Executive Engineer, Flood Forecasting & Warning Centre, BWDB, Dhaka.
38. Executive Engineer, Planning-1 Directorate, BWDB, Dhaka.

23/11/2015

(Md. Abdul Hye)
Director
Directorate of Planning-1,
BWDB, Dhaka.

Annexture-1

Workshop
on
The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: November 16, 2015
Time: 09:30 – 14:00
Venue: Conference Room, the 3rd Floor, WAPDA Building, Motijheel, BWDB

AGENDA

09:00 – 09:30	Arrival and Registration
09:30 – 10:00	Opening Session Chair: DG, BWDB Recitation from the Holy Quran- Mr. Omar Faruque Opening Remarks by Chief Planning, BWDB Outline of Project Activities by JICA Expert Team Remarks by JICA Bangladesh Office Remarks by ADG Planning, BWDB Remarks by DG, BWDB
10:00 – 10:15	Tea/Coffee Break
10:15 – 11:00	Session 2: Present Condition of Embankment Chair: Chief Planning, BWDB Outline of Embankment Works of BWDB Speaker: Mr. Harunur Rashid, SE, Design-1 (15 min) Rough assessment on Current Status of River Embankment in Bangladesh Speaker: Tatsuya MOCHIZUKI, JICA Expert Team (15 min) Discussion (10 min) Remarks by Chairman of Session 2 (5 min)
11:00 – 12:15	Session 3: Preparation of Manuals and Pilot Project Work Chair: Chief Engineer, Design Outline/Basic Consideration on Draft Design Manual for Embankment Speaker: Tatsuya MOCHIZUKI, JICA Expert Team (15 min) Outline/Basic Consideration on Draft Construction Manual for Embankment Speaker: Johji KOIZUMI, JICA Expert Team (15 min) Outline/Basic Consideration on Draft O&M Manual for Hydraulic Structures Speaker: Yosuke USUI, JICA Expert Team (15 min) Outline of Pilot Project Work: Speaker: Mr. Osamu NAKAZAWA, JICA Expert Team (10 min) Discussion (15 min) Remarks by Chairman of Session 4 (5 min)
12:15 – 13:00	Session 4: Report on Training in Japan Chair: Chief Engineer, Design, BWDB Report on Training in Japan Speaker: Mr. Khondaker Khalequzzaman, Chief Monitoring (25 min) Discussion (15 min) Remarks by (Chairman of Session 3 (5 min)
13:00 – 13:15	Session 5: Closing Session Closing Remarks by ADG (Planning), BWDB Thanks Giving by Director, Planning-1
13:15 – 14:00	Adjourn and Lunch

Annexture-2

Participant List of the Workshop

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: November 16, 2015,

Time: 09:30 pm – 14:00 pm

Venue: Conference Room, 3rd Floor, WAPDA Building, BWDB

No	Name	Title/Organization	Phone No Email Address	Signature
1	Md. Mahfuzur Rahman	Chief planning BWDB		
2	Abul Kalam Azad	Chief Engineer Central Zone BWDB.		
3	Md. Abdur Rahman Akhanda	Chief Training & Staff Develop BWDB		
4	Md. Mozaddegue Hosse	Chief Engr. Easter Zone, BWDB Comilla.		
5	Md. Masud Ahmed	ADG (Planning) BWDB		
6	S.M. Shahidul Haque	CSO to the DG.		
7	Md. Jahangir Kabir	Chief Engineer Design		
8	Saeeda Nazneen	Chief Engineer O&M		

16-11-2015

No	Name	Title/Organization	Phone No Email Address	Signature
9	Mohammad Ali	Director O&M BWDB.		
10	K. M. Anwar Hossain	Addl. Chief Engr. South-west zone BWDB, Khulna		
11	BRAZA MOHAN NATH	S E, Design Circle-5, BWDB, Dhaka		
12	Sujoy Chakma	Director Planning-III BWDB. Dhaka		
13	HAMIDA CHOWDHURY	DEPUTY SECRETARY. M/O WATER RESOURCES.		
14	Poly Das	Assistant Engineer. Design Circle-2 BWDB, Dhaka.		
15	Nasima Jahan	E.E, Design Circle2 BWDB		
16	Md. Abul Kausar	SE/Design circle-4		
17	Dr. Jiban Kumar Sarker	EE/Design circle-4		
18	Md. Shahjahan Siraj	EE/Tangail O&M ~~BWDB~~ Division,		

No	Name	Title/Organization	Phone No Email Address	Signature
19	Md. Mahfuzur Rahman	Executive Engineer Design Circle-5 BWDB, Dhaka		
20	SALEH AHMED	Executive Engineer BWDB		
21	Dhirendra Nath Sarker	S.E. Moulvibazar O&M Circle. BWDB, Moulvibazar.		
22	Faizur Rob	Executive Engineer(Addl.C.) Moulvibazar O&M Div. BWDB, Moulvibazar.		
23	Md. Mainul Islam	Deputy Project Manager for Capacity Development of Management for Sustainable Water Related Info		
24	Naba Kumar Chowdhury	Executive Engineer Jamalpur O&M Div. BWDB, Jamalpur		
25	Provati Mukherjee	Chief Engineer, Hydrology, BWDB, Dhaka.		
26	Motaher Hossain	SE. Design Circle-6 BWDB.		
27	Md. Aminul Hossain	Executive Engr. FFWC, BWDB		
28	Md. Mahboob-ul-Alam	Director Contract & Procurement Cell BWDB, Dhaka		

No	Name	Title/Organization	Phone No Email Address	Signature
29	Md. Kamalur Rahman Talukder	Addl. Chief Engineer BWDB		
30	Dr. Shamal chandra Das,	Executive Engr. office of the chief Planning, BWDB		
31	Nasrin Jahan	Project officer JICA, BWDB		
32	Md. Enayet Ullah	Executive Engineer. Planning-1 BWDB.		
33	FAZLUR RASHID	DIRECTOR STAFF DEV. BWDB		
34	A. K. MANZUR HASAN	Superintending Engineer. SWHC, BWDB.		
35	Md. Sajidur Rahman Sarder	Superintending Engineer, Ganges Barrage Study Project		
36	Md. Kudrat Ali ACE/ Project Director, Sirai River Restoration	Project (2nd PA)		
37	A. K. M. Shafiqul Hasan	Superintending Engr/ Director Process Section, CMO BWDB		
38	Md. Asaduzzaman	E. E. Planning-1 BWDB.		

No	Name	Title/Organization	Phone No Email Address	Signature
39	Md. Mahbur Rahman	BWDB Director programe.		
40	Muhammad Hiruzzaman ~~Deput~~	Deputy Secretar Ministry of Water Resources		
41	Johji KOIZUMI	a Member of JICA Expert Team		
42	Osamu NAKAZAWA	JICA Expert Environment & Social Considerations		
43	Tatsuya Mochizuki	JICA Expert.		
44	Md. Harun ur Rashed	Superintending Engineer, Design Circle-1 BWDB.		
45	Atiqur Rahman	Chief Engineer Northern Zone BWDB, Rangpur		
46	Kh. Khaleguzzaman	Chief Monitoring ~~Of~~ BWDB.		
47	Md. Abdul Hye	Director (SE) BWDB		
48	Hasan Inbair	JICA local senior expert		

No	Name	Title/Organization	Phone No Email Address	Signature
49	Koichi Kitamura	JICA		
50	Mohammad Shahabuddin	Addl. Chief Engr./- Project Director, IMIP, MIP, BWDB, Dhaka.		
51	Akhil Kumar Biswas	Superintending Engs Feni O&M Circle BWDB, Feni		
52	Md. Mossarraf Hossain	Chief Engineer Southern Zone BWDB, Barisal		
53	Md. Sumon Miah	Assistant Engineer planning-1 BWDB		
54	Md. Raqib Hossain	Assistant Engineer Planning-1 BWDB		
55	Shamsad Mahmuda Fatima.	Assistant Engr. planning-1 BWDB		
56	Md. fahad Hasan	Assistant Engineer Processing section BWDB, Dhaka		
57	M. Abdur Rakib	Assistant Engineer Office of the chief Planning, BWDB, Dhaka		
58	Ashutosh Barman	Assistant Engineer Office of the Chief Planning, BWDB, Dhaka		

No	Name	Title/Organization	Phone No Email Address	Signature
59	Md Fakhrul Abedin Project Director HFM & LIP, BWDB Dhaka	BWDB		
60	Md Moniruzzaman Executive Engineer BWDB, Habiganj	BWDB		
61	Md. Rajos khan ADE, BWDB, Joypurhat.	BWDB		
62	Yosuke USUI	JICA Expert Team/ Team Leader		
63	Muntasir Ibn Mohsin	Administrator JICA Study Team PCDMSWRI		
64				
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Workshop in Field No. 1
on
The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: January 23, 2016
Time: 09:00 – 14:00
Venue: Pilot Repair Work Site, &
Conference Room, Hotel Rest Inn, Moulvibazar

AGENDA

08:00 – 08:20	Arrival and Registration at Moulvibazar O&M Division Office, BWDB (Participants from Dhaka move from Hotel Rest Inn to BWDB Office)
08:20 – 09:00	Move to Pilot Repair Work Site (all participants)
09:00 – 09:30	Session 1 in Field Safety Gathering in Pilot Repair Work Site
09:30 – 10:30	Session 2 in Field Joint Site Inspection (Especially for sand-cement gunny bag works)
10:30 – 11:00	Move from the site to Hotel Rest Inn (All participants)
11:00 – 11:30	Tea/Coffee Break
11:30 – 13:00	Session 3: Safety Management & Foot Protection Works of Pilot Repair Works Chair: ADG Planning, BWDB Opening Remarks by Chief Planning, BWDB Safety Management in Japan (10min) Speaker: Mr. Kazumitsu MURAOKA, JICA Expert to BWDB Report on Trial Fabrication of Sand-Cement Gunny Bag (15min) Speaker: Mr. Md. Mainul Islam, Deputy Engineer in Charge of the Works, JICA Expert Team Construction of Foot Protection Works by Sand-Cement Gunny Bags (15 min) Speaker: Mr. Abdul Kader, Sectional Officer, Moulvibazar O&M Division Questions & Answers, Discussion (40 min) Closing Remarks by Chairman
13:00 – 14:00	Adjourn and Lunch

* 14:30 Participants from Dhaka will start from Hotel Rest Inn to Dhaka.

Proceeding of the workshop on activities of Pilot Repair Work in the Manu River Embankment, Moulvibazar under the Project "Capacity Development of Management for Sustainable Water Related Infrastructure" held on 23 January 2016 at site & in the Conference Room of Hotel Rest Inn, Moulvibazar

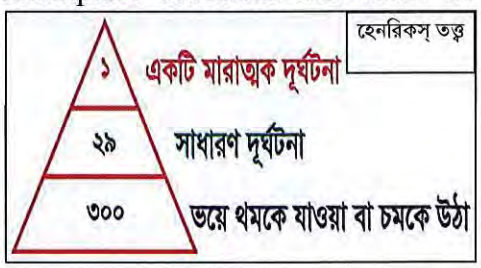
A half day workshop on the activities of Pilot Repair Work on the right embankment/ along the Manu river of Manu River Project at Noarai, Akhailkura Union, Moulvibazar Sadar Upazilla was held on 23 January, 2016.

The workshop had 3 session, 2 (two) at the working site at Noarai, Akhailkura Union, and the 3rd one of Workshop in the Hotel Rest Inn Conference Room of the Moulvibazar City. The 1st two sessions was administrated by Mr. Johji Koizumi, Project Manager at the Repair/Construction site at the field and the 3rd session was chaired by the Additional Director General (Planning), BWDB in Rest Inn hotel.

The participants list are attached in Annex-A

The First session in the field start at 09:15, Before that all participants gathered in BWDB, Moulvibazar Office for preparation and wear safety helmet with logos of BWDB & JICA and start for the site.

In the site all the labor and participants including the JICA officials and JET Consultant stand on line and Mr. Koizumi discussed the Safety Law (Heinrich's Law) and the safety Slogan "Safety First" "সবার আগে নিরাপত্তা" (Sobar Age Nirapotta) was enchanted by everybody. It was discussed that, as per Heinrich's Law, that in a workplace, for every accident that causes a major injury, there are 29 accidents that cause minor injuries and 300 accidents that cause no injuries. Because many accidents share common root causes, addressing more commonplace accidents that cause no injuries can prevent accidents that cause injuries. In other words after 300 incidents of ordinary incidents or awful events, one ordinary Accident may Happen and after 29 number of ordinary Accident, one serous Accident may happen that caus major injury even death cases with major loss of Properties Machineries and assets.



Then the 2nd session of inspection of the Pilot work started. The participants inspected manufacturing of Sand-Cement gunny bag and CC block. Chief Engineer, North Eastern Zone, BWDB /Sylhet and Superintending Engineer/Moulvibazar O&M Circle pointed about the cutting of shoal in Manu River just opposite to the pilot site. Director Design-1 measured the dimensions of the sand cement gunny bag and enquired about the volume of each sand-cement gunny bag.

Then the participants came back in the Hotel Rest Inn and the 3rd Session on presentation of paper & discussion started.

The 3rd session of Workshop started with Recitation of Holy Quran. Then all participants introduced themselves. With the permission of the Chair, Mr. Mahfuzur/ Rahman, Chief Planning delivered his inaugural speech.

Mr. Mahfuz told that this Capacity Development Project & the Pilot Repair Work is a Joint Venture by BWDB & JICA. If the lesson learnt from this pilot repair works can be disseminated to other BWDB works then it will be helpful in future. He said that he liked the safety demonstration in the field very much as this type of thing is a new in BWDB .He also expressed satisfaction about the quality of C.C blocks and sand cement gunny bags.

He also said that the vehicle driver & machinery drivers should also be very careful about the safety measures. He said that plan design, execution, workshop etc. all are beneficial to BWDB.

Then Mr. Muraoka, JICA expert to BWDB delivered his speech on Safety measures adopted in Japan during construction. He said that he joined in BWDB since September, 2014. He has visited almost all over Bangladesh. Before coming to Bangladesh he worked in Japanese Ministry of Land Infrastructure Transport & Tourism. He has some experience in construction work. In all construction site safety issue is of utmost importance.

Through power point presentation he showed the symbol of safety measures which are demonstrated in the construction site. He also described about the importance of safety and industrial safety and health Act of Japan since Nov1946. In slide he showed the daily safety measure activities in Japan & also the weekly & Monthly safety measure activities.

He also mentioned that in the 1900th century US steel in USA had the slogan **Production First, Quality Second, and Safety Third**. But that did not worked good. Then US steel President Mr. Gray changed company's polity as:

SAFETY FIRST

QUALITY SECOND

PRODUCTION THIRD

He also showed the Typical Japanese Safety Placard

ANZEN-DAI-ICHI

Which means Safety first

Then Mr. Mainul Islam, Deputy Project Manager of Pilot Repair Works presented his paper in "Trial Fabrication for Sand-Cement Gunny Bag" through power point presentation.

He spoke about objective of Sand-Cement Gunny Bag Fabrication, Inspection of Sand-Cement Gunny Bag & out come from the trial result.

Objective of Sand-Cement Gunny Bag is shaping the foundation of embankment & toe wall. In the field 99 of Sand-Cement Gunny Bag was fabricated with different proportion and sand type. Inspection of sand cement gunny bag was carried out after 7 days curing, 14 days curing & 3-5 days curing for work ability and hardening by (1) measuring unit weight (2) dropping test (3) scratch surface and other observation. After all observation it was decided that Send Cement preparation is 8:1 & FM of sand=1.50 (preferably Sreemongal sand) & 220 Kg. of Water p/m^3 will be used.
i.e., 24.5 kg of water for 25 Kg Cement & 200 Kg of sand will be used for one small batch of Sand Cement Mortar.

Then Mr Abdul Quder, S.O/BWDB delivered his paper on construction of Sand Cement Gunny bag. He pointed the following:

1. Fabrication
2. Curing and stock pile.
3. Dumping.
4. Setting up shape and measurement.
5. Difficulties such as
    a. Water Level rise and drop of Manu River
    b. Delivery of bags
    c. Hike of Market Price of Gunny bags.
    d. Checking shape of Sand Cement gunny bag mound under water.

He also spoke about the extension of Geo-textile sheet in the foundation from toe wall

to the bottom of foundation sand cement mound's top peripheral surface. Also he showed a graphical progress of the sand cement gunny bag construction and dumping.

Then the floor was opened for discussion and comments by the participants.

Mr. Mahfuzur Rahman, Chief, Planning pointed out that price hike is not a problem. Also the rise of water land in Manu River can be known from the BWDB and it is not a serious problem. He also expressed his satisfaction about the size & shape of the CC block at site.

Mr. Harun, Superintending Engineer, Design-1 said that survey under water may not be a problem. He also pointed out that the mixer machine operator should be well trained about the water cement ratio. He also suggested that safety measure motivation procedure and activities should be included in the construction manual. The safety measure issue may also be disseminated in the broad review meeting. He also suggested that here sand cement bag has been fabricated in 8:1 proportion with sand of FM=1.49. But for experiment 100 nos. Sand Cement Gunny bag may be fabricated with 10:1 proportion & Sand of FM=1 and see the outcome. Mr. Harun, SE also told that Geotextile filter may be extended if necessary.

Mr. Amirul Hossain, Director Planning-1, BWDB thanked Mr. Johji Koizumi for the Safety Drill. He pointed out that Japan is a trusted friend of Bangladesh. He also said that Japanese never compromise with the quality of work so he thinks that high quality workmanship are being maintained& will be maintained in the pilot repair works.

Chief Engineer, North Eastern Zone, BWDB, Sylhet thanked JICA & JICA expert for such a workshop & safety drill in the field. He suggested that in future some other contractor representative from other areas of BWDB should be invited in such workshop so that they can be aware of safety activities and procedures followed in the pilot work.

Mr. Dhiren, SE, Moulvibazar pointed out that trial may be made to increase the volume of the sand cement gunny bag so that it covers some more area and no of sand cement gunny bag is reduced. He also suggested that the work may be extended 50m more along the side of the grave yard.

Then Mr. Md. Masud Ahmed, ADG Planning and chairman of the session in his speech praised about the activities of JICA expert team. He suggested that care should be taken for proper curing. He expressed his satisfaction about the shape and size of the blocks. He also told that initiative of JICA is very helpful in respect of safety procedure and capacity development of BWDB. He thanked Mr. Ara & other JICA experts heartily.

Then the workshop ended with thanks to everybody by the Chair of the Workshop and lunch.

27/1/18

(Md. Masud Ahmed, PEng.)
Addl. Director General (Planning)
BWDB, Dhaka.

Memo No. :-907, Dt. 27.01.2016

Distribution: (Not as per seniority)

1. Additional Director General (Planning), BWDB, Dhaka.
2. Chief Engineer, Design, BWDB, 72, Green Road, Dhaka.
3. Chief Planning, BWDB, Dhaka.
4. Chief Engineer, North-Eastern Zone, BWDB, Sylhet.
5. Superintending Engineer, Moulvibazar O & M Circle, BWDB, Moulvibazar.
6. Superintending Engineer, Sylhet O & M Circle, BWDB, Sylhet.
7. Superintending Engineer, Design Circle-1, BWDB, 72, Green Road, Dhaka.
8. Superintending Engineer, Design Circle-6, BWDB, 72, Green Road, Dhaka.
9. Director, Directorate of Planning-1, BWDB, Dhaka.
10. Executive Engineer, Office of the Chief Planning, BWDB, Dhaka.
11. Executive Engineer, Directorate of Planning-1, BWDB, Dhaka.
12. Executive Engineer, Design Circle-1, BWDB, 72, Green Road, Dhaka.
13. Executive Engineer, Moulvibazar O & M Division, BWDB, Moulvibazar.
14. Executive Engineer, Sylhet O & M Division, BWDB, Sylhet.
15. Executive Engineer, Habiganj O & M Division, BWDB, Habiganj.
16. Executive Engineer, Kishoregonje O & M Division, BWDB, Kishoregonje.
17. -20. 04 (Four) Sectional Officers, Moulvibazar O & M Division, BWDB, Moulvibazar.
21. Sub-Divisional Engineer, Sylhet O & M Division, BWDB, Sylhet.
22. 01 (One) Sectional Officer, Sylhet O & M Division, BWDB, Sylhet.
23. Sub-Divisional Engineer, Habiganj O & M Division, BWDB, Habiganj.
24. 01 (One) Sectional Officers, Habiganj O & M Division, BWDB, Habiganj.

C.C.

1. C.S.O to Director General, BWDB, Dhaka.
2. PA to Additional Director General (Planning), BWDB, Dhaka
3. Yosuke USUI, Deputy Team Leader, JICA Expert Team, The Project for Capacity Development of Management for Sustainable Water Related Infrastructure.
4. Office Copy

27/01/16

Md. Amirul Hossain
Director
Planning-1, BWDB, Dhaka

Annexture-A

Participant List
for
The Workshop on the Activities of Pilot Repair Works of Manu River Right Embankment

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: January 23, 2016,

Time: 08:30 pm – 14:00 pm

Venue: Conference Room, 2nd Floor, Rest Inn Hotel, Moulvibazar

No	Name	Title/Organization	Phone No Email Address	Signature
1	Md. Masud Ahmed	ADG (Planning) BWDB		
2	Md. Mahfuzur Rahman	Chief planning, BWDB		
3	Hasan Zubair	JICA Senior Expert		
4	Naoki Matsumura	County Programme Coordinator (Disaster Management), JICA/HaPMR		
5	Md. Harun ur Rasheed	Superintending Engineer, Design Circle-1 BWDB		
6	Anisuzzaman Chowdhury	Deputy Program Manager JICA		
7	Muhammad Masoud	Executive Engr. Design circle-1 BWDB		
8	AFM Tauhid Jaman	Asst. Engr. Design Circle-1 BWDB		

No	Name	Title/Organization	Phone No Email Address	Signature
9	Md. Abdul Hye	Add. Chief Engineer BWDB, Sylhet		
10	Hitoshi ARA	JICA BD Office		
11	Dhirendra Nath Sarker.	BWDB, S.E. Moulvibazar.		
12	M L Shaikat	Sub-Divisional Engg. Habiganj O&M Sub-Division-II BWDB Habiganj		
13	Md. Abdul Mannan	Sub-Assistant Engg. Ballah O&M Section BWDB, Habiganj.		
14	Sabyasachi Chowdhury	Executive Engineer Habiganj O&M Division BWDB Habiganj		
15	Md. Roqib Hossain	Assistant Engineer Directorate of Planning-1, BWDB, Dhaka		
16	Md. Golam Bari	Sub-Assistant Engineer Sylhet O&M Division BWDB, Sylhet		
17	Md. Atiqul Islam	Sub-Assistant Engineer BWDB Moulvibazar		
18	MD Bashir Uddin	Sub-Assistant Engineer, BWDB, Moulvibazar		

No	Name	Title/Organization	Phone No Email Address	Signature
19	Md. Amirul Hassain Director	Planning-1 BWDB		
20	Md. Enayet Ullah. Executive Engineer.	Planning-1 BWDB		
21	Md. Sirajul Islam Executive Engineer	Sylhet O&M Division BWDB		
22	Md. Shamsul Haque Executive Engineer	Moulvibazar Mechanical Division		
23	Md. Tawhidul Islam Sub-Divisional Engineer	Sylhet O&M Sub- Division-3 BWDB, Sylhet		
24	Md. Faizeer Rob Executive Engineer (Addl.charge) Moulvibazar O&M Div.	Moulvibazar O&M Div. BWDB, Moulvibazar.		
25	Md. Abdul Mannan SAE/S.O Moulvibazar O&M Division.	Moulvibazar O&M Div. BWDB moulvibazar		
26	Md. Abdul kader Sectional officer Moulvibazar O&M Division	Moulvibazar O&M Division, BWDB		
27	JOHJI KOIZUMI	Project Manager, Pilot Repair Works & a memeber of JET		
28	Kazumitsu MURAOKA	JICA Expert TO BWDB		

No	Name	Title/Organization	Phone No Email Address	Signature
29	Md. Kamrul Hasan	Creative Media Ltd.		
30	MD. RASEL	〃		
31	Solimah hasan	〃		
32	NURULISLAM	〃		
33	Md. Mainul Islam	Deputy Project Manager, JET PRW, BWDB.		
34	Yosuke Usui	Team Leader Project CDMSWMS JICA Expert Team		
35	Muntasir Ibn Mohsin	Administrator Project For CDMSWRS JICA Expert Team		
36				
37				
38				

Workshop in Field No. 2
on
The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: April 02, 2016
Time: 09:00 – 14:00
Venue: Pilot Repair Works Site, &
Conference Room, Hotel Kairan, Julia Shopping City (2nd Floor), 111 M. Saifur Rahman Road (Chowmuhona), Moulvibazar

AGENDA

08:00 – 08:20	Arrival and Registration at Moulvibazar O&M Division Office, BWDB (Participants from Dhaka move from Hotel Rest Inn to BWDB Office)
08:20 – 09:00	Move to Pilot Repair Works Site (all participants)
09:00 – 10:30	Session in Field 1. Morning Gathering for workers & engineers of T.S.S. (Simple address by the Project Manager of T.S.S., "Safety First" Call by all) 2. Joint Site Inspection Fabrication of CC Block with projection Earth works (compaction method, demonstration of checking of density in field: by the staffs of Moulvibazar O&M Division Office, BWDB, others) Foot and slope protection works, Compensation works, etc.
10:30 – 11:00	Move from the site to Hotel Kairan (All participants)
11:00 – 11:30	Tea/Coffee Break
11:30 – 13:00	Session in Conference Room: Quality Control (QC) for Embankment in Pilot Repair Works Chair: ADG Planning, BWDB Opening Remarks by Chief Planning, BWDB 1. River Embankment Works in Japan (15mins) Speaker: Mr. Kazumitsu Muraoka, JICA Expert to BWDB 2. Report of Trial Compaction and QC for Embankment (trial compaction and daily QC with checking field density for embankment, etc.) (15mins) Speaker: Mr. Abdul Kader, Sectional Officer, Rajnagar O&M Section-II, Moulvibazar O&M Division, BWDB 3. Preparation of Works and Others (soil test for selection of embankment material, trial fabrication of CC block with projection, etc.) (15mins) Speaker: Mr. Md. Mainul Islam, Deputy Engineer in Charge of the Works, JICA Expert Team Questions & Answers, Discussion (45mins) Closing Remarks by Chairman
13:00 – 14:00	Adjourn and Lunch * 14:30 Participants from Dhaka will start to Dhaka.

Proceeding of the workshop No. 2 on activities of Pilot Repair Work in the Manu River Embankment, Moulvibazar under the Project "Capacity Development of Management for Sustainable Water Related Infrastructure" held on 2nd April 2016 at the working site as well as at the conference room of Hotel R. S. Kairan, Moulvibazar.

A half day workshop on the activities of Pilot Repair Work along the Manu right embankment under Manu River Project at Noarai, Akhailkura Union, Moulvibazar Sadar Upazilla was held on 2nd April 2016.

The workshop had 3 session, 2 (two) at the working site and the 3rd one at the Hotel R. S. Kairan conference room located at the Moulvibazar district town. The 1st two session held at the field was administrated by Mr. Jojhi Koizumi, Project Manager of the Repair/Construction site and the 3rd session at the hotel conference room was chaired by Chief Planning, BWDB, Dhaka.

The list of participants is attached in Annexure-A

Before the outset of the first session in the field at 9.30, all participants gathered at the Moulvibazar BWDB office premium for necessary preparation.

In the site all the workers and participants including the JICA officials and JET Consultant stood on line putting safety helmet on. Representative of TSS JV (the Contractor) and Mr. Mainul Islam, DPM discussed about the safety at working site and the safety Slogan "Safety First" "সবার আগে নিরাপত্তা" (Sobar Age Nirapotta) was enchanted by a labor leader & everybody. It was revealed that for Gods Mercy & following the safety rules strictly there was no accident happened so far in the working site.

Then the 2nd session- Inspection of the Pilot work started. The participants observed the compaction activity by bulldozer. Practical demonstration of field density test and Degree of compaction test was done in the worksite and result found quite satisfactory.

The Chief Engineer, North Eastern Zone & Others inspected the toe wall construction & Geo-textile placement as well as laying. Superintending Engineer, Design-1 (SE-1) & others inspected the casting of projected blocks. SE-1 also inspected the sand cement gunny bag (100 no. samples) prepared as per the proportion of 10:1 with ordinary local sand as a test case for the future use in the Projects by BWDB prepared as per decision of the 1st workshop.

After completing the field visit, the participants then came back in the Hotel R. S. Kairan and the 3rd Session-Presentation of papers & discussion started at the hotel conference room.

The 3rd session started with recitation from the Holy Quran. Then all participants introduced themselves. With the permission form Mr. Kh. Khaluquzzaman, Chairman of the session Mr. Amirul Hossain, Director, Planning-III & previous Director of Planning-1 delivered the introductory speech.

Mr. Amirul told that this Capacity Development Project & the Pilot Repair Work is a Joint Venture by BWDB & JICA. Last January, the first workshop was held and as a follow-up & to know about the present activities of the Project, this 2nd workshop has been organized. This project will continue up to June 2017. If the lesson learnt from this pilot repair works can be disseminated to other BWDB works then it will be helpful in future for BWDB.

Then Mr. Kazumitsu Muraoka, JICA expert to BWDB delivered his speech as to the construction work of River Embankment in Japan. First he said that

REMEMBER!

In 1900th, US Steel in USA. The company policy was:

Production First, Quality Second, Safety Third

Then, US Steel President Mr. Gary Changed Company's policy

Safety First, Quality Second and Production Third

Through power point presentation he narrated that there has been the standard ToR for civil construction works in Japan and all civil works should comply with this ToR. Also additional ToR should be added for each construction works.

To develop beautiful, strong and long-life infrastructure, he said that three aspects shall have to be given importance. Those are:

(i) Good designing

(ii) Well-planned and controlled construction

(iii) Strong supervision

If any one of these is lacking, it will not be a good infrastructure. Also sustainable maintenance work will be needed. After making a contract, the contractor makes the construction plan incorporating the following items:

(1) Construction outline, (2) Organization chart on construction site, (3) Machine usage list, (4) Main machine, (5) Materials list, (6) Method of works, (7) Supervision plan, (8) Safety management, (9) Management plan for emergency, (10) Traffic management, (11) Environmental countermeasure, (12) Improvement of environment on construction site, (13) Recycle, re-use and disposal plan & (14) Others

Govt. Officials check the plan and approve it. Then the contractor starts the construction in accordance with the construction plan.

Embankment materials for embankment construction are carried by Dump Truck which is inspected by Govt. Officials and no overloading is allowed. Even if there is overloading, penalty is imposed. Proper compaction is done by pay loader or other suitable equipment and field density is tested by R/I (Radio Isotope) equipment.

He showed some of the photos of embankment works in Japan. He also mentioned that there is ruler gauge to measure the compacted height of the embankment and profile mark for the section of the embankment in Japan. He also said that, the contractor should finally submit all the documents and photos of construction work to supervisor. And also the contractor should make the record of construction and submit to supervisor. He said that in Japan, Supervisor is Govt. Official not the consultant. Supervisor assess the design value, then contractor's value after work and then compare with the supervisor's value.

After Mr. Muraoka, Mr. Abdul Kader, S.O, BWDB presented his paper on Trial Compaction & QC for embankment. He spoke through power point presentation in respect of trial compaction and steps followed for trial compaction-

Step-1: Use of planning compaction

Step-2: Manual compaction by hammer

Step-3: Use of Bulldozer

He also spoke about the daily quality control for compaction in constructing the embankment. He described all the steps in detail and finally spoke about the findings recommendation, e.g., in case of use of bulldozer for spreading & compaction of material layer by layer, number of passes of compaction of 2 times is enough. Thickness of spreading material shall be not more than 25cm. He finally showed the sectional position of working and testing each day.

Then Mr. Md. Mainul Islam, Deputy Project Manager of Pilot Repair works presented his paper on preparation work & other works. He spoke about

(1) Soil test for selection of embankment material

(2) Trial for fabrication of C.C. block 40*40*20 cm with projected part

He stated that trial fabrication for 1:2:4 & 1:3:6 proportion done in this case for the view point of workability and shaping, no difference was found.

He also spoke about manufacturing & dumping of C.C. blocks. Additional trial fabrication of the sand cement gunny bag (10:1 mortar) with local sand of FM≤1 was carried out. He pointed out that embankment material were tested in RRI after collection form Borrow pits and also form the existing embankment and the result was found satisfactory as per requirements.

After having all presentations finished, the floor was opened for discussion and comments by the participants.

Mr. Md. Harun Ur Rasheed, Superintending Engineer, Design-I said that no reinforcement should be used in constructing the projected block as the projected portion is very small and we cannot provide required clear cover for M. S. bar here. He also said that we can think of using 10:1 sand cement mortar gunny bag after 14 days curing in BWDB work as the result found here after trial fabrication is satisfactory.

Mr. Amirul Hossain, Director, Planning-III thanked Mr. Johji Koizumi and the presenters for their activities and presentation. He wanted to know how these ideas of Pilot work will be disseminated. At this point, JET expert Mr. Hasan Zubair told that these will be disseminated through the Design Manual, O & M Manual & Construction Manual, which are under process of review and approval. Mr. Amirul Hossain suggested that the O & M Manual & Construction Manual may be made in Bangla as short hand out for the facilities of understanding by the field level staff & workers.

Mr. Md. Mahboob ul Kabir, Director, Contract & Procurement Cell wanted to know about the financial position and payment status to the contractor and time schedule of work. JET Expert Team Member Mr. Hasan Zubair replied that in every month IPC is submitted by contractor and that is recommended for payment by JICA Supervising Team Member and Contractor are getting money regularly. There is no problem in this regard. Time schedule for work completion is 15 of May/2016 & till now 73% of work has been done. If there is natural calamity then extra time may be required.

Then Mr. Dhirendra Nath Sarker, SE, Moulvibazar requested JICA to take more repair & rehabilitation work in vulnerable parts of embankment in Moulvibazar & expressed satisfaction over the works and for the dumping work already done on the upstream of the pilot work site.

Mr. Md. Abdul Basit, XEN, Design-VI said that although there was no difference between workability & shape size between the proportion of 1:3:6 & 1:2:4 manufacturing the projected blocks but definitely there will be difference in strength.

At this point, Mr, Kh. Khalequzzaman, Chief Planning said that trial has been alright but we should implement the item of projected block as per the specification & what is mentioned in BOQ.

Then Mr. Md. Abdul Hye, Chief Engineer, Sylhet Zone told that BWDB officials specially SO & Work Assistant are getting training here in the field tests for embankment construction and also officials form Sylhet, Habiganj are observing these in workshop. He requested JICA whether we can also utilize equipment like R/I (Radio Isotope) for embankment works in Bangladesh. He also asked the contractor representative in the workshop to give his views about the work. The contractor TSS JV representative Mr. Bakshi Jubayer said that they learnt many things form this work specially how to get the determination on constructing the work in time and how to apply the specified construction procedure. They are happy with JICA's regular payment against their executed work.

Mr. Kitamura, JICA representative told that after approval of the manuals JICA will try to make these in Bangla,

At the end of the session, Mr. Kh. Khalequzzaman, Chief Planning said that JICA is a good friend of Bangladesh and they are undertaking many projects in Bangladesh and helping in our nation building process.

He said that quality works are being done in the pilot work site with necessary field testing. Our people are also learning how to manage site in an appropriate way and supervise properly.

He requested JICA to take such project in the Coastal Zone of Bangladesh

The workshop ended with thanks form the chair and with lunch.

25/08/25

Khondoker Khalequzzaman
Chief Planning
BWDB

Memo No- 2337 Date: 11.04.2016

Distribution: (Not as per seniority)

1. Additional Director General (Planning), BWDB, Dhaka.
2. Chief Engineer, Design, BWDB, 72, Green Road, Dhaka.
3. Chief Planning, BWDB, Dhaka.
4. Chief Monitoring, BWDB, Dhaka.
5. Chief Engineer, North-Eastern Zone, BWDB, Sylhet.
6. Superintending Engineer, Moulvibazar O & M Circle, BWDB, Moulvibazar.
7. Superintending Engineer, Design Circle-1, BWDB, 72, Green Road, Dhaka.
8. Superintending Engineer, Sylhet O & M Circle, BWDB, Sylhet.
9. Superintending Engineer, Design Circle-6, BWDB, 72, Green Road, Dhaka.
10. Director, Planning Directorate-1, BWDB, Dhaka.
11. Director, Contract & Procurement Cell, BWDB, Dhaka.
12. Director, Program, BWDB, Dhaka.
13. Director, O & M, BWDB, Dhaka.
14. Director, Planning Directorate-3, BWDB, Dhaka.
15. Chief Staff Officer (CSO), BWDB, Dhaka.
16. Executive Engineer, Office of the Chief Planning, BWDB, Dhaka.
17. Executive Engineer, Planning Directorate-1, BWDB, Dhaka.
18. Executive Engineer, Design Circle-1, BWDB, 72, Green Road, Dhaka.
19. Executive Engineer, Moulvibazar O & M Division, BWDB, Moulvibazar.
20. Executive Engineer, Sylhet O & M Division, BWDB, Sylhet.
21. Executive Engineer, Habiganj O & M Division, BWDB, Habiganj.
22. Executive Engineer, Sunamganj O & M Division, BWDB, Sunamganj.
23. Sub-Divisional Engineer, Design Circle-1, BWDB, 72, Green Road, Dhaka.
24. Sub-Divisional Engineer, Sylhet O & M Division, BWDB, Sylhet.
25. Sub-Divisional Engineer, Habiganj O & M Division, BWDB, Habiganj.
26. Sub-Divisional Engineer, Sunamganj O & M Division, BWDB, Sunamganj.
27-30. 04 (Four) Sectional Officers, Moulvibazar O & M Division, BWDB, Moulvibazar.
31. 01 (One) Sectional Officer, Sylhet O & M Division, BWDB, Sylhet.
32. 01 (One) Sectional Officer, Habiganj O & M Division, BWDB, Habiganj.

C.C.

1. C.S.O. to Director General, BWDB, Dhaka.
2. PA to Additional Director General (Planning), BWDB, Dhaka
3. Yosuke USUI, Team Leader/Expert for O & M, JICA Expert Team, the project for Capacity Development of Management for Sustainable Water Related Infrastructure.
4. Office Copy

(Khondaker Khalequzzaman)
Chief Planning,
BWDB, Dhaka

Annexture-A

Participant List
for
The Workshop-2 on the Activities of Pilot Repair Works of Manu River Right Embankment

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: April 02, 2016,

Time: 08:00 pm – 14:00 pm

Venue: Conference Room, 2nd Floor, Hotel Kairan, Moulvibazar

No	Name	Title/Organization	Phone No Email Address	Signature
1	Khondaker Khaleqazzaman	Chief Planning BWDB		
2	Md. Abdul Hye	Chief Engg. BWDB		
3	Md. Mahbub Rahman	Director Program BWDB		
4	Md. Abdul Basit	Ex Engineer, I Design circle-6 BWDB		
5	Md. Harun ur Rashed	Superintending Engineer Design – 1, BWDB		
6	Md. Faizur Rob	Executive Engineer (Addl.Ch.) BWDB, Moulvibazar		
7	Md. Shamsul Haque	Executive Engineer Mechanical Division BWDB, Moulvibazar		
8	Faiz Ahmed Khan	Sub-Divisional Engineer, Moulvibazar Mechanical Division, BWDB, Moulvibazar		

No	Name	Title/Organization	Phone No Email Address	Signature
9	M L Shaikat	Sub-Divisional-Engr Habiganj O&M sub-Division-II BWDB Habiganj		
10	Sabyasachi Chowdhury	Executive Engineer Habiganj O & M Division. BWDB, Habiganj		
11	MD. ABDUL MANNAN	Sub-Assistant Engineer, Balla O & M Section, BWDB Habiganj.		
12	ASHRAFUL ALAM	WORK Assistant BWDB Moulvibazar. O & M Division		
13	MD. JOHIRUL HAQUE	CO. Chairman T. S. S (JV) Moulvi Bazar		
14	Bakshi Jubayer Ahmed	Advisor T. S. S (JV) Moulvibazar		
15	Engr. AFM Tauhid Jaman	AE, Design-1, BWDB, Dhaka		
16	Md. Afiqul Islam	Sub Asst Engineer BWDB Moulvibazar		
17	M.D. Abdul Momin Bhuyan	S.A.E/SO BWDB Moulvibazar		
18	Md. Iman Ali	SDE BWDB Moulvibazar		

No	Name	Title/Organization	Phone No Email Address	Signature
19	Johji Koizumi	A JET member, Project Manager for Pilot Repair Work		
20	Md. Abdul Kader.	Sectional officer. Rajnagar O & M section-II BHDB, Moulvibazar		
21	Md. Mainul Islam Deputy Project Manager, JET	JET, JICA		
22	Md. Khairul Islam	Executive Engr. BWDB		
23	Md. Mahboob-ul-Kabir	Director BWDB		
24	Dhirendra Nath Sarker.	S.E, BWDB Moulvibazar.		
25	Tatsuya Mochizuki	JICA		
26	Koichi Kitamura	JICA BD office		
27	Kazumitsu MURAOKA	JICA Expert to BWDB		
28	Md. Amirul Hossain	Director Planning-3 BWDB, Dhaka		

No	Name	Title/Organization	Phone No Email Address	Signature
29	Hasan Zubair	JICA Senior Expert		
30	Yosuke USUI	JICA Expert Team / Team Leader		
31	Muntasir Ibn Mohsin	Administrator JICA Study Team PCDMSWRI		
32				
33				
34				
35				
36				
37				

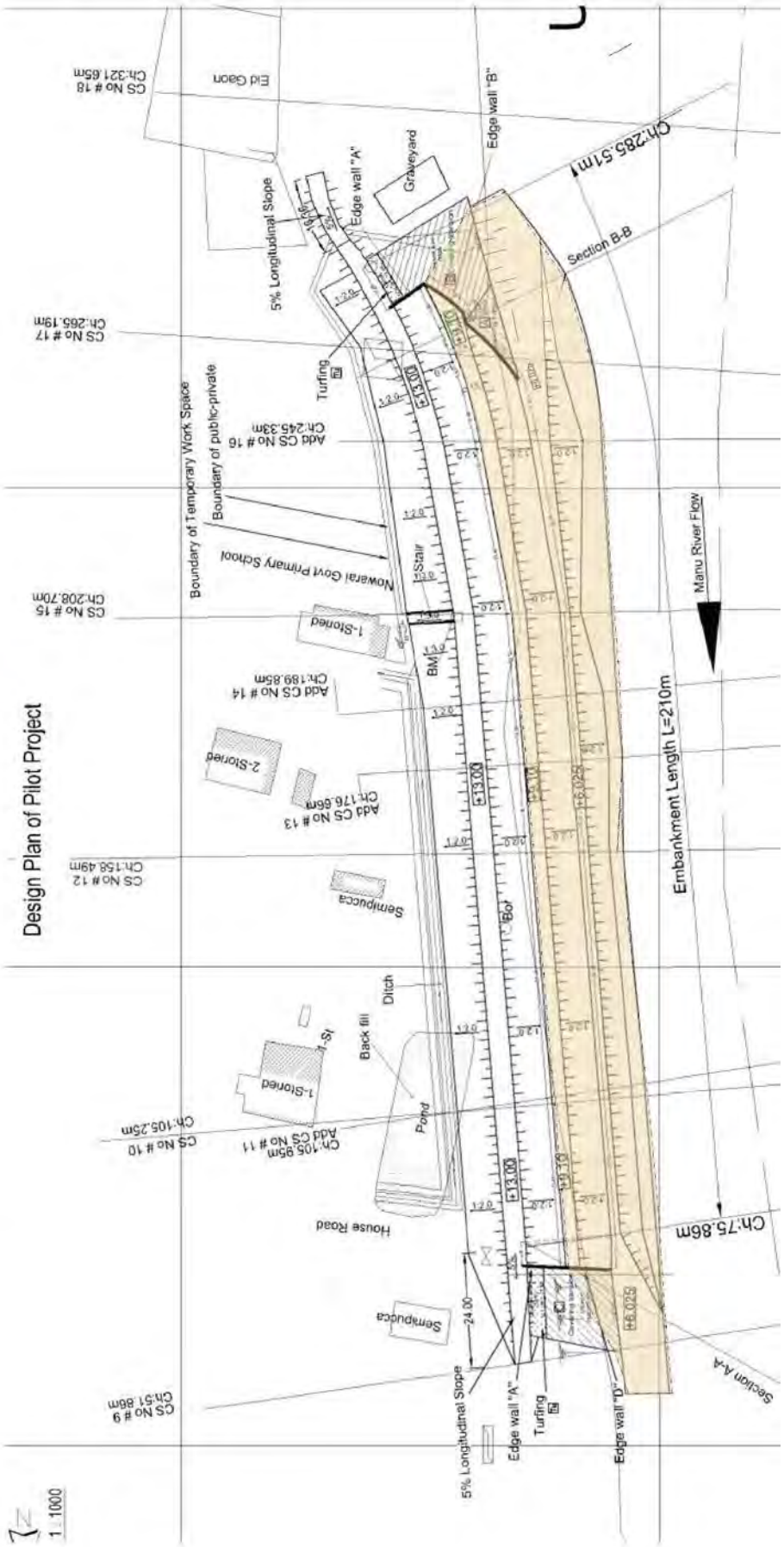
Final Inspection Step-1 for the Pilot Repair Works
on
The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: March 11 & 12, 2017
Time: 09:15 – 14:00
Venue: Pilot Repair Work Site, &
Conference Room, Hotel Rest Inn, Moulvibazar

AGENDA

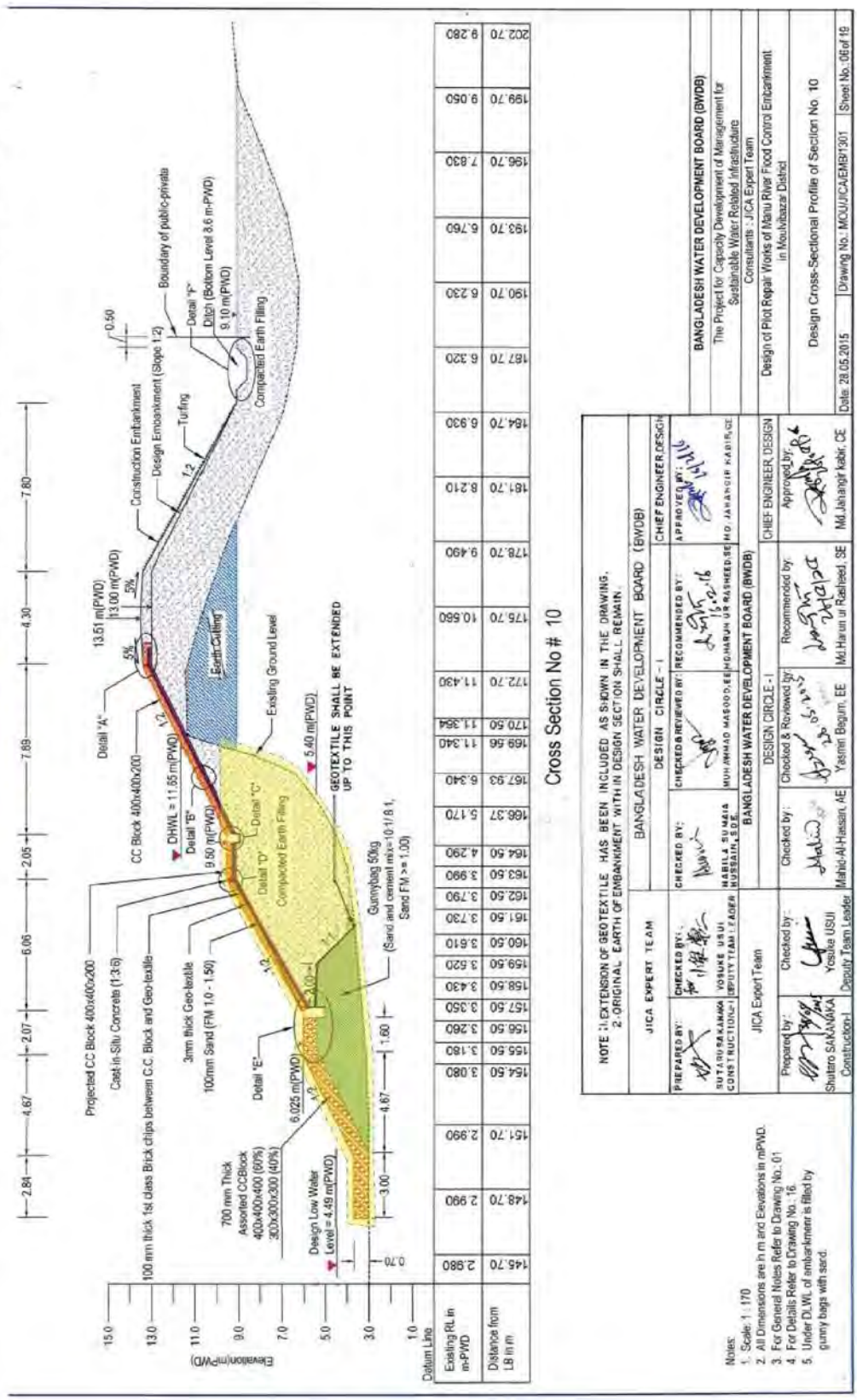
Session 1	March 11, 2017
14:00 – 14:45	Move to Pilot Repair Work Site (from BWDB O&M Moulvibazar)
14:45 – 16:00	Session 1 in Field: Site Inspection 1) Toe Protection 2) Slope Protection up to intermediate berm (9.5m (PWD) 3) Modification of Termination Area
Session 2	March 12, 2017
– 11:30	Come to Hotel Rest Inn (All participants)
11:30 – 13:00	Session 2: Discussion of Inspection for Step-1 1. Opening Remarks by Superintending Engineer, Moulvibazar O&M BWDB 2.Briefly explanation for construction sand-cement mortar gunny bags construction (10min) by Project Manager of the Works, JICA Expert Team 3. Discussion for Inspection for Step-1 1) Toe Protection 2) Slope Protection up to intermediate berm 3) Others i) Termination Area ii) Date of Final Inspection on 9 or 10 April, 2017 4. Closing Remarks by SE, Design Circle 2 BWDB
13:00 – 14:00	Adjourn and Lunch

Location of Step-1 for Intermediate Final Inspection : Toe Protection and Slope Protection till 9.50m (PWD)



Section of Step-1 for Intermediate Final Inspection

: Toe Protection and Slope Protection till 9.50m (PWD)



Existing RL in m-PWD	2.980	2.990	3.080	3.180	3.260	3.350	3.430	3.520	3.610	3.730	3.790	3.990	4.290	5.170	6.340	11.340	11.364	10.660	9.490	8.210	6.930	6.320	6.230	6.760	7.830	9.050	9.280
Distance from LB in m	145.70	148.70	151.70	154.60	155.60	156.60	157.60	158.60	159.60	160.60	161.60	162.60	163.60	164.60	166.37	167.93	169.66	170.60	172.70	175.70	178.70	181.70	184.70	187.70	190.70	193.70	196.70	199.70	202.70

1. Outline of the Works

1) Commencement date: 25 November, 2015 Intended Completion Date: 30 April, 2017

2) Contract value; Taka 65,110,614.96.-

3) Main work quantities; Proposed river bank is located at the right bank of Manu River in Moulvibazar. Proposed length of bank is 210 m and main work items (original quantities) are follows;

i) Earth work; excavation is 7,600 m3 and filling/embankment is 17,682 m3,

ii) Toe Protection works; dumping CC-block 40*40*40cm is 16,998 nos and 30*30*30cm is 26,861nos and sand-cement mortar gunny bags foundation is 110,088 nos and

iii) Slope Protection works; CC-block 40*40*20cm with projection part (1:2:4 mix) is 21,284 each, CC-block 40*40*20cm (normal, 1:3:6 mix) is 6,521 each and Geo-texitle sheet for slope is 4,940m

2. Outline of Step-1

The works of Toe Protection and Slope protection from Toe Wall (top:6.025m PWD) to intermediate berm level (9.5m PWD) is to be supposed for Step-1.

The location of Step-1 is shown on attached location sketch and

main work item is stated below table;

Table Main work item of Step-1 of Toe & Slope Protection

Type of work	Work item	Quantity of works done				Remark
		unit	Original	Amended	Work done	
Toe Protection	Dumping CC-block 40*40*40cm	Each	16,998	ditto	16,680	310 reserved
	Dumping CC-block 30*30*30cm	Each	26,861	ditto	26,135	715 reserved
	Sand cement (10:1)gunnybag foundation	No.	44,035	0	100	According to Trial Fabrication
	Sand cement (8:1)gunny bag foundation	No.	66,053	110,088	108,000	
Slope Protection	Work item	unit	Proposed Q'ty		Work Done	by 08/03/10
	CC-block 40*40*20 with projection part, 1:2:4 concrete mix	Each	9,522		8,950	1st Slope
		Each	4,409		3,683	Berm
			13,931		12,633	Total
	Geo-texitle sheet for slope, t=3mm	Sqm	1,144		833	Behind TW
		Sqm	1,524		1,504	1st Slope
		Sqm	705		681	Berm
			3,373		3,018	Total

Record of Final Inspection Step-1

Name of the Works: Pilot Repair Works of Manu River Flood Control Embankment in Moulvibazar District (JICA Contract Agreement No.: JICA (BD) 11-12001) (PRW)

Session1. Site Inspection

Date: 14:30-16:00, 11th March, 2017

Place: The Site at Notaria, Akhailkura, Moulvibazar

Session2. Explanation and Discussion

Date: 12:15 – 13:15, 12th March,2017

Place: Conference room of Hotel Rest Inn, Moulvibazar

The second session was presided over by Mr. Md. S. M. Shahidul Islam, Seperentending Engineer , Moulvibazar O&M Circle, BWDB

1. Attendance and Icons (abbreviations) for each party

1) Attendance is referred to attendance list (Attachment #1).

2) Icons or abbreviations used in this Inspection are as follows, unless otherwise specified;

JICA: Procuring Entity, Japan International Cooperation Agency Bangladesh Office and JICA long Term Expert for BWDB

JET: Project Manager (PM), Senior Expert of JET and Deputy Project Manager (DPM) entrusted or appointed by JICA [JET: JICA Expert Team]

TSS: the Contractor, T.S.S. (JV)

BWDB: Superintending Engineer (SE) of Design Circle (DC) 1 and 2 BWDB and Superintending Engineer (SE), Executive Engineer (Xen) Mechanical & Civil, Sub-Divisional Engineer (SDE) and Sectional Officer (SO) and other officers from BWDB, Moulvibazar

2. Outline of the Works

1) Commencement date: 25 November, 2015 Intended Completion Date: 30 April, 2017

2) Contract value; Taka 65,110,614.96.-

3) Main work quantities; Proposed eroded river bank is located at the right bank of Manu River in Moulvibazar. Proposed length of bank is 210 m and main work items (original quantities) are follows;

i) Earth work; excavation is 7,600 m3 and filling/embankment is 17,682 m3,

ii) Toe Protection works; dumping CC-block 40*40*40cm is 16,998 nos and 30*30*30cm is 26,861nos and sand-cement mortar gunny bags foundation is 110,088 nos and

iii) Slope Protection works; CC-block 40*40*20cm with projection part (1:2:4 mix) is 21,284 each, CC-block 40*40*20cm (normal, 1:3:6 mix) is 6,521 each and Geo-texitle sheet for slope is 4,940m2

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3. Objective of Final Inspection Step-1

To facilitate investigation of the first slope of Protection Work from 6.025m level, including Toe Protection works to the berm level 9.50m, intermediate Inspection is to be done by not only supervising team (joint team of JET and BWDB O&M Moulvibazar) but also by some BWDB engineers concerned with this Pilot Repair Works before flood comes. The workmanship and quality of the works done for Step-1 can be checked and inspected on the site before water level becomes above EL 6.025 m (top of Toe Wall) up to intermediate berm at EL 9.5m.

II. Final Inspection Step-1

1. Outline of Step-1

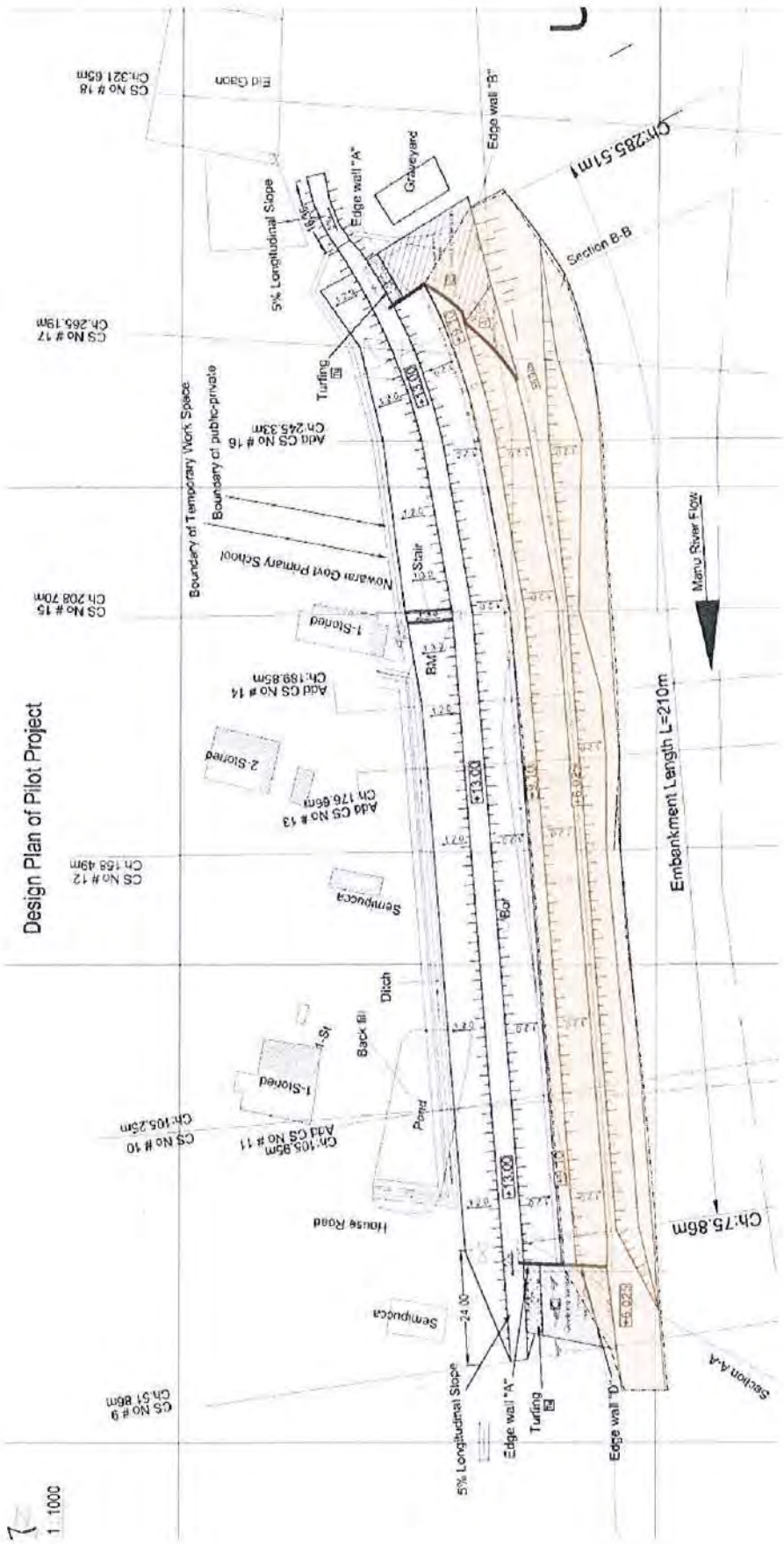
The works of Toe Protection and Slope protection from Toe Wall (top: 6.025m PWD) to intermediate berm level (9.5m PWD) is to be supposed for Step-1.
The location of Step-1 is shown on attached location sketch and
main work item is stated below table;

Table Main work item of Step-1 of Toe & Slope Protection

Type of work	Work item	Quantity of works done				Remark
		unit	Original	Amended	Work done	
Toe Protection	Dumping CC-block 40*40*40cm	Each	16,998	ditto	16,680	310 reserved
	Dumping CC-block 30*30*30cm	Each	26,861	ditto	26,135	715 reserved
	Sand cement (10:1)gunnybag foundation	No.	44,035	0	100	According to Trial Fabrication
	Sand cement (8:1)gunny bag foundation	No.	66,053	110,088	108,000	
Slope Protection	Work item	unit	Proposed Q'ty		Work Done	by 10/03 /2017
	CC-block 40*40*20 with projection part, 1:2:4 concrete mix	Each	9,522		8,950	1st Slope
		Each	4,409		3,683	Berm
			13,931		12,633	Total
	Geo-texitle sheet for slope, t=3mm	Sqm	1,144		833	Behind TW
		Sqm	1,524		1,504	1st Slope
		Sqm	705		681	Berm
			3,373		3,018	Total

Location of Step-1 for Intermediate Final Inspection

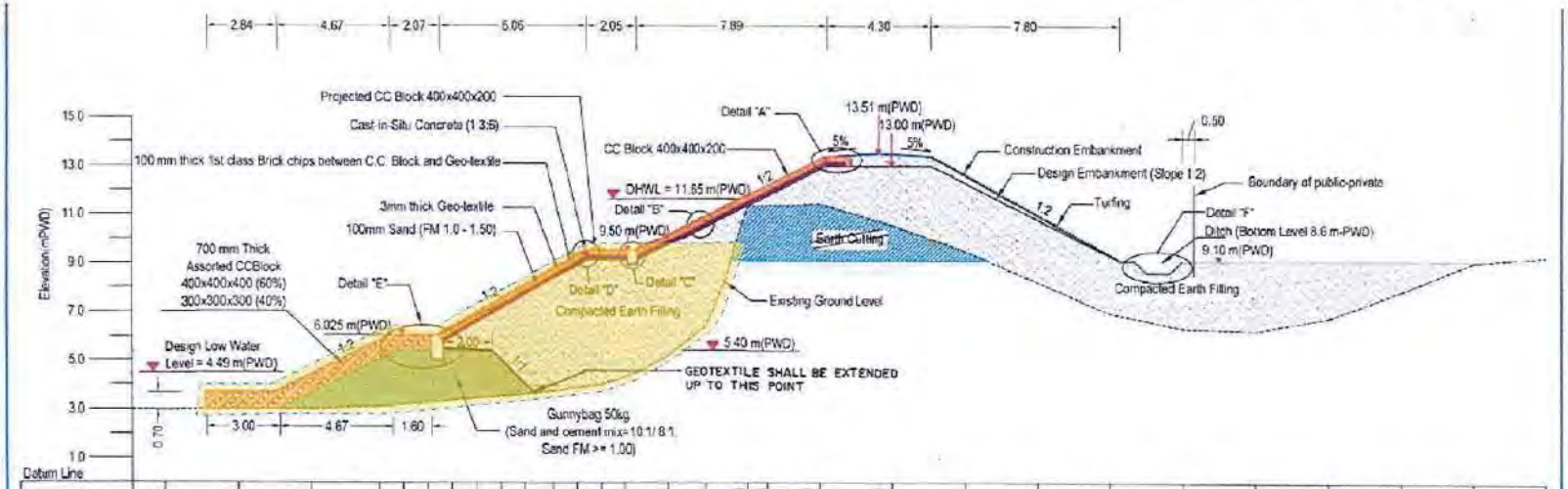
: Toe Protection and Slope Protection till 9.50m (PWD)



3 Record of Final Inspection Step-1 on 11 & 12 March 2017

Section of Step-1 for Intermediate Final Inspection

: Toe Protection and Slope Protection till 9.50m (PWD)



Existing RL in m-PWD	2.680	2.990	2.990	2.990	3.080	3.180	3.280	3.350	3.430	3.520	3.610	3.730	3.790	3.990	4.290	5.170	6.340	11.340	11.364	11.430	10.660	9.490	8.210	6.930	6.320	6.230	6.760	7.830	9.050	9.280	
Distance from LB in m	145.70	148.70	151.70	154.60	155.50	156.50	157.50	158.50	159.50	160.50	161.50	162.50	163.50	164.50	166.37	167.93	169.66	170.50	172.70	175.70	178.70	181.70	184.70	187.70	190.70	193.70	196.70	199.70	202.70		

Cross Section No # 10

NOTE : 1. EXTENSION OF GEOTEXTILE HAS BEEN INCLUDED AS SHOWN IN THE DRAWING.
2. ORIGINAL EARTH OF EMBANKMENT WITH IN DESIGN SECTION SHALL REMAIN.

JICA EXPERT TEAM		BANGLADESH WATER DEVELOPMENT BOARD (BWDB)			
		DESIGN CIRCLE - I			CHIEF ENGINEER, DESIGN
PREPARED BY: SUTARU SAKANAKA CONSTRUCTION-I	CHECKED BY: YOSUKE USUI DEPUTY TEAM LEADER	CHECKED BY: NABILA SUMAIA HUSSAIN, SDE	CHECKED & REVIEWED BY: MUHAMMAD MASOOD, EE	RECOMMENDED BY: MD. HARUN UR RASHEED, SE	APPROVED BY: MD. JAHANGIR KABIR, CE

JICA Expert Team		BANGLADESH WATER DEVELOPMENT BOARD (BWDB)			
		DESIGN CIRCLE - I			CHIEF ENGINEER, DESIGN
Prepared by: Shutaro SAKANAKA Construction-I	Checked by: Yosuke USUI Deputy Team Leader	Checked by: Mahid-Al-Hassan, AE	Checked & Reviewed by: Yasmin Begum, EE	Recommended by: Md.Harun ur Rasheed, SE	Approved by: Md.Jahangir kabir, CE

Notes:
1. Scale: 1 : 170
2. All Dimensions are in m and Elevations in mPWD.
3. For General Notes Refer to Drawing No.: 01
4. For Details Refer to Drawing No.: 16
5. Under DLWL of embankment is filled by gunny bags with sand.

BANGLADESH WATER DEVELOPMENT BOARD (BWDB)	
The Project for Capacity Development of Management for Sustainable Water Related Infrastructure	
Consultants : JICA Expert Team	
Design of Pilot Repair Works of Manu River Flood Control Embankment in Moulvibazar District	
Design Cross-Sectional Profile of Section No. 10	
Date: 28.05.2015	Drawing No.: MOU/JICA/EMB/1301 Sheet No.: 06of 19

2. Site Inspection Record in Session -1

Surperintending Engineer (SE) Desgin Circle (DC) 1 and 2 BWDB, JICA long term Expert to BWDB and SE O&M circle Moulvibazar, Xen Civil/ME and other staff Division, Moulvibazar and JICA Expert Team visited and inspected the Works on the evening 11 March, 2017.

1) Toe Protection
Inspected by the team and found OK.
2) Slope Protection
Inspected by the team and found OK.
3) Modification of Termination Area
- After observing and inspecting the condition of down-stream termination area, method/treatment for protection for such area (saying area C), has been agreed among the participants using pitching placing block (1:3:6mix, with projection part) with sand mat/filter geo-sheet and brick chips as proposed by JET.
- After observing and inspecting the condition of up-stream termination area, it is decided that;
i) further cutting for the higher elevation existing ground beside the last portion of Toe Wall and ending Edge Wall of berm in order coming water not to be pooling on such portion,
ii) after such cutting the area, pitching placing block (1:3:6mix, with projection part) with sand mat/filter geo-sheet and brick chips will be applied for transmission are A and B ,
iii) between area A /B and river side Toe Protection area will be filled assorted CC-block with more than 2 layer and
iv) after i) cutting and dressing for further pitching covering, such area shall be surveyed and make sketch, Drafting Revised Design Drawing will be made based on such survey result by CAD method.
-It is advised that gap of dumping CC-block beneath the Grave yard will be filled with further CC-blocks.

3. Minutes of Discussion in Session 2 at conference room

Project Manager of the Work (PM) briefly gave explanation for works done, especially "Toe Protection" using sand-cement mortar gunny bags foundation using projected recording Photos and record of Work Shop held last year with help of Power Point presentation.

After the deliveration by Project Manager, Mr. Johji Koizumi, Mr Haroon, Superintend Engineer, Design Circle II commented as follows;

(a) In executing the Pilot Repair Works, the adverse situation faced last year and within of in this year shall have be mentioned in the Construction Manual for lessons learning.

(b) The case of delay in the execution of the works shall have to been mentioned also

(c) Soil boring in the completed embankment shall have to be made for determining C % ϕ value.

(d) After completion, a sign board stating the work including name of JICA & BWDB may be installed in the site

(e) Still today earth work & embankment in the country side, drain construction, stair construction are left out. Utmost effort should be taken by the Contractor and monitoring by JET is necessary to complete the work within 30 April, 2017.

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(f) Here, we found that dumping has been done properly upto 6.025 R/L (top level of Toe Wall) from the bed of the river over the same cement mortar gunny bag foundation which should be followed by BWDB.

(g) Our Engineer should follow the working procedures of this work

(h) the drawing section in which gunny bag has been written should be written as sand cement mortar gunny bags

Mr. Muraoka, JICA long term Expert commented as below;

(a) Contractor and JET deserve thanks for accomplishing the progress of works up to 95 % till today.

(b) All sequences of work including compaction activities should be shown in the final document.

(c) As built drawing shall have to be prepared properly showing all the changes and actual measurements. And Final pictures (As built drawing) will be the most important for the future river infrastructure management by BWDB.

(d) Proper planning should be done for completion the Works in time. The Work may have been started as early as possible just monsoon is over.

For this comment, Mr. Hasan Zubair, senior expert of JET replied that in the Pilot Repair Works all the land required have been given by public volunteerly and there was paddy in the land. So the work was started after harvesting paddy in the middle of December. If land is acquired and Crop compensation is given then work can be started any time.

Mr. Bejoy, Xen requested to place below in the area outside project length near the Grave yard from the lowest elevation. JET Team told that it will be done by the available blocks keeping budgetary provision as per the amount approved by JICA within the time available up to 30th April 2017. But there is little scope of any extra work now.

TSS JV expressed the view that they will complete all the work by 1st week of April 2017.

At the end, Mr. Md. S. M. Shahidul Islam, Seperentending Engineer BWDB, Moulovibazar thanked JICA, BWDB officials & JET for this work and requested for taking this type of work in future in other vulnerable area of Manu river. He also requested JICA to help in financing the DPP for the Manu River Rehabilitation project preparation is under process & approval.

The meeting ended with thank from the chair.

III. Others

1. Schedule of Final Inspection.

Upon completion of the Works, Final Inspection will be held on 9 or 10 April, 2017

2. In the Final Inspection BWDB Engineer from Dhaka, Moulvibazar & other adjacent area of BWDB & JET & JICA representative will attend preferably.

B. Chakraborty
16/03/17

Bejoy Indra Sanker Chakraborty
Executive Engineer, BWDB
Moulvibazar O & M Division

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2017.3.16

Johji Koizumi
Project Manager,
Pilot Repair Works

Photographs of Final Inspection Step-1:

Ph1. At the berm of end point at down-stream: observing termination area of down-stream on 11 March 2017

Ph2. At the berm of edge of First Slope in up-stream: checking existing condition of termination area of up-stream on 11 March 2017

	
Ph3. Inspection were conducted by SE DC1, DC2, JET Experts and SE, X'en Mech/Civil and other staff of BWDB Moulvibazar on 11 March 2017	Ph3. Session 2: Discussion for Final Inspection Step-1 held the meeting room of Rest Inn hotel, Moulvibazar on 12 March 2017

Attachment # 1: Attendance List of Final Inspection on12 March 2017
2: Progress Chart for Pilot Repair Works: for the works done by the end of February 2017
#3: Reference photos during construction of sand-cement mortar foundation

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Participant List
for
The Workshop for Intermediate Final Inspection Step-1
for the Pilot Repair Works of Manu River at Moulvibazar

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: March 12, 2017

Time: 09:00 pm – 13:00 pm

Venue: Worksite & Conference Room, 2nd Floor, Rest Inn Hotel, Moulvibazar

No	Name	Title/Organization	Phone No Email Address	Signature
1	YASMIN BEGUM	SE / BWDB		
2				
3	Johji KOIZUMI	Project Manager of Pilot Repair Works		
4	Md. Anisur Rahman	XEN / BWDB		
5	Bejoy Indra Sankar Chakraborty	XEN/BWDB		
6	M. A. Hannan Khan	SDE / BWDB		
7	Md. Khalid bin olid	SDE / BWDB		
8	Hasan Zubair	JICA. Expert		

No	Name	Title/Organization	Phone No Email Address	Signature
9	Md. Shahadat Hossain	Sub-Assis. Eng.		
10	Md. Hasan Parves Riadh	SAE/SO BWDB		
11	Md. Shiful Islam	SAE/SO (Mech:) BWDB.		
12	Md. Sakib Hossain	SAE/SO BWDB		
13	Arif Hossain	Sub-Asst. Engineer.		
14	Md. Mukhlechur Rahman Talukdar	Asst. Engineer BWDB, Moulvibazar.		
15	S.M. SHAHIDUL ISLAM	Superintending Engineer, Moulvibazar O&M Circle		
16	Kazumitsu MURAOKA	JICA / Expert. to BWDB		
17	Md. Harun ur Rashid	Superintending Engineer Design Circle-2		
18	~~YASMIN BEGUM~~			

No	Name	Title/Organization	Phone No Email Address	Signature
19	Md. Iman Ali	SDE BWDB, Moulvibazar		
20	Md. Abdul Kader	Sectional officer. Rajnagar O&M section-2 BWDB, Moulvibazar		
21	Md. Johirul Haque	TSS (JV)		
22	SYED RAZAUR Rahman	TSS (JV)		
23	Md. Mainul Islam	DPM of PRW CDMSWRI		
24	Md. Atiqul Islam	BWDB Moulvibazar		
25	Muntasir Ibn Mohsin	Administrator JICA, CDMSWRI		

Inspection for the Pilot Repair Works
on
The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: **April 27, 2017**
Time: **9:15 – 11:00**
Venue: **Pilot Repair Work Site, Akhailkura Union, Sadar Upazilla, Moulvibazar District**

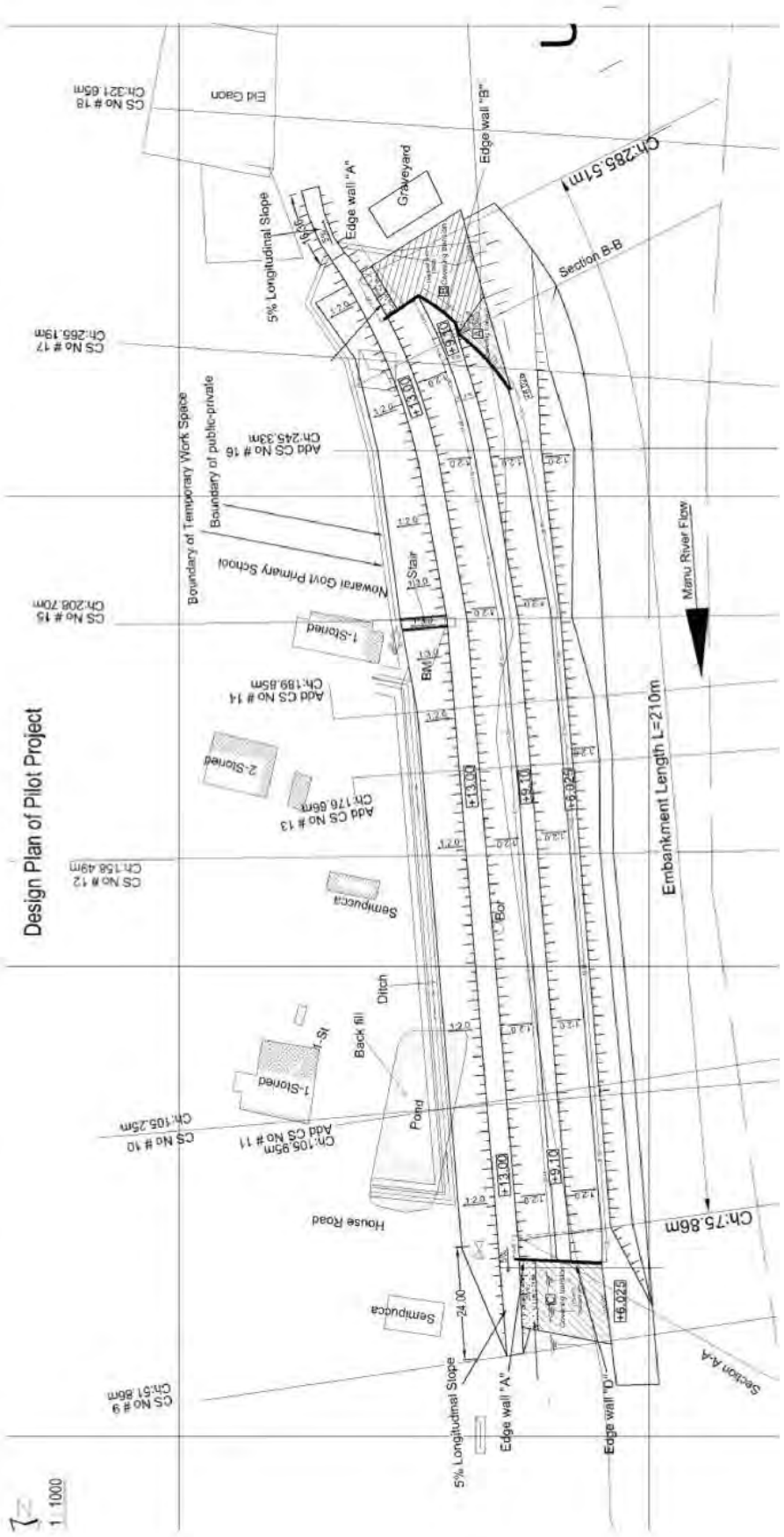
AGENDA

08:30 – 9:15	Move to Pilot Repair Work Site (from Hotels)
09:15– 11:00	**Site Inspection and Discussion** 1. Jointly inspection for the site condition and the progress of the Works at the final stage of the Works 2. Judging / making decision whether "Time Extension" Is required or not.
11:00 – 17:00	Move from the site to Dhaka

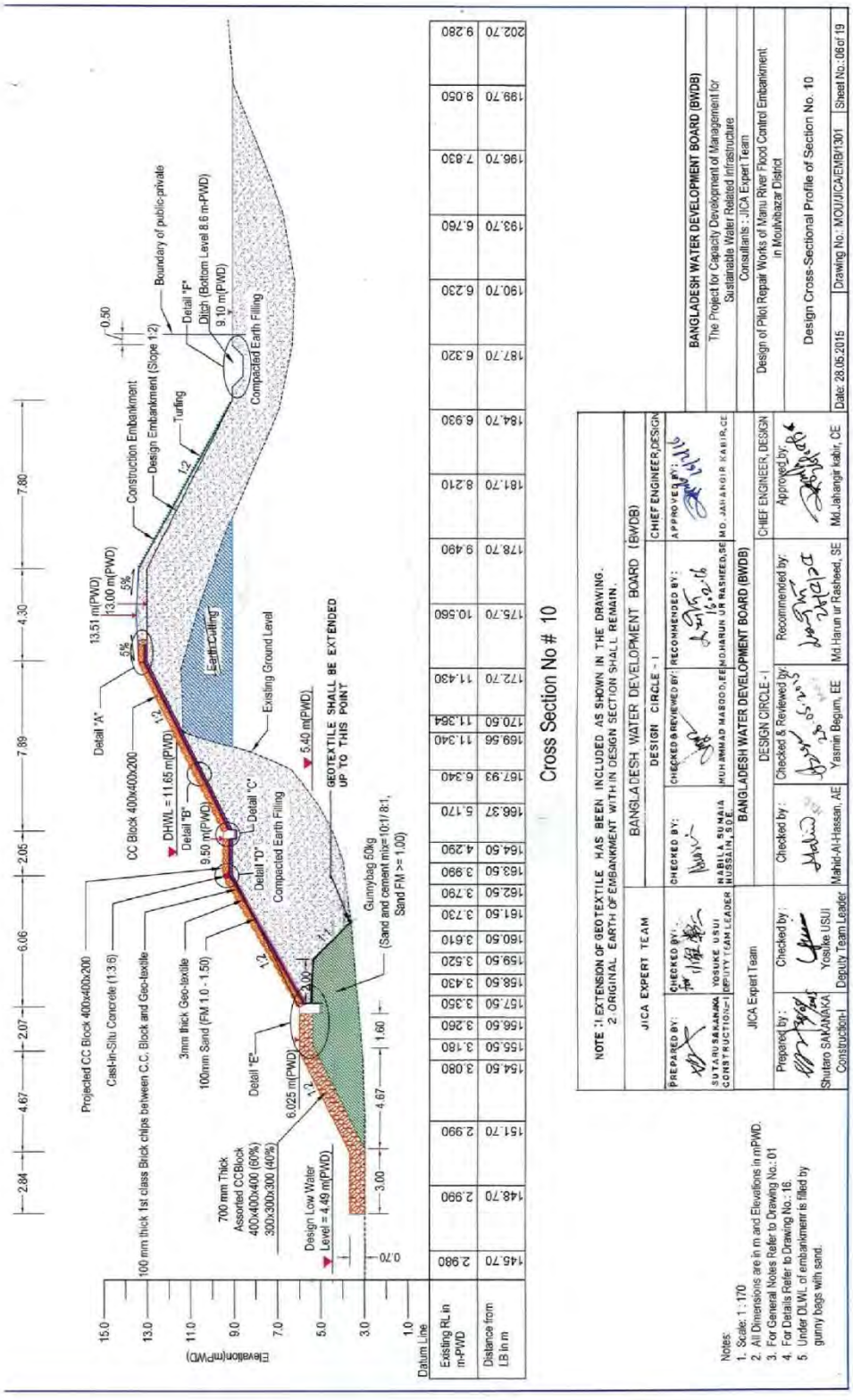
Remark: Due to unavoidable circumstances caused by rainfall at the end of March & April 2017, the Works hampered much. As such there is every possibility that the Works cannot complete in due time. So, the work shop has been postponed. It will be organized at a later stage.

Location for Final Inspection

Note: This is reference draft of proposed modification Drawing of 04/19 of Contract Drawing



Typical Cross Section of Final Inspection



Existing RL in m-PWD	2.980	2.990	2.990	148.70	151.70	145.70
Distance from LB in m	9.280	202.70	189.70	9.050	196.70	7.830	190.70	6.230	193.70	6.760	187.70	6.320	184.70	6.930	181.70	8.210	178.70	9.480	175.70	10.560	172.70	11.430	170.60	11.364	169.56	11.340	167.93	6.340	166.37	5.170	164.60	4.290	163.60	3.990	162.60	3.730	161.60	3.610	160.60	3.520	159.60	3.430	158.60	3.350	157.60	3.260	156.60	3.180	155.60	3.080	154.60

Cross Section No # 10

NOTE :1. EXTENSION OF GEOTEXTILE HAS BEEN INCLUDED AS SHOWN IN THE DRAWING.
2. ORIGINAL EARTH OF EMBANKMENT WITHIN DESIGN SECTION SHALL REMAIN.

JICA EXPERT TEAM	BANGLADESH WATER DEVELOPMENT BOARD (BWDB)		
	DESIGN CIRCLE - I		CHIEF ENGINEER,DESIGN
PREPARED BY: SUTARU SAKANAKA CONSTRUCTION-I	CHECKED BY: YOSUKE USUI DEPUTY TEAM LEADER	CHECKED &REVIEWED BY: NABILA SUMAIA HUSSAIN, SDE	RECOMMENDED BY: MUHAMMAD MAQBOOL EE MOHARUN UR RASHEED,SE	APPROVED BY: MD. JAHANGIR KABIR,CE

JICA Expert Team	BANGLADESH WATER DEVELOPMENT BOARD (BWDB)		
	DESIGN CIRCLE -I		CHIEF ENGINEER, DESIGN
Prepared by: Shutaro SAKANAKA Construction-I	Checked by: Yosuke USUI Deputy Team Leader	Checked & Reviewed by: Mahid-Al-Hassan, AE	Recommended by: Yasmin Begum, EE	Approved by: Md.Harun ur Rasheed, SE	Md.Jahangir kabir, CE

BANGLADESH WATER DEVELOPMENT BOARD (BWDB)

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Consultants : JICA Expert Team

Design of Pilot Repair Works of Manu River Flood Control Embankment in Moulvibazar District

Design Cross-Sectional Profile of Section No. 10

Date: 28.05.2015 | Drawing No.: MOU/JICA/EMB/1301 | Sheet No.: 06of 19

Notes:
1. Scale: 1 : 170
2. All Dimensions are in m and Elevations in mPWD.
3. For General Notes Refer to Drawing No.: 01
4. For Details Refer to Drawing No.: 16.
5. Under DLWL of embankment is filled by gunny bags with sand.

1. Outline of the Works

1) Commencement date: 25 November, 2015 Intended Completion Date: 30 April, 2017

2) Contract value; Taka 65,110,614.96.-

3) Main work quantities are shown below table

Table Main work item of Pilot Repair Works

Type of work	Work item	Quantity of works				Remark
		unit	Original Design	Amended Design	Proposed Final works done	
Length	Proposed length of embankment (on crest)	m	210	200	200+ Up/s 10m Down/s23m	Suite to site condition, but add covering transition 33m
Earth work	Cutting and excavation	m3	7,600	4,957	4,957	Remaining original ground
	Filling/embankment	m3	17,682	15,697	15,697	
Toe Protection	Dumping CC-block 40*40*40cm	Each	16,998	ditto	16,690	
	Dumping CC-block 30*30*30cm	Each	26,861	ditto	26,851	
	Sand cement (10:1) gunny bag foundation	No.	44,035	100	100	According to Trial Fabrication.
	Sand cement (8:1) gunny bag foundation	No.	66,053	110,088	109,050	(Work Shop on Jan2016)
Slope Protection	CC-block 40*40*20 with projection part,1:2:4 concrete mix	Each	21,284	ditto	19,882	
	CC-block 40*40*20 plain, 1:3:6 concrete mix	Each	6,521	ditto	11,135	Including covering Termination Area
	Geo-texitle sheet for Slope Protection, t=3mm	Sqm	4,940	6,084	5,948	Variation No.4 and covering Termination Area

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Minutes of Site Inspection

Name of the Works: Pilot Repair Works of Manu River Flood Control Embankment in Moulvibazar District (JICA Contract Agreement No.: JICA (BD) 11-12001) (PRW)

Site Inspection

Date: 9:15-11:00, 27th April, 2017

Place: The Site at Notaria, Akhailkura, Moulvibazar

The joint site Inspection was made by Project Director and Project Manager of the Project from BWDB. JICA representatives and Supervising Team (consist of JICA Expert Team and BWDB O&M Office, Moulvibazar).

1. Attendance and Icons (abbreviations) for each party

1) Attendance is referred to attendance list (Attachment #1).

2) Icons or abbreviations used in this Inspection are as follows, unless otherwise specified;

JICA: Procuring Entity, Japan International Cooperation Agency Bangladesh Office and JICA long Term Expert for BWDB

JET: Project Manager (PM), Senior Expert of JET and Deputy Project Manager (DPM) entrusted or appointed by JICA [JET: JICA Expert Team]

TSS: the Contractor, T.S.S. (JV)

BWDB: Chief Planning and Executive Engineer, BWDB (Project Director (PD) and Project Manager of the Project, Superintending Engineer (SE), Executive Engineer, and Sectional Officer (SO) and other officers from BWDB, Moulvibazar

2. Objective of Site Inspection

1) Jointly inspect the site condition and the progress of the Works at the final stage of the Works

2) Judging / making decision whether "Time Extension" Is required or not.

3. Comments/suggestions and instruction at Site Inspection

1) Drainage: earthen drain alongside the toe of country side proposed bank slope

- Pooling water is found in excavated drain and such pooling water may seriously affect the embankment, when water will pass through the drain and there will be erosion as the soil is sandy. The berm from the country side toe is only 0.65m width which may be eroded and ultimately the embankment may be damaged. Also the pooled water in the drain may be seeped through the embankment body.

-Engineer in charge of Design of Design Circle BWDB gave the comments, through telephone, that the Drain of original Design Drawing had better t not to be constructed because of the same reasons mentioned above.
-Alternative counter measure for that portion, the Inspection team recommends that existing some puddle/swamp area nearby the toe may be filled and the area proper level with proper gradient to facilitate overland drainage to lower area.

from proposed toe of the bank towards country side connecting ground not as to stuck/pile water.

2) Stair Case
- Existing stair case is found remaining just beside the proposed Stair, existing stair must be demolished and remove the RCC material because remaining RCC structure shall hamper the stability and strength of proposed embankment with less bonding of earth and making water way inside the bank.
- PM of Pilot Repair works instructs TSS to measure the volume of the existing RCC and to estimate extra cost for demolishing works. PM will evaluate them and make Variation to TSS to do so accordingly.

3) Gaps at construction joint at Crest
- Gap of construction joint between placing cc-block and Gap concrete connecting placing cc-block on 2nd Slope. The reasons are considered;
  i) settlement of constructed embankment below the placing cc-block on the slope or
  ii) not good workman-ship for casting Gap concrete or other causes
- TSS will repair such gaps in order to be satisfied of original Gap concrete
- If in the defect liability period such gap is increasing, such movement of gap is considered as "Defects" responsible with TSS.

4) Sliding of the country side slope
- It is found that the some portion of country side slope has slided, which recently were covered with turf. The reasons are considered of lack of compaction of such area slope.
- TSS is instructed that such area shall be repaired

5) Crack found on to the Crest
- Between (design) Cross Session (C/S) #16 and #17, there are some cracks on the crest near country side.
- The reason must be considered of lack of compaction against such embankment work, so TSS is instructed to compact such embankment area.
- TSS are strongly cautioned that the failure/slipping/sinking embankment because of lack of proper bonding between original (old) ground/earth and new embankment and not proper embankment workmanship with lack of compaction. It will be the responsibility for TSS to carry out proper embankment works.

6) Deformation of surface of placing cc-block

- Around C/S #16-17, a little deformation of the surface of placing cc-block on the 2nd slope, in case of the cause by the settlement of embankment, the further deformation and settlement will be the responsibility of TSS (JV).

4. Discussion for Judging of "Time Extension"

After discussion and on the basis of site Inspection, the team of Inspection concluded that "The Works shall have to be extended beyond Intended Completion Date, 30 April 2017 as per current Contract due to unavoidable circumstances (bad weather and heavy rain).

And it is recommended that extending days are 30 days. That is the Intended Completion Date is now 30th May 2017.

5. Others

1) Final Inspection will be conducted after completion of the Works.

30/04/17

(Khondaker Khalequzzaman)

Chief Planning BWDB,
Project Director of the Project for Capacity Development of Management for Sustainable Water Related Infrastructure

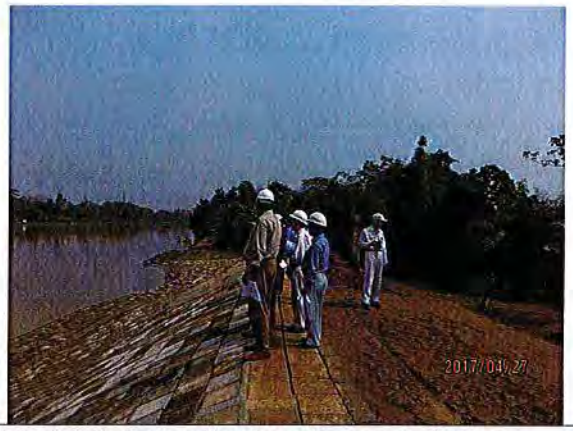
小泉常二 2017.04.30

(Johji Koizumi)

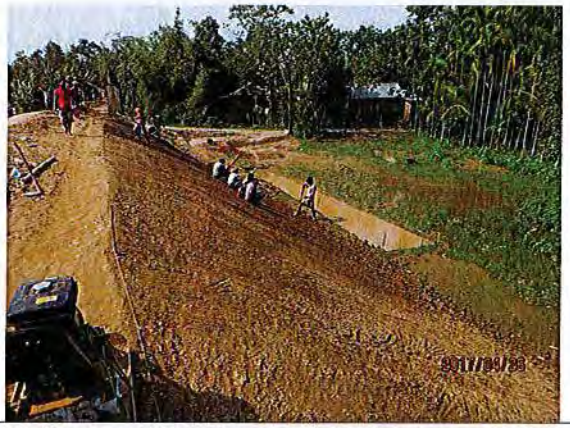
The Project Manager of the Pilot Repair Works of Flood Control Embankment in Moulvibazar District,
A member of JICA Expert Team

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Photos: Site Inspection on 27 April 2017



Ph1. Jointly Inspection from the crest of down-stream area



Ph2. Proposed Drainage at Toe of proposed country side slope. Existing swamp small ponds.

Ph3. Old and new RCC Stair Case on to the Slope near the School.

Ph4. Checking cracks on to the crest of the bank at about C/S # No.17

Ph5. Checking construction joint between placing cc-block on cracks and Gap concrete at about C/S # No.16

Ph5. Discussion for the site Inspection and Judging the necessity of Time Extension.

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Attendance List of Site Inspection on27 April 2017

Participant List
in
Site Inspection and Discussion
for the Pilot Repair Works of Manu River at Moulvibazar

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: April 27, 2017

Time: 09:15 pm – 11:00 pm

No	Name	Title/Organization	Phone No Email Address	Signature
1	Kh. Khaleguzzaman	Chief Planning BWDB.		
2	S.M. Shahidul Islam	Superintending Engineer, moulvibazar O&M circle, BWDB		
3	Dr. Shamal Chandra Das	E. E. Office of the chief Planning BWDB		
4	Anisuzzaman Chowdhury	Deputy Program Manager JICA		
5	Koizumi tsu Muraoka	JICA Expert		
6	Md. Hasan Zubair	JICA Senior Expert		
7	Md. Abdul Kader	Sectional officer BWDB. Moulvibazar		
8	Joji KOIZUMI	PM - PRW JICA Expert		

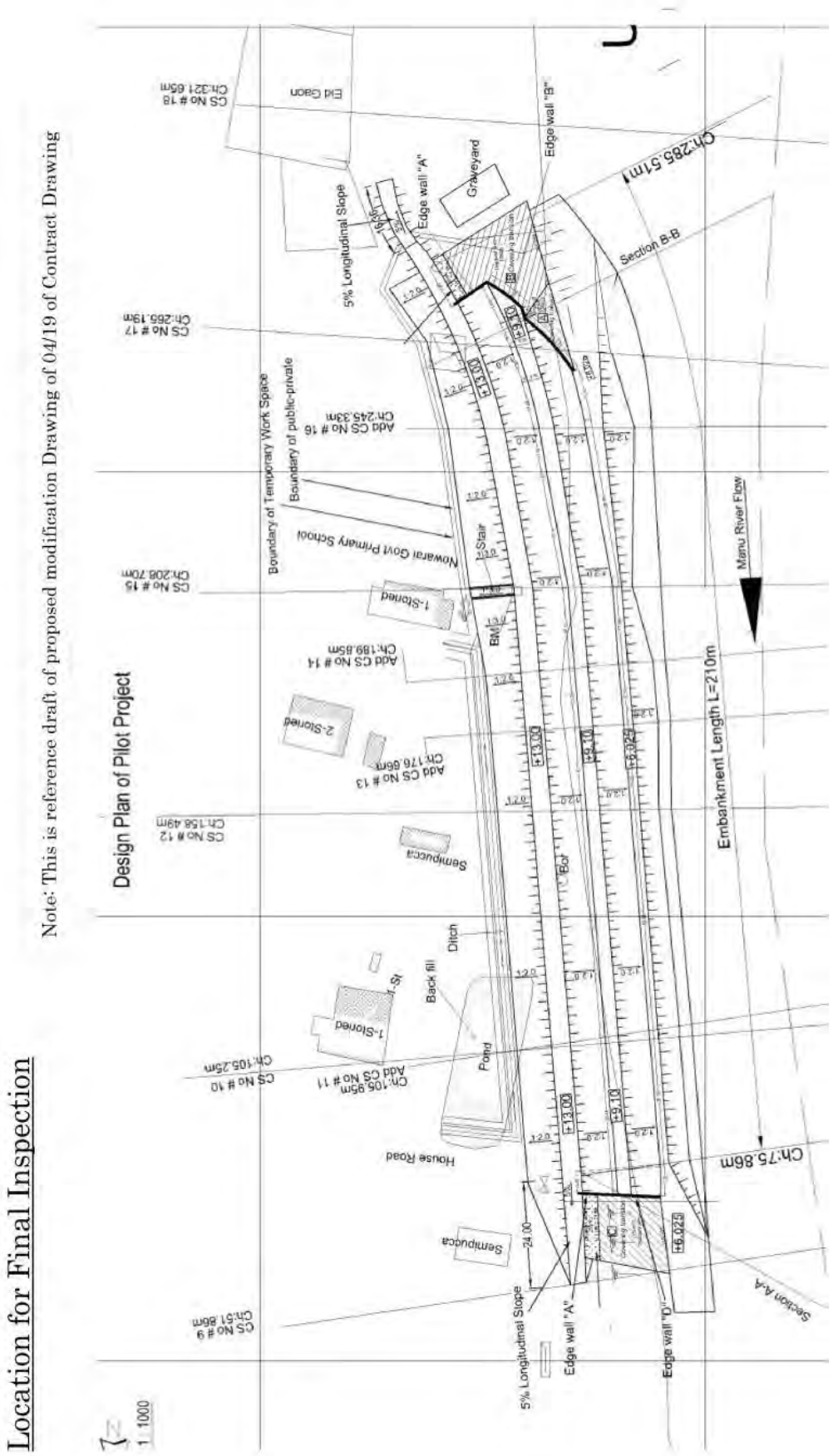
No	Name	Title/Organization	Phone No Email Address	Signature
9	Md. Mainul Islam	DPM-PRW JET Team		
10	Md. Johirul Haque	TSS (JV)		
11	Ahmed Sidi Mohiuddin	SE 1st TSS (JV)		
12	Kutubonnih	Land owner		
13	Muntasir Ibn Mohsin	Administrator PCDMSWRI		
14				
15				
16				
17				
18				

Final Inspection for the Pilot Repair Works
on
The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: **May 20, 2017**
Time: **14:00 – 17:00**
Venue: **Pilot Repair Work Site, Akhailkura Union, Sadar Upazilla, Moulvibazar District & Conference Room, Hotel Rest Inn, Moulvibazar**

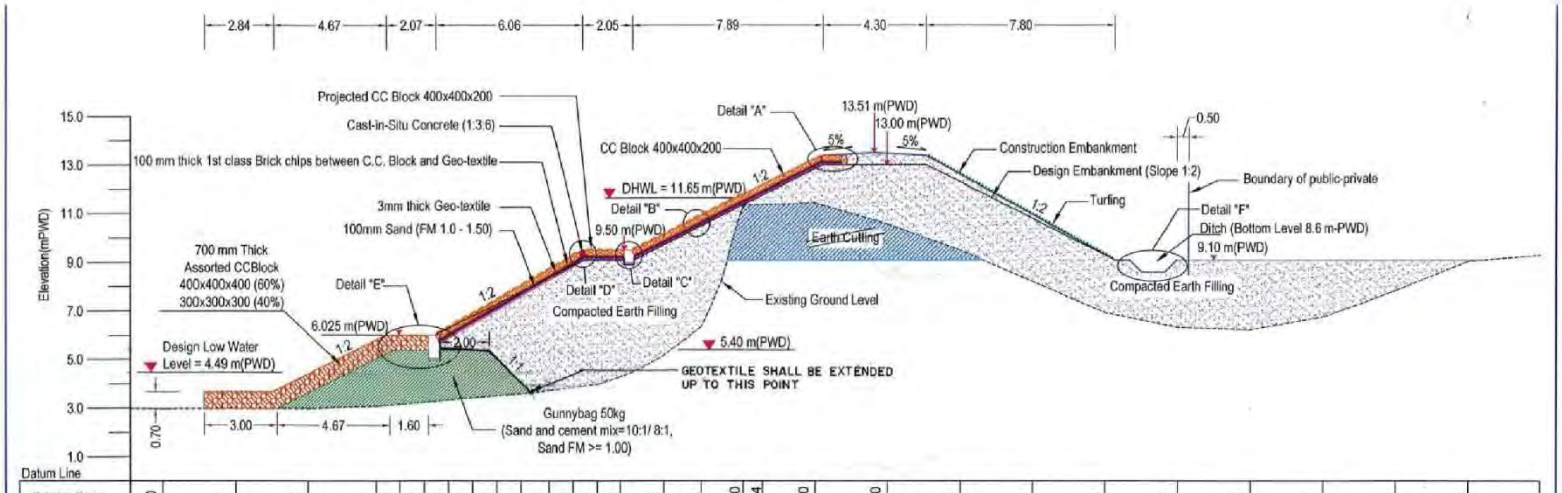
AGENDA

07:00 – 13:00	Move to Pilot Repair Work Site (from Dhaka)
14:00– 15:00	Session 1 in Field: Site Inspection 1) Investigation and checking workman-ship of the Works 2) Inspection and confirmation of completion of the Works
15:00 – 15:30	Move from the site to Hotel Rest Inn (All participants)
15:30 – 17:00	Session 2: Discussion of the Works upon completion Presiding by Director, Planing-1, BWDB, Project Coordinator of the Project 1. Briefly explanation of the construction progress for the Works with showing Photos by Project Manager of the Works, JICA Expert Team (10min) 2. Discussion for Final Inspection and the Works 1) Repair Pilot Works (PRW) 2) Learnings/studies and suggestions/advices from PRW, for further BWDB works 3. Others 1) Records of learning are described in the proposed “Construction Manuals (Revision)” of Capacity Development Project 2) Subsequent process; issuance “Competed Certificate”, “Taking Over Document” and others 4. Closing Remarks by Superintending Engineer, Design Circle-II, BWDB 5. Address from PE, Representative of JICA Bangladesh Office 6. Thanks given by Superintending Engineer, Moulvibazar O&M Circle
17:00 –	Adjourn



2 Draft_ Agenda of Final Inspection on 20 May 2017

Typical Cross Section of Final Inspection



Existing RL in m-PWD	2.980	2.990	2.990	3.080	3.160	3.260	3.350	3.430	3.520	3.610	3.730	3.790	3.990	4.290	5.170	6.340	11.340	11.384	11.430	10.560	9.490	8.210	6.930	6.320	6.230	6.760	7.830	9.050	9.280				
Distance from LB in m	145.70	148.70	151.70	154.50	155.50	156.50	157.50	158.50	159.50	160.50	161.50	162.50	163.50	164.50	166.37	167.93	169.56	170.60	172.70	175.70	178.70	181.70	184.70	187.70	190.70	193.70	196.70	199.70	202.70				

Cross Section No # 10

NOTE : 1. EXTENSION OF GEOTEXTILE HAS BEEN INCLUDED AS SHOWN IN THE DRAWING.
2. ORIGINAL EARTH OF EMBANKMENT WITH IN DESIGN SECTION SHALL REMAIN.

JICA EXPERT TEAM		BANGLADESH WATER DEVELOPMENT BOARD (BWDB)			
		DESIGN CIRCLE - I			CHIEF ENGINEER,DESIGN
PREPARED BY:	CHECKED BY:	CHECKED BY:	CHECKED & REVIEWED BY:	RECOMMENDED BY:	APPROVED BY:
SUTARU SAKANAKA CONSTRUCTION-I	YOSUKE USUI DEPUTY TEAM LEADER	NABILA SUMAIA HUSSAIN, SDE	MUHAMMAD MABOOD, EE	MD.HARUN UR RASHEED, SE	MD. JAHANGIR KABIR, CE

JICA Expert Team		BANGLADESH WATER DEVELOPMENT BOARD (BWDB)			
		DESIGN CIRCLE - I			CHIEF ENGINEER, DESIGN
Prepared by :	Checked by :	Checked by :	Checked & Reviewed by:	Recommended by:	Approved by:
Shutaro SAKANAKA Construction-I	Yosuke USUI Deputy Team Leader	Mahid-Al-Hassan, AE	Yasmin Begum, EE	Md.Harun ur Rasheed, SE	Md.Jahangir kabir, CE

Notes:
1. Scale: 1 : 170
2. All Dimensions are in m and Elevations in mPWD.
3. For General Notes Refer to Drawing No.: 01
4. For Details Refer to Drawing No.: 16.
5. Under DLWL of embankmenr is filled by gunny bags with sand.

BANGLADESH WATER DEVELOPMENT BOARD (BWDB)	
The Project for Capacity Development of Management for Sustainable Water Related Infrastructure	
Consultants : JICA Expert Team	
Design of Pilot Repair Works of Manu River Flood Control Embankment in Moulvibazar District	
Design Cross-Sectional Profile of Section No. 10	
Date: 28.05.2015	Drawing No.: MOU/JICA/EMB/1301 Sheet No.: 06 of 19

1. Outline of the Works

1) Commencement date: 25 November, 2015 Intended Completion Date: 30 May, 2017

2) Contract value; Taka 65,110,614.96.-

3) Main work quantities are shown below table

Table Main work item of Pilot Repair Works

Type of work	Work item	Quantity of works				Remark
		unit	Original Design	Amended Design	Work done Final Measurement	
Length	Proposed length of embankment (on crest)	m	210	200	200+ Up/s 10m Down/s23m	Suite to site condition, but add covering transition 33m
Earth work	Cutting and excavation	m3	7,600	4,957	4,957	
	Filling/embankment	m3	17,682	15,697	15,727	
Toe Protection	Dumping CC-block 40*40*40cm	Each	16,998	ditto	16,990	
	Dumping CC-block 30*30*30cm	Each	26,861	ditto	26,851	
	Sand cement (10:1) gunny bag foundation	No.	44,035	100	100	According to Trial Fabrication. (Work Shop_ Jan2016
	Sand cement (8:1) gunny bag foundation	No.	66,053	110,088	111,210	
Slope Protection	CC-block 40*40*20 with projection part, 1:2:4 concrete mix	Each	21,284	ditto	18,555	Add transition area covering (Variation-6)
	CC-block 40*40*20 plain, 1:3:6 concrete mix	Each	6,521	ditto	10,630	
	Geo-texitle sheet for Slope Protection, t=3mm	Sqm	4,940	6,084	6,248	Variation No.4 & No.6 (Tran-sition area)

Minutes of Final Inspection

Name of the Works: Pilot Repair Works of Manu River Flood Control Embankment in Moulvibazar District (JICA Contract Agreement No.: JICA (BD) 11-12001) (PRW)

Session1. Site Inspection

Date: 14:30-15:30, 20th May, 2017

Place: The Site at Noarai, Akhailkura, Moulvibazar

Session2. Explanation and Discussion

Date: 16:00 – 17:30, 20th May, 2017

Place: Meeting room of Hotel Rest Inn, Moulvibazar

I. Attendance and Icons (abbreviations) for each party

1) Attendance is referred to attendance list (Attachment #1).

2) Icons or abbreviations used in this Inspection are as follows, unless otherwise specified;

JICA: Procuring Entity, Japan International Cooperation Agency Bangladesh Office Representative of Office in charge of the Project and local officer

JET: Team Leader of the Project, Project Manager (PM), Senior Expert of JET and Deputy Project Manager (DPM) entrusted or appointed by JICA [JET: JICA Expert Team]

TSS: the Contractor, T.S.S. (JV)

BWDB: Director of Planing-1 BWDB and Project Coordinator of the Project (PC), Superintending Engineer (SE) of Design Circle (DC) 2, BWDB, Superintending Engineer (SE), Moulvibazar O&M Circle, Executive Engineer (Xen) Civil, Sub-Divisional Engineer (SDE), Sectional Officer (SO) and other officers from BWDB, Moulvibazar O&M Division Office, BWDB

II. Site Inspection (Session 1)

1. Remedial works and re-compaction works were inspected at the site where for the crack found on the last joint site inspection on 27 April 2017. As a result, it is found already repaired and in good condition.

2. Backfilling of the small ditch at the toe of country side slope has not been completed. It is instructed to be completed by 23rd May 2017.

3. There is some settled portion of the shoulder of the crest in riverside of around 5 meter long at near Cross Section No.16. Such part is to be re-constructed and repaired properly.

4. The Work can be declared substantially completed subject to completion of the filling of ditches, stated in bullet 2 above, and to be carried out remedial works for some settled part, stated in bullet 3.above.

5. A warning notice board should be erected to refrain boats or other motor vessels form anchoring at the vicinity of the pilot repair works. Moreover, a large signboard is to be established informing the details of the completed pilot repair works. The prescribed format of Publicity Cell, BWDB should be followed while establishing the information board and furnishing necessary information.

6. The handouts should have the as-built drawing in place of the previously planned drawing to avoid confusion relating to drop of earthen drain at the C/S toe of embankment.

III. Discussion on the completion of the Works (Session-2)

The discussion meeting started around 4 pm, Mr. Fazlur Rashid, Director Planning-I and Project Coordinator presided over the meeting.

1. Explanation of construction progress

Brief explanation of the construction progress for the Works with showing Photographs by Project Manager (PM) of the Works, JICA Expert Team

1) Using Power Point Slides and referring handout copies of slides, PM explained overall progress of the Works, especially the delay of the Works due to inclement weather and others

2) Recorded photographs are presented for some activities, such as Trial Fabrication of sand-cement mortar gunny bags, Trial Compaction for embankment works, Safety Gathering as Capacity Building events and also Temporary Prevention works for the slope during suspension period of works in the rainy season of 2016.

3) Construction Manual (Revision) version-2 are also introduced and some of articles of the Manual were referred to the studies and learning from this Pilot Repair Works.

4) The works done are quite satisfactory.

2. Discussion

- SE DC2 comments are followings;

1) The entire work was done following the step-by-step administrative procedures. It should be practiced during implementation of other projects by BWDB.

2) When planning the schedule analyzing the previous year's hydrological data is essential.

3) Manuals, such as Construction Manuals Hard copies, is to be delivered to all BWDB O&M Division Offices

- Representative of JICA BD commented as follows;

1) It is a pleasure to know that the Pilot Works is almost complete and after Taking Over from JICA to BWDB, JICA Bangladesh Office would like to request BWDB O&M Moulvibazar Division Office to take care the Pilot Site.

2) In the Project, making Manuals, for design, construction and O&M are almost completed and those Manuals are being disseminated. It is desired for BWDB to utilize these Manuals effectively.

- Director of Planning 1, BWDB comments;

1) We have many places where we need to do, improvement works. JICA are requested to assist further project not only river embankment works, but also water resource project.

2) He extended thanks not only to BWDB staff but also to local & foreign JET members contributing much for this Project.

3) The Work may be declared Completed on 23rd May 2017 after the remedial measures taken for minor repair and settled portion and filling of some small ditches (pooling area).

4) The works done, especially turfing works are very nice.

5) JICA and BWDB will devise scopes in favor of preparing GIS data base for all BWDB structures in Bangladesh. Both the parties would share their collected information, compile together, prepare combined GIS data base and explore the possibilities to establish a permanent GIS Cell at the BWDB HQ. Extended discussion would be held under the chairmanship of the Chief Planning, BWDB, Dhaka.

- Executive Engineer, O&M Moulvibazar Division Office, BWDB's thanks giving and remarks;

1) Thanking JICA BD and JET members and the Contractor (TSS JV) completing the Works. It show different type, challenging works, such as introduction of placing CC- block with off-set (projection part) and other events.

3. Actual Completion Date of Works

After discussion regarding Actual Completion Date, finally all member of Final Inspection concluded as follows;

1) The Works is not yet completed by Today (20 May 2017)

2) After finishing i) filling water pooling places near toe of country side slope and ii) repair works for sinking part at some shoulder of riverside slope at the crest (stating the Site Inspection), the Works will be deemed as "Completed" on 23 May 2017.

3) TSS (JV) shall carry out such outstanding works and report to BWDB and Supervising Team, with recoding photos.

The meeting ended thanks from the Chair.

30/5/17

(Fazlur Rashid)
Director, Planning-I, BWDB
and Project Coordinator of
the Project

30.05.17

(Md. Harunur Rasheed)
Superintending Engineer,
Design Circle-II, BWDB

小泉 常二

(Johji Koizumi)
The Project Manager of
the Pilot Repair Works,
A member of JICA Expert
Team

Photos of Final Inspection

Ph1. Site Inspection by Director Plaining-1, SE DC2 and Moulvibazar BWDB, JICA and Supervising Team on 20 May 2017

Ph2. Pointing out some sinking part at the embankment crest at around C/S No.16 on Site Inspection

Ph3. On final inspection day (20170520) visiting team on the completed work.

Ph4. Session 2: Discussion for Final Inspection and CDMSWRI Project at Rest In Hotel on 20 May 2017

Ph5. Carried out outstanding filling work for water pooling area near toe of country side slope on 21 May 2017

Ph6. SO of BWDB and PM inspect the repairing work for the sinking portion on the crest of bank. On 21 May 2017

Ph7. Carry & dumping/filling earth to water pooling area near toe of country side slope on 21 May 2017

Ph8. Re-compacting the crest at the sinking portion on the crest of bank. On 22 May 2017

Ph9. Filling earth to water pooling area has been completed by 22 May. Taken on 22 May 2017

Ph8. Re-compacting the crest at the sinking portion on the crest of bank and the repair work has been completed by 22 May 2017

Attachment # 1: Agenda of Final Inspection on 20 May 2017
2: Attendance List of Final Inspection on 20 May 2017

Participant List
for
The Workshop for Final Inspection
for the Pilot Repair Works of Manu River at Moulvibazar

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: May 20, 2017

Time: 14:00 pm – 17:30 pm

Venue: Worksite & Conference Room, 2nd Floor, Rest Inn Hotel, Moulvibazar

No	Name	Title/Organization	Phone No Email Address	Signature
1	Md. Harunur Rashed	Superintending Engineer, Design Circle-2 BWDB		
2	Fazlur Rashid	Director, Planning-1, BWDB, Dhaka		
3	S.M. SHAHIDUL ISLAM	Superintending Engineer, Moulvibazar O&M Circle		
4	Bejoy Indra Sanker Chakraborty	Executive Engineer Moulvibazar O&M Division		
5	Md. Rahat Khan	JICA,		
6	Md. Khalid bin olid	Sub-divisional Engineer (A.C) BWDB, Moulvibazar		
7	Md. Abdol Kader	Sectional officer. Kamalganj O&M Section-2 BWDB, Moulvibazar.		
8	MD. SAKIB HOSSAIN	Sectional officer, Moulvibazar O&M Section-3, BWDB, Moulvibazar.		

No	Name	Title/Organization	Phone No Email Address	Signature
9	Md. Hasan Parves Riadh	Sectional officer. Moulvibazar O&M Section-6 BWDB. Moulvibazar.		
10	Md. Shahadat hossain	sectional officer Moulvibazar O&M section - 4 Bww.db. Moulvibazar		
11	TANJIR SAIF AHMED	SDE, Planning-1 BWDB		
12	Md. Mainul Islam	DPM- PRW CDMSWRI		
13	Ahmed Sadi Mahiuddin	TSS's SE		
14	Liton Roy	TSS's PM		
15	Md. Johirul Haque	TSS (Gv) In charge		
16	Koichi Kitamura	JICA		
17	Johji KOIZUMI			
18	Hasan Zubair	JICA, Expert		

No	Name	Title/Organization	Phone No Email Address	Signature
19	Yosuke Usui	JICA Expert Team		
20	Muntasir Ibn Mohsin	Administrator JICA Study Team PCDMSWRI		
21				
22				
23				
24				
25				
26				
27				

Minutes of the Workshop on the Project for "Capacity Development of Management for Sustainable Water Related Infrastructure" regarding dissemination of manuals and action plan held on 13th July 2017 in BWDB Conference Room, 3rd Floor, WAPDA Building, Motijheel C/A, Dhaka-1229.

A workshop was held for the dissemination of Design Manual (Prepared by JICA Experts & approved by BWDB), O&M Manual (Prepared by JICA Experts & approved by BWDB), & Construction Manual (Prepared by JICA Experts & under review and process of approved by BWDB) on 13th July 2017 in BWDB Conference room, 3rd Floor, WAPDA Building.

The Workshop was conducted in 5 (Five) sessions as described below. The program and participant list in the workshop is attached in Annex-1 and Annex-2 respectively.

Opening Session: Mr. Md. Mahfuzur Rahman, Director General, BWDB chaired the session. The sessionstarted with recitation from the Holy Quran. Mr. Md. Abdur Rahman Akhanda, Aditional Director General (Planning), BWDB, Dhaka said in his opening speech that the prepared and approved manuals would be disseminated and discussed in details. If any issue would be raised, then it could be accordingly accommodated in the manuals. Then he hoped that the workshop would be fruitful and useful for BWDB practitioners.

Mr. Hitoshi Ara, Senior Representative, JICA Bangladesh Office said that the Manual had been prepared in the updated form. He expressed necessity to apply this manual in to the real field and practice for further improvement. The prepared Action Plan for dissemination had been prepared. He requested BWDB to impart appropriate importance in dealing with the manuals. He told that the manuals would be disseminated to the BWDB offices and requested concerned persons to practice the manuals in the field level.

Mr.Yosuke USUI, Team Leader of the JICA Expert Team described the outline of the project, its activities, objective of the manual & action plan in short. He said that the Project started in August 2013 and will be completed in October, 2017. The overall goal of the project was to achieve water related risk reduction through proper management of water related infrastructure. The described that the manuals are of utmost importance and its dissemination and further practice would improve capacity of BWDB.

Mr. Md. Mahfuzur Rahman, Director General, BWDB, Dhaka expressed gratitude that for the last three years BWDB had been closely associated with this project. He expressed satisfaction on scheduled activities including investigation, exploration, preparation of

manual, training, pilot works, GIS Database etc. accomplished under the Project. He hoped enriching BWDB's manpower with the disseminated knowledge through this workshop and offered accomplishment of the manuals with the suggestions if any. With the speech of the DG, BWDB, the session ended leading to a tea break.

Session 2: Presentation on Design Manual

Mr. Mohammad Shahabuddin, Chief, Training and Staff Development, BWDB, Dhaka chaired the session. The Design Manual was presented by Mr. Tatsuya Mochizuki, JICA Expert in Design. Mr. Mochizuki described the relation between 1995 Standard Design Manual of BWDB and this Manual. He also explained the application of Design Manual with 4 sections, e.g. Prerequisite concerning River Embankment Design, Basic of Embankment Design, design specifications and Verification of Embankment safety. He also briefed the points considered in Design Manual presentation. Then he explained the text book for correct understanding of the river embankment for junior engineers. Embankment failure & counter measures, earthquake phenomenon, relation between dry density and water content ratio, use of projected block in slope protection up to high water level & failure phenomenon in Khulna & Moulvibazar were described as well.

The Chairman of the session then opened the floor for discussion.

Mr. Md. Harunur Rasheed, Superintending Engineer, Design Circle-2, BWDB, Dhaka pointed out that text book for understanding of River Embankment would be useful for BWDB with content of good information. Dr. Shamal Chandra Das, Executive Engineer, Office of the Chief Planning, BWDB, Dhaka opined that compaction would be very important. He intensified on ensuring proper compaction while implementing embankment works. Mr. Tatsuya Mochizuki, JICA Expert (Design) told that BWDB needs to achieve desired compaction using proper equipments and compaction procedures.

Mr. Md. Sajidur Rahman Sarder, Chief Engineer, Southern Zone, BWDB, Barisal asked ways to ensure the stability of embankment made of dredged fill sand against seepage. Mr. Mochizuki suggested providing good clay cover over the embankment for that purpose. Also proper vegetation cover with good turf on the clay should be given, he suggested. Any crack on the surface of slope should be repaired with appropriate materials, he added.

Mr. Fazlur Rashid, Director, Planning-1, BWDB, Dhaka mentioned that in the text book of understanding embankments, provision of extra banking height had been considered. If the

total filling height of the embankment including the extra banking height for subsidence/ settlement was considered, then whether we would have to provide extra banking height again or not. Mr. Mochizuki made clarification that BWDB engineers should have to check the height. If the total height would be equal to the height including the extra banking height then the design should be OK. If not, for any reason, the designers should provide extra banking height as required.

Mr. K. M. Humayun Kabir, Additional Chief Engineer & Project Director, Capital Dredging of River System in Bangladesh said that slope protection by block is suitable for coastal zone & for flashy rivers. But in case of North-western and Central Zone of BWDB, blocks along the river side might enhance the surcharge load and might threaten to safety. Mr. Md. Harunur Rasheed, Superintending Engineer, Design Circle-2, BWDB, Dhaka replied that placing of block at 1:2 or 1:3 slope should not be critical against stability in the mentioned zone along major rivers. Mr. Kazumitsu Muraoka, JICA Expert to BWDB said that sediment deposition on the river bed is an important factor with respect to the stability of the river embankment.

Chairman of the session thanked everybody for lively discussion and hope that the Design Manual would be helpful for BWDB in designing the infrastructures.

Session 3: Presentation on Construction Manual

Mr. Johji Koizumi, JICA Expert (Construction) & PM of Pilot Repair Work presented the Construction Manual (revised) by power point based on the activities done in the Pilot Repair Works at Moulvibazar. He explained the objective of construction manual. He mentioned that the manual was supplemented to the TS (Technical Specification) of BWDB and standard schedule of rates with special emphasis on detail of quality control methods and tests, construction planning including progress control and safety control measures.

He described about the trial mix of sand cement mortar and concluded that 8:1 proportion was found better. He described about compaction of layers would be of 20 cm to 30 cm by plate compactor and Bulldozer as had been practiced and done in the Pilot Repair Works. He also spoke about the temporary protection measures taken to protect the area of Pilot Work for flood during 2016 as the work could not be completed in time within May, 2016 due to early rain and adverse weather condition. He recommended for proper planning and scheduling of work execution taken consideration of the weather.

Chairman of the session then opened the floor for discussion.

Mr. Md. Harunur Rasheed, Superintending Engineer, Design Circle-2, BWDB, Dhaka asked the best ratio of Sand Cement mortar bag and the thickness of Sand Cement Bag. Mr. Koizumi replied in favor of 8:1 proportion. However, if enough time for manufacturing and curing was found, then 10:1 ratio would also do. He told that the thickness of sand cement bag was not determined. However he said that the mixture could be easily used.

Mr. K. M. Humayun Kabir, Additional Chief Engineer & Project Director, Capital Dredging of River System in Bangladesh expressed his concern that the cost would be higher compared to BWDB's existing cost for such work. Mr. Yosuke Usui, Team Leader, JICA Expert Team replied that BWDB has to build the embankment just on the bank of the river and protection work with sand cement bag morter, toe wall, projected block etc. That is why the cost would be a bit higher. However, at locations with sufficient set-back distance for the embankment, then cost could be minimized. Mr. K. M. Humayun Kabir, Additional Chief Engineer & Project Director, Capital Dredging of River System in Bangladesh also requested JICA to undertake such Pilot Work along Jamuna & Padma rivers.

Mr. Md. Amirul Hossain, Director, Planning-3, BWDB, Dhaka wanted to know about the similar Project to be taken by JICA. Mr. Muraoka replied that JICA was working out scopes for the next collaboration initiatives.

Mr. Md. Sajidur Rahman Sarder, Chief Engineer, Southern Zone, BWDB, Barisal wanted to know about the allowable velocity which could be tolerated by earthen embankment without protection. Mr. Md. Harunur Rasheed replied that it is 1m/sec for well turfed embankment. Mr. Yosuke Usui told that as per Japanese experience it is 2m/sec with good quality soil and good turf.

Chairman of the session concluded that the Construction manual would be very useful for improving the quality of BWDB infrastructure in future.

Session 4: Presentation on O&M Manual

Mr. Yosuke Usui, Team Leader, JICA presented the O&M Manual. He mentioned that the O&M Manual had been prepared as per Government Approved O&M guide line 2010. He told about the 4 pillars of O&M i.e. Basic Scheme Data, Budget, Planning and Monitoring. He spoke about different kinds of maintenance, importance of patrol and inspection,

beneficiary participation/ peoples' participation, flood fighting procedures, O&M planning, budgeting, motivation of people & authorities for active participation in O&M and placing proper budget for O&M.

Chairman of the session then opened the floor for discussion.

Mr. Amirul Hossain, Director, Planing-3, BWDB, Dhaka suggested that in the maintenance list of structure in page 05 of the manual inlet, outlet etc. might be added. He also suggested adding the words at page-4 of the manual.

-"Operation of structures is carried out to maintain desired or planned quantity and quality of water inside the Project"

-"Maintenance of infrastructure is carried out to maintain the structures in good operation condition. Maintenance can ensure easy and timely operation of infrastructure"

The word beneficiary participation could be replaced by people participation, he suggested.

Mr. S. M. Shahidul Islam, Superintending Engineer, Moulvibazar O & M Circle, BWDB, Moulvibazar told that budget would be main problem. Even the O&M budget indicated in the DPP was not provided all the time. So budget for O&M should be increased, he opined.

Mr. Usui put importance on sufficient budget and requested BWDB to place demand to the authority with sufficient inventory data and justification to convince GoB to place adequate fund. Mr. Kazumitsu Muraoka said that in Japan also Govt. does not place sufficient fund if proper justification and inventory data is not furnished. So making a good inventory data-base is a must. Mr. Koichi Kitamura from JICA Bangladesh Office said that for this data base JICA could help if requested by Government of Bangladesh & BWDB.

Mr. Md. Harunur Rasheed said that in the manual it was mentioned that BWDB supervising staff could not inspect even once in a month. This was due to shortage of fund and logistic support. So these things should be given in plenty. BWDB should also fix up the priorities properly.

Chairman of the session thanked Mr. Usui for good presentation and also praised the participant for lively discussion. He told that BWDB should follow the 4 pillars of O&M in the real sense and stick to participatory approach of operation.

Session 5: Presentation of Action Plan

Mr. Yosuke Usui, Team Leader presented the action plan for dissemination of manuals.

He mentioned about the present condition of embankment and desired future of embankment, slope/application and target user of Manuals, challenges of application of manuals, Road map on Action plan for Dissemination & Effective use of Manuals, Implementation of Action plan, Basic Strength of Action Plan and implementation Structure of Action Plan. He also requested the chairman of the session to include these things in the training session of BWDB. Then the floor was opened for discussion.

Mr. Amirul Hossain, Director, Planning-3, BWDB, Dhaka commented that BWDB had lack of equipment and logistic support also. So these should be mentioned with the lack of budget. He stressed on establishment of GIS cell in BWDB. Mr. Koichi Kitamura & Mr. Kazumitsu Muraoka told that in this respect JICA would help BWDB if requested with technical assistance & fund. At this stage DG, BWDB again joined the workshop.

Mr. Md. Harunur Rasheed asked that whether budget for dissemination would be provided by JICA or BWDB. Mr. Usui replied that is would be form BWDB budget.

Mr. Koichi Kitamura from JICA Bangladesh office took the floor and expressed his happiness as everybody was present till the end and initial dissemination had been done. He requested to apply manuals in a proactive approach. He suggested to customize the manuals with acquired knowledge. He hoped all the best for all of the participants, BWDB, JICA and the JICA Expert Consultants.

Mr. Fazlur Rashid, Director, Planning-1, BWDB, Dhaka thanked everybody for patient hearing and lively participation. The workshop ended with vote of thanks for the Chair.

20.07.2017

(Md. Mahfuzur Rahman)
Director General
Bangladesh Water Development Board.

Annexture-1

Seminar on Prepared Manuals

Date: July 13, 2017
Time: 09:00 – 15:20
Venue: Conference Room, the 3rd Floor, WAPDA Building, Motijheel, BWDB

AGENDA

08:30 – 09:00	Arrival and Registration
09:00 – 10:00 (60min)	Opening Session Chair: DG, BWDB Recitation from the Holy Quran- ……. (5 min) Opening Remarks by ADG, Planning, BWDB (5 min) Remarks by JICA Bangladesh Office (5 min) Objective of Manuals and the Seminar by JICA Expert Team (5 min) Remarks by DG (10 min)
10:00 – 10:15	Tea/Coffee Break
10:15 – 11:45 (90min)	Session 2: Design Manual for River Embankment Chair: ADG, Planning, BWDB Outline of Design Manual (60 min) Speaker: Mr. Tatsuya Mochizuki, Expert for Design, JICA Expert Team Q& A, Discussion (20 min) Remarks by Chairman of Session 2
11:45 – 12:45 (60 min)	Session 3: Construction Manual for River Embankment Chair: ADG, West, BWDB Outline of Construction Manual (45 min) Speaker: Mr. Johji Koizumi, Expert for Construction, JICA Expert Team Q& A, Discussion (15 min) Remarks by Chairman of Session 2
12:45 – 13:45	Lunch Break & Prayer
13:45 – 15:00 (75 min)	Session 4: O&M Manual Chair: ADG, East, BWDB Outline of O&M Manual (60 min) Speaker: Mr. Yosuke Usui, Team Leader/ Expert for River Management, JICA Expert Team Q & A, Discussion (15 min) Remarks by Chairman of Session 2
15:00 – 15:30 (30min)	Session 5: Action Plan for Dissemination and Effective Use of Manual Chair: Chief Planning, BWDB Outline of Action Plan (20 min) Speaker: Mr. Yosuke Usui, Team Leader/ Expert for River Management, JICA Expert Team Q& A, Discussion (10 min) Remarks by Chairman of Session 2
15:30 – 15:50 (20 min)	Session 5: Closing Session Closing Remarks by Chief Planning, BWDB Thanks Giving by Director, Planning-1
15:50	Tea/Coffee, Adjourn

Participant List
for
Seminar on Prepared Manuals

The Project for Capacity Development of Management for Sustainable Water Related Infrastructure

Date: July 13, 2017

Time: 09:30 am – 16:30 pm

Venue: Conference Room, 3rd Floor, WAPDA Building, Motijheel, BWDB

No	Name	Title/Organization	Phone No Email Address	Signature
1.	Md. Mahfuzur Rahman	DG, BWDB		
2.	Md. Abdur Rahman Akhanda	ADG(P), BWDB		
3.	Md. Mosuddeque Hossain	ADC(WR) BWDB		
4.	Mohammad Ali	C.E. Rajshahi, BWDB.		
5.	Mohammad Shahabuddin	CE. Training & Staff Dev.		
6	A.M. Aminul Haque	CP, BWDB		
7	Saeda Nazneen	Chief Engineer Design, BWDB		
8.	Md. Sajidur Rahman Sarder	Chief Engineer Southern Zone, Barisal		

No	Name	Title/Organization	Phone No Email Address	Signature
9	Mohammad Ali	Add. chief Engineer BADB, Faridpur		
10	Fazlur Rashid	Director, Planning-1, BWDB		
11	Md. Enayet Ullah.	Executive Engineer. Planning-1 BWDB.		
12	YASMIN BEGUM	S.E. DESIGN-1 BWDB.		
13	Md Fakhrul Abedin	Addl. chief Engr PD, HFMLIP		
14	K M HUMAYUN KABIR	Addl. chief Engr. Capital Pilot Dredging		
15.	Dr. Shamal Ch. Das	Executive Engr. Office of the C/P BWDB		
16	Md. Abul Kausar	Superintending Engineer Design circle-4 BWDB, Dhaka.		
17	Md. Aminul Hossain	Director, PL-3 Project Director Blue Gold, BWDB		
18	Md. Abdus Salam	Director O&M Dte. BWDB. Dhaka		

No	Name	Title/Organization	Phone No Email Address	Signature
19	Md. Anif Hossen	SDE, BWDB (Design circle-1)		
20.	Poly Das	SDE, Design Circle-2 BWDB		
21	Hasnin Fatema Kanon	SDE, Design Circle-2 BWDB, Dhaka.		
22.	Saida Afrose	SDE. Design Circle-2 BWDB, Dhaka.		
23.	Asif Mahmud	AE, Design-02, BWDB, Dhaka		
24.	Saffat Ara Sayeed	AE, Planning-2 BWDB, Dhaka		
25	Abdur Rahman Taskia	AE, planning-1 BWDB, Dhaka		
29	Md. Atiqul Islam	AE, Planning-1 BWDB, Dhaka		
25.	Md. Sarwar Jahem	SDE, Directorate of O&M BWDB, Dhaka		
26.	Tasnia Begum	AE, Planning-1 BWDB, Dhaka		

No	Name	Title/Organization	Phone No Email Address	Signature
27	Nusaeib Hossain	A.E., Design-06 BWDB, Dhaka.		
28	MD. Nahinur Rahman	AE, Directorate of Staff Development, BWDB, Dhaka		
29	Md. Abdus Sattar	Superintending Engr. Design Circle-5 BWDB, Dhaka.		
30	MD. SHAHINUR RAHMAN	Sub-Divisional Engineer, Planning-3. BWDB.		
31	A F M Tauhid Jaman	Sub-Divisional Engineer, ECRRP, BWDB		
32	Md. Jannatun Naim	AE, Directorate of Project Evaluation,		
33	Md. Kawsar Sarkar	AE, planning-3 BWDB. Dhaka		
34	Sourav Kumar Das	AE, office of the Chief Monitoring		
35	Nasreen Islam Mukti	AE, Planning-1		
36	Nahid Nawaz.	AE, Planning-2 BWDB, Dhaka.		

No	Name	Title/Organization	Phone No Email Address	Signature
37	Hiroshi ARA	Senior Representative JICA Bangladesh Office		
38	Koichi Kitamura	Representative JICA BD Office		
39	Kazumitsu Maruoka	JICA Expert to the BWDB		
40	Tatsuya Mochizuki	JICA expert Team		
41	Yosuke Usui	〃		
42	Johji KOIZUMI	JICA Expert Team, PM of Blst Repair Works		
43	Hasan Zubair	JICA Local Senior Expert		
44	S.M.SHAHIDUL ISLAM	Superintending Engr. Moulibazar ORM circle BWDB		
45	Md. Harun ur Rashid	Superintending Engr. Design Circle-2 BWDB, Dhaka		
46	M. A. Bashar	SE, CE O & M		

No	Name	Title/Organization	Phone No Email Address	Signature
47	MUSA NURUR RAHMAN	SE, DESIGN-6 BWDB		
48	AKM Tahmidul Islam	Director, planning 2		
49	Md Rafiqul Alam	Superintending Engineer/ Director, CPC, BWDB Dhaka.		
50	Goutam Biswas	SDE. Design circle-4 BWDB. Green Road. Dhaka.		
51	Munshi Amin Faysal	SDE, Design Circle-6 BWDB, Dhaka.		
52	Mirza Asiful Islam	AE, Design Circle-2, BWDB, Dhaka.		
53	Md. Abdul Malek	SDE, Design circle-6 BWDB, Dhaka		
54	Md. Marsum Billah	SDE, Design circle-5 BWDB, Dhaka		
55	M. Nazmul Islam	SDE, Dte. of Planning - I, BWDB, Dhaka		
56	A.K. Manzu Hasan	AE E/Hydrology		

No	Name	Title/Organization	Phone No Email Address	Signature
57	Md. Abdullah Al Amin	XEN, BWDB		
58	MD RAQIB HOSSAIN	SDE, DP-1 BWDB		
59	A.K.M. Wahed Uddin Chowdhury	ACE, BWDB Khulna		
60	Md. Abdur Raghid	D.D, BWDB		

付属資料-8：　本邦研修プログラムと研修員リスト

付属資料-8.1：2014 年本邦研修

付属資料-8.2：2015 年本邦研修

表　本邦研修2014 プログラム

日付		受入先等	狙い・目的
10/19 (日)	終日	東京着	
10/20 (月)	AM	・プログラム・オリエンテーション ・研修オリエンテーション	本研修の目的・位置づけの説明 研修員受入に係る諸手続
	PM	・内閣府防災担当：	日本の災害対応体制に関する講義。国、県、地方の役割や、防災関連機関との役割分担、関連機関との防災情報共有システムの整備状況等について学ぶ。
10/21 (火)	終日	・国土交通省 水管理・国土保全局	① 日本の河川管理行政（日本の河川の特徴、河川管理者について、日本の河川管理・治水対策の特徴、費用対効果、総合治水等）について学ぶ。 ② 日本の治水施設の維持管理（法令、維持管理の必要性、最近の災害事例、日常管理と出水時管理、今後の取組み等）について学ぶ。
10/22 (水)	AM	・水資源機構 本社	水資源機構の事業概要（歴史、技術開発、工事の品質管理、事業実施上の安全管理、維持管理、環境配慮、技術管理等）について学ぶ。
	PM	・水資源機構利根導水総合事業所	利根導水事業の目的、機能、その維持管理についての説明を受けるとともに施設視察を行い、どのように施設が維持管理されているかを学ぶ。
10/23 (木)	終日	・国土交通省 関東地方整備局 利根川上流河川事務所	① 直轄区間の河川管理の例として、利根川流域における治水の歴史、対策概要、築堤事業の施工法・施工監理、総合治水、防災情報、治水事業の効果、過去の大水害等について学ぶ。 ② 渡良瀬遊水池及び周辺の河川施設を視察し、総合治水、盛土施工監理、越流堤の機能、排水ゲートの役割、各施設の維持管理について学び、今後の「バ」国における計画・設計・施工・維持管理についての参考とする。

日付		受入先等	狙い・目的
10/24 (金)	終日	・埼玉県 県土整備部 河川砂防課	① 県管理区間の河川管理の例として、埼玉県における治水の歴史、河川砂防行政、対策概要、ハード・ソフト対策、市街化と治水、総合治水、水辺再生事業等の計画・事業実施、維持管理について学ぶ。 ② 県管理の総合治水対策施設として調整池、排水機場を見学し、今後の「バ」国における計画・設計・施工・維持管理についての参考とする。
10/25 (土)	AM	移動(新幹線:東京－名古屋)	-
	PM	・名古屋市港防災センター:	(財)名古屋市防災管理公社が運営する名古屋市港防災センターは、いざという時、市民一人ひとりが災害の実態を正しく知りそれに対処する方法を学ぶ施設であるとともに、災害時には応急対策活動の拠点施設としての役割を持っている。日本国内にはこの様な、災害を疑似体験し、市民の防災意識を高める施設が数多くあるが、「バ」国にはまだこの様な施設は無い。 防災に対しての実務者である研修参加者に、災害を疑似体験し、防災意識を更に高めることを目的として視察を行う。
10/26 (日)	終日	自習	研修前半の取り纏め、資料整理、アクションプラン作成準備
10/27 (月)	AM	自習	

日付		受入先等	狙い・目的
	PM	・国土交通省 中部地方整備局 木曽川下流河川事務所	① 直轄区間の河川管理の例として、木曽三川流域における治水の歴史、対策概要、築堤事業の施工法・施工監理、水衝部対策工、維持管理について学ぶ。特に、低平地の濃尾平野の河川管理は、「バ」国と地形的な類似点がある。 ③ 木曽三川の堤防(補修、耐震工事現場)、輪中排水機場、ケレップ水制等の河川管理・防災施設の視察を通じて、今後の「バ」国における計画・設計・施工・維持管理についての参考とする。
10/28 (火)	AM	・水資源機構 長良川河口堰管理所	河口堰の目的、機能、地域における重要性、その維持管理についての説明を受けるとともに施設視察を行い、どのように施設が設計・建設・維持管理されているか、環境・社会影響緩和のために、どのような配慮がなされているかを学ぶ。
	PM	・愛知県 建設部 河川課 環境・海岸グループ	伊勢湾台風による被災を契機として始められた愛知県の高潮対策の歴史、概要、海岸堤防の設計・施工法・施工監理、維持管理について学ぶ。「バ」国においては、サイクロンによる沿岸部の被災が常態化しており、参考となる。
10/29 (水)	AM	・愛知県河川部 環境・海岸グループ	海岸堤防を視察し、今後の「バ」国における計画・設計・施工・維持管理についての参考とする。
	PM	移動(新幹線:名古屋－東京)	
10/30 (木)	AM	・ホテル会議室(研修取りまとめ)	各研修員より、両国の河川管理・防災面における比較、研修で参考となったこと、今後の業務適用が見込まれる事項を発表し、研修員間での情報共有を図る。
	PM	・ホテル会議室(アクションプラン準備)	今回の本邦研修を踏まえ、帰国後の河川管理・防災業務への活用、知識・知見を広
10/31	AM	・ホテル会議室(アクションプラン準備)	

日付		受入先等	狙い・目的
(金)	PM	・ホテル会議室(アクションプラン発表会、評価会、終了式)	めるための取組み、関係機関との連携強化のための方策など、今後の取組みをアクションプラン(短期、中期、長期)として作成、発表し共有する。
11/01 (土)		成田空港発	

表　研修参加者リスト及び感想・意見

NO.	氏名/所属	感想・意見
1	Mr. PRAMANIK Akm Aftab Hossain Deputy Secretary, Economic Relations Division, Ministry of Finance	・日本は全てがシステマテックであり、先進的である。「バ」国には主要な河川として５００以上があり、毎年、規模は異なるが、洪水やサイクロン被害がある。今回研修では、内閣府、国土交通省、水資源機構、利根川上流、埼玉県、木曽川下流、愛知県を訪問してそれぞれ有益な講義を受け、工事中のサイトを新工法も含めて視察する機会を得た。設計、施工、維持管理を一連のものとして、施設の適切なマネジメントが必要と認識した。 ・研修で獲得した知識は「バ」国の既存のシステムに適用が可能である。研修で得た知見は、ワークショップ、セミナー、報告書、会議等を通じて周知する。
2	Mr. HOSSAIN Kazi Sakhawat Deputy Secretary, Development Wing, Ministry of Water Resources	・今回研修に参加して非常に多くを学んだ。中央政府、地方自治体それぞれが投入した努力、継続した維持管理対応に感銘を受けた。今後の役に立てたい。政府に対して、可能な限り日本の技術を最小するよう働きかける。 ・名古屋港防災センターで平常時に住民が地震体験をするなどして防災について学んでいる様子に接して感銘を受けた。バ「バ」国にはこのような施設は無いので、非常に印象深かった。 ・日本語の習得は難しいと思うが、日本人の勤勉さ、誠実さに接して感銘した。市街を含めて環境が大変綺麗であった。
3	Mr. RASAL Abu Usuf Mohammad Assistant Chief, Planning Wing, Ministry of Water Resources	・研修受入機関の選定、講義内容は素晴らしかった。講師による抗議が英語であればさらに良かったと思う。「バ」国では総合治水対策としての調整池を設けることは容易ではないと考える。国としての防災組織体制は、両国で大差が無いと思える。 ・日本における河川管理・防災施設の維持管理は予算面の違いもあり、「バ」国と異なり、非常に良い状況である。 ・木曽川下流においては建設後５０年以上経過した排水機場をメンテナンスして使用していることを視察して驚いた。その維持管理姿勢は大いに参考となる。
4	Mr. KUNDU Jati Das	・日本における防災面の資金、技術、教育に投入され

	Chief Engineer (Design), Design Department, BWDB	た努力は長期にわたるもので、膨大で圧倒される。その経験は類をみない。市民は時間を良くまもり、非常に職務に忠実、誠実である。河川管理および防災に関する基本的な考え方は基本的に両国で同じと考える。 ・「バ」国においては、全ての河川が国境の向こうのインドから流入し自国流域内での治水は無理である。同じ理由で、上流域での管理も容易ではない。 ・防災面では、日本の支援のお蔭もあり、「バ」国でもそれなりの成果を上げていると理解している。災害による犠牲者数は減少傾向にある。 現在は河川管理、それも planned dredging の重要性が高まっている。堆積のために特に河口部で河床上昇が激しく河積が確保、維持されていないなど、様々な弊害が生じている。ＢＩＷＴＡ（Bangladesh Inland Water Transport Authority）は航路維持のための浚渫を実施しているが、ＢＷＤＢの意図する河川管理のための浚渫とは規模、目的が異なる。既に外国コンサルによる study は行われている。計画的な浚渫を実施することで、河岸への影響を軽減出来、河岸浸食による土地の流失を防ぎ、洪水被害も軽減出来ると考えている。浚渫土砂を適切に河川内に集積して土地の造成を行い、国土の保全に資することが可能である。ＣＤＳＰ（Char Development and Settlement Project）と呼ばれている。実現のために是非、日本の支援を仰ぎたい。
5	Mr. AKHANDA Md. Abdur Rahman Director, Directorate of Planning-1, (Project Coordinator), BWDB	・良く準備された研修を用意してくれたことを評価する。日本は自然災害の多発する脆弱な条件にあることが理解できた。流域単位の統合治水の考え方は、私にとっては新規の発想であった。「バ」国と日本では地形をはじめとして、条件が異なるので、研修で得られた知見のうち、「バ」国に適用可能なものを参考にしたい。 ・木曽川下流の工事現場視察（堤防補修、耐震工事）は非常に参考になった。 ・「バ」国の南西部の湾岸地域の河川管理・防災について日本の支援を強く期待する。
6	Mr. ABEDIN Md. Fakhrul Superintending Engineer, Office of the	・「バ」国においては地形的に非常に低平なこと、河川規模が大きいこともあり、塩水遡上の問題が深刻

	Chief Planning, BWDB	である。長良川河口堰について学んだことは非常に有益である。 ・研修では、設計についてもう少し詳細な話も聞きたかった。
7	Dr. DAS Shamal Chandra Executive Engineer/Project Manager, Office of the Chief Planning, (Project Manager), BWDB	・1971 年の独立以来、40 年以上にわたり日本は「バ」国の最も大事な友人である。日本における調整池としての湿地の活用に係る手法は「バ」国でも適用可能であり、情報を共有する。 ・濃尾平野における表流水と地下水の利用の歴史について多くを学んだ。海岸河口地域における飲料水の確保について、長良川河口堰の視察、説明によって多くを学んだ。治水、水資源確保、環境保全という多目的な事業であることが理解出来た。 「バ」国における同種の事業、施設を検討する上で、大いに参考となる。引き続き支援を仰ぎたい。
8	Mr. KABIR K. M. Humayun Director, Directorate of Processing, BWDB	・「バ」国は自然災害に非常に脆弱な条件下にある国である。３大河川の上流は全て国外にある。国土も低平で、大部分が標高０－８ｍにある。雨季には水没する土地が多く、世界で人口密度の高い国である。海岸線は全部で７００ｋｍにも及んでおり、塩水遡上、海岸堤防の劣化という複数の問題を抱えている。ベンガル湾に面したポルダーの堤防は強固でなく、補修が必要である。堆砂の管理も緊急の課題と認識している。 ・毎年、6,000 ヘクタールの土地が河岸浸食等のために流失している。堆積と流失といった 2 つの問題解決が迫られている。 ・「バ」国の河川は日本の河川とは川幅が全く異なる。雨量も違う。ピーク流量は 150,000ｍ３. 2007、2008 年の洪水ではダッカ市内も１ヶ月水没した。経済的に自前予算、人的なリソース不足のために、適切なマネジメントが出来ていない。維持管理には３０億タカが必要である。 ・研修に参加する機会を得て感謝する。 日本は先進国で、全てがプログラム化されている印象を受けた。 ・私はデータプロセスも担当している。 強固なデータベースの構築を目指しているので、是非ご支援いただきたい。

9	Mr. SIRAJ Mohammad Shajahan Executive Engineer, Office of the Chief Planning, BWDB	・研修プログラムは中央政府、地方自治体、独立行政法人までを含んでおり、日本の河川管理・防災について短期間で学ぶ上で適切であった。 ・「バ」国の３大河川（ガンジス、ジャムナ、メグナ）は海のような河川で、とてもコントロール出来ない規模である。しかし、日本で見聞きした事柄は、ガンジスバラージを具体化する上で、大いに参考になる。 ・研修機会を与えてくれた日本国、ＪＩＣＡに深く感謝する。
10	Mr. AHMED Golam Faruque Deputy Chief, Planning, BWDB	・日本は台風、「バ」国はサイクロンによる被害がある。地形は異なるが、自然災害が多発する国同士であり、日本の支援は非常に重要である。 「バ」国の特徴として、インド側で豪雨があるとその結果として洪水が我が国（「バ」国）に来るという点がある。河川管理という面では難しい側面が存在する。 ・利根川上流河川事務所で視察した渡良瀬遊水池施設はその維持管理の詳細も伺うことが出来て、印象深かった。 ・日本人は非常に誠実で、我々研修員に親切であった。
11	Mr. KHAN Kamruzzaman Sub-Divisional Engineer, Directorate of Planning-III, BWDB	・非常に良い内容の研修に参加する機会を与えられたことを感謝する。 ・研修を通じて、両国の地形の違い（日本は基本的に山国、「バ」国は低平）をあらためて認識した。「バ」国においては、1970、1991、2007、2008 年に大きな災害があった。「バ」国においても地震についての対応が必要と捉えられている。 国土面積に対して、「バ」国の河川面積は 7%、日本は 8%であり、「バ」国の河川は緩流河川である。Sedimentation problem が大きな課題である。 ・防災という点では、日本は国民の安全を極めて重視しており、必要な予算も確保していることを学んだ。「ﾊﾞ」国においては、予算確保が厳しい。 ・日本では子供の頃から防災教育が行われており、感銘を受けた。 ・講師の使用言語がほとんど日本語であったため、細かい点について直接、聞くことが出来なかったのが少し残念であった。

12	Mr. HOSSAIN Mohammad Akbar Research Officer, Directorate of Planning-1, BWDB	・利根導水、長良川河口堰の魚道を視察出来て非常に良い経験となった。中々得られない経験であった。ここまで配慮しているのかと感銘を受けた。長良川河口堰の講義、視察は、「バ」国で計画されているガンジスバラージに非常に参考となるものであった。 ・埼玉県における参加型の河川管理・防災は印象に残った。参考にしたい。 ・「バ」国では環境面から多くの河川が危機に瀕しており、日本の取組みが非常に参考になった。被害の軽減のための継続的な努力が必要であり、それがあって、速やかな復旧、復興も可能なことを理解した。先は長いが日本のレベルに近づけたい。 ・地球温暖化、気候変動による海面上昇に「バ」国は非常に脆弱である。そのような課題に取り組む事業もあるので、貢献したい。

表　本邦研修 2015 プログラム

日付		受入先等	狙い・目的
10/4 (日)	終 日	成田着	
10/5 (月)	AM	・研修オリエンテーション	研修員受入に係るガイダンスおよび諸手続の説明。
	PM	・プログラム・オリエンテーション	研修の目的、研修要項、日程、講義資料、日本の基本情報資料等の配布と説明。 研修員、研修監理員および同行者の紹介。 アクションプラン作成要領と発表日程について説明。質疑応答。
10/6 (火)	終 日	・国土交通省　水管理・国土保全局	①　日本の河川管理行政（日本の河川の特徴、河川管理者について、日本の河川管理・治水対策の特徴、費用対効果、総合治水等）について学ぶ。 ②　日本の治水施設の維持管理（法令、維持管理の必要性、最近の災害事例、日常管理と出水時管理、今後の取組み等）について学ぶ。
10/7 (水)	AM	・水資源機構　本社	水資源機構の事業概要（歴史、技術開発、工事の品質管理、事業実施上の安全管理、維持管理、環境配慮、技術管理等）について学ぶ。 水資源機構から BWDB に派遣されていた長期専門家との意見交換、交流。
	PM	・水資源機構利根導水総合事業所秋ヶ瀬管理所	利根導水事業の歴史、目的および秋ヶ瀬取水堰の機能・規模および維持管理について受講すると共に同取水堰施設の見学を通じて、どのように施設が維持管理されているかについて学ぶ。

日付		受入先等	狙い・目的
10/8 (木)	終 日	・国土交通省 関東地方整備局 利根川上流河川事務所	① 直轄区間の河川管理の例として、利根川流域における治水の歴史、対策概要、築堤事業の施工法・施工監理、総合治水、防災情報、治水事業の効果、過去の大水害等について学ぶ。 ② 大利根河川防災ステーションの役割について学び施設の見学をする。 ③ 堤防強化工事の施工現場の見学と説明により堤防設計、施工、維持管理について学び、今後の「バ」国における計画・設計・施工・維持管理についての参考とする。
10/9 (金)	終 日	・国土交通省 関東地方整備局 霞ヶ浦河川事務所	① 水害を受けやすい地形特性を有する地域における治水事業の背景、歴史を学び、地形が類似したバングラデシュ国における河川管理および防災対策についての参考とする。あわせて諸施設の適切な維持管理についても学び自国における担当業務への反映の一助とする。 ② 常陸川水門等の施設の見学を通じて施設の維持管理の現状について、その背景、考え方、計画および現状の問題点とそれらの解決方針について学び自国での維持管理の参考とする。
10/10 (土)	AM	・本所防災館	東京消防庁 本所防災館は、住民一人ひとりが災害の実態を正しく知りそれに対処する方法を学ぶ施設である。日本国内にはこの様な災害を疑似体験し、市民の防災意識を高める施設が数多くあるが、「バ」国には未だこの様な施設は無い。 防災に対しての実務者である研修参加者に、災害を疑似体験させ相互に議論をさせ、防災意識を更に高めることを目的として視察を行う。

日付		受入先等	狙い・目的
	PM	・江戸東京博物館	前回研修において日本の歴史、文化について基礎的な知識を入手する機会の提供を強く求める要望があった。このため、展示資料が充実しており、博物館所属のボランティア英語ガイドの配置可能な同博物館を訪れ、研修員の関心が高い、江戸時代以降の歴史および文化について学び、日本に対する理解を深めてもらう。
10/11（日）	終日	自習	研修前半の取り纏め、資料整理、アクションプラン作成準備
10/12（月）	AM	移動（新幹線：東京から名古屋へ）	
	PM	・自習	アクションプラン作成作業
10/13（火）	AM	・国土交通省　中部地方整備局　木曽川下流河川事務所	① 直轄区間の河川管理の例として、木曽三川流域における治水の歴史、対策概要、築堤事業の施工法・施工監理、水衝部対策工、維持管理について学ぶ。特に、低平地の濃尾平野の河川管理は、「バ」国と地形的な類似点がある。 ② 堤防（補修、耐震工事現場）、輪中地域の排水機場、ケレップ水制等の河川管理・防災施設の視察を通じて、今後の「バ」国における計画・設計・施工・維持管理についての参考とする。
	PM	・水資源機構　長良川河口堰管理所	河口堰の多目的性（河川管理、水資源開発、環境保全）、操作、維持管理等についての説明を受けるとともに施設見学を行い、どのように施設が設計・建設・維持管理されているか、環境・社会影響緩和のために、どのような配慮がなされているかを学ぶ。

日付		受入先等	狙い・目的
10/14 (水)	終 日	・愛知県河川部 環境・海岸グループ	伊勢湾台風による被災を契機として始められた愛知県の高潮対策の歴史、概要、海岸堤防の設計・施工法・施工監理、維持管理について学ぶ。「バ」国においては、サイクロンによる沿岸部の被災が常態化しており、参考となる。名古屋港を高潮被害から護る防波堤を見学し、今後の「バ」国における計画・設計・施工・維持管理についての参考とする。
10/15 (木)	AM	移動(新幹線:名古屋－東京)	
	PM	・TIC セミナールーム (アクションプラン準備)	フリートーキング形式により、各研修員から研修に関する感想を発表してもらい、研修員の間での情報交換、共有を図り、アクションプラン作成の参考とする。
10/16 (金)	AM	・ホテル会議室(アクションプラン準備)	今回の本邦研修を踏まえ、帰国後の河川管理・防災業務への活用、知識・知見を広めるための取組み、関係機関との連携強化のための方策など、今後の取組みをアクションプラン(短期、中期、長期)として作成する。
	PM	・JICA 本部(アクションプラン発表会、評価会、終了式)	① 研修員3グループによるアクションプランの発表とそれに対する講評により、研修で得た知見の確認およびそれらを有効活用するためのアプローチについて共有を図る。 ② 研修の評価(アンケート結果)を共有して、今後の技プロ活動の参考とすると共に研修の継続的な改善に資する。 ③ 研修修了証の授与により、研修員の業務改善意識を支援する。
11/17 (土)		離日　成田空港発	

表　研修参加者リスト及び感想・意見

NO.	氏名/所属	感想・意見
1	Mr. Fazlur Rashid Superintending Engineer/Director Planning Directorate-1, BWDB	・本所防災館における各種の災害疑似体験（暴風雨、都市水害、地震、火災）は忘れがたい経験であった。消火器を実際に自分で使って初期消火訓練をするのは人生初めての経験であり、個人レベルでの防災について学ぶことが多かった。組織、機関としても実際に即した防災対応が必要と、あらためて認識した。 ・研修中に見学したどの施設もその仕上げ、出来栄えと状態の良さに深い感銘を受けた。構造物の設計、施工、維持管理の裏側で多くの人々が尽力し、継続的に関わっていることが垣間見えて、非常に参考になった。帰国後、これらの知見を関係者と共有したい。 ・バングラデシュ（バ国）と異なり、日本には国際河川が無い。その点は河川管理という面では一元的な管理が可能であるため、恵まれた環境にあると言える。豊かな日本においても低コストで効果的な河川管理、防災に取り組んでいることを知り、大変参考になった。 ・バ国では河岸浸食、洗掘被害が大きな問題と認識している。 ・本邦研修は非常に有益である。帰国後、関係者、特に次世代のために研修で得た知見を広報、伝搬したい。
2	Mr. Mohammad Enayet Ullah Executive Engineer, Office of the Planning Directorate-1, BWDB	・堤防強化工事の現場を見学した結果、常に新工法の導入に前向きであることを学んだ。 ・この研修は業務改善のために極めて有効である。 ・日本滞在を通じて日本社会が時間を重んじ、時間に非常に正確であることを知った。 ・都市部では地上に街区が形成されると同時に地下にも大規模な地下街が形成されていることを見て驚いた。防災面の対策が万全であるためと思う。

NO.	氏名/所属	感想・意見
3	Mr. Khondaker Khalequzzaman Chief Monitoring Office of the Monitoring Engineer Hydrology, BWDB	・バ国では低平地・デルタにおける塩水遡上被害、河岸浸食、海岸堤防被害、サイクロン襲来後の復旧困難、洪水被害軽減・災害管理の難しさ等々の水・河川に係る諸問題があり苦闘している。 ・バ国では大河川を含む多くの河川が国境の向こうから流入してくるので維持管理を含めて管理が非常に難しい。 ・堤防については壊れる前に改修、メンテナンスが必要であることを学んだ。維持管理関係者に広めることで少しでも維持管理状況の改善につなげたい。 ・日本のシステムは素晴らしいが、構造物建設費とその維持管理費はコストが高いと思う。 ・ベンガル湾沿いの海岸線を安定させたい。海岸地域を護るためにどうしたら強固な堤防が建設できるか支援して欲しい。 ・日本には地下水管理についても支援をして欲しい。
4	Mr. Muhammad Hiruzzaman Deputy Secretary, Audit Branch, Audit Wing, Ministry of Water Resources	・欧州各国をはじめ多くの外国を訪問する機会があったが、成田空港から都心に移動中および研修中に見た日本は清潔で、きちんとしている。日本人は戦争にも相次ぐ大災害にも決してへこたれない強い国民であると尊敬している。 ・滞在中に接した人々は大変親切で皆が相手のことを常におもんばかっていると感じた。 ・この研修に参加できたことを名誉に思う。日本人の優れた点を帰国後に周辺の人々に伝える。
5	Ms. Mosammat Shamsad Mahmuda Fatima Assistant Engineer, Office of the Planning Directorate-1, BWDB	・この研修に参加できて幸運だった。バ国にいては見聞き出来ない多くのことを学ぶことができた。 ・バ国は予算の制約および関係機関のコーディネーションの不足という課題を抱えている。そのような状況を改善するために日本の支援を切望する。 ・研修で得た知見は周囲の人々に伝え、業務改善に貢献したい。

NO.	氏名/所属	感想・意見
6	Ms. Hamida Chowdhury Deputy Secretary, Development-4 Branch, Development Wing, Ministry of Water Resources	・研修では多くの場所を訪れ、自然および人工の美に接する機会を得た。室内での講義および現場に出ての見学、説明に接して短期間ながら多くのことを学んだ。この貴重な経験、学んだことを帰国後、周囲の人に広めたい。 ・日本もバ国同様に災害の多い国であると理解できた。違う点は、バ国は５４の国際河川があることである。 ・最大の問題は、どうすれば河岸浸食により、土地および家屋が失われることを防げるかである。
7	Mr. M. L. Shaikat Assistant Engineer, Office of the Chief Planning, BWDB	・愛知県における研修により、海岸部の災害リスクの低減について多くを学んだ。 ・日本の河口堰建設と、そのち密な維持管理による塩水遡上による被害軽減の実績について感銘を受けた。どうすれば業務改善に貢献することができるか考えたい。可能であれば、日本の継続的な支援によるバ国の状況改善を期待する。
8	Mr. Faizur Rob Chowdhury Sub-Divisional Engineer and Executive Engineer, Office of the Executive Engineer, Moulvibazar O&M Division, BWDB	・本所防災館のような施設をバ国でも建設出来ることが望ましい。防災ステーションとして機能させることが可能である。 ・堤防強化工事の施工方法、河口堰による塩水遡上の防止、海岸堤防、高潮防波堤について学ぶ機会があり、非常に参考になった。それら施設の維持管理が優先順位をつけながら、しっかり実行されている点に感銘した。帰国後、自分の業務姿勢がどのように変化するか興味深い。貴重な経験を関係者と分かち合いたい。
9	Mr. Md. Fahad Hasan Assistant Engineer, Office of the Director Processing Section, BWDB	・G8 メンバー国に初めて来ることが出来て満足している。 ・名古屋港を船舶上から見学できたことが印象深い。愛知県の日光川水閘門改築の工法は極めて興味深いものであった。 ・バ国では地下水を巡る諸問題に悩んでいる。一方、日本では地下水問題は解決していると思える。地下水に係る支援を日本に期待する。

NO.	氏名/所属	感想・意見
10	Mr. Harun Ur Rasheed Superintending Engineer, Office of the Superintending Engineer, Design Circle-1, BWDB	・研修の全期間にわたり JICA センターに滞在することが出来たため、意思疎通、食事等全ての面で問題なく、快適に過ごすことができた。 ・堤防護岸設計、河岸浸食対策についてトピックを含める等もう少し時間を割いて欲しかった。 ・日本の農地・灌漑施設維持管理は素晴らしい。灌漑はバ国でも重要なので、設計基準の詳細も学びたかった。 ・バ国では大きな課題として堆積問題がある。これは防災とも深く係っているので、もっと学びたかった。 ・本所防災館は重要な施設である。その役割について非常に関心がある。バ国にも導入したい。 ・この研修を計画、準備してくれた多くの関係者に深く感謝したい。
11	Mr. Kazi Tofael Hossain Superintending Engineer, Office of the Superintending Engineer, Design Circle-2, BWDB	・船舶による名古屋港の見学は港の実際の広さ、防災施設の規模が実感できて非常に良い内容の研修であった。学んだことを整理して業務に活かしたい。 ・この研修の実現に尽力してくれた全ての関係者にこの機会に感謝したい。
12	Mr. A. K. Manzur Hasan Superintending Engineer, Surface Water Hydrology Circle, BWDB	・日本が災害の多い国であることが理解できた。同時に河川管理と防災をめぐる両国の状況は非常に異なっていることも理解することが出来て非常に勉強になった。 ・家庭の水利用の水源については。バ国は地下水がメインである一方、日本は河川水の利用がメインであることを学んだ。 ・印象に残った見学場所としては名古屋港をあげたい。船舶による海上からの見学は補足説明と共に分かり易かった。 ・バ国では、ジャムナ河における深刻な堆積が大きな問題である。どうすれば解決できるかについて日本の支援をお願いしたい。 ・バ国の河川の概要について、流域面積の 93%が外国にあり、わずか 7%がバ国内にある。