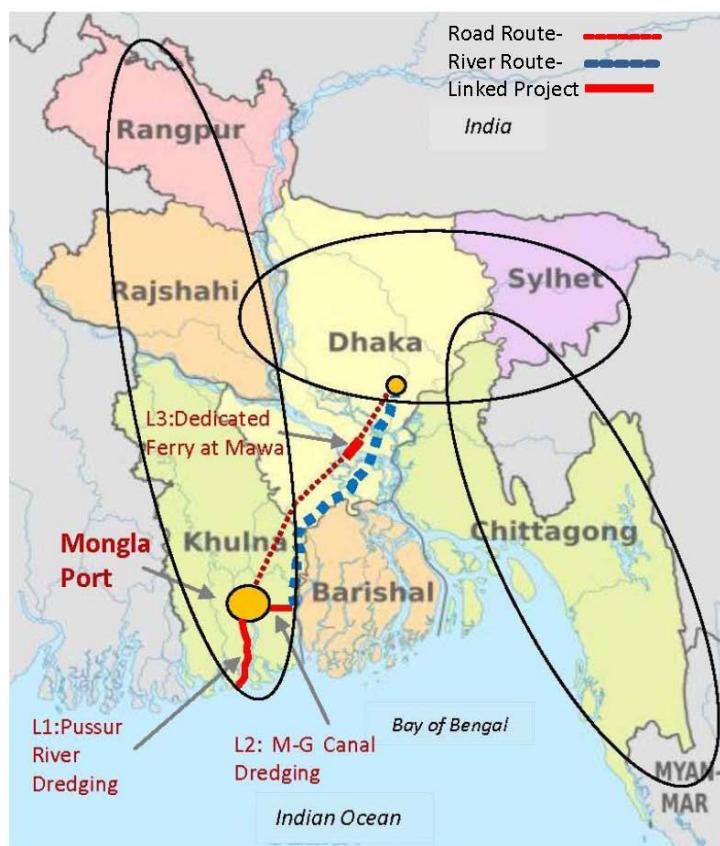




Mongla Port Authority Feasibility Study

DEVELOPMENT OF TWO JETTIES AT MONGLA PORT THROUGH PPP



Volume 2 of 2
ANNEXURES

March 2013

Draft Final Report

Feasibility Study

**DEVELOPMENT OF TWO JETTIES
AT MONGLA PORT THROUGH PPP**

**Volume 2 of 2
Annexures**

March 2013



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Annexure I

Cost Estimate

SHEET 1

Updated on: 17 March 2013 / Ver 14

Development of Two Jetties at Mongla Port through PPP

Estimation of Costs

Option A: Two Jetty Model (Base Case)

Exchange Rate: as in Feb. 2013

Hard Costs

SI	Item	Amount (mTk)	Amount (m USD)	1 USD 80 Tk
1	Civil Construction Cost (Jetty & Backup)	1,817	22.71	Sheet 2
2	Equipment Cost	1,412	17.65	Sheet 3
	Sub-Total	3,229	40.36	
3	Contingency (15% of Sub-Total)	484	6.05	
	TOTAL	3,713	46.41	

Soft Costs

SI	Item	Amount (m Tk)	Amount (m USD)	Remarks
1	IDC	251.2	3.14	Fin Model Capex Sheet
2	Working Capital	100	1.25	"
3	Project Management (4.5% of Hard Cost)	167	2.09	"
	Total	518	6.48	

	Amount (m Tk)	Amount (m USD)
Total Capital Cost	4,231	52.9

Item	Amount (m Tk)	Amount (m USD)	Remarks
O&M Costs for Option A	247	3.08	Sheet 4

SHEET 2A

Exchange Rate as in Feb 2013

1 USD

80 Tk

Option A

Civil Costs (for Jetty 3 and 4)

Sl.	Item	Unit	Quantity	Unit Rate (Tk)	Amount (m Tk)	Amount (m USD)	REMARKS
A	Jetty						
1	Completion of Remaining Piles for 2 Jetties	Nos.	550	500,000	275.0	3.44	Unit Rate: As per CPA Project (Backup Facilities for 400m Berth)
2	RCC Jetty Deck, For 2 Jetty (183 x 40) sqm, each jetty (with pilecap, girder & beams)	cum	76,448	11,000	840.9	10.51	Unit Rate: As per Schedule of Rate 2011, Public Works Dept. Quantity: Sheet 6, Drawing No. 3,4,5
	Sub-total of Jetty (A)				1,115.9	13.95	
B	Back-up Facilities (BUFAC)						
3	Heavy-duty Paved Yard	sqm	74,360	7,000	520.5	6.51	Unit Rate: As per CPA Project (Backup Facilities for 400m Berth) Quantity: Drawings No. 7
4	Admin. Building (2 storied)	sqm	1200	10,000	12.0	0.15	Unit Rate: As per current market rate; Quantity: Drawings No. 7
5	Workshop	sqm	750	6,000	4.5	0.06	"
6	Firestation	sqm	450	6,000	2.7	0.03	"
7	Electric substation	sqm	450	6,000	2.7	0.03	"
8	Fuel Service Station	sqm	300	6,000	1.8	0.02	"
9	Utility building	sqm	150	6,000	0.9	0.01	"
10	Gate House	sqm	300	6,000	1.8	0.02	"
11	Internal Roads	sqm	4600	4,000	18.4	0.23	"
12	Drains and Culverts	m	575	15,000	8.6	0.11	"
13	Gates	Nos.	2	100,000	0.2	0.00	"
	Sub-total of BUFAC (B)				574.1	7.18	
C	General Facilities						
14	Electrical Works, Water Supply & Sanitation		15% of Back-up facilities		86.1	1.08	
15	Boundary Wall and Fencing	m	984	40,000	39.4	0.49	Unit Rate: As per current market rate; Quantity: Item C15, Drawings No. 7
16	Office Furniture and Misc.	LS			1.0	0.01	
	Sub-total Gen Facilities (C)				126	1.58	
	Sum of (A+B+C)				1,817	22.71	
	TOTAL CIVIL COSTS				1,817	22.71	

SHEET 2B

Details of Civil Costs (Option A):

A1: No of Piles				A2: Jetty Area Details (For Jetty 3 and 4)	
	Piles/row/Jetty	No of rows	No of piles	RCC Jetties	2 Nos.
Vertical Piles (river side)				Length	183 m
Row 1	73	1	73	Width	40 m
Row 2, 3, 4, 5	38	4	(existing)	2 Jetty length	366 m
Row 6,7	38	2	76	Total Jetty Area (2 jetties) 14,640 sqm	
Batter Piles (intermediate)	6	2	(existing)	Ref. of Item A2: Drawing No. 7	
	6	3	18		
Batter Piles (land side)				B11: Road Details	
Row 8	70	1	70	Length (m)	286+289
Row 9	38	1	38	Width (m)	8
Total piles per jetty			275	Area (sqm)	4600
No of Jetties			2	Ref. of Item B11: Drawing No. 7	
Total Piles (to be constructed)			550	B12: Drain Details	
Total no. of piles in 9 rows (+6 mid batter)		(9+6)	878	Length (m)	286+289

Ref. of Item A1: Drawing No. 3

B: Backup Area Details				C15: Boundary Wall Details	
Item	Width (m)	Length (m)	Area (sqm)	Length E-W (m)	301+65
B3. Heavy Duty Pavewayard	286	260	74360	Length N-S (m)	289+289+40
B4. Admin. Building	15	40	600	Total (m)	984
B5. Workshop	15	50	750	Ref. of Item C15: Drawing No. 7	
B6. Fire Station	15	30	450		
B7. Electric substation	15	30	450		
B8. Fuel Service Station	15	20	300		
B9. Utility Building	15	10	150		
B10. Gate House	15	20	300		

Ref. of Item B: Drawing No. 7

SHEET 3

Exchange Rate as in Feb 2013

Option A

1 USD 80 Tk

Equipment Costs (for Jetty 3 and 4, full capacity)

Sl. No.	Equipment	Purpose	Units	Unit Cost (m Tk)	Amount (m Tk)	Total Cost (m USD)	Remarks
1	Mobile Harbour Cranes, 40 T (2 per berth)	Ship to Shore Operation	4	250.0	1,000	12.50	As per recent CPA procurement
2	Mobile Cranes 10 T	Yard Operation	2	2.5	5	0.06	"
3	Tractor Trailer, 15 to 20 T (4 per hook & 2 stand by)	Jetty to Yard Operation	10	2.5	25	0.31	"
4	High Mast Fork Lift Trucks(FLT), 5 T	Yard Operation	2	5.0	10	0.13	"
5	Low Mast Fork Lift Trucks(FLT), 3 T	Delivery Operation	2	3.0	6	0.08	"
6	Reach Stackers, 30-40 T	Stacking and hoisting	2	40.0	80	1.00	"
7	Mobile Hopper	Handling of Bulk Receipt	4	7.2	29	0.36	"
8	Lorry/Truck 3-5 T (2 per crane)	Delivery of Bagged Cargo	8	4.0	32	0.40	"
9	Workshop Equipment	For workshop	LS		10	0.13	
Sub- Total					1,197	14.96	
CD VAT CD=3%, VAT=15%				of sub-total Cost	18%	215	2.69
TOTAL EQUIPMENT COSTS						1,412	17.65

SHEET 4

Exchange Rate as in Feb. 2013

1 USD 80 Tk

Option A

Operation & Maintenance Costs (Annual)

Sl. No.	Item	Fixed Cost	Variable Cost	Amount (m Tk)	Remarks
1	Repair & Maintenance of Civil asset	✓		18.2	1% of civil cost
2	Repair and maintenance of mechanical and electrical equipment including spares		✓	28.2	2% of equipment cost for 1st five years and 5% thereafter
3	Insurance	✓		9.1	0.5% of gross fixed asset value
4	Salary Expenses	✓		54.6	Sheet 5
5	Office Maintenance	✓		7.2	Assumed 6 lacs/month
6	Fuel/Diesel (at full capacity)		✓	117.0	Item 6
7	Electricity	✓		0.6	Assumed 50,000 Tk./month
	Sub-Total of O&M Cost			234.9	
8	Other expenses (Misc. unforeseen) LS			11.7	5% of Sub-total cost
	TOTAL O&M EXPENSES			247	

Fixed Cost	89.6 m Tk/Yr
	1.12 m USD/Yr
Variable Cost	726.3 Tk/TEU Assumed Full Capacity as 2,00,000 TEUs for 2 Jetties
	9.08 USD/TEU "

Item 6: Fuel/Diesel Cost Details

Sl. No.	Equipment	Nos	Hourly Consumption (Litre/hr)	Average Operation (hr/day)	Total Daily Consumption (Litre)	Yearly Operations I Days	Rate (Tk/litre)	Yearly Amount (Tk)
1	Mobile Harbour Cranes, 40 T (2 per berth)	4	60	8	1920	350	70	47,040,000
2	Mobile Cranes 10 T	2	10	10	200	350	70	4,900,000
3	Tractor Trailer (4/hook & 2 stand by)	10	6	8	480	350	70	11,760,000
4	High Mast Fork Lift Trucks (FLT), 5 T	2	5	8	80	350	70	1,960,000
5	Low Mast Fork Lift Trucks (FLT), 3 T	2	3	8	48	350	70	1,176,000
6	Reach Stackers, 30-40 T	2	13	8	208	350	70	5,096,000
7	Mobile Hopper	4	10	10	400	350	70	9,800,000
8	Lorry/Truck 3-5 T (2 per crane)	8	15	12	1440	350	70	35,280,000
	Total	34			4,776			117,012,000
	Total in m Tk.							117

Fuel rate

70 Tk/litre

Current market rate

N.B Fuel cost calculated based on CPA Consumption

SHEET 5

Option A

Expenditure of Manpower (for Jetty 3 & 4, full capacity)

	Sl. No.	Type of Personnel	Post	Lumpsum Salary Monthly (Tk)	Monthly Total (Tk)
A. Managerial	1	Chief Executive Officer	1	3,00,000	3,00,000
	2	Financial Controller	1	1,50,000	1,50,000
	3	Terminal Manager (Operation)	1	1,50,000	1,50,000
	4	Plant Manager	1	90,000	90,000
	5	Manager (Commercial)	1	90,000	90,000
	6	Manager HRD	1	90,000	90,000
B. Supervisory	7	Security Chief	1	50,000	50,000
	8	Asstt. Manager IT	1	50,000	50,000
	9	Asstt. Manager (Accounts and Finance)	1	50,000	50,000
	10	Asstt. Manager (Marketing & Commercial)	1	50,000	50,000
C. Supporting Staff	11	Security Officer	1	40000	40000
	15	IT Support Officer	1	40,000	40,000
	13	Operation Supervisor (2 Persons/Berth)	4	40,000	160,000
	14	Workshop Supervisor (SAE)	3	40,000	120,000
	16	Tractor Trailor (TT) Operator (2/TT)	20	35,000	700,000
	17	Senior Equipment Operator (4/Shift)	8	35,000	280,000
	18	Junior Equipment Operator (4/Shift)	8	30,000	240,000
	12	Security Inspector (1/Shift)	3	30,000	90,000
	19	Account Astt.	1	30,000	30,000
	20	Lorry Operator	12	30,000	360,000
	21	Admin Assistant	1	20,000	20,000
	22	Technician/Mechanics (4/Shift)	8	20,000	160,000
	23	Tech. Helper	8	15,000	120,000
	24	Store Keeper (2/Shift)	4	15,000	60,000
	25	Gate Control Astt. (2 Person/Shift)	6	10,000	60,000
	26	Vehicle Driver	6	15,000	90,000
	27	Security Guard (12/Shift)	36	10,000	360,000
	28	Office Support Staff	10	10,000	100,000
	Sub-Total		150		3,500,000
	Other Benefits		30% of Sub-Total Cost		1,050,000
	Total				4,550,000

Total in m Tk per month **4.55**

Total in m Tk per year **54.60**

Source: Based on Manpower Requirement of Pangaon ICT

N.B Manpower Requirement has been assesed based on two shift operation for Jetty 3 and 4

SHEET 6A

Option A

Calculation of Concrete Volumes (for Jetty 3 and 4)

Sl.	Item	Length (ft)	Width (ft)	Height (ft)	Height (m)	Area (sqm)	nos	Total Quantity (Cft)	Total Quantity (cum)	Remarks
1	Pile Cap	3.9	3.9	3.0			678	31,069	880	Item 1, Ref. drawing no. 5
2	Girder	210.3	2.0	3.4			532	764,511	21,658	Item 2, Ref. drawing no. 4,5
3	Tie beams	600.0	2.0	2.7			490	1,587,600	44,975	Item 3, Ref. drawing no. 4,5
4	Deck slab	600.0	210.3	1.3			2	315,450	8,936	Ref. drawing no. 3
A Concrete in Jetty and Deck Slab (1+2+3+4)								2,698,630	76,448	
B Concrete in RCC Piles								28,926	8,819	0.28
C Concrete in Road								0.20	4,600	
Total Concrete Volume (A+B+C)									79,861	

Cost of Concrete in Jetty and Deck Slab	Tk	840,932,846
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RCC Rate Tk/c 11,000 As per schedule rate 2011, PWD

1 cum = 35.30 cft

1 m 3.28 ft

Item 1: Pile Cap Details			
Vertical Piles (river side)	Piles/row/Jetty	No of rows	Pile caps
Row 1	73	1	73
Row 2,3,4,5,6,7	38	6	228
Batter Piles (intermediate)	6	5	Jointly with above rows
Batter Piles (land side)			
Row 8,9 per jetty	38	1	38
No of Jetties			339
Total pile caps (to be made)			678

Ref. Drawing No. 3

Item 3: Tie Beam (TB) Details		
No of Tie Beam/Jetty		
Tie Beam/row	35	
No of Rows		7
Total TB/Jetty	245	
No of TB for 2 Jetties	490	
TB to be constructed	490	

Ref. Drawing No. 4

SHEET 6B

Item 2: Girder Details	
No. of Girders/Jetty	
Girder/Column	38
No of Column	7
Total Girders/Jetty	266
No of Girders for 2 Jetties	532

Ref. Drawing No. 4

Item B: Height of Concrete of Piles per jetty (excluding pile cap)				
Row	No of Rows	Piles	Height/pi le	Total Height (ft)
<i>Vertical Piles (River side)</i>				
Row 1				
Row 1	1	73	59	4,307
Row 2,3,4,5	4	152	(Existing)	
Row 6,7	2	76	32	4,864
<i>Batter Piles (intermediate)</i>				
Row 8				
Row 8	1	70	33	2,310
Row 9				
Row 9	1	38	33	1,254
Total Height per jetty				14,463
No of jetties				2
Total concrete Height (two jetties)				28,926

Ref. Drawing No: 6

SHEET 8

Development of Two Jetties at Mongla Port through PPP

Estimation of Costs

Option B, Phase I: Three Jetty Model

Exchange Rate as in Feb. 2013

1 USD 80 Tk

Hard Costs

Sl	Item	Amount (m Tk)	Amount (m USD)	Remarks
1	Civil Construction Cost (Jetty & Backup)	454	5.67	Sheet 9
2	Equipment Cost	706	8.83	Sheet 10
	Sub-Total	1,160	14.50	
3	Contingency (15% of Sub Total)	174	2.18	
	TOTAL	1,334	16.68	

Soft Costs

Sl	Item	Amount (m Tk)	Amount (m USD)	Remarks
1	IDC	83.2	1.04	Fin Model Capex Sheet
2	Working Capital	50	0.63	"
3	Project Management (5% of Hard Cost)	60	0.75	"
	Total	194	2.42	

	Amount (m Tk)	Amount (m USD)
Total Capital Cost	1,528	19.10

Item	Amount (m Tk)	Amount (m USD)	Remarks
O&M Cost for Option B, Phase I	129	1.61	Sheet 11

Option B, Phase I

SHEET 9A

Exchange Rate as in Feb 2013

1 USD

80 Tk

Civil Costs (for Jetty 3 and 4)

Sl.	Item	Unit	Quantity	Unit Rate (Tk)	Amount (m Tk)	Amount (m USD)	REMARKS
A	Jetty						
1	Completion of Remaining Piles for 2 Jetties	Nos.	550	500,000	Not to be made in Phase 1		Unit Rate: As per CPA Project (Backup Facilities for 400m Berth) Quantity: Item A2, Drawing No. 3
2	RCC Jetty Deck, For 2 Jetty (183 X 40) sqm, each jetty (with pilecap, girder & beams)	cum	76,448	11,000	"	"	Unit Rate: As per Schedule of Rate 2011, Public Works Dept. Quantity: Drawing No.3,4,5; Sheet 6
B	Back-up Facilities (BUFAC)						
3	Heavy-duty Paved Yard	sqm	37,180	7,000	260.3	3.25	Unit Rate: As per CPA Project (Backup Facilities for 400m Berth)
4	Admin. Building (2 storied)	sqm	1200	10,000	12.0	0.15	Unit Rate: Current Market Rate Quantity: Item B, Drawing No. 8
5	Workshop	sqm	750	6,000	4.5	0.06	"
6	Firestation	sqm	450	6,000	2.7	0.03	"
7	Electric substation	sqm	450	6,000	2.7	0.03	"
8	Fuel Service Station	sqm	300	6,000	1.8	0.02	"
9	Utility building	sqm	150	6,000	0.9	0.01	"
10	Gate House	sqm	300	6,000	1.8	0.02	"
11	Internal Roads	sqm	4600	4,000	18.4	0.23	"
12	Drains and Culverts	m	575	15,000	8.6	0.11	"
13	Gates	Nos.	2	100,000	0.2	0.003	"
	Sub-total of BUFAC				313.9	3.92	
C	General Facilities						
14	Electrical Works, Water Supply & Sanitation		15% of Back-up facilities		47.1	0.59	
15	Boundary Wall and Fencing	m	1165	40,000	46.6	0.58	Unit Rate: Current Market Rate Quantity: Item C15; Drawing No. 8
16	Office Furniture and Misc.	LS			1.0	0.01	Unit Rate: Current Market Rate
	Sub-total Gen Facilities				95	1.18	
D	Overhauling of Jetty 5	LS	5%	of civil cost of one jetty for Option A	45.4	0.57	
	Sum of (B+C+D))				454	5.67	
	TOTAL CIVIL COSTS				454	5.67	

SHEET 9B

Details of Civil Costs (Option B, Phase 1):

Item A1 and A2: Not required to consider in Phase I

A1: No of Piles

	Piles/row/jetty	No of rows	No of piles
Vertical Piles (river side)			
Row 1	73	1	73
Row 2, 3, 4, 5	38	4	existing
Row 6,7	38	2	76
Batter Piles (intermediate)	6	2	existing
	6	3	18
Batter Piles (land side)			
Row 14	70	1	70
Row 15	38	1	38
Total			275
No of Jetties			2
Total Piles (to be laid)			550

Ref. of Item A1: Drawing No. 3

A2: Jetty Area Details (For Jetty 3 and 4, with facilities)

RCC Jetties	2 Nos.
Length	183 m
Width	40 m
Berth length	366 m
Total Jetty Area (2 jetties)	14,640 sqm

Ref of Item A2: Drawing No. 7

B11: Road Details

Length (m)	286+289
Width (m)	8
Area (sqm)	4600

Ref of Item B11: Drawing No. 8

B12: Drain Details

Length (m)	286+289
Total (m)	575

Ref of Item B12: Drawing No. 8

B: Backup Area Details

Item	Width (m)	Length (m)	Area (sqm)
B3. Heavy Duty Paveyard	286	130	37180
B4. Admin. Building	15	40	600
B5. Workshop	15	50	750
B6. Fire Station	15	30	450
B7. Electric substation	15	30	450
B8. Fuel Service Station	15	20	300
B9. Utility Building	15	10	150
B10. Gate House	15	20	300

Ref. of Item B: Drawing No. 8

C15: Boundary Wall Details

Length E-W (m)	301+135+111
Length N-S (m)	289+289+40
Total (m)	1165

Ref of Item C15: Drawing No. 8

Item D

Civil Cost for 2 Jetties of Option A	1817 m Tk
Civil cost for each jetty	908 m Tk

SHEET 10

Exchange Rate as in Feb 2013

Option B, Phase I

1 USD 80 Tk

Equipment Costs (for Jetty 3 and 4, full capacity)							
Sl. No.	Equipment	Purpose	Units	Unit Cost (m Tk)	Amount (m Tk)	Total Cost (m USD)	Remarks
1	Mobile Harbour Cranes, 40 T (2 per berth)	Ship to Shore Operation	4	250.0	1,000	12.50	As per recent CPA procurement
2	Mobile Cranes 10 T	Yard Operation	2	2.5	5	0.06	"
3	Tractor Trailer (4 per hook & 2 stand by)	Jetty to Yard Operation	10	2.5	25	0.31	"
4	High Mast Fork Lift Trucks (FLT), 5 T	Yard Operation	2	5.0	10	0.13	"
5	High Mast Fork Lift Trucks (FLT), 3 T	Delivery Operation	2	3.0	6	0.08	"
6	Reach Stackers, 30-40 T	Stacking	2	40.0	80	1.00	"
7	Mobile Hopper	Handling of Bulk Receipt	4	7.2	29	0.36	"
8	Lorry/Truck 3-5 T (2 per crane)	Delivery of Bagged Cargo	8	4.0	32	0.40	"
9	Workshop Equipment	For workshop	LS		10	0.13	
	Sub- Total				1,197	14.96	
	CD VAT CD=3%, VAT=15%	of sub-total Cost	18%		215	2.69	
	TOTAL EQUIPMENT COST	as estimated for Option A			1,412	17.65	

Equipment Cost for Phase I

50% of Equip. Cost of Option A

706.1 8.83

SHEET 11

Exchange Rate as in Feb 2013

1 USD 80 Tk

Option B, Phase I

Operation & Maintenance Costs (Annual)

Sl. No.	Item	Fixed Cost	Variable Cost	Amount (m Tk)	Remarks
1	Repair & Maintenance of Civil asset	✓		4.5	1% of civil cost
2	Repair and maintenance of mechanical and electrical equipment including spares		✓	14.1	2% of equipment cost for 1st five years and 5% thereafter
3	Insurance	✓		2.3	0.5% of gross fixed asset value
4	Salary Expenses	✓		35.4	Sheet 5
5	Office Maintenance	✓		7.2	Assumed 6 lacs/month
6	Fuel/Diesel		✓	58.5	Item 6 calculation
7	Electricity	✓		0.6	Assumed 50,000 Tk/month
	Sub-Total of O&M Cost			122.6	
8	Other expenses (Misc. unforeseen) LS			6.1	5% of Sub-total cost
	TOTAL O&M EXPENSES			129	

Fixed Cost	50.0 m Tk/Yr
	0.63 m USD/Yr
Variable Cost	726.3 Tk/TEU Assumed Full Capacity as 1,00,000 TEUs for 1 Jetty
	9.08 USD/TEU "

Item 6: Fuel/Diesel Cost Details

Sl. No.	Equipment	Nos	Hourly Consumption (Litre/hr)	Average Operation (hr/day)	Total Daily Consumption (Litre)	Yearly Operational Days	Rate (Tk/litre)	Yearly Amount (Tk)
1	Mobile Harbour Cranes, 40 T (2 per berth)	4	60	8	1920	350	70	47,040,000
2	Mobile Cranes 10 T	2	10	10	200	350	70	4,900,000
3	Tractor Trailer (4/hook & 2 stand by)	10	6	8	480	350	70	11,760,000
4	High Mast Lift Trucks (FLT), 5 T	2	5	8	80	350	70	1,960,000
5	Low Mast Fork Lift Trucks (FLT), 3 T	2	3	8	48	350	70	1,176,000
6	Reach Stackers, 30-40 T	2	13	8	208	350	70	5,096,000
7	Mobile Hopper	4	10	10	400	350	70	9,800,000
8	Lorry/Truck 3-5 T (2 per crane)	8	15	12	1440	350	70	35,280,000
	Total	34			4776			117,012,000
Total in m Tk.		(fuel cost of Option A, full Capacity)						117

Fuel Cost for Phase I	50% of fuel cost of Option A	58.51 m Tk
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Fuel rate 70 Tk/litre Current market rate

N.B Fuel cost calculated based on CPA Fuel Consumption

SHEET 12

Option B, Phase I

Expenditure of Manpower (for Jetty 5 Opeartion)

	Sl. No.	Type of Personnel	Post	Lumpsum Salary Monthly (Tk)	Monthly Total (Tk)
A. Managerial	1	Chief Executive Officer	1	3,00,000	3,00,000
	2	Financial Controller	1	1,50,000	1,50,000
	3	Terminal Manager (Operation)	1	1,50,000	1,50,000
	4	Plant Manager	1	90,000	90,000
	5	Manager (Commercial)	1	90,000	90,000
	6	Manager HRD	1	90,000	90,000
B. Supervisory	7	Security Chief	1	50,000	50,000
	8	Asstt. Manager IT	1	50,000	50,000
	9	Asstt. Manager (Accounts and Finance)	1	50,000	50,000
	10	Asstt. Manager (Marketing & Commercial)	1	50,000	50,000
	11	Security Officer	1	40000	40000
C. Supporting Staff	15	IT Support Officer	1	40,000	40,000
	13	Operation Supervisor (2/Berth)	2	40,000	80,000
	14	Workshop Supervisor (SAE)	2	40,000	80,000
	16	Tractor Trailor (TT) Operator (2	10	35,000	350,000
	17	Senior Equipment Operator (4/Shift)	4	35,000	140,000
	18	Junior Equipment Operator (4/Shift)	4	30,000	120,000
	12	Security Inspector, 3 shift (1/Shift)	3	30,000	90,000
	19	Account Astt.	1	30,000	30,000
	20	Lorry Operator	6	30,000	180,000
	21	Admin Assistant	1	20,000	20,000
	22	Technician/Mechanics (4/Shift)	4	20,000	80,000
	23	Tech. Helper	4	15,000	60,000
	24	Store Keeper (2/Shift)	2	15,000	30,000
	25	Gate Control Astt. (2 /Shift)	6	10,000	60,000
	26	Vehicle Driver	4	15,000	60,000
	27	Security Guard, 3 shift (8/Shift)	24	10,000	240,000
	28	Office Support Staff	10	10,000	100,000
	Sub-Total		99		2,270,000
	Other Benefits		30% of Sub-Total Cost		681,000
	Total				2,951,000

Total in m Tk per month	2.95
Total in m Tk per year	35.41

Source: Based on Manpower Requirement of Pangaon ICT

N.B Manpower Requirement

has been assesed based on

two shift operation for Jetty 3

and 4

SHEET 13

Development of Two Jetties at Mongla Port through PPP

Estimation of Costs

Option B, Phase II: Three Jetty Model

Exchange Rate as in Feb. 2013

Hard Costs

SI	Item	Amount (mTk)	Amount (m USD)	Remarks
1	Civil Construction Cost (Jetty & Backup)	1,416	17.69	Sheet 14
2	Equipment Cost	706	8.83	Sheet 15
	Sub-Total	2,122	26.52	
3	Contingency (15% of Sub-Total)	318	3.98	
	TOTAL PROJECT COST	2,440	30.50	

Soft Costs

SI	Item	Amount (m Tk)	Amount (m USD)	Remarks
1	IDC	167.2	2.09	Fin Model Capex Sheet
2	Working Capital	0	0.00	"
3	Project Management (4.5% of Hard Cost)	110	1.37	"
	Total	277	3.46	

	Amount (m Tk)	Amount (m USD)
Total Capital Cost	2,717	33.96

Item	Amount (m Tk)	Amount (m USD)	Remarks
O&M Costs for Option B, Phase II	247	3.08	Sheet 16

SHEET 14A

Option B, Phase II

Exchange Rate as in Feb 2013

1 USD

80 Tk

Civil Costs Calculation (for Jetty 3 and 4)

Sl.	Item	Unit	Quantity	Unit Rate (Tk)		Amount (m Tk)	Amount (m USD)	REMARKS
A	Jetty							
1	Completion of Remaining Piles for 2 Jetties	Nos.	550	500,000		275	3.44	Unit Rate: As per CPA Project (Backup Facilities for 400m Berth) Quantity: Item A1, Drawing No. 3
2	RCC Jetty Deck, For 2 Jetty (with pilecap, girder & beams)	cum	76,448	11,000		841	10.51	Unit Rate: As per Schedule of Rate 2011, Public Works Dept. Quantity: Drawing No.3,4,5; Sheet 6
	Sub-total of Jetty					1,116	13.95	
B	Back-up Facilities (BUFAC)							
3	Heavy-duty Paved Yard	sqm	37,180	7,000		260	3.25	Unit Rate: As per CPA Project (Backup Facilities for 400m Berth) Quantity: Item B, Drawing No. 8
4	Admin. Building (2 storied)	Built in Option B, Phase 1				Built in Option B, Phase 1		
5	Workshop							
6	Firestation							
7	Electric substation							
8	Fuel Service Station							
9	Utility building							
10	Gate House							
11	Internal Roads							
12	Drains and Culverts							
13	Gates							
	Sub-total of BUFAC					260	3.25	
C	General Facilities							
14	Electrical Works, Water Supply & Sanitation			15% of Back-up facilities		Built in Option B, Phase 1		
15	Boundary Wall and Fencing	m	984	40,000		39	0.49	Unit Rate: Current Market Rate Quantity: Item C15; Drawing No. 8
16	Office Furniture and Misc.	LS				Built in Option B, Phase 1		
	Sub-total of Gen Facilities					39	0.49	
	TOTAL CIVIL COST					1,416	17.69	

SHEET 14B

Details of Civil Costs (Option B, Phase II):

A1: No of Piles			
	Piles/row/Jett y	No of rows	No of piles
Vertical Piles (river side)			
Row 1	73	1	73
Row 2, 3, 4, 5	38	4	existing
Row 6,7	38	2	76
Batter Piles (intermediate)			
	6	2	existing
	6	3	18
Batter Piles (land side)			
Row 8	70	1	70
Row 9	38	1	38
Total			275
No of Jetties			2
Total Piles (to be laid)			550

Ref. of Item A1: Drawing No. 3

A2: Jetty Area Details	
(For Jetty 3 and 4, with facilities)	
RCC Jetties	2 Nos.
Length	183 m
Width	40 m
Berth length	366 m
Total Jetty Area (2 j)	14,640 sqm

Ref. of Item A2: Drawing No. 8

C15: Boundary Wall Details	
Length E-W (m)	301+65
Length N-S (m)	289+289+40
Total (m)	984

Ref. of Item C15: Drawing No. 8

B: Backup Area Details			
Item	Width (m)	Length (m)	Area (sqm)
B3. Heavy Duty Pavewayd	286	130	37180
B4. Admin. Building	15	40	600
B5. Workshop	15	50	750
B6. Fire Station	15	30	450
B7. Electric substation	15	30	450
B8. Fuel Service Station	15	20	300
B9. Utility Building	15	10	150
B10. Gate House	15	20	300

Ref. of Item B: Drawing No. 8

SHEET 15

Exchange Rate: as in Feb 2013

Option B, Phase II

1 USD

80 Tk

Equipment Costs (for Jetty 3 and 4, full capacity)

Sl. No.	Equipment	Purpose	Units	Unit Cost (m Tk)	Amount (m Tk)	Total Cost (m USD)	Remarks
1	Mobile Harbour Cranes, 40 T (2 per berth)	Ship to Shore Operation	4	250.0	1,000	12.50	As per recent CPA procurement
2	Mobile Cranes 10 T	Yard Operation	2	2.5	5	0.06	"
3	Tractor Trailer (4 per hook & 2 stand by)	Jetty to Yard Operation	10	2.5	25	0.31	"
4	High Mast Fork Lift Trucks (FLT), 5 T	Yard Operation	2	5.0	10	0.13	"
5	Low Mast Fork Lift Trucks (FLT), 5 T	Delivery Operation	2	3.0	6	0.08	"
6	Reach Stackers, 30-40 T	Stacking	2	40.0	80	1.00	"
7	Mobile Hopper	Handling of Bulk Receipt	4	7.2	29	0.36	"
8	Lorry/Truck 3-5 T (2 per crane)	Delivery of Bagged Cargo	8	4.0	32	0.40	"
9	Workshop Equipment	For workshop	LS		10	0.13	
Sub- Total					1,197	14.96	
CD VAT CD=3%, VAT=15%			of sub-total Cost	18%	215	2.69	
TOTAL EQUIPMENT COST			as estimated for Option A		1,412	17.65	

Equipment Cost for Phase II	50% of Equip. Cost of Option A	706.1	8.83
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SHEET 16

Exchange Rate as in Feb. 2013

Option B, Phase II

1 USD 80 Tk.

Operation & Maintenance Costs (Annual)

Sl. No.	Item	Fixed Cost	Variable Cost	Amount (m Tk)	Remarks
1	Repair & Maintenance of Civil asset	✓		18.2	1% of civil cost (as calculated in Item 1)
2	Repair and maintenance of mechanical and electrical equipment including spares		✓	28.2	2% of equipmnt. cost for 1st five years and 5% thereafter
3	Insurance	✓		9.1	0.5% of civil cost (as calculated below)
4	Salary Expenses	✓		54.6	Sheet 5
5	Office Maintenance	✓		7.2	Assumed 6 lacs/month
6	Fuel/Diesel (at full capacity)		✓	117.0	Item 6
7	Electricity	✓		0.6	Assumed 50,000 Tk./month
	Sub-Total of O&M Cost			235.0	
8	Other expenses (Misc. unforeseen) LS			11.8	5% of Sub-total cost
	TOTAL O&M EXPENSES			247	

Fixed Cost	89.8 m Tk/Yr 1.12 m USD/Yr	
Variable Cost	726.3 Tk/TEU 9.08 USD/TEU	Assumed Full Capacity as 2,00,000 TEUs for 2 Jetties " "

Item 6: Fuel/Diesel Cost Details

Sl. No.	Equipment	Nos	Hourly Consumption (Litre/hr)	Average Operation (hr/day)	Total Daily Consumption (Litre)	Yearly Operational Days	Rate (Tk/litre)	Yearly Amount (Tk)
1	Mobile Harbour Cranes, 40 T (2 per berth)	4	60	8	1920	350	70	47,040,000
2	Mobile Cranes 10 T	2	10	10	200	350	70	4,900,000
3	Tractor Trailer (4/hook & 2 stand by)	10	6	8	480	350	70	11,760,000
4	High Reach Fork Lift Trucks (FLT), 5 T	2	5	8	80	350	70	1,960,000
5	Low Reach Fork Lift Trucks (FLT), 3 T	2	3	8	48	350	70	1,176,000
6	Reach Stackers, 30-40 T	2	13	8	208	350	70	5,096,000
7	Mobile Hopper	4	10	10	400	350	70	9,800,000
8	Lorry/Truck 3-5 T (2 per crane)	8	15	12	1440	350	70	35,280,000
	Total	34			4776			117,012,000
	Total in m Tk.							117

Fuel rate 70 Tk/litre Current market rate

N.B Fuel cost calculated based on CPA Fuel Consumption

Item 1: Total Civil Cost for Option B, Phase II

BUFAC and Gen. Facilities cost of Option B, Phase I	409 m Tk
Civil Cost of Option B, Phase II	1416 m Tk
Total	1824 m Tk

SHEET 17

Option B, Phase II

Expenditure of Manpower (for Jetty 3 & 4, full capacity)

Sl. No.	Type of Personnel	Post	Lumpsum Salary Monthly (Tk)	Monthly Total (Tk)
A. Managerial	1 Chief Executive Officer	1	3,00,000	3,00,000
	2 Financial Controller	1	1,50,000	1,50,000
	3 Terminal Manager (Operation)	1	1,50,000	1,50,000
	4 Plant Manager	1	90,000	90,000
	5 Manager (Commercial)	1	90,000	90,000
	6 Manager HRD	1	90,000	90,000
B. Supervisory	7 Security Chief	1	50,000	50,000
	8 Asstt. Manager IT	1	50,000	50,000
	9 Asstt. Manager (Accounts and Finance)	1	50,000	50,000
	10 Asstt. Manager (Marketing & Commercial)	1	50,000	50,000
C. Supporting Staff	11 Security Officer	1	40,000	40,000
	15 IT Support Officer	1	40,000	40,000
	13 Operation Supervisor (2 Persons/Berth)	4	40,000	160,000
	14 Workshop Supervisor (SAE)	3	40,000	120,000
	16 Tractor Trailor (TT) Operator (2/TT)	20	35,000	700,000
	17 Senior Equipment Operator (4 /Shift)	8	35,000	280,000
	18 Junior Equipment Operator (4/Shift)	8	30,000	240,000
	12 Security Inspector (1/Shift)	3	30,000	90,000
	19 Account Astt.	1	30,000	30,000
	20 Lorry Operator	12	30,000	360,000
	21 Admin Assistant	1	20,000	20,000
	22 Technician/Mechanics (4/Shift)	8	20,000	160,000
	23 Tech. Helper	8	15,000	120,000
	24 Store Keeper (2/Shift)	4	15,000	60,000
	25 Gate Control Astt. (2/Shift)	6	10,000	60,000
	26 Vehicle Driver	6	15,000	90,000
	27 Security Guard (12/Shift)	36	10,000	360,000
	28 Office Support Stuff	10	10,000	100,000
	Sub-Total	150		3,500,000
	Other Benefits		30% of Sub-Total Cost	1,050,000
	Total			4,550,000

Total in m Tk per month	4.55
Total in m Tk per year	54.60

Source: Based on Manpower Requirement of Pangaon ICT

N.B Manpower Requirement has been assesed based on two shift operation for Jetty 3 and 4

Annexure II

Financial Model



Financial Model

Development of Two Jetties at Mongla Port through PPP

Traffic Scenario IV (all linked projects implemented)
PPP Option C

Assumptions

Project Assumptions		
Term	30	years (from signing)
Jetty Construction Period	2	years
Backup Facilities Construction Period	1	year

Timeline Assumptions		
Agreement Signing Date	2014	
Civil Construction Start	2014	
Option A		
Construction Start	2014	
COD	2016	
Option B		
Refurbishment Start	2014	
Jetty 5 COD	2015	
Jetty 3 and 4 Construction Start	5	years (from signing)
		2019
Jetty 3 and 4 COD	2021	
Dredging Complete	2015	

Terminal Assumptions		
Before Dredging		
Average Vessel Capacity		
Container Ships	500 TEUs/ ship	
GC ships	8,000 MT/ ship	
Average GRT of Vessels		
Container Ships	7,000 MT	
GC Ships	12,000 "	
Average Berth Occupancy per vessel		
Container Ships	3 days	
GC Ships	6 days	
TEU to Container proportion	1.38 TEU/container	
MT per TEU	9	
After Dredging		
Average Vessel Capacity		

<i>Container Ships</i>	1,000	<i>TEUs/ship</i>
<i>GC ships</i>	10,000	<i>MT/ ship</i>
Average GRT of Vessels		
<i>Container Ships</i>	14,000	<i>MT</i>
<i>GC Ships</i>	24,000	"
<i>Container Ships</i>	3	<i>days</i>
<i>GC Ships</i>	6	"
% of days (berth occupancy)		
<i>Container Ships</i>	60%	
<i>GC Ships</i>	40%	
	6	<i>ships/month</i>
	2	"
Terminal Capacity	70,000	<i>TEUs per Jetty/yr</i>
	240,000	<i>MT per Jetty/yr</i>
TEU to Container proportion	<i>1.38 TEU/container</i>	
MT per TEU	9	

Tariff Assumptions		
Tariff Escalation	3%	<i>per year</i>
Mobile Harbour Crane Charge	20'	40'
<i>Loaded Container (US \$/ container)</i>	18.00	27.00
<i>Empty Container (US \$/ container)</i>	9.00	13.50

Container Traffic Assumptions		
% of Import Containers	52%	
% of Export Containers	48%	
Containers Needing Reefer Service	25%	<i>of export containers</i>
Containers needing Extra Movement	15%	<i>of all containers</i>
Cargo Needing Space for storage	20%	<i>of all general cargo</i>
<i>Storage</i>	15	<i>sqm/TEU</i>
	1.67	<i>sqm/ MT</i>

Containers needing storage beyond Free Period	40%	<i>of all containers</i>
No. of days stored	7	<i>days</i>
Containers needing Lift on/ Lift off service	40%	<i>of all containers</i>

Container Traffic Breakdown	FCL	LCL		Empty	Total	
Import	20'	40'	20'	40'	20'	40'
%	45.17%	19.62%	15.07%	4.12%	3.48%	12.54%
Export						
%	35.51%	29.31%	10.93%	8.28%	10.34%	5.63%
						100%

Cost Assumptions		
Lease Rental	0.1	<i>m US \$</i> for land
	0.2	<i>m US \$</i> for Jetty 5 rental
Lease Rental Escalation	2%	
Civil Cost Breakdown		
	Construction Year 1	50%
	Construction Year 2	50%
Contingency	15%	
O&M Costs		
Civil Structure Maintenance	1%	<i>of civil cost</i>
Equipment Maintenance	2%	<i>of equipment cost for 1st 5 years</i>
	5%	<i>of equipment cost thereafter</i>
Insurance	0.5%	<i>of gross fixed assets value</i>
Office Maintenance	0.6	<i>m Taka/month</i>
Electricity	50,000	<i>Taka/month</i>
Other expenses	5%	<i>of O&M costs</i>
Escalation		
Civil Cost Escalation	2.5%	<i>yearly (avg. of last 14 yrs US\$ inflation)</i>
Equipment Cost Escalation	2.5%	"
Civil Maintenance Cost Escalation	1%	<i>per year</i>
Equipment Maintenance Escalation	2%	<i>first year</i>
	5%	<i>after first year</i>
Salary Escalation	2%	<i>per year</i>

Fuel Cost Escalation	2.5%	"
Electricity Escalation	1%	"

Financial Assumptions		
CD VAT	18%	
Debt	75%	<i>of Capital Cost</i>
Equity	25%	"
Company Income Tax Rate	37.5%	
Minimum Tax Rate	0.5%	
<i>Loan</i>		
IPFF	<i>m US\$</i>	
Percentage of Loan	80%	
Tenor	15	
LIBOR rate	0.46%	
Spread	0.5%	
Margin of PFI	3%	
Grace Period	5	
PFI (Commercial Bank)		
Percentage of Loan	20%	
Tenor	5	
Cost of Fund for PFIs	2.5%	
Margin of PFI	3%	
Grace Period	2	
Rate for Hedging	1.0%	
Currency Exchange Rate <i>(as on February 2013)</i>	80.00	<i>Tk / US\$</i>

Summary Output

	Model A 2-Jetty Option		Model B 3-Jetty Option	
			Phase I	Phase II
Term of Contract	30	years	30	years
Project Cost	4,231	mil Tk	1,528	2,440
	52.90	mil US\$	19.10	33.96
Construction Start	2014		2014	2019
Commercial Operation Date	2016		2015	2021

Modifiers		
Model	Option C	▼
Traffic Scenario	Scenario - IV	
Tariff Rate	120%	▼ of MPA Tariff
Viability Gap Funding		million US \$
	0%	of Project Cost

Output	Option B
Equity IRR	25.60%
Project IRR	14.52%
DSCR	
Average	1.86
Maximum	3.40
Minimum	1.08
Equity Payback Period (year)	8
Project Payback Period (year)	11

MT per TEU

Capital Cost

Civil Costs		Total Cost (m Tk)	Total Cost (m US\$)	Total Cost (m Tk)	Total Cost (m US\$)	Total Cost (m Tk)	Total Cost (m US\$)
		Option A		Option B			
				Phase I		Phase II	
A	Jetty and Apron						
1	Completion of Remaining Piles for 2 Jetties	275	3.44	0	0	275	3.44
2	RCC Jetty Deck, For 2 Jetty (with pilecap, girder & beams)	841	10.51	0	0	841	10.51
	Sub-total of Jetty	1,116	13.95	0.00	0.00	1,116	13.95
B	Back-up Facilities (BUFAC)						
3	Heavy-duty Paved Yard	521	6.51	260	3.25	260	3.25
4	Admin. Building (2 storied)	12	0.15	12	0.15		
5	Workshop	5	0.06	5	0.06		
6	Firestation	3	0.03	3	0.03		
7	Electric substation	3	0.03	3	0.03		
8	Fuel Service Station	2	0.02	2	0.02		
9	Utility building	1	0.01	1	0.01		
10	Gate House	2	0.02	2	0.02		
11	Internal Roads	18	0.23	18	0.23		
12	Drains and Culverts	9	0.11	9	0.11		
13	Gates	0	0.00	0	0.00		
14	Electrical Works, Water Supply & Sanitation	86	1.08	47	0.59		
15	Boundary Wall and Fencing	39	0.49	47	0.58	39	0.49
16	Office Furniture and Misc.	1	0.01	1	0.01		
	Sub-total Gen Facilities	126	1.58	95	1.18	39	0.49
D	Overhauling of Jetty 5 (for Option B)			45	0.57		
Total Civil Cost		1,817	22.71	454	5.67	1,416	17.69

Equipment	No. of Units	Unit Cost	Total Cost	Total Cost

1	Mobile Harbour Cranes, 40 T (2 per berth)	4	250	1000	12.5
2	Mobile Cranes 10 T	2	2.5	5	0.0625
3	Tractor Trailer, 15 to 20 T ¹ per hook & 2 stand by)	10	2.5	25	0.3125
4	High Mast Fork Lift Trucks(FLT), 5 T	2	5	10	0.125
5	Low Mast Fork Lift Trucks(FLT), 3 T	2	3	6	0.075
6	Reach Stackers, 30-40 T	2	40	80	1
7	Mobile Hopper	4	7.2	28.8	0.36
8	Lorry/Truck 3-5 T (2 per crane)	8	4	32	0.4
9	Workshop Equipment	LS		10	0.125
Sub-total of Equipment				1,197	14.96
CD VAT		18%		215	2.69
Total Equipment Cost				1,412	17.65

Total Hard Cost	<i>m Tk</i>	<i>m US \$</i>	<i>m Tk</i>	<i>m US \$</i>	<i>m Tk</i>	<i>m US \$</i>
	Option A		Option B			
			<i>Phase I</i>	<i>Phase II</i>		
Civil Cost	1,817	22.71	454	5.67	1,416	17.69
Equipment Cost ¹	1,412	17.65	706	8.83	706	8.83
Contingency	15%	484	6.05	2.18	318	3.98
Total	3,713	46.42	1,334	16.68	2,440	30.50

Soft Cost	<i>m Tk</i>	<i>m US \$</i>	<i>m Tk</i>	<i>m US \$</i>	<i>m Tk</i>	<i>m US \$</i>
	Option A		Option B			
			<i>Phase I</i>	<i>Phase II</i>		
IDC	251.2	3.14	83.2	1.04	167.2	2.09
Working Capital ²	100	1.25	50	0.63	0	0.00
Project Management	4.5%	167	2.09	0.75	110	1.37
Total	518	6.48	194	2.42	277	3.46

Total Capital Cost	Option A		Option B			
			<i>Phase I</i>		<i>Phase II</i>	
	<i>m Tk</i>	<i>m US \$</i>	<i>m Tk</i>	<i>m US \$</i>	<i>m Tk</i>	<i>m US \$</i>
	4,231	52.90	1,528	19.10	2,440	33.96

All Capital Cost estimated at 2013 value

¹ Percentage of Equipment Needed at Phase I for Option B

50%

² 3 Months O&M Expense

Tariff

Dues on Vessels		
Berthing Fee	US\$/ ship	106.20
Berth Occupancy Charge	US\$ / GRT / day	0.04

Dues on Conventional Cargo					
Item	Landing/ Handling Charge		Shipping Charge		per 1000 kg
	Import (Tk)	Import (US\$)	Export (Tk)	Export (US\$)	
Bagged Cargo - wheat and rice	48.00	0.60			"
Bagged Cargo - Cement, fertilizer, salt, sugar etc.	38.40	0.48			"
Cement, clinker, limestone upto 1000 kg	72.00	0.90			"
Wheeled or tracked equipment, not in cases	210.00	2.63			"
All other Imports not exceeding 3000 kg	108.00	1.35	36.00	0.45	"
All other Imports exceeding 3000 kg not exceeding 20,000 kg	216.00	2.70	216.00	2.70	"
All other Imports exceeding 20,000 kg	300.00	3.75	300.00	3.75	"
Raw materials of cement - gypsum, flyash	72.00	0.90			"
Jute and jute goods			25.20	0.32	"
Tea in chest			21.60	0.27	"
Sylhet sand			36.00	0.45	"
Garments, cotton and fabric			18.00	0.23	per carton
Hoisting Charge	100%	of Handling Charge			
Storage Charge	<i>Tk/sqm/month</i>	45.00			
	<i>US\$/sqm/month</i>	0.56			

Dues on Containers				
	Tariff for 20 ft containers (boxes)			
Tariff Item		FCL	LCL	Empty
Loading or Discharging charge	US \$/ Container	52.08	156	26.52
Storage charge	US\$ / day	1.80	1.80	1.80
Extra movement	US \$ / Cont./ move	51.12	51.12	26.04
Reefer container	US \$/ Container	13.20	13.20	13.20
Lift on/Lift off charge	US \$/ Container	15.00	15.00	7.50
MT per TEU				
Tariff for 40 ft containers (boxes)				
Tariff Item		FCL	LCL	Empty
Loading or Discharging charge	US \$/ Container	78.12	234.00	39.84
Storage charge	US\$ / Cont./ day	3.60	3.60	3.60
Extra movement	US \$ / Cont./ move	76.68	76.68	39.00
Reefer container	US \$/ Container	13.20	13.20	13.20
Lift on/Lift off charge	US \$/ Container	22.50	22.50	1.13
Stuffing/Unstuffing ¹	US\$ / 1000 kg	1.13		
Hoisting Charge ¹	"	1.35		

1. It is assumed that stuffing/ unstuffing and hoisting will be conducted by private operators

>> Final Traffic for New Project

Select

Scenarios	Mawa Ferry + Clearance of MG Channel						
Options	Option III Option II + Garments						
TOTAL TRAFFIC - MAXIMUM ALLOWABLE TRAFFIC							
In Metric Ton/No. of TEUs							
Year	2013	2014	2015	2016	2017	2018	2019
Total Containers - TEUs	-	-	4,167	28,087	42,562	60,000	60,000
Total Traffic - MT	-	-	121,014	145,789	175,874	200,000	200,000
TOTAL TRAFFIC - POTENTIAL TRAFFIC							
In Metric Ton/No. of TEUs							
Year	2013	2014	2015	2016	2017	2018	2019
Total Containers	-	-	4,167	28,087	42,562	64,442	97,924
Bulk Traffic	-	-	106,446	129,016	155,300	186,172	223,485
EXPORT							
In Metric Ton/No. of TEUs							
Non-Containerised Traffic	-	-	-	-	-	-	-
Number of TEUs	-	-	2,151	8,152	12,105	17,865	26,249
IMPORT							
In Metric Ton/No. of TEUs							
Year	2013	2014	2015	2016	2017	2018	2019
Containerised Traffic	-	-	14,568	144,040	220,076	336,555	517,897
Non-Containerised Traffic	-	-	106,446	129,016	155,300	186,172	223,485
Number of TEUs	-	-	2,016	19,935	30,458	46,578	71,675

COMMODITY WISE TRAFFIC

EXPORT

MT per TEU	2013	2014	2015	2016	2017	2018	2019
Year							
Raw Jute & Jute Products	-	-	9,699	14,555	21,237	30,353	42,704
Shrimp/Fish	-	-	3,968	5,451	7,280	9,705	12,735
General Cargo	-	-	1,876	2,456	3,140	3,951	4,920
Garments	-	-	-	27,820	42,883	66,102	101,893
Leather Goods	-	-	-	139	208	305	441
Container - Others	-	-	-	8,485	12,716	18,668	26,977
TOTAL	-	-	15,543	58,905	87,463	129,084	189,670

IMPORT

In Metric Ton	2013	2014	2015	2016	2017	2018	2019
Year							
Food Grain	-	-	24,367	30,622	38,536	48,568	61,306
Cement - Clinker	-	-	-	-	-	-	-
Fertilizers	-	-	78,437	94,201	113,133	133,400	157,298
LPG	-	-	-	-	-	-	-
Coal	-	-	-	-	-	-	-
Containerised Import	-	-	-	127,267	199,502	312,736	490,240
Bulk Others	-	-	-	-	-	-	-
General Cargo	-	-	18,210	20,966	24,205	28,022	32,539
MT per TEU	-	-	121,014	273,056	375,376	522,726	741,382

Projected Revenue by Product Line (in thousands)											
2020		2021		2022		2023		2024		2025	
Category A	Category B	Category C	Category D	Category E	Category F	Category G	Category H	Category I	Category J	Category K	Category L
70000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000
240000	480000	480000	480000	480000	480000	480000	480000	480000	480000	480000	480000
2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
60,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000
200,000	342,982	392,457	449,286	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000

2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
149,348	219,161	268,600	327,923	399,119	485,339	540,784	602,885	672,472	751,598	758,064	846,969
267,664	305,391	348,521	394,817	450,714	514,655	576,429	645,720	723,461	802,666	899,131	1,007,335

-	-	-	-	-	-	-	-	-	-	-	-
38,533	61,130	78,655	100,214	126,631	159,242	178,010	199,251	223,307	250,568	254,235	285,914

2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
800,709	1,141,877	1,372,481	1,645,348	1,968,906	2,356,262	2,621,278	2,916,518	3,245,516	3,620,272	4,030,627	4,488,444
267,664	305,391	348,521	394,817	450,714	514,655	576,429	645,720	723,461	802,666	899,131	1,007,335
110,815	158,031	189,946	227,709	272,488	326,097	362,774	403,634	449,166	501,030	503,828	561,055

2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
59,340	101,318	133,256	171,684	215,625	267,468	280,184	293,503	307,457	322,073	337,384	353,424
16,810	28,846	38,500	50,335	64,782	82,345	91,032	100,636	111,253	122,990	135,966	150,310
6,082	10,178	13,285	17,037	21,572	27,059	30,595	34,649	39,303	44,655	50,819	57,930
157,064	229,797	281,492	343,204	418,445	510,181	583,152	666,561	761,899	870,873	995,434	1,137,811
629	1,151	1,637	2,281	3,129	4,239	4,845	5,538	6,330	7,235	8,270	9,453
38,503	70,417	100,163	139,568	191,437	259,340	296,433	338,832	387,295	442,690	506,008	578,382
278,428	441,706	568,332	724,109	914,988	1,150,631	1,286,241	1,439,719	1,613,537	1,810,517	2,033,881	2,287,310

2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
76,501	88,306	101,980	117,824	136,192	157,496	176,652	198,201	222,451	249,747	280,483	315,100
-	-	-	-	-	-	-	-	-	-	-	-
185,477	210,452	238,788	270,941	307,423	348,816	389,963	435,964	487,392	544,885	609,161	681,019
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
768,492	1,104,286	1,328,545	1,590,880	1,905,015	2,281,179	2,532,957	2,812,525	3,122,949	3,467,635	3,850,365	4,275,337
-	-	-	-	-	-	-	-	-	-	-	-
37,902	44,224	51,689	60,521	70,990	83,426	98,134	115,548	136,186	160,671	189,750	224,323
1,068,372	1,447,268	1,721,002	2,040,165	2,419,620	2,870,918	3,197,707	3,562,238	3,968,977	4,422,938	4,929,758	5,495,779

Projected Population by Age Group and Sex													
2032		2033		2034		2035		2036		2037		2038	
140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000	140000
480000	480000	480000	480000	480000	480000	480000	480000	480000	480000	480000	480000	480000	480000
140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000
480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000

2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000
480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000

2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
946,802	1,058,490	1,184,058	1,325,312	1,484,304	1,663,370	1,869,835	2,098,309	2,356,206	2,647,532	2,976,878	3,349,514
1,128,729	1,264,945	1,417,826	1,589,445	1,782,141	1,998,553	2,204,358	2,470,338	2,768,730	3,103,528	3,479,223	3,900,871

-	-	-	-	-	-	-	-	-	-	-	-
321,876	362,246	408,146	460,356	519,770	587,409	664,442	752,206	852,232	966,272	1,096,330	1,244,706

2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
4,999,412	5,569,949	6,207,298	6,919,648	7,716,273	8,607,689	9,643,143	10,768,819	12,031,787	13,450,081	15,044,380	16,838,462
1,128,729	1,264,945	1,417,826	1,589,445	1,782,141	1,998,553	2,204,358	2,470,338	2,768,730	3,103,528	3,479,223	3,900,871
624,927	696,244	775,912	864,956	964,534	1,075,961	1,205,393	1,346,102	1,503,973	1,681,260	1,880,548	2,104,808

2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
370,225	384,024	398,336	413,182	428,582	444,555	461,123	478,310	496,136	514,627	533,807	553,702
166,168	183,698	203,078	224,503	248,188	274,372	303,319	335,319	370,695	409,803	453,037	500,833
66,148	75,661	86,692	99,504	114,412	131,789	152,081	175,820	203,641	236,307	274,735	320,026
1,300,552	1,486,570	1,699,195	1,942,230	2,220,028	2,537,558	2,900,505	3,315,364	3,789,561	4,331,582	4,951,128	5,659,288
10,805	12,350	14,117	16,136	18,444	21,082	24,097	27,544	31,483	35,986	41,133	47,016
661,109	755,667	863,750	987,292	1,128,504	1,289,914	1,474,411	1,685,296	1,926,344	2,201,869	2,516,802	2,876,780
2,575,007	2,897,971	3,265,168	3,682,848	4,158,158	4,699,271	5,315,536	6,017,652	6,817,860	7,730,174	8,770,643	9,957,646

2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
354,102	398,057	447,608	503,486	566,517	637,639	717,915	808,551	910,915	1,026,561	1,157,254	1,304,997
-	-	-	-	-	-	-	-	-	-	-	-
761,353	851,164	951,569	1,063,818	1,189,308	1,329,601	1,486,443	1,661,787	1,857,815	2,076,967	2,321,970	2,595,874
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
4,747,214	5,271,174	5,852,964	6,498,967	7,216,271	8,012,746	8,897,128	9,879,122	10,969,501	12,180,227	13,524,582	15,017,318
-	-	-	-	-	-	-	-	-	-	-	-
265,471	314,500	372,983	442,822	526,318	626,256	746,015	889,696	1,062,286	1,269,854	1,519,798	1,821,144
6,128,141	6,834,894	7,625,124	8,509,093	9,498,414	10,606,242	11,847,502	13,239,157	14,800,517	16,553,609	18,523,604	20,739,333

Revenue											
Option C											
		Contract Year Calendar Year	2013	1 2014	2 2015	3 2016	4 2017	5 2018	6 2019		
Terminal Capacity		TEUs Tonnes	0 0	0 240,000	70,000 240,000	70,000 240,000	70,000 240,000	70,000 240,000	70,000 240,000		
Throughput (Containerised)											
Import	52%	TEUs	0	0	2,165	14,590	22,110	31,168	31,168		
Export	48%	"	0	0	2,002	13,496	20,452	28,832	28,832		
Total TEU		"	0	0	4,167	28,087	42,562	60,000	60,000		
Throughput (Non Containerised)											
Total Tonnes		Tonnes	0	0	121,014	145,789	175,874	200,000	200,000		
Throughput (Boxes)											
Total Import Containers					0	1,390	9,366	14,193	20,008	20,008	
		FCL Containers	20'	45.17%	0	628	4,231	6,411	9,037	9,037	
			40'	19.62%	0	273	1,838	2,785	3,926	3,926	
		Empty	20'	3.48%	0	48	326	493	696	696	
			40'	12.54%	0	174	1,175	1,780	2,510	2,510	
Total Export Containers					0	1,255	8,457	12,815	18,065	18,065	
		FCL Containers	20'	35.51%	0	445	3,003	4,550	6,414	6,414	
			40'	29.31%	0	368	2,479	3,757	5,296	5,296	
		LCL Containers	20'	10.93%	0	137	924	1,401	1,975	1,975	
			40'	8.28%	0	104	700	1,061	1,495	1,495	
		Empty	20'	10.34%	0	130	874	1,325	1,868	1,868	
			40'	5.63%	0	71	476	722	1,018	1,018	
Total Containers					0	2,644	17,823	27,008	38,073	38,073	
Tariff Escalation	3%				1.00	1.03	1.06	1.09	1.13	1.16	1.19
MT per TEU											
Dues on Ships											
Berth Charges											
(applicable on both import and export)											
Average TEU per ship		after dredging	1,000	500 TEUs/ ship							
Average Berth Occupancy time			3.00	3.00 days/ ship							
Average GRT of Ships			14,000	7000 tons/ ship							
No. of Container Ships						0	2	14	21	30	30
Berthing Fee			106.20	US\$/ ship	"000 US \$	0	0	2	3	4	4
Berth Occupancy Charge			0.04	per GRT / day	"	0	2	23	36	53	54
Revenue from Container Ships					"000 US \$	0	2	25	38	56	58
Average GRT per ship		after dredging	10,000	8,000 Tons/ ship							
Average Berth Occupancy time			6.00	6.00 days/ ship							
Average GRT of Ships			24,000	12,000 tons/ ship							
No. of GC Ships						0	6	7	9	10	10
Berthing Fee	MT per TEU		106.20	US\$/ ship	"000 US \$	0	1	1	1	1	1
Berth Occupancy Charge			0.04	per GRT / day	"	0	16	40	53	60	62
Revenue from GC Ships					"000 US \$	0	17	40	54	61	63
Total Revenue from Ships					m US \$	0.00	0.02	0.07	0.09	0.12	0.12

		<i>Contract Year</i>	1 2013	2 2014	3 2015	4 2016	5 2017	6 2018	
		<i>Calendar Year</i>	2013	2014	2015	2016	2017	2018	2019
Dues on Non- Containerised Cargo									
Handling Charge									
Import Cargo									
<i>Break Bulk Cargo</i>		1.00 <i>US\$ per 1000 kg</i>							
Import Amount		'000 kg							
Handling Charge		"'000 US \$							
			0	121,014		145,789	175,874	200,000	200,000
			0	128		159	198	232	239
Revenue from Handling		'000 US \$	0	128	159	198	232	239	
Revenue from Hoisting	(100% of Handling Ch.)	'000 US \$	0	128	159	198	232	239	
Cargo Storage Charge									
Cargo needing storage			tons						
<i>Tariff</i>		sqm/ton	1.67						
		US\$/sqm/month	0.56						
		sqm							
			0	24,203		29,158	35,175	40,000	40,000
			0	40,338		48,596	58,625	66,667	66,667
Revenue from Cargo Storage		'000 US \$	0	289	358	445	522	537	
Revenue from Non-Containerised Cargo		m US \$	0.00	0.55	0.68	0.84	0.99	1.01	
Dues on Containerised Cargo									
Crane Charge									
(import and export containers)									
FCL containers		Tariff (US\$)							
20'		18.00							
40'		27.00							
LCL containers			'000 US \$						
20'		18.00							
40'		27.00							
Empty container			'000 US \$						
20'		9.00							
40'		13.50							
		sqm							
			0	20	142	222	322	332	
			0	18	127	199	289	297	
Revenue from Cranes		'000 US \$	0	52	359	561	815	839	
Loading and Discharging Charge									
FCL containers		Tariff (US\$)							
20'		52.08							
40'		78.12							
LCL containers			'000 US \$						
20'		156.00							
40'		234.00							
Empty container			'000 US \$						
20'		26.52							
		sqm							
			0	5	35	54	79	81	
			0	10	72	112	163	168	
Revenue from Loading and Discharging		'000 US \$	0	195	1,351	2,109	3,063	3,155	
Container Storage Charge									
Containers needing Storage		Tariff (US\$)							
20'		1.80							
40'		3.60							
		sqm							
			0	593	3,998	6,059	8,541	8,541	
			0	400	2,697	4,088	5,762	5,762	
Revenue from Container Storage		'000 US \$	0	19	129	202	293	302	

		<i>Contract Year</i>	1 2014	2 2015	3 2016	4 2017	5 2018	6 2019
		<i>Calendar Year</i>	2013	2014	2015	2016	2017	2018
Reefer Container Service Charge								
Containers Needing Reefer Service		25% of export containers		0	314	2,114	3,204	4,516
	Tariff	13.2	US\$/ cont.	000 US\$	0	4	30	48
Revenue from Reefer Container Service			'000 US \$	0	4	30	48	69
Extra Movement Charge								
Containers needing Extra Movement		Tariff (US\$)						
	20'	51.12		0	196	1,319	1,999	2,818
	40'	76.68		0	113	764	1,157	1,632
Revenue from Extra Movement			'000 US \$	0	20	138	215	312
Lift on/ Lift Off Charge								
Containers needing Lift on/Lift off		Tariff (US\$)						
	20'	15.00		0	522	3,518	5,331	7,515
	40'	22.50		0	302	2,037	3,087	4,351
Revenue from Lift on/ Lift off			'000 US \$	0	16	108	168	244
Revenue from Containerised Cargo			m US \$	0.00	0.30	2.12	3.30	4.80
Total Revenue			m US \$	0.00	0.87	2.86	4.24	5.90
	<i>Revenue per TEU</i>		US\$/ TEU	0.00	77.71	77.66	79.76	81.89
								84.34

Revenue												
Option C		7 2020	8 2021	9 2022	10 2023	11 2024	12 2025	13 2026	14 2027	15 2028	16 2029	17 2030
Terminal Capacity		70,000 240,000	140,000 480,000	140,000 480,000	140,000 480,000	140,000 480,000	140,000 480,000	140,000 480,000	140,000 480,000	140,000 480,000	140,000 480,000	140,000 480,000
Throughput (Containerised)												
Import	52%	31,168	72,726	72,726	72,726	72,726	72,726	72,726	72,726	72,726	72,726	72,726
Export	48%	28,832	67,274	67,274	67,274	67,274	67,274	67,274	67,274	67,274	67,274	67,274
Total TEU		60,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000
Throughput (Non Containerised)												
Total Tonnes		200,000	342,982	392,457	449,286	480,000						
Throughput (Boxes)												
Total Import Containers		20,008	46,685	46,685	46,685	46,685	46,685	46,685	46,685	46,685	46,685	46,685
FCL Containers		9,037	21,087	21,087	21,087	21,087	21,087	21,087	21,087	21,087	21,087	21,087
		3,926	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160
Empty		696	1,623	1,623	1,623	1,623	1,623	1,623	1,623	1,623	1,623	1,623
		2,510	5,856	5,856	5,856	5,856	5,856	5,856	5,856	5,856	5,856	5,856
Total Export Containers		18,065	42,153	42,153	42,153	42,153	42,153	42,153	42,153	42,153	42,153	42,153
FCL Containers		6,414	14,967	14,967	14,967	14,967	14,967	14,967	14,967	14,967	14,967	14,967
		5,296	12,356	12,356	12,356	12,356	12,356	12,356	12,356	12,356	12,356	12,356
LCL Containers		1,975	4,608	4,608	4,608	4,608	4,608	4,608	4,608	4,608	4,608	4,608
		1,495	3,489	3,489	3,489	3,489	3,489	3,489	3,489	3,489	3,489	3,489
Empty		1,868	4,359	4,359	4,359	4,359	4,359	4,359	4,359	4,359	4,359	4,359
		1,018	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374
Total Containers		38,073	88,837	88,837	88,837	88,837	88,837	88,837	88,837	88,837	88,837	88,837
Tariff Escalation	3%		1.23	1.27	1.30	1.34	1.38	1.43	1.47	1.51	1.56	1.60
MT per TEU												
Dues on Ships												
Berth Charges												
(applicable on both import and export)												
		<i>after dredging</i>	<i>before dredging</i>									
Average TEU per ship		1,000	500									
Average Berth Occupancy time		3.00	3.00									
Average GRT of Ships		14,000	7000									
No. of Container Ships		30	70	70	70	70	70	70	70	70	70	70
Berthing Fee		106.20 US\$/ ship	4	9	10	10	11	11	11	12	12	12
Berth Occupancy Charge		0.04 per GRT / day	56	134	138	142	147	151	155	160	165	170
Revenue from Container Ships		60	143	148	152	157	162	166	171	176	182	187
		<i>after dredging</i>	<i>before dredging</i>									
Average GRT per ship		10,000	8,000									
Average Berth Occupancy time		6.00	6.00									
Average GRT of Ships		24,000	12,000									
No. of GC Ships		10	17	20	22	24	24	24	24	24	24	24
Berthing Fee	MT per TEU	106.20 US\$/ ship	1	2	3	4	4	4	4	4	4	4
Berth Occupancy Charge		0.04 per GRT / day	64	112	135	153	172	177	183	188	194	200
Revenue from GC Ships		65	114	138	156	176	181	186	192	198	204	210
Total Revenue from Ships		0.12	0.26	0.29	0.31	0.33	0.34	0.35	0.36	0.37	0.39	0.40

	7 2020	8 2021	9 2022	10 2023	11 2024	12 2025	13 2026	14 2027	15 2028	16 2029	17 2030	
Dues on Non- Containerised Cargo												
Handling Charge												
Import Cargo												
<i>Break Bulk Cargo</i>												
Import Amount	200,000	342,982	392,457	449,286	480,000	480,000	480,000	480,000	480,000	480,000	480,000	
Handling Charge	246	434	512	604	664	684	705	726	748	770	793	
Revenue from Handling	246	434	512	604	664	684	705	726	748	770	793	
Revenue from Hoisting	<i>(100% of Handling Ch.)</i>	246	434	512	604	664	684	705	726	748	770	793
Cargo Storage Charge												
Cargo needing storage	40,000	68,596	78,491	89,857	96,000	96,000	96,000	96,000	96,000	96,000	96,000	
<i>Tariff</i>	sqm/ton US\$/sqm/month	1.67 0.56	66,667	114,327	130,819	149,762	160,000	160,000	160,000	160,000	160,000	
Revenue from Cargo Storage	553	978	1,152	1,359	1,495	1,540	1,586	1,634	1,683	1,733	1,785	
Revenue from Non-Containerised Cargo	1.05	1.85	2.18	2.57	2.82	2.91	3.00	3.09	3.18	3.27	3.37	
Dues on Containerised Cargo												
Crane Charge												
<i>(import and export containers)</i>												
<i>FCL containers</i>												
20'	18.00	342	822	847	872	898	925	953	982	1,011	1,041	
40'	27.00	306	736	758	781	804	828	853	879	905	932	
<i>LCL containers</i>												
20'	18.00	74	178	183	188	194	200	206	212	218	225	
40'	27.00	55	132	136	140	145	149	153	158	163	168	
<i>Empty container</i>												
20'	9.00	28	68	70	72	75	77	79	81	84	86	
40'	13.50	59	141	145	149	154	158	163	168	173	184	
Revenue from Cranes	864	2,077	2,139	2,203	2,269	2,337	2,408	2,480	2,554	2,631	2,710	
Loading and Discharging Charge												
<i>FCL containers</i>												
20'	52.08	990	2,379	2,450	2,523	2,599	2,677	2,757	2,840	2,925	3,013	
40'	78.12	886	2,129	2,193	2,259	2,327	2,396	2,468	2,542	2,619	2,697	
<i>LCL containers</i>												
20'	156.00	640	1,539	1,585	1,632	1,681	1,732	1,784	1,837	1,892	1,949	
40'	234.00	477	1,146	1,181	1,216	1,252	1,290	1,329	1,369	1,410	1,452	
<i>Empty container</i>												
20'	26.52	84	201	207	213	220	226	233	240	247	255	
40'	39.84	173	415	428	441	454	468	482	496	511	526	
Revenue from Loading and Discharging	3,249	7,809	8,043	8,285	8,533	8,789	9,053	9,324	9,604	9,892	10,189	
Container Storage Charge												
<i>Containers needing Storage</i>												
20'	8,541	19,929	19,929	19,929	19,929	19,929	19,929	19,929	19,929	19,929	19,929	
40'	5,762	13,445	13,445	13,445	13,445	13,445	13,445	13,445	13,445	13,445	13,445	
Revenue from Container Storage	311	747	770	793	817	841	866	892	919	947	975	

	7 2020	8 2021	9 2022	10 2023	11 2024	12 2025	13 2026	14 2027	15 2028	16 2029	17 2030
Reefer Container Service Charge											
Containers Needing Reefer Service	4,516	10,538	10,538	10,538	10,538	10,538	10,538	10,538	10,538	10,538	10,538
<i>Tariff</i>	13.2	73	176	181	187	193	198	204	210	217	223
Revenue from Reefer Container Service	73	176	181	187	193	198	204	210	217	223	230
Extra Movement Charge											
Containers needing Extra Movement	20' 40'	2,818 1,632	6,576 3,807								
Revenue from Extra Movement	331	796	820	844	869	896	922	950	979	1008	1038
Lift on/ Lift Off Charge											
Containers needing Lift on/Lift off	20' 40'	7,515 4,351	17,536 10,153								
Revenue from Lift on/ Lift off	259	623	641	661	680	701	722	743	766	789	812
Revenue from Containerised Cargo	5.09	12.23	12.59	12.97	13.36	13.76	14.17	14.60	15.04	15.49	15.95
Total Revenue	6.26	14.33	15.06	15.85	16.52	17.01	17.52	18.05	18.59	19.15	19.72
<i>Revenue per TEU</i>	86.87	89.18	92.00	94.86	97.81	100.75	103.77	106.88	110.09	113.39	116.79

Revenue													
Option C		18 2031	19 2032	20 2033	21 2034	22 2035	23 2036	24 2037	25 2038	26 2039	27 2040		
Terminal Capacity		140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000		
		480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000		
Throughput (Containerised)													
Import		52%	72,726	72,726	72,726	72,726	72,726	72,726	72,726	72,726	72,726		
Export		48%	67,274	67,274	67,274	67,274	67,274	67,274	67,274	67,274	67,274		
Total TEU			140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000		
Throughput (Non Containerised)													
Total Tonnes			480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000		
Throughput (Boxes)													
Total Import Containers			46,685	46,685	46,685	46,685	46,685	46,685	46,685	46,685	46,685		
FCL Containers		21,087	21,087	21,087	21,087	21,087	21,087	21,087	21,087	21,087	21,087		
Empty		9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160	9,160		
Empty		1,623	1,623	1,623	1,623	1,623	1,623	1,623	1,623	1,623	1,623		
		5,856	5,856	5,856	5,856	5,856	5,856	5,856	5,856	5,856	5,856		
Total Export Containers			42,153	42,153	42,153	42,153	42,153	42,153	42,153	42,153	42,153		
FCL Containers		14,967	14,967	14,967	14,967	14,967	14,967	14,967	14,967	14,967	14,967		
LCL Containers		12,356	12,356	12,356	12,356	12,356	12,356	12,356	12,356	12,356	12,356		
Empty		4,608	4,608	4,608	4,608	4,608	4,608	4,608	4,608	4,608	4,608		
Empty		3,489	3,489	3,489	3,489	3,489	3,489	3,489	3,489	3,489	3,489		
		2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374	2,374		
Total Containers			88,837	88,837	88,837	88,837	88,837	88,837	88,837	88,837	88,837		
Tariff Escalation	MT per TEU	3%		1.70	1.75	1.81	1.86	1.92	1.97	2.03	2.09	2.16	2.22
Dues on Ships													
Berth Charges													
(applicable on both import and export)													
Average TEU per ship			<i>after dredging</i>	1,000	500								
Average Berth Occupancy time				3.00	3.00								
Average GRT of Ships				14,000	7000								
No. of Container Ships				70	70	70	70	70	70	70	70		
Berthing Fee				106.20	US\$/ ship	13	13	14	14	15	15		
Berth Occupancy Charge				0.04	per GRT / day	180	186	191	197	203	209		
Revenue from Container Ships				193	199	205	211	217	224	230	237	244	252
Average GRT per ship			<i>after dredging</i>	10,000	8,000								
Average Berth Occupancy time				6.00	6.00								
Average GRT of Ships				24,000	12,000								
No. of GC Ships				24	24	24	24	24	24	24	24		
Berthing Fee	MT per TEU			106.20	US\$/ ship	4	4	5	5	5	5		
Berth Occupancy Charge				0.04	per GRT / day	212	218	225	231	238	246		
Revenue from GC Ships				216	223	229	236	243	251	258	266	274	282
Total Revenue from Ships				0.41	0.42	0.43	0.45	0.46	0.47	0.49	0.50	0.52	0.53

	18 2031	19 2032	20 2033	21 2034	22 2035	23 2036	24 2037	25 2038	26 2039	27 2040	
Dues on Non- Containerised Cargo											
Handling Charge											
Import Cargo											
<i>Break Bulk Cargo</i>											
Import Amount	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	
Handling Charge	817	842	867	893	920	947	976	1,005	1,035	1,066	
Revenue from Handling	817	842	867	893	920	947	976	1,005	1,035	1,066	
Revenue from Hoisting	<i>(100% of Handling Ch.)</i>	817	842	867	893	920	947	976	1,005	1,035	1,066
Cargo Storage Charge											
Cargo needing storage	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	96,000	
<i>Tariff</i>	sqm/ton 1.67	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	
US\$/sqm/month 0.56											
Revenue from Cargo Storage	1,839	1,894	1,951	2,009	2,069	2,131	2,195	2,261	2,329	2,399	
Revenue from Non-Containerised Cargo	3.47	3.58	3.68	3.80	3.91	4.03	4.15	4.27	4.40	4.53	
Dues on Containerised Cargo											
Crane Charge											
<i>(import and export containers)</i>											
FCL containers											
20'	18.00	1,105	1,138	1,172	1,207	1,243	1,281	1,319	1,359	1,400	
40'	27.00	989	1,019	1,049	1,081	1,113	1,147	1,181	1,216	1,253	
LCL containers											
20'	18.00	239	246	253	261	269	277	285	293	302	
40'	27.00	178	183	189	194	200	206	212	219	225	
Empty container											
20'	9.00	92	94	97	100	103	106	109	113	116	
40'	13.50	189	195	201	207	213	219	226	233	240	
Revenue from Cranes	2,791	2,875	2,961	3,050	3,141	3,235	3,333	3,433	3,536	3,642	
Loading and Discharging Charge											
FCL containers											
20'	52.08	3,197	3,293	3,391	3,493	3,598	3,706	3,817	3,931	4,049	
40'	78.12	2,861	2,947	3,036	3,127	3,221	3,317	3,417	3,519	3,625	
LCL containers											
20'	156.00	2,068	2,130	2,194	2,260	2,327	2,397	2,469	2,543	2,619	
40'	234.00	1,540	1,587	1,634	1,683	1,734	1,786	1,839	1,894	1,951	
Empty container											
20'	26.52	270	278	286	295	304	313	322	332	342	
40'	39.84	558	575	592	610	628	647	667	687	707	
Revenue from Loading and Discharging	10,495	10,809	11,134	11,468	11,812	12,166	12,531	12,907	13,294	13,693	
Container Storage Charge											
Containers needing Storage											
20'	19,929	19,929	19,929	19,929	19,929	19,929	19,929	19,929	19,929	19,929	
40'	13,445	13,445	13,445	13,445	13,445	13,445	13,445	13,445	13,445	13,445	
Revenue from Container Storage	1,004	1,034	1,065	1,097	1,130	1,164	1,199	1,235	1,272	1,310	

	18 2031	19 2032	20 2033	21 2034	22 2035	23 2036	24 2037	25 2038	26 2039	27 2040
Reefer Container Service Charge										
Containers Needing Reefer Service		10,538	10,538	10,538	10,538	10,538	10,538	10,538	10,538	10,538
	Tariff	13.2		237	244	251	259	267	275	283
Revenue from Reefer Container Service		237	244	251	259	267	275	283	291	300
Extra Movement Charge										
Containers needing Extra Movement	20' 40'	6,576 3,807								
Revenue from Extra Movement		1069	1101	1134	1168	1204	1240	1277	1315	1355
Lift on/ Lift Off Charge										
Containers needing Lift on/Lift off	20' 40'	17,536 10,153								
Revenue from Lift on/ Lift off		837	862	888	914	942	970	999	1,029	1,060
Revenue from Containerised Cargo		16.43	16.93	17.43	17.96	18.50	19.05	19.62	20.21	20.82
Total Revenue		20.31	20.92	21.55	22.20	22.86	23.55	24.26	24.98	25.73
	Revenue per TEU	120.30	123.91	127.62	131.45	135.40	139.46	143.64	147.95	152.39
										156.96

Revenue

Option C

	28 2041	29 2042	30 2043
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Terminal Capacity	140,000 480,000	140,000 480,000	140,000 480,000
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Throughput (Containerised)

Import	52%	72,726	72,726	72,726
Export	48%	67,274	67,274	67,274
Total TEU		140,000	140,000	140,000

Throughput (Non Containerised)

Total Tonnes	480,000	480,000	480,000
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Throughput (Boxes)

Total Import Containers	46,685	46,685	46,685
<i>FCL Containers</i>	21,087	21,087	21,087
9,160	9,160	9,160	9,160
<i>Empty</i>	1,623	1,623	1,623
5,856	5,856	5,856	5,856
Total Export Containers	42,153	42,153	42,153
<i>FCL Containers</i>	14,967	14,967	14,967
12,356	12,356	12,356	12,356
<i>LCL Containers</i>	4,608	4,608	4,608
3,489	3,489	3,489	3,489
<i>Empty</i>	4,359	4,359	4,359
2,374	2,374	2,374	2,374
Total Containers	88,837	88,837	88,837

Tariff Escalation

MT per TEU	3%	2.29	2.36	2.43
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Dues on Ships

Berth Charges

(applicable on both import and export)

	after dredging	before dredging
Average TEU per ship	1,000	500
Average Berth Occupancy time	3.00	3.00
Average GRT of Ships	14,000	7000

No. of Container Ships

Berthing Fee	70	70	70
Berth Occupancy Charge	17	18	18
	242	249	257

Berth Occupancy Charge

Revenue from Container Ships

	after dredging	before dredging
Average GRT per ship	10,000	8,000
Average Berth Occupancy time	6.00	6.00
Average GRT of Ships	24,000	12,000

No. of GC Ships

Berthing Fee	24	24	24
MT per TEU	6	6	6
Berth Occupancy Charge	285	293	302

Revenue from GC Ships

Total Revenue from Ships	0.55	0.57	0.58
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	28 2041	29 2042	30 2043	
Dues on Non- Containerised Cargo				
Handling Charge				
Import Cargo				
<i>Break Bulk Cargo</i>				
Import Amount	480,000	480,000	480,000	
Handling Charge	1,098	1,131	1,165	
Revenue from Handling	1,098	1,131	1,165	
Revenue from Hoisting	<i>(100% of Handling Ch.)</i>	1,098	1,131	1,165
Cargo Storage Charge				
Cargo needing storage	96,000	96,000	96,000	
<i>Tariff</i>	160,000	160,000	160,000	
sqm/ton	1.67			
US\$/sqm/month	0.56			
Revenue from Cargo Storage	2,471	2,545	2,621	
Revenue from Non-Containerised Cargo	4.67	4.81	4.95	
Dues on Containerised Cargo				
Crane Charge				
<i>(import and export containers)</i>				
FCL containers				
20'	18.00	1,485	1,529	1,575
40'	27.00	1,329	1,369	1,410
LCL containers				
20'	18.00	321	330	340
40'	27.00	239	246	253
Empty container				
20'	9.00	123	127	131
40'	13.50	254	262	270
Revenue from Cranes	3,751	3,863	3,979	
Loading and Discharging Charge				
FCL containers				
20'	52.08	4,296	4,425	4,558
40'	78.12	3,846	3,961	4,080
LCL containers				
20'	156.00	2,779	2,862	2,948
40'	234.00	2,070	2,132	2,196
Empty container				
20'	26.52	363	374	385
40'	39.84	750	773	796
Revenue from Loading and Discharging	14,104	14,527	14,963	
Container Storage Charge				
Containers needing Storage				
20'	19,929	19,929	19,929	
40'	13,445	13,445	13,445	
Revenue from Container Storage	1,350	1,390	1,432	

	28 2041	29 2042	30 2043
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Reefer Container Service Charge

Containers Needing Reefer Service	10,538	10,538	10,538	
Tariff	13.2	318	328	338

Revenue from Reefer Container Service

318 328 338

Extra Movement Charge

Containers needing Extra Movement	20'	6,576	6,576	6,576
	40'	3,807	3,807	3,807

Revenue from Extra Movement

1437 1480 1525

Lift on/ Lift Off Charge

Containers needing Lift on/Lift off	20'	17,536	17,536	17,536
	40'	10,153	10,153	10,153

Revenue from Lift on/ Lift off

1,124 1,158 1,193

Revenue from Containerised Cargo

22.08 22.75 23.43

Total Revenue

27.30 28.12 28.96

Revenue per TEU 161.67 166.52 171.52

O & M Cost

Option C	Contract Year Calendar Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2027
Fixed Costs																
Civil Structure Maintenance	escalation 1% mil US\$/ year 0.06 0.23	Phase I m US \$	0.00	0.06	0.06	0.06	0.06	0.06	0.06	0.25	0.25	0.25	0.25	0.26	0.26	0.26
Salary Expenses	escalation 2% mil US\$/ year 0.44 0.68	Phase I m US \$	0.00	0.46	0.47	0.48	0.49	0.50	0.51	0.80	0.82	0.83	0.85	0.87	0.88	0.90
Office Maintenance	escalation 1% mil US\$/ year 0.09	m US \$	0.00	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Electricity	escalation 1% mil US\$/ year 0.004	Phase I m US \$	0.000	0.004	0.004	0.004	0.004	0.004	0.004	0.008	0.008	0.008	0.008	0.008	0.009	0.009
Insurance	gross fixed assets value 0.5%	m US \$	0.09	0.07	0.06	0.05	0.04	0.10	0.20	0.18	0.15	0.14	0.13	0.11	0.09	0.08
Lease Rental	escalation 2% mil US\$/ year 0.30 0.10	Phase I m US \$	0.30	0.31	0.31	0.32	0.32	0.33	0.34	0.11	0.12	0.12	0.12	0.12	0.13	0.13
Total Fixed Costs		m US \$	0.39	0.99	1.00	1.01	1.02	1.09	1.21	1.44	1.44	1.46	1.46	1.47	1.48	1.49
Variable Costs																
Terminal Capacity Terminal Traffic	TEUs "	0 0	70,000 4,167	70,000 28,087	70,000 42,562	70,000 60,000	70,000 60,000	70,000 140,000	140,000 140,000							
Equipment Maintenance	MT per TEU first 5 years 2.52 thereafter 6.30	US\$/ year/TEU m US \$	0.00	0.01	0.07	0.11	0.15	0.15	0.38	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Fuel / Diesel	escalation 2% US\$/ year/TEU 10.45 10.45	Phase I m US \$	0.00	0.05	0.32	0.49	0.71	0.73	0.74	1.78	1.82	1.87	1.91	1.96	2.01	2.06
Other expenses	of O&M costs 5%	"	0.02	0.05	0.07	0.08	0.09	0.10	0.12	0.21	0.21	0.21	0.21	0.22	0.22	0.22
Total Variable Costs		m US \$	0.02	0.11	0.46	0.68	0.95	0.98	1.24	2.87	2.91	2.96	3.01	3.06	3.11	3.16
Total O & M Cost		m US \$	0.41	1.10	1.45	1.68	1.97	2.06	2.45	4.31	4.35	4.42	4.47	4.53	4.59	4.65
	O&M per TEU	US\$/ TEU	0	264	52	40	33	34	41	31	31	32	32	32	33	33

O & M Cost

Option C	Contract Year Calendar Year	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
		2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043		
Fixed Costs																			
Civil Structure Maintenance	escalation 1% mil US\$/ year 0.06 0.23	Phase I	m US \$ 0.26	1.16	1.17	1.18	1.20	1.21	1.22	1.23	1.24	1.26	1.27	1.28	1.30	1.31	1.32	1.33	1.35
Salary Expenses	escalation 2% mil US\$/ year 0.44 0.68	Phase I	m US \$ 0.92	1.35	1.37	1.40	1.43	1.46	1.49	1.52	1.55	1.58	1.61	1.64	1.67	1.71	1.74	1.78	1.81
Office Maintenance	escalation 1% mil US\$/ year 0.09	m US \$ 0.10	1.16	1.17	1.18	1.20	1.21	1.22	1.23	1.24	1.26	1.27	1.28	1.30	1.31	1.32	1.33	1.35	
Electricity	escalation 1% mil US\$/ year 0.004	Phase I	m US \$ 0.009	1.16	1.17	1.18	1.20	1.21	1.22	1.23	1.24	1.26	1.27	1.28	1.30	1.31	1.32	1.33	1.35
Insurance	gross fixed assets value 0.5%	m US \$ 0.07	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.010	0.010	0.010	0.010	0.010	0.010	0.010	
Lease Rental	escalation 2% mil US\$/ year 0.30 0.10	Phase I	m US \$ 0.13	1.32	1.35	1.37	1.40	1.43	1.46	1.49	1.52	1.55	1.58	1.61	1.64	1.67	1.71	1.74	1.78
Total Fixed Costs		m US \$	1.50	1.52	1.53	1.55	1.60	1.62	1.64	1.66	1.68	1.70	1.73	1.75	1.78	1.81	1.84	1.87	
Variable Costs																			
Terminal Capacity	TEUs	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000		
Terminal Traffic	"	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000	140,000		
MT per TEU																			
Equipment Maintenance	first 5 years 2.52 thereafter 6.30	US\$/year/TEU	m US \$ 0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Fuel / Diesel	escalation 2% US\$/ year/TEU 10.45 10.45	Phase I	m US \$ 2.11	1.44	1.48	1.52	1.55	1.59	1.63	1.67	1.71	1.76	1.80	1.84	1.89	1.94	1.98	2.03	2.08
Fuel / Diesel	Phase II	m US \$ 2.22	2.27	2.33	2.39	2.45	2.51	2.57	2.63	2.70	2.76	2.83	2.90	2.98	3.05				
Other expenses	of O&M costs 5%	"	0.22	0.23	0.23	0.24	0.24	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.27	0.28	0.28	0.29	
Total Variable Costs		m US \$	3.22	3.27	3.33	3.39	3.45	3.51	3.58	3.64	3.71	3.78	3.85	3.92	3.99	4.07	4.14	4.22	
Total O & M Cost		m US \$	4.72	4.79	4.87	4.94	5.05	5.13	5.21	5.30	5.39	5.48	5.57	5.67	5.77	5.88	5.98	6.09	
O&M per TEU		US\$/ TEU	34	34	35	35	36	37	37	38	38	39	40	40	41	42	43	44	

Assets Schedule

		<i>Contract Year</i> <i>Calendar Year</i>	2013	1	2	3	4	5	6	7	8	9	10	11	2023	2024
Civil Cost Escalation Factor	2.48%			1.02	1.05	1.08	1.10	1.13	1.16	1.19	1.22	1.25	1.28	1.31		
Equipment Cost escalation factor	2.48%			1.02	1.05	1.08	1.10	1.13	1.16	1.19	1.22	1.25	1.28	1.31		
Civil Construction																
Option A		m US\$		13.38	13.71											
Option B		m US\$		6.69								11.78	12.08			
Equipment																
Mobile Harbour Crane	Service Life	25	years													
Initial units																
Option A					2	2										
Option A		m US\$			6.40	6.56										
Option B		"			6.40								7.42			
Replacement units																
Option A																
Option B																
Replacement total costs																
Option A		m US\$														
Option B		"														
Mobile Cranes 10 T	Service Life	12	years													
Initial units																
Option A					1	1										
Option B					1								1			
Initial total Costs	MT per TEU	0.03														
Option A		m US\$			0.03	0.03										
Option B		"			0.03								0.04			
Replacement units																
Option A																
Option B																
Replacement total costs																
Option A		m US\$														
Option B		"														

		<i>Contract Year</i>	1	2	3	4	5	6	7	8	9	10	11	
		<i>Calendar Year</i>	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Tractor Trailer	Service Life	8 years												
Initial units														
	Option A				5	5								
	Option B				5						5			
Initial total Costs		m US\$/ tractor	0.03											
	Option A			m US\$		0.16	0.16							
	Option B		"		0.16						0.19			
Replacement units														
	Option A										5	5		
	Option B										5			
Replacement total costs		MT per TEU												
	Option A			m US\$							0.20	0.20		
	Option B		"								0.20			
High Mast Fork Lift Trucks(FLT), 5 T	Service Life	8 years												
Initial units														
	Option A					2								
	Option B				2									
Initial total Costs		m US\$/ crane	0.06											
	Option A			m US\$			0.13							
	Option B		"		0.13									
Replacement units											2			
	Option A										2			
	Option B										2			
Replacement total costs												0.16		
	Option A			m US\$								0.16		
	Option B		"									0.16		
Low Mast Fork Lift Trucks(FLT), 3 T	Service Life	8 years												
Initial units														
	Option A					2								
	Option B				2									
Initial total Costs		m US\$/ crane	0.04											
	Option A			m US\$			0.08							
	Option B		"		0.08									
Replacement units											2			
	Option A										2			
	Option B										2			
Replacement total costs												0.10		
	Option A			m US\$								0.10		

		<i>Contract Year</i>	1	2	3	4	5	6	7	8	9	10	11	
		<i>Calendar Year</i>	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
	Option B	"												0.10
Reach Stackers	Service Life	8 years												
Initial units														
	Option A		1	1										
	Option B		1										1	
Initial total Costs	m US\$/ crane	0.50												
	Option A	m US\$		0.51	0.53									
	Option B	"		0.51								0.59		
Replacement units														
	Option A											1	1	
	Option B											1		
Replacement total costs														
	Option A	m US\$										0.64	0.65	
	Option B	"										0.64		
Mobile Hopper	Service Life	8 years												
Initial units														
	Option A		2	2										
	Option B		2									2		
Initial total Costs	m US\$/ crane	0.09												
	Option A	m US\$		0.18	0.19									
	Option B	"		0.18								0.21		
Replacement units														
	Option A											2	2	
	Option B											2		
Replacement total costs														
	Option A	m US\$										0.23	0.24	
	Option B	"										0.23		
Lorry/Truck 3-5 T	Service Life	8 years												
Initial units														
	Option A		4	4										
	Option B		4									4		
Initial total Costs	m US\$/ crane	0.05												
	Option A	m US\$		0.20	0.21									
	Option B	"		0.20								0.24		
Replacement units														
	Option A											4	4	
	Option B											4		

	<i>Contract Year</i>		1	2	3	4	5	6	7	8	9	10	11	
	<i>Calendar Year</i>		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Replacement total costs		m US\$											0.26	0.26
	Option A	"											0.26	
	Option B	"											0.26	
Workshop Equipment	Service Life	8 years												
Initial units								1						
	Option A													
	Option B							1						
Initial total Costs	LS	0.13												
	Option A	m US\$						0.13						
	Option B	"						0.13						
Replacement units													1	
	Option A												1	
	Option B												1	
Replacement total costs													0.16	
	Option A	m US\$											0.16	
	Option B	"											0.16	
Subtotal														
	Option A	m US\$		7.50	8.03								1.32	1.78
	Option B	"		7.83									1.74	
CDVAT	18%													
	Option A	"		1.35	1.44								0.24	0.32
	Option B	"		1.41									0.31	
Contingency	15%													
	Option A	m US\$		1.33	1.42								0.23	0.32
	Option B	"		1.39									0.31	
Total Equipment Cost														
	Option A	m US\$		10.18	10.89								1.80	2.42
	Option B	"		10.63									11.79	2.36
Total Cost														
	Option A	m US\$		23.56	24.60								1.80	2.42
	cumulative	"		23.56	48.16	48.16	48.16	48.16	48.16	48.16	48.16	48.16	49.96	52.38
	Option B	"		17.32									11.78	23.86
	cumulative	"		17.32	17.32	17.32	17.32	17.32	29.10	52.96	52.96	55.32	55.32	

Assets Schedule

	<i>Contract Year</i>	12	13	14	15	16	17	18	19	20	21	22	23	24
	<i>Calendar Year</i>	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Civil Cost Escalation Factor	2.48%	1.34	1.37	1.41	1.44	1.48	1.52	1.55	1.59	1.63	1.67	1.71	1.76	1.80
Equipment Cost escalation factor	2.48%	1.34	1.37	1.41	1.44	1.48	1.52	1.55	1.59	1.63	1.67	1.71	1.76	1.80
Civil Construction														
Option A														
Option B														
Equipment														
Mobile Harbour Crane	Service Life	25	years											
Initial units														
Option A														
Option A						m US\$								
Option B						"								
Replacement units														
Option A														
Option B														
Replacement total costs														
Option A						m US\$								
Option B						"								
Mobile Cranes 10 T	Service Life	12	years											
Initial units														
Option A														
Option B														
Initial total Costs	MT per TEU	0.03												
Option A						m US\$								
Option B						"								
Replacement units														
Option A							1	1						
Option B							1							1
Replacement total costs														
Option A						m US\$		0.04	0.05					
Option B								0.04						0.05

		<i>Contract Year</i>	12	13	14	15	16	17	18	19	20	21	22	23	24
		<i>Calendar Year</i>	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037

Tractor Trailer	Service Life	8	years
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Initial units

Option A

Option B

Initial total Costs

m US\$/ tractor

0.03

m US\$

Option A

"

Option B

Replacement units

Option A

5 5

Option B

10

Replacement total costs

MT per TEU

m US\$

0.25 0.25

Option A

"

0.50

High Mast Fork Lift Trucks(FLT), 5 T	Service Life	8	years
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Initial units

Option A

Option B

Initial total Costs

m US\$/ crane

0.06

m US\$

Option A

"

Option B

Replacement units

Option A

2

Option B

2

Replacement total costs

Option A

m US\$

0.20

Option B

"

0.20

Low Mast Fork Lift Trucks(FLT), 3 T	Service Life	8	years
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Initial units

Option A

Option B

Initial total Costs

m US\$/ crane

0.04

m US\$

Option A

"

Option B

Replacement units

Option A

2

Option B

2

Replacement total costs

Option A

m US\$

0.12

	<i>Contract Year</i>	12	13	14	15	16	17	18	19	20	21	22	23	24
	<i>Calendar Year</i>	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Option B	"													0.12
Reach Stackers	Service Life	8	years											
Initial units														
Initial total Costs	Option A													
	Option B													
	m US\$/ crane	0.50												
Replacement units	Option A													1 1
	Option B													2
Replacement total costs	Option A													0.80 0.82
	Option B													1.59
Mobile Hopper	Service Life	8	years											
Initial units														
Initial total Costs	Option A													
	Option B													
	m US\$/ crane	0.09												
Replacement units	Option A													2 2
	Option B													4
Replacement total costs	Option A													0.29 0.29
	Option B													0.57
Lorry/Truck 3-5 T	Service Life	8	years											
Initial units														
Initial total Costs	Option A													
	Option B													
	m US\$/ crane	0.05												
Replacement units	Option A													4 4
	Option B													8

	<i>Contract Year</i>	12 2025	13 2026	14 2027	15 2028	16 2029	17 2030	18 2031	19 2032	20 2033	21 2034	22 2035	23 2036	24 2037
	<i>Calendar Year</i>													
Replacement total costs														
	Option A	m US\$												
	Option B	"												
Workshop Equipment	Service Life	8	years											
Initial units														
	Option A													
	Option B													
Initial total Costs	LS	0.13												
	Option A	m US\$												
	Option B	"												
Replacement units														
	Option A													1
	Option B													1
Replacement total costs														
	Option A	m US\$												0.20
	Option B	"												0.20
Subtotal														
	Option A	m US\$												1.65 2.22
	Option B	"												3.82 0.05
CDVAT	18%													
	Option A	"												0.30 0.40
	Option B													0.69 0.01
Contingency	15%													
	Option A	m US\$												0.29 0.39
	Option B	"												0.68 0.01
Total Equipment Cost														
	Option A	m US\$												2.24 3.01
	Option B	"												5.18 0.07
Total Cost														
	Option A	m US\$												2.24 3.01
	cumulative	"	52.38	52.38	52.44	52.50	52.50	52.50	52.50	54.74	57.75	57.75	57.75	57.75
	Option B	"												0.07
	cumulative	"	55.32	55.32	55.38	55.38	55.38	55.38	55.38	60.56	60.56	60.56	60.56	60.64

Assets Schedule

	<i>Contract Year</i>	25	26	27	28	29	30
	<i>Calendar Year</i>	2038	2039	2040	2041	2042	2043
Civil Cost Escalation Factor	2.48%	1.84	1.89	1.94	1.98	2.03	2.08
Equipment Cost escalation factor	2.48%	1.84	1.89	1.94	1.98	2.03	2.08

Civil Construction

Option A	m US\$
Option B	m US\$

Equipment

Mobile Harbour Crane	Service Life	25	years
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Initial units

Option A	m US\$
Option A	"
Option B	"

Replacement units

Option A	m US\$
Option B	"

Replacement total costs

Option A	m US\$
Option B	"

Mobile Cranes 10 T	Service Life	12	years
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Initial units

Option A	m US\$
Option B	"

Initial total Costs

MT per TEU	0.03	m US\$
Option A	"	m US\$
Option B	"	m US\$

Replacement units

Option A	1	1
Option B	1	1

Replacement total costs

Option A	m US\$	0.06	0.06
Option B	m US\$	0.06	0.06

	<i>Contract Year</i>	25	26	27	28	29	30
	<i>Calendar Year</i>	2038	2039	2040	2041	2042	2043

Tractor Trailer	Service Life	8	years
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Initial units

Initial total Costs	Option A					
	Option B					
		m US\$/ tractor	0.03			
Replacement units	Option A			m US\$		
	Option B		"			
Replacement total costs	Option A			5	5	
	Option B			10		
		MT per TEU				
	Option A		m US\$	0.30	0.31	
	Option B		"	0.61		

High Mast Fork Lift Trucks(FLT), 5 T	Service Life	8	years
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Initial units

Initial total Costs	Option A					
	Option B					
		m US\$/ crane	0.06			
Replacement units	Option A		m US\$			
	Option B		"			
Replacement total costs	Option A		2			
	Option B		2			
		m US\$		0.25		
	Option A		"	0.25		

Low Mast Fork Lift Trucks(FLT), 3 T	Service Life	8	years
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Initial units

Initial total Costs	Option A					
	Option B					
		m US\$/ crane	0.04			
Replacement units	Option A		m US\$			
	Option B		"			
Replacement total costs	Option A		2			
	Option B		2			
		m US\$		0.15		
	Option A		"	0.15		

	<i>Contract Year</i>	25	26	27	28	29	30
	<i>Calendar Year</i>	2038	2039	2040	2041	2042	2043
Option B	"				0.15		

Reach Stackers

Service Life	8	years
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Initial units

Option A

Option B

Initial total Costs

m US\$/ crane

0.50

m US\$

Option A

Option B

"

Replacement units

Option A

Option B

Replacement total costs

Option A

m US\$

Option B

"

Mobile Hopper

Service Life	8	years
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Initial units

Option A

Option B

Initial total Costs

m US\$/ crane

0.09

m US\$

Option A

Option B

"

Replacement units

Option A

Option B

Replacement total costs

Option A

m US\$

Option B

"

Lorry/Truck 3-5 T

Service Life	8	years
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Initial units

Option A

Option B

Initial total Costs

m US\$/ crane

0.05

m US\$

Option A

Option B

"

Replacement units

Option A

Option B

	<i>Contract Year</i>	25	26	27	28	29	30
	<i>Calendar Year</i>	2038	2039	2040	2041	2042	2043
Replacement total costs							
	Option A	m US\$					
	Option B	"					
Workshop Equipment	Service Life	8	years				
Initial units							
	Option A						
	Option B						
Initial total Costs	LS	0.13					
	Option A	m US\$					
	Option B	"					
Replacement units							
	Option A						
	Option B						
Replacement total costs							
	Option A	m US\$					
	Option B	"					
Subtotal							
	Option A	m US\$	0.36	0.37	0.41		
	Option B	"	0.67	0.40			
CDVAT	18%						
	Option A	"	0.07	0.07	0.07		
	Option B	"	0.12	0.07			
Contingency	15%						
	Option A	m US\$	0.06	0.07	0.07		
	Option B	"	0.12	0.07			
Total Equipment Cost							
	Option A	m US\$	0.49	0.51	0.55		
	Option B	"	0.90	0.54			
Total Cost							
	Option A	m US\$	0.49	0.51	0.55		
	cumulative	"	57.75	57.75	58.24	58.75	59.30
	Option B	"	0.90	0.54			
	cumulative	"	60.64	60.64	61.54	62.08	62.08

Source of Finance

Option C

Capital Cost Spread

			Contract Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
			Calendar Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Hard Cost																			
Civil Cost	m US\$			6.69															
Equipment	"			10.63															
Working Capital	"			0.63															
Soft Cost	"			2.42															
				2.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Project Cost	m US\$			20.37															
Less: VGF					20.37	0.00	0.00	0.00	0.00	11.78	23.86	0.00	0.00	2.36	0.00	0.00	0.06	0.00	0.00
Total Project Cost after VGF				20.37															
					0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Debt	75%	m US\$	15.27
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Equity

Drawdown from Equity	m US\$	5.09	0.00	0.00	0.00	0.00	2.95	5.97	0.00	0.00	0.59	0.00	0.00	0.01	0.00	0.00	0.00
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Loan

Loan Amount (m US \$)

Loan	15.27
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Loan Details	% of Loan	Amount (m USD)	Tenor	LIBOR rate	Spread	Cost of fund for PFI	Margin of PFI	Rate for Hedging	Effect rate	Grace Period
Loan A (IPFF)	80%	12.22	15	0.46%	0.5%	3%	1%	5.0%	5	
Loan B (PFI)	20%	3.05	5			3%	3%	1%	6.5%	2

MT per TEU

Loan Drawdown	Amount (m USD)	Year 1 1st Half	Year 1 2nd Half	Year 2 1st Half	Year	
					2	2nd Half
Loan A (IPFF)	12.22	20%	30%	30%	20%	100%
		2.44	3.67	3.67	2.44	12.22
Loan B (PFI)	3.05	20%	30%	30%	20%	100%
		0.61	0.92	0.92	0.61	3.05

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

1 Loan A (IPFF)

Ist Half	Beginning Balance	m US\$	2.44	9.99	13.00	13.65	14.33	15.05	13.55	12.04	10.54	9.03	7.53	6.02	4.52	3.01	1.51	0.00	0.00
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	<u>Year</u>	<u>2014</u> 1	<u>2015</u> 2	<u>2016</u> 3	<u>2017</u> 4	<u>2018</u> 5	<u>2019</u> 6	<u>2020</u> 7	<u>2021</u> 8	<u>2022</u> 9	<u>2023</u> 10	<u>2024</u> 11	<u>2025</u> 12	<u>2026</u> 13	<u>2027</u> 14	<u>2028</u> 15	<u>2029</u> 16	<u>2030</u> 17	<u>2031</u> 18	<u>2032</u> 19
Principal Repayment	"	0.00	0.00	0.00	0.00	0.00	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.00	0.00	0.00	
Interest Accrued	"	0.06	0.25	0.32	0.34	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Interest Payment	"	0.00	0.00	0.00	0.00	0.00	0.37	0.34	0.30	0.26	0.22	0.19	0.15	0.11	0.07	0.04	0.00	0.00	0.00	
Ending Balance	"	2.50	10.24	13.32	13.99	14.69	14.30	12.80	11.29	9.78	8.28	6.77	5.27	3.76	2.26	0.75	0.00	0.00	0.00	

Year		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2nd Half																				
Beginning Balance	m US\$	6.17	12.68	13.32	13.99	14.69	14.30	12.80	11.29	9.78	8.28	6.77	5.27	3.76	2.26	0.75	0.00	0.00	0.00	
MT per TEU	"	0.00	0.00	0.00	0.00	0.00	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.00	0.00	0.00	
Interest Accrued	"	0.15	0.31	0.33	0.35	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Interest Payment	"	0.00	0.00	0.00	0.00	0.00	0.35	0.32	0.28	0.24	0.21	0.17	0.13	0.09	0.06	0.02	0.00	0.00	0.00	
Ending Balance	"	6.32	13.00	13.65	14.33	15.05	13.55	12.04	10.54	9.03	7.53	6.02	4.52	3.01	1.51	0.00	0.00	0.00	0.00	
Interest Payment (IPFF)	m US\$	0.00	0.00	0.00	0.00	0.00	0.73	0.65	0.58	0.50	0.43	0.35	0.28	0.21	0.13	0.06	0.00	0.00	0.00	
Principle Payment (IPFF)	"	0.00	0.00	0.00	0.00	0.00	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	0.00	0.00	0.00	
Debt Servicing (IPFF)	"	0.00	0.00	0.00	0.00	0.00	2.23	2.16	2.08	2.01	1.93	1.86	1.79	1.71	1.64	1.56	0.00	0.00	0.00	

2 Loan B (PFI)

Ist Half																			
Beginning Balance	m US\$	0.61	2.51	3.31	2.21	1.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Principal Repayment	"	0.00	0.00	0.55	0.55	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Accrued	"	0.02	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Payment	"	0.00	0.00	0.11	0.07	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ending Balance	"	0.63	2.60	2.76	1.66	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2nd Half																			
Beginning Balance	m US\$	1.55	3.21	2.76	1.66	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Principal Repayment	"	0.00	0.00	0.55	0.55	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Accrued	"	0.05	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Payment	"	0.00	0.00	0.09	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ending Balance	"	1.60	3.31	2.21	1.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Payment (PFI)	m US\$	0.00	0.00	0.20	0.13	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Principle Payment (PFI)	"	0.00	0.00	1.10	1.10	1.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Debt Servicing (PFI)	"	0.00	0.00	1.30	1.23	1.16	0.00												

Phase II Loan (only for Option B and C)

Loan Amount (m US \$)

Loan	26.74
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Loan Details	% of Loan	Amount (m USD)	Tenor	LIBOR rate	Spread	Cost of fund for PFIs	Margin of Hedging	Rate for Hedging	Effective rate	Grace Period
Loan C (IPFF)	80%	21.39	10	0.46%	0.5%	3%	1%	5.0%	5	
Loan D (PFI)	20%	5.35	5			3%	3%	1%	6.5%	2

Year		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
		1	2	3	4	5	6	7	8	9	10	11	12	13	14					
Ist Half																				
Beginning Balance	m US\$	0.00	0.00	0.00	0.00	0.00	0.00	21.39	22.46	23.59	24.77	26.02	27.33	28.66	16.40	10.93	5.47	0.00	0.00	0.00
Principal Repayment	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.73	2.73	2.73	2.73	2.73	0.00	0.00	0.00	0.00
Interest Accrued	"	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.56	0.59	0.61	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Payment	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.54	0.41	0.27	0.14	0.00	0.00	0.00	0.00
Ending Balance	"	0.00	0.00	0.00	0.00	0.00	0.00	21.39	22.46	23.59	24.77	26.02	27.33	28.66	16.40	10.93	5.47	0.00	0.00	0.00
Interest Payment (IPFF)	m US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Principle Payment (IPFF)	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Debt Servicing (IPFF)	"	0.00																		

	Year	<u>2014</u> 1	<u>2015</u> 2	<u>2016</u> 3	<u>2017</u> 4	<u>2018</u> 5	<u>2019</u> 6	<u>2020</u> 7	<u>2021</u> 8	<u>2022</u> 9	<u>2023</u> 10	<u>2024</u> 11	<u>2025</u> 12	<u>2026</u> 13	<u>2027</u> 14	<u>2028</u> 15	<u>2029</u> 16	<u>2030</u> 17	<u>2031</u> 18	<u>2032</u> 19
Ending Balance	"	0.00	0.00	0.00	0.00	0.00	21.92	23.02	24.18	25.39	26.66	24.59	19.13	13.66	8.20	2.73	0.00	0.00	0.00	

Year		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
2nd Half																				
Beginning Balance	m US\$	0.00	0.00	0.00	0.00	0.00	21.92	23.02	24.18	25.39	26.66	24.59	19.13	13.66	8.20	2.73	0.00	0.00	0.00	0.00
Principal Repayment	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.73	2.73	2.73	2.73	0.00	0.00	0.00	0.00	0.00	0.00
Interest Accrued	"	0.00	0.00	0.00	0.00	0.00	0.54	0.57	0.60	0.63	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Payment	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.47	0.34	0.20	0.07	0.00	0.00	0.00	0.00
Ending Balance	"	0.00	0.00	0.00	0.00	0.00	22.46	23.59	24.77	26.02	27.33	21.86	16.40	10.93	5.47	0.00	0.00	0.00	0.00	0.00
Interest Payment (IPFF)	m US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.29	1.02	0.75	0.47	0.20	0.00	0.00	0.00	0.00	0.00
Principle Payment (IPFF)	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.47	5.47	5.47	5.47	5.47	0.00	0.00	0.00	0.00	0.00
Debt Servicing (IPFF)	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.75	6.48	6.21	5.94	5.67	0.00	0.00	0.00	0.00	0.00
4 Loan D (PFI)																				
Ist Half																				
Beginning Balance	m US\$	0.00	0.00	0.00	0.00	0.00	5.35	5.70	5.35	3.56	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Principal Repayment	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.89	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Accrued	"	0.00	0.00	0.00	0.00	0.00	0.17	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Payment	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.12	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ending Balance	"	0.00	0.00	0.00	0.00	0.00	5.52	5.89	4.46	2.67	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2nd Half																				
Beginning Balance	m US\$	0.00	0.00	0.00	0.00	0.00	5.52	5.89	4.46	2.67	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Principal Repayment	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.89	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Accrued	"	0.00	0.00	0.00	0.00	0.00	0.18	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Payment	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ending Balance	"	0.00	0.00	0.00	0.00	0.00	5.70	6.08	3.56	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Payment (PFI)	m US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.20	0.09	0.00								
Principle Payment (PFI)	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.78	1.78	1.78	0.00								
Debt Servicing (PFI)	"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.10	1.99	1.87	0.00								
Total Loan Repayment	m US\$	0.00	0.00	1.10	1.10	1.10	1.51	1.51	3.29	3.29	3.29	6.97	6.97	6.97	6.97	6.97	0.00	0.00	0.00	
Interest During Construction	"	0.28 1.03	0.75																	
Total Interest Payment	m US\$	0.00	0.00	0.20	0.13	0.05	0.73	0.65	0.90	0.71	0.52	1.64	1.30	0.95	0.61	0.26	0.00	0.00	0.00	0.00
Total Debt Servicing	m US\$	0.00	0.00	1.30	1.23	1.16	2.23	2.16	4.18	3.99	3.80	8.61	8.27	7.92	7.58	7.23	0.00	0.00	0.00	0.00

Depreciation Schedule

Three Jetty Model

		<i>Contract Year</i>	1 2013	2 2014	3 2015	4 2016	5 2017	6 2018	7 2019	8 2020	9 2021	10 2022	11 2023	12 2024	13 2025	13 2026
		<i>Calendar Year</i>														
Building & Civil Construction																
	<i>Rate</i>	10%														
<i>Investment in Civil Works</i>	m US\$		-	6.69	-	-	-	-	11.78	12.08	-	-	-	-	-	-
<i>Depreciation</i>	"		-	-	0.67	0.60	0.54	0.49	0.44	1.57	2.62	2.36	2.13	1.91	1.72	1.55
<i>Depreciated Value</i>	"		-	6.69	6.02	5.42	4.88	4.39	15.73	26.24	23.61	21.25	19.13	17.21	15.49	13.94
Machinery and Equipment																
	<i>Rate</i>	20%														
<i>Investment in Machinery</i>	m US\$		-	10.63	-	-	-	-	-	11.79	-	-	2.36	-	-	-
<i>Depreciation</i>	"		-	-	2.13	1.70	1.36	1.09	0.87	0.70	2.91	2.33	1.87	1.96	1.57	1.26
<i>Depreciated Value</i>	"		-	10.63	8.50	6.80	5.44	4.35	3.48	14.57	11.66	9.33	9.82	7.86	6.29	5.03
Depreciation	m US\$			0.00	2.79	2.30	1.90	1.58	1.31	2.27	5.54	4.69	3.99	3.88	3.29	2.81

Note: Depreciation rates based on Bangladesh Income Tax Ordinance 1984

Depreciation Schedule

Three Jetty Model

		<i>Contract Year</i>	14 2027	15 2028	16 2029	17 2030	18 2031	19 2032	20 2033	21 2034	22 2035	23 2036	24 2037	25 2038	26 2039	27 2040
		<i>Calendar Year</i>														
Building & Civil Construction																
	<i>Rate</i>	10%														
<i>Investment in Civil Works</i>	m US\$		-	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Depreciation</i>	"		1.39	1.25	1.13	1.02	0.91	0.82	0.74	0.67	0.60	0.54	0.49	0.44	0.39	0.35
<i>Depreciated Value</i>	"		12.55	11.29	10.16	9.15	8.23	7.41	6.67	6.00	5.40	4.86	4.38	3.94	3.54	3.19
Machinery and Equipment																
	<i>Rate</i>	20%														
<i>Investment in Machinery</i>	m US\$		0.06	-	-	-	-	5.18	-	-	-	0.07	-	-	-	0.90
<i>Depreciation</i>	"		1.01	0.82	0.65	0.52	0.42	0.33	1.30	1.04	0.83	0.67	0.55	0.44	0.35	0.28
<i>Depreciated Value</i>	"		4.08	3.27	2.61	2.09	1.67	6.52	5.21	4.17	3.34	2.74	2.20	1.76	1.41	2.03
Depreciation	m US\$		2.40	2.07	1.78	1.54	1.33	1.16	2.04	1.71	1.43	1.21	1.04	0.88	0.75	0.64

Depreciation Schedule

Three Jetty Model

		<i>Contract Year</i>	28	29	30
		<i>Calendar Year</i>	2041	2042	2043
Building & Civil Construction					
<i>Rate</i>	10%				
<i>Investment in Civil Works</i>	m US\$		-	-	-
<i>Depreciation</i>	"		0.32	0.29	0.26
<i>Depreciated Value</i>	"		2.87	2.58	2.33
Machinery and Equipment					
<i>Rate</i>	20%				
<i>Investment in Machinery</i>	m US\$		0.54	-	-
<i>Depreciation</i>	"		0.41	0.43	0.35
<i>Depreciated Value</i>	"		2.16	1.73	1.38
Depreciation	m US\$		0.72	0.72	0.60

Income Statement

Three Jetty Model

	<i>Contract Year</i>	1 2014	2 2015	3 2016	4 2017	5 2018	6 2019	7 2020	8 2021	9 2022	10 2023	11 2024	12 2025	13 2026	14 2027
<i>Terminal Operator Income Statement</i>															
Revenue															
Ship Charges	m US\$	0.00	0.02	0.07	0.09	0.12	0.12	0.12	0.26	0.29	0.31	0.33	0.34	0.35	0.36
Non-Containerised Cargo Charges	"	0.00	0.55	0.68	0.84	0.99	1.01	1.05	1.85	2.18	2.57	2.82	2.91	3.00	3.09
Containerised Cargo Charges	"	0.00	0.30	2.12	3.30	4.80	4.94	5.09	12.23	12.59	12.97	13.36	13.76	14.17	14.60
Gross Revenue	m US \$	0.00	0.87	2.86	4.24	5.90	6.08	6.26	14.33	15.06	15.85	16.52	17.01	17.52	18.05
O&M Expenses															
Fixed Costs	m US\$	0.39	0.99	1.00	1.01	1.02	1.09	1.21	1.44	1.44	1.46	1.46	1.47	1.48	1.49
Variable Costs	"	0.02	0.11	0.46	0.68	0.95	0.98	1.24	2.87	2.91	2.96	3.01	3.06	3.11	3.16
Earnings before Depreciation	m US\$	(0.41)	(0.23)	1.40	2.55	3.93	4.01	3.81	10.02	10.70	11.43	12.05	12.49	12.94	13.40
Depreciation	m US\$	0.00	2.79	2.30	1.90	1.58	1.31	2.27	5.54	4.69	3.99	3.88	3.29	2.81	2.40
Interest Expense	m US\$	0.00	0.00	0.20	0.13	0.05	0.73	0.65	0.90	0.71	0.52	1.64	1.30	0.95	0.61
Profit before Taxes	m US\$	(0.41)	(3.03)	(1.10)	0.52	2.30	1.98	0.88	3.59	5.30	6.92	6.53	7.90	9.18	10.39
Applicable Tax Exemption		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0	0	0	0
Company Income Tax	37.50%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.45	2.96	3.44	3.90
Minimum Tax	0.50%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.09	0.09	0.09
MT per TEU															
Applicable Tax	m US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.45	2.96	3.44	3.90
Net Income After Tax	m US\$	(0.41)	(0.23)	1.21	2.43	3.88	3.29	3.15	9.12	9.99	10.91	7.96	8.23	8.54	8.90

Income Statement

Three Jetty Model

	<i>Contract Year</i>	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
	<i>Calendar Year</i>	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	
<i>Terminal Operator Income Statement</i>																		
Revenue																		
Ship Charges	m US\$	0.37	0.39	0.40	0.41	0.42	0.43	0.45	0.46	0.47	0.49	0.50	0.52	0.53	0.55	0.57	0.58	
Non-Containerised Cargo Charges	"	3.18	3.27	3.37	3.47	3.58	3.68	3.80	3.91	4.03	4.15	4.27	4.40	4.53	4.67	4.81	4.95	
Containerised Cargo Charges	"	15.04	15.49	15.95	16.43	16.93	17.43	17.96	18.50	19.05	19.62	20.21	20.82	21.44	22.08	22.75	23.43	
Gross Revenue	m US \$	18.59	19.15	19.72	20.31	20.92	21.55	22.20	22.86	23.55	24.26	24.98	25.73	26.51	27.30	28.12	28.96	
O&M Expenses																		
Fixed Costs	m US\$	1.50	1.52	1.53	1.55	1.60	1.62	1.64	1.66	1.68	1.70	1.73	1.75	1.78	1.81	1.84	1.87	
Variable Costs	"	3.22	3.27	3.33	3.39	3.45	3.51	3.58	3.64	3.71	3.78	3.85	3.92	3.99	4.07	4.14	4.22	
Earnings before Depreciation	m US\$	13.87	14.36	14.86	15.37	15.87	16.42	16.99	17.57	18.16	18.78	19.41	20.06	20.73	21.42	22.14	22.87	
Depreciation	m US\$	2.07	1.78	1.54	1.33	1.16	2.04	1.71	1.43	1.21	1.04	0.88	0.75	0.64	0.72	0.72	0.60	
Interest Expense	m US\$	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Profit before Taxes	m US\$	11.54	12.57	13.32	14.04	14.71	14.38	15.28	16.13	16.96	17.74	18.54	19.32	20.10	20.70	21.42	22.27	
Applicable Tax Exemption		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Company Income Tax	37.50%	4.33	4.72	4.99	5.26	5.52	5.39	5.73	6.05	6.36	6.65	6.95	7.24	7.54	7.76	8.03	8.35	
Minimum Tax	0.50%	0.09	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.14	0.14	0.14	
Applicable Tax	MT per TEU	m US\$	4.33	4.72	4.99	5.26	5.52	5.39	5.73	6.05	6.36	6.65	6.95	7.24	7.54	7.76	8.03	8.35
Net Income After Tax	m US\$	9.28	9.64	9.86	10.11	10.35	11.03	11.26	11.52	11.81	12.13	12.46	12.82	13.20	13.66	14.10	14.52	

Cash Flow Statement

Three Jetty Model

	Contract Year Calendar Year	1 2014	2 2015	3 2016	4 2017	5 2018	6 2019	7 2020	8 2021	9 2022	10 2023	11 2024
Cash flow from Operations												
Revenue	m US\$	0.00	0.87	2.86	4.24	5.90	6.08	6.26	14.33	15.06	15.85	16.52
Less: O&M Expense	m US\$	0.41	1.10	1.45	1.68	1.97	2.06	2.45	4.31	4.35	4.42	4.47
Cash Generated by the Project	m US\$	(0.41)	(0.23)	1.40	2.55	3.93	4.01	3.81	10.02	10.70	11.43	12.05
Capital Expenditure	m US\$	20.37	0.00	0.00	0.00	11.78	23.86	0.00	0.00	2.36	0.00	
Less: VGF	m US\$	0.00										
Cash Flow wrt the Project (before tax)	m US\$	(20.77)	(0.23)	1.40	2.55	3.93	(7.77)	(20.06)	10.02	10.70	9.07	12.05
Project IRR (before Tax)	17.18%											
Less: Tax	37.5%	m US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.45
Less: Adjustment for Tax Saving from Interest Expense	m US\$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62
Cash flow wrt the Project (after tax)	m US\$	(20.77)	(0.23)	1.40	2.55	3.93	(7.77)	(20.06)	10.02	10.70	9.07	8.98
Cumulative Cash flow wrt the Project (after tax)	m US\$	(20.77) ₁	(21.00) ₁	(19.60) ₁	(17.05) ₁	(13.12) ₁	(20.89) ₁	(40.94) ₁	(30.92) ₁	(20.22) ₁	(11.15) ₁	(2.17) ₁
Project IRR (after Tax)	14.52%											
	Year	m US\$										
Cumulative Cash Flow during years where payback occurs	11	(2.17)										
Project Payback in Year	12	6.87										
Project Payback in Year	11											
Cash Available for Debt Servicing (after tax)	m US\$	(0.41)	(0.23)	1.40	2.55	3.93	4.01	3.81	10.02	10.70	11.43	9.60
Less: Debt Servicing	m US\$	-	-	1.30	1.23	1.16	2.23	2.16	4.18	3.99	3.80	8.61
Retained Earning after debt servicing and tax	m US\$	(0.41)	(0.23)	0.10	1.32	2.77	1.78	1.65	5.84	6.71	7.63	0.99

Retained Earning (Beginning Balance)	m US\$	(0.41)	(0.64)	(0.53)	0.79	3.56	5.34	6.99	12.83	19.53	27.16	28.15
Equity Injection	m US\$	5.09	0.00	0.00	0.00	0.00	2.95	5.97	0.00	0.00	0.59	0.00
Cash flow wrt Equity	m US\$	(5.50)	(0.23)	0.10	1.32	2.77	(1.16)	(4.32)	5.84	6.71	7.04	0.99
Cumulative Cash flow wrt Equity	m US\$	(5.50) 1	(5.73) 1	(5.63) 1	(4.30) 1	(1.53) 1	(2.70) 1	(7.01) 1	(1.18) 1	5.53 0	12.57 0	13.55 0
Equity IRR (after Tax)		25.60%										
	Year	m US\$										
Cumulative Cash Flow during years	9	5.53										
where payback occurs	10	12.57										
Equity Payback in Year	8											
	MT per TEU											
Debt Service Coverage Ratio (DSCR)			1.1	2.1	3.4	1.8	1.8	2.4	2.7	3.0	1.1	
Average DSCR		1.9										
Total Taxes	113.63 m US\$		909 crore Tk									
Employment	150											
Land Lease	5.54 m US\$		44 crore Tk									

Cash Flow Statement

Three Jetty Model

	Contract Year Calendar Year	12 2025	13 2026	14 2027	15 2028	16 2029	17 2030	18 2031	19 2032	20 2033	
Cash flow from Operations											
Revenue	m US\$	17.01	17.52	18.05	18.59	19.15	19.72	20.31	20.92	21.55	
Less: O&M Expense	m US\$	4.53	4.59	4.65	4.72	4.79	4.87	4.94	5.05	5.13	
Cash Generated by the Project	m US\$	12.49	12.94	13.40	13.87	14.36	14.86	15.37	15.87	16.42	
Capital Expenditure	m US\$	0.00	0.00	0.06	0.00	0.00	0.00	0.00	5.18	0.00	
Less: VGF	m US\$										
Cash Flow wrt the Project (before tax)	m US\$	12.49	12.94	13.34	13.87	14.36	14.86	15.37	10.69	16.42	
Project IRR (before Tax)	17.18%										
Less: Tax	37.5%	m US\$	2.96	3.44	3.90	4.33	4.72	4.99	5.26	5.52	5.39
Less: Adjustment for Tax Saving from Interest Expense	m US\$	0.49	0.36	0.23	0.10	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Cash flow wrt the Project (after tax)	m US\$	9.04	9.14	9.21	9.45	9.64	9.86	10.11	5.17	11.03	
Cumulative Cash flow wrt the Project (after tax)	m US\$	6.87 0	16.01 0	25.22 0	34.67 0	44.31 0	54.17 0	64.28 0	69.45 0	80.48 0	
Project IRR (after Tax)	14.52%										
	Year	m US\$									
Cumulative Cash Flow during years where payback occurs	11	(2.17)									
Project Payback in Year	12	6.87									
	11										
Cash Available for Debt Servicing (after tax)	m US\$	9.53	9.49	9.50	9.54	9.64	9.86	10.11	10.35	11.03	
Less: Debt Servicing	m US\$	8.27	7.92	7.58	7.23	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Retained Earning after debt servicing and tax	m US\$	1.26	1.57	1.92	2.31	9.64	9.86	10.11	10.35	11.03	

Retained Earning (Beginning Balance)	m US\$	29.41	30.98	32.90	35.22	44.86	54.72	64.83	75.18	86.21
--------------------------------------	--------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Equity Injection	m US\$	0.00	0.00	0.01	0.00	0.00	0.00	0.00	1.30	0.00
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Cash flow wrt Equity	m US\$	1.26	1.57	1.91	2.31	9.64	9.86	10.11	9.06	11.03
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Cumulative Cash flow wrt Equity	m US\$	14.81	16.39	18.30	20.61	30.25	40.11	50.22	59.28	70.31
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Equity IRR (after Tax)	25.60%
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	Year	m US\$
Cumulative Cash Flow during years	9	5.53
where payback occurs	10	12.57
Equity Payback in Year	8	

MT per TEU	
Debt Service Coverage Ratio (DSCR)	1.2

Average DSCR	1.9
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Total Taxes	113.63 m US\$	909
Employment	150	
Land Lease	5.54 m US\$	44

Cash Flow Statement

Three Jetty Model

	Contract Year Calendar Year	21 2034	22 2035	23 2036	24 2037	25 2038	26 2039	27 2040	28 2041	29 2042	30 2043	
Cash flow from Operations												
Revenue	m US\$	22.20	22.86	23.55	24.26	24.98	25.73	26.51	27.30	28.12	28.96	
Less: O&M Expense	m US\$	5.21	5.30	5.39	5.48	5.57	5.67	5.77	5.88	5.98	6.09	
Cash Generated by the Project	m US\$	16.99	17.57	18.16	18.78	19.41	20.06	20.73	21.42	22.14	22.87	
Capital Expenditure	m US\$	0.00	0.00	0.07	0.00	0.00	0.00	0.90	0.54	0.00	0.00	
Less: VGF	m US\$											
Cash Flow wrt the Project (before tax)	m US\$	16.99	17.57	18.09	18.78	19.41	20.06	19.83	20.88	22.14	22.87	
Project IRR (before Tax)		17.18%										
Less: Tax	37.5%	m US\$	5.73	6.05	6.36	6.65	6.95	7.24	7.54	7.76	8.03	8.35
Less: Adjustment for Tax Saving from Interest Expense	m US\$	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Cash flow wrt the Project (after tax)	m US\$	11.26	11.52	11.73	12.13	12.46	12.82	12.29	13.12	14.10	14.52	
Cumulative Cash flow wrt the Project (after tax)	m US\$	91.74 0	103.26 0	114.99 0	127.12 0	139.58 0	152.40 0	164.69 0	177.81 0	191.91 0	206.44 0	
Project IRR (after Tax)		14.52%										
	Year	m US\$										
Cumulative Cash Flow during years where payback occurs	11	(2.17)										
Project Payback in Year	12	6.87										
Project Payback in Year	11											
Cash Available for Debt Servicing (after tax)	m US\$	11.26	11.52	11.81	12.13	12.46	12.82	13.20	13.66	14.10	14.52	
Less: Debt Servicing	m US\$	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
Retained Earning after debt servicing and tax	m US\$	11.26	11.52	11.81	12.13	12.46	12.82	13.20	13.66	14.10	14.52	

Retained Earning (Beginning Balance)	m US\$	97.47	108.99	120.79	132.92	145.38	158.20	171.39	185.05	199.16	213.68
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Equity Injection	m US\$	0.00	0.00	0.02	0.00	0.00	0.00	0.23	0.13	0.00	0.00
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Cash flow wrt Equity	m US\$	11.26	11.52	11.79	12.13	12.46	12.82	12.97	13.53	14.10	14.52
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Cumulative Cash flow wrt Equity	m US\$	81.57	93.08	104.87	117.00	129.46	142.28	155.25	168.77	182.88	197.40
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Equity IRR (after Tax)	25.60%
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	Year	m US\$
Cumulative Cash Flow during years	9	5.53
where payback occurs	10	12.57
Equity Payback in Year	8	

MT per TEU

Debt Service Coverage Ratio (DSCR)

Average DSCR	1.9
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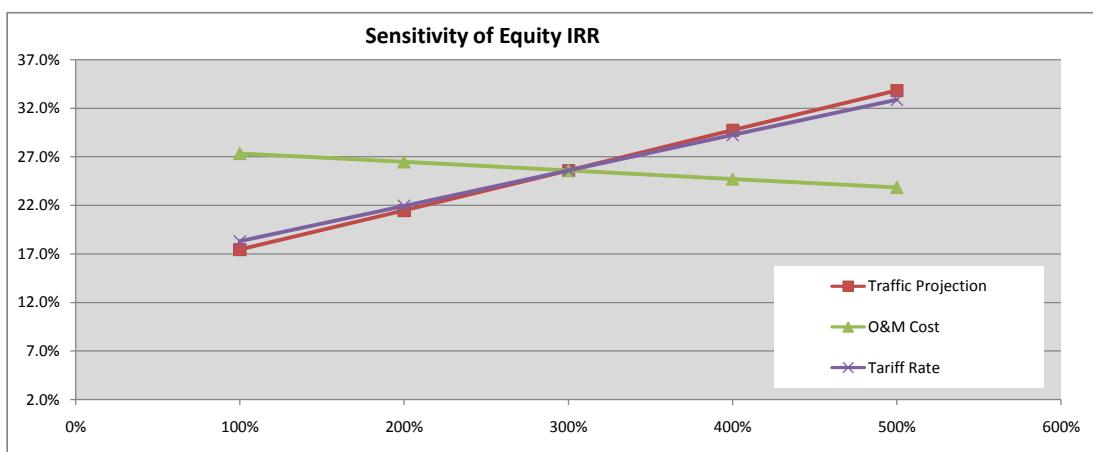
Total Taxes	113.63 m US\$	909
Employment	150	
Land Lease	5.54 m US\$	44

Sensitivity

Capital Cost	100%
Traffic Projection	100%
O&M Cost	100%
Tariff Rate	100%
Equity IRR	25.6%

		-20%	-10%	0%	10%	20%
		80%	90%	100%	110%	120%
Capital Cost	25.6%	30.7%	28.0%	25.6%	23.5%	21.6%
		80%	90%	100%	110%	120%
Traffic Projection	25.6%	17.5%	21.5%	25.6%	29.7%	33.8%
		80%	90%	100%	110%	120%
O&M Cost	25.6%	27.4%	26.5%	25.6%	24.7%	23.8%
		80%	90%	100%	110%	120%
Tariff Rate	25.6%	18.3%	21.9%	25.6%	29.3%	32.9%

Traffic Projection	17.5%	21.5%	25.6%	29.7%	33.8%
O&M Cost	27.4%	26.5%	25.6%	24.7%	23.8%
Tariff Rate	18.3%	21.9%	25.6%	29.3%	32.9%



MT per TEU

Container Data

Container & Containerized Cargo Handling Statement from MPA

2011-2012 Fiscal Year

Sl. No	Name of Month	Number of Vessel	Import Cont. & Cargo (m.Ton)								Export Cont & Cargo							
			Empty		Loaded		Total		M/C	F/C	G/C	Import	Loaded		Empty		Total	
			20'	40'	20'	40'	BOX	TEU	TON	TON	TON	TON	20'	40'	20'	40'	BOX	TEU
1	July-11	04	138	311	722	170	1341	1822	408	0	15998	16396	215	360	191	42	808	1210
2	August-11	03	184	310	593	97	1184	1591	245	20	10901	11176	438	329	258	59	1084	1472
3	September-11	02	154	191	287	48	680	919	287	0	5762	6049	270	217	359	37	883	1137
4	October-11	03	182	217	504	77	980	1274	380	23	10300	10703	381	213	162	45	801	1059
5	November-11	03	76	124	684	142	1026	1292	175	19	14843	15037	375	176	466	155	1172	1503
6	December-11	02	42	254	545	71	912	1237	248	23	10203	10474	144	250	484	50	928	1228
1	January-12	04	218	260	399	99	976	1335	40	40	9387	9467	494	285	220	117	1116	1518
2	February-12	03	60	76	384	65	585	726	130	45	8146	8321	234	103	53	49	439	591
3	March-12	05	689	239	696	114	1738	2091	185	275	13998	14458	849	266	117	54	1286	1606
4	April-12	01	151	110	58	60	379	549	297	0	1522	1819	240	112	179	69	600	781
5	May-12	02	89	334	323	190	936	1460	461	48	7815	8324	343	320	304	87	1054	1461
6	June-12	03	17	145	521	168	851	1164	454	38	10888	11380	190	188	181	136	695	1019
1	July-12		52	328	1054	245	1679	2252	320	81	20988	21389	385	432	483	275	1575	2282
4	October-12		166	181	334	225	906	1312	302	61	8283	8646	376	289	39	0	704	1015
5	November-12		133	375	531	205	1245	1826	163	20	11614	11797	584	430	182	316	1512	2258
	Ground Total		2,421	4,050	9,026	2,468	17,975	24,494	4,500	866	191,413	196,779	6,055	4,585	4,211	1,767	16,618	22,992

F/C	Frozen Cargo	G/C	General Cargo	M/C	Master Cargo	Average	1.38
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Loaded			Empty			Total			52%
Import	20'	40'	20'	40'					
Total Boxes	9,026	2,468	2,421	4,050		17,965			
%	50.24%	13.74%	13.48%	22.54%		100%			

Export									48%
Total Boxes	6,055	4,585	4,211	1,767		16,618			
MT per TEU	36.44%	27.59%	25.34%	10.63%		100%			

Projected Container Breakdown			FCL			LCL			70%		
for Terminal Operator			LCL			Empty			Total		
Import	20'	40'	20'	40'		20'	40'				
%	45.17%	19.62%	15.07%	4.12%		3.48%	12.54%		100%		
Export	35.51%	29.31%	10.93%	8.28%		10.34%	5.63%		100%		

US\$ Inflation Rate

Table of Inflation Rates by Month and Year (1999-2013)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
2013	1.6												
2012	2.9	2.9	2.7	2.3	1.7	1.7	1.4	1.7	2	2.2	1.8	1.7	2.1
2011	1.6	2.1	2.7	3.2	3.6	3.6	3.6	3.8	3.9	3.5	3.4	3	3.2
2010	2.6	2.1	2.3	2.2	2	1.1	1.2	1.1	1.1	1.2	1.1	1.5	1.6
2009	0	0.2	-0.4	-0.7	-1.3	-1.4	-2.1	-1.5	-1.3	-0.2	1.8	2.7	-0.4
2008	4.3	4	4	3.9	4.2	5	5.6	5.4	4.9	3.7	1.1	0.1	3.8
2007	2.1	2.4	2.8	2.6	2.7	2.7	2.4	2	2.8	3.5	4.3	4.1	2.8
2006	4	3.6	3.4	3.5	4.2	4.3	4.1	3.8	2.1	1.3	2	2.5	3.2
2005	3	3	3.1	3.5	2.8	2.5	3.2	3.6	4.7	4.3	3.5	3.4	3.4
2004	1.9	1.7	1.7	2.3	3.1	3.3	3	2.7	2.5	3.2	3.5	3.3	2.7
2003	2.6	3	3	2.2	2.1	2.1	2.1	2.2	2.3	2	1.8	1.9	2.3
2002	1.1	1.1	1.5	1.6	1.2	1.1	1.5	1.8	1.5	2	2.2	2.4	1.6
2001	3.7	3.5	2.9	3.3	3.6	3.2	2.7	2.7	2.6	2.1	1.9	1.6	2.8
2000	2.7	3.2	3.8	3.1	3.2	3.7	3.7	3.4	3.5	3.4	3.4	3.4	3.4
1999	1.7	1.6	1.7	2.3	2.1	2	2.1	2.3	2.6	2.6	2.6	2.7	2.2

Annexure III

Not Used Intentionally

Annexure IV

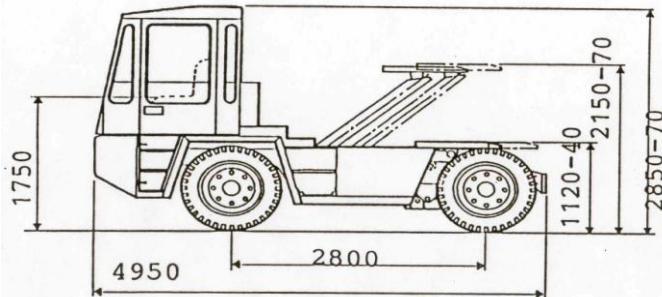
Broad Outline Specifications of Equipment

Annexure IV: Broad Outline Specifications of Equipment

A BROAD OUTLINE SPECIFICATIONS FOR GENERAL CARGO AND CONTAINER HANDLING EQUIPMENT, REQUIRED FOR OPERATION OF TERMINAL AT MONGLA PORT, CONSISTING JETTY NOS. 3 AND 4.

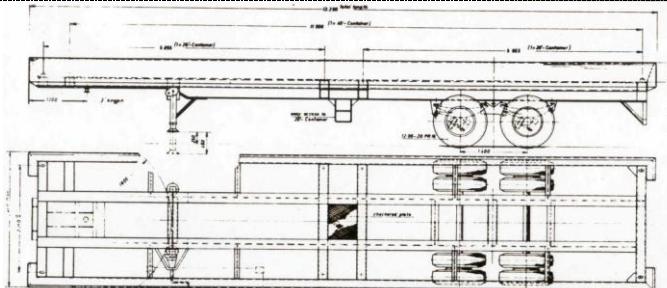
SI.	NAME OF THE EQUIPMENT, with brief Specification	REMARKS
01	<p>MOBILE HARBOUR CRANE (MHC), AC electricity 11 ~ 0.4 KV or diesel driven, minimum 40 MT under retractable 20' ~ 40' spreader, distance water side rail to fender face 3.2 M, clear out reach from water side to spreader hook centre 40 M, travel dist. 120 (+- 60) M, handling capacity (in a rational handling situation in conjunction with the lifting/lowering, derricking, rotating, travelling etc movements) minimum 20 cycles or containers/ hr.</p>	<p>For Ship to Shore operation. Economic service life (ESL) Not Less Than (NLT) 20 yrs.</p>
Picture 1: Mobile Harbour Crane		
02	<p>MOBILE CRANE , Travel & operate from same cabin type i.e. not truck type, Diesel engine driven, lifting capacity not less than (NLT) 10 MT at clear out reach NLT 1.5 M at radius 5 M over end while the crane is on outriggers, length of the telescopic boom should be able to give NLT 15 M height under lifting hook with full circle slewing, Speeds: travelling NLT 25 KM/hr - hoisting line NLT 60 M/min – derricking not more than (NMT) 65 sec – slewing NLT 2 rpm, grad ability NLT 15%, ground clearance NLT 300 mm.</p>	<p>For yard operation. ESL NLT 08 yrs.</p>
Picture 2: Mobile Crane		

SI.	NAME OF THE EQUIPMENT, with brief Specification	REMARKS
03A	TRACTOR 5 TH WHEEL TYPE, Capable of pulling 5 th wheel type semi trailers, Diesel/CNG converted from gasoline engine driven, Engine brake hp NLT 175	For transfer operation. ESL NLT 08 yrs.



Picture 3A: Tractor

03B	TRAILOR SEMI (5 TH WHEEL & FLAT BED TYPE), Capable of carrying 2 numbers of TEU or 1 number FEU or palletized/ gunny bagged / bailed general cargo of 50 MT (FEU & TEU over twist locks and general cargo over checkered steel plate covered bed, 2 rear axles in tandem with 8 pneumatic rubber wheels.	For transfer operation. ESL NLT 08 yrs.
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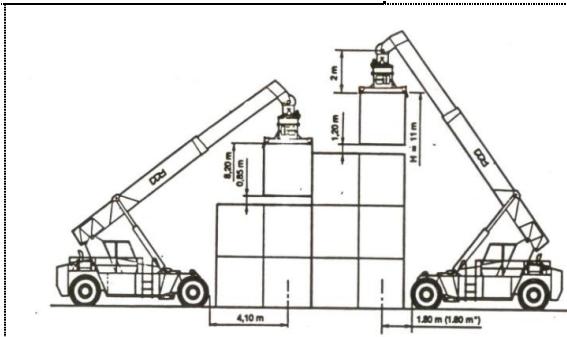
Picture 3B: Trailor

04	HIGH MAST FORK LIFT TRUCK (HM FLT), Diesel engine driven, lifting capacity NLT 10 MT at NLT 600 mm load centre at NLT 7500 mm lifting height over forks of NLT 1200 mm length, Speeds: lifting NLT 200mm/sec- travelling NLT 20 KM/hr, grade ability NLT 15%.	For yard operation. ESL NLT 10 yrs.
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Picture 4: Fork Lift Truck

SI.	NAME OF THE EQUIPMENT, with brief Specification	REMARKS
05	LOW MAST FORK LIFT TRUCK (LM FLT), Closed height NMT 2240 mm including over head guard, lifting capacity NLT 5 MT at NLT 500 mm load centre at NLT 1500 mm free lift over forks of NLT 1000 mm length, Speers: lifting NLT 300 mm/sec , side shifting NLT +- 75 mm.	For stuffing/ un stuffing. ESL NLT 08 yrs.
06	REACH STACKER, Diesel Hydraulic, lift capacity min. 30 MT at 1 st row under retractable 20' ~ 40 spreader, lift height min. 18 M, lift clear outreach min. 6.5 M, lift speed loaded min. 0.22 m/s, travel speed loaded min. 22 km/hr, incline driving ability with load at 2 km /hr 20%, service weight min. 40 MT, engine type & fuel 4 stroke & diesel, power min. 225 KW, displacement/ no of cylinder min. 12L/ 6, maximum fuel consumption 18 liter/hr & size of wheel front/ rear 4/2 & of same size, electronic over load protection, outside turning radius of expanded spreader max. 10,000+-10 cm.	For yard operation. ESL NLT 10 yrs.



Picture 5: Reach Stacker

07	MOBILE HOPPER	For Yard/ Delivery operation. ESL NLT 08 yrs.
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Picture 6: Mobile Hopper

08	TRUCK /LORRY (General/ Common Type), Diesel/ CNG converted from gasoline engine, Engine hp NLT 100, Wooden cargo platform with 600 mm high fixed front, side & swing rear railing.	For transfer operation. ESL NLT 08 yrs.
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SI.	NAME OF THE EQUIPMENT, with brief Specification	REMARKS
		
Picture 7: Truck/Lorry		

Annexure V

List of Meetings and Field Visits

Annexure V: List of Meetings and Field Visits

Sl.	Date	Place/ Organization List of persons met	Consultants	Purpose
1.	21/11/2012	PPP Office Ministry of Shipping IPFF Cell, Bangladesh Bank Mongla Port Authority PPP Unit, Finance Division	IIFC Mr. Nazrul Islam, ED & CEO Deloitte Mr. Sumit Mishra. Financial Specialist	Kick-Off Meeting
2.	26/11/2012	Mongla Port Authority Mr. Md. Altaf Hossain, Member Operation Commander M Enamul Haque, Harbour Master Mr. Mahbub Ullah, Director (Traffic) Engr. Md. Kowser Ali, Chief Engineer Mr. Kazi M Nurul Amin, Deputy Chief Engr. Sk. Sowkat Ali, Executive Engineer	IIFC Mr. Nazrul Islam, ED & CEO Mr. Muhammad Shamsur Rahman, Group Manager (Commercial) Mr. Md. Emtiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist	Introductory Meeting
3.	26/11/2012	Mongla Port Authority Engr. Sk. Sowkat Ali, Executive Engineer	IIFC Mr. Nazrul Islam, ED & CEO Mr. Muhammad Shamsur Rahman, Group Manager (Commercial) Mr. Md. Emtiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist	Meeting on Technical issues and Data Collection (reports, charts and drawings)
4.	27/11/2012	Mongla Port Authority Different officials	IIFC Mr. Nazrul Islam,	Site Visit

Sl.	Date	Place/ Organization List of persons met	Consultants	Purpose
			ED & CEO Mr. Muhammad Shamsur Rahman, Group Manager (Commercial) Mr. Md. Emtiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist Mongla Port Authority Mr. Mizanur Rahman Mr. Belal Hossain	
5.	27/11/2012	Mongla Port Authority Commodore M A K Azad, Chairman Commander M Enamul Haque, Harbour Master	IIFC Mr. Nazrul Islam, ED & CEO Mr. Muhammad Shamsur Rahman, Group Manager (Commercial) Mr. Md. Emtiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist	Meeting on current status of MP and development plans
6.	28/11/2012	Mongla Port Authority Mr. Mahbub Ullah, Director (Traffic)	IIFC Mr. Md. Emtiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist	Meeting on ship traffic at port
7.	28/11/2012	Mongla Port Authority Commander M Enamul Haque, Harbour Master	IIFC Mr. Nazrul Islam, ED & CEO Mr. Muhammad Shamsur Rahman, Group Manager	Meeting on navigational issues and MPA presentation at PPP Investors

Sl.	Date	Place/ Organization List of persons met	Consultants	Purpose
			(Commercial)	forum
8.	28/11/2012	Mongla Port Authority Mr. Siddikur Rahman, Deputy Chief Accounts	IIFC Mr. Md. Emtiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist	Meeting on Mongla Port Tariff structure
9.	28/11/2012	Mongla Port Authority Engr. Md. Kowser Ali, Chief Engineer Engr. Sk. Sowkat Ali, Executive Engineer	IIFC Mr. Nazrul Islam, ED & CEO Mr. Md. Emtiazul Hassan Mazumder, Project Officer	Meeting on site drawings
10.	28/11/2012	Mongla Export Processing Zone Md. Hafizur Rahman, General Manager	IIFC Mr. Muhammad Shamsur Rahman, Group Manager (Commercial) Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (Mongla EPZ)
11.	28/11/2012	Pace Tobacco Industries (MEPZ) Mr. Pratik Vyas, Chairman	IIFC Mr. Muhammad Shamsur Rahman, Group Manager (Commercial) Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (Tobacco export)
12.	29/11/2012	Controller Movement and Storage, Food Division, Khulna Mr. Amzad Hussain, Director	IIFC Mr. Md. Emtiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (food import and distribution)
13.	29/11/2012	Bangladesh Jute Association, Khulna Md. Abdul Hamid, Asst. Secretary	IIFC Mr. Md. Emtiazul Hassan Mazumder, Project Officer	Stakeholder Consultation and data collection (jute export)

Sl.	Date	Place/ Organization List of persons met	Consultants	Purpose
			Deloitte Mr. Sumit Mishra. Financial Specialist	
14	29/11/2012	Uttara Jute Traders, Khulna Mr. Bikash Kanti Biswas, General Manager	IIFC Mr. Md. Emtiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (jute production and export)
15	29/11/2012	Akunzee Brothers, Khulna Mr. A.M. Harun ar Rashid, Proprietor	IIFC Mr. Md. Emtiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (jute production and export)
16	30/11/2012	Marco Shipping Co. - PIL Bangladesh Ltd. Khulna Kazi Nurul Huda, Asst. Manager (Operation)	IIFC Mr. Md. Emtiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (ship traffic at MP and navigational issues)
17	1/12/2012	Mongla Custom's Clearing & Forwarding Agent's Association, Khulna Md. Shamsul Alam, Vice President	IIFC Mr. Md. Emtiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (cargo movement at MP)
18	3/12/2012	Mongla Port Authority Commodore M. A. K. Azad, ndc, psc, BN, Chairman	IIFC Mr. Imran Ehsan, Senior Consultant MACE Mr. S. D. Badrinath, Environmental Specialist Mr. K. Sekar, Environmental Specialist	Introductory Meeting

Sl.	Date	Place/ Organization List of persons met	Consultants	Purpose
19	3/12/2012	Mongla Port Authority Mr. Mahbub Ullah, Director (Traffic)	IIFC Mr. Imran Ehsan, Senior Consultant MACE Mr. S. D. Badrinath, Environmental Specialist Mr. K. Sekar, Environmental Specialist	Meeting of MP traffic and dredging issues
20	3/12/2012	Mongla Port site	IIFC Mr. Imran Ehsan, Senior Consultant MACE Mr. S. D. Badrinath, Environmental Specialist Mr. K. Sekar, Environmental Specialist	Site Visit
21	4/12/2012	Mongla Port Authority Commander M Enamul Haque, Harbour Master	IIFC Mr. Imran Ehsan, Senior Consultant MACE Mr. S. D. Badrinath, Environmental Specialist	Meeting on navigational issues and water supply
22	4/12/2012	Mongla Port Authority Engr. Md. Kowser Ali, Chief Engineer (C&H) Mr. Mizanur Rahman, Deputy Chief Engineer	IIFC Mr. Imran Ehsan, Senior Consultant MACE Mr. S. D. Badrinath, Environmental Specialist	Meeting on technical and environmental issues
23	6/12/2012	Export Promotion Bureau (EPB) Mr. Ehsan Kabir, Secretary	IIFC Mr. Md. Emiazul Hassan Mazumder, Project Officer Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (export/ import from the country)

Sl.	Date	Place/ Organization List of persons met	Consultants	Purpose
24	10/12/2012	Bangladesh Export Processing Zones Authority (BEPZA) Mr. Sayed Nurul Islam, Member (Investment Promotion) Mr. Khurshid Alam, General Manager (Investment Promotion) Mr. Shibu Ranjan Das, Deputy Manager	IIFC Mr. Imran Ehsan, Senior Consultant Maitrayee Roy, Consultant Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (export/import from EPZs)
25	12/12/2012	Bangladesh Frozen Foods Exporters Association Mr. Md. Abul Bashar, Executive Director	IIFC Mr. Imran Ehsan, Senior Consultant Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (frozen foods export)
26	12/12/2012	Mark Worldwide International Courier And Cargo Mr. Farhan Ahmed, Managing Director	IIFC Mr. Imran Ehsan, Senior Consultant Maitrayee Roy, Consultant Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (transportation of cargo)
27	12/12/2012	M/S Sohel Enterprise (C&F Agent) Mr. Md. Sohel Rana, Director	IIFC Mr. Imran Ehsan, Senior Consultant Maitrayee Roy, Consultant Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and data collection (transportation of cargo)
28	17/12/2012	Business Initiative Leading Development (BUILD) Ms. Ferdaus Ara Begum, CEO	IIFC Mr. Imran Ehsan, Senior Consultant Maitrayee Roy, Consultant Deloitte Mr. Sumit Mishra. Financial Specialist	Stakeholder Consultation and Data Collection (export from Dhaka)

Sl.	Date	Place/ Organization List of persons met	Consultants	Purpose
29	17/12/2012	Dhaka Chamber of Commerce & Industry (DCCI) Mr. Md. Humayun Kabir Fakir, Joint Secretary (R&P)	IIFC Mr. Imran Ehsan, Senior Consultant Maitrayee Roy, Consultant Deloitte Mr. Sumit Mishra, Financial Specialist	Stakeholder Consultation and Data Collection (export from Dhaka)
30	19/12/2012	A PL Bangladesh Pvt. Limited Mr. Monoar Hossain, Director (Sales)	IIFC Mr. Imran Ehsan, Senior Consultant Deloitte Mr. Sumit Mishra, Financial Specialist	Stakeholder Consultation and Data Collection (ship traffic at Mongla Port)
31	24/12/2012	Bangladesh Garments Manufacturers and Exporters Association (BGMEA) Mr. Md. Munir Hossain, Director, BGMEA, Director, Vertex Group	IIFC Mr. Imran Ehsan, Senior Consultant Maitrayee Roy, Consultant	Stakeholder Consultation and Data Collection (RMG Export)
32	24/12/2012	Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA) Mr. Mohammad Hatem, 1st Vice President Mr. Shameem Ahmed, Vice-President (Finance) Mr. Mahiuddin Faruqui, Vice President	IIFC Mr. Imran Ehsan, Senior Consultant Maitrayee Roy, Consultant	Stakeholder Consultation and Data Collection (Knitwear Export)
33	1/1/2013	Bangladesh Inland Water Transport Authority (BIWTA) Dr. Md. Shamsuddoha Khondoker, Chairman Mr. Mahmud Hasan Salim, Director (Planning) Mr. Mohammad Hossain, Joint Director (Marine) Mr. Golam Kabir, Joint Director (Port)	IIFC Mr. Muhammad Shamsur Rahman, Group Manager (Commercial) Mr. Imran Ehsan, Senior Consultant Mr. Md. Emtiazul Hassan Mazumder, Project Officer	Stakeholder Consultation and Data Collection (waterways transport of goods and dredging in channels)

Sl.	Date	Place/ Organization List of persons met	Consultants	Purpose
		Engr. Rokibul Islam Talukder, Suptdg. Engineer (cc) & Project Director Mr. Md. Mahbub Alam, Director of Hydrography		
34	23/01/2013	PPP Office Afsar H Uddin, CEO Abu Rashed, PPP Advisor Sukesh Kumar Sarkar, Deputy Manager Proshanto Kumar Kar, Computer Analyst	IIFC Nazrul Islam, Managing Director Mr. Muhammad Shamsur Rahman, Group Manager Commercial Mr. Rabiul Islam, Infrastructure Advisor Mr. Imran Ehsan, Senior Consultant Ishrat Jahan, Consultant	Discussion on Draft Major Terms and Conditions
35	20/02/2013	World Bank Dr. Abdullah, WB Afsar H Uddin, CEO, PPP Office Ms. Husne Ara Shikha, Joint Director & Deputy Project Director, IPFF	IIFC Nazrul Islam, Managing Director Mr. Muhammad Shamsur Rahman, Group Manager Commercial Mr. Hadi Hossain Babul, Port Consultant Mr. Rabiul Islam, Infrastructure Advisor Mr. Imran Ehsan, Senior Consultant Ishrat Jahan, Consultant	Presentation of findings of draft financial analysis of the project
36	05/03/2013	CEGIS Dr. Mominul Haque Sarkar Managing Director (In Charge)	IIFC Nazrul Islam, Managing Director Mr. Rabiul Islam, Infrastructure	Discussion on Dredging of Mongla- Ghasiakhali Canal

Sl.	Date	Place/ Organization List of persons met	Consultants	Purpose
			Advisor Ishrat Jahan, Consultant	
37	23/03/13	Mongla Port Authority MPA Management, Senior Officers, CBA representatives Bangladesh Bank Project Related officials Khulna management PPP Office CEO Ministry of Shipping 2 Senior Officials	IIFC Managing Director Senior Advisors, Consultants	Discussion workshop with stakeholders. held at Bangladesh Bank Auditorium at Khulna

Annexure VI

Meeting Records



MEETING NOTES NO. 01

Project Number	4 0 0 2 7	WP1 - 0 3 8	Date: 6-Dec-12 Duration: 11:00 AM-11:45 AM
Participants			Distribution:
<u>Export Promotion Bureau (EPB):</u> <ul style="list-style-type: none">• Mr. Ehsan Kabir, Secretary		<u>Deloitte Touche Tohmatsu India Private Limited:</u> <ul style="list-style-type: none">• Sumit Mishra, Manager Consulting <u>IIFC :</u> <ul style="list-style-type: none">• Mr. Md. Emtiazul Hassan Mazumder, Project Officer	Team members
Project: Feasibility Study of Development of two jetties at Mongla Port			
Discussion Topic(s): Development of two jetties at Mongla port project meeting A meeting was held from 11:00 am to 11:45 am on 10 December 2012 at EPB Office in presence of the above participants. In the meeting, the key points were as follows: <ol style="list-style-type: none">1. EPB collects data from NRB in raw format and then process it to derive necessary information.2. All data are published yearly.3. The softwares are in the process of developing in such a manner to achieve distance data between hinterland and ports.4. The quantity data is not accurate because the units are not mentioned from the source of the data. EPB have positive remarks regarding Mongla port, provided that the access for ships in the channel will be developed for regular freight movement.			
ACTIONS			
	What	Who	By When
1.			



MEETING NOTES NO. 02

Project Number	4 0 0 2 7	WP1 - 0 3 9	Date: 10/12/2012 Duration: 3:00 PM-3:45PM
Participants			Distribution:
<u>Bangladesh Export Processing Zones Authority:</u> <ul style="list-style-type: none">• Mr. Sayed Nurul Islam, Member (Investment Promotion)• Mr. Khurshid Alam, General Manager, IP• Shibu Ranjan Das, Deputy Manager		<u>Deloitte Touche Tohmatsu India Private Limited:</u> <ul style="list-style-type: none">• Sumit Mishra, Manager Consulting <u>IIFC:</u> <ul style="list-style-type: none">• Imran Ehsan, Senior Consultant• Maitrayee Roy, Consultant	
Project: Feasibility Study of Development of two jetties at Mongla Port			
Discussion Topic(s): Development of two jetties at Mongla port project meeting A meeting was held from 3:00 pm to 3:45 pm on 10 December 2012 at BEPZA Office in presence of the above participants. In the meeting, the key points were as follows: <ol style="list-style-type: none">5. At first, Member (Investment Promotion) welcomed IIFC & Deloitte members in the meeting.6. Mr. Imran Ehsan briefed about the purpose of the meeting. He said that IIFC, in association with international consultants, Deloitte Touche Tohmatsu India Private Limited and Mahindra Consulting Engineers Limited, India (MACE), carried out an assignment for the Public Private Partnership Office, Prime Minister's Office and IPFF Project, Bangladesh Bank, for preparing a Feasibility Study on construction of two jetties at Mongla Port through PPP. He also mentioned that for preparing a Feasibility Study required consultation with stakeholders of the project and collection of relevant data for preparing a thorough demand assessment.7. The purpose of the meeting was to get information on List of export processing zones along with their geographical locations Commodity-wise export from each of the EPZ for the last 10 years (volume of export), Commodity-wise import (as raw material) by each of the EPZ for the last 10 years (volume of export)8. Member (IP) said that BEPZA did not maintain the commodity database. They collected all the EPZ's total value of export products every day.9. Member (IP) referred Mr. Khurshid Alam, General Manager (IP) & Mr. Shibu Ranjan Das, Deputy Manager to Deloitte and IIFC members.10. Deputy Manager said that they maintained Manpower record, total Import and Export Record in each EPZ's. He also mentioned five major EPZ's that were in Dhaka EPZ's (Nos-2), Ishordi EPZ (1), Uttara EPZ and Comilla EPZ.11. Mr. Mishra asked where he could get the information regarding Commodity-wise export from each of the EPZ for the last 10 years (volume of export), Commodity-wise import (as raw material) by each of the EPZ for the last 10 years. Deputy Manager suggested visiting each EPZ's for collecting the authentic information.			
ACTIONS			
	What	Who	By When



MEETING NOTES NO. 03

Project Number	4 0 0 2 7 WP1 - 0 4 2	Date: 12/12/2012 Duration: 3:00 PM- 4:00 PM
Participants		Distribution:
Mark Worldwide Pvt. Ltd. <ul style="list-style-type: none">• Farhan Ahmed, Managing Director	<u>Deloitte Touche Tohmatsu India Private Limited:</u> <ul style="list-style-type: none">• Sumit Mishra, Manager Consulting <u>IIFC :</u> <ul style="list-style-type: none">• Imran Ehsan, Senior Consultant• Maitrayee Roy, Consultant	
Project: Feasibility Study of Development of two jetties at Mongla Port		
Discussion Topic(s): Development of two jetties at Mongla port project meeting		
A meeting was held from 3:00 pm to 4:00 pm on 12 December 2012 at Mark Worldwide Pvt. Ltd. in presence of the above participants. In the meeting, the key points were as follows:		
<p>12. At first, Mr. Farhan Ahmed welcomed IIFC & Deloitte members in the meeting.</p> <p>13. Mr. Imran Ehsan briefed about the purpose of the meeting. He said that IIFC, in association with international consultants, Deloitte Touche Tohmatsu India Private Limited and Mahindra Consulting Engineers Limited, India (MACE), carried out an assignment for the Public Private Partnership Office, Prime Minister's Office and IPFF Project, Bangladesh Bank, for preparing a Feasibility Study on construction of two jetties at Mongla Port through PPP. He also mentioned that for preparing a Feasibility Study required consultation with stakeholders of the project and collection of relevant data for preparing a thorough demand assessment.</p> <p>14. During the meeting, Mr. Farhan Ahmed said about their carrying out export and import activities and commodities (Export and Import).</p> <p>15. Mr. Sumit Mishra asked about their exporting and importing products. In reply, Mr. Ahmed informed that they exported their products to Saudi Arabia, Germany, London, Italy. They imported their products mainly in Pakistan, China.</p> <p>16. Their main important imported product was garments. All garments products were containerized (100%).</p> <p>17. Mode of transportation:</p> <ul style="list-style-type: none">• About 95% products were imported through Chittagong port by Ship.• Only 5% products were imported by Air. <p>7. Barriers of Chittagong Port: Mr. Farhan Ahmed said that CPA was is principal seaport of Bangladesh handling about 92% of import-export trade of the country. CPA played a vital role in the national economy.</p> <p>CPA) was a basic services provider. He also opined that they executed their export</p>		

and import activities in

CPA but they faced several obstacles are as follows:

- Traffic Load High
- Transport Cost
- Loading Charge
- Port Bill
- Labour charge
- Carrying charge
- Port Authority Charge
- Shipping Bill / Freight Charge
- Customs Documents Processing Charge
- Chittagong Chambers of Commerce Fees

8. **Commodities:** Managing Director mentioned that they exported Containerized Products. Some of them were:

- Jute
- Tea

Main Export products: Garments, Leather, Vegetables, Handicrafts (Raw Jute), Tobacco

Export products Production areas:

- Tea (Producing from Pancagarh, Sylhet),
- Garments: EPZs (8 Nos.)
- Leather (Hazaribagh, Dhaka)
- Vegetables: All over specially from Dinajpur, Comilla, Dinajpur and Shantahar
- Rice: Dinajpur
- Tobacco : Rangpur, Rajshahi, Bagura

Non-Containerized products: They imported some non-containerized items. They are given as follows:

- Rice
- Coal

8. **Development of Mongla Port:** In the discussion, Mr. Mishra asked Managing Director that how many C&F's would be shift for the development of Mongla Port with all kinds of facilities. Managing Director replied that they were hopeful for moving most of the local exporters and importers (about 100%) within six (6) months. He gave priority on container costing and customer service of mongla port. He urged development of Mongla port by providing necessary services and facilities to the port users efficiently and effectively at competitive price.

ACTIONS

	<i>What</i>	<i>Who</i>	<i>By When</i>



MEETING NOTES NO. 04

Project Number	4 0 0 2 7 WP1 - 0 4 3	Date: 17/12/2012 Duration: 2:00 PM-3:00 PM
Participants		Distribution:
<u>Business Initiative Leading Development (BUILD):</u> <ul style="list-style-type: none">• Ferdaus Ara Begum, CEO <u>Dhaka Chamber of Commerce & Industry:</u> <ul style="list-style-type: none">• Md. Humayun Kabir Fakir, Joint Secretary (R&P)	<u>Deloitte Touche Tohmatsu India Private Limited:</u> <ul style="list-style-type: none">• Sumit Mishra, Manager Consulting <u>IIFC :</u> <ul style="list-style-type: none">• Imran Ehsan, Senior Consultant• Maitrayee Roy, Consultant	Team Members
Project: Feasibility Study of Development of two jetties at Mongla Port		
Discussion Topic(s): Development of two jetties at Mongla port project meeting		
A meeting was held from 2:00 pm to 3:00 pm on 17 December 2012 at Dhaka Chamber of Commerce & Industry office in presence of the above participants. In the meeting, the key points were as follows:		
<ul style="list-style-type: none">• At first, Ms. Ferdaus Ara Begum, CEO welcomed IIFC & Deloitte members in the meeting.1. Mr. Imran Ehsan briefed about the purpose of the meeting. He said that IIFC, in association with international consultants, Deloitte Touche Tohmatsu India Private Limited and Mahindra Consulting Engineers Limited, India (MACE), carried out an assignment for the Public Private Partnership Office, Prime Minister's Office and IPFF Project, Bangladesh Bank, for preparing a Feasibility Study on construction of two jetties at Mongla Port through PPP. He also mentioned that for preparing a Feasibility Study required consultation with stakeholders of the project and collection of relevant data for preparing a thorough demand assessment.2. Mr. Sumit Mishra asked about their outlook for various exporting/ importing industries, geographical location of upcoming industrial clusters in Dhaka, the import intensity of the industries (i.e. ratio of imports to total production) that generate demand for port services, mode of transportation (road/rail/water) which was adopted by various industries for export /import of cargo, and available advantages and the challenges faced by various exporting/ importing industries.3. CEO, BUILD said that private investors were interested on development of Mongla Port. She mentioned a number of points for development of Mongla Port that are illustrated below:		
<u>Mentioned points:</u>		

- Infrastructure Support needs to build up.
 - Huge Traffic Jam between Dhaka-Chittagong Route where as less traffic Jam between Dhaka-Mangla Route. Therefore, Dhaka-Mangla Route has good road connection.
 - Government has not properly taken care of Mangla Port. They should provide the logistical support towards the investors so that investors would come and invest.
 - Garments play a vital role in the national economy. For a garment exporter, lead time is a critical issue. To make garment exports competitive, reduction of lead time is critical. Garment exporters suggested that such reduction in time will require institutional as well as infrastructural reform of Mangla port.
4. During the discussion, Mr. Mishra asked where he could get the information regarding Commodity-wise export from each of the EPZ for the last 10 years (volume of export), Commodity-wise import (as raw material) by each of the EPZ for the last 10 years. On that note, CEO, BUILD replied that information regarding inbound ship situation of Mangla port could be found from Government assigned authority of Bangladesh Bureau of Statistics (BBS). BBS published the full volume of data & statistics bulletin on monthly basis.
5. After the discussion, CEO, BUILD referred IIFC & Deloitte members to Mr. Md. Humayun Kabir Fakir, Joint Secretary (R&P), DCCI.
6. Joint Secretary (R&P), DCCI mentioned that 87% Import and Export activities had done through Chittagong Port. The remaining 13% Import and Export activities had done through Mangla port & other land ports.
7. Finally, Joint Secretary (R&P), DCCI suggested Export Statistics Book of Bangladesh Bank for getting the proper information on commodity-wise export and import volume-wise from EPZ's for the last 10 years.

ACTIONS

	<i>What</i>	<i>Who</i>	<i>By When</i>



MEETING NOTES NO. 05

MEETING NOTES NO. 05

Project Number <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>4</td><td>0</td><td>0</td><td>2</td><td>7</td><td></td><td>WP1</td><td>-</td><td>0</td><td>3</td><td>7</td></tr></table>											4	0	0	2	7		WP1	-	0	3	7	Date: 24/12/2012 Duration: 12:00 PM-12:50 PM
4	0	0	2	7		WP1	-	0	3	7												
Participants											Distribution:											
Bangladesh Garments Manufacturers and Exporters Association (BGMEA) Mr. Md. Munir Hossain, Director, BGMEA and Director, Vertex Group	IIFC : Mr. Imran Ehsan, Senior Consultant Ms. Maitrayee Roy, Consultant					Team Members																

Project: Development of Two Jetties at Mongla Port through PPP

Discussion Topic(s): Export/ import scenario of RMG sector in the country

A meeting was held on 24 December 2012 at Vertex Group office in presence of the above participants on the Mongla Port project. Key points discussed in the meeting were as follows:

- Mr. Imran Ehsan briefed about the purpose of the meeting. He stated that IIFC, in association with international consultants, Deloitte and MACE, is carrying out an assignment for the IPFF Project, Bangladesh Bank and Mongla Port Authority (MPA), for preparing a Feasibility Study on construction of two jetties at Mongla Port through PPP. He also mentioned that preparing a Feasibility Study required consultation with stakeholders of the project and collection of relevant data for preparing a thorough traffic assessment.
- Mr. Imran Ehsan asked about BGMEA's outlook regarding the major garments production centers within Bangladesh and share of each of the centers in production and export, mode of transportation used to send export cargo to ports i.e. road, rail, waterways etc. and percentage share of each mode, the constraints in exporting/importing garments through Mongla Port, the major importing countries of garments, and demand of garment export in the next 10 years etc.
- Mr. Md. Munir Hossain stated that he is very interested in the project as he is also a member of the Mongla Port Advisory Committee. The committee was formed by the Ministry of Shipping including various stakeholders and headed by the Shipping Minister. The committee holds meetings once every three months
- Mr. Md. Munir Hossain provided the following information in regards to the queries:
 - About 78% of total exports from the country is RMG
 - Some members of BKMEA are members of BGMEA also. Knitwear accounts for about 50% of total garments products exported from the country.
 - 0% percent of RMG is exported through Mongla Port.
 - Of total export almost all is exported through Chittagong Port. 1-2% exported through Air and less than 1% through land port (Benapole).
 - Major RMG production centers are: Dhaka area (75%) and Chittagong (25%).
 - The major garments production centers within Bangladesh are areas around Dhaka:

Dhaka city, Narayanganj, Savar, Tongi.

- Mode of transportation to Chittagong Port: 95% By Covered Van (Road). Each covered van holds one 20 ft TEU container of cargo.
 - 0% transport through waterways. Rest through air or rail. Air only used when there is deadline to meet (very expensive). Rail is not used much because it takes much longer than by road (covered vans).
 - Cost of transportation (Dhaka – Chittagong): around BDT 10,000/- BDT 12,000/- per Covered Van (28 -30 CBM / van).
 - Amount of RMG in each container depends on what kind of garments it is. A 20 ft TEU container holds about 9,000 pieces of formal shirts (hard collar) or 12,000 pieces of casual shirts. On average 12,000 – 16,000 pieces per 20 ft container. 28- 30 CBM per 20 ft container.
 - 100% of RMG export is containerized.
 - Major raw materials getting imported for garment manufacturing: Fabrics, Yarn and cotton
 - 80% of Fabrics requirement met through imports. Rest produced locally. Import fabrics are mainly containerized.
 - 20% of Yarn requirement met through imports. 80% produced locally.
 - 100% of cotton is imported.
 - Exporting countries of RMG: Europe (57%), USA (29%), other countries (14%).
 - Major Raw Material Import from countries: mainly from China (about 75%) , second highest from India and the rest from others (Taiwan, Korea, Malaysia, Singapore, Indonesia, Turkey, Thailand etc.)
 - Growth prospects: Same growth as in the last several years will continue for the next 2-5 years. In addition, growth would increase more if Govt. can ensure the adequate gas-supply to industries.
- Mr. Munir Hassan also discussed the problems with Mongla Port and why there are no RMG factories in the Khulna region. The key constraints to using Mongla Port is there are not enough ships to carry cargo, not adequate infrastructure support as in Chittagong Port and no adequate road connection (no Padma Bridge).
 - The major reason why there are no RMG industries in Khulna/ Mongla area is because there is no Gas supply. Running factories using other fuel sources is expensive. While inquired about why the RMG industry is clustered only in the Dhaka and Chittagong regions he pointed out that other areas in Bangladesh does not have adequate facilities to cater to international clients who come to visit the factories before placing orders. Also since there are no airport facilities in Mongla, it will be difficult to take clients to visit factories. Dhaka and Chittagong are the most equipped to provide such facilities (in addition to gas supply) and hence the industry has grown in these two regions.
 - According to Mr. Hassan, if Mongla Port is fully developed and road communication is adequate, a high percentage of Dhaka based RMG factories may use the port. The amount of factories that may use the port will depend on two factors: cost and time required in sending cargo through MP compared to CP. Users will chose Mongla if they can get cargo exported through Mongla faster and/ or cost of export through Mongla Port is less than Chittagong Port.
 - The garments industry is also facing problem as gas supply to factories is not adequate. If adequate supply of gas is provided production and hence export will increase. The industry also faces problem with skilled manpower shortage because of high turnover rate.

- During the discussion, Mr. Imran Ehsan asked if information regarding volume of RMG export for the last 10 years is available. Mr. Munir Hassan referred Mr. Rasel, RDTI Cell, BGMEA, as having some of those data.

ACTIONS

	<i>What</i>	<i>Who</i>	<i>By When</i>
	Contact Mr. Rasel, BGMEA for data	IIFC	ASAP



MEETING NOTES NO. 06

Project Number	4 0 0 2 7 WP1 - 0 4 4	Date: 24/12/2012 Duration: 3:30 PM- 4:30 PM
Participants		Distribution:
Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA) Mohammad Hatem, 1st Vice President Shameem Ahmed, Vice-President (Finance) Mahiuddin Faruqui, Vice President	IIFC : Mr. Imran Ehsan, Senior Consultant Ms. Maitrayee Roy, Consultant	Team Members
Project: Development of Two Jetties at Mongla Port through PPP		
Discussion Topic(s): Export/ import scenario of knitwear sector in the country A meeting was held on 24 December 2012 at BKMEA office in presence of the above participants on the Mongla Port project. Key points discussed in the meeting were as follows: <ul style="list-style-type: none">• Mr. Imran Ehsan briefed about the purpose of the meeting. He stated that IIFC, in association with international consultants, Deloitte and MACE, is carrying out an assignment for the IPFF Project, Bangladesh Bank and Mongla Port Authority (MPA), for preparing a Feasibility Study on construction of two jetties at Mongla Port through PPP. He also mentioned that preparing a Feasibility Study required consultation with stakeholders of the project and collection of relevant data for preparing a thorough traffic assessment.• Mr. Imran Ehsan asked about BGMEA's outlook regarding the major garments production centers within Bangladesh and share of each of the centers in production and export, mode of transportation used to send export cargo to ports i.e. road, rail, waterways etc. and percentage share of each mode, the constraints in exporting/importing garments through Mongla Port, the major importing countries of garments, and demand of garment export in the next 10 years etc.• Mr. Mohammad Hatem mentioned that he is a member of Mongla Port Advisory Committee. He provided the following information in regards to the queries:<ul style="list-style-type: none">▪ 0% percentage of total export of knitwear sent through Mongla Port.▪ About 50% of total RMG is Knitwear products.▪ FY 2010-2011, the export of Knitwear was \$ 9.48 billion. It was about \$ 8.45 billion the previous year. The export growth was 46.2% by value. They do not have any data about export amount by volume.▪ Major Production Centers: Dhaka area (80%) and Chittagong (20%). In Dhaka, most of the factories are located in Narayanganj. This is because the town has all the		

facilities and suppliers required for knitwear production. Others in Dhaka city and Gazipur.

- Mode of transportation used to send export cargo: 85-90% through Chittagong port, 10-15% through air and about 1% through land ports.
- 98% of cargo transported to Chittagong Port by Covered Van / Road. Internal Container Depot (rail) use is very negligible.
- Charges paid for transport: Around BDT 8000/- BDT 10,000/- BDT per Covered Van for 28 CBM. On occasions such as Eid, the charges paid per container is higher: around 30,000/- BDT for using covered vans.
- Each 20 ft container contains about 28 – 30 CBM or 7.5 tonnes to cargo. Each 40 ft container contains 56 – 62 CBM of cargo. The measurement is weight-wise. 140-150 GSM carried 32,000 pieces which was 7.5 Tonne.
- Raw materials imported for knitwear manufacturing: Yarn. 80% imported from India. Rest from Korea, Indonesia, Thailand, Singapore etc. Imported Yarn is mainly 100% containerized.
- Major importing countries of Knitwear: 80% in India, Indonesia, Turkey, Thailand and Korea, Hong Kong.
- Major exporting countries of Knitwear: 75% in Europe, 15% in USA, 10% others.
- Key constraints in using Mongla port: No adequate infrastructure facilities and absence of ships.
- Industries not being set up in the area because of lack of gas supply.
- Demand of Knitwear export in the next 10 years: 1st Vice President was hopeful that the growth would increase by 14%. Their target amount for export is \$50- \$60 billion by 2020.
- Mr Hatem also mentioned that they have a dedicated pontoon for BGMEA and BKMEA goods for ferry crossings at Padma. However, facility is not used as no export of RMG goods take place through Mongla.
- He also informed the consultants that currently the Knitwear industry is running at 50% capacity. If gas supply is ensured and political disturbances which result in shutdown of production is averted, the industry production and export will double.
- Mongla Port will be utilized only when ship traffic at port is increased and adequate infrastructural facilities are built at the port.

ACTIONS

	<i>What</i>	<i>Who</i>	<i>By When</i>



MEETING NOTES NO. 07

Project Number	4 0 0 2 7 WP1 - 0 4 5	Date: 01/01/2013 Duration: 11:30 PM-1:00 PM
Participants		Distribution:
Bangladesh Inland Water Transport Authority (BIWTA): Dr. Md. Shamsuddoha Khondoker, Chairman Mr. Mahmud Hasan Salim, Director (Planning) Mr. Mohammad Hossain, Joint Director (Marine) Mr. Golam Kabir, Joint Director (Port) Engr. Rokibul Islam Talukder, Suptdg. Engineer (cc) & Project Director Mr. Md. Mahbub Alam Director (Hydrography)	IIFC : Mr. Muhammad Shamsur Rahman, Group Manager Commercial Mr. Imran Ehsan, Senior Consultant Mr. Md. E. H. Mazumder, Project Officer	Team Members
Project: Development of Two Jetties at Mongla Port through PPP		
A meeting was held on 1 January 2013 at BIWTA office in presence of the above participants on the Mongla Port PPP project. Key points discussed in the meeting were as follows: <ul style="list-style-type: none">The main waterways route from Dhaka to Mongla is currently closed due to siltation. There are no plans to undertake dredging and open up the route any time soon. MG canal (length 30k.m. depth: Low tide 1 meter) is clogged by siltation closing off the route.Currently detour is used by vessels via Sundarban Bogi canal. However, Forest department has objections in using the Bogi canal due to possible environmental damage to the Sundarbans. The route may be closed off any time due to the objections.There are dredging plans of the MG Canal approved by the authority, however it is unlikely to be executed as dredging will provide only a temporary solution. For sustainable results, integrated project needs to be undertaken comprising the authorities from WDB (Water Development Board), LGED, Fisheries. A massive canal re-excavation and sustaining activities needs to be performed.The reasons for siltation: WAPDA folders, Shrimp Hatcheries, Flood Control Sluice Gates. These mechanisms restrict the flow of water and cause both way (upstream and downstream) siltation. The salinity coverage is also expanding for these reasons.No container is transported through waterways. Only bulk cargo is transported		

through cargo ships. Commodities transported is given in attached document.

- Cost of transport from Dhaka to CTG is Tk 400/ton. More information on transportation cost can be found in the Water Transport Cell website (<http://www.watertransportcell.com>) container is transported on waterways hence Cost/ TEU is not available.
- Average weight of cargo that can be transported is 500-600 tons.
- Periodical maintenance dredging executed in passenger routes.
- Capital dredging of 53 routes all over the country are under execution.
- Pangaon Inland Container Terminal scheduled to be opened up for cargo transportation (Dhaka - Chittagong) in April 2013. The ICT will be operated by Chittagong Port Authority.
- Waterways distance: (source: hYdrographY department)
 - Dhaka - CTG : 299 km
 - Dhaka - Chandpur: 68 km
 - Mongla - Dhaka: 297 km
 - Dhaka - Ashuganj : 111 km
 - Chandpur - Baghabari: 162 km
 - Mongla - Noapara: 81 km
- Time required to transport cargo from various locations:
 - Chittagong - Naryanganj : 14 hours
 - Chittagong - Ashuganj: 6 hours
 - Chittagong to Baghabari: 22 hours
 - Mongla - Naryanganj : 22 hours
- According to BIWTA officials most bulk cargo (about 75%) is transported by waterways using cargo vessels.

A chart showing the river depths at various riverways in the country was also obtained from the BIWTA officials.

ACTIONS

	<i>What</i>	<i>Who</i>	<i>By When</i>



MEETING NOTES NO. 08

Project Number	4 0 0 2 7 WP1 - 0 7 2	Date: 23/01/2013 Duration: 1:30 PM – 3:00 PM
Participants		Distribution:
PPP Office: Afsar H Uddin, CEO Abu Rashed, PPP Advisor Sukesh Kumar Sarkar, Deputy Manager Proshanto Kumar Kar, Computer Analyst	IIFC : Nazrul Islam, Managing Director Mr. Muhammad Shamsur Rahman, Group Manager Commercial Mr. Rabiul Islam, Structural Engineering Consultant Mr. Imran Ehsan, Senior Consultant Ishrat Jahan, Consultant	Team Members
Project: Development of Two Jetties at Mongla Port through PPP		
A meeting was held on 23 January 2013 at PPP office premises in presence of the above mentioned participants on Feasibility Study of Mongla Port. Main meeting agenda was to discuss about the draft major terms and conditions for construction of two jetties at Mongla Port through PPP. Key points of the meeting were as follows:		
<ul style="list-style-type: none">• Mr. Nazrul Islam started discussion with a brief of transportation network of the port mentioning the importance of Padma bridge. He pointed out one of the main problem of the port is lack of enough draft of the river for which container cannot reach at port properly. This has lost the attraction of the port. At present, most of the exports and imports are handled by the Chittagong Port Authority (CPA). So, the authority should have first focus on to develop the river capacity rather than the jetty capacity.• Mr. Nazrul informed that the port has signed a contract with a Malaysian Company for its dredging work. In this regard, Mr Shamsur Rahman suggested that maintenance dredging have to be maintained with proper capital dredging. Mr. Rabiul Islam suggested for providing the maintenance dredging to a 3rd party. Finally Mr. Afsar advised to handover this job to the private operator.• MD, IIFC mentioned about the shortest way of Dhaka-Mongla route where it has got a restriction at Ghasiakhali point due to siltation. He said that Mongla Port Authority (MPA) can request to Ministry of Shipping for navigation at Ghasiakhali.• To attract the private investor jetty no 5 can be given to the private operator along with jetty 3 and 4. As jetty 5 is already completed so that the operator can start using this jetty while jetty 3 and 4 are under construction. It will make a quick cash flow. Mr. Afsar said to inform Deloitte about jetty 5 issues.• The constraints and mitigation techniques of the Mongla port was also discussed in the meeting. Ports banking and customs issues are difficult enough which are needed to be		

identified and mitigated.

- Mr. Nazrul said that the consultant's consortium may talk to Malaysian Dredging company for its additional task of dredging at Ghasiakhali point. In this regard, Mr Rabiul said that it is BIWTA's task to handle all river navigation activities.
- CEO, PPP Office asked about pile test for the construction work of the jetties. All testing and due-diligences can be completed by the pre-qualified bidder in between pre-qualification and main bidding, suggested by Mr. Nazrul.
- The mode of contract was also one of the key issues of the discussion. BOO mode will be better than BOT mode. On BOT mode, the transfer of the project to the executing agency demands super quality of equipments that requires too much negotiation and may cause loosing of private investor's attraction. On the other hand, it may be BOT practice but specifications have to be more identified not specifying the brand name, suggested by Mr. Afsar. Another option was to call bid as BOT basis keeping a scope of turning to BOO basis when negotiation become more difficult.
- The 3rd site visit schedule was informed to the meeting.
- Mr. Afsar requested to arrange a formal meeting by next week with consultant's consortium with a presentation on Major Terms and Conditions (MTC) of the project.

ACTIONS

	What	Who	By When
1.	Arrange a formal meeting with consultant's consortium and relevant agencies.	IIFC	1 st week of February.
2.	Prepare a presentation on MTC	IIFC	Before formal meeting.
3.	Inform Deloitte about jetty 5 issue.	IIFC	ASAP



MEETING NOTES NO. 09

Project Number	4 0 0 2 7 WP1 - 0 9 8	Date: 11/02/2013 Duration: 4:30 PM – 6:40 PM
Participants		Distribution:
Ministry of Shipping (MoS) Syed Monjurul Islam, Secretary Ms. Seema Shaha, Joint Secretary Mr.Nasir Arif Mahmud, Joint Secretary Mr.Pankaj Kumar Pal, Deputy Secretary Mr. Md. Shahjahan Ali, Asstt. Secretary	IIFC : Mr. Nazrul Islam, Managing Director Mr. Muhammad Shamsur Rahman, Group Manager Commercial Mr. Rabiul Islam, Infrastructure Advisor Mr. Hadi Hossain Babul, Port Advisor	Team Members
Mongla Port Authority Commodore M Habibur Rahman Bhuiyan, Chairman	Mr. Imran Ehsan, Senior Consultant	
PPP Office Mr. Afsar H Uddin, CEO	Ms. Ishrat Jahan, Consultant	

Project: Construction and Operation of Two Jetties at Mongla Port through PPP

A meeting was held on 11 February 2013 at Conference Room of Ministry of Shipping on the aforementioned project of Mongla Port Authority. The Secretary, MoS presided over the meeting.

The meeting agenda was to present the up to date progress of the project. The important issue was to discuss about the draft major terms and conditions, critical decisions needed to be taken for construction and operation of two jetties at Mongla Port through PPP. Key points of the meeting were as follows:

- **PPP options at Mongla Port:**

Option A: Two Jetty Option- This is the base case option that will be carried out by a private operator through PPP under a Concession Agreement (CA) for a fixed term. Terminal Operator will construct and operate the jetties 3 and 4 for a stipulated time period. Approximately 22 Acres of land will be handed over for two jetties and ancillary facilities.

Option B: Three Jetty Option- In this case, the Terminal Operator, in the initial phase will procure Cargo Handling equipment and operate Jetty 5 for 8-10 years. Terminal Operator will start construction of Jetty 3 and Jetty 4 as soon as port traffic reaches pre-agreed volume (say 90,000 TEUs). After construction of Jetty 3 and 4, the Jetty 5 will be returned to MPA. Trigger date for starting construction work for Jetty 3 and 4 may be

linked with amount of TEUs handled at Jetty 5.

Option C: BGMEA/ BKMEA Option- This option may be used in conjunction with 2-Jetty and 3-Jetty model. BGMEA/BKMEA may hold 25% share in Project Company which will assure cargo to Mongla as they are the largest users of the sea ports.

Decision Taken on three options:

In case of Option B, the Secretary said that it is a good opportunity and it may attract many investors. Beside this, there are opportunities of misunderstanding among the people who works in the port area. Except this, Ministry and MPA also have lack of work experience of PPP practice. The Secretary assured that they would consider the issue again and inform the consultants accordingly.

Regarding Option C, the Ministry thinks that revenue, charges and other issues will be complex. There is scope of mistrust to Private Sector.

• **Three Linked Projects:**

Link Project 1 - Dredging of Pussur River: This includes capital dredging of Pussur River by MPA and maintenance Dredging of Jetty Front by MPA.

Secretary informed that Dredging of Pussur is Ministry's concern. Already they have purchased dredger and visited the site to oversee the equipments and functioning. Another dredging procurement is under tendering stage at present. Maintenance dredging is also MPA's responsibility.

Link Project 2 - Dredging of Inland Waterway Routes: This project includes opening up the Mongla-Ghasiakhali (M-G) Canal by BIWTA through dredging.

Govt. is concerned about this issue not only for ease the transportation but also for saving Sundarban. Besides, if M-G canal is opened, the MPA and Pangaon Terminal will be more useful, attractive and competitive to Chittagong Port Authority (CPA).

Link Project 3 - Dedicated Ferry Service: A dedicated Ferry Service may be started at Padma River for ease transportation of cargo from Dhaka-Mongla

The meeting decided that it may be added as PPP project till Padma bridge constructed. MPA may purchase dedicated ferry at Padma River for its transportation activities.

• **Mode of Transaction-BOT or BOO:** In a PPP Project, transfer of assets at end of term, BOT mode may increase complexity of PPP Agreement and may discourage Investors. Consultant recommends for Build Own Operate (BOO) Model to be used.

Decision Taken: The meeting gave decision for BOT option for this project.

• **EIA and SIA issue:** The consultant showing the estimated timeline for Project Starting informed the meeting that the GoB should take steps immediately for preparation of EIA and SIA to reduce Financial Closure time.

The meeting agreed with the issue. The Chairman, MPA informed that EIA is presently being carried out for the existing 5 Jetties by the authority. The Secretary requested MPA to add jetty 3 and 4 areas with present EIA activities.

Decision Taken: To be decided.

• **Commencement of Transaction Phase:** The Consultant suggested that Transaction process starting with RFQ preparation should be commenced immediately to meet October 2013 deadline. In this regard, MoS and PPP Office decision is needed urgently.

It was suggested to construct a small working committee for detailed activities for the project.

Decision Taken: Concerned authority will provide decision on the issue later on.

- **Backup area of Jetty 4:** This includes proposed design of car parking at Mongla Port, should be adjusted so that the backup area for Jetty 4 is not compromised.

Decision Taken: Concerned authority will provide decision on the issue later on.

- **Tariff Structure:** Chairman, MPA suggested to keep the tariff for Jetty 3 and 4 same as MPA. If the Terminal Operator estimates the tariff lower than the MPA tariff, it will shift users from MPA to the Private Operators.

In this regard, Secretary suggested modeling a separate tariff for the Terminal Operator (TO). If Terminal Operator can bring more ships, it will earn revenue to port. The tariff can be competitive with MPA.

Decision Taken: Concerned authority will provide decision on the issue later on.

ACTIONS			
	<i>What</i>	<i>Who</i>	<i>By When</i>
Decisions should be taken for-			
1.	Option selection	MPA/MoS/PPP Office	
2.	Link Project 3 - Dedicated Ferry Service	MPA/MoS/PPP Office	
3.	Extended activities on EIA for jetty 3 and 4 areas with present EIA activities.	MPA	
4.	Commence of Transaction Phase	MPA/MoS/PPP Office	
5.	Backup area of Jetty 4	MPA	
6.	Tariff Structure	MPA/MoS	



MEETING NOTES NO. 10

Project Number	4 0 0 2 7	WP1 - 0 4 5	Date: 1/1/2013 Duration: 11:30 AM –1:00PM
Participants			Distribution:
Bangladesh Inland Water Transport Authority (BIWTA) Engr. Zulhuddin Ahmed, Chief Engineer Engr. Rokibul Islam Talukder, Suptdg. Engineer (cc) & Project Director Mr. Kabir Hossain, Deputy Director (Ports) Mr Abdul Hai, Deputy Director (traffic)		IIFC : Engr. A. K. M. Rabiu Islam, Infrastructure Advisor Mr. Tareq Aman, Consultant	Team Members
Project: Development of Two Jetties at Mongla Port through PPP			
A set of meeting were held on 14 February 2013 at BIWTA office in presence of the above participants. The meetings were related to the Mongla Ghashiakhali (MG) Canal project. Key points discussed in the meetings were as follows: <ul style="list-style-type: none">The total length of the Mongla-Ghashiakhali Canal is 6.5 k.m. The water route of Mongla nala to Ghashiakhali river is 30 km. The difficult length of the waterway is 10 km, having 1-1.5 feet draft only. An area with 500 meter width along the MG canal is owned by BIWTA. In recent past, a dredging company was hired by BIWTA, to dredging the channel with three dredgers for excavating 30 lacs cubic meter. However, it was observed that the rate of excavating silt not enough to retain the anticipated draft of 7-8 feet, due to higher rate siltation. Thereby, the project was closed after dredging 2 lacs cubic meter silts. Mr. Rakibul informed that as the arteries of that area are empoldered for shrimp cultivation, the rate of siltation is higher in those areas. At the time of high tide the channel gets upto 7 feet of draft. A study on the MG channel was previously prepared by CEGIS in this regard.For this scenario, the existing inland vessels have to pass by 60 km of waterways to reach Mongla.At present, BIWTA is paying 175 Tk./ m³ for dredging in inland rivers and 250 Tk./m³ for dredging in coastal areas. With such rate of siltation, in this MG Canal, initially the entity has to dredge 30 lac m³ and maintain dredging 20 lac m³ per year for anticipated draft of 12 feet. One technical and two supervising persons are required to oversee the progress and operation of dredging activities.Presently BIWTA has the 6 dredgers, with capacity of dredging of 6 lac m³ per year. Other dredging activities are performed by about 22 private operators.For construction of a ferry ghat, BIWTA requires Tk. 30 lacs, along with 1 crore for conventional ferry pontoon. Construction and installation of Ro Ro pontoon, and operation of RoRo and ferries are conducted by BIWTC. The access road to the ghat is			

constructed by RHD. BIWTA charges 30 Tk. per truck for using the terminal.

- BIWTA also informed that the entity requested PPP office to implement Khanpur ICT terminal in PPP. The feasibility study of the project was earlier conducted by IIFC.
- In the meeting with Mr. Kabir Hossain, Deputy Director (Ports) informed the history of annual leasing out MG channel, which is as follows:

FY 2009-10 Tk. 1 Crore 40 Lacs

FY 2010-11 Tk. 1 Crore 40 Lacs

FY 2011-12 Tk 1 Crore

FY 2012-13 Tk. 85 Lacs

ACTIONS

	<i>What</i>	<i>Who</i>	<i>By When</i>
	CEGIS report on MG Cannel	Engr. Rokibul Islam Talukder	17 February 2013

MEETING NOTES NO. 11

Project Number	4 0 0 2 7	WP1 - 1 3 9	Date: 23/3/2013 Duration: 9:30 AM – 4:00 PM
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Participants

Mongla Port Authority

- Commodore H. R. Bhuiyan, ndc, psc, BN, Chairman
- Md. Abdul Mannan, Member (Finance)
- Commander M Enamul Haque, Harbour Master
- Mr. Md. Mahbubullah, Director (Traffic)
- Mr. Md Kausar Ali, Chief Engineer (Civil & Hydraulic)
- Mr. Howlader Zakir Hossain, Director (Administration)
- Mr. Md. Siddiqur Rahman, Deputy Chief (Finance/Accounts Officer)
- Mr. Md. Mijuddin Mia, President, CBA
- Mr. Abu Bakar Siddique, General Secretary, CBA

Ministry of Shipping

- Mr. Md. Sajjadul Islam, Deputy Chief
- Mr. Pankaj Kumar Paul, Deputy Secretary

PPP Office

- Mr. Syed Afsor H.Uddin, CEO
- Mr. Md. Humayun Kabir, Deputy Manager

Bangladesh Bank

- Ms. Husne Ara Shikha, Joint Director, Bangladesh Bank, Deputy Project Director, IPFF
- Mr. Shyamal Kumar Das, General Manager, Khulna (plus 3 more)
- Mr. Goutam Kumar Ghosh, Deputy Director

IIFC

- Mr. Nazrul Islam, Managing Director
- Engr. A. K. M. Rabiu Islam, Infrastructure Advisor
- Hadi Hossain Babul, Port and Shipping Advisor
- Mr. Imran Ehsan, Senior Consultant
- Mr. Kazi Ashiqur Rahman, Consultant

Deloitte

- Mr. P. Pranavant, Director
- Mr. Sumit Mishra, Manager

Development of Two Jetties at Mongla Port through PPP

A stakeholder discussion meeting on the findings of the draft Feasibility Study on the development of two jetties at Mongla Port through PPP was held at the Bangladesh Bank Conference Hall, Khulna, on 23 March 2013. The meeting was chaired by Commodore H. R. Bhuiyan, ndc, psc, BN, Chairman, Mongla Port Authority, and attended by the above officials.

After introductions and welcome speech by Chairman, MPA and Mr. Shyamal Kumar Das, General Manager, Bangladesh Bank, the following presentations were given by the meeting organizers:

Session 1a - National Policy on PPP by *Ms. Husne Ara Shikha, Joint Director, Bangladesh Bank, Deputy Project Director, IPFF*

Session 1b - General Introduction to Project by *Mr. Afsor H.Uddin, CEO, PPP Office*

Session 2 - Economic Benefits by *IIFC and Deloitte*

Session 3- Project Description by *IIFC*

Session 4 - Project Analysis & Results (Base Case) by *IIFC and Deloitte*

Session 5 - Linked Projects by *IIFC*

Session 6 - Project Development & Structuring by *IIFC and Deloitte*

Session 7 - Project Analysis & Results (Alternative Options) by *IIFC and Deloitte*

A question and answer and open discussion session was held after the presentations. Key points discussed in the meeting are as follows:

1. Commander M Enamul Haque, MPA, enquired what are the criteria for selecting the loan tenure for IPFF loans. He also enquired what initiatives will be taken by IPFF to increase disbursement of the loan.

Ms. Husne Ara Shikha, Bangladesh Bank, answered that the criteria for loan tenure depends on a variety of factors such as type of project, customer relationship, strengthening financial institutions etc. IPFF is already taking steps to increase disbursement by getting strongly involved in the development of projects such as the Mongla Port project. If the procurement process is conducted in a transparent manner, then World Bank will fund the project.

2. Commodore H. R. Bhuiyan, MPA, inquired what the criteria of IPFF are for selecting which project to fund. Does the development of two jetties at Mongla Port meet the criteria to receive funding for IPFF.

Ms. Husne Ara Shikha answered that viable PPP projects will be funded by IPFF. Feasibility study is therefore being carried out to judge the feasibility of the Mongla Port project.

3. Mr. Howlader Zakir Hossain, MPA, enquired whether investors will be interested in the Mongla Port project.

Mr. Afsor H.Uddin, PPPO, stated that some PPP projects in the recent past has not been able to attract investors for some major issues:

- lack of awareness
- lack of commercial viability
- lack of interest in region

As such PPPO will take steps to conduct appropriate road shows and awareness creation to attract investors for the PPP projects, including the Mongla PPP project. If commercial viability of the project is ensured and awareness creation conducted, the project will attract investors. He also stated that the PPPO is taking steps to formulate a PPP Law to create a strong institutional support under which PPPs can be implemented.

Mr. Nazrul Islam added that already in Bangladesh, over 70 PPP projects have been carried out. The term PPP is quite new and previously PPP was known under PSP, PPI, PFI etc. in various countries. A similar project (the New Mooring Container terminal) is under implementation by the CPA and the MOS. The contractual structure is likely to be quite similar between the Mongla project and the NMCT. MPA may study the NMCT tender documents after receiving them from MOS/CPA.

4. Mr. Howlader Zakir Hossain, MPA, observed that the Consultants expect 150 new port workers to be engaged by the Terminal Operator. He inquired whether these workers will be part of the MPA. He also inquired if there is any provision of variable royalty that will be received by MPA from the Terminal Operator.

Mr. Nazrul Islam, IIFC, answered that the new workers may be engaged from the current pool of workers of MPA, but they will work for the project company. The Terminal Operator will need workers specialized in specific skills so it will be beneficial for them if they hire retired MPA workers and officials to operate the Terminal. The PPP Agreement may also have a provision in place where at least 30% of Terminal Operator's workforce has to be former and/or existing MPA workers. The criteria for such a quota system will be prepared by the MPA and given to IIFC for inclusion in the PPP agreement.

He also stated that revenue sharing will depend on which PPP model is chosen by MPA/ Ministry of Shipping. The amount of royalty that MPA will receive will be a bidding parameter. The amount and mode of payment of royalty will be finalized after discussion with MPA in the next phase of the project.

5. Mr. Md. Mijuddin Mia, CBA, MPA, expressed concern that majority of ships may go to the new jetties if private operator is engaged, leaving the existing jetties unutilized. He also enquired who the owner will be of the new jetties.

Mr. Syed Afsor H Uddin and Mr. Nazrul Islam, IIFC, stated that Government will always be the owner of the land. Terminal Operator will get the right to do business on MPA's land through the PPP Agreement for a fixed amount of time. Ownership will not change.

Mr Islam also stated that once the linked projects (which are part of the PPP project) are implemented, there will be significant cargo traffic increase at Mongla Port. This will benefit not only the Terminal Operator but the whole of Mongla Port. The cargo will be shared between the PPP terminal and the jetties operated by MPA. The share is expected to be between 10 to 50% with the share of the PPP terminal decreasing over time due to capacity limitations.

6. Commander M Enamul Haque, MPA, observed that implementing PPP Option B will mean that a large amount of money will be saved as investment is deferred to a later time when traffic at port is higher. He inquired whether this money can be used to implement linked project 2: clearance of MG canal.

Mr. Nazrul Islam, IIFC, answered that this will not be possible as they are two different businesses and projects. However, government can take the decision to implement linked projects L2 and L3 under PPP also. The Consultant will recommend this in the feasibility report.

Mr. Nazrul Islam further stated that Jetty 5 under Option B can be structured such that the Mongla port receives a fixed royalty for it, say US\$200,000 per year for the years that it is used by the PPP project. In other words, the cash benefit to MPA will be:

For Jetty 3 & 4	\$100,000 per year for 30 years
For Jetty 5 project	\$200,000 per year for the years that it is used by the PPP

Mr. Md. Sajjadul Islam, Ministry of Shipping, stated that Ministry will consider all options on how to implement L2 and L3 in an effective and timely manner.

7. After the open discussion session, Commodore H. R. Bhuiyan, Chairman, MPA, stated that MPA will consider the options proposed by the Consultant and will also brainstorm about other options that may be used. Mr. Nazrul Islam confirmed that the draft Feasibility Study will be submitted by 31 March 2013. MPA may submit written comments on the report so that the study can be finalized. Other options that may be proposed by MPA will also be analyzed by the Consultant to determine their viability.
8. Chairman, MPA, concluded the meeting after thanking everyone for participating in the workshop and sharing their valuable thoughts.

ACTIONS

	What	Who	By When
1.	Finalisation and submission of draft Feasibility Study	Consultant Consortium	31 March 2013
2.	Review the project options and other aspects	Mongla Port Authority	

Annexure VII

Site Visit Pictures

Picture 1 : Unloading activities in Jetty 7



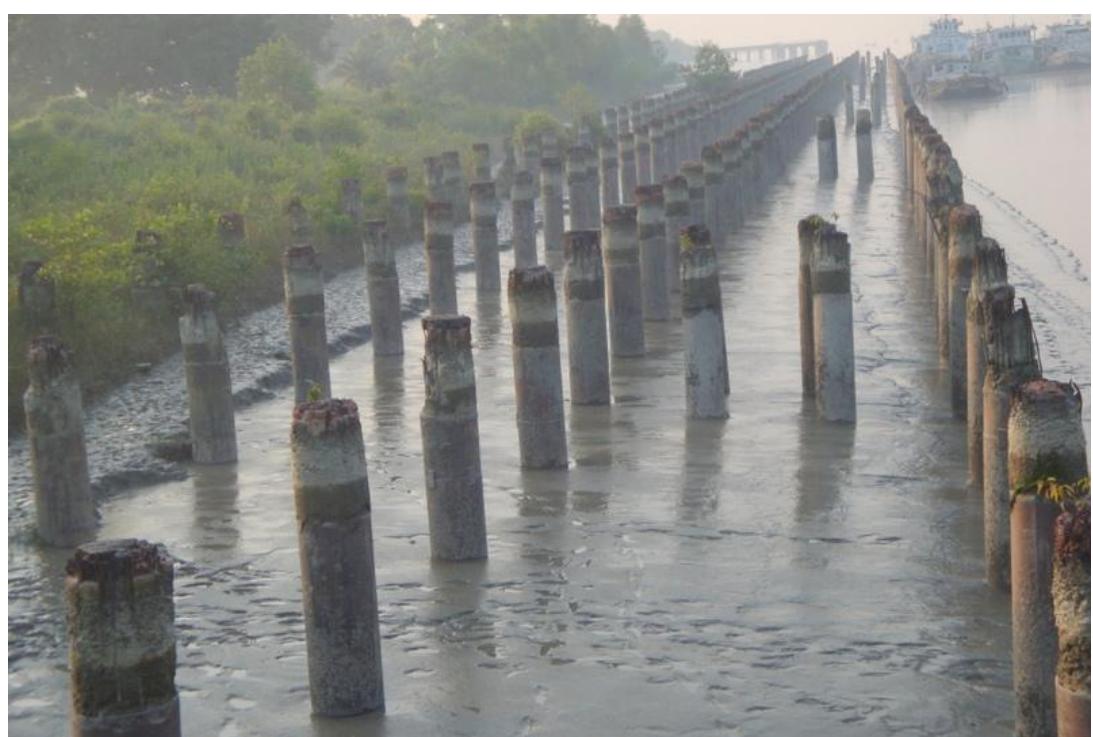
Picture 2: Backup yard and storage facility



Picture 3: The new dredger procured by MPA



Picture 4: The piles at Jetty no. 3 and 4



Picture 5: Inspection of the piles and pile-caps under the jetty



Picture 6: Lighterage activities at the Mooring buoys



Picture 7: Proposed site (from the access road)



Picture 8: Access road to the site



Annexure VIII

List of Books/Reports Consulted

List of Books/ Reports Consulted

1. Port and Logistics Efficiency Improvement, 13 July 2011, TA 7389-BAN, by GMAPS, Drewry, IDRG and IWM
2. Mongla Port Tariff 2003
3. Bangladesh Port System Dev. Project - Master Plan and Trade Facilitation Study, Final Report, Vol-1:Main Text-Part I, October 1998, Mott MacDonald
4. Mongla Port Area Development Project, Final Report, February 1996, Japan Overseas Consultants Co.. Ltd.
5. Feasibility Study for Improvement of Navigability of Mongla Port, Final Report, September, Mongla Port Authority
6. Hydrographic Chart in front of Jetty 3 and Jetty 4 of Mongla Port, Mongla Port Authority
7. Excerpt from Contract Document of Dredging at the Harbour Area of Mangle Port, Mongla Port Authority
8. Water Demand and Supply at Mongla Port, 19 November 2012, Mongla Port Authority
9. Statistical Yearbook of Bangladesh 2011, October 2012, Bangladesh Bureau of Statistics
10. Final Report-Tender Documents for New Mooring Container Terminal: V 1 (TI), October 2002, BCEOM French Engineering Consultants
11. Final Report-Tender Documents for New Mooring Container Terminal: V 2B (GD), October 2002, BCEOM French Engineering Consultants
12. Final Report-Tender Documents for New Mooring Container Terminal: V 3 (Price Proposal), October 2002, BCEOM French Engineering Consultants
13. Final Report-Tender Documents for New Mooring Container Terminal: Addendum No. 1, December 2002, BCEOM French Engineering Consultants
14. Draft Report-Tender Documents for New Mooring Container Terminal: V 1 (TI), August 2002, BCEOM French Engineering Consultants
15. Feasibility Study for Improvement of Navigability of Mongla Port, Final Report, August 2002, BCEOM French Engineering Consultants
16. Draft Report-Tender Documents for New Mooring Container Terminal: V 3 (Price Proposal), August 2002, BCEOM French Engineering Consultants
17. Master Plan & Trade Facilitation Study, Final Report, Executive Summary, October 1998, Mott MacDonald Ltd.
18. Master Plan and Trade Facilitation Study, Final Report, Vol.-3, Appendices Part-1, October 1998, Mott MacDonald Ltd.
19. Master Plan and Trade Facilitation Study, Final Report-Vol.- 4, Appendices Part-2, October 1998, Mott MacDonald Ltd.
20. PQ Document for Now Mooring Container Terminal (2nd Round), June 2010, CPA
21. Pre-Feasibility Report(Final) on Khanpur Container Terminal, 13 June 2001, CBIC
22. Draft Supply Operate and Transfer (SOT) Contract for New Mooring Container Terminal (NCT), June 2012, IIFC, Chittagong Port Authority
23. Invitation For Tender (IFT) for New Mooring Container Terminal (NCT) Project, June 2012, IIFC, Chittagong Port Authority

24. Master Plan and Trade Facilitation Study, Final Report, Vol. - 1, Main Text , Part - 1, October 1998, Mott MacDonald Ltd.
25. Master Plan and Trade Facilitation Study, Final Report, Vol - 2, Main Text, Part - 2, October 1998, Mott MacDonald Ltd.
26. Project Finance and Investment in Ports, 28-29 Nov. 2001, The Hatton, London
27. World Container Terminals, Global Growth and Private Profit, April 19998, Drewry Consultants
28. Ports Upgrading Project Final Report - May 1998, Mott MacDonald
29. Inception Report of Construction of a Container Terminal at New Mooring, Ctg., October 2000, BCEOM
30. Findings & Recom. Rep. of Construction of a Container Termi. at New Mooring, Ctg., January 2001, BCEOM
31. Final Report-Tender Documents for New Mooring Container Terminal: V 2A (ER), October 2002, BCEOM French Engineering Consultants
32. Involuntary Resettlement Sourcebook 2004, World Bank
33. Ports-Developing Best Practices for Promoting PSI in Infrastructure, 2000, ADB
34. Handbook for Preparing a Resettlement Action Plan, IFC, World Bank
35. Acquisition and Requisition of Immovable Property Ordinance, 1982 (Amendment 94), Gazette Notification
36. Information Memorandum for New Mooring Container Terminal, 30 June 2009, IIFC & Chittagong Port Authority
37. Operational Feasibility of New Mooring Container Terminal, 30 August 2007, IIFC and Chittagong Port Authority
38. Chittagong Port Authority Overview 2012
39. Container Handling Statistics for the last Ten years
40. Environmental Conversation Act-1995 and Rules 1997
41. Environmental Conversation Act-1995, Amendment 2000-2002 and 2010
42. Noise Control Rules 2006
43. Problems in Maintaining the Navigability of Mongla-Ghasiakhali Route, January 2011, CEGIS, Bangladesh
44. A Study of Mongla Port's Strategic Development Options for The World Bank, by Asaf Ashar, April 2010

Annexure IX

Initial Environmental Examination

Development of Two Jetties at Mongla Port through PPP
Mongla, Bagerhat District, Khulna Division, Bangladesh



Initial Environmental Examination Report

Executing Agency



Mongla Port Authority

Consultant



Infrastructure Investment Facilitation Company

Deloitte.

Deloitte Touche Thomatsu India Private Limited



Mahindra Consulting Engineers Limited

March 2013

1 INTRODUCTION

1.1 IPFF Projects

The People's Republic of Government of Bangladesh (GoB) with support from World Bank(WB) has taken the **Investment Promotion and Financing Facility (IPFF)** Project to open a new window for infrastructure financing through private sector participation. The IPFF has made available partial debt financing through private sector financial intermediaries for eligible, government-endorsed infrastructure projects to be developed by private sector. Projects developed solely by the private sector but identified by the Government to be in the public interest are also eligible for financing.

IPFF, a World Bank financed Project under **Bangladesh Bank (BB)** was created in the Year 2006. The objectives of the additional financing for IPFF project are:

- ❖ To supplement the resources of the Bangladesh financial markets to provide term finance for infrastructure and other investment projects beyond the capacity of local financial institutions and
- ❖ To scale up the financing of **Public Private Partnership (PPP) ventures** in infrastructure already started.

The proposed operations will support Bangladesh Bank, the implementing agency, to scale up the financing of PPP ventures in infrastructure. The increased provision of infrastructure will create or help maintain jobs during the economic slowdown and remove bottlenecks in economic growth caused by existing infrastructure shortages.

Funds are allocated to local financial institutions for on-lending to private sector infrastructure projects selected by the government. Financing comes from the government but is administered by BB. The private sector infrastructure promoters operate under incentive-based contractual arrangements designed to align their interests with those of the GoB. Sub-loans to Preferred Financial Institutions (PFIs), for investment projects eligible for financing from the facility, are approved by the BB as agent of GoB subject to World Bank's 'No Objection'.

Projects are supported on market terms and require at least a 30% equity component from the private infrastructure promoter and a further minimum of 14% third-party funding which may come from the PFIs. The PFIs are required to co-invest as well as assume all commercial credit risk to reinforce alignment of their interests and those of the government. BB is carrying out the selection of PFIs on a transparent basis. Eligibility is restricted to local financial institutions licensed by BB.

1.2 Imports & Exports of Bangladesh

Bangladesh's Exports accounts for 38% (in value terms) of the total Bangladeshi international trade. Export growth in Bangladesh is mainly due to the exports of finished garments goods. This alone accounted for more than 65.8% of total country's export (2009) followed by jute and jute products (23%), basic mining minerals and oil (19.1 %) and chemicals (12.9%). The volume of exports from the Export Processing Zones (EPZs) accounted for about 22.5% of total country's export.

Bangladesh imports are mainly from Asian countries. Bangladesh imports from China is accounting for more than 25% of the total Country's imports. The second largest supplier is India from which Bangladesh is importing 12% of its total imports. Other major import sources include Singapore, South Korea, Malaysia, Indonesia and Japan.

Materials for garment and textile sectors remain the largest import commodities of Bangladesh. This accounts for 18% of import (in value terms) followed by petroleum, oil and liquid (POL) products (14.9%), food products (including grain and commodities other than grains; 13.4%), machineries (6.7%) and iron and steel (6.1%).

Bangladesh's international trade grew by an average of 13.9% per annum (Crore Taka 266,389 in 2009) (Table 1.1) and the Imports accounts for more than 60% of total international trade.

Table 1.1: Exports & Imports of Bangladesh

Year	Bangladesh International Trade			% Share	
	Export, Crore TK	Import, Crore TK	Total, Crore TK	Export	Import
2000	32,419	50,371	82,790	39.2%	60.8%
2001	30,943	49,049	79,992	38.7%	61.3%
2002	33,242	55,918	89,160	37.3%	62.7%
2003	40,581	64,257	104,838	38.7%	61.3%
2004	50,835	80,895	131,730	38.6%	61.4%
2005	62,601	99,130	161,731	38.7%	61.3%
2006	78,931	118,478	197,409	40.0%	60.0%
2007	87,022	148,370	235,392	37.0%	63.0%
2008	97,498	154,821	252,319	38.6%	61.4%
2009	102,148	164,241	266,389	38.3%	61.7%
CAGR%	13.6%o -	14.0%	13.9%		

CAGR: Compounded Annual Growth Rate

1.3 Ports of Bangladesh

Chittagong Port (CP) is Bangladesh's largest port for all trades. It has handled about 30 million tons in 2009 which account for about 95% of the country's total sea borne trade.

Mongla Port (MP) is the second largest port in the Country. It handles mainly general goods (jute and jute products), reefer containers (mainly shrimps and fish for exports), clinkers, food grain, fertilizers, etc. The cargo handled by these major ports of Bangladesh is given in Table 1.2.

Table 1.2: Cargo Handled by Major Ports

Year	Chittagong Port (Tons Handled)			Mongla Port (Tons Handled)			Total Tons		Total, Tons
	Imports	Exports	Total	Imports	Exports	Total	Imports	Exports	
2000	14,909,312	1,998,485	16,907,797	2,462,420	304,041	2,766,461	17,371,732	2302526	19,674,258
2001	16,099,695	1,991,441	18,091,136	1,947,384	305,496	2,252,880	18,047,079	2296937	20,344,016
2002	18,319,211	2,261,283	20,580,494	1,450,248	350,268	1,800,516	19,769,459	2611551	22,381,010
2003	18,986,294	2,400,502	21,386,796	1,178,544	315,687	1,494,231	20,164,838	2716189	22,881,027
2004	19,413,460	2,458,972	21,872,432	1,254,374	221,798	1,476,172	20,667,834	2680770	23,348,604
2005	22,989,122	2,895,769	25,884,891	1,215,072	267,572	1,482,644	24,204,194	3163341	27,367,535
2006	23,936,103	3,089,550	27,025,653	662,263	252,112	914,375	24,598,366	3341662	27,940,028

Year	Chittagong Port (Tons Handled)			Mongla Port (Tons Handled)			Total Tons		Total, Tons
	Imports	Exports	Total	Imports	Exports	Total	Imports	Exports	
2007	24,236,261	3,392,974	27,629,235	573,986	225,111	799,097	24,810,247	3,618,085	28,428,332
2008	24,492,707	3,704,862	28,197,569	600,902	225,995	826,897	25,093,609	3,930,857	29,024,466
2009	26,718,834	3,763,747	30,482,581	1,253,227	169,272	1,422,499	27,972,061	3,933,019	31,905,080
CAGR%	6.7%	7.3%	6.8%	-7.2%	-6.3%	-7.1%	5.4%	6.1%	5.5%

(Source: Chittagong Port Authority and Mongla Port Authority, 2010)

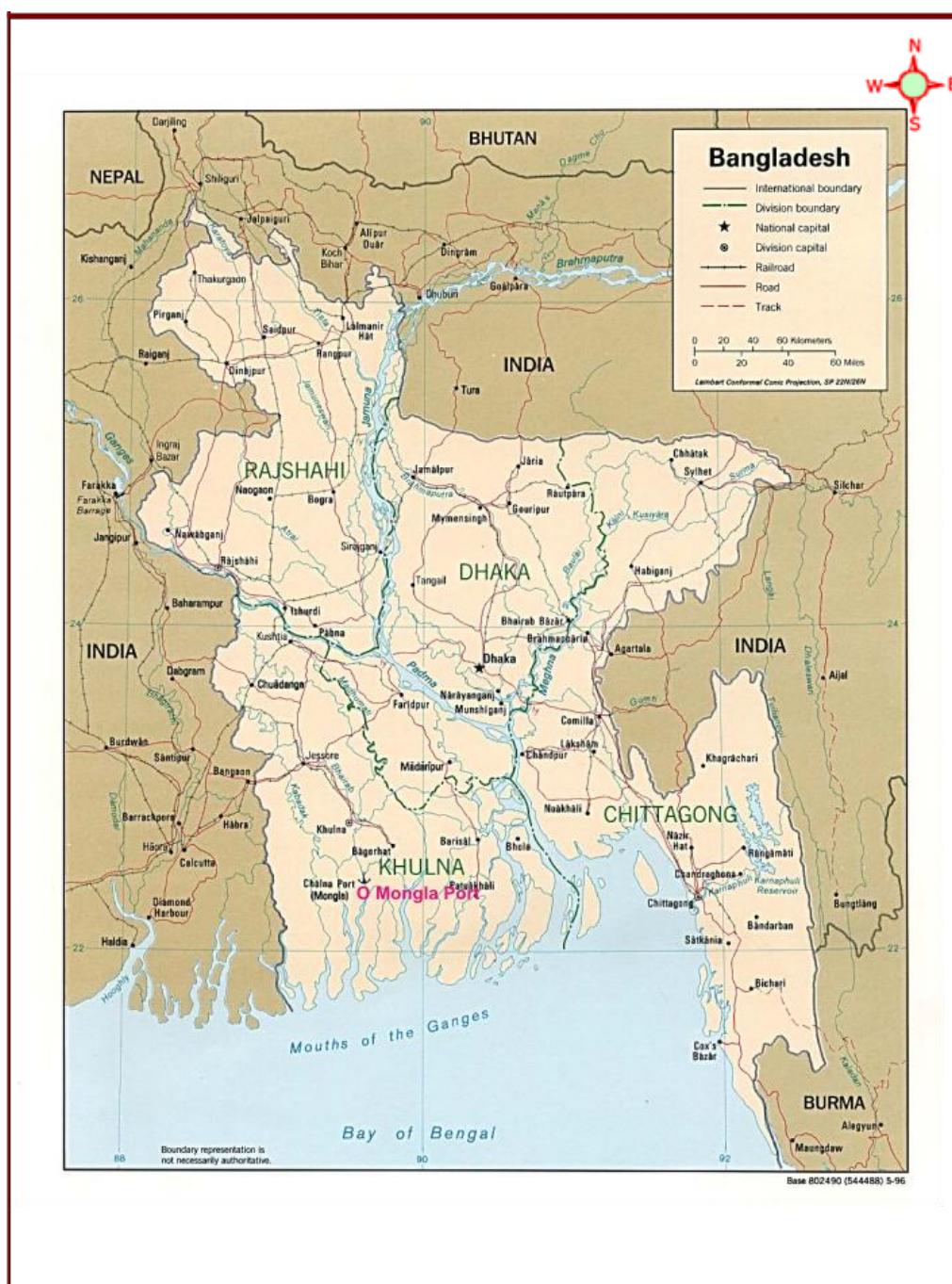
The total sea borne trade tonnage handled by the two ports grew by an average of 5.6% per year (from 19 million MT in 2000 rising to 32 million MT in 2009). Bangladesh international trade (by tonnage) weigh heavily towards imports which accounts for more than 87% of total sea borne trade.

Current domestic cargo hinterland contributes to sea borne goods throughputs are: Dhaka and surrounding area (70%), Chittagong (20%) and Khulna, Jessore & the rest of Bangladesh (10%).

1.4 Mongla Port

Mongla Port is located along the Pussur River at about 130 km upstream from Hiron Point in the Bay of Bengal. Mongla Port is falling in Mongla village, Bagerhat District, Khulna Division of Bangladesh (Figure 1.1).

Figure 1.1: Index Map



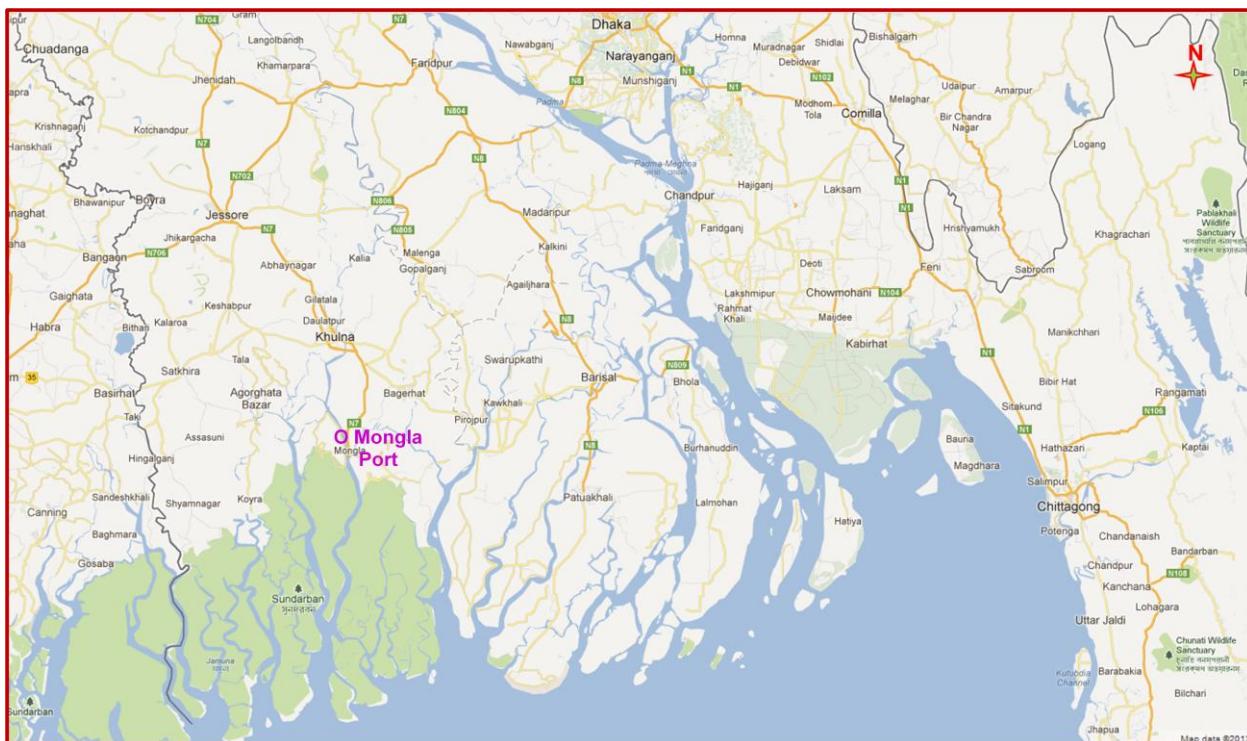
MP is under the administrative control of the Ministry of Shipping (MoS), Government of Bangladesh. The Chairman is the Chief Executive of the Mongla Port Authority (**MPA**). The Chairman is assisted by a Board of 3 Members that formulates policies with respect to the operations, administration, finance and development of the port. Facilitating the implementation of the policies and operations are 12 Executive Departments.

Presently, the port provides facilities for the handling of goods in the river as well as alongside jetties. The bulk of the goods (90%) are handled at the anchorage facilities with the remaining 10% at the jetty.

Due to its connectivity, by all means, Chittagong Port enjoys the major sea trade **Fig. 1.2**). GOB has taken the interest in reviving the activity in the port by improving its' connectivity and to

generate goods volume through the port. Mongla Special Economic Zone (MSEZ) is also developed in the MPA land.

Figure 1.2: Port in Regional Map



GoB is actively trying to revitalize the Mongla Port by promoting its use as a Gateway for the land locked states of Bhutan and Nepal and as a Transit Port for the movement of Indian goods. Major conventional transit routes have been identified for India, Nepal and Bhutan. Additional transit routes using waterways and rail are also being examined.

1.5 Berthing Facilities at Mongla Port

Initially, provisions were made to construct 7 jetties (Jetties 3-9) under the ‘Project Permanent Port on Pussur River’. The 5 jetties (5-9) were completed during 1976-78 and the pile driving of 2 jetties (3&4) were also made. The Jetties 3 & 4 were not completed due to financial constraints in Second Five Year Plan Period.

The maximum depths in the River is 7 m at jetty area, 7.5 m up to 10 km downstream and 8.5 m up to 20 km further south. The Tidal variation is about 3 m.

Currently Jetties 8 & 9 are in operations. Due to silting and low drafts, operations at Jetties 5-7 are stopped. Both jetties 8 & 9 can handle the containers as well as general cargo. Bulk cargo is being handled at anchorage.

MP has 11 anchorage berths and 5 river mooring berths which are conveniently located for mid-stream operations where loading and discharging to/from lighters (barges) takes place. There are number of private operators manage their own ports along the river (**Table 1.3**).

Table 1.3: Berthing Facilities at Mongla Port

Berth	Operating Owner	No. of berths	Draft (m)	Type of cargo handling
General and container berth	MPA	5	7.0	General cargo/ container
River mooring berth	MPA	5	8.0	General cargo
Anchorage, berth	MPA	11	8.5	General cargo
Private jetties	Private	5	7.0	Clinker, LPG, POL, etc.
Total Berthing Facility	-	26	-	-

1.6 Port Profile

MPA has about 942.13 Ha land in its possession from Hiron Point in Bay of Bengal to Khulna as detailed in Table 1.4.

Existing wharf structure consists of steel piles and reinforced concrete deck on top of the piles. Vertical piles are of 600 mm diameter and the spacing between them is 5.0 m, centre to centre. The top deck level is at +12.5 m above Mean Sea Level (aMSL). The top width of the wharf is 55.5 m. Presently, vessels of up to 15,000 DWT are being handled alongside. Whenever necessary, the laden vessels arrive and depart from the wharf during the high tide due to draft limitations.

Table 1.4: Available Land with MPA

Land Use at	Area, Acres	Area, Ha
Permanent Port	2068.40	834.82
Old Mongla	134.60	54.47
Khulna	105.14	42.66
Failahat	1.00	0.34
Hiron Point	14.26	4.84
Total	2323.80	942.13

Rubber tyred gantries (RTGs) and rail mounted gantries (RMGs) offer the most intensive use of land. Between 1,000-1,500 TEUs per hectare can be stacked at any one time. Straddle carriers can stack between 600-900 TEUs per hectare.

Main stack yard used for the stacking of containers is at J9. The yard has an area of 1.72 Ha. With the average dwell time of 19 days, the yard can accommodate 19,80029,700 TEUs annually.

The yard at J8 is presently used for refrigerated containers and stuffing/unstuffing operations. The 4 open stack yards in the port can accommodate between 55,700-84,000 TEUs annually using straddle carrier operations.

The Port handling capacity is about 5.6 million ton per annum (MTPA). The average berthing occupancy time for ships is 2.73 days for container vessels and 7.76 days for general cargo vessels. Average GRT of vessels that call at MP is 10,000 – 12,000 GRT of general cargo vessels and 7,000 – 8,000 GRT of container carrying vessels.

The major revenue for MP is from:

- Dues on Vessel: Port Due, Pilotage Charge, Mooring Charge, Anchorage Charge, Shifting Charge, etc.
- Dues on Cargo: River Dues, Landing/Shipping Charge, Handling Charge, Storage Charge, Hoisting Charge, etc.

1.7 Development of Jetties 3 & 4

The honourable Minister of Shipping during his visit to Mongla Port in September 2002 suggested to lease out the uncompleted Jetties 3 & 4 to the Private Entrepreneurs on BOT basis which was accepted by MPA. It is also decided that **Jetties 3 & 4 should be designed as multi-purpose terminals** with capability of handling containers and general cargo.

MPA intends to appoint an Investor-cum Operator for construction and operation of two jetties at Mongla Port through PPP. The **Terminal Operator** to be selected through a competitive and transparent tendering process under Policy and Strategy for Public-Private Partnership, 2010. MPA will provide about 22 acres of land to jetty operator for construction of two jetties and ancillary facilities.

Two options are being considered for operation of the PPP Project as detailed below:

Option A: Two Jetty Option (Base Case – Jetties 3 & 4 to be constructed and operated for a fixed term).

The Terminal Operator has to construct:

- ❖ Additional piles (11 rows amounting approximate 550 piles).
- ❖ Two Jetties with 65 m width.
- ❖ Backup facility
- ❖ Internal Road, Drain and Culvert, Boundary Wall and Internal Utilities.
- ❖ Terminal Operator to procure Cargo Handling Equipment.

The **Terminal Operator** will operate the 2 jetties by his own manpower with the arrangements for a period of 30 years.

Option B: Three Jetty Option (Existing Jetty 5 to be operated by the Terminal Operator during the Construction of Jetties 3 & 4 and Jetty 5 operations to be handed over back to MPA after 8 to 10 years, on completion of the jetties). The trigger date for starting construction work for Jetty 3 and Jetty 4 may be linked with amount of TEUs handled at Jetty 5. The Terminal Operator operates Jetty 3 and Jetty 4 for the remainder of its 30 year Term.

The main port development in the short to medium term (2010-2015) would be completing the Jetties 3 & 4 by 2015. When fully completed, the Container Terminal will have an annual capacity of 1.1 TEUs or about 20 million tons.

Based on the total terminal area including open yard, warehouse of 375,000 m² and an average handling of 15 ton per m² per year, MP handling capacity is estimated 6.5 million ton per year. Overall, MP will contribute about 10% of total port handling capacity of the Country.

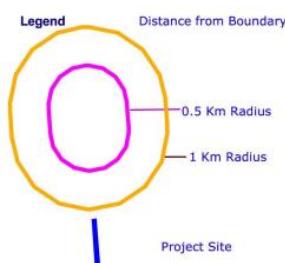
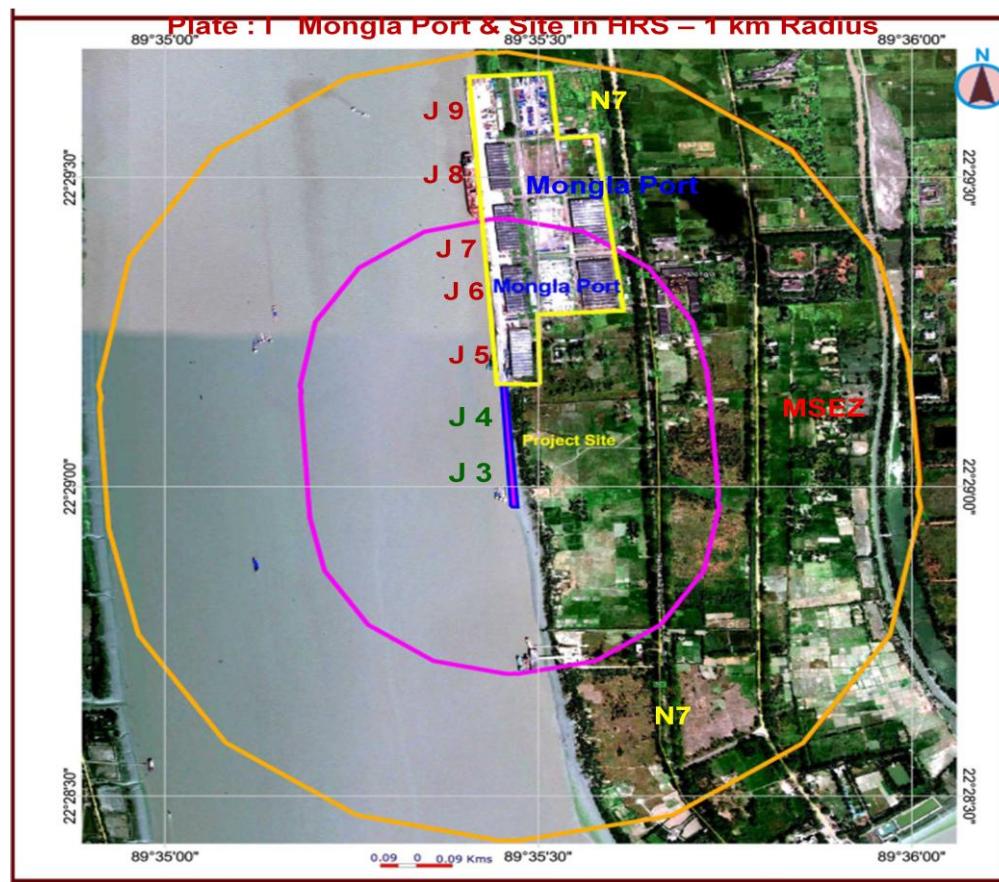
There are **3 Linked Projects** proposed as developmental activities, for success of the main project. These are:

- I. Dredging of Pussur Channel - Capital Dredging of Pussur River by MPA & Maintenance Dredging of Jetty Front by MPA.
- II. Dredging of Inland Waterway Route from Dhaka to Mongla - Opening up the Mongla-Ghasiakhali (MG) Canal by BIWTA through dredging.

III. Dedicated Ferry service for crossing Padma River- for easy transportation of cargo from Dhaka to Mongla.

The Linked Project 1 is being undertaken by MPA. The Linked Projects 2 and 3 may be implemented through separate PPPs if found viable. Separate Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) shall be undertaken for individual proposals.

Plate I depicts the Mongla Port and its environs in High Resolution Satellite Imagery (HRS; Google Earth) and **Plate II** depicts the same pictorially. **Plate III** depicts the development site and its environs.





1.8 SWOT Analysis

The analysis of MP has been made on the following key points:

- i. Service quality and operations efficiency
- ii. Port infrastructures
- iii. Commercial parameters
- iv. Comparison of transportation cost advantages by road and waterway
- v. Shipping network and intermodal connectivity.

Strengths

- ❖ MP has captive hinterland in the Jessore region. Goods are mainly frozen food, jute products.
- ❖ Port is currently under-utilized and can take more volume from CP.
- ❖ Strong government interest to revive the activity at the port.
- ❖ Large land reserve available for port development and expansion.

Weaknesses

- ❖ Approach channel draft of 8.5 m and berth draft of 7 m limits the size and draft of ship call.
- ❖ No rail connection from Dhaka to Mongla.
- ❖ Inefficient road connection to major hinterlands in the Dhaka region. Ferry crossing is regulated between Dhaka and Mongla.
- ❖ Lack of high capacity quay side cranes to efficiently handle goods. Container vessels called at MP to be self-gearied.
- ❖ Limited captive goods hinterlands. Goods from Dhaka region is shipped almost exclusively through CP due to availability and frequency of shipping line services and established logistic networks and facilities.
- ❖ High dredging cost required to maintain draft in the channel and at berth.

Opportunities

- ❖ Firm plans have been committed towards the building of the Padma Bridge which will allow to cross the river when travelling between Dhaka and Mongla without the use of a ferry. Padma bridge, which is expected to be ready in 2015, will provide importers/exporters to and from a more efficient transport network
- ❖ MP has land available for development to attract niche market goods.
- ❖ The development of industries in the Mongla EPZ will provide an impetus for the import and export of goods through the port
- ❖ The inefficiencies in CP will provide opportunities for MP to attract the importers/exporters shipping lines

Threats

- ❖ MP tendering out NCT to private operators. This will increase the handling capacity.
- ❖ Possible development of a new deep water sea port at Sonadia.

1.9 IEE Study

Mongla Port Authority intends to develop two jetties through **Public Private Partnership (PPP)** mode. MPA has requested support from the PPP Office through technical assistance from IPFF Program, Bangladesh Bank. It is imperative that the project sponsors for IPFF projects are aware of and comply with the legal and institutional requirements of the GoB and WB as applicable.

The primary institution for environmental regulation in Bangladesh is the Department of Environment (DoE) working under the Ministry of Environment and Forest (MoEF). The industries are Categorised as Green, Orange A, Orange B and Red. DoE issues the following clearances to the sponsors depending on the category of the project :

- ❖ Issuing Site Clearance Certificate (SCC) for Orange-A, Orange-B and Red category projects,
- ❖ Approving TOR for EIA and EIA for Red category projects and
- ❖ Issuing ECC for all category projects:

The **Environmental Clearance Certificate (ECC)** is mandatory for the Existing Industries as per Clause 7(3) of the Environmental Conservation Act, 1995 (EC Act) and the Environmental Conservation Rules, 1997 (ECR) and Proposed Projects as per Rule 7 and Schedule 1 of ECR.

All PPP Projects are falling in Red Category as per DoE. The Steps involved in ECC for Red Category Industries are listed below.

1. Application to Department of Environment (DOE) with :
 - I. Feasibility Report (applicable only for new industries).
 - II. IEE Report including Terms of Reference (TOR) for EIA.
 - III. Process Flow Diagram
 - IV. Layout Plan with location of ETP.
 - V. Drawing of the ETP.
 - VI. Time Frame (for new industries only).
 - VII. EMP along with process flow diagram, ETP layout Plan, location & ETP Scheme (for Existing Industry only).
 - VIII. Pollution Abatement Plan and emergency Plan.
 - IX. NOC from local Authority.
 - X. Relocation or Rehabilitation (R&R) Plan, if any.
2. The Site Clearance will be given within 60 working days (if acceptable).
3. On receipt of the Site Clearance, the Industry may start land & infrastructural development and submit the EIA and ETP Design for DOE Approval.
4. Approval of EIA & ETP Design within 60 days of submission.
5. Installation of ETP/EIA and apply for ECC.
6. Issuance of ECC within 30 days.
7. On receipt of ECC, the Industry can resume trial and commercial production/ activities.

The ECC shall be renewed every year 30 days before its expiry.

World Bank Safeguard Policies are designed to protect the interests of third parties from adverse impacts of World Bank-assisted projects. The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. Based on project type and scale, project location, sensitivity of issues, nature of impacts and magnitude of impacts, WB has classified all projects into three categories, viz: Category A (with significant adverse environmental impacts that are sensitive, diverse, or unprecedented), Category B (with potential adverse environmental impacts on human population or environmentally important areas and are less adverse than those of Category A projects) and Category C (with minimal or no adverse environmental impacts). The **Public Consultation and Disclosure of Information** are required/Mandatory as per WB OP 4.01 requirements.

All PPP Projects are falling in Red Category as per DoE. As the Project is proposed within the existing Port with less environmental and social impacts, the Project can be categorised as Category B Project as per WB. Accordingly, the proposed Project by MPA requires SCC, TOR for EIA, EIA approval & ECC from DoE and Public Consultation as per WB OP requirements.

The application has to be made to DoE with a list of documents. Also, the **Initial Environmental Examination (IEE)** Report along with information /report, as applicable and specified in the IEE checklist has to be submitted.

After having the SCC, the Project Proponent (PP) may start land and infra-structure developments and submit a TOR to DoE for approval for conducting the Environmental Impact Assessment (EIA). The PP/Sponsors conduct and prepare the EIA as per requirements outlined in the TOR and submit the same, if required, along with ETP design to the DoE for approval.

The **Public Consultations, both at Local and National Level**, have to be conducted and the Proceedings, Issues raised, Response & Action Plan to address the Public Issues are to be prepared and disclosed.

After having EIA approved they will build super structure and procure & install machinery. DoE will issue the ECC after the installation of ETP and EMP measures and other required plans for implementation. After having the ECC, the PP/Sponsors can install gas connection (if needed) and commence trial and commercial productions.

Infrastructure Investment Facilitation Company (IIFC) is a specialise consulting company, under the Economic Relations Division (ERD) of the Ministry of Finance (MoF), Government of Bangladesh. IIFC was established in 1999 as a Company Limited by guarantee under the Companies Act 1994 and is in operation since January 2000. IIFC is the only dedicated Institution for facilitating Public Private Participation in Infrastructure in the Country.

The **Consultant Consortium of IIFC**, viz. IIFC, Deloitte Touche Tohmatsu India Private Limited, India and Mahindra Consulting Engineers Limited, India (MACE), has been engaged by the IPFF for carrying out the detailed feasibility study as well as the IEE study for the Development of the two Jetties at Mongla Port.

The Consultant has carried out the IEE by visiting the site and collecting the basic information from MPA and other sources. The existing baseline data of Mongla Port has been referred and used for the IEE from the 'EIA Report of proposed Khulna Thermal Power Plant' prepared by the Center for Environmental and Geographic Information Services, Dhaka.

The IEE Report has been prepared and submitted in the following Format, as required by DoE, **along with the proposed TOR for the EIA Study:**

- ❖ Introduction
- ❖ Description of the Project
- ❖ Description of Existing Background environment (1 km Radius).
- ❖ Potential Significant Impacts during Construction & Operation Phases.
- ❖ Mitigative and abatement Measures.
- ❖ Residual Impacts, if any (to be studied in EIA).
- ❖ Monitoring Programme.
- ❖ Summary & Conclusion.

2 DESCRIPTION OF THE PROJECT

2.1 Environmental Setting

Mongla Port is located in the southwestern parts of Bangladesh. The National Highway N7 (adjacent to Port) connects Mongla with Khulna and from Khulna to Dhaka by N8. Khulna is the nearest rail head. The nearest airport to the port is located at Jessore Mongla is also connected by Inland Waterways with Dhaka.

The existing Jetties (5-9) of Mongla Port and their back-up areas are in-between the Coordinates $22^{\circ}29'10''$ - $22^{\circ}29'40''$ N Latitude and $89^{\circ}35'24''$ - $89^{\circ}35'38''$ E Longitude (**Fig. 2.1**). The proposed development site, **within the designated Port Area**, is in-between the Coordinates $22^{\circ}28'57.76''$ - $22^{\circ}29'16.44''$ NLat, and $89^{\circ}35'26.86''$ - $89^{\circ}35'38.88''$ E Longitude

There is **no adverse environmental issue** about the site. The site is completely protected from waves. The site is devoid of mangroves and corals. The northeast boundary of **Sundarbans**, National Heritage Center of Bangladesh, is at a distance of 4.7 km in southwest from the Site. Other than Sundarbans, there are no eco sensitive areas within 10 km area.

Mongla Town is at a distance of 1.7 km in southeast from the site (no road connectivity from N7). As per the Community Report June 2012 (Population and Housing Census 2011) of Bangladesh Bureau of Statistics, there are 39,837 persons (Males 21,607 & Females 18,230) in 8,927 Households (HHs). Mongla Special Economic Zone (SEZ) is at a distance of 500 m in the east from the Port. The nearest important places and their distance (aerial) form the site are:

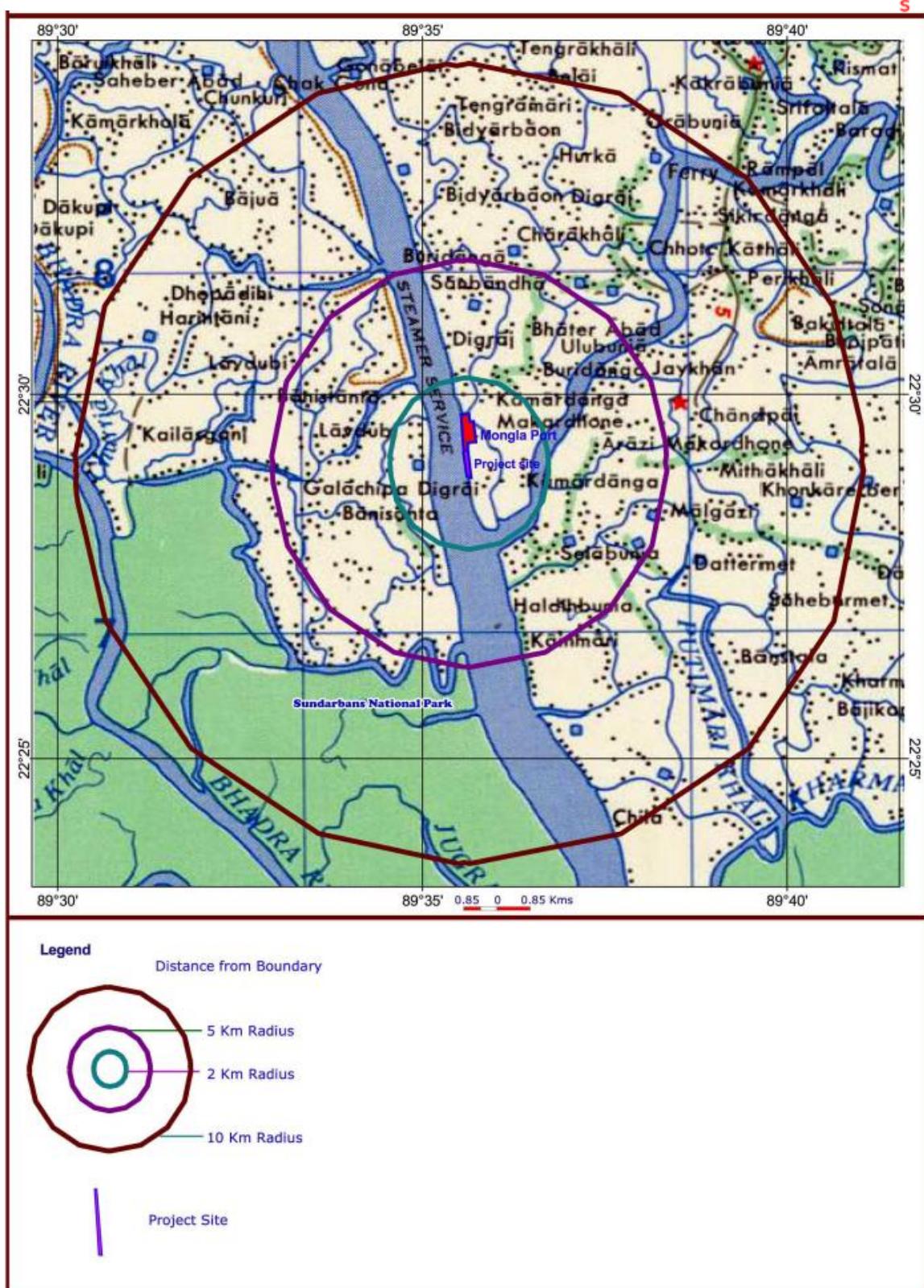
Place	Direction from Site	Distance from Site, km
Bagerhat, District Head Quarters	NE	26
Khulna, Division Head Quarters	N	35
Dhaka, National Capital	NE	158
Jessore (Airport)	NW	85
Chittagong, Business Capital	E	225

The area is drained by the tidal River Pussur (Pasur) and Mongla Nalla. Mongla Nalla confluence into Pussur River at a distance of 1.2 km in the south of the Port. Pussur River confluences with Bay of Bengal after a distance of 55 km. Hiron Point is at a distance of 84 km from the main Port.

The Linked Project (No. 2) Mongla-Ghasiakhali (MG) Canal is located at distance of 14.7 km in the northeast.

Development of Two Jetties at Mongla Port

Figure 2.1: Topo Map



The proposal of ‘Development of Two Jetties at Mongla Port’ is technically and environmentally feasible as:

- ❖ Proposed within the designated Port Area.
- ❖ Site is completely devoid of corals and mangroves.
- ❖ No land acquisition is needed and thus, no Resettlement & Rehabilitation (R&R).
- ❖ No change in the existing land use pattern.
- ❖ Better utilisation of the available infrastructure facility.
- ❖ Utilisation of local labour force.
- ❖ Development of the Region due to better connectivity.

The major advantage of the Proposal are:

- ❖ Large Port Area with access to river and to sea.
- ❖ Sheltered inland water access from Dhaka (Pangaon ICT and two other private ICTs are close to completion).
- ❖ Sheltered anchorage port for easy loading /unloading of ships and heavy equipment.
- ❖ Potential for carrying cargo from Nepal and Bhutan.
- ❖ Close access to Mongla SEZ where large area available for industrial plots.
- ❖ Good track record of PPP for port based industries:
- ❖ Existence of the following private sector organizations within MPA area:
 - Union LPG Gas, Kleanheat LPG Malaysia
 - Meghna cement mills
 - Omera petroleum
- ❖ Construction of Padma Bridge will reduce the distance to 190 km to Dhaka.
- ❖ Port related service charges are lower.
- ❖ Distance of Mongla with other hub ports is comparable with other regional ports.

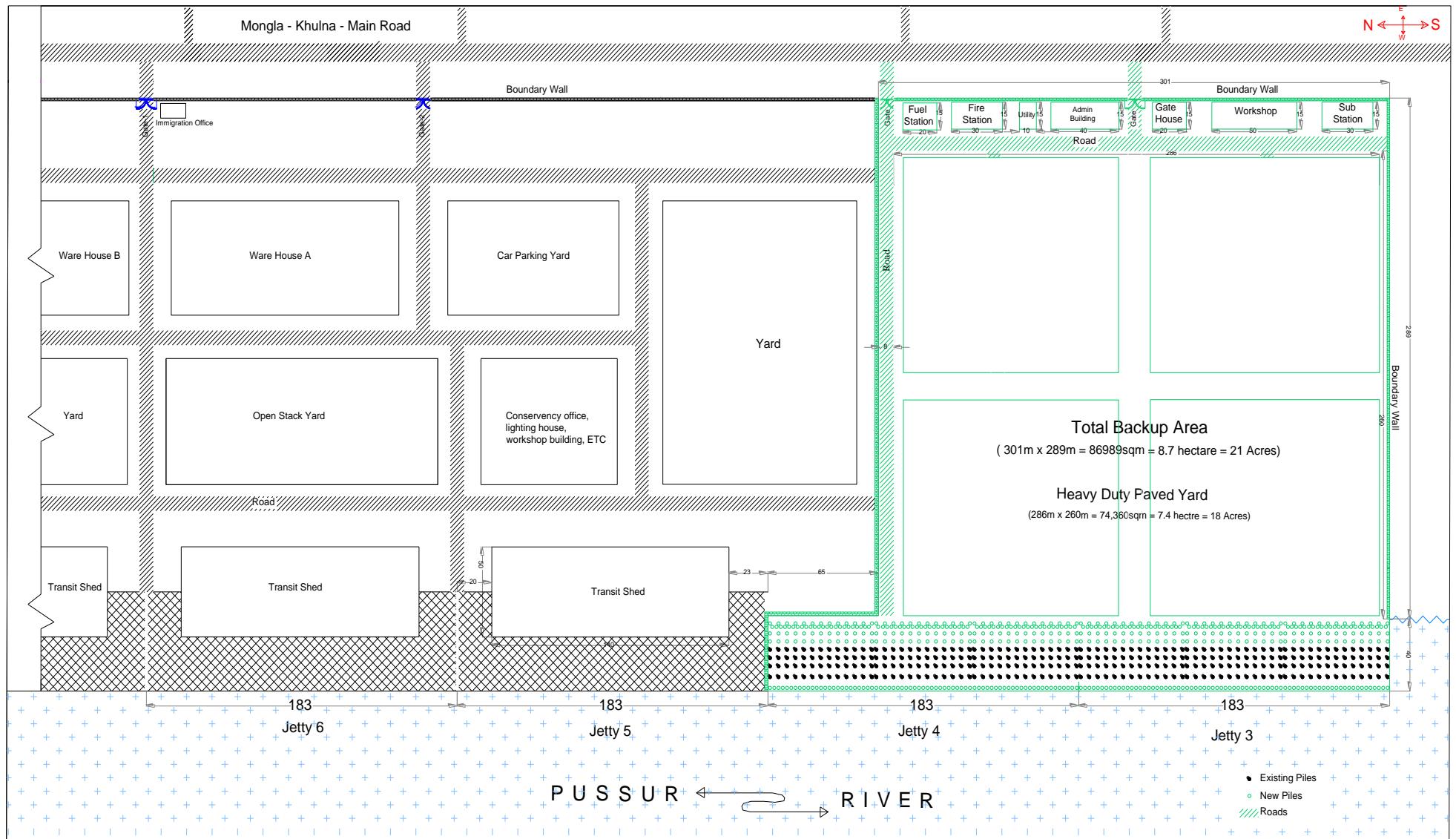
2.2 Proposed Activity

2.2.1 Option A

In Option A (Figure 2.2), the Terminal Operator has to construct:

- ❖ Completion of remaining Piles for 2 Jetties – about 550 Nos.
- ❖ RCC Jetty Deck (about 80,000 cum) for 2 Jetty, (183 x 40 sq. m each with pile cap, girder, beams, etc.).
- ❖ Backup facilities like internal Road, Drain & Culvert, Internal Utilities, etc. in addition to General Facilities like Electrical Works, Water Supply & Sanitation, Compound Wall/Fencing, etc.

Figure 2.2: Option A



The Units dimensions/size are given below:

Table 2.1: Units dimensions/size

Facility	Unit	Quantity
Heavy-duty Paved Yard	sqm	74,360
Admin. Building (2 storied)	sqm	1200
Workshop	sqm	750
Fire station	sqm	450
Electric substation	sqm	450
Fuel Service Station	sqm	300
Utility building	sqm	150
Gate House	sqm	300
Internal Roads	sqm	4600
Drains and Culverts	m	575
Gates	Nos.	2

The following equipments are also considered in the cost estimate:

Table 2.2: Equipments are considered in the cost estimate

Equipment	Purpose
Mobile Harbour Cranes, 40 T (2 per berth)	Ship to Shore Operation
Mobile Cranes 10 T	Yard Operation
Tractor Trailer (4 per hook & 2 stand by)	Jetty to Yard Operation
High Mast Fork Lift Trucks(FLT), 5 T	Yard Operation
Low Mast Fork Lift Trucks(FLT), 3 T	Delivery Operation
Reach Stackers, 30-40 T	Stacking
Mobile Hopper	Handling of Bulk Receipt
Lorry/Truck 3-5 T (2 per crane)	Delivery of Bagged Cargo
Workshop Equipment	For workshop

The **Cost Estimate for Option A** is worked out to be **46.41 million US Dollar** (Exchange Rate considered 1 USD: 80 BDT):

Table 2.3: Cost Estimate for Option A

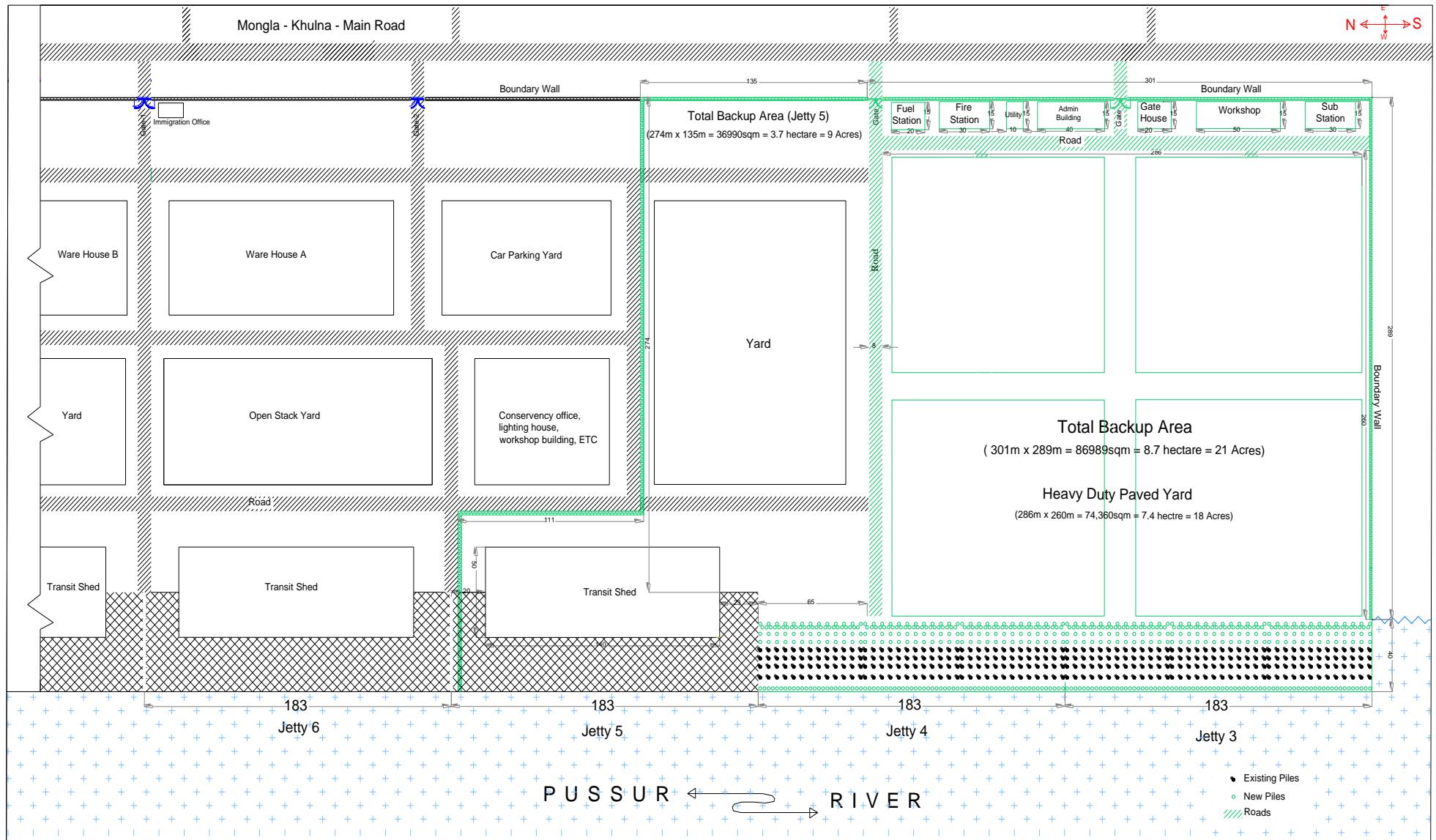
Option A - Item	Amount (m USD)
Civil Construction Cost (Jetty & Backup)	22.71
Equipment Cost	17.65
Contingency (15% of Sub-Total)	6.05
Total Project Cost	46.41

2.2.2 Option B

In Option B (Figure 2.3), the Terminal Operator has to construct the Jetties 3 & 4 in two Phases. In the initial Phase-I, Jetty 5 backup area has to be developed for its operation in Option B constructions in Phase-II.

Estimated cost for Option B in Phase-I is **16.68 million US Dollar** and that for Phase-II it is **30.50 million US Dollar**

Figure 2.3: Option B



2.2.3 Persons employed

The Facility requires about **150 persons** in various capacity, as detailed below, for smooth operation:

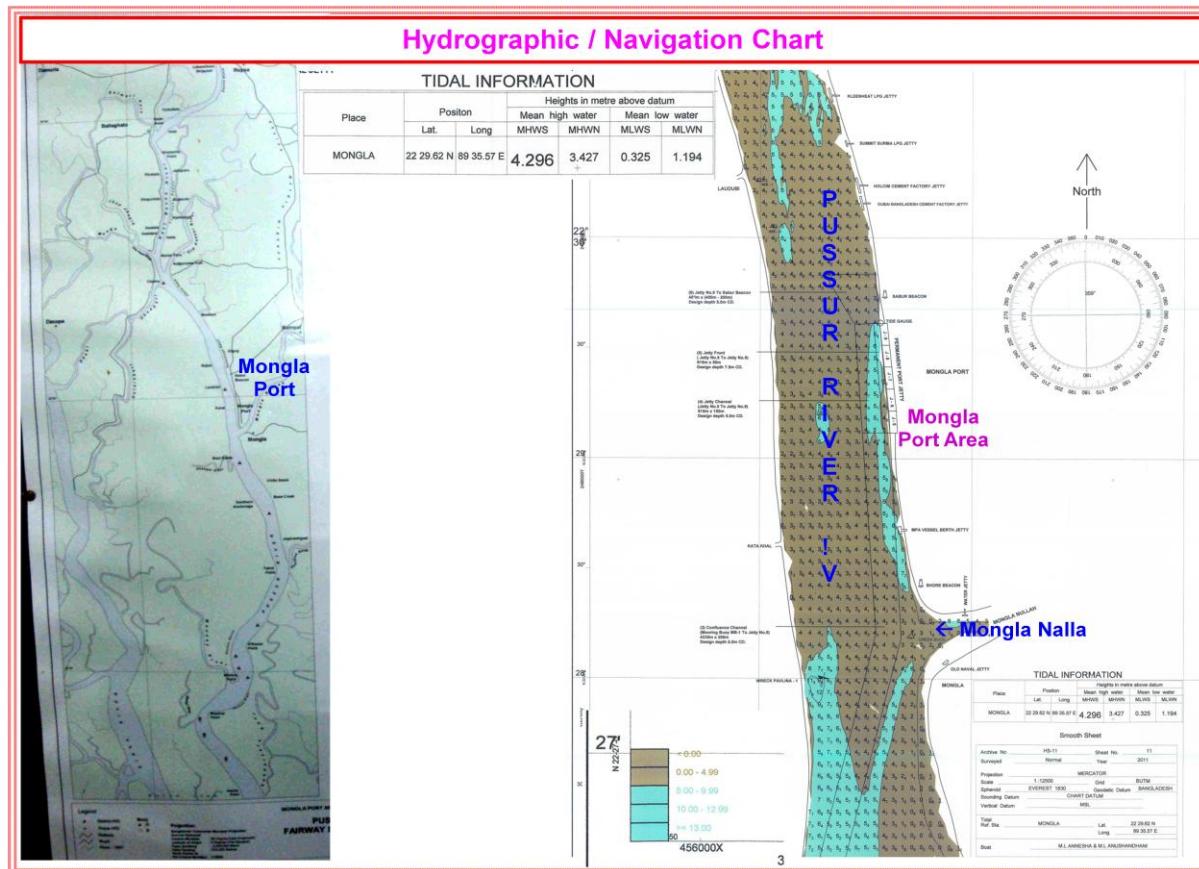
Table 2.4:

Type of Personnel	Post/No. of Employee
Chief Executive Officer	1
Financial Controller	1
Terminal Manager (Operation)	1
Plant Manager	1
Manager (Commercial)	1
Manager HRD	1
Security Chief	1
Asstt. Manager IT	1
Asstt. Manager (Accounts and Finance)	1
Asstt. Manager (Marketing & Commercial)	1
Security Officer	1
IT Support Officer	1
Operation Supervisor (2 Persons/Berth)	4
Workshop Supervisor (SAE)	3
Tractor Trailor (TT) Operator (2/TT)	20
Senior Equipment Operator (4/Shift)	8
Junior Equipment Operator (4/Shift)	8
Security Inspector (1/Shift)	3
Account Asstt.	1
Lorry Operator	12
Admin Assistant	1
Technician/Mechanics (4/Shift)	8
Tech. Helper	8
Store Keeper (2/Shift)	4
Gate Control Asstt. (2 Person/Shift)	6
Vehicle Driver	6
Security Guard (12/Shift)	36
Office Support Stuff	10
Total	150

2.3 Linked Projects (LPs)

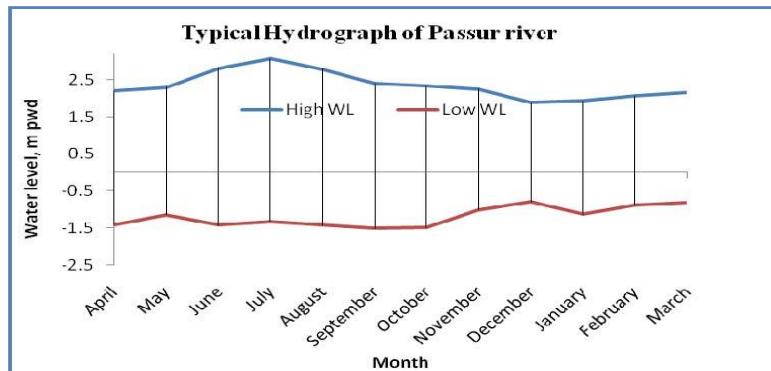
Linked Project-1: Pussur River is the main water communication system in the Region. Mongla Port is located in the eastern banks of Pussur River. The river is deep and navigable throughout the year for the large marine ships to enter the Mongla Port from Bay of Bengal from Akram Point. Hydrographic chart of Pussur River is collected from MPA and is shown below :

Figure 2.4: Hydrographic/Navigation Chart



The water level of the Pussur river rises from January–February to till July–August then recedes up to December–January. A typical hydrograph of Pussur River at Mongla is given below:

Figure 2.5: Typical Hydrograph of Passur River



As per recorded water level data, the long term maximum high water level at Mongla station is 2.56 m and minimum is 0.51 m. Presently, vessel of maximum 5 m – 6 m draught can proceed up to port jetty utilizing tidal advantage.

The MPA has a Master Plan of upgrading its capacity of ship handling up to 450 ships per year within 10 years. Accordingly, the channel up to Jetty-10 shall be improved for maintaining 7.5 m draught at jetty site.

Linked Project -2: Pussur is also an important river route through which Khulna-Barisal steam boats and other vessels ply. In earlier days, Mongla was connected with Dhaka by Inland Waterway Route through Mongla-Ghasiakhali (MG) Canal. Presently, the MG Canal is silted. Desilting of the MG Canal will result in resuming the Steamer Service between Dhaka & Mongla and also increase the port operations at Mongla. The MG Canal location/setting is shown below:

Figure 2.6: Linked Projects



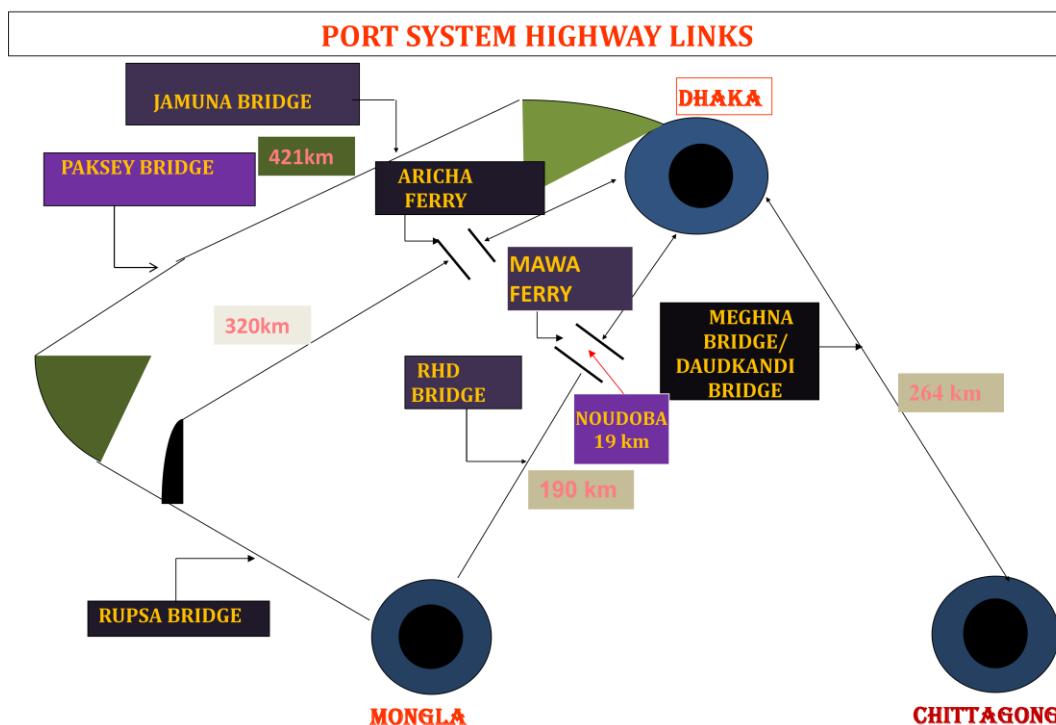
Linked Project -3 is the ‘Dedicated Ferry Service at Padma River’ for easy transportation of cargo from Dhaka to Mongla.

2.4 Justification for the Proposal

Traffic assessment for the development of Mongla Port has been carried out for six scenarios as detailed below:

- Scenario 0 – Natural Growth - No dredging, no connectivity/Linked projects
- Scenario I – Dredging of Pussur river (Base Case)
- Scenario II – Base Case + Provision of dedicated Mawa Ferry Service
- Scenario III – Base Case + Clearance of MG Canal
- Scenario IV – Base Case + Provision of dedicated Mawa Ferry service + Clearance of MG Canal
- Scenario V – Base Case + Construction of Padma Bridge.

Figure 2.7: Port System Highway Links



The potential traffic under each scenario, Commodity-wise traffic based on the scenario selected, Total containerised and non-containerised traffic, etc. are also assessed. It is assumed that the Completion Year for each activity as below:

- Dredging of Pussur Channel – 2015
- Dedicated Mawa Ferry – 2015
- Clearance of MG Canal - 2015
- Padma Bridge – 2018

Some assumptions made for the Traffic Assessment given below:

Conversions	
Tones Per TEU	7
Bale - Kg	180.00
Bale - Metric ton	5555.56
Ibs - Kg	0.45
lb - Metric Ton	453600.00
Nautical miles - Km	1.852

Share of New 2 Jetties	Percentage
Containerised Traffic	50%
Non Containerised Traffic	50%

Preferred Mode of Transportation	
Rail preferred over Road for >	600 km
Waterways preferred over Road <	200 km
Rail share of traffic	30%
Waterways share of traffic	20%
Road share of traffic	50%

Choose type of Vessels >>			
Type	Post PMX	Panamax	Feeder
Dead Weight Tonnage (DWT)	54,000	37,000	20,000
Gross Registered Tonnage (GRT)	54,000	36,000	18,000
Capacity - TEU	7,473		
Draft Needed - Mtr.	14.50	13.50	9.00
Vessel Profile	20%	60%	20%
Time Charter Rate (BDT/Day)	23,000	14,500	9500
Fuel Used (Tons/Day)	147	100	52
Bunker Cost (BDT/Ton)	650	650	

Overseas Ports	% Traffic
Germany (Rotterdam)	29%
India (Kolkatta)	15%
China	13%
US	2%

Overseas Ports	% Traffic
Malaysia	6%
France	9%
Spain	8%
UK	6%
Italy	12%
Total	100%

Inland Transportation Cost	BDT Per TEU (20 ft.)	Distance	Per TEU/km	Per Ton per km
Dhaka - CP	15,000	264	57	8
Mongla - CP	26,500	700	38	5
Khulna - MP	3,000	50	60	8
Khulna - CP	20,000	650	31	4
Khulna - CP	30,000	650	46	6
Khulna - CP (Frozen)	70,000	650	108	15

Share of Export	Share of Import
Frozen food/Shrimps	Food Grain
Jute & Jute Products	Food Grain Non Cereal
General Cargo	Fertilizer
Garments	Cement Clinker
Leather Goods	LPG
Container Traffic -Others	Coal (Growth in Import level)
	Containerised Import - Others
	Bulk - Others
	General Cargo - Others

Based on the traffic assessment made, it is evident that the development of Jetties 3 & 4 at Mongla is techno-economically feasible which will result in the overall economy of the Region.

2.5 Proposed TOR for EIA study

The Terms of Reference (TOR) for the study & preparation of Environmental Impact Assessment (EIA) Report has been devised. TORs will help the project proponents and Consultants to prepare the EIA report with relevant project specific data which are informative, compact and easy to comprehend. TOR for the projects is expected to cover all environmental and social related issues.

The development of port facilities can make a significant contribution to the economic development and the growth of maritime transport. At the same time it may also create adverse impact on the surrounding environment.

The development may create a wide range of impact on the environment through activities like construction work, dredging, reclamation, land fills, discharges from ships and cargo operations and other port related activities. Port development and operation should, therefore, be planned with careful consideration of their environmental impact. The preparation of EIA report and implementation of EMP is essential for effectively managing these adverse effects.

EIA-EMP report should be based on maximum rated capacity of the project in terms of cargo handling, technology, equipment, manpower, resource use, etc. The Chapter wise Table of Content of the EIA Report is prescribed below.

1. Executive Summary

2. Introduction

- Project Background.
- Purpose of the Study, Project, Project Proponent, brief description of the project-name, nature, size.
- Need for the Project.
- Location of the project- land description, extent of the land, plot/ survey nos./ village, upazila & district.
- Importance of the Project to the Region & Country.
- Scope of the EIA Study
- Disclosure of EIA Team.

Essential Maps to be provided

- A map specifying location of the site, district and the Country (Index Map).
- A map of project area and 10 km area from boundary of the proposed/existing project area, / international boundaries.
- A map covering aerial distance of 25 km from the project site boundary delineating environmental sensitive areas.
- Boundaries of the proposed site shall be shown therein with latitude and longitude.
- Area drainage contour map of the project area.
- Land use map of the study area to 1: 50,000 scale based on recent satellite imagery of the project area and 10 km from the proposed project boundary delineating the cropping pattern, wastelands, forest area, built-up areas, water bodies, human habitation and other surface features such as roads/National Highways, railway lines, ports, airports, major industries etc.

3. Legal & Legislative Frameworks

- The proponent should confirm that the project meets the environmental regulations and standards applicable for the project.
- Any litigation pending against the proposed project and/ or any direction/ order passed by any court of law against the project, if so, details thereof.

4. Project Proponent

- Profile of the project proponent, name and contact address with e-mail.
- Implementing organization, organizational chart, project consultants, etc.
- Project Concept & Components.
- Project Schedule.

5. Project Description

(This chapter should cover the broader details of the basic activities, layout and implementation schedule of the project.)

- Type of the project- new/expansion, container/cargo handling facility, etc.
- Relevance of the project in the light of the existing development plans of the region.
- Project coverage, master plan, phasing and scope.
- Description of a project site, geology, topography, transport and connectivity, demographic aspects, socio, cultural and economic aspects.
- Capacity of the port, types of cargo proposed for handling, cargo handling equipments, ancillary operations, housing, truck parking details, etc.
- Technologies involved for design, construction, equipment and operation.
- Use of existing infrastructures – road, railway and inland waterway net works, water supply, electrical power, etc.
- Water budget - during construction/ operation stages.
- Estimated cost of development of the project, environmental cost, rehabilitation of communities / villages present status of such activities.
- Resources, manpower and time frame, etc. –required for project implementation.
- Environmental Management/Pollution Mitigation Measures.

Essential Maps to be Provided

- Site lay out plan of the proposed development shall be submitted by clearly marking the layout, navigation channels, harbor basin, berths, workshops, container freight station, cargo handling systems, covered and uncovered storage yards, warehouses, roads, effluent disposal point, administrative and operational buildings, utilities, town ships, greenbelt, dredged material disposal sites, etc.
- Hydrographic charts of the offshore area giving general morphology of the river/coastal stretch to a scale of 1:50,000 shall be submitted covering water depth up to 10 m beyond the maximum.
- proposed dredging depths of the project and covering a distance of 10 km along the river/coast from the project limits on both sides.

6. Analysis of Alternatives (Technology & Sites)

- Description of various alternatives like locations or layouts or technologies studied.
- Description of each alternative.
- Selection of alternative.

7. Description of the Environment

Study Area: As a primary requirement of EIA process, the proponent should collect primary baseline data in the project area as well as in the area falling 10 km aerial distance from the project boundary (25 km towards Sundarbans). The study areas for different environmental attributes (water, air, noise, soil, etc.) is to be submitted considering the proposed activities and location, along with proper reasoning, for review and approval.

7.1 Land Environment

- Availability of land for earmarking for the Project without causing a due hardship to local habitat and their socio cultural and economic aspects.
- Justification for the proposed quantum of the area is to be given.
- Study of land use pattern, habitation, cropping pattern, forest cover, environmentally sensitive places, etc, by employing remote sensing techniques and also through secondary data sources.

7.2 Topography

- Baseline data to be given on description of existing status of the land at the project area including description of slopes/ inland topography, features (lowland, littoral areas, shoal areas), terrain features, slope and elevation.

7.3 Geology

- Baseline data to be provided on rock types, regional tectonic setting (reported fractures/faulting, folding, warping), history of any volcanic activity, seismicity and associated hazards, mainly in the Project & Coastal area.
- Information on quarry yields, strengths of rock, distance of quarries from habitat, restrictions for quarrying, environmental controls, statutory permissions, etc., should be provided.

7.4 Soil

- Soil data including type, classification, characteristics, soil properties, etc., are important from engineering considerations for design of structures, loading capacities of cargo stockpiles, green belt development etc.
- Changes in parameters of soil also may affect plantation and vegetative growth which in turn may endanger the health of local habitat.
- Baseline data of the soil, results of investigations carried out to be provided.

7.5 Water Environment

7.5.1 Ground Water

Baseline data of ground water including data of pH, dissolved solids, suspended solids, BOD, DO, coli-form bacteria, oil, heavy metals, etc. is to be collected at least for one season. Usage purpose of the ground water, if any, is to be indicated.

7.5.2 Surface Water

Baseline data on location of surface water like lagoons, lakes, tidal inlets, streams, rivers, their details, present quality and their utility, if any, is to be provided. Details of water bodies in the project area shall be described specifically. Water quality is to be monitored for one season.

7.6 Marine Environment

7.6.1 Hydrology/Geomorphology

Hydrology requires collection of oceanographic data during the study period, covering the following parameters:

- Tides
- Waves (wind waves and swells)
- Storm surges
- Currents
- Salinity
- Sea water temperature
- Suspended load, and
- Seabed bathymetry.
- Baseline oceanographic data should extend at least to depths more than 10 m of proposed deepening of the harbor approach and basin as proposed.

A study on likely changes in the sediment transport and littoral drift due to the construction of port should be taken up.

Details of mangroves, marshes and other vegetation, sand dunes, stability, seismic characteristics, history of any endangered species, river bank/coastal erosion and shoreline changes should be furnished.

7.6.2 Bed Sediment Contamination

Baseline data on bottom sediments and the associated bottom biota and other physical habitat, at the project area and the neighborhood areas has to be collected and analyzed.

7.6.3 Harbor Water Quality

Baseline data shall be collected on chemical parameters in the port area for understanding hydro chemical characteristics in the water/marine environment (such as water temperature, DO, pH, TSS, Turbidity, Salinity, BOD, heavy metals, etc.)

7.7 Biological Environment

7.7.1 Ecology

- Baseline data of both terrestrial and aquatic flora and fauna at the project area is to be ascertained by proper surveys including mangroves and marshes and other inland waters & coastal vegetation, etc.
- Data on rare & endangered species are also necessary.
- Flora-Fauna Status & Species Diversity of Sundarbans shall be included.

7.7.2 Flora and Fauna

Details on secondary data on the existing flora and fauna in the study area shall be carried out along with classification as per Schedule.

7.8 Air Environment

7.8.1 Meteorological Data

Meteorological data for at least a 10 year period should be presented from the nearest meteorological station, except for the history of cyclones and tidal surges for which 100 year data is required.

The list of Meteorological parameters includes: Wind speed and direction (Wind Rose diagrams), Temperature, Relative humidity, Barometric pressures, Rainfall, History of cyclones, etc.

7.8.2 Ambient Air Quality

Baseline data of ambient air parameters namely particulate matter size less than 2.5 um or PM2.5 (in ug/m³), particulate matter size less than 10 um or PM10 (ug/m³), sulphur dioxide (ug/m³), nitrogen dioxide (ug/m³), ozone (ug/m³), carbon monoxide (mg/m³), heavy metals (Particulate Lead; ug/m³) shall be monitored. One season data should be monitored other than monsoon. At least one station should be in the up-wind/ non-impact/ non-polluting area as a control station and one station in down wind direction.

7.9 Noise Levels

Baseline data on noise levels at the project area and the neighbourhood areas is to be monitored and reported with applicable Noise Standards.

7.10 Socio-Economics and Occupational Health Environment

Baseline data at the project area shall include the demography, particularly on human settlements, health status of the communities, existing infrastructure facilities in the Project area and area of impact due to the proposed activity. Present employment and livelihood of these populations, awareness of the population about the proposed activity shall also be included.

7.11 Public Utilities

Base line data of existing public utility infrastructure shall be ascertained and reported to assess the impact of the project on these public utilities in order to incorporate desired methods in the EMP and monitor the same during the construction as well as operational phases of the Project.

8. Anticipated Environmental Impact and Mitigation Measures

This Chapter should describe the likely impact of the project on each of the environmental parameters, methods adopted for assessing the impact such as model studies, empirical methods, reference to existing similar situations, reference to previous studies, details of mitigation methods proposed to reduce adverse effects of the project, best environmental practices and conservation of natural resources.

The identification of specific impact followed with mitigation measures should be done for different stages i.e., **Construction Phase** (including dredging) and **Operation Phase** (ship traffic including discharges from vessels and cargo operations).

8.1 Land Environment

Anticipated Impacts:

- Impact of project construction/operation on the land requirement / land use pattern should be assessed.

- Effect of future growth of the port facility and/or of the ancillaries should be carefully assessed. Impact on the public utilities arising out of the utilities for the project activities and impact on the natural drainage system shall be assessed.
- Prediction of impact should include impact on the existing infrastructures like road networks, housing, ground water/surface waters, etc. and loss of productive soil (if any) and impact on the natural drainage pattern.

Mitigation Measures:

- Mitigation measures to reduce adverse effects like adopting soil improvement techniques and adopting suitable design methods to reduce land requirement.
- Strengthening of road and rail network infrastructure to handle the increase in traffic and truck parking arrangements, integration of Port development with the local land use plan should be planned.

8.2 Topography, Geology and Soil

Anticipated Impacts:

- Impact of port construction/operation on the topography due to activities like large scale quarrying, filling of low lying area with dredged spoils and borrowed material, damage to existing vegetation/green belt and plantation, changes in land use patterns, disturbance to existing protected areas like mangroves, forests and environmentally sensitive areas/zones should be assessed.
- Flooding due to filling up of low-lying areas should be assessed.
- Impact on the surrounding land use pattern, on infrastructure like housing, ground water, etc should be assessed.
- Impact of the project construction on the geology and vice-versa should to be studied in detail.
- Impact of project construction/operation on the soil parameters, probability of settlement, subsidence, slides, surface drainage, leachets etc., are to be assessed and addressed.

Mitigation Measures:

- Mitigation measures to reduce adverse effects include improving green belt, obtaining construction materials from other sources, usage of alternative construction materials like fly ash, where possible, storm water management, etc.
- Adopting soil improvement techniques and suitable designs, ground covering, etc.

8.3 Water Environment

Anticipated Impact:

- Impact of port operations on surface waters, contamination due to cargo operations, impact on utility of surface water resources by the neighboring colonies, impact on surface water flow (ex. flooding) due to anticipated alterations/obstructions, etc.
- Discharge of trade effluent/sewage and its impact.
- Impact of project construction/operation on the ground water on account of leachets, run off from material and cargo storages and toxic or harmful substances, percolation, etc.

Mitigation Measures:

- Protection measures to surface water resources to prevent reduction in their quality due to construction and operational activities.
- Proposals to treat effluents confirming to standards notified under EC Act should be submitted.
- Mitigation measures to reduce adverse effects like impervious paving the cargo areas, impervious roads, lined drains, routing surface drainage to settlement tanks/pits, etc.
- Treatment of effluent, recycle/ reuse and disposal should be planned.
- Groundwater study on leaches should be carried out periodically and should be correlated with baseline data.
- Remedial measures should be taken in case of any deviation.
- Based on the total water budget of the project, the use of ground water should be reviewed and alternatives to be presented.

8.4 Hydrology

Anticipated impact:

- Impact of the project construction/operation on the hydrology on account of port construction should be assessed by suitable model studies.

Mitigation measures:

- Careful port design should be planned to minimize impact due to changes in current patterns and other hydrology.
- Model experiments or computer simulations of these changes are useful in developing an appropriate design.
- Shore protection works like construction of sea walls, sand bye passing or bank nourishment should be studied.

8.5 Sediment Contamination

Anticipated Impact:

- Impact of the project construction/operation on the bed sediment contamination on account of port construction/operations is to be assessed by suitable empirical/model studies.

Mitigation Measures:

- A survey of contamination of bottom sediments should be undertaken before dredging.

8.6 Harbor Water Quality

Anticipated Impact:

- Impact of the project construction/operation on the harbor water quality on account of port construction is to be assessed by suitable empirical/model studies.

Mitigation Measures:

- Proper collection and disposal of liquid and solid waste from shore establishment and ships should be planned.

8.7 Biological Environment

Anticipated impact:

- Impact of the project construction/operation on the river/marine/coastal ecology on account of port construction should be assessed by suitable empirical/model studies.
- Impact due to floodlights on the species should be studied.

Mitigation Measures:

- Mitigation measures to reduce adverse effects should be provided.

8.8 Air Environment

Anticipated Impact:

- Impact of project construction/operation on the ambient air quality on account of emissions of dust during construction and cargo handling as well as emission of gases from equipment deployed for construction and cargo handling should be assessed.
- Prediction due to emissions during cargo handling/ emissions from the ships in the port area/ emissions due to increased traffic, emission inventory for critical pollutants with and without mitigation measures, prediction of the impact due to the existing activity on the proposed project, prediction of impact due to on going projects in the surrounding area on the proposed project and the ambient environment shall be carried out.

Mitigation Measures:

- Mitigation measures proposed during the construction stage should include dust suppression measures by suitable techniques.
- Mitigation measures proposed during the operation stage should include alternative solutions such as closed conveyor system, closed silos, closed vehicles to transport dusty cargo, etc, mitigation measures to lower the emissions from the ships and green belt development.

8.9 Noise Pollution

Anticipated Impact:

- Impact of project construction/operation on the noise and vibration on account of construction equipment, cargo handling equipment and road traffic.

Mitigation Measures:

- Mitigation measures to comply the norms should be planned.

8.10 Solid Waste Management

Anticipated Impact:

- Details of municipal solid waste facilities, biomedical treatment facilities and hazardous waste disposal facilities in the area should be inventorized, in case if it is proposed to utilize the same.
- Impact due to non-hazardous and hazardous solid waste generated during the construction and operational stages should be assessed.

Mitigation Measures:

- Mitigation measures to comply the norms should be planned.
- Options for minimization of solid waste and environmentally compactable disposal/ recycling of waste to
- Conservation of natural resources should be planned.
- Management and disposal of temporary structures made during construction phase should be planned.

8.11 Socio-Economic and Occupational Health Environment

Anticipated Impact:

- Predicted impact on the communities of the proposed activity.
- Present status of health, housing, public utilities, commercial structures and transportation should be collected.
- Impact of the project on socio cultural aspects should be assessed.
- Socio-economic impact due to displacement of fishing settlements (if any) and population influx due to increased activities should be assessed.

Mitigation Measures:

- Mitigation measures to reduce adverse effects including satisfactory R&R methods should be planned.

9. Environmental Monitoring Programme

This Chapter shall include details of environmental monitoring programme. It should include the technical aspects of monitoring the effectiveness of mitigation measures (including measurement methodologies, data analysis, reporting schedules, emergency procedures, detailed budget & procurement schedules).

10. Additional Studies

Risk Assessment, Risk Mitigation Measures, Disaster Management Plan, etc. shall be prepared and submitted.

11. Environmental Cost Benefit Analysis

If recommended at the scoping stage, this chapter shall be included for the environmental cost benefit analysis of the project.

12. Environmental Management Plan (EMP)

- EMP for Construction Phase: Land Environment, Water Environment, Air Quality, Noise Levels, Biological Environment and Socioeconomics.
- EMP for Operation Phase : Land Environment, Water Environment, Air Quality, Noise Levels, Biological Environment and Socioeconomics.
- Occupational Health & Safety Measures.
- Green Belt Development.
- Rain Water Harvesting Measures.
- Project Cost & EMP Budget.
- CSR Budget.
- EMP Cell for Implementation of proposed EMP Measures.

13. Project Benefits

This chapter shall include benefits accruing to the locality, neighborhood, region and nation as a whole. It should bring out details of benefits by way of:

- Improvements in the physical infrastructure by way addition of project infrastructure, ancillary industries that may come up on account of the project.
- Improvements in the social infrastructure like roads, railways, townships, housing, water supply, electrical power, drainage, educational institutions, hospitals, etc.
- Employment potential –skilled; semi-skilled and unskilled, both during construction and operational phases of the project with specific attention to employment potential of local population as well as necessity for imparting any specialized skills to them to be eligible for such employment in the project on a long term basis and Other tangible benefits like improved standards of living, health, education etc.

14. Public Consultation

*The **Public Consultations, both at Local and National Level**, have to be conducted and the Proceedings, Issues raised, Response & Action Plan to address the Public Issues are to be prepared and disclosed.*

15. Conclusion & Recommendations

3 DESCRIPTION OF THE EXISTING BACKGROUND ENVIRONMENT

3.1 Study Area

The proposed area is located in the South-western region of Bangladesh which is a part of alluvial delta formed by major rivers originating from the Himalayas in the North. The land use of the area is dominated by **shrimp aquaculture cum rice cultivation**. In general, this agricultural land covers 75% of the study area and 95% of the project area. Settlement density is very low.

An area of 1 km radius from the Port has been considered for setting the environmental baseline condition for the IEE Study. The study area of 10 km area includes two districts namely Khulna and Bagerhat, four Upazila namely Dacope (Khulna), Rampal, Mongla and Sharankola (Bagerhat) Figure 3.1.

The northeast boundary of **Sundarbans**, National Heritage Center of Bangladesh, is at a distance of 4.7 km in southwest from the Site. Other than Sundarbans, there are no eco sensitive areas within 10 km area. The eco sensitivity map is given as Figure 3.2.

Physiographically, the area is tidal delta with dominant tidal flushing and saline enriched shallow aquifer. Elevation contours are in the ranges 0-20 m above Mean Sea Level (aMSL) Figure 3.3.

The general landscape of project area is flat topography with some low lying swampy areas, some inter-tidal canals, intensive shrimp farming land, rural settlements, homestead and roadside planted vegetation and natural scattered mangroves along the River and inter-tidal canals.

Pussur (Pasur) River is the major river in the study area which is an extension of the Rupsha River. The Bhairab or the Rupsha River flows south of Khulna and is renamed as Pussur near Chalna Port. It confluences into the Bay of Bengal, flowing to the right of Trikona and Dubla islands. Down from the Mongla Port, the river flows through the Sundarbans.

The Pussur is an important river route through which Indian vessels under transit agreement, clinker carrying vessels, LPG carrying vessels, fuel carrying vessels, maritime transportation vessels of approaching and departing Mongla Port, barges, Khulna-Barisal steamboats and other vessels ply round the year. The Pussur and all its distributaries are tidal channels and is the main river to control drainage system of the total study and project area.

The study area is non-urbanized. The pollution sources in and around the study area are mainly cement industries, emissions from boats/vessel, agricultural lands and domestic households.

Figure 3.1: Study Area

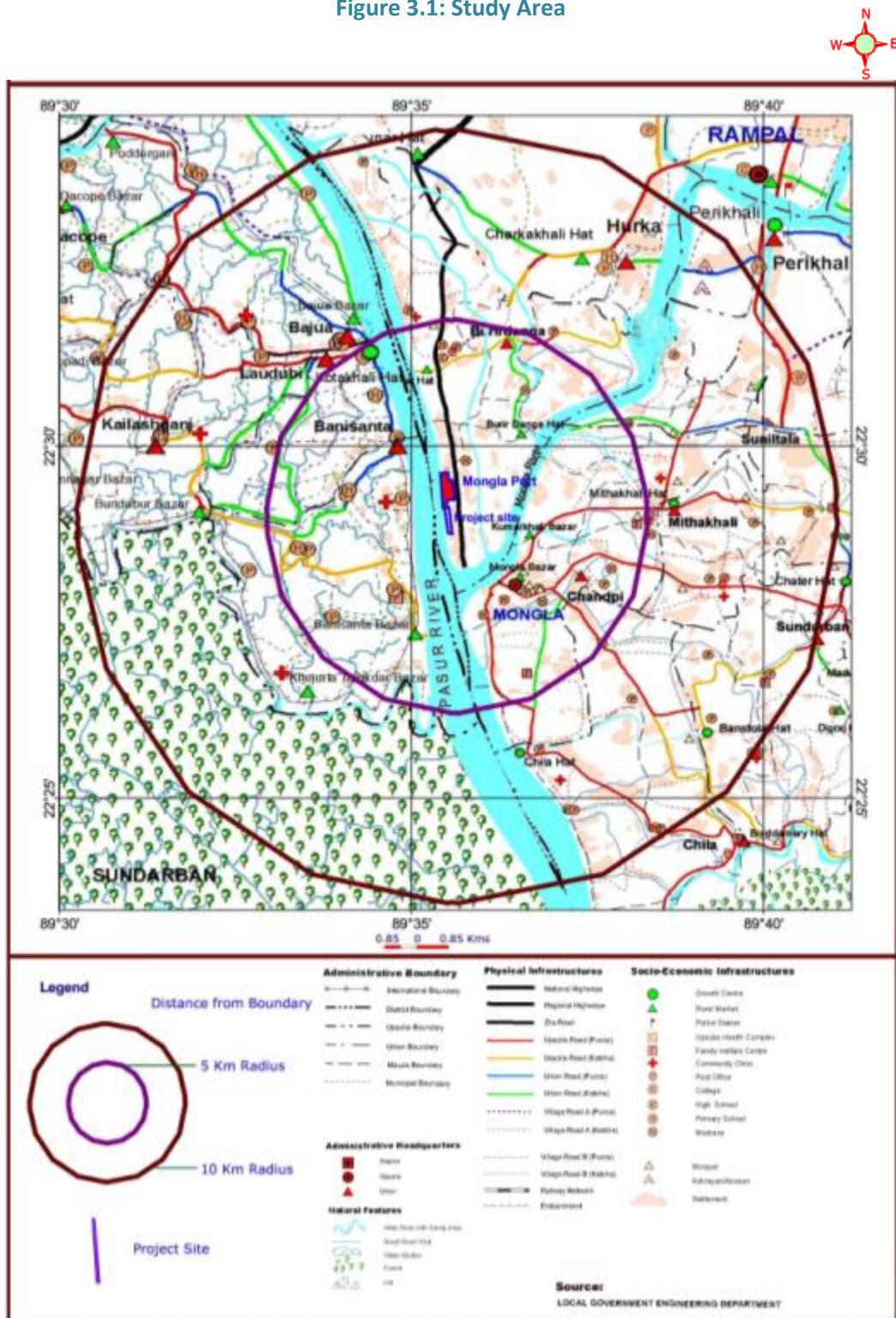
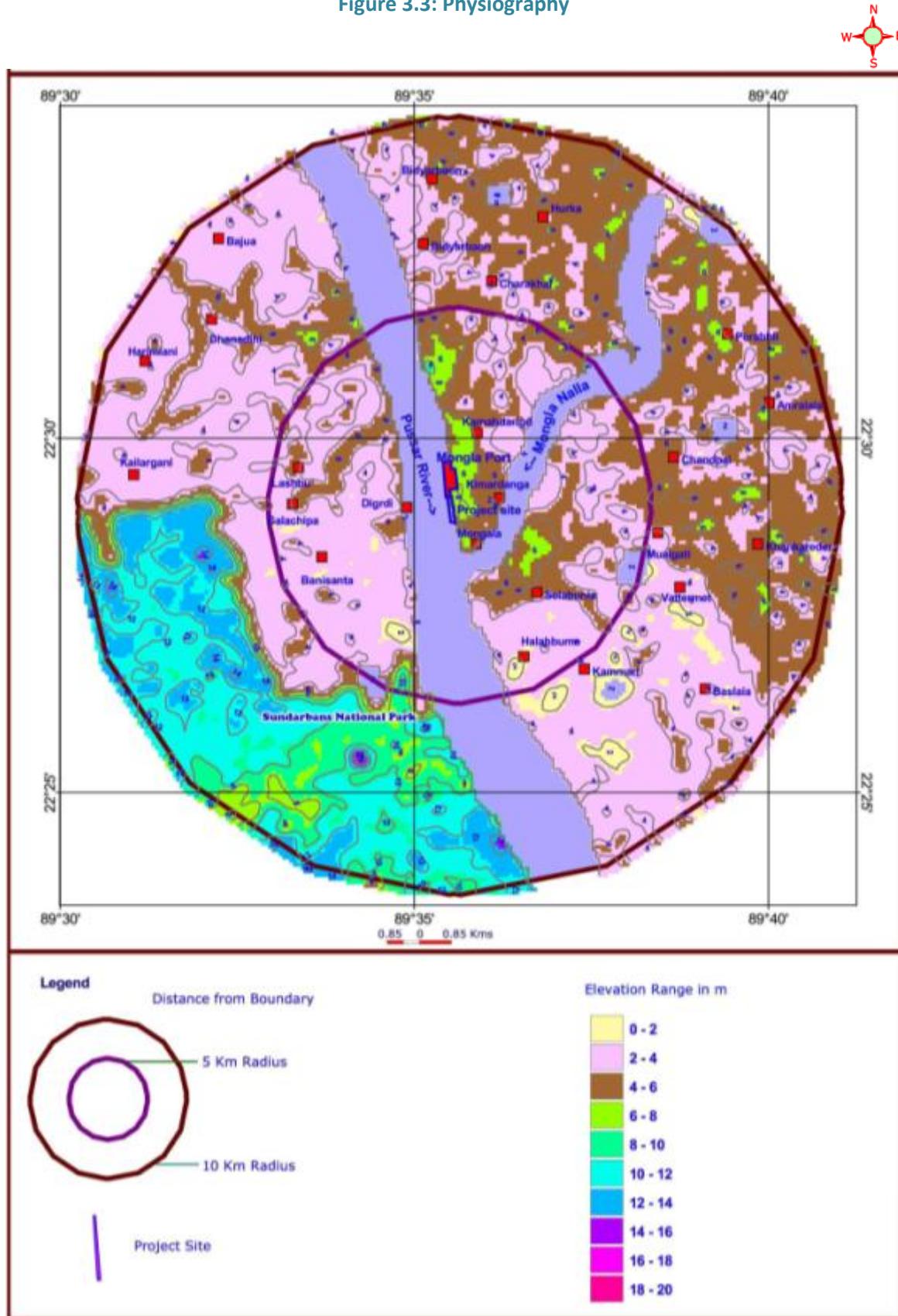


Figure 3.2: Eco Sensitivity Map



Figure 3.3: Physiography



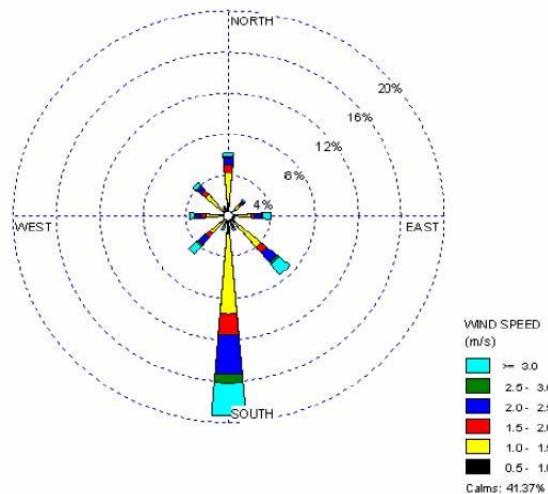
3.2 Meteorological Status

The project area lies in the South-central climate zone of Bangladesh and shows tropical monsoon climate with three prominent seasons - Summer/Pre-monsoon (March to May), Rainy/monsoon season (June to October) and Winter season (November to February). The rainy season is hot and humid, and characterized by heavy rainfall, tropical depression and cyclone. The winter is predominately cool and dry. The summer is hot and dry interrupted by occasional heavy rainfall.

Gentle north/north-westerly winds with occasional violent thunderstorms called northwester during summer and southerly wind with occasional cyclonic storm during monsoon are prominent wind characteristics of the region.

Meteorological condition has been established using data on different metrological parameters observed at Mongla Station of the Bangladesh Meteorological Department (BMD).

Data of 1989-2008 period shows that monthly maximum temperature varies from 23.3 °C to 36.5 °C and the monthly minimum temperature varies in the range of 12.2 °C to 27.8 °C. While April is the warmest month, January is the coldest month. Monthly average relative humidity in the project area varies seasonally from 70% to 90%. June, July and August are the most humid months (80 % to 90 %) while during January to March it remains lowest (20% to 30%).



The region is characterized by Southerly winds from the Bay of Bengal during monsoon and Northwesterly winds from Himalaya during winter. Wind speed has been measured at 10 meter height and the mean wind velocity of Mongla is 1.7 m/s (6.1 km/hr). The yearly mean **wind rose** shows that wind prevails flowing from south to north direction in most of the time in a year.

Mongla is located in highly rainfall prone areas and the annual rainfall ranges from 1232 mm to 2786 mm with an average 1946 mm per annum (**Table 3.1**). Almost 80% rainfall occurs in monsoon and a negligible amount in winter.

Table 3.1: Rainfall at Mongla

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1991	29	29	20	88	91	419	395	298	323	259	4	2	1957
1992	8	108	0	4	118	174	350	243	170	55	2	0	1232
1993	9	21	167	72	186	424	225	379	243	91	36	0	1853
1994	4	18	40	149	139	344	278	380	123	130	3	0	1608
1995	4	70	11	9	208	304	244	268	302	148	229	0	1797
1996	2	22	24	47	119	453	386	357	133	274	1	0	1818
1997	2	70	123	131	214	233	478	355	591	12	0	14	2223
1998	29	65	149	97	234	229	294	443	553	110	207	0	2410
1999	1	0	0	25	202	262	435	442	479	321	12	0	2179
2000	28	9	15	134	283	309	356	209	327	124	5	0	1799
2001	1	19	6	22	301	539	445	136	181	251	53	0	1954
2002	13	5	32	74	206	983	389	441	492	62	89	0	2786
2003	0	2	175	41	127	351	284	229	188	263	0	28	1688
2004	0	0	7	95	109	293	280	336	506	274	3	0	1903
2005	28	0	93	25	238	342	633	264	391	390	1	1	2406
2006	0	0	14	9	243	255	462	318	390	48	6	0	1745
2007	2	71	1	64	57	226	580	262	355	267	101	0	1986
2008	50	36	12	7	146	252	474	217	299	197	0	0	1690
Monthly	11.67	30.28	49.39	60.72	178.94	355.11	388.22	309.83	335.89	182.00	41.78	2.50	-
Mean													

The monthly average sunshine hour in Mongla varies between 4-9 hour/day in a year. The monthly average evaporation in Mongla varies between 3-5 mm/day.

Seismicity: Mongla area occurs in the Seismic Zone III. Seismically it is in the quiet zone and the only historic high magnitude earthquake occurred in this zone was centered in the Sundarbans. The possible maximum earthquake magnitude in Richter's scale is 7.0. The suggested Basic Horizontal Seismic co-efficient for this zone is 0.04 (Source: Bangladesh Meteorological Department).

As per tectonic classification, the area falls under Faridpur trough of Western platform flank which is adjacent to the hinge line. Tectonically this area is inactive and no apparent major structure like fault or fold exists in the region that might be geologically significant.

3.3 Ambient Air Quality

Monitoring of ambient air quality in the Cement Plants area near Mongla is periodically carried out by the Department of Environment, Khulna Division. The rural areas of Mongla were also monitored. The maximum concentration of pollutants that monitored were given in Table 3.2 with the Air Quality Standards.

Table 3.2: Ambient Air Quality

Location	Maximum Pollutant Concentration Range, ug/m ³				
	PM2.5	PM10	SO ₂	NOx	CO
Mongla Rural Area	-	140	8	16	-
AQ Standards*	65 (24-hly)	150 (24-hly)	365 (24-hly)	100 (Yearly)	10000 (8-hly)

Legend: PM2.5-Particulate Matter size less than 2.5 um; PM10-Respirable Particulate Matter size less than 10 um; SO₂-Sulphur dioxide; NOx-Oxides of Nitrogen & CO-Carbon monoxide.

- : Not included/Not available.

*: AQ Standards- Ambient Air Quality Standards as amended vide SRO No. 220/Act/2005 dated 19.07.2005 under EC Act 1995.

The monitored values (existing baseline status) were found to be well within the Ambient Air Quality Standards stipulated by DoE.

3.4 Noise levels

The study area is completely rural and no major point source of noise exists within the vicinity of the Port area. The monitored **equivalent noise levels (Leq)** were found to be <50 dB(A) during day times (6 am to 9 pm) and <40 dB(A) during night times (9 pm to 6 am). The Port Area falls in Mixed Zone Category and the Noise Standards for Mixed Zone are 60 dB(A) during day times and 50 dB(A) during night times. Thus, the noise levels in the Port vicinity were found to be well within the Ambient Noise Standards.

Noise Quality Standards (Leq) * for Mixed Zone, dB(A)	60	50
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Legend: Leq-Equivalent Noise Level.

*: Ambient Noise Quality Standards (vide Rule 12). Day time is reckoned in between 6 a.m and 9 p.m. and Night time is reckoned in between 9 p.m. and 6 a.m.

Note: A warning limit value of **85 dB(A)** may be set as the level below which very little risk to unprotected ear of earring impairment exists for 8-hour exposure.

3.5 Water Environment

3.5.1 Pussur River - Discharge

The minimum monthly discharge (occurs during February) of the Passur River is 6000 m³/sec where the highest flow is 22,500 cubic meter per sec during wet season (BWDB, 2005). Tidal effects this area two times in every days. However, tidal water intrudes maximum during high tide which is mainly saline water. The intrusion of salinity is controlled by the upland flow coming down the river. During wet season, the salinity front recedes towards the sea and migrates upstream in the dry season.

3.5.2 Tides in Pussur River

The tides of the Passur River are important for navigation as determines the possibility of crossing the shallow outer bar at the entrance. The tide is semi-diurnal in nature. Two tides (flood and ebb) are regularly observed.

The approximate range of the tide observed at Mongla station is between 1.2 m to 3.5 m and the tidal amplitude is around 3.25 m (Data : MPA). The mean water level (Chart Datum) at Mongla is 0.87 m.

3.5.3 River Bed Sediment

As per available Borewell Data, Clay dominates up to 4.5 m and Silty Clay and Silt dominates in 4.5 m to 9.0 m depth below the riverbed. Sands are abundant below 9 m depth. Coarse size of sand increases with depth. The rate of sedimentation needs to be accounted during preconstruction phase and the project authority would regularly monitor and the measures will be taken accordingly.

3.5.4 Water Quality

Water quality of the Pussur River at Mongla was being monitored by DoE Laboratory of Khulna Division and the data for Year 2010 is given in Table 3.3.

The surface temperature ranges between 22.9° - 33.0°C throughout the year. The salinity concentration is 27 parts per thousand (ppt) at the mouth of the Passur River. The surface salinity levels ranging between 10 - 29 ppt throughout the year. The dissolved oxygen (DO) content in Pussur River near the Sundarbans is about 6 mg/l. While most of the monitored parameters were found to be within the Standards of ECR 1997 Norms for fisheries, drinking and industrial use but BOD is higher than the standard level. Standards for other parameters are not specified in ECR' 97

Table 3.3: Water Quality of Pussur River at Mongla Port – 2010

loc ation	Date	Tem p.	pH	EC	CF	T. Alkalinity	Turbid ity	T S	TDS	SS	DO	BOD	COD	Sali nity
		°C		µS/cm	mg/l	mg/l	NTU	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
1	7-Jan	27.4	7.74	3010	879	36	68.7	1565	1510	55	5.1	0.8	55	1.6
2	7-Jan	27.1	7.72	3020	878.8	36	68.5	1570	1510	60	5.1	0.8	55	1.6
3	7-Jan	27.8	7.71	3030	879	36	68.8	1565	1510	55	5.1	0.8	55	1.6
1	11-Feb	29.8	7.66	4380	1262	36	182	2390	2180	210	4.7	1	76	2.3
2	11-Feb	29.2	7.63	4380	1268	36	178	2390	2190	200	4.7	1	76	2.3
3	11-Feb	29.1	7.65	4380	1263	36	179	2380	2180	200	4.7	1	76	2.3
1	9-Mar	32.6	7.56	11780	2944.4	38	176	6080	5890	190	4.7	1.2	76	6.7
2	9-Mar	32.6	7.57	11780	2945.2	38	178	6080	5890	190	4.7	1.2	76	6.7
3	9-Mar	32.1	7.55	11780	2946.4	38	177	6090	5890	200	4.7	1.2	76	6.7
1	17-Apr	32.6	7.59	25300	8273	36	185.6	12950	12700	250	4.6	0.7	136	15.5
2	17-Apr	32.6	7.59	25300	8273	36	186.2	12950	12700	250	4.6	0.7	138	15.5
3	17-Apr	32.6	7.59	25300	8273	36	184.8	12950	12700	250	4.6	0.7	136	15.5
1	5-May	32.6	7.59	29200	9480	36	198.6	14900	14600	300	4.5	1.2	177	17.6
2	5-May	32.9	7.54	29200	9470	36	198.6	14900	14600	300	4.4	1.2	177	17.6
3	5-May	33.2	7.57	29200	9470	36	199.6	14900	14600	300	4.5	1.2	177	17.6

loc ation	Date	Tem p.	pH	EC	Cl	T. Alkal ity	Turbid ity	T S	TDS	SS	DO	BOD	COD	Salinity
		°C		µS/cm	mg/l	mg/l	NTU	mg/l						
1	13-Jun	31.6	7.69	18000	5820	36	112.6	9200	9000	200	4.7	1.1	97	10.8
2	13-Jun	31.6	7.69	18000	5800	36	113.2	9200	9000	200	4.7	1.1	97	10.8
3	13-Jun	31.6	7.69	18000	5810	36	112.4	9200	9000	200	4.7	1.1	97	10.8
1	1-Jul	31.6	7.69	440	32.6	36	76.6	285	220	65	5.2	0.8	26	-
2	1-Jul	31.6	7.69	440	32.6	36	76.6	285	220	65	5.2	0.8	26	-
3	1-Jul	31.6	7.69	440	32.6	36	76.6	285	220	65	5.2	0.8	26	-
1	5-Aug	31.6	7.69	275	16.6	36	68.6	192	137	55	5.3	0.7	22	-
2	5-Aug	31.6	7.69	275	16.6	36	68.6	192	137	55	5.3	0.7	22	-
3	5-Aug	31.6	7.69	275	16.6	36	68.6	192	137	55	5.3	0.7	22	-
1	8-Sep	31.6	7.74	270	15.6	36	65.6	180	135	45	5.5	0.7	22	-
2	8-Sep	31.6	7.76	270	15.6	36	65.6	180	135	45	5.5	0.7	22	-
3	8-Sep	31.6	7.74	270	15.6	36	65.6	180	135	45	5.5	0.7	22	-
1	12-Oct	30.6	7.79	290	26.6	36	62.6	192	145	47	5.6	0.7	22	-
2	12-Oct	30.6	7.78	290	26.6	36	62.6	192	145	47	5.6	0.7	22	-
3	12-Oct	30.6	7.78	290	25.6	36	62.6	192	145	47	5.6	0.7	22	-
1	5-Nov	24.6	7.79	340	38.6	36	56.6	210	170	40	5.6	0.7	22	-
2	5-Nov	26.6	7.79	340	38.6	36	56.6	210	170	40	5.6	0.7	22	-
3	5-Nov	25.6	7.79	340	38.6	36	56.6	210	170	40	5.6	0.7	22	-
1	12-Dec	21.5	7.72	520	62.6	36	72.6	320	260	60	5.1	0.9	25	0.4
2	12-Dec	20.9	7.71	520	62.6	36	73.6	320	260	60	5.1	0.9	25	0.4
3	12-Dec	21.1	7.72	520	62.6	36	71.6	320	260	60	5.1	0.9	25	0.4

Location 1 - Port side river sample, Location 2 - Middle of the river & Location 3 - Opposite of Mongla Port (during high tide periods).

3.5.5 Ground Water

Deep ground water aquifer is the main source of domestic water supply in this area as the shallow aquifer shows salinity, which is also subject to salinity intrusion from river and sea. The depth to the fresh ground water table in the project area ranges from 700 ft. (213.36 meter) to 900 ft. (274.32 meter) (Date : DPHE, Rampal). The ground water quality of Mongla (from available borewell data) are given in Table 3.4.

Table 3.4: Ground Water Quality

Sl No.	Parameters	Units	Sample from BH 7	Sample from BH 8	Sample from BH 9	Standard
1.	pH		8.10(20.5°C)	8.09 (20.6°C)	8.11 (20.7°C)	6.5-8.5
2.	Total Hardness	ppm	89.62	62.72	98.56	200-500
3.	Chloride	ppm	34.34	23.31	36.20	150-600
4.	Sulphate	ppm	41.5	28.16	43.75	400
5.	Iron	ppm	0.132	Trace	Trace	0.3-1.0
6.	Arsenic	ppm	0.005	0.002	0.002	0.05

3.6 Land Environment

3.6.1 Soil Status

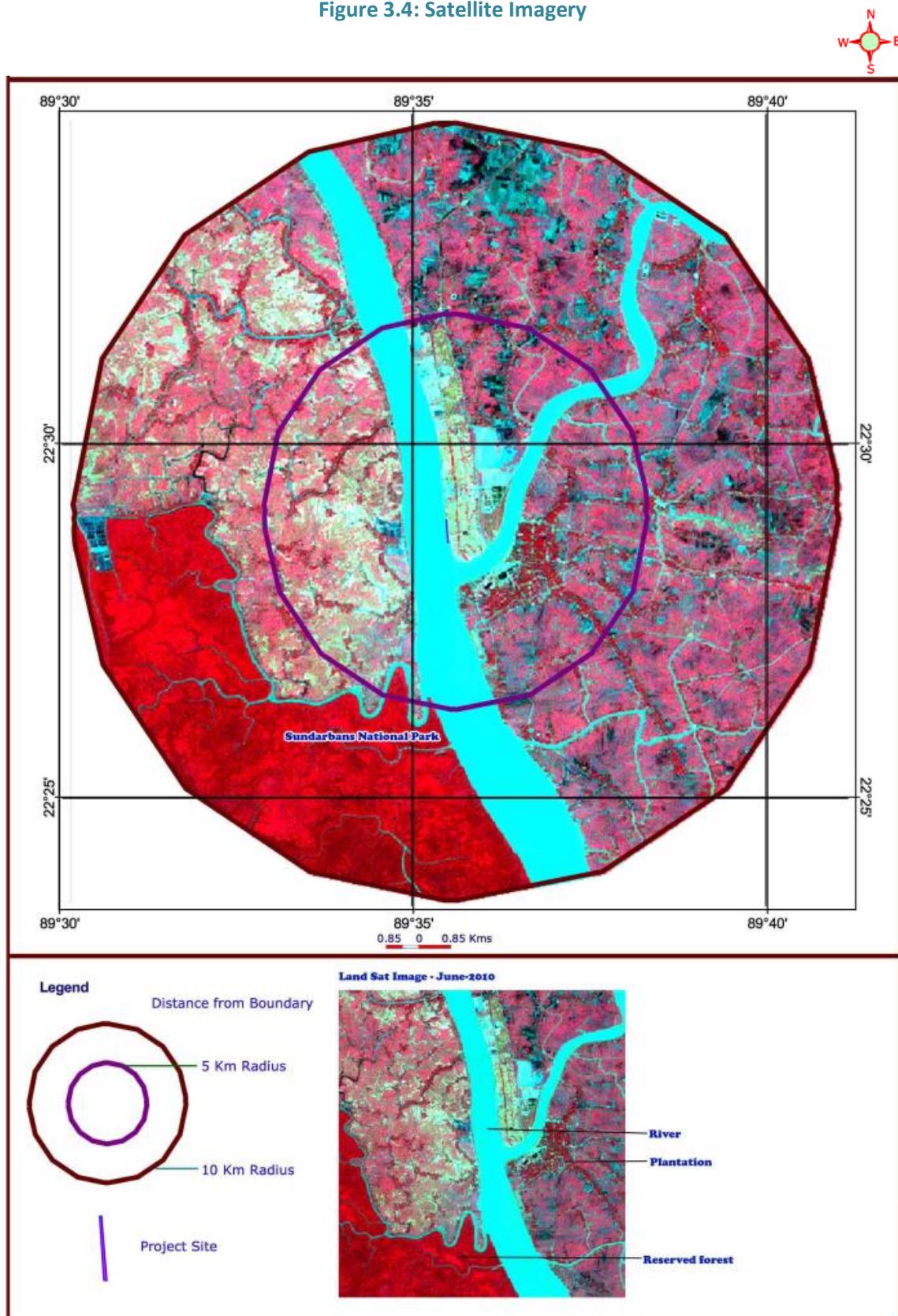
Lithology shows that the area comprises of clay on the upper part and sand in the deep. The upper surface layer consists of clay, the intermediate layer of mainly fine sand and deeper layer contains mainly fine to coarser sand.

The soil of this sub-region is mainly saline in the dry season. Calcareous silt loams to silty clays occupy riverbanks and basin margins, and non-calcareous silty clays occupy river basin centers. The proportion of calcareous soils and the proportion of soils with peaty substratum are higher than the former sub-region. Tidal flooding is mainly shallow (outside of the embanked areas), but some basin centers are more deeply flooded and stay wet round the year.

3.6.2 Land Use Pattern

For land use pattern, the Satellite data of (Fig. 3.4) will be used. The general landscape of project area is flat topography with low lying swampy areas, inter-tidal canals, intensive shrimp farming land, rural settlements, homestead & roadside planted vegetation and natural scattered mangroves along the River and inter-tidal canals.

Figure 3.4: Satellite Imagery



Land type classification is based on depth of inundation during monsoon season due to normal flooding in an average year. According to SRDI, there are five land type classes: High land (Above flood level), Medium highland (Flooding depth 0-90 cm), Medium lowland (Flooding depth 90-180 cm), Lowland (Flooding depth 90-270 cm) and very lowland (Flooding depth >270 cm).

Land Type	Description	Flooding depth	Flooding characteristics
F_0	Highland	0-30 cm	Non flooded to intermittent
F_1	Medium Highland	30-90 cm.	Seasonal
F_2	Medium Lowland	90-180 cm	Seasonal
F_3	Lowland	180-270 cm	Seasonal, but remains wet in early dry season
F_4	Very Lowland	> 270 cm	Seasonal but remains wet in most of the dry season

The land type characteristics are almost uniform within the study area. Most of the cultivable land is medium highland (> 94%) where maximum flooding depth is below 90 cm during the monsoon period.

The net cultivable area (NCA) is about 75.4% of the gross area (**Table 3.5**). The other major distributions are: 0.5% intertidal, 0.2% mangrove, 0.1% water bodies, 9.3% rivers, 0.41% roads and 14.1% settlements. In the project area, all the lands are used as mono-cropped. In the study area, about 63.3%, 32.8% and 3.9% lands are being utilized for single, double and triple cropped respectively.

Table 3.5: Land Use Pattern

Land use	Study area	
	Area (ha)	%
Agriculture land	26344	75.4
Single crop	16676	63.3
Double crop	8641	32.8
Triple crop	1027	3.9
Intertidal area	192	0.5
Mangrove	60	0.2
Water bodies	41	0.1
River	3241	9.3
Road	137	0.4
Settlement	4940	14.1

3.7 Biological Environment

3.7.1 Flora-Fauna

Three types of ecosystem exist in the project site and adjacent area viz. terrestrial, aquatic and mangrove ecosystem. In general, brackish water ecosystem is dominant in the study area.

The Pussur River is the habitat of good number of fish, Irrawaddy dolphin, Ganges River Dolphin and Estuarine Crocodile. The Sundarbans is also the resort for the saltwater crocodiles. It is to be noted that freshwater dolphins are globally endangered and are protected under the Bangladesh Wildlife Act 2010.

Generally, mangroves grow in tidal canals, creeks, tidal inlets and outlets, roadside borrow pits, and tidal flood plains within the study areas.

Most of the homestead cover consists of timbers plant species, few medicinal plants and some vegetables and fruit trees. These provided roosting area for the local resident birds and nesting sites for the waterfowl like egrets and herons. The roadside vegetation is mostly planted.

The detailed flora-fauna list of Mongla Port Area is appended.

Table 3.6: Detailed flora-fauna list

Scientific Name	Local name	Habit	Importance	Status
<i>Abroma augusta</i>	Ulatkambal	Shrub	Medicinal	Rare
<i>Acacia moniliformis</i>	Aakashmoni	Tree	Note known	Common
<i>Acacia nilotica</i>	Babla	Tree	Ornamental	Common
<i>Acalypha indica</i>	Muktajhuri	Shrub	Medicinal	Common
<i>Acanthus illicifolius</i>	Hargoja	Saline Herb	Medicinal	Common
<i>Achyranthes aspera</i>	Apang	Herb	Medicinal	Common
<i>Acrostichum aureum</i>	Tiger Fern	Herb	Not Known	Common
<i>Adenanthera</i>	Rakton	Tree	Firewood	Rare
<i>Adhatoda zeylanica</i>	Bashak	Shrub	Medicinal	Rare
<i>Aegle marmelos</i>	Bel	Tree	Medicinal, Fruits	Common
<i>Aeschynomene aspera</i>	Shola	Shrub	Fuel	Rare
<i>Albizia odoratissima</i>	Shrish	Tree	Timber	Common
<i>Albizia richardiana</i>	Gagon serish	Tree	Firewood, timber	Common
<i>Albizia lebbeck</i>	Sirish	Tree	Timber and fuel wood	Very Common
<i>Albizia procera</i>	Silkarnoi	Tree	Timber and fuel wood	Common
<i>Alostonia macrophylla</i>	Chatim	Tree	Ornamental	Common
<i>Alstonia scholaris</i>	Shatim/Shatian	Tree	Timber	Rare
<i>Amaarthus spinosa</i>	Katanatea	Herb	Medicinal	Common
<i>Anthocephalus chinensis</i>	Kadam	Tree	Timber and fuel wood	Common
<i>Aphanamixis polystachya</i>	Pitraj	Tree	Timber	Rare
<i>Areca catechu</i>	Supari	Tree	Fruit and Timber	Very Common
<i>Artocarpus heterophyllus</i>	Kanthal	Tree	Timber, Fruits	Common
<i>Artocarpus lakoocha</i>	Deoa	Tree	Fruits	Rare
<i>Averrhoa carambola</i>	Kamrangia	Tree	Fruits	Common
<i>Avicennia officinalis</i>	Bine	Tree	Timber	Common
<i>Azadirachta indica</i>	Nim	Tree	Timber and medicine	Common
<i>Bambusa sp</i>	Bash	Woody Herb	Furniture	Common

Scientific Name	Local name	Habit	Importance	Status
<i>Barringtonia acutangula</i>	Hijal	Shrub	Fuel wood	Common
<i>Bauhinia</i> sp.	Kanson	Tree	Ornamental	Rare
<i>Bombax ceiba</i>	Shimul	Tree	Cotton and Fuel wood	Common
<i>Borassus flabellifera</i>	Tal	Tree	Timber	Common
<i>Calamus tenuis</i>	Bet	Shrub	Thatching	Common
<i>Calophyllum inophyllum</i>	Sultan Chapa/Punnag	Tree	Ornamental	Rare
<i>Calotropis gigantea</i>	Akand	Shrub	Medicinal	Common
<i>Calotropis procera</i>	Akand	Shrub	Medicinal	Common
<i>Carica papaya</i>	Papay	Shrub	Fruit	Common
<i>Carissa carandas</i>	Karamcha	Shrub	Fruit	Common
<i>Cassia fistula</i>	Sonalu	Tree	Ornamental	Common
<i>Cassia siamea</i>	Minjira	Tree	Ornamental	Common
<i>Cassia alata</i>	Dardmardon	Shrub	Medicinal	Common
<i>Cassia occidentalis</i>	Barahalkasunda	Shrub	Fuel wood	Common
<i>Cassia tora</i>	Chakunda	Shrub	Fuel wood	Common
<i>Casuarina eqisetifolia</i>	Jahu	Tree	Ornamental	Common
<i>Centella asitica</i>	Thankuni	Herb	Medicinal and Vegetables	Common
<i>Cerbera Odollam</i>	Dabur/Amdoua	Tree	Fuel wood	Rare
<i>Cestrum nocturnum</i>	Hasnahena	Shrub	Ornamental	Rare
<i>Citrus grandis</i>	Jambura	Tree	Fruits	Common
<i>Clerodendrum viscosum</i>	Bhat	Shrub	Medicinal	Common
<i>Cocos nucifera</i>	Narikel	Tree	Fruit and Fuel wood	Very Common
<i>Crataeva nurvala</i>	Baroon	Tree	Fuel wood	Common
<i>Crotalaria retusa</i>	Ban-san	Herb	Medicinal	Rare
<i>Croton bonplandianum</i>	Banjhal	Herb	Medicinal	Common
<i>Cuscuta australis</i>	Swarnalata	Herb	Medicinal	Common
<i>Cynodon dactylon</i>	Durba Gash	Herb	Medicinal	Common
<i>Dalbergia sissoo</i>	Sisso	Tree	Timber	Common
<i>Datura metel</i>	Dhutura	Shrub	Medicinal	Rare
<i>Datura suaveolens</i>	Dutura	Herb	Medicinal	Rare
<i>Delonix regia</i>	Krichnochura	Tree	Ornamental	Common
<i>Dillenia indica</i>	Chalta	Tree	Fruit	Common
<i>Diospyros discolor</i>	Bilatigab	Tree	Fruit	Common
<i>Diospyros perigrina</i>	Deshigab	Tree	Fruit and Timber	Rare
<i>E. ovalifolia</i>	Tali Mander	Tree	Firewood	Common
<i>Eclipta alba</i>	Kalokashi	Herb	Medicinal	Common
<i>Eichornia crassipes</i>	Kachuripana	Herb	Fertilizer	Common
<i>Enhydra fluctuins</i>	Halencha	Herb	Vegetable	Common
<i>Erythrina ovalifolia</i>	Talimandar	Tree	Fuel wood	Common
<i>Erythrina variegata</i>	Mander	Tree	Firewood, Ornamental	Common

Scientific Name	Local name	Habit	Importance	Status
<i>Euphorbia hirta</i>	Dudhia	Herb	Fuel wood	Common
<i>Excoecaria agallocha</i>	Gheoa	Tree	Fuel wood	Common
<i>Ficus hispida</i>	Dumur	Tree	Fuel wood	Common
<i>Ficus benghalensis</i>	Bat	Tree	Fuel wood	Common
<i>Ficus heterophylla</i>	Bhui Dumur	Herb	Fuel wood	Common
<i>Ficus hispida</i>	Dumur	Shrub	Fruit and Fuel wood	Very Common
<i>Ficus religiosa</i>	Assawath	Tree	Fuel wood	Common
<i>Gardenia jesminoides</i>	Ghandhoraj	Shrub	Flower	Common
<i>Glycosmis pentaphylla</i>	Daton, Atdli pata	Shrub	Medicinal	Common
<i>Gmelina arborea</i>	Gamari	Tree	Timber	Rare
<i>Heletropium indicum</i>	Hatisuri	Herb	Medicinal	Common
<i>Heriteria fomes</i>	Sundari	Tree	Timber	Common
<i>Hoya parasitica</i>	Parghaca	Climber	Medicinal	Common
<i>I. pescarpi</i>	Chagol Khuri	Climber	Fuel	Rare
<i>Ipomea fistulosa</i>	Dhol Kalmi	Shrub	Fuel	Common
<i>Justicia granderusa</i>	Jagadmadon	Shrub	Medicinal	Rare
<i>Leucas acpera</i>	Satodrun	Herb	Medicinal	Common
<i>Leucauna laucocephalata</i>	Ipil ipil	Tree	Timber	Common
<i>Litchi chinensis</i>	Lichu	Tree	Fruit	Common
<i>Musa sapientum</i>	Kacha kala	Herb	Vegetable	Common
<i>Mangifera indica</i>	Aum	Tree	Fruit and Timber	Common
<i>Marsilea quadrifolia</i>	Susnishak	Herb	Medicinal	Common
<i>Mikania scandens</i>	Assamlata	Herb	Medicine	Common
<i>Mimosa pudica</i>	Lajjaboti	Shrub	Medicinal	Common
<i>Moringa oleifera</i>	Sajna	Tree	Vegetable	Common
<i>Muntingia calabura</i>	China chari	Tree	Ornamental	Very Rare
<i>Musa paradisiaca</i> var. <i>sapientum</i>	Kala	Shrub	Fruit	Common
<i>Musa paradisiaca</i> var. <i>sapientum</i>	Kala	Shrub	Fruit	Common
<i>Nerium odorum</i>	Karobi	Shrub	Medicinal	Common
<i>Nicotiana plumbaginifolia</i>	Bantamak	Herb	Wild	Common
<i>Nipa fruticans</i>	Golpata	Tree	Domestic use	Common
<i>Nyctanthes arbortristis</i>	Safali	Herb	Ornamental	Common
<i>Nymphaea nouchli</i>	Sapla	Herb	Medicinal, Vegetable	Common
<i>Nymphoides cristatum</i>	Chandmala	Herb	Medicinal	Common
<i>Ocimum americanum</i>	Tulshi	Herb	Medicine	Common
<i>Oryza sativa</i>	Dhan	Herb	Food	Common
<i>P. hydropiper</i>	Panimarch	Herb	Medicinal	Common
<i>P. plebajum</i>	Ajban	Herb	Medicinal	Common
<i>Pandanus</i> sp.	Keya	Herb	Ornamental	Common
<i>Phoenix paludosa</i>	Hental	Tree	Wildlife	Common

Scientific Name	Local name	Habit	Importance	Status
<i>Phoneix sylvestris</i>	Khejur	Tree	Fruit and Fuel wood	Common
<i>Physalis minima</i>	Bantepari	Herb	-	Common
<i>Pistia strateotes</i>	Topapana	Herb	-	Common
<i>Pithecellobium dulce</i>	Dakshnia Babul	Tree	Ornamental, Avunue	Common
<i>Polyalthia longifolia</i>	Debdaru	Tree	Ornamental	Common
<i>Polygonum orientale</i>	Baro Panimarch	Herb	Medicinal	Common
<i>Pongamia pinnata</i>	Karonga	Tree	Fuel wood	Common
<i>Psidium guajava</i>	Peyara	Shrub	Fruit	Common
<i>Raulwolfia serpentina</i>	Sarpagandha	Shrub	Medicinal	Rare
<i>Rhizophora mucronata</i>	Khamu	Tree	Wild	Common
<i>Rhynchospora rufescens</i>	Shimbhatraji	Herb	-	Rare
<i>Ricinus communis</i>	Reri	Shrub	Oil	Common
<i>Scoparia dulcis</i>	Bandhana	Herb	Medicinal	Common
<i>Sesbania grandiflora</i>	Bakphul	Shrub	Medicinal	Rare
<i>Sesbania rostrata</i>	Dhaincha	Herb	Fuel / Fertilizer	Common
<i>Spondias dulcis</i>	Amra	Tree	Fruit	Common
<i>Sterculia foetida</i>	Jangli badam	Tree	Medicinal	Rare
<i>Streblus asper</i>	Sheora	Shrub	Fuel wood	Common
<i>Swietenia mahagoni</i>	Mahogoni	Tree	Timber, Medicinal	Very Common
<i>Syzygium cumini</i>	Kalogam	Tree	Medicinal, Timber	Common
<i>Tamarindus indica</i>	Tetul	Tree	Fruit	Common
<i>Tectona grandis</i>	Segun	Tree	Timber	Common
<i>Terminalia arjuna</i>	Arjun	Tree	Timber and Medicinal	Common
<i>Terminalia bellirica</i>	Bhorae	Tree	Medicinal	Rare
<i>Terminalia catappa</i>	Katbadam	Tree	Fruit	Common
<i>Thevetia peruviana</i>	Kalka	Tree	Ornamental	Common
<i>Trewia nudiflora</i>	Pitali/Latim	Tree	Timber and fuel wood	Common
<i>Typha angustata</i>	Hogla	Herb	Domestic use	Common
<i>Vitex negundo</i>	Nishinda	Shrub	Medicinal	Rare
<i>Zizyphus mauritiana</i>	Baroi	Tree	Fruit	Common

Table 3.7: List of Birds

Scientific Name	English Name	Local Name	Local Status	IUCN Global Status
<i>Glaureola lactea</i>	Small Pratincole	Soto Babubatan	UR	LC
<i>Acridotheres fuscus</i>	Jungle Myna	Jhuti Shalik	CR	LC
<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler	Bachal Nolfutki	CWV	LC
<i>Actitis hypoleucos</i>	Common Sandpiper	Pati Batan	CWV	LC
<i>Aegithina tiphia</i>	Common Iora	Pati Fatikjal	CR	LC
<i>Alauda erythrorhynchos</i>	Pale-billed Flowerpecker	Metethot Fuljhuri	CR	LC
<i>Alauda gulgula</i>	Oriental Skylark	Udoi Ovrobhorot	CR	LC
<i>Alcedo atthis</i>	Common Kingfisher	Pati Machranga	CR	LC
<i>Amaurornis phoenicurus</i>	White-breasted Water hen	Dholabook Dahuk	UR	LC
<i>Anas acuta</i>	Northern Pintail	Utturey Lenjahash	CWV	LC
<i>Anas crecca</i>	Eurasian Teal	Pati Tilihash	CWV	LC
<i>Anas poecilorhyncha</i>	Indian Spot-billed Duck	Metey Hash	UR	LC
<i>Anas querquedula</i>	Garganey	Giria Hash	CWV	LC
<i>Anastomus oscitans</i>	Asian Open bill	Ashio Shamkhol	CR	LC
<i>Anser indicus</i>	Bar-headed Goose	Dagi Rajhash	UWV	LC
<i>Anthus hodgsoni</i>	Olive-backed Pipit	Jolpaipith Tulika	CWV	LC
<i>Anthus richardi</i>	Richard's Pipit	Richarder Tulika	CWV	LC
<i>Anthus roseatus</i>	Rosy Pipit	Golapi Tulika	CWV	LC
<i>Anthus rufulus</i>	Paddy field Pipit	Dhani Tulika	CR	LC
<i>Arachnothera longirostra</i>	Little Spider hunter	Choto Makormar	CR	LC
<i>Ardea cinerea</i>	Grey Heron	Dhupni Bok	CR	LC
<i>Ardeola grayii</i>	Indian Pond Heron	Deshi Kanibok	CR	LC
<i>Artamus fuscus</i>	Ashy Wood swallow	Metey Bonbabil	CR	LC
<i>Athene brama</i>	Spotted Owlet	Khuruley Kutipecha	CR	LC
<i>Atthya ferina</i>	Common Pochard	Pati Bhutihash	CWV	LC
<i>Bubulcus ibis</i>	Cattle Egret	Go Boga	CR	LC
<i>Butorides striata</i>	Striated Heron	Khude Bok	CR	LC
<i>Caprimulgus macrurus</i>	Large-tailed Nightjar	Lenja Ratchora	CR	LC
<i>Casmerodius albus</i>	Great Egret	Boro Boga	CR	LC

Scientific Name	English Name	Local Name	Local Status	IUCN Global Status
<i>Celeus brachyurus</i>	Rufous Woodpecker	Khoira Khathkurali	CR	LC
<i>Centropus sinensis</i>	Greater Coucal	Boro Kubo	CR	LC
<i>Ceryle rudis</i>	Pied Kingfisher	Pakra Machranga	CR	LC
<i>Charadrius alexandrinus</i>	Kentish Plover	Kentish Jiria	CR/RR	LC
<i>Charadrius dubius</i>	Little Plover	Ringed	Choto Nothjiria	CR & CWV
<i>Charadrius leschenaultii</i>	Greater Plover	Sand	Boro Dhuljiria	CWV
<i>Charadrius mongolus</i>	Lesser Plover	Sand	Soto Dhuljiria	CWV
<i>Charadrius squatarola</i>	Grey Plover		Metey Jiria	CWV
<i>Chlidonias hybrida</i>	Whiskered Tern		Julphi Panchil	CR/WV
<i>Ciconia nigra</i>	Black Strock		Kala Manikjor	WV
<i>Cisticola juncidis</i>	Zitting Cisticola		Bhomra Soton	CR
<i>Columba livia</i>	Common Pigeon		Gola Paira	CR
<i>Copsychus saularis</i>	Oriental Magpie-Robin		Udoi Doel	CR
<i>Coracias benghalensis</i>	Indian Roller		Bangla Nilkanto	CR
<i>Corvus macrorhynchos</i>	Large-billed Crow		Dar Kak	CR
<i>Corvus splendens</i>	House Crow		Pati Kak	CR
<i>Cuculus micropterus</i>	Indian Cuckoo		Bokotakou Kokil	CR
<i>Cypsiurus balasiensis</i>	Asian Palm Swift		Ashio Talbatashi	CR
<i>Dendrocitta vagabunda</i>	Rufous Treepie		Khoira Harichacha	CR
<i>Dendrocopos canicapillus</i>	Greycapped Pygmy Woodpecker		Metetooipi Batkurali	UR
<i>Dendrocopos macei</i>	Fulvous-breasted Woodpecker		Batabi Kathkurali	CR
<i>Dendrocygna bicolor</i>	Fulvous Whistling Duck		Raj Shorali	CWV
<i>Dendrocygna javanica</i>	Lesser Whistling Duck		Pati Shorali	CR
<i>Dicrurus macrocercus</i>	Black Drongo		Kala Fingey	CR
<i>Dinopium benghalense</i>	Lesser Golden back		Bangla Kaththokra	CR
<i>Dinopium javanense</i>	Common Golden back		Pati Kaththokra	CR
<i>Egretta garzetta</i>	Little Egret		Choto Boga	CR
<i>Egretta intermedia</i>	Yellow-billed Egret		Majhla Boga	CR

Scientific Name	English Name	Local Name	Local Status	IUCN Global Status
<i>Elanus caeruleus</i>	Black-winged Kite	Katua Chil	UR	LC
<i>Eudynamys scolopaceus</i>	Asian Koel	Ashio Kalakokil	CR	LC
<i>Falco tinnunculus</i>	Common Kestrel	Pati Kestrel	CWV	LC
<i>Gallicrex cinerea</i>	Water cock	Deshi Kora	UR	LC
<i>Gallinago gallinago</i>	Common Snipe	Pati Chega	CWV	LC
<i>Gallinago stenura</i>	Pin-tailed Snipe	Lenja Chega	CWV	LC
<i>Gallinula chloropus</i>	Common Moorhen	Pati Panmurgi	CR	LC
<i>Gelochelidon nilotica</i>	Gull-billed Tern	Kalathot Panchil	CR	
<i>Halcyon coromanda</i>	Ruddy Kingfisher	Lal Machranga	RR	LC
<i>Halcyon smyrnensis</i>	White-throated Kingfisher	Dholagola Machranga	CR	LC
<i>Haliaeetus leucogaster</i>	White-bellied sea Eagle	Sindhu Eagle	RR	LC
<i>Haliastur Indus</i>	Brahminy Kite	Shonkho Chil	CR	LC
<i>Heliopais personata</i>	Masked Finfoot	Giolo Hansh	RR	LC
<i>Hierococcyx varius</i>	Common Hawk-Cuckoo	Pati Chokhgelo	CR	LC
<i>Hypothymis azurea</i>	Black-naped Monarch	Kalaghlar Rajon	CR	LC
<i>Ichthyophaga ichthyaetus</i>	Grey-headed Fish Eagle	Metematha Kura-eegol	UR	Near Threatened
<i>Ixobrychus cinnamomeus</i>	Cinnamon Bittern	Khoira Bogla	UR	LC
<i>Ketupa zeylonensis</i>	Brown Fish Owl	Khoira Mechopecha	UR	
<i>Lanius cristatus</i>	Brown Shrike	Khoira Latora	CWV	LC
<i>Lanius schach</i>	Long-tailed Shrike	Lenja Latora	CR	LC
<i>Larus brunnicephalus</i>	Brown-headed Gull	Khoiramatha Gangchil	CWV	LC
<i>Larus brunnicephalus</i>	Great Black-headed Gull	Palasi Gangchil	CWV	LC
<i>Larus ridibundus</i>	Common Black-headed Gull	Kalamatha Gangchil	CWV	LC
<i>LC Acridotheres tristis</i>	Common Myna	Bhat Shalik	CR	LC
<i>Leptocoma zeylonica</i>	Purple-rumped Sunbird	Begunikomor Moutushi	CR	LC
<i>Leptoptilos javanicus</i>	Lesser Adjutant	Modontak	RR	Vulnerable
<i>Lonchura malabarica</i>	Indian Silver bill	Deshi Chandithot	UR	LC
<i>Lonchura malacca</i>	Black-headed Munia	Kalamatha Munia	UR	LC

Scientific Name	English Name	Local Name	Local Status	IUCN Global Status
<i>Lonchura punctulata</i>	Scaly-breasted Munia	Butibook Munia	CR	LC
<i>Malacocincla abbotti</i>	Abbott's Babbler	Aboter Satarey	CR	LC
<i>Megalaima asiatica</i>	Blue-throated Barbet	Neelgola Boshonto	CR	LC
<i>Megalaima haemacephala</i>	Coppersmith Barbet	Shekra Boshonto	CR	LC
<i>Megalaima lineata</i>	Lineated Barbet	Dagi Boshonto	CR	LC
<i>Megalurus palustris</i>	Striated Grassbird	Dagi Ghashpakhi	CR	LC
<i>Merops orientalis</i>	Green Bee-eater	Shobuj Shuichora	CR	LC
<i>Metopidius indicus</i>	Bronze-winged Jacana	Dol Pipi	UR	LC
<i>Milvus migrans</i>	Black Kite	Bhubon Chil	CR	LC
<i>Mirafra assamica</i>	Bengal Bush Lark	Bangla Jharbhorot	CR	LC
<i>Motacilla alba</i>	White Wagtail	Dhola Khonjon	CWV	LC
<i>Motacilla cinerea</i>	Grey Wagtail	Metey Khonjon	UWV	LC
<i>Motacilla citreola</i>	Citrine Wagtail	Sitrin Khonjon	CWV	LC
<i>Motacilla flava</i>	Western Yellow Wagtail	Holdey Khonjon	CWV	LC
<i>Motacilla madaraspatensis</i>	White-browed Wagtail	Dholavru Khonjon	UR	LC
<i>Mycteria leucocephala</i>	Painted Stork	Rangila bok	RR	Near Threatened
<i>Nettapas coromandelianus</i>	Cotton Pygmy Goose	Dhola Balihash	UR	LC
<i>Numenius arquata</i>	Eurasian Curlew	Eureshio Gulinda	V	LC
<i>Numenius glareola</i>	Wood Sandpiper	Bon Batan	CWV	LC
<i>Tringa nebularia</i>	Common Greenshank	Pati Shobujpa	CWV	LC
<i>Tringa ochropus</i>	Green Sandpiper	Shobuj Batan	UWV	LC
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	Kalamatha Nishibok	CR	LC
<i>Oriolus xanthornus</i>	Black-hooded Oriole	Kalamatha Benebou	CR	LC
<i>Orthotomus sutorius</i>	Common Tailorbird	Pati Tuntuni	CR	LC
<i>Parus inornata</i>	Plain Prinia	Nirol Prina	CR	LC
<i>Parus major</i>	Great Tit	Boro Tit	CR	LC
<i>Passer domesticus</i>	House Sparrow	Pati Chorui	CR	LC
<i>Pelargopsis capensis</i>	Stork-billed Kingfisher		UR	LC
<i>Pericrocotus</i>	Small Minivet	Choto Saheli	CR	LC

Scientific Name	English Name	Local Name	Local Status	IUCN Global Status
<i>cinnamomeus</i>				
<i>Phaenicophaeus tristis</i>	Green-billed Malkoha	Shobujhot Malkoa	CR	LC
<i>Phalacrocorax carbo</i>	Great Cormorant	Boro Pankouri	CWV	LC
<i>Phalacrocorax fuscicollis</i>	Indian Cormorant	Deshi Pankouri	V	LC
<i>Phalacrocorax niger</i>	Little Cormorant	Choto Pankouri	CR	LC
<i>Phylloscopus fuscatus</i>	Dusky Warbler	Kalchey Futki	CWV	LC
<i>Picus xanthopygaeus</i>	Streak-throated Woodpecker	Dagigola Kathkurali	UR	LC
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Kodali Bok	RR	LC
<i>Ploceus manyar</i>	Streak Weaver	Dagi Babui	RR (DD)	LC
<i>Ploceus philippinus</i>	Baya Weaver	Deshi babui	CR	LC
<i>Pluvialis fulva</i>	Pacific Golden Plover	Proshanto Shonajiria	CWV	LC
<i>Prinia gracilis</i>	Graceful Prinia	Shundori Prinia	RR (DD)	LC
<i>Psittacula krameri</i>	Rose-ringed Parakeet	Modna Tia	CR	LC
<i>Pycnonotus cafer</i>	Red-vented Bulbul	Bangla Bulbul	CR	LC
<i>Rhipidura albicollis</i>	White-throated Fantail	Dholagola Chatighurani	CR	LC
<i>Rynchops albicollis</i>	Indian Skimmer	Panikata	RR	Vulnerable
<i>Sarkidiornis melanotos</i>	Comb Duck	Nakta Hash	RWV	LC
<i>Spilornis cheela</i>	Crested Serpent Eagle	Tila Nag-eegol	CR	LC
<i>Sterna acuticauda</i>	Black-bellied Tern	Kalapet Panchil	UR	LC
<i>Sterna aurantia</i>	River Tern	Nodia Panchil	UWV	LC
<i>Sterna hirundo</i>	Common Tern	Pati Panchil	UWV	LC
<i>Streptopelia chinensis</i>	Spotted Dove	Tila Ghughu	CR	LC
<i>Streptopelia decaocto</i>	Eurasian Collared Dove	Eurashio Konthighughu	CR	LC
<i>Streptopelia tranquebarica</i>	Red Turtle Dove	Lal Konthighughu	CR	LC
<i>Sturnus contra</i>	Pied Myna	Ashio Pakrashalik	CR	LC
<i>Sturnus ginginianus</i>	Bank Myna	Gaang Shalik	UR	LC
<i>Sturnus malabaricus</i>	Chestnut-tailed Starling	Khoiralej Telshalik	CR	LC
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Khoira Chokachoki	CWV	LC
<i>Tadorna tadorna</i>	Common Shelduck	Pati Chokachoki	CWV	LC
<i>Terpsiphone paradisi</i>	Asian Paradise-	Ashio Shabulbuli	UR	LC

Scientific Name	English Name	Local Name	Local Status	IUCN Global Status
flycatcher				
<i>Treron phoenicopterus</i>	Yellow-footed Green Pigeon	Holdepa Horial	CR	LC
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Bil Batan	UWV	LC
<i>Tringa tetanus</i>	Common Redshank	Pati Lalpa	CWV	LC
<i>Turdoides striatus</i>	Jungle Babbler	Bon Satarey	CR	LC
<i>Turdoides earlei</i>	Striated Babbler	Dagi Satarey	UR	LC
<i>Tyto alba</i>	Barn Owl	Lokkhi Pecha	UR	
<i>Upupa epops</i>	Eurasian Hoopoe	Pati Hoodhood	UR	LC
<i>Vanellus duvaucelii</i>	River Lapwing	Nodi Titi	UR	
<i>Vanellus indicus</i>	Red-wattled Lapwing	Hot Titi	UR	LC
<i>Zoothera torquatus</i>	Eurasian Stone Chat	Pati Shilafidda	CWV	LC
<i>Zosterops palpebrosus</i>	Oriental White-eye	Udoi Dholachokh	CR	LC

Source: IUCN, Department of Forest and Field Investigation Note: Local Status: CR-Common Resident, UR-Uncommon Resident, CWV- Common Winter Visitor, UWV- Uncommon Winter Visitor, RR-Rare Resident, DD-Data Deficient, WV-Winter Vagrant, RWV-Rare winter visitor

Table 3.8: List of Mammals

English name	Local Name	Scientific Name	IUCN Global Status	IUCN Local Status
				Least
Asian House Shrew	Chika/Chucho	Suncus murinus	Concern	NO
				(LC)
Asian Palm Civet	Gandhogakul	Paradoxurus hermaphroditus	LC	VU
Asiatic Porcupine	Brush-tailed Sajaru	Atherurus macrourus	LC	EN
Asiatic Long tail Mouse	Climbing Indur	Vandeleuria oleracea	LC	DD
Barking Deer	Maya Harin	Muntiacus muntjak	LC	EN
Bengal Fox	Pati Shial/Shial	Vulpes bengalensis	LC	VU
Chital	Chitra Harin	Axis axis	LC	NO
Common Tree Shrew	Gecho Chucho	Tupaia glis	LC	DD
Eastern House Mouse	Nenti indur	Mus musculus	LC	NO
Eurasian Otter	Ud Biral	Lutra lutra	Near Threatened	EN
Eurasian Wild Boar	Buno Shukar	Sus scrofa	LC	NO
Finless Porpoise	Shishu	Neophocaenoides phocaenoides	Vulnerable	EN
Fishing Cat	Mecho Biral/Baghaila	Felis viverrina	Endangered	EN
Ganges River Dolphin	Shishu / Shushuk	Platanista gangetica	Endangered	EN
Golden Jackal	Sial	Canis aureus	LC	VU
Greater Bandicot Rat	Dhari indur	Bandicota indica	LC	NO
Greater False Vampire Bat	Badur	Megaderma lyra	LC	NO
Greater Short-nosed Bat	fruit Kola badur	Cynopterussphinx	LC	DD
House Rart	Indur	Rattus rattus	LC	NO
Indian crested Porcupine	Shojaru	Hystrix indica	LC	EN
Indian Flying Fox	Baro Badur	Pteropus giganteus	LC	NO
Indian Hare	Khargosh	Lepus nigricollis	LC	EN
Indian Pipistrelle	Chamchika/ Cham Badur	Pipistrellus coromandra	LC	NO
Irrawaddy Dolphin	Mohonar Shushuk	Orcaea brevirostris	Vulnerable	CR
Jungle Cat	Ban Biral	Felis chaus	LC	EN
Large- Indian Civet	Baro Baghdash	Viverra zibetha	Near Threatened	EN
Leopard cat	Chita Biral	Prionailurus bengalensis	LC	DD
Lesser Bandicot -rat	Baro indur	Bandicota bengalensis	LC	NO
Little Indian Field Mouse	Metho indur	Mus booduga	LC	NO
Northern palm Squirrel	Khatbirali	Funambulus pennantii	LC	NO
Oriental Small- Clawed Otter	Bhodor/ Biral	Aonyx cinerea	Vulnerable	EN
Rhesus Macaque	Kota Banor	Macaca mulaa	LC	VU

English name	Local Name	Scientific Name	IUCN Global Status	IUCN Local Status
Small- Indian Civet	Choto Bagdash	<i>Viverricula indica</i>	LC	VU
Small- Indian Mongoose	Benji, Nakul	<i>Herpestes auropunctatus</i>	LC	NO
Bengal Tiger	Bagh	<i>Pantheratigris</i>	Endangered	CR

Table 3.9: List of Amphibians

English name	Local Name	Scientific Name	IUCN Status	Local Status
Asian Brown Tree Frog	Gecho Bang	<i>Polypedates leucomystax</i>	LC	NO
Green Frog	Sabuj Bang	<i>Euphlyctis hexadactylus</i>	LC	VU
Indian Bull Frog	Sona bang	<i>Hoplobatrachus tigerinus</i>	LC	NO
Indian Tree Frog	Gecho Bang	<i>Polypedates maculatus</i>	LC	NO
Asian Brown Painted Frog	Not known	<i>Kaloula pulchra</i>	LC	VU
Large Tree Frog	Baro Gecho Bang	<i>Rhacophorus maximus</i>	LC	VU
Leaping Frog	Pana bang	<i>Hylaranatyptleri</i>	LC	NO
Ornate Microhylid	Cheena Bang	<i>Microhyla ornata</i>	LC	VU
Pointed-headed Frog	Pana Bang	<i>Ranaalticola</i>	LC	VU
Skipper Frog	Mali Bang	<i>Euphlyctis cyanophlyctis</i>	LC	-
Southern Cricket Frog	Jhiji Bang	<i>Fejervaryasyhadrensis</i>	LC	NO
Two-striped Grass Frog	Kaad Bang	<i>Sylvirana taipehensis</i>	LC	EN

CR – Critically Endangered, EN - Endangered, VU – Vulnerable, NO – Not Threatened

Table 3.10: List of Reptiles

English name	Local Name	Scientific Name	IUCN Global Status	IUCN Local Status
Bengal Monitor	Ghuy Shap	<i>Varanus bengalensis</i>	LC	VU
Brooks House Gecko	Tiktiki	<i>Hemidactylus brookii</i>	LC	NO
Brown Roofed Turtle	Baro Kori Kasim	<i>Pangshura smithii</i>	Near threatened	EN
Checkered Keelback	Dhora Shap	<i>Xenochropis piscator</i>	LC	NO
Common Garden Lizard	Roktochosha	<i>Calotes versicolor</i>	LC	NO
Common House Gecko	Tiktiki	<i>Hemidactylus frenatus</i>	LC	NO
Common River Terrapain	Boro Kasim	<i>Batagur baska</i>	Critically Endangered	CR
Common Smooth Water	Painna Shap	<i>Enhydris enhydris</i>	LC	NO

English name	Local Name	Scientific Name	IUCN Global Status	IUCN Local Status
Snake				
Common Vine Snake	Laodoga Shap	<i>Ahaetulla nasuta</i>	-	VU
Common Wolf Snake	Gharginni Shap	<i>Lycodon aulicus</i>	-	VU
Crowned River Turtle	Kali Kasim	<i>Hardella thurjii</i>	Vulnerable	EN
Lower				
Estuarine Crocodile	Lonapanir Kumir	<i>Crocodylus porosus</i>	Risk/least concern	CR
Ganges softshell Turtle	Khalua Kasim	<i>Aspideretes gangeticus</i>	-	EN
Gharial	Ghorial/Baishal	<i>Gavialis gangeticus</i>	Critically Endangered	CR
Indian Rat Snake	Daraj Shap	<i>Ptyas mucosus</i>	LC	VU
Indian Roofed Turtle	Kori/Hali Kasim	<i>Pangshura tectum</i>	LC	-
Jerdon's Blind Snake	Dumukh Shap	<i>Typhlops jerdoni</i>	LC	-
Keeled Grass skink	Anjoni	<i>Mabuya carinata</i>	LC	-
Median Roofed Turtle		<i>Pangshura tentoria</i>	LC	EN
Monocled Cobra	Gokhra Shap	<i>Naja kaouthia</i>	LC	VU
Narrow-headed Softshell Turtle	Sim Kasim	<i>Chitra indica</i>	Endangered	CR
Olive Keelback	Maita Shap	<i>Atretium schistosum</i>	LC	-
Olive Ridley Turtle	Jalpaironga Samudrik Kasim	<i>Lepidochelys olivacea</i>	Vulnerable	EN
Spectacled Cobra	Khoiya Gokhra Shap	<i>Naja naja</i>	-	EN
Spotted Flapshell Turtle	Pataporı	<i>Lissemys punctata</i>	LC	VU
Spotted Litter skink	Anzoni	<i>Sphenomorphus maculatus</i>	LC	
Tokay Gecko	Takkhak	<i>Gekko gecko</i>	LC	VU
Yellow Monitor	Sona Guy	<i>Varanus flavescens</i>	LC	EN
Yellow-bellied Gecko	House Tiktiki	<i>Hemidactylus flaviviridis</i>	LC	-
Ring Lizard	Ram Godi	<i>Varanus salvator</i>	LC	EN
Paintet Bronzedback tree Snake	Gecho	<i>Dendrelaphis pictus</i>	-	VU

Source: IUCN, Department of Forest and Field Investigation

Note: CR – Critically Endangered, EN - Endangered, VU – Vulnerable, NO – Not Threatened

3.7.2 Planktons

The information of plankton and other microscopic invertebrates' species has been collected from secondary literature review and presented in Table 3.7 & Table 3.8.

Table 3.11: Phytoplankton and Zooplankton Species in the Mongla Port Area

Phytoplankton			Zooplankton	
Class	Genus	Phylum	Class	Genus
Chlorophyceae	Closterium sp Hydrodictyon sp Chlorella sp	Arthropoda	Crustacea	Merocyclops sp Mesocyclops sp. Cyclops sp.
Cyanophyceae	Lyngbya sp Oscillatoria sp Schizothrix sp Calothrix sp Spiulina sp Microcoleus sp			Diaptomus sp. Bosmina sp. Diaphasomqa sp
Baillariophyceae	Gyrsigma sp Navicula sp Cyclotella sp Coscinodiscus sp			Praunus sp. Mysidella sp. Epinebalia sp. Tigriopus sp. Oxyurostylis sp. Anatanis sp

Table 3.12: Moluccas Fauna in Mongla Port Area

Phylum	Local name	Scientific name
		Narita lineata
Mollusca	Shamuk	Turbo (Lunella) cinereus
		Luteria elongata
	Zebra shamuk (Invasive)	Zebra mussel/ Dreissena polymorpha (ESA,1998)

3.7.3 Fisheries

The fisheries resources of the study area are rich and diversified with mainly brackish water to minor fresh water fish habitats (Table 3.13). The area has a close connection with mangrove forest providing support to a number of marine and fresh water fishes. The network of river systems of this region connects the fresh water fish habitats with the brackish water habitats and maintains biological balance of the major fish groups.

The species composition of fishes in the study area is still rich in its diversity and is believed to have about 120 species. Among the brackish water fishes; Hilsa, Parsha, Tapashi, Bhetki, Tularandi, etc. are abundant in the study area.

Crab is going to be an important species for its market demand worldwide. Both natural harvesting and cultivation (crab fattening) of crab species (mainly *Scylla serrata*) is a growing practice in southwestern part of Bangladesh. The natural crabs are collected from inter-tidal creeks, khals, mangrove area and rivers using local traps and Estuarine Set Beg Net (ESBN). Apart from this, some crab fattening practices was also observed along with the shrimp farms.

Table 3.13: Analysis of the fish production from the study area

Sl. No.	Name of the Habitat	Study area	
		Area, Ha	Production, M.Ton
1.	a. Aquaculture: Shrimp	5816.26	2326.50
	b. Aquaculture: Fish		2326.50
	sub-total		4653.00
2.	Intertidal area	192.32	30.77
3.	Mangrove	59.86	9.57
4.	Other surface water	41.39	6.62
5.	River	3241.79	518.7
	sub-total		565.66
	Total		5218.66

3.7.4 The Sundarbans

Sundarbans is the world's largest Mangrove forest consist of about 330 species of plants, 42 species of mammals, 35 species of reptiles, 400 species of fishes and 270 species of birds. The Sundarbans are divided in 3 ecological zones on different degrees of salinity viz. Oligohaline zone, Mesohaline zone & Polyhaline zone.

The Bangladesh Sundarbans now covers an area of about 5,770 km² of which 4,016 km² are land and the remaining 1,761 km² is under water in the form of rivers, canals and creeks. This mangrove tract constitutes 44% of the total forest area in Bangladesh and contributes about 50% of the total revenue derived from the forestry sector. However, the most important value of the Sundarbans stems from the protection it affords to millions of people against the ravages of cyclonic storms, surges and tidal waves which frequently generate from the Bay of Bengal.

The mangrove of the Sundarbans is unique compared to the non-deltaic coastal mangrove forests. For instance, unlike in the cases of the other mangrove of the world, the Rhizophoraceae is of only minor importance and the dominant species are the Sundri (*Heritiera fomes*) of the Sterculiaceae family, from which the Sundarbans takes its name, and the Gewa (*Excoecaria agalloha*) of the Euphorbiaceae family. Other dominant plant species include the Passur (*Xyloearpus mekongensis*), Ohundal (*Xyloearpus granatum*), Kankra (*Bruguiera gymnorhiza*), Keora (*Sonneratia apetala*), Baen (*Avicennia officinalis*), Golpatta (*Nypa fruticans*) and Goran (*Ceriops decandra*) (BWDB, 2001).

This mangrove tract is also both diverse and complex in terms of faunal riches. Moreover, it is now the only refuge left for the national pride of Bangladesh: the Bengal tiger (*Panthera tigris*). In addition, its waterways and canals are richest fish-nurseries in the region. Despite the combination of high tidal flow velocity, heavy silt load and low light penetration, a remarkable diversity of finfish and shellfish exists inside the Sundarbans forest and in the adjacent marine zone of the northern Bay of Bengal. These are mainly of marine origin, but several freshwater species are able to take advantage of low salinity and freshwater conditions in the northern part of the forest.

3.8 Socio-economic Environment

3.8.1 Population

The socio-economic and health environment data were obtained from the Population and Housing Census 2011 by Bangladesh Bureau of Statistics (BBS) viz. 'Community Report-Bagerhat Zila (June 2012)'.

There are 9 Wards in Mongla Upazila/Paurashava. The relevant socio-economic data such as demographic features including population distribution, literacy rate, occupational status, educational facilities and medical facilities are given in Table 3.14 & Table 3.18.

There are about 8927 Households (HHs) in Mongla.. The total **population** was 39837 with a Male population of 21607 (54.2%) and a Female population of 18230 (45.8%). The sex-ratio is 119.

In the total population, the **Literate** population is 22774 (57.2%) whereas the illiterate population is 12769 (32.0%) excluding the Children of <7 years old. The literacy rate is very much varying (65.55% among Males and 62.3% among Females).

Occupational Structure : In the total population of 39837 of Mongla Paruashava, about 3499 persons are employed and about 2923 persons are Non-workers. About 230 persons are involved in agricultural activities, 57 persons in Industries and about 3119 persons (2708 Males & 411 Females) are in Service.

Out of 8615 HHs, 23.1% is having Tap water as drinking water source, 0.4% tubewells and 76.5% other sources. About 80.2% of HHs have electricity connection.

Almost, all basic amenities exist in all wards.

Table 3.14: Households, Population & Distribution of Population by Sex and Sex Ratio

Administrative Unit Residence / Community	Households				Population			Sex Ratio
	Total	General	Institutional	Others	Total	Male	Female	
Mongla Upazila Total	32383	31912	39	432	136588	71492	65096	110
Mongla Upazila except Pourashava	23456	23297	21	138	96751	49885	46866	106
Mongla Paurashava Total	8927	8615	18	294	39837	21607	18230	119
Mongla Paurashava	8927	8615	18	294	39837	21607	18230	119
Araji Makordone	1094	1083	0	11	4832	2371	2461	96
*Machmara	211	211	0	0	829	409	420	97
Ward No-02 Total	985	973	1	11	4156	2064	2092	99
*Makordone Selabunia Uttar	629	620	1	8	2651	1342	1309	103
*Selabunia	356	353	0	3	1505	722	783	92
Ward No-03 Total	735	732	0	3	3117	1536	1581	97
*Makordone Selabunia Dakshin	735	732	0	3	3117	1536	1581	97
Ward No-04 Total	1285	1128	10	147	6945	4762	2183	218
*Galachipa Digraj	984	830	8	146	5693	4121	1572	262
*Kamardanga	301	298	2	1	1252	641	611	105
Ward No-05 Total	451	407	0	44	1841	973	868	112
*Bazar AreaPhPsv Mahalla	451	407	0	44	1841	973	868	112
Ward No-06 Total	587	536	0	51	2750	1588	1162	137
*Labour Colony	587	536	0	51	2750	1588	1162	137

Administrative Unit Residence / Community	Households				Population			Sex Ratio
	Total	General	Institutional	Others	Total	Male	Female	
Ward No-07 Total	1730	1722	2	6	7032	3416	3616	94
*Purba Selabunia	1730	1722	2	6	7032	3416	3616	94
Ward No-08 Total	890	880	0	10	3634	1837	1797	102
*Madhya Selabunia	890	880	0	10	3634	1837	1797	102
Ward No-09 Total	959	943	5	11	4701	2651	2050	129
*Char Selabunia	718	711	2	5	3671	2067	1604	129
*Paschim Selabunia	241	232	3	6	1030	584	446	131

Table 3.15: Distribution of Population by Literacy Rate

Administrative Unit Residence / Community	Total Population	Literates (Can write a Letter)				Illiterates			Literacy Rate		
		Total	Male	Female	Total	Male	Female	Total	Male	Female	
Mongla Upazila Total	136588	69352	37478	31874	51893	26149	25744	57.2	58.9	55.3	
Mongla Upazila except Pourashava	96751	46578	24750	21828	39124	19456	19668	54.3	56.0	52.6	
Mongla Paurashava Total	39837	22774	12728	10046	12769	6693	6076	64.1	65.5	62.3	
Mongla Paurashava	39837	22774	12728	10046	12769	6693	6076	64.1	65.5	62.3	
Araji Makordone	4832	2210	1098	1112	2071	990	1081	51.6	52.6	50.7	
*Machmara	829	350	170	180	384	185	199	47.7	47.9	47.5	
Ward No-02 Total	4156	2366	1179	1187	1288	629	659	64.8	65.2	64.3	
*Makordone Selabunia Uttar	2651	1555	788	767	776	392	384	66.7	66.8	66.6	
*Selabunia	1505	811	391	420	512	237	275	61.3	62.3	60.4	
Ward No-03 Total	3117	1637	822	815	1105	524	581	59.7	61.1	58.4	
*Makordone Selabunia Dakshin	3117	1637	822	815	1105	524	581	59.7	61.1	58.4	
Ward No-04 Total	6945	5103	3618	1485	1307	879	428	79.6	80.5	77.6	
*Galachipa Digraj	5693	4246	3148	1098	1040	767	273	80.3	80.4	80.1	
*Kamardanga	1252	857	470	387	267	112	155	76.2	80.8	71.4	
Ward No-05 Total	1841	707	409	298	905	450	455	43.9	47.6	39.6	
*Bazar Area Ph Psv Mahalla	1841	707	409	298	905	450	455	43.9	47.6	39.6	
Ward No-06 Total	2750	1208	692	516	1274	769	505	48.7	47.4	50.5	
*Labour Colony	2750	1208	692	516	1274	769	505	48.7	47.4	50.5	
Ward No-07 Total	7032	4623	2318	2305	1632	711	921	73.9	76.5	71.5	
*Purba Selabunia	7032	4623	2318	2305	1632	711	921	73.9	76.5	71.5	
Ward No-08 Total	3634	2424	1269	1155	781	342	439	75.6	78.8	72.5	
*Madhya	3634	2424	1269	1155	781	342	439	75.6	78.8	72.5	

Administrative Unit Residence / Community	Total Popula tion	Literates (Can write a Letter)			Illiterates			Literacy Rate		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
Selabunia										
Ward No-09 Total	4701	2146	1153	993	2022	1214	808	51.5	48.7	55.1
*Char Selabunia	3671	1485	757	728	1763	1095	668	45.7	40.9	52.1
*Paschim Selabunia	1030	661	396	265	259	119	140	71.8	76.9	65.4

Table 3.16: Distribution of Population by Employment Status

Administrative Unit Residence / Community	Total Population	Employment Status							
		Employed		Looking for Work		Household Work		Do not Work	
		Male	Female	Male	Female	Male	Female	Male	Female
Mongla Upazila Total	136588	13739	10706	1335	146	58	236	9441	2260
Mongla Upazila except Pourashava	96751	10240	7727	908	113	52	187	7137	1641
Mongla Paurashava Total	39837	3499	2979	427	33	6	49	2304	619
Mongla Paurashava	39837	3499	2979	427	33	6	49	2304	619
Araji Makordone	4832	575	355	44	10	2	4	375	120
*Machmara	829	76	38	8	0	0	3	47	12
Ward No-02 Total	4156	383	268	21	3	0	6	270	79
*Makordone Selabunia Uttar	2651	204	159	17	2	0	4	134	46
*Selabunia	1505	179	109	4	1	0	2	136	33
Ward No-03 Total	3117	312	172	38	3	1	2	184	58
*Makordone Selabunia Dakshin	3117	312	172	38	3	1	2	184	58
Ward No-04 Total	6945	193	307	43	1	0	4	84	39
*Galachipa Digraj	5693	128	290	33	1	0	1	54	27
*Kamardanga	1252	65	17	10	0	0	3	30	12
Ward No-05 Total	1841	310	225	56	1	0	14	193	33
*Bazar AreaPhPsv Mahalla	1841	310	225	56	1	0	14	193	33
Ward No-06 Total	2750	358	494	49	2	1	2	236	86
*Labour Colony	2750	358	494	49	2	1	2	236	86
Ward No-07 Total	7032	467	224	42	7	0	6	348	48
*Purba Selabunia	7032	467	224	42	7	0	6	348	48
Ward No-08 Total	3634	317	152	39	1	1	3	225	50
*Madhya Selabunia	3634	317	152	39	1	1	3	225	50
Ward No-09 Total	4701	508	744	87	5	1	5	342	94
*Char Selabunia	3671	422	707	65	4	1	5	288	81
*Paschim Selabunia	1030	86	37	22	1	0	0	54	13

Table 3.17: Distribution of Population - Employed by Field of Activity

Administrative Unit Residence / Community	Total Population	Field of Activity					
		Agriculture		Industry		Service	
		Male	Female	Male	Female	Male	Female
Mongla Upazila Total	136588	4024	234	161	17	6521	1084
Mongla Upazila except Pourashava	96751	3806	222	108	13	3813	673
Mongla Paurashava Total	39837	218	12	53	4	2708	411
Mongla Paurashava	39837	218	12	53	4	2708	411
Araji Makordone	4832	160	9	11	2	184	33
*Machmara	829	16	0	0	1	22	7
Ward No-02 Total	4156	6	0	8	0	254	21
*Makordone Selabunia Uttar	2651	5	0	8	0	146	17
*Selabunia	1505	1	0	0	0	108	4
Ward No-03 Total	3117	4	0	12	1	156	37
*Makordone Selabunia Dakshin	3117	4	0	12	1	156	37
Ward No-04 Total	6945	5	1	0	0	302	42
*Galachipa Digraj	5693	2	0	0	0	288	33
*Kamardanga	1252	3	1	0	0	14	9
Ward No-05 Total	1841	1	0	11	0	213	56
*Bazar Area Ph Psv Mahalla	1841	1	0	11	0	213	56
Ward No-06 Total	2750	0	0	0	0	494	49
*Labour Colony	2750	0	0	0	0	494	49
Ward No-07 Total	7032	13	1	9	0	202	41
*Purba Selabunia	7032	13	1	9	0	202	41
Ward No-08 Total	3634	2	0	2	0	148	39
*Madhya Selabunia	3634	2	0	2	0	148	39
Ward No-09 Total	4701	11	1	0	0	733	86
*Char Selabunia	3671	11	1	0	0	696	64
*Paschim Selabunia	1030	0	0	0	0	37	22

Table 3.18: Distribution of General Households by Source of Drinking Water, Electricity Connection

Administrative Unit Residence / Community	Number of Household s	Source of Drinking Water			Electricity Connection , %	Housing Tenancy, %		
		Tap	Tubewell	Others		Owned	Rented	Rent Free
Mongla Upazila Total								
	31912	6.6	4.4	88.9	44.9	80.4	13.3	6.3
Mongla Upazila except Pourashava	23297	0.5	5.9	93.5	31.8	90.8	4.0	5.2
Mongla Paurashava Total	8615	23.1	0.4	76.5	80.2	52.1	38.5	9.3
Mongla Paurashava	8615	23.1	0.4	76.5	80.2	52.1	38.5	9.3
Araji Makordone	1083	3.0	0.0	97.0	75.6	75.9	17.1	7.0
*Machmara	211	0.0	0.0	100.0	51.7	72.5	2.4	25.1
Ward No-02 Total	973	11.6	0.0	88.4	87.7	49.6	46.8	3.6
*Makordone Selabunia Uttar	620	16.1	0.0	83.9	84.0	54.4	41.1	4.5
*Selabunia	353	3.7	0.0	96.3	94.1	41.4	56.7	2.0
Ward No-03 Total	732	1.6	0.7	97.7	90.3	40.3	55.5	4.2
*Makordone Selabunia Dakshin	732	1.6	0.7	97.7	90.3	40.3	55.5	4.2
Ward No-04 Total	1128	64.5	0.8	34.7	72.1	24.8	63.7	11.5
*Galachipa Digraj	830	84.0	1.1	14.9	82.0	7.7	78.6	13.7
*Kamardanga	298	10.4	0.0	89.6	44.3	72.5	22.1	5.4
Ward No-05 Total	407	37.8	2.2	60.0	70.3	33.9	38.8	27.3
*Bazar AreaPhPsv Mahalla	407	37.8	2.2	60.0	70.3	33.9	38.8	27.3
Ward No-06 Total	536	49.8	0.0	50.2	74.4	42.7	19.4	37.9
*Labour Colony	536	49.8	0.0	50.2	74.4	42.7	19.4	37.9
Ward No-07 Total	1722	30.3	0.5	69.2	85.9	63.9	32.1	4.0
*Purba Selabunia	1722	30.3	0.5	69.2	85.9	63.9	32.1	4.0
Ward No-08 Total	880	1.1	0.0	98.9	89.7	43.6	48.5	7.8

Administrative Unit Residence / Community	Number of Household s	Source of Drinking Water			Electricity Connection , %	Housing Tenancy, %		
		Tap	Tubewell	Others		Owned	Rented	Rent Free
*Madhya Selabunia	880	1.1	0.0	98.9	89.7	43.6	48.5	7.8
Ward No-09 Total	943	16.0	0.1	83.9	74.5	64.3	32.8	3.0
*Char Selabunia	711	20.4	0.1	79.5	73.6	73.3	24.6	2.1
*Paschim Selabunia	232	2.6	0.0	97.4	77.6	36.6	57.8	5.6

3.9 Summary of Baseline Status

The findings of baseline environmental status of the study area are summarized below :

- The collected meteorological data represented the local weather phenomena.
- The monitored ambient air quality in the study area was found to be in compliance with the amended National Ambient Air Quality Standards of 150 ug PM10/m³, 365 ug SO₂/m³ and 100 ug NOx/m³.
- Ambient equivalent noise levels (Leq) during day and night times were found to be well within the Noise Norms of <60 dB(A) during day times and <50 dB(A) during night times.
- The water quality of surface waters were found to be in compliance with Inland Surface Water Quality except BOD.
- The ground water quality was found to be in compliance with the Potable Water Quality Standards.
- The soil in the study area would very well support vegetation after amending it suitably.
- Sundarbans, UNESCO Heritage Centre of Bangladesh is at 4.7 km from the existing Port. There is no other Eco Sensitive Area within the study area of 10 km.
- The area is thinly populated and basic amenities are available almost in all villages.

Thus, there is **adequate buffer** for the proposed Project in the physical, biological and edaphic environments of the study area.

4 ENVIRONMENTAL IMPACTS DURING CONSTRUCTION AND OPERATION PHASES

The Environmental Impacts are categorized as primary or secondary impacts. Primary impacts are those which are attributed directly to the project and secondary impacts are those which are indirectly induced and typically include the associated investment and changed pattern of social and economic activities by the proposed action.

The proposed Project would create impact on the environment in two distinct phases :

- during the construction phase which may be regarded as temporary and short term and
- during the operation phase which would have long term effects.

The impacts have been assessed for the Project assuming that the pollution due to the existing industrial activities has already been covered under baseline environmental status and continue to remain same till the operation of the project.

4.1 Impacts during Construction Phase

4.1.1 Construction Materials & Traffic Volume

The proposed construction (Option A & B) involves piling of 550 piles (in 11 rows in addition to the existing 4 rows) for the Jetties and Backup Areas. The proposed construction requires about 1,43,300 cu.m of concrete in the ratio steel, cement, sand & aggregate.

The sources of construction materials, mode of transport and distance to Mongla Port/site are given in Table 4.1.

Table 4.1: Construction Materials Sources

Material	Source	Mode of Transport	Approx. Distance, km
Cement	Khulna	By Road / Boat	50
	Dhaka	By Road / Boat	280
	Chittagong	By Boat	350
Boulders and crushed stone	Sylhet (Jaflong)	By Road / Boat	400-450
Coarse Sand	Sylhet (Jaflong)	By Road / Boat	400-450
Bricks and Brick aggregates	Local	By Road	10-20
Mild Steel (for RCC)	Dhaka & Chittagong	By Road / Boat	280-350

The existing Inland Waterways and National Highway N7 are adequate to handle the proposed volume of traffic in transportation of construction materials from various sources to the site.

4.1.2 Dredging

The dredging works will cover six areas of the Pussur Channel within the Port area (Table 4.2). The total estimated dredge material is assessed to be 4.2 million m³.

Table 4.2: Dredging Areas & Quantity

Area	Dimension	Dredge Depth
Area 1: Sabur Beacon Turning Ground	400 m x 400 m / 200 m	5.0 m CD
Area 2: Jetty Front	915 m x 50 m	7.5 m CD
Area 3: Jetty Channel	915 m x 150 m	5.0 m CD
Area 4: Confluence Channel	4,235 m x 200 m	5.0 m CD
Area 5: Mooring Bouy Area	1,600 m x 400 m	7.5 m CD
Area 6: Base Creek Area	4,100 m x 200 m	5.0 m CD

Dredging material will be dumped at 3 low lying areas within the Port already identified which are located within 2 km from the Port. The total duration of the dredging work is expected to be 420 days.

4.1.3 Land Environment

The Project is proposed within the **designated Port Area** and does not involve any land acquisition. Thus, there is **no R&R issue** also. The widening and extension of Jetties and backup areas are proposed only in the leeward side of existing Jetty. Thus, there will not be any adverse impact on the existing land use and soil quality during the construction period.

4.1.4 Ambient Air Quality

The impacts of construction activities on air quality are cause for concern due to fugitive dust emanating during construction period. The main sources of emission will be due to the transportation, movement and operation of construction materials and equipments at site and fugitive dusts from handling of cement, sand and stone chips, etc.

Movements and operations of construction machineries, diesel driven pumps, boats, barges, etc. would also cause emissions of SO₂ and NOx. However, the impact will be for short duration, confined locally and is expected to be negligible outside the site area. The monitored ambient air pollutants values at the site were found to be in lower levels with respect to the respective Ambient Air Quality Standards and there is adequate buffer level in the ambient air pollutants' levels in the vicinity. Thus, the net impact will be limited and insignificant.

4.1.5 Noise Levels

The proposed construction activities would increase the equivalent noise levels by another 2-3 dB(A). As the site is proposed in the Port area, there will be very less impact and are confined locally.

4.1.6 Water Quality

Presently, the water demand of Mongla Port is about 2,500 cum/day for the Port Operations, Township, Supply to Boats/Ships, etc. MPA has a Water Treatment Plant located at Foila, 22 kms from the port. The WTP treats underground water and transports them to Mongla through pipelines.

The proposed Construction requires about 250-300 cum/day which will be met with the existing water supply of MPA. Impact on water quality during construction phase may be due to non-point discharges of solids and sewage generated from the construction workforce. As the local work force will be pooled and used, the water requirements and wastewater generation during the construction period would be minimum.

There will be a wastewater generation to the tune of 200-300 lits/day due to the construction activities which may reach the River and its water quality may be marginally affected. However, as there is much dilution available, its impact would also be insignificant.

4.1.7 Solid Wastes

Presently, the solid wastes generated in the Port Area is being collected, transported and land filled within the MPA Area. Due to the proposal, about 50-75 kg Municipal solid Wastes will be generated which will also be transported to the land fill site, vermi composted and used as manure for Green Belt. The construction wastes will be minimal due to proposed pile construction.

4.1.8 Biological Environment

There is no cutting of trees/mangroves is involved. The construction will not have any significant adverse impact on terrestrial flora and fauna. However, piling and other construction works involving equipments will have impact on the aquatic flora & fauna and also on the benthic/sedimentary organisms. As the piling works will be carried out during day times, these impact will be minimum and temporary in nature.

The construction of concrete piers/pillars to support the Jetties would encourage the settlement of sedentary organisms to settle upon it. Thus, implementation of the project will enhance the positive impacts on the aquatic environment.

Sundarbans : Presently, vessels in & out of Mongla Port are sailing in Pussur River through Sundarbans to reach the Bay of Bengal. The proposed Project will increase the vessels' movements to Mongla Port via Sundarbans.

The Sundarbans is also the resort for the saltwater crocodiles and freshwater dolphins which are globally endangered and are protected under the Bangladesh Wildlife Act 2010.

The impact of the proposed activity on the Sundarbans shall be studied in depth during the EIA Study and Conservation Measures shall be delineated.

4.1.9 Socioeconomic Environment

There is no land acquisition and R&R issues due to the Proposal. As the construction is proposed in the Jetty area, no adverse impact is anticipated on the local settlements also. However, the project would provide direct or indirect job opportunities for the local population during the Construction Phase. This is a definite positive impact due to the Project.

4.2 Impacts during Operation Phase

4.2.1 Air Environment

During Operational Phase of the Project, the visiting ships/boats, etc. would cause emissions of SO₂ and NOx. It is to be mentioned that the monitored pollutants' levels in the Harbour area were found to be very well below the permissible NAAQ Norms and the net impact for changed scenario (implementation of project) will be limited and insignificant.

4.2.2 Noise Environment

Visiting ships/boats/ferries may result in increase in the equivalent noise levels by 2-3 dB(A) till their departure from the Jetties. However, the noise levels will be well within the permissible limit for Mixed Zone/Industrial areas and as such no impact is envisaged.

4.2.3 *Land Environment*

As no solid/hazardous wastes disposal is anticipated from the Project, there is no impact on the land environment during the Operation Phase.

4.2.4 *Water Environment*

No effluent is anticipated during Operation Phase. However, oil sleeks (if any) from the visiting ships/boats might cause some negligible impact on the receiving river.

An Effluent Treatment Plant (ETP) of adequate capacity shall be constructed in the Port Area to take care of the bilge/ballast water discharge from vessels into the River. The detailed ETP Scheme shall be addressed in the EIA Report.

4.2.5 *Biological Environment*

The construction of concrete piers/pillars to support the Jetties would encourage the settlement of sedentary organisms to settle upon it. Thus, implementation of the project will enhance the positive impacts on the aquatic environment.

The impact of the proposed additional traffic in Pussur River on the Sundarbans shall be studied in depth during the EIA Study and Conservation Measures shall be delineated.

4.2.6 *Socioeconomic Environment*

About 190 persons shall be getting direct employment in various categories due to the Proposal. About 500 persons will get indirect employment. Thus, the project has beneficial impacts due to employment, increased connectivity, transport and overall economy of the region. This would be a positive long term impact due to the Project.

4.2.7 *Occupational Health*

An industrial worker may be exposed to five types of hazards, depending upon his occupation :

Physical, Chemical, Biological, Mechanical and Psychosocial hazards. Accidents are a common feature in most industries. All efforts shall be taken to avoid the accidents and have a good 'Occupational Environment'.

Hazards exposure can be kept within permissible exposure level (PEL)/Threshold Level value (TLV) so as to protect health of workers. A List of expected hazards in work environment will be prepared in which workers are likely to be exposed directly or indirectly in any work process and work places.

An assessment has to be carried out for Exposure Specific Health Status Evaluation of all Workers Including Casual and Contract Workers.

5 MITIGATIVE AND ABATEMENT MEASURES

The proposed construction will have short term negative impacts during the Construction Phase and are insignificant during Operation Phase. However, an effective Environmental Management Plan (EMP) is proposed to ensure that the various negative impacts are mitigated and the positive impacts are enhanced.

5.1 EMP for Construction Phase

- It shall be ensured that no change in the hydrology and natural drainage system of the area.
- Exploitation of forests or natural resources by the workforce shall not be allowed strictly.
- The construction materials like sand, stone chips, etc. shall be obtained only from approved quarries.
- Proper placement of construction machineries shall be ensured to eliminate vibrations and noise.
- All machinery items shall be well lubricated to reduce noise.
- High Speed Diesel with low sulphur content shall be used for running the machineries.
- It shall be ensured that no oil leakage from the construction machineries or visiting boats.
- Cement handling shall be supervised properly to check fugitive emissions.
- Carrying of plastic and other nutrient locking materials (if they disposed on land) shall be banned totally.
- Empty cement bags, debris, etc. shall not be disposed off at the site or inside the River. They shall be collected and disposed off properly as per Norms/Guidelines.
- The labours for the construction works shall be pooled from the local public (as proposed) to avoid transit camps, sewage generation & its disposal, etc.
- Periodical monitoring of water quality, turbidity levels, bottom conditions, ambient air quality, noise levels, etc. shall be carried out as per Norms during the construction period.

5.2 EMP for Operation Phase

- On completion of construction, all debris and extraneous materials shall be cleared off and no residuals should be left at the site.
- An effective monitoring mechanism shall be evolved to ensure that the environmental safeguard measures have been implemented properly.
- Periodical monitoring of environmental parameters shall be carried out as per Norms to have a cross check and a data base.

Table 5.1: Proposed EMP Measures

Sl. No.	Environmental Component/Activity	Potential Impacts	I _n , I _L , I _p grade of Significance	Abatement of Control/EMP	Action Plan
1	Water	Getting polluted. Increased water requirements	I _s	Wastewater Prevention & Control of Pollution Water Conservation Practices	-
2	Emission from Boats	Stacks with controlled emissions	I _s	Better Quality Fuel Properly trained staff	Proper maintenance of equipments and engines
3	Transportation Handling	Increased transportation and handling operations	I _s	Proper floor management during loading and unloading. Harbour Management Noise control	-
4	Work Force	Employment opportunity	I _L	Educated and trained People	Periodical training to the staff

5.3 Budget for EMP

The Project Cost of the proposed Project and the proposed EMP Budget are given below :

Project Cost & Breakup :	Option A	: 3.842 million Takas
	Option B (2 Phases)	: 3,906 million Takas
Capital Cost - Pollution Control Measures		: 80.00 lakhs Tk
Recurring Cost	:	10.00 lakhs Tk/Annum
For Green Belt & Environmental Monitoring works	:	5.00 lakhs Tk/Annum
Budget for Social Measures/CSR Activities	:	25.00 lakhs Tk/Annum
Occupational Health & Safety Measures	:	5.00 lakhs Tk/Annum

Adequate budget provision in the Project Cost itself are made for implementing the EMP measures and Post-project Monitoring.

6 RESIDUAL IMPACTS TO BE STUDIED IN EIA

During the EIA Study, the following impacts shall be studied in detail, impacts shall be predicted, evaluated and proposed with effective mitigating measures :

- Erosion and Accretion along the Pussur River in Mongla Region with suitable Modelling.
- Periodical Dredging Plan for Mongla Port Area.
- Adequacy of National Highway N7 for the proposed Traffic Volume.
- The impact of the Sundarbans shall be studied in depth during the EIA Study with specific reference to the freshwater dolphins and saltwater crocodiles. Conservation Measures shall also be delineated.
- Need based Assessment of local population,

The objectives of the study are:

- To assess socio-economic status of the villages in the area.
- To prepare a general demographic profile of the villages.
- To assess the existing resources and possible impact on them.
- To prepare Action Plan for identification of local employable youth by training in skills relevant to the project for eventual employment in the project.
- To study economic measures which can help in upliftment of poor sections of the society.

7 ENVIRONMENTAL MONITORING PROGRAMME

Considering the Environmental setting of the project, project activities and their interaction, the following Environmental Monitoring Works shall be carried out.

- Site specific Micrometeorological Data on wind speed & direction (wind roses), temperature, humidity, cloud cover, atmospheric pressure along with rainfall at the Port Area.
- Ambient Air Quality Monitoring on 24-hourly basis, continuously for 2 days/week for 4 weeks in a month continuously for the parameters PM2.5, PM10, SO₂, NOx, CO and Particulate Lead as per Air Quality Standard as amended vide SRO No. 220-Act/2005 dated 19.07.2005 under Environmental Conservation Act 1995..
- Noise Level Measurements at all air quality monitoring station for Leq, Lday and Lnigh values once in a month.
- Water Quality Monitoring – grab sampling once in a month for Surface Waters and Ground Waters as per Norms.
- Soil & Sediment Quality Monitoring once in a season for Textural & Physical Parameters, Nutrients, etc.

The frequency of monitoring shall be as follows:

Air	Noise	Potable & Marine Waters	Soil & Sediments
PM2.5	Day & Night Leq	pH	Bulk Density
PM10	Noise levels dB(A)	Turbidity	Porosity
SO ₂		Salinity	pH
NOx	Once in a month	TSS	EC
CO	for the entire period	DO	Na
		COD	Cl
24-hourly continuously for 2 days/week/ month for the entire period		BOD	Heavy Metals
		Sulphides	Mn
		Phenols	Cu
		Oil & Grease	Zn
		Total Ammoniacal Nitrogen (NH ₂ -N)	Pb
		Once in a month	Once in a month

8 SUMMARY AND CONCLUSION

The Government of Bangladesh is actively trying to revitalize the Mongla Port by promoting its use as a Gateway for the land locked states of Bhutan and Nepal and as a Transit Port for the movement of Indian goods. Additional transit routes using waterways and rail are also being examined.

Initially, provisions were made to construct 7 jetties (Jetties 3-9) under the ‘Project Permanent Port on Pussur River’. The 5 jetties (5-9) were completed during 1976-78 and the pile driving of 2 jetties (3&4) were also made. The Jetties 3 & 4 were not completed due to financial constraints in Second Five Year Plan Period.

The honourable Minister of Shipping during his visit to Mongla Port suggested to lease out the uncompleted Jetties 3 & 4 to the Private Entrepreneurs on BOT basis which was accepted by MPA. It is also decided that **Jetties 3 & 4 should be designed as multi-purpose terminals** with capability of handling containers, general cargo and bulk cargo.

MPA intends to appoint an Investor-cum Operator for construction and operation of two jetties at Mongla Port through PPP. The **Terminal Operator** to be selected through a competitive and transparent tendering process under Policy and Strategy for Public-Private Partnership, 2010. MPA will provide 22 acres of land to jetty operator for construction of two jetties and ancillary facilities.

The proposal of ‘Development of Two Jetties at Mongla Port’ is techo-economically and environmentally feasible.

The main port development in the short to medium term (2010-2015) would be completing the Jetties 3 & 4 by 2015. When fully completed, the Container Terminal will have an annual capacity of 1.1 million TEUs or about 20 million tons. Overall, MP will contribute about 10% of total port handling capacity of the Country.

There are also **3 Linked Projects** to the proposed developmental activities :

- Dredging of Pussur Channel - Capital Dredging of Pussur River by MPA & Maintenance Dredging of Jetty Front by MPA.
- Dredging of Inland Waterway Route from Dhaka to Mongla - Opening up the Mongla-Ghasiakhali (MG) Canal by BIWTA through dredging.
- Dedicated Ferry service for crossing Padma River- for easy transportation of cargo from Dhaka to Mongla.

The Linked Projects 1 and 2 may be implemented through separate PPPs if found viable and separate Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) shall be undertaken for individual proposals.

The existing Jetties (5-9) of Mongla Port and their back-up areas are in-between the Coordinates $22^{\circ}29'10''$ - $22^{\circ}29'40''$ N Latitude and $89^{\circ}35'24''$ - $89^{\circ}35'38''$ E Longitude. The proposed development site, **within the designated Port Area**, is in-between the Coordinates $22^{\circ}28'57.76''$ - $22^{\circ}29'16.44''$ N Latitude and $89^{\circ}35'26.86''$ - $89^{\circ}35'38.88''$ E Longitude

There is **no environmental issue** about the site. The site is completely protected from waves. The site is devoid of mangroves and corals. The northeast boundary of **Sundarbans**, National Heritage Center of Bangladesh, is at a distance of 4.7 km in southwest from the Site. Other than Sundarbans, there are no eco sensitive areas within 10 km area. Mongla Town is at a distance of 1.7 km in southeast from the site (no road connectivity from N7).

The existing baseline environmental status of the study area are summarized below :

The collected meteorological data represented the local weather phenomena.

- The monitored ambient air quality in the study area was found to be in compliance with the amended National Ambient Air Quality Standards of 150 ug PM10/m³, 365 ug SO₂/m³ and 100 ug NOx/m³.
- Ambient equivalent noise levels (Leq) during day and night times were found to be well within the Noise Norms of <60 dB(A) during day times and <50 dB(A) during night times.
- The water quality of surface waters were found to be in compliance with Inland Surface Water Quality except BOD.
- The ground water quality was found to be in compliance with the Potable Water Quality Standards.
- The soil in the study area would very well support vegetation after amending it suitably.
- Sundarbans, UNESCO Heritage Centre of Bangladesh is at 4.7 km from the existing Port. There is no other Eco Sensitive Area within the study area of 10 km.
- The area is thinly populated and basic amenities are available almost in all villages.

Thus, there is **adequate buffer** for the proposed Project in the physical, biological and edaphic environments of the study area.

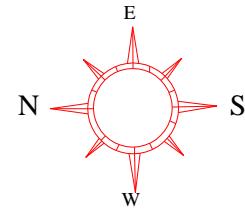
The proposed Project would create impact on the environment in two distinct phases, during the construction phase which may be regarded as temporary and short term and during the operation phase which would have long term effects. The likely impacts due to the proposal are identified and mitigating measures are also proposed.

The Project Cost of the proposed Project and the proposed EMP Budget are given below:

Project Cost & Breakup	:	3.842 million Takas
Capital Cost - Pollution Control Measures	:	80.00 lakhs Tk
Recurring Cost	:	10.00 lakhs Tk/Annum
For Green Belt & Environmental Monitoring works	:	5.00 lakhs Tk/Annum
Budget for Social Measures/CSR Activities	:	25.00 lakhs Tk/Annum
Occupational Health & Safety Measures	:	5.00 lakhs Tk/Annum

TOR for EIA Study is also dealt in the IEE Report

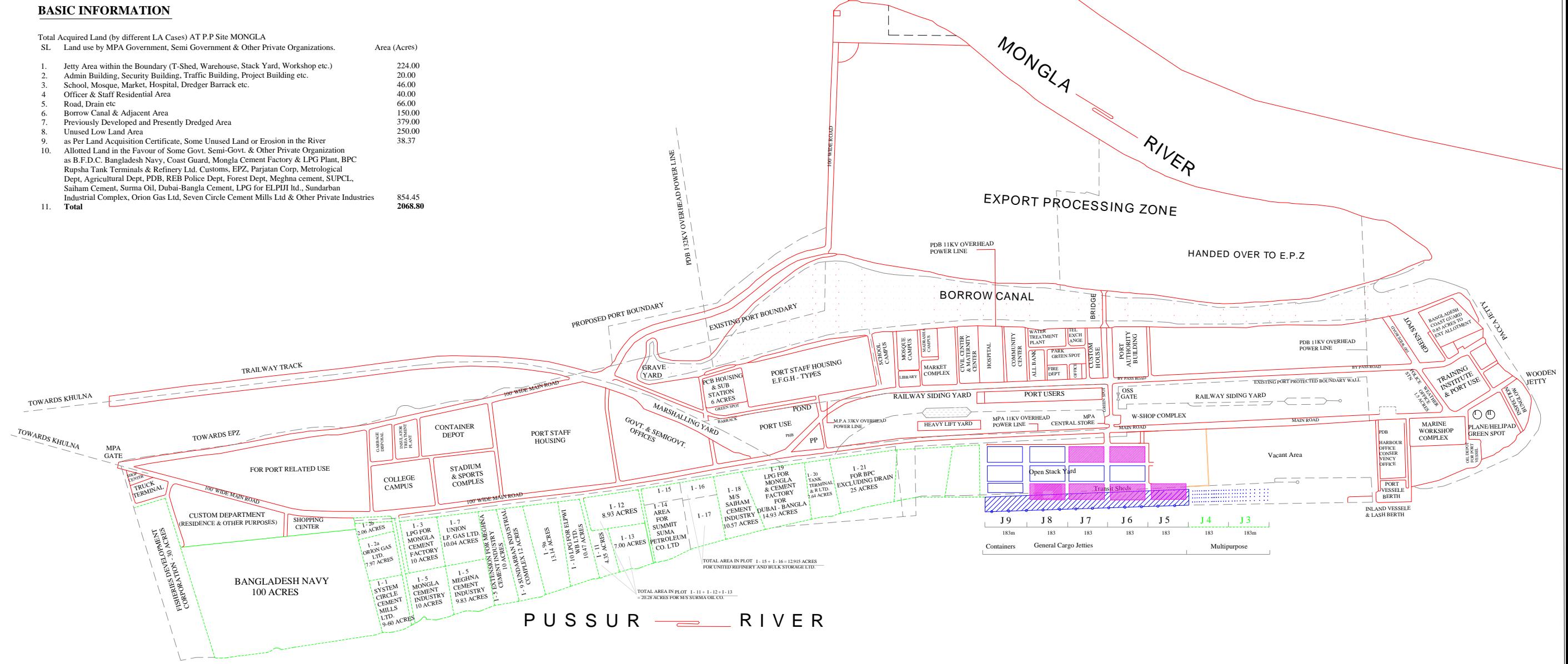
Annexure IX: Technical Drawings



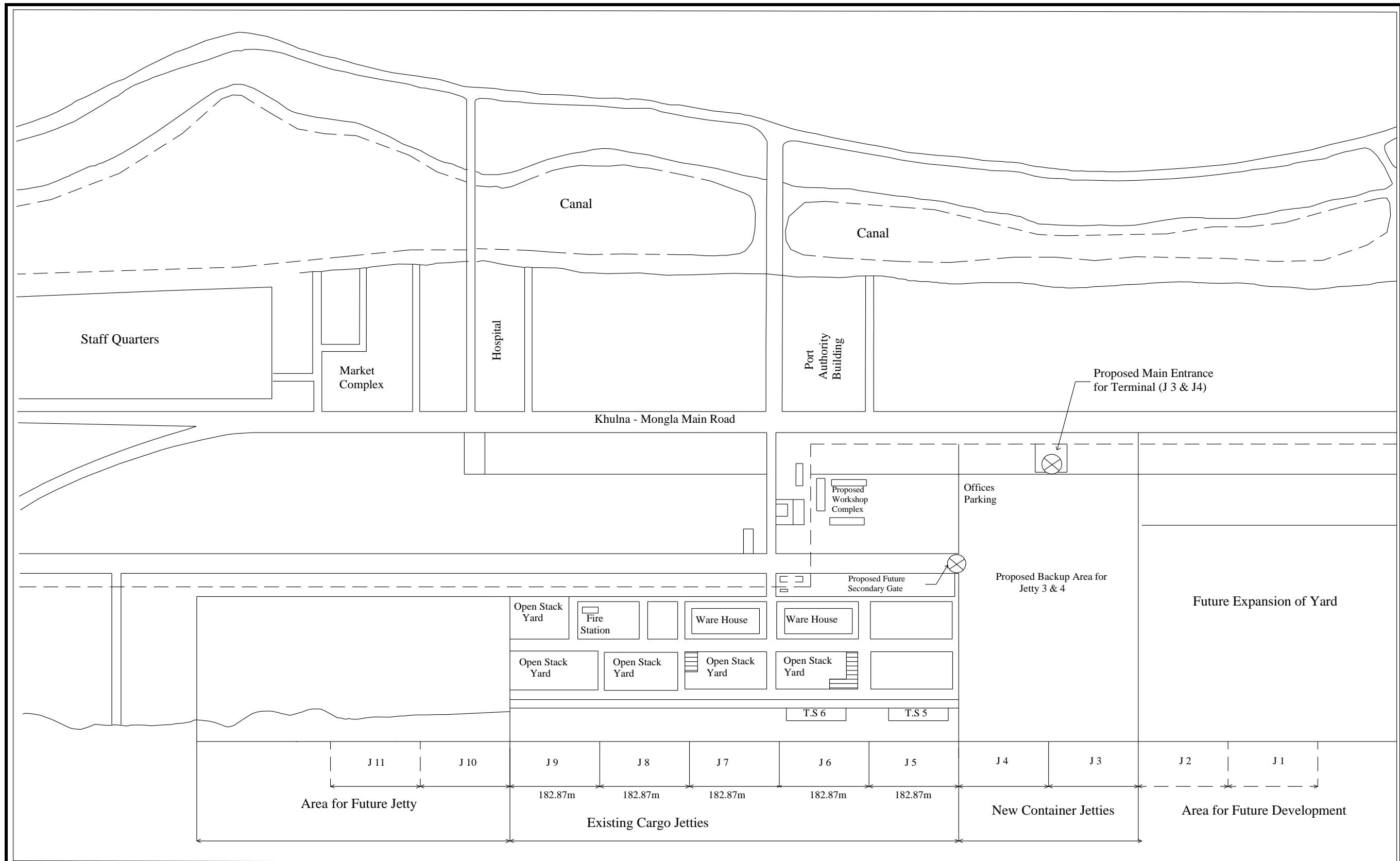
BASIC INFORMATION

Total Acquired Land (by different LA Cases) AT P.P Site MONGLA
SL Land use by MPA Government, Semi Government & Other Private Organizations.

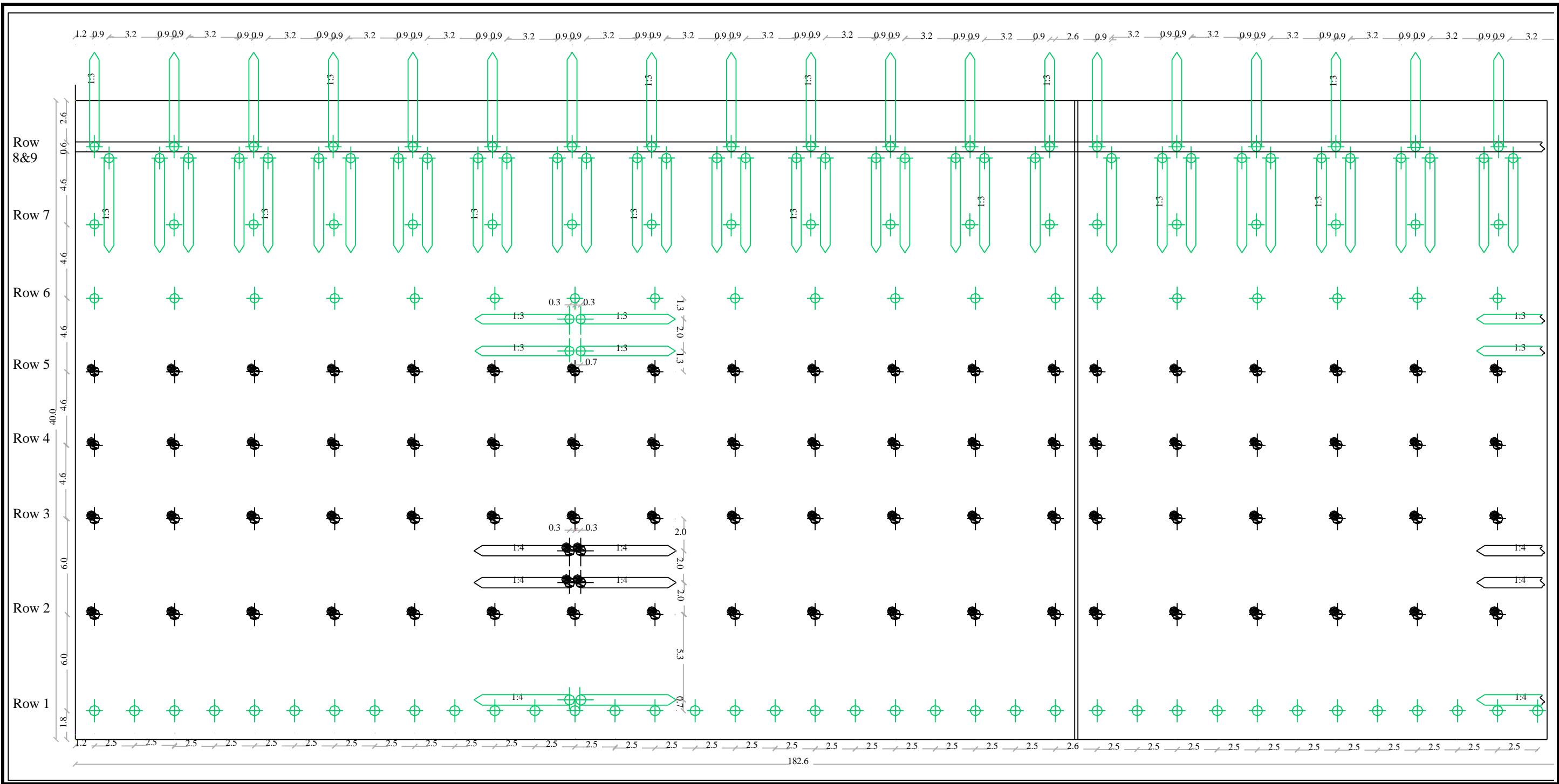
	Area (Acres)
1. Jetty Area within the Boundary (T-Shed, Warehouse, Stack Yard, Workshop etc.)	224.00
2. Admin Building, Security Building, Traffic Building, Project Building etc.	20.00
3. School, Mosque, Market, Hospital, Dredger Barrack etc.	46.00
4. Officer & Staff Residential Area	40.00
5. Road, Drain etc	66.00
6. Borrow Canal & Adjacent Area	150.00
7. Previously Developed and Presently Dredged Area	379.00
8. Unused Low Land Area	250.00
9. as Per Land Acquisition Certificate, Some Unused Land or Erosion in the River	38.37
10. Allotted Land in the Favour of Some Govt. Semi-Govt. & Other Private Organization as B.F.D.C. Bangladesh Navy, Coast Guard, Mongla Cement Factory & LPG Plant, BPC Rupsha Tank Terminals & Refinery Ltd. Customs, EPZ, Parjatan Corp, Meteorological Dept, Agricultural Dept, PDB, REB Police Dept, Forest Dept, Meghna cement, SUPCL, Sainam Cement, Surma Oil, Dubai-Bangla Cement, LPG for ELPUI Ltd., Sundarban Industrial Complex, Orion Gas Ltd, Seven Circle Cement Mills Ltd & Other Private Industries	854.45
11. Total	2068.80



Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Drawing No: MPA 1 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title: Layout Plan of Mongla Port (Permanent Port Site) Source: ADB Report on "Port and Logistics Efficiency Improvement"-July 2011 by G-Maps, Drewry Consultancy and Others	Prepared by: Rabiu Islam Checked by: Nazrul Islam	IIFC Deloitte Mahindra

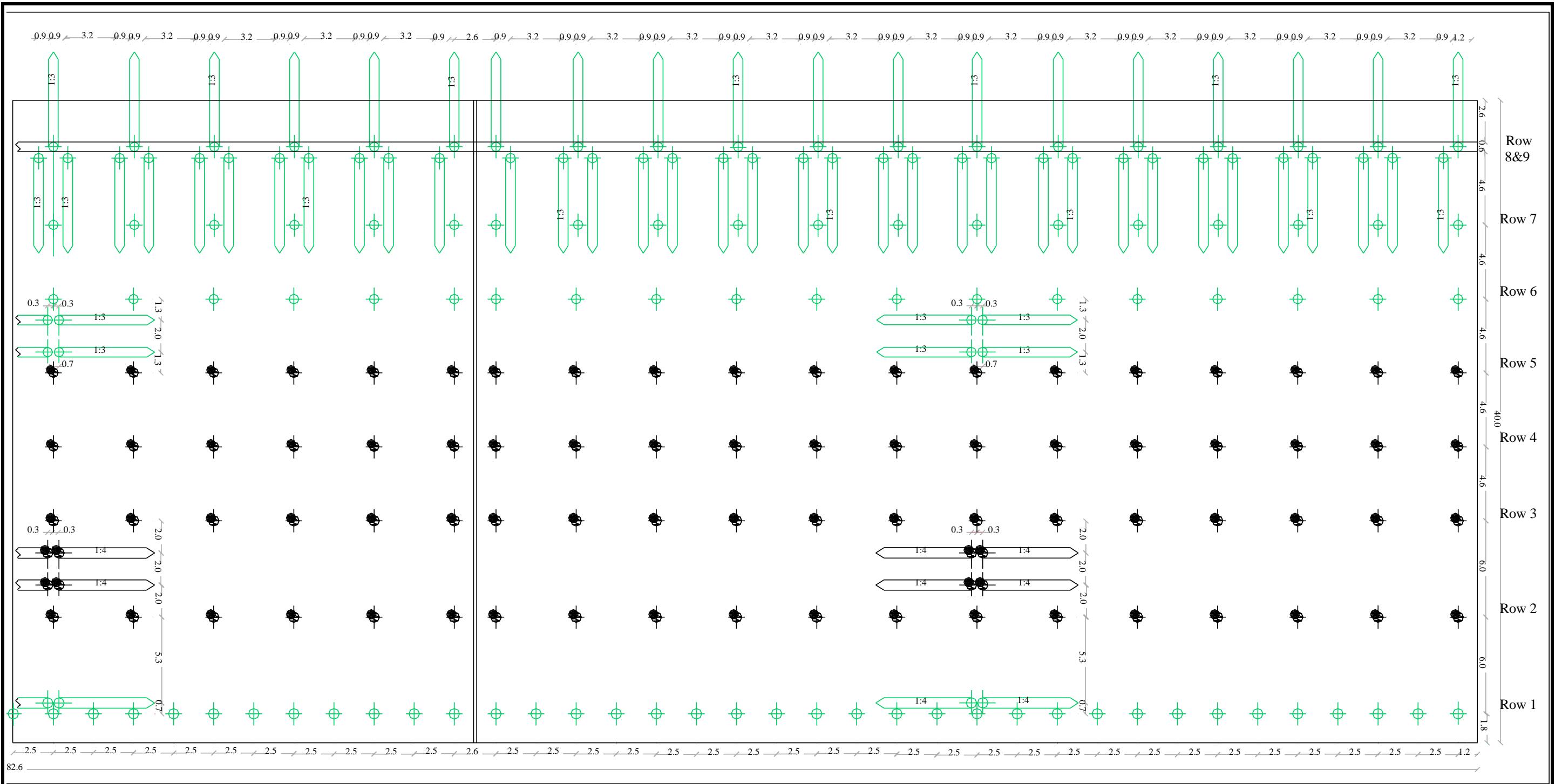


Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Drawing No: MPA 2 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	<p>Title: Area Development Plan of Mongla Port Area</p> <p>Source: ADB report on "Mongla Port Area Development Project", February 1996, by JOCL and others</p>	<p>Prepared by: Rabiul Islam Checked by: Nazrul Islam</p>	 IIFC  Deloitte  Mahindra Infrastructure Investment Facilitation Company Deloitte Touche Tohmatsu India Private Ltd. Mahindra Consulting Engineers Ltd.

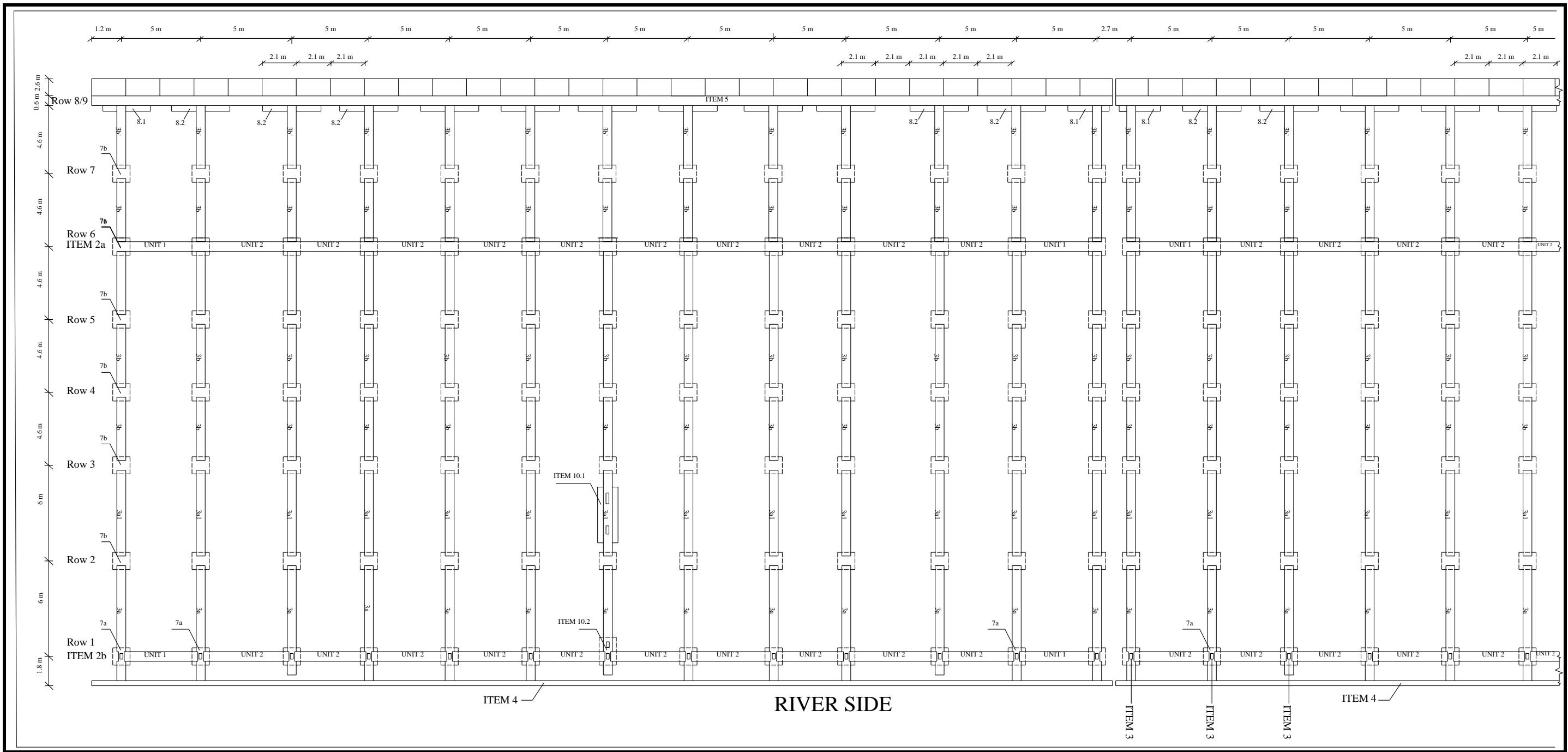


• Existing Piles Existing Piles 164
 + New Piles New piles 275
 Total 439

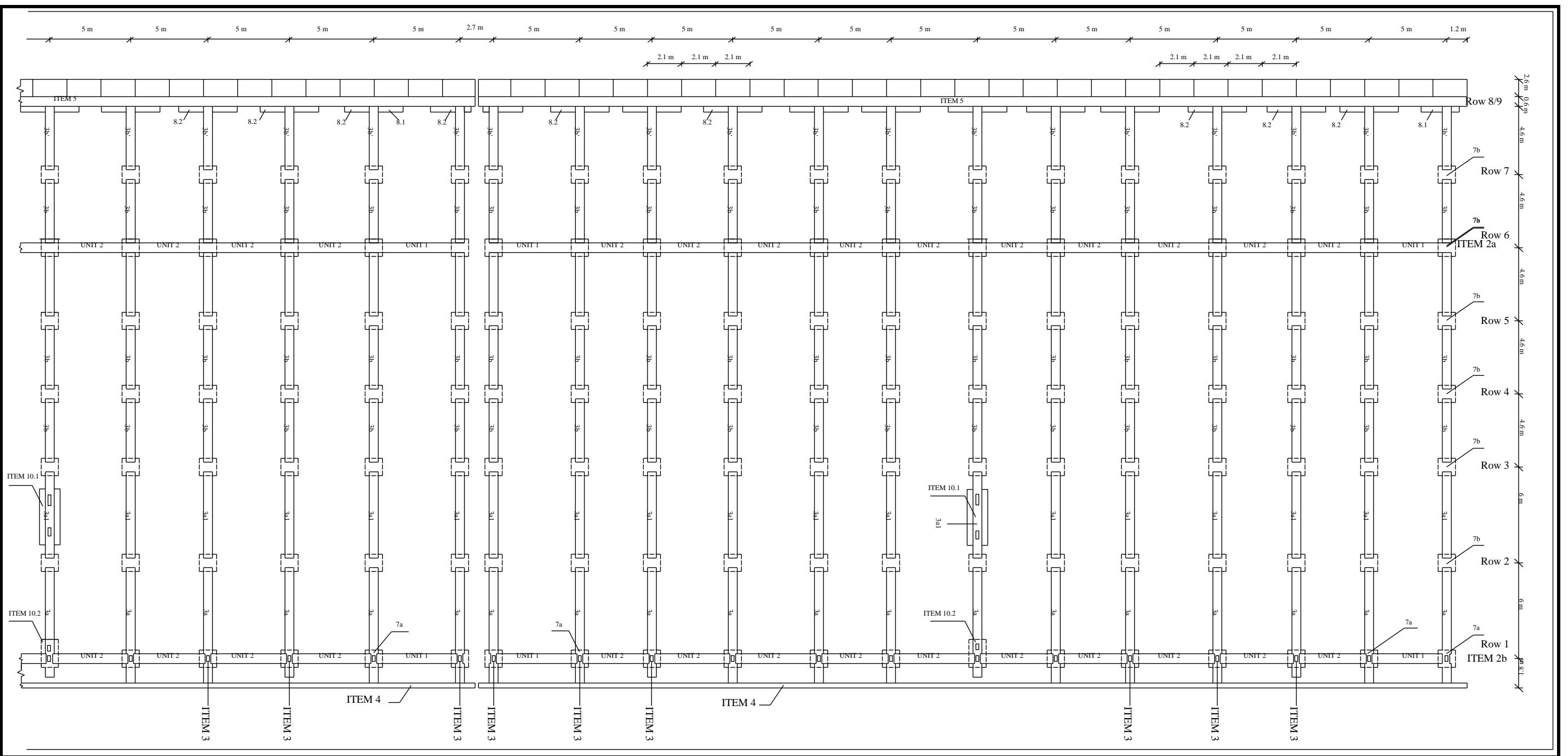
Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Drawing No: MPA 3 (1 of 2) 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title: Plan of Piles at Jetty No. 3 & 4 (shown for one Jetty) Source: Mongla Port Authority	Prepared by: Rabiul Islam Checked by: Nazrul Islam	 IIFC Infrastructure Investment Facilitation Company  Deloitte Touche Tohmatsu India Private Ltd.  Mahindra Consulting Engineers Ltd.



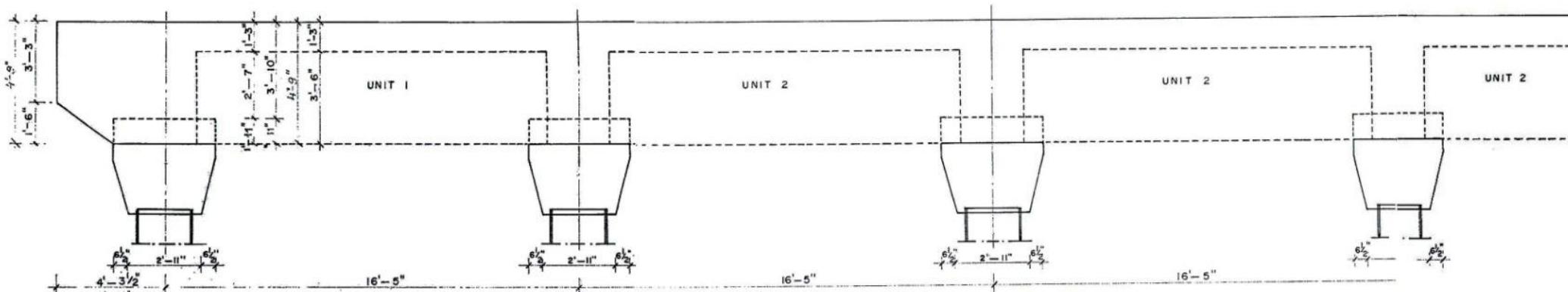
Sponsor	IPFF Project Bangladesh Bank	Project:	Development of Two Jetties at Mongla Port through PPP	Drawing No: MPA 3 (2 of 2) 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title:	Plan of Piles at Jetty No. 3 & 4 (shown for one Jetty)	Prepared by: Rabiul Islam Checked by: Nazrul Islam	 IIFC  Deloitte  Mahindra Infrastructure Investment Facilitation Company Deloitte Touche Tohmatsu India Private Ltd. Mahindra Consulting Engineers Ltd.



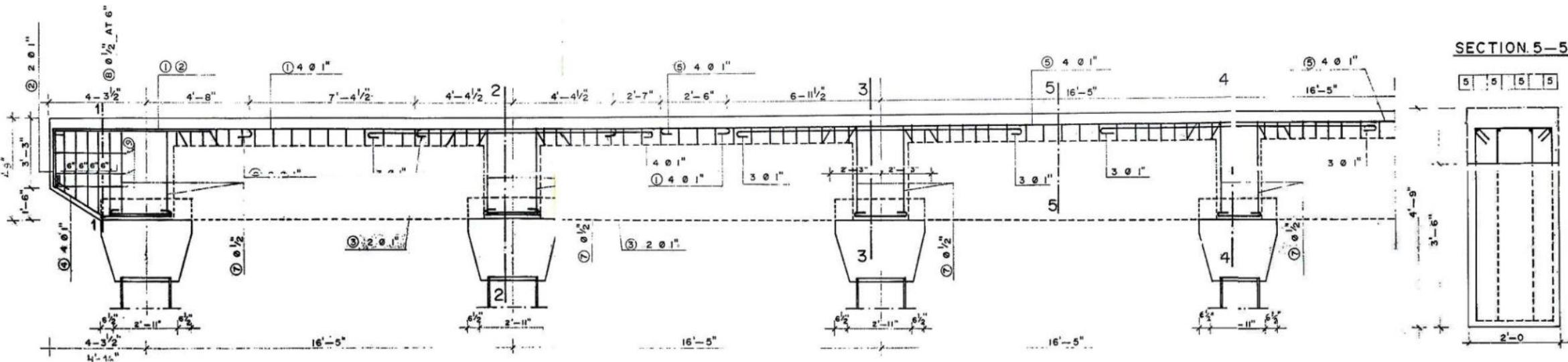
Sponsor	 IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Drawing No: MPA 4 (1 of 2) 12 February 2013		Consultant
Executing Agency	 Mongla Port Authority	<p>Title: Disposition Plan of Girders at Jetty No. 3 & Jetty No 4</p> <p>Source: PIM, Yugoslavia, for Chalna Port Authority, June 1976</p>	Prepared by: Rabiul Islam Checked by: Nazrul Islam		<p>Infrastructure Investment Facilitation Company Deloitte Touche Tohmatsu India Private Ltd. Mahindra Consulting Engineers Ltd.</p>



Sponsor	 IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Drawing No: MPA 4 (2 of 2)	Consultant
Executing Agency	 Mongla Port Authority	Title: Disposition Plan of Girders at Jetty No. 3 & Jetty No. 4 Source: PIM, Yugoslavia, for Chalna Port Authority, June 1976	12 February 2013 Prepared by: Rabiul Islam Checked by: Nazrul Islam	 IIFC  Deloitte  Mahindra Infrastructure Investment Facilitation Company Deloitte Touche Tohmatsu India Private Ltd. Mahindra Consulting Engineers Ltd.



REINFORCEMENT PLAN FOR ITEM 2a II PHASE

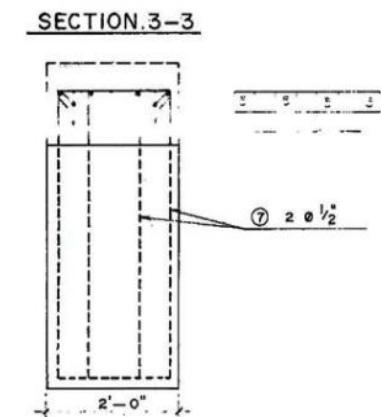
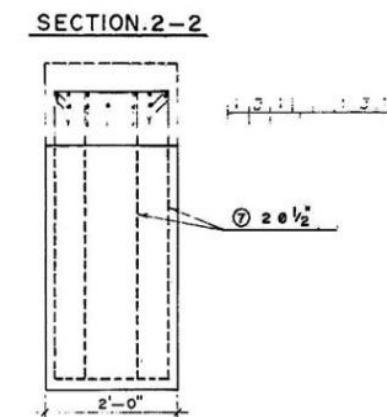
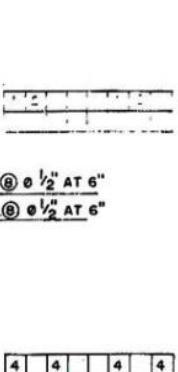
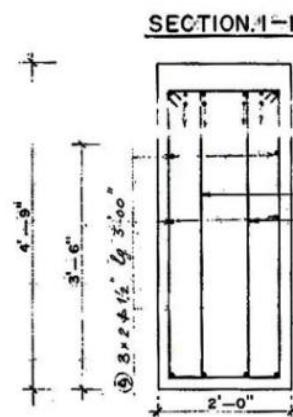


SECTION.5-5

ITEM	MARK	Q	PCS	LENGTH	TOTAL LENGTH
1	10"	30'-0"	10	6x4m	31'--8" 760'-0"
2	2'-8" AT 10"	8'-9"	12	6x2m	13'--1" 157'-0"
3	10"	8'-9"	12	10'--5"	125'-0"
4	6 1/2"-7" 3'-0" 10"	6'-9"	24	7'--3"	174'-0"
5	10"	35'-4"	12	12x4m	37'--0" 1776'-0"
6	10"	18'-11"	10	2x4m	20'--7" 164'-8"
7	3'-10"	3'-10"	22	3'	216' 00"
8	1'-2" 6 1/2"-1'-2" 3'-10"	6 1/2"-1'-2" 3'-10"	30	5x6	10'-3 1/2" 308'-8"

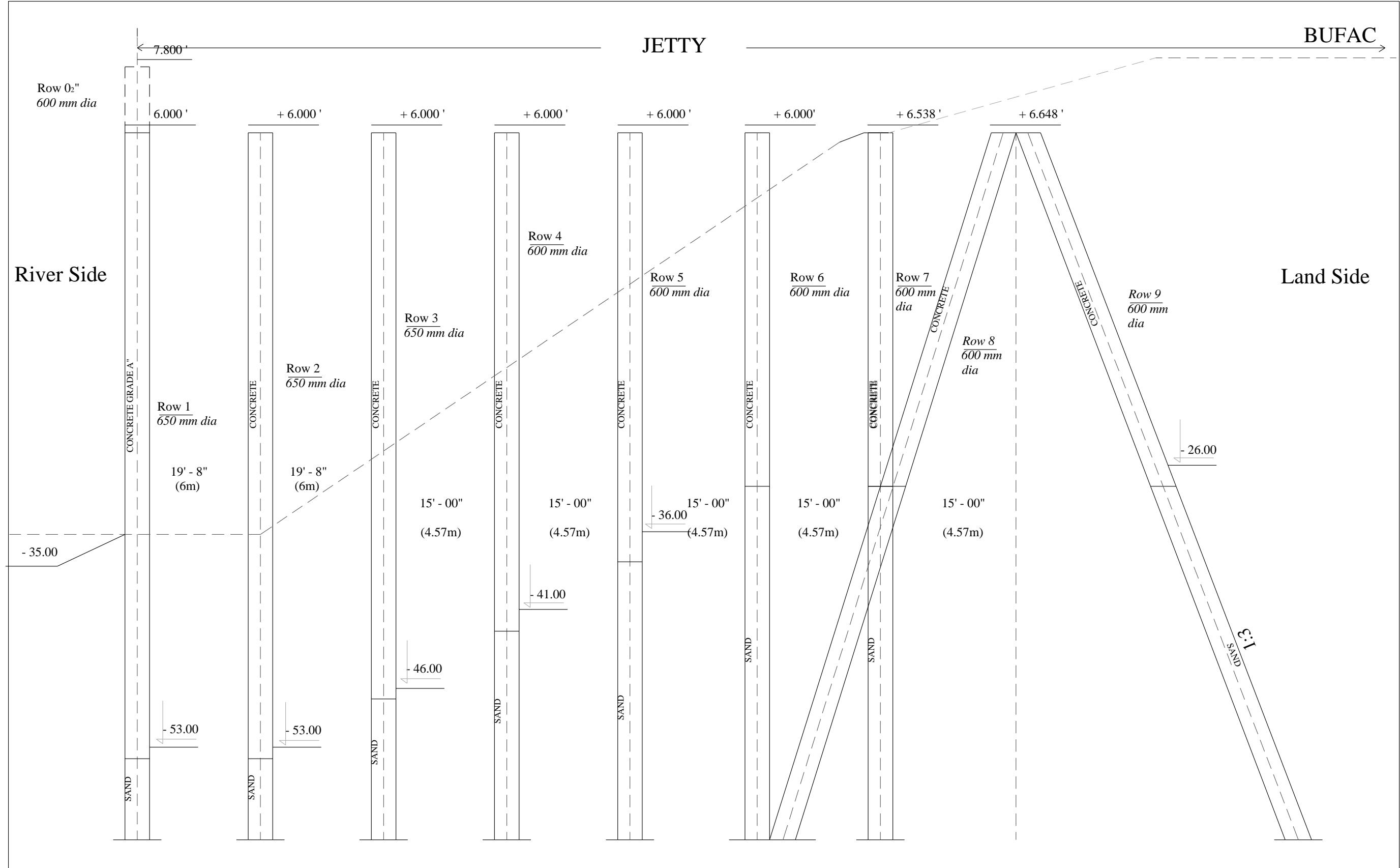
B	LENGTH FT.	WEIGHT LB./FT.	TOTAL WEIGHT LB.	TOTAL WEIGHT KG.
1"	3156.67	2.670	8428.31	3823.50
1/2"	1583.75	0.667	1321.16	599.50
			TOTAL	4423.00

CONCRETE GRADE A

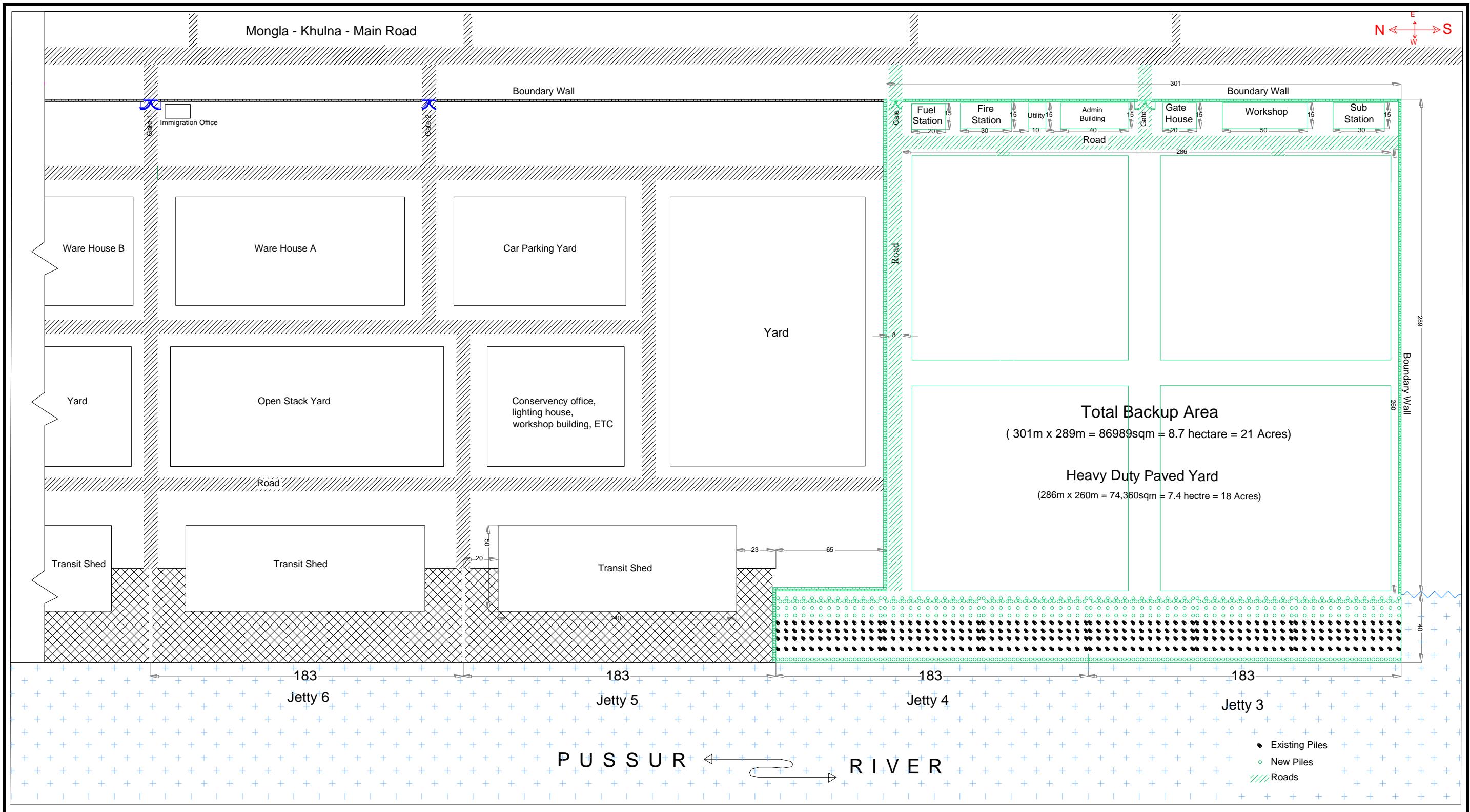


WORK NO.	THE GOVERNMENT OF REPUBLIC OF BANGLA MINISTRY OF COMMUNI
REFERENCE DRAWINGS	CHALNA PORT PROJ
DESCRIPTIONS PLAN OF SHUTTERING REINFORCEMENT PLAN JETTIES 3-4 PH.	
PIM IVAN MILUTINOVIC - BEograd-YUGOSLAVIA THE ENTERPRISE FOR WATERWAYS	
DATE NOV. 8th. 1975 SCALE: - 3/4" 1' DRG. NO.	

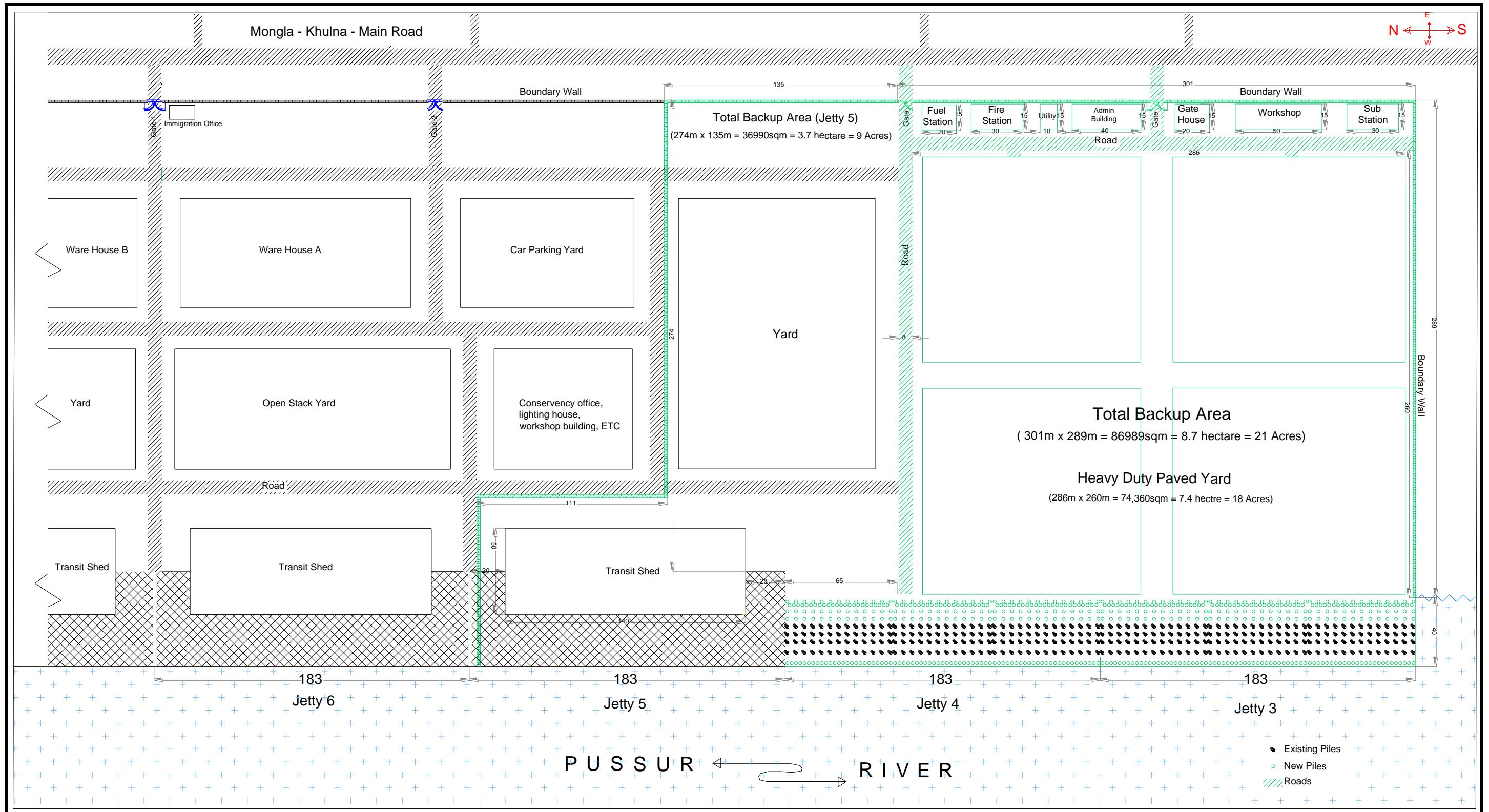
Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Drawing No: MPA 5 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title: Reinforcement Details of Jetty Structure of Jetty No. 3 and 4 Source: PIM, Yugoslavia, for Chalna Port Authority, November 1975	Prepared by: Rabiu Islam Checked by: Nazrul Islam	 IIFC  Deloitte  Mahindra Infrastructure Investment Facilitation Company Deloitte Touche Tohmatsu India Private Ltd. Mahindra Consulting Engineers Ltd.



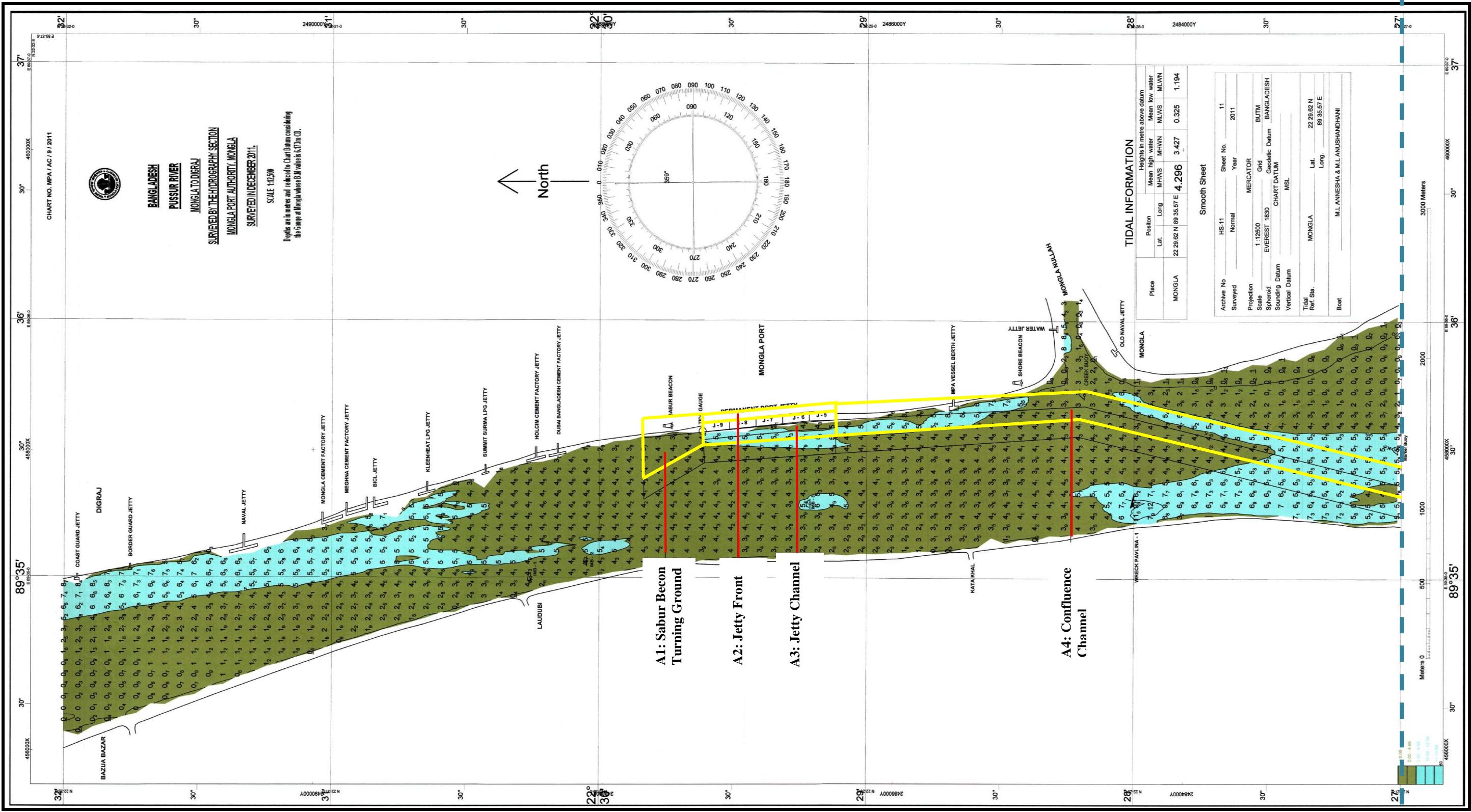
Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Consultant
Executing Agency	Mongla Port Authority	Title: Side Elevation of Piles at Jetty No. 3 and 4	IIFC Deloitte Mahindra
<i>Source:</i> PIM, Yugoslavia, for Chalna Port Authority, June 1973		Drawing No: MPA 6 12 February 2013 Prepared by: Rabiul Islam Checked by: Nazrul Islam	Infrastructure Investment Facilitation Company Deloitte Touche Tohmatsu India Private Ltd. Mahindra Consulting Engineers Ltd.



Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Drawing No: MPA 7 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title: Proposed Conceptual Plan of Jetty No. 3 & 4 with Backup Facilities (Option A)	Prepared by: Rabiu Islam Checked by: Nazrul Islam	IIFC Deloitte Mahindra

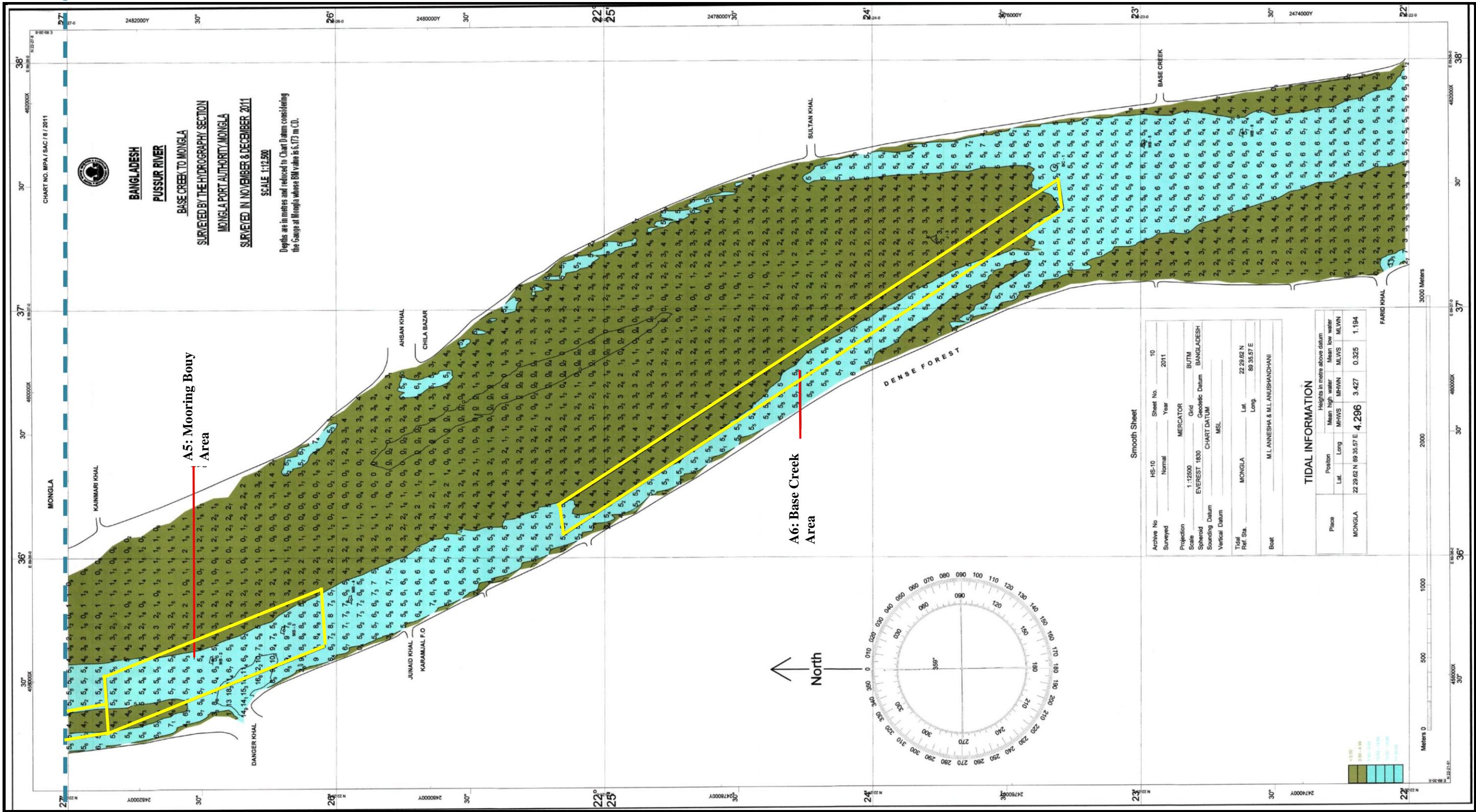


Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Drawing No: MPA 8 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title: Proposed Conceptual Plan of Jetty No. 3, 4 & 5 (part) with Backup Facilities (Option B)	Prepared by: Rabiu Islam Checked by: Nazrul Islam	 IIFC  Deloitte  Mahindra



Sponsor	 IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Drawing No: MPA 9 (1 of 2) 12 February 2013		Consultant IIFC Deloitte Mahindra
Executing Agency	 Mongla Port Authority	Title: Hydrographic Chart of Pussur Channel showing Proposed area for Dredging Source: <i>Department of Hydrography, MPA</i>	Prepared by: Rabiul Islam Checked by: Nazrul Islam		Infrastructure Investment Facilitation Company Deloitte Touche Tohmatsu India Private Ltd. Mahindra Consulting Engineers Ltd.

Match Line



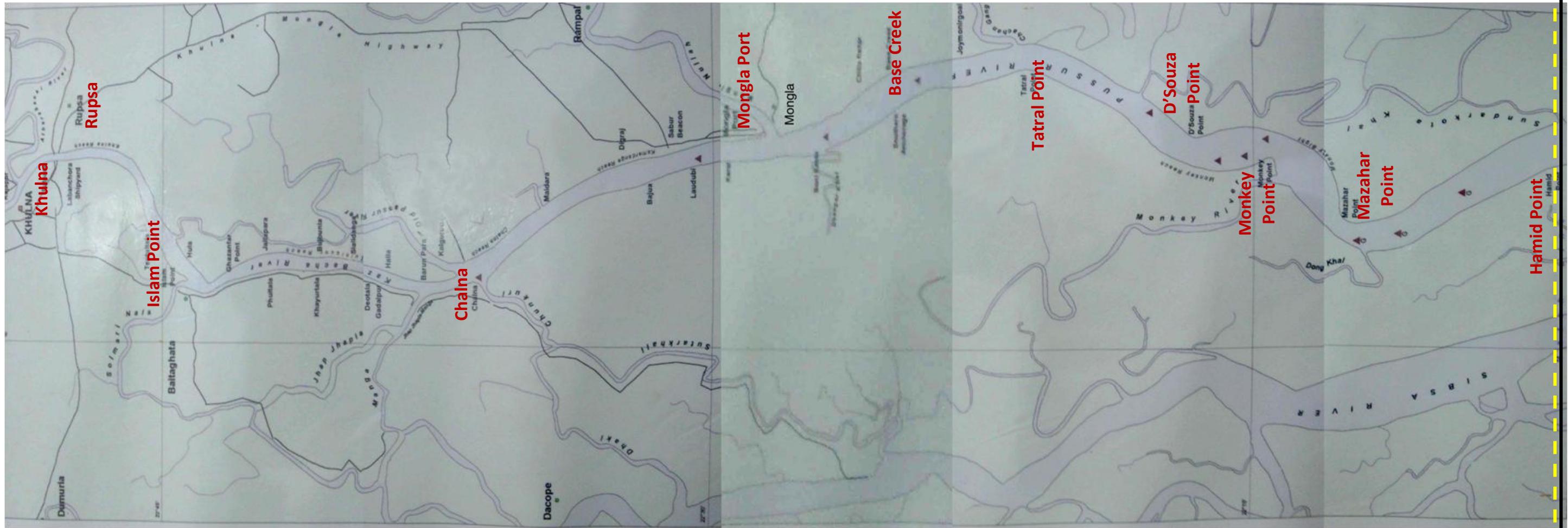
Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Drawing No: MPA 9 (2 of 2) 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title: Hydrographic Chart of Pussur Channel showing Proposed area for Dredging Source: Department of Hydrography, MPA	Prepared by: Rabiul Islam Checked by: Nazrul Islam	IIFC Deloitte Mahindra

Annexure XI

Project Related Maps

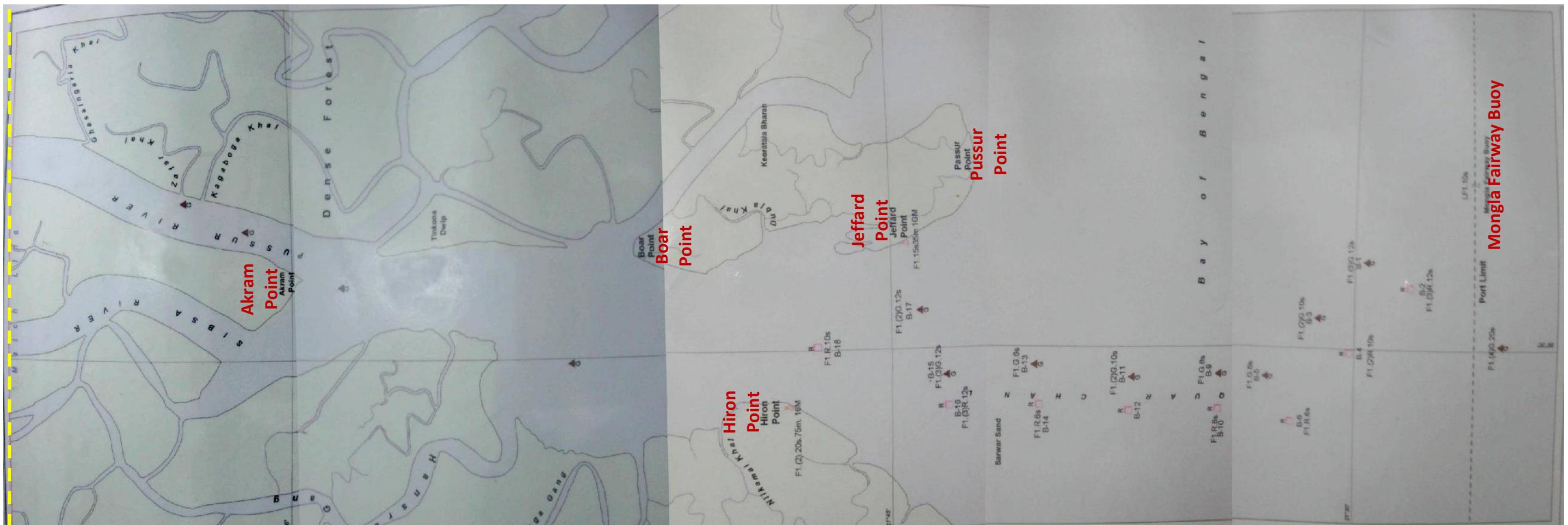


Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Map No: MPA 1 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title: Global Map of Mongla Port Area (Showing Mongla river and Pussur river) <small>Source: Google Earth</small>	Prepared by: Rabui Islam Checked by: Nazrul Islam	 IIFC  Deloitte Touche Tohmatsu India Private Ltd.  Mahindra Consulting Engineers Ltd.

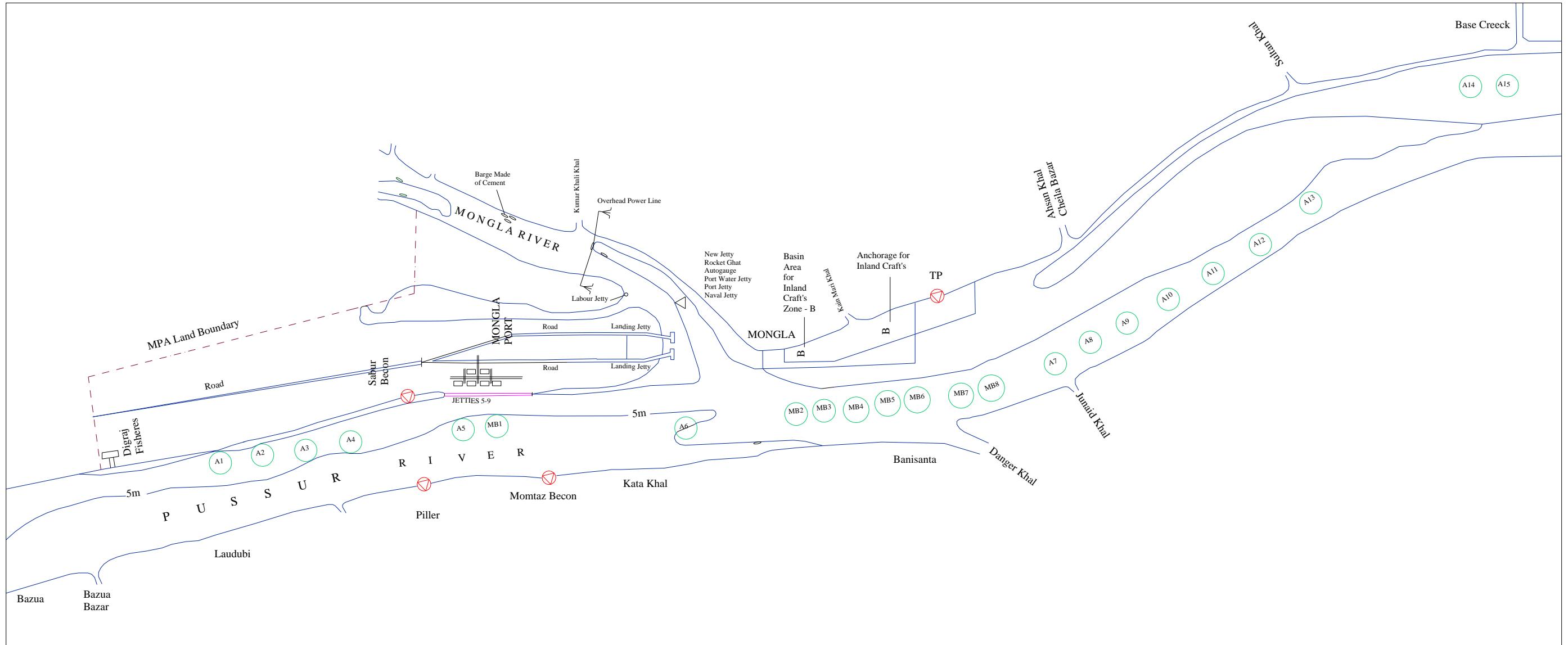


Sponsor	IPFF Project Bangladesh Bank	Project:	Development of Two Jetties at Mongla Port through PPP	Map No: MPA 2 (1 of 2) 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title:	Map showing view of Mongla Port (From Fairway Buoy to Khulna)	Prepared by: Rabiul Islam Checked by: Nazrul Islam	 IIFC Infrastructure Investment Facilitation Company  Deloitte Deloitte Touche Tohmatsu India Private Ltd.  Mahindra Mahindra Consulting Engineers Ltd.

**Sheet 2/2
Match Line**



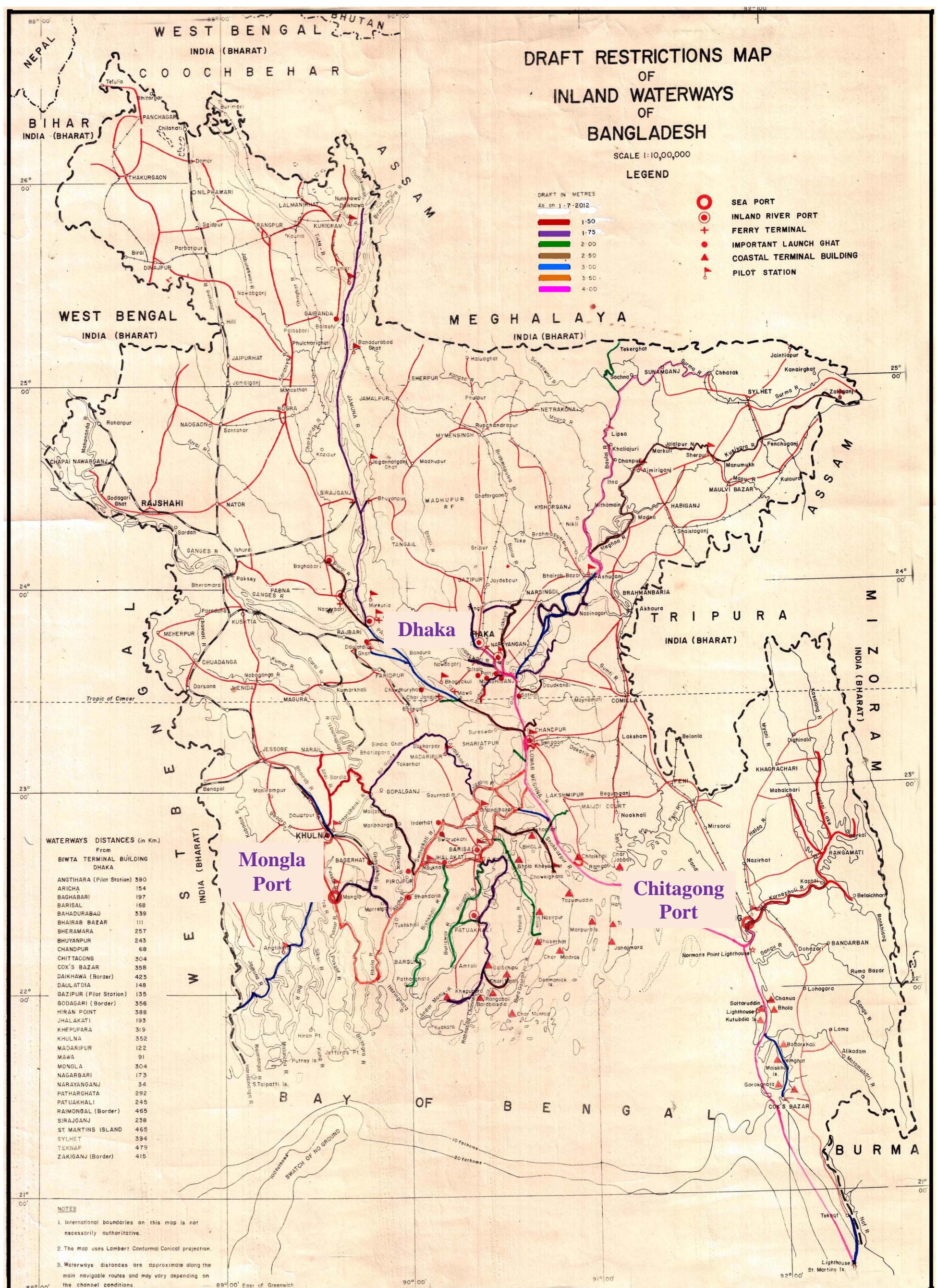
Sponsor	IPFF Project Bangladesh Bank	Project:	Development of Two Jetties at Mongla Port through PPP	Map No: MPA 2 (2 of 2) 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title:	Map showing view of Mongla Port (From Fairway Buoy to Khulna)	Prepared by: Rabiul Islam Checked by: Nazrul Islam	 IIFC  Deloitte  Mahindra Infrastructure Investment Facilitation Company Deloitte Touche Tohmatsu India Private Ltd. Mahindra Consulting Engineers Ltd.



Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Map No: MPA 3 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title: Map of Mongla Port Area (From Base Creek to Digras/ Bazua Bazar) Source: ADB report on "Mongla Port Area Development Project", February 1996, by JOCL and others	Prepared by: Rabiu Islam Checked by: Nazrul Islam	 Infrastructure Investment Facilitation Company  Deloitte Touche Tohmatsu India Private Ltd.  Mahindra Consulting Engineers Ltd.



Sponsor	 IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Map No: MPA 4 12 February 2013	Consultant
Executing Agency	 Mongla Port Authority	Title: Map of Dhaka-Mongla waterways (indicating MG canal) Source: Google Earth	Prepared by: Rabiu Islam Checked by: Nazrul Islam	 IIFC  Deloitte  Mahindra Infrastructure Investment Facilitation Company Deloitte Touche Tohmatsu India Private Ltd. Mahindra Consulting Engineers Ltd.



Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Map No: MPA 5 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title: Bangladesh Inland Waterways Map (Showing Dhaka, MPA and CPA) Source: Department of Hydrography, BIWTA, 1988	Prepared by: Rabib Islam Checked by: Nazrul Islam	IIFC Infrastructure Investment Facilitation Company Deloitte. Deloitte Touche Tohmatsu India Private Ltd. Mahindra Mahindra Consulting Engineers Ltd.



Sponsor	IPFF Project Bangladesh Bank	Project: Development of Two Jetties at Mongla Port through PPP	Map No: MPA 6 12 February 2013	Consultant
Executing Agency	Mongla Port Authority	Title: Bangladesh road network Map Source: Roads and Highways Department	Prepared by: Rabiul Islam Checked by: Nazrul Islam	 IIFC Deloitte Mahindra