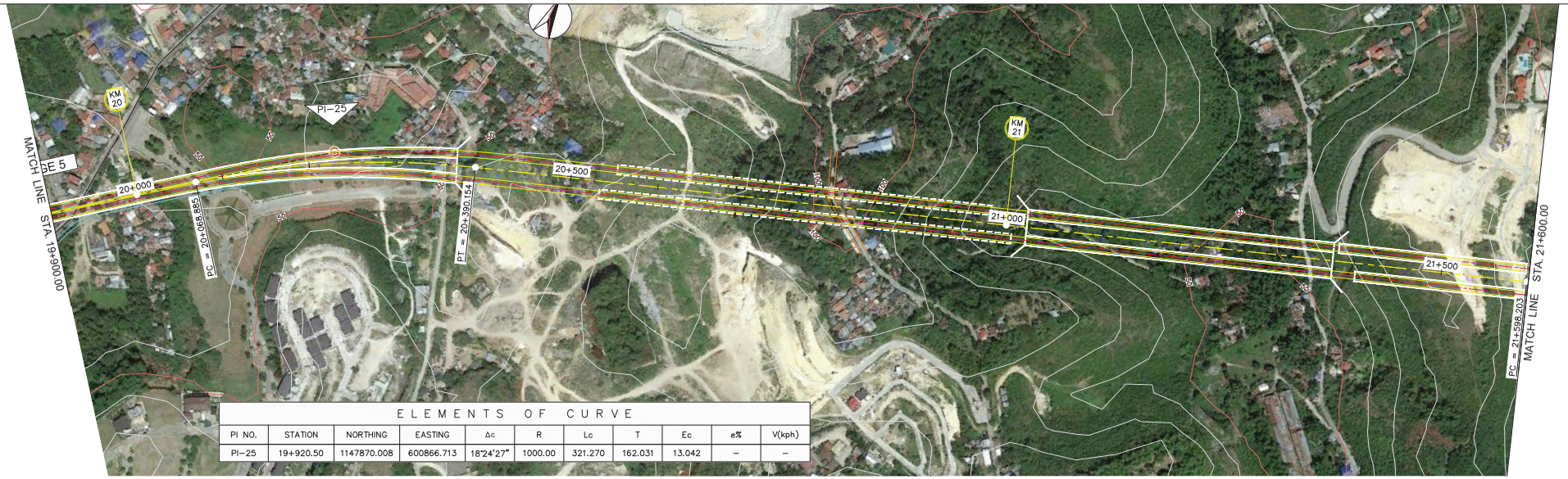
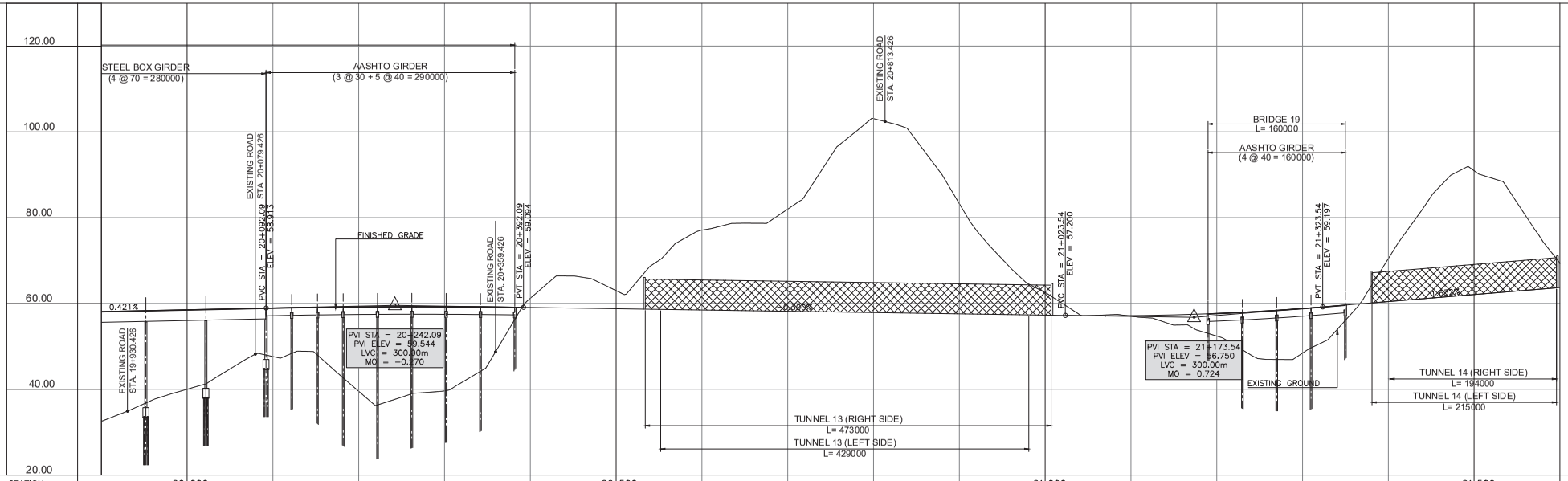


ELEMENTS OF CURVE

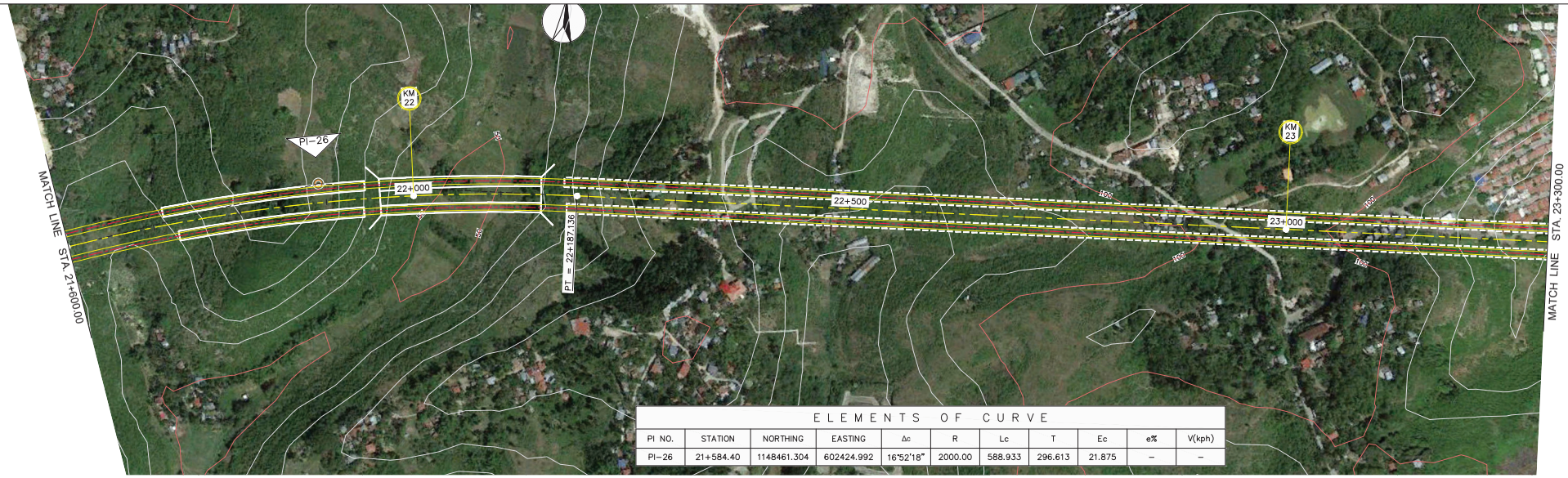
PI NO.	STATION	NORTHING	EASTING	Δc	R	Lc	T	Ec	e%	V(kph)
PI–25	19+920.50	1147870.008	600866.713	18°24'27"	1000.00	321.270	162.031	13.042	–	–



STATION	20+000						20+500						21+000						21+500	
FINISHED GRADE	58.105	58.526	58.946	59.227	59.269	59.071	58.771	58.471	58.171	57.871	57.571	57.271	57.159	57.673	58.831	60.445	62.077	63.708		
EXISTING GROUND	32.585	39.996	47.620	39.517	39.607	61.202	62.979	77.080	81.985	103.080	83.258	62.533	57.026	52.392	48.420	70.446	90.938	69.433		
HORIZONTAL CURVATURE			PC=20+068.88		PI–26 R=1000.00	PT=20+390.15						R=∞							PC=21+	
VERTICAL CURVATURE	L=331.67 g=0.421%			LVC=300.00 K=416.244				L=631.45 g=–0.300%						LVC=300.00 K=155.311			L=287.31 g=1.632%			
SUPER ELEVATION	–2.00%	19+736.67	19+769.37		e=3.10% LEFT								20+068.84		20+101.54					
		19+715.57		19+757.76		e=–3.10% RIGHT							20+080.44			20+122.63				

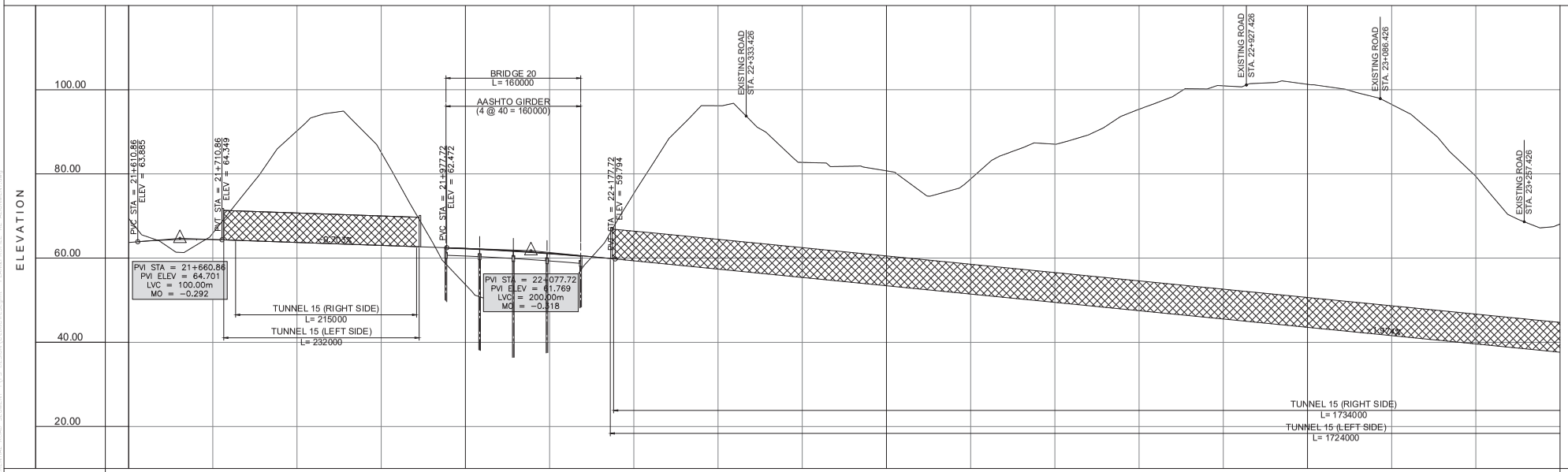
STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	PLAN AND PROFILE STA. 19+900.000~STA. 21+600.000	H = 1:5000 V = 1:1000	PP-13	13 OF 15

A 16.1-16



ELEMENTS OF CURVE

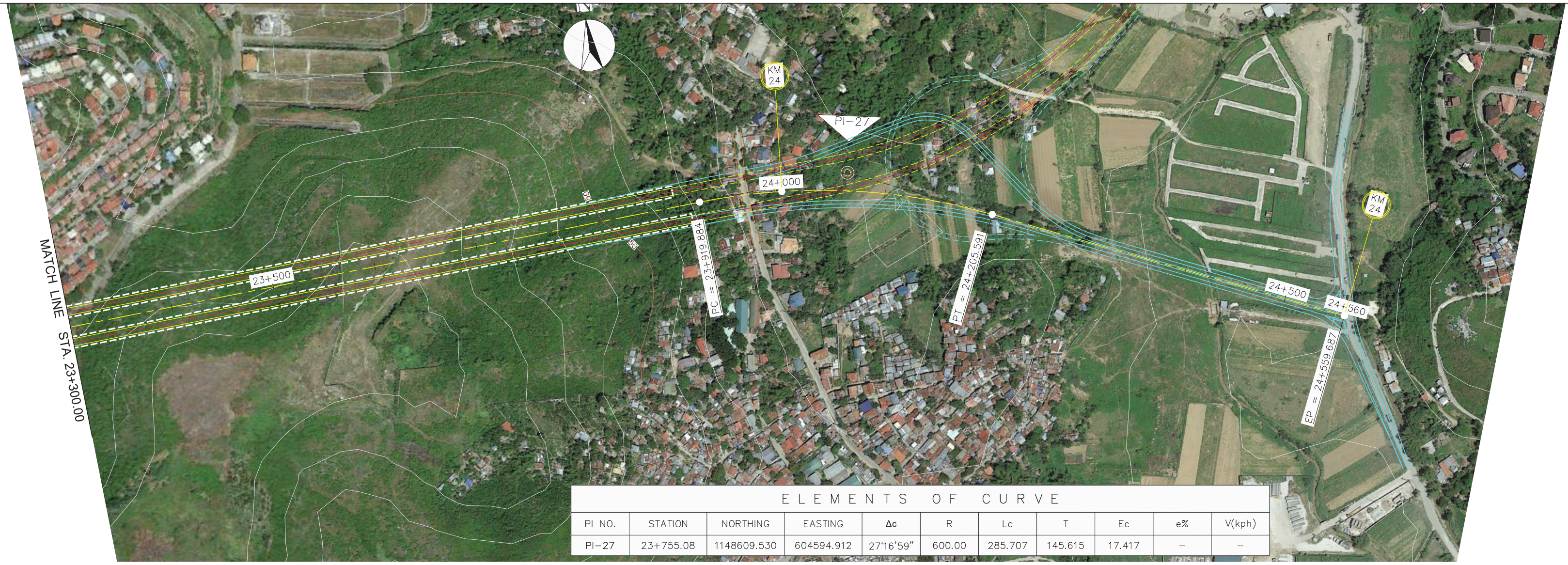
PI NO.	STATION	NORTHING	EASTING	Δc	R	Lc	T	Ec	e%	V(kph)
PI-26	21+584.40	1148461.304	602424.992	16°52'18"	2000.00	588.933	296.613	21.875	–	–



STATION	22+000					22+500						23+000			
FINISHED GRADE	63.708	64.412	63.722	63.019	62.300	61.137	59.355	57.380	55.406	53.431	51.457	49.482	47.508	45.534	43.559	41.585	39.610	37.636
EXISTING GROUND	69.433	65.930	90.231	85.088	53.706	50.854	75.363	96.205	82.738	80.733	78.803	87.065	95.368	100.926	101.286	96.504	79.417	68.102
HORIZONTAL CURVATURE	C=21+598.20			PI-27 R=2000.00			PT=22+187.14									R=0C		
VERTICAL CURVATURE	LVC=100.00 K=42.827			L=266.87 g=−0.703%			LVC=200.00 K=157.351									L=1824.14 g=−1.974%		
SUPER ELEVATION	NC=2.00%																	

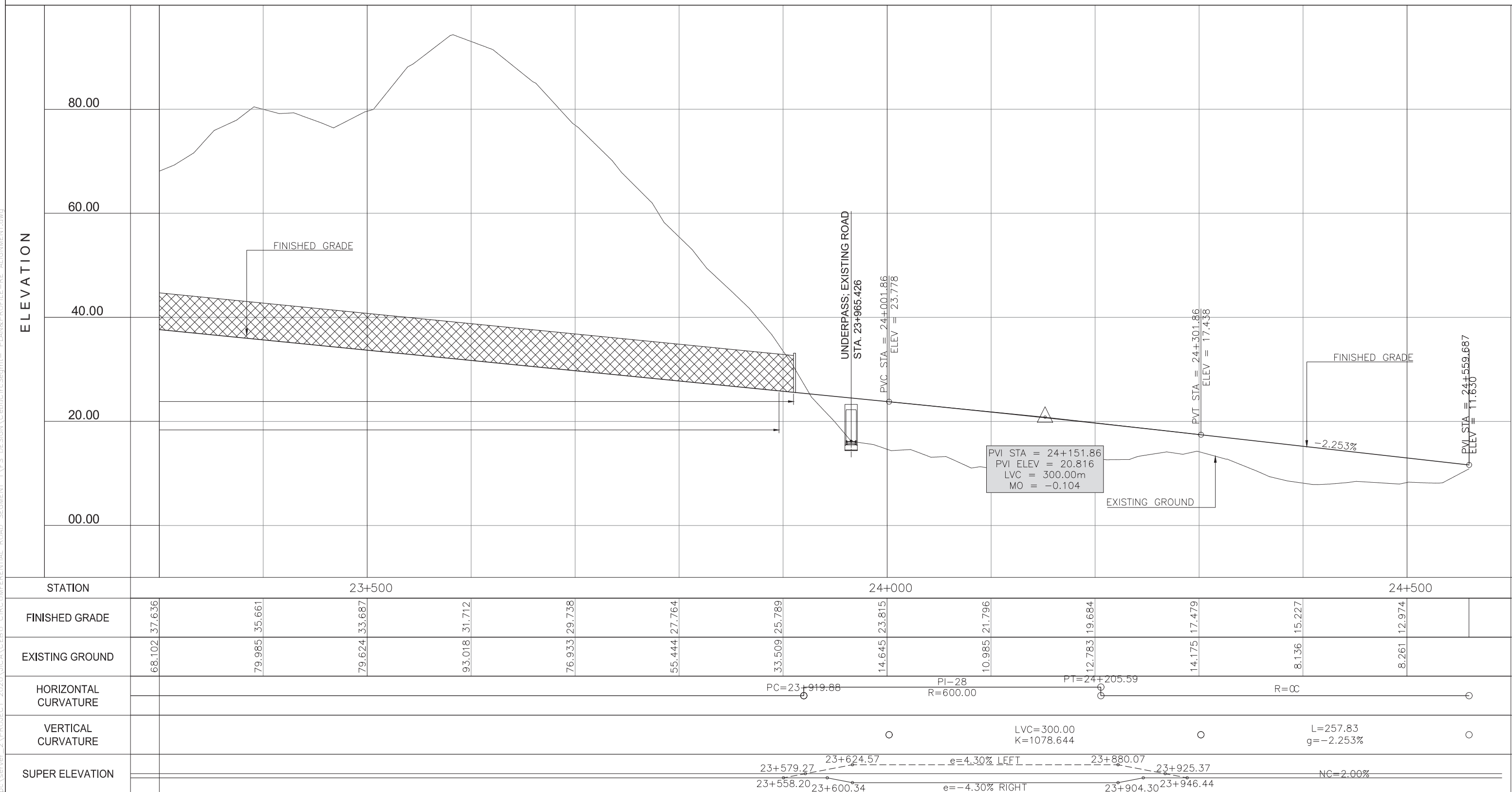
STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	PLAN AND PROFILE STA. 21+600.000~STA. 23+300.000	H = 1:5000 V = 1:1000	PP-14	14 OF 15

A 16.1-17

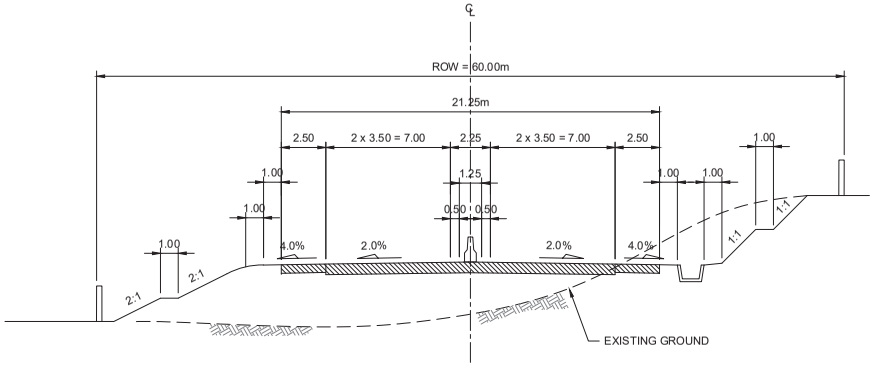


ELEMENTS OF CURVE

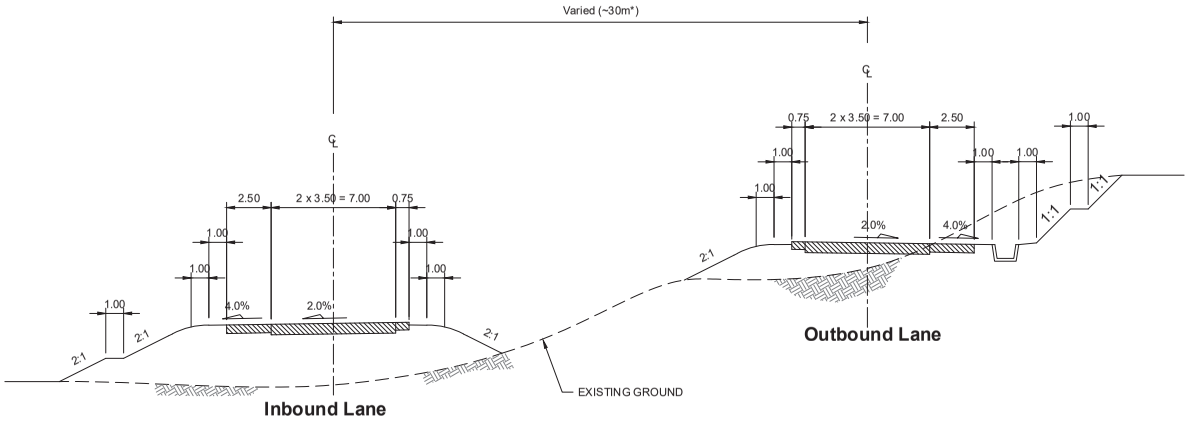
PI NO.	STATION	NORTHING	EASTING	Δc	R	Lc	T	Ec	e%	V(kph)
PI-27	23+755.08	1148609.530	604594.912	27°16'59"	600.00	285.707	145.615	17.417	–	–



STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	PLAN AND PROFILE STA. 23+300.000~STA. 24+559.687	H = 1:5000 V = 1:1000	PP-15	15 OF 15

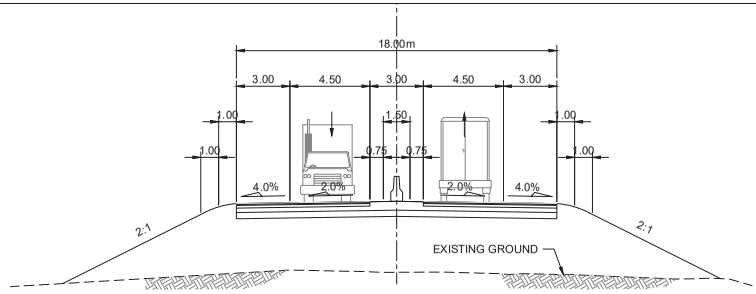


1 - TYPICAL ROAD CROSS SECTION (4-LANE)
SCALE 1:300

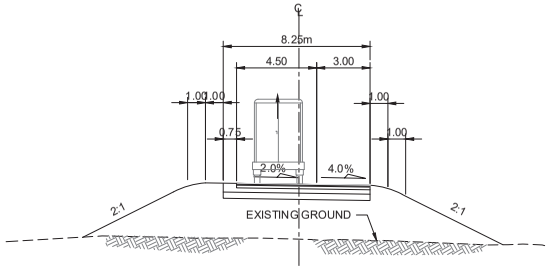


* ***The maximum mutual separation distance of the road section neighboring the tunnel section depends on the mutual separation distance of the tunnel.***

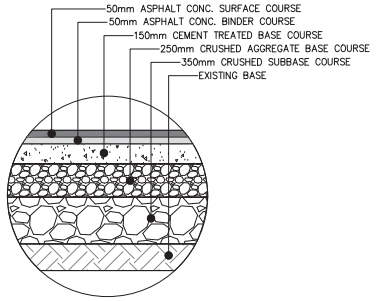
2 - TYPICAL ROAD CROSS SECTION (4-LANE SEPARATION)
SCALE 1:300



3 - TYPICAL SECTION (2 - WAY RAMP)
SCALE 1:300



4 - TYPICAL SECTION (1 - WAY RAMP)
SCALE 1:300



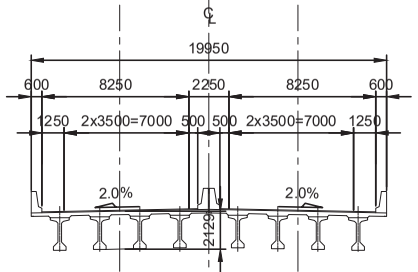
PAVEMENT DETAIL

A 16.1-19

STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	TYPICAL ROADWAY SECTIONS	1:300	TS-01	1 of 2

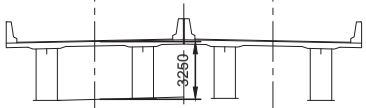
INTEGRATED SECTION

BR 1-2
BR 6
BR18-2
BR18-3
BR18-4
BR18-5



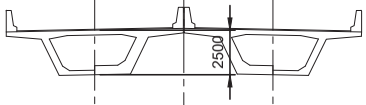
AASHTO GIRDER

BR18-6



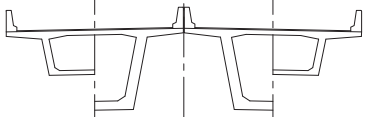
STEEL NARROW BOX GIRDER

BR 7



PC BOX GIRDER

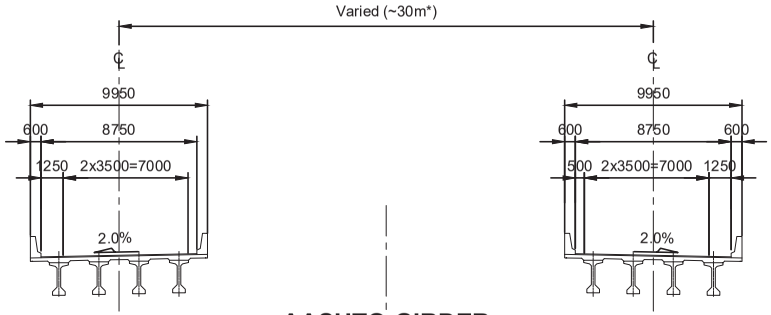
BR 1-1
BR 5-2



PC BOX GIRDER (CANTILEVER)

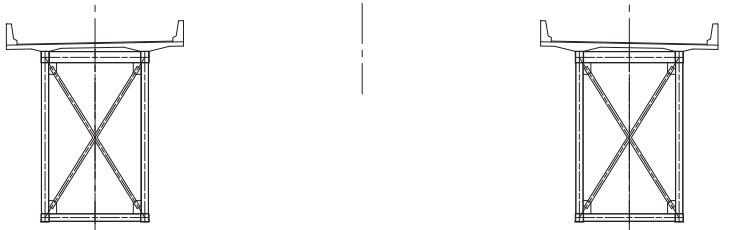
SEPARATED SECTION

BR 2
BR 3-2
BR 4
BR5-1
BR8-2
BR10
BR12
BR13
BR14-2
BR 15
BR 16
BR 17
BR18-1
BR18-7
BR18-8
BR19
BR20



AASHTO GIRDER

BR 9



STEEL TRUSS GIRDER

BR 8-1

PC BOX GIRDER

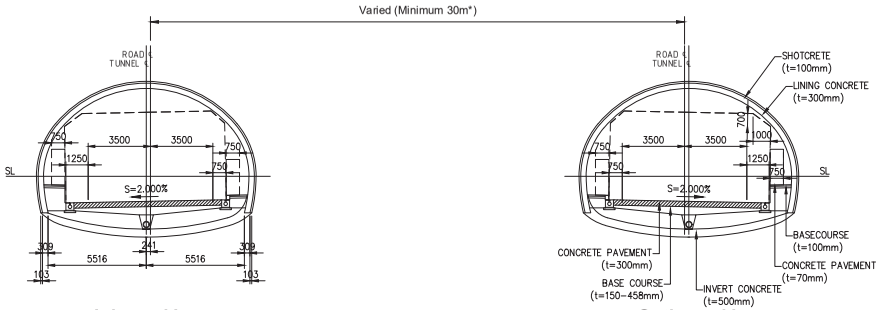
BR 3-1
BR 11
BR 14-1

PC BOX GIRDER (CANTILEVER)

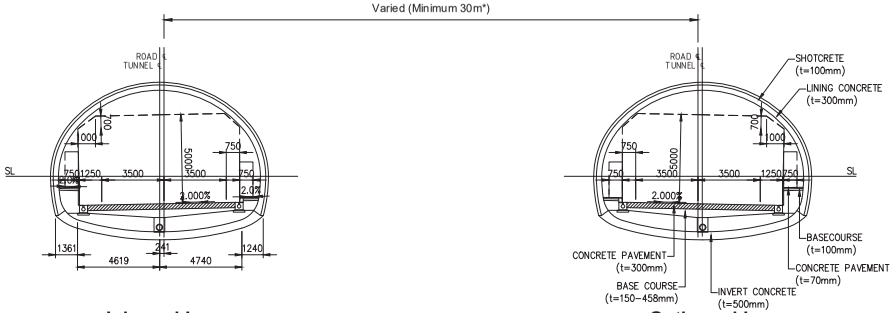
BR 3-3

PC HOLLOW SLAB

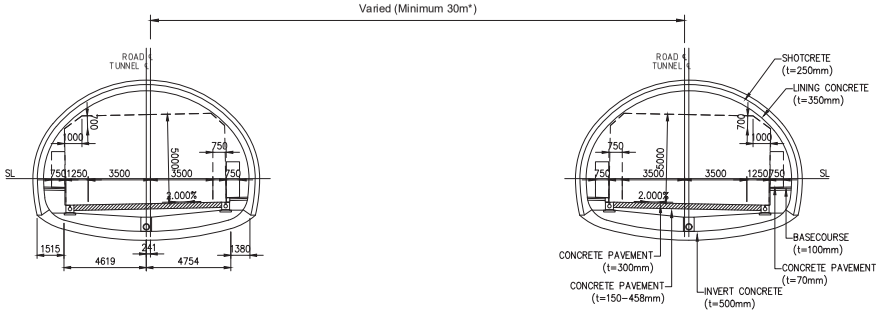
STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	TYPICAL BRIDGE SECTIONS	1:1000	TS-02	2 of 2



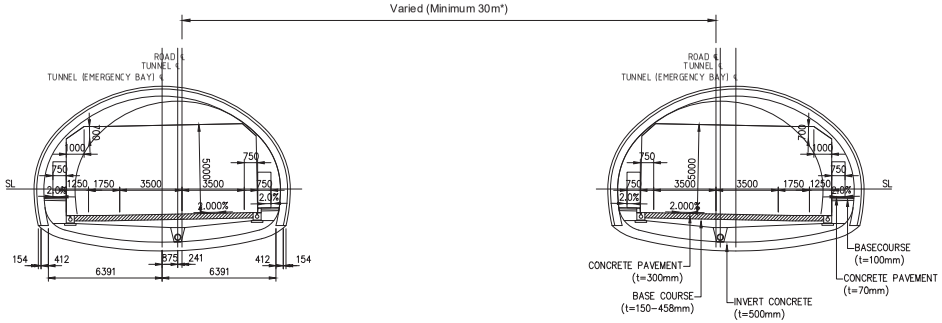
1 - TYPICAL TUNNEL SECTION (4-LANE CII-B)
SCALE 1:300



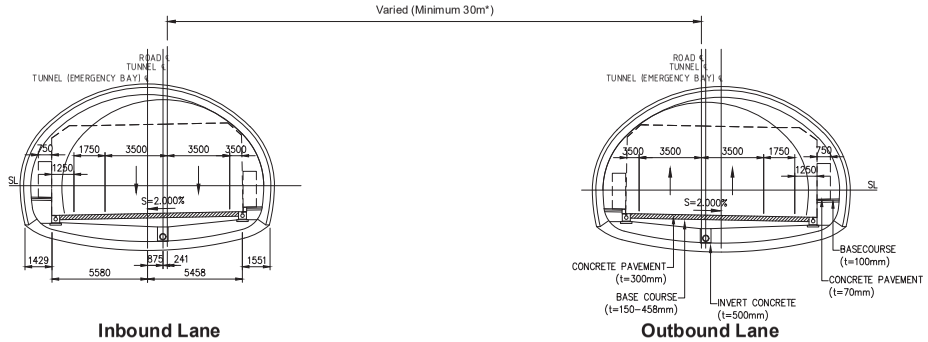
1 - TYPICAL TUNNEL SECTION (4-LANE DI-B)
SCALE 1:300



1 - TYPICAL TUNNEL SECTION (4-LANE DIII-A)
SCALE 1:300



1 - TYPICAL TUNNEL SECTION (4-LANE CII)
SCALE 1:300



2 - TYPICAL TUNNEL SECTION (4-LANE DI)
SCALE 1:300

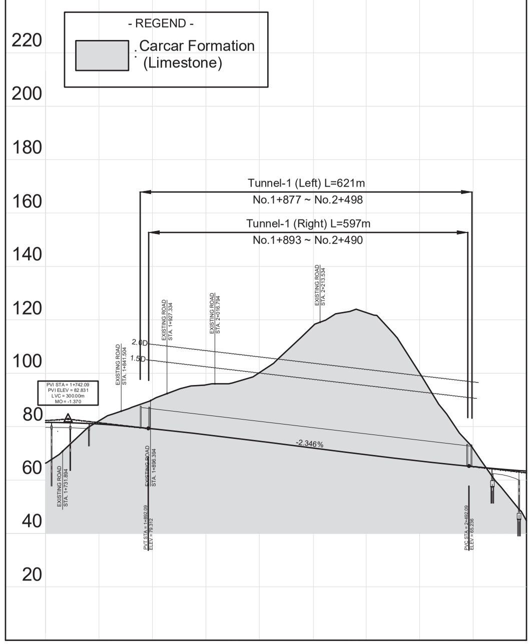
* ***The twin tunnel will have a mutual separation distance (distance between the centerline of two tunnels) of 30 m based on Japan standard (Design Guideline -Part 3-) in consideration of the effect of deformation and stress by neighboring construction.***

STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	TYPICAL TUNNEL SECTIONS	1:300	TS-01	1 of 2

ELEVATION (m)

V=1: 25
H=1: 500

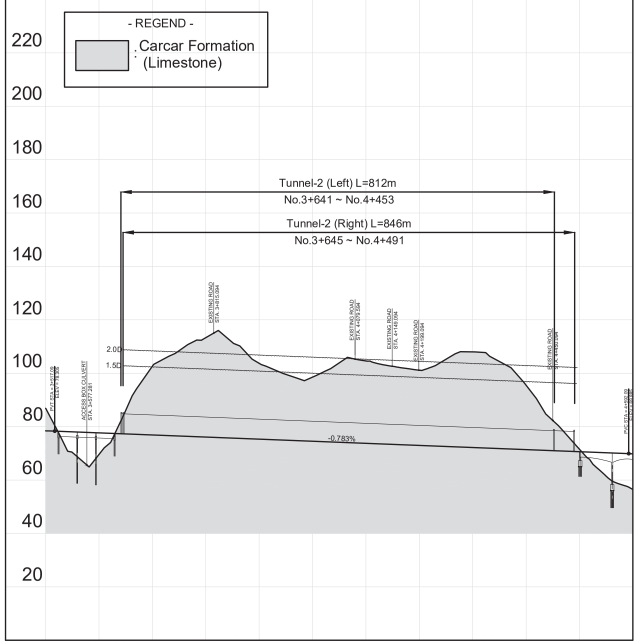
TUNNEL-1



Chainage Number	1+700	1+800	1+900	2+000	2+100	2+200	2+300	2+400	2+500
Finished Grade Elevation (m)	81.571	80.956	79.126	76.780	74.434	72.089	69.743	67.397	65.054
Existing Ground Elevation (m)	66.334	82.156	90.126	95.640	100.210	117.654	122.718	100.063	71.739

Basic Geology	Carcar Formation (Limestone)
Ground Condition	Residential Area
Excavation Pattern – Left	DIII (223m), DI (40m), CII (258m), DI (25m), DIII (75m)
Excavation Pattern – Right	DIII (207m), DI (40m), CII (258m), DI (25m), DIII (67m)
Auxiliary Method – Left	AGF (223m)
Auxiliary Method – Right	AGF (207m)

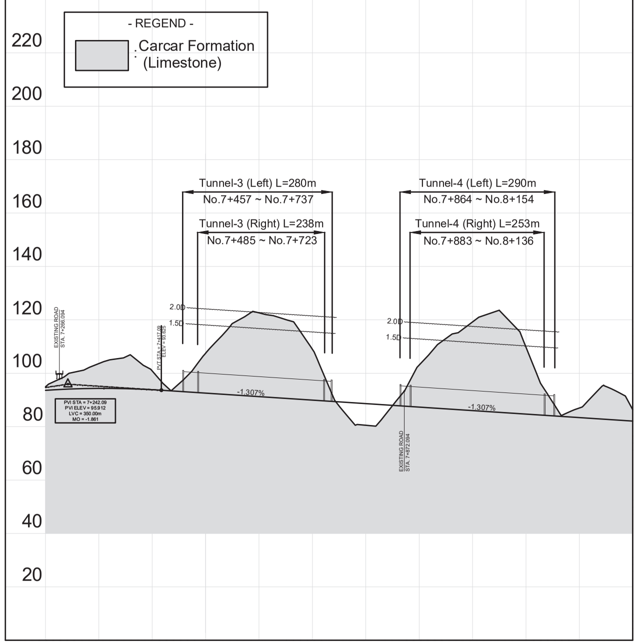
TUNNEL-2



Chainage Number	3+500	3+600	3+700	3+800	3+900	4+000	4+100	4+200	4+300	4+400	4+500
Finished Grade Elevation (m)	78.421	77.655	76.872	76.089	75.306	74.522	73.739	72.956	72.173	71.390	70.606
Existing Ground Elevation (m)	86.868	69.583	102.630	113.335	103.712	98.546	104.599	101.131	108.010	95.515	71.546

Basic Geology	Carcar Formation (Limestone)
Ground Condition	Low Overburden Area; Residential Area; DI-L(31m)
Excavation Pattern – Left	DIII (59m), DI (50m), CII (128m), DI (59m), DIII (78m), DI (25m), DI (169m), CII (121m), DI (33m), DIII (59m)
Excavation Pattern – Right	DIII (55m), DI (50m), CII (128m), DI (59m), DIII (78m), DI (25m), DI (169m), CII (121m), DI (33m), DIII (97m)
Auxiliary Method	DI-R(31m)

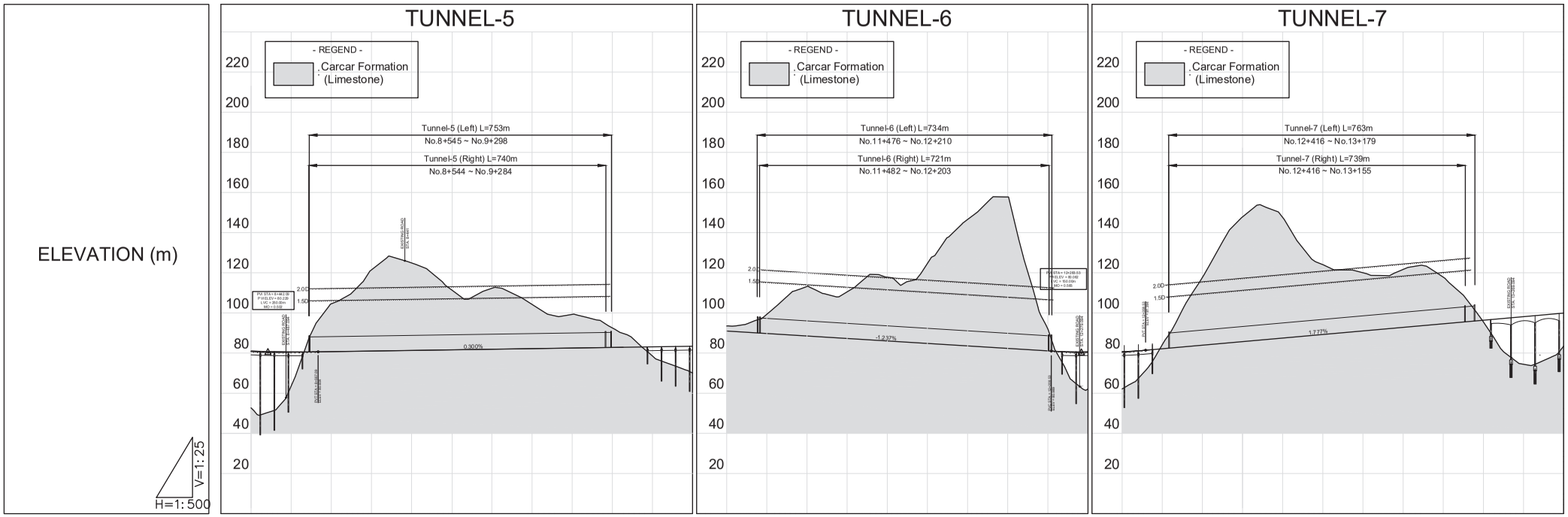
TUNNEL-3 & TUNNEL-4



Chainage Number	7+200	7+300	7+400	7+500	7+600	7+700	7+800	7+900	8+000	8+100	8+200
Finished Grade Elevation (m)	93.599	94.322	93.831	92.541	91.235	89.928	88.621	87.314	86.007	84.700	83.393
Existing Ground Elevation (m)	94.914	103.636	100.832	107.476	122.616	108.950	80.515	103.079	119.216	109.752	86.989

Basic Geology	Carcar Formation (Limestone)
Ground Condition	Residential Area; Residential Area; Ridge Line (Weathered Area)
Excavation Pattern – Left	DIII (89m), DI (130m), DIII (61m), DIII (82m), DI (152m), DIII (56m)
Excavation Pattern – Right	DIII (61m), DI (130m), DIII (47m), DIII (63m), DI (152m), DIII (88m)
Auxiliary Method – Left	AGF (61m)
Auxiliary Method – Right	AGF (47m)

STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	GEOLOGICAL PROFILE (1/5)	V=1:25 H=1:500	GP-01	1 of 5

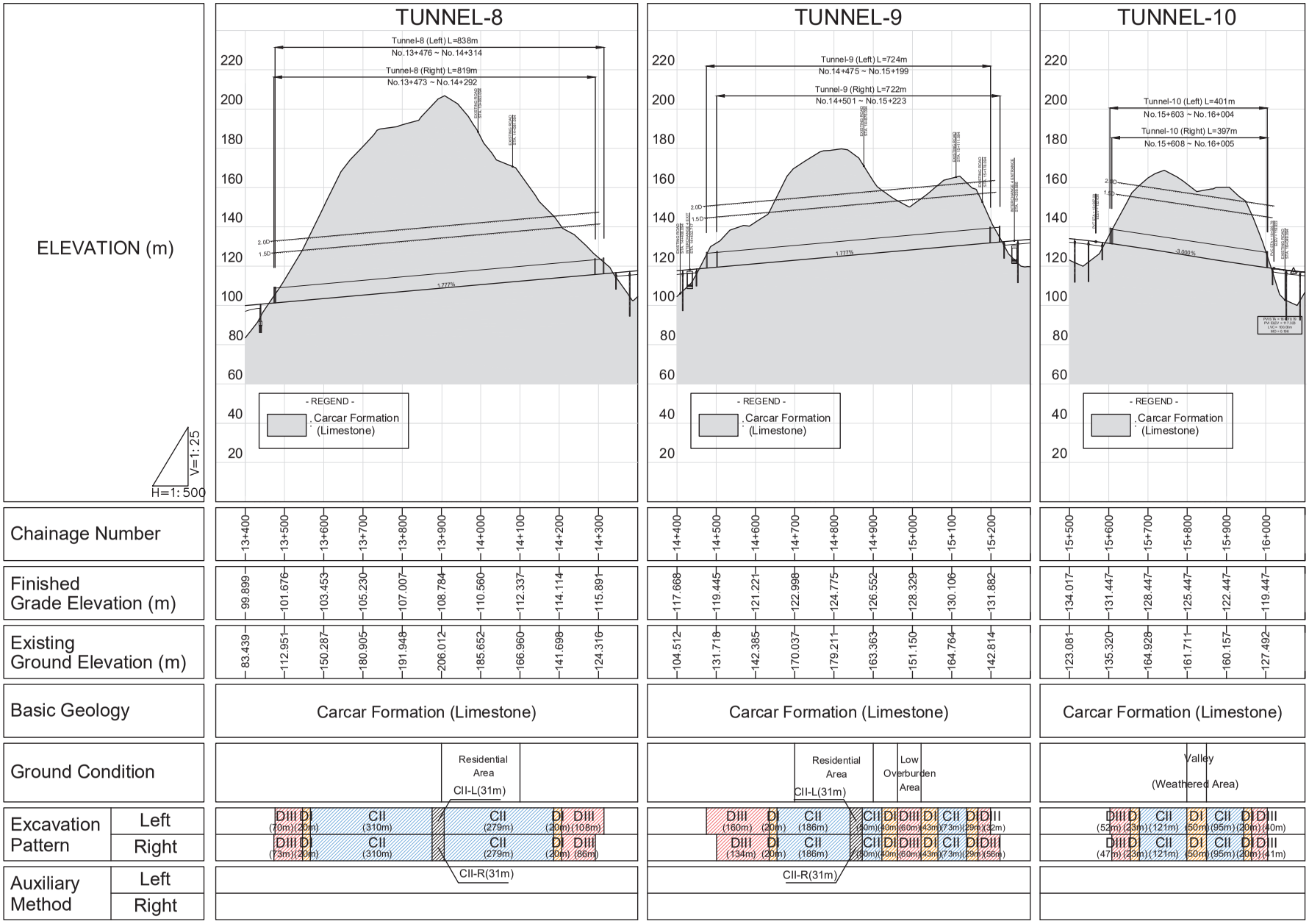


Chainage Number	8+400	8+500	8+600	8+700	8+800	8+900	9+000	9+100	9+200	9+300	9+400
Finished Grade Elevation (m)	81.000	80.548	80.703	81.003	81.303	81.603	81.903	82.203	82.503	82.803	83.103
Existing Ground Elevation (m)	52.691	63.626	104.524	121.425	124.885	111.444	112.263	104.249	99.246	92.533	78.551
Basic Geology	Carcar Formation (Limestone)										
Ground Condition						Residential Area					
Excavation Pattern Left			DIII (76m)	DI (43m)	CII (224m)	DI (20m)	DI (134m)	DIII (225m)			
Excavation Pattern Right			DIII (77m)	DI (43m)	CII (224m)	DI (20m)	DI (134m)	DIII (211m)			
Auxiliary Method Left						DI-L(31m)		AGF (225m)			
Auxiliary Method Right						DI-R(31m)		AGF (211m)			

Chainage Number	11+400	11+500	11+600	11+700	11+800	11+900	12+000	12+100	12+200		
Finished Grade Elevation (m)	90.987	89.751	88.514	87.277	86.041	84.804	83.568	82.331	81.095		
Existing Ground Elevation (m)	93.470	99.326	113.179	110.493	117.813	124.659	146.549	157.745	92.018		
Basic Geology	Carcar Formation (Limestone)										
Ground Condition						Residential Area					
Excavation Pattern Left			DIII (241m)	DI (104m)	DI (20m)	CII (278m)	DI (20m)	DIII (40m)			
Excavation Pattern Right			DIII (235m)	DI (104m)	DI (20m)	CII (278m)	DI (20m)	DIII (33m)			
Auxiliary Method Left				DI-L(31m)							
Auxiliary Method Right				DI-R(31m)							

Chainage Number	12+300	12+400	12+500	12+600	12+700	12+800	12+900	13+000	13+100	13+200	13+300
Finished Grade Elevation (m)	80.698	82.131	83.908	85.685	87.462	89.238	91.015	92.792	94.569	96.346	98.123
Existing Ground Elevation (m)	62.089	84.120	117.704	147.828	147.591	124.028	120.012	121.641	117.783	95.529	74.401
Basic Geology	Carcar Formation (Limestone)										
Ground Condition		Residential Area				Residential Area					
Excavation Pattern Left		DIII (57m)	DI (20m)	CII (339m)		DI (20m)	DI (201m)	DIII (95m)			
Excavation Pattern Right		DIII (57m)	DI (20m)	CII (339m)		DI (20m)	DI (201m)	DIII (71m)			
Auxiliary Method Left		AGF (57m)					DI-L(31m)				
Auxiliary Method Right		AGF (57m)					DI-R(31m)				

STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	GEOLOGICAL PROFILE (2/5)	V=1:25 H=1:500	GP-02	2 of 5

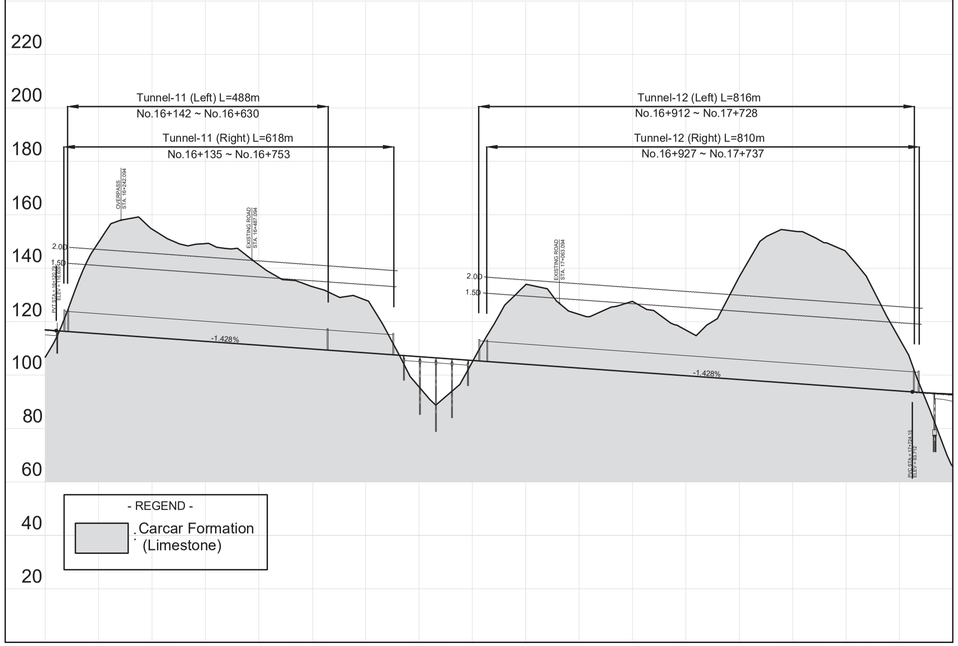


STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	GEOLOGICAL PROFILE (3/5)	V=1:25 H=1:500	GP-03	3 of 5

ELEVATION (m)

V=1: 25
H=1: 500

TUNNEL-11 & TUNNEL-12



Chainage Number	16+100	16+200	16+300	16+400	16+500	16+600	16+700	16+800	16+900	17+000	17+100	17+200	17+300	17+400	17+500	17+600	17+700
Finished Grade Elevation (m)	116.940	115.478	114.050	112.622	111.194	109.766	108.337	106.909	105.481	104.053	102.625	101.197	99.769	98.341	96.913	95.485	94.057
Existing Ground Elevation (m)	106.689	149.719	154.650	149.235	141.300	133.129	128.075	95.642	104.927	133.872	122.752	127.608	116.856	136.767	153.933	146.049	113.602

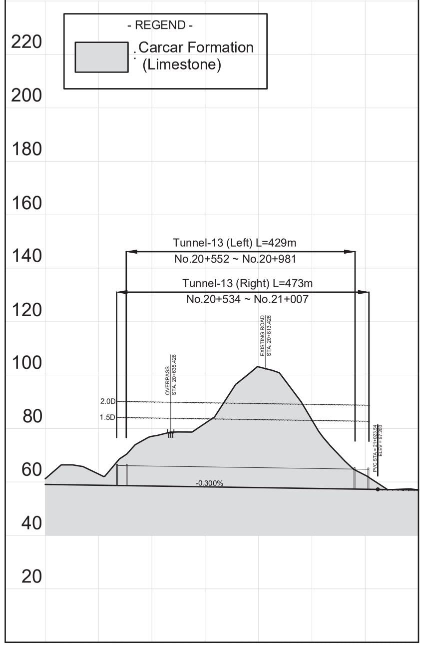
Basic Geology: Carcar Formation (Limestone)

Ground Condition: Low Overburden Area

Excavation Pattern	
Left	DIII (34m), DI (20m), CII (293m), DI (51m), DIII (90m); DIII (68m), DI (73m), DIII (315m), DI (20m), CII (50m), CII-L(31m), CII (193m), DI (20m), DIII (46m)
Right	DIII (41m), DI (20m), CII (293m), DI (51m), DIII (213m); DIII (53m), DI (73m), DIII (315m), DI (20m), CII (50m), CII-R(31m), CII (193m), DI (20m), DIII (55m)

Auxiliary Method: Left — ; Right —

TUNNEL-13

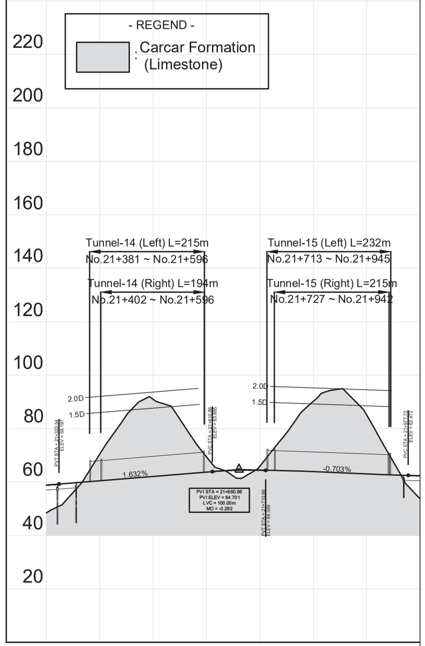


Chainage Number	20+400	20+500	20+600	20+700	20+800	20+900	21+000
Finished Grade Elevation (m)	59.071	58.771	58.471	58.171	57.871	57.571	57.271
Existing Ground Elevation (m)	61.202	62.979	77.080	81.985	103.080	83.258	62.533

Basic Geology: Carcar Formation (Limestone)

Excavation Pattern	
Left	DIII (161m), DI (22m), CII (145m), DI (20m), DIII (81m)
Right	DIII (179m), DI (22m), CII (145m), DI (20m), DIII (107m)

TUNNEL-14 & TUNNEL-15



Chainage Number	21+300	21+400	21+500	21+600	21+700	21+800	21+900
Finished Grade Elevation (m)	58.831	60.445	62.077	63.708	64.412	63.722	63.019
Existing Ground Elevation (m)	48.420	70.446	90.938	69.433	65.930	90.231	85.088

Basic Geology: Carcar Formation (Limestone)

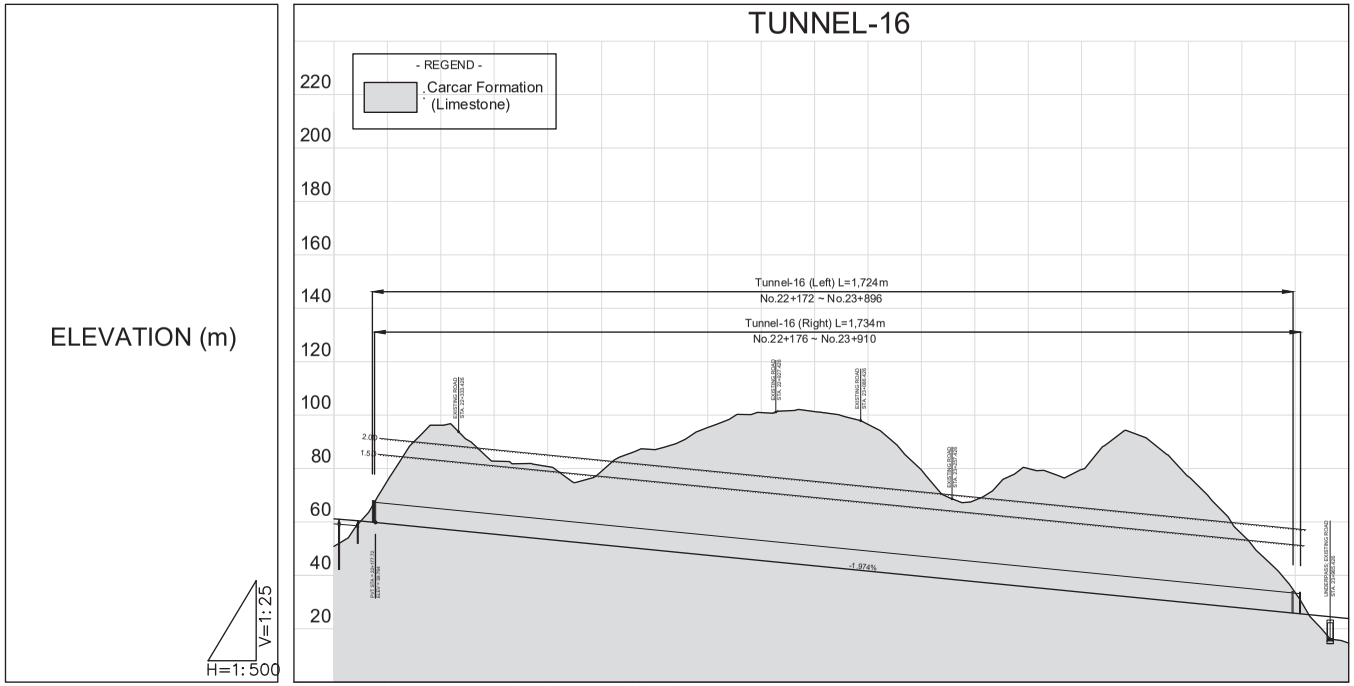
Ground Condition: Thick Talus/Soil Area; Thick Talus/Soil Area

Excavation Pattern	
Left	DIII (78m), DI (75m), DIII (62m); DIII (82m), DI (91m), DIII (59m)
Right	DIII (57m), DI (75m), DIII (62m); DIII (68m), DI (91m), DIII (56m)

Auxiliary Method	
Left	AGF (62m); AGF (82m)
Right	AGF (62m); AGF (68m)

STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	GEOLOGICAL PROFILE (4/5)	V=1:25 H=1:500	GP-04	4 of 5

TUNNEL-16



		22+100	22+200	22+300	22+400	22+500	22+600	22+700	22+800	22+900	23+000	23+100	23+200	23+300	23+400	23+500	23+600	23+700	23+800	23+900
Chainage Number																				
Finished Grade Elevation (m)		61.137	59.355	57.380	55.406	53.431	51.457	49.482	47.508	45.534	43.559	41.585	39.610	37.636	35.661	33.687	31.712	29.738	27.764	25.789
Existing Ground Elevation (m)		50.854	75.363	96.205	82.738	80.733	78.803	87.065	95.368	100.928	101.286	96.504	79.417	68.102	79.985	79.624	93.018	76.933	55.444	33.509
Basic Geology		Carcar Formation (Limestone)																		
Ground Condition		Low Overburden Area								Residential Area										
Excavation Pattern	Left	DIII (57m)	DI (20m)	CII (119m)	DI (153m)	DIII (70m)	DI (31m)	CII (100m)	CII-L(31m) CII (484m)					DI (75m)	CII (100m)	CII-L(31m) CII (337m)			DI (31m)	DIII (85m)
	Right	DIII (53m)	DI (20m)	CII (119m)	DI (153m)	DIII (70m)	DI (31m)	CII (100m)	CII (484m)					DI (75m)	CII (100m)	CII (337m)			DI (31m)	DIII (99m)
Auxiliary Method	Left								CII-R(31m)							CII-R(31m)				
	Right																			

STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	GEOLOGICAL PROFILE (5/5)	V=1:25 H=1:500	GP-05	5 of 5

STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	INTERCHANGE 1 LAYOUT PLAN STA. 3+135.717	1 : 2500	PP-01	1 OF 24

STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	INTERCHANGE 2 LAYOUT PLAN STA. 6+765.572	1 : 2500	PP-05	5 OF 24

STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	INTERCHANGE 3 LAYOUT PLAN STA. 9+963.000	1 : 3000	PP-10	10 OF 24

STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CEBU CIRCUMFERENTIAL ROAD SEGMENT 1	INTERCHANGE 4 ENTRANCE LAYOUT PLAN STA. 15+259.686	1 : 2500	PP-18	18 OF 24