

Bangladesh 人民共和国

Bangladesh 送電株式会社 (PGCB)

Bangladesh 国  
ダッカーチッタゴン基幹送電線  
強化事業準備調査

ファイナルレポート

BOOK-2

付録

平成 27 年 9 月  
(2015 年 9 月)

独立行政法人  
国際協力機構 (JICA)

東京電力株式会社  
東電設計株式会社

南ア
CR(5)
15-043



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Bangladesh国ダッカーチッタゴン基幹送電線強化事業準備調査  
ファイナルレポート














## 付録 1

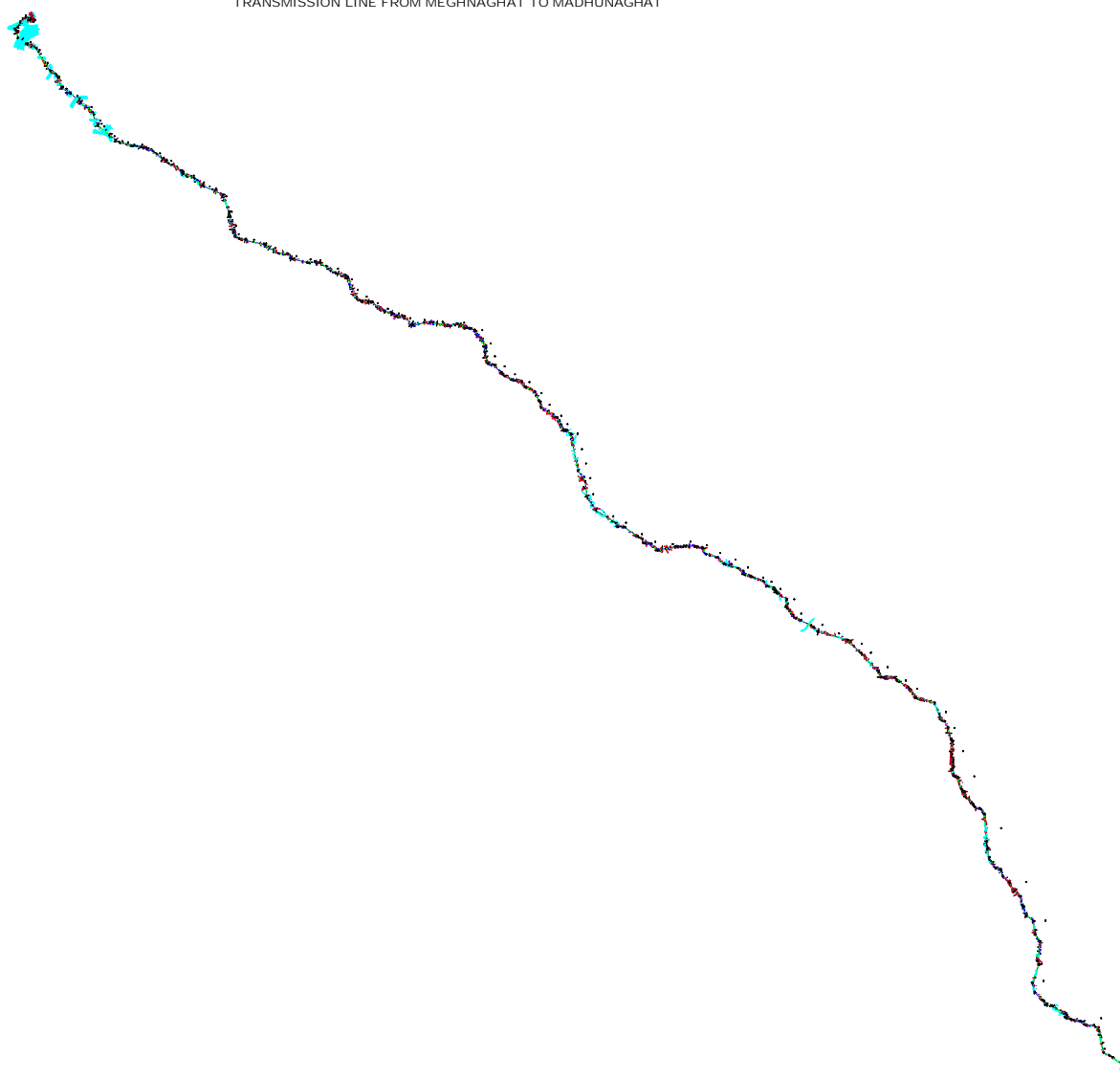
### 400 kV 送電線ルートの提案 (Meghnaghat - Madunaghat 間)



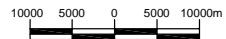
**LEGEND**

-  New Line
-  Existing Line
-  Road
-  House
-  Building
-  Homestead
-  Pond
-  Khal / River
-  Tower
-  Angle Tower
-  Tree

ROUTE ALIGNMENT SURVEY OF PROPOSED 400kV  
TRANSMISSION LINE FROM MEGHNAGHAT TO MADHUNAGHAT



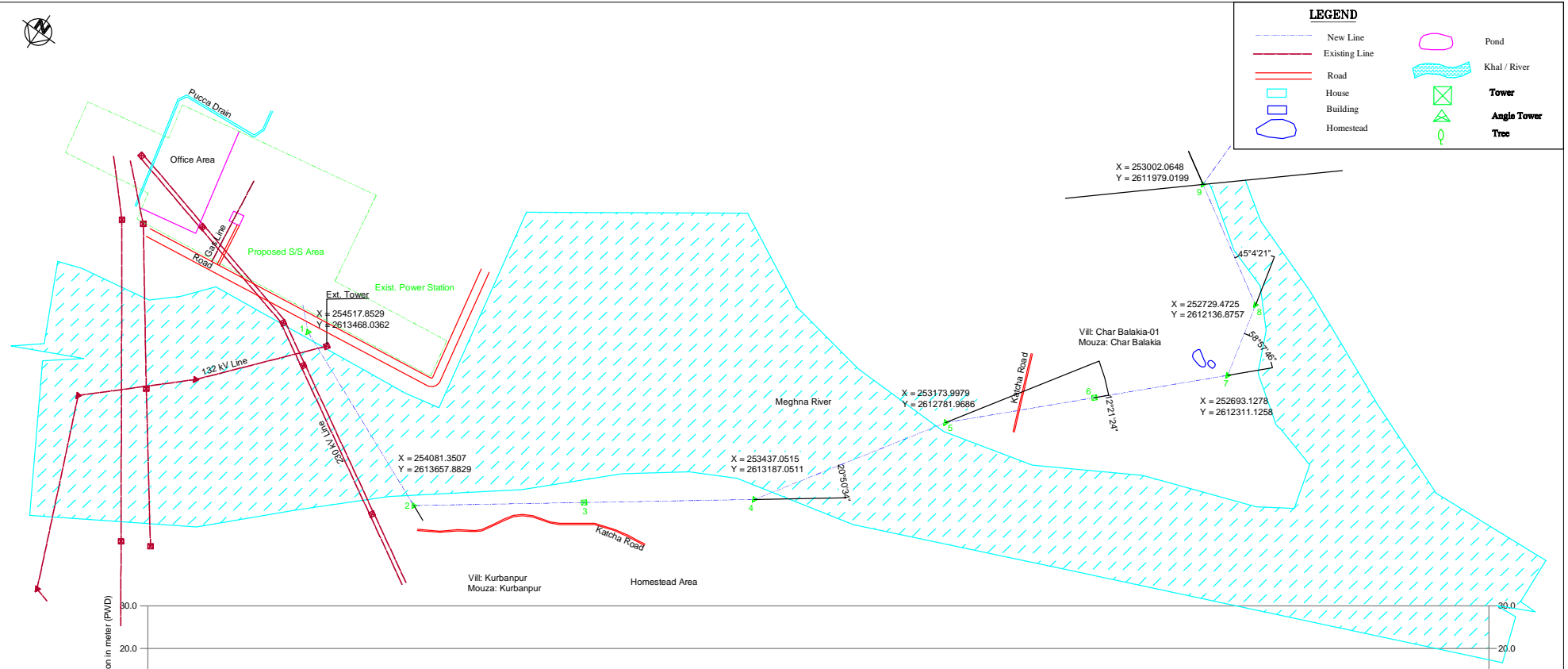
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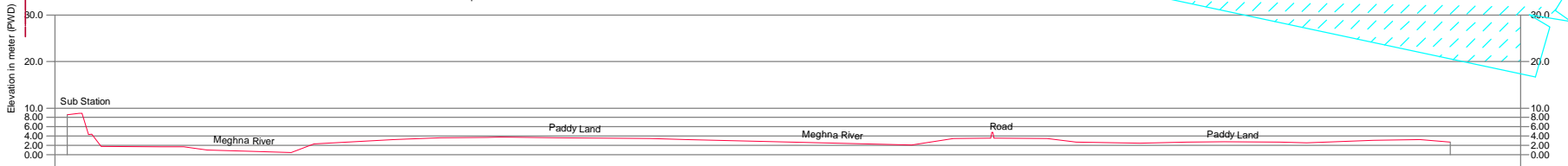
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		TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400kV TRANSMISSION LINE FROM MEGHNA GHAT TO MADHUNAGHAT	
DATE OF PREPARATION	August 2014					
DESCRIPTION						
REVISIONS						
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)					
SURVEYED BY						
CHECKED BY						
				1.		

**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- Tower
- Angle Tower
- Tree



Elevation in meter (PWD)



Tower No	CHAINAGE (IN m)	EXISTING LEVEL (m)
Tower-01	0+00	3.00
	0+100	1.68
	0+200	1.66
	0+300	0.97
	0+400	0.46
Tower-02	0+529	2.32
	0+700	3.20
	0+800	3.62
	0+900	3.73
Tower-03	0+928	3.77
	1+050	3.59
	1+150	3.56
	1+250	3.50
Tower-04	1+327	3.25
	1+810	2.11
	1+900	3.45
	1+980	3.55
	1+982	3.77
	1+986.5	3.52
	2+100	3.47
Tower-06	2+163	2.71
	2+300	2.45
	2+400	2.73
	2+480	2.75
Tower-07	2+600	2.67
Tower-08	2+657	2.55
	2+800	3.06
	2+900	3.21
Tower-09	2+965	2.73

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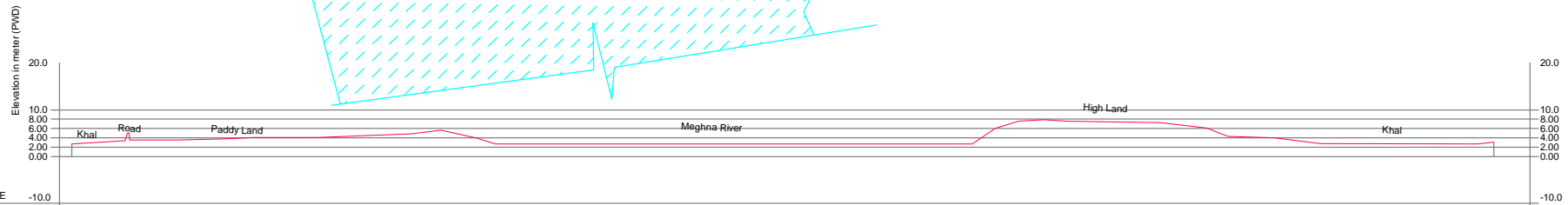
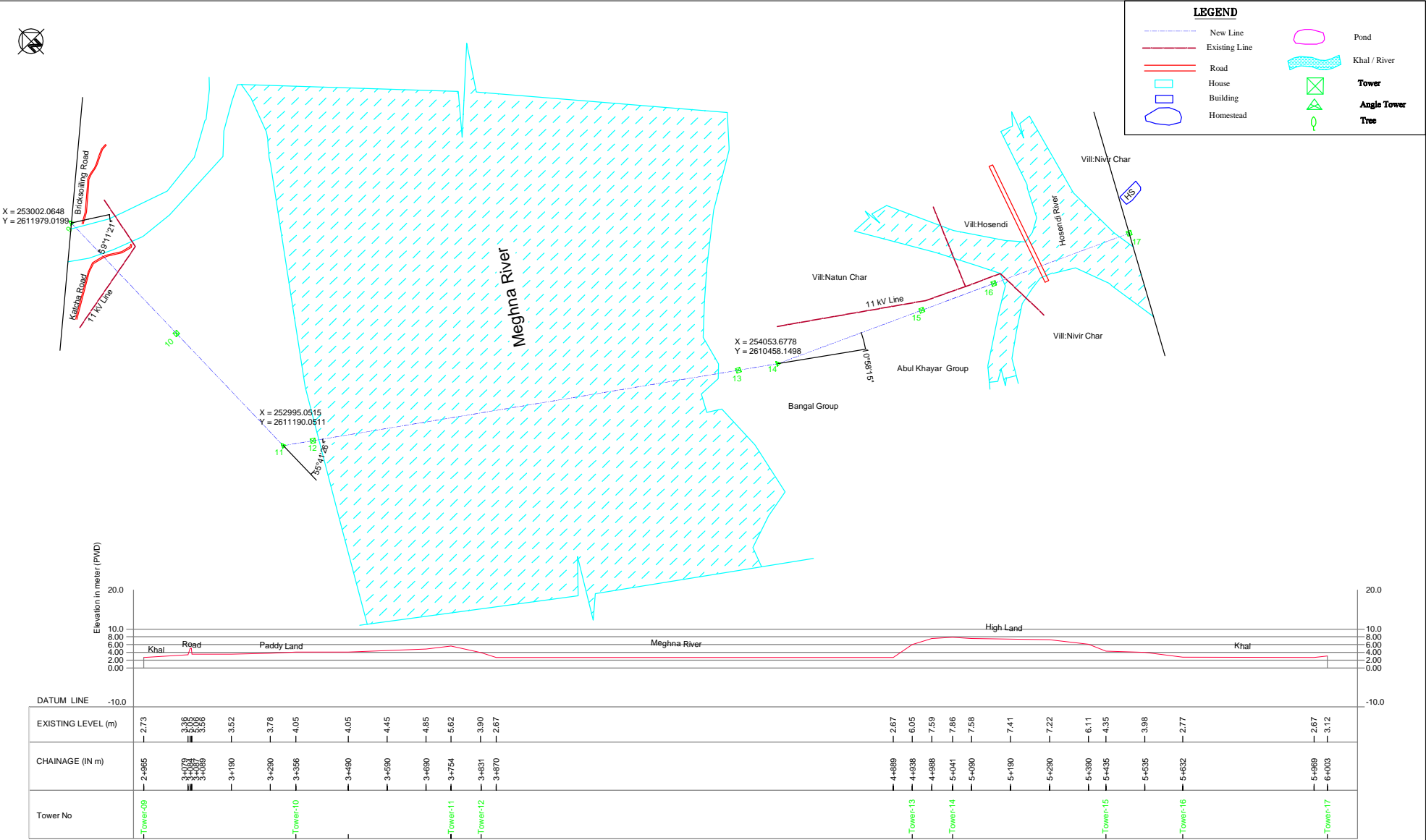
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61	62	63	64	65	66	67	68	69	70	71	72																		

CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	<b>TEPCO / JICA</b>		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATBARBARI.
SURVEYED BY				DATE OF PREPARATION	DESCRIPTION
CHECKED BY				NOVEMBER 2014	
				REVISIONS	
				1.	



EXISTING LEVEL (m)	-2.73	3.18	3.36	3.52	3.78	4.05	4.05	4.45	4.85	5.62	3.90	2.67	2.67	6.05	7.59	7.86	7.58	7.41	7.22	6.11	4.35	3.98	2.77	2.67	3.12	
CHAINAGE (IN m)	2+985	3+000	3+015	3+030	3+190	3+290	3+356	3+490	3+590	3+690	3+754	3+831	3+870	4+889	4+898	4+988	5+041	5+090	5+190	5+290	5+390	5+435	5+535	5+632	5+869	6+003
Tower No	Tower-09					Tower-10				Tower-11	Tower-12			Tower-13	Tower-14						Tower-15		Tower-16		Tower-17	

**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

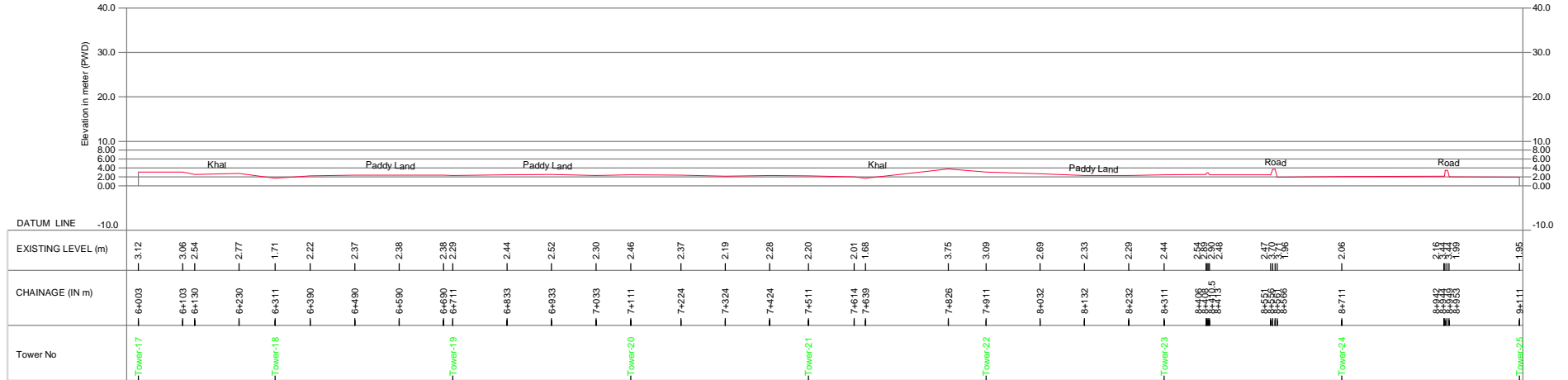
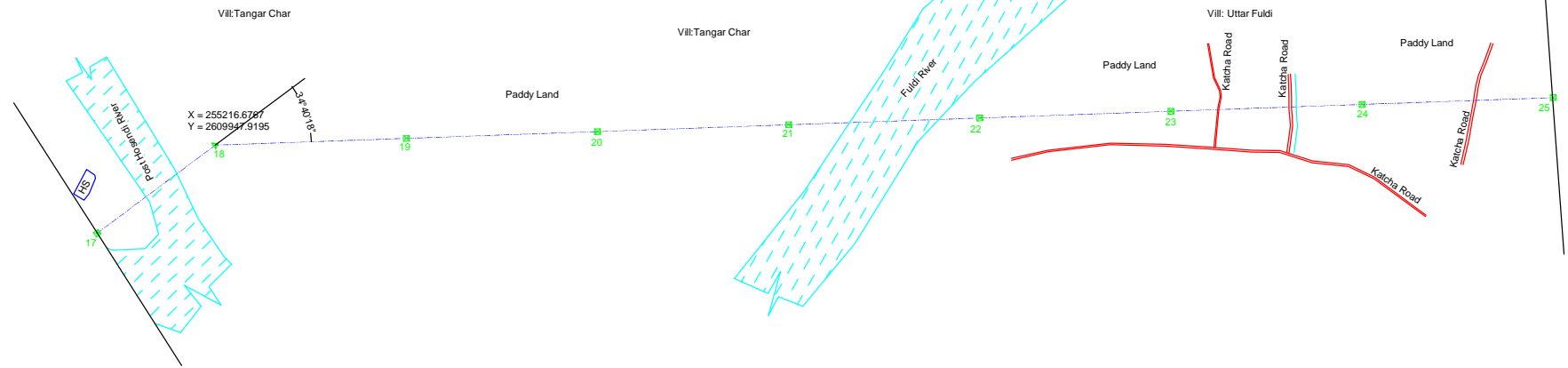
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SURVEYED BY		DATE OF PREPARATION		NOVEMBER 2014		
CHECKED BY		REVISIONS		1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

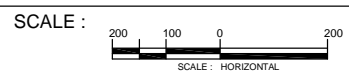
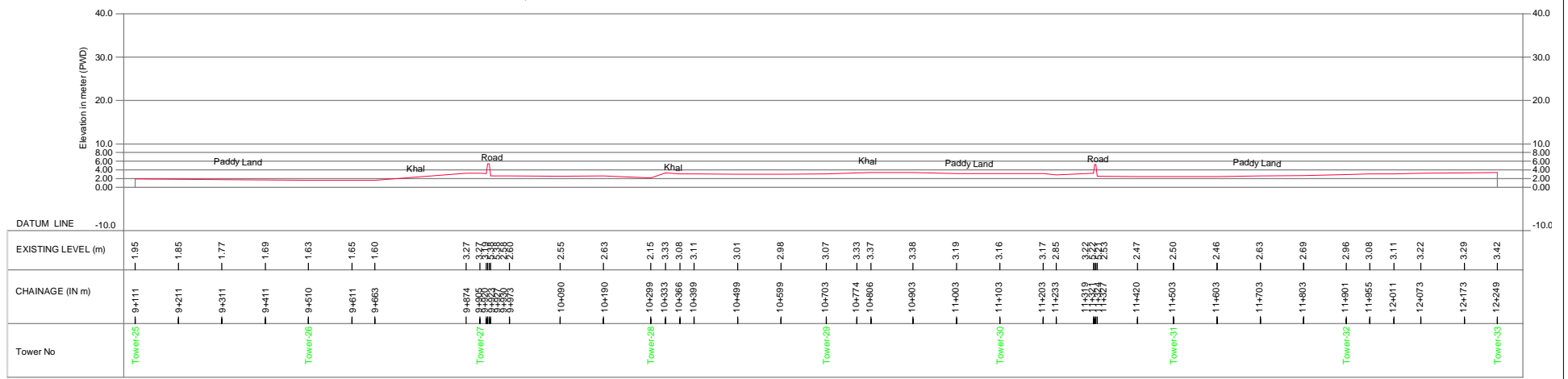
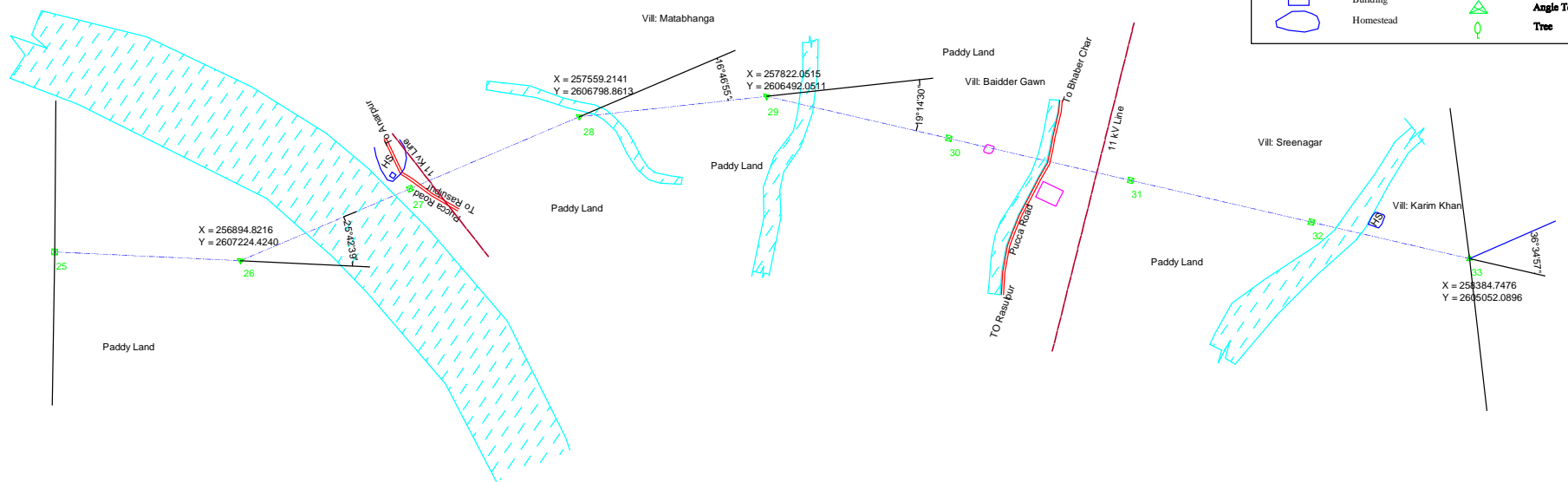
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SURVEYED BY	TEPCO / JICA		DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION
CHECKED BY			REVISIONS	1.	



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



Sheet Index

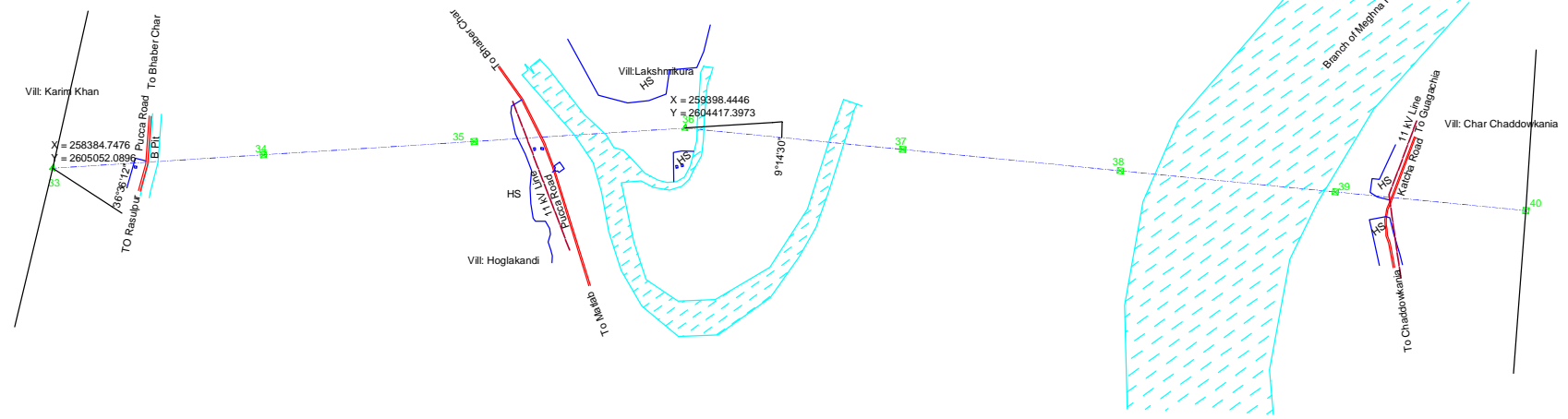
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SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS	1.		



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- ▲ Tower
- ▲ Angle Tower
- Tree



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

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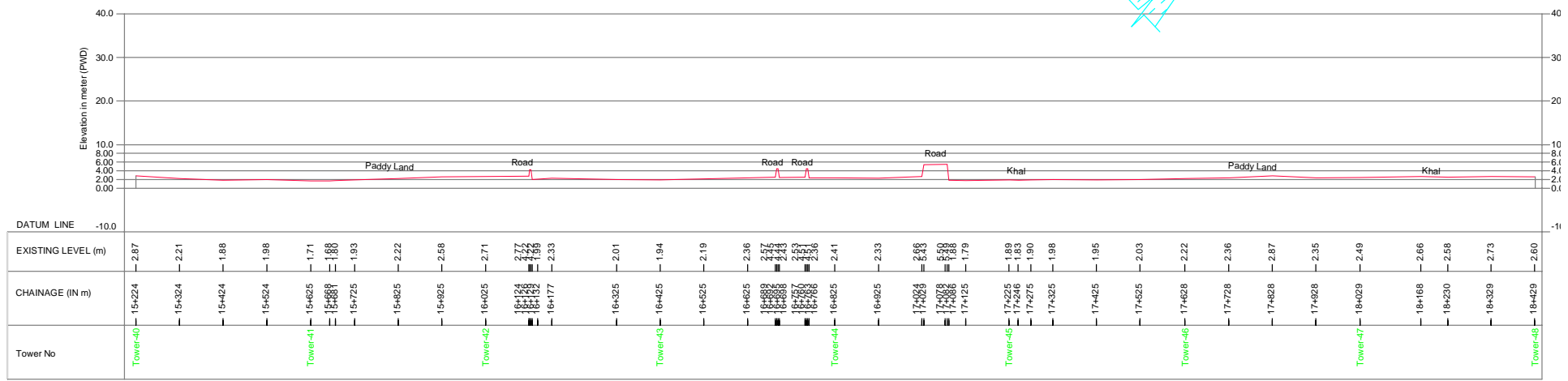
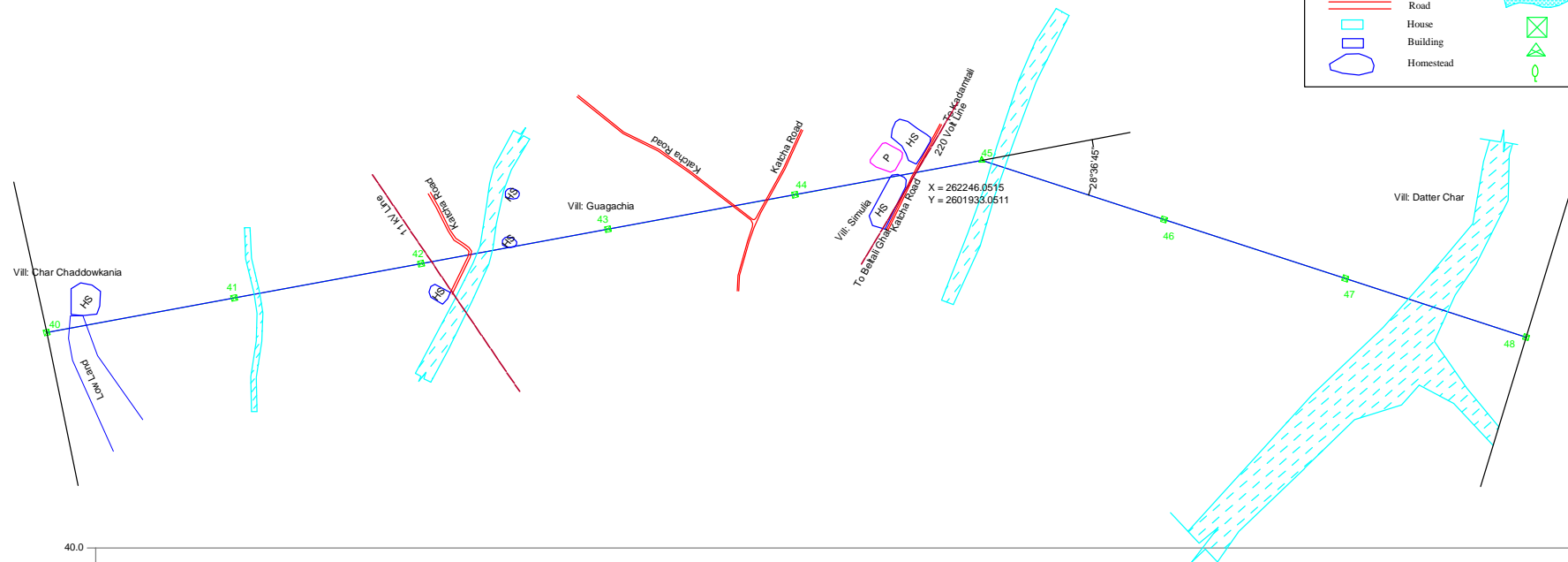
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	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)		SIGNATURE		TITLE		
SURVEYED BY			TEPCO / JICA					DATE OF PREPARATION
CHECKED BY								
					REVISIONS			
					1.			





LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



SCALE :

SCALE: HORIZONTAL

SCALE: VERTICAL

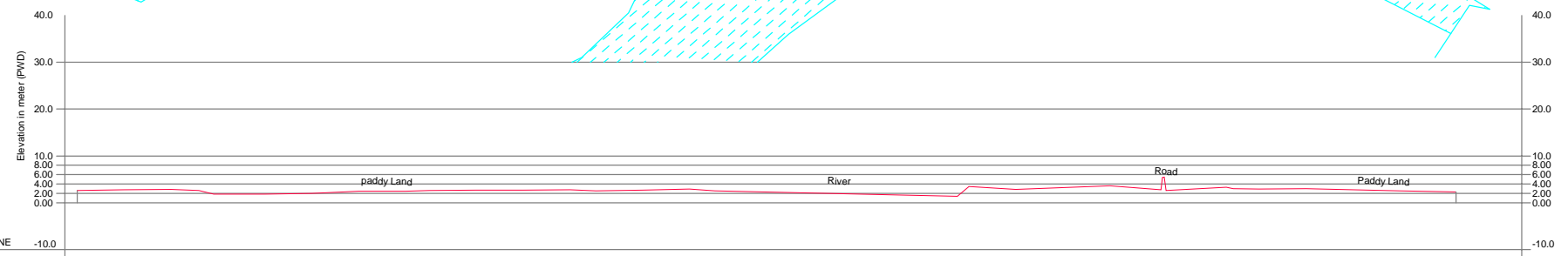
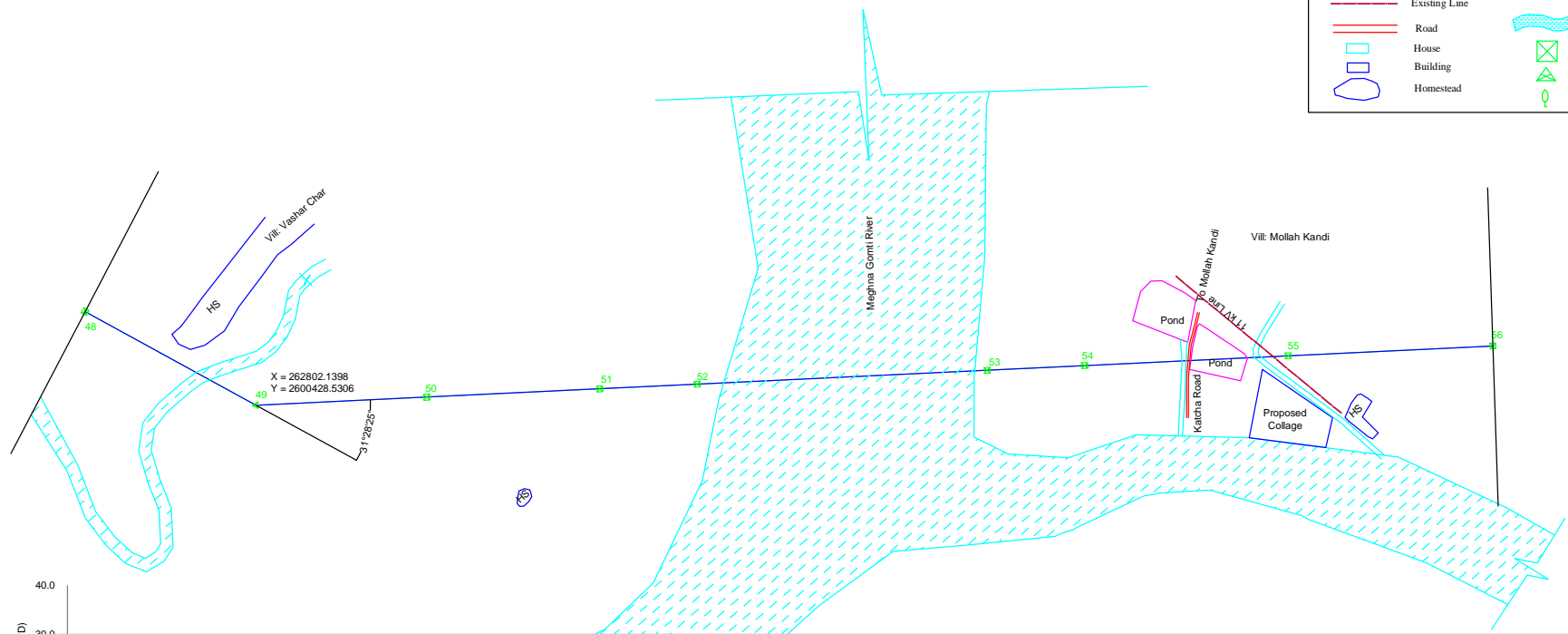
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SURVEYED BY				DATE OF PREPARATION	DESCRIPTION	
CHECKED BY				NOVEMBER 2014		
				REVISIONS		
				1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



EXISTING LEVEL (m)	CHAINAGE (IN m)	Tower No
2.60	18+429	Tower-48
2.75	18+529	
2.88	18+629	
2.59	18+688	
1.88	18+720	
1.82	18+829	Tower-49
2.03	18+929	
2.44	19+029	
2.44	19+129	
2.59	19+179	Tower-50
2.71	19+279	
2.69	19+379	
2.75	19+479	
2.55	19+534	Tower-51
2.70	19+634	
2.89	19+734	Tower-52
2.53	19+788	
1.41	20+304	Tower-53
3.45	20+329	
2.88	20+429	
3.21	20+529	Tower-54
3.63	20+629	
2.79	20+729	
2.45	20+749	
2.60	20+749	
3.38	20+827	
2.89	20+847	Tower-55
3.04	21+047	
2.77	21+147	
2.57	21+247	
2.31	21+367	Tower-56

**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

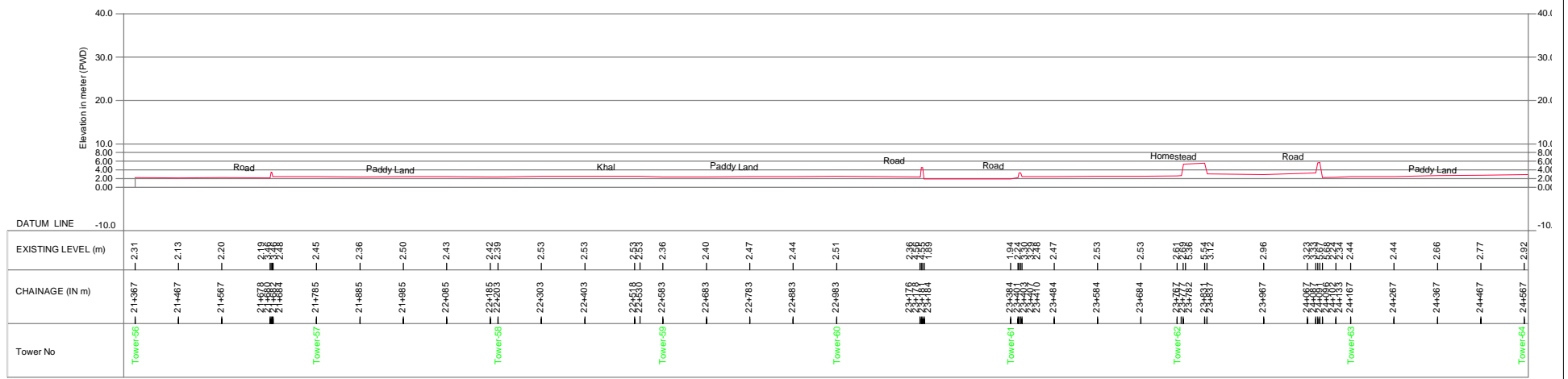
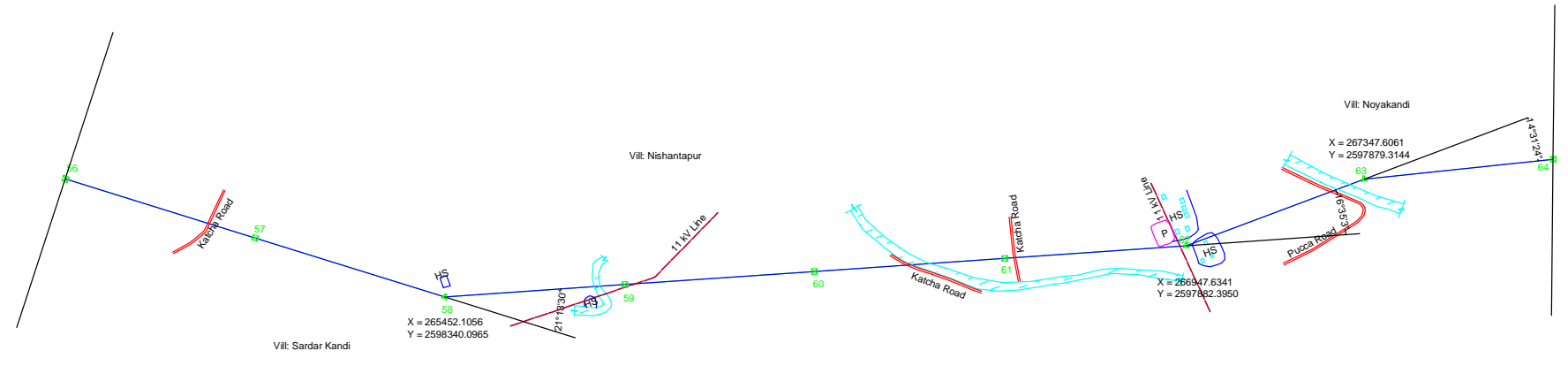
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
	Engineers Associates Ltd. (EAL)				TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400kV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI,	
LOCAL CONSULTANT		TEPCO / JICA		DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
SURVEYED BY				REVISIONS	1.		
CHECKED BY							



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

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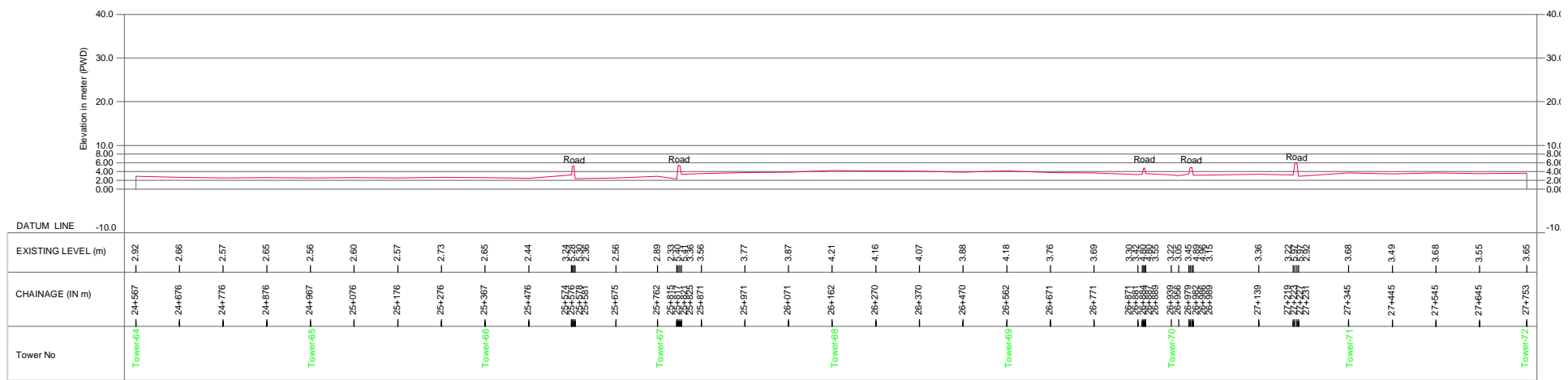
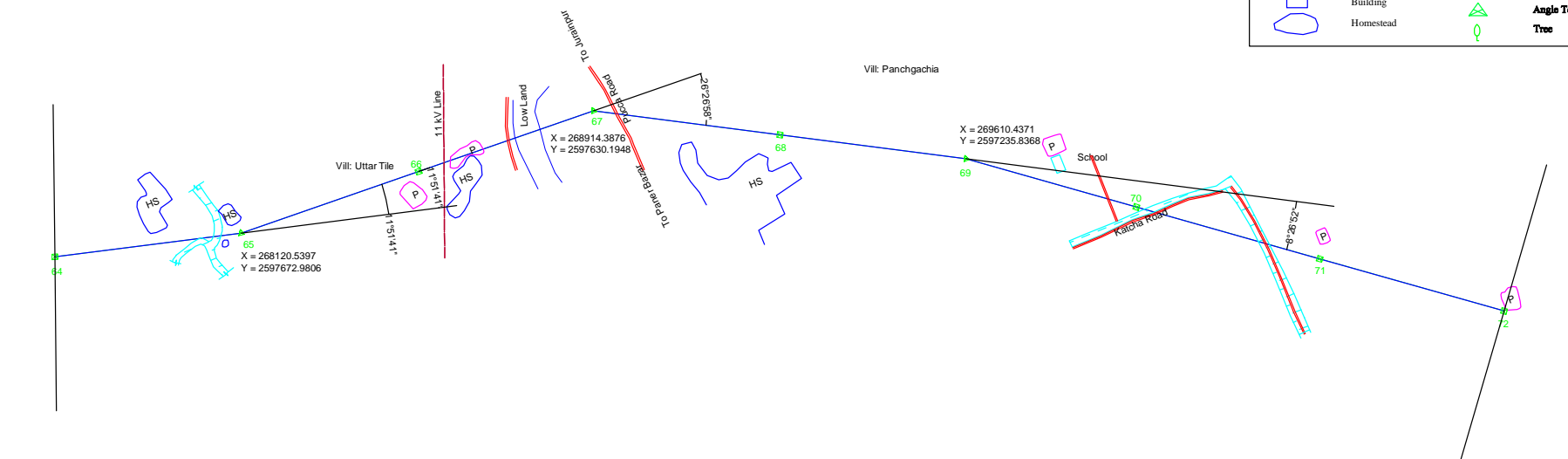
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SURVEYED BY		DATE OF PREPARATION		NOVEMBER 2014		
CHECKED BY		REVISIONS		1.		



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- ~ Khal / River
- Tower
- △ Angle Tower
- Tree



**SCALE :**

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SCALE: VERTICAL: 1:20

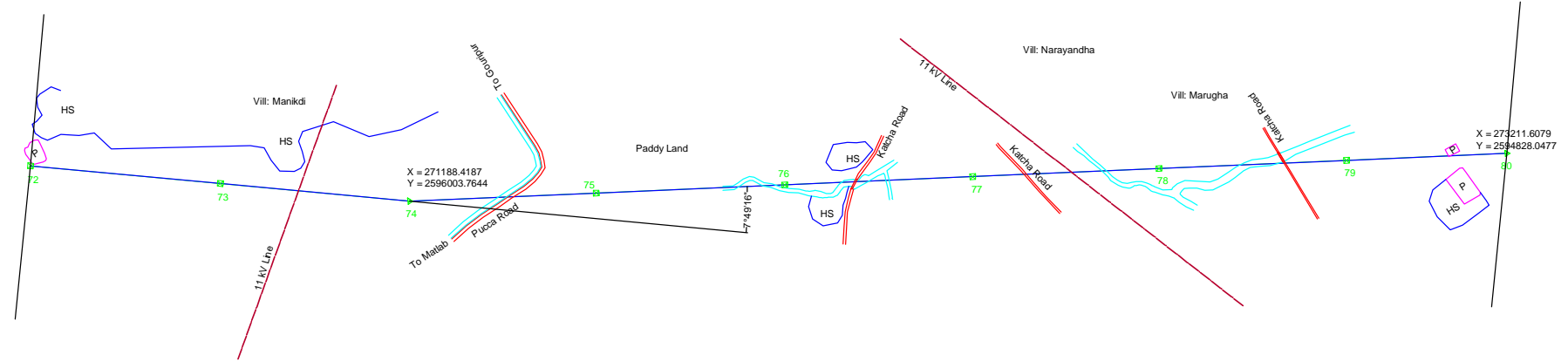
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	Engineers Associates Ltd. (EAL)	SIGNATURE		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY		TEPCO / JICA	DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION
CHECKED BY			REVISIONS	1.	



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

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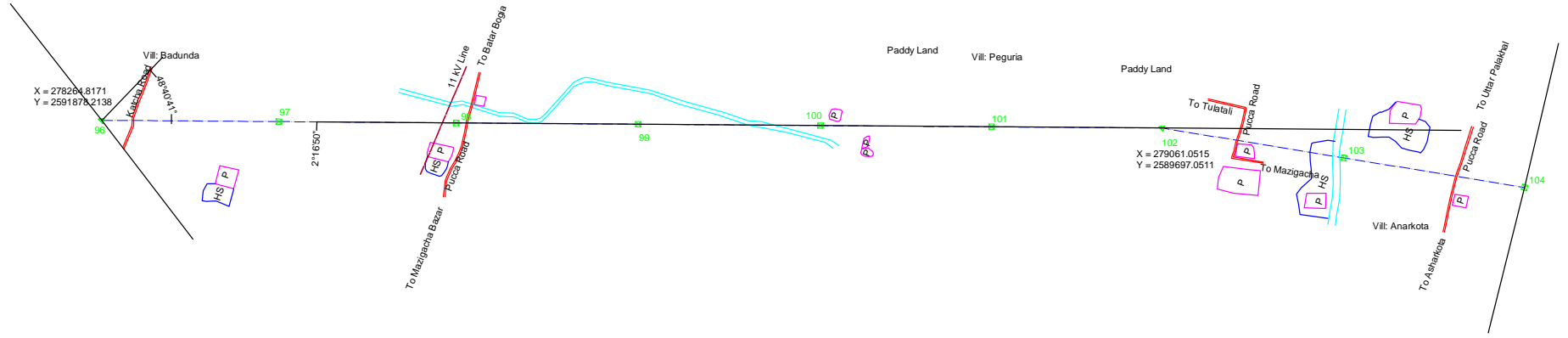






**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- ~ Khal / River
- ⊠ Tower
- ⊠ Angle Tower
- Tree



Elevation in meter (PWD)	40.0	30.0	20.0	10.0	8.00	6.00	4.00	2.00	0.00	DATUM LINE	-10.0																															
EXISTING LEVEL (m)	3.88	3.90	3.90	3.92	3.79	3.88	3.89	3.81	3.93	3.89	3.80	3.71	3.77	3.69	3.66	3.73	3.56	3.57	3.60	3.77	3.69	3.74	3.79	4.01	3.93	4.16	3.99	4.16	4.15	4.15	4.00	4.22	4.66	4.49	4.55	4.57	4.23					
CHAINAGE (IN m)	36+886	36+890	36+895	36+900	36+905	37+086	37+166	37+274	37+374	37+474	37+574	37+682	37+782	38+080	38+180	38+280	38+300	38+361	38+459	38+559	38+659	38+759	38+834	38+934	39+034	39+134	39+207	39+307	39+370	39+435	39+499	39+564	39+611	39+711	39+856	39+916	39+976	40+011				
Tower No	Tower96					Tower97								Tower99					Tower100					Tower101											Tower102							Tower104

**SCALE :**

SCALE: HORIZONTAL: 1:2000

SCALE: VERTICAL: 1:1000

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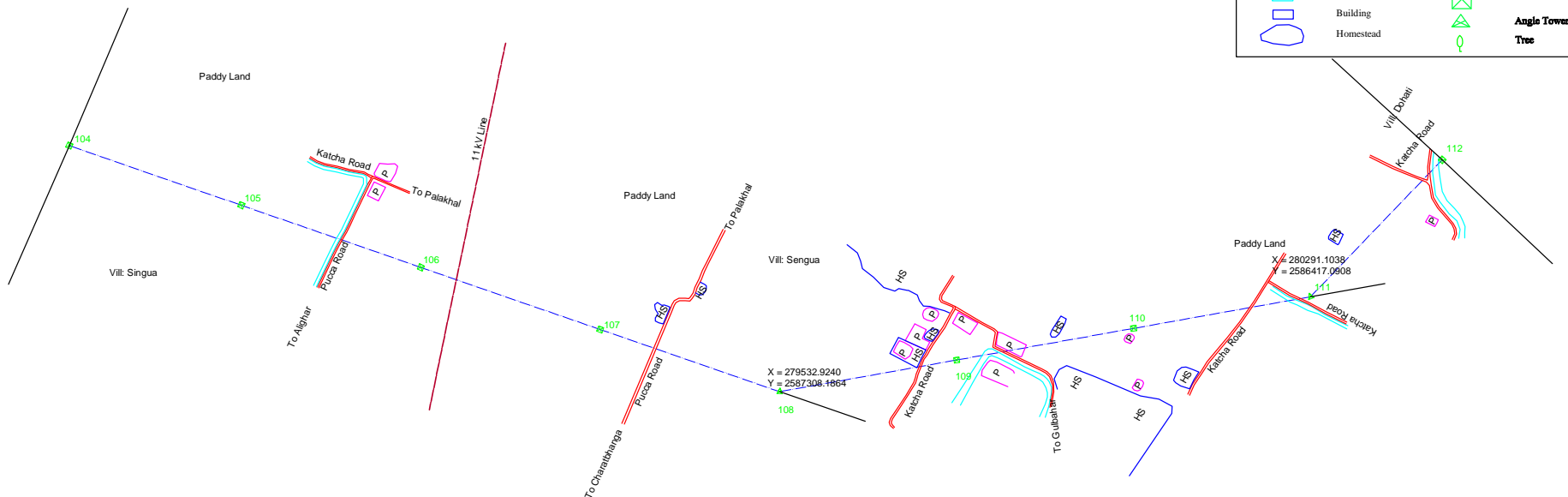
CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY				DATE OF PREPARATION	DESCRIPTION
CHECKED BY				NOVEMBER 2014	
				REVISIONS	
				1.	





**LEGEND**

- New Line
- Existing Line
- == Road
- House
- Building
- Homestead
- Pond
- ~ Khal / River
- ⊠ Tower
- △ Angle Tower
- Tree



**SCALE :**

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SCALE: HORIZONTAL

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SCALE: VERTICAL

Sheet Index

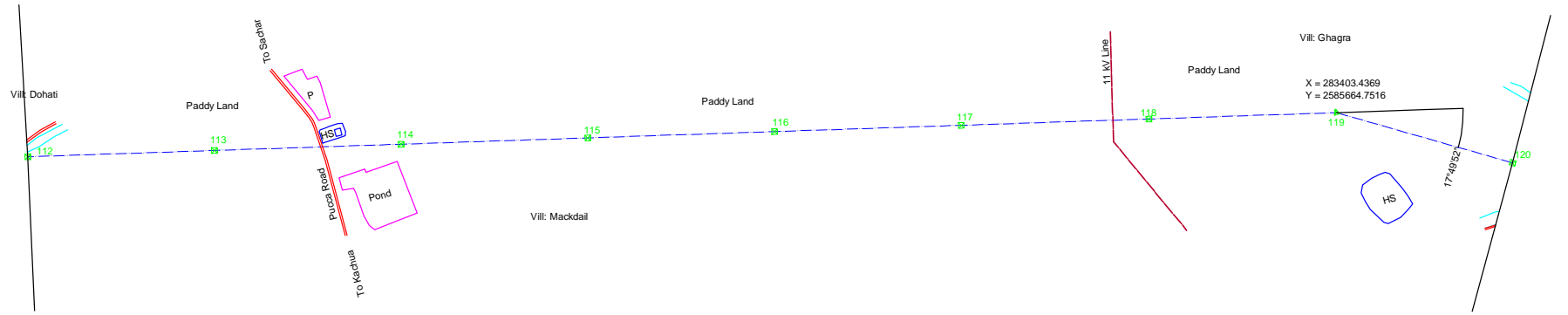
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61	62	63	64	65	66	67	68	69	70	71	72																		

CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS	1.		



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- Tower
- Angle Tower
- Tree



SCALE :



Sheet Index

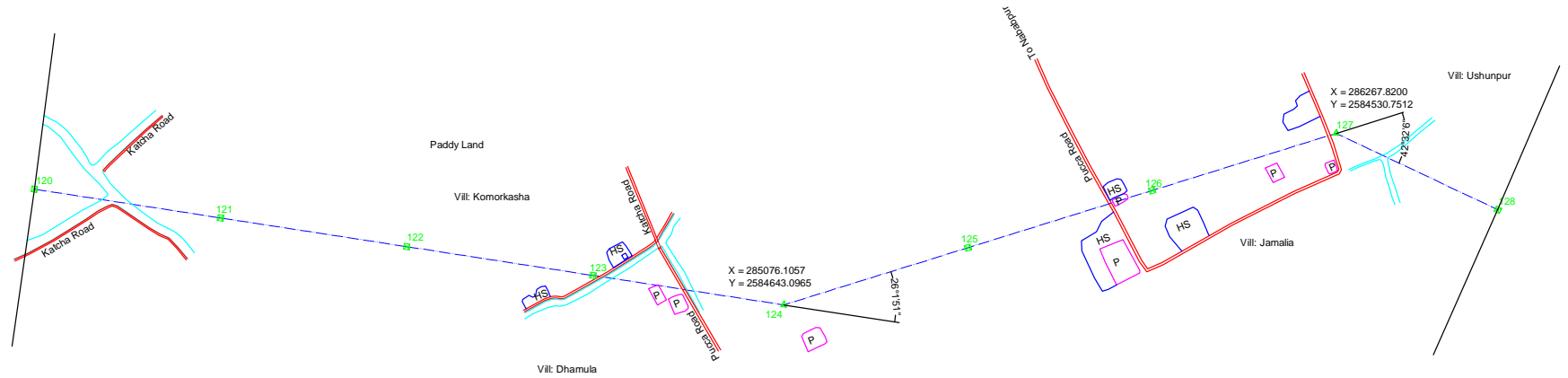
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY		TEPCO / JICA		DATE OF PREPARATION	DESCRIPTION
				NOVEMBER 2014	
CHECKED BY				REVISIONS	
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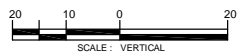
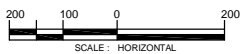


**LEGEND**

- New Line (dashed blue line)
- Existing Line (solid red line)
- Road (red line with double lines)
- House (blue rectangle)
- Building (blue rectangle with roof)
- Homestead (blue irregular shape)
- Pond (pink oval)
- Khal / River (blue wavy line)
- Tower (green square with cross)
- Angle Tower (green triangle with cross)
- Tree (green circle with cross)



SCALE :



Sheet Index

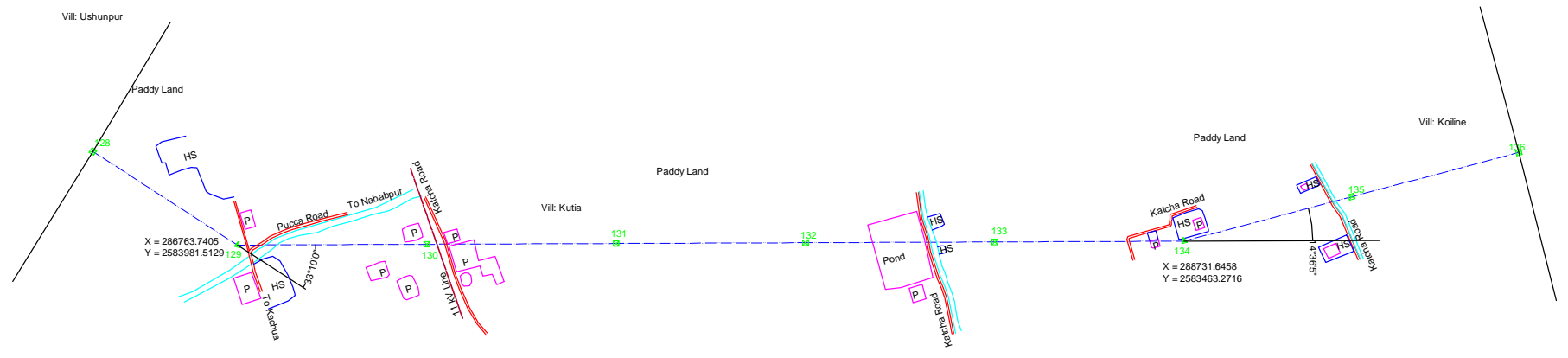
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARAI.	
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	
CHECKED BY				REVISIONS	1.	



**LEGEND**

- New Line (dashed blue line)
- Existing Line (solid red line)
- Road (double red line)
- House (cyan rectangle)
- Building (blue rectangle)
- Homestead (blue irregular shape)
- Pond (pink oval)
- Khal / River (cyan wavy line)
- Tower (green square with cross)
- Angle Tower (green triangle with cross)
- Tree (green circle with cross)



**SCALE :**

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Vertical Scale: 1:20 (0 to 20m)

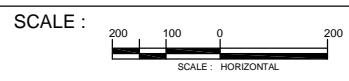
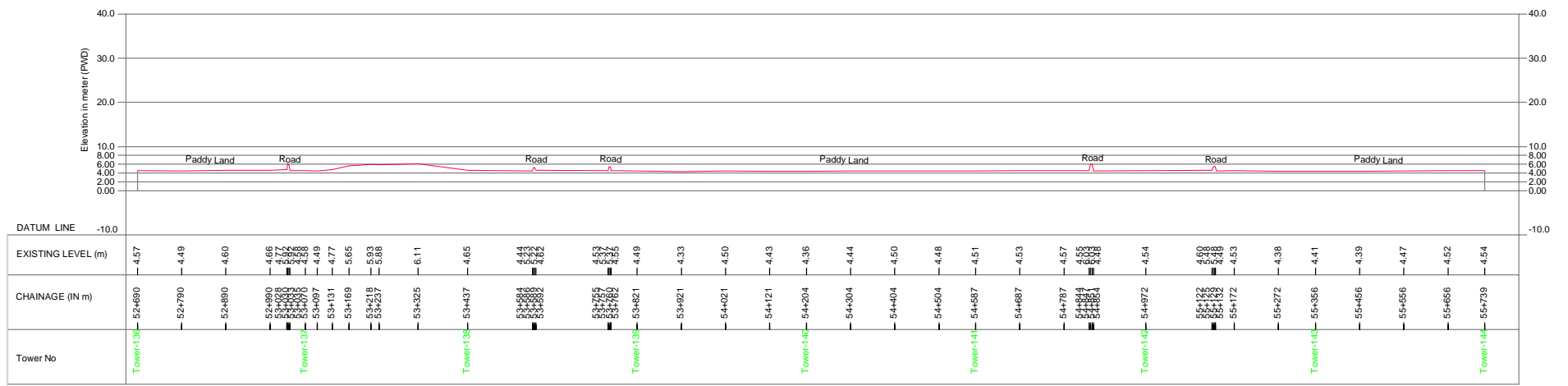
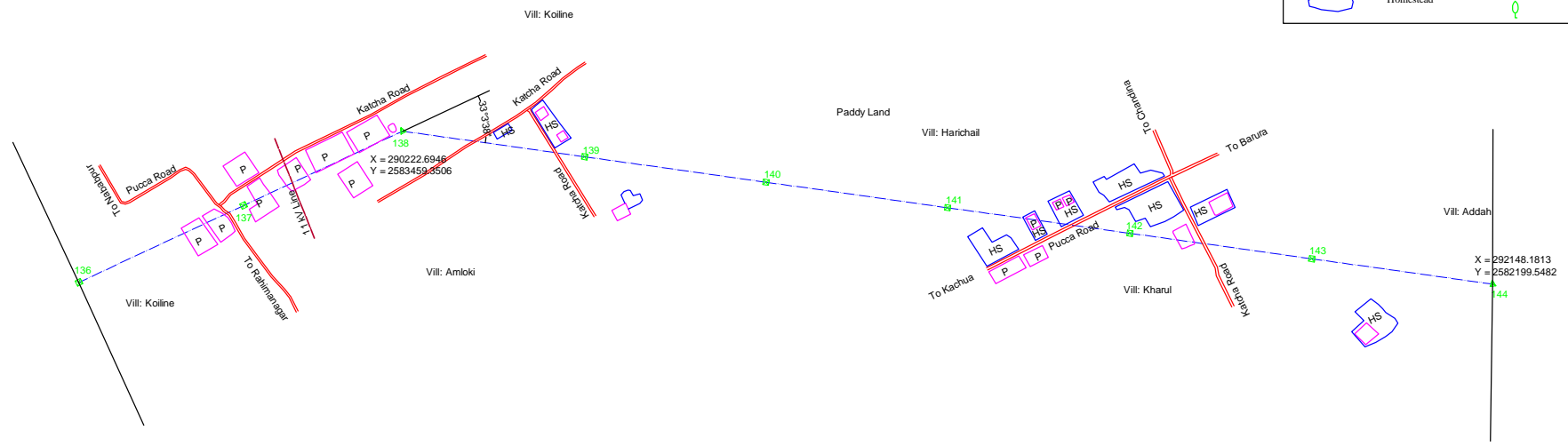
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
	Engineers Associates Ltd. (EAL)	SIGNATURE		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY		TEPCO / JICA	DATE OF PREPARATION	DESCRIPTION	
CHECKED BY			NOVEMBER 2014		
			REVISIONS		
			1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



Sheet Index

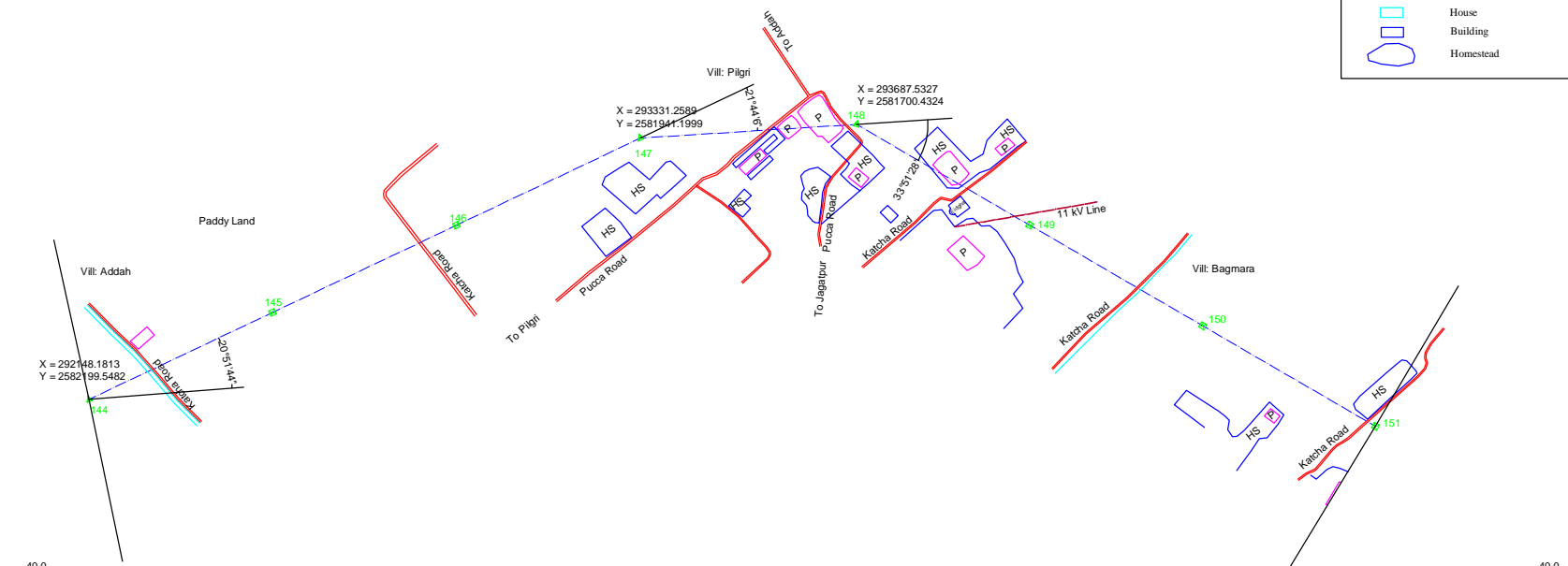
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	TEPCO / JICA	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)			TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014		
CHECKED BY				REVISIONS	1.		



### LEGEND

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- ~ Khal / River
- Tower
- △ Angle Tower
- Tree



Elevation in meter (PWD)	
40.0	40.0
30.0	30.0
20.0	20.0
10.0	10.0
8.00	8.00
6.00	6.00
4.00	4.00
2.00	2.00
0.00	0.00
DATUM LINE	-10.0
EXISTING LEVEL (m)	4.54, 4.48, 4.52, 4.63, 4.60, 4.51, 4.63, 4.54, 4.60, 4.60, 4.53, 4.71, 4.67, 4.63, 3.22, 3.89, 3.93, 3.97, 3.99, 4.98, 4.16, 4.77, 4.53, 4.54, 4.49, 4.70, 4.63, 4.70, 4.66, 4.63, 4.70, 4.66, 4.71
CHAINAGE (IN m)	55+738, 55+747, 55+756, 55+765, 55+774, 55+783, 56+039, 56+048, 56+142, 56+242, 56+342, 56+442, 56+546, 56+646, 56+746, 56+846, 56+950, 57+050, 57+107, 57+200, 57+208, 57+250, 57+353, 57+362, 57+371, 57+380, 57+480, 57+582, 57+682, 57+779, 57+878, 58+021, 58+121, 58+130, 58+248, 58+257, 58+266, 58+275, 58+375, 58+489, 58+498, 58+507, 58+516
Tower No	Tower-144, Tower-145, Tower-146, Tower-147, Tower-148, Tower-149, Tower-150, Tower-151

**SCALE :**

SCALE: HORIZONTAL

SCALE: VERTICAL

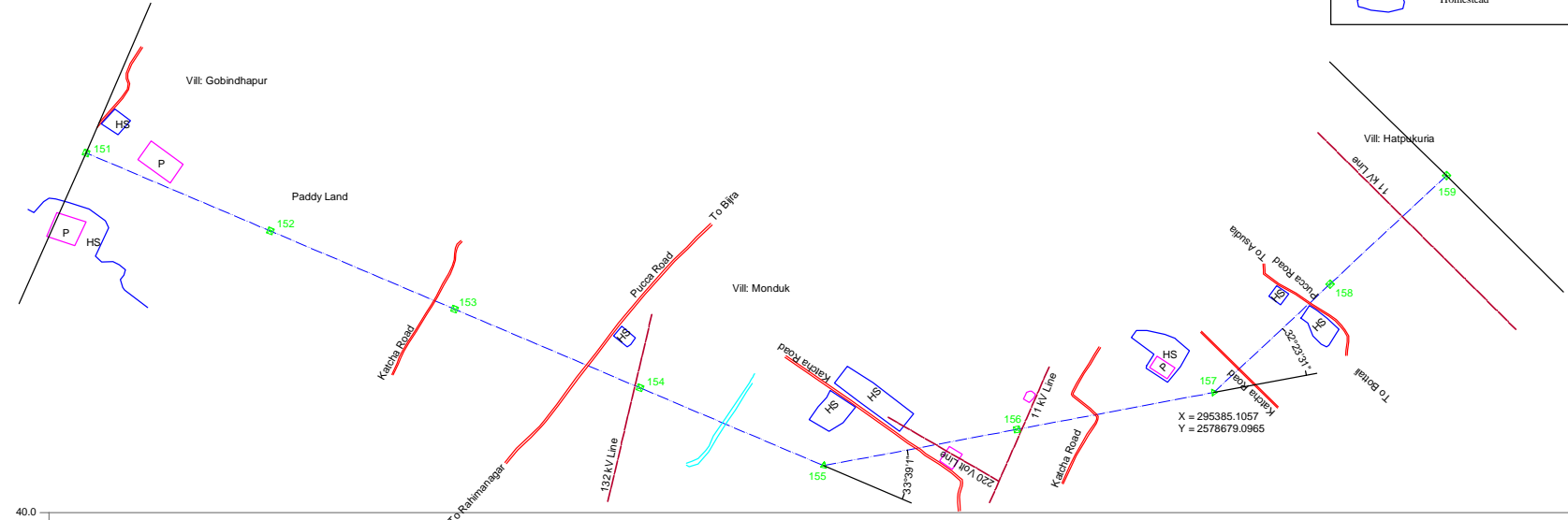
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)			PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	APPROVED BY		SIGNATURE	TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY		<b>TEPCO / JICA</b>		DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS			
				1.			



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE: HORIZONTAL

SCALE: VERTICAL

Sheet Index

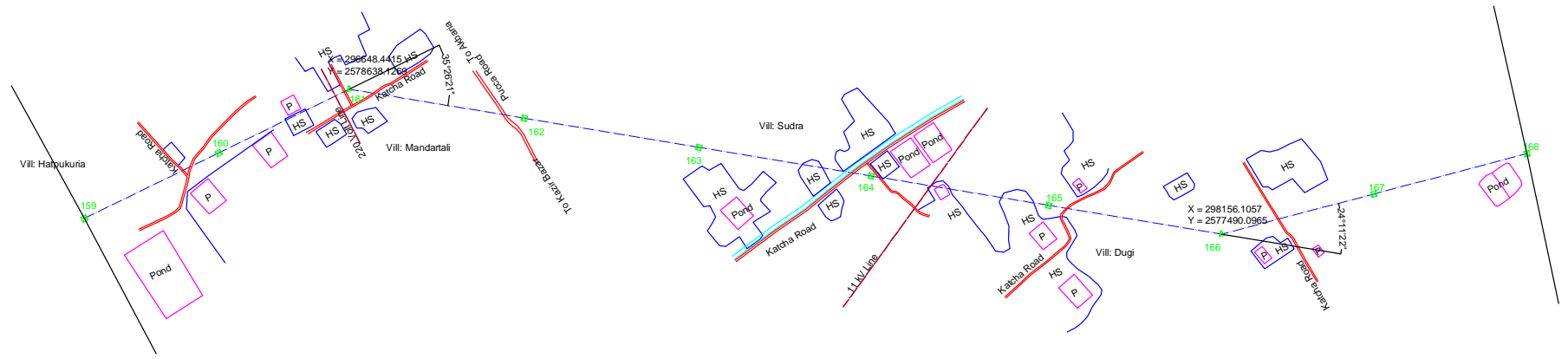
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	<b>TEPCO / JICA</b>	TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
SURVEYED BY		DATE OF PREPARATION		NOVEMBER 2014		
CHECKED BY		REVISIONS				
		1.				



**LEGEND**

	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tree
	Homestead		



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

Sheet Index

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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)			TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY		TEPCO / JICA		DATE OF PREPARATION	DESCRIPTION	
CHECKED BY				NOVEMBER 2014		
				REVISIONS		
				1.		

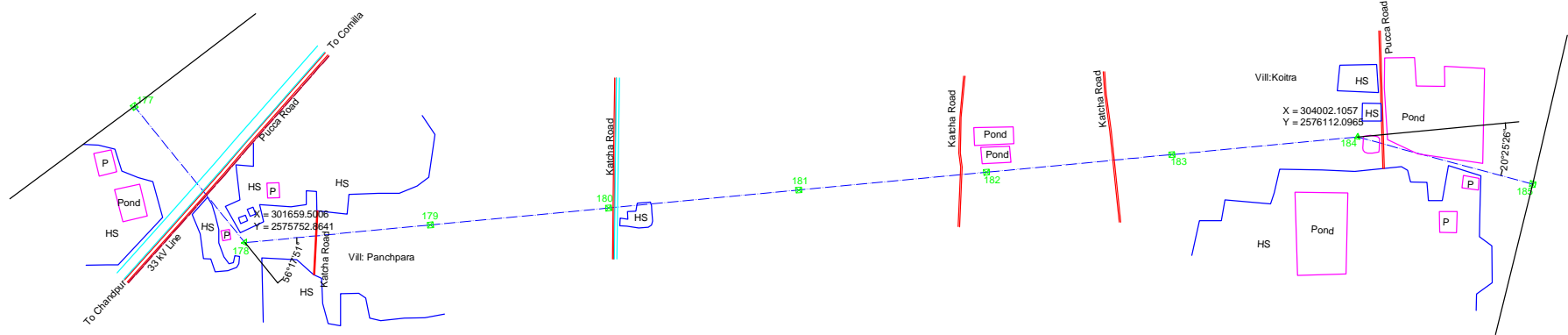






**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- ~ Khal / River
- △ Tower
- △ Angle Tower
- Tree



Elevation in meter (PWD)	
40.0	40
30.0	30
20.0	20
10.0	10
6.00	6.1
4.00	4.1
2.00	2.1
0.00	0.1
DATUM LINE	-10.0
EXISTING LEVEL (m)	4.71, 4.79, 4.60, 4.59, 4.51, 4.62, 4.71, 4.57, 4.50, 4.46, 4.60, 4.47, 4.55, 4.45, 4.49, 4.49, 4.53, 4.60, 4.56, 4.67, 4.77, 4.63, 4.56, 4.44, 4.48, 4.51, 4.46, 4.51, 4.61, 4.49, 4.55, 4.54, 4.68, 4.52, 4.53, 4.44, 4.52, 4.48
CHAINAGE (IN m)	67+807, 68+007, 68+117, 68+134, 68+150, 68+279, 68+379, 68+428, 68+431, 68+434, 68+437, 68+454, 68+579, 68+674, 68+774, 68+874, 68+974, 68+1074, 68+1174, 68+1274, 68+1374, 68+1474, 68+254, 68+354, 68+459, 68+559, 68+659, 68+759, 68+859, 68+959, 68+1059, 68+1159, 68+1259, 68+1359, 68+1459, 70+059, 70+159, 70+259, 70+354, 70+454, 70+554, 70+649, 70+702, 70+705, 70+708, 70+711, 70+714, 70+717, 70+720, 70+849, 70+949, 71+034, 71+034
Tower No	Tower-177, Tower-178, Tower-179, Tower-180, Tower-181, Tower-182, Tower-183, Tower-184, Tower-185

**SCALE :**

SCALE: HORIZONTAL

SCALE: VERTICAL

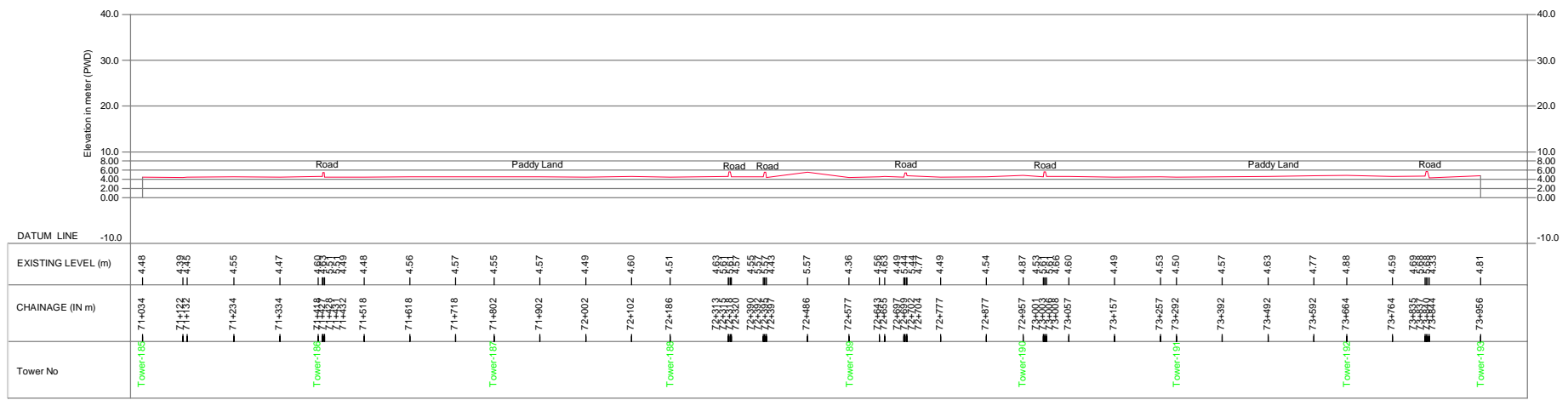
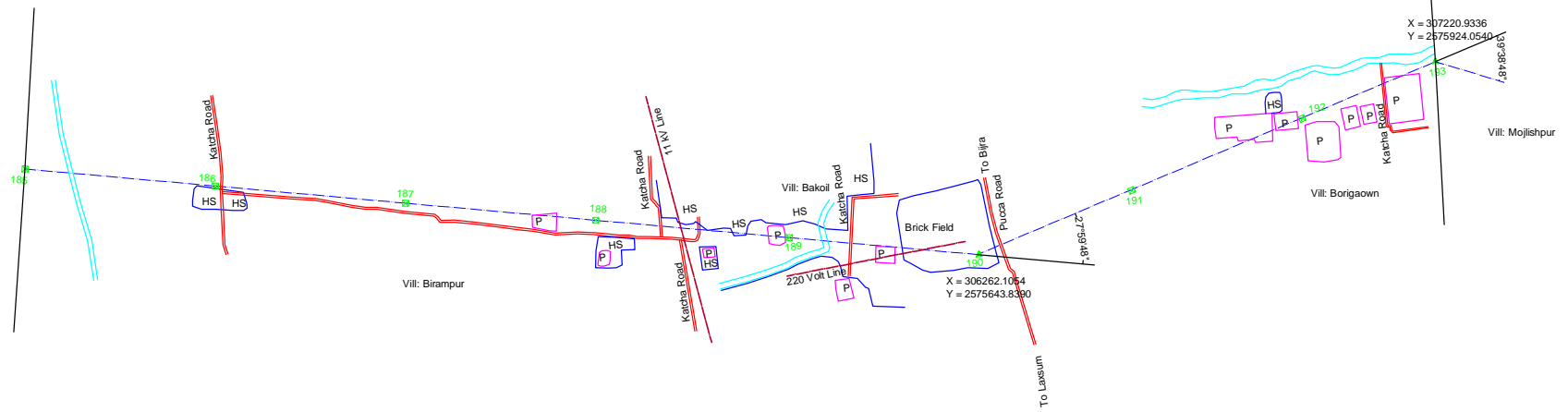
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CONSULTANT		Tokyo Electric Power Company, Incorporated (TEPCO)		PROJECT NAME		MAIN POWER GRID STRENGTHENING PROJECT	
		APPROVED BY	SIGNATURE				
LOCAL CONSULTANT		Engineers Associates Ltd. (EAL)		<b>TEPCO / JICA</b>		ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARAI,	
		SURVEYED BY					
CHECKED BY				DATE OF PREPARATION		NOVEMBER 2014	
						DESCRIPTION	
				REVISIONS			
				1.			



LEGEND			
	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tree
	Homestead		



**SCALE :**

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SCALE: HORIZONTAL

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SCALE: VERTICAL

Sheet Index

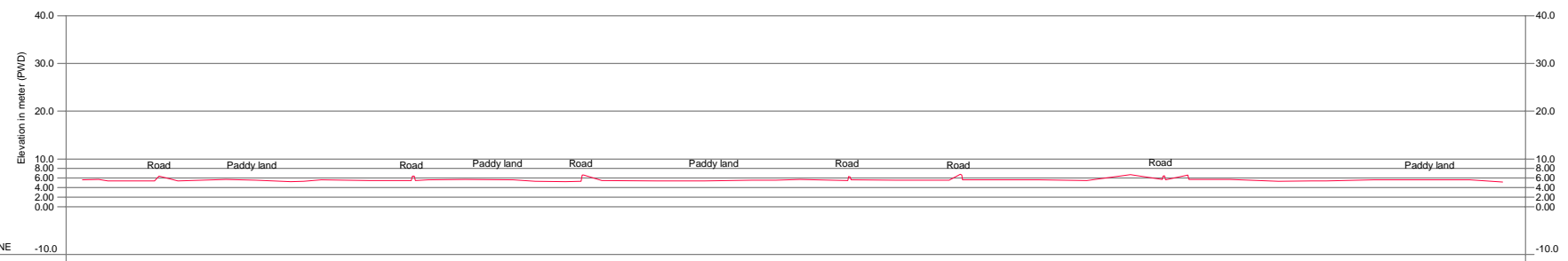
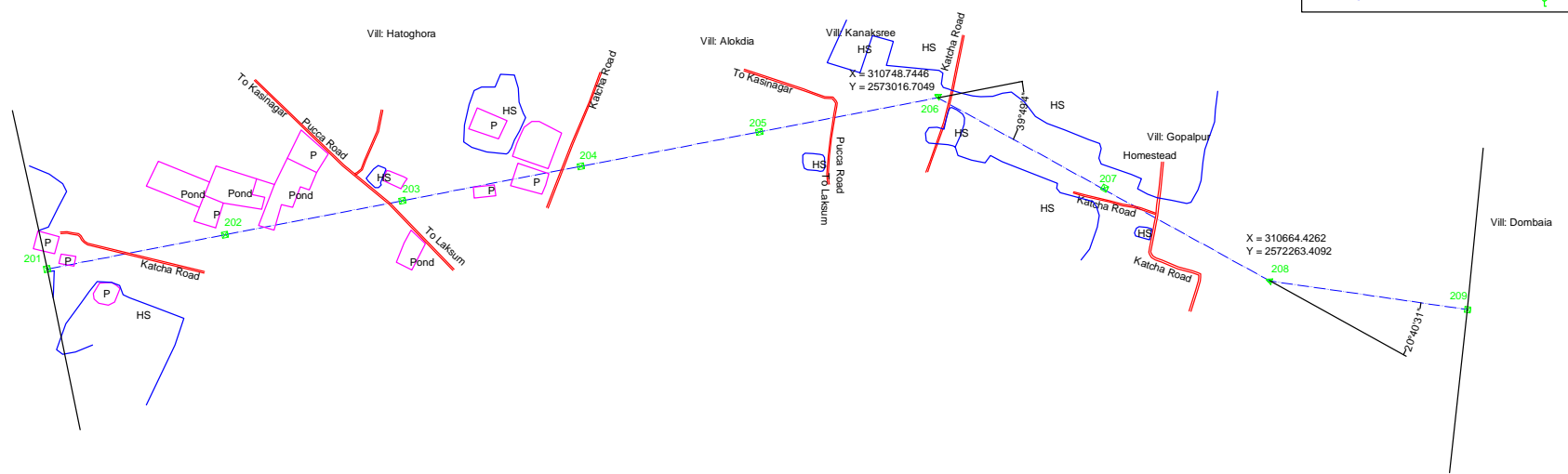
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS	1.		



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- X Tower
- △ Angle Tower
- Tree



EXISTING LEVEL (m)	CHAINAGE (IN m)	Tower No
5.65	76+865	Tower-201
5.74	76+869	
5.44	77+019	
5.44	77+085	
5.43	77+116	
6.34	77+125	
6.37	77+135	
5.37	77+165	
5.74	77+265	
5.57	77+327	Tower-202
5.27	77+401	
5.30	77+428	
5.64	77+465	
5.47	77+565	
5.51	77+653	
5.44	77+659	
5.61	77+688	Tower-203
5.74	77+765	
5.64	77+865	
5.32	77+912	
5.21	77+935	
5.32	78+008	
6.62	78+019	
5.50	78+051	Tower-204
5.4	78+165	
5.44	78+265	
5.56	78+365	
5.57	78+414	Tower-205
5.74	78+456	
5.68	78+565	
6.62	78+619	
5.52	78+665	
5.69	78+777	Tower-206
6.79	78+800	
6.76	78+803	
6.74	78+813	
5.64	78+865	
5.66	78+965	
5.46	79+065	
6.74	79+156	Tower-207
5.74	79+227	
6.46	79+227	
6.46	79+227	
6.46	79+227	
6.46	79+227	
5.64	79+277	
5.74	79+365	
5.32	79+465	
5.42	79+535	Tower-208
5.43	79+565	
5.64	79+665	
5.64	79+765	
5.62	79+865	
5.19	79+934	Tower-209

**SCALE :**

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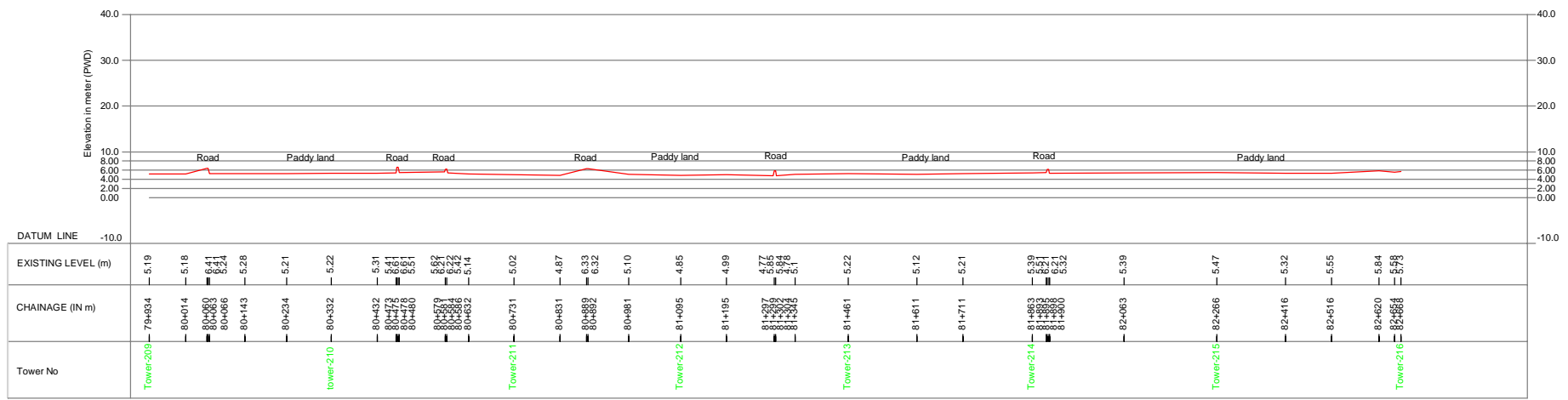
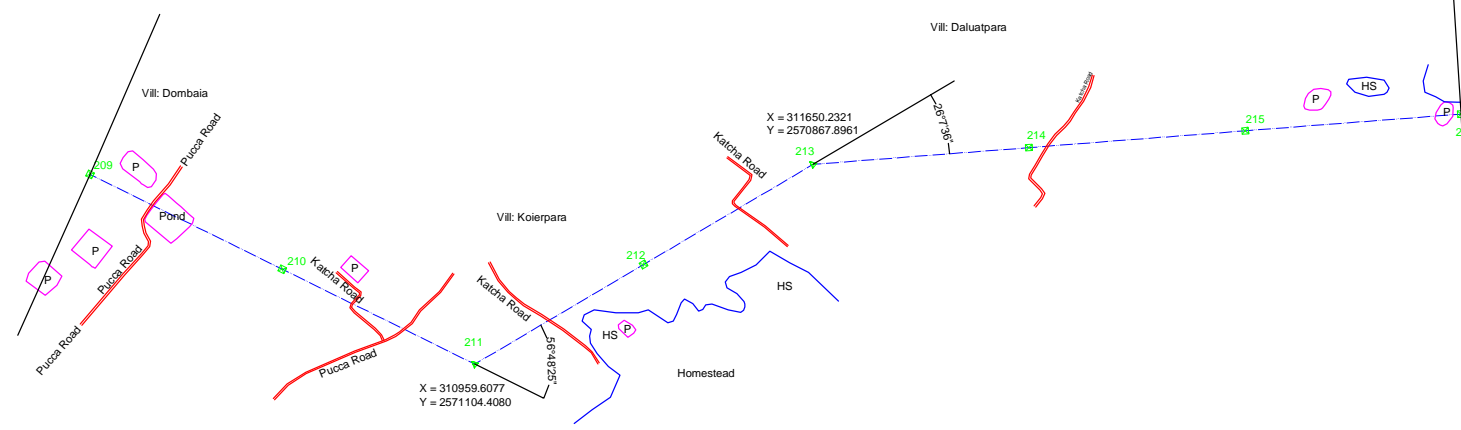
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
	LOCAL CONSULTANT			Engineers Associates Ltd. (EAL)	TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
	SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014
CHECKED BY		TEPCO / JICA		REVISIONS		
				1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE: HORIZONTAL

SCALE: VERTICAL

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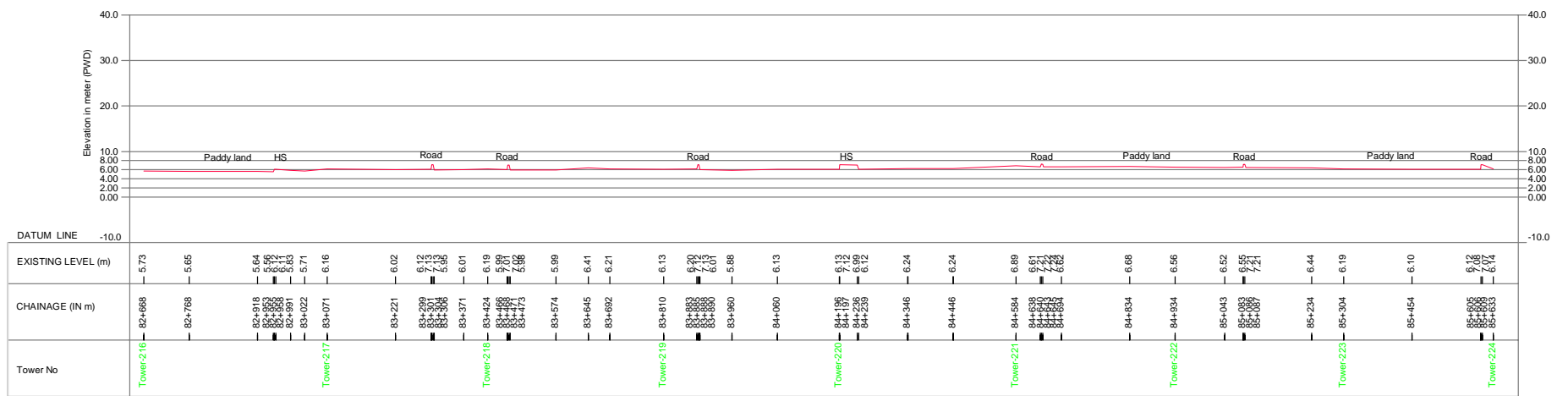
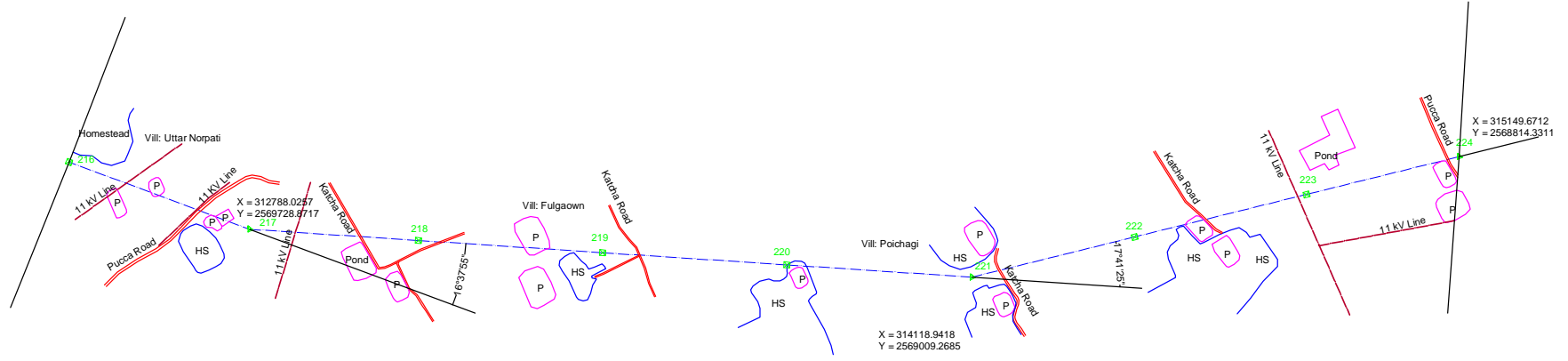
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400kV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS	1.		



### LEGEND

	New Line		Pond
	Existing Line		Khal / River
	Road		<b>Tower</b>
	House		<b>Angle Tower</b>
	Building		<b>Tree</b>
	Homestead		



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

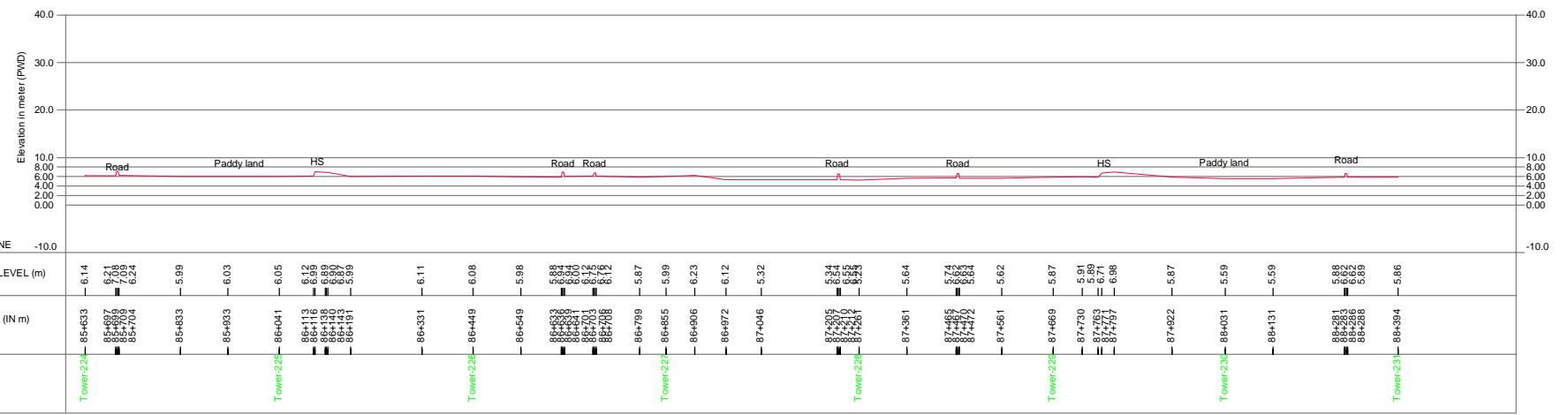
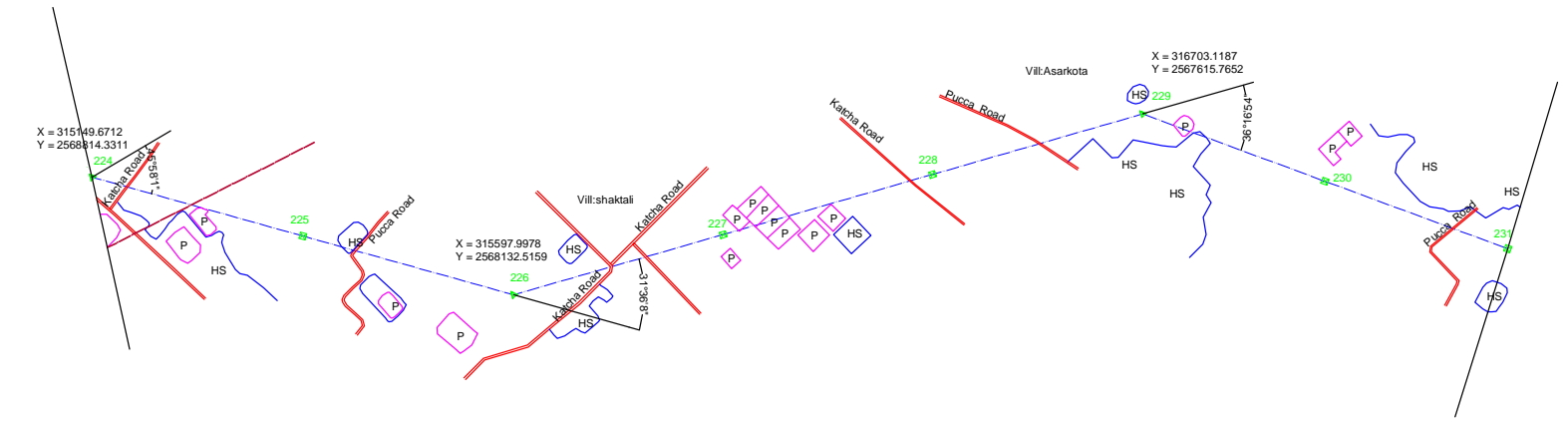
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)		APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)		<b>TEPCO / JICA</b>		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
SURVEYED BY			DATE OF PREPARATION		NOVEMBER 2014		DESCRIPTION	
CHECKED BY			REVISIONS		1.			

**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- X Tower
- ▲ Angle Tower
- Tree



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

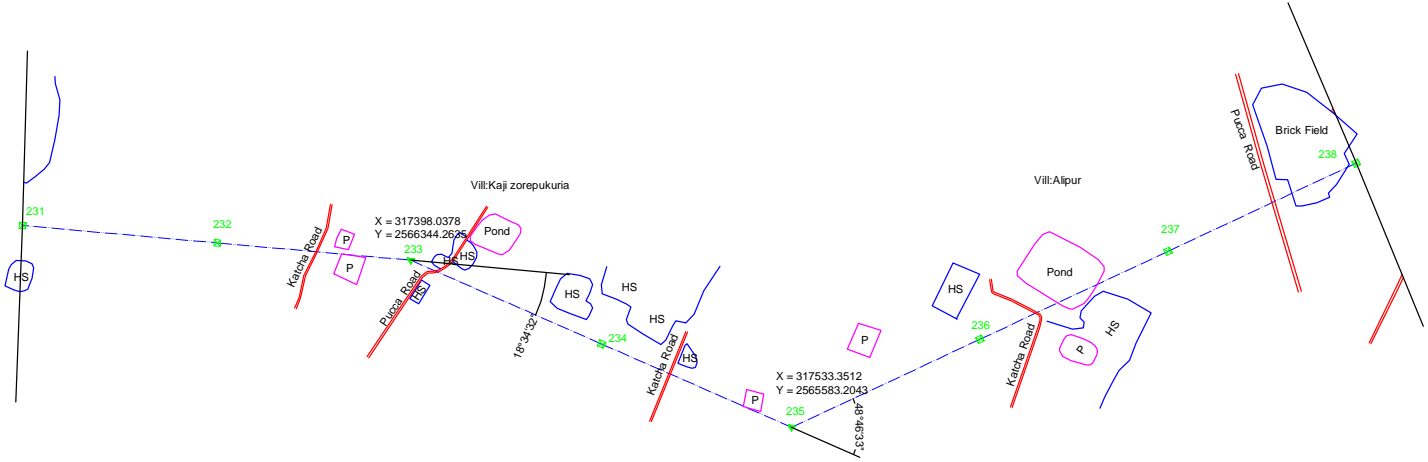
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	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	<b>TEPCO / JICA</b>		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
SURVEYED BY		DATE OF PREPARATION			NOVEMBER 2014	DESCRIPTION	
CHECKED BY		REVISIONS					
		1.					



LEGEND			
	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tree
	Homestead		



Elevation in meter (PWD)	
Left Axis	Right Axis
40.0	40.0
30.0	30.0
20.0	20.0
10.0	10.0
8.00	8.00
6.00	6.00
4.00	4.00
2.00	2.00
0.00	0.00
DATUM LINE	-10.0
EXISTING LEVEL (m)	5.86, 5.78, 5.91, 5.86, 5.77, 5.78, 6.85, 5.98, 5.86, 5.92, 6.02, 7.05, 5.93, 5.92, 5.87, 6.02, 6.12, 6.14, 6.21, 6.02, 6.12, 6.14, 6.21, 6.02, 6.02, 5.88, 6.32, 6.02, 6.09, 6.04, 6.04, 6.07, 6.90, 6.75
CHAINAGE (IN m)	88+384, 88+494, 88+594, 88+757, 88+857, 88+938, 88+942, 88+944, 89+057, 89+118, 89+164, 89+169, 89+171, 89+268, 89+388, 89+495, 89+605, 89+631, 89+634, 89+646, 89+805, 89+891, 89+981, 90+081, 90+191, 90+277, 90+327, 90+380, 90+383, 90+385, 90+436, 90+527, 90+627, 90+683, 90+763, 90+874, 90+879, 90+886, 91+031, 91+049
Tower No	Tower-231, Tower-232, Tower-233, Tower-234, Tower-235, Tower-236, Tower-237, Tower-238

**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

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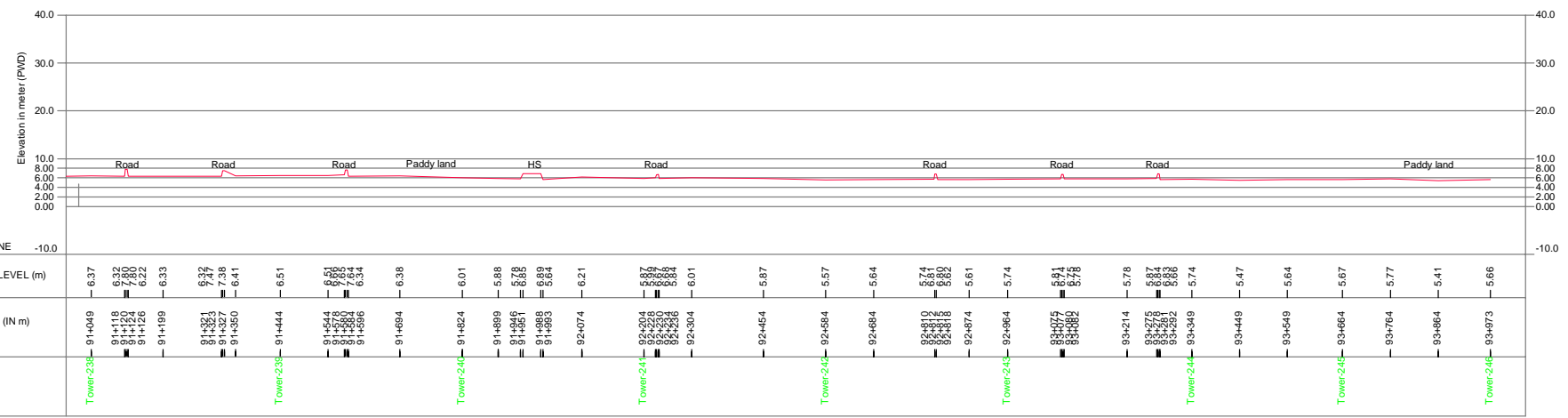
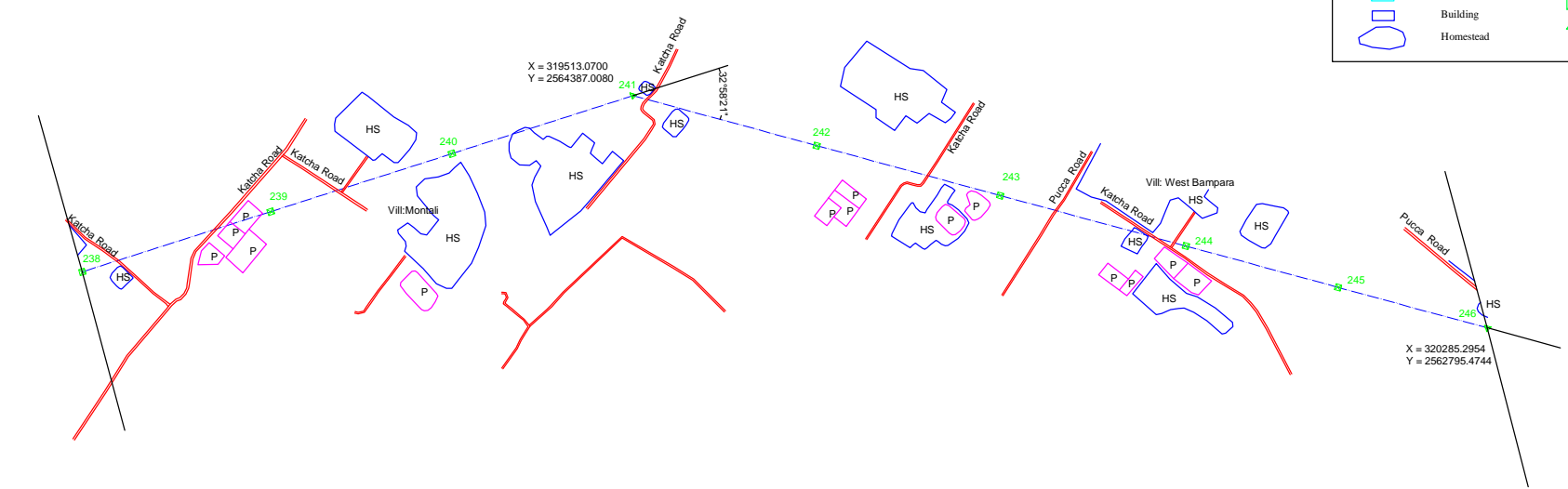
CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
	Engineers Associates Ltd. (EAL)	SIGNATURE		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
LOCAL CONSULTANT		TEPCO / JICA	DATE OF PREPARATION	DESCRIPTION	
SURVEYED BY			NOVEMBER 2014		
CHECKED BY			REVISIONS		
			1.		





**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- ~ Khal / River
- ⊠ Tower
- △ Angle Tower
- Tree



**SCALE :**

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SCALE: HORIZONTAL

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SCALE: VERTICAL

Sheet Index

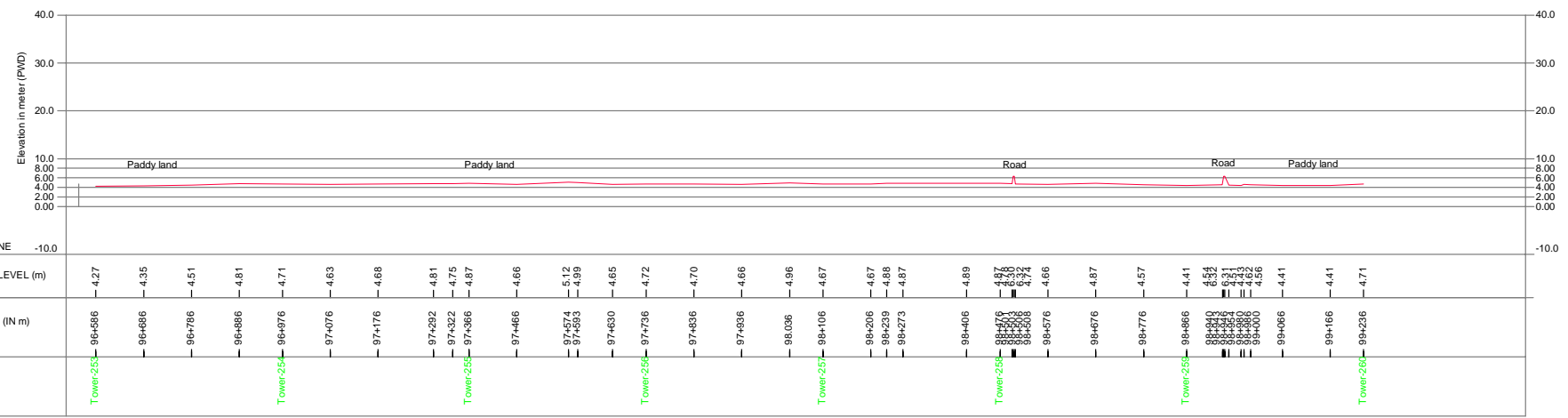
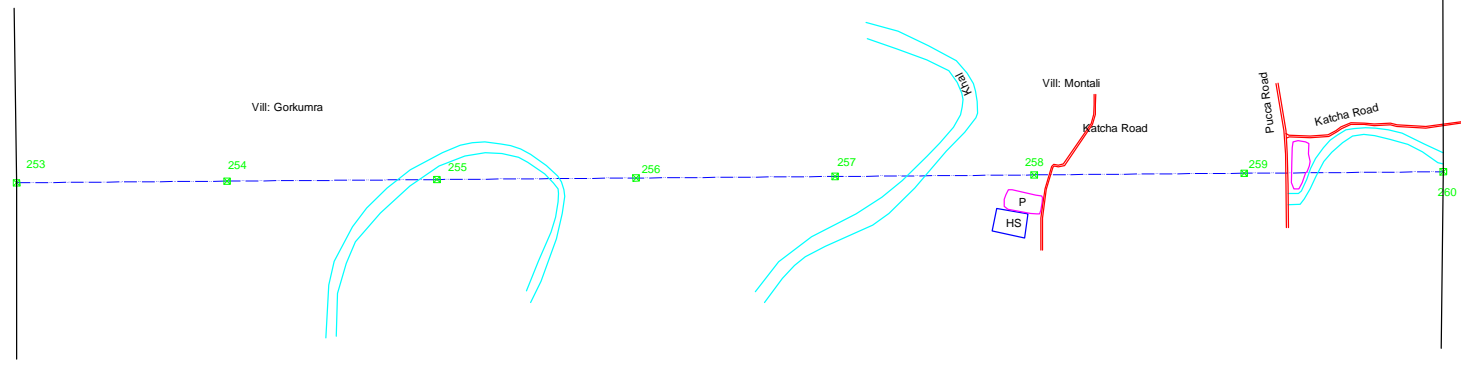
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	TEPCO / JICA	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TITLE		ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.				
SURVEYED BY		DATE OF PREPARATION		NOVEMBER 2014		DESCRIPTION		
CHECKED BY		REVISIONS		1.				





LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

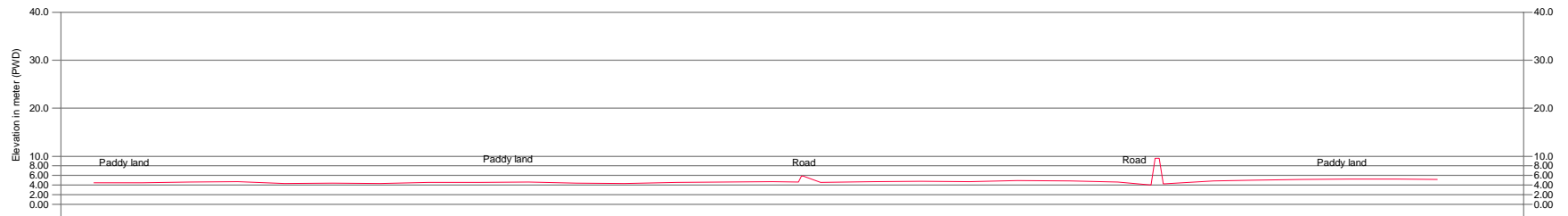
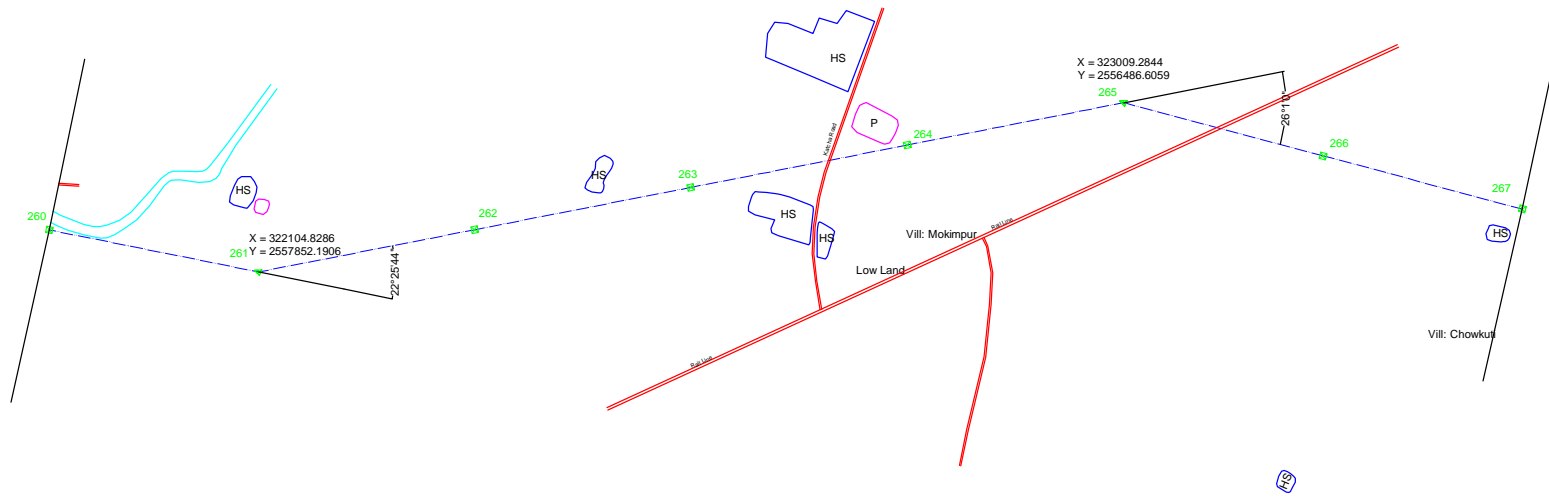
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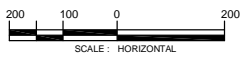
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SURVEYED BY	DATE OF PREPARATION			DESCRIPTION		
CHECKED BY	NOVEMBER 2014					
				REVISIONS		
				1.		



EXISTING LEVEL (m)	CHAINAGE (IN m)	Tower No
4.71	99+236	Tower-260
4.51	99+336	
4.65	99+436	
4.71	99+536	
4.31	99+633	Tower-261
4.42	99+733	
4.31	99+833	
4.56	99+933	
4.52	100+042	Tower-262
4.61	100+142	
4.41	100+242	
4.32	100+342	
4.57	100+451	Tower-263
4.66	100+551	
4.67	100+651	
5.82	100+715	
5.88	100+715	
4.56	100+751	
4.67	100+881	Tower-264
4.77	100+981	
4.69	101+081	
4.91	101+181	
4.87	101+271	Tower-265
4.60	101+371	
4.03	101+440	
9.57	101+449	
9.56	101+457	
4.21	101+466	
4.87	101+571	
4.99	101+654	Tower-266
5.18	101+754	
5.24	101+854	
5.24	101+954	
5.18	102+037	Tower-267

SCALE :



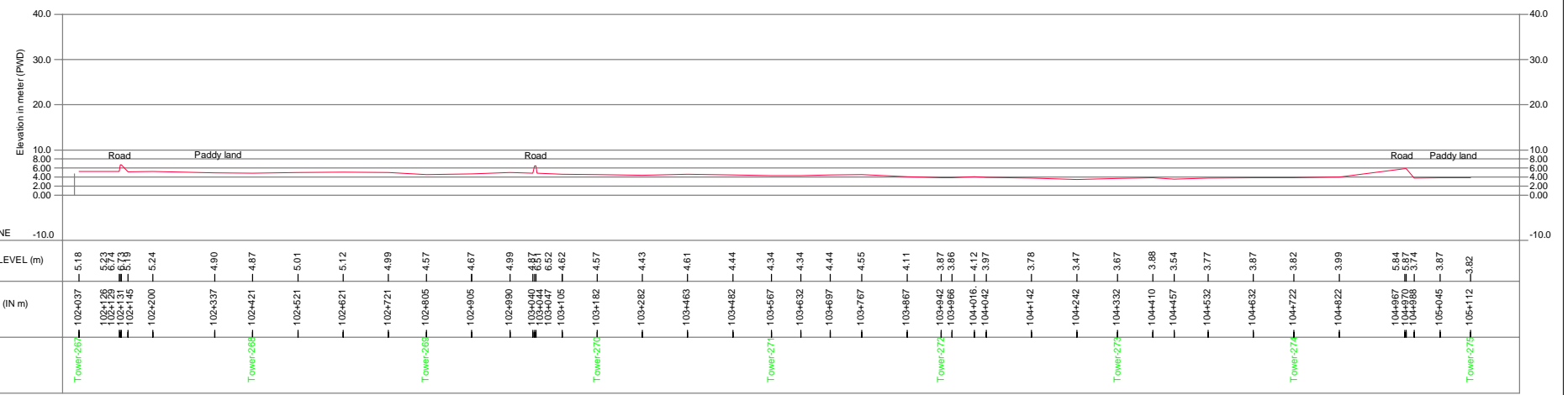
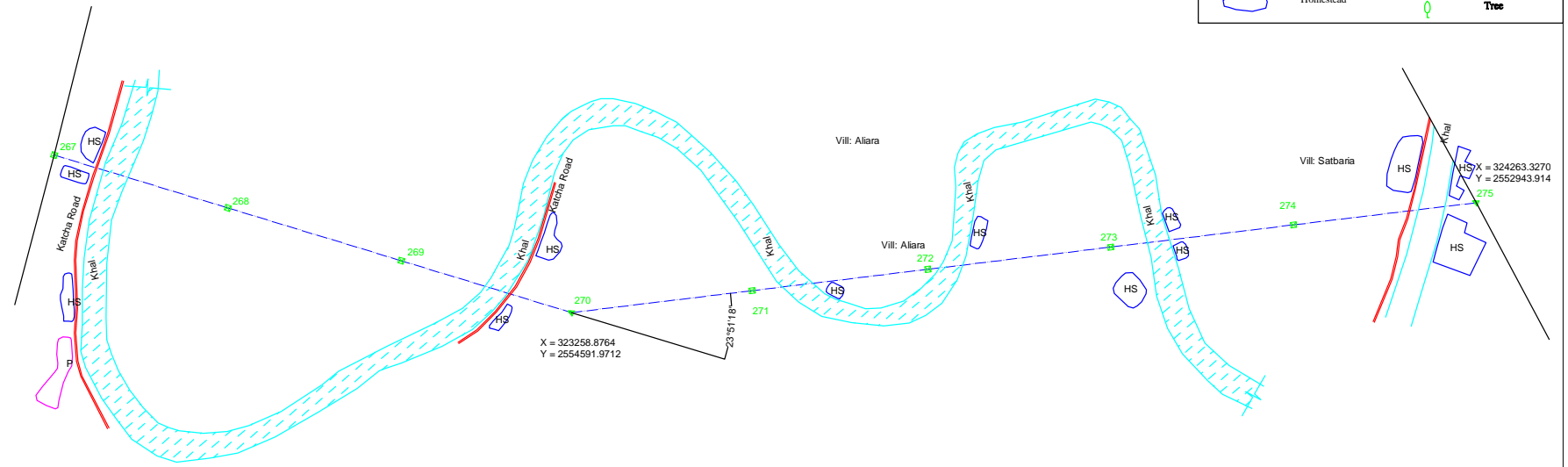
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	TEPCO / JICA	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TITLE			ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY		DATE OF PREPARATION			NOVEMBER 2014		
CHECKED BY		REVISIONS			1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

Sheet Index

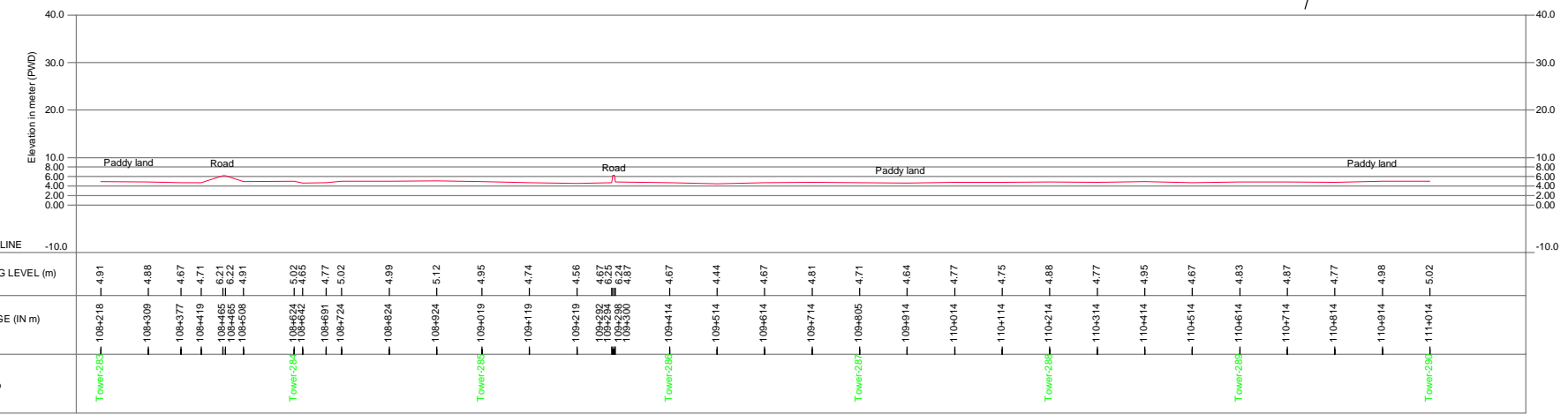
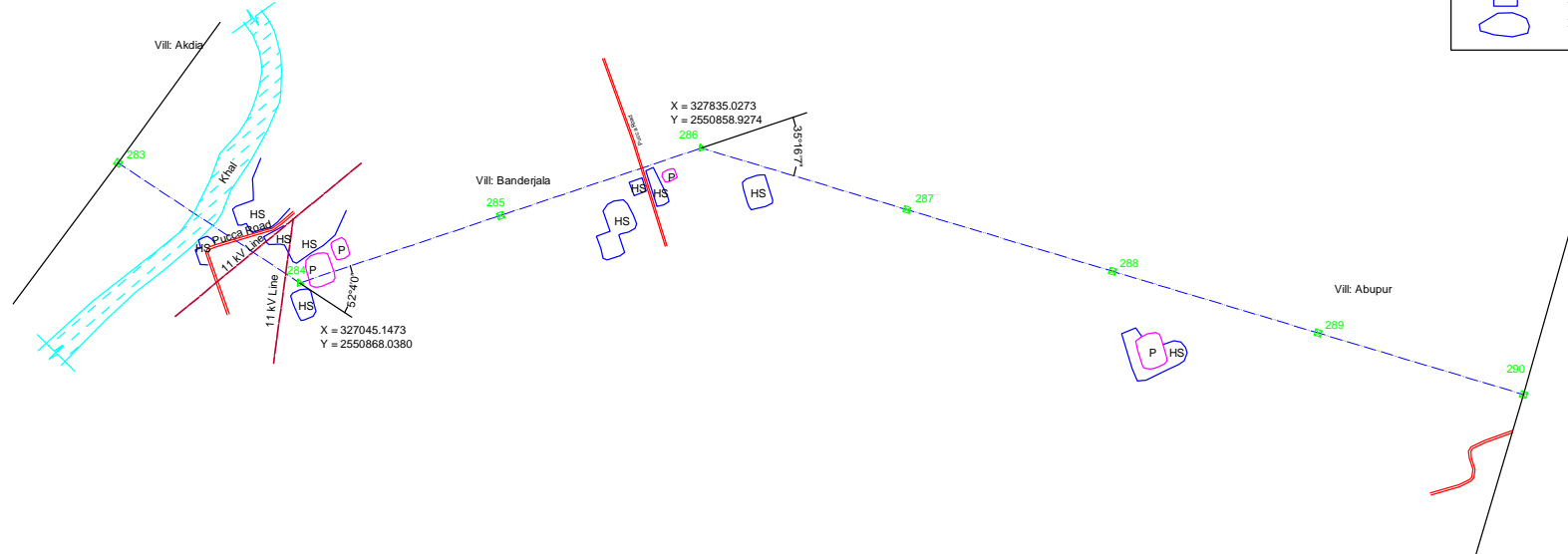
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SURVEYED BY			<b>TEPCO / JICA</b>			DATE OF PREPARATION	DESCRIPTION
CHECKED BY						NOVEMBER 2014	
					REVISIONS		
					1.		





LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

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SCALE: HORIZONTAL

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SCALE: VERTICAL

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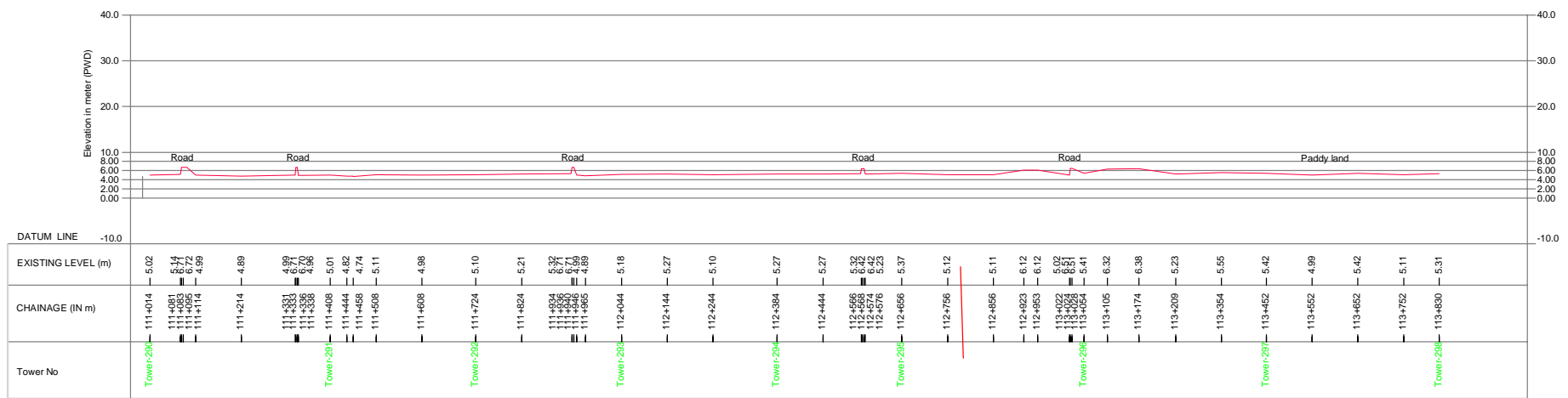
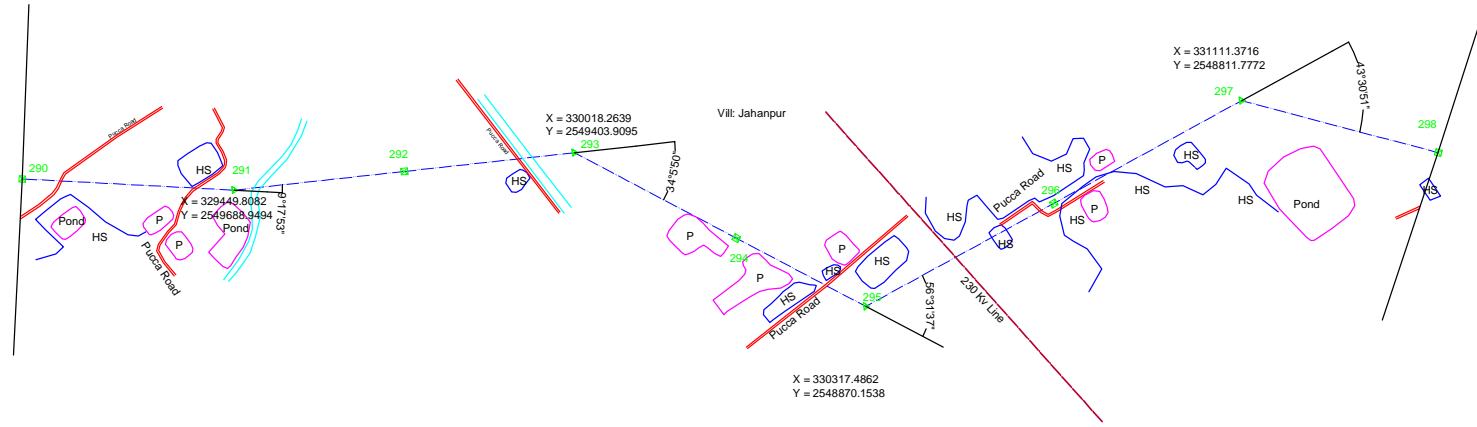
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SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	
CHECKED BY				REVISIONS	1.	



**LEGEND**

- New Line (dashed blue line)
- Existing Line (solid red line)
- Road (red line with double lines)
- House (blue rectangle)
- Building (blue rectangle with a smaller rectangle inside)
- Homestead (blue irregular shape)
- Pond (pink irregular shape)
- Khal / River (blue wavy line)
- Tower (green square with a cross)
- Angle Tower (green triangle with a cross)
- Tree (green circle with a vertical line)



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

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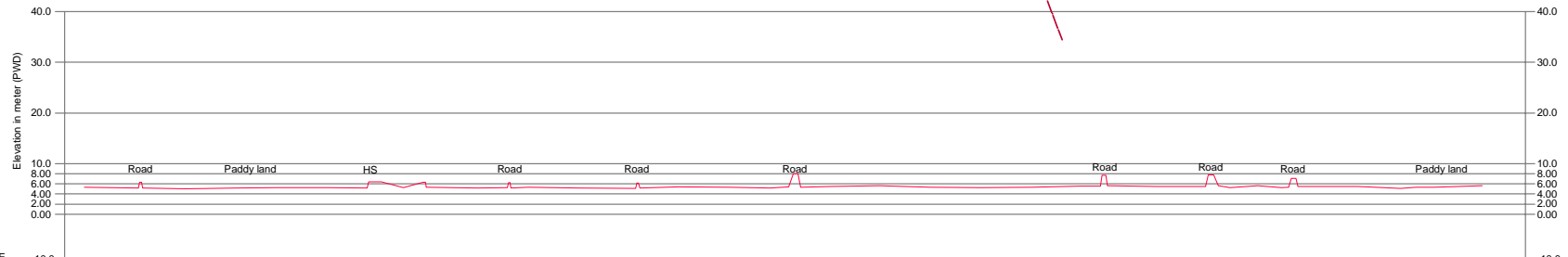
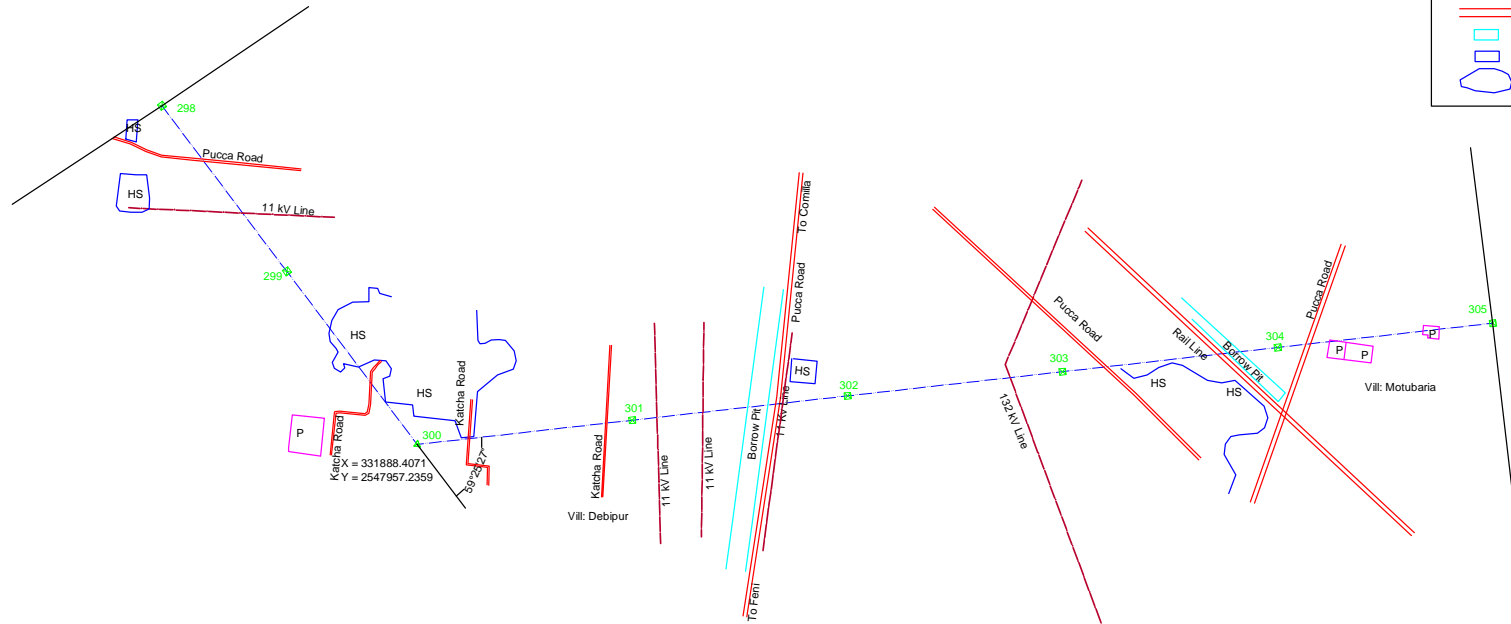
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SURVEYED BY		TEPCO / JICA		DATE OF PREPARATION	NOVEMBER 2014
CHECKED BY				REVISIONS	1.



### LEGEND

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- Tower
- Angle Tower
- Tree



EXISTING LEVEL (m)	CHAINAGE (IN m)	Tower No
5.31	113+830	Tower-298
5.20	113+837	
6.32	113+839	
5.18	113+845	
5.02	114+030	
5.21	114+130	
5.28	114+210	Tower-299
5.28	114+310	
6.32	114+381	
6.41	114+416	
5.28	114+460	
6.31	114+487	
6.32	114+514	
5.21	114+625	Tower-300
5.23	114+687	
6.41	114+865	
6.41	114+870	
6.32	114+876	
6.14	114+882	
5.40	115+003	Tower-301
5.31	115+102	
5.20	115+183	
5.41	115+220	
6.31	115+223	
5.51	115+302	
5.64	115+400	Tower-302
5.32	115+489	
5.24	115+589	
5.32	115+689	
5.57	115+796	Tower-303
5.65	115+835	
7.68	115+835	
5.65	115+848	
5.45	115+945	
5.48	116+042	
7.74	116+047	
5.61	116+053	
5.23	116+050	
5.23	116+050	
5.67	116+145	Tower-304
5.31	116+208	
7.11	116+212	
5.47	116+225	
5.45	116+343	
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5.32	116+483	
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SCALE :



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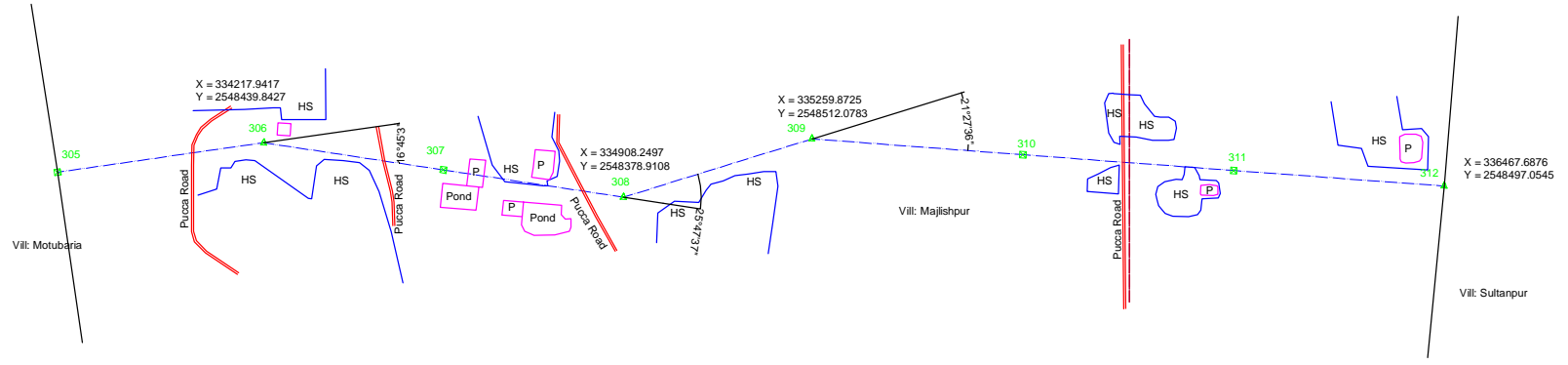
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SURVEYED BY					DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY					REVISIONS	1.		



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- Tower
- Angle Tower
- Tree



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

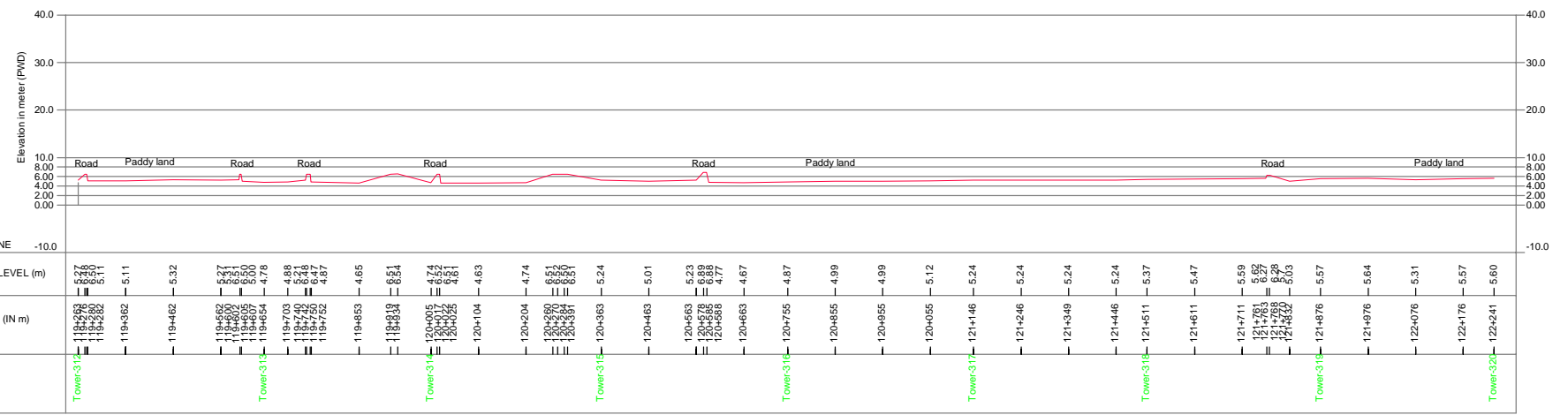
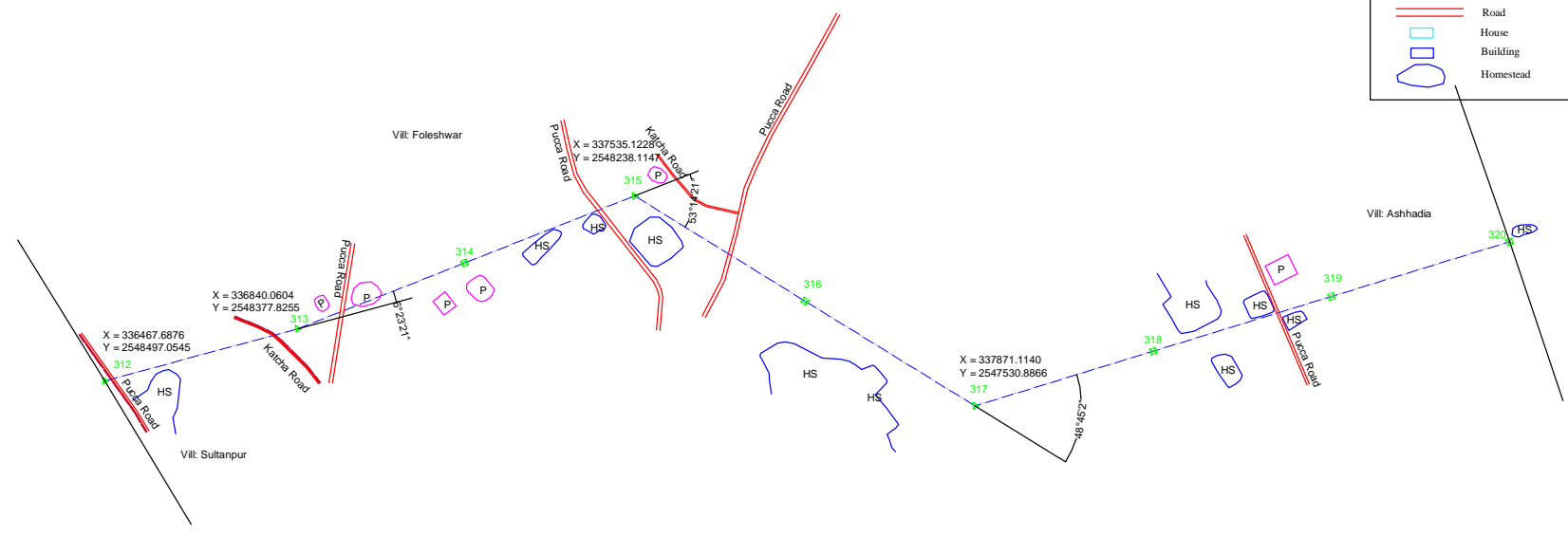
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)		SIGNATURE
SURVEYED BY		TEPCO / JICA	DATE OF PREPARATION	NOVEMBER 2014
CHECKED BY			DESCRIPTION	
		REVISIONS	1.	

**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- X Tower
- ▲ Angle Tower
- Tree



**SCALE :**

SCALE: HORIZONTAL

SCALE: VERTICAL

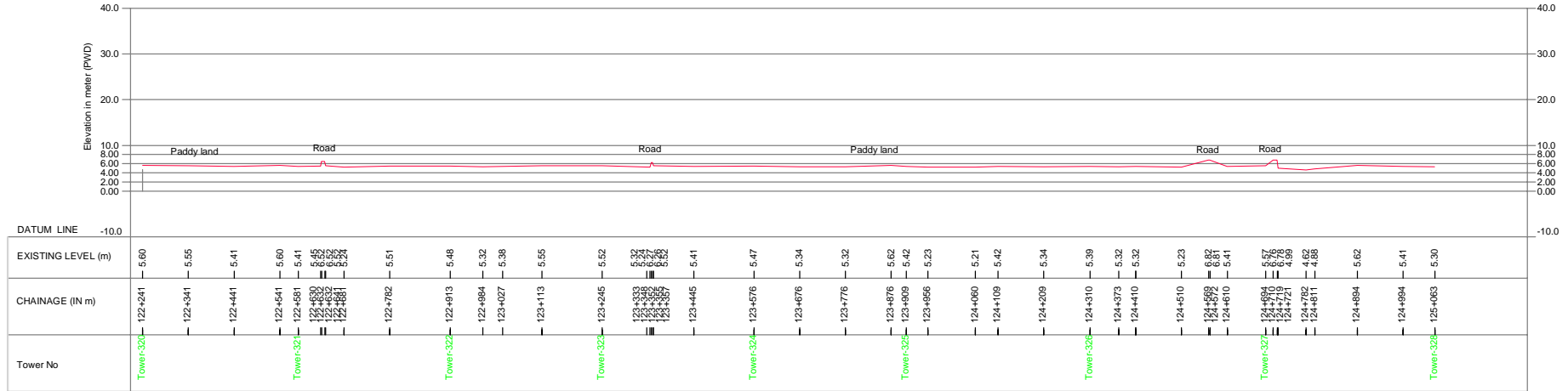
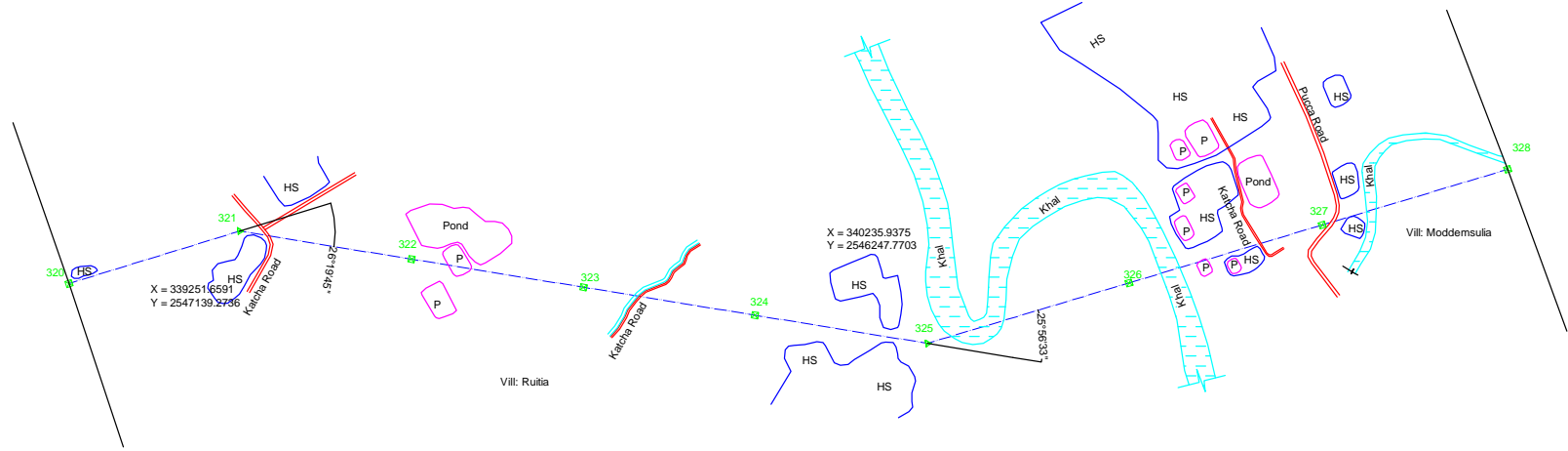
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	<b>TEPCO / JICA</b>		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
	SURVEYED BY				DATE OF PREPARATION	DESCRIPTION	
	CHECKED BY				NOVEMBER 2014		
		REVISIONS					
				1.			



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



SCALE :

SCALE: HORIZONTAL

SCALE: VERTICAL

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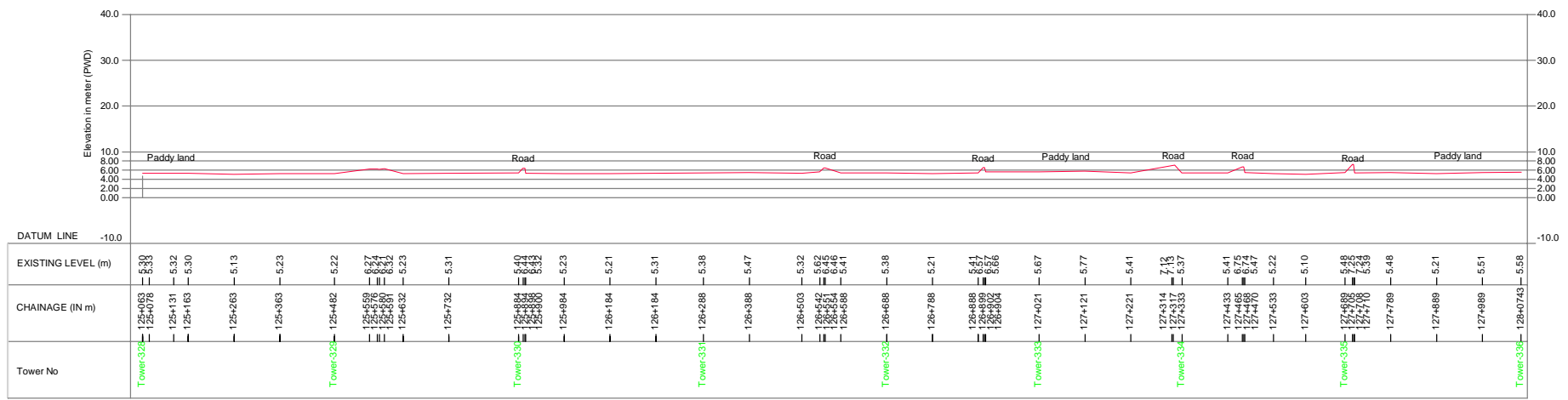
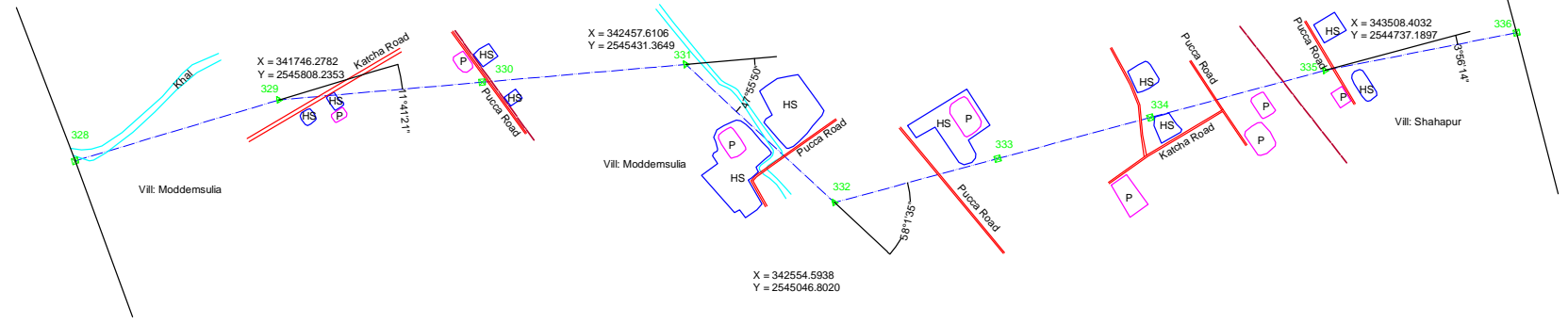
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SURVEYED BY		TEPCO / JICA	DATE OF PREPARATION	DESCRIPTION	
CHECKED BY			NOVEMBER 2014		
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			1.		



**LEGEND**

- New Line
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- Tower
- Angle Tower
- Tree



**SCALE :**

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SCALE: VERTICAL

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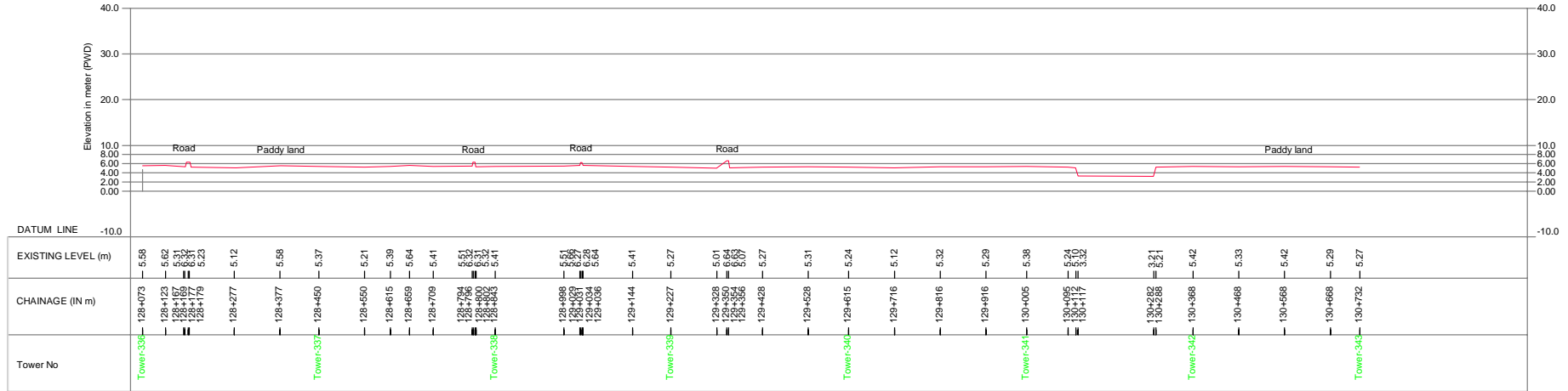
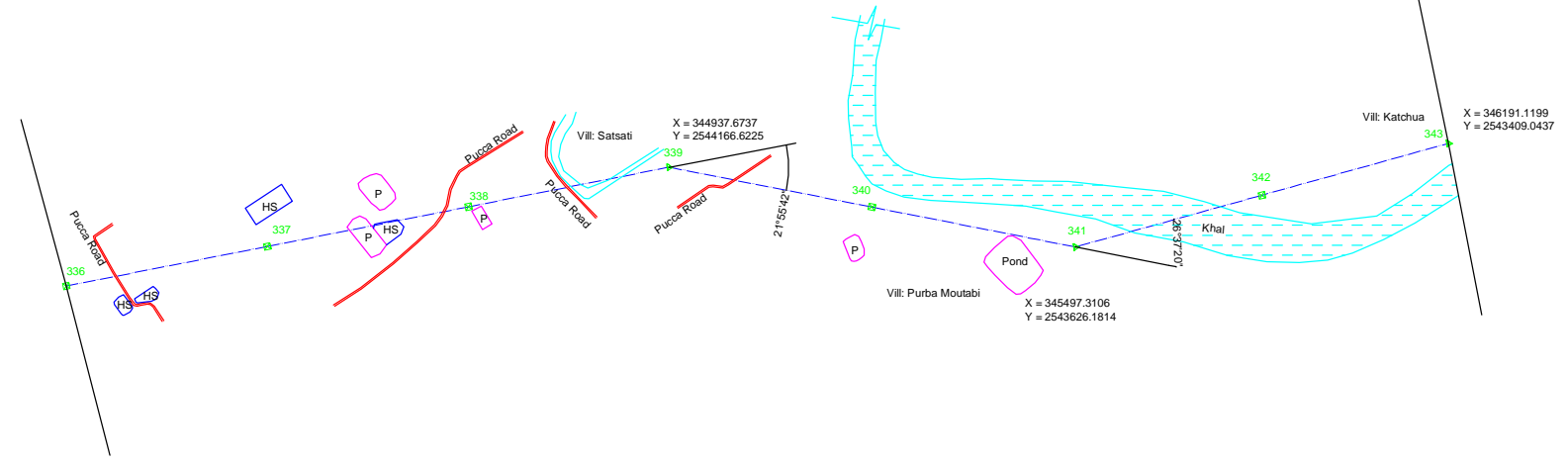
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- ~ Khal / River
- ⊠ Tower
- △ Angle Tower
- ♣ Tree



**SCALE :**

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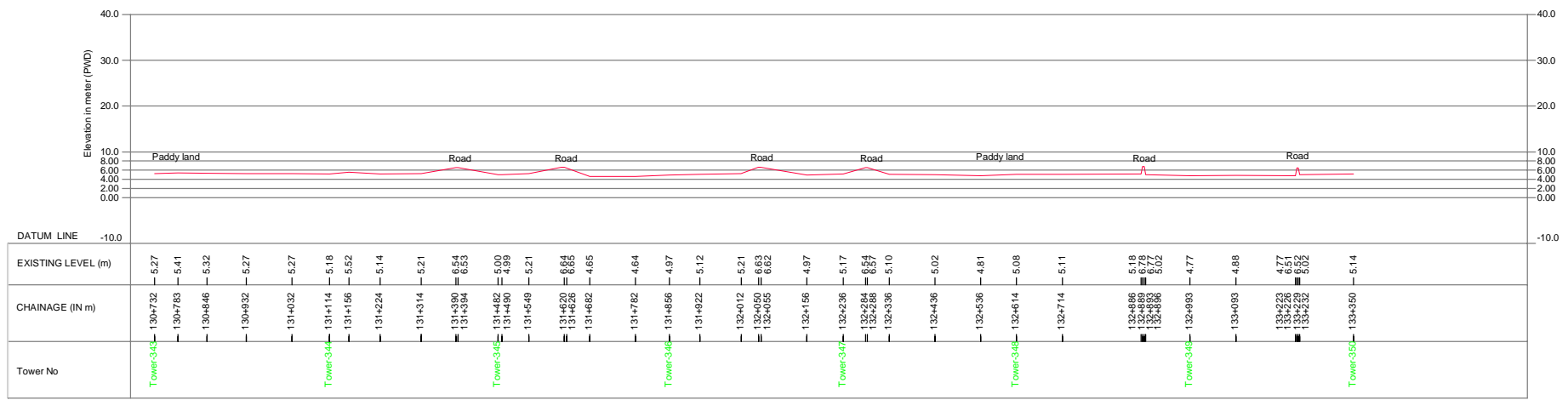
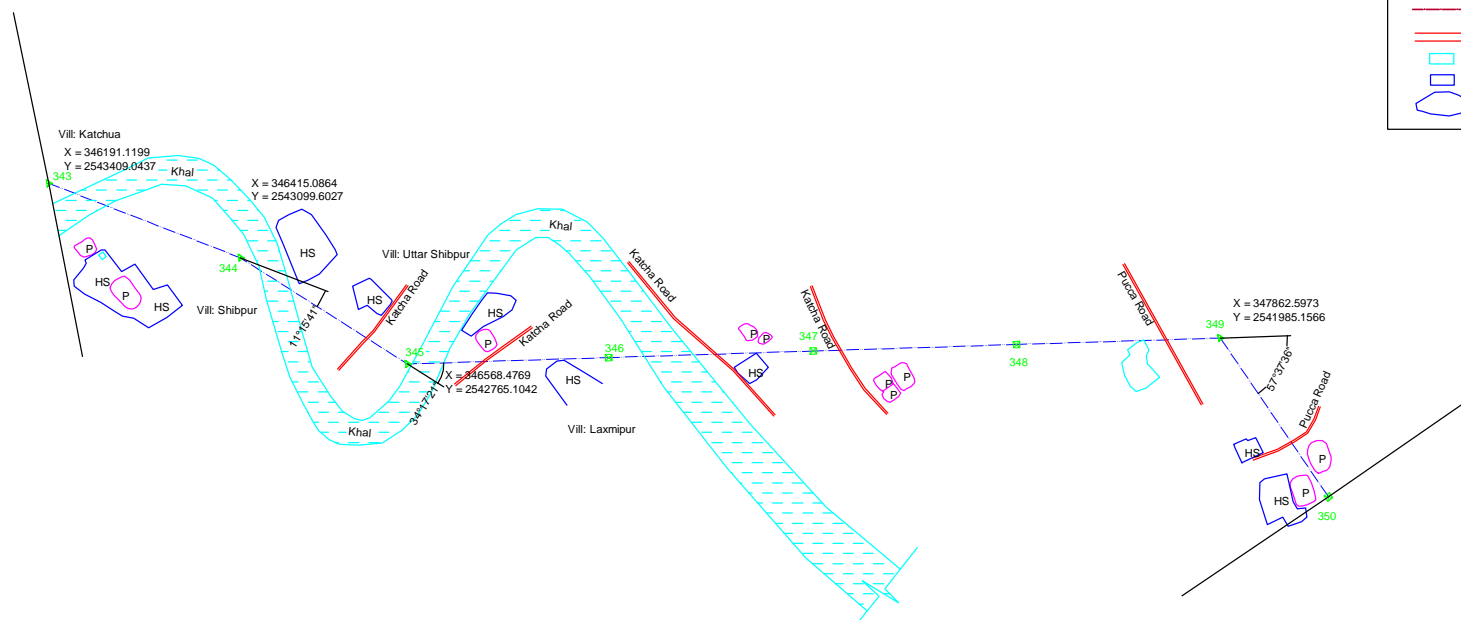
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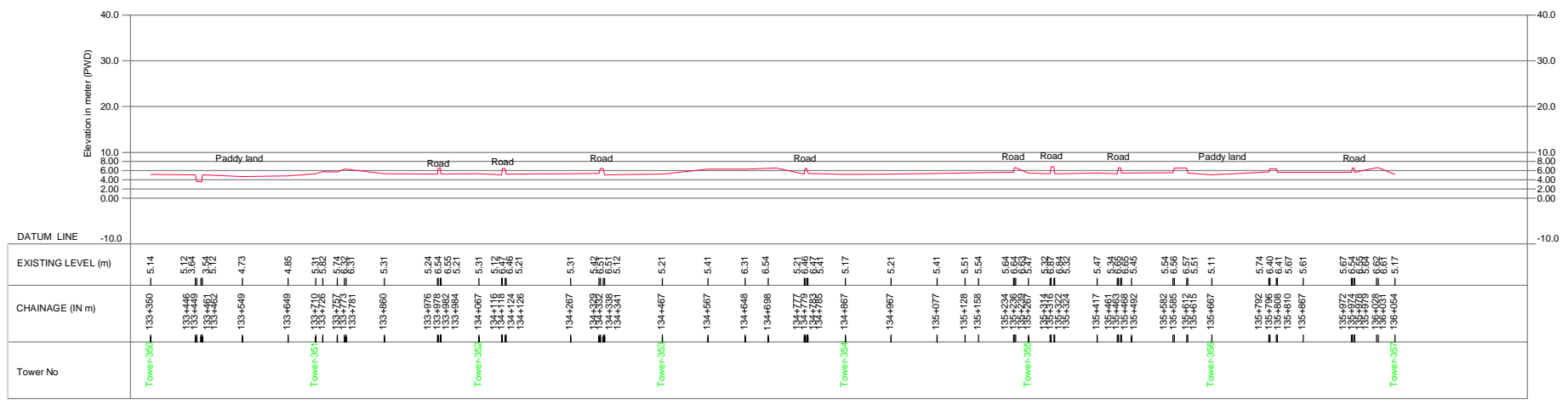
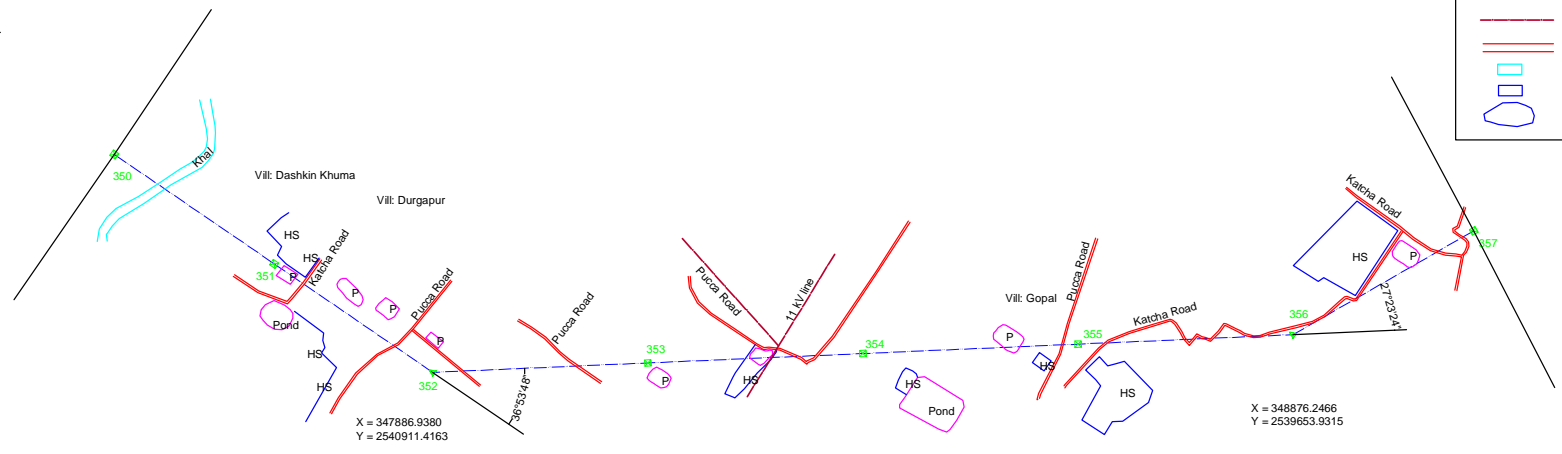
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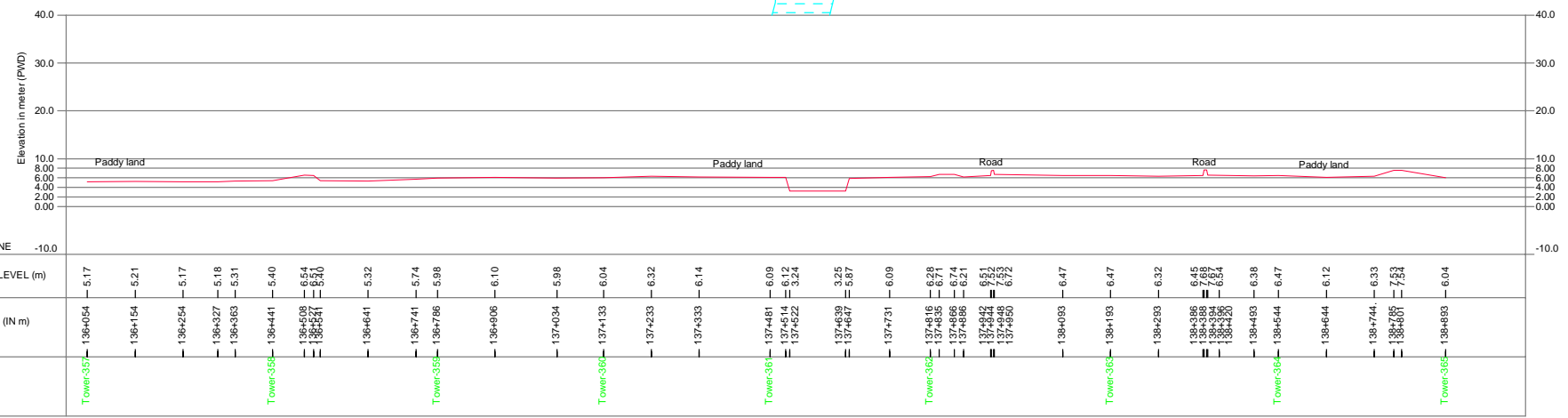
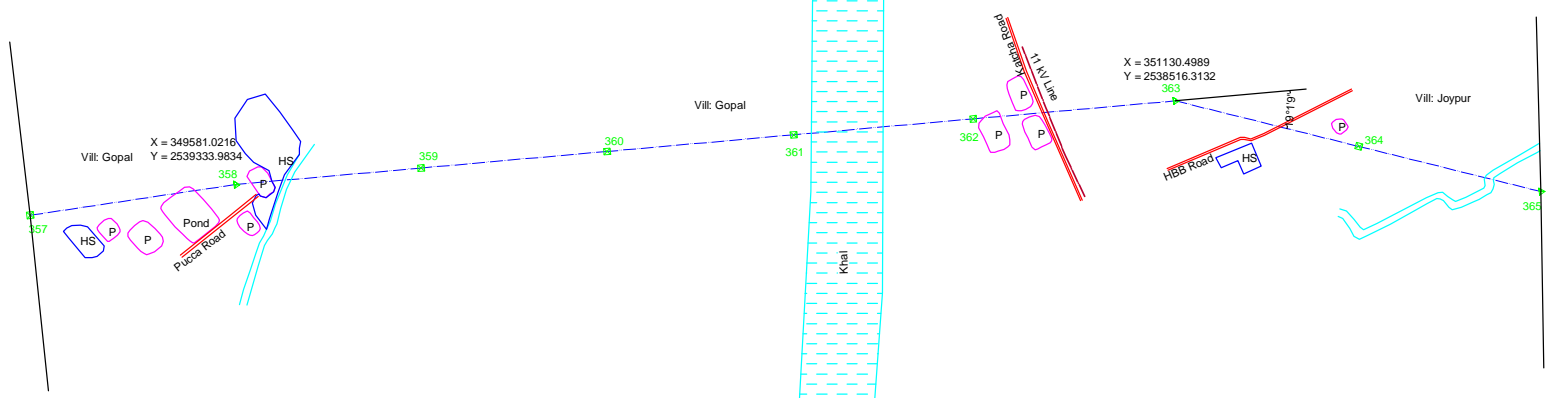
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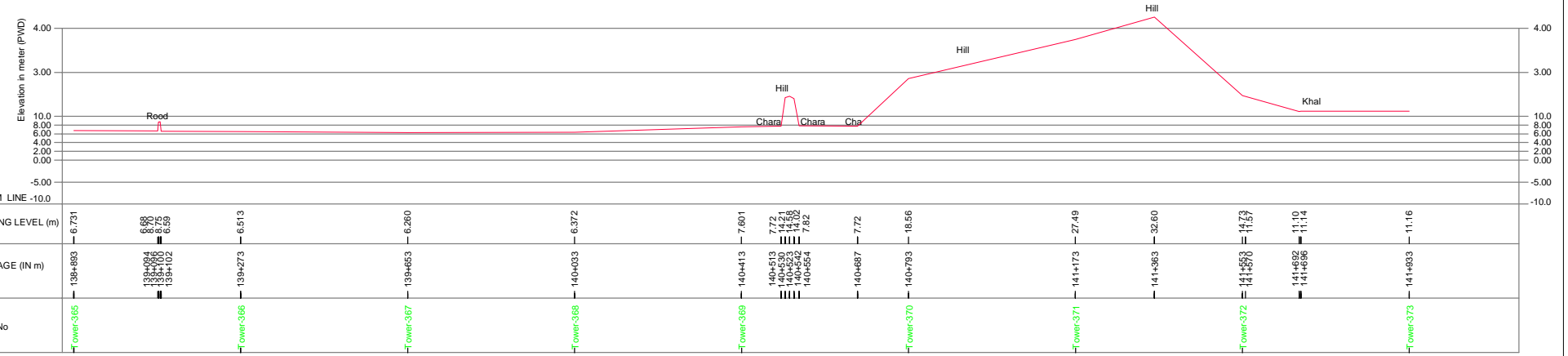
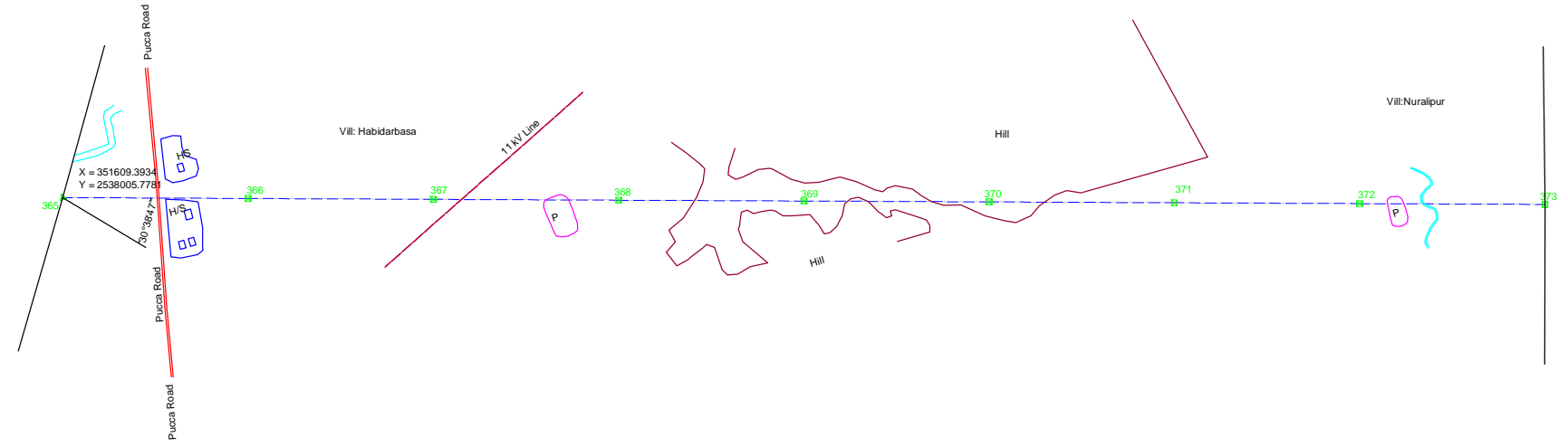
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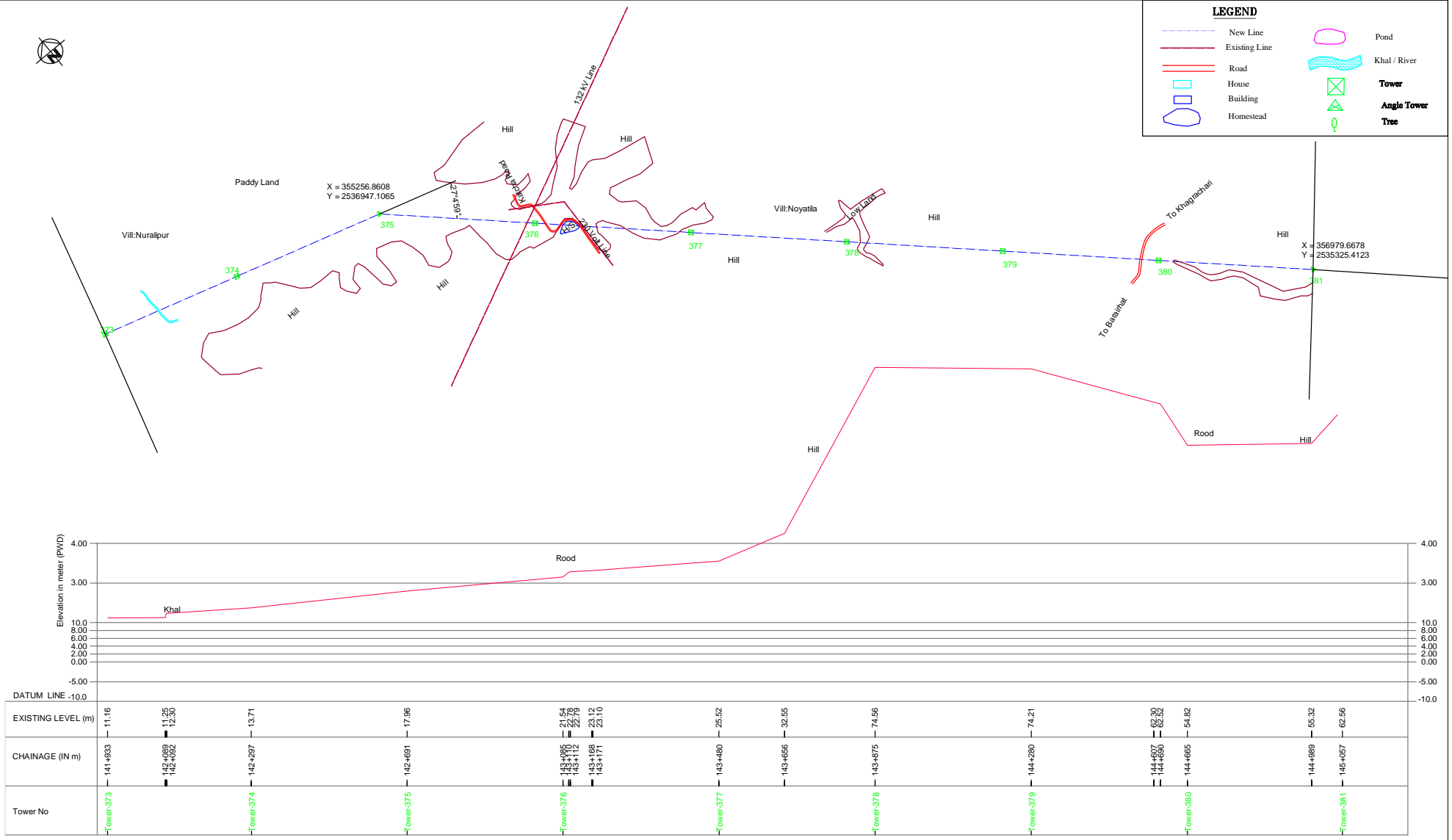
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**SCALE :**

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SCALE: VERTICAL

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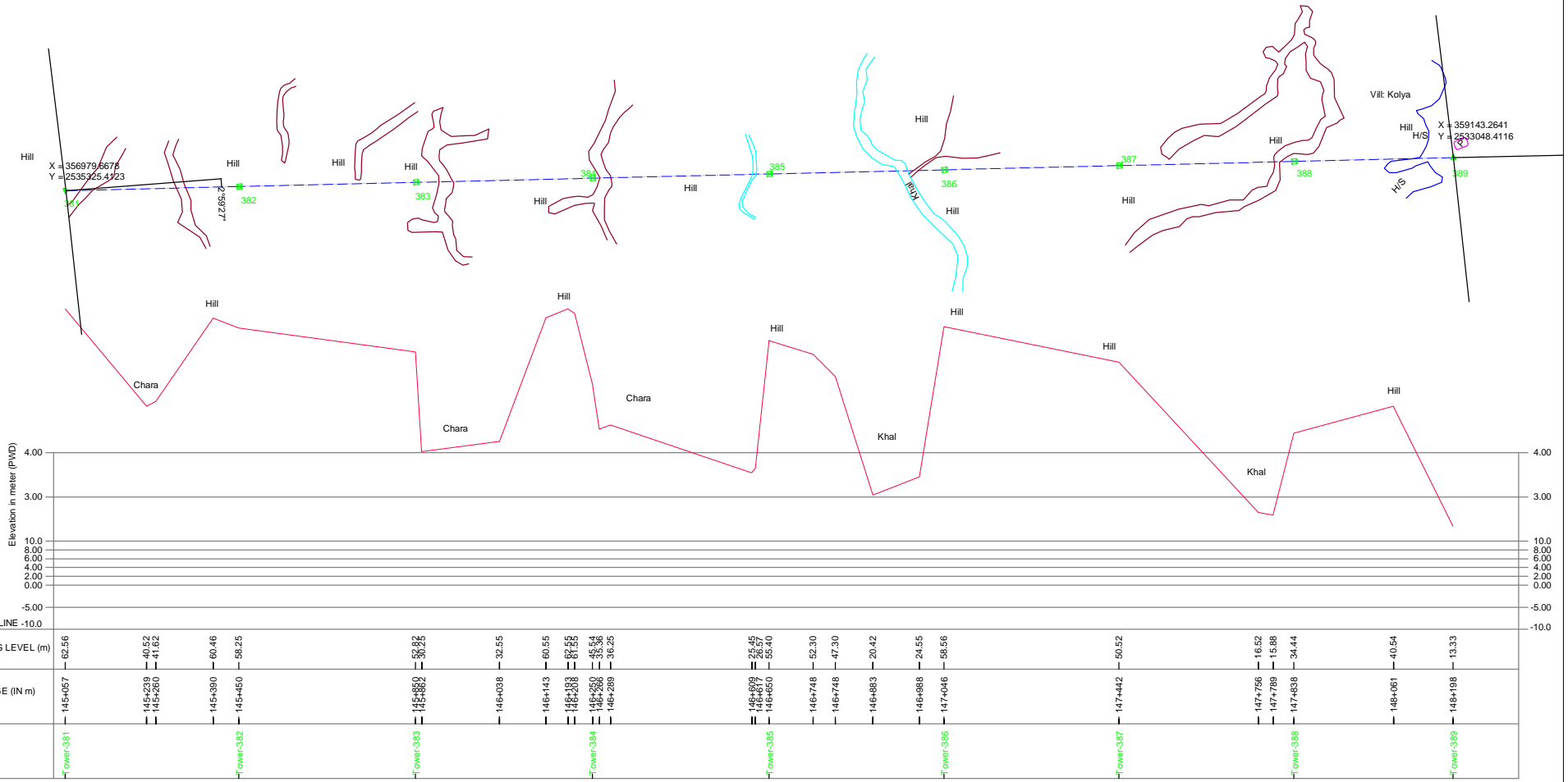
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SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	
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**SCALE :**

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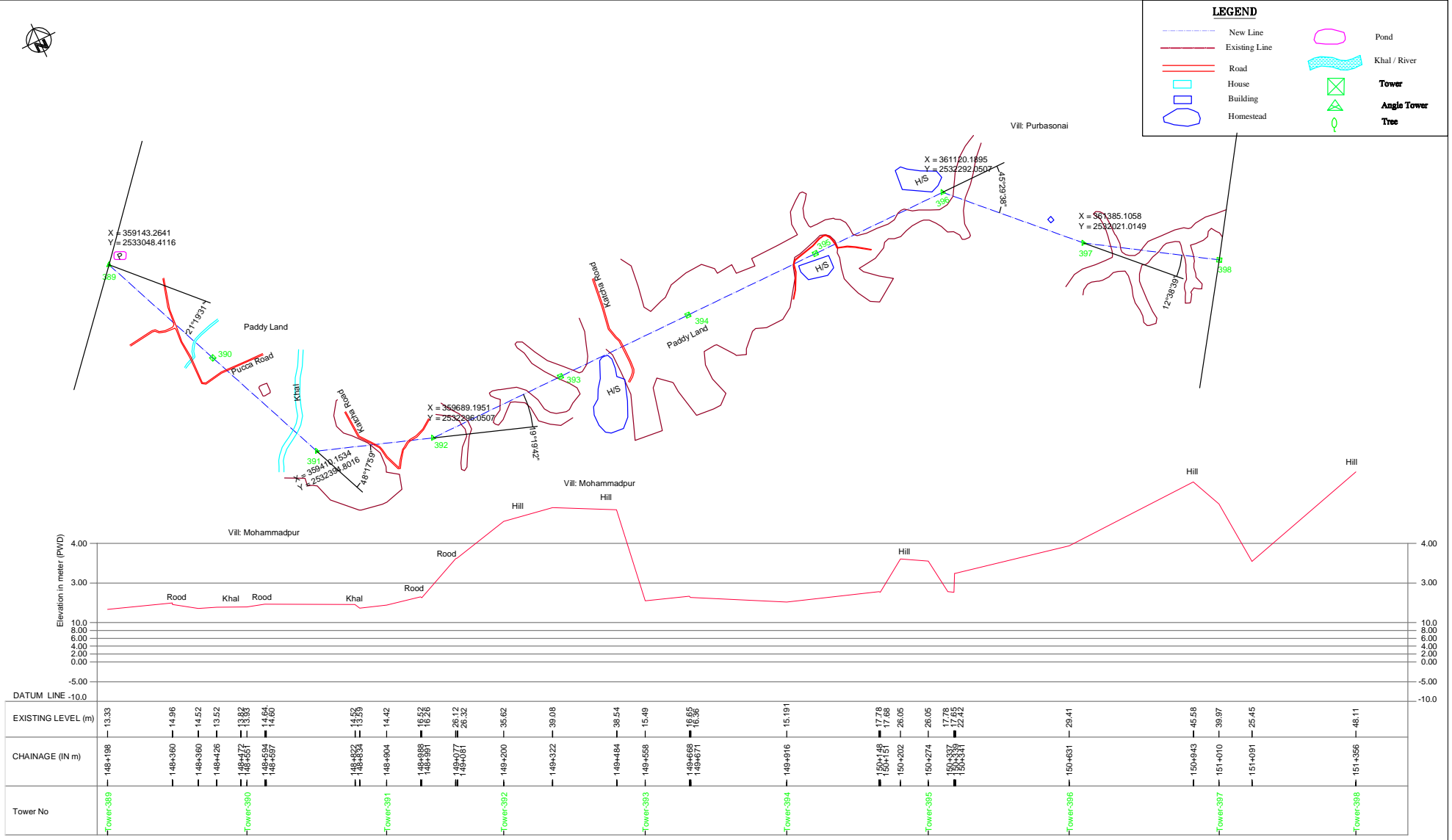
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SURVEYED BY	TEPCO / JICA	DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
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SCALE : VERTICAL

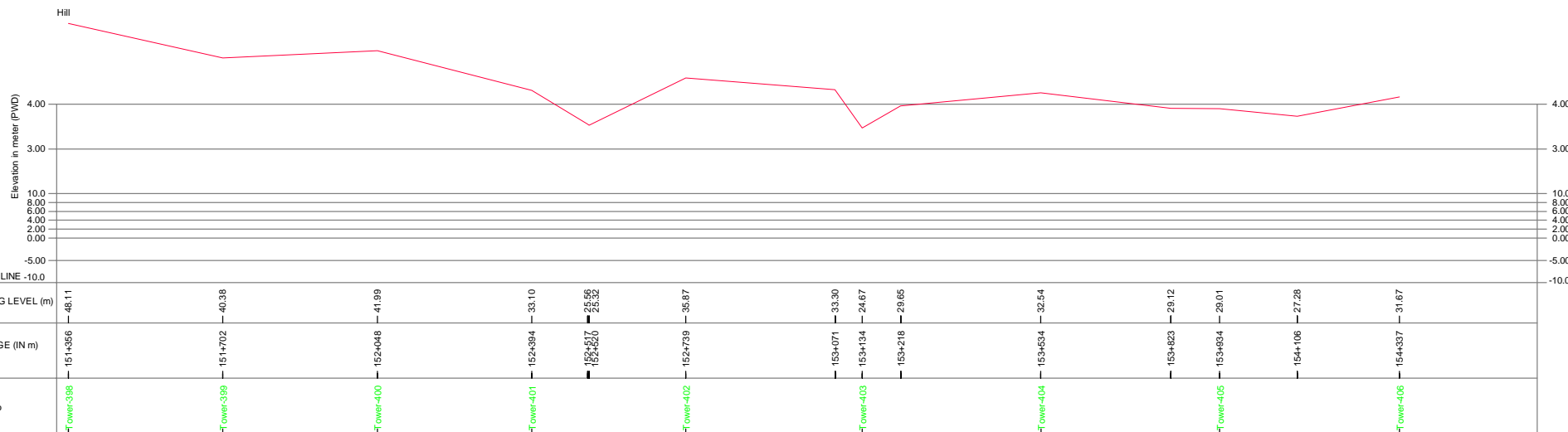
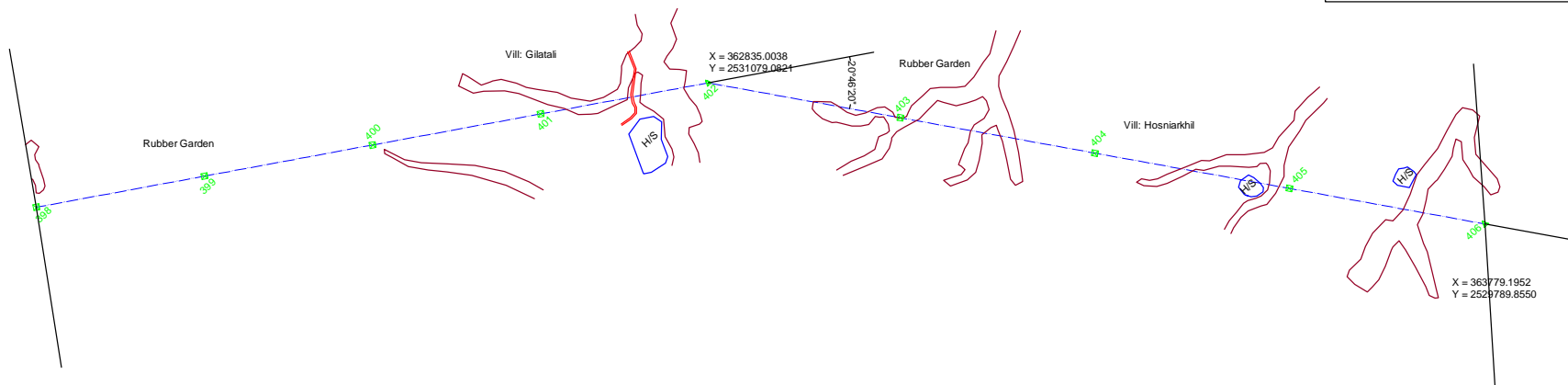
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CHECKED BY			DATE OF PREPARATION	NOVEMBER 2014		
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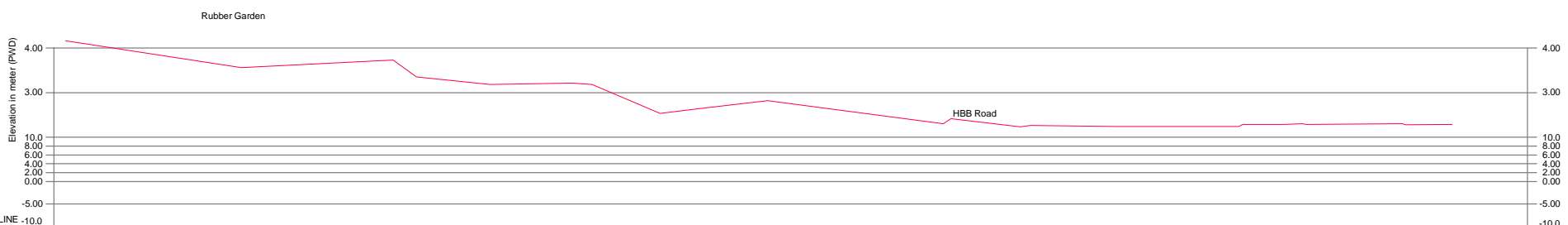
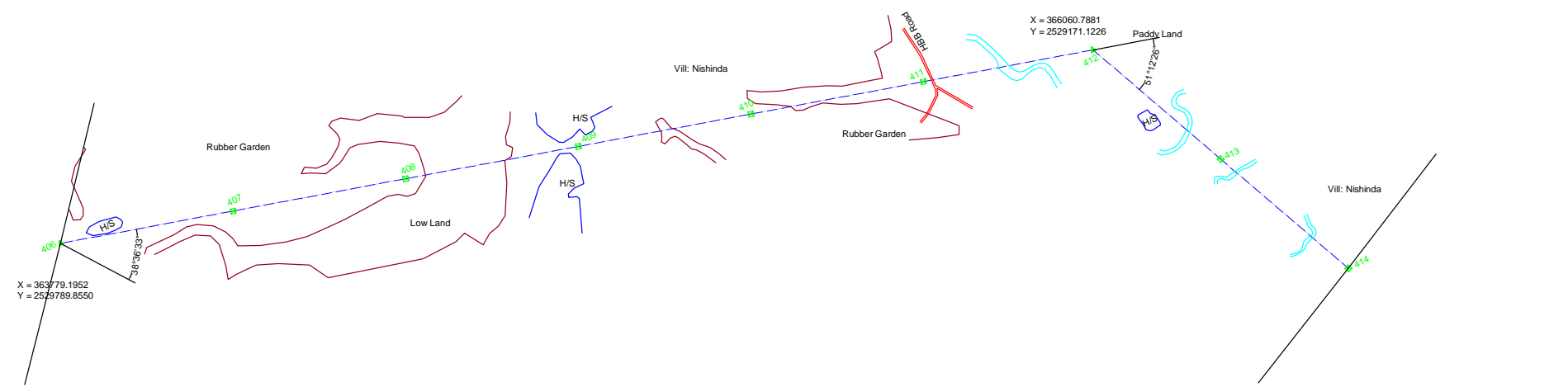
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LEGEND			
	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tree
	Homestead		



EXISTING LEVEL (m)	31.67		25.64		27.28	23.53		21.85		22.12	21.84		15.35	16.54		18.19		12.99	12.87	12.87	12.87	12.98	12.88				
CHAINAGE (IN m)	154+337		154+732		155+072	155+127		155+290		155+474	155+522		155+673	155+775		155+917		156+312	156+328	156+332	156+332	156+332	156+332	157+457			
Tower No	Tower-406		Tower-407		Tower-408					Tower-409						Tower-410			Tower-411				Tower-412		Tower-413		Tower-414

**SCALE :**

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 SCALE: VERTICAL

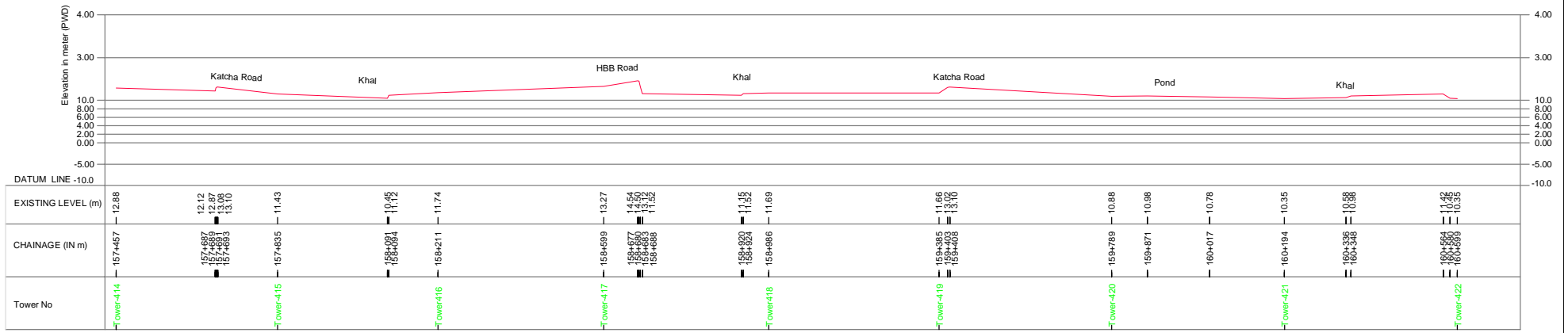
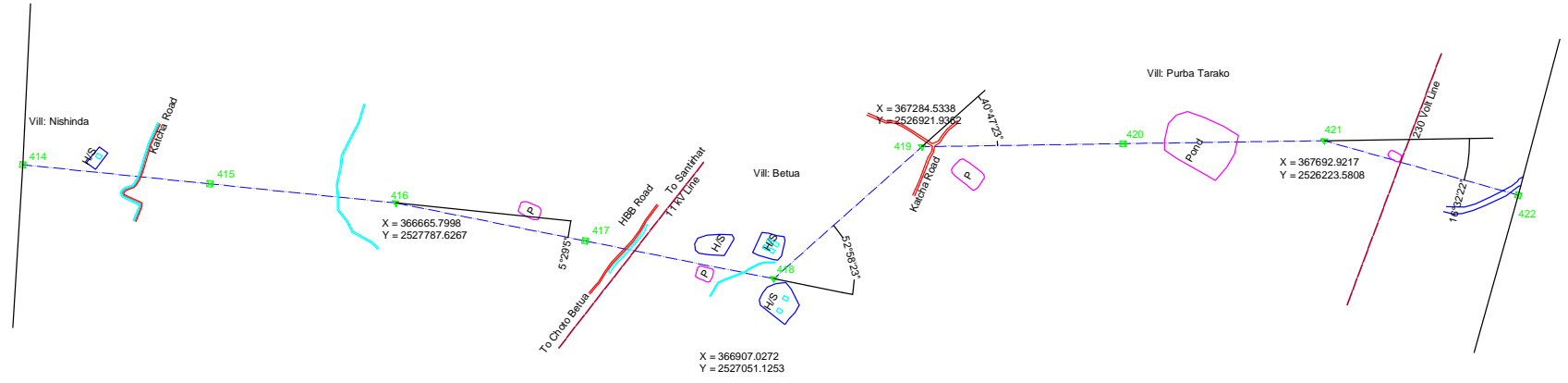
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SCALE : VERTICAL

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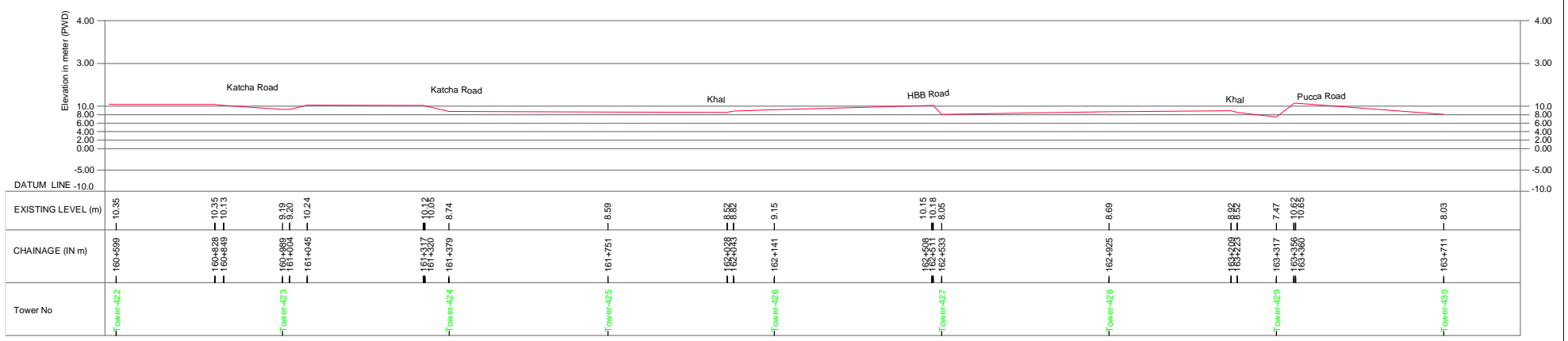
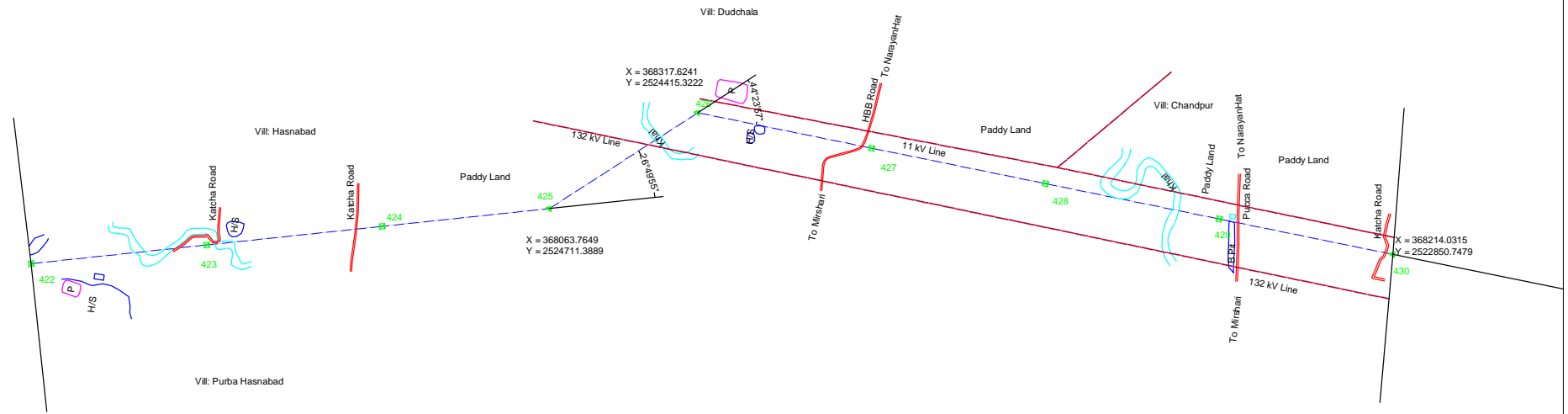
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY				DATE OF PREPARATION	DESCRIPTION
CHECKED BY				NOVEMBER 2014	
				REVISIONS	
				1.	





LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE: HORIZONTAL  
 SCALE: VERTICAL

Sheet Index

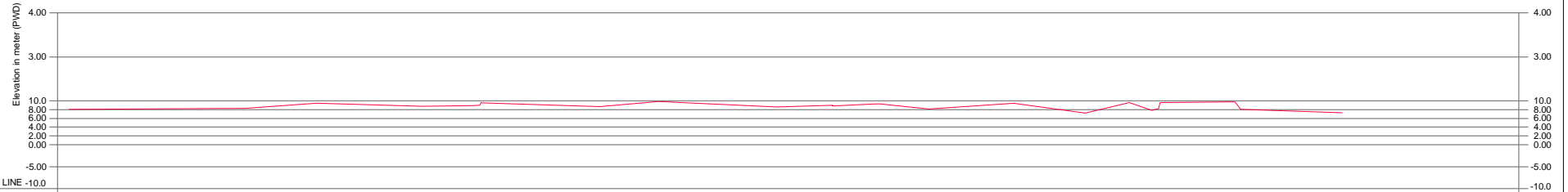
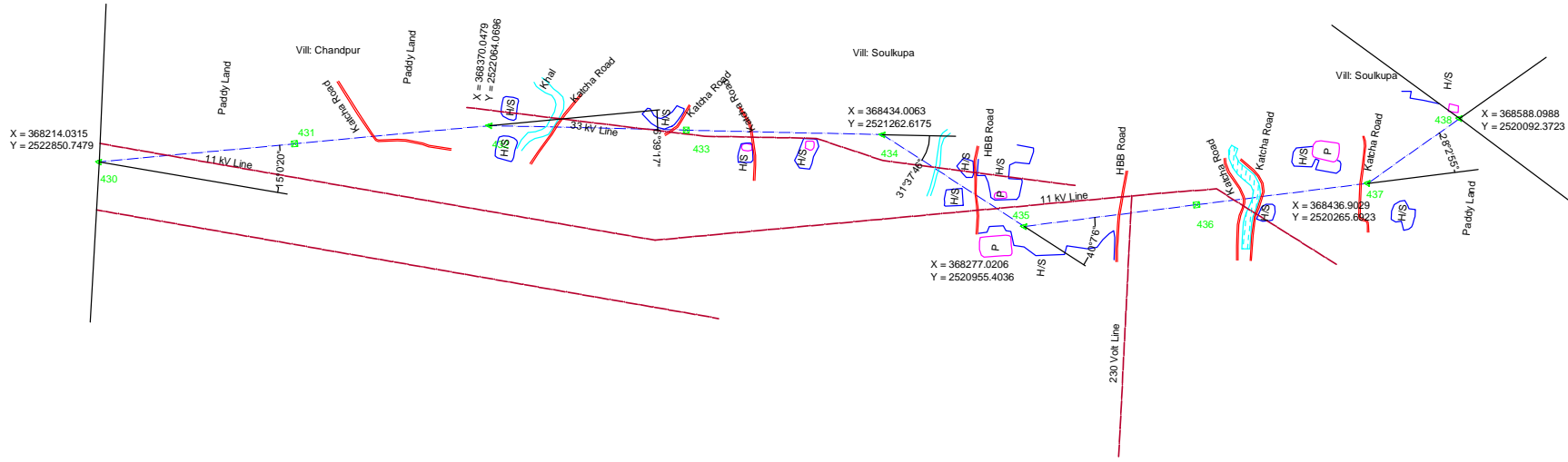
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LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARJI.	
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	
CHECKED BY				REVISIONS	1.	
					DESCRIPTION	



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- ▲ Tower
- ▲ Angle Tower
- Tree



DATUM LINE	-10.00
EXISTING LEVEL (m)	8.03
CHAINAGE (IN m)	163+711, 164+110, 164+268, 164+271, 164+451, 164+503, 164+506, 164+511, 165+013, 165+043, 165+315, 165+440, 165+439, 165+538, 165+539, 165+660, 165+852, 165+855, 166+015, 166+113, 166+134, 166+139, 166+186, 166+319, 166+363, 166+588
Tower No	Tower-430, Tower-431, Tower-432, Tower-433, Tower-434, Tower-435, Tower-436, Tower-437, Tower-438

**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

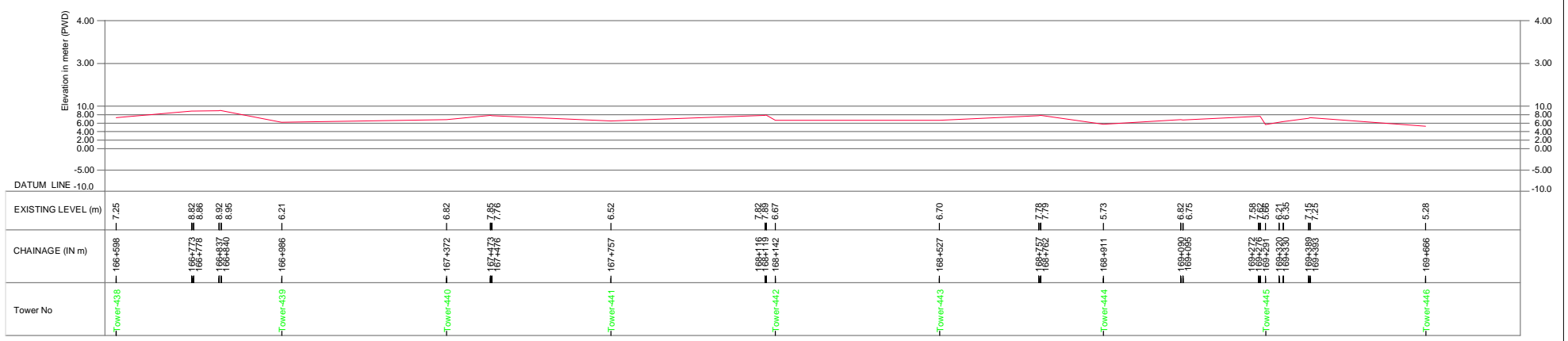
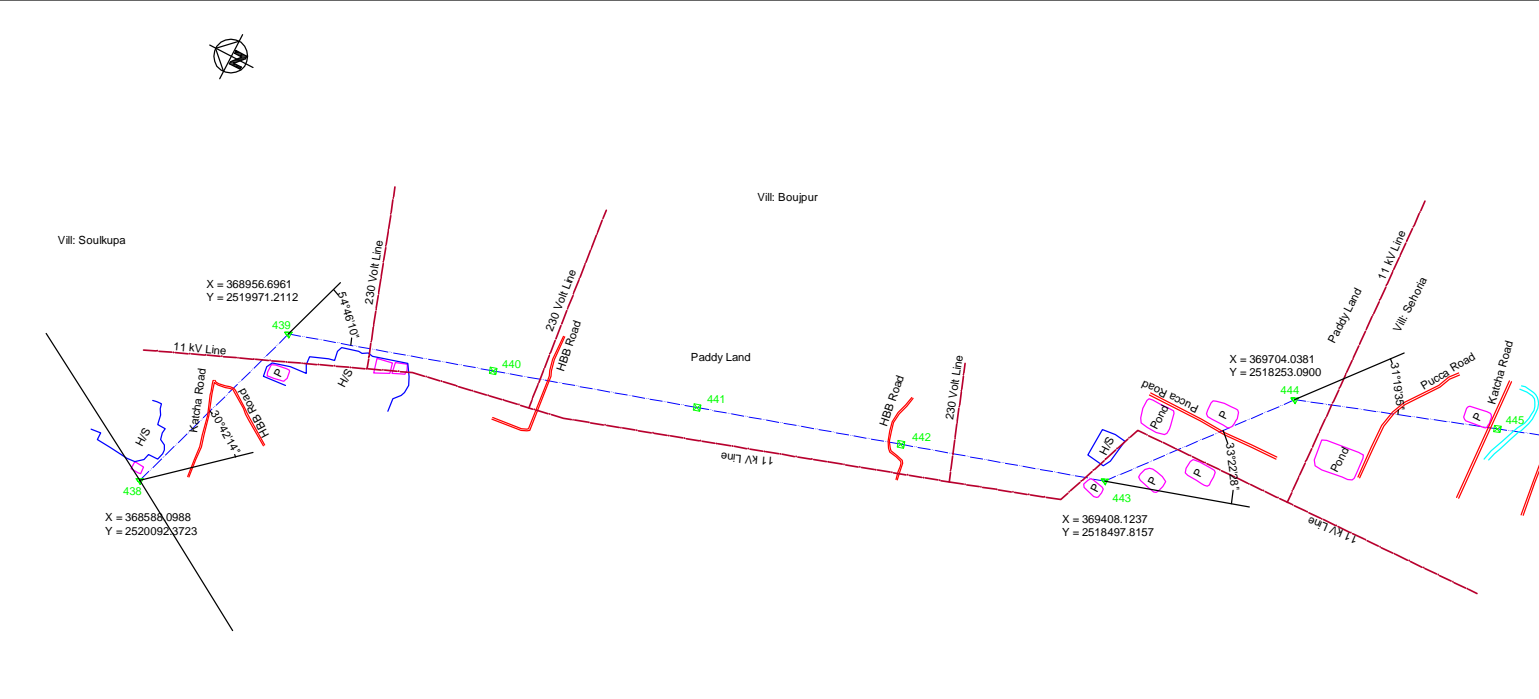
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SURVEYED BY		TEPCO / JICA		DATE OF PREPARATION	NOVEMBER 2014
CHECKED BY				REVISIONS	
				1.	

**LEGEND**

- New Line
- Existing Line
- == Road
- House
- Building
- Homestead
- Pond
- ~ Khal / River
- ⊠ Tower
- △ Angle Tower
- Tree



**SCALE :**

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SCALE: HORIZONTAL

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SCALE: VERTICAL

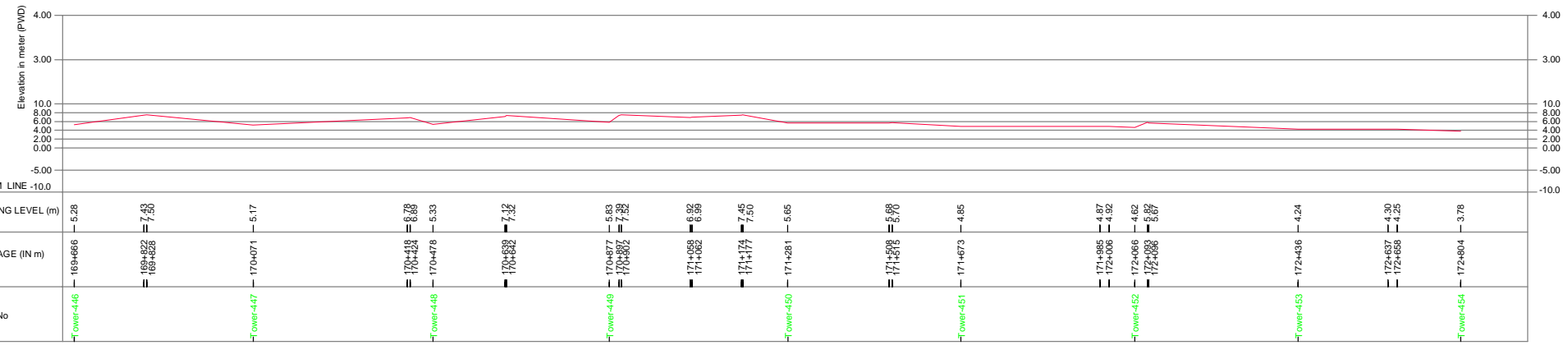
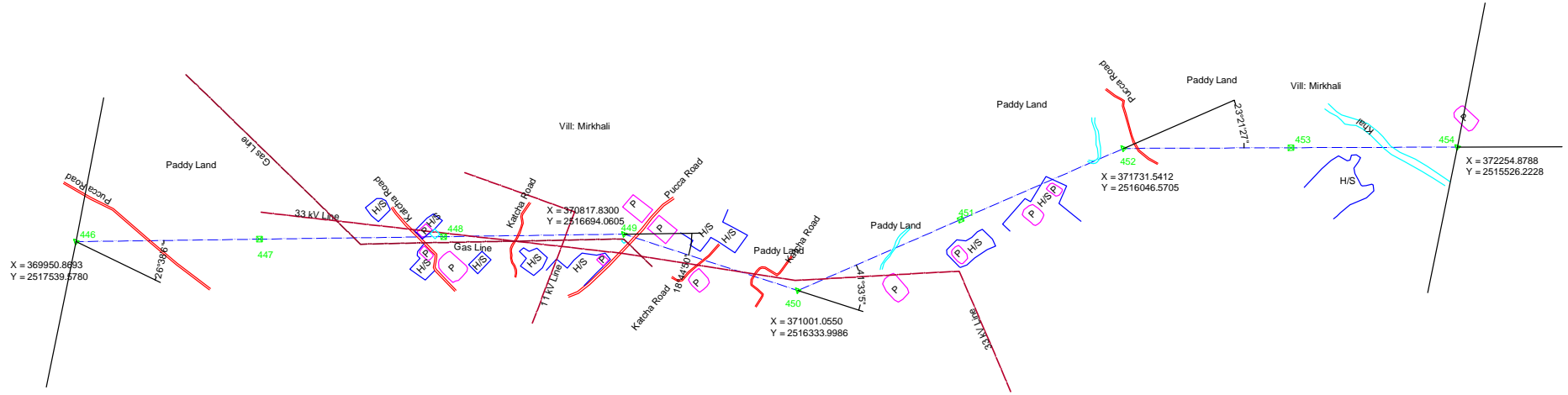
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SURVEYED BY				DATE OF PREPARATION	DESCRIPTION	
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				1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



SCALE :

SCALE : HORIZONTAL

SCALE : VERTICAL

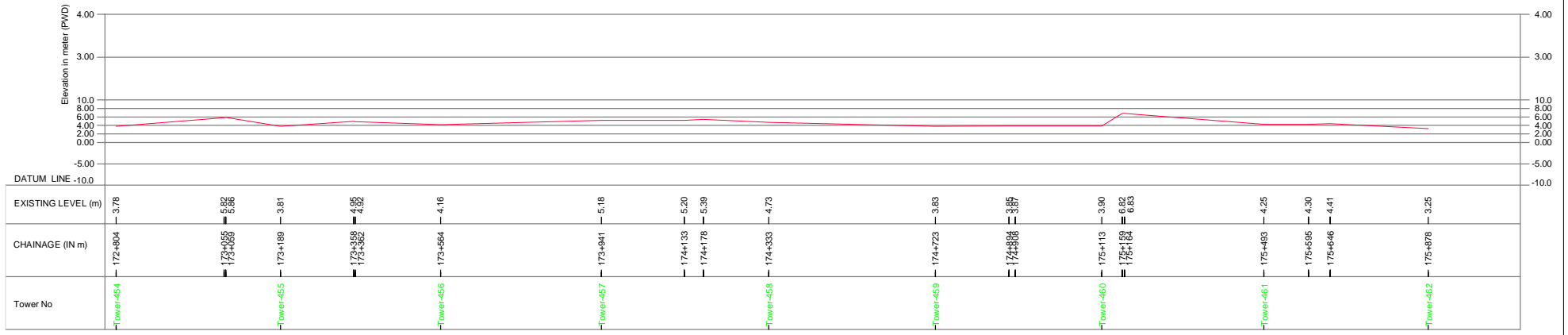
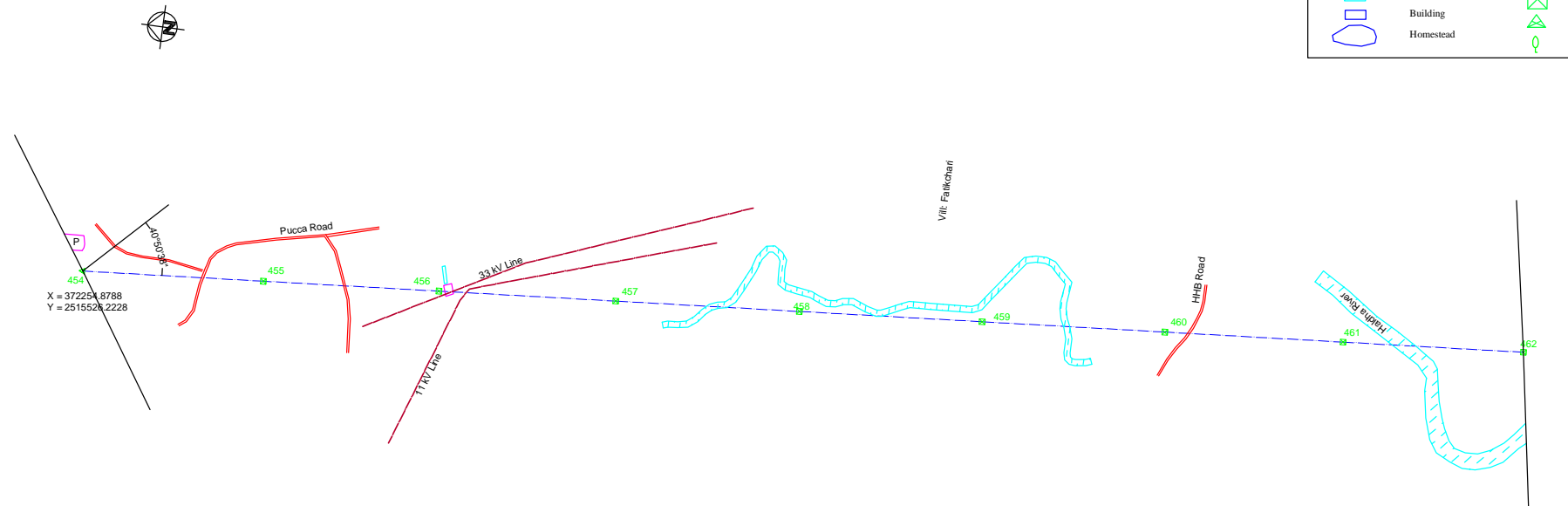
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SURVEYED BY		DATE OF PREPARATION		NOVEMBER 2014	DESCRIPTION	
CHECKED BY		REVISIONS		1.		

**LEGEND**

	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tree
	Homestead		



**SCALE :**

SCALE: HORIZONTAL  
 SCALE: VERTICAL

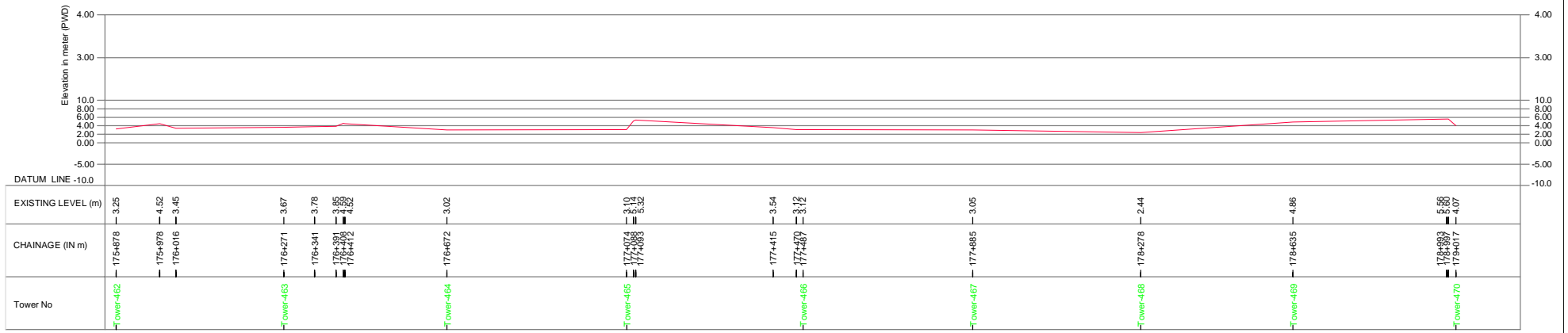
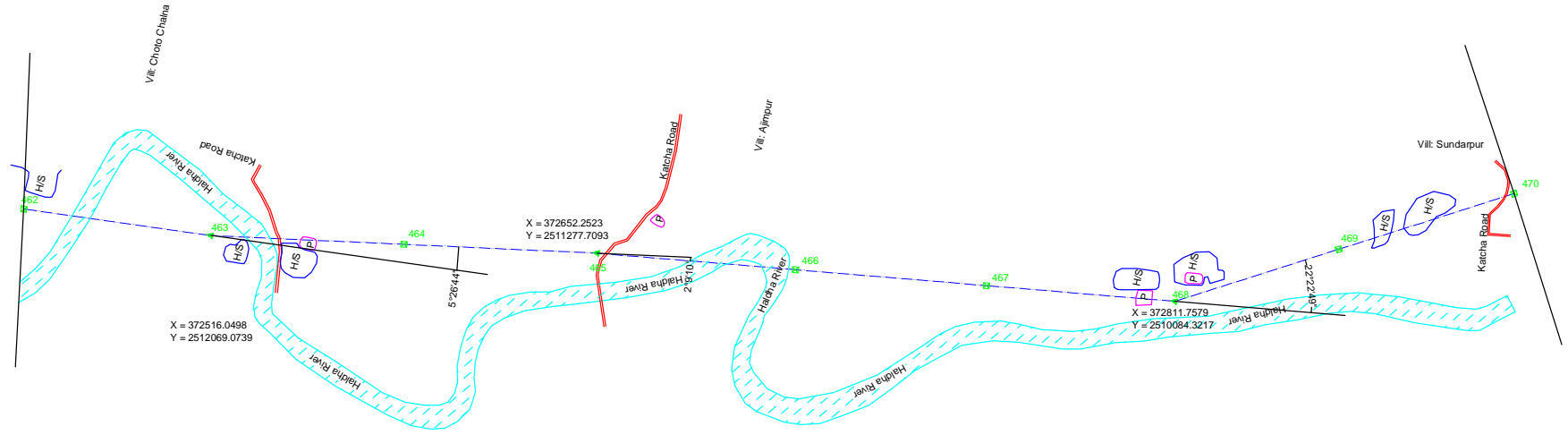
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CHECKED BY				NOVEMBER 2014		
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				1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

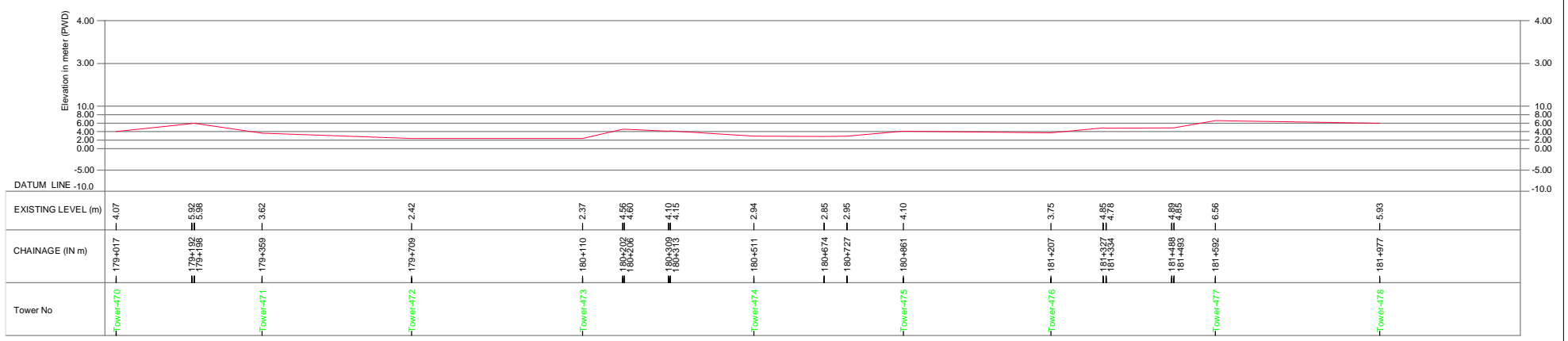
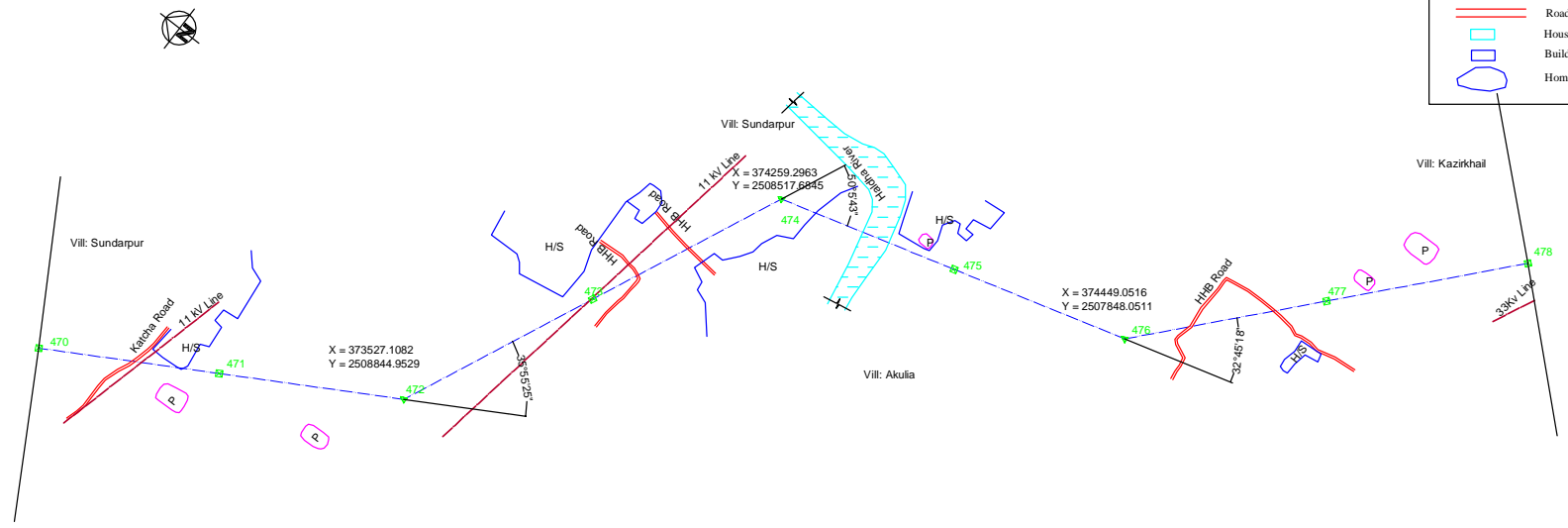
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				REVISIONS	
				1.	

**LEGEND**

- New Line
- Existing Line
- == Road
- House
- ▭ Building
- Homestead
- Pond
- ▭ Khal / River
- ⊠ Tower
- △ Angle Tower
- Tree



**SCALE :**

200 100 0 200  
SCALE: HORIZONTAL

20 10 0 20  
SCALE: VERTICAL

Sheet Index

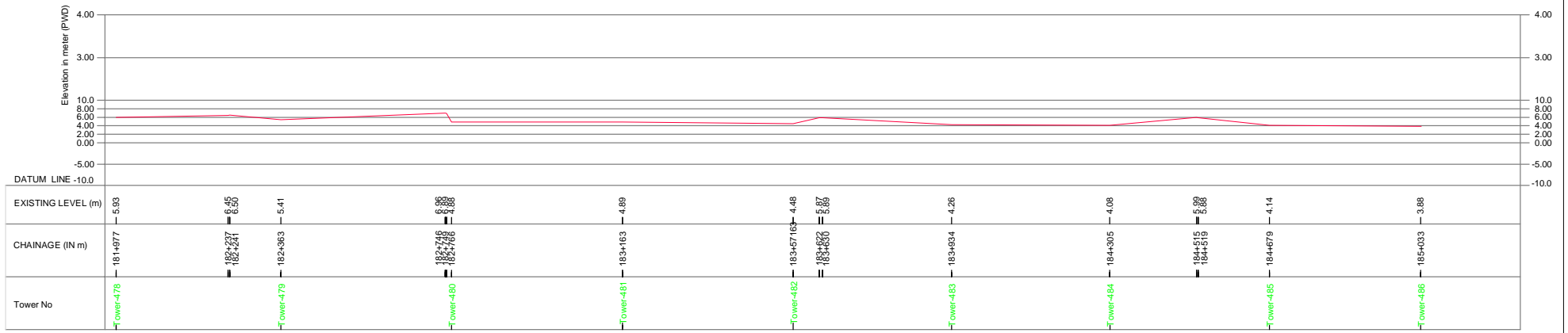
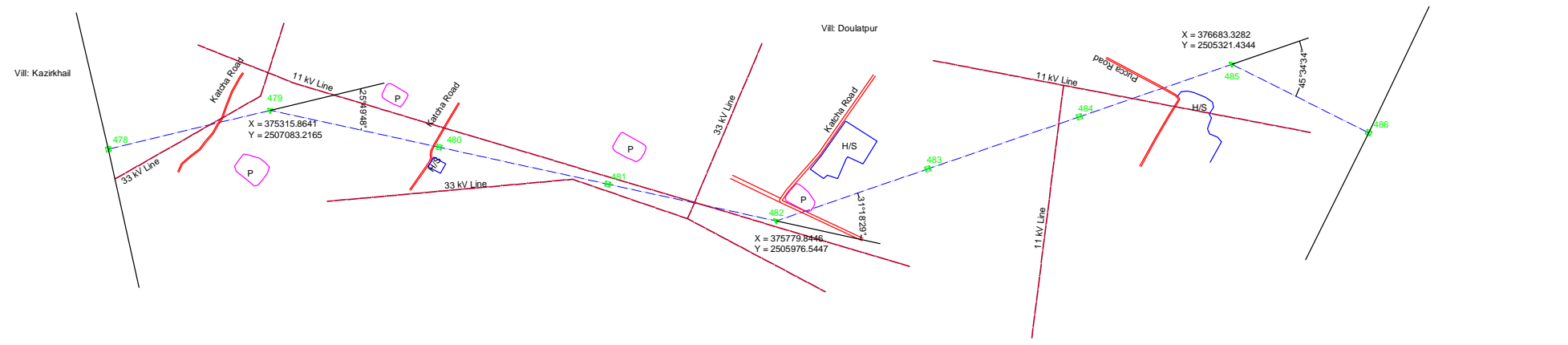
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				1.		



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- Tower
- ▲ Angle Tower
- Tree



**SCALE :**

SCALE : HORIZONTAL

SCALE : VERTICAL

Sheet Index

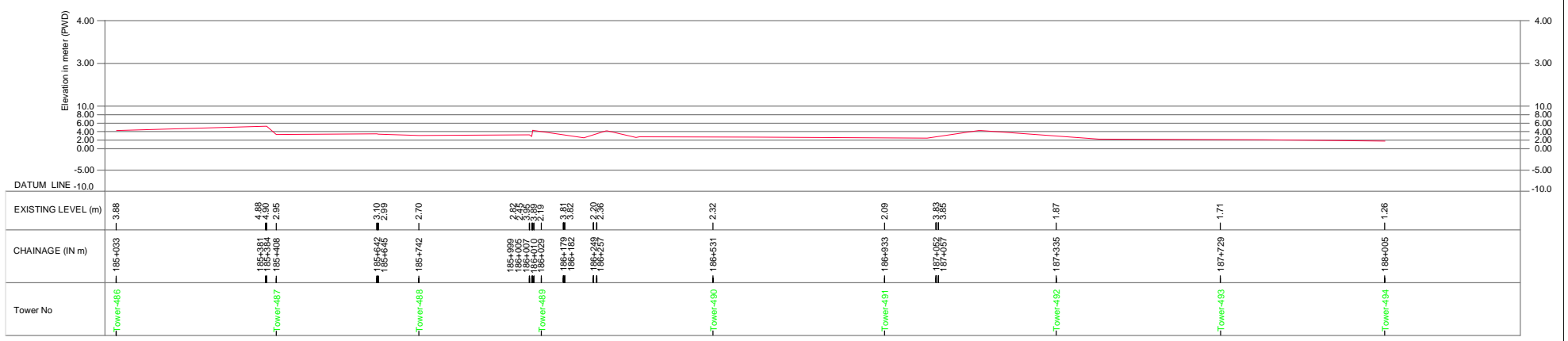
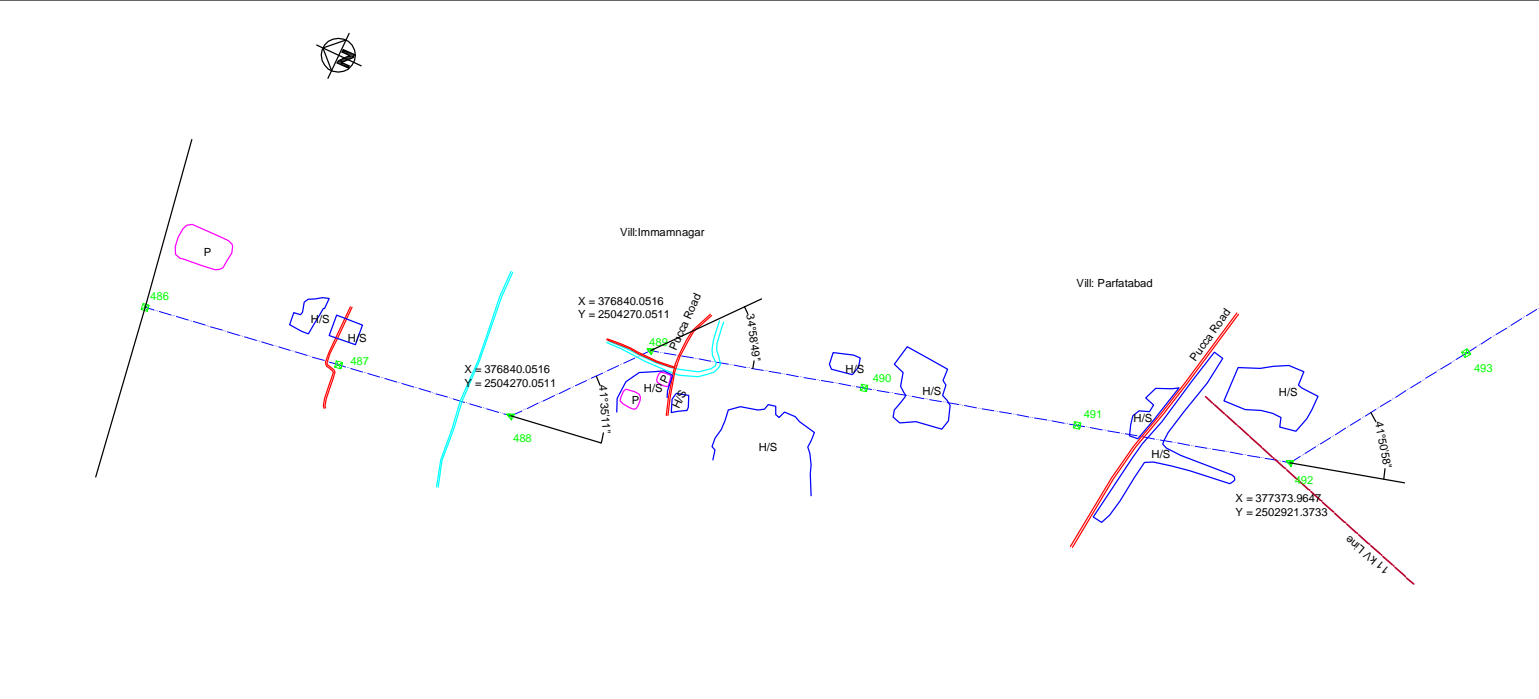
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				1.	



**LEGEND**

- New Line (dashed blue line)
- Existing Line (solid red line)
- Road (double red line)
- House (blue rectangle)
- Building (blue rectangle with cross)
- Homestead (blue circle)
- Pond (pink oval)
- Khal / River (blue wavy line)
- Tower (green square with cross)
- Angle Tower (green triangle with cross)
- Tree (green circle with cross)



**SCALE :**

200 100 0 200  
SCALE: HORIZONTAL

20 10 0 20  
SCALE: VERTICAL

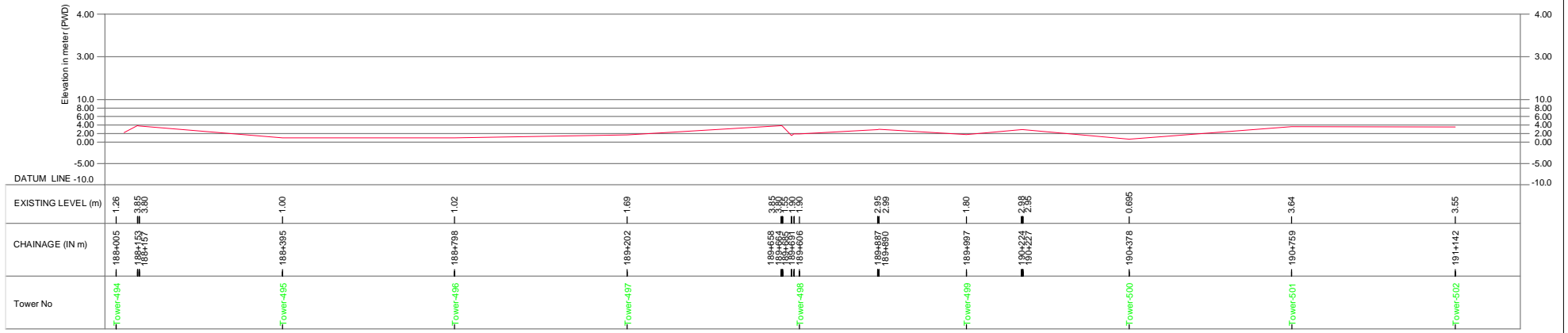
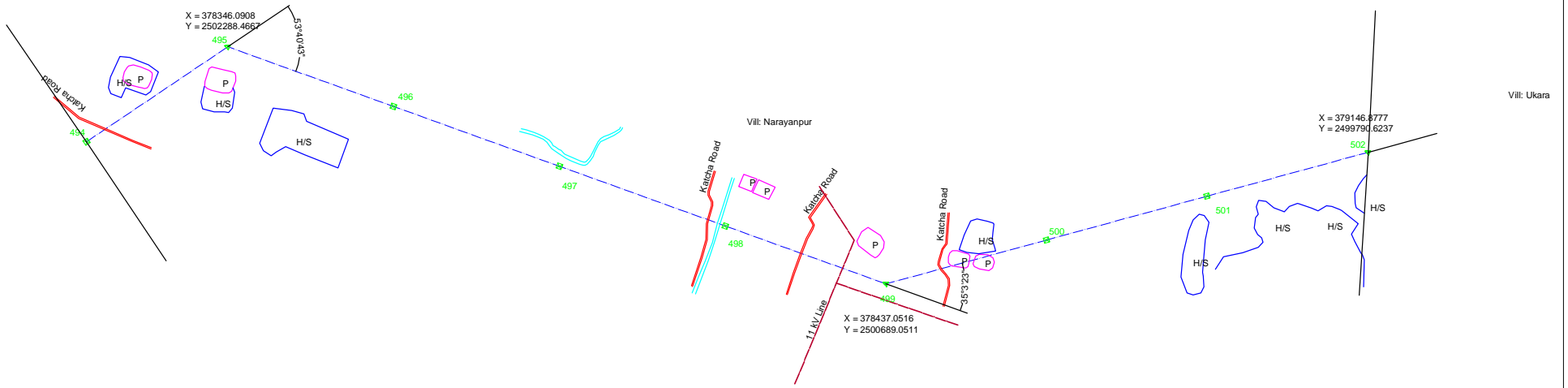
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LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE: HORIZONTAL

SCALE: VERTICAL

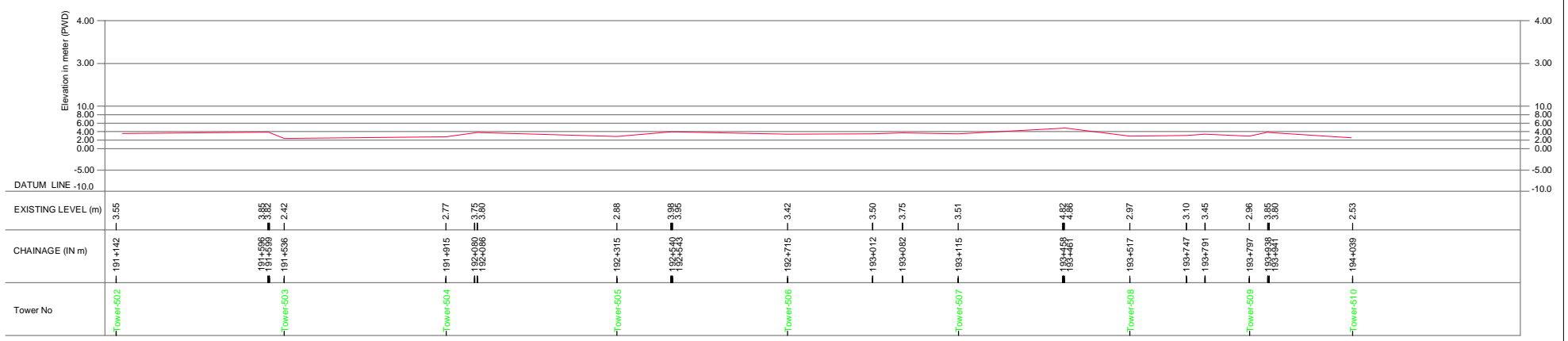
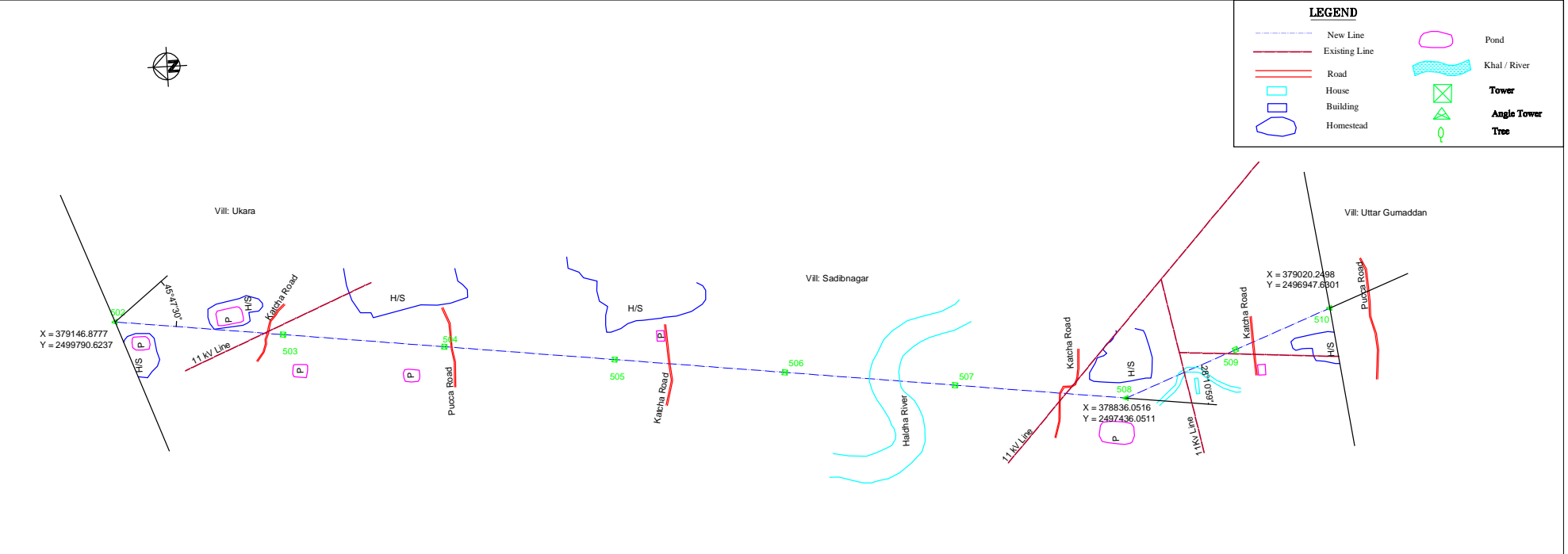
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SURVEYED BY			NOVEMBER 2014		
CHECKED BY			REVISIONS		
			1.		

**LEGEND**

- New Line
- Existing Line
- == Road
- House
- Building
- Homestead
- Pond
- Khal / River
- Tower
- Angle Tower
- Tree



**SCALE :**

SCALE: HORIZONTAL: 1:200

SCALE: VERTICAL: 1:20

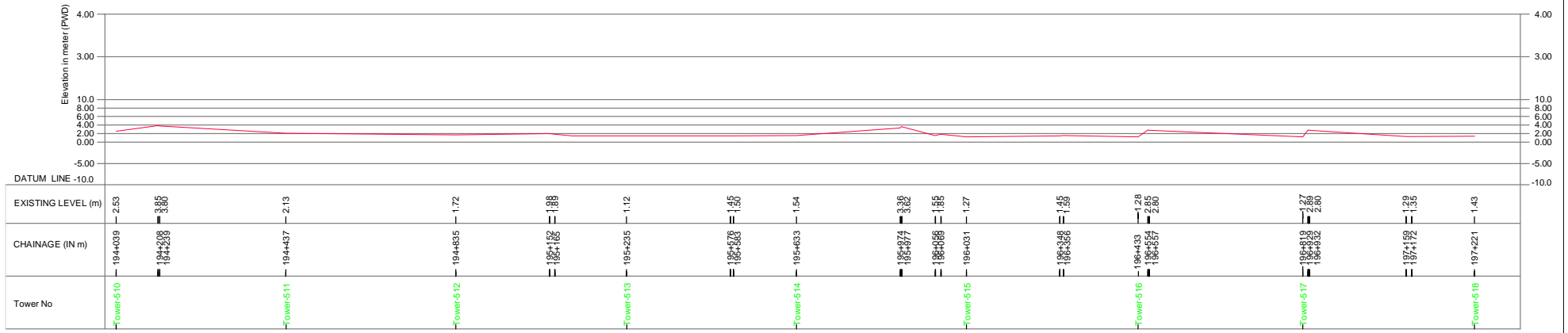
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LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE: HORIZONTAL

SCALE: VERTICAL

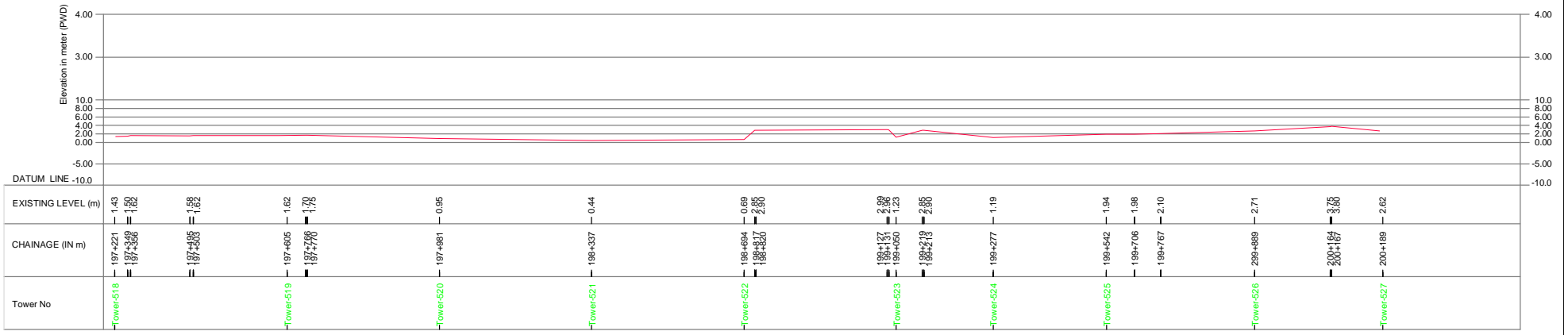
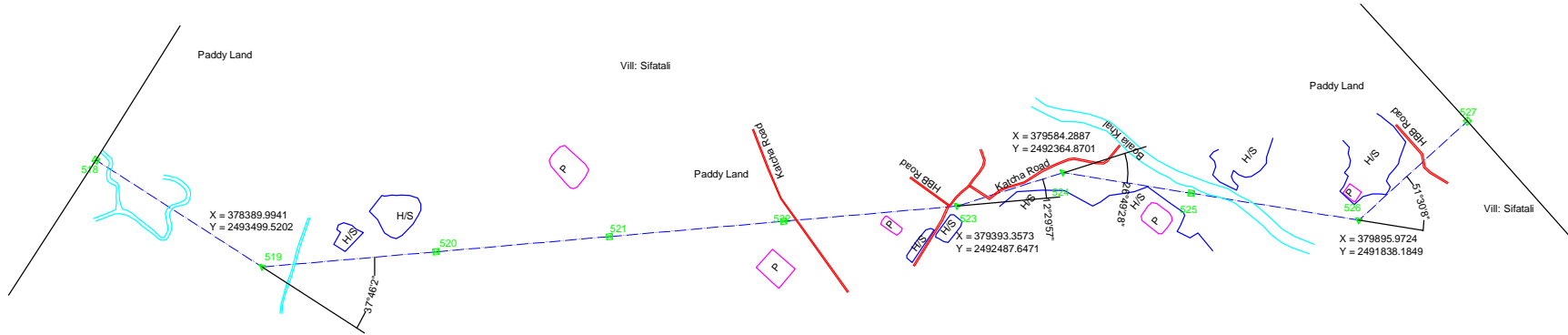
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LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE: HORIZONTAL  
 SCALE: VERTICAL

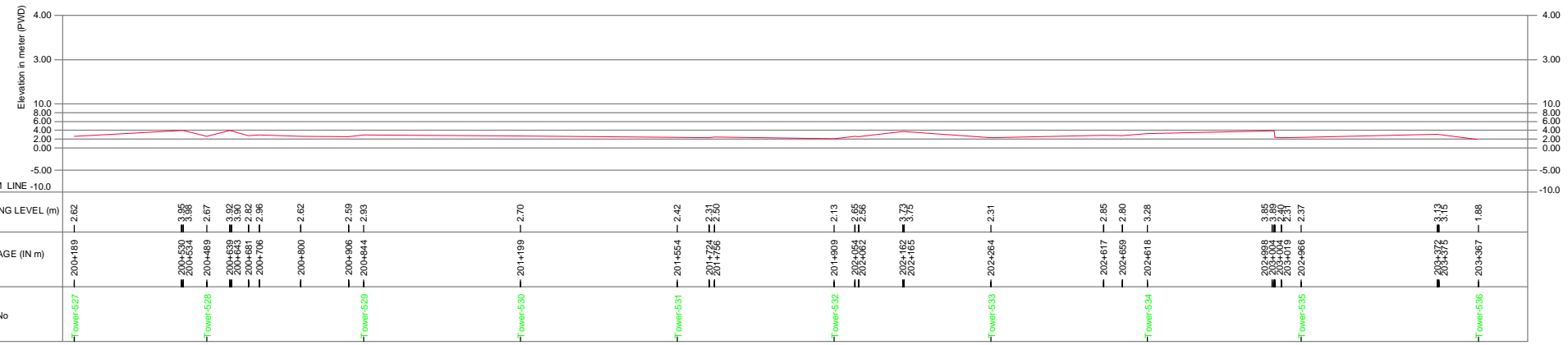
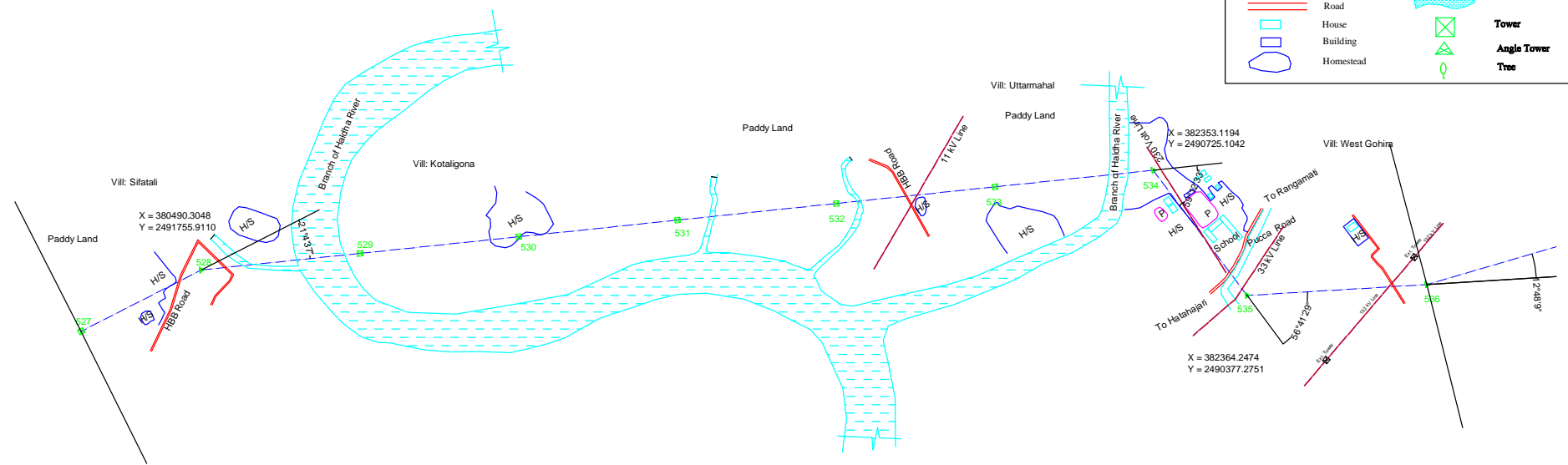
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	TEPCO / JICA	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TITLE			ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY		DATE OF PREPARATION			NOVEMBER 2014	DESCRIPTION	
CHECKED BY		REVISIONS			1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE : HORIZONTAL  
 SCALE : VERTICAL

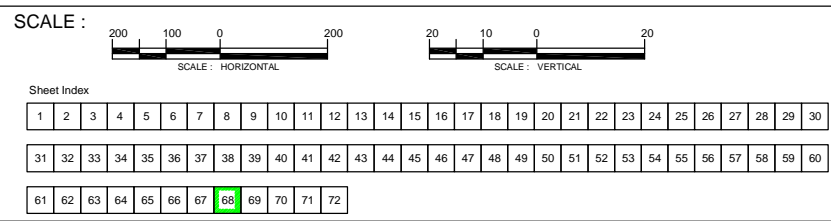
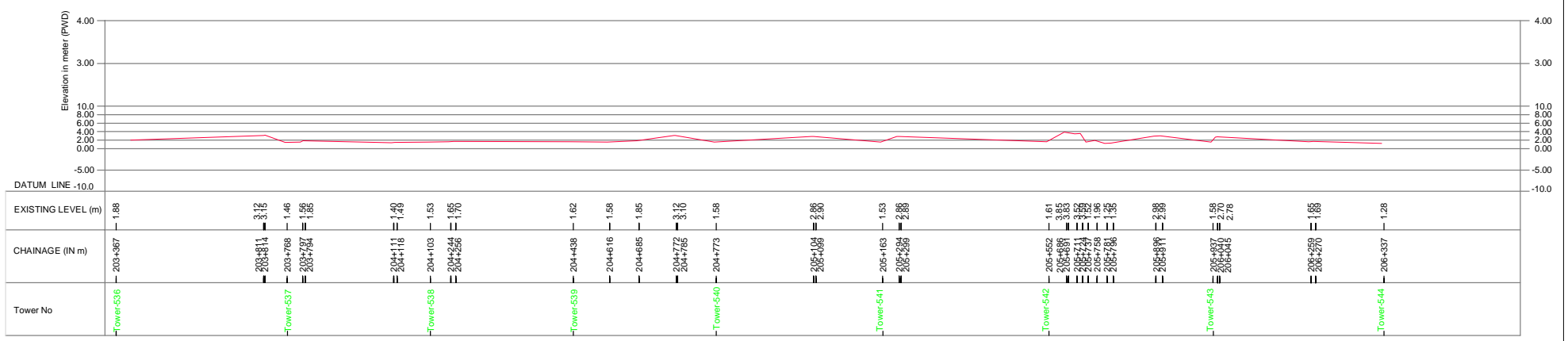
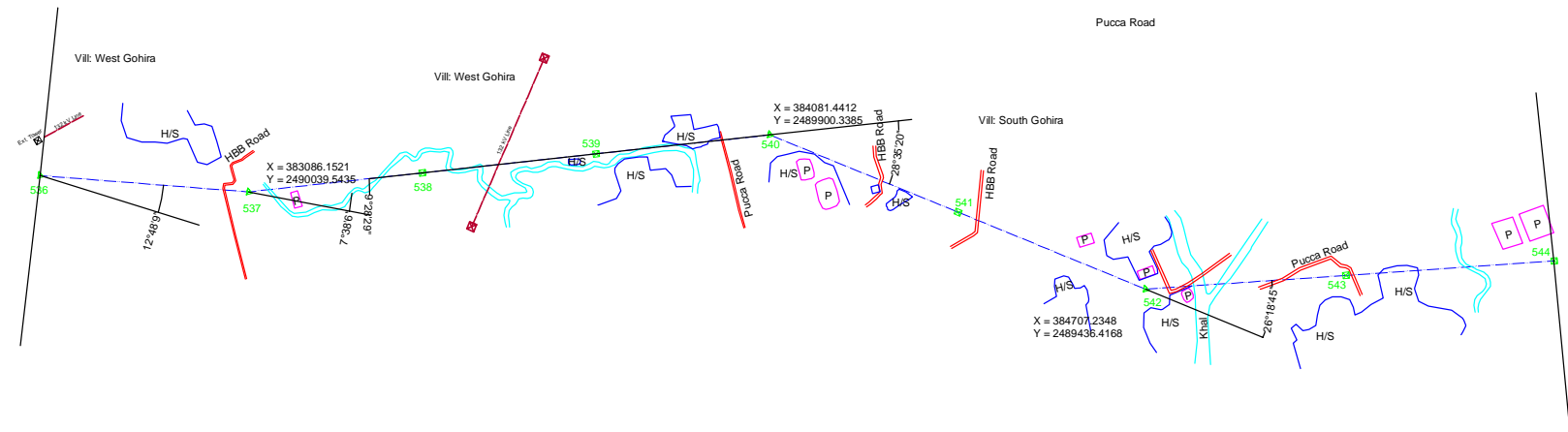
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS	1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree

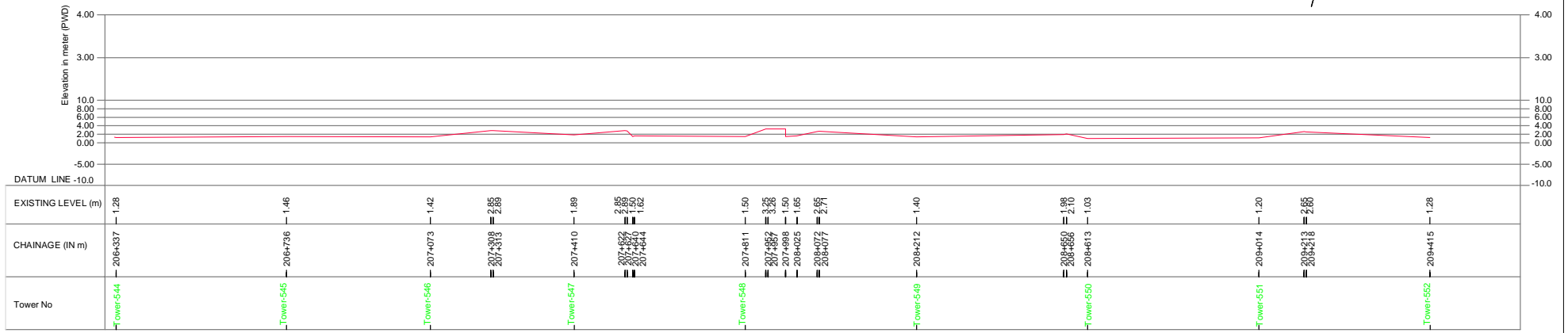
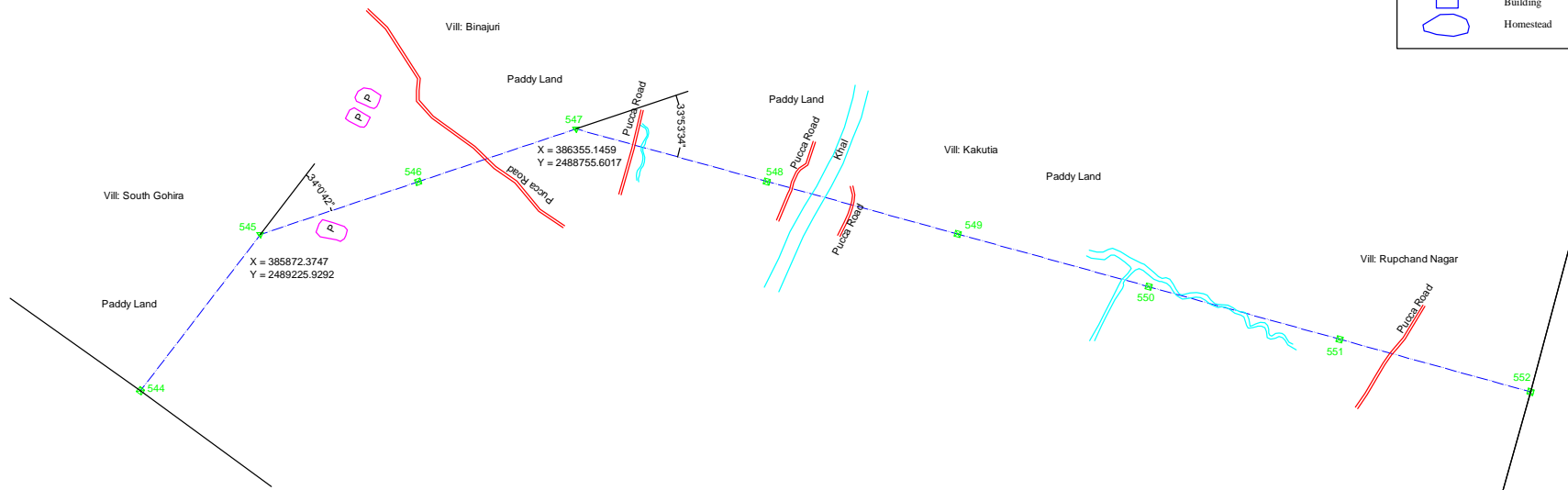


CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY STUDY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATHERBARI.	
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	
CHECKED BY				REVISIONS		
			1.			



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- ~ Khal / River
- ⊠ Tower
- △ Angle Tower
- Tree



**SCALE :**

SCALE: HORIZONTAL: 1:200

SCALE: VERTICAL: 1:20

Sheet Index

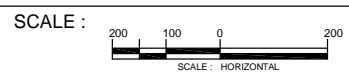
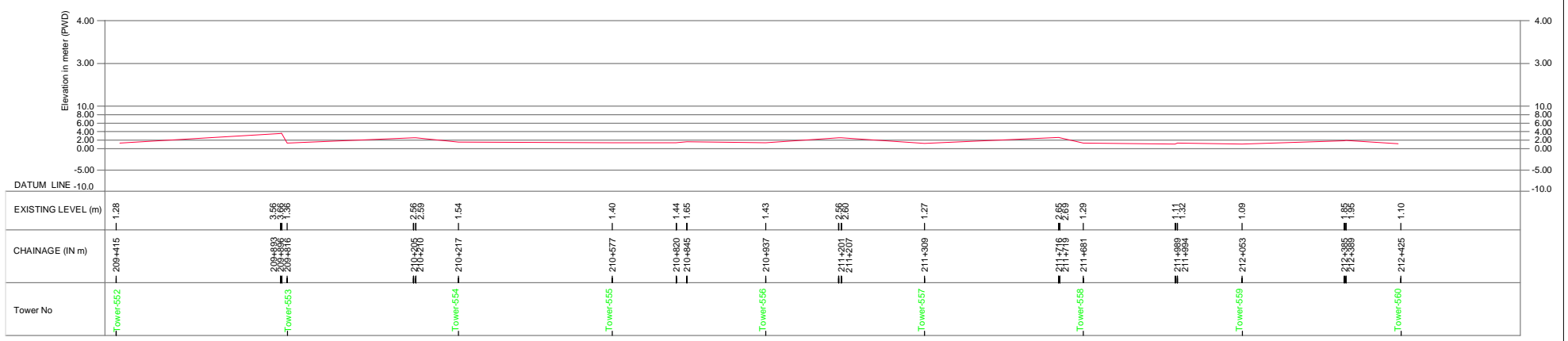
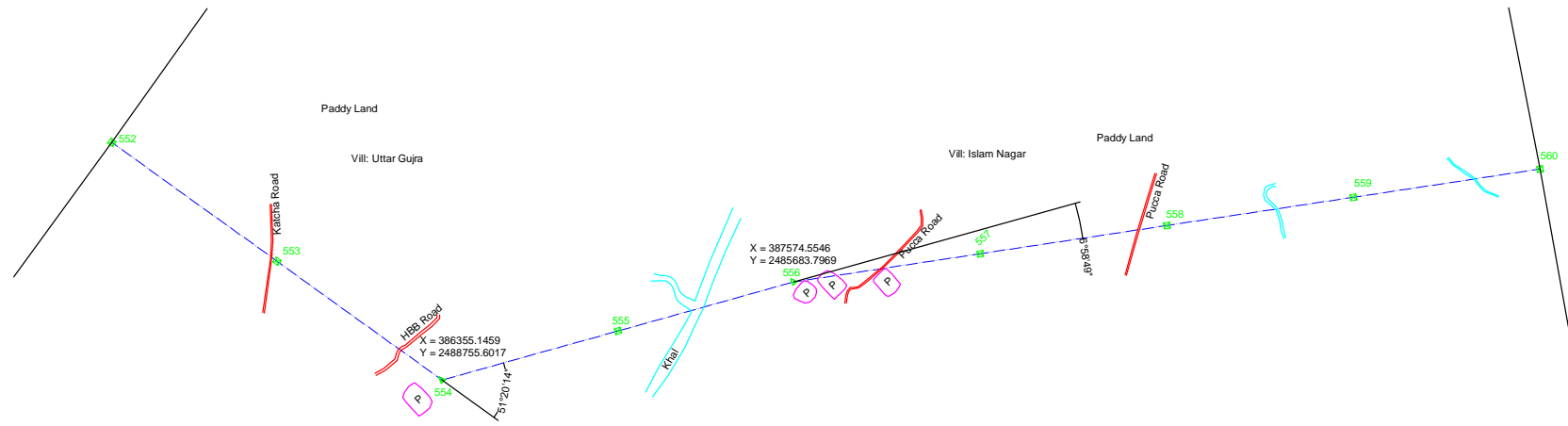
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61	62	63	64	65	66	67	68	69	70	71	72																		

CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
SURVEYED BY		TEPCO / JICA	DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY			REVISIONS	1.		





LEGEND			
	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tree
	Homestead		



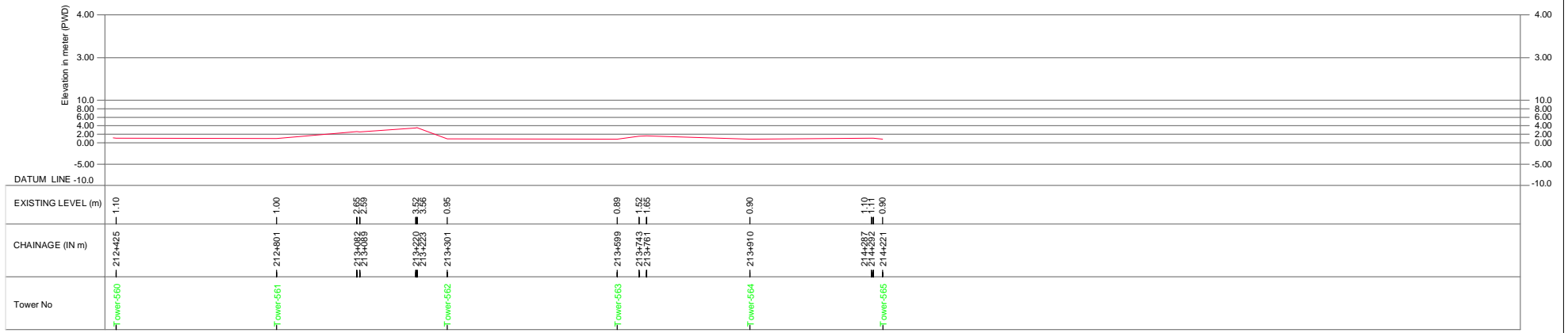
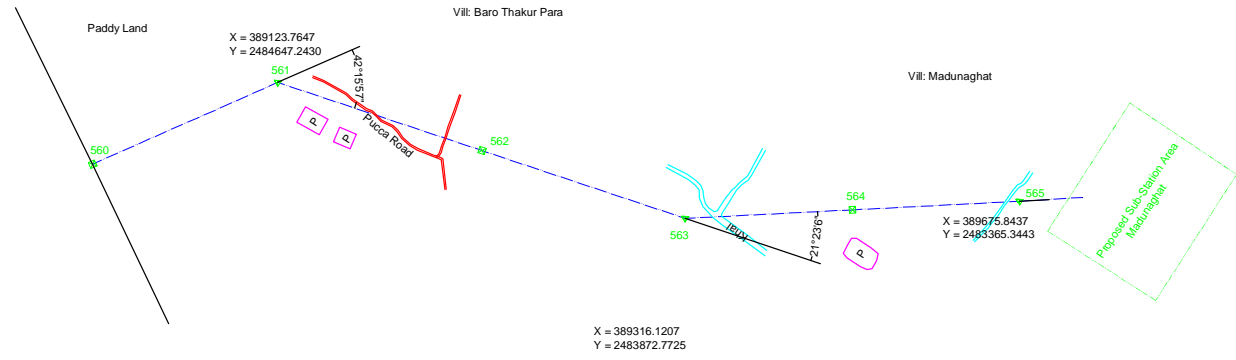
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	
CHECKED BY			REVISIONS	1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



**SCALE :**

SCALE: HORIZONTAL  
 SCALE: VERTICAL

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61	62	63	64	65	66	67	68	69	70	71	72																		

CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
	Engineers Associates Ltd. (EAL)	SIGNATURE		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY		TEPCO / JICA	DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION
CHECKED BY			REVISIONS		
			1.		

## 付録 2

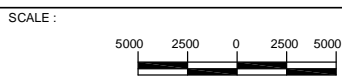
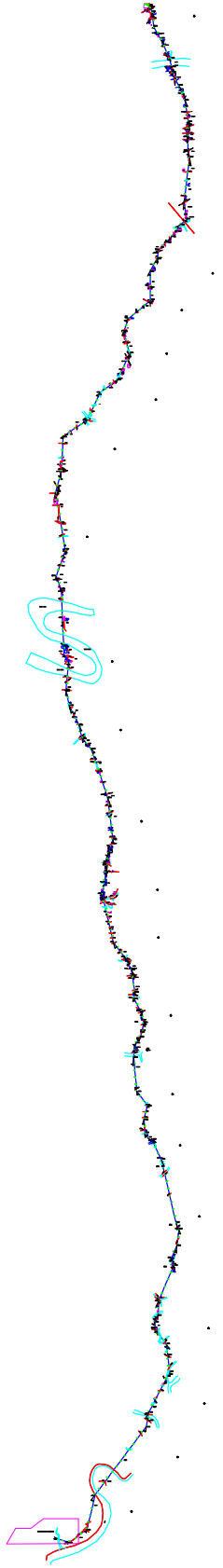
### 400 kV 送電線ルート (Madunaghat - Matarbari 間)



**LEGEND**

	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tee
	Homesite		

ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV  
TRANSMISSION LINE FROM MADHUNAGHAT TO MATARBARI.

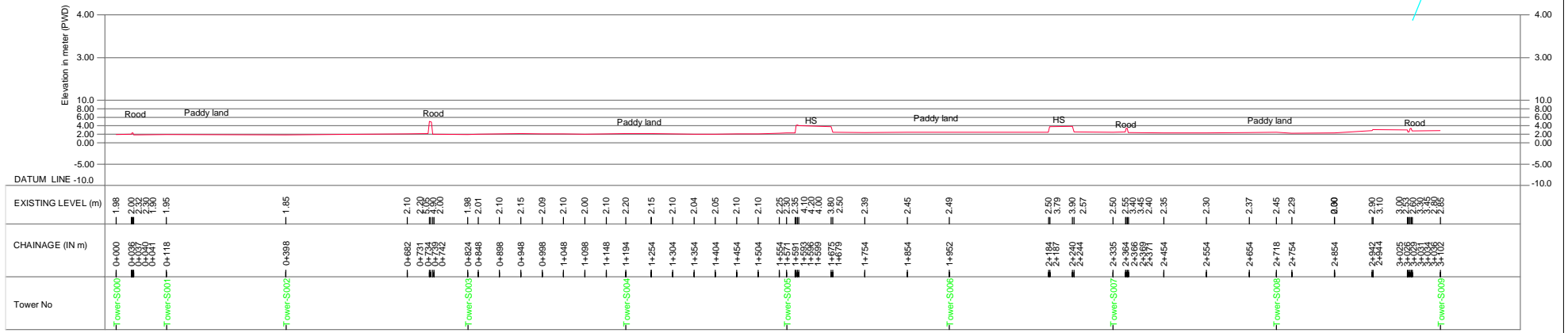
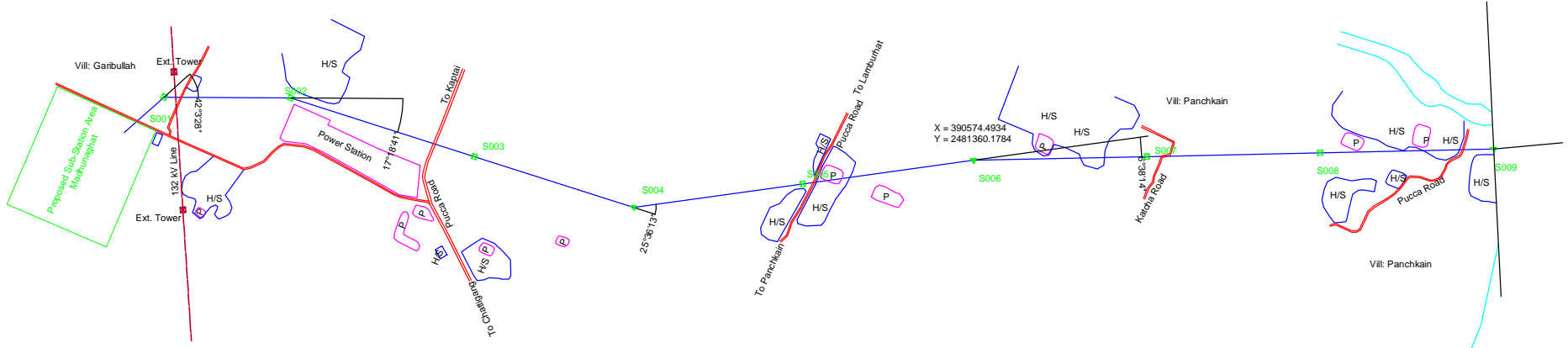


CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID-STRENGTHENING PROJECT
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MADHUNAGHAT TO MATARBARI
SURVEYED BY		DATE OF PREPARATION	August 2014
CHECKED BY		REVISIONS	



**LEGEND**

- New Line (dashed blue line)
- Existing Line (solid red line)
- Road (red line with double lines)
- House (blue rectangle)
- Building (blue rectangle with roof)
- Homestead (blue outline)
- Pond (pink oval)
- Khal / River (blue wavy line)
- Tower (green square with cross)
- Angle Tower (green triangle with cross)
- Tree (green circle with stem)



**SCALE :**

Horizontal Scale: 1:200 (Scale: HORIZONTAL)

Vertical Scale: 1:20 (Scale: VERTICAL)

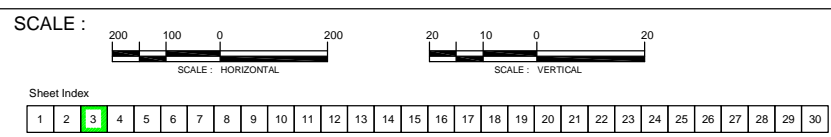
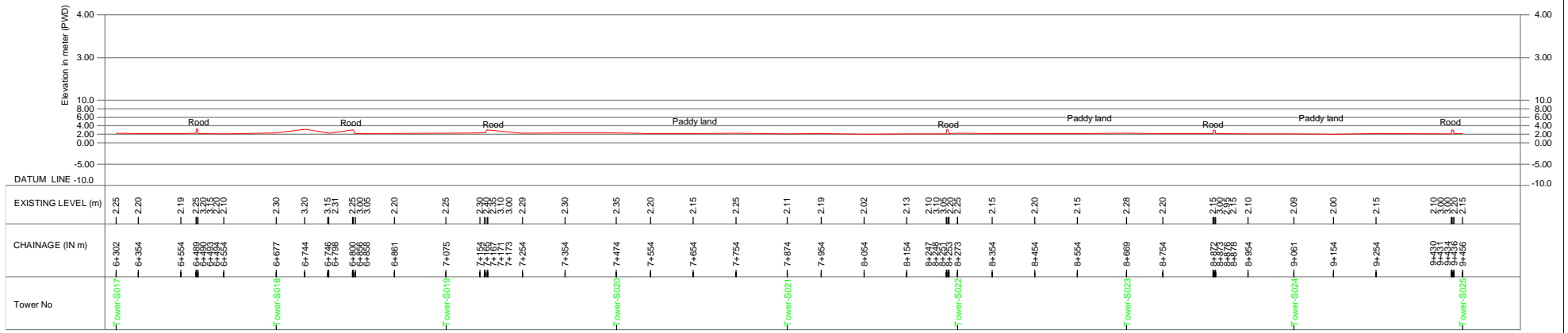
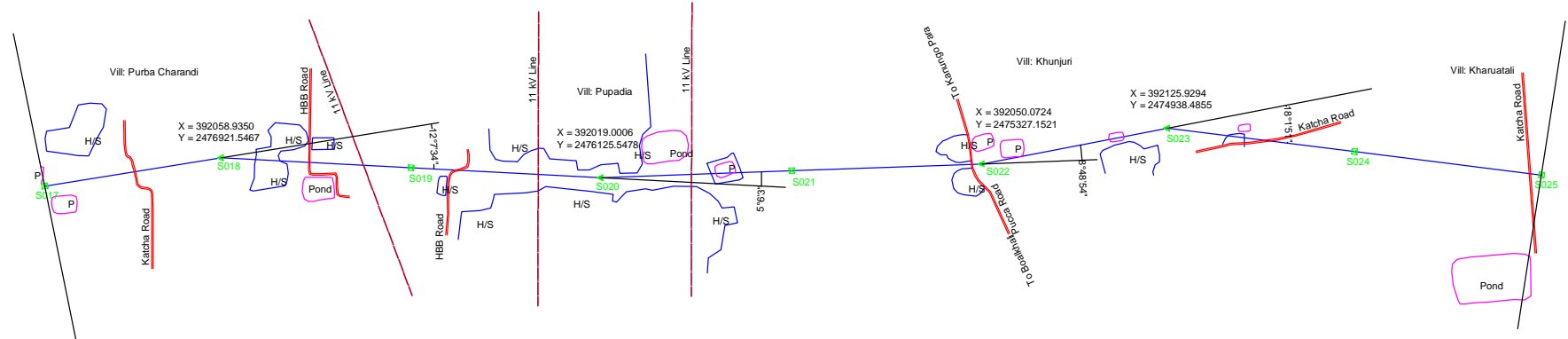
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY				DATE OF PREPARATION	DESCRIPTION
CHECKED BY				NOVEMBER 2014	
				REVISIONS	
				1.	





LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree

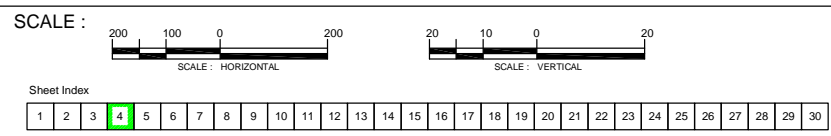
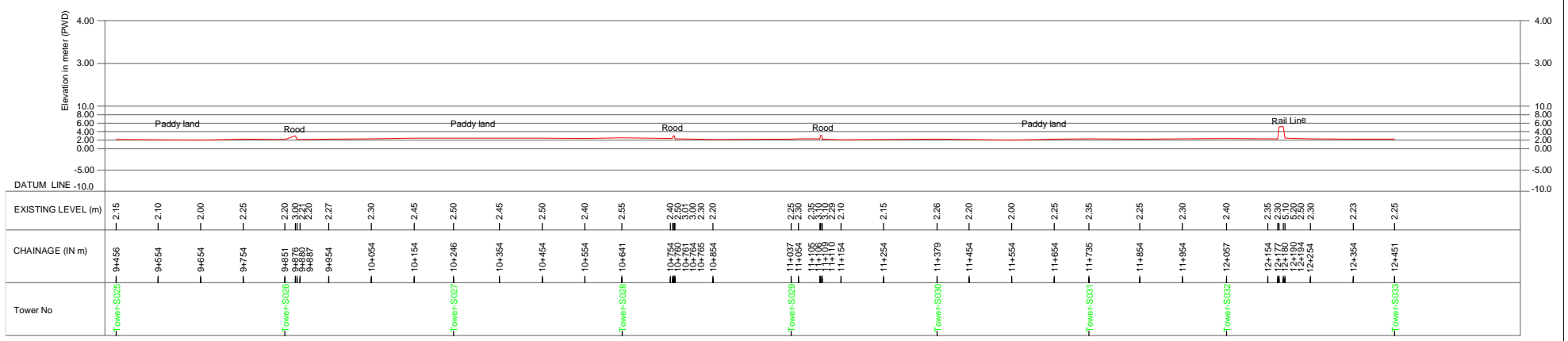
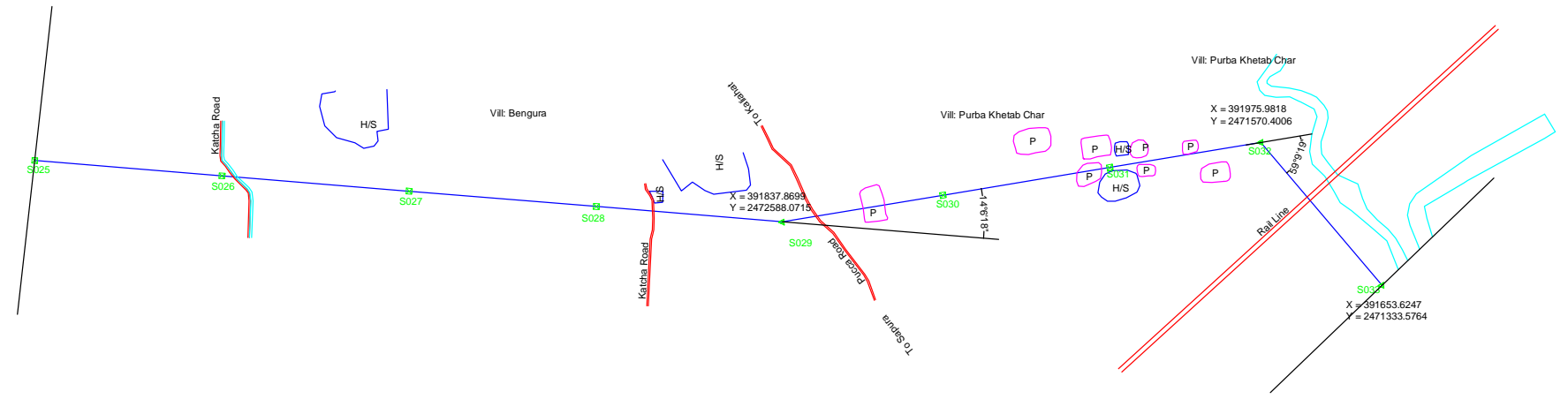


CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS	1.		



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- X Tower
- ▲ Angle Tower
- Tree

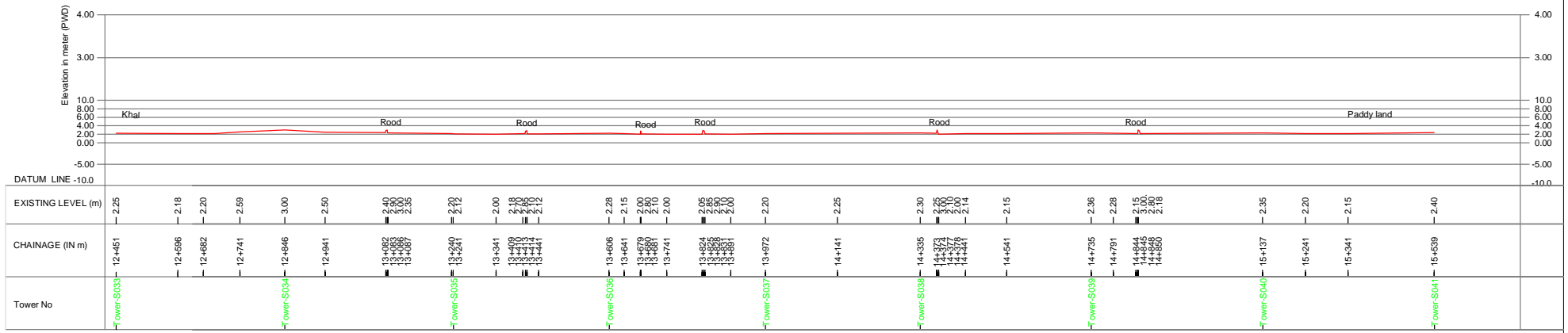
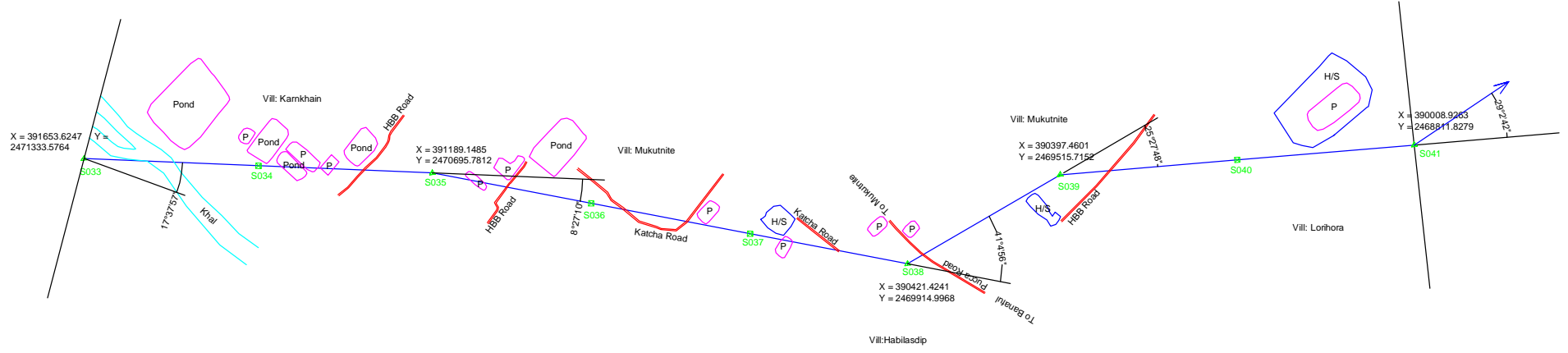


CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	<b>TEPCO / JICA</b>	TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
SURVEYED BY		DATE OF PREPARATION		NOVEMBER 2014		
CHECKED BY		REVISIONS		1.		



**LEGEND**

- New Line (Blue dashed line)
- Existing Line (Red solid line)
- Road (Red double line)
- House (Cyan rectangle)
- Building (Cyan rectangle with blue border)
- Homestead (Blue outline)
- Pond (Pink outline)
- Khal / River (Blue wavy line)
- Tower (Green triangle on a pole)
- Angle Tower (Green triangle on a pole with a cross)
- Tree (Green circle with a stem)



**SCALE :**

SCALE: HORIZONTAL: 1:2000

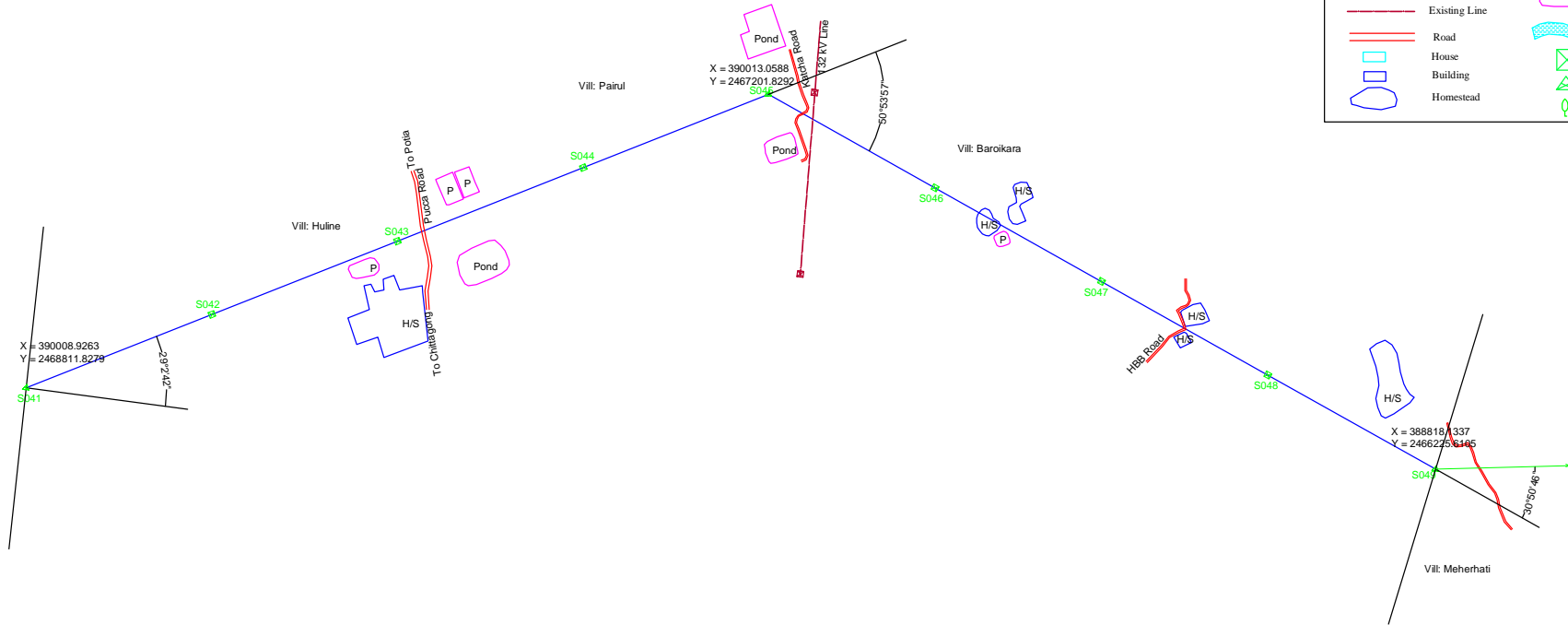
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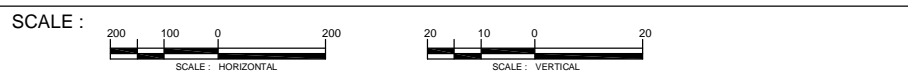
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LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)			TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS	1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



Elevation in meter (PVID)	Ground Profile																																						
	4.00	3.00	2.00	1.00	0.00	-1.00	-2.00	-3.00	-4.00	-5.00																													
	Paddy land, Road, Paddy land, Road, Paddy land, Road, Paddy land																																						
DATUM LINE	-10.0																																						
EXISTING LEVEL (m)	2.40	2.20	2.10	2.38	2.00	2.15	2.35	2.20	2.05	2.15	1.95	1.92	2.30	2.25	2.10	2.15	2.25	2.20	2.10	2.25	2.19	2.20	2.00	1.95	2.15														
CHAINAGE (IN m)	15+539	15+641	15+741	15+942	16+041	16+141	16+344	16+396	16+400	16+402	16+541	16+641	16+747	16+941	17+149	17+223	17+223	17+223	17+229	17+341	17+534	17+641	17+741	17+841	17+919	18+041	18+106	18+110	18+112	18+141	18+304	18+441	18+541	18+692					
Tower No	Tower-S041			Tower-S042			Tower-S043						Tower-S044								Tower-S046					Tower-S047									Tower-S048				Tower-S048



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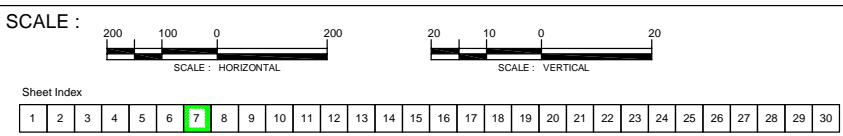
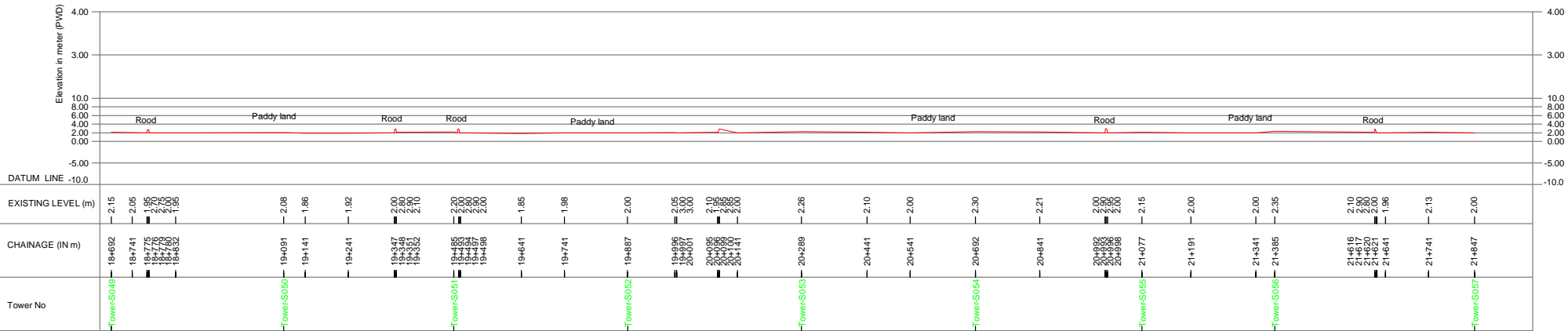
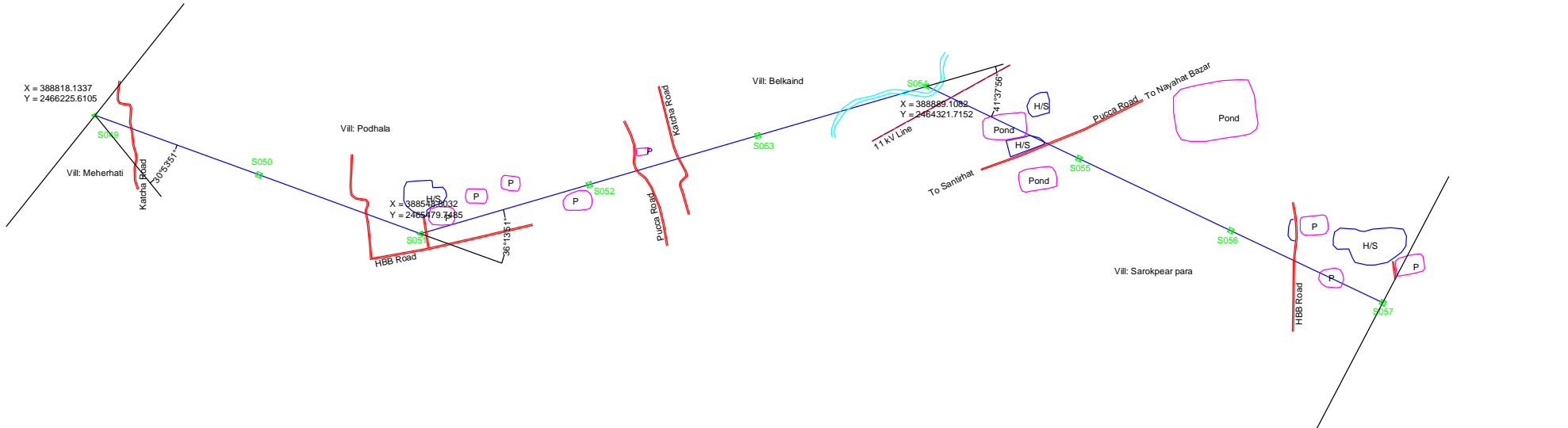
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS	1.		



**LEGEND**

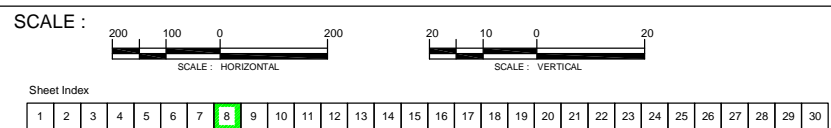
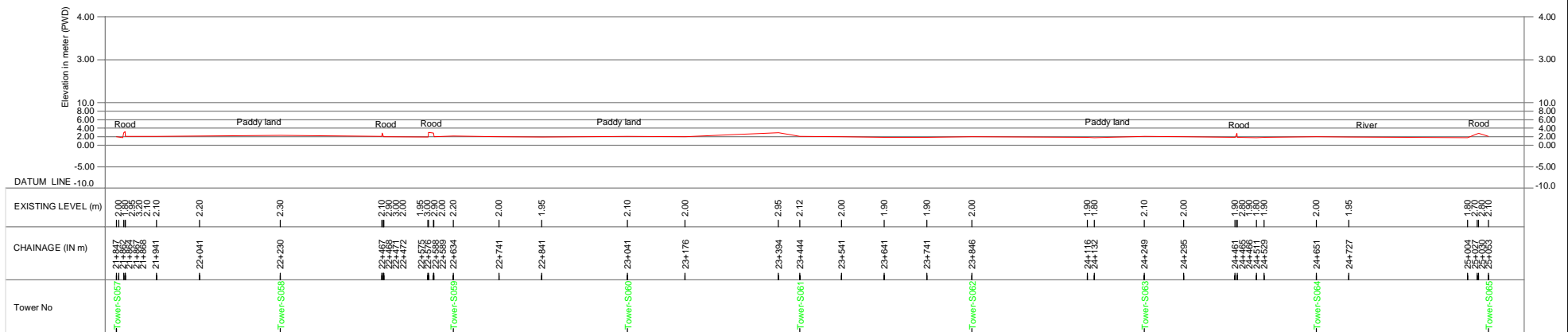
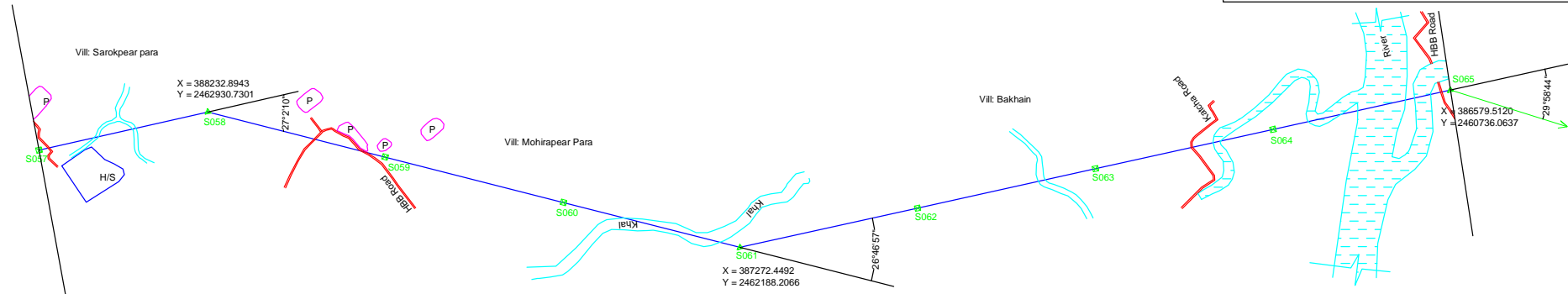
- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- Tower
- Angle Tower
- Tree



CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	<b>TEPCO / JICA</b>		TITLE
SURVEYED BY		DATE OF PREPARATION			DESCRIPTION
CHECKED BY		NOVEMBER 2014			
		REVISIONS			
		1.			



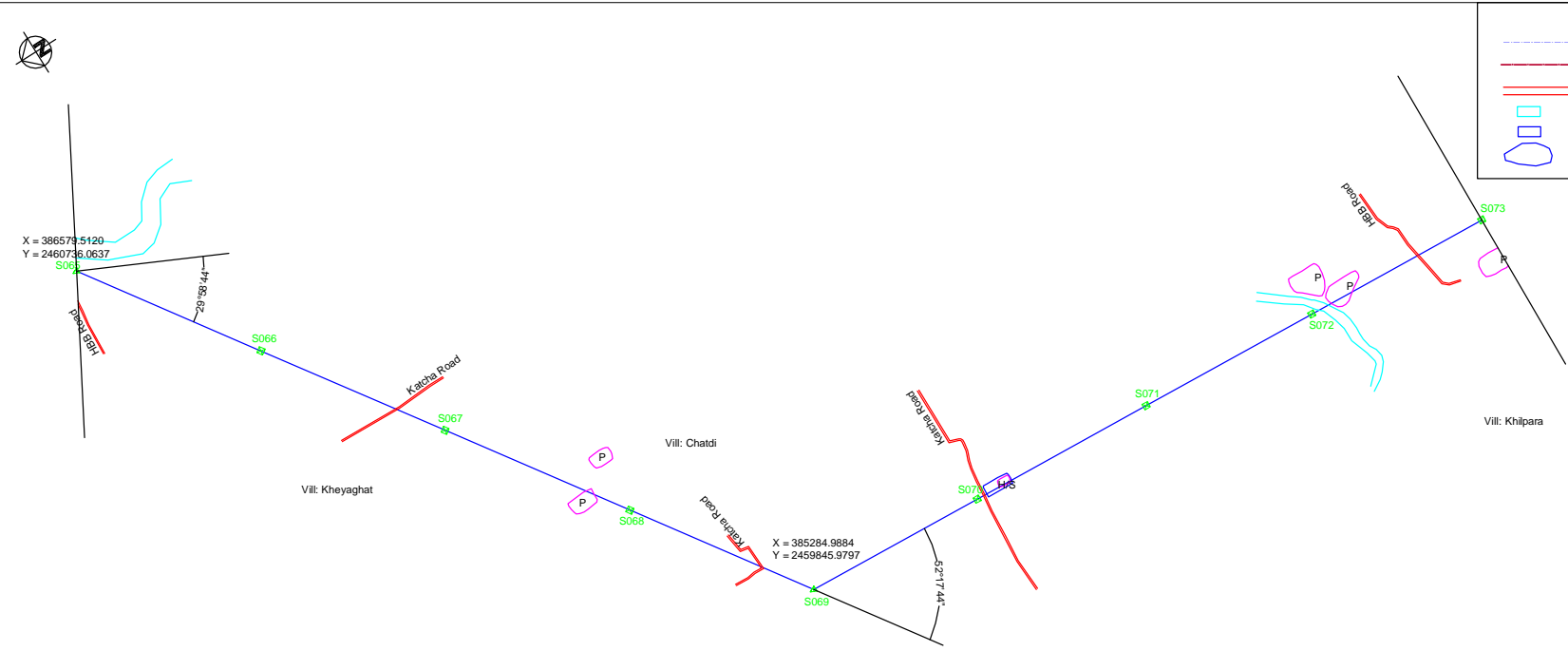
LEGEND			
	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tree
	Homestead		



CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
SURVEYED BY				DATE OF PREPARATION	DESCRIPTION	
CHECKED BY				NOVEMBER 2014		
				REVISIONS		
				1.		

**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- ~ Khal / River
- ⊠ Tower
- △ Angle Tower
- Tree



Tower No	Elevation in meter (PWD)	
	4.00	3.00
	Paddy land	
	Road	
	Road	
	Road	
	Paddy land	
	Road	
	-5.00	
	-10.00	
EXISTING LEVEL (m)	2.10	1.90
CHAINAGE (IN m)	25+053	25+141
	25+241	25+341
	25+446	25+541
	25+638	25+726
	25+726	25+821
	25+821	25+911
	25+941	26+041
	26+222	26+341
	26+441	26+506
	26+506	26+576
	26+576	26+624
	26+741	26+841
	26+889	26+988
	27+002	27+141
	27+241	27+367
	27+441	27+541
	27+641	27+737
	27+759	27+882
	27+982	28+041
	28+117	28+117
	2.10	1.85
	1.90	1.70
	2.20	1.50
	2.10	1.90
	2.00	2.05

**SCALE :**

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20 10 0 20  
SCALE: VERTICAL

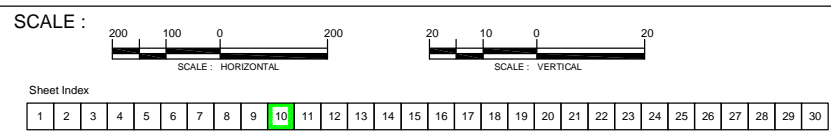
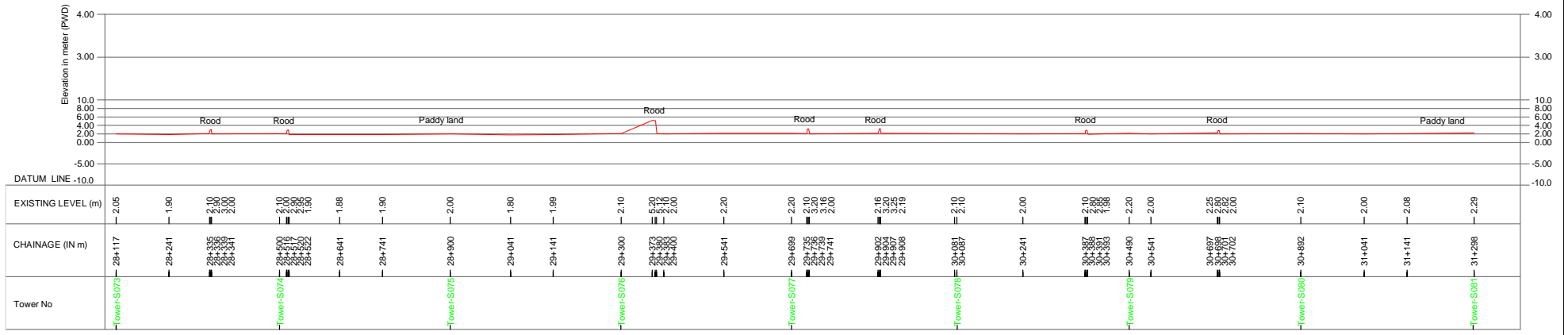
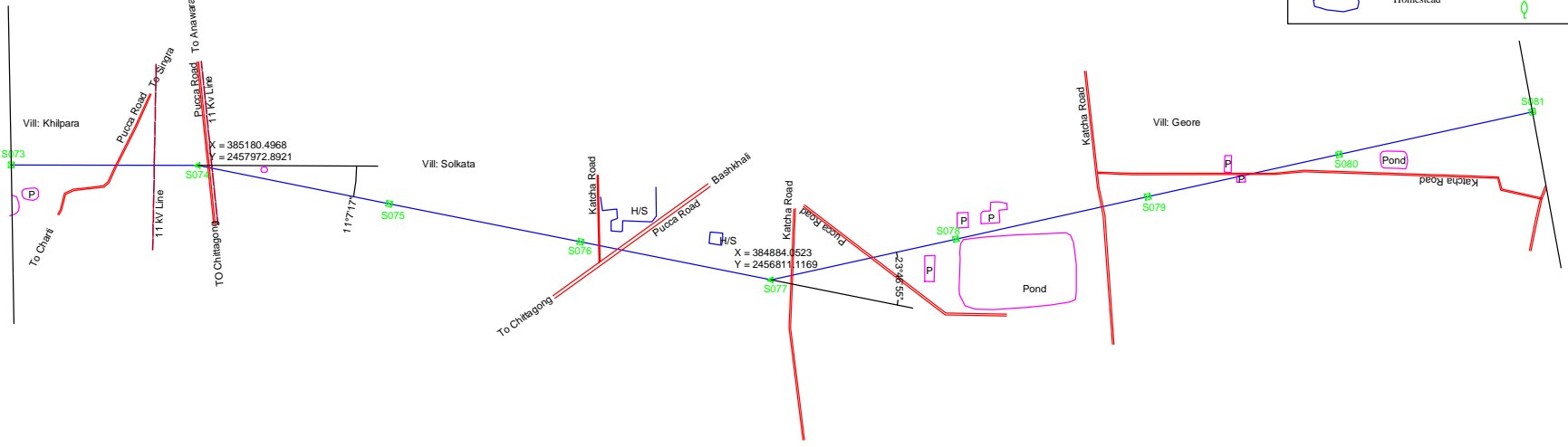
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS	1.		



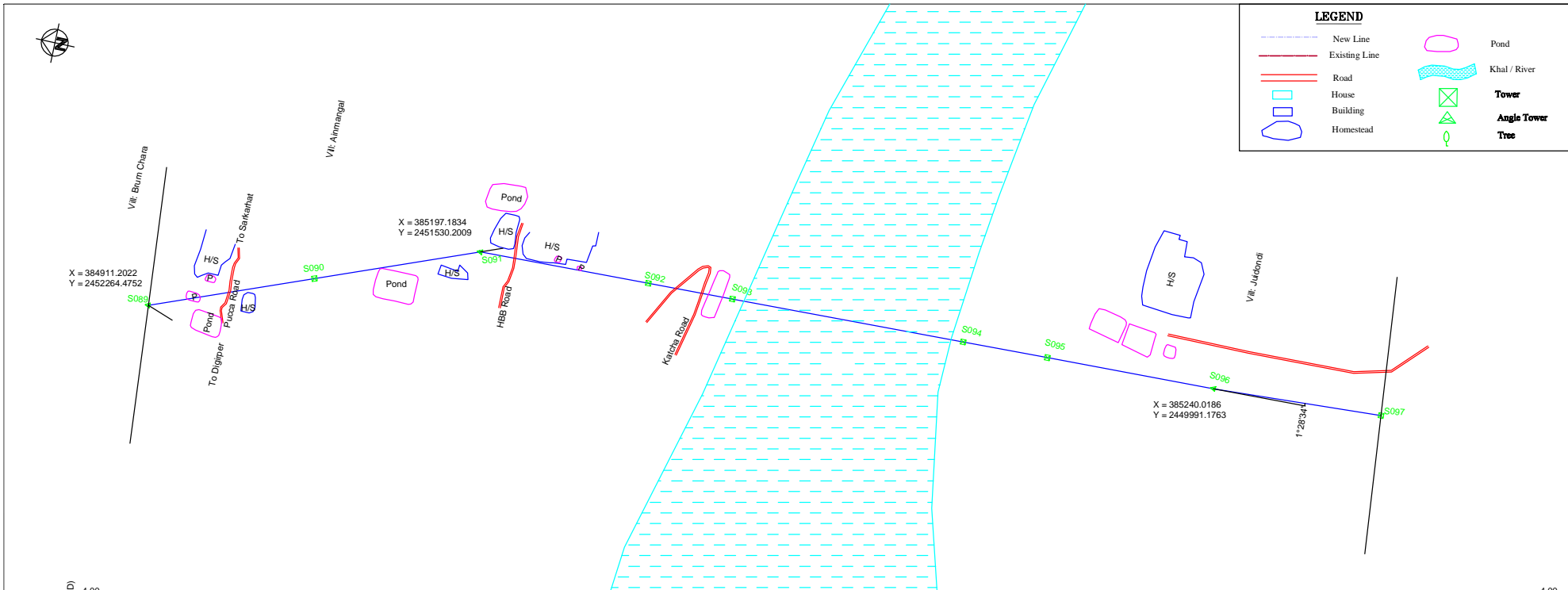
LEGEND	
	New Line
	Existing Line
	Road
	House
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	TEPCO / JICA	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	SIGNATURE		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	
CHECKED BY				REVISIONS	1.	

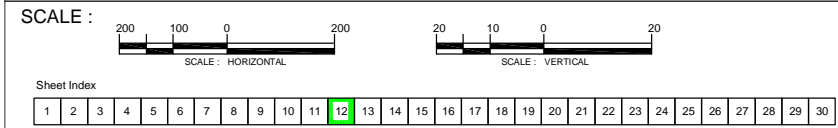
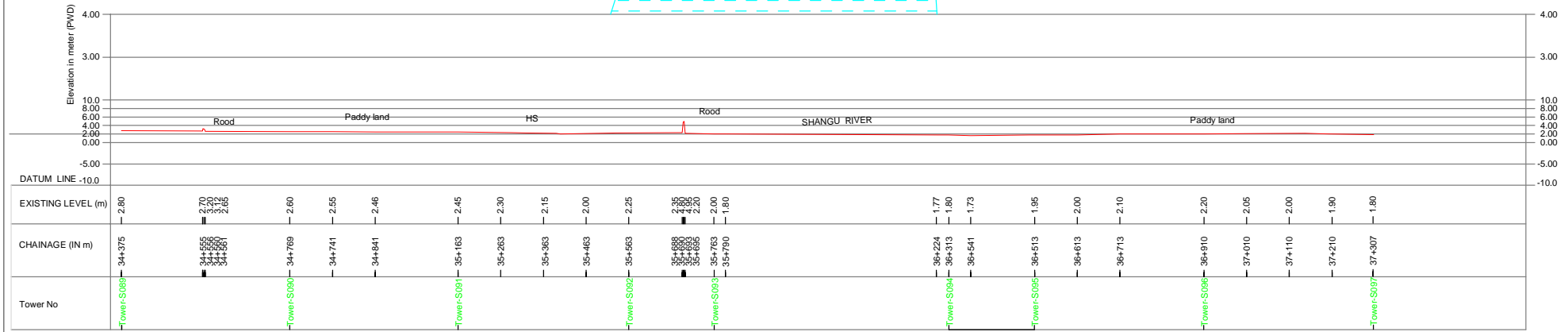




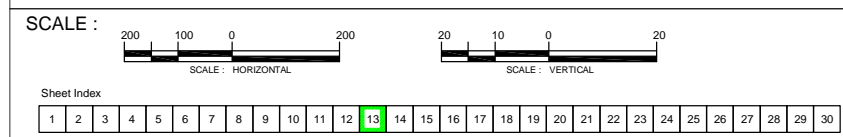
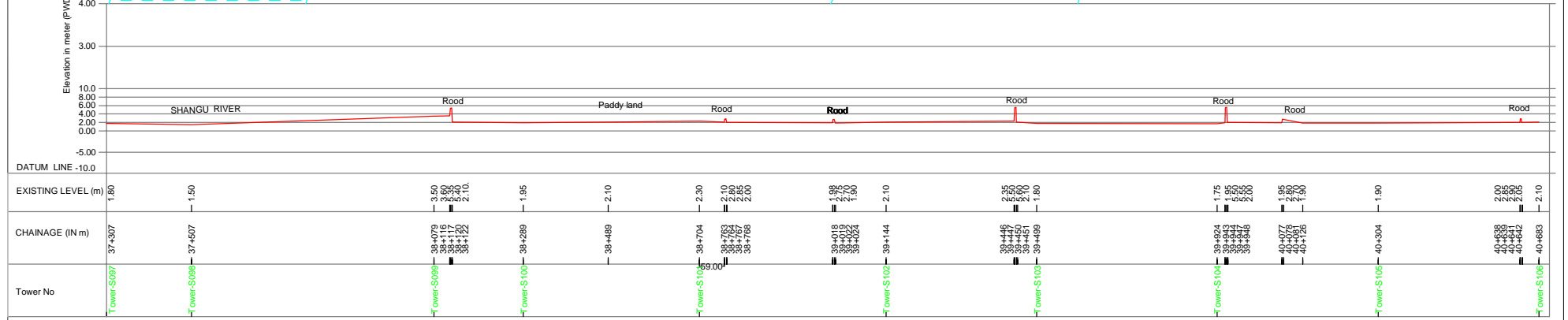
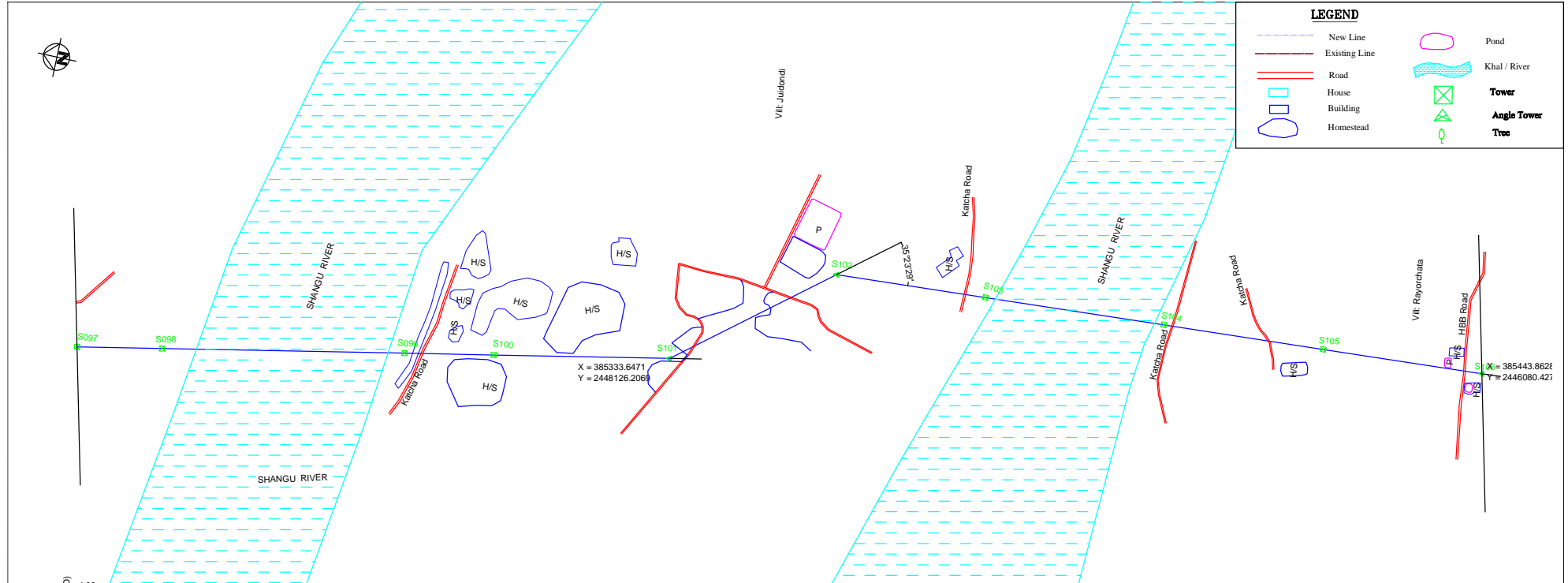


**LEGEND**

	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tree
	Homestead		



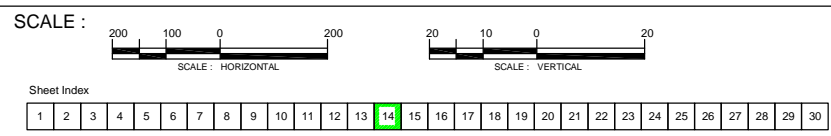
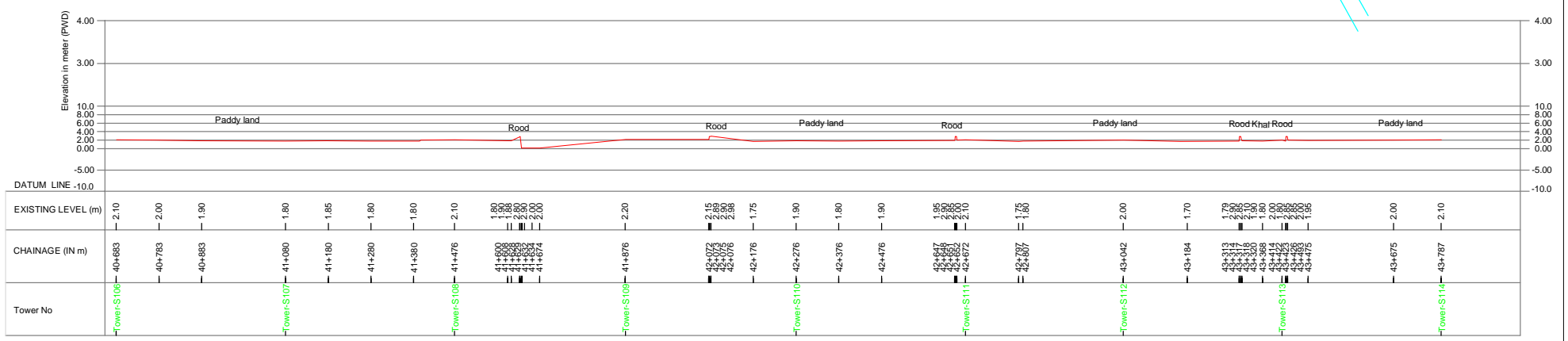
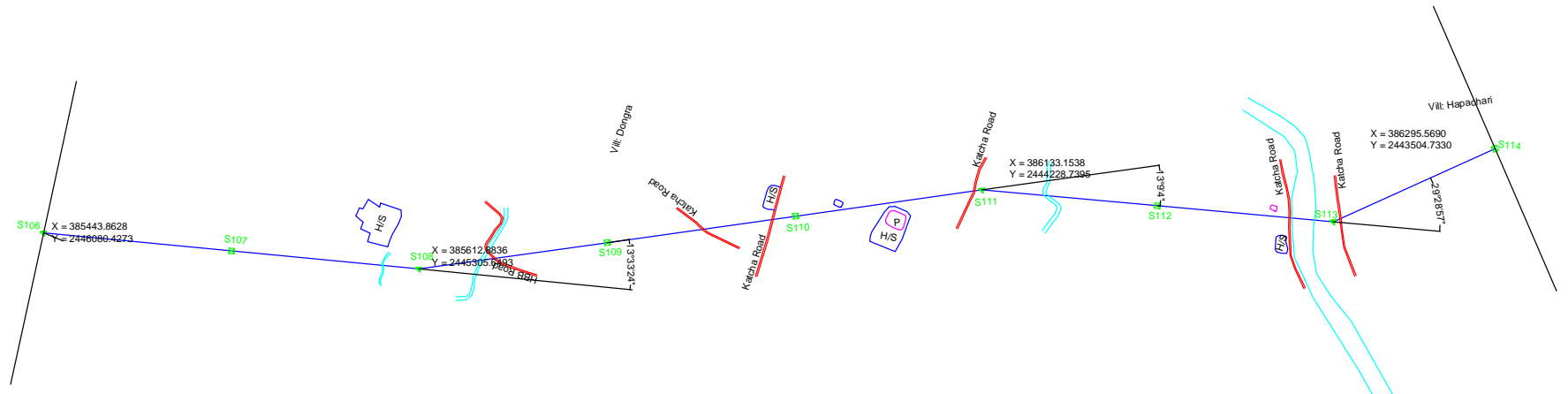
CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	
CHECKED BY				REVISIONS	1.	



CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY		TEPCO / JICA		DATE OF PREPARATION	NOVEMBER 2014
CHECKED BY				REVISIONS	
				1.	



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree

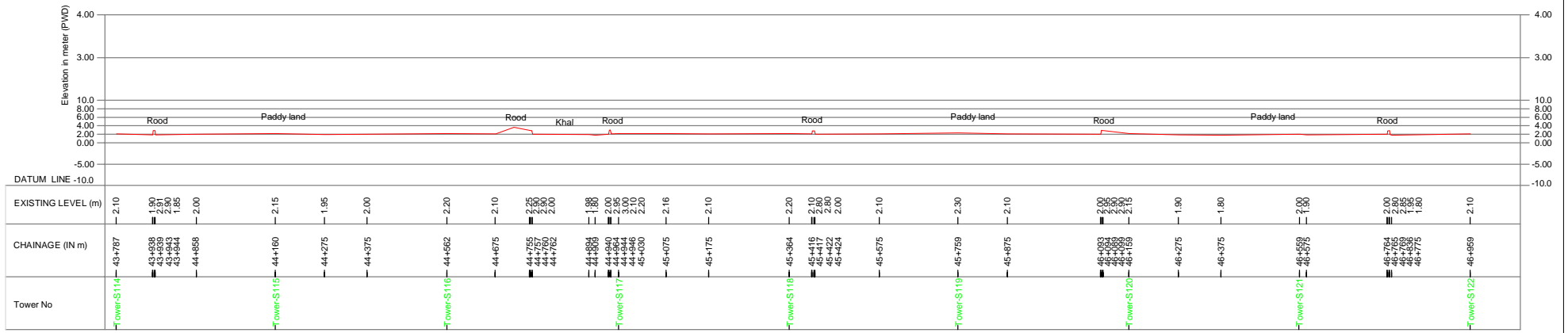
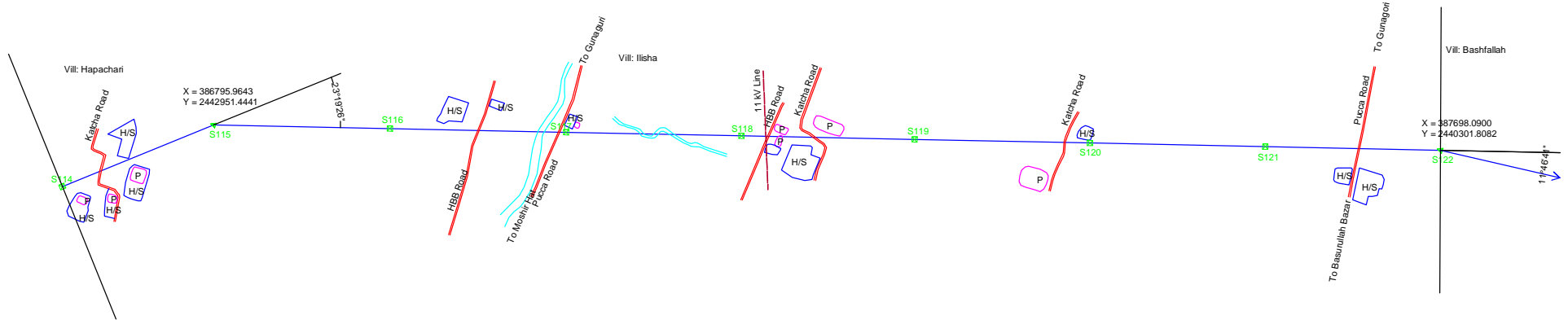


CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
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SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS	1.		



**LEGEND**

- New Line (dashed blue line)
- Existing Line (solid red line)
- Road (double red line)
- House (blue rectangle)
- Building (blue rectangle with 'H/S')
- Homestead (blue irregular shape)
- Pond (pink oval)
- Khal / River (blue wavy line)
- Tower (green square with 'S')
- Angle Tower (green triangle with 'S')
- Tree (green circle with 'T')



**SCALE :**

Horizontal scale: 1:200 (200m, 100m, 0, 200m)

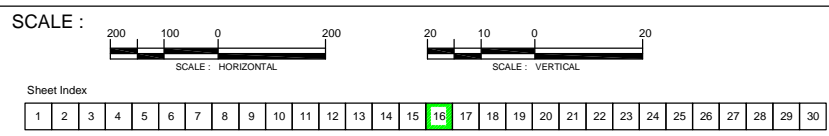
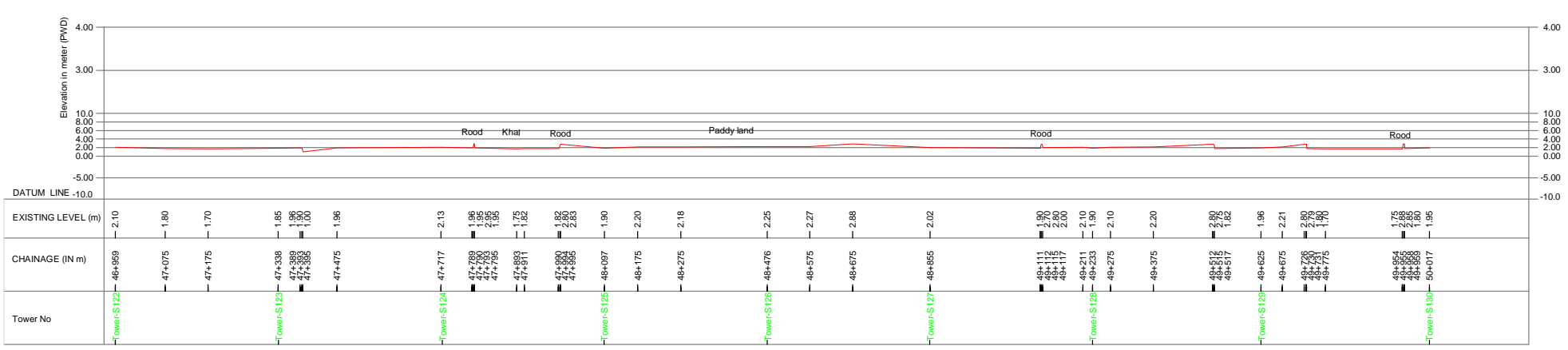
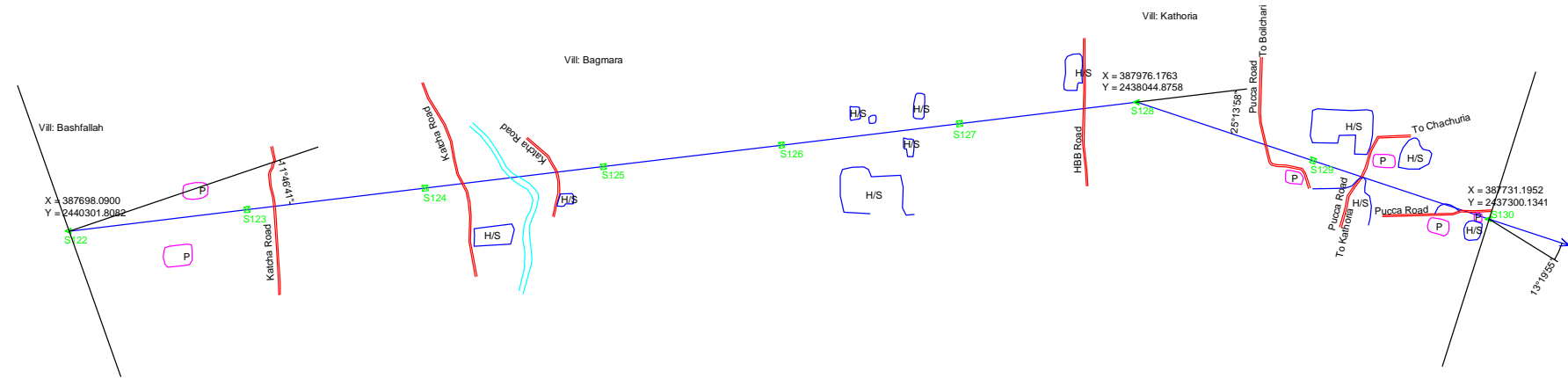
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Sheet Index: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
	Engineers Associates Ltd. (EAL)	SIGNATURE		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY		TEPCO / JICA	DATE OF PREPARATION	NOVEMBER 2014	
CHECKED BY			REVISIONS	1.	



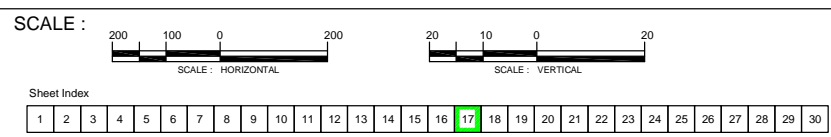
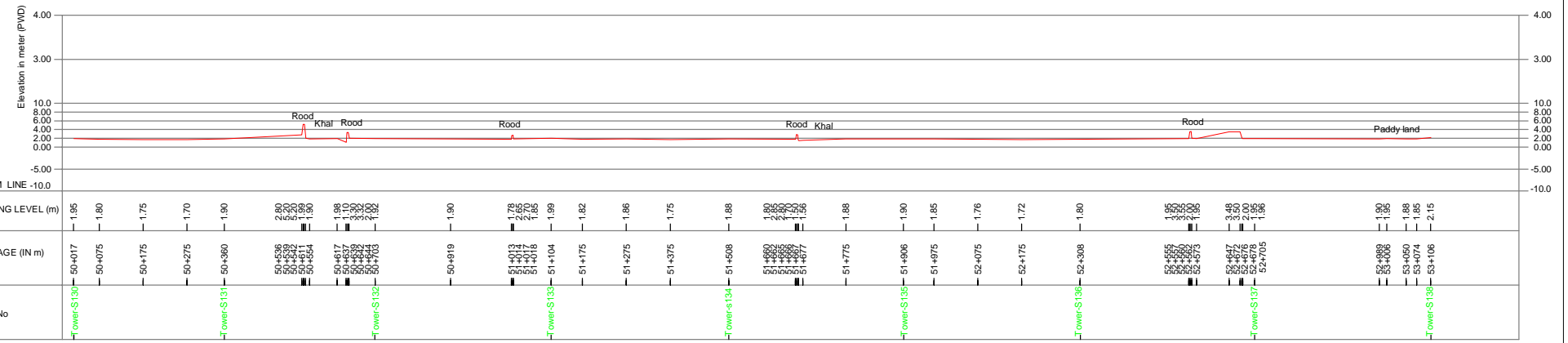
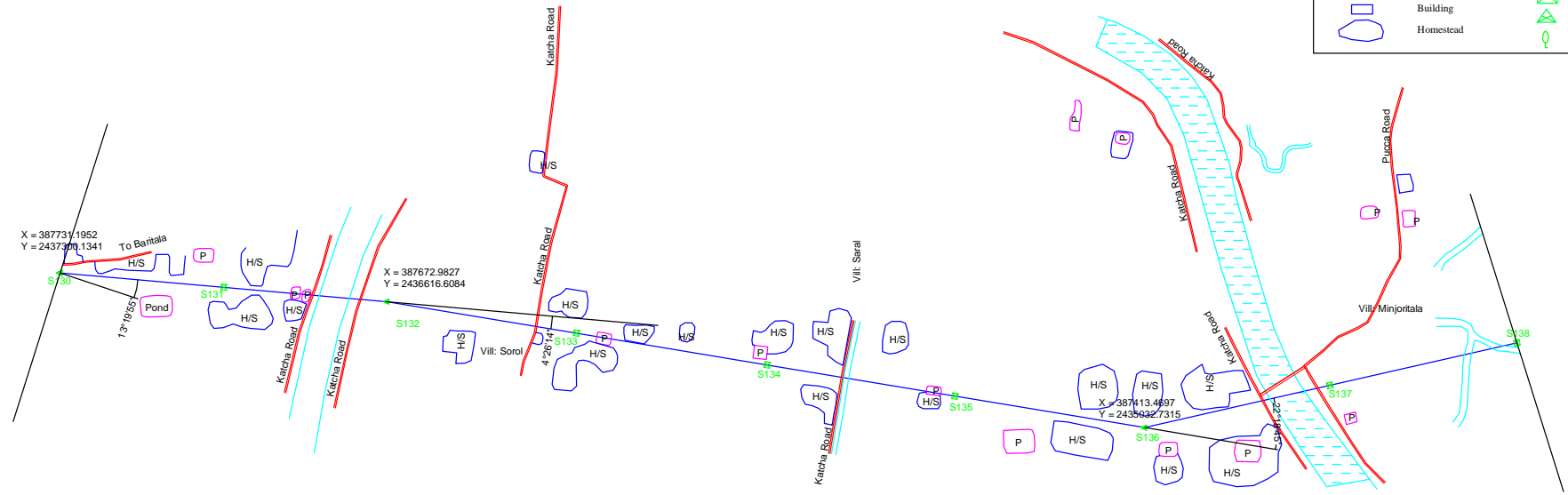
LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
SURVEYED BY				DATE OF PREPARATION	DESCRIPTION	
CHECKED BY				NOVEMBER 2014		
				REVISIONS		
				1.		



LEGEND			
	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tree
	Homestead		



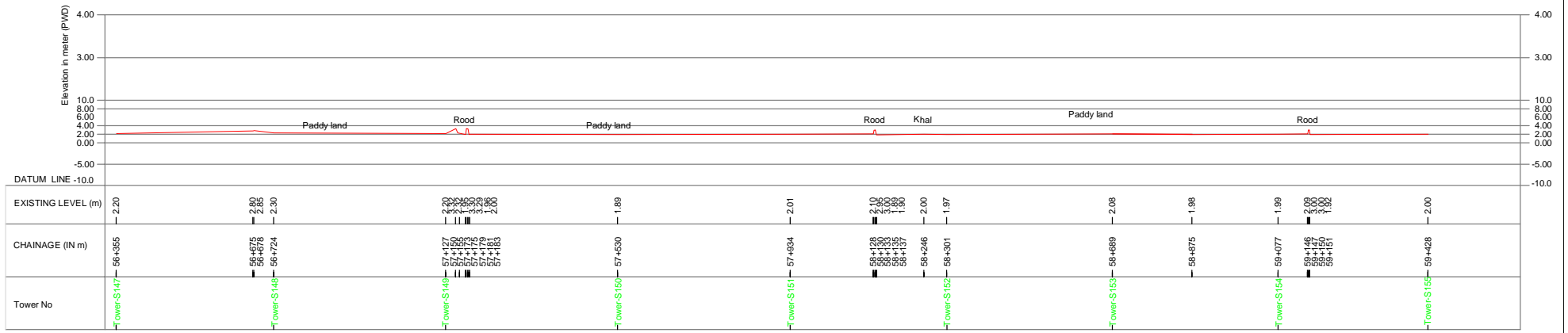
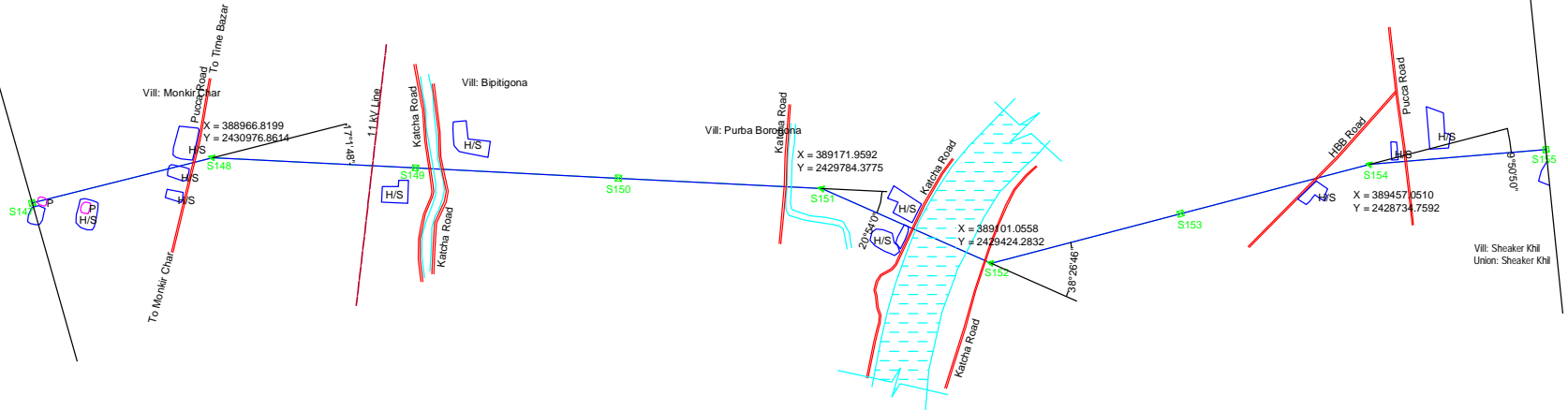
CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
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SURVEYED BY		TEPCO / JICA		DATE OF PREPARATION	DESCRIPTION
CHECKED BY				NOVEMBER 2014	
				REVISIONS	
				1.	





**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- ~ Khal / River
- ⊠ Tower
- △ Angle Tower
- Tree



**SCALE :**

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SCALE: HORIZONTAL

20 10 0 20  
SCALE: VERTICAL

Sheet Index

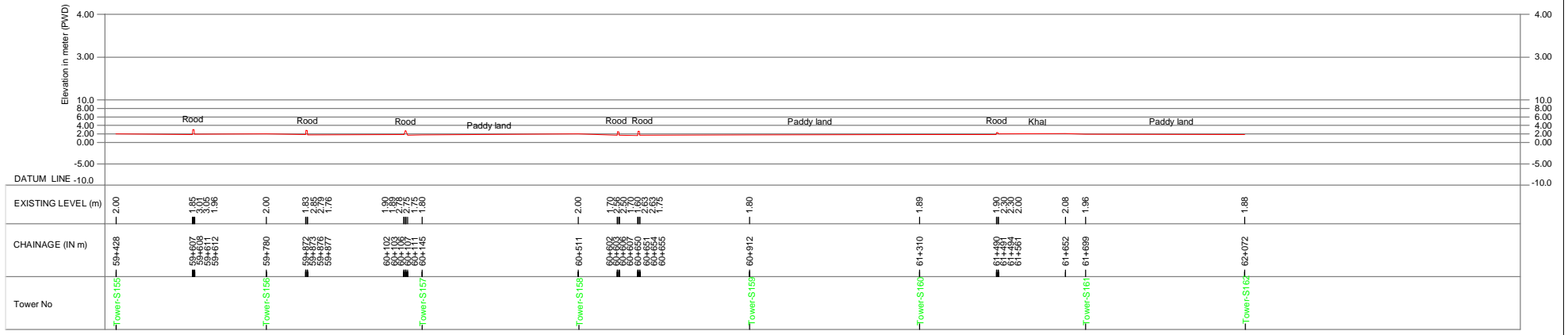
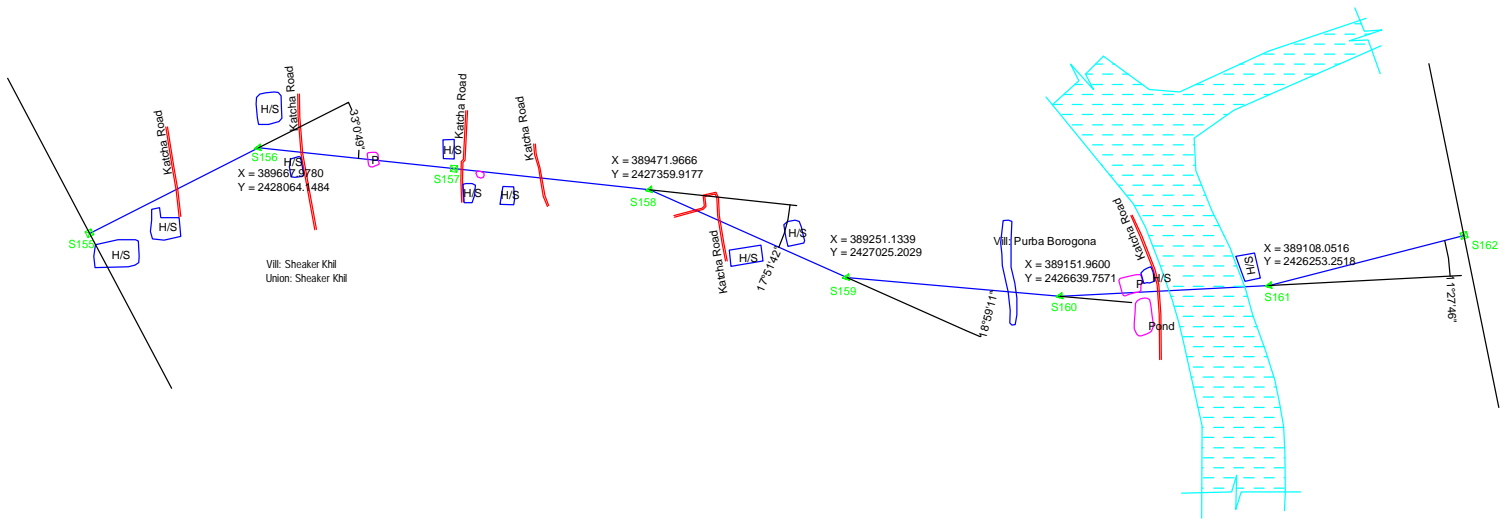
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
	Engineers Associates Ltd. (EAL)	SIGNATURE		TITLE
SURVEYED BY		TEPCO / JICA	DATE OF PREPARATION	DESCRIPTION
CHECKED BY			NOVEMBER 2014	
			REVISIONS	
			1.	



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Homestead
- Pond
- Khal / River
- Tower
- ▲ Angle Tower
- Tree



**SCALE :**



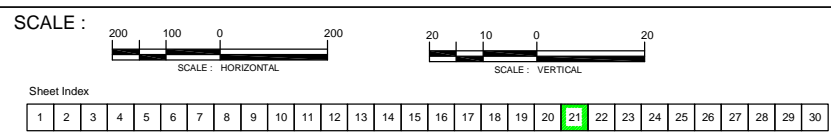
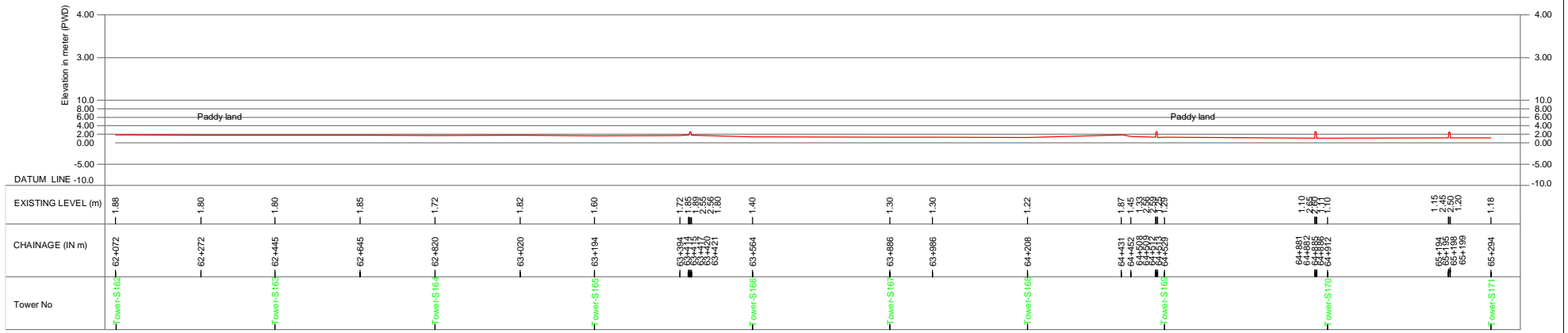
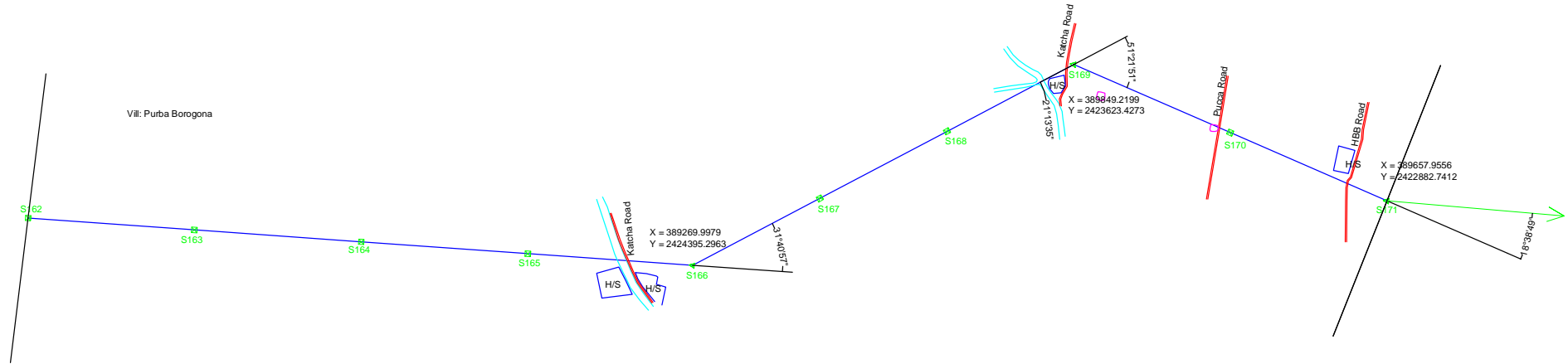
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)		APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)				TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY			<b>TEPCO / JICA</b>		DATE OF PREPARATION	NOVEMBER 2014	
CHECKED BY					REVISIONS	1.	



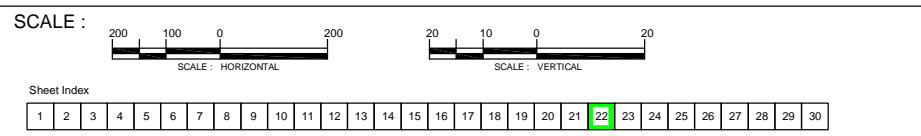
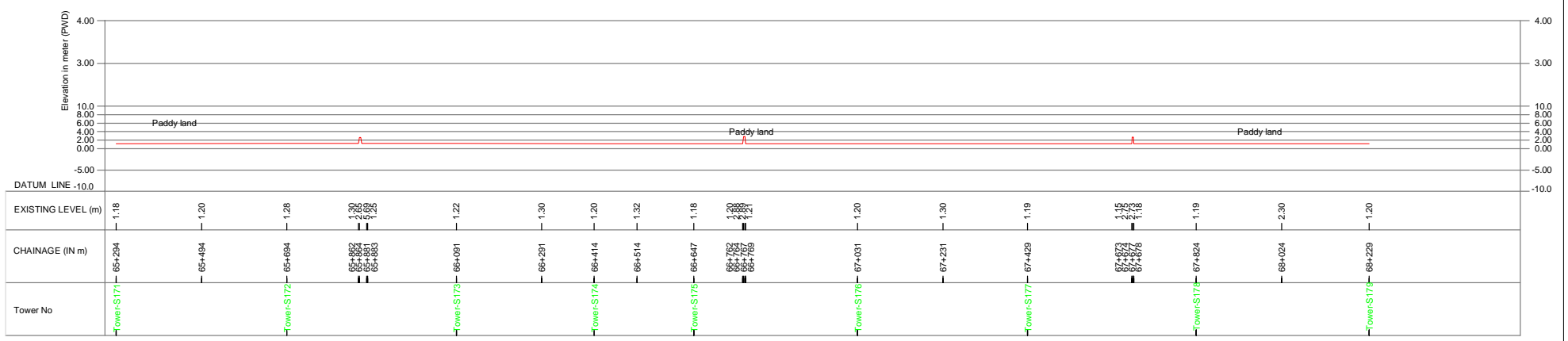
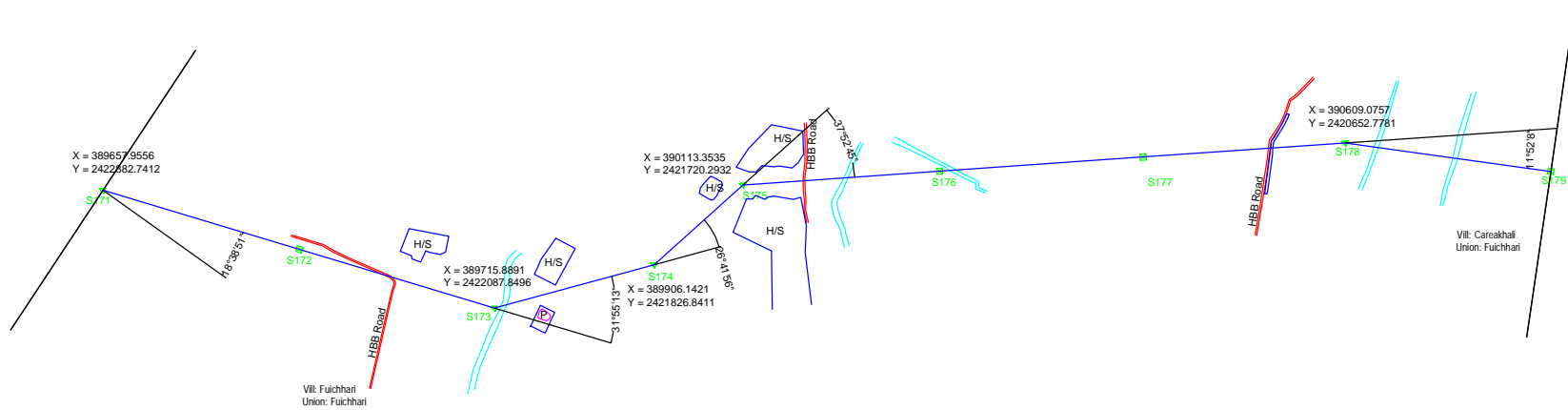
LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
	LOCAL CONSULTANT			Engineers Associates Ltd. (EAL)	TITLE
SURVEYED BY		TEPCO / JICA		DATE OF PREPARATION	NOVEMBER 2014
CHECKED BY				REVISIONS	1.



LEGEND			
	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tree
	Homestead		

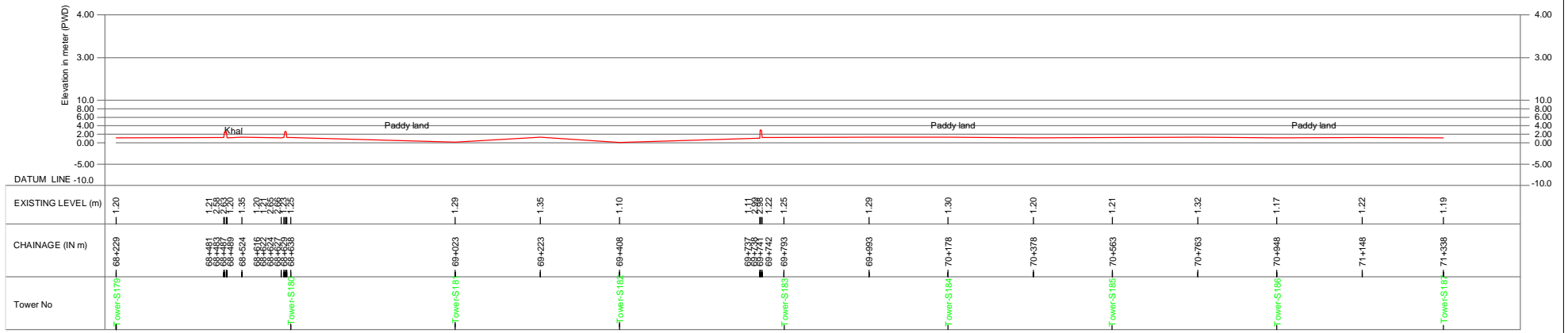
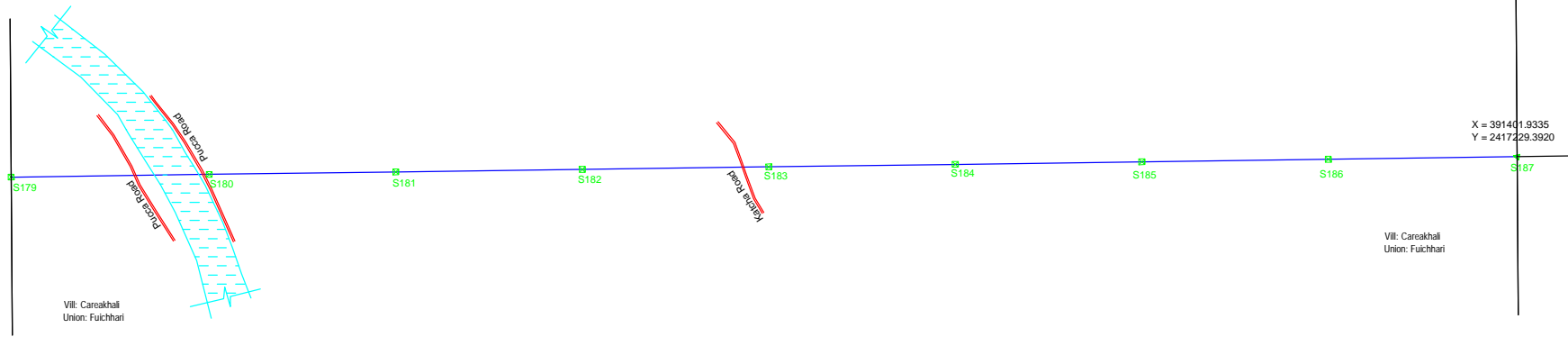


CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
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				1.		



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- ~ Khal / River
- Tower
- △ Angle Tower
- Tree



**SCALE :**

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SCALE: HORIZONTAL

20 10 0 20  
SCALE: VERTICAL

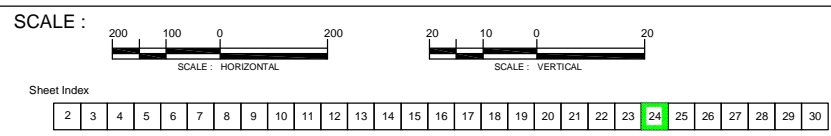
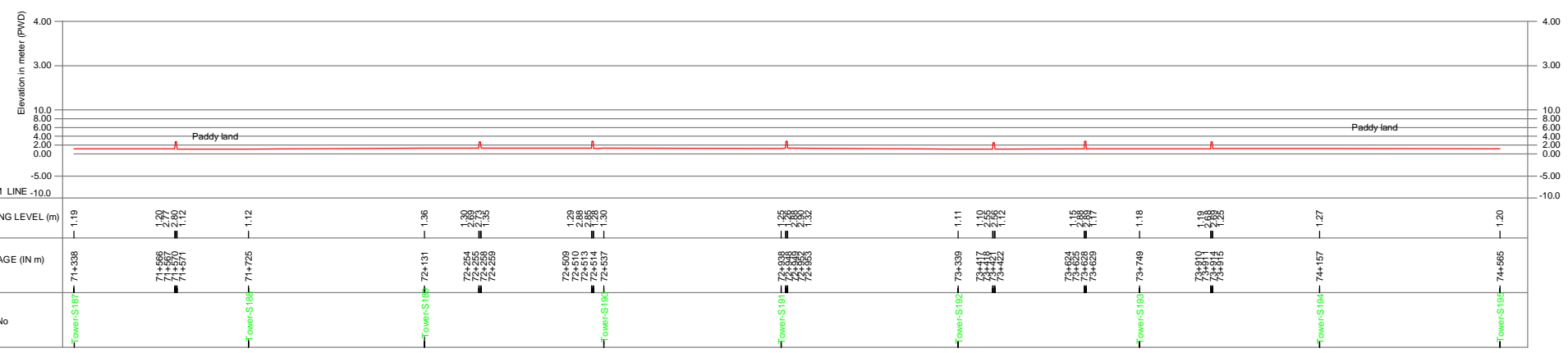
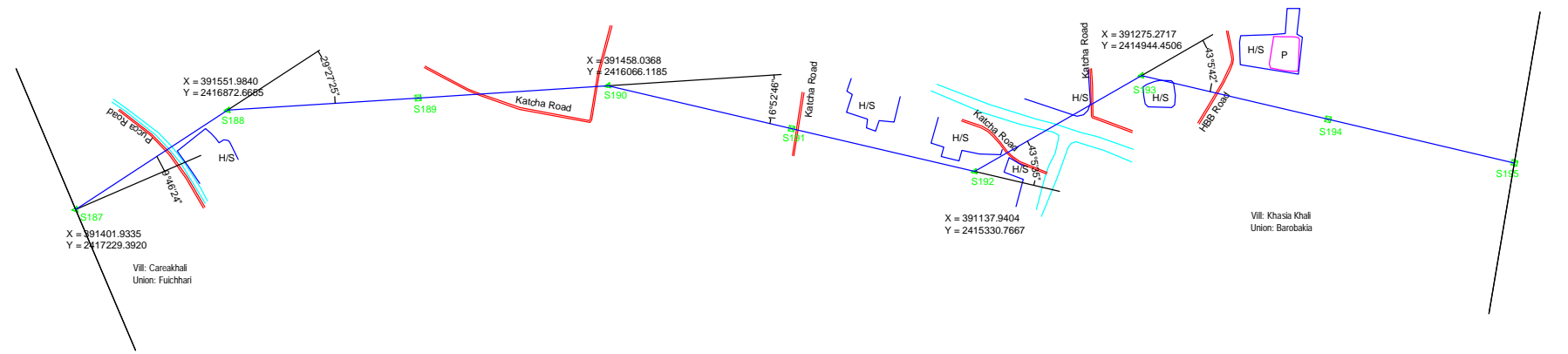
Sheet Index

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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
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SURVEYED BY		TEPCO / JICA		DATE OF PREPARATION	NOVEMBER 2014
CHECKED BY				REVISIONS	1.



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree

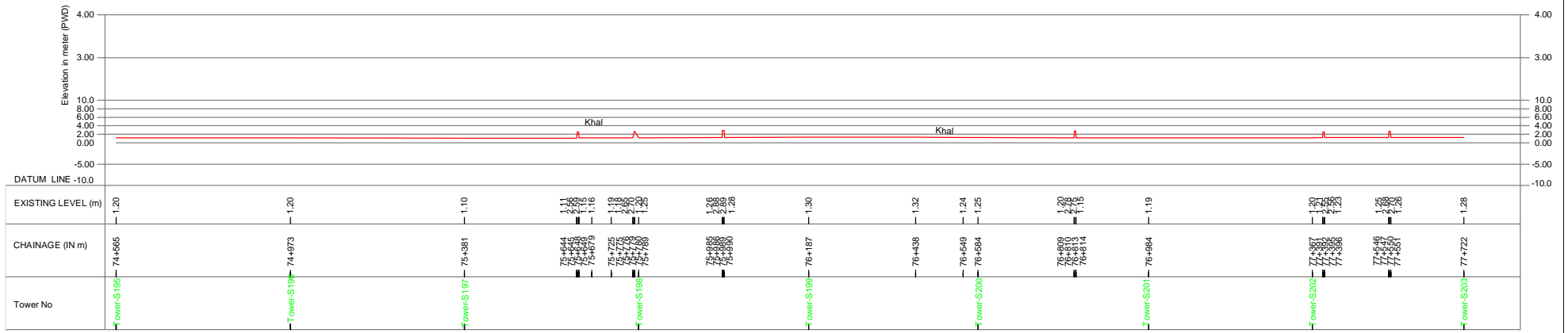
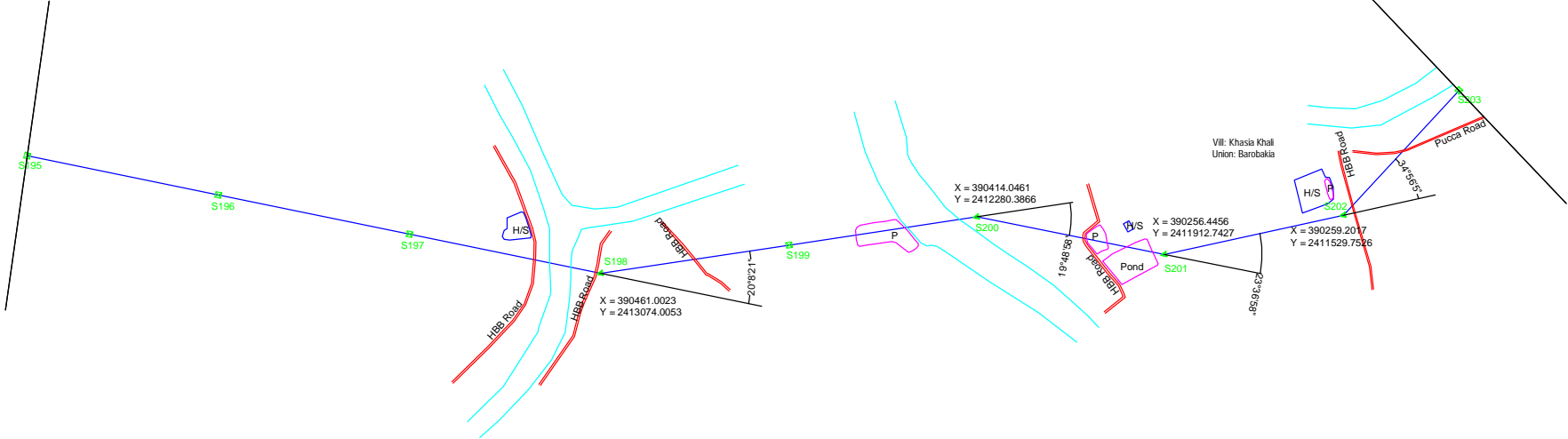


CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
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SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS			
				1.			



**LEGEND**

- New Line (dashed blue line)
- Existing Line (solid red line)
- Road (double red line)
- House (blue rectangle)
- Building (blue rectangle with cross)
- Homestead (blue irregular shape)
- Pond (pink oval)
- Khal / River (blue wavy line)
- Tower (green square with cross)
- Angle Tower (green triangle with cross)
- Tree (green circle with cross)



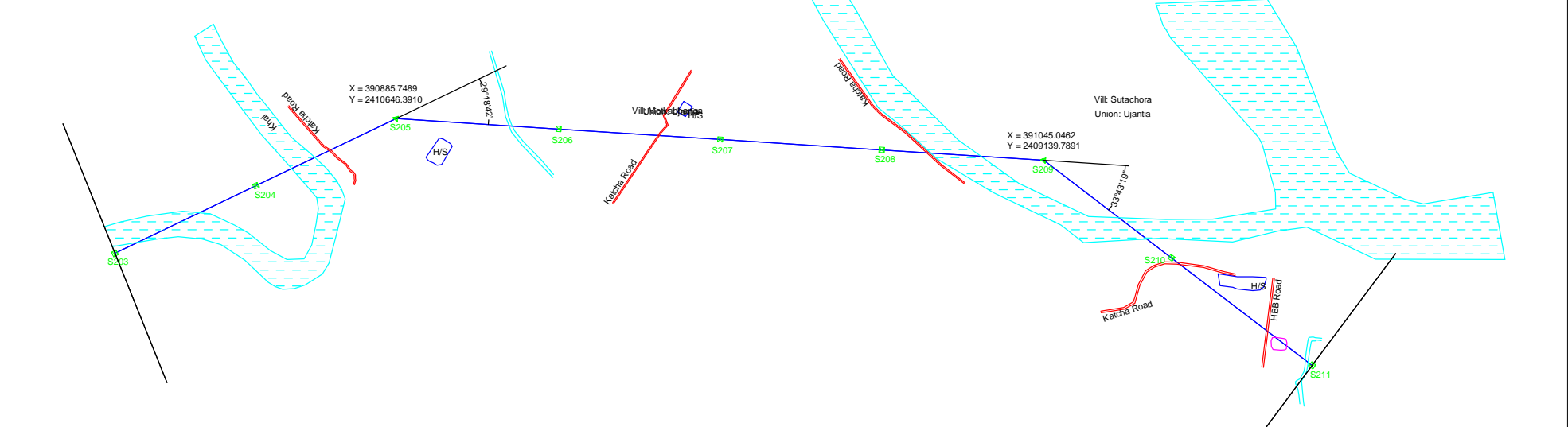
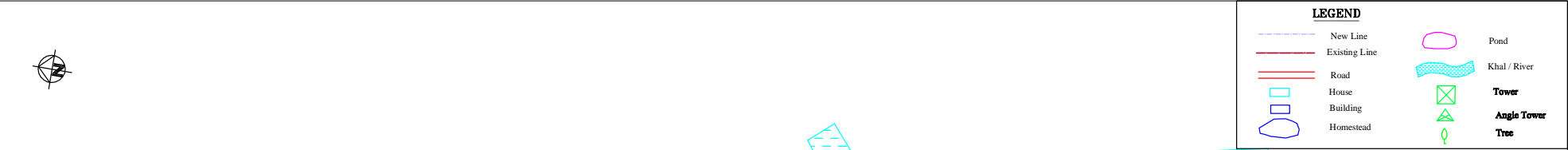
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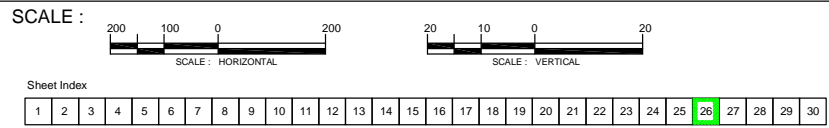
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Sheet Index: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
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SURVEYED BY		TEPCO / JICA		DATE OF PREPARATION	NOVEMBER 2014
CHECKED BY				REVISIONS	1.



EXISTING LEVEL (m)	CHAINAGE (IN m)	Tower No
1.28	77+722	Tower-S203
1.80	77+733	
1.70	77+792	
1.50	77+992	
1.22	78+087	Tower-S204
1.78	78+179	
1.90	78+239	
1.90	78+276	
2.85	78+277	
2.85	78+280	
1.80	78+281	
1.27	78+450	Tower-S205
1.30	78+650	
1.22	78+830	Tower-S206
1.20	78+930	
1.30	79+061	
1.30	79+065	
1.30	79+066	
1.25	79+208	Tower-S207
1.82	79+239	
2.60	79+240	
1.37	79+586	Tower-S208
1.50	798+701	
1.56	79+818	
1.20	79+885	
1.38	79+985	Tower-S209
1.84	80+185	
1.85	80+267	
1.25	80+340	Tower-S210
2.60	80+357	
2.85	80+360	
1.83	80+361	
1.20	80+617	
2.65	80+619	
2.85	80+622	
1.36	80+623	
1.22	80+754	Tower-S211

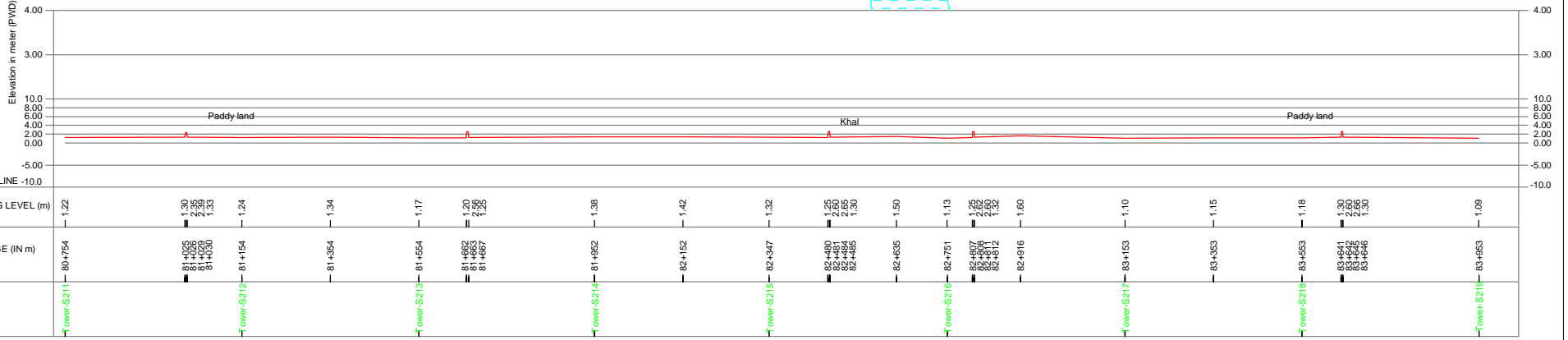
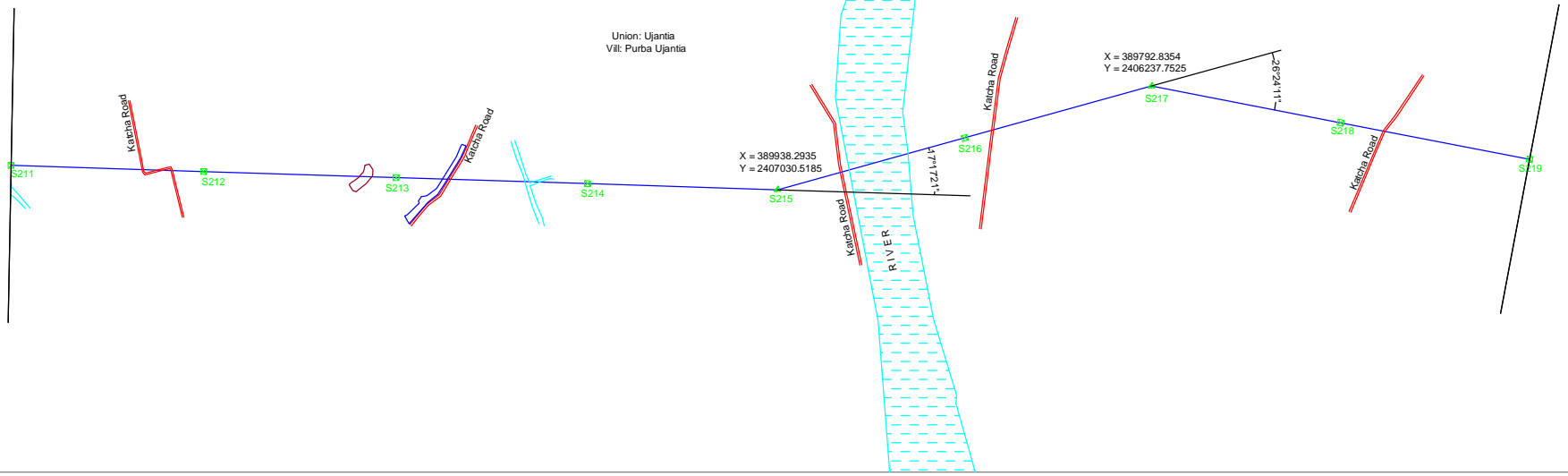


CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
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				1.			



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- Tower
- Angle Tower
- Tree



**SCALE :**

Horizontal scale: 1:200 (0 to 200 meters)

Vertical scale: 1:20 (0 to 20 meters)

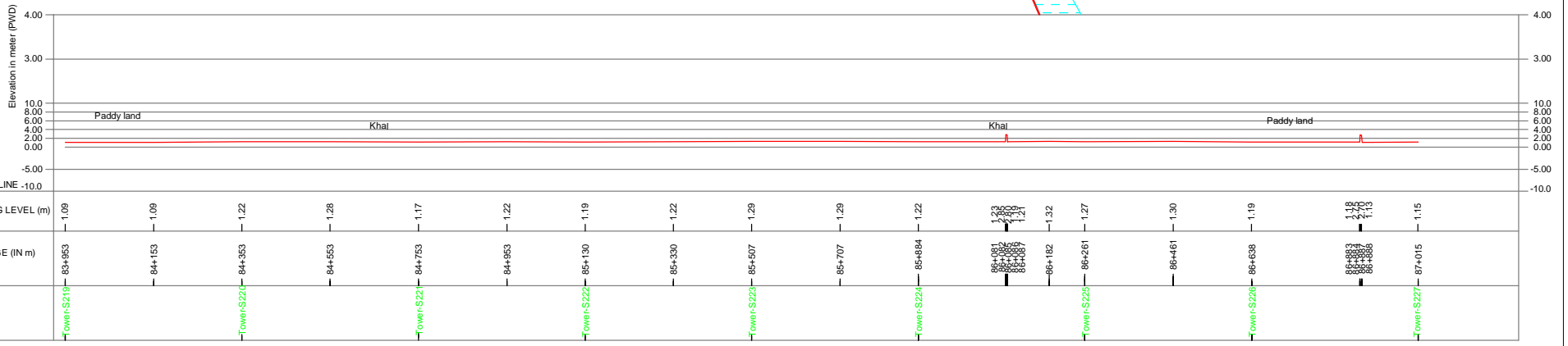
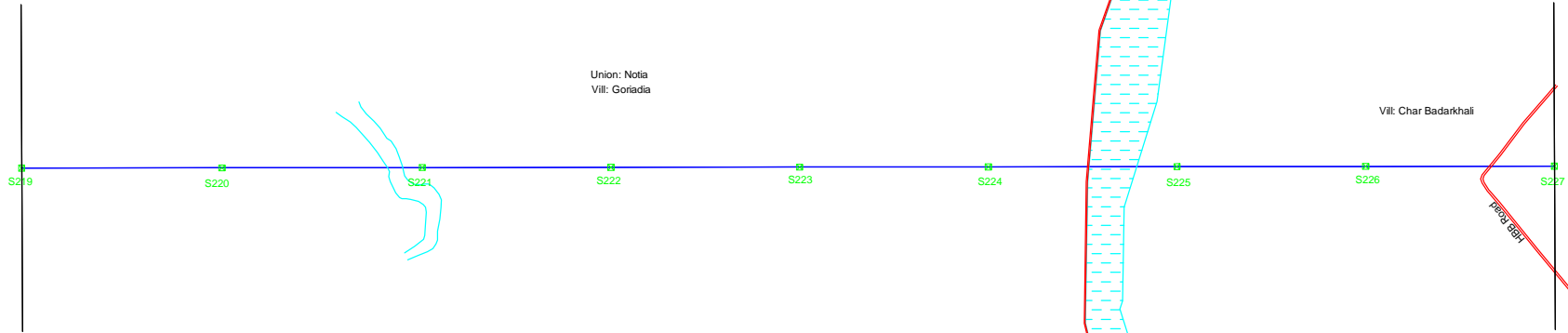
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	TEPCO / JICA	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY		SIGNATURE	DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION
CHECKED BY			REVISIONS	1.	



**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- Tower
- ▲ Angle Tower
- Tree



**SCALE :**



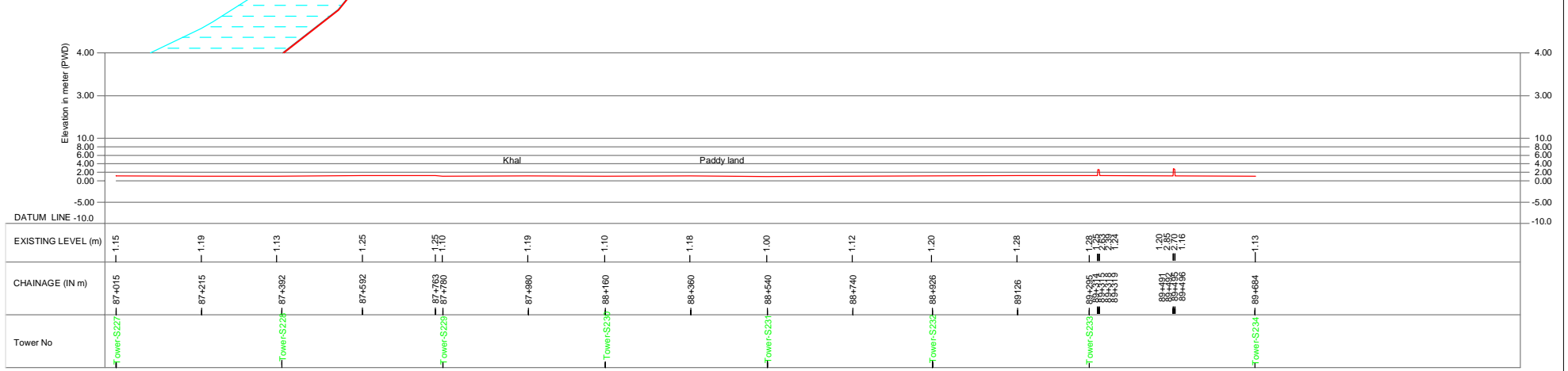
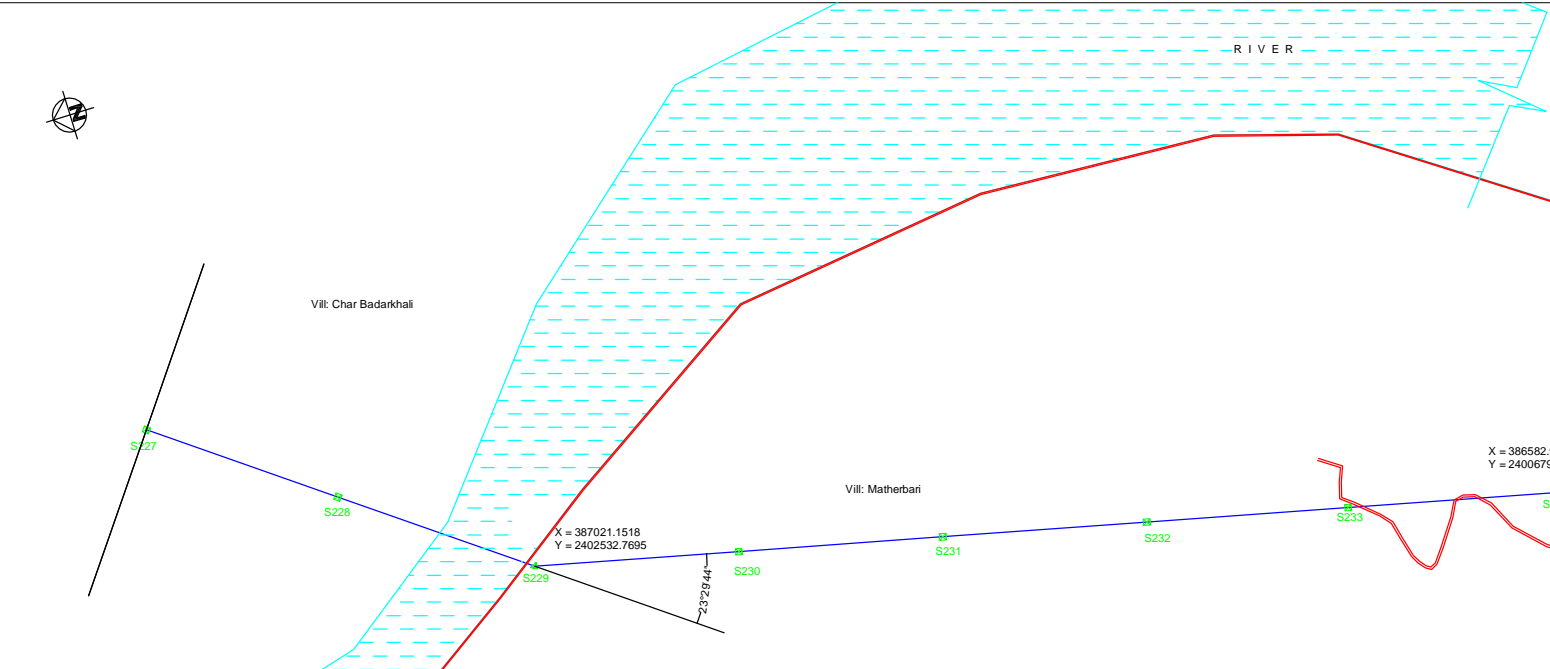
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
	LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	<b>TEPCO / JICA</b>		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.
SURVEYED BY		DATE OF PREPARATION			DESCRIPTION	
CHECKED BY		REVISIONS				
		1.				

**LEGEND**

- New Line
- Existing Line
- Road
- House
- Building
- Homestead
- Pond
- Khal / River
- Tower
- Angle Tower
- Tree



**SCALE :**

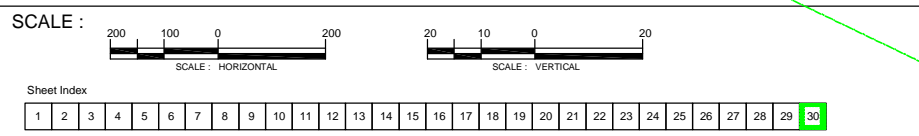
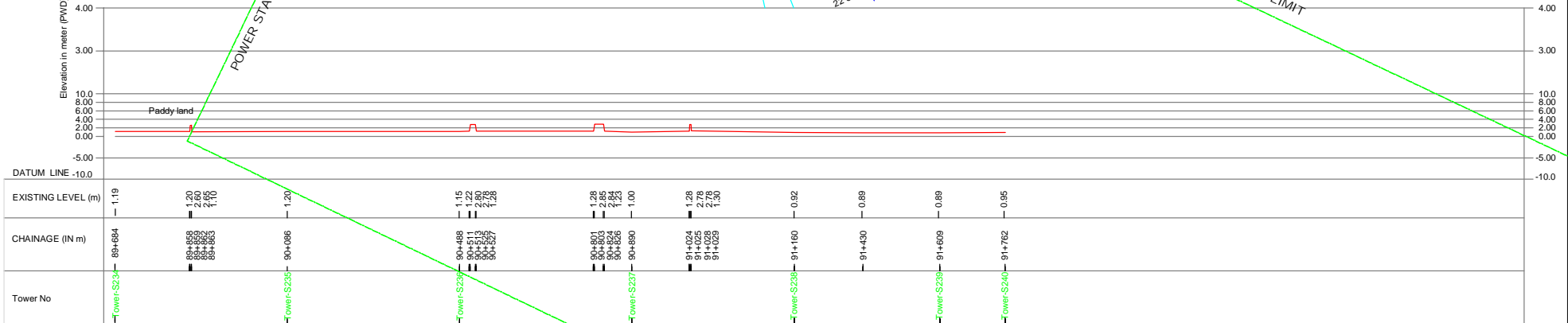
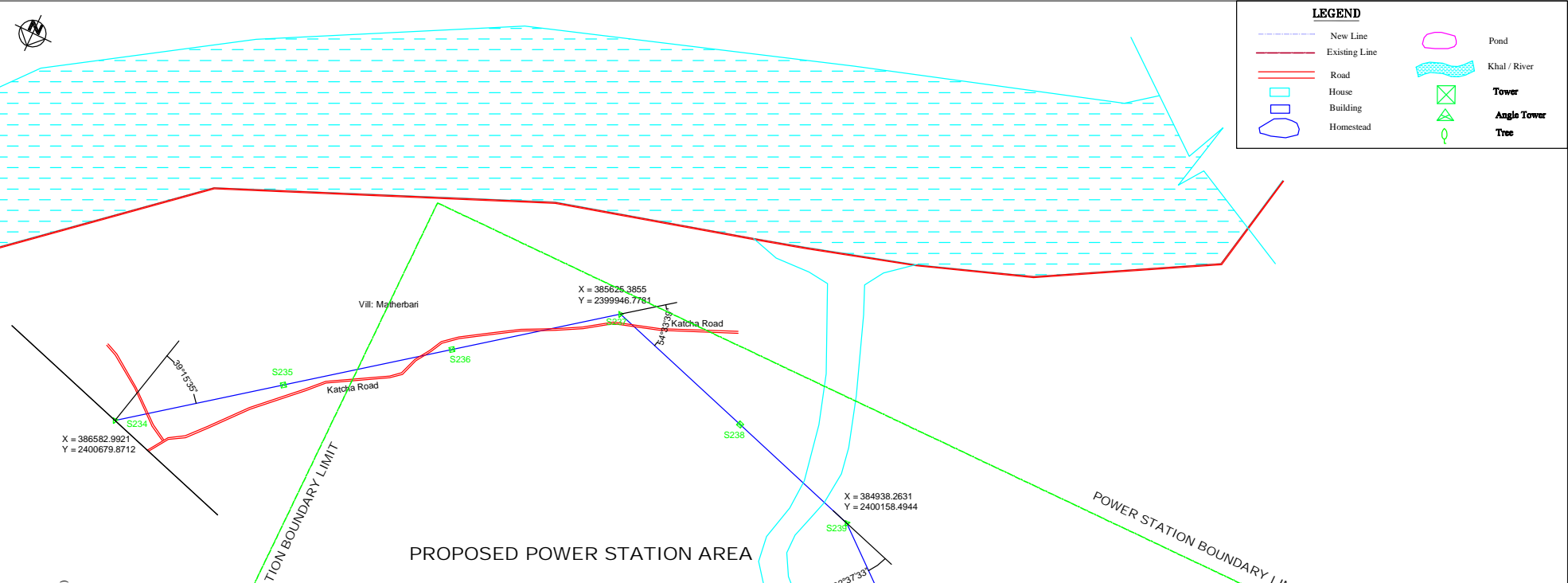
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.		
SURVEYED BY				DATE OF PREPARATION	NOVEMBER 2014	DESCRIPTION	
CHECKED BY				REVISIONS			
				1.			



CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)			TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 400KV TRANSMISSION LINE FROM MEGHNA GHAT TO MATARBARI.	
SURVEYED BY		TEPCO / JICA		DATE OF PREPARATION	NOVEMBER 2014	
CHECKED BY				REVISIONS	1.	

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## 付録 3

### 230 kV 送電線ルート<sup>の</sup>提案 (LILO & Madunaghat - Old Madunaghat 間)



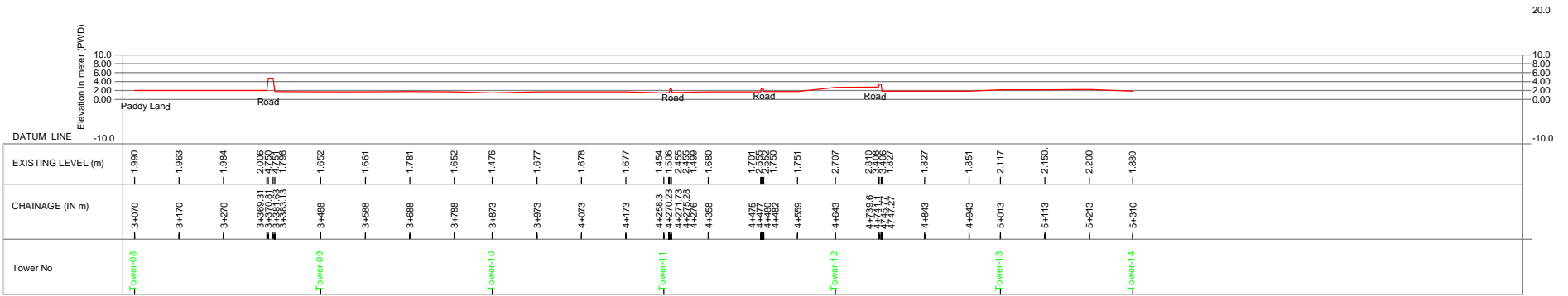
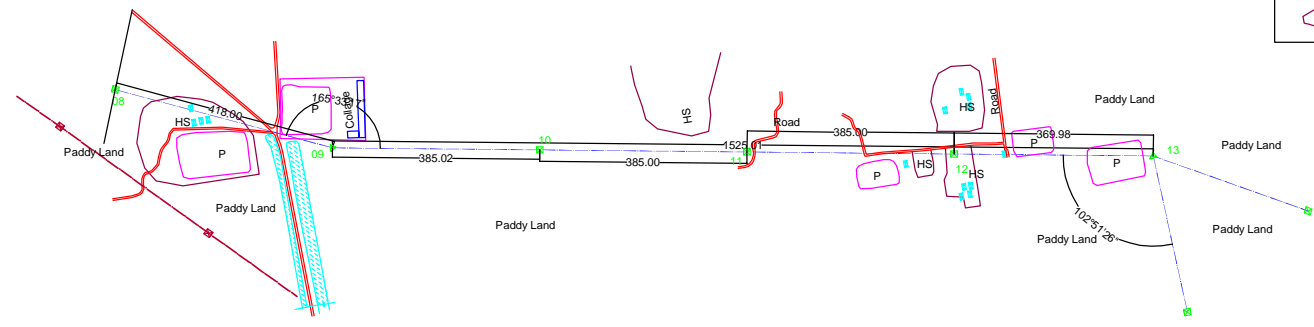








LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



SCALE :

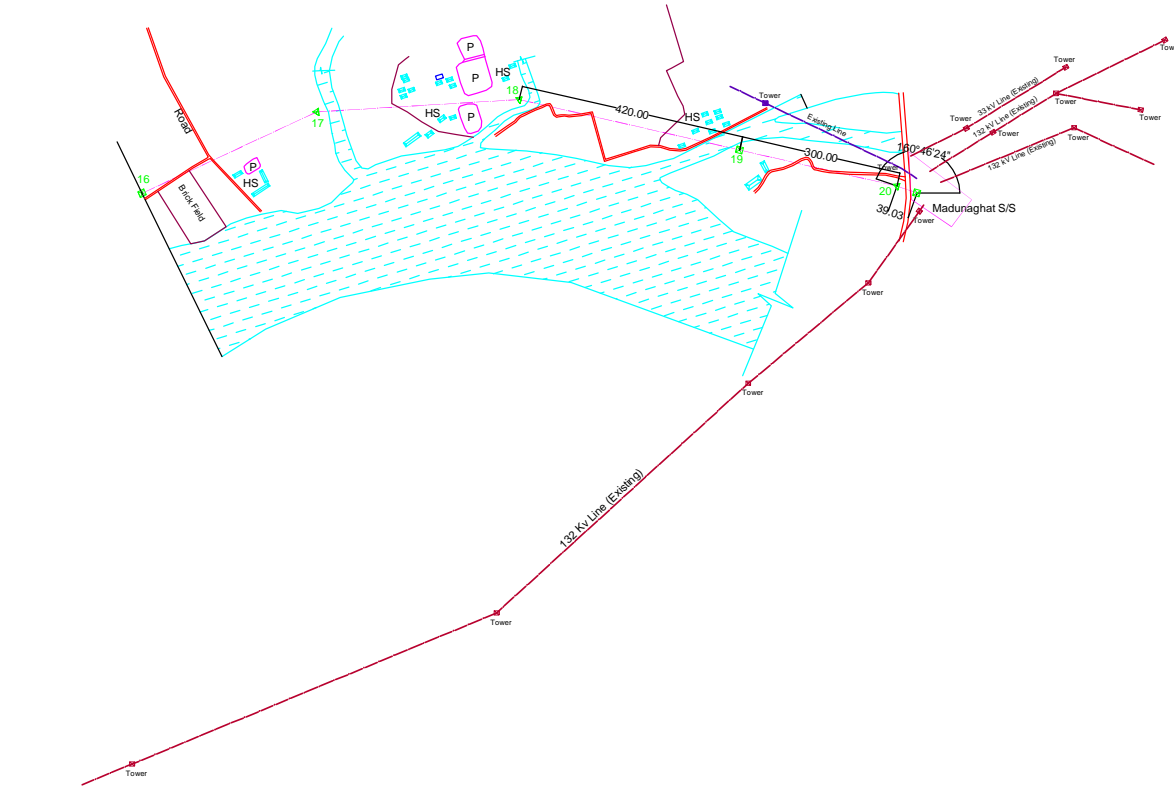
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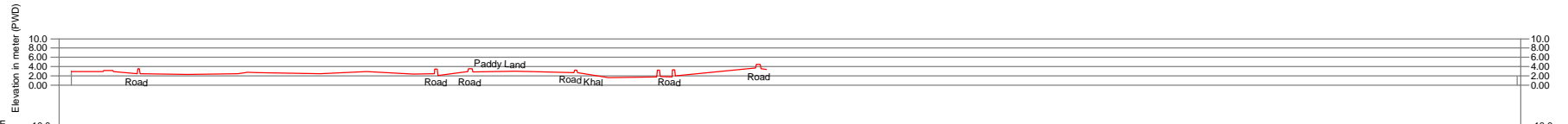
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	TEPCO / JICA	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	DATE OF PREPARATION		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 230KV TRANSMISSION LINE FROM MADUNAGHAT NEW SS TO HATAZARI-SIKALBAHA LINE		
SURVEYED BY				JANUARY 2015	DESCRIPTION		
CHECKED BY				REVISIONS	1.		



LEGEND			
	New Line		Pond
	Existing Line		Khal / River
	Road		Tower
	House		Angle Tower
	Building		Tree
	Homestead		



	Elevation in meter (P.W.D.)	
	10.0	8.00
	6.00	4.00
	2.00	0.00
DATUM LINE	-10.0	
EXISTING LEVEL (m)	2.919	2.309
CHAINAGE (IN m)	5+986	6+216
Tower No	Tower-16	Tower-17

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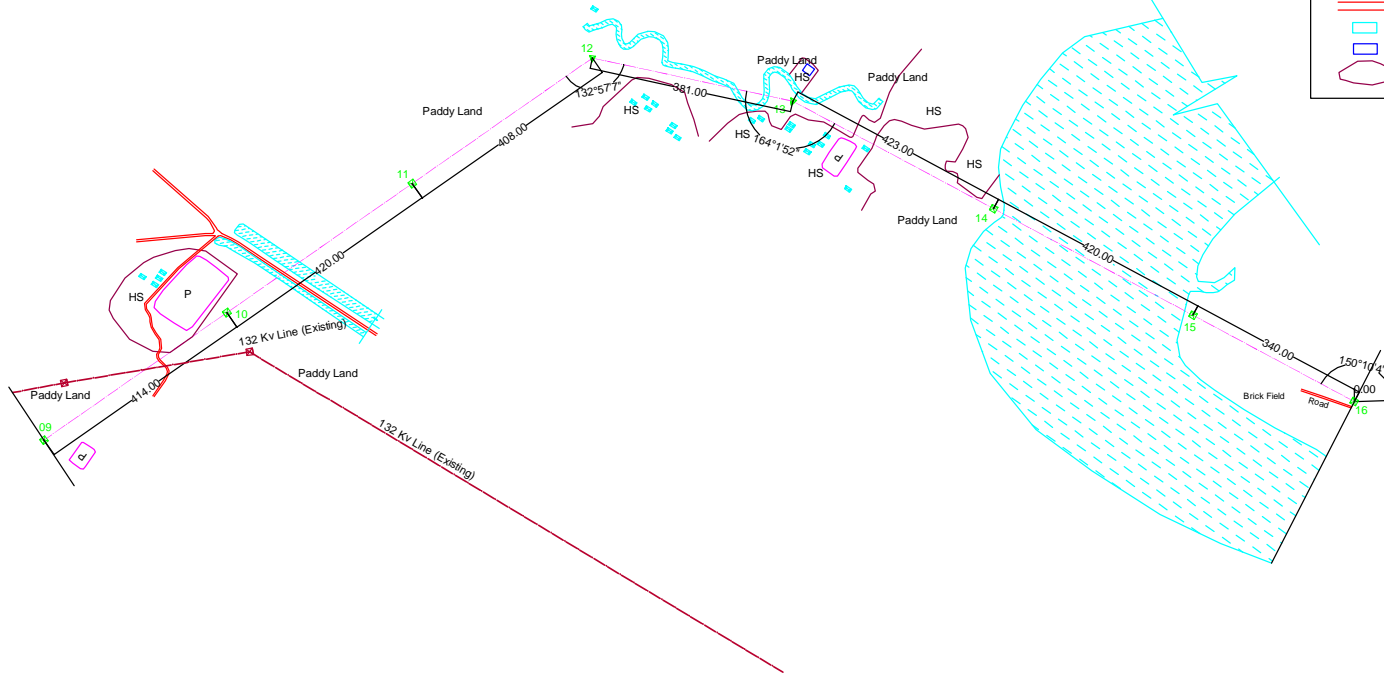
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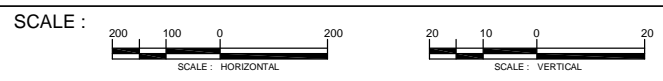
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT		
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	<b>TEPCO / JICA</b>		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 230KV TRANSMISSION LINE FROM MADUNAGHAT NEW SS TO MADUNAGHAT OLD SS		
SURVEYED BY				DATE OF PREPARATION	JANUARY 2015	DESCRIPTION	
CHECKED BY				REVISIONS	1.		



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree

Tower No	Elevation in meter (PWD)	
	Existing Level (m)	Chainage (in m)
Tower 09	1.859	3+180
	1.961	3+260
	1.963	3+360
	1.910	3+417.81
	1.118	3+419.31
	1.948	3+423.81
Tower 10	1.990	3+510
	2.006	3+574
	2.016	3+580.83
	2.074	3+581.49
	2.110	3+576.89
	2.180	3+824
	2.200	3+924
	2.280	3+994
	2.300	4+094
	2.317	4+194
	2.007	4+294
Tower 11	2.355	4+402
	2.120	4+502
	2.004	4+602
	2.166	4+653.54
	2.278	4+677.08
	2.623	4+737.45
	2.624	4+737.45
Tower 12	2.490	4+783.03
	2.310	4+883
	2.270	4+983
	2.583	5+083
Tower 13	3.658	5+206.92
	3.018	5+216.92
	2.284	5+306.94
	2.286	5+306.94
Tower 14	2.933	5+426
	2.958	5+4726
	2.783	5+826
Tower 15	2.919	5+926
Tower 16	2.919	5+986



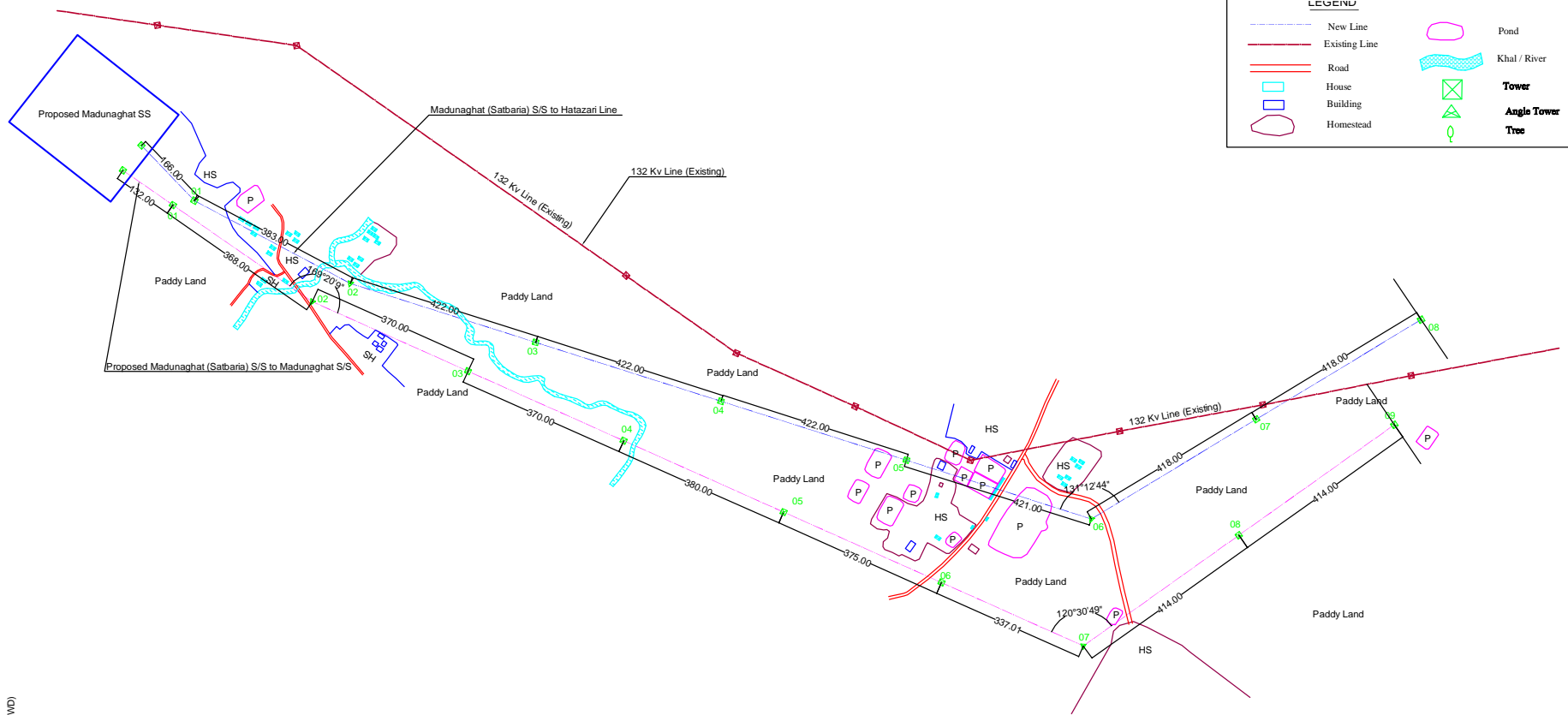
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CONSULTANT	Tokyo Electric Power Company, Incorporated (TEPCO) Engineers Associates Ltd. (EAL)	APPROVED BY	SIGNATURE	PROJECT NAME	PREPARATORY SURVEY ON DHAKA - CHITTAGONG MAIN POWER GRID STRENGTHENING PROJECT	
LOCAL CONSULTANT	Engineers Associates Ltd. (EAL)	TEPCO / JICA		TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 230KV TRANSMISSION LINE FROM MADUNAGHAT NEW SS TO MADUNAGHAT OLD SS	
SURVEYED BY				DATE OF PREPARATION	DESCRIPTION	
CHECKED BY				JANUARY 2015		
				REVISIONS		
		1.				



LEGEND	
	New Line
	Existing Line
	Road
	House
	Building
	Homestead
	Pond
	Khal / River
	Tower
	Angle Tower
	Tree



Tower No	CHAINAGE (IN m)	EXISTING LEVEL (m)	Elevation in meter (P.W.D)	
			Sub Station	Paddy Land
	0+000	1.777	10.0	10.0
	0+132	1.676	8.00	8.00
	0+232	1.666	6.00	6.00
	0+332	1.650	4.00	4.00
	0+388.93	1.500	2.00	2.00
	0+400.00	1.434	0.00	0.00
	0+400.00	1.790		
	0+458.00	1.793		
	0+500	1.804		
	0+600	1.713		
	0+700	1.747		
	0+800	1.850		
	0+870	1.930		
	0+970	1.710		
	1+070	1.867		
	1+170	1.877		
	1+240	1.831		
	1+257.66	1.950		
	1+340	1.876		
	1+440	1.827		
	1+540	1.853		
	1+620	1.762		
	1+720	1.817		
	1+820	2.586		
	1+959.94	1.817		
	1+981.74	1.765		
	1+988.00	1.830		
	1+988.00	1.830		
	2+095	1.936		
	2+195	2.010		
	2+295	2.008		
	2+332	1.988		
	2+445.94	2.388		
	2+445.94	2.388		
	2+457.30	2.300		
	2+457.30	2.300		
	2+562	1.936		
	2+682	1.889		
	2+746	1.885		
	2+846	1.885		
	2+946	1.859		
	3+046	1.963		
	3+160	1.859		

**SCALE :**

SCALE: HORIZONTAL

SCALE: VERTICAL

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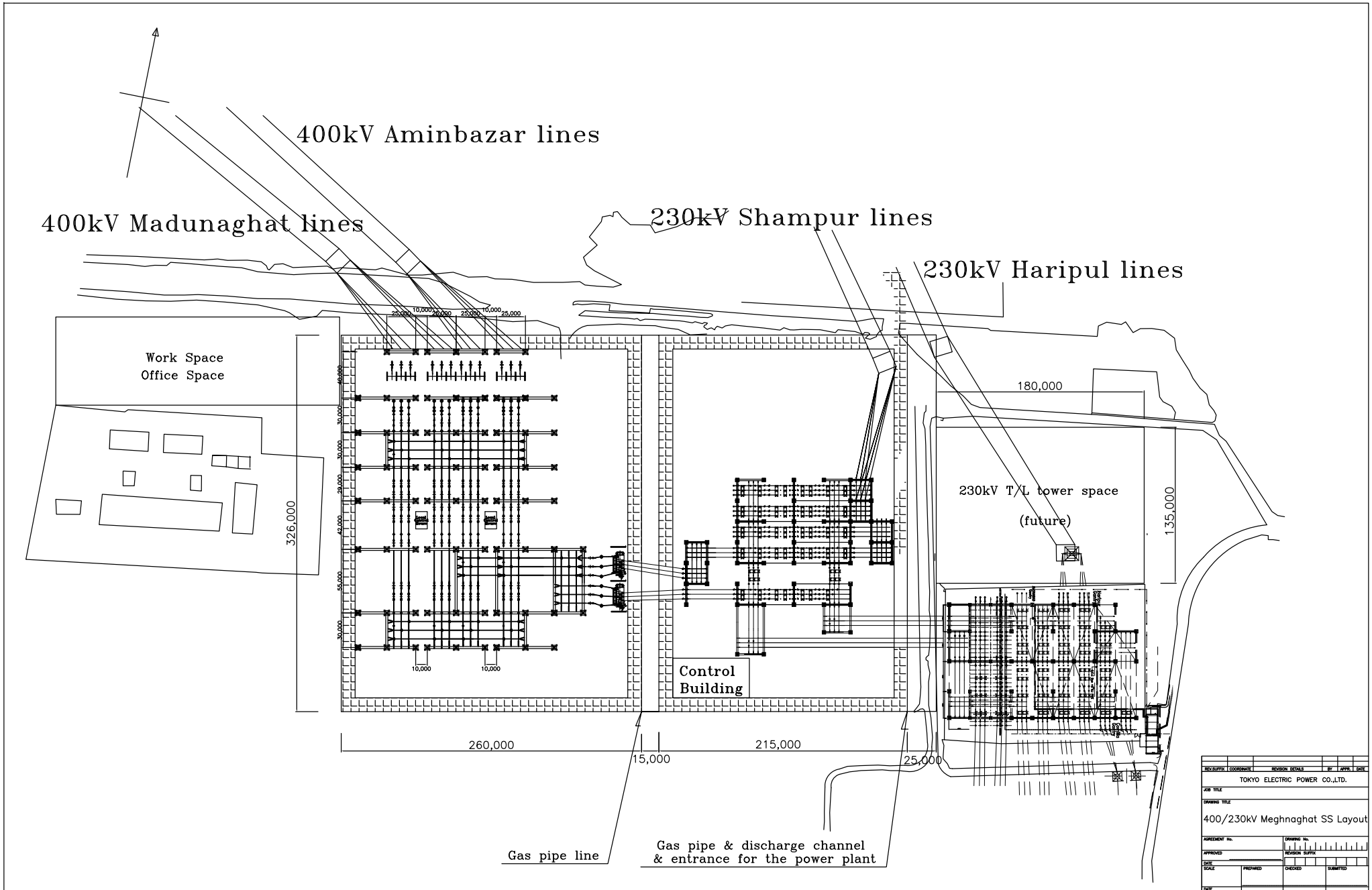
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	LOCAL CONSULTANT			Engineers Associates Ltd. (EAL)	TITLE	ROUTE ALIGNMENT SURVEY OF PROPOSED 230kV TRANSMISSION LINE FROM MADUNAGHAT NEW SS TO MADUNAGHAT OLD SS		
	SURVEYED BY				DATE OF PREPARATION	JANUARY 2015	DESCRIPTION	
	CHECKED BY				REVISIONS	1.		

## 付録 4

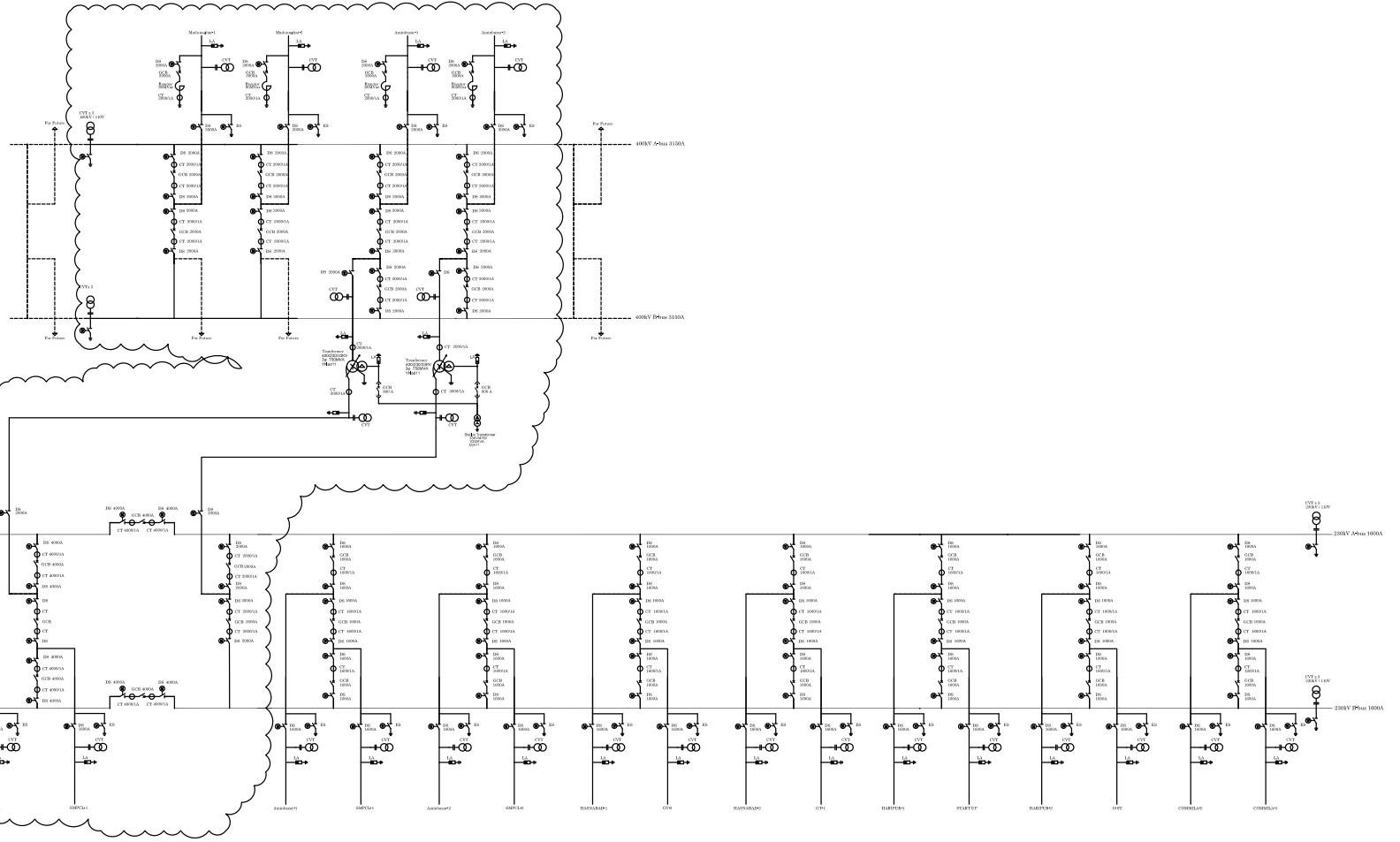
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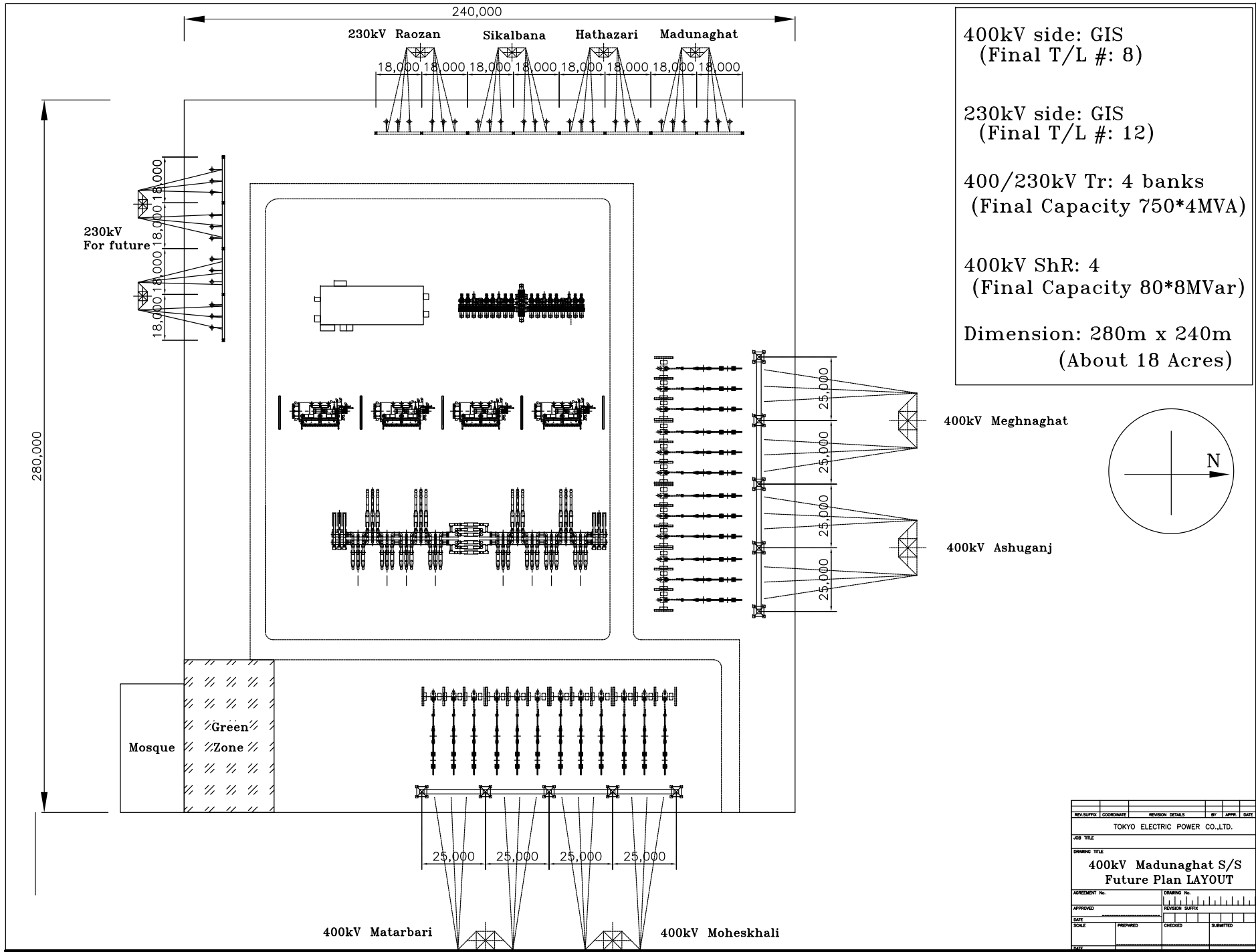


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TOKYO ELECTRIC POWER CO.,LTD.					
JOB TITLE					
DRAWING TITLE					
400/230kV Meghnaghat SS Layout					
APPROVED			DRAWING No.		
DATE			REVISION SURFACE		
SCALE	PREPARED	CHECKED	SUBMITTED		
DATE					

# Project Scope

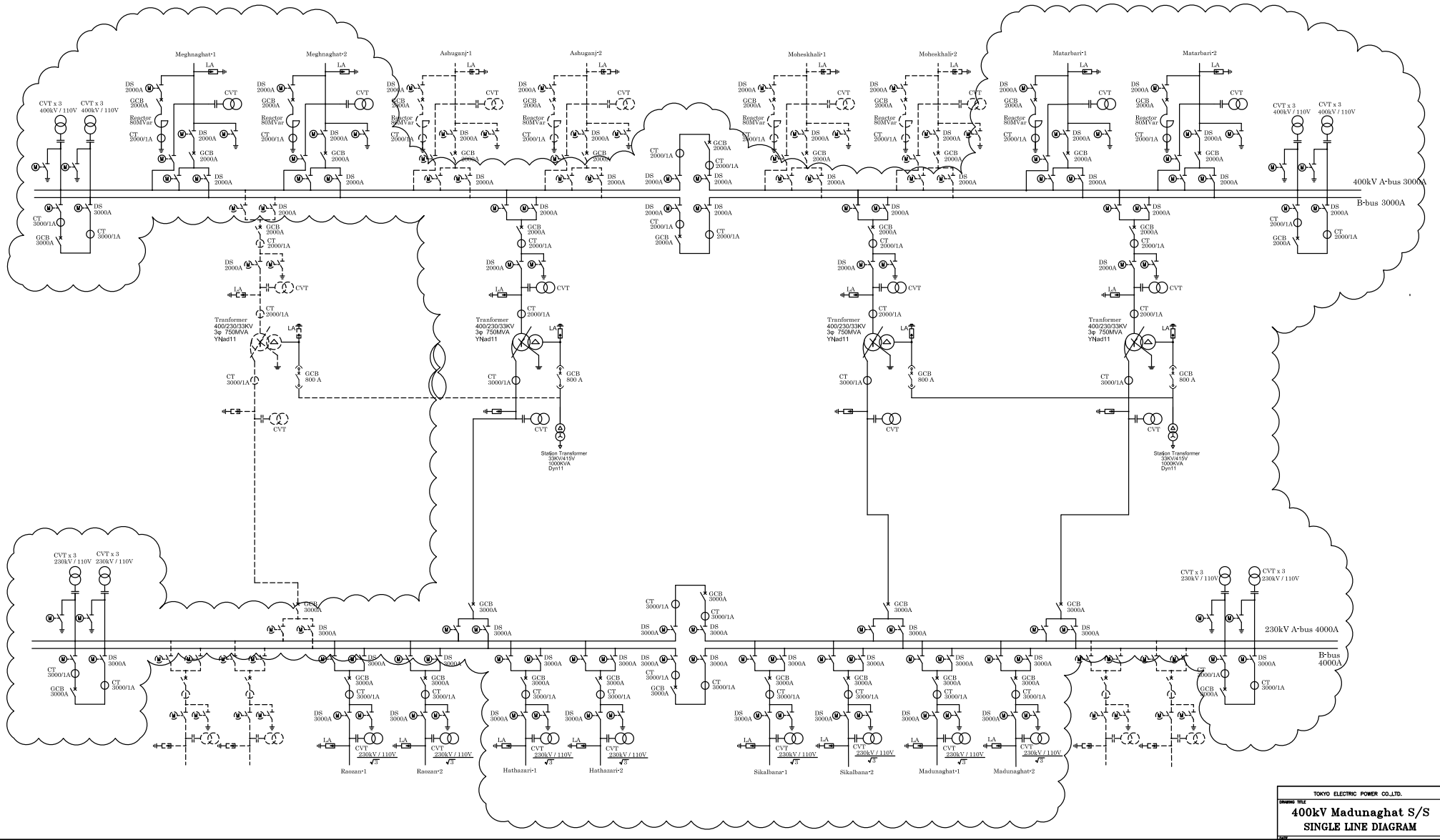




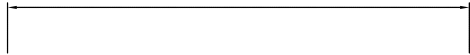


REV. SUFFIX	COORDINATE	REVISION DETAILS	BY	APPR.	DATE
TOKYO ELECTRIC POWER CO.,LTD.					
JOB TITLE					
DRAWING TITLE					
<b>400kV Madunaghat S/S Future Plan LAYOUT</b>					
AGREEMENT No.			DRAWING No.		
APPROVED			REVISOR SUFFIX		
DATE	PREPARED	CHECKED	SUBMITTED		
SCALE					
DATE					

# Project Scope



100,000



132kV GIS

S.C.room

Control Building

230kV Tr

Kaptai Road

230kV GIS

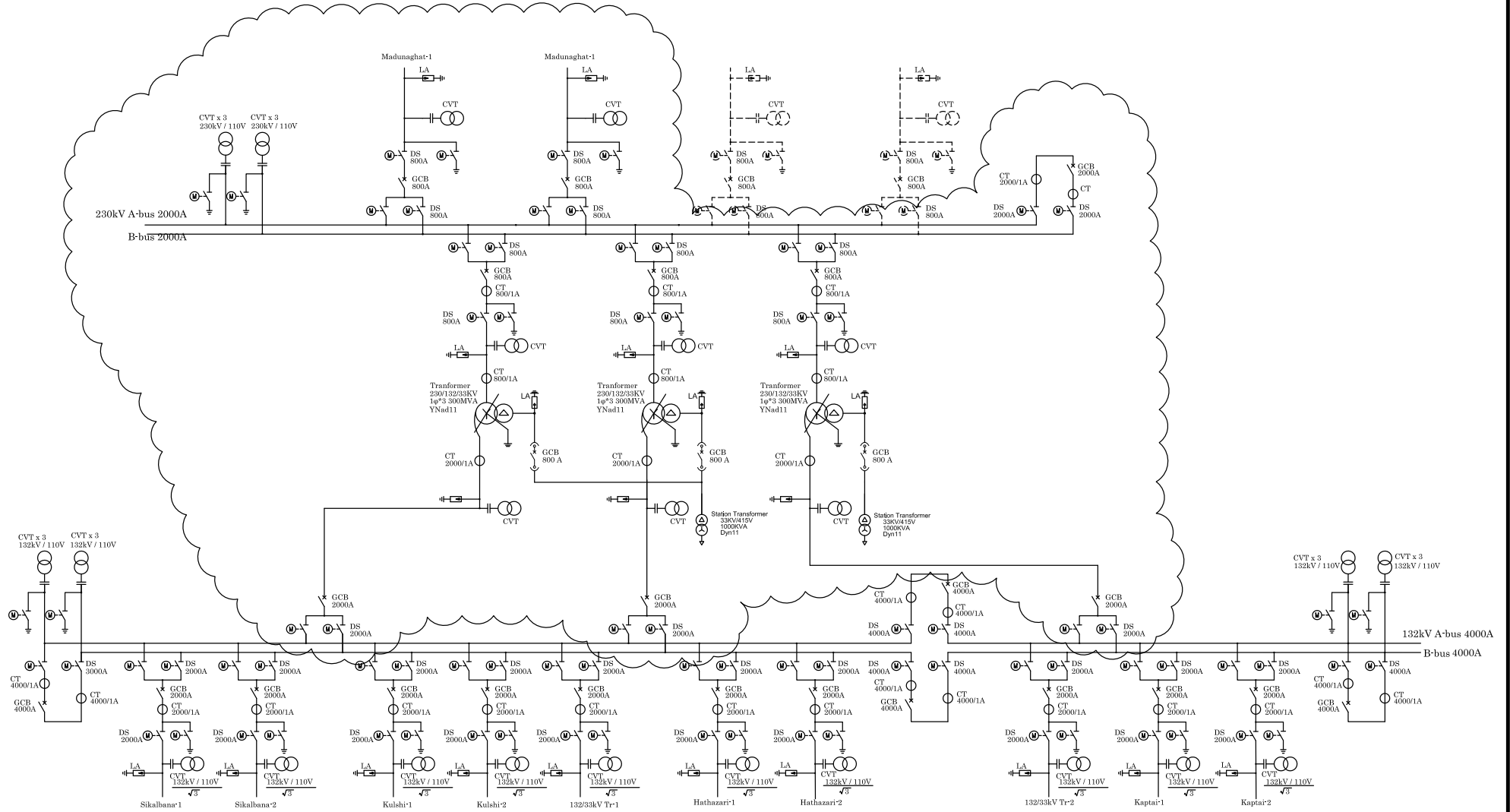
Pond

33kV SW yard

Creek

REV.SUFFIX	COORDINATE	REVISION DETAILS	BY	APPR.	DATE
TOKYO ELECTRIC POWER CO.,LTD.					
JOB TITLE					
DRAWING TITLE					
230/132 Old Madunaghat SS Layout					
AGREEMENT No.			DRAWING No.		
APPROVED			REVISION SUFFIX		
DATE			DATE		
SCALE		PREPARED		CHECKED	
DATE		SUBMITTED		DATE	

# Project Scope



## 付録 5

### 天然資源の調査に関する業務指示書 (Flora and Fauna)



# TOR of the Flora and Fauna Survey

## 1. Scope of Work

Following evaluation will be cleared in report:

- a. To evaluate potential impact of Transmission line extension (including substations) to the rare, endangered and protected species\*
- b. To assess adaptability of rare, endangered and protected species against the impact
- c. To estimate how many rare, endangered and protected trees\* will be cut or dried up
- d. To recommend available mitigation countermeasures to minimize impact to the rare, endangered, protected species\*.

(\*)=including not only species categorized as rare, endangered and protected species listed on IUCN Red List of 2013 and by Bangladesh's Law but species of limited distribution (endemic), and important economic and cultural use to local people.

## 2. Output

Following items will be included in report,

- a. A list of Flora (clarifying rare, endangered, protected, endemic and important economically or culturally uses species to local people impacted by the project.
- b. A list of Fauna (clarifying rare, endangered, protected, endemic and important economically or culturally uses species to local people impacted by the project.
- c. A distribution map (1/10000) of rare, endangered, protected, endemic and important economically or culturally uses species to local people impacted by the project.
- d. An evaluation of impact to rare, endangered, protected species based on their ecological requirements and limitation.
- e. A list of adaptability assessment of rare, endangered, protected species against the Project impact.
- f. Estimation of numbers of rare, endangered and protected trees will be cut or dried up.
- g. Recommendation of available mitigation countermeasures to minimize project Impacts to the rare, endangered, protected species.

## 3. Methods

### (1) General methods

A list of fauna and flora (including rare, endangered, and protected species) potentially found in the project area will be prepared before field survey conducted. Broad survey or opportunistic survey will be employed to identify and record fauna and flora in the project site and surround habitat. GPS will be used to record geographic coordinate and plotted to the map of it identified plots. In addition, interview to the local people will

be done to gain information about species will be also taken as documentation. Information concerning on rare, endangered, and protected species will be collected through analyses of various sources of scientific reports, interviews with beneficiaries, partner agencies(including international natural conservation organizations), project staff and local people.

## **(2) Sampling station and its each unit**

To cover representative habitat impacted by the Project, the Consultant defines 7 main sampling stations (including access road, these points will be defined after consultation with JICA Survey Team). Number of sampling unit or observation point vary, with range 2 - 4 unit or point, within taxa group depend on specification of taxa and representative of microhabitat. For example, mammal observation might need more observation point or transect rather than amphibian observation. Detail of sampling unit or observation point explained in each taxa methodology section.



### (3) Time of survey

The time of survey vary on taxa and type of project, it is required 2 times of Rainy season and Dry season, but some taxa of Mammal and Avian will be done 4 times of Spring, Summer, Autumn and Winter. To cover each station, the Consultant will need about XX days or weeks for field observation including time needed for preliminary survey, sample preservation, coordination to local authority, move from one station to another, and to anticipate bad weather, team at least need XXX times in the field.

## 4. Detailed survey methods on each Taxa

### (1) Flora

For vegetation assessment, the consultant will use broad survey and quadrat sampling.

Broad survey will be used to record species of plants in the area. Quadrat sampling will be used to determine a vegetation profile and to estimate number of important tree\* (with Diameter at Breast High or DBH more than 35 cm) that will be cut during the construction of facilities. Quadrats will be placed with XXX m interval along XX km transects line crossing to the right and left of it. In each station the consultant will set up 20 quadrats (minimum number of quadrat), therefore the consultant will have totally 120 quadrats in six stations. The quadrat dimension used for tree (DBH  $\geq$  35 cm) is 20 m x 20 m, for pole (10 cm  $\leq$  DBH < 35 cm) is 10 m x 10 m, for sapling (DBH < 10 cm) is 5 m x 5 m, and for seedling (height < 50 cm) and undergrowth (grasses, vines, herbs, shrubs, ferns species) is 1 m x 1 m (Figure 1). Individual plants will be identified to their corresponding taxon (family, genus, and species). In term of vegetation analyze, the consultant will assess the habitat type, stratum, biometric, and ecology. Quadrat method will allow the consultant to calculate density and dominance to compute the biodiversity indices. Unidentified plant will be collected and brought to the laboratory of Botany at (University of XXX or research centers) for processing, verification, and authentication.

(\*)=trees which are protected by Treaty or local Law

**Figure2: Size of Quadrat**

### (2) Mammals

Broad survey combined with scan observation, and line transect will be employed to record medium-large size of mammals (particularly primates). Survey will be done in existing walk path in the field used by local to perform line transect. This method allows the consultant to calculate density estimation of mammals observed. Survey will be done twice, once in the morning start at 6 am—10 am to record diurnal mammals and second in the night start at 6 pm—10pm to record nocturnal mammals. Spotlighting will especially perform at night survey. Volant mammals (bats) will be captured by using net. A total of XX net will be accumulated for the survey periods. Checking starts at 6 pm and ends at around 10pm. All the nets for this study will be placed two

to three meters from the ground along suspected fly path and near feeding trees in series of three or four. All capture bats will be released after processing.

Small non-volant mammal (rodents and shrews) will be captured using live trap baited with butter. The consultant will use XX live traps each station. A total of XX trap will be accumulated for the survey periods in six sampling units. Traps will be set starting at 4 pm and checked the following morning at 7 am. They will be positioned five to ten meters apart in strategic areas suspected to be most productive such as root tangles, tree buttresses, rotting logs, small crevices, etc. Individuals trapped will be measured, photograph, and identified. All identified individuals will be released. Any unidentified one or not ascertained is automatically collected. They will be properly catalogued and tagged, and will be fixed in 10% formalin and stored in 70% ethanol.

Medium sized to large sized non-volant mammals will be identified and their perceive abundance primarily based on interviews with knowledgeable local residents. Pictures will be used to aid the interview process but are only shown at the last minute. This will be combined other secondary indicators such as scats, skeletal remain, foot prints, etc. For captured individuals, sex is determined followed by approximate age (adult, sub-adult, and juvenile). This is followed by standard biometric measurements: total length (TL), tail-vent (TV), hind foot (HF), ear (E), forearm for bats (FA) and weight. Qualitative descriptions are also noted to document morphological features when alive and to aid the photographs taken. Indirect observation base on footprint, scratch, nest, and feces will also note.

### **(3) Avian (Birds)**

Broad survey will be employed to record bird species which strongly associate with stream ecosystem as well as forest around the stream. Point observation placed with 100 m interval along 1 km line transect parallel the streams (500m to the right and left of stream) will also employed to count number, density, and biodiversity indices of bird's communities. All individuals observed and/or heard will be noted by following information: species name, numbers of individuals, habitat type, elevation, geographic coordinate, fly singly or in flocks, and other information needed. Rare and protected species will be listed and mapped. The ecology of rare and protected species, such as breeding site, feeding site, nesting site, and breeding season, will be also specifically observed and record.

### **(4) Amphibians and Reptiles**

Opportunistic broad survey will be used to collect and record herpeto-fauna in the sampling areas. This method include spotlighting in the stream and along stream side, forest hiking, transect count, point observation and checking of traps. Individuals will be captured by hands and/or sticks. Some pith fall traps will also establish in some potential area to capture the litter frog. Various suspected microhabitats (i.e. puddles, sections of streams, tree holes, and forest floor, with significant decaying leaf litter cover, tree buttress, logs, leaf axils, epiphytes, tree fern and others) were thoroughly examined with help from local researchers. Darts and blow pipe will be also employed to capture small gecko and lizards. Observation will be carried out twice at 7—11 am and 6—12

pm. Interview will be also performs but only to conspicuous and easily identifiable species. Standard biometric measurements will be used to captured individuals, then photograph and note the qualitative description of individuals. Additional data on microhabitat, altitude, date, weather, time observed and behavior prior to capture will be noted. All identified individuals will be released. Unidentified individuals or new record on site will be sampled and preserved in 30% formalin and then bring it to Laboratory of University or Research centers for further investigation.

#### **(5) Insects**

Opportunistic sweeping using insect net will be employed near or around the river side, and surround shrub and under story vegetation to collect flying insect particularly dragonfly (Odonata), butterfly and moths (*Lepidoptera*) and beetles (*Coleopterans*) might have been designated as rare, endangered, and protected species. Any rare and protected species will be noted include additional information of its microhabitat and ecology. Unidentified individuals will be sampled and preserved and then bring it to the Laboratory of University or Research centers for further information. Freshwater insect (include nymph of Odonata and Coleopterans) captured during the macro benthic sampling will be also examined.

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## 付録 6-a

PGCB から DOE へ IEER レポートが提出された際の  
公式文書コピー





Bangladesh国ダッカーチッタゴン基幹送電線強化事業準備調査  
ファイナルレポート



## 付録 6-b

DOE から PGCB へ IEER レポートが認可された際の  
公式文書コピー



Government of the People's Republic of Bangladesh  
**Department of Environment**  
Head Office, E-16 Agargaon  
Dhaka-1207  
www.doe.gov.bd

Memo No: DoE/Clearance/5339/2014/ ২২৭

Date: 11/09/2014

**Subject:** Exemption of IEE and Approval of Terms of Reference (TOR) for EIA of Meghnaghat-Madunaghat-Matarbari 400KV Transmission Line Project.


Ref: Your Application dated 08/07/2014.

With reference to the above, the undersigned is directed to convey the exemption of IEE and approval of the Terms of Reference (TOR) for Environmental Impact Assessment (EIA) of Meghnaghat-Madunaghat-Matarbari 400KV Transmission Line Project.

- I. Power Grid Company of Bangladesh Ltd. shall submit a comprehensive Environmental Impact Assessment (EIA) considering the overall activity of the proposed Rural Electricity Transmission and Distribution activity in accordance with the TOR and time schedule submitted to the Department of Environment (DOE).
- II. The EIA shall incorporate the following components/items in addition to the issues mentioned in the proposed TOR for EIA.
  - (a) There shall be a new Section on 'Analysis of Suitability for Alternative Routes' this analysis shall be performed, among other approaches, in a GIS based Spatial Decision Support System (SDSS) presenting the suitability of different options for both the interventions;
  - (b) Refer to Section-8; a detail technical and financial proposal shall be included for developing an in-house environmental monitoring system to be operated by the proponent's own resources (equipments and expertise);
  - (c) Specific formats for Environmental monitoring shall be included under Section 8.
- III. Without approval of EIA report by the Department of Environment, Power Grid Company of Bangladesh Ltd. shall not be able to open L/C in favor of importable machineries.
- IV. Without obtaining Environmental Clearance, Power Grid Company of Bangladesh Ltd. shall not be able to start the physical activity of the project.



- V. Power Grid Company of Bangladesh Ltd. shall submit the EIA along with a filled-in application for Environmental Clearance in prescribed form, the applicable fee in a treasury chalan, the no objection certificates (NOCs) from the local authority, NOCs from forest department (if it is required in case of cutting any forested plant, private or public) and NOC from other relevant agencies for operational activity etc. to the Head Office of DOE with a copy to concerned Divisional offices of DOE.

  
11.09.2014

**(Syed Nazmul Ahsan)**  
Deputy Director (Environmental Clearance)  
and  
Member Secretary  
Environmental Clearance Committee  
Phone # 8181778

**Project Director**

Meghnaghat-Madunaghat-Matarbari 400KV Transmission Line Project  
Power Grid Company of Bangladesh (PGCB) Ltd.  
Institution of Engineers Bangladesh (IEB) Bhaban (New) 3rd & 4th Floor  
Ramna, Dhaka-1000

**Copy Forwarded to :**

- 1) Private Secretary to the Hon'ble Secretary, Ministry of Environment and Forests, Bangladesh Secretariat, Dhaka.
- 3) Director, Department of Environment, Dhaka/Chittagong Divisional Office, Dhaka/Chittagong.
- 4) Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.

## 付録 7

### 自然環境調査結果

(List of terrestrial Flora and Fauna)















**Table-1: Terrestrial Flora List in the Rainy season**

Sl. No.	Scientific name	Local name	English name	Family	Survey sites No. (A,B,C=Number of quadrat)												Conservation Sites			Remarks							
					7		6	5			4			3		2		1			IUCN	CITES	Local Law				
					A	B	A	A	B	C	A	B	A	B	A	B	C										
85	<i>Lygodium japonicum</i> (Thunb.) Sw.	Japanilata fern		Schizaeaceae	√									√													
86	<i>Mangifera indica</i> L.	Aam	Mango	Anacardiaceae	√	√		√				√													DD		
87	<i>Marsilea minuta</i> L.	Susnishak	Marshy fern	Marsileaceae		√			√		√															LC	
88	<i>Melastoma malabathricum</i> L.	Bon tejpata	Indian rhododendron	Melastomaceae	√									√													
89	<i>Melia azederach</i> L.	Ghoranim	Bead tree	Meliaceae			√																				
90	<i>Mikania micrantha</i> kunth	Asamlata	Heartleaf	Asteraceae	√	√		√			√																
91	<i>Merremia gangetica</i>	Indukanipana		Convolvulaceae	√																						LC
92	<i>Microcos paniculata</i> L.	Asargula		Tiliaceae	√																						
93	<i>Mikania micrantha</i> Kunth	Tufainnalata	Heratleafhem pvine	Asteraceae	√		√		√	√	√	√	√														
94	<i>Mimosa himalayna</i> Gamble*	Borosarmida	Giant sensitive plant	Mimosaceae	√																						
95	<i>Mimosa pudica</i> L.	Lajjabati	Sensitive plant	Mimosaceae	√	√		√			√	√															LC
96	<i>Momordica charantia</i> L. var. <i>charantia</i>	Titakorolla	Bitter melon	Cucurbitaceae	√				√																		
97	<i>Moringa olifera</i> Lam.	Sajna	Horse radish tree	Moringaceae	√																						
98	<i>Momordica cochinchinensis</i> (Lour.) Sprengel	Kakrul, Akri	Sweet gourd	Cucurbitaceae							√																
99	<i>Monochoria hastata</i> (L.) Solms.	Fena	Arrowleaf false pickereweed	Pontederiaceae						√																	LC

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					7		6	5			4			3		2		1			IUCN	CITES	Local Law	
					A	B	A	A	B	C	A	B	A	B	A	B	C							
100	<i>Musa paradisiaca</i> L.	Kacha kola	Banana	Musaceae	√	√		√			√													
101	<i>Neolamarckia cadamba</i> (Roxb.) Bosser	Kadam		Rubiaceae											√									
102	<i>Nymphaea nouchali</i> Burm.f.	Shapla	Water lily	Nymphaeaceae														√	LC					
103	<i>Oryza sativa</i> L.	Dhan	Paddy	Poaceae											√	√		√						
104	<i>Pandanus foetidus</i> Roxb.	Koikikanta	Screw pine	Pandanaceae					√															
105	<i>Passiflora foetida</i> L.	Jumkolata	Wild passion fruit	Passifloraceae								√												
106	<i>Persicaria orientalis</i> (L.) Spach	Biskatali	The garden gate	Polygonaceae			√																	
107	<i>Phoenix sylvestris</i> (L.) Roxb.	Khajur	Date sugar palm	Arecaceae				√																
108	<i>Phyllanthus acidus</i> (L.) Skeels	Horboroi	Country gooseberry	Euphorbiaceae	√						√													
109	<i>Phyllanthus emblica</i> L.	Amloki	Indian gooseberry	Euphorbiaceae	√						√													
110	<i>Phyllanthus reticulatus</i> Poir.	Cirkuti	Reticulated leaf-flaver	Euphorbiaceae				√	√	√			√											
111	<i>Phyllanthus sikkimensis</i> Mull.Arg.*	Sikimamla		Euphorbiaceae		√																		
112	<i>Piper retrofractum</i> Vahl	Chai lata	Javanese long pepper	Piperaceae											√									
113	<i>Piper peepuloides</i> Roxb.	Pipul		Piperaceae						√														
114	<i>Pistia stratiotes</i> L.	Futihena	Tropical duckweed	Araceae		√									√				LC					
115	<i>Pongamia pinnata</i> (L.) Pierre	Koronja	indian beach	Fabaceae		√													LC					
116	<i>Pouzolzia zeylanica</i> (L.) Benn.	Kullaruki	Pouzolzia	Urticaceae		√		√	√															



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					7		6		5		4			3		2		1			IUCN	CITES	Local Law				
					A	B	A	B	A	B	C	A	B	A	B	A	B	C									
135	<i>Solanum torvum</i> Sw.	Titbegun	Cherry eggplant	Solanaceae								√						√									
136	<i>Spermacoce articularis</i> L.f.	Atharogia		Rubiaceae								√															
137	<i>Sphagneticola calendulacea</i> (L.) Pruski	Vimraj	Trailing daisy	Asteraceae								√															
138	<i>Spilanthes acmella</i> (L.) L.	Mariccha		Asteraceae			√			√	√																
139	<i>Stephania japonica</i> (Thunb.) Miers	Musarralata	Snake vine	Menispermaceae					√			√					√			√							
140	<i>Streblus asper</i> Lour.	Horba	Toothbrush tree	Moraceae	√		√	√	√			√															
141	<i>Swietenia mahagoni</i> (L.) Jacq.	Mahogany	Spanish mahogany	Meliaceae	√				√			√													EN		
142	<i>Synedrella nodiflora</i> (L.) Gaertn.	Relanodi	Nodeweed	Asteraceae			√		√	√							√										
143	<i>Syzygium cuminii</i> (L.) Skeels		Java plum	Myrtaceae					√			√	√														
144	<i>Syzygium fruticosum</i> (Roxb.) DC.	Kawyagajam		Myrtaceae	√																						
145	<i>Tabernaemontana alternifolia</i> L.	Janglitagar		Apocynaceae	√																						
146	<i>Tectona grandis</i> L.f.	Segun	Teak	Verbenaceae	√									√	√												
147	<i>Tamarindus indica</i> L.	Tetul	Tamarind tree	Tamaricaceae		√																					
148	<i>Terminalia catappa</i> L.	Katbadam	Indian almond	Combretaceae					√								√										
149	<i>Urena lobata</i> L.	Jangligagra	Congo jute	Malvaceae	√																						
150	<i>Vitex negundo</i> L.	Nishinda	Chaste tree	Verbenaceae		√																					
151	<i>Ziziphus mauritiana</i> Lam.	Kul	Plum	Rhamnaceae		√	√		√																		





Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Narayangonj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, langolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Order: Odonata	Family: Coenagriidae															
Narrow-winged Damselfly (Foring)	<i>Agriocnemis femina</i> (Brauer), 1890	√			√	√			√	√	√	√	√	√	√	LC
Damselfly (Foring)	<i>Agriocnemis pygmaea</i> (Rambur)				√	√			√	√	√			√	√	LC
Damselfly (Foring)	<i>Ceriagrion cerinorubellum</i> (Brauer)				√				√	√	√	√	√	√	√	LC
Damselfly (Foring)	<i>Pseudagrion microcephalum</i> Rambur, 1842								√	√	√			√	√	LC
Narrow-winged Damselfly (Foring)	<i>Copera vittata</i> Selys, 1863								√	√	√			√	√	LC
Fork-tail Daselfly (Foring)	<i>Ischnura senegalensis</i> Rambur				√											LC

Table-2 Terrestrial Fauna (Insects) in the Rainy season																
Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Narayangonj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, langolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Family: Libellulidae																
Evening Skimmer (Foring)	<i>Tholymis tillarga</i> Fabricius, 1798								√	√	√			√	√	LC
Slender skimmer (Foring)	<i>Orthetrum sabina</i> Drury, 1770				√				√	√	√	√	√	√	√	LC
Common red skimmer (Foring)	<i>Orthetrum pruinsum neglectum</i> Rambur, 1842								√	√	√	√		√	√	LC
Black-tailed skimmer Dragonfly (Foring)	<i>Orthetrum cancellatum</i> Linnaeus, 1758								√	√	√			√	√	LC
Skimmer (Foring)	<i>Neurothemis fulvia</i> Kirby, 1889								√	√	√	√	√	√	√	LC
Common Skimmer (Foring)	<i>Hydrobasileus croceus</i> Brauer, 1867								√	√	√	√	√	√	√	LC
Blue darter (Foring)	<i>Diplacodes trivialis</i>								√	√	√			√	√	LC
Black-tipped percher (Foring)	<i>Diplacodes nebulosa</i> Fabricius, 1793								√	√	√	√	√	√	√	LC

Table-2 Terrestrial Fauna (Insects) in the Rainy season																
Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Narayanganj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, Iargolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Skimmer (Foring)	<i>Brachythemis contaminata</i> Fabricius, 1793								√	√	√	√	√	√	√	LC
Skimmer (not known)	<i>Brachydiplax chalybea</i> Brauer, 1868								√	√	√	√	√	√	√	LC
Wandering Glider (Foring)	<i>Pantala flavescens</i> Fabricius					√										LC
Order: Orthoptera Family: Gryllidae																
Cricket (Urchunga)	<i>Gryllus</i> spp.						√	√	√	√	√		√	√		LC
Family: Acrididae																
Small Rice Grasshopper (Ghas Foring)	<i>Oxya chinensis</i> (Thunberg)				√	√			√	√	√	√		√	√	LC
Short horned Grasshopper (Ghas	<i>Oxya hyla</i> Serville				√	√										LC

Sampling stations	1			2		3		4			5	6	7		
	A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site	Meghnaghat power station Narayanganj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, langolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name															
Common Name	Scientific Name														
Foring)															
Short Horned Grasshopper (Ghas Foring)	<i>Trilophidia annulata</i> (Thunberg)			√	√										LC
Short horned grasshopper (Ghas foring)	<i>Locusta danica</i>							√	√	√	√			√	LC
Order: Dictyoptera Family: Mantidae															
Praying mantis (Shikari mantis)	<i>Mantis religiosa</i> Linnaeus, 1758					√	√	√	√	√	√	√	√	√	LC
Order: Diptera Family: Culicidae															
Aedes mosquito (Mosha)	<i>Aedes aegypti</i> Linnaeus, 1762							√				√		√	LC
Culex mosquito (Mosha)	<i>Culex</i> spp.							√				√		√	LC
Family: Syrphidae															

Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Narayanganj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, langolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Hoverfly	<i>Eristalinus quinquelineatus</i> (Fabricius)								√	√	√				√	LC
Hover fly	<i>Episyrphus spp.</i>								√	√	√				√	LC
Family: Muscidae																
House fly	<i>Musca domestica</i> Linn.	√	√	√	√				√	√	√	√	√	√	√	LC
Order: Homoptera Family: Delphacidae																
Brown planthopper (Badami gachh foring)	<i>Nilaparvata lugens</i> , Stal, 1924								√	√	√	√	√	√	√	LC
Family: Cicadellidae																
Rice green leaf (Dhaner sabuj pata foring)	<i>Nephotettix nigropictus</i>			√	√	√			√	√	√			√	√	LC
Spotted jassid	<i>Nephotettix cincticeps</i> Matsumura								√	√	√				√	LC

Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Narayanganj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, langolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Family: Alydidae																
Rice bug (Dhaner Gandhi poka)	<i>Leptocorisa acuta</i> Thunberg, 1904		√	√	√				√	√	√			√	√	LC
Family: Pentatomida																
Radish bug (Not available)	<i>Eurydema pulchrum</i> Westwood, 1837								√	√	√	√			√	LC
Order: Lepidoptera Family: Pieridae																
Common Grass Yellow (Holud)	<i>Eurema hecabe contubernalis</i> Moore		√	√	√	√	√	√	√	√	√	√	√	√	√	LC
Common Emigrant (Pairachali)	<i>Catopsilia Pomona</i> (Fabricius)						√	√								LC
Red spot Jezebel (Kanka)	<i>Delias descombesi descombesi</i> (Boisduval)								√	√	√	√	√			LC
The spot puffin (not available)	<i>Appias lalage lalage</i> Doubleday, 1842								√	√	√	√	√	√	√	LC

Table-2 Terrestrial Fauna (Insects) in the Rainy season																
Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Narayanganj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, langolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Family: Amathusiidae																
Common Duffer (Kotkote)	<i>Discophora sondaica</i> zal Westwood					√	√									LC
Family: Danaidae																
White Tiger (Shushama)	<i>Danaus melanippus indicus</i> (Fruhstorfer)					√										LC
Glassy Tiger (Shetalkuchi)	<i>Parantica aglea aglea</i> (Stoll)					√	√									LC
Family: Nymphalidae																
Powdered Baron (Tomosha)	<i>Euthalia monina kesava</i> Moore					√	√									LC
The grey pansy	<i>Junonia atlites</i> (Linn.)					√	√	√	√	√				√		LC
The lemon pansy	<i>Junonia lemonias</i> Linnaeus, 1758							√	√	√	√	√	√	√	√	LC
Family: Satyridae																

Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Narayanganj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, Iargolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Dark Evening Brown	<i>Melanitis phedima bela</i> Moore						√	√	√	√	√			√	√	LC
The long- brand bushbrown (not available)	<i>Mycalis visala visala</i> Moore, 1857								√	√	√	√	√	√	√	LC
Family: Papilionidae																
Common mormon (not available)	<i>Papilio plytes laertias</i> Romulus Cramer, 1775								√	√	√	√	√	√	√	LC
Common Birdwing (Shonal)	<i>Troides Helena Cerberus</i> (Felder & Felder)						√	√								LC
Family: Hesperioidea																
Smaller Darlet	<i>Oriens goloides</i> Moore								√	√	√			√	√	LC
Order: Coleoptera Family: Chrysomelidae																
Red pumpkin beetle	<i>Aulacophora foveicollis</i> Lucas	√	√	√	√	√	√	√	√	√	√			√	√	LC
Pumpkin beetle	<i>Aulacophora frontalis</i> Baly	√	√	√	√	√	√	√	√	√	√			√	√	LC



Sampling stations	1			2		3		4			5	6	7		
	A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site	Meghnaghat power station Narayanganj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, Iargolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name															
Common Name	Scientific Name														
Order: Hymenoptera Family: Aphidae															
Aphis		<i>Rhopalosiphum sp.</i>		√	√			√	√	√	√	√	√	√	LC
Family: Anthophoridae															
		<i>Amegilla spp.</i>	√	√			√	√	√	√				√	LC
Family: Halictidae															
Solitary Bee		<i>Lasioglossum sp.</i>	√	√			√	√	√	√				√	LC
		<i>Nomia sp.</i>		√											LC
Family: Trigonidae															
Sweat bee		<i>Trigona sp.</i>						√	√	√				√	LC
Family: Apidae															
Western Honey bee (Momachhi)		<i>Apis mellifera</i> Linn.						√	√	√				√	LC

Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Narayanganj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, Iargolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Wild Honey bee (Bonno Momachhi)	<i>Apis dorsata</i> Linn.						√	√								LC
Family: Vespoidae																
Bolta	<i>Vespa</i> sp.								√	√	√	√	√	√	√	LC
Order: Coleoptera Family: Coccinellidae																
Lady beetle	<i>Micraspis crocea</i> (Mulsant)								√	√	√			√	√	LC
Order: Dictyoptera Family: Blattellidae																
German Cockroach (Telapoka)	<i>Blattella germanica</i> Linn.						√	√								LC
Family: Mantidae																LC
Praying Mantis (Praying Mantis)	<i>Mantis religiosa</i> (Linnaeus)						√	√								LC

Sampling stations	1			2		3		4			5	6	7		
	A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site	Meghnaghat power station Narayangonj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, langolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name															
Common Name		Scientific Name													
Order: Anura		Family: Bufonidae													
Southeast Asian toad		<i>Duttaphrynus (Bufo) melanostictus</i>													
		Family: Dicroglossidae													
Asiatic Bull Frog		<i>Hoplobatrachus tigerinus</i>													
Skipper Frog		<i>Euphlyctis cyanophlyctis</i>													
Indian Cricket frog		<i>Fejervarya limnocharis</i>													
Nepal Cricket frog		<i>Fejervarya nepalensis</i>													
Forest Cricket frog		<i>Fejervarya syhadrensis</i>													
Pierre's cricket frog		<i>Fejervarya pierrei</i>													

Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Narayangonj	Hosendy, 1 no union, Gojaria, Munshigonj	Lukhipur, Voberchar union, Gojaria, Munshigonj	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, langolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Jorajgonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
	Family: Rhacophoridae															
Common Indian tree frog	<i>Polypedates leucomystax</i>		√	√	√	√						√				LC
	Family: Microhylidae															
Painted Bull Frog	<i>Kaloula pulchra</i>		√	√	√	√	√									LC
Ornate Narrow- mouthed Frog	<i>Microhyla ornata</i>		√	√	√	√	√									LC
	Family: Ranidae															
Two-striped Grass Frog	<i>Hylarana taipehensis</i>		√													LC

Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Naravangoni	Hosendy, 1 no union, Gojaria, Munshigoni	Lukhipur, Voberchar union, Gojaria, Munshigoni	Zur kezur gasch, Poishakhi, 8 no union. Laksam. Comilla	Shirpulia, 2 no pidia union, Jangolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgonj, Mirsharai	Segun Bagan, Korerhut Union, Joralgoni, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banskhali	Laichata union, Banskhali	Janghal Pyron, Chechuria, Banskhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Garden Lizard	<i>Calotes versicolor</i>				√	√	√	√	√	√	√		√	√	√	LC
Green garden lizard	<i>Calotes jerdoni</i>		√													LC
South Asian Giant House Gekko	<i>Gekko gekko</i>								√	√				√	√	LC
Spotted house Lizard	<i>Hemidactylus brookii</i>								√	√	√		√		√	LC
Garnot's Gecko	<i>H. garnotii</i>								√	√	√		√	√	√	LC
Spotted house Lizard	<i>H. frenatus</i>	√		√					√	√	√		√	√	√	LC
Brooke's house gecko	<i>Hemidactylus brookii</i>			√			√	√								LC
Common Skink	<i>Eutropis carinatus</i>				√	√			√		√		√	√	√	LC
Stripped shink	<i>Mabuya dissimilis</i>															LC
Bengle Monitor	<i>Varanus bengalensis</i>		√	√	√	√	√	√		√				√		LC



Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Naravangoni	Hosendy, 1 no union, Gojaria, Munshigoni	Lukhipur, Voberchar union, Gojaria, Munshigoni	Zur kezur gasch, Poishakhi, 8 no union. Laksam. Comilla	Shirpulia, 2 no pidia union, Jangolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joralgoni, Mirsharai, Chittagong	Segun Bagan, Korerhut Union, Joralgoni, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banskhali	Laichata union, Banskhali	Janghal Pyron, Chechuria, Banskhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Copper-headed Trinket Snake	<i>Coelognathus radiatus</i>			√			√	√								LC
Trinket snake	<i>Coelognathus Helena</i>	√		√												LC
Common Wolf Snake	<i>Lycodon aulicus</i>								√	√						LC
Indian rat snake	<i>Ptyas mucosa</i>			√	√	√	√	√								LC
Indo-chinese Rat Snake	<i>Ptyas korros</i>								√	√	√		√	√	√	LC
Red-necked Keelback	<i>Rhabdophis subminiatus</i>										√		√			LC
Dark-bellied Marsh Snake	<i>Xenochrophis cerasogaster</i>								√	√	√		√	√	√	LC





Sampling stations		1			2		3		4			5	6	7		
		A	B	C	S	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Naravangoni	Hosendy, 1 no union, Gojaria, Munshigoni	Lukhipur, Voberchar union, Gojaria, Munshigoni	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, Jansolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joraigonj, Mirsharai, Chittagong	Segun Bagan, Korerhut Union, Joraigonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhal	Laichata union, Banshkhal	Janghal Pyron, Chechuria, Banshkhal	IUCN Global status
Species Name																
Common Name	Scientific Name															
House Sparrow	<i>Passer domesticus</i>	√	√	√	√	√	√	√	√	√	√	√	√	√	√	LC
Black Drongo	<i>Dicrurus macrocercus</i>	√	√	√	√	√	√	√	√	√	√	√	√	√	√	LC
Pied Myna	<i>Sturnus contra</i>	√	√	√	√	√	√	√	√	√	√	√	√	√	√	LC
Chestnut-tailed Starling	<i>Sturnus malabaricus</i>								√		√					LC
Common Myna	<i>Acridotheres tristis</i>	√			√	√	√	√	√	√	√	√	√	√	√	LC
Jungle Myna	<i>Acridotheres fuscus</i>						√	√	√	√	√	√	√	√	√	LC
Great Tit	<i>Parus major</i>						√	√	√	√		√	√	√	√	LC
Oriental Magpie-Robin	<i>Copsychus saularis</i>	√	√	√	√	√	√	√	√	√	√	√	√	√	√	LC
Common Tailorbird	<i>Orthotomus sutorius</i>	√	√	√	√	√	√	√	√	√	√	√	√	√	√	LC
Common Pigeon	<i>Columba livia</i>	√	√	√	√	√	√	√	√	√	√			√	√	LC
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	√												√	√	LC

Sampling stations		1			2		3		4			5	6	7		
		A	B	C	S	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Naravangoni	Hosendy, 1 no union, Gojaria, Munshigoni	Lukhipur, Voberchar union, Gojaria, Munshigoni	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, Jansolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joraigoni, Mirsharai, Chittagong	Segun Bagan, Korerhut Union, Joraigoni, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banskhali	Laichata union, Banskhali	Janghal Pyron, Chechuria, Banskhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Spotted Dove	<i>Streptopelia chinensis</i>	√	√	√	√	√	√	√	√	√	√	√	√	√	√	LC
Red Turtle Dove	<i>Streptopelia tranquebarica</i>		√			√								√		LC
Red-vented Bulbul	<i>Pycnonotus cafer</i>	√	√	√	√	√	√	√	√	√	√	√	√	√	√	LC
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	√	√		√			√	√	√	√	√	√	√	√	LC
House Crow	<i>Corvus splendens</i>	√	√	√	√	√	√	√	√	√	√	√	√	√	√	LC
Large-billed Crow	<i>Corvus macrorhynchos</i>	√	√	√	√	√	√	√	√	√	√			√	√	LC
Black-hooded Oriole	<i>Oriolus xanthornus</i>	√	√	√	√			√	√	√	√	√		√		LC
Ashy Woodswallow	<i>Artamus fuscus</i>	√	√	√	√		√							√		LC
Rufous Treepie	<i>Dendrocitta vagabunda</i>	√	√	√	√			√	√		√	√		√		LC
Scarlet-bucket Flowerpecker	<i>Dicaeum cruentatum</i>		√					√						√		LC

Sampling stations		1			2		3		4			5	6	7		
		A	B	C	S	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Naravangoni	Hosendy, 1 no union, Gojaria, Munshigoni	Lukhipur, Voberchar union, Gojaria, Munshigoni	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpuia, 2 no pidia union, Jansolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joraigonj, Mirsharai, Chittagong	Segun Bagan, Korerhut Union, Joraigonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banshkhali	Laichata union, Banshkhali	Janghal Pyron, Chechuria, Banshkhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Purple-rumped Sunbird	<i>Nectarinia zeylonica</i>	√	√	√	√		√	√						√		LC
Purple Sunbird	<i>Nectarinia asiaticus</i>	√	√	√			√							√		LC
Baya Weaver	<i>Ploceus philippinus</i>			√	√		√	√	√	√			√	√		LC
Scaly-breasted Munia	<i>Lonchura punctulata</i>	√	√	√	√		√			√				√		LC
Paddyfield Pipit	<i>Anthus rufulus</i>			√		√			√				√	√		LC
Common Iora	<i>Aegithina tiphia</i>		√	√	√				√	√			√		√	LC
White-throated Fantail	<i>Rhipidura albicollis</i>			√	√				√				√			LC
Common Kingfisher	<i>Alcedo atthis</i>			√	√	√	√	√	√	√			√	√	√	LC
White-throated kingfisher	<i>Halcyon smyrnensis</i>			√	√	√	√	√	√	√			√	√	√	LC
Plaintive Cuckoo	<i>Cacomantis merulinus</i>									√					√	LC
Asian Koel	<i>Eudynamys scolopaceus</i>			√	√			√	√	√				√		LC



Sampling stations		1			2		3		4			5	6	7		
		A	B	C	S	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Naravangoni	Hosendy, 1 no union, Gojaria, Munshigoni	Lukhipur, Voberchar union, Gojaria, Munshigoni	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, Jansolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joraigonj, Mirsharai, Chittagong	Segun Bagan, Korerhut Union, Joraigonj, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banskhali	Laichata union, Banskhali	Janghal Pyron, Chechuria, Banskhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Grey-headed Fish Eagle	<i>Ichthyophaga ichthyaetus</i>			√	√								√		√	NT
Crested Serpent Eagle	<i>Spilornis Cheela</i>				√		√		√	√	√		√			LC
Little Cormorant	<i>Phalacrocorax niger</i>				√	√	√	√	√	√	√		√	√	√	LC
Little Egret	<i>Egretta garzetta</i>						√	√	√	√	√		√	√	√	LC
Great Egret	<i>Casmerudias albus</i>						√		√							LC
Cattle Egret	<i>Bubulcus ibis</i>		√	√	√	√	√	√	√	√	√		√	√	√	LC
Indian Pond Heron	<i>Ardeola grayii</i>		√	√	√	√	√	√	√	√	√		√	√	√	LC
Cinnamon Bittern	<i>Ixobrychus cinnamomeus</i>						√	√	√				√	√		LC
Yellow Bittern	<i>Ixobrychus sinensis</i>							√	√							
Asian Openbill	<i>Anastomus oscitans</i>								√							LC
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>			√	√		√	√	√	√	√		√	√		LC



Table-6 Terrestrial Fauna (Mammals) in the Rainy season																
Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Naravansoni	Hosendy, 1 no union, Gojaria, Munshigoni	Lukhipur, Voberchar union, Gojaria, Munshigoni	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, Jangolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korethut Union, Joragonj, Munshigoni	Segun Bagan, Korethut Union, Joragoni, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banskhali	Laichata union, Banskhali	Janghal Pyron, Chechuria, Banskhali	IUCN Global status
Species Name																
Common Name		Scientific Name														
Order: Insectivora		Family: Soricidae														
Grey Musk Shrew		<i>Suncus murinus</i> (Linnaeus 1766)														
Order: Chiroptera		Family: Pteropidae														
Short-nosed Fruit Bat		<i>Cynopterus sphinx</i> (Vahl 1797)														
Indian Flying Fox		<i>Pteropus giganteus</i> Brunnich 1782														
Greater Asiatic Yellow House Bat		<i>Scotophilus heathii</i> (Horsfield, 1831)														







Table-6 Terrestrial Fauna (Mammals) in the Rainy season																
Sampling stations		1			2		3		4			5	6	7		
		A	B	C	A	B	A	B	A	B	C	A	A	A	B	
Name of the site		Meghnaghat power station Naravansoni	Hosendy, 1 no union, Gojaria, Munshigoni	Lukhipur, Voberchar union, Gojaria, Munshigoni	Zur kezur gasch, Poishakhi, 8 no union, Laksam, Comilla	Shirpulia, 2 no pidia union, Jangolkut, Comilla	Gamari Bagan, Noi tila majarer upor, Korerhut Union, Joragonj, Munshigoni	Segun Bagan, Korerhut Union, Joragoni, mirsharai, Chittagong	Purba Guzara, Raozan	Garibullah para, Raozan.	Lambur hat, Raozan	Mudhunaghat, Chittagong	Banunchara, Banskhali	Laichata union, Banskhali	Janghal Pyron, Chechuria, Banskhali	IUCN Global status
Species Name																
Common Name	Scientific Name															
Hog Badger*	<i>Arctonyx collaris</i> F.G.Cuvier 1825								√	√	√			√	√	NT
Common Otter*	<i>Lutra lutra</i> (Linnaeus 1758)								√	√	√		√	√	√	NT
	Family: Viverridae															
Large Indian Civet	<i>Viverra zibetha</i> Linnaeus 1758			√				√	√	√	√		√	√	√	NT
Order: Artiodactyla	Family: Cervidae															
Barking Deer	<i>Muntiacus vaginalis</i> (Boddaest 1785) (= <i>M. muntjak</i> )							√	√				√	√	√	LC



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# Dry Season

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Sl. No.	Scientific name	English name	Local name	Family	Survey sites No. (A,B,C=Number of quadrat)												Conservation Sites			Remarks								
					7		6		5			4			3		2				1			IUCN	CITES	Local Law		
					A	B	A	B	A	B	C	A	B	A	B	A	B	C										
35	<i>Clerodendrum viscosum</i> Vent.		Vat	Verbenaceae	√		√	√					√		√													
36	<i>Coccinia grandis</i> (L.) Voigt	Ivy gourd	Kelakachup ata	Cucurbitaceae		√	√														√							
37	<i>Cocos nucifera</i> L.	Coconut palm	Nairkel	Arecaceae		√	√	√			√																	
38	<i>Canna indica</i> L.	Canna lily	Kalaboti	Cannaceae		√	√	√													√							
39	<i>Commelina benghalensis</i> L.	Blue commelina	Kanaialata	Commelinaceae	√				√		√					√					LC							
40	<i>Crateva magna</i> (Lour.) DC.	Three leaved caper	Barun	Capparaceae																	√							
41	<i>Crotalaria pallida</i> Aiton		Jhunjhuni	Fabaceae						√																		
42	<i>Croton bonplandianus</i> Baill.	Bonplant's croton	Paglamaric h	Euphorbiaceae			√	√	√						√		√											
43	<i>Curcuma zedoaria</i> (Christm.) Roscoe	Indian arrowroot	Soti	Zingiberaceae											√													
44	<i>Cyanthillium cinereum</i> (L.) H. Rob.	Purple fleabane	Sialimutra	Asteraceae					√																			
45	<i>Cynodon dactylon</i> (L.) Pers.	Star grass, Couch grass	Durba grass	Poaceae		√															√							
46	<i>Cyperus rotandus</i> L.	Nut grass	Nagarmuth a	Cyperaceae	√				√																			
47	<i>Desmodium gangeticum</i> (L.) DC.		Chalani	Fabaceae							√																	
48	<i>Dioscorea alata</i> L.	Asiatic yam	Banga alu	Dioscoreaceae												√												
49	<i>Dioscorea bulbifera</i> L.	Air potato	Banalu	Dioscoreaceae											√													
50	<i>Dioscorea pentaphylla</i> L.	Five-leafyam	Jum alu	Dioscoreaceae							√																	
51	<i>Diplazium esculentum</i> (Retz.) Sw.		Dhekishak	Woodsiaceae					√												LC							



Table-1 Terrestrial Flora in the Dry season																									
Sl. No.	Scientific name	English name	Local name	Family	Survey sites No. (A,B,C=Number of quadrat)												Conservation Sites			Remarks					
					7		6		5			4			3		2		1			IUCN	CITES	Local Law	
					A	B	A	B	A	B	C	A	B	C	A	B	A	B	C						
69	<i>Ipomoea fistulosa</i> Mart.ex Choisy		Dolkolmi	Convolvulaceae		√			√		√							√	√						
70	<i>Ipomoea aquatica</i> Forssk.	Water spinach	Kalmi	Convolvulaceae		√												√	√	LC					
71	<i>Ixora paevetta</i> Andr.	The torch tree	Gandhalran gan	Rubiaceae		√		√																	
72	<i>Justicia gendarussa</i> Burm.f.*		Jagatmadan	Convolvulaceae		√			√		√														
73	<i>Lagerstroemia speciosa</i> (L.) Pers.		Jarul	Lythraceae										√											
74	<i>Lannea coromandelica</i> (Houtt.) Merr.		Badi	Anacardiaceae					√							√									
75	<i>Lantana camara</i> L.	Lantana	Khutuskant a	Verbenaceae	√		√	√	√																
76	<i>Lepisanthes rubiginosa</i> (Roxb.) Leenh.		Rubihorina	Sapindaceae	√								√												
77	<i>Lindernia antipoda</i> (L.) Alston	Sparrow false pimpernel	Zai ghas	Linderniaceae														√		LC					
78	<i>Lippia alba</i> (P.Mill.) N.E.Br. ex Britt. & Wilson		Shunk	Verbenaceae					√									√							
79	<i>Ludwigia adscendens</i> (L.) Hara		Mulcha	Onagraceae												√									
80	<i>Ludwigia hyssopifolia</i> (G.Don) Exell.	Seedbox	Zaikura	Onagraceae					√							√				LC					
81	<i>Lygodium japonicum</i> (Thunb.) Sw.		Japanilata fern	Schizaeaceae	√								√												
82	<i>Mangifera indica</i> L.	Mango	Aam	Anacardiaceae	√	√		√			√									DD					
83	<i>Marsilea minuta</i> L.	Marshy fern	Susnishak	Marsileaceae		√		√	√											LC					
84	<i>Melastoma malabathricum</i> L.	Indian rhododendron	Bon tejpata	Melastomaceae	√							√													

















22	<i>Leptocorisa acuta</i> Thunberg, 1904	Rice bug (Dhaner Gandhi poka)		√	√			√	√	√			√	√			√	LC		
			Family: Pentatomida																	
23	<i>Eurydema pulchrum</i> Westwood, 1837	Radish bug (Not available)			√		√	√	√	√								LC		
			Order: Lepidoptera , Family: Pieridae																	
24	<i>Eurema hecabe contubernalis</i> Moore	Common Grass Yellow, (Holud)		√	√	√	√	√	√	√	√	√	√	√			√	LC		
			Family: Danaidae																	
25	<i>Danaus melanippus indicus</i> (Fruhstorfer)	White Tiger (Shushama)									√			√				LC		
26	<i>Parantica aglea aglea</i> (Stoll)	Glassy Tiger (Shetalkuchi)					√				√	√						LC		
			Family: Nymphalidae																	
27	<i>Euthalia monina kesava</i> Moore	Powdered Baron (Tomosha)									√	√						LC		
28	<i>Junonia atlites</i> (Linn.)	The grey pansy			√			√	√	√	√	√						LC		







				A	B	A	B	A	B	C	A	B	A	B	A	B	C	IUCN	CITES	
Species Name	Scientific Name	Common Name	Order, Family																	
			Order: Anura, Family: Bufonidae																	
1	<i>Duttaphrynus (Bufo) melanostictus</i>	Southeast Asian toad		√	√	√	√	√	√	√	√	√	√	√	√	√	√	LC		
			Family: Dicroglossidae																	
2	<i>Hoplobatrachus tigerinus</i>	Asiatic Bull Frog			√	√		√		√	√	√	√	√		√	√	LC		
3	<i>Euphlyctis cyanophlyctis</i>	Skipper Frog		√	√	√	√	√	√	√		√	√	√	√	√	√	LC		
4	<i>Fejervarya limnocharis</i>	Indian Cricket frog					√			√	√		√	√	√			LC		
5	<i>Fejervarya nepalensis</i>	Nepal Cricket frog		√			√	√		√					√	√		LC		
			Family:Microhylida e																	
6	<i>Microhyla ornata</i>	Ornate Narrow-mouthed Frog				√	√				√			√		√	√	LC		
7	<i>Microhyla berdmorei</i>	Bardmori Narrow-mouthed Frog		√			√		√						√	√				

**Table-4 Terrestrial Fauna (Reptile) in the Dry season**

			7		6		5		4			3		2		1			IUCN	CITES	
			A	B	A	B	A	B	C	A	B	A	B	A	B	C					
	Species Name																				
	Scientific Name	Common Name																			
1	<i>Calotes versicolor</i>	Garden Lizard	√	√	√		√	√	√	√	√	√	√							LC	
2	<i>Calotes jerdoni</i>	Green garden lizard														√				LC	
3	<i>Hemidactylus brookii</i>	Spotted house Lizard		√	√		√	√	√											LC	
4	<i>H. frenatus</i>	Spotted house Lizard	√	√	√		√	√	√					√				√		LC	
5	<i>Hemidactylus brookii</i>	Brooke's house gecko								√	√							√		LC	
6	<i>Mabuya mabuya</i>	Shink																		LC	
7	<i>Varanus bengalensis</i>	Bengle Monitor	√				√			√	√	√	√			√	√			LC	I
8	<i>Amphiesma stolata</i>	Striped keelback	√	√	√		√	√	√											LC	
9	<i>Dendrelaphis pictus</i>	Painted Bronzeback								√	√									LC	
10	<i>Lycodon jara</i>	Common Wolf Snake					√	√												LC	
11	<i>Ptyas mucosa</i>	Indian rat snake								√	√	√	√					√		LC	





11	<i>Treron bicintus</i>	Oreng-e-breasted Green Pigeon						√	√			√			√	√			
12	<i>Treron phoenicopterus</i>	Yellow-footed Green Pigeon			√	√							√	√	√	√			
13	<i>Streptopelia decaocto</i>	Eurasian Collared Dove		√									√				LC		
14	<i>Streptopelia chinensis</i>	Spotted Dove					√	√	√	√			√	√	√	√	LC		
15	<i>Pycnonotus cafer</i>	Red-vented Bulbul		√	√	√		√		√	√	√	√	√	√	√	LC		
16	<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul			√					√	√		√	√			LC		
17	<i>Corvus splendens</i>	House Crow		√	√	√	√	√	√	√	√	√	√	√	√	√	LC		
18	<i>Corvus macrorhynchos</i>	Large-billed Crow		√	√	√		√	√	√	√	√		√	√	√	LC		
19	<i>Oriolus xanthornus</i>	Black-hooded Oriole			√	√		√		√		√	√		√	√	LC		
20	<i>Phalacrocorax niger</i>	Little Cormorant			√	√				√		√		√	√				

21	<i>Phalacrocorax fuscicollis</i>	Indian Cormorant		√						√								
22	<i>Artamus fuscus</i>	Ashy Woodswallow			√			√		√		√	√	√			LC	
23	<i>Dendrocitta vagabunda</i>	Rufous Treepie			√	√		√		√		√	√	√	√		LC	
24	<i>Dicaeum cruentatum</i>	Scarlet-bucket Flowerpecker			√					√				√			LC	
25	<i>Dicaeum erythrorhynchos</i>	Pale-billed Flowerpecker		√			√	√	√			√						
26	<i>Nectarinia zeylonica</i>	Purple-rumped Sunbird			√		√			√	√		√	√	√		LC	
27	<i>Ploceus philippinus</i>	Baya Weaver		√			√	√		√	√		√	√	√		LC	
28	<i>Lonchura punctulata</i>	Scaly-breasted Munia			√				√	√	√		√	√	√		LC	
29	<i>Lonchura straiata</i>	White-rumped Munia				√	√	√					√					
30	<i>Anthus rufulus</i>	Paddyfield Pipit		√	√			√				√			√		LC	

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31	<i>Rhipidura albicollis</i>	White-throated Fantail				√		√							√			√	LC		
32	<i>Alcedo atthis</i>	Common Kingfisher		√	√	√		√		√	√			√				√	LC		
33	<i>Halcyon smyrnensis</i>	White-throated kingfisher			√	√		√			√	√	√	√	√	√			LC		
34	<i>Eudynamys scolopaceus</i>	Asian Koel			√			√	√			√	√					√	LC		
35	<i>Dinopium bengalensis</i>	Lesser goldenback						√		√		√					√	√	LC		
36	<i>Hirundo rustica</i>	Barn Swallow		√		√		√	√	√					√						
37	<i>Centropus sinensis</i>	Greater Coucal													√						
38	<i>Centropus bengalensis</i>	Lesser Coucal		√	√	√				√		√	√		√	√			LC		
39	<i>Athene brama</i>	Spotted Owlet			√			√	√			√	√		√			√	LC		
40	<i>Haliastur indus</i>	Brahminy Kite			√			√				√		√				√	LC		
41	<i>Milvus migrans</i>	Black Kite							√			√									
42	<i>Egretta garzetta</i>	Little Egret		√	√	√	√	√	√	√	√	√		√	√				LC		
43	<i>Casmerudias albus</i>	Great Egret		√							√								LC		
44	<i>Bubulcus ibis</i>	Cattle Egret			√	√		√						√		√	√		LC		
45	<i>Ardeola grayii</i>	Indian Pond Heron		√	√	√	√	√	√	√	√	√	√	√	√	√	√		LC		



			Order: Chiroptera, Family: Pteropidae																	
2	<i>Pteropus giganteus</i> Brunnich 1782	Indian Flying Fox		√	√	√		√	√	√	√	√	√	√		√	√	LC		
3	<i>Rousettus leschenaulti</i> (Desmarest, 1820)	Leschenault's Rousette										√	√	√	√		√	LC		
4	<i>Pipistrellus coromandra</i> (Gray, 1838)	Indian Pipistrelle										√	√					LC		
			Order: Carnivora, Family: Canidae																	
5	<i>Canis aureus</i> Linnaeus 1758	Asiatic Jackal		√	√	√		√	√	√				√	√		√	LC	III	
			Family: Felidae																	
6	<i>Felis chaus</i> Schreber 1777	Wildcat		√	√	√		√	√	√	√	√	√	√				LC		
			Family: Herpestidae																	
7	<i>Herpestes edwardsi</i> , (E.Geoffroy-Saint-Hillare 1818)	Common Mongoose		√	√	√	√	√	√	√	√	√						LC	III	
			Family: Mustelidae																	
8	<i>Arctonyx collaris</i> F.G.Cuvier 1825	Hog Badger		√	√			√	√	√								NT		







## 付録 8

### 用地取得と生活補償に対するアクションプラン



**People's Republic of Bangladesh  
Power Grid Company of Bangladesh Limited (PGCB)**

# **Dhaka - Chittagong Main Power Grid Strengthening Project**

## **Action Plan for Land Acquisition and Livelihood Compensation**

**January 2015**

**Japan International Cooperation Agency (JICA)  
Tokyo Electric Power Company  
Tokyo Electric Power Services Co., Ltd.**



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Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Livelihood Compensation



## Abbreviations

BFD	Forest Department
BPDB	Bangladesh Power Development Board
CUL	Compensation under the Law
DAM	Department of Agricultural Marketing
DC	Deputy Commissioner
DOE	Department of Environment
DOF	Department of Fisheries
DPP	Development Project Performa
EMF	Electric Magnetic Field
EMaP	Environmental Management Plan
EMoP	Environmental Monitoring Plan
EP	Entitled Person
GOB	Government of Bangladesh
GRC	Grievance Redress Committee
HH	Household
IOL	Inventory of Losses
JICA	Japan International Cooperation Agency
LA	Land Acquisition
LAO	Land Acquisition Officer
MOPEMR	Ministry of Power, Energy and Mineral Resources
NGO	Non-Governmental Organization
PAPs	Project Affected Persons
PGCB	Power Grid Company of Bangladesh Limited
PWD	Public Works Department
ROW	Right of Way
RPF	Resettlement Policy Framework
RV	Replacement Value
TL	Transmission Line

Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Livelihood Compensation

## Definitions

**Resettlement Plan (RP) or Resettlement Action Plan (RAP):** A resettlement plan (or resettlement action plan) is the planning document that describes what will be done to address the direct social and economic impacts associated with the involuntary taking of land.

**Project Affected Person (PAP):** Any person (household) that loses their home, land, or business interests because of land acquisition.

**Compensation:** A payment in kind, cash or other assets given in exchange for the taking of land, or loss of other assets, including fixed assets thereon, in part or whole.

**Cut-off Date:** This is the date on and beyond which any persons who encroach on the area are not entitled to compensation or any other form of resettlement assistance. It is often established on the commencement date or last date of the census of PAPs.

**Eligibility:** The criteria for qualification to receive benefits under a resettlement program.

**Resettlement Entitlements:** Resettlement entitlements with respect to a particular eligibility category are the sum total of compensation and other forms of assistance provided to displaced persons in the respective eligibility category.

**Replacement Cost:** In determining the replacement cost, depreciation of the asset and the value of salvage materials are not taken into account, nor is the value of benefits to be derived from the project deducted from the valuation of an affected asset.

For agricultural land, it is the pre-project or pre-displacement, whichever is higher, market value of land of equal productive potential or use located in the vicinity of the affected land, plus the cost of preparing the land to levels similar to those of the affected land, plus the cost of any registration and transfer taxes.

For land in urban areas, it is the pre-displacement market value of land of equal size and use, with similar or improved public infrastructure facilities and services and located in the vicinity of the affected land, plus the cost of any registration and transfer taxes.

For houses and other structures, it is the market cost of the materials to build a replacement structure with an area and quality similar to or better than those of the affected structure, or to repair a partially affected structure, plus the cost of transporting building materials to the construction site, plus the cost of any labor and contractors' fees, plus the cost of any registration and transfer taxes.

**Grievance Procedures:** The processes established under law, local regulations, or administrative decision to enable property owners and other displaced persons to redress issues related to acquisition, compensation, or other aspects of resettlement.

**Population Census:** A complete and accurate count of the population that will be affected by land acquisition and related impacts. When properly conducted, the population census provides the basic information necessary for determining eligibility for compensation.

**Asset Inventory:** A complete count and description of all property that will be acquired.

**Household Survey:** A complete and accurate survey of the project-affected population. The survey focuses on income-earning activities and other socioeconomic indicators.

**Socioeconomic Survey:** The population census, asset inventory, and household survey together constitute the socioeconomic survey of the affected population.

Note: Definitions are taken from the JICA Guidelines for Environmental and Social Consideration, or subsequently from the World Bank OP4.12 and glossary of *the Involuntary Resettlement Sourcebook, Planning and Implementation in Development Projects* (2004).

## **1. General**

### **1.1 Project Description**

The objective of the proposed Dhaka – Chittagong Main Power Grid Strengthening Project is to ensure stable power supply in Bangladesh by constructing high voltage power transmission lines between Dhaka and Chittagong and rehabilitating its central load dispatching center, thereby contributing to the country’s economic growth and climate change mitigation.

### **1.2 Project Components**

To achieve the above objective, the project components will be as follows:

- Construction of double circuit 400 kV transmission line (214 km from Meghnaghat to Madunaghat, and 92 km from Matarbari to Madunaghat)
- Expansion of 400 kV / 230 kV substations
- Construction of 230 kV / 132 kV substations
- Construction of double circuit 230 kV (5.2 km from LILO at Madunaghat SS to Hathazari-Sikalbaha)
- Construction of double circuit 230 kV (8 km from new Madunaghat SS to the existing Madunaghat SS)
- Rehabilitation of the Central Load Dispatching Center
- Their related facilities including access roads
- Consulting Services (detailed design, support for bidding, or construction supervision, etc.)

### **1.3 Project Catchment Area**

Dhaka District and Chittagong District

### **1.4 Project Proponent**

Power Grid Company of Bangladesh Limited (hereinafter “PGCB”)

### **1.5 Anticipated Land Acquisition and Resettlement**

There is no involuntary resettlement both on the TL routes and substation sites anticipated in the Project. However, land acquisition both permanently and temporarily is anticipated as described below:

### (1) Transmission Line Route

Number of towers constructed for 400kV TL from Meghnaghat to Matarbari is approximately 800 in total. It requires 2m<sup>2</sup> of land per one suspension tower base (approximately 550 nos) and 3m<sup>2</sup> of land per one tension tower base (approximately 250 nos): in total 1,860 m<sup>2</sup> of paddy land and certain trees will be permanently affected by the tower construction<sup>1</sup>. Construction of one tower base for 230kV requires 1m<sup>2</sup> of land per one suspension tower (approximately 20 nos) and 1m<sup>2</sup> of land per one tension tower (approximately 10 nos). Number of towers for 230 kV TL in total will be 30 in total, and it will be 80 m<sup>2</sup> of land permanently acquired. In conclusion, it is approximately required not more than 2,000 m<sup>2</sup> in total to acquire the land for tower foundation.

The construction period of each tower is expected to last 30 days, during which the construction site (700 m<sup>2</sup> per tower) and temporary access road (200 m<sup>2</sup>) will be blocked where farm activities will be disturbed. It is long enough to lose the income opportunity for land owners for one crop season, and job opportunity and crop share for sharecroppers and cultivators too.

As for the right of way (hereinafter “ROW”), wiring work will last 3 weeks per 3 km, which will require safety instruction for local farmers. It is however not anticipated to hinder their farming activities. Settlements and homesteads have been avoided when the route map was drafted so that no land acquisition or involuntary resettlement is anticipated.

### (2) Substations

As large as 220 acres (equivalent to 89 ha) of land for the candidate site for new Meghnaghat Substation is within Meghnaghat Power Station Complex presently owned by BPDB. BPDB and PGCB will take all official procedures for transferring ownership, so that no acquisition of private land is anticipated.

On the contrary, not more than 20 acres (10 ha) of land will be acquired for the construction of 400 kV / 230 kV Madunaghat Substation including road expansion in the surrounding area. The affected area is mainly East Gujra Union and Groche Union of Raozan Upazila of Chittagong District. The existing road is planned to be widened for 2m, as long as 1,000 m from the nearest jetty to the substation site, which will require land acquisition of paddy land and gardens of homesteads by the road. The details of losses by the expansion of access road have not been finalized yet as the road design including route selection has not been fixed yet as of January 2015.

There is no land acquisition for the expansion of other substations anticipated.

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<sup>1</sup> 19 Upazilas under 7 Districts: Sonargaon Upazila (Narayanganj District), Gazaria (Munshiganj), Daudkandi (Comilla), Kachua (Chandpur), Barura (Comilla), Laksam (Comilla), Nangolkot (Comilla), Feni-S (Feni), Chhagolnaiya (Feni), Mirsarai (Chittagong), Fatikchhari (Chittagong), Hathazari (Chittagong), Raozan (Chittagong), Boalkhali (Chittagong), Patiya (Chittagong), Anowara (Chittagong), Banshkhali (Chittagong), Pekua (Cox's Bazar), and Moheshkhali (Cox's Bazar).

## 1.6 Entitlement Matrix

### (1) Transmission Line Route

The following types of losses (permanently and temporarily) are foreseen on the 400 kV and 230 kV / 132 kV TL routes, and entitlements have been drafted based on the legislations in Bangladesh and JICA Guidelines.

Approximately 600 out of approximately 800 tower bases are owned by private land owners, which will be affected permanently. If the land for tower bases is acquired involuntarily, compensation shall be paid at replacement cost. On the other hand, fully given an informed consent and power of choice to the land owners for their possible land use for the tower bases, PGCB, together with contractors of the transmission lines, will conclude agreements in writing with them with regard to the land use to avoid possible misunderstandings and disputes in the future in case they agree to voluntary land acquisition.

Those land owners of ROW will be temporarily affected during the construction period and compensation for the damages to their standing crops and trees shall be paid. Sharecroppers will temporarily lose their means of livelihoods during the construction period and their such losses also be compensated. PGCB shall restore the land to its original conditions after construction period is over.

**Table 1-1: Entitlement Matrix (Transmission Line Route)**

	Type of Loss	Entitled Persons (EP)	Entitlements (Compensation Package)	Responsible Organizations
1	Permanent loss of paddy land at tower foundations*	Legal land owner	Cash compensation under Law (CCL) market value of land area plus 50% premium	Implementation: Deputy Commissioner (DC)'s Office (Land Acquisition Officer, LAO) Monitoring: PGCB
			Top-up grant to cover 1) Gap between the average of last 12 months' sales values of same kind of land, and the current market value of private land 2) Max allowable replacement value (RV) to purchase new land (and trees) with equal productive value, preparation cost, and registration cost (such as stamp duty and tax)	Implementation: contractors  Supervision and monitoring: PGCB  Advise given by DC Office (LAO)
			One time assistance for annual cropping volume (3 years)	
2	Permanent loss of trees / perennials / fruit trees at tower foundations*	Owners	- Timber trees: The value equals that of the lumber - Fruit or fodder trees: the value equal to the cumulative value of the fruit crop for its productive life	
3	Temporary loss of access to paddy land and trees during construction period (=Temporary loss of	Legal land owner	Profit loss for 1 crop season	
		Cultivator	One time assistance for crop share	

standing crops, trees and job opportunities)	Sharecropper	One time assistance for 3 months of wage and crop share	
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(Note) In case the land owners for their possible land use for the tower bases agree to voluntary land acquisition, the above 1 and 2 will be excluded from the entitlements.

(Source) developed by JICA Survey Team.

### (2) New Madunaghat Substation

Permanent losses of the following types are foreseen for the construction of new Madunaghat Substation and entitlements have been drafted as follows. According to the information given at the East Gujra Union Parishad Office, there are 46 land owners of 82 land plots at the substation site who will lose their land permanently, and their cultivators and sharecroppers will also permanently lose their means of livelihood.

**Table 1-2: Entitlement Matrix (new Madunaghat Substation)**

	Type of Loss	Entitled Persons (EP)	Entitlements (Compensation Package)	Responsible Organizations
1	Permanent loss of paddy land	Legal land owner	Cash compensation under Law (CCL) market value land area plus 50% premium	Implementation: DC Office (LAO) Monitoring: PGCB
			Top-up grant to cover 1) Gap between the average of last 12 months' sales values of same kind of land, and the current market value of private land 2) Max allowable replacement value (RV) to purchase new land with equal productive value, preparation cost, and registration cost (such as stamp duty and tax)	Implementation: contractors  Supervision and monitoring: PGCB  Advise given by DC Office (LAO)
			One time assistance for annual cropping volume (3 years)	
2	Permanent loss of access to paddy land (=Permanent loss of income from crop sales and livelihood means)	Legal land owner	- One time assistance for annual cropping volume (3 years) - Support in transitional period	
		Cultivator	- One time assistance for crop share - Support in transitional period	
		Sharecropper	- One time assistance for 3 months of wage - Support in transitional period	

(Source) developed by JICA Survey Team.

### (3) Access Road Expansion to New Madunaghat Substation

Permanent and temporary losses of the following types are anticipated for the expansion of access road to new Madunaghat Substation and entitlements have been drafted as follows. The number of land plots reaches 4 along the access road as long as 1,000 m.



**Table 1-3: Entitlement Matrix (Road Expansion to Madunaghat Substation)**

	Type of Loss	Entitled Persons (EP)	Entitlements (Compensation Package)	Responsible Organizations
1	Permanent loss of paddy land	Legal land owner	Cash compensation under Law (CCL) market value land area plus 50% premium	Implementation: DC Office (LAO) Monitoring: PGCB
			Top-up grant to cover 1) Gap between the average of last 12 months' sales values of same kind of land, and the current market value of private land 2) Max allowable replacement value (RV) to purchase new land with equal productive value, preparation cost, and registration cost (such as stamp duty and tax)	Implementation: contractors  Supervision and monitoring: PGCB  Advise given by DC Office (LAO)
2	Permanent loss of access to paddy land (=loss of income from crop sales and livelihood means)	Legal land owner	One time assistance for annual cropping volume (3 years)	
		Sharecropper	One time assistance for 3 months of wage	
3	Permanent loss of trees / perennials / fruit trees*	Owners	<ul style="list-style-type: none"> <li>- Timber trees: The value equals that of the lumber</li> <li>- Fruit or fodder trees: the value equal to the cumulative value of the fruit crop for its productive life</li> </ul>	
4	Permanent loss of certain homestead area*	Legal land owner	Cash compensation under Law (CCL) market value of land area plus 50% premium	Implementation: DC Office (LAO) Monitoring: PGCB
			Top-up grant to cover 1) Gap between the average of last 12 months' sales values of same kind of land, and the current market value of private land 2) Max allowable replacement value (RV) to purchase new land with equal productive value, preparation cost, and registration cost (such as stamp duty and tax)	Implementation: contractors  Supervision and monitoring: PGCB  Advise given by DC Office (LAO)
5	Permanent loss of houses and other structures in homestead*	Legal land owner and family members	<ul style="list-style-type: none"> <li>- Market cost of materials to build a replacement structure with an area and quality up to similar level (or better), or to repair a partially affected structure</li> <li>- Cost of transporting building materials to the site</li> <li>- Cost of labor and contractors' fee</li> <li>- Cost of registration and taxes (if any)</li> </ul>	
6	Temporary loss of access to homestead during construction period*	Legal land owner and family members	<ul style="list-style-type: none"> <li>- Provision of temporary access and relocation where possible</li> <li>- Restoration of access to the land, structure, utilities</li> </ul>	

(Note) As of January 2015, the inclusion of the above 3, 4, 5 and 6 has not been finalized yet since the road design including route selection remains unfinished.

(Source) developed by JICA Survey Team.

## 1.7 Land Acquisition and Compensation Budget and Financial Plan

In addition to the compensation stipulated by the Ordinance 1982 and the Electricity Act 1910, all the compensation will be done according to the principle of the replacement cost, which will require PGCB to pay the gap between CUL and the replacement value (top-up). The total cost

for land acquisition and compensation is estimated 515.98 million Taka. Adequate budgetary support will be fully committed and made available to cover the costs of land acquisition and compensation within the agreed implementation period.

**Table 1-4: Land Acquisition and Compensation Cost**

(Unit: BDT)

Division		Land acquisition		Livelihood / ROW Compensation				TOTAL
				Permanet Loss		Temporary Loss		
		CUL	Top-up	Crop	Labor	Crop	Labor	
1	400kV from Meghnaghat to Madunaghat SS	1,610,703	241,605	74,402	0	8,628,674	8,079,898	18,635,282
2	400kV from Madunaghat SSn to Matarbari CFPP	435,938	65,391	23,947	0	2,728,933	3,436,113	6,690,322
3	230 kV TL from new Madunaghat SS - existing Madunaghat SS	56,069	8,410	2,082	0	213,499	287,541	567,601
4	230 kV TL from LILO at Madunaghat SS from Hathazari-Sikalbaha TL	32,347	4,852	1,201	0	138,774	186,902	364,076
5	New Madunaghat SS	402,521,898	60,378,285	11,457,784	1,207,672	0	0	475,565,638
6	Road Expantion to Madunaghat SS	11,979,818	1,796,973	341,005	35,943	0	0	14,153,739
TOTAL		416,636,774	62,495,516	11,900,421	1,243,614	11,709,880	11,990,453	515,976,658

(Source) developed by JICA Survey Team.

## 1.8 Grievance Redress Mechanism

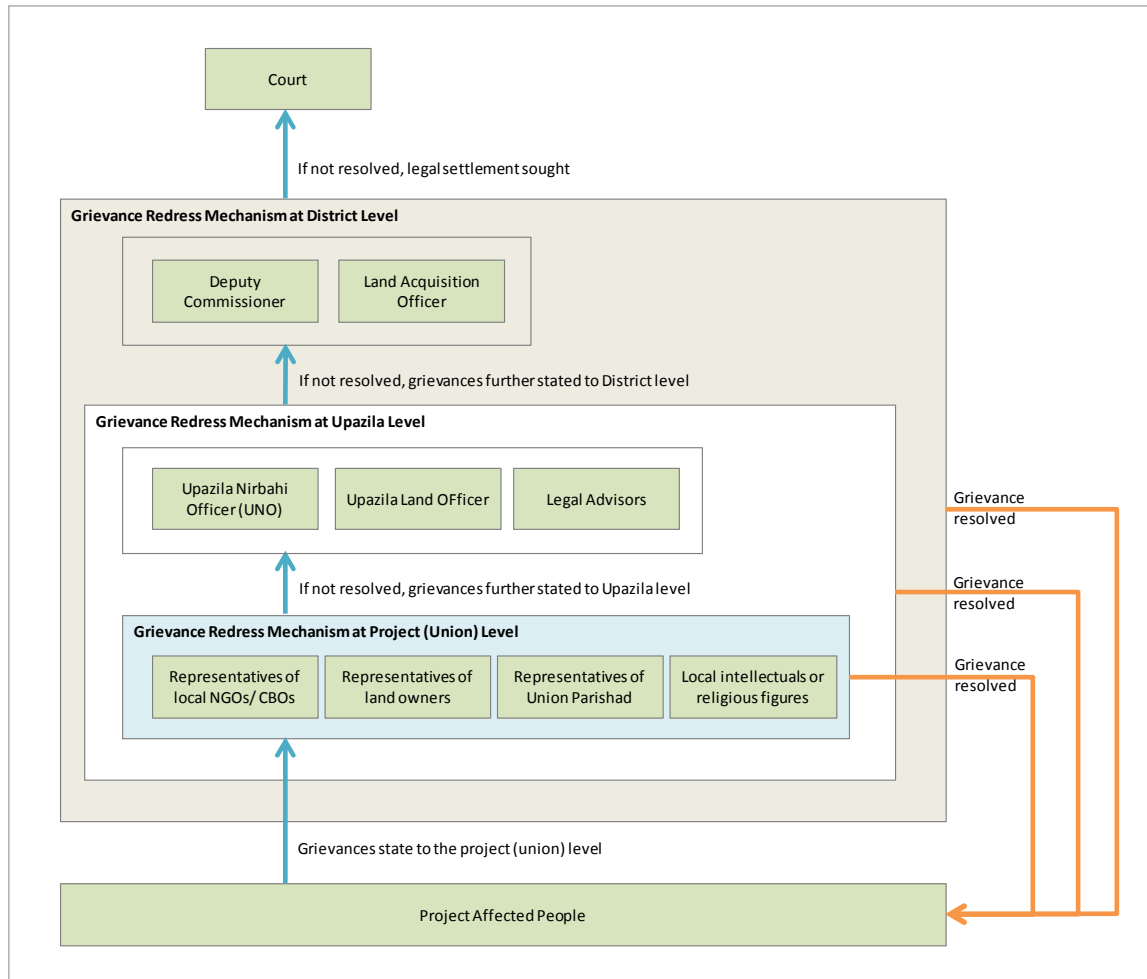
As soon as the budget for land acquisition and livelihood compensation becomes available, PGCB will make a payment to the Deputy Commissioner's Office of Chittagong District to initiate the payment procedure as stipulated in the Ordinance 1982 and Land Acquisition Act 1870.

Endorsed by the Ministry of Power, Energy and Mineral Resources (MOPEMR), a formal grievance redress committees (GRC) will be formed then at union level for any grievances involving resettlement benefits, relocation and other assistance. The purpose of establishing GRCs is to promptly address the concerns and complaints using an accessible and transparent process to the PAPs. GRCs can be comprised of the following members whose standing is neutral and independent:

- PGCB
- Project staff in charge of the Action Plan for Land Acquisition and Livelihood Compensation
- Local NGO
- Chairman of Union Parishad
- Representatives from the Project Affected Persons (PAPs)
- Local intellectuals

- Legal advisors

The structure of GRC is described in the figure below. The core function of GRC will be further discussed and determined in due course of time.



(Source: Developed by JICA Survey Team)

**Figure 1-1 Grievance Redress Mechanism**

## 1.9 Public Consultation and Participation

The PAPs and their communities will be consulted about the project, the rights and options available to them, and proposed mitigation measures for adverse effects, and to all extents possible be involved in the decision-making process concerning the land acquisition.

PAPs will be involved in the process of developing and implementing the Action Plan for Land Acquisition and Livelihood Compensation. The PAPs will receive prior notification of the compensation, relocation and other assistance available to them.

PGCB will be responsible, in close coordination with the Deputy Commissioner and contractors, to hold and conduct a number of consultations with primary and secondary stakeholders and information dissemination on the following issues:

- The relevant details of the project
- The RP and various degrees of project impact
- Details of entitlements under the Action Plan and what is required of PAPs in order to claim their entitlements
- Compensation process and compensation rates
- Relocation and resettlement site development operation in order to obtain agreement and support of affected people in participating in these operations
- Implementation schedule and timetable for the delivery of entitlements

Public participation will be spontaneously performed and information will be made available during preparation and implementations of the RP and at the minimum include community meetings and focus groups discussions.

### **1.10 Application of Exception**

In case of voluntary resettlement, which refers to any resettlement not attributable to eminent domain or other forms of land acquisition backed by powers of the state, the operative principles are informed consent and power of choice. PGCB will, together with the contractor of the transmission lines, inform the land owners of their possible land use for the tower base, duly take into account the land owners' responses when conducting surveys and determining the final route alignment, and conclude agreements in writing with the land owners with regard to the land use for the tower base to avoid possible misunderstanding and disputes in the future. PGCB will duly inform the land owners that they have the right to express objection to the possible land use.

### **1.11 Implementation Schedule**

The implementation schedule of ROW compensation and acquisition of land for new Madunaghat SS and its access road is shown in the ANNEX I.

### **1.12 Monitoring Arrangements**

Appropriate reporting (including auditing and redress functions), monitoring and evaluation mechanisms, will be identified and set in place as part of the management system of land

acquisition and livelihood restoration. An external monitoring group will be hired by the Project and will evaluate the whole process and final outcome.

An Environmental Management Plan (EMaP) has been prepared to provide guidelines for the monitoring during pre-construction, construction and operation activities of 1) transmission lines, 2) substations and 3) access road expansion.

The purposes of creating an EMaP are to:

- Confirm that mitigation measures shall reduce any negative impacts on the environment to allowable levels during the construction and operation phase.
- Set up an organization that is responsible for the implementation of monitoring the plan.
- Perform appropriate monitoring during the construction and operation phase.

The environmental components that will be monitored are those that will be positively or negatively affected, or expected to be affected.

The Environmental Management Plan and the Environmental Monitoring Plan concerning social aspects including ROW compensation and land acquisition is shown in the ANNEX II and ANNEX III respectively.

### **1.13 Further Arrangements**

For acquiring the land for new Madunaghat Substation, As stipulated in the Acquisition and Requisition of Immovable Property Ordinance 1982, the PGCB will submit an application of land acquisition to the Government of Bangladesh (hereinafter “GOB”), with sufficient data and information regarding the project design and cost, through the Deputy Commissioner of Chittagong District. The DC Office will follow all the official procedures to acquire land and provide compensation as stipulated in the Ordinance 1982.

In order to activate the budget for land acquisition and livelihood compensation, it is necessary for the Planning Commission to approve the Development Project Proforma (hereinafter “DPP”). To complete all the procedures from the PGCB’s application to the payment of compensation through the DC Office to the project affected persons (PAPs), it will take over 12 months.

This Action Plan for Land Acquisition and Livelihood Compensation is to be translated into Bengalese and disclosed for the reference of PAPs as well as other interested groups.



## 2. Legislations in Bangladesh and Gaps from JICA's Policy

### 2.1 Key legislations

The Acquisition and Requisition of Immovable Property Ordinance of 1982 and its subsequent amendments in 1993 and 1994 provide the key legal instrument for the acquisition of private land for development activities in Bangladesh.

Salient provisions of the Ordinance which show tangible gaps with the JICA Guidelines are as follows:

**Avoiding / minimizing land acquisition:** The Ordinance only implicitly discourages unnecessary acquisition as land acquired for one purpose cannot be used for a different purpose. There are however no mechanisms to monitor if this condition is actually adhered to.

**Eligibility for Compensation:** The Ordinance stipulates compensation only for the persons who appear in the land administration records as the owners (=titleholders). It does not recognize the rights of those without legal title to the lands who live in or make a living from.

**Compensation paid for:** The Ordinance provides for compensation of lands and other objects built and grown on them (structures, trees and orchards, crops and any other developments like ponds, built amenities etc.). No provisions are there to assess and restore lost income stream or income sources caused by the land acquisition to the PAPs.

**Compensation standards:** Landowners receive compensation under the law (CUL) as per the market value of the property at the publication date of the notice<sup>2</sup> with a premium of 50 percent on the assessed price. Any damage to standing crops or trees on the property, the expenses incidental to compelled change to the residence or place of business, and reduction of the profits of the property in the acquisition period are also entitled to a sum of 50 percent on top of such market value<sup>3</sup>. The 1994 amendment made provisions for payment of crop compensation to tenant cultivators ("*bargadar*").

Although the Ordinance stipulates 'market prices' of the acquired lands as the just compensation, the legal assessment method almost always results in prices far below the actual market prices. Certain pricing standards, which are regarded as unrealistic, are used to assess other losses like structures and various built amenities, trees, crops, and the like.

**Relocation of Homestead Losers:** No legal obligation is there to relocate, or assist with relocation of, those whose homesteads have been acquired.

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<sup>2</sup> The average value of the properties of similar description and with similar advantages in the vicinity during the last twelve months prior to the publication date of the notice. (Section 8 (1) of the Acquisition and Requisition of Immovable Property Ordinance 1982.)

<sup>3</sup> The market value thus determined does not always reflect the actual market value.

**Ensuring Payment / Receipt of the Compensation:** Even with the given legal provision, the compensation process is time-consuming. There is, moreover, no certainty as to when an affected landowner would get the stipulated compensation or whether he would at all get it.

Lands are legally acquired and handed over to the project proponent as soon as the acquisition authority identifies the owners ('awardees') by examining the records, and sends a legal notice advising them to claim compensation ('awards'). And it turns out to be an obligation of the PAPs to prove that the acquired land legally belong to them.

**Socio-economic rehabilitation:** The provisions are so restricted that the Ordinance shows no concern about the long-term socio-economic changes the PAPs might undergo in the post-acquisition period. Except for the compensation at the legal 'market price', there are no other provisions in the acquisition or other-laws that require the government to mitigate the resultant adverse impacts caused by the acquisition. Socio-economic rehabilitation of the involuntarily displaced persons is absent in the legal regime of Bangladesh.

## **2.2 JICA's policy on land acquisition and resettlement**

The key principles of JICA policies on involuntary resettlement are summarized below.

- a Avoidance or minimization of land acquisition and involuntary resettlement  
Land acquisition and involuntary resettlement will be avoided where feasible, or minimized, by identifying possible alternative project designs that have the least adverse impact on the communities in the project area.
- b Entitlement and assistance for restoration and improvement in social and economic conditions.  
Where displacement of households is unavoidable, all PAPs (including communities) losing assets, livelihoods or resources will be fully compensated and assisted so that they can improve, or at least restore, their former economic and social conditions.
- c Compensation and rehabilitation support  
People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standards of living, income opportunities and production levels to pre-project levels.
- c. Application of the principle of the replacement cost  
Compensation must be based on the full replacement cost as much as possible.



d. Actions prior to displacement

Compensation and other assistance required for relocation should be given prior to displacement. Acquisition of assets, payment of compensation, and the resettlement and start of the livelihood rehabilitation activities of PAPs, should be completed prior to construction activities, except when a court of law orders so in expropriation cases. Sufficient civic infrastructure must also be provided at relocation sites before displacement takes place.

e. Assistance in transition period

Resettlement assistance will be provided not only for immediate loss, but also for a transition period needed to restore livelihoods and standards of living of PAPs. Such support could take the form of short-term jobs, subsistence support, salary maintenance, or similar arrangements.

f. Assistance to the Vulnerable

The needs of those most vulnerable to the adverse impacts of resettlement are to be well considered. Assistance should be provided to help them improve their socio-economic status.

g. Consultation and Participation of the Affected People

In preparing a resettlement plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people.

Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans.

h. Grievance Mechanism

Appropriate and accessible grievance mechanisms must be established for the affected people and their communities.

In terms of categories of PAPs and types of lost assets, the gaps in the existing legal framework of Bangladesh and requirements of the JICA Guidelines are identified as presented in the table below.

**Table 2-1 Gap Analysis between Bangladeshi Laws and JICA Guidelines**

No	Category of PAPs / Types of lost assets	Bangladesh Laws	JICA Guidelines
1	For lands of all types and other assets for legal land	Acquired by DC as per legal requirements / procedures	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based
2	Land tenants	Compensation for the standing crops if harvesting of crops is not possible	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported.
3	Land Users	Squatters, encroachers and unauthorized users / occupiers are not recognized	ditto
4	Owners of temporary structures	Only compensation under law (CUL)	Compensation must be based on the full replacement cost as much as possible.
5	Owners of permanent structure buildings	ditto	ditto
6	Perennials crops	Market prices of the standing crops with value of plants	Compensation must be based on the full replacement cost as much as possible.
7	Timing for payment of entitled compensation by the PAPs	No concern on the part of the project proponent. Land is handed over to the project proponent as soon as the fund is placed to the DC.	On the completion of payment of compensation to the PAPs the land to be vacated and handed over to the project proponent.
8	The issue of relocation and income generation activities	No concern about relocation and income generation activities.	People who must be resettled involuntarily and whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standards of living, income opportunities and production levels to pre-project levels.
9	Vulnerability of PAPs	No distinction between the PAPs	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, the landless, elderly, women and children, ethnic minorities, etc.
10	Role of DC, project proponent and PAPs	DC to acquire lands, the project proponent to use the land, and PAPs to seek compensation from the DC.	DC and project proponent to assist the PAPs in getting the compensation, assist to collect the legal and required documents, and provide support for the transition period between displacement and livelihood restoration.

(Source) JICA Survey Team

### 2.3 Procedures of land acquisition

Under the Ordinance of 1982, the DC at District level is entrusted to acquire land for agencies requiring land for any public or private infrastructure projects. The procedures of land acquisition will follow the following steps:

Step 1: After identifying and selecting the exact ground locations of the required land, the project proponent will carry out detailed engineering surveys and design the construction works and lay them on the mauza maps. The project proponent will prepare the land acquisition proposals to obtain an administrative approval by the line ministry.

Step 2: The project proponent, after obtaining the approval of the administrative ministry, makes a request to the DC, with sufficient information including the amount of land to be acquired from each plot, the ownership status such as private and public lands, for the acquisition of the land as per the proposal.

Step 3: Within 90 days, the DC will appraise the application through a) site observation, b) consultation with local politicians and residents, c) develop project profile, d) cost estimate. The DC will then develop and submit proposal on land acquisition to the Ministry of Land for the appraisal by the central government within 90 days.

- The DC will publish a notice as stipulated in Section 3 of the Ordinance of 1982 stating that there is a proposal for the property to be acquired. The persons to be displaced may submit an objection to the land acquisition to the DC within 15 days after the notice is served.  
All the legal titleholders will be advised to show their ID cards and other documents that verify their rights. For those with no registration, the DC Office will call for circumstantial evidence from community leaders, local elite people, and religious leaders, etc., to add them to the list.
- The DC consults with the Public Works Department (PWD), Forest Department (BFD), Department of Agricultural Marketing (DAM) and Department of Fisheries (DOF) to assess the value of structures, trees, crops and aqua products for their existing rates.
- Under Section 6, a second public notice is served stating the GOB's decision of land acquisition and taking possession thereof. The DC Office will confirm the PAPs, exact land area and size for acquisition, number of relocated houses, agriculture land, forestry and fishing areas that will be lost. The persons to be displaced are requested to submit their statements of property, amounts and particulars of the claims to compensation after 15 days of the second notice being served. The DC Office will respond to any grievances made by the PAPs in order to agree to the assistance package.
- The project proponent shall deposit the estimated amount of the award of compensation with the DC within 60 days from the receipt of the estimate given by the DC.
- Upon serving the last notice (Section 7), the DC shall pay the amount to the owners of the acquired property within another 60 days from the date of deposit by the project proponent. The DC will take possession of the property after completion of the compensation payment to the PAPs and immediately declare this in the official gazette, and hand the property over to the project proponent.

### **3. Social Impact Survey**

#### **3.1 Survey Outline**

The JICA Survey Team and PGCB have worked on three basic types of surveys needed: population census, asset inventory, and household survey prior to the project appraisal. The census and asset inventory will cover all the potential PAPs regardless of entitlement of land ownership. The household survey will cover at least 20 % of affected / displaced PAPs in order to collect typical features of the affected households, basic data of their livelihoods and living standard, vulnerable groups.

##### **(1) Population Census**

A complete and accurate count of the population will be made in the population census to confirm who and how many of the people would be affected by land acquisition and related impacts. The population census provides the basic information necessary for determining eligibility for compensation.

##### **(2) Asset Inventory**

In the asset inventory survey, a complete count and description of all property will be undertaken for the property to be acquired. An asset inventory of losses (IOL) will involve a mapping of all households affected by land acquisition: homesteads, trees, standing crops, structures and other kinds of losses i.e. wages and income. A listing of their losses will be remunerated into a database.

The IOL for each PAP record the following:

- amount and type of land to be acquired
- type of trees and / or standing crops acquired
- homesteads and other structures to be acquired
- loss of livelihood (type and income loss)
- other types of losses
- types of community infrastructure or common property resources to be acquired

In conjunction with the population census and IOL of the PAPs, household data will be collected on:

- size, sex and age composition of each affected household
- types of occupation / livelihood for each economically active household member
- assessment of income levels for each economically active household member
- number of school age children attending school
- ethnic, language, and religious identity of each affected household

- PAPs attitudes (intentions / opinions) towards the project, land acquisition and resettlement

### (3) Household Survey

The household survey will focus on income-earning activities and other socioeconomic indicators to observe the social and economic conditions of PAPs, such as income, expenditure, employment, education, skills, livelihood, utilities, health services facilities, social services, and other socio-economic and cultural aspects that prevail in the targeted areas. The household survey also included an inventory of formal and informal community level organizations that represent the PAPs, and that can be engaged in information dissemination and consultation related to the preparation of a resettlement plan and its implementation.

## 3.2 Survey Results

### 3.2.1 400 kV Transmission Lines

The land owners of the proposed tower locations of 400kV transmission line have been identified during the route survey in June and July 2014 as listed in the ANNEX IV.

The lands of 597 tower locations are owned by the private land owners. The lands of the remaining tower locations are government lands.

Downbelow is the summary of socioeconomic survey, focus group discussion and key informant interviews conducted en route.

Socioeconomic survey comprised of population census, asset inventory, and household survey using a set of questionnaire was conducted in seven Upazillas (Mirsarai, Anowara, Banskhali, Raozan, Laksam, Gozaria and Sonargaon) along the proposed 400kV transmission line. Total 184 household heads have been interviewed. The findings are summarized as below:

**Table 3-1 Summary of Interviewed Households on Transmission Line Route**

Division	District	Upazila	No of interviewee	No. of Family Member	Sex		Occupation										
					Male	Female	Farmer	Business	Service	student	House wife	Agriculture Labor/ Day Labor	Unemployed	Teacher	Retired/Elder	Driver	others
Chittagong	Chittagong	Anowara	35	177	101	76	10	13	2	1	6	0	3	0	0	0	0
		Banskhali	31	164	77	87	9	8	3	0	4	5	0	1	0	1	0

		Raozan	27	115	64	51	5	2	1	0	12	1	0	0	0	2	4
	Comilla	Laksam	29	130	67	63	5	6	1	0	11	1	0	0	2	2	1
Dhaka	Munshiganj	Gazaria	32	133	78	55	6	17	3	0	1	1	0	0	1	0	3
	Narayanganj	Sonargaon	30	125	67	58	3	13	7	0	1	0	0	0	4	0	2
Total			184	844	454	390	38	59	17	1	35	8	3	1	7	5	10

(Source: developed by the JICA Survey Team)

#### (1) Occupation

59 respondents (32.1%) are businessmen, 38 are farmers (20.65%), 35 (19.0%) are housewives, 17 (9.2%) are service providers, 8 (4.4%) are daily labourers, 7 (3.8%) are retired persons, and 20 (10.9%) are others.

#### (2) Family Size:

The average family size among 184 respondents is **4.64**.

#### (3) Monthly Income:

The average monthly incomes of the respondents are as follows. 113 respondents (60 %) of the total respondents have family income below Tk.10,000 per month, out of which 40 (21.7%) are in poverty.

Income range	No of respondents	%	Average monthly income
< Tk.5,000	40	21.7%	Tk. 612
Tk. 5,000 – Tk. 10,000	73	39.7%	Tk. 9,075
Tk. 10,000 – Tk. 15,000	21	11.4%	Tk. 12,047
Tk. 15,000 – Tk. 20,000	23	12.5%	Tk. 14,913
Tk.20,000 <	27	14.7%	Tk. 34,703

(Source) socioeconomic survey

#### (4) Houses

The roofs of 156 houses (84.7%) are made of tin, 12 (6.5%) are of concrete and 16 (8.8%) are of thatch / hay.

The walls of 84 houses (45.7%) are made of tin, 46 (25.0%) are of clay, 34 (18.5%) are of concrete and the rest 20 (10.9%) are of bamboo.

Similarly, 146 houses (79.3%) have clay-made floor, 35 (19.0%) are of concrete and 3 (1.6%)

are of bamboo.

(5) Source of Drinking Water

The main source of drinking water for all 184 households is tube well water. Besides, ponds and river water are also used in various purposes like, bathing, cooking, cleaning etc.

(6) Electricity

140 households (76.1%) are electrified with grid system and 4 (2.2%) are with solar system. The remaining 40 houses (21.7%) are not electrified.

(7) Fuels for cooking

154 households (83.7%) use wood for cooking purpose, 24 (13.0%) use LPG / Natural gas, 14 (7.6%) use cow dung, 13 (7.1%) use leaves and 10 (5.4%) use natural garbage.

(8) Medical Treatment

Most of the respondents go to Government Hospital for their medical treatment. Some of them go to such places as private clinic, quack doctor, MBBS Doctors etc. to seek medical attention.

### 3.2.2 400kV Substations

There are two 400kV substations to be constructed under this project: Meghnaghat 400kV Substation located in Sonargaon Upazila, and Madunaghat 400kV Substation in Raozan Upazila of Chittagong District.

The location of the proposed Meghnaghat 400kV SS is within Meghnaghat power station complex. The land of this complex was acquired and developed by BPDB. Subsequently the lands are being used by different IPPs for power generation and also by PGCB for grid substations. Therefore there is no need of land acquisition for the proposed Meghnaghat 400kV SS and no resettlement is expected to be required.

The proposed Madunaghat 400kV SS is located at East Gujra Union of Raojan Upazila of Chittagong district in the North West side of a 25MW power station operated by the Rural Power Company Limited (RPCL) located on the north side of Chittagong – Kaptai road. Less than 10 acres of land will be required to construct the proposed Madunaghat 400kV SS. For this, a survey team was sent to the proposed location of Madunaghat SS from October 8 to 16, and from November 12 to 21, 2014 to demarcate the area of the proposed substation and identify the land owners of the substation area.

The latest list of the affected land owners for the proposed Madunaghat SS has been developed based on the data collected at East Gujra Union Land office as in the ANNEX V. Downbelow is the summary of socioeconomic survey, focus group discussion and key informant interviews

conducted on site late November 2014.

Socioeconomic survey using a set of questionnaire was conducted, and 36 out of total 50 land owners for 86 plots were interviewed. Among them, 34 of them are genuine land owners, and two were sharecroppers and the total area of the lands possessed by the 36 people is 1,867.5 decimals. Among the remaining 14 land owners, names of two land owners were not found in the list provided from the land office. Their addresses were not found in the list either. The other two refused to give their opinions in the interviews. The remaining ten farm land owners were not found during the survey. Their addresses are also not known to others. The area of land acquired by these 14 people is 631 decimals in total. The findings are summarized as below:

**Table 3-2 Summary of Interviewed Households on new Madunaghat SS**

Division	District	Upazila	No of interviewee	No. of Family Member	Sex		Occupation										
					Male	Female	Farmer	Business	Service	student	House wife	Teacher	Retired/Elder	Driver	Electrician	Foreign service	others
Chittagong	Chittagong	Raozan	36	151	81	70	6	10	3	1	5	2	6	1	1	1	0

(Source: developed by the JICA Survey Team)

### (1) Occupation

Among the 36 respondents, those engaged in business were the most (27.77%). The percentage of retired and old man were the second most (16.66%) followed by housewife (14%), service (8.33%), teacher (5.55%). The remaining (driver, electrician, foreign service, and student) shares equal (2.77%).

### (2) Family Size

The total number of family members for all 36 respondents are 151. Among them there are 81 Male and 70 Female. Their average family size is 4.19.

### (3) Monthly Income

The monthly income of the 36 respondents has been categorized in 4 categories:

Range Tk. 5,000-8,000: 17 respondents, their monthly income average: Tk.6,941 per month

Range Tk. 8,001-11,000: 12 respondents, their average monthly income: Tk.9,916

Range Tk.11,001-14,000: 2 respondents, and their monthly income: Tk.12,000

Range Tk.14,001-30,000: 5 respondents, their average monthly income: Tk.20,000



The average 36 respondents average monthly income Tk.10,027.77.

Income range	No of respondents	%	Average monthly income
Tk. 5,000-8,000/=	17	47.2	6,941.17
Tk. 8,001- 11,000/=	12	33.3	9,916.68
Tk. 11,001- 14,000/=	2	5.6	12,000
Tk. 14,001-30,000/=	5	13.9	20,000
<b>Total</b>	<b>36</b>	<b>100.0</b>	<b>10,027.77</b>

(Source) socioeconomic survey

#### (4) Houses

According to the remarks of the respondents, the materials that are being used in their respected households are as follows. Among the 36 respondents, the materials used for roof are: Tin 20 and Concrete 16. Those used for wall are: Tin 1, Concrete 23, Bamboo 10, and Clay 2. Those for floor are, Concrete 20 and Clay 16. 36 respondents say that they use safety tank (modern 44%) and the remaining (56%) use Water Log/Slave Latrine.

#### (5) Assets

The numbers and kinds of assets of the total 36 respondents are listed below.

SL. No.	House hold Assets found	No. of Assets
1	TV	29
2	Fan	31
3	By Cycle	01
4	Al Mira	36
5	Computer	01
6	Bed	32
7	Chair/Bench	35
8	Watch	2
9	Mobile	36
10	Refrigerator	23

(Source) socioeconomic survey

#### (6) Source of Drinking Water

Total 36 (100%) respondents said they use and drink the tube well water and also said that there is no arsenic in the tube well water and it is completely pure. Besides, ponds and channel water is also used by the respondents in various purposes like, bathing, cooking, cleaning etc. But, they use only tube well water as their only source of drinking water.

#### (7) Electricity

Among the 36 respondents, there are 36(100%) respondents that have electricity in their households. There are so many respondents who use the electricity for different purposes such as fan, light, television, refrigerator, mobile charge, irrigation, small factory, computer, business centre, office, school, college etc.

(8) Fuels for cooking

Among the total 36 respondents all of them use wood as the material to act as a fuel in their cooking in their respected households.

(9) Medical Treatment

Among the total 36 respondents, the maximum number of respondents go to Govt. Hospital for their medical treatment, and the number of respondents going there are 34. The rest of the respondents go to M.B.B.S doctors (20) and Quack Doctors (16) respectively.

(10) Land Tenure

The total quantity of land in residential land for all the 36 respondents are 495 decimal of TK.161,000,000 present value. Average per decimal residential land value is Tk. 325,252. The total another quantity of cultivated land for the all the 36 respondents are 1,867.5 decimal of Tk.30,179,140 present value. Average per decimal cultivated land vale is Tk.161,602.

Number of Respondent	Residential land		Cultivable Land of the site	
	Quantity of Land (dec)	Present value (Tk.)	Quantity of Land (dec)	Present value (Tk.)
36	495	161,000,000	1,867.5	301,791,940

(Source) socioeconomic survey

(11) Production of Paddy

The total quantity of cultivated land is 1,867.5 decimal, where 93,375Kg crops are produced two times in a year. The total types of paddy (Tk. 30 per Kg) is Tk. 2,801,250.

Quantity of Cultivated Land (dec)	Production of paddy crops a year (twice) (Kg)	Total Price of Paddy (Tk.30 per Kg)
1,867.5	93,375	2,801,250

(Source) socioeconomic survey

### 3.2.3 Access Road

The access road will be constructed by expanding of existing farm road with 3.5 meter to 5.5 meter width and 1,000 meter length from the nearest jetty to the substation site, which will require land acquisition of paddy land and gardens of homesteads by the road.

The socioeconomic survey and FGD were conducted at the same time as those for the new Madunaghat SS. All the details are included in the above.

## 4. Detailed Description of Impacts and Category of PAPs

This section describes that the results of predictions and impact evaluations of the major environmental impact items for the proposed transmission line, substation and access road. There is no item evaluated as “A” (significant positive/negative impact is expected).

These predictions and impact evaluations have been made studying mitigation measures for avoiding or mitigating impacts with respect to various forms of environmental items.

### 4.1 Transmission line

#### (1) Pre-construction Phase

##### a. Land Acquisition

**Findings:** Number of towers constructed for 400kV TL from Meghnaghat to Matarbari is approximately 800 in total. It requires 2m<sup>2</sup> of land per one suspension tower base (approximately 550 nos) and 3m<sup>2</sup> of land per one tension tower base (approximately 250 nos): in total 1,860 m<sup>2</sup> of paddy land and certain trees will be permanently affected by the tower construction<sup>4</sup>. Construction of one tower base for 230kV requires 1m<sup>2</sup> of land per one suspension tower (approximately 20 nos) and 1m<sup>2</sup> of land per one tension tower (approximately 10 nos). Number of towers for 230 kV TL in total will be 30 in total, and it will be 80 m<sup>2</sup> of land permanently acquired. In conclusion, it is approximately required not more than 2,000 m<sup>2</sup> in total to acquire the land for tower foundation.

**Mitigation Measures:** Such permanent land acquisition for the above tower bases shall be conducted on the basis of compensation at replacement cost. Trees within clearance distance from cables will be removed. Standing crops and trees will be compensated at market price. However, given an informed consent, the land owners have the right to fully exercise their power of choice: to voluntarily or involuntarily provide their land for tower bases. If PGCB does not purchase the land under the proposed transmission towers, PGCB shall restore the land to its original conditions after construction of the transmission towers.

##### b. Right of Way (ROW)

The construction period of each tower is expected to last 30 days, during which the construction site (700 m<sup>2</sup> per tower) and temporary access road (200 m<sup>2</sup>) will be blocked where farm activities will be disturbed. It is long enough to lose the income opportunity for land owners for

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<sup>4</sup> 19 Upazilas under 7 Districts: Sonargaon Upazila (Narayanganj District), Gazaria (Munshiganj), Daudkandi (Comilla), Kachua (Chandpur), Barura (Comilla), Laksam (Comilla), Nangolkot (Comilla), Feni-S (Feni), Chhagolnaiya (Feni), Mirsarai (Chittagong), Fatikchhari (Chittagong), Hathazari (Chittagong), Raozan (Chittagong), Boalkhali (Chittagong), Patiya (Chittagong), Anowara (Chittagong), Banskhali (Chittagong), Pekua (Cox's Bazar), and Moheshkhali (Cox's Bazar).

one crop season, and job opportunity and crop share for sharecroppers and cultivators too.

Wiring work will last 3 weeks per 3 km, which will require safety instruction for local farmers. It is however not anticipated to hinder their farming activities. Settlements and homesteads have been avoided when the route map was drafted so that no land acquisition or involuntary resettlement is anticipated.

**Mitigation Measures:** ROW compensation shall be conducted to replace their crop income for one season, one time assistance for three months' of their wages.

## (2) Construction Phase

### a. Disturbance to Poor People

**Findings:** Livelihood means of cultivators and sharecroppers will be temporary lost during construction period due to the blockage of farm land for the construction purpose. They work on daily basis and they are not well-paid.

**Mitigation Measures:** Compensation for their income for one season shall be offered to them in order for them to sustain their living and find other job opportunities.

### b. Disturbance to Ethnic Minority Groups and Indigenous People

**Findings:** According to the results of Population Census of 2011 and interview survey conducted during the field survey, no ethnic minority groups or indigenous people have been identified along the transmission line route.

### c. Deterioration of Local Economy such as Losses of Employment and Livelihood Means

**Findings:** Land owners, cultivators and sharecroppers will temporarily lose their means of livelihood during construction period due to the construction blockage of farm land. The period for such blockage will last for 30 days, and in the worst scenario their loss can last for the whole season.

**Mitigation Measures:** Compensation for such income loss for one season shall be offered for sustaining their living and seeking other job opportunities.

### d. Land Use and Utilization of Local Resources

**Findings:** Farm activities will be disturbed temporarily due to the construction work. It is approximately estimated that 800m<sup>2</sup> per tower bases will be blocked exclusively for the construction, where farm activities will be disturbed for 30 days, which may affect their standing crops for a whole season.

**Mitigation Measures:** Compensation for such income loss for one season shall be offered for sustaining their living and seeking other job opportunities.

e. Disturbance to Water Usage, Water Rights, etc.

**Findings:** Transmission line route has been selected avoiding any steep sloping land. Any slopes shall be reinforced with concrete, plantation or other means to minimize soil runoff and turbid water generation.

f. Infectious Diseases

**Findings:** Temporary influx of migrant labor during construction period may increase risk of infection.

**Mitigation Measures:** Local people will be put priority as laborers for simple work during construction period, which will help lower the risk of infectious diseases brought by external workers. Pre-employment and periodic medical check-ups will be conducted for external workers (technical workers, etc).

g. Work Conditions (Including Work Safety)

**Findings:** Labor accidents may occur anytime without prevention measures including safety education and training, allocation of protective equipment and distribution of protection clothes to laborers and workers.

**Mitigation Measures:** The contractor shall establish a work safety plan and submit it to PGCB to obtain approval. The work safety plan shall stipulate mitigation measures on such aspects as safety training, etc., and those as provision of protective equipment, etc.

h. Right of Way

**Findings:** Farm activities will be disturbed temporarily due to the construction work. Land owners, cultivators and sharecroppers will temporarily lose their means of livelihood during construction period due to the construction blockage of farm land. The period for such blockage will last for 30 days, which may affect their standing crops for a whole season.

**Mitigation Measures:** Compensation for such income loss for one season shall be offered for sustaining their living and seeking other job opportunities.

i. Accidents

**Findings:** Traffic and labor accidents can occur at any time which does harm to local residents living in surrounding areas and workers involved in construction work.

**Mitigation Measures:** As prevention measures for land traffic accidents, observation of traffic regulations, installation of traffic signs and training and education on safe driving will be implemented.

(3) Operation Phase

a. Work Conditions (Including Work Safety)

**Findings:** Labor accidents such as electric shocks while in construction period may occur at any time if there are no protection measures.

**Mitigation Measures:** The work safety plan shall stipulate mitigation measures on such aspects as safety education and training, allocation of protective equipment and distribution of protective clothes to laborers and workers.

b. Accidents

**Findings:** The transmission line route was selected avoiding any steep sloped areas. - Preventing soil loss by stabilizing any slopes of the construction area with concrete as necessary based on geological survey. Tower breakdown by cyclones will not occur as wind pressure is taken into account in the design. Land traffic accidents may also occur during construction phase.

**Mitigation Measures:** As prevention measures for land traffic accidents, observation of traffic regulations, installation of traffic signs and training and education on safe driving will be implemented.

## 4.2 Substation (Madunaghat)

(1) Pre-construction Phase

a. Land Acquisition

**Findings:** Approximately 7 ha of farm land will be required for the construction of new Madunaghat substation in Raozan Upazila of Chittagong District.

**Mitigation Measures:** It is the Deputy Commissioner of Chittagong District conducting land acquisition and payment of compensation in accordance with the Ordinance 1982. PGCB shall pay to DC Office when the budget is allocated from the Government of Bangladesh. A top-up payment shall be made on the basis of compensation at replacement cost. Trees within clearance distance from cables shall be removed. And standing crops and trees shall be compensated at market price.

b. Social Institutions such as Social Infrastructure and Local Decision-making Institutions

**Findings:** Land acquisition at new Madunaghat substation will cause permanent loss of land, standing crops and livelihood means of cultivators and sharecroppers.

**Mitigation Measures:** The Deputy Commissioner's Office of Chittagong District will take responsibility for initiatives to conduct local consultations concerning compensation in accordance with the Ordinance 1982, on top of which compensation at replacement cost shall be

added as agreed between PGCB and JICA.

c. Misdistribution of Benefits and Compensation

**Findings:** Equality of compensation and fair treatment among the project affected people must be assured.

**Mitigation Measures:** Landowners and other affected people must be legitimately identified for proper payment of compensation.

d. Local Conflicts of Interest

**Findings:** In case equality of compensation and fair treatment among the project affected people is not assured, disputes and conflicts among them can occur at any time.

**Mitigation Measures:** Regulations of Bangladesh stipulate that public consultation must be held in the land acquisition process, and their complaints or suggestions must stay heard for immediate action.

(2) Construction Phase

e. Disturbance to Poor People

**Findings:** Livelihood means of sharecroppers will be permanently lost. Sharecroppers work on daily basis and they are not well-paid.

**Mitigation Measures:** Compensation for their income shall be offered to them in order for them to sustain their living and bridging support shall be given until they find other job opportunities.

f. Disturbance to Ethnic Minority Groups and Indigenous People

**Findings:** According to the results of Population Census of 2011 and interview survey conducted during JICA survey, no ethnic minority groups or indigenous people have been identified in the substation site of Raozan Upazila.

g. Deterioration of Local Economy such as Losses of Employment and Livelihood Means

**Findings:** Land owners will permanently lose their land and their sharecroppers will permanently lose their means of livelihood.

**Mitigation Measures:** Compensation for such income loss shall be offered at replacement cost for their losses, sustaining their living and seeking other job opportunities. As mitigation measures, employing as many local residents as possible, and using the services and products offered by the local community.

h. Land Use and Utilization of Local Resources

**Findings:** Farm activities will be disturbed permanently due to the permanent acquisition of land as large as 7 ha at new Madunaghat substation site. Land owners will permanently lose their land and their sharecroppers will permanently lose their means of livelihood.

**Mitigation Measures:** Compensation for such losses shall be offered, sustaining their living and seeking other job opportunities.

a. Infectious Diseases

**Findings:** Temporary influx of migrant labor during construction period may increase risk of infection.

**Mitigation Measures:** Local people will be put priority as laborers for simple work during construction period, which will help lower the risk of infectious diseases brought by external workers. Pre-employment and periodic medical check-ups will be conducted for external workers (technical workers, etc).

b. Work Conditions (Including Work Safety)

**Findings:** Labor accidents may occur anytime without prevention measures including safety education and training, allocation of protective equipment and distribution of protection clothes to laborers and workers.

**Mitigation Measures:** The contractor shall establish a work safety plan and submit it to PGCB to obtain approval. The work safety plan shall stipulate mitigation measures on such aspects as safety training, etc., and those as provision of protective equipment, etc.

c. Accidents

**Findings:** Accidents can occur at any time which does harm to local residents living in surrounding areas and workers involved in construction work.

**Mitigation Measures:** As prevention measures for land traffic accidents, observation of traffic regulations, installation of traffic signs and training and education on safe driving will be implemented.

(3) Operation Phase

a. Disturbance to Poor People

**Findings:** Sharecroppers who permanently lost their means of livelihood during construction work may not be able to find other job opportunities in the surrounding area even after the construction work.

**Mitigation Measures:** Bridging support shall be given to them until they find new jobs.

b. Deterioration of Local Economy such as Losses of Employment and Livelihood Means



**Findings:** Sharecroppers who permanently lost their means of livelihood during construction work may not be able to find other job opportunities in the surrounding area even after the construction work.

**Mitigation Measures:** Bridging support shall be given to them until they find new jobs.

c. Land Use and Utilization of Local Resources

**Findings:** Changing the traditional land usage patterns and utilization of local resources may last even after the construction work is over.

**Mitigation Measures:** Bridging support shall be given to them until they find new jobs and new land.

d. Electromagnetic Field

**Findings:** Negative impact of electromagnetic fields on human health is not anticipated if local residents keep out of the substation complex.

e. Work Conditions (Including Work Safety)

**Findings:** Labor accidents may occur anytime without prevention measures including safety education and training, allocation of protective equipment and distribution of protection clothes to laborers and workers.

**Mitigation Measures:** The contractor shall establish a work safety plan and submit it to PGCB to obtain approval. The work safety plan shall stipulate mitigation measures on such aspects as safety training, etc., and those as provision of protective equipment, etc.

f. Accidents

**Findings:** Accidents can occur at any time which does harm to local residents living in surrounding areas and workers involved in construction work.

**Mitigation Measures:** As prevention measures for land traffic accidents, observation of traffic regulations, installation of traffic signs and training and education on safe driving will be implemented.

### 4.3 Access Road

(1) Pre-construction Phase

a. Land Acquisition

**Findings:** The existing road will be expanded for 2m for 1,000m up to the new substation, for which approximately 2,000m<sup>2</sup> of land will be required.

**Mitigation Measures:** It is the Deputy Commissioner of Chittagong District who will conduct

land acquisition and payment of compensation in accordance with the Ordinance 1982. PGCB will pay to DC Office when the budget is allocated from the Government of Bangladesh. A top-up payment shall be made on the basis of compensation at replacement cost to bridge the gap with the JICA Guidelines. Trees within clearance distance from cables will be removed. And standing crops and trees will be compensated at market price.

b. Social Institutions such as Social Infrastructure and Local Decision-making Institutions

**Findings:** Land acquisition for expanding the existing road will cause permanent loss of land, standing crops and livelihood means of cultivators and sharecroppers to some extent.

**Mitigation Measures:** The Deputy Commissioner's Office of Chittagong District will take responsibility for initiatives to conduct local consultations concerning compensation in accordance with the Ordinance 1982, on top of which compensation at replacement cost shall be added as agreed between PGCB and JICA.

g. Misdistribution of Benefits and Compensation

**Findings:** Equality of compensation and fair treatment among the project affected people must be assured.

**Mitigation Measures:** Landowners and other affected people must be legitimately identified for proper payment of compensation.

h. Local Conflicts of Interest

**Findings:** In case equality of compensation and fair treatment among the project affected people is not assured, disputes and conflicts among them can occur at any time.

**Mitigation Measures:** Regulations of Bangladesh stipulate that public consultation must be held in the land acquisition process, and their complaints or suggestions must stay heard for immediate action.

(2) Construction Phase

a. Disturbance to Poor People

**Findings:** Livelihood means of sharecroppers will be permanently lost. Sharecroppers work on daily basis and they are not well-paid.

**Mitigation Measures:** Compensation for their income shall be offered to them in order for them to sustain their living and bridging support shall be given until they find other job opportunities.

b. Disturbance to Ethnic Minority Groups and Indigenous People

**Findings:** According to the results of Population Census of 2011 and interview survey

conducted during JICA survey, no ethnic minority groups or indigenous people have been identified in the substation site of Raozan Upazila.

c. Deterioration of Local Economy such as Losses of Employment and Livelihood Means

**Findings:** Land owners will permanently lose their land and their sharecroppers will permanently lose their means of livelihood.

**Mitigation Measures:** Compensation for such income loss shall be offered at replacement cost for their losses, sustaining their living and seeking other job opportunities. As mitigation measures, employing as many local residents as possible, and using the services and products offered by the local community.

e. Land Use and Utilization of Local Resources

**Findings:** Land acquisition for road expansion may hinder specific activities at homesteads and farm land along the road. Land owners will permanently lose their land and their sharecroppers will permanently lose their means of livelihood.

**Mitigation Measures:** Compensation for such losses shall be offered, sustaining their living and seeking other job opportunities.

i. Infectious Diseases

**Findings:** Temporary influx of migrant labor during construction period may increase risk of infection.

**Mitigation Measures:** Local people will be put priority as laborers for simple work during construction period, which will help lower the risk of infectious diseases brought by external workers. Pre-employment and periodic medical check-ups will be conducted for external workers (technical workers, etc).

j. Work Conditions (Including Work Safety)

**Findings:** Labor accidents may occur anytime without prevention measures including safety education and training, allocation of protective equipment and distribution of protection clothes to laborers and workers.

**Mitigation Measures:** The contractor shall establish a work safety plan and submit it to PGCB to obtain approval. The work safety plan shall stipulate mitigation measures on such aspects as safety training, etc., and those as provision of protective equipment, etc.

k. Accidents

**Findings:** Accidents can occur at any time which does harm to local residents living in surrounding areas and workers involved in construction work.

**Mitigation Measures:** As prevention measures for land traffic accidents, observation of traffic regulations, installation of traffic signs and training and education on safe driving will be implemented.

(3) Operation Phase

Not applicable.

## 5. Entitlement matrix

### (1) Transmission Line Route

The following types of losses (permanently and temporarily) are foreseen on the 400 kV and 230 kV / 132 kV TL routes, and entitlements have been drafted based on the legislations in Bangladesh and JICA Guidelines.

Approximately 600 out of approximately 800 tower bases are owned by private land owners, which will be affected permanently. If the land for tower bases is acquired involuntarily, compensation shall be paid at replacement cost. On the other hand, fully given an informed consent and power of choice to the land owners for their possible land use for the tower bases, PGCB, together with contractors of the transmission lines, will conclude agreements in writing with them with regard to the land use to avoid possible misunderstandings and disputes in the future in case they agree to voluntary land acquisition.

Those land owners of ROW will be temporarily affected during the construction period and compensation for the damages to their standing crops and trees shall be paid. Sharecroppers will temporarily lose their means of livelihoods during the construction period and their such losses also be compensated. PGCB shall restore the land to its original conditions after construction period is over.

**Table 5-1: Entitlement Matrix (Transmission Line Route)**

	Type of Loss	Entitled Persons (EP)	Entitlements (Compensation Package)	Responsible Organizations
1	Permanent loss of paddy land at tower foundations*	Legal land owner	Cash compensation under Law (CCL) market value of land area plus 50% premium	Implementation: Deputy Commissioner (DC)'s Office (Land Acquisition Officer, LAO) Monitoring: PGCB
			Top-up grant to cover 1) Gap between the average of last 12 months' sales values of same kind of land, and the current market value of private land 2) Max allowable replacement value (RV) to purchase new land (and trees) with equal productive value, preparation cost, and registration cost (such as stamp duty and tax)	Implementation: contractors  Supervision and monitoring: PGCB  Advise given by DC Office (LAO)
			One time assistance for annual cropping volume (3 years)	
2	Permanent loss of trees / perennials / fruit trees at tower foundations*	Owners	- Timber trees: The value equals that of the lumber - Fruit or fodder trees: the value equal to the cumulative value of the fruit crop for its productive life	
3	Temporary loss of access to paddy land and trees during construction period (=Temporary loss of	Legal land owner	Profit loss for 1 crop season	
		Cultivator	One time assistance for crop share	

standing crops, trees and job opportunities)	Sharecropper	One time assistance for 3 months of wage and crop share	
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(Note) In case the land owners for their possible land use for the tower bases agree to voluntary land acquisition, the above 1 and 2 will be excluded from the entitlements.

(Source) developed by JICA Survey Team.

### (2) New Madunaghat Substation

Permanent losses of the following types are foreseen for the construction of new Madunaghat Substation and entitlements have been drafted as follows. According to the information given at the East Gujra Union Parishad Office, there are 46 land owners of 82 land plots at the substation site who will lose their land permanently, and their cultivators and sharecroppers will also permanently lose their means of livelihood.

**Table 5-2: Entitlement Matrix (new Madunaghat Substation)**

	Type of Loss	Entitled Persons (EP)	Entitlements (Compensation Package)	Responsible Organizations
1	Permanent loss of paddy land	Legal land owner	Cash compensation under Law (CCL) market value land area plus 50% premium	Implementation: DC Office (LAO) Monitoring: PGCB
			Top-up grant to cover 1) Gap between the average of last 12 months' sales values of same kind of land, and the current market value of private land 2) Max allowable replacement value (RV) to purchase new land with equal productive value, preparation cost, and registration cost (such as stamp duty and tax)	Implementation: contractors  Supervision and monitoring: PGCB  Advise given by DC Office (LAO)
			One time assistance for annual cropping volume (3 years)	
2	Permanent loss of access to paddy land (=Permanent loss of income from crop sales and livelihood means)	Legal land owner	- One time assistance for annual cropping volume (3 years) - Support in transitional period	
		Cultivator	- One time assistance for crop share - Support in transitional period	
		Sharecropper	- One time assistance for 3 months of wage - Support in transitional period	

(Source) developed by JICA Survey Team.

### (3) Access Road Expansion to New Madunaghat Substation

Permanent and temporary losses of the following types are anticipated for the expansion of access road to new Madunaghat Substation and entitlements have been drafted as follows. The number of land plots reaches 4 along the access road as long as 1,000 m.

**Table 5-3: Entitlement Matrix (Road Expansion to Madunaghat Substation)**

	Type of Loss	Entitled Persons (EP)	Entitlements (Compensation Package)	Responsible Organizations
1	Permanent loss of paddy land	Legal land owner	Cash compensation under Law (CCL) market value land area plus 50% premium	Implementation: DC Office (LAO) Monitoring: PGCB
			Top-up grant to cover 1) Gap between the average of last 12 months' sales values of same kind of land, and the current market value of private land 2) Max allowable replacement value (RV) to purchase new land with equal productive value, preparation cost, and registration cost (such as stamp duty and tax)	Implementation: contractors  Supervision and monitoring: PGCB  Advise given by DC Office (LAO)
2	Permanent loss of access to paddy land (=loss of income from crop sales and livelihood means)	Legal land owner	One time assistance for annual cropping volume (3 years)	
		Sharecropper	One time assistance for 3 months of wage	
3	Permanent loss of trees / perennials / fruit trees*	Owners	<ul style="list-style-type: none"> <li>- Timber trees: The value equals that of the lumber</li> <li>- Fruit or fodder trees: the value equal to the cumulative value of the fruit crop for its productive life</li> </ul>	
4	Permanent loss of certain homestead area*	Legal land owner	Cash compensation under Law (CCL) market value of land area plus 50% premium	Implementation: DC Office (LAO) Monitoring: PGCB
			Top-up grant to cover 3) Gap between the average of last 12 months' sales values of same kind of land, and the current market value of private land 4) Max allowable replacement value (RV) to purchase new land with equal productive value, preparation cost, and registration cost (such as stamp duty and tax)	Implementation: contractors  Supervision and monitoring: PGCB  Advise given by DC Office (LAO)
5	Permanent loss of houses and other structures in homestead*	Legal land owner and family members	<ul style="list-style-type: none"> <li>- Market cost of materials to build a replacement structure with an area and quality up to similar level (or better), or to repair a partially affected structure</li> <li>- Cost of transporting building materials to the site</li> <li>- Cost of labor and contractors' fee</li> <li>- Cost of registration and taxes (if any)</li> </ul>	
6	Temporary loss of access to homestead during construction period*	Legal land owner and family members	<ul style="list-style-type: none"> <li>- Provision of temporary access and relocation where possible</li> <li>- Restoration of access to the land, structure, utilities</li> </ul>	

(Note) As of January 2015, the inclusion of the above 3, 4, 5 and 6 has not been finalized yet since the road design including route selection remains unfinished.

(Source) developed by JICA Survey Team.

## **6. Methods of Valuing Affected Assets**

Compensation for legal land owners will be based on the principle of replacement costs. Replacement costs are the amounts calculated before displacement which are needed to replace any affected assets without depreciation and without deduction for taxes and/or costs of transaction.

The Land Acquisition Officer (LAO) of Deputy Commissioner's Office and Land Officer of Upazila Nirbahi Office will support the sub-registrar's office for determining the price of land. Land price averages from the sub-registrar's office for the previous one year from the date of the notice given under Section 3 of the Ordinance of 1982 are considered for the land valuation. The transacted price, recorded price, existing prices and expected prices should be averaged to reach the replacement value (RV).

A land and property valuation survey based on the prices recorded from formal and informal sources as below will determine the RV of land and structures:

- Government price
- Potential sales price
- Potential buyer price
- Enumerated price collected in the socioeconomic survey
- Price deemed appropriate as quoted by a retired government officer living in the vicinity
- Price deemed appropriate as quoted by local intellectuals
- Price deemed appropriate as quoted by religious leaders

PGCB will allocate budget to fill the difference between the RV and the cash compensation under law (CUL) as the top-up payment. In the case of any depreciation costs deducted from affected structures in the CUL by the DC, PGCB will pay the same as additional construction grants to re-settlers. It will also pay stamp duty and land registration fees when replacement land purchase is confirmed.



## **7. Organizational Responsibilities and Implementation Procedures**

The following figure shows the implementation schedule of the Action Plan. Major actions taken by PGCB are summarized down below:

### **7.1 Finalization of Action Plan for Land Acquisition and Livelihood Compensation**

PGCB is the implementing agency of the project, and the Deputy Commissioner's Office of Chittagong District is the immediate organization for affected people to consult for compensation as stipulated in the Ordinance 1982.

PGCB will prepare and submit an application for administrative approval to MOPEMR and make a request to DC of Chittagong. It will also prepare and submit the Action Plan for Land Acquisition and Livelihood Compensation to MOPEMR.

It will allocate the required budget for additional grant on top of DC's payment for land as 'top-up payment', which shall be approved by the GOB.

### **7.2 Data collection and EP identification**

PGCB will deploy adequate human resources for supervision, consultation, and monitoring of land acquisition and livelihood compensation during project implementation.

PGCB, in line with the DC, will design and conduct a socioeconomic survey and collect data. A supplemental survey can be conducted to obtain additional key information and update all the data, and the Action Plan should be revised if required.

ID cards, EP files, and Entitlement Cards will be issued at this stage. It is desirable to formulate an inventory verification committee to ensure if this procedure is properly implemented among the affected people.

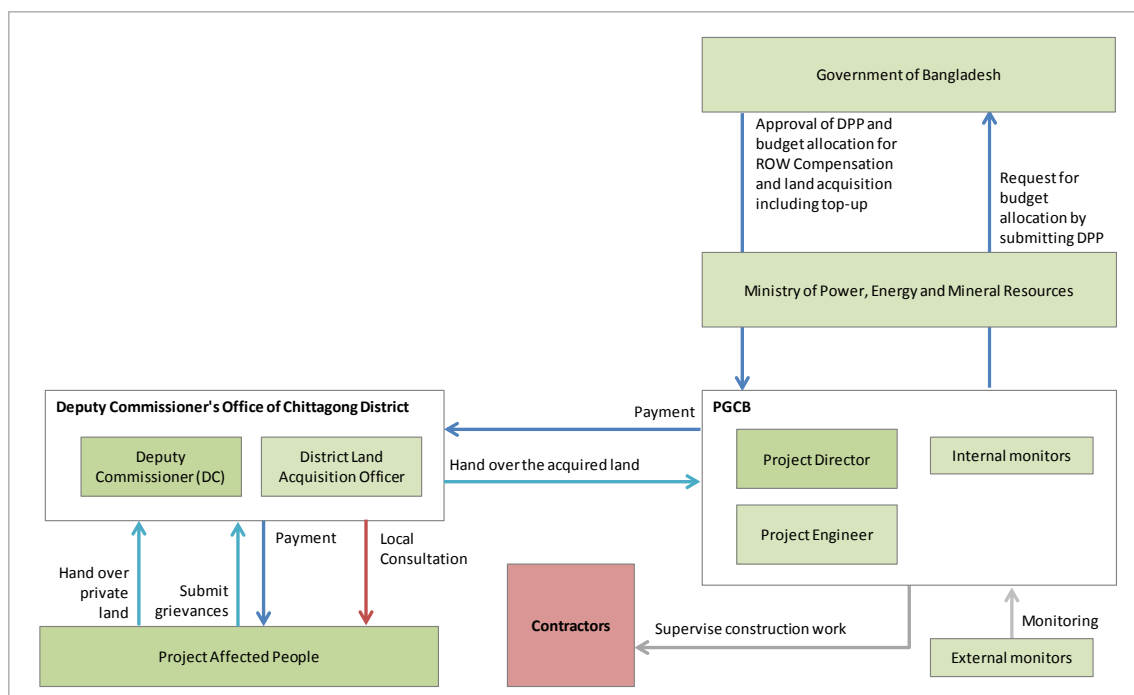
### **7.3 Local consultation and information management**

Local consultations such as public consultation meetings and focus group discussion shall be organized to ensure if PAPs keep informed of the project implementation process, benefits and losses, environmental and social impact, and etc.

For effective information sharing, it is recommended to conduct such meetings not only for the affected people but local residents living in the surrounding area. Meetings can be conducted and brochure be distributed at local markets.

### **7.4 Implementation of land acquisition**

The following figure shows the implementation schedule of the Action Plan. Major actions taken by PGCB are summarized below:



(Source: Developed by JICA Survey Team)

**Figure 7-1 Implementation Arrangements**

(1) Budget Application for CUL and top-up payment

PGCB is the implementing agency of the project, and the Deputy Commissioner's Office of Chittagong District is the immediate organization for affected people to consult for compensation as stipulated in the Ordinance 1982.

PGCB will prepare and submit an application for administrative approval to MOPEMR and make a request to DC of Chittagong for taking necessary actions for estimating the degree of land acquisition and cost. It will also prepare and submit the Action Plan for Land Acquisition and Livelihood Compensation to MOPEMR.

PGCB will submit the DPP to the GOB for allocation of the required budget for cash compensation under law (CCL) and an additional grant for 'top-up payment', which shall be approved by the GOB.

(2) Local consultation and information management

The Deputy Commissioner's Office of Chittagong District will conduct a series of local consultations as stipulated by law to ensure that PAPs are kept informed of the project implementation process, benefits and losses, environmental and social impact, etc.

### (3) Implementation of land acquisition

The Deputy Commissioner will pay the cash compensation under law (CCL) and top-up payment on the affected lands, structures, crops and trees to the PAPs.

A grievance redress mechanism will be established at Union level, Upazila level and District level for the affected people to address grievances.

### (4) Monitoring

Appropriate reporting, including auditing and redress functions, monitoring and evaluation mechanisms, will be identified and set in place. In addition to internal monitoring conducted by PGCB, an external monitoring group should be hired that will evaluate the resettlement process and final outcome.

## **7.5 Monitoring**

Appropriate reporting including auditing and redress functions, monitoring and evaluation mechanisms will be identified and set in place. In addition to an internal monitoring conducted by PGCB, an external monitoring group should be hired that will evaluate the resettlement process and final outcome (see the last chapter for further details).

## **7.6 Implementation Schedule**

The implementation schedule of ROW compensation and acquisition of land for new Madunaghat SS and its access road is shown in the ANNEX I.

## **8. Land Acquisition and Compensation Budget and Financial Plan**

The total cost for land acquisition and compensation is estimated 515.98 million Taka. Adequate budgetary support will be fully committed and made available to cover the costs of land acquisition and compensation within the agreed implementation period.

In addition to the compensation stipulated by the Ordinance 1982 and the Electricity Act 1910, all the compensation will be done according to the principle of the replacement cost, which will require PGCB to pay the gap between CUL and the replacement value (top-up).

**Table 8-1: Land Acquisition and Compensation Cost**

(Unit: BDT)

Division	Land acquisition		Livelihood / ROW Compensation				TOTAL	
			Permanet Loss		Temporary Loss			
	CUL	Top-up	Crop	Labor	Crop	Labor		
1	400kV from Meghnaghat to Madunaghat SS	1,610,703	241,605	74,402	0	8,628,674	8,079,898	18,635,282
2	400kV from Madunaghat SSn to Matarbari CFPP	435,938	65,391	23,947	0	2,728,933	3,436,113	6,690,322
3	230 kV TL from new Madunaghat SS - existing Madunaghat SS	56,069	8,410	2,082	0	213,499	287,541	567,601
4	230 kV TL from LILO at Madunaghat SS from Hathazari-Sikalbaha TL	32,347	4,852	1,201	0	138,774	186,902	364,076
5	New Madunaghat SS	402,521,898	60,378,285	11,457,784	1,207,672	0	0	475,565,638
6	Road Expantion to Madunaghat SS	11,979,818	1,796,973	341,005	35,943	0	0	14,153,739
TOTAL		416,636,774	62,495,516	11,900,421	1,243,614	11,709,880	11,990,453	<b>515,976,658</b>

(Source) developed by JICA Survey Team.

## 9. Grievance Redress Mechanism

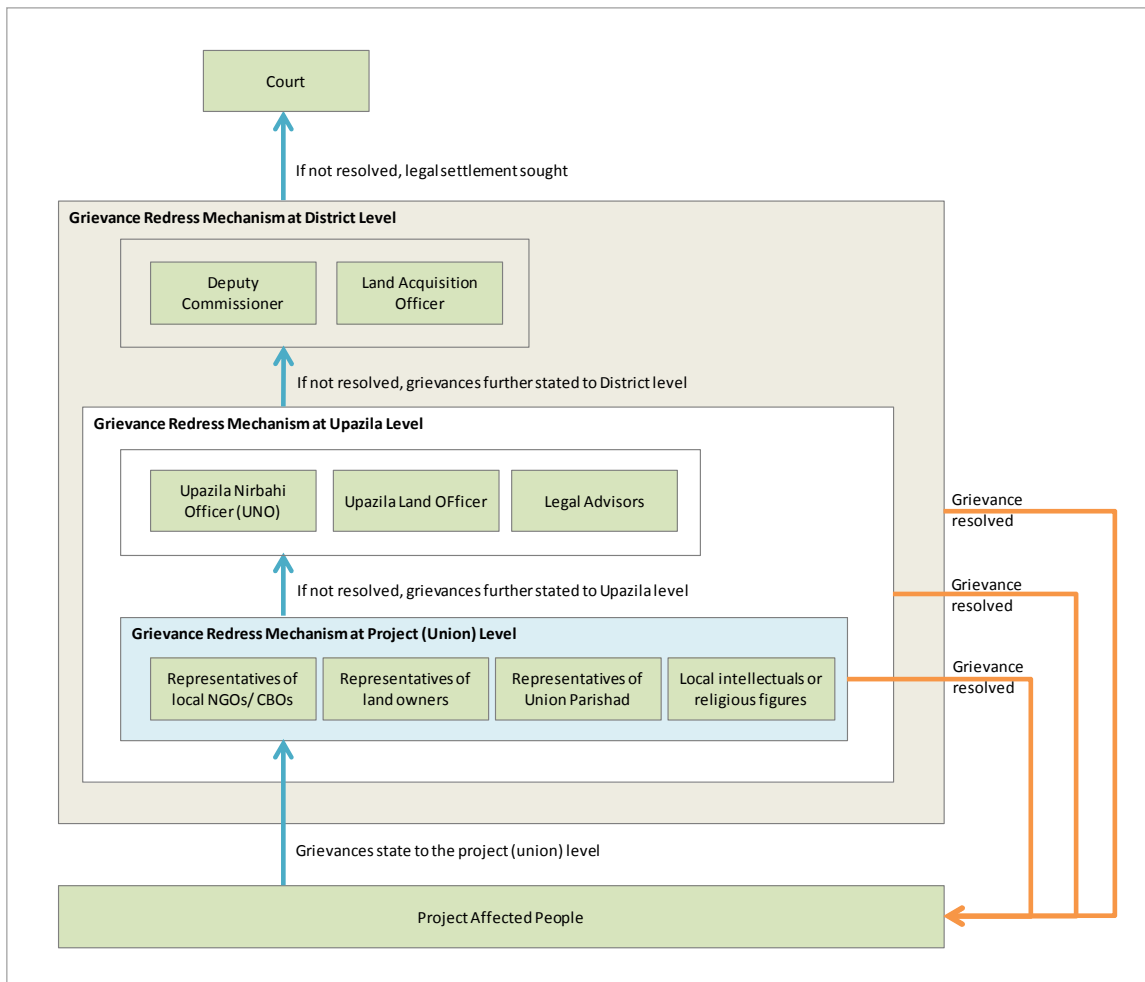
As soon as the budget for land acquisition and livelihood compensation becomes available, PGCB will make a payment to the Deputy Commissioner's Office of Chittagong District to initiate the payment procedure as stipulated in the Ordinance 1982 and Land Acquisition Act 1870.

Endorsed by the Ministry of Power, Energy and Mineral Resources (MOPEMR), a formal grievance redress committees (GRC) will be formed at union level for any grievances involving resettlement benefits, relocation and other assistance. The purpose of establishing GRCs is to promptly address the concerns and complaints using an accessible and transparent process to the PAPs. GRCs can be comprised of the following members whose standing is neutral and independent:

- PGCB
- Project staff in charge of the Action Plan for Land Acquisition and Livelihood Compensation
- Local NGO
- Chairman of Union Parishad
- Representatives from the Project Affected Persons (PAPs)
- Local intellectuals
- Legal advisors

The core function of GRC will be further discussed and determined in due course of time.

The structure of GRC is described in the figure below. The core function of GRC will be further discussed and determined in due course.



(Source: Developed by JICA Survey Team)

**Figure 9-1 Grievance Redress Mechanism**

## 10. Public Consultation and Participation

The PAPs and their communities will be consulted about the project, the rights and options available to them, and proposed mitigation measures for adverse effects, and to all extents possible be involved in the decision-making process concerning the land acquisition.

PAPs will be involved in the process of developing and implementing the Action Plan for Land Acquisition and Livelihood Compensation. The PAPs will receive prior notification of the compensation, relocation and other assistance available to them.

PGCB will be responsible, in close coordination with the Deputy Commissioner and contractors, to hold and conduct a number of consultations with primary and secondary stakeholders and information dissemination on the following issues:

- The relevant details of the project
- The RP and various degrees of project impact
- Details of entitlements under the Action Plan and what is required of PAPs in order to claim their entitlements
- Compensation process and compensation rates
- Relocation and resettlement site development operation in order to obtain agreement and support of affected people in participating in these operations
- Implementation schedule and timetable for the delivery of entitlements

Public participation will be spontaneously performed and information will be made available during preparation and implementations of the RP and at the minimum include community meetings and focus groups discussions.

## **11. Monitoring Arrangements**

Appropriate reporting (including auditing and redress functions), monitoring and evaluation mechanisms, will be identified and set in place as part of the management system of land acquisition and livelihood restoration. An external monitoring group will be hired by the Project and will evaluate the whole process and final outcome.

An Environmental Management Plan (EMaP) has been prepared to provide guidelines for the monitoring during pre-construction, construction and operation activities of 1) transmission lines, 2) substations and 3) access road expansion.

The purposes of creating an EMaP are to:

- Confirm that mitigation measures shall reduce any negative impacts on the environment to allowable levels during the construction and operation phase.
- Set up an organization that is responsible for the implementation of monitoring the plan.
- Perform appropriate monitoring during the construction and operation phase.

The environmental components that will be monitored are those that will be positively or negatively affected, or expected to be affected.

The Environmental Management Plan and the Environmental Monitoring Plan concerning social aspects including ROW compensation and land acquisition is shown in the ANNEX II and ANNEX III respectively.



### ANNEX II-1: Environmental Management Plan (Transmission Line)

No	Potential Impact to be Managed	Sources of Potential Impact	Standard of Impact	Objectives	Management Effort	Management Location	Period of Management	Management Institution	Cost
<b>Pre-construction Phase</b>									
1	Land acquisition	<ul style="list-style-type: none"> <li>- Loss of land at tower bases (permanent)</li> <li>- Kept out of the construction zone (temporary)</li> <li>- Livelihood means (temporary)</li> </ul>	<ul style="list-style-type: none"> <li>- the Acquisition and Requisition of Immovable Property Ordinance 1982</li> <li>- JICA Guidelines for Environmental and Social Considerations (2010)</li> </ul>	<ul style="list-style-type: none"> <li>- Consideration for land owners, sharecroppers and compensation for standing agriculture products</li> </ul>	<ul style="list-style-type: none"> <li>- Towers are constructed in non-residential areas</li> <li>- Land acquisition shall be conducted on the basis of replacement cost</li> <li>- Standing crops and trees shall be compensated at market price</li> <li>- Temporary block out during construction period will occur for safety and security</li> </ul>	- Tower bases	<ul style="list-style-type: none"> <li>- During land acquisition process</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation: Office of the Deputy Commissioner</li> <li>- Monitoring: PGCB</li> </ul>	Expenses to be paid by PGCB
2	ROW	<ul style="list-style-type: none"> <li>- Kept out of the construction zone</li> <li>- Trees will be removed if they are within clearance distance</li> <li>- Standing crops and trees will be affected</li> </ul>	<ul style="list-style-type: none"> <li>- Electricity Act 1910</li> </ul>	<ul style="list-style-type: none"> <li>- Consideration for land owners, sharecroppers and compensation for standing agriculture products</li> </ul>	<ul style="list-style-type: none"> <li>- Compensation shall be conducted in compliance with relevant laws and regulations</li> </ul>	- ROW	<ul style="list-style-type: none"> <li>- During the official procedure</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation and monitoring: PGC B</li> </ul>	Expenses to be paid by PGCB
<b>Construction Stage</b>									
3	Disturbance to the Poor	<ul style="list-style-type: none"> <li>- Loss of farmlands, being kept out of construction zones</li> </ul>	<ul style="list-style-type: none"> <li>- Employment of local residents</li> </ul>	<ul style="list-style-type: none"> <li>- Consideration of local residents' feelings</li> </ul>	<ul style="list-style-type: none"> <li>- Employ as many local residents as possible</li> <li>- Use the services and products</li> </ul>	- Villages along the transmission line route	<ul style="list-style-type: none"> <li>- During construction phase</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation: Contractor/ Environmental Consultant</li> <li>- Supervisor:</li> </ul>	Expenses included in contract cost by Contractor
4	Deterioration of	<ul style="list-style-type: none"> <li>- Loss of farmlands, being kept out of construction zones</li> </ul>	<ul style="list-style-type: none"> <li>- Employment of local residents</li> </ul>	<ul style="list-style-type: none"> <li>- Consideration of local residents' feelings</li> </ul>	<ul style="list-style-type: none"> <li>- Employ as many local residents as possible</li> <li>- Use the services and products</li> </ul>	- Villages along the transmission line route	<ul style="list-style-type: none"> <li>- During construction phase</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation: Contractor/ Environmental Consultant</li> <li>- Supervisor:</li> </ul>	Expenses included in contract cost by Contractor



Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Llivelihood Compensation

No	Potential Impact to be Managed	Sources of Potential Impact	Standard of Impact	Objectives	Management Effort	Management Location	Period of Management	Management Institution	Cost
	Local Economy such as Losses of Employment and Means of Livelihood	- Changing the traditional land usage patterns and utilization of local resources			offered by the local community			PGCB/ Supervision Consultant	
5	Land Use and Utilization of Local Resources								
6	Infectious Diseases	- Temporary influx of migrant labor during construction may increase risk of infection	-----	- Consideration of hygiene and sanitation of local residents	- Establish medical center and implementation of periodic medical check-ups - Education and training on workers' health care	- Construction area	- During construction phase	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
7	Work Conditions (including work safety)	Labor accidents	- Handling heavy loads - Working at heights - Electric shocks	- Prevention measures against labor accidents, accidents, and health problems	- Prepare a manual for labor accident prevention including safety education and training - Provide workers with appropriate protective equipment - Inspect and ensure that any lifting devices, such as cranes, are appropriate for expected loads - Keep lifting devices well maintained and perform maintenance checks as appropriate - Use facilities and	- Construction area	- During construction phase	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor

Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Livelihood Compensation

No	Potential Impact to be Managed	Sources of Potential Impact	Standard of Impact	Objectives	Management Effort	Management Location	Period of Management	Management Institution	Cost
					equipment that protects against electric shocks				
8	ROW	- Loss of standing crops - Loss of trees	-Electricity Act 1910	- Consideration to affected peoples' socioeconomic conditions	- Compensation should be conducted in compliance with relevant laws and regulations	- ROW	- During construction	- Implementation: Contractor - Supervision: PGCB	Expenses included in contract cost by Contractor
9	Accidents	- Land traffic accidents	- Land traffic	- Prevention of land traffic accidents	- Observation of traffic regulations, installation of traffic signs and education on safe driving - Training safe operation of vehicles	- Construction area - Roads near the construction area	- During construction phase	- Implementation : Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
<b>Operational Stage</b>									
10	Work Conditions (including work safety)	Labor accidents	- Handling heavy loads - Working at heights - Electric shocks	- Prevention measures against labor accidents, accidents, and health problems	- Prepare a manual for labor accident prevention including safety education and training - Provide workers with appropriate protective equipment - Use facilities and equipment that protects against electric shocks	- Along the transmission line route and towers	- During the inspection work	PGCB	PGCB

(Source: the JICA Survey Team)

### ANNEX II-2: Environmental Management Plan (New Madunaghat Substation)

No	Potential Impact to be Managed	Sources of Potential Impact	Standard of Impact	Objectives	Management Effort	Management Location	Period of Management	Management Institution	Cost
<b>Pre-construction Phase</b>									
1	Land acquisition	- Land acquisition at new Madunaghat substation - Loss of land - Kept out of the construction zone - Standing crops - Livelihood means	- the Acquisition and Requisition of Immovable Property Ordinance 1982 - JICA Guidelines for Environmental and Social Considerations (2010)	- Consideration for land owners, sharecroppers and compensation for standing agriculture products	-- Land acquisition shall be conducted in compliance with relevant laws and regulations - DC Office will take responsibility to conduct local consultations concerning compensation by law. - Top-up payment and livelihood compensation shall be made	- Site of Madunaghat Substation - Affected people	- During land acquisition process - Once after compensation	- Implementation: Office of the Deputy Commissioner - Monitoring: PGCB	Expenses to be paid by PGCB
2	Social Institutions	- Changing peoples' thinking through interacting with local government officers, local residents and others in the land acquisition procedure							
3	Misdistribution of Benefits and Compensation	- Can occur among residents, workers, government officers, and local politicians	-----	- Consideration for land owners, sharecroppers and compensation for standing agriculture products	- Monitor the progress of Government procedure for land acquisition - Interviewing affected people	- Areas to be acquired - Affected people	- Once after the compensation is paid	- Implementation and Monitoring: PGCB	PGCB
4	Local Conflicts of Interest								
<b>Construction Stage</b>									
5	Disturbance to the Poor	- Loss of farmlands, being kept out of construction zones - deterioration of the poor's living standard due to the temporary loss of job in ROW	- Employment of local residents	- Consideration of local residents' feelings and socioeconomic status	- Employ as many local residents as possible - Use the services and products offered by the local community	- Villages along the transmission line route	- During construction phase	- Implementation: Contractor/ Environmental Consultant - Supervisor: PGCB/ Supervision Consultant	Expenses included in contract cost by Contractor
6	Deterioration of Local Economy	- deterioration of local							

Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Livelihood Compensation

No	Potential Impact to be Managed	Sources of Potential Impact	Standard of Impact	Objectives	Management Effort	Management Location	Period of Management	Management Institution	Cost
	such as Losses of Employment and Means of Livelihood	socioeconomic status due to the temporary loss of job in ROW							
7	Land Use and Utilization of Local Resources	- Changing the traditional land usage patterns and utilization of local resources							
8	Infectious Diseases	- deterioration of labor health - Spreads of infectious diseases	-	- Consideration of hygiene and sanitation of workers	- Establish medical center and implementation of periodic medical check-ups - Education and training on workers' health care	- Contractor's office	- During construction phase	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
9	Work Conditions (including work safety)	Labor accidents	- Handling heavy loads - Working at heights - Electric shocks	- Prevention measures against labor accidents and health problems	- Prepare a manual for labor accident prevention including safety education and training - Provide workers with appropriate protective equipment - Inspect and ensure that any lifting devices, such as cranes, are appropriate for expected loads - Keep lifting devices well maintained and perform maintenance	- Construction area	- During construction phase	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor

Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Llivelihood Compensation

No	Potential Impact to be Managed	Sources of Potential Impact	Standard of Impact	Objectives	Management Effort	Management Location	Period of Management	Management Institution	Cost
					checks as appropriate - Use facilities and equipment that protects against electric shocks				
10	Accidents	- Land traffic accidents	- Land traffic	- Prevention of traffic accidents	- Land traffic accidents - Observation of traffic regulations, installation of traffic signs and education on safe driving - Training safe operation of vehicles	- Construction area - Roads near the construction area	- During construction phase	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
<b>Operational Stage</b>									
11	Disturbance to the Poor	- Changing the traditional land usage patterns and utilization of local resources	- Employment of local residents	- Consideration of local residents' socioeconomic conditions	- Support transition period to find alternative jobs	- Villages nearby the substation site	- Transition period	- Implementation and Supervision: PGCB	PGCB
12	Deterioration of Local Economy such as Losses of Employment and Means of Livelihood								
13	Land use and utilization of local resources								
14	Work Conditions (including work safety)	Labor accidents	- Handling heavy loads - Working at heights - Electric shocks	- Prevention measures against labor accidents during operation and maintenance works, accidents, and health	- Prepare a manual for labor accident prevention including safety education and training	- Substation	- During operation and maintenance works	- Implementation and supervision: PGCB	PGCB

Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Llivelihood Compensation

No	Potential Impact to be Managed	Sources of Potential Impact	Standard of Impact	Objectives	Management Effort	Management Location	Period of Management	Management Institution	Cost
				problems	<ul style="list-style-type: none"> <li>- Provide workers with appropriate protective equipment</li> <li>- Use facilities and equipment that protects against electric shocks</li> </ul>				

(Source: the JICA Survey Team)

### ANNEX II-3: Environmental Management Plan (Access Road Expansion to New Madunaghat Substation)

No	Potential Impact to be Managed	Sources of Potential Impact	Standard of Impact	Objectives	Management Effort	Management Location	Period of Management	Management Institution	Cost
<b>Pre-construction Phase</b>									
1	Land acquisition	<ul style="list-style-type: none"> <li>- Land acquisition at along the existing road as long as 1,000m</li> <li>- Kept out of the construction zone</li> <li>- Standing crops</li> <li>- Livelihood means</li> <li>- Changing peoples' thinking through interacting with local government officers, local residents and others in the land acquisition procedure</li> </ul>	<ul style="list-style-type: none"> <li>- the Acquisition and Requisition of Immovable Property Ordinance 1982</li> <li>- JICA Guidelines for Environmental and Social Considerations (2010)</li> </ul>	<ul style="list-style-type: none"> <li>- Consideration for land owners, sharecroppers and compensation for standing agriculture products</li> <li>- Confirmation of affected peoples' feelings</li> </ul>	<ul style="list-style-type: none"> <li>-- Land acquisition shall be conducted in compliance with relevant laws and regulations</li> <li>- DC Office will take responsibility to conduct local consultations concerning compensation by law.</li> <li>- Top-up payment and livelihood compensation shall be made</li> </ul>	<ul style="list-style-type: none"> <li>- Access road</li> <li>- Affected people</li> </ul>	<ul style="list-style-type: none"> <li>- During land acquisition process</li> <li>- Once after compensation</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation: Office of the Deputy Commissioner</li> <li>- Monitoring: PGCB</li> </ul>	Expenses to be paid by PGCB
2	Social Institutions								
3	Misdistribution of Benefits and Compensation	<ul style="list-style-type: none"> <li>- Can occur among residents, workers, government officers, and local politicians</li> </ul>	-----	<ul style="list-style-type: none"> <li>- Consideration for land owners, sharecroppers and compensation for standing agriculture products</li> </ul>	<ul style="list-style-type: none"> <li>- Monitor the progress of Government procedure for land acquisition</li> <li>- Interviewing affected people</li> </ul>	<ul style="list-style-type: none"> <li>- Areas to be acquired</li> <li>- Affected people</li> </ul>	<ul style="list-style-type: none"> <li>- Once after the compensation is paid</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation and Monitoring: PGCB</li> </ul>	PGCB
4	Local Conflicts of Interest								
<b>Construction Stage</b>									
5	Disturbance to the Poor	<ul style="list-style-type: none"> <li>- deterioration of the poor's living standard due to the permanent loss of livelihood means</li> <li>- deterioration of local socioeconomic status due to the permanent loss</li> </ul>	<ul style="list-style-type: none"> <li>- Employment of local residents</li> </ul>	<ul style="list-style-type: none"> <li>- Consideration of local residents' socioeconomic conditions and feelings</li> </ul>	<ul style="list-style-type: none"> <li>- Employ as many local residents as possible</li> <li>- Use the services and products offered by the local community</li> </ul>	<ul style="list-style-type: none"> <li>- Villages along the road</li> </ul>	<ul style="list-style-type: none"> <li>- During construction phase</li> </ul>	<ul style="list-style-type: none"> <li>- Implementation: Contractor/ Environmental Consultant</li> <li>- Supervisor: PGCB/ Supervision Consultant</li> </ul>	Expenses included in contract cost by Contractor
6	Deterioration of Local Economy such as Losses of Employment and Means of								

Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Llivelihood Compensation

No	Potential Impact to be Managed	Sources of Potential Impact	Standard of Impact	Objectives	Management Effort	Management Location	Period of Management	Management Institution	Cost
	Livelihood	of livelihood means							
7	Land Use and Utilization of Local Resources	- Changing the traditional land usage patterns and utilization of local resources							
8	Infectious Diseases	- deterioration of labor health - Spreads of infectious diseases	-----	- Consideration of hygiene and sanitation of local residents	- Establish medical center and implementation of periodic medical check-ups - Education and training on workers' health care	- Construction area	- During construction phase	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
9	Work Conditions (including work safety)	Labor accidents	- Handling heavy loads	- Prevention measures against labor accidents, accidents, and health problems	- Prepare a manual for labor accident prevention including safety education and training - Provide workers with appropriate protective equipment - Inspect and ensure that any lifting devices, such as cranes, are appropriate for expected loads - Keep lifting devices well maintained and perform maintenance checks as appropriate	- Construction area	- During construction phase	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
10	Accidents	- Land traffic accidents	- Land traffic	- Prevention of traffic accidents	- Traffic accidents - Observation of	- Construction area	- During construction	- Implementation: Contractor	Expenses included in contract cost by



Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Llivelihood Compensation

No	Potential Impact to be Managed	Sources of Potential Impact	Standard of Impact	Objectives	Management Effort	Management Location	Period of Management	Management Institution	Cost
					<ul style="list-style-type: none"> <li>traffic regulations, installation of traffic signs and education on safe driving</li> <li>- Training safe operation of vehicles</li> </ul>	- Roads near the construction area	phase	- Supervisor: PGCB	Contractor
<b>Operational Stage</b>									
	N/A								

(Source: the JICA Survey Team)

### ANNEX III-1: Environmental Monitoring Plan (Transmission Line)

No	Significant Impact to be Monitored	Source of Significant Impact	Monitored Parameter	Purpose of the Monitoring	Monitoring Method			Responsible Organization	Cost
					Method of Collecting and Analyzing Data	Location	Duration and Frequency		
<b>Pre-Construction</b>									
1	Land acquisition	<ul style="list-style-type: none"> <li>- Loss of land at tower bases (permanent)</li> <li>- Kept out of the construction zone (temporary)</li> <li>- Livelihood means (temporary)</li> </ul>	<ul style="list-style-type: none"> <li>- the Acquisition and Requisition of Immovable Property Ordinance 1982</li> <li>- JICA Guidelines for Environmental and Social Considerations (2010)</li> </ul>	- Confirmation of compensation process	- Monitor the progress of Government procedure for land acquisition of 1) tower basis and 2) substation site	- Areas to be acquired	- Quarterly during the official process	<ul style="list-style-type: none"> <li>- Implementation: Deputy Commissioner's Office</li> <li>- Monitoring: PGCB</li> </ul>	PGCB
2	ROW Compensation	<ul style="list-style-type: none"> <li>- Kept out of the construction zone</li> <li>- Trees will be removed if they are within clearance distance</li> <li>- Standing crops will be affected</li> </ul>	<ul style="list-style-type: none"> <li>- Electricity Act 1910</li> <li>- JICA Guidelines for Environmental and Social Considerations (2010)</li> </ul>	- Confirmation of compensation process	- Monitor the progress of Government procedure for general notification of ROW.	- ROW	- Quarterly during the official process	- Implementation and Monitoring: PGCB	PGCB
<b>Construction Phase</b>									
3	Disturbance to the Poor	- deterioration of the poor's living standard due to the temporary loss of job in ROW	--	- Confirmation of affected peoples' economic situation	- Interviewing affected people	- Affected people	- Simultaneously	<ul style="list-style-type: none"> <li>- Implementation: Contractor</li> <li>- Monitoring: PGCB</li> </ul>	Expenses included in contract cost by Contractor
4	Deterioration of local economy	- deterioration of local socioeconomic status due to the temporary loss of job in ROW	--	- Confirmation of affected peoples' economic situation	- Interviewing affected people	- Affected people	- Simultaneously	<ul style="list-style-type: none"> <li>- Implementation: Contractor</li> <li>- Monitoring: PGCB</li> </ul>	Expenses included in contract cost by Contractor
5	Land Use and Utilization of Local Resources	- Changing the traditional land usage patterns and utilization of local resources	-	- Consideration of local residents' feelings	- Interviewing affected people	- Villages along the transmission line route and substation	- Simultaneously	<ul style="list-style-type: none"> <li>- Implementation: Contractor/ Environmental Consultant</li> <li>- Supervisor: PGCB/</li> </ul>	Expenses included in contract cost by Contractor

Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Livelihood Compensation

No	Significant Impact to be Monitored	Source of Significant Impact	Monitored Parameter	Purpose of the Monitoring	Monitoring Method			Responsible Organization	Cost
					Method of Collecting and Analyzing Data	Location	Duration and Frequency		
								Supervision Consultant	
6	Infectious disease	- deterioration of labor health - Spreads of infectious diseases	- health condition	- Monitor the health condition	- Medical check-ups	- Contractor's office	- Once a year	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
7	Work Environment (Including Work Safety)	- Labor accidents	- Handling heavy loads - Working at heights - Electric shocks	- Evaluation of effect of the work safety plan	- Record of accidents	- Contractor's office	- Once a year	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
8	ROW Compensation	- Kept out of the construction zone - Trees will be removed if they are within clearance distance - Standing crops will be affected	- Electricity Act 1910 - JICA Guidelines for Environmental and Social Considerations (2010)	- Confirmation of compensation process	- Monitor the payment of ROW Compensation by the contractor for the entitled people.	- ROW	- Simultaneously	- Implementation: Contractor - Monitoring: PGCB	PGCB
9	Accidents	- Land traffic accidents	- Land traffic	- Evaluation of effect of traffic schedule	- Record of accidents	- Contractor's office	- Once a year	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor.
<b>Operation Stage</b>									
10	Work Environment (Including Work Safety)	1) Labor accidents	- Handling heavy loads - Working at heights - Electric shocks	- Evaluation of effect of the work safety plan	- Record of accidents	- PGCB office	- Once a year	Implementation and Monitoring: PGCB	PGCB

(Source: the JICA Survey Team)

### ANNEX III-2: Environmental Monitoring Plan (New Madunaghat Substation)

No	Significant Impact to be Monitored	Source of Significant Impact	Monitored Parameter	Purpose of the Monitoring	Monitoring Method			Responsible Organization	Cost
					Method of Collecting and Analyzing Data	Location	Duration and Frequency		
<b>Pre-Construction</b>									
1	Land acquisition and Land Use	- Loss of land - Kept out of the construction zone - Standing crops - Livelihood means	- the Acquisition and Requisition of Immovable Property Ordinance 1982 - JICA Guidelines for Environmental and Social Considerations (2010)	- Confirmation of compensation process	- Monitor the progress of Government procedure for land acquisition	- Areas to be acquired	- Quarterly during the official process	- Implementation: Deputy Commissioner's Office - Monitoring: PGCB	PGCB
2	Social Institutions	- Changing peoples' thinking through interacting with local government officers, local residents and others in the land acquisition procedure	-----	- Confirmation of affected peoples' feelings	- Interviewing affected people	- Affected people	- Once after compensation	- Implementation and Monitoring: PGCB	PGCB
3	Misdistribution of Benefits and Compensation	- Can occur among residents, workers, government officers, and local politicians	-----	- Confirmation of compensation process	- Monitor the progress of Government procedure for land acquisition - Interviewing affected people	- Areas to be acquired	- Once after the compensation is paid	- Implementation and Monitoring: PGCB	PGCB
4	Local Conflicts of Interest	- Can occur among residents, workers, government officers, and local politicians	-----	- Confirmation of affected peoples' feelings	- Interviewing affected people	- Affected people	- Once after compensation	- Implementation and Monitoring: PGCB	PGCB
<b>Construction Phase</b>									
5	Disturbance to the Poor	- deterioration of the poor's living standard due to the permanent loss of	--	- Confirmation of affected peoples' economic situation	- Interviewing affected people	- Affected people	- Simultaneously	- Implementation: Contractor - Monitoring: PGCB	PGCB

Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Livelihood Compensation

No	Significant Impact to be Monitored	Source of Significant Impact	Monitored Parameter	Purpose of the Monitoring	Monitoring Method			Responsible Organization	Cost
					Method of Collecting and Analyzing Data	Location	Duration and Frequency		
		livelihood means							
6	Deterioration of local economy	- deterioration of local socioeconomic status due to the permanent loss of livelihood means	--	- Confirmation of affected peoples' economic situation	- Interviewing affected people	- Affected people	- Simultaneously	- Implementation: Contractor - Monitoring: PGCB	PGCB
7	Land Use and Utilization of Local Resources	- Changing the traditional land usage patterns and utilization of local resources	-	- Confirmation of affected peoples' socio-economic situation	- Interviewing affected people	- Affected people	- Simultaneously	- Implementation: Contractor - Monitoring: PGCB	PGCB
8	Infectious disease	- deterioration of labor health - Spreads of infectious diseases	- health condition	- Monitor the health condition	- Medical check-ups	- Contractor's office	- Once a year	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
9	Work Environment (Including Work Safety)	- Labor accidents	- Handling heavy loads - Working at heights - Electric shocks	- Evaluation of effect of the work safety plan	- Record of accidents	- Contractor's office	- Once a year	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
10	Accidents	- Land traffic accidents	- Land traffic	- Evaluation of effect of traffic schedule	- Record of accidents	- Contractor's office	- Once a year	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor.
<b>Operation Stage</b>									
11	Disturbance to the Poor	- deterioration of the poor's living standard lasting after the construction	--	- Confirmation of affected peoples' economic situation	- Interviewing affected people	- Affected people	- Simultaneously	- Implementation and Monitoring: PGCB	PGCB
12	Deterioration of local economy	- deterioration of local socioeconomic status due to the permanent loss of livelihood means continue after the construction	--	- Confirmation of affected peoples' economic situation	- Interviewing affected people	- Affected people	- Simultaneously	- Implementation and Monitoring: PGCB	PGCB
1	Land Use and	- Impact of change	-	- Confirmation of	- Interviewing	- Affected people	- Simultaneously	- Implementation	PGCB

Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Llivelihood Compensation

No	Significant Impact to be Monitored	Source of Significant Impact	Monitored Parameter	Purpose of the Monitoring	Monitoring Method			Responsible Organization	Cost
					Method of Collecting and Analyzing Data	Location	Duration and Frequency		
3	Utilization of Local Resources	in the traditional land usage patterns and utilization of local resources continue after construction		affected peoples' socio-economic situation	affected people			and Monitoring: PGCB	
14	Work Environment (Including Work Safety)	1) Labor accidents	- Nos of accident	- Evaluation of effect of the work safety plan	- Record of accidents	- On-site	- Once a year	- Implementation and Monitoring: PGCB	PGCB

(Source: the JICA Survey Team)

**ANNEX III-3: Environmental Monitoring Plan (Road Expansion to Maduhaghat Substation)**

No	Significant Impact to be Monitored	Source of Significant Impact	Monitored Parameter	Purpose of the Monitoring	Monitoring Method			Responsible Organization	Cost
					Method of Collecting and Analyzing Data	Location	Duration and Frequency		
<b>Pre-Construction</b>									
1	Land acquisition and Land Use	- Loss of land - Kept out of the construction zone - Standing crops - Livelihood means	- the Acquisition and Requisition of Immovable Property Ordinance 1982 - JICA Guidelines for Environmental and Social Considerations (2010)	- Confirmation of compensation process	- Monitor the progress of Government procedure for land acquisition	- Areas to be acquired	- Quarterly during the official process	- Implementation: Deputy Commissioner's Office - Monitoring: PGCB	PGCB
6	Social Institutions	- Changing peoples' thinking through interacting with local government officers, local residents and others in the land acquisition procedure	-----	- Confirmation of affected peoples' feelings	- Interviewing affected people	- Affected people	- Once after compensation	- Implementation and Monitoring: PGCB	PGCB
7	Misdistribution of Benefits and Compensation	- Can occur among residents, workers, government officers, and local politicians	-----	- Confirmation of compensation process	- Monitor the progress of Government procedure for land acquisition	- Areas to be acquired	- Once after the compensation is paid	- Implementation and Monitoring: PGCB	PGCB
8	Local Conflicts of Interest	- Can occur among residents, workers, government officers, and local politicians	-----	- Confirmation of affected peoples' feelings	- Interviewing affected people	- Affected people	- Once after compensation	- Implementation and Monitoring: PGCB	PGCB
<b>Construction Phase</b>									
4	Disturbance to the Poor	- deterioration of the poor's living standard due to the permanent loss of livelihood means	--	- Confirmation of affected peoples' economic situation	- Interviewing affected people	- Affected people	- Simultaneously	- Implementation: Contractor - Monitoring: PGCB	PGCB
5	Deterioration of	- deterioration of	--	- Confirmation of	- Interviewing	- Affected people	- Simultaneously	- Implementation:	PGCB

Dhaka-Chittagong Main Power Grid Strengthening Project  
Action Plan for Land Acquisition and Livelihood Compensation

No	Significant Impact to be Monitored	Source of Significant Impact	Monitored Parameter	Purpose of the Monitoring	Monitoring Method			Responsible Organization	Cost
					Method of Collecting and Analyzing Data	Location	Duration and Frequency		
	local economy	local socioeconomic status due to the permanent loss of livelihood means		affected peoples' economic situation	affected people			Contractor - Monitoring: PGCB	
	Land Use and Utilization of Local Resources	- Impact of change in the traditional land usage patterns and utilization of local resources continue after construction	-	- Confirmation of affected peoples' socio-economic situation	- Interviewing affected people	- Affected people	- Simultaneously	- Implementation and Monitoring: PGCB	PGCB
9	Infectious disease	- deterioration of labor health - Spreads of infectious diseases	- health condition	- Monitor the health condition	- Medical check-ups	- Contractor's office	- Once a year	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
0	Work Environment (Including Work Safety)	- Labor accidents	- Handling heavy loads - Working at heights - Electric shocks	- Evaluation of effect of the work safety plan	- Record of accidents	- Contractor's office	- Once a year	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor
11	Accidents	- Land traffic accidents	- Land traffic	- Evaluation of effect of traffic schedule	- Record of accidents	- Contractor's office	- Once a year	- Implementation: Contractor - Supervisor: PGCB	Expenses included in contract cost by Contractor.
<b>Operation Stage</b>									
	N/A								

(Source: the JICA Survey Team)







## 付録 9

### 社会環境調査の質問事項



## Questionnaire for Preparatory Survey on Dhaka -Chittagong Main Power Grid Strengthening Project.

Name of the Site.....Name of the Place.....Time...../...../.....
Date: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Photograph No: <input type="text"/> <input type="text"/> <input type="text"/> ID No. <input type="text"/> <input type="text"/> <input type="text"/>
<b><u>Respondent Identification</u></b>
Greetings. My name.....I.....came from a research organization. Now, we are collecting data for the purpose of construction of 400 kV Power Transmission Line.

Name of household head	Father's Name
Mother's Name	Wife's Name
Village	Union
Mauza (JL No)	Post office
Upazila	District
Indigenous People (mention tribe)	Religion
Membership of organization if any	

Land Acquisition and crop compensation of the directly affected respondent *	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Land marked (details) :.....		
.....		
.....		

Name of Interviewer.....	Signature.....	Date.....
Name of Supervisor.....	Signature.....	Date.....

**BACKGROUND OF THE RESPONDENT**

01) Please fill out your family profile.

Q	Name	Status	Sex	Age	Education	Occupation	Income source
						Main	Secondary

02) What is the monthly income of your family in total.....Taka

03) What is the monthly expenditure of your family in total.....Taka

**MIGRATION IN AND OUT**

04) You live in this area for how long? .....

05) Where did you live before here (Probe)?.....

06) What is the reason you live here?.....

**LAND OWNERSHIP OF THE RESPONDENT**

07) Do you own any land? Yes  1 No  2 (If “No” skip to Q No. 09)

08) Own house.....decimal| Present Value.....Taka

09) Cultivated land.....decimal| Present Value.....Taka

10) Other land (for.....decimal Total: .....

11) Type of House: your roof, wall and floor Record Properly									
	Tin	Concrete	Tiles	Soil	Bamboo	Thatch/ Golpata	Jute stick	Wood	Others
Roof	1	2	3	4	5	6	7	8	
Wall	1	2	3	4	5	6	7	8	
Floor	1	2	3	4	5	6	7	8	

### ACTIVITIES

- 12) Type of Land..... 13) Quantity of Land.....  
 14) Market Value of Land..... 15) Type of Crops.....  
 16) Price of Crops (unit price.....(Market Value).....

### MEDICAL TREATMENT OF THE FAMILY MEMBERS AND HOUSE HOLD ASSET

17) Where you and your family go for medical treatment ?

I) Village Doctor (Quack)	II) MBBS Doctor
III) Pharmacy	IV) Family Welfare Centre
V) Rural Dispensary	VI) upazilla Health Complex
VII) Private Clinic	VIII) Others.....

18) What types of material in your households?

a. Bicycle	b. Van	c Rickshaw
d. mobile phone	e. Radio	f. TV
g. Computer	h. refrigerator	i. washing machine
j. motor cycle	k. car	l. table fan
m. ceiling fan	n. Fishing net	o. Agriculture tool
p. Country Boat	q. Engine Boat.	r. Water purify machine.
s. Others.....		

### KNOWLEDGE, ATTITUDE, ABOUT THE ELECTRICITY WATER AND SANITATION

19) What is the main source of drinking water in your family?

a. Pipe inside house.....01	b. Pipe outside house.....02
c. Tube well/deep tube well.... 03	d. Well.....04
e. Pond/canal.....05	f. River.....06
g. Others.....07	

20) Is there any arsenic contamination in the water source of your locality? Yes  1 No  2

21) What type of toilet do you have in your house?

a. safety tank/modern toilet.....01	b. Water logged/slab latrine.....02
c. Pit latrine.....03	d. Open latrine.....04
e. Hanging latrine.....05	f. Bushes/open field.....06
g. Others.....07	

22) Is there electricity in your house? Yes  1 No  2

23) If “yes”, what do you use electricity for in your household?.....

24) What is the monthly expenditure for electricity? Taka.....

25) Would you please say, in your area, electricity is used in what purposes?

.....  
.....  
.....

26) What are the advantages do you get in your area due to the supply of electricity from the organizations like PDB/POLLI BIDDUTH ?

.....  
.....  
.....

27) What are the disadvantages?

.....  
.....

28) What will be your reaction if a new power Transmission line over the installed in your village/Locality?

.....  
.....

29) What material do you use to ignite the flame for cooking purposes?

a. Wood.....01	b. Natural garbage.....02
c. Cow’s dung.....03	d. LP/ liquid gas.....04
e. Electric heater.....05	f. Gas.....06
g. Kerosene.....07	h. Others .....08

30) What is the monthly expenditure for fuel purposes? Taka.....



**INFORMATION ABOUT MIGRATORY BIRDS**

31) Do you know about migrated birds? Yes  1 No  2

32) In your locality is there any sanctuary for the migrated birds? ?

Yes  1 No  2 (skip to Q No 34)

33) What is the name and address of the Sanctuary.....

.....

.....(Verbatim)

34) What would be your reaction, if a high voltage power transmission line is installed over your village/locality? Do you think there would be any environmental hazards?

.....

.....

.....

(Verbatim)

**Be thankful to the respondent and end the discussion.**



## 付録 10

### 13か所のボーリング調査記録



RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.						Client: LGED				
Bore Hole No : BH 01				Ground Water Level (GWL) : 0.0m.Below						
Method of Boring : WASH				Date of Starting :22/06/2014						
Boring Depth : 32.0m				Date of Completion :23/06/2014						
Location of Boring : Tower No. 05 (N 23°36'23.66" E 90°34'52.18")										
Sample No.	Type of Sample	Stratification			Picture of Soil Sample	Standard Penetration Test (SPT)				Graphical representation of N values
		Depth below E.G.L. (m)	Thickness (m)	Description of Soil Strata		SPT Intervals (meter)	Blows on Spoon per 15 cm Penetration			
				Soil Strata Legend		15 cm	15 cm	15 cm		
D1		1	2.0m	Gray fine Silty SAND with Clay.		1	1	1	2	
D2		2	5.0m	Gray fine Silty SAND .		2	1	2	3	
D3		3				1	1	2	3	
D4		4				1	1	3	4	
D5		5				1	2	3	5	
D6		6				2	3	3	6	
D7		7	7.0m	Light gray fine Silty SAND .		7	2	3	6	
D8		8				2	3	5	8	
D9		9				3	4	5	9	
D10		10				3	4	6	10	
D11		11				3	4	7	11	
D12		12				2	4	6	10	
D13		13				2	3	4	7	
D14		14	2.0m	Gray fine Silty SAND .		14	2	3	7	
D15		15				2	3	5	8	
D16		16	11.0m	Light gray fine Silty SAND .		16	2	3	8	
D17		17				3	4	6	10	
D18		18				4	4	6	10	
D19		19				5	7	9	16	
D20		20				6	10	14	24	
D21		21				7	14	16	30	
D22		22				7	15	17	32	
D23		23				8	16	19	35	
D24		24				8	18	20	38	
D25		25				9	20	22	42	
D26		26	10	21	23	44				
D27		27	10	21	24	45				
D28		28	2.0m	Light brown Dense Corse SAND .		28	12	22	46	
D29		29	2.9m	Gray Dense medium SAND .		29	14	24	50	
D30		30				15	28	22	> 50	
D31		31	2.9m	Gray Dense medium SAND .		31	16	30	20	> 50
D32		32				16	32	18	> 50	

RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.						Client: LGED						
Bore Hole No : BH 02			Ground Water Level (GWL) : 0.45m.Below			Soil Strata Legend:						
Method of Boring : WASH			Date of Starting :23/06/2014			Sand	Peat / Organic					
Boring Depth : 30.0m			Date of Completion :24/06/2014			Silt	Mica					
						Clay	Disturb Sample (D)					
						Grit/ Stone	Undisturb Sample (UD)					
Location of Boring :Tower No.11( N 23°35'32.80" E 90°34'45.68")												
Sample No.	Type of Sample	Stratification			Soil Strata Legend	Picture of Soil Sample	Standard Penetration Test (SPT)				Graphical representation of N values	
		Depth below E.C.L (m)	Thickness (m)	Description of Soil Strata			SPT Intervals (meter)	Blows on Spoon per 15 cm Penetration				N- Value
		15 cm	15 cm	15 cm					00 10 20 30 40 50			
D1		1	3.0m	Light gray loose fine silty SAND trace Clay.			1	1	1	2		
D2		2					2	1	1	2		3
D3		3					3	1	2	2		4
D4		4	9.0m	Gray Loose fine Silty SAND .			4	1	1	2		3
D5		5					5	1	1	1		2
D6		6					6	1	1	2		3
D7		7					7	2	2	2		4
D8		8					8	2	3	3		6
D9		9					9	2	3	4		7
D10		10					10	3	4	4		8
D11		11					11	3	4	5		9
D12		12					12	4	5	7		12
D13		13	10.0m	Gray Medium fine Silty SAND .			13	5	7	9		16
D14		14					14	5	8	11		19
D15		15					15	6	10	12		22
D16		16					16	6	12	13		25
D17		17					17	7	13	14		27
D18		18					18	7	13	14		27
D19		19					19	8	14	15		29
D20		20	4.0m	Light gray Dense fine Silty SAND			20	8	15	16		31
D21		21					21	8	14	17		31
D22		22					22	8	15	18		33
D23		23					23	9	17	20		37
D24		24	7.0m	Gray Dense fine Silty SAND .			24	10	19	22		41
D25		25					25	12	21	24		45
D26		26					26	12	23	24		47
D27		27					27	13	24	26		50
D28		28					28	14	25	25		> 50
D29		29					29	14	27	23		> 50
D30		30	30	15	30	20	> 50					



RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.										Client: LGED						
Bore Hole No : BH 04										Ground Water Level (GWL) : 0.45m.Below						
Method of Boring : WASH										Date of Starting :25/06/2014						
Boring Depth : 24.0m										Date of Completion :25/06/2014						
Location of Boring :Tower No.96( N 23°25'16.03" E 90°49'47.02")																
Sample No.	Type of Sample	Depth below E.G.L (m)	Thickness (m)	Stratification		Soil Strata Legend	Picture of Soil Sample	Standard Penetration Test (SPT)				Graphical representation of N values				
				Description of Soil Strata				SPT Intervals (meter)	Blows on Spoon per 15 cm Penetration				N- Value			
											00	10	20	30	40	50
D1		1	3.0m	Gray Soft Clayey Silt.			1	1	1	2						
D2		2					2	1	1	2						
D3		3					3	1	1	2						
D4		4	3.0m	Gray loose fine Silty SAND .			4	U	D	S						
D5		5					5	1	3	4		7				
D6		6					6	4	5	8		13				
D7		7	5.0m	Gray fine Silty SAND .			7	4	6	10		16				
D8		8					8	6	8	12		20				
D9		9					9	8	12	16		28				
D10		10					10	8	14	14		30				
D11		11					11	9	15	17		32				
D12		12	8.0m	Gray fine SAND .			12	7	10	20		30				
D13		13					13	9	11	21		32				
D14		14					14	10	13	22		35				
D15		15					15	12	15	23		38				
D16		16					16	12	16	24		40				
D17		17					17	13	18	26		44				
D18		18					18	14	20	26		46				
D19		19					19	14	21	28		49				
D20		20	5.0m	Gray Silty SAND			20	15	24	26		50				
D21		21					21	14	30	20		> 50				
D22		22					22	16	32	18		> 50				
D23		23					23	17	35	15		> 50				
D24		24					24	18	40	10		> 50				
D25		25					25									
D26		26					26									
D27		27					27									
D28		28					28									
D29		29					29									
D30		30	30													




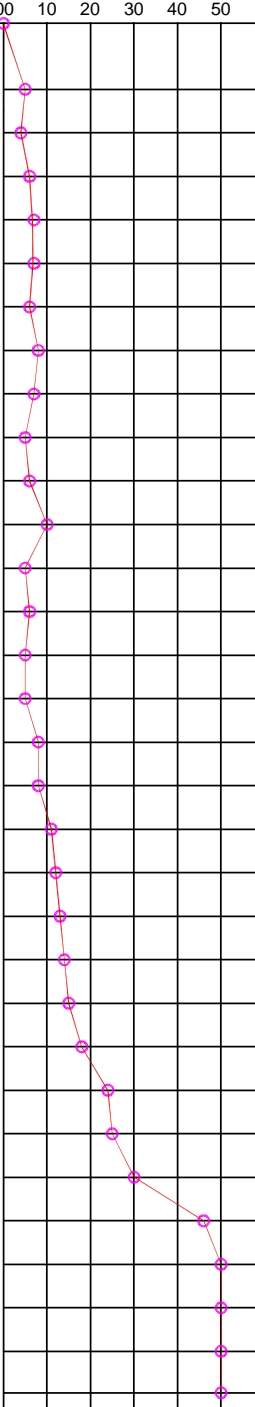



RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.										Client: LGED			
Bore Hole No : BH 05		Ground Water Level (GWL) : 0.30m.Below		Stratification Description of Soil Strata Soil Strata Legend Picture of Soil Sample						Soil Strata Legend:			
Method of Boring : WASH		Date of Starting :26/06/2014								Sand		Peat / Organic	
Boring Depth : 31.0m		Date of Completion :26/06/2014								Silt		Mica	
				Clay		Disturb Sample (D)		Undisturb Sample (UD)		Grit/ Stone			
Location of Boring :Tower No.285( N 23°03'26.59" E 91°18'42.23")													
Sample No.	Type of Sample	Depth below E.G.L. (m)	Thickness (m)	Description of Soil Strata	Soil Strata Legend	Picture of Soil Sample	SPT Intervals (meter)	Blows on Spoon per 15 cm Penetration			N- Value	Graphical representation of N values	
								15 cm	15 cm	15 cm			
D1		1	2.5m	Brown Soft Clayey Silt.			1	1	1	2			
D2		2					2	1	1	1		2	
D3		3					3	1	1	2		3	
D4		4	2.0m	Gray Soft Clayey Silt.			4	2	2	4			
D5		5					5	2	2	3		5	
D6		6	1.5m	Gray fine Silty SAND .			6	2	3	3		6	
D7		7					7	2	3	4		7	
D8		8	3.1m	Gray fine Silty SAND with clay.			8	3	4	4		8	
D9		9					9	3	3	4		7	
D10		10					10	4	5	6		11	
D11		11	9.9m	Light brown Silty SAND .			11	4	6	7		13	
D12		12					12	5	7	8		15	
D13		13					13	6	8	10		18	
D14		14					14	6	8	10		18	
D15		15					15	7	9	11		20	
D16		16					16	7	10	12		22	
D17		17					17	7	10	13		23	
D18		18					18	7	11	14		25	
D19		19					19	8	13	16		29	
D20		20	11.9m	Gray fine Silty SAND .			20	8	15	18		33	
D21		21					21	8	14	16		30	
D22		22					22	9	15	18		33	
D23		23					23	10	16	20		36	
D24		24					24	11	17	21		38	
D25		25					25	12	20	22		42	
D26		26					26	13	22	24		46	
D27		27					27	14	23	25		48	
D28		28					28	15	24	26		50	
D29		29					29	16	28	22		> 50	
D30		30					30	17	30	20		> 50	
D31		31	31	20	35	15	> 50						


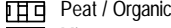

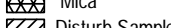

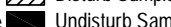

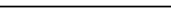


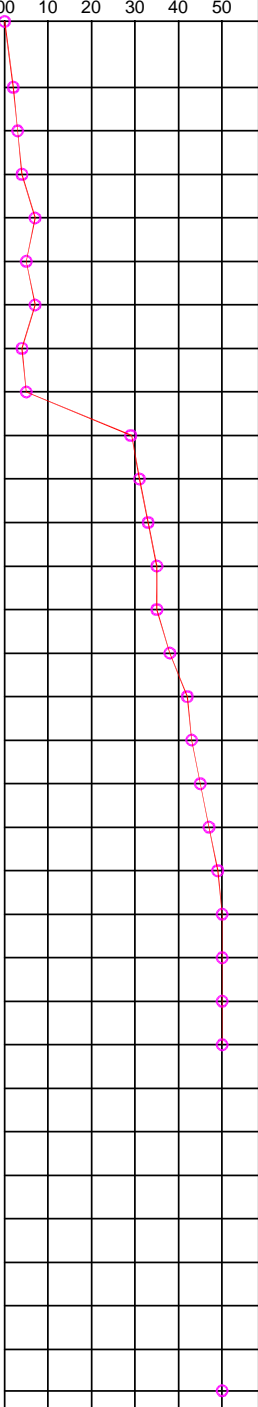

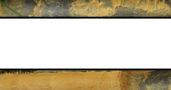

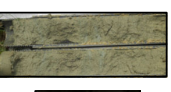



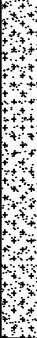
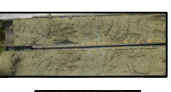



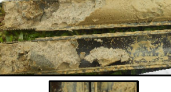


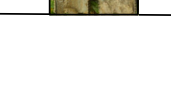

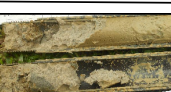


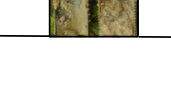



RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.										Client: LGED		
Bore Hole No : BH 06										Ground Water Level (GWL) : 0.0m.Below		
Method of Boring : WASH										Date of Starting :27/06/2014		
Boring Depth : 30.0m										Date of Completion :27/06/2014		
Location of Boring :Tower No.327(N 23°1'27.03" E 91°26'35.84")												
Sample No.	Type of Sample	Depth below E.G.L (m)	Thickness (m)	Stratification		Soil Strata Legend	Picture of Soil Sample	Standard Penetration Test (SPT)				Graphical representation of N values
				Description of Soil Strata				SPT Intervals (meter)	Blows on Spoon per 15 cm Penetration			
								15 cm	15 cm	15 cm		
D1		1	2.0m	Brown Clayey Silt.			1	1	1	2	3	
D2		2					2	1	1	2	3	
D3		3	4.0m	Gray fine Silty SAND .			3	2	2	2	4	
D4		4					4	2	2	3	5	
D5		5					5	4	5	6	11	
D6		6					6	4	6	7	13	
D7		7	4.0m	Gray fine Silty SAND .			7	4	6	7	13	
D8		8					8	5	6	8	14	
D9		9					9	5	6	9	15	
D10		10					10	6	10	12	22	
D11		11					11	10	13	15	28	
D12		12					12	11	14	16	30	
D13		13	4.0m	Gray fine Sandy Silty .			13	12	14	17	31	
D14		14					14	14	16	18	34	
D15		15					15	14	17	20	37	
D16		16					16	15	18	22	40	
D17		17	3.0m	Gray fine SAND .			17	16	20	22	42	
D18		18					18	16	20	22	42	
D19		19					19	17	22	24	46	
D20		20	11.0m	Gray fine SAND .			20	17	22	25	47	
D21		21					21	17	23	25	48	
D22		22					22	18	24	25	49	
D23		23					23	18	27	23	> 50	
D24		24					24	19	28	22	> 50	
D25		25					25	20	30	20	> 50	
D26		26					26	22	32	18	> 50	
D27		27					27	23	35	15	> 50	
D28		28					28	23	35	14	> 50	
D29		29					29	24	40	10	> 50	
D30		30					30	24	50	-	> 50	

RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.										Client: LGED					
Bore Hole No : BH 07			Ground Water Level (GWL) : 0.0m.Below			Soil Strata Legend:									
Method of Boring : WASH			Date of Starting :28/06/2014			Sand		Peat / Organic		Mica					
Boring Depth : 31.0m			Date of Completion :28/06/2014			Silt		Disturb Sample (D)		Undisturb Sample (UD)					
Clay			Grit/ Stone			Clay		Disturb Sample (D)		Undisturb Sample (UD)					
Location of Boring :Tower No.349( N 22°59'6.43" E 91°30'18.89")															
Sample No.	Type of Sample	Stratification		Soil Strata Legend	Picture of Soil Sample	Standard Penetration Test (SPT)				Graphical representation of N values					
		Depth below E.G.L. (m)	Thickness (m)			Description of Soil Strata	SPT Intervals (meter)	Blows on Spoon per 15 cm Penetration			N- Value				
						15 cm	15 cm	15 cm		00	10	20	30	40	50
D1		1	12.0m	Gray medium Silt Clay.		1	1	2	3	5					
D2		2			2	2	4								
D3		3			2	3	3	6							
D4		4			2	3	4	7							
D5		5			2	3	4	7							
D6		6			2	3	3	6							
D7		7			2	3	5	8							
D8		8			2	3	4	7							
D9		9			2	2	3	5							
D10		10			3	3	3	6							
D11		11			3	4	6	10							
D12		12			1	2	3	5							
D13		13	5.0m	Gray loose Silty SAND .		13	2	3	3	6					
D14		14			2	2	3	5							
D15		15			2	2	3	5							
D16		16			2	3	3	6							
D17		17			3	4	4	8							
D18		18	8.0m	Gray medium fine Silty SAND.		18	3	5	6	11					
D19		19			3	6	6	12							
D20		20			3	6	7	13							
D21		21			3	6	8	14							
D22		22			4	7	9	15							
D23		23			5	8	10	18							
D24		24			6	10	14	24							
D25		25			6	11	14	25							
D26		26			7	14	16	30							
D27		27			8	20	26	46							
D28		28	5.9m	Gray dense fine SAND.		28	10	24	26	50					
D29		29			13	27	23	>	50						
D30		30			14	28	22	>	50						
D31		31			16	31	19	>	50						

RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.										Client: LGED		
Bore Hole No : BH 08					Ground Water Level (GWL) : 0.0m.Below					Soil Strata Legend:		
Method of Boring : WASH					Date of Starting :29/06/2014					 Sand  Peat / Organic		
Boring Depth : 23.0m					Date of Completion :29/06/2014					 Silt  Mica		
										 Clay  Disturb Sample (D)		
										 Grit/ Stone  Undisturb Sample (UD)		
Location of Boring :Tower No.428( N 22°49'40.53." E 91°42'48.74")												
Sample No.	Type of Sample	Stratification			Soil Strata Legend	Picture of Soil Sample	Standard Penetration Test (SPT)				Graphical representation of N values	
		Depth below E.G.L. (m)	Thickness (m)	Description of Soil Strata			SPT Intervals (meter)	Blows on Spoon per 15 cm Penetration				N- Value
							15 cm	15 cm	15 cm			
D1		1	8.0m	Brown Clayey silt			1	1	1	2		
D2		2					2	1	1	2		3
D3		3					3	1	2	2		4
D4		4					4	2	3	4		7
D5		5					5	1	2	3		5
D6		6					6	2	3	4		7
D7		7					7	1	2	2		4
D8		8					8	1	2	3		5
D9		9	8.0m	Brown fine Silty SAND.			9	12	14	14		29
D10		10					10	11	15	16		31
D11		11					11	12	16	17		33
D12		12					12	14	17	18		35
D13		13					13	13	17	18		35
D14		14					14	14	18	20		38
D15		15					15	15	20	22		42
D16		16					16	15	21	22		43
D17		17	7.0m	Brown medium dense SAND.			17	16	22	23		45
D18		18					18	17	23	24		47
D19		19					19	18	24	25		49
D20		20					20	18	30	20		> 50
D21		21					21	22	35	15		> 50
D22		22					22	22	38	12		> 50
D23		23					23	24	40	10		> 50
D24		24										
D25		25										
D26		26										
D27		27										
D28		28										
D29		29										
D30		30										
D31		31										

RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.										Client: LGED		
Bore Hole No : BH 09			Ground Water Level (GWL) : 0.0m.Below			Soil Strata Legend:						
Method of Boring : WASH			Date of Starting :30/06/2014			Sand		Peat / Organic		Mica		
Boring Depth : 30.0m			Date of Completion :30/06/2014			Silt		Disturb Sample (D)		Undisturb Sample (UD)		
						Clay						
						Grit/ Stone						
Location of Boring :Tower No.009(N 22°25'30.82" E 91°56'28.69")												
Sample No.	Type of Sample	Stratification		Soil Strata Legend	Picture of Soil Sample	Standard Penetration Test (SPT)				Graphical representation of N values		
		Depth below E.G.L. (m)	Thickness (m)			Description of Soil Strata	SPT Intervals (meter)	Blows on Spoon per 15 cm Penetration			N- Value	
						15 cm	15 cm	15 cm				
D1		1	3.0m	Gray Soft Clayey Silt.		1	1	2	3			
D2		2			1	2	2	3				
D3		3			2	3	3	6				
D4		4	10.0m	Light brown Clayey Silt.		U	D	S				
D5		5			1	1	1	2				
D6		6			1	1	1	2				
D7		7			1	1	2	3				
D8		8			1	2	2	4				
D9		9			2	2	3	5				
D10		10			2	3	3	6				
D11		11			2	4	5	9				
D12		12			3	5	7	12				
D13		13			4	7	8	15				
D14		14	5	8	10	18						
D15		15	6	10	12	22						
D16		16	6	10	13	23						
D17		17	7	13	15	28						
D18		18	8	14	16	30						
D19		19	9	15	18	33						
D20		20	10	16	20	36						
D21		21	10	15	20	35						
D22		22	11	17	21	38						
D23		23	12	18	22	40						
D24		24	13	20	22	42						
D25		25	14	22	23	45						
D26		26	15	23	24	47						
D27		27	16	24	26	50						
D28		28	17	26	24	> 50						
D29		29	18	27	23	> 50						
D30		30	18	30	20	> 50						
		17.0m		Gray medium fine Silty SAND.								



RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.				Client: LGED	
Bore Hole No : BH 10				Ground Water Level (GWL) : 0.30m.Below	
Method of Boring : WASH				Date of Starting :01/07/2014	
Boring Depth : 32.0m				Date of Completion :01/07/2014	
Soil Strata Legend:					
Sand		Peat / Organic		Mica	
Silt		Disturb Sample (D)		Undisturb Sample (UD)	
Clay					
Grit/ Stone					

Location of Boring :Tower No.099( N 22°08'18.0" E 91°53'17.6")

Sample No.	Type of Sample	Stratification		Soil Strata Legend	Picture of Soil Sample	Standard Penetration Test (SPT)					Graphical representation of N values	
		Description of Soil Strata	Depth below E.C.L. (m)			Thickness (m)	SPT Intervals (meter)	Blows on Spoon per 15 cm Penetration				N- Value
								15 cm	15 cm	15 cm		
D1		Light brown clay silt	1	1.0m		1	1	2	3			
D2		Gray Silty Sand With Clay .	2	9.0m		U	D	S				
D3			3			1	0	1	1			
D4			4			1	0	1	1			
D5			5			1	1	1	2			
D6			6			1	1	1	2			
D7			7			1	1	1	2			
D8		Gray fine Silty SAND .	8	3.0m		2	3	3	6			
D9			9			2	4	5	9			
D10			10			3	5	10	15			
D11		Gray medium SAND	11	2.0m		4	8	12	20			
D12			12			5	7	10	17			
D13		Gray fine Silty SAND .	13	19.9m		5	8	12	20			
D14			14			6	9	13	22			
D15			15			6	10	14	24			
D16			16			7	12	15	27			
D17			17			8	12	17	29			
D18			18			8	12	17	29			
D19			19			9	13	18	31			
D20			20			9	14	17	31			
D21			21			10	15	18	33			
D22			22			10	16	19	35			
D23			23			12	18	20	38			
D24			24			12	20	21	41			
D25			25			13	21	22	43			
D26			26			13	22	23	45			
D27		27		13	22	24	46					
D28		28		14	23	25	48					
D29		29		14	24	26	50					
D30		30		15	27	23	> 50					
D31		31		16	30	20	> 50					
D32		32		17	32	18	> 50					

RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.		Client: LGED	
Bore Hole No : BH 11		Ground Water Level (GWL) : 0.30m.Below	
Method of Boring : WASH		Date of Starting :02/07/2014	
Boring Depth : 33.0m		Date of Completion :03/07/2014	

Soil Strata Legend:

Sand	Peat / Organic
Silt	Mica
Clay	Disturb Sample (D)
Grit/ Stone	Undisturb Sample (UD)

Location of Boring :Tower No.231( N 21°43'21.52"E 91°54'27.12")

Sample No.	Type of Sample	Stratification		Soil Strata Legend	Picture of Soil Sample	Standard Penetration Test (SPT)				
		Description of Soil Strata	Thickness (m)			SPT Intervals (meter)	Blows on Spoon per 15 cm Penetration			N- Value
							15 cm	15 cm	15 cm	
D1		Light Brown clay silt.	1.0m			1	1	1	2	
D2		Light Brown Silty sand .	11.0m			2	1	0	1	1
D3						3	1	1	2	3
D4						4	1	1	2	3
D5						5	1	1	3	4
D6						6	1	1	2	3
D7						7	1	1	2	3
D8						Light Brown Silty sand .	9.0m			8
D9		9	2	3	5					8
D10		10	3	6	8					14
D11		Gray coarse SAND .	9.0m			11	4	8	11	19
D12						12	4	6	9	15
D13						13	4	7	10	17
D14						14	5	8	10	18
D15						15	6	10	12	22
D16						16	6	10	12	22
D17						17	7	11	12	23
D18						18	7	12	13	25
D19						19	8	13	15	28
D20						20	8	14	16	30
D21		Gray coarse SAND .	11.9m			21	8	14	17	31
D22						22	8	15	18	33
D23						23	9	16	20	36
D24						24	9	16	21	37
D25						25	10	17	22	39
D26						26	10	18	22	40
D27						27	11	20	22	42
D28						28	12	21	23	44
D29						29	13	23	25	48
D30						30	14	23	26	49
D31						31	15	24	26	50
D32						32	16	27	23	> 50
D33		33	17	28	22	> 50				

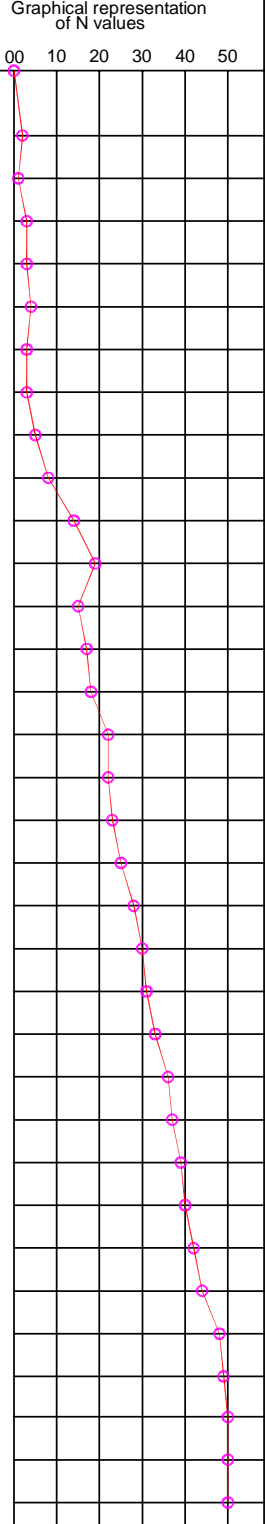


Fig: 2

RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.			Client: LGED	
Bore Hole No : BH 12			Ground Water Level (GWL) : 0.30m.Below	
Method of Boring : WASH			Date of Starting :04/07/2014	
Boring Depth : 27.0m			Date of Completion :05/07/2014	

Soil Strata Legend:

	Sand		Peat / Organic
	Silt		Mica
	Clay		Disturb Sample (D)
	Grit/ Stone		Undisturb Sample (UD)

Location of Boring :Tower No.395( N 22°53'36.85"E 91°37'45.58")

Sample No.	Type of Sample	Stratification		Soil Strata Legend	Picture of Soil Sample	Standard Penetration Test (SPT)					
		Description of Soil Strata	Thickness (m)			SPT intervals (meter)	Blows on Spoon per 15 cm Penetration			N- Value	Graphical representation of N values
							15 cm	15 cm	15 cm		
D1		Brown Clayey Silt.	3.0m			1	2	2	3	5	
D2	2					2	3	5	8		
D3	3					3	4	6	10		
D4	4	Brown Dense SAND .	24.0m			4	4	6	8	14	
D5	5					4	7	8	15		
D6	6					4	8	8	16		
D7	7					4	9	11	20		
D8	8					4	10	11	21		
D9	9					4	11	12	23		
D10	10					5	12	13	25		
D11	11					6	13	14	27		
D12	12					7	14	16	30		
D13	13					7	15	17	32		
D14	14					7	16	18	34		
D15	15					8	17	18	35		
D16	16					8	18	20	38		
D17	17					8	18	21	39		
D18	18					9	20	22	42		
D19	19					9	21	23	44		
D20	20					10	22	24	46		
D21	21					12	22	25	47		
D22	22					12	23	25	48		
D23	23					13	24	25	49		
D24	24					14	25	25	50		
D25	25					16	26	24	50		
D26	26					16	29	21	50		
D27	27					17	30	20	50		
D28	28										
D29	29										
D30	30										
D31	31										
D32	32										
D33	33										



RECORD OF BORING AND TESTING (BORE LOG)

Project: Dhaka - Chitagong main Power Grid Strengthening project.		Client: LGED	
Bore Hole No : BH 13		Ground Water Level (GWL) : 4.50m.Below	
Method of Boring : WASH		Date of Starting :05/07/2014	
Boring Depth : 27.0m		Date of Completion :06/07/2014	

Soil Strata Legend:

	Peat / Organic
	Mica
	Disturb Sample (D)
	Undisturb Sample (UD)

Location of Boring :Tower No.410 N 22°52'13.54" E 91°40'19.51")

Sample No.	Type of Sample	Stratification		Soil Strata Legend	Picture of Soil Sample	Standard Penetration Test (SPT)				Graphical representation of N values	
		Description of Soil Strata	Thickness (m)			SPT intervals (meter)	Blows on Spoon per 15 cm Penetration				N- Value
							15 cm	15 cm	15 cm		
D1		Light brown clay silt	5.0m			1	2	6	8		
D2				2	4	6	10				
D3				3	5	8	13				
D4				4	6	7	13				
D5				5	8	9	17				
D6		Brown Dense SAND .	22.0m			3	5	7	12		
D7				7	6	8	14				
D8				8	7	9	16				
D9				9	8	10	18				
D10				10	10	12	22				
D11				11	10	12	22				
D12				12	7	11	24				
D13				13	8	12	26				
D14				14	7	13	28				
D15				15	7	14	30				
D16				16	8	16	34				
D17				17	8	18	38				
D18		18	8	18	38						
D19		19	9	20	41						
D20		20	10	22	45						
D21		21	11	23	47						
D22		22	11	23	47						
D23		23	12	24	49						
D24		24	14	24	50						
D25		25	15	28	50						
D26		26	16	30	50						
D27		27	17	32	50						
D28											
D29											
D30											
D31											
D32											
D33											



## 付録 1 1

### バルク供給料金



People's Republic of Bangladesh Government

Bangladesh Energy Regulatory Commission

TCB Building (3<sup>rd</sup> Floor), 1 Karwan Bazar, Dhaka – 1215.

**Mass Circulation**

No – BERC/Tariff/BST-05/BIUBO/2012/2437

Date: 20<sup>th</sup> September, 2012

As per the power given by section 22(b) and 34 of Bangladesh Regulatory Commission Act 2003, Bangladesh Regulatory Commission has redefined the wholesale electricity tariff for different power distributor agencies/companies/rural electricity development board getting electricity supplied by Bangladesh Electricity Development Board to be effective from 1<sup>st</sup> September, 2012 as following:

Serial no	Customer class	Agencies	Approved wholesale (bulk) electricity tariff taka/kwh
1	Class: G-1	Dhaka Power Distribution Company Limited (DPDC)  (a) 132 KV  (b) 33 KV	5.3250  5.4050
2	Class: I-1	Rural Electricity Development Board (REB)  (a) 132 KV  (b) 33 KV	5.3250  4.0325
3	Class: I-2	Dhaka Electric Supply Company Limited (DESCO)  (a) 132 KV  (b) 33 KV	5.3250  5.4050
4	Class: I-3	West Zone Power Distribution Company Limited (WOZOPADIKO)  (a) 133 KV	5.3250

		(b) 33 KV	4.4300
5	Class: I-4	Bangladesh Electricity Development Board (PDB) (a) 133 KV (b) 33 KV	5.3250 4.9775
6	Class: I-5	North West Zone Power Distribution Company Limited (a) 133 KV (b) 33 KV	5.3250 4.9775
7	Class: I-6	Future constructed power distribution company (a) 132 KV (b) 33 KV	5.3250 4.9775

- \* Considering the socio-financial situation of the rural people this reduced tariff has been set up. BIUBO will bill to all PABIS at this wholesale rate. By considering financial, geographical and other situations PABIBO will propose retail tariff of different PABIS for approval of the commission. But, for an affluent PABIS, tariff of DPDC/DESCO won't be greater than 33 KV stage of tariff.

2. This approved wholesale tariff on electricity usage will be effective from 1<sup>st</sup> September, 2012.

3. The whiling charge which is being pain to Power Grid Company of Bangladesh (PGBC) will remain unchanged.

4. Other conditions will remain unchanged in case of wholesale electricity supply.

5. This statement will remain effective until further notice.

Order by Commission

Mohammad Abu Faroque

Manager (Economy and Accounts)

And

Secretary (Extra Responsibility)

## 付録 12

### 最終消費者料金





People's Republic of Bangladesh Government  
 Bangladesh Energy Regulatory Commission  
 TCB Building (3<sup>rd</sup> Floor), 1 Karwan Bazar, Dhaka – 1215.

**Mass Circulation**

No – BERC/Tariff/ SUPPLY-12/ BUBO/2012/Sec-01/0720

Date: 13<sup>th</sup> March, 2014

As per the power given by section 22(b) and 34 of Bangladesh Regulatory Commission Act 2003, Bangladesh Regulatory Commission has reselected the electricity tariff for different customers getting electricity supplied by Bangladesh Electricity Development Board to be effective from 14<sup>th</sup> March, 2014 as following:

Serial No	Customers	Approved electricity tariff Taka/ KWH
1	2	3
(1)	<b>Class-A: Residence</b>  <b>Lifeline : 1-50 unit</b>  1 <sup>st</sup> Phase: 1-75 unit  2 <sup>nd</sup> Phase: 76-200 unit  3 <sup>rd</sup> Phase: 201-300 unit  4 <sup>th</sup> Phase: 301-400 unit  5 <sup>th</sup> Phase: 401-600 unit  6 <sup>th</sup> Phase: More than 600 unit	<b>3.33</b>  3.53  5.01  5.19  5.42  8.51  9.93
(2)	<b>Class B: Pump used on agriculture</b>	2.51
(3)	<b>Class C: Small Industry</b>  Flat  Off-peak hour	7.42  6.64

	Peak hour	9.00
(4)	<b>Class D: Nonresidential lights and electricity</b>	4.98
(5)	<b>Class E: Commercial and Office</b>	
	Flat	9.58
	Off-peak hour	8.16
	Peak hour	11.85
(6)	<b>Class F: Medium Pressure General Use (11 KV)</b>	
	Flat	7.32
	Off-peak hour	6.62
	Peak hour	9.33
(7)	<b>Class G-2: Too High Pressure General Use (132 KV)</b>	
	Flat	6.16
	Off-peak hour	6.35
	Peak hour	9.19
(8)	<b>Class H: High Pressure General Use (33 KV)</b>	
	Flat	7.20
	Off-peak hour	6.55
	Peak hour	9.28
(9)	<b>Class J: Street Lights and water pumps</b>	6.93

2. No other customers of residence class will get the privilege of lifeline (1-50 unit) tariff.

3. All customers from residence class using electricity from 1<sup>st</sup> phase to 3<sup>rd</sup> phase will get the tariff privilege of earlier phase/phases.

4. The tariff for all customers using irrigation for agriculture will remain the same.
5. For all customers' current minimum charge, service charge, demand charge and late fee punishment will remain all the same.
6. Current value added tax and other conditions for electricity supply will remain the same for all customers.
7. This statement will remain effective further statement.

By order of the commission

Abdul Khalek

Secretary

