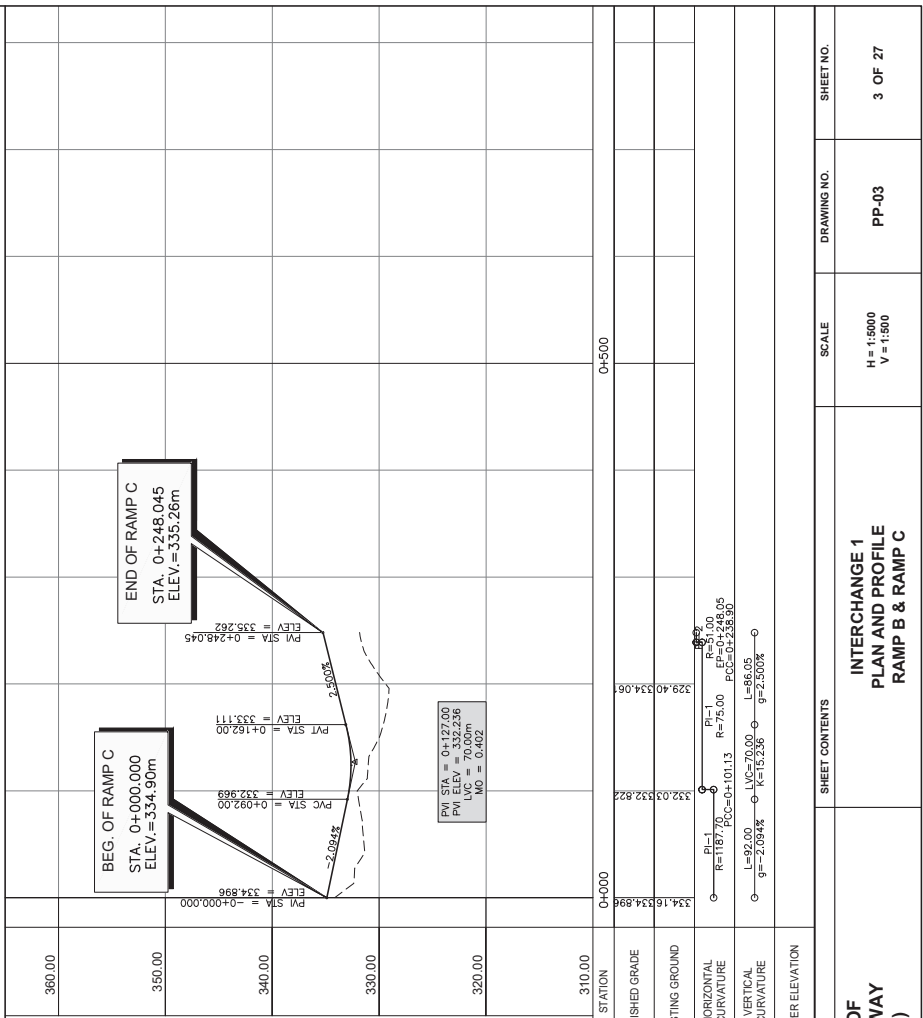
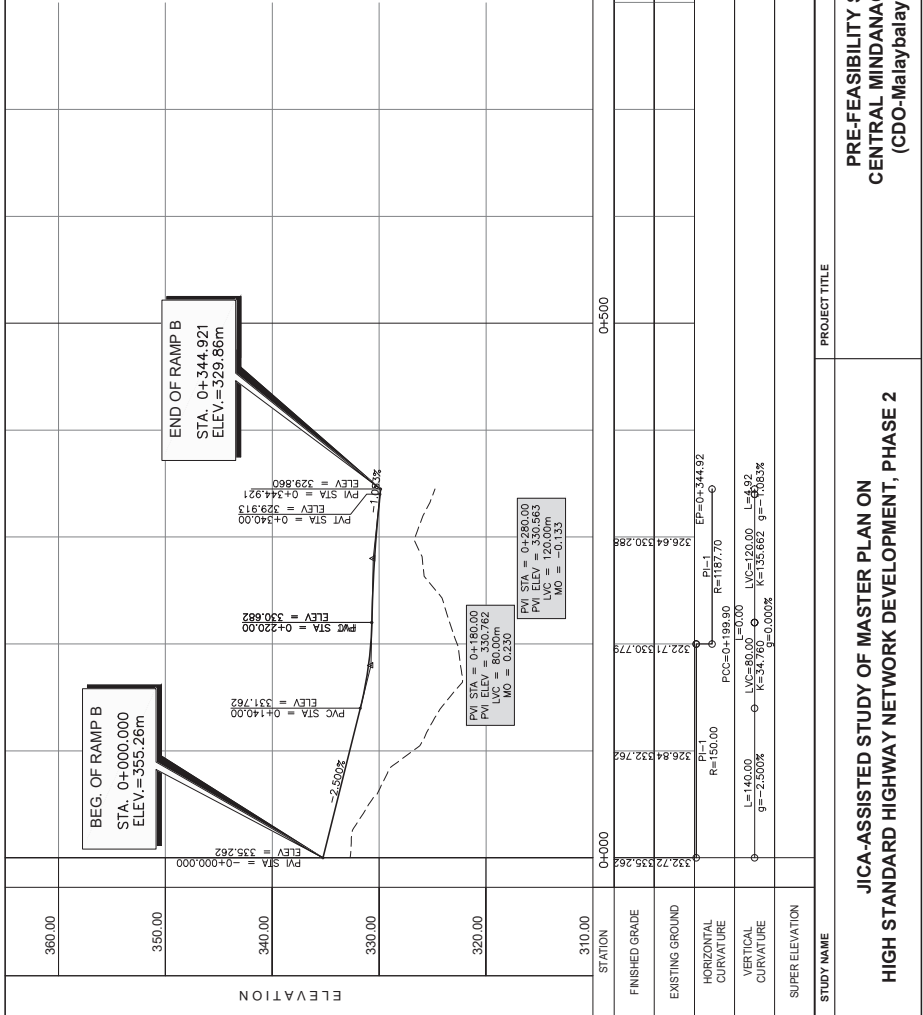


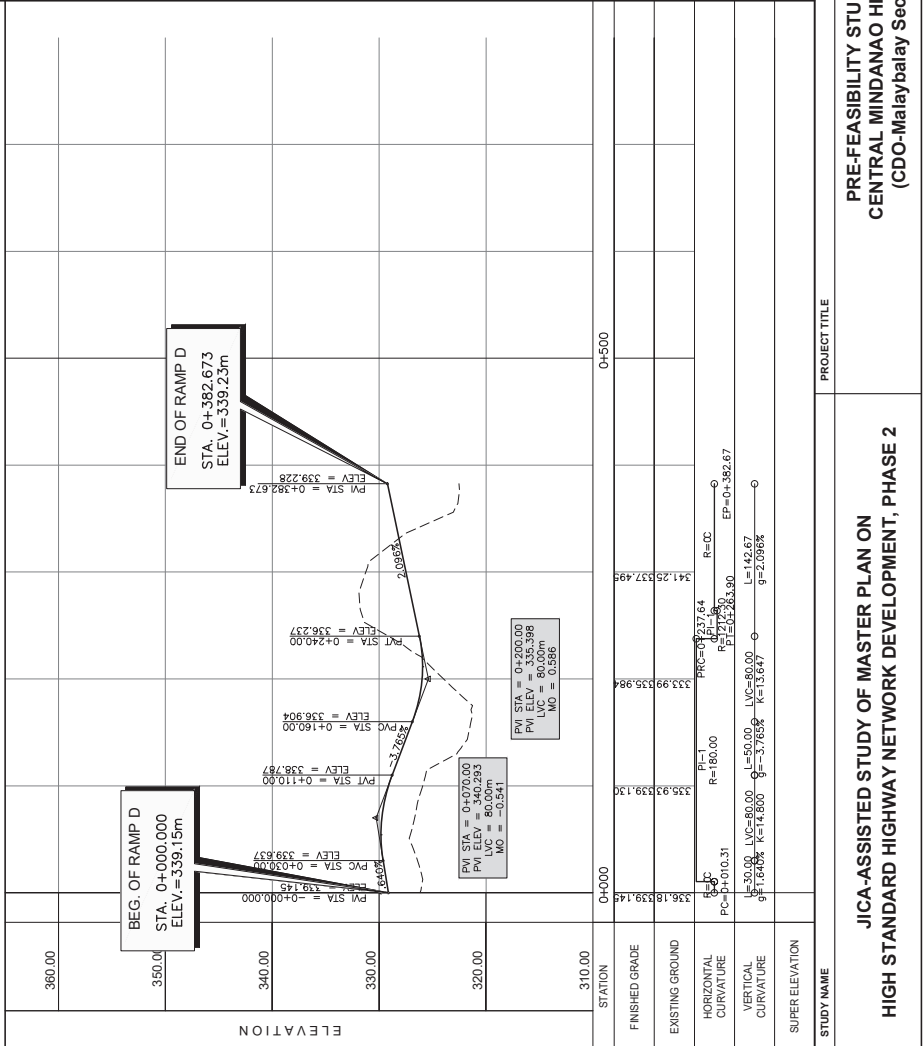
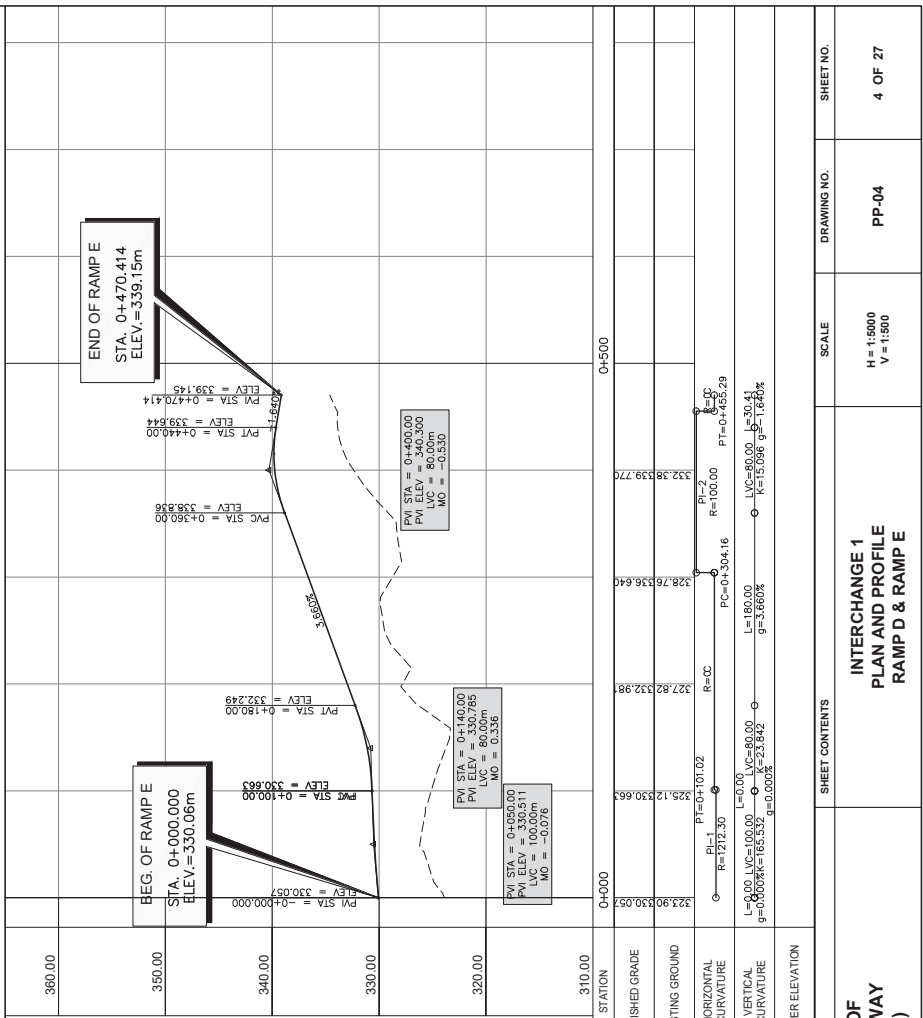
ELEMENTS OF CURVE

PI NO.	STATION	NORTHING	EASTING	$\Delta\alpha$	R	Lc	T	Ec	$e\%$	V(kph)
PI-1	0+117.95	935372.515	698027.620	78°21'24"	150.00	199.801	117.947	40.818	-	-
PI-2	0+272.50	935489.458	697990.738	63°54'45"	1187.70	145.020	72.600	2.317	-	-

ELEMENTS OF CURVE

PI NO.	STATION	NORTHING	EASTING	$\Delta\alpha$	R	Lc	T	Ec	$e\%$	V(kph)
PI-1	0+050.60	935146.772	698098.850	45°24'44"	1187.70	101.134	50.598	1.077	-	-
PI-2	0+199.31	935285.678	698036.632	105°14'36"	75.00	137.763	98.173	48.543	-	-

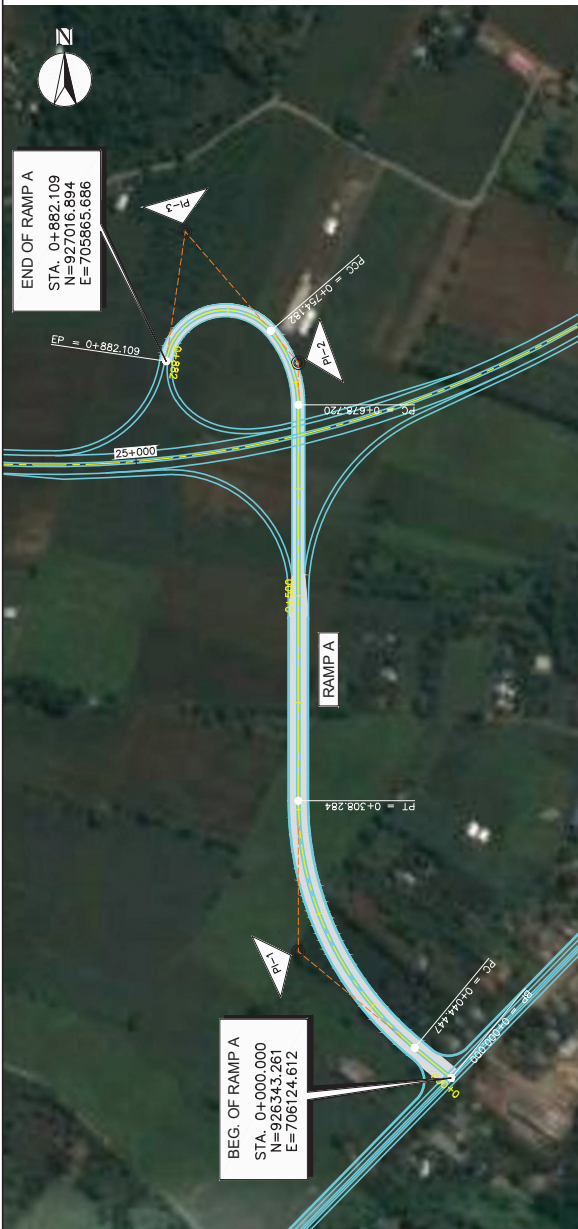
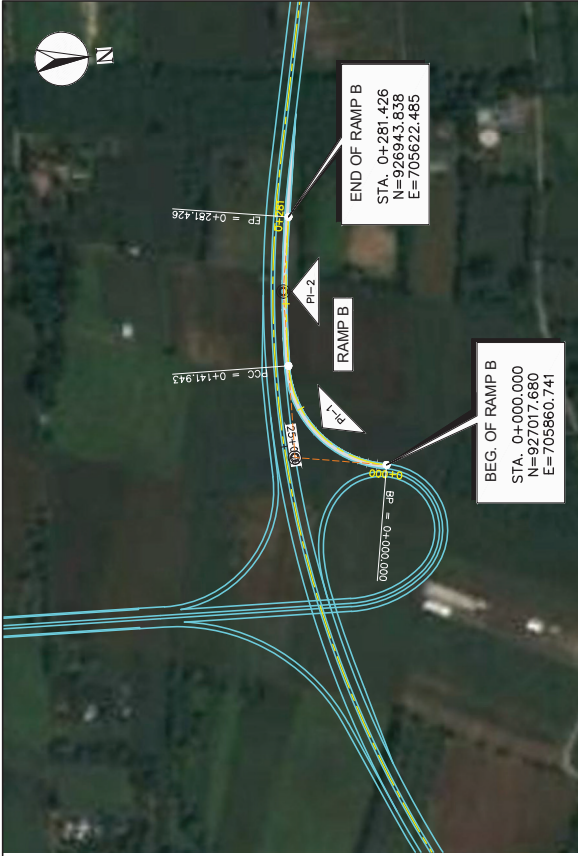






2 INTERCHANGE 2 @ STA. 25+150.000 (OVERPASS)
SCALE 1:2500

STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
<p>JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2</p>	<p>PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)</p>	<p>INTERCHANGE 2 LAYOUT PLAN (OVERPASS) STA. 25+150.000</p>	<p>1 : 2500</p>	<p>PP-05</p>	<p>5 OF 27</p>



STATION		ELEVATION		STATION		ELEVATION		STATION		ELEVATION	
510.00	500.00	490.00	480.00	460.00	510.00	500.00	490.00	480.00	460.00	510.00	500.00
FINISHED GRADE		EXISTING GROUND		FINISHED GRADE		EXISTING GROUND		FINISHED GRADE		EXISTING GROUND	
HORIZONTAL CURVATURE		HORIZONTAL CURVATURE		HORIZONTAL CURVATURE		HORIZONTAL CURVATURE		HORIZONTAL CURVATURE		HORIZONTAL CURVATURE	
VERTICAL CURVATURE		VERTICAL CURVATURE		VERTICAL CURVATURE		VERTICAL CURVATURE		VERTICAL CURVATURE		VERTICAL CURVATURE	
SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION	
STATION		STATION		STATION		STATION		STATION		STATION	
0+000	0+500	0+000	0+500	0+000	0+500	0+000	0+500	0+000	0+500	0+000	0+500
PVI STA = 0+400.00 PVI ELEV = 479.053 LVC = 80.00m K = 0.484		PVI STA = 0+630.00 PVI ELEV = 484.135 LVC = 150.00m K = 0.337		PVI STA = 0+400.00 PVI ELEV = 481.370 LVC = 80.00m K = 0.229		PVI STA = 0+882.109 PVI ELEV = 480.353 LVC = 150.00m K = 0.337		PVI STA = 0+080.00 PVI ELEV = 479.053 LVC = 80.00m K = 0.484		PVI STA = 0+281.426 PVI ELEV = 483.83m LVC = 150.00m K = 0.337	
R=100.00 L=151.43 g=2.370%		R=100.00 L=177.11 g=1.500%		R=100.00 L=115.00 g=1.363%		R=100.00 L=177.11 g=1.500%		R=100.00 L=151.43 g=2.370%		R=100.00 L=151.43 g=2.370%	
P=0+044.45 PC=0+044.45 PI=1 R=300.00		P=0+308.28 PC=0+308.28 PI=1 R=300.00		P=0+754.18 PC=0+754.18 PI=2 R=55.00		P=0+167.67 PC=0+167.67 PI=2 R=106.00		P=0+141.94 PC=0+141.94 PI=1 R=100.00		P=0+281.43 PC=0+281.43 PI=1 R=100.00	
L=360.00 K=54.976 g=-0.924%		L=360.00 K=54.976 g=-0.924%		L=115.00 K=52.393 g=1.363%		L=177.11 K=52.393 g=1.500%		L=151.43 K=25.840 g=-1.500%		L=151.43 K=25.840 g=-1.500%	
SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION	
STATION		STATION		STATION		STATION		STATION		STATION	
0+000	0+500	0+000	0+500	0+000	0+500	0+000	0+500	0+000	0+500	0+000	0+500
FINISHED GRADE		EXISTING GROUND		FINISHED GRADE		EXISTING GROUND		FINISHED GRADE		EXISTING GROUND	
HORIZONTAL CURVATURE		HORIZONTAL CURVATURE		HORIZONTAL CURVATURE		HORIZONTAL CURVATURE		HORIZONTAL CURVATURE		HORIZONTAL CURVATURE	
VERTICAL CURVATURE		VERTICAL CURVATURE		VERTICAL CURVATURE		VERTICAL CURVATURE		VERTICAL CURVATURE		VERTICAL CURVATURE	
SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION		SUPER ELEVATION	
STATION		STATION		STATION		STATION		STATION		STATION	
0+000	0+500	0+000	0+500	0+000	0+500	0+000	0+500	0+000	0+500	0+000	0+500

STUDY NAME: JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2

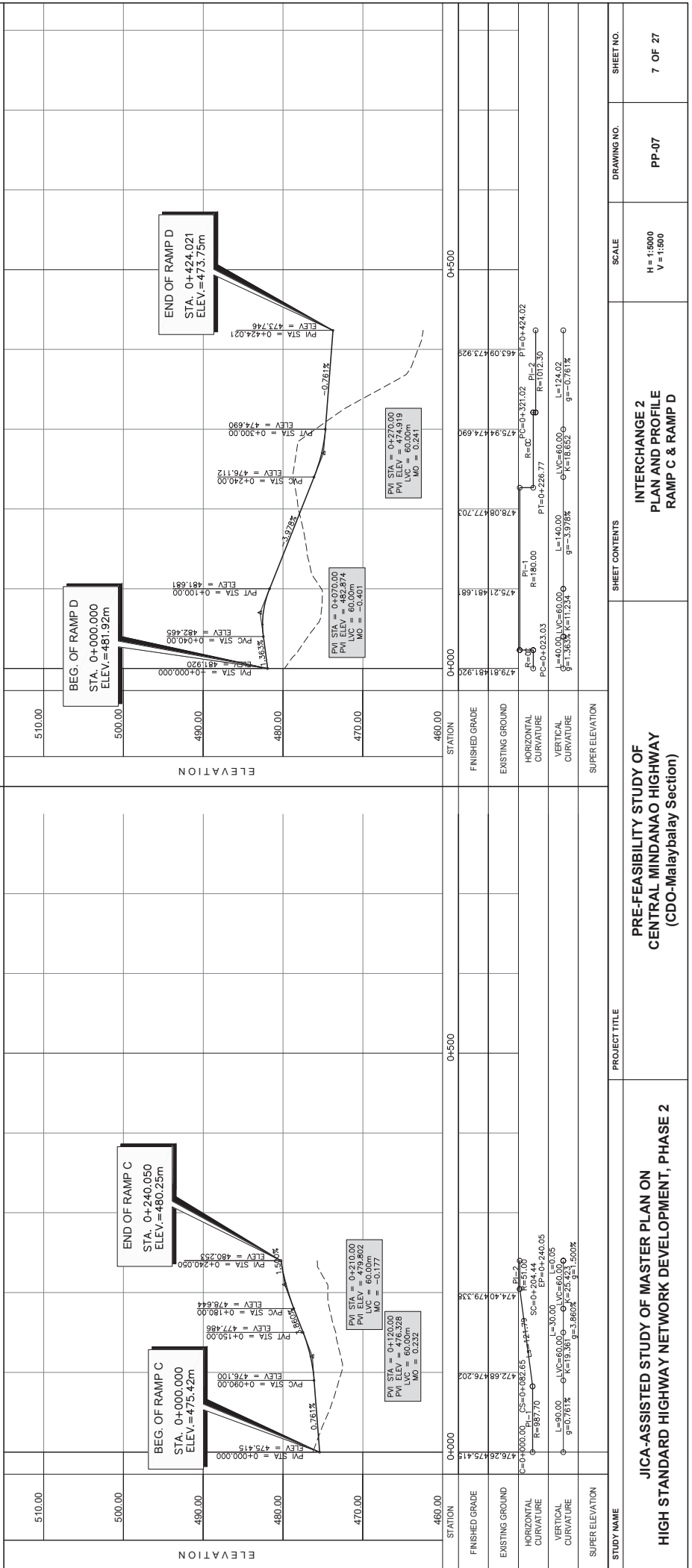
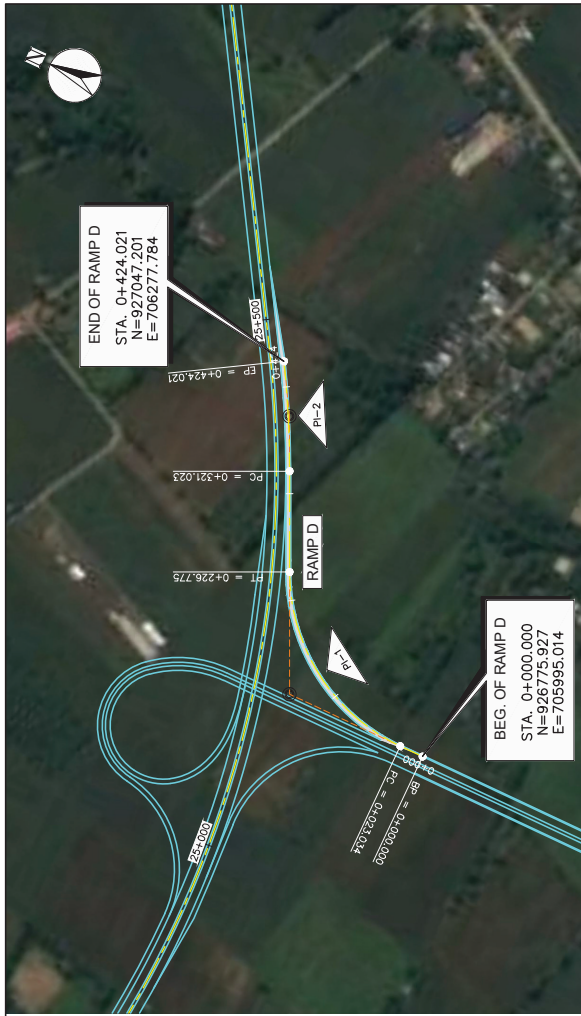
PROJECT TITLE: PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)

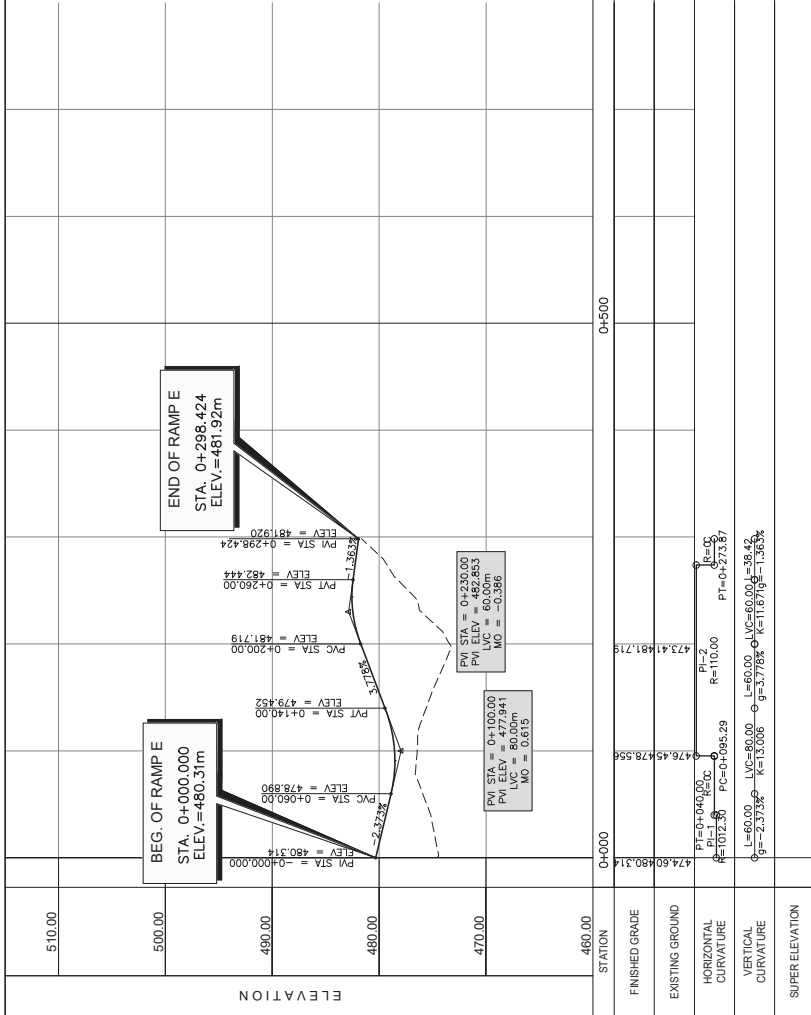
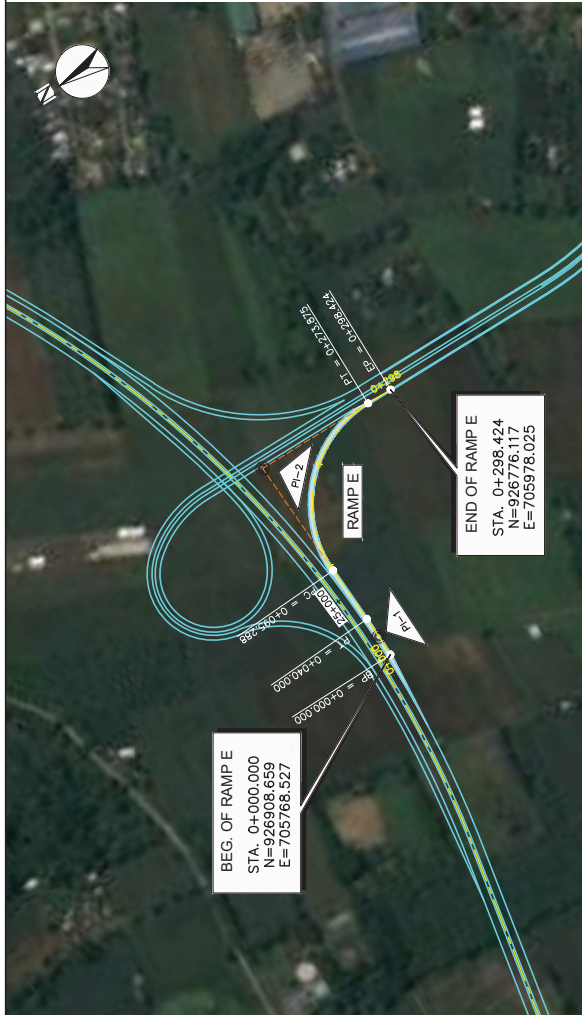
SHEET CONTENTS: INTERCHANGE 2 PLAN AND PROFILE RAMP A & RAMP B

SCALE: H = 1:5000, V = 1:500

DRAWING NO.: PP-06

SHEET NO.: 6 OF 27





STATION	0+000	0+500
FINISHED GRADE	480.31	
EXISTING GROUND	478.55	
HORIZONTAL CURVATURE	PI=0+040.00 R=1072.50 PC=0+095.29 P2=0+273.57 PI=0+273.57	
VERTICAL CURVATURE	L=60.00 g=-2.373%	L=60.00 g=3.778%
SUPERELEVATION		
STUDY NAME	JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	
PROJECT TITLE	PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)	
SHEET CONTENTS	INTERCHANGE 2 PLAN AND PROFILE RAMP E	
SCALE	H = 1:5000 V = 1:500	
DRAWING NO.	PP-08	
SHEET NO.	8 OF 27	

E L E M E N T S O F C U R V E (RAMP A)

PI NO.	STATION	NORTHING	EASTING	Δc	R	Lc	T	Ec	e%	V(kph)
PI-1	0+185.58	926463.190	705982.988	502321"	300.00	263.837	141.135	31.540	-	-
PI-2	0+718.13	927014.136	705995.217	404721"	106.00	75.462	39.410	7.089	-	-
PI-3	0+876.74	927137.953	705984.799	13005311"	56.00	127.926	122.559	78.746	-	-

E L E M E N T S O F C U R V E (RAMP B)

PI NO.	STATION	NORTHING	EASTING	Δc	R	Lc	T	Ec	e%	V(kph)
PI-1	0+085.90	926932.822	705847.350	8119798"	100.00	141.943	85.903	31.831	-	-
PI-2	0+211.80	926933.636	705891.591	805729"	987.70	139.483	69.858	2.467	-	-

E L E M E N T S O F C U R V E (RAMP C)

PI NO.	STATION	NORTHING	EASTING	Δc	R	Lc	T	Ec	e%	V(kph)
PI-1	0+041.35	926987.774	706028.716	447740"	987.70	82.648	41.348	0.865	-	-

E L E M E N T S O F C U R V E (RAMP C)

PI NO.	STATION	NORTHING	EASTING	Δ	R	A	La	eb	x	y	Tl	Tk	Xm	Ta	Es	LC	T	Ec	e%	V(kph)	
SP-1	-	926987.778	705867.729	-	51.00	80.93	121.79	71°56'50"	103.037	47.742	87.476	50.214	12.547	54.548	-	-	-	-	-	-	-
PI-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400011"	35.607	18.584	3.274	-	-

E L E M E N T S O F C U R V E (RAMP D)

PI NO.	STATION	NORTHING	EASTING	Δc	R	Lc	T	Ec	e%	V(kph)
PI-1	0+137.38	926913.298	705996.577	64°51'10"	180.00	203.741	114.348	33.250	-	-
PI-2	0+372.57	927021.174	706233.295	54°49'47"	1012.30	102.998	51.544	1.311	-	-

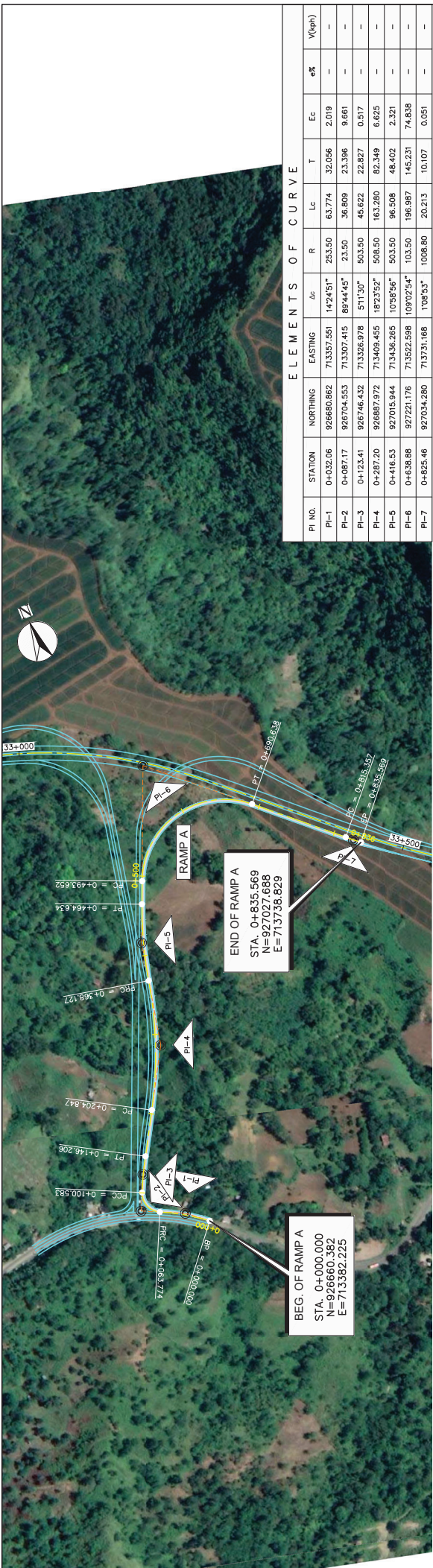
E L E M E N T S O F C U R V E (RAMP E)

PI NO.	STATION	NORTHING	EASTING	Δc	R	Lc	T	Ec	e%	V(kph)
PI-1	0+020.00	926908.697	705788.529	21°15'50"	1012.30	40.000	20.003	0.199	-	-
PI-2	0+211.25	926916.614	705979.613	93°01'13"	110.00	178.586	115.957	49.831	-	-

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 CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)	INTERCHANGE 2 ELEMENTS OF CURVE	N.T.S.	PP-09	9 OF 27

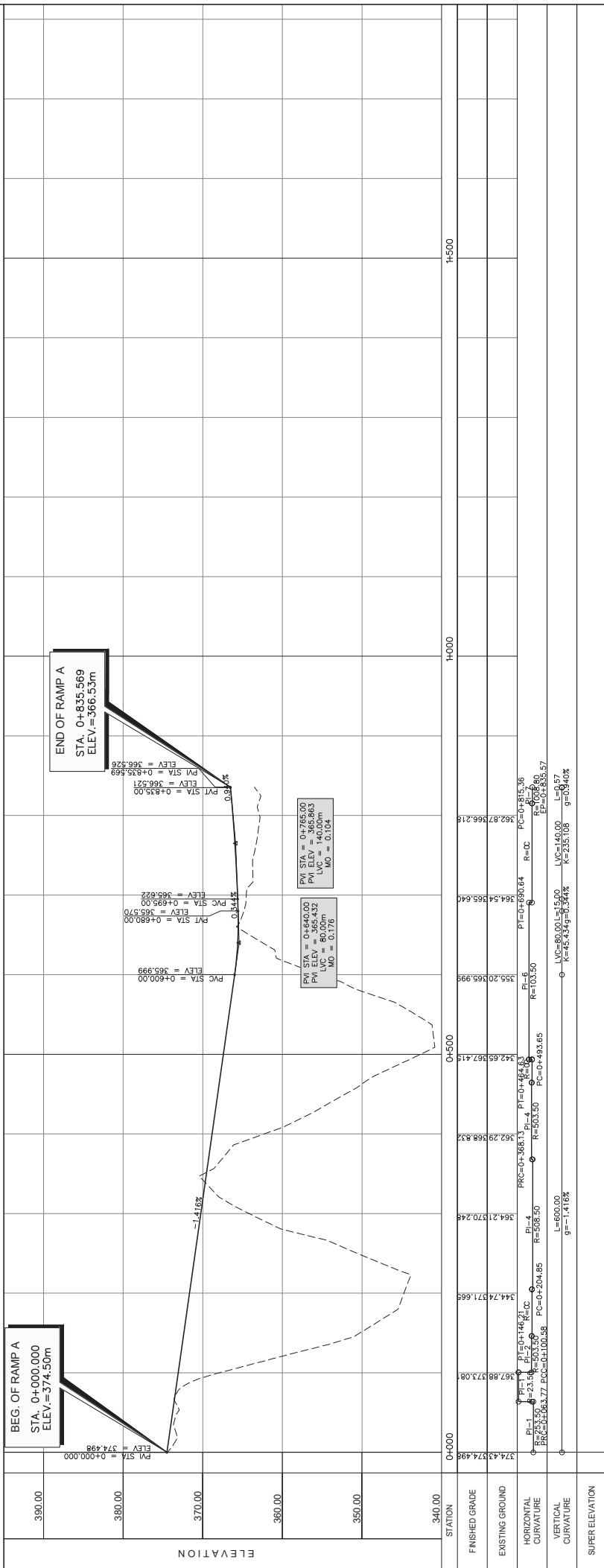


STUDY NAME	PROJECT TITLE	SHEET CONTENTS	SCALE	DRAWING NO.	SHEET NO.
JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)	INTERCHANGE 3 LAYOUT PLAN (OVERPASS) STA. 33+100.000	1 : 2500	PP-10	10 OF 27



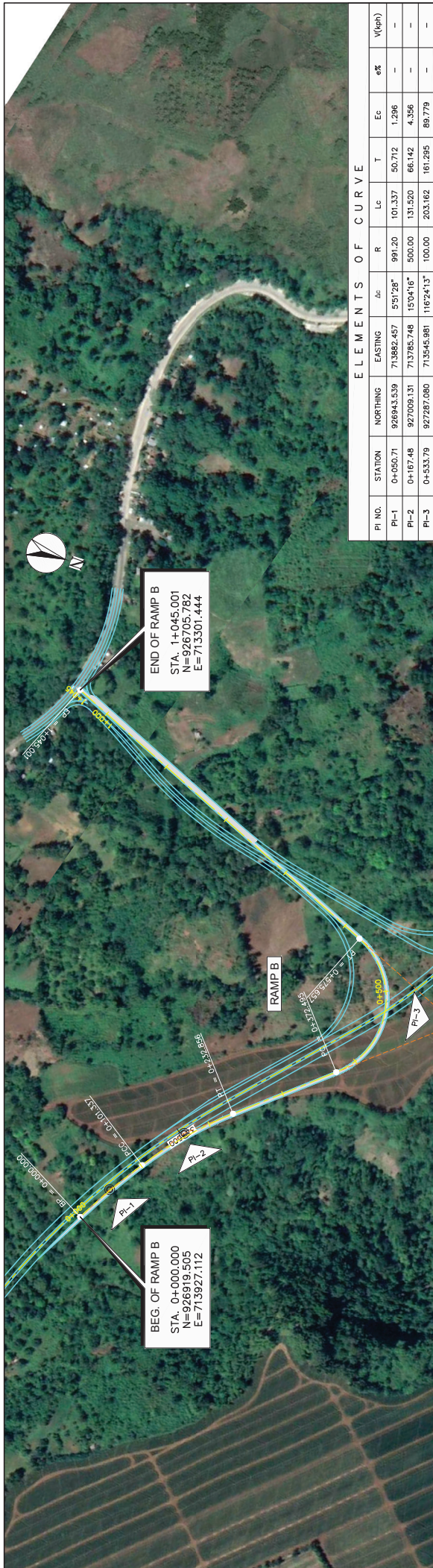
ELEMENTS OF CURVE

PI NO.	STATION	NORTHING	EASTING	$\Delta\phi$	R	Lc	T	Ec	e%	V(ftph)
PI-1	0+032.06	926860.882	713357.551	142°45'1"	253.50	63.774	32.086	2.019	-	-
PI-2	0+087.17	926704.553	713307.415	89°44'45"	23.50	36.809	23.396	9.661	-	-
PI-3	0+123.41	926746.432	713326.978	57°1'30"	503.50	45.622	22.827	0.817	-	-
PI-4	0+287.20	926887.972	713409.455	18°23'52"	508.50	163.980	82.349	6.625	-	-
PI-5	0+416.53	927015.944	713436.285	10°58'56"	503.50	96.508	48.402	2.321	-	-
PI-6	0+638.88	927221.176	713522.598	109°02'54"	103.50	196.987	145.231	74.838	-	-
PI-7	0+825.46	927034.280	713731.188	1°08'53"	1008.80	20.213	10.107	0.051	-	-



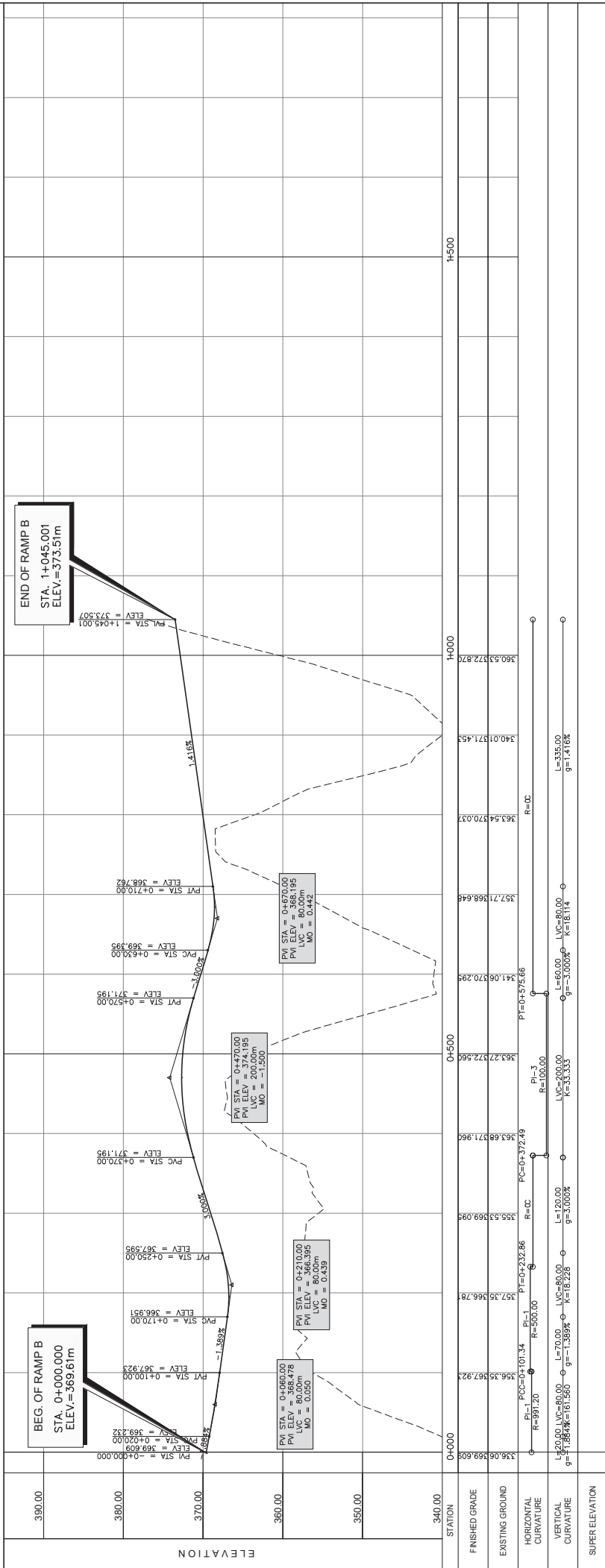
STATION	14:00	14:500	14:500
FINISHED GRADE			
EXISTING GROUND			
HORIZONTAL CURVATURE			
VERTICAL CURVATURE			
SUPER ELEVATION			

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 CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)	INTERCHANGE 3 PLAN AND PROFILE RAMP A	H = 1:5000 V = 1:500	PP-11	11 OF 27



E L E M E N T S O F C U R V E

PI NO.	STATION	NORTHING	EASTING	$\Delta\alpha$	R	Lc	T	Ec	e%	V(veh)
PI-1	0+050.71	928943.539	713882.457	5°51'28"	991.20	101.337	50.712	1.296	-	-
PI-2	0+167.48	927008.131	713785.748	15°04'16"	500.00	131.520	66.142	4.356	-	-
PI-3	0+533.79	927287.080	713545.981	116°24'13"	100.00	203.162	161.295	89.779	-	-

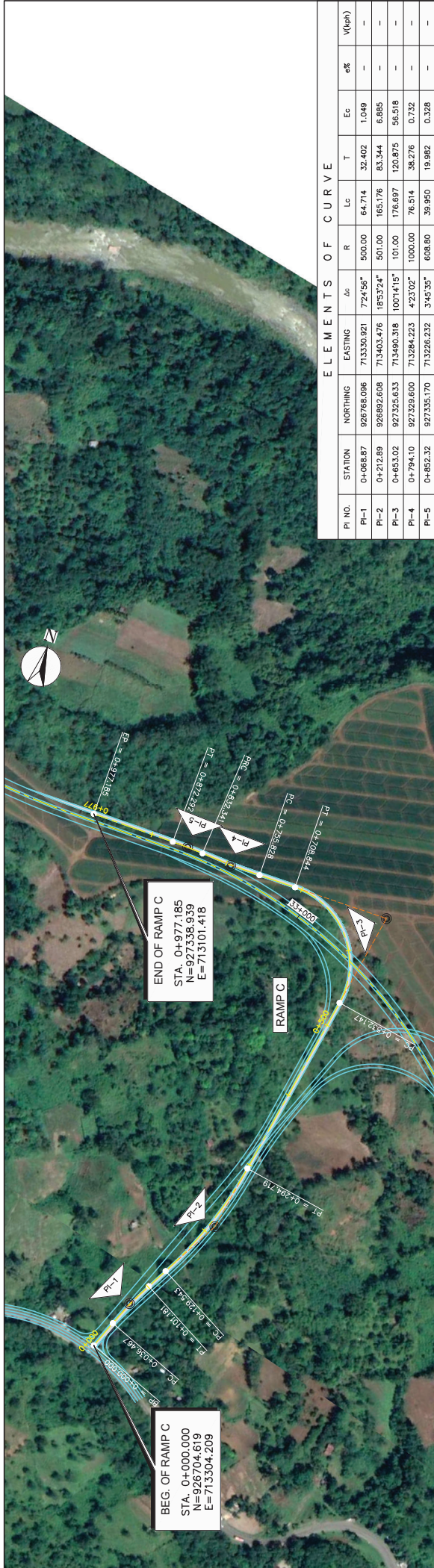


STATION	FINISHED GRADE	EXISTING GROUND	HORIZONTAL CURVATURE	VERTICAL CURVATURE	SUPER ELEVATION
0+000	336.00	359.60			
0+050	355.35	369.09			
0+100	353.35	366.78			
0+150	355.35	369.09			
0+200	353.35	366.78			
0+250	355.35	369.09			
0+300	353.35	366.78			
0+350	355.35	369.09			
0+400	353.35	366.78			
0+450	355.35	369.09			
0+500	353.35	366.78			
0+550	355.35	369.09			
0+600	353.35	366.78			
0+650	355.35	369.09			
0+700	353.35	366.78			
0+750	355.35	369.09			
0+800	353.35	366.78			
0+850	355.35	369.09			
0+900	353.35	366.78			
0+950	355.35	369.09			
1+000	353.35	366.78			

JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2

PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)

INTERCHANGE 3 PLAN AND PROFILE RAMP B

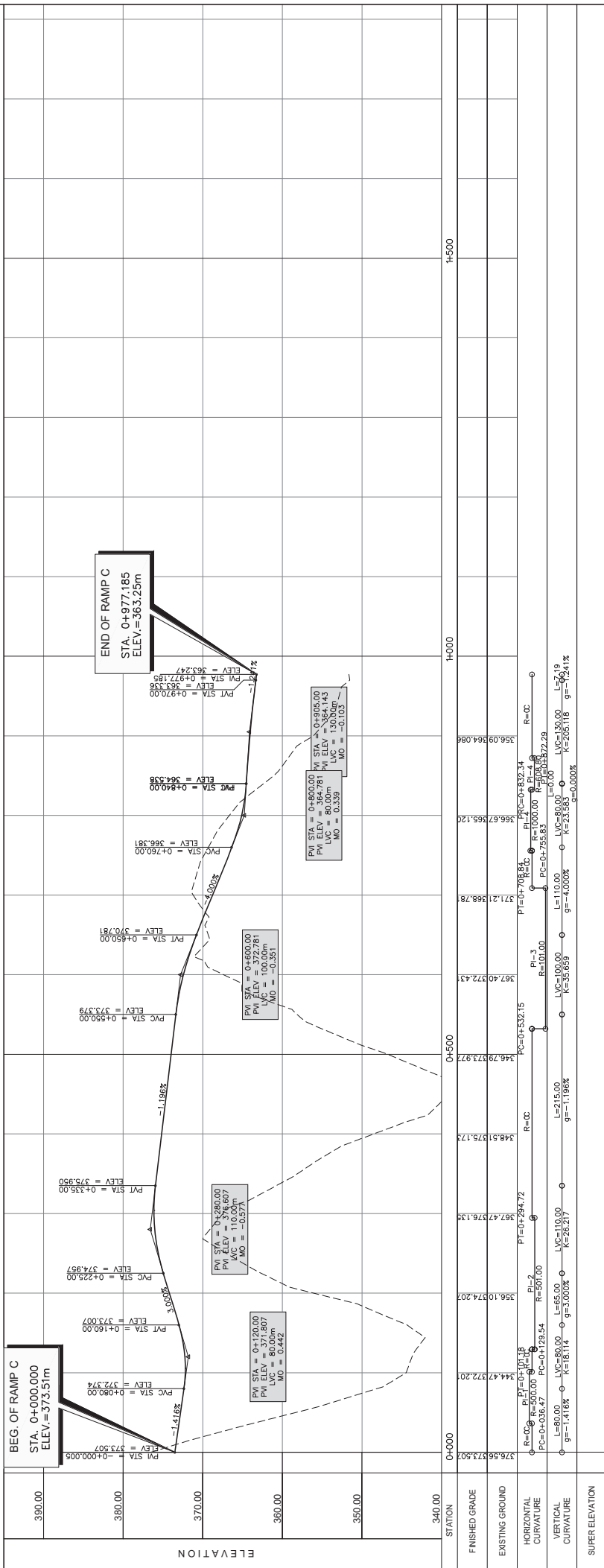


BEG. OF RAMP C
 STA. 0+000.000
 N=926704.619
 E=713304.209

END OF RAMP C
 STA. 0+977.185
 N=927338.939
 E=713101.418

ELEMENTS OF CURVE

PI NO.	STATION	NORTHING	EASTING	Δα	R	Lc	T	Ec	e%	V(kph)
PI-1	0+068.87	927768.096	713330.921	72°4'56"	500.00	64.714	32.402	1.049	-	-
PI-2	0+212.89	926892.608	713403.476	165°3'24"	501.00	165.176	85.344	6.885	-	-
PI-3	0+653.02	927325.633	713490.318	100°14'15"	101.00	176.697	120.875	56.518	-	-
PI-4	0+794.10	927329.600	713284.223	4°23'02"	1000.00	76.514	38.276	0.732	-	-
PI-5	0+852.32	927335.170	713226.232	3°45'35"	606.80	39.950	19.982	0.528	-	-



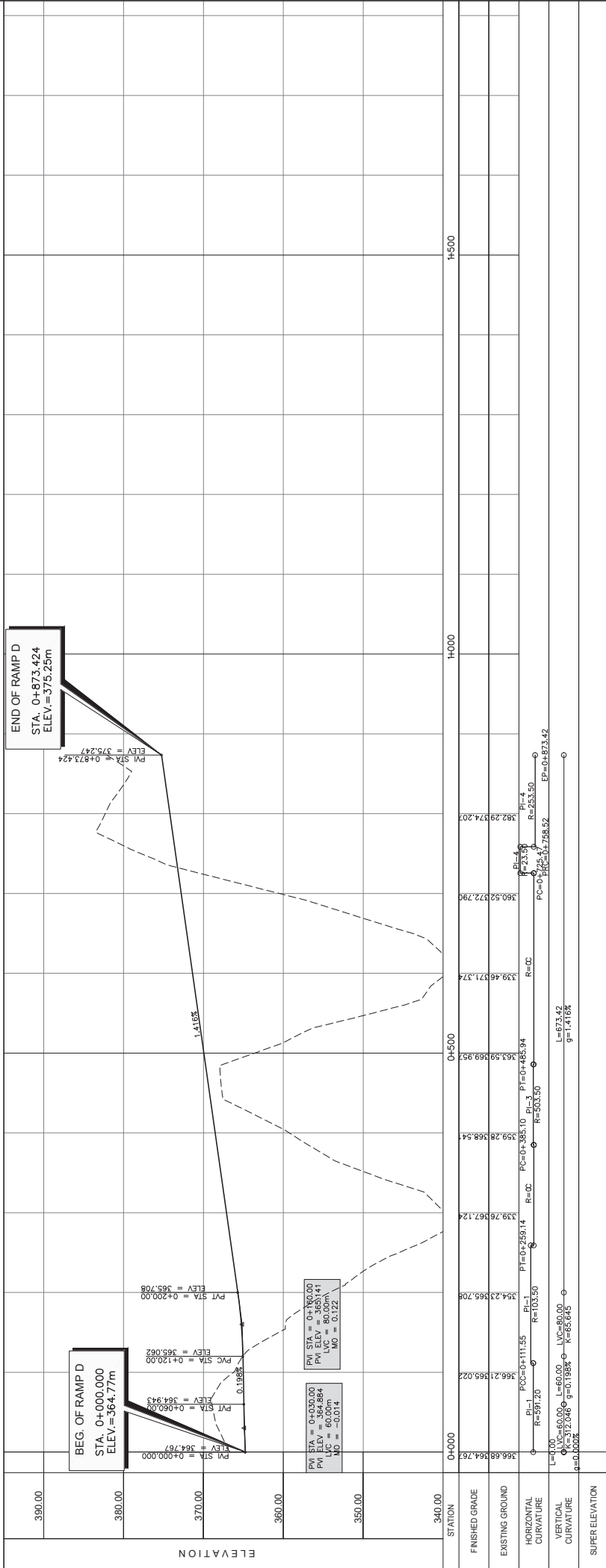
STATION	ELEVATION	FINISHED GRADE	EXISTING GROUND	HORIZONTAL CURVATURE	VERTICAL CURVATURE	SUPER ELEVATION
0+000	390.00	373.507	373.507	0+000.005	-	-
0+100	380.00	372.574	372.574	0+000.005	-	-
0+200	370.00	373.507	373.507	0+000.005	-	-
0+300	360.00	372.574	372.574	0+000.005	-	-
0+400	350.00	373.507	373.507	0+000.005	-	-
0+500	340.00	373.507	373.507	0+000.005	-	-
0+600	330.00	373.507	373.507	0+000.005	-	-
0+700	320.00	373.507	373.507	0+000.005	-	-
0+800	310.00	373.507	373.507	0+000.005	-	-
0+900	300.00	373.507	373.507	0+000.005	-	-
1+000	290.00	373.507	373.507	0+000.005	-	-

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 CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)	INTERCHANGE 3 PLAN AND PROFILE RAMP C	H = 1:5000 V = 1:500	PP-13	13 OF 27



ELEMENTS OF CURVE

PI NO.	STATION	NORTHING	EASTING	$\Delta\alpha$	R	Le	T	Ec	e%	V(kph)
PI-1	0+055.94	927202.875	713333.861	10°48'38"	591.20	111.547	55.939	2.641	-	-
PI-2	0+201.06	927254.007	713470.854	8°14'28"	103.50	147.898	88.509	33.336	-	-
PI-3	0+435.69	926993.149	713418.540	11°28'28"	503.50	100.834	50.586	2.535	-	-
PI-4	0+745.39	926707.382	713288.322	60°34'13"	23.50	33.046	19.919	7.506	-	-
PI-5	0+816.98	926725.505	713222.075	25°58'14"	253.50	114.904	58.456	6.653	-	-

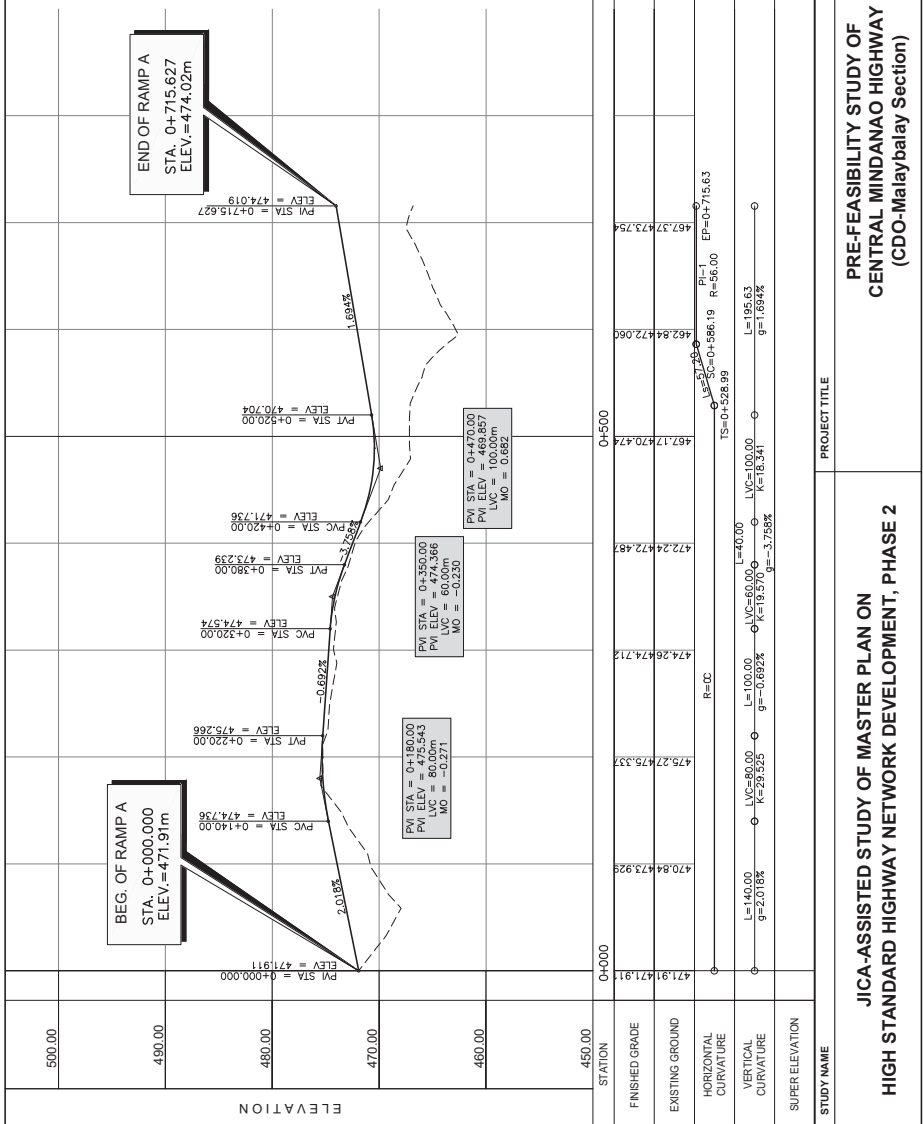
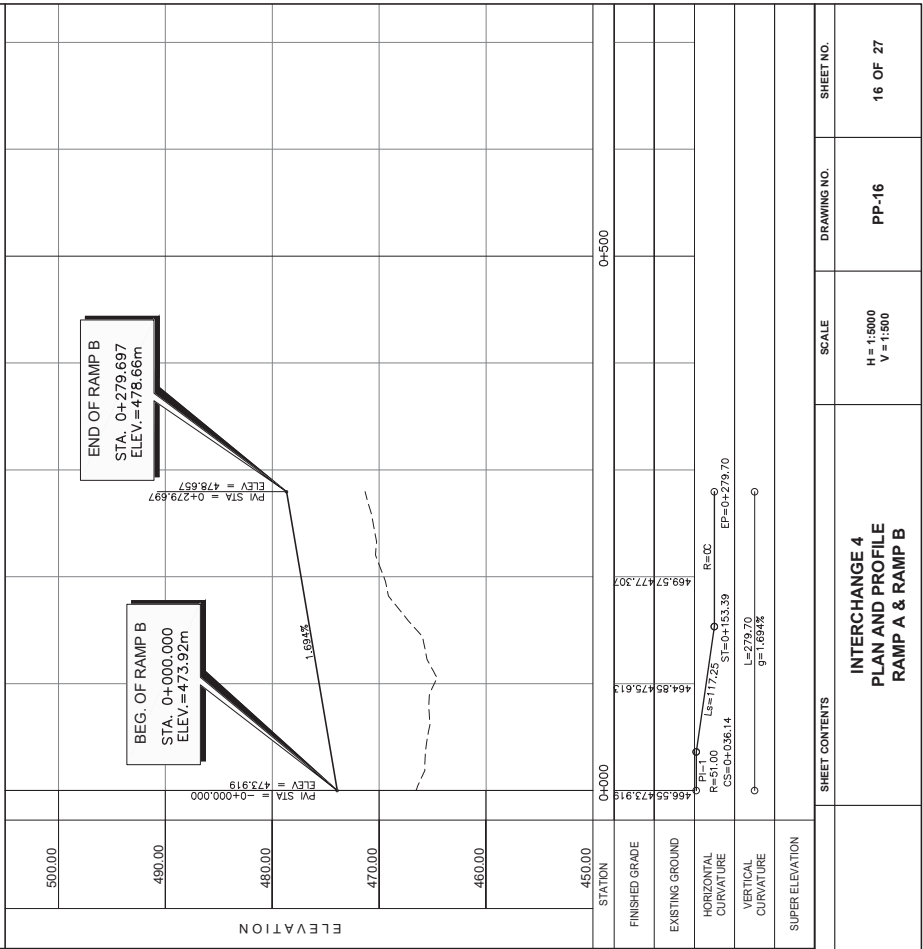
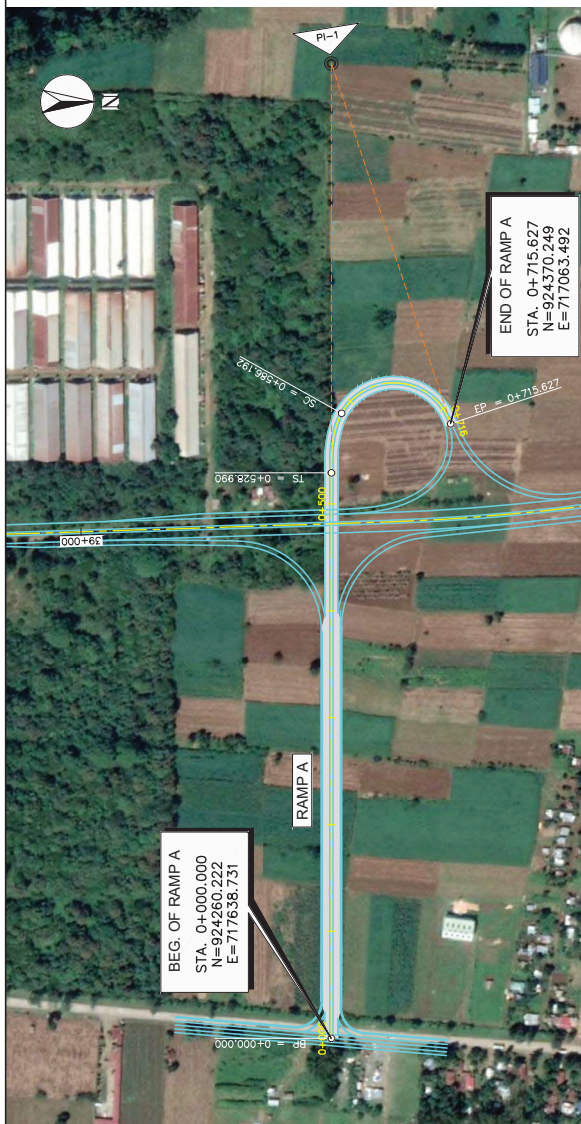
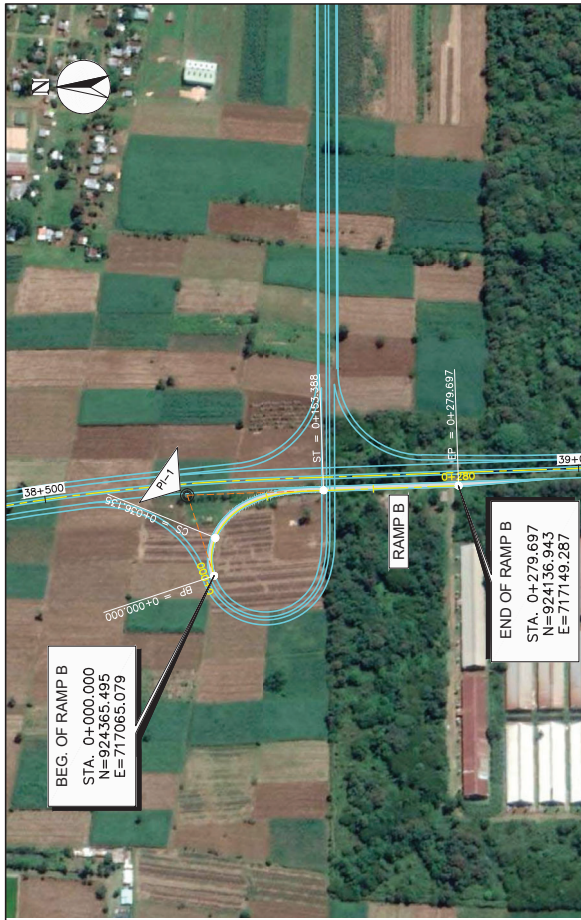


STATION	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500	1:500				
390.00																										
380.00																										
370.00																										
360.00																										
350.00																										
340.00																										
FINISHED GRADE																										
EXISTING GROUND																										
HORIZONTAL CURVATURE																										
VERTICAL CURVATURE																										
SUPER ELEVATION																										
STUDY NAME	JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2										PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)										INTERCHANGE 3 PLAN AND PROFILE RAMP D		DRAWING NO. PP-14		SHEET NO. 14 OF 27	

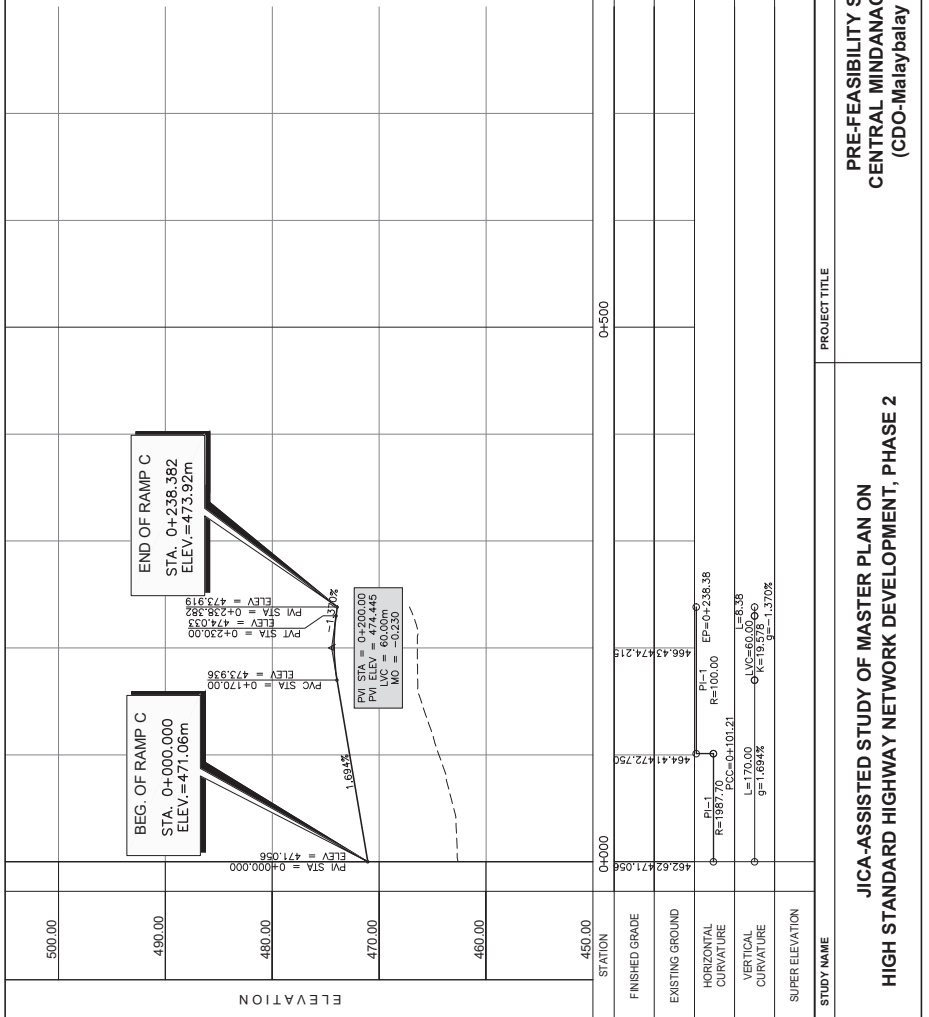
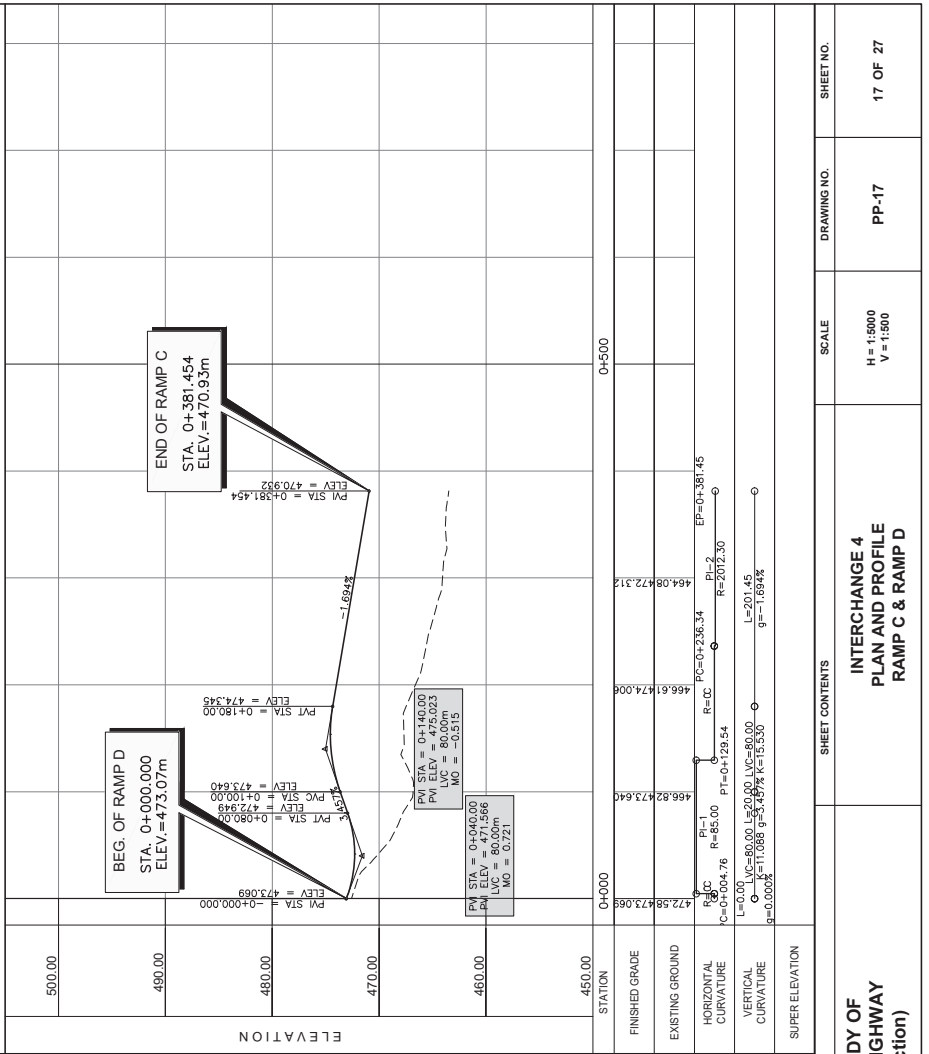
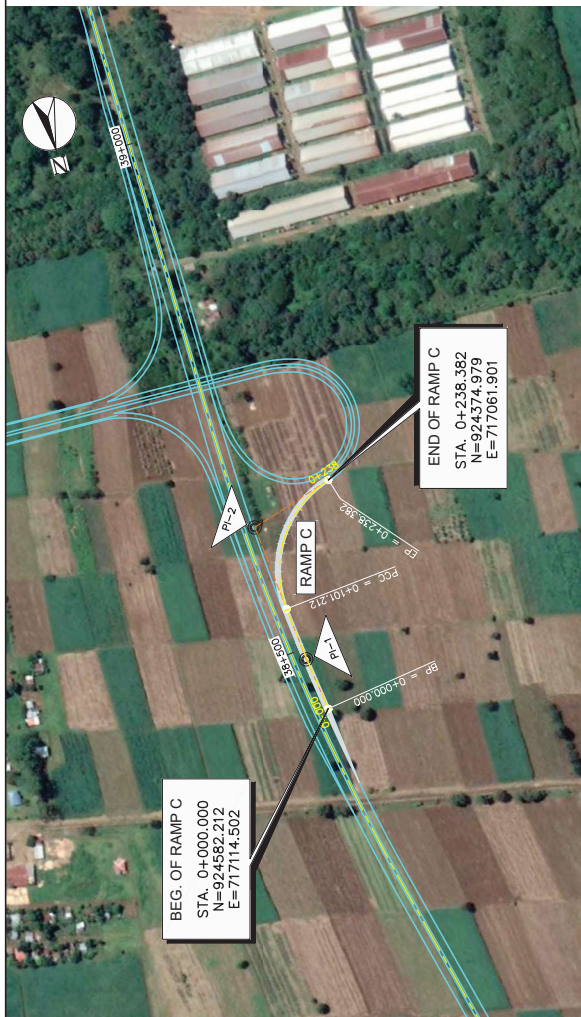
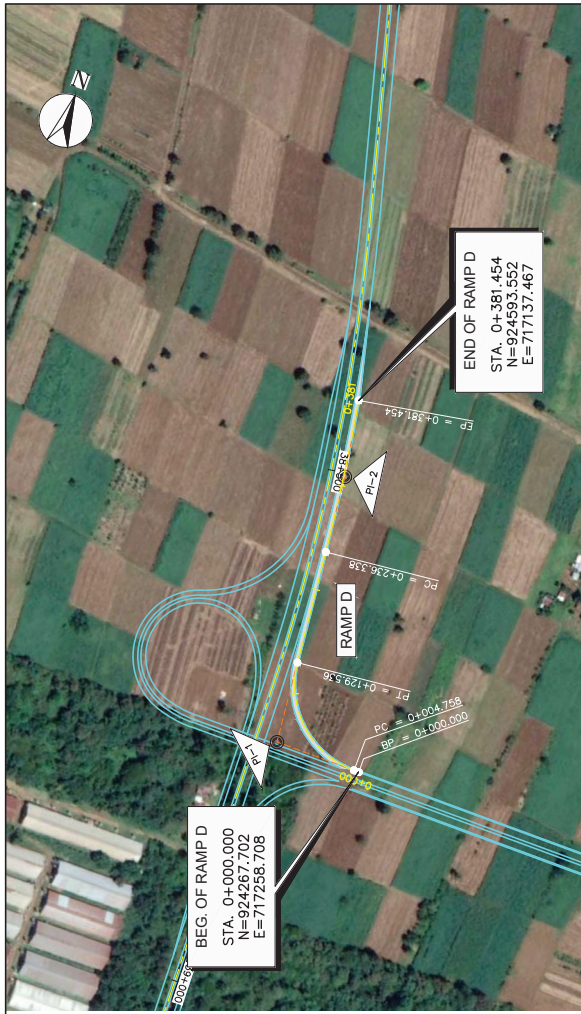


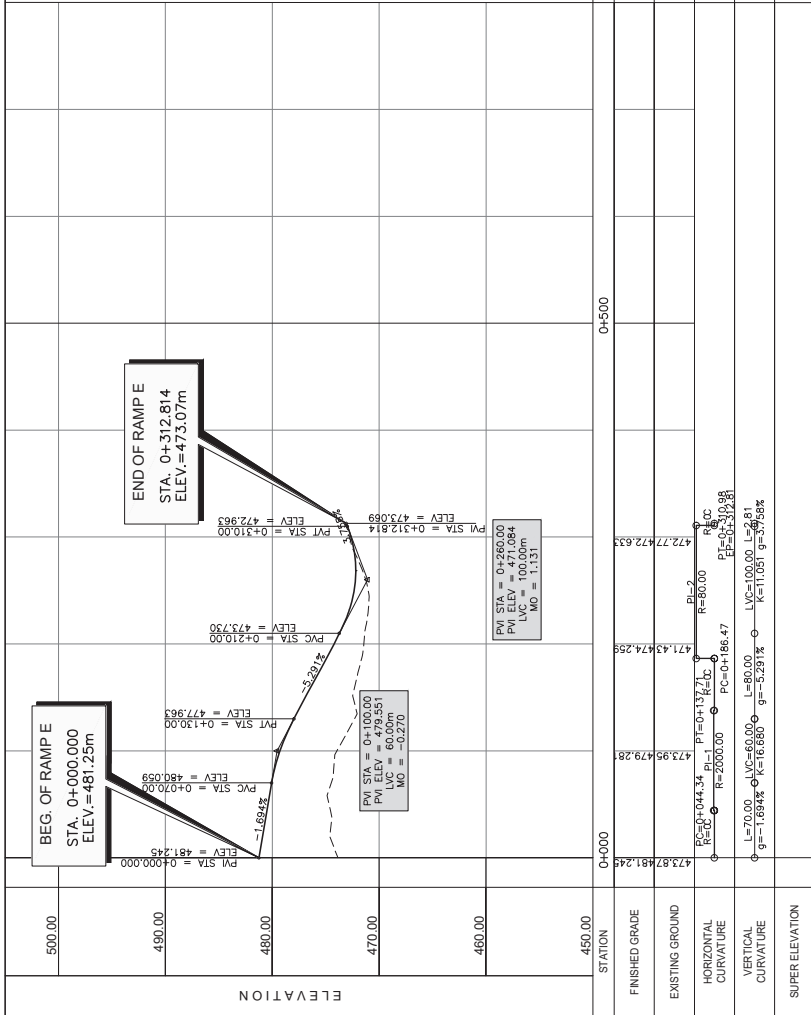
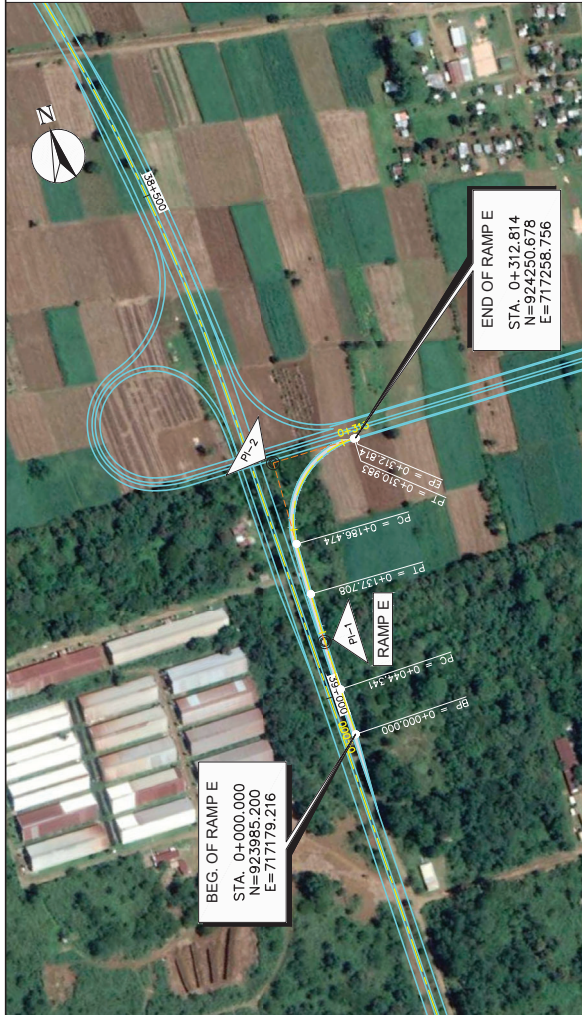
A 15.1-64

<p>STUDY NAME</p> <p>JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2</p>	<p>PROJECT TITLE</p> <p>PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)</p>	<p>SHEET CONTENTS</p> <p>INTERCHANGE 4 LAYOUT PLAN (UNDERPASS) STA. 38+765.000</p>	<p>SCALE</p> <p>1 : 2500</p>	<p>DRAWING NO.</p> <p>PP-15</p>	<p>SHEET NO.</p> <p>15 OF 27</p>
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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 CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)	INTERCHANGE 4 PLAN AND PROFILE RAMP A & RAMP B	H = 1:5000 V = 1:500	PP-16	16 OF 27





STATION	0+000	0+500
FINISHED GRADE	473.817 481.248	472.774 472.633
EXISTING GROUND	473.954 479.28	473.434 474.298
HORIZONTAL CURVATURE	PC=0+044.34 PI=0+137.71 PVI=0+100.00 R=2000.00 L=60.00 PC=0+186.47 PF=0+242.81	PVI STA = 0+260.00 PVI ELEV = 471.084 LVC = 100.00m MO = 1.131
VERTICAL CURVATURE	L=70.00 g=-1.694% K=11.051 g=-5.291%	L=60.00 LVC=100.00 K=11.051 g=-5.291%
SUPER ELEVATION		
STUDY NAME	JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	
PROJECT TITLE	PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)	
SHEET CONTENTS	INTERCHANGE 4 PLAN AND PROFILE RAMP E	
SCALE	H = 1:5000 V = 1:500	
DRAWING NO.	PP-18	
SHEET NO.	18 OF 27	

ELEMENTS OF CURVE (CDO INT 4 RAMP A)																						
PI NO.	STATION	NORTHING	EASTING	Δ	R	A	La	θa	x	y	Tl	Tk	JR	Xm	Ts	Es	Δc	LC	T	Ec	e%	V(eph)
PI-1	--	924329.999	716942.976	--	56.00	56.60	57.20	29°15'46"	55.728	9.558	38.669	19.554	2.412	28.354	--	--	132°25'48"	129.435	127.059	82.853	--	--

ELEMENTS OF CURVE (CDO INT 4 RAMP B)																						
PI NO.	STATION	NORTHING	EASTING	Δ	R	A	La	θa	x	y	Tl	Tk	JR	Xm	Ts	Es	Δc	LC	T	Ec	e%	V(eph)
PI-1	--	924371.469	717082.971	--	51.00	77.33	117.25	65°51'48"	102.678	40.862	84.368	44.777	10.717	56.137	--	--	40°35'46"	36.135	18.863	3.377	--	--

ELEMENTS OF CURVE (CDO INT 4 RAMP C)													
PI NO.	STATION	NORTHING	EASTING	Δc	R	Lc	T	Ec	e%	V(eph)			
PI-1	0+050.62	924532.350	717123.268	2°55'03"	1987.70	101.212	50.617	0.644	--	--			
PI-2	0+185.05	924400.888	717139.538	7°35'34"	100.00	137.170	81.838	29.219	--	--			

ELEMENTS OF CURVE (CDO INT 4 RAMP D)													
PI NO.	STATION	NORTHING	EASTING	Δc	R	Lc	T	Ec	e%	V(eph)			
PI-1	0+081.44	924267.469	717177.270	84°06'32"	85.00	124.778	76.681	29.477	--	--			
PI-2	0+308.83	924522.116	717150.296	4°07'55"	2012.30	145.115	72.589	1.309	--	--			

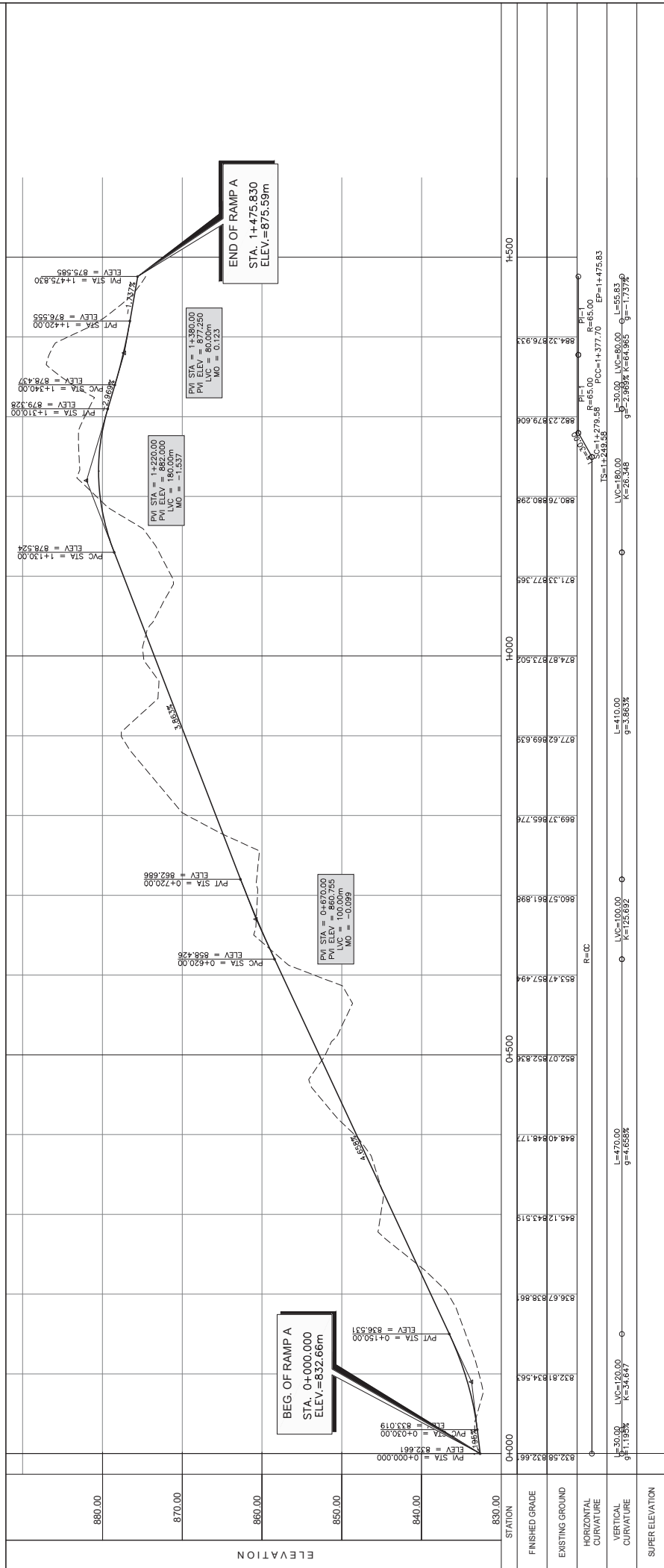
ELEMENTS OF CURVE (CDO INT 4 RAMP E)													
PI NO.	STATION	NORTHING	EASTING	Δc	R	Lc	T	Ec	e%	V(eph)			
PI-1	0+091.03	924076.171	717176.028	2°40'29"	2000.00	93.367	46.692	0.545	--	--			
PI-2	0+265.33	924250.471	717178.071	89°10'23"	80.00	124.509	78.854	32.329	--	--			

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 CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)	INTERCHANGE 4 ELEMENTS OF CURVE	N.T.S.	PP-19	19 OF 27



A 15.1-69

<p>STUDY NAME JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2</p>	<p>PROJECT TITLE PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)</p>	<p>SHEET CONTENTS INTERCHANGE 5 LAYOUT PLAN (OVERPASS) STA. 55+280.000</p>	<p>SCALE 1 : 2500</p>	<p>DRAWING NO. PP-20</p>	<p>SHEET NO. 20 OF 27</p>
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STATION	880.00	870.00	860.00	850.00	840.00	830.00
STATION	0+000	0+500	1+000	1+500	1+500	1+500
FINISHED GRADE	832.66	832.836	832.502	832.776	832.933	832.933
EXISTING GROUND	832.66	832.836	832.502	832.776	832.933	832.933
HORIZONTAL CURVATURE	9°11.195%	9°11.195%	9°11.195%	9°11.195%	9°11.195%	9°11.195%
VERTICAL CURVATURE	9°11.195%	9°11.195%	9°11.195%	9°11.195%	9°11.195%	9°11.195%
SUPER ELEVATION	0%	0%	0%	0%	0%	0%

STUDY NAME
 JICA-ASSISTED STUDY OF MASTER PLAN ON
 HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2

PROJECT TITLE
 PRE-FEASIBILITY STUDY OF
 CENTRAL MINDANAO HIGHWAY
 (CDO-Malaybalay Section)

SHEET CONTENTS
 INTERCHANGE 5
 PLAN AND PROFILE
 RAMP A

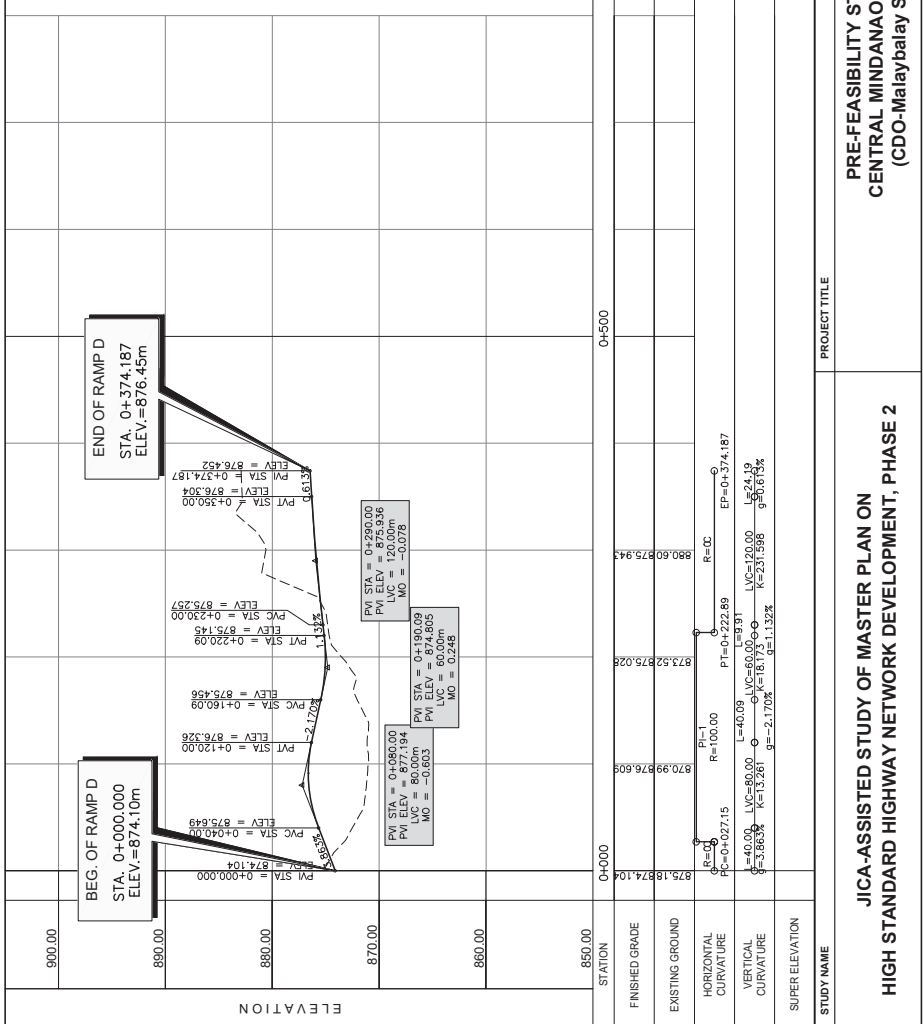
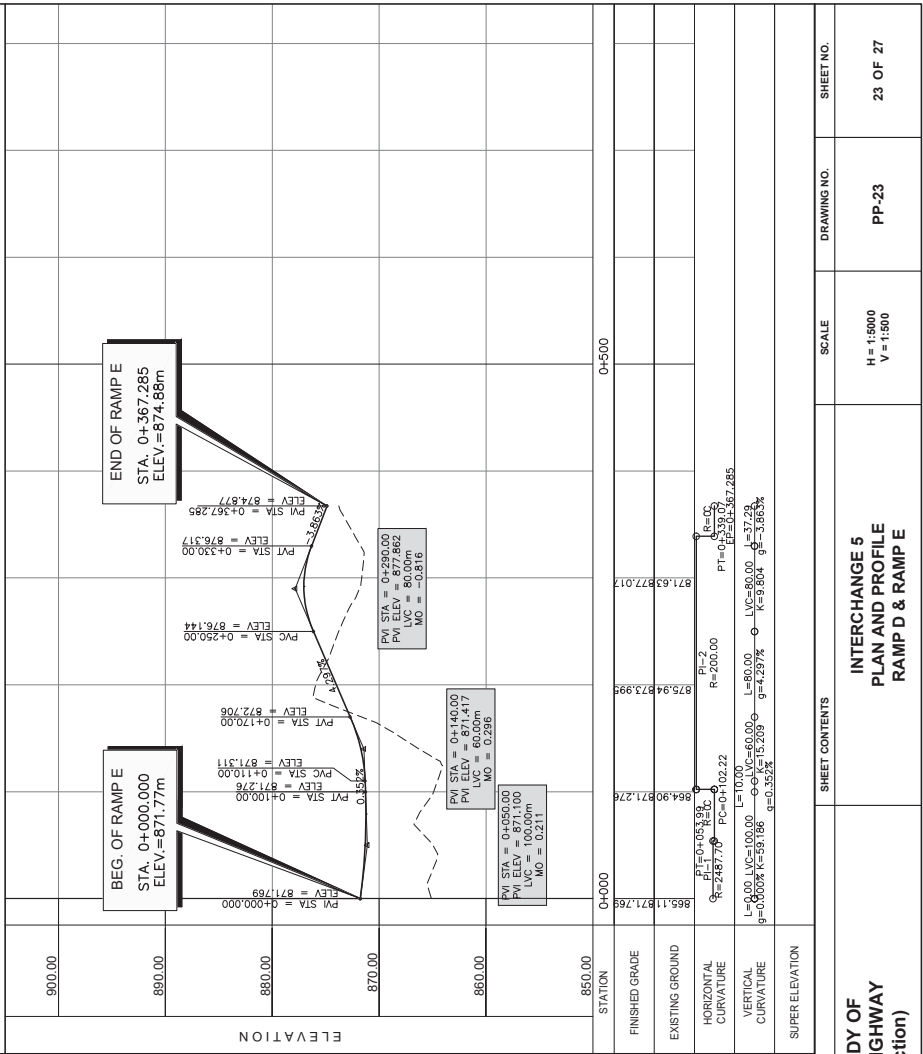
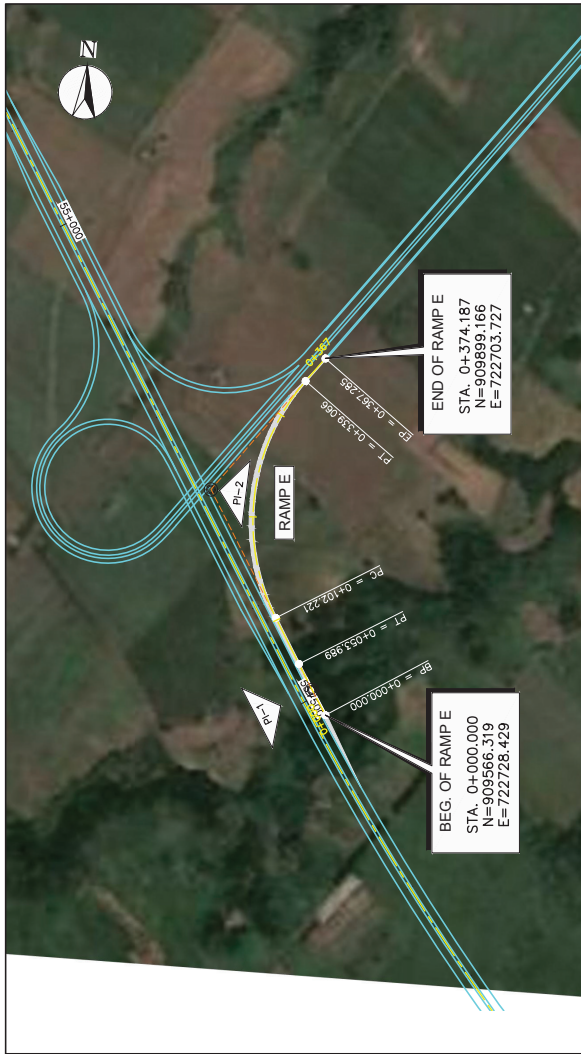
SCALE
 H = 1:5000
 V = 1:500

DRAWING NO.
 PP-21

SHEET NO.
 21 OF 27



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 CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)		INTERCHANGE 5 PLAN AND PROFILE RAMP B & RAMP C		H = 1:5000 V = 1:500		PP-22		22 OF 27	
ELEVATION		ELEVATION		ELEVATION		ELEVATION		ELEVATION		ELEVATION	
900.00		900.00		900.00		900.00		900.00		900.00	
890.00		890.00		890.00		890.00		890.00		890.00	
880.00		880.00		880.00		880.00		880.00		880.00	
870.00		870.00		870.00		870.00		870.00		870.00	
860.00		860.00		860.00		860.00		860.00		860.00	
850.00		850.00		850.00		850.00		850.00		850.00	
STATION	0+000	STATION	0+500	STATION	0+000	STATION	0+500	STATION	0+000	STATION	0+500
FINISHED GRADE	875.04	872.5, 485	875.04	872.5, 485	875.04	872.5, 485	875.04	872.5, 485	875.04	872.5, 485	875.04
EXISTING GROUND	875.04	872.5, 485	875.04	872.5, 485	875.04	872.5, 485	875.04	872.5, 485	875.04	872.5, 485	875.04
HORIZONTAL CURVATURE	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%
VERTICAL CURVATURE	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%	PI-1 R=60.00 L=175.00 g=-1.737%
SUPER ELEVATION											



A 15.1-72

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 CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)	INTERCHANGE 5 PLAN AND PROFILE RAMP D & RAMP E	H = 1:5000 V = 1:500	PP-23	23 OF 27

ELEMENTS OF CURVE (CDO INT 5 RAMP A)																						
PI NO.	STATION	NORTHING	EASTING	Δ	R	A	Ls	Es	x	y	TL	Tr	Xm	Ts	Es	Δ_c	LC	T	Ec	e%	V(kph)	
PI-1	—	909674.903	722504.514	—	65.00	44.16	30.00	13°13'20"	239.841	2.299	20.056	10.051	0.576	14.973	—	86°29'42"	98.125	61.141	24.237	—	—	—

ELEMENTS OF CURVE (CDO INT 5 RAMP A)										
PI NO.	STATION	NORTHING	EASTING	Δ_c	R	Lc	T	Ec	e%	V(kph)
PI-2	1+438.84	909763.735	722420.481	86°29'42"	65.00	98.125	61.141	24.237	—	—

ELEMENTS OF CURVE (CDO INT 5 RAMP B)																						
PI NO.	STATION	NORTHING	EASTING	Δ	R	A	Ls	Es	x	y	TL	Tr	Xm	Ts	Es	Δ_c	LC	T	Ec	e%	V(kph)	
PI-1	—	909850.488	722508.467	—	60.00	41.59	28.83	13°45'47"	26.659	2.299	19.275	9.662	0.576	14.385	—	92°10'26"	96.524	62.321	26.509	—	—	—

ELEMENTS OF CURVE (CDO INT 5 RAMP C)										
PI NO.	STATION	NORTHING	EASTING	Δ_c	R	Lc	T	Ec	e%	V(kph)
PI-1	0+182.92	909872.412	722515.280	74°03'47"	110.00	142.191	82.986	27.792	—	—

ELEMENTS OF CURVE (CDO INT 5 RAMP D)										
PI NO.	STATION	NORTHING	EASTING	Δ_c	R	Lc	T	Ec	e%	V(kph)
PI-1	0+175.62	909784.721	722596.617	112°09'56"	100.00	195.737	148.673	79.175	—	—

ELEMENTS OF CURVE (CDO INT 5 RAMP E)										
PI NO.	STATION	NORTHING	EASTING	Δ_c	R	Lc	T	Ec	e%	V(kph)
PI-1	0+027.00	909589.151	722714.025	114°36'	2487.70	53.989	26.995	0.146	—	—
PI-2	0+236.74	909768.995	722606.064	67°51'04"	200.00	236.845	134.524	41.032	—	—

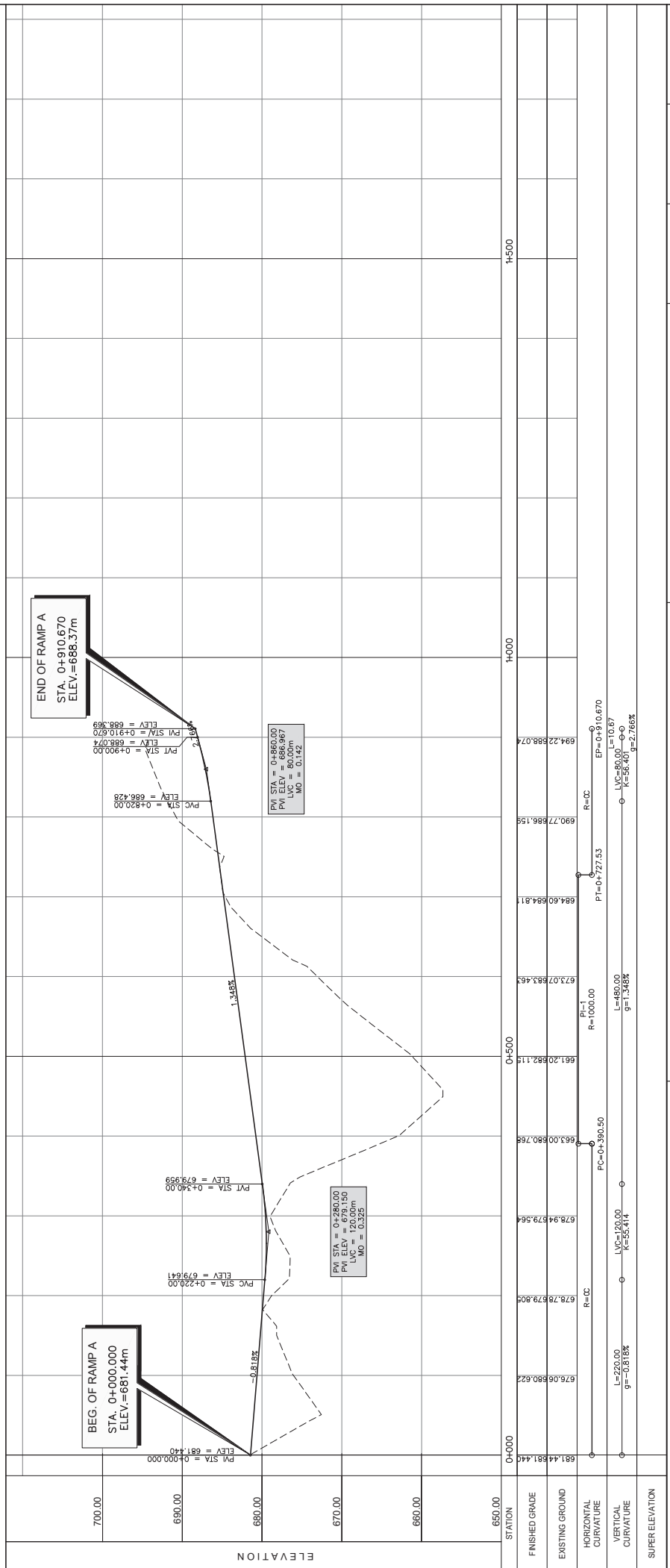
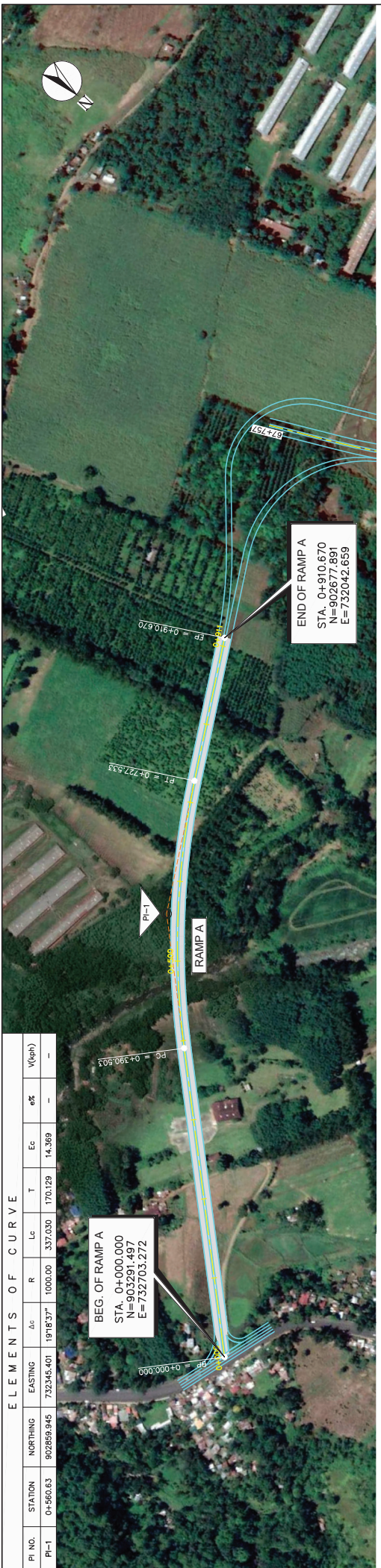
STUDY NAME JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2	PROJECT TITLE PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)	SHEET CONTENTS INTERCHANGE 5 ELEMENTS OF CURVE	SCALE N.T.S.	DRAWING NO. PP-24	SHEET NO. 24 OF 27
	PROJECT TITLE PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)				



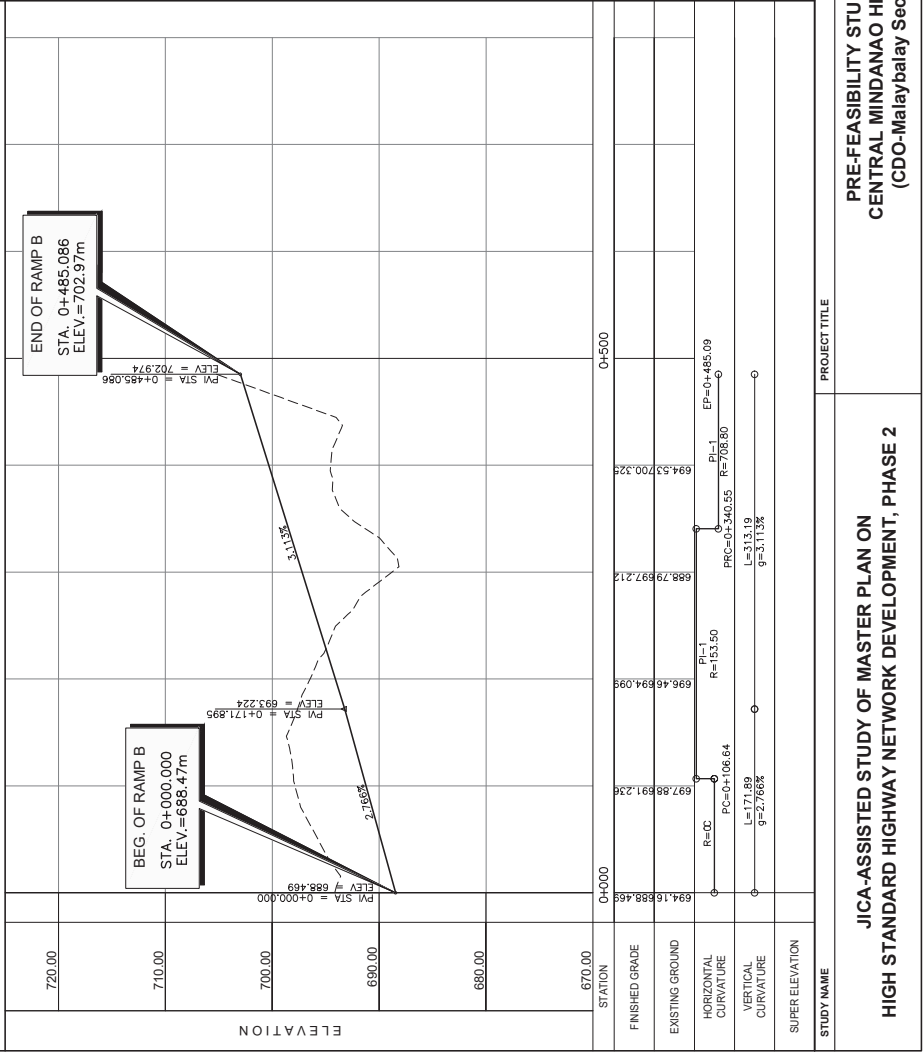
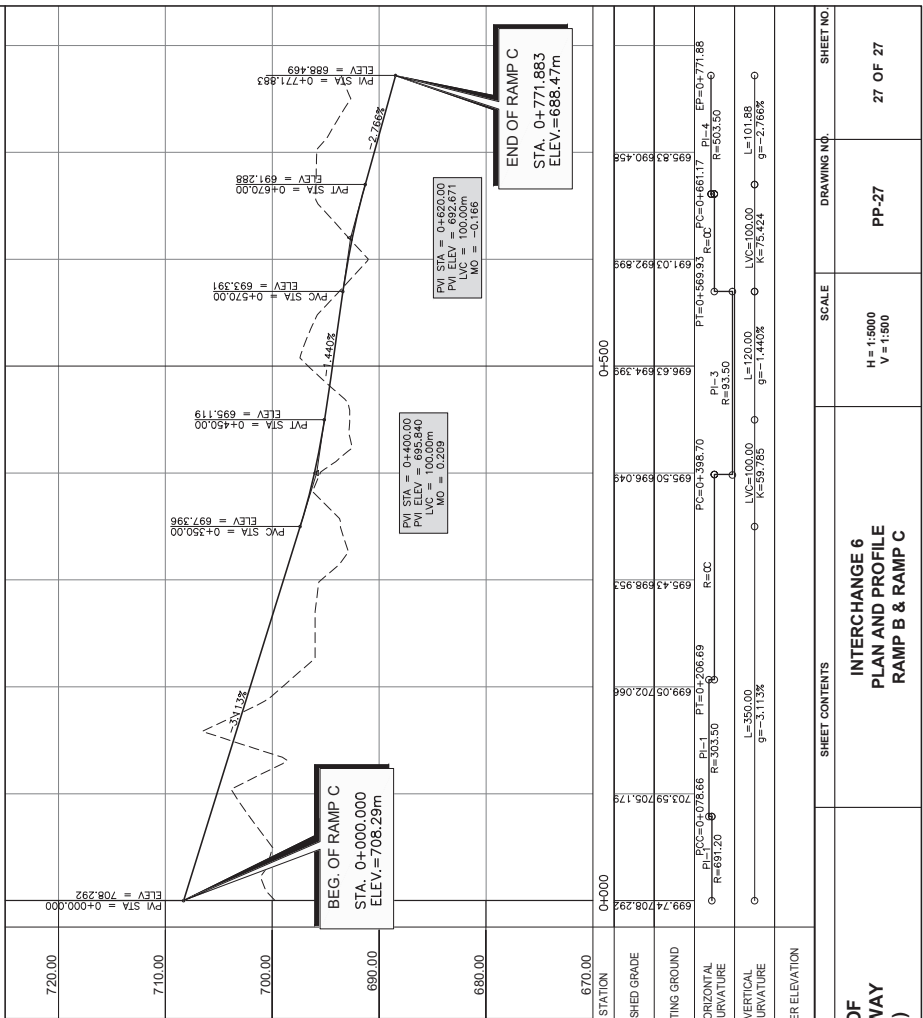
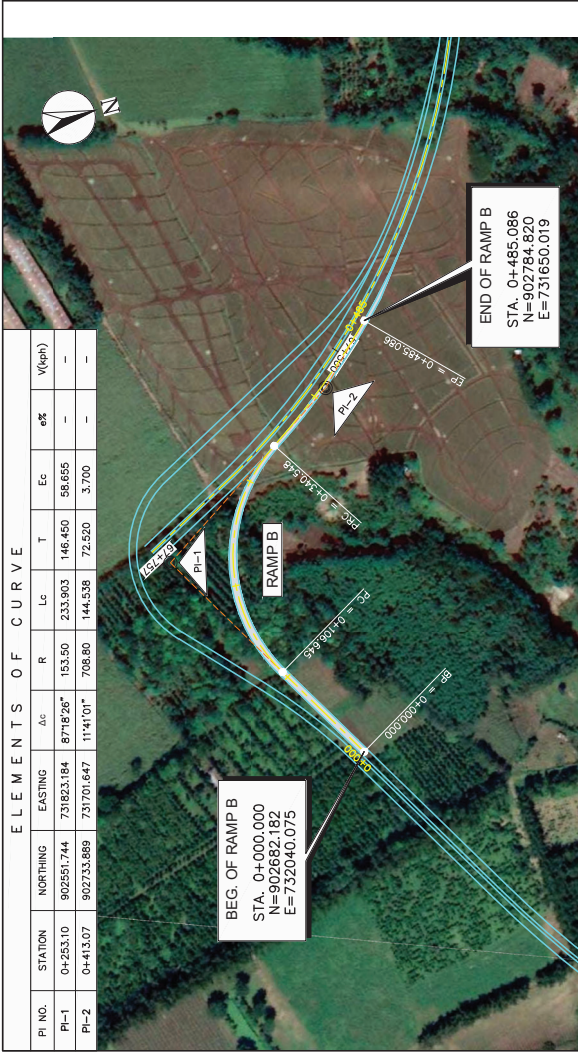
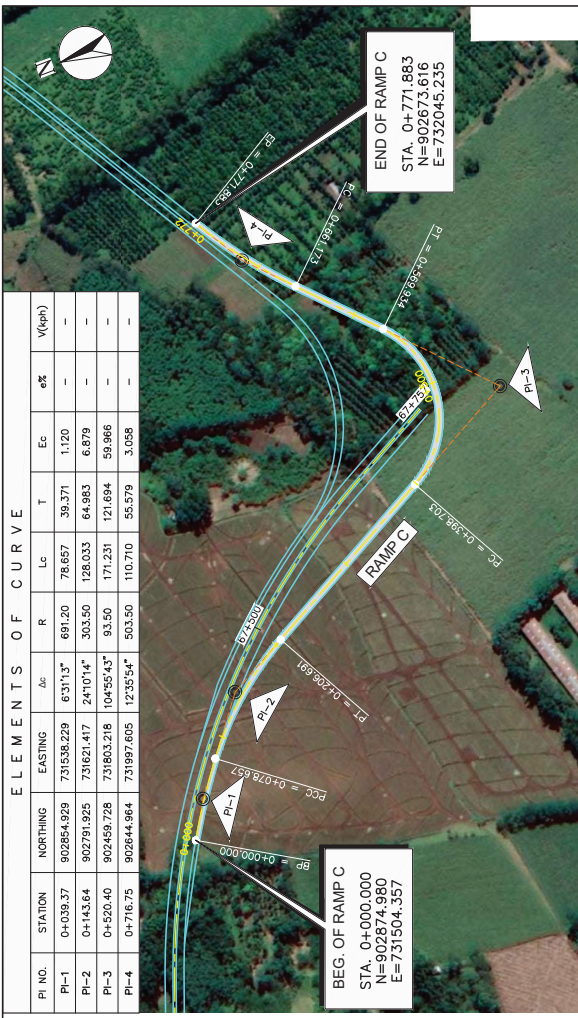
6 INTERCHANGE 6 @ STA. 67+757.000 (OVERPASS)
SCALE 1:2500

<p>STUDY NAME</p> <p>JICA-ASSISTED STUDY OF MASTER PLAN ON HIGH STANDARD HIGHWAY NETWORK DEVELOPMENT, PHASE 2</p>	<p>PROJECT TITLE</p> <p>PRE-FEASIBILITY STUDY OF CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)</p>	<p>SHEET CONTENTS</p> <p>INTERCHANGE 6 LAYOUT PLAN (UNDERPASS) STA. 67+757.000</p>	<p>SCALE</p> <p>1 : 2500</p>	<p>DRAWING NO.</p> <p>PP-25</p>	<p>SHEET NO.</p> <p>25 OF 27</p>
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ELEMENTS OF CURVE										
PI NO.	STATION	NORTHING	EASTING	Δc	R	Lg	T	Ec	e%	V(veh)
PI-1	0+560.63	902859.945	732345.401	191°8'37"	1000.00	337.030	170.129	14.369	-	-



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 CENTRAL MINDANAO HIGHWAY (CDO-Malaybalay Section)		INTERCHANGE 6 PLAN AND PROFILE RAMP A		H = 1:5000 V = 1:500	PP-26	26 OF 27



STATION	FINISHED GRADE	EXISTING GROUND	HORIZONTAL CURVATURE	VERTICAL CURVATURE	SUPER ELEVATION
0+000	708.292	705.175	R=303.50	g=-3.113%	
0+500	698.952	696.045	R=303.50	g=-1.440%	
0+771.883	688.470	688.470	R=303.50	g=-2.766%	

15.2 CONSTRUCTION UNIT PRICE

Appendix 15-2 Construction Unit Price for Central Mindanao Highway

1. Earthwork - Embankment Section

(1) 2-lane Section

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
1	Embankment Section (2 Lanes, Asphalt Pavement. W=13.3m, H=7m) Section (L=1.0 km)				
1.1	Clearing and Grubbing	ha	4.6	299,263.60	1,385,590.00
1.2	Embankment from Roadway Excavation	m3	190,960.0	248.39	47,432,554.00
1.3	Subgrade Preparation	m2	13,300.0	30.81	409,773.00
1.4	Aggregate Base Course (t=20cm)	m3	2,660.0	1,809.64	4,813,642.00
1.5	Aggregate Sub Base Course (t=30cm)	m3	3,990.0	1,568.53	6,258,435.00
1.6	Cement Treated Base Course (t=20cm)	m3	2,660.0	2,870.45	7,635,397.00
1.7	Bituminous Tack Coat	m2	13,300.0	33.90	450,870.00
1.8	Bituminous Prime Coat	m2	13,300.0	37.29	495,957.00
1.9	Anti-Rutting Bituminous Concrete Binder Course, Hot Laid (t=5 cm)	m2	13,300.0	1,035.57	13,773,081.00
1.10	Anti-Rutting Bituminous Wearing Concrete Course, Hot Laid (t=5 cm)	m2	13,300.0	1,114.64	14,824,712.00
1.11	Concrete Barrier (New Jersey Type)	l.m.	0.0	5,732.48	-
1.12	Slope Net with Seeding for Common Soil on Fill	m2	31,304.0	317.75	9,946,846.00
1.13	Drainage (Grouted Riprap Class A Slide Ditch)	l.m.	2,000.0	4,854.33	9,708,660.00
1.14	RCPC, 1220 mm dia	l.m.	414.0	8,616.84	3,567,372.00
1.15	Traffic Sign and Safety Facilities	l.m.	1,000.0	10,382.99	10,382,990.00
1.16	Lighting	each	34.0	195,166.47	6,635,660.00
1.17	General Requirement (32.5% of Civil Work)	LS	1		44,759,500.18
Total					182,481,039.18
Unit Cost (Item 1 - Million Peso / km)					182.48
Unit Cost (Item 1 - Peso /sq.m)					13,720.38

(2) 4-lane Section

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
1	Embankment Section (4 Lanes, Asphalt Pavement, W=23.6m, H=7m) Section (L=1.0 km)				
1.1	Clearing and Grubbing	ha	5.7	299,263.60	1,693,832.00
1.2	Embankment from Roadway Excavation	m3	254,820.0	248.39	63,294,740.00
1.3	Subgrade Preparation	m2	23,600.0	30.81	727,116.00
1.4	Aggregate Base Course (t=20cm)	m3	4,720.0	1,809.64	8,541,501.00
1.5	Aggregate Sub Base Course (t=30cm)	m3	7,080.0	1,568.53	11,105,192.00
1.6	Cement Treated Base Course (t=20cm)	m3	4,720.0	2,870.45	13,548,524.00
1.7	Bituminous Tack Coat	m2	23,600.0	33.90	800,040.00
1.8	Bituminous Prime Coat	m2	23,600.0	37.29	880,044.00
1.9	Anti-Rutting Bituminous Concrete Binder Course, Hot Laid (t=5 cm)	m2	23,600.0	1,035.57	24,439,452.00
1.10	Anti-Rutting Bituminous Wearing Concrete Course, Hot Laid (t=5 cm)	m2	23,600.0	1,114.64	26,305,504.00
1.11	Concrete Barrier (New Jersey Type)	l.m.	1,000.0	5,732.48	5,732,480.00
1.12	Slope Net with Seeding for Common Soil on Fill	m2	31,304.0	317.75	9,946,846.00
1.13	Drainage (Grouted Riprap Class A Slide Ditch)	l.m.	2,000.0	4,854.33	9,708,660.00
1.14	RCPC, 1220 mm dia	l.m.	513.0	8,616.84	4,420,439.00
1.15	Traffic Sign and Safety Facilities	l.m.	1,000.0	10,382.99	10,382,990.00
1.16	Lighting	each	34.0	195,166.47	6,635,660.00
1.17	General Requirement (32.5% of Civil Work)	LS	1		64,402,981.50
Total					262,566,001.50
Unit Cost (Item 1 - Million Peso / km)					262.57
Unit Cost (Item 1 - Peso /sq.m)					11,125.68

2. Earthwork - High Cut Section

(1) 2-lane Section

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
2	Cut Section (2 Lanes, Asphalt Pavement, W=13.3m, H=10m) Section (L=1.0 km)				
2.1	Clearing and Grubbing	ha	4.1	299,263.60	1,235,959.00
2.2	Roadway Excavation (Common Soil)	m3	215,600.0	658.16	141,899,296.00
2.3	Roadway Excavation (Soft Rock)	m3	92,400.0	987.24	91,220,976.00
2.4	Subgrade Preparation	m2	13,300.0	30.81	409,773.00
2.5	Aggregate Base Course (t=20cm)	m3	2,660.0	1,809.64	4,813,642.00
2.6	Aggregate Sub Base Course (t=30cm)	m3	3,990.0	1,568.53	6,258,435.00
2.7	Cement Treated Base Course (t=20cm)	m3	2,660.0	2,870.45	7,635,397.00
2.8	Bituminous Tack Coat	m2	13,300.0	33.90	450,870.00
2.9	Bituminous Prime Coat	m2	13,300.0	37.29	495,957.00
2.10	Anti-Rutting Bituminous Concrete Binder Course, Hot Laid (t=5 cm)	m2	13,300.0	1,035.57	13,773,081.00
2.11	Anti-Rutting Bituminous Wearing Concrete Course, Hot Laid (t=5 cm)	m2	13,300.0	1,114.64	14,824,712.00
2.12	Concrete Barrier (New Jersey Type)	l.m.	0.0	2,568.16	-
2.13	Slope Net with Seeding for Common Soil on Cut	m2	19,796.0	522.75	10,348,359.00
2.14	Slope Net with Seeding for Soft Rock	l.m.	8,484.0	645.75	5,478,543.00
2.15	Drainage (Grouted Riprap Class A Slide Ditch,)	l.m.	2,000.0	4,666.88	9,333,760.00
2.16	RCPC, 1220 mm dia	l.m.	76.5	8,616.84	659,188.00
2.17	Traffic Sign and Safety Facilities	l.m.	1,000.0	10,382.99	10,382,990.00
2.18	Lighting	each	34.0	195,166.47	6,635,660.00
2.19	General Requirement (32.5% of Civil Work)	LS	1		105,903,394.35
Total					431,759,992.35
Unit Cost (Item 2 -Million Peso / km)					431.76
Unit Cost (Item 3 - Peso / km)					32,463.16

(2) 4-lane section

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
2	Cut Section (4 Lanes, Asphalt Pavement, W=23.6m, H=8m) Section (L=1.0 km)				
2.1	Clearing and Grubbing	ha	6.0	299,263.60	1,795,582.00
2.2	Roadway Excavation (Common Soil)	m3	221,060.0	658.16	145,492,850.00
2.3	Roadway Excavation (Soft Rock)	m3	94,740.0	987.24	93,531,118.00
2.4	Subgrade Preparation	m2	23,600.0	30.81	727,116.00
2.5	Aggregate Base Course (t=20cm)	m3	4,720.0	1,809.64	8,541,501.00
2.6	Aggregate Sub Base Course (t=30cm)	m3	7,080.0	1,568.53	11,105,192.00
2.7	Cement Treated Base Course (t=20cm)	m3	4,720.0	2,870.45	13,548,524.00
2.8	Bituminous Tack Coat	m2	23,600.0	33.90	800,040.00
2.9	Bituminous Prime Coat	m2	23,600.0	37.29	880,044.00
2.10	Anti-Rutting Bituminous Concrete Binder Course, Hot Laid (t=5 cm)	m2	23,600.0	1,035.57	24,439,452.00
2.11	Anti-Rutting Bituminous Wearing Concrete Course, Hot Laid (t=5 cm)	m2	23,600.0	1,114.64	26,305,504.00
2.12	Concrete Barrier (New Jersey Type)	l.m.	1,000.0	2,568.16	2,568,160.00
2.13	Slope Net with Seeding for Common Soil on Cut	m2	19,796.0	522.75	10,348,359.00
2.14	Slope Net with Seeding for Soft Rock	l.m.	8,484.0	645.75	5,478,543.00
2.15	Drainage (Grouted Riprap Class A Slide Ditch,)	l.m.	2,000.0	4,666.88	9,333,760.00
2.16	RCPC, 1220 mm dia	l.m.	128.0	8,616.84	1,102,956.00
2.17	Traffic Sign and Safety Facilities	l.m.	1,000.0	10,382.99	10,382,990.00
2.18	Lighting	each	34.0	195,166.47	6,635,660.00
2.19	General Requirement (32.5% of Civil Work)	LS	1		121,230,639.08
Total					494,247,990.08
Unit Cost (Item 2 -Million Peso / km)					494.25
Unit Cost (Item 2 -Peso /sq.m)					20,942.71

3. Bridge - P/S Concrete Girder

(1) 2-lane Bridge

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
4	Cost of Concrete Viaduct (P/S Concrete Girder, 2 Lanes, W=10.9m, Span=35m, Single-Column H=10m)				
4.1	Structure Excavation	m3	8,035.7	772.82	6,210,161
4.2	Foundation Backfill	m3	3,214.3	1,361.67	4,376,796
4.3	Bituminous Tack Coat	ton	9,300.0	33.90	315,270
4.4	Bituminous Concrete Surface Course	ton	9,300.0	1,114.64	10,366,152
4.5	Concrete Piles Cast in Drilled Holes, 1.5m	m	2,857.1	33,646.26	96,132,171
4.6	Railing	l.m.	2,000.0	6,158.51	12,317,020
4.7	Reinforcing Steel	kg	2,686,700.0	78.60	211,174,620
4.8	Prestressing Steel	kg	482.1	188.07	90,667
4.9	Lean Concrete 17Mpa	m3	160.7	5,010.71	805,293
4.10	Structural Concrete, Class A Pile Cap	m3	4,821.4	6,916.29	33,346,398
4.11	Structural Concrete, Class AA Column	m3	1,800.0	14,345.79	25,822,422
4.12	Structural Concrete, Class P Coping	m3	2,725.0	20,525.11	55,930,925
4.13	Structural Concrete, Class AA Deck Slab	m3	2,507.0	9,401.27	23,568,984
4.14	Structural Concrete, Class AA Diaphragm	m3	462.9	22,575.79	10,449,366
4.15	Structural Concrete, Class A Parapet	m3	800.0	10,363.83	8,291,064
4.16	Non-Shrink Grout	m3	4.3	98,968.46	424,151
4.17	AASHTO PC Girder Type V, L=35.0m	each	87.0	1,429,898.78	124,401,194
4.18	Steel Decking	sq.m	10,900.0	2,986.75	32,555,575
4.19	Elastomeric Bearing Pad (606 x 306 x 60mm)	each	171.4	5,736.16	983,342
4.20	Rubber Filler (400 x 150 x 50mm)	each	171.4	1,064.97	182,566
4.21	Hard Rubber Filer & Restrainer Bolt dia 30mm	set	171.4	1,935.79	331,850
4.22	Expansion Joint	m	250.0	36,184.91	9,046,228
4.23	Concrete Barrier (New Jersey Type)	l.m.	0.0	5,732.48	0
4.24	Cast Iron Deck Drain	each	50.0	24,205.87	1,210,294
4.25	Rainwater Downspout (PVC 150)	l.m.	450.0	973.79	438,206
4.26	Rainwater Downspout (PVC 200)	l.m.	500.0	1,418.44	709,220
4.27	Road Lighting	each	34.0	195,166.47	6,635,660
4.28	Traffic Sign and Safety Facilities	l.m.	1,000.0	10,382.99	10,382,990
4.29	General Requirement (32.5% of Civil Work)	L.S	1.0		223,112,040
Total					909,610,625.13
Unit Cost (Item 4 -Million Peso / km)					909.61
Unit Cost (Item 4 -Peso /sq.m)					83,450.52

(2) 4-lane Bridge

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
4	Cost of Concrete Viaduct L=1km (P/S Concrete Girder, Span=35m, Single-Column 4 Lanes, W=21.2m, H=10m)				
4.1	Structure Excavation	m3	10,285.7	772.82	7,949,006.00
4.2	Foundation Backfill	m3	4,114.3	1,361.67	5,602,299.00
4.3	Bituminous Tack Coat	ton	19,600.0	33.90	664,440.00
4.4	Bituminous Concrete Surface Course	ton	19,600.0	1,114.64	21,846,944.00
4.5	Concrete Piles Cast in Drilled Holes, 1.2m	m	5,714.3	24,575.60	140,432,000.00
4.6	Railing	l.m.	2,000.0	6,158.51	12,317,020.00
4.7	Reinforcing Steel	kg	4,941,240.0	78.60	388,381,464.00
4.8	Prestressing Steel	kg	2,812.9	188.07	529,029.00
4.9	Lean Concrete 17Mpa	m3	205.7	5,010.71	1,030,775.00
4.10	Structural Concrete, Class A Pile Cap	m3	6,171.4	6,916.29	42,683,390.00
4.11	Structural Concrete, Class AA Column	m3	4,800.0	14,345.79	68,859,792.00
4.12	Structural Concrete, Class P Coping	m3	5,194.0	20,525.11	106,607,421.00
4.13	Structural Concrete, Class AA Deck Slab	m3	4,968.0	9,401.27	46,705,509.00
4.14	Structural Concrete, Class AA Diaphragm	m3	450.0	22,575.79	10,159,106.00
4.15	Structural Concrete, Class A Parapet	m3	1,000.0	10,363.83	10,363,830.00
4.16	Non-Shrink Grout	m3	5.7	98,968.46	565,534.00
4.17	AASHTO PC Girder Type V, L=35.0m	each	232.0	1,429,898.78	331,736,517.00
4.18	Metal Decking (8 mm thk)	sq.m	21,600.0	2,986.75	64,513,800.00
4.19	Elastomeric Bearing Pad (606 x 306 x 60mm)	each	457.1	5,736.16	2,622,245.00
4.20	Rubber Filler (400 x 150 x 50mm)	each	457.1	1,064.97	486,843.00
4.21	Hard Rubber Filer & Restrainer Bolt dia 30mm	set	457.1	1,935.79	884,933.00
4.22	Expansion Joint	m	560.0	36,184.91	20,263,550.00
4.23	Concrete Barrier (New Jersey Type)	l.m.	1,000.0	5,732.48	5,732,480.00
4.24	Cast Iron Deck Drain	each	100.0	24,205.87	2,420,587.00
4.25	Rainwater Downspout (PVC 150)	l.m.	900.0	973.79	876,411.00
4.26	Rainwater Downspout (PVC 200)	l.m.	1,000.0	1,418.44	1,418,440.00
4.27	Road Lighting	each	34.0	195,166.47	6,635,660.00
4.28	Traffic Sign and Safety Facilities	l.m.	1,000.0	10,382.99	10,382,990.00
4.29	General Requirement (32.5% of Civil Work)	L.S	1.0		426,618,404.88
Total					1,739,290,419.88
Unit Cost (Item 4 -Million Peso / km)					1,739.29
Unit Cost (Item 4 -Peso /sq.m)					82,042.00

4. Bridge – Steel Box

(1) 2-lane Section

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
3	Cost of Steel Viaduct (Steel Box Girder, 2 Lanes, W=10.9m, Span=50m Concrete Pier Single-Column H=10m)				
3.1	Structure Excavation	m3	5,400.0	772.82	4,173,228.00
3.2	Foundation Backfill	m3	2,160.0	1,361.67	2,941,207.00
3.3	Bituminous Tack Coat	m2	9,300.0	33.90	315,270.00
3.4	Bituminous Concrete Surface Course (t=5cm)	m2	9,300.0	1,114.64	10,366,152.00
3.5	Concrete Piles Cast in Drilled Holes, 1.2m	m	3,000.0	24,575.60	73,726,800.00
3.6	Railing	l.m.	2,000.0	6,158.51	12,317,020.00
3.7	Reinforcing Steel	kg	2,315,990.0	78.60	182,036,814.00
3.8	Prestressing Steel	kg	337.5	188.07	63,467.00
3.9	Lean Concrete 17Mpa	m3	108.0	5,010.71	541,157.00
3.10	Structural Concrete, Class A Pile Cap	m3	3,240.0	6,916.29	22,408,780.00
3.11	Structural Concrete, Class AA Column	m3	1,715.0	14,345.79	24,603,030.00
3.12	Structural Concrete, Class P Coping	m3	2,289.0	20,525.11	46,981,977.00
3.13	Structural Concrete, Class AA Deck Slab	m3	2,507.0	9,401.27	23,568,984.00
3.14	Structural Concrete, Class A Parapet	m3	800.0	10,363.83	8,291,064.00
3.15	Non-Shrink Grout	m3	3.0	98,968.46	296,905.00
3.16	Structural Steel (Super Structure)	kg	3,270,000.0	223.69	731,466,300.00
3.17	Structural Steel (Sub Structure)	kg	0.0	212.51	-
3.18	Metal Decking (8 mm thk)	sq.m	10,900.0	2,986.75	32,555,575.00
3.19	Elastomeric Bearing Pad (800 x 800 x 60mm)	each	80.0	19,995.35	1,599,628.00
3.20	Rubber Filler (400 x 150 x 50mm)	each	80.0	1,064.97	85,198.00
3.21	Hard Rubber Filer & Restrainer Bolt dia 30mm	set	80.0	1,935.79	154,863.00
3.22	Expansion Joint (For Steel Girder)	m	186.0	107,240.66	19,946,763.00
3.23	Concrete Barrier (New Jersey Type)	l.m.	0.0	5,732.48	-
3.24	Cast Iron Deck Drain	each	50.0	24,205.87	1,210,294.00
3.25	Rainwater Downspout (PVC 150)	l.m.	450.0	973.79	438,206.00
3.26	Rainwater Downspout (PVC 200)	l.m.	500.0	1,418.44	709,220.00
3.27	Road Lighting	each	34.0	195,166.47	6,635,660.00
3.28	Traffic Sign and Safety Facilities	l.m.	1,000.0	10,382.99	10,382,990.00
3.29	General Requirement (32.5% of Civil Work)	L.S	1.0		395,790,379.40
	Total				1,613,606,931.40
	Unit Cost (Item 3 -Million Peso / km)				1,613.61
	Unit Cost (Item 3 -Peso /sq.m)				162,171.55

(2) 4-lane Section

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
3	Cost of Steel Viaduct L=1km (Steel Box Girder, Span=50m Concrete Pier Single-Column 4 Lanes, W=21.2m, H=10m)				
3.1	Structure Excavation	m3	11,250.0	772.82	8,694,225.00
3.2	Foundation Backfill	m3	4,500.0	1,361.67	6,127,515.00
3.3	Bituminous Tack Coat	m2	19,600.0	33.90	664,440.00
3.4	Bituminous Concrete Surface Course (t=5cm)	m2	19,600.0	1,114.64	21,846,944.00
3.5	Concrete Piles Cast in Drilled Holes, 1.5m	m	4,000.0	42,716.92	170,867,680.00
3.6	Railing	l.m.	2,000.0	6,158.51	12,317,020.00
3.7	Reinforcing Steel	kg	5,224,540.0	78.60	410,648,844.00
3.8	Prestressing Steel	kg	1,969.1	188.07	370,320.00
3.9	Lean Concrete 17Mpa	m3	225.0	5,010.71	1,127,410.00
3.10	Structural Concrete, Class A Pile Cap	m3	6,750.0	6,916.29	46,684,958.00
3.11	Structural Concrete, Class AA Column	m3	5,600.0	14,345.79	80,336,424.00
3.12	Structural Concrete, Class P Coping	m3	5,724.0	20,525.11	117,485,730.00
3.13	Structural Concrete, Class AA Deck Slab	m3	4,876.0	9,401.27	45,840,593.00
3.14	Structural Concrete, Class A Parapet	m3	1,000.0	10,363.83	10,363,830.00
3.15	Non-Shrink Grout	m3	4.0	98,968.46	395,874.00
3.16	Structural Steel (Super Structure)	kg	6,480,000.0	223.69	1,449,511,200.00
3.17	Structural Steel (Sub Structure)	kg	0.0	212.51	-
3.18	Metal Decking (8 mm thk)	sq.m	21,600.0	2,986.75	64,513,800.00
3.19	Elastomeric Bearing Pad (800 x 800 x 60mm)	each	240.0	19,995.35	4,798,884.00
3.20	Rubber Filler (400 x 150 x 50mm)	each	240.0	1,064.97	255,593.00
3.21	Hard Rubber Filer & Restrainer Bolt dia 30mm	set	240.0	1,935.79	464,590.00
3.22	Expansion Joint (For Steel Girder)	m	392.0	107,240.66	42,038,339.00
3.23	Concrete Barrier (New Jersey Type)	l.m.	1,000.0	5,732.48	5,732,480.00
3.24	Cast Iron Deck Drain	each	100.0	24,205.87	2,420,587.00
3.25	Rainwater Downspout (PVC 150)	l.m.	900.0	973.79	876,411.00
3.26	Rainwater Downspout (PVC 200)	l.m.	1,000.0	1,418.44	1,418,440.00
3.27	Road Lighting	each	34.0	195,166.47	6,635,660.00
3.28	Traffic Sign and Safety Facilities	l.m.	1,000.0	10,382.99	10,382,990.00
3.29	General Requirement (32.5% of Civil Work)	L.S	1.0		819,916,753.83
	Total				3,342,737,534.83
	Unit Cost (Item 3 -Million Peso / km)				3,342.74
	Unit Cost (Item 3 -Peso /sq.m)				157,676.30

5. Interchange

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
1	Trumpet Type Interchange (1.0m+3.5m+2m) Ramp				
1.1	Clearing and Grubbing	ha	2.9	291,964.48	832,099.00
1.2	Embankment from Roadway Excavation	m3	197,220.0	248.39	48,987,476.00
1.3	Subgrade Preparation	m2	28,185.0	30.81	868,380.00
1.4	Aggregate Base Course (t=20cm)	m3	4,491.0	1,809.64	8,127,093.00
1.5	Aggregate Sub Base Course (t=30cm)	m3	6,736.5	1,568.53	10,566,402.00
1.6	Cement Treated Base Course (t=20cm)	m3	4,011.0	2,870.45	11,513,375.00
1.7	Bituminous Tack Coat	m2	20,300.0	33.90	688,170.00
1.8	Bituminous Prime Coat	m2	20,055.0	37.29	747,851.00
1.9	Anti-Rutting Bituminous Concrete Binder Course, Hot Laid (t=5 cm)	m2	20,300.0	1,035.57	21,022,071.00
1.10	Anti-Rutting Bituminous Wearing Concrete Course, Hot Laid (t=5 cm)	m2	20,055.0	1,114.64	22,354,105.00
1.11	Portland Cement Concrete Reinforced with Wire Mesh Pavement, 320mm thk	m2	2,400.0	2,568.16	6,163,584.00
1.12	Concrete Barrier (New Jersey Type)	l.m.	760.0	5,732.48	4,356,685.00
1.13	Slope Net with Seeding for Common Soil on Fill	m2	37,654.2	317.75	11,964,635.00
1.14	Drainage (Grouted Riprap Class A Slide Ditch)	l.m.	4,210.0	4,854.33	20,436,729.00
1.15	RCPC, 1220 mm dia	l.m.	272.0	8,616.84	2,343,780.00
1.16	Traffic Sign and Safety Facilities	l.m.	2,900.0	10,382.99	30,110,671.00
1.17	Tool Road Lighting	each	26.0	195,166.47	5,074,328.00
1.18	ROW Fence	l.m.	4,300.0	1,723.02	7,408,986.00
1.19	Bridge 35m PC-I Girder	m2	490.0	63,466.45	31,098,561.00
1.20	Portable Weighing Station	set	1.00	4,384,308.22	4,384,308.00
1.21	Toll Island	each	6.00	170,017.65	1,020,106.00
1.22	Crash Attenuators	set	6.00	56,308.53	337,851.00
1.23	Toll Booth (Type 1)	each	4.00	476,261.45	1,905,046.00
1.24	Toll Booth (Maxi Type 2)	each	2.00	1,035,523.93	2,071,048.00
1.25	Toll Plaza	sq.m.	300.00	26,758.65	8,027,595.00
1.26	Toll House	Unit	1.00	5,535,000.00	5,535,000.00
1.27	Toll Plaza Lighting System	each	6.00	378,666.24	2,271,997.00
1.28	General Requirement (32.5% of Civil Work)	LS	1		87,820,827.90
Total					358,038,759.90
Unit Cost (Item 1 - Million Peso / Interchange)					358.04

6. Overpass

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
1	Cost of Steel Overpass (Steel I Girder, 2 Lanes, W=8.50m, Span=40m)				
1.1	Structure Excavation	m3	1,696.8	772.82	1,311,321.00
1.2	Foundation Backfill	m3	565.6	1,361.67	770,161.00
1.3	Subbase Course (t=30cm)	m3	51.0	1,568.53	79,995.00
1.4	Aggregate Base Course (t=20cm)	m3	34.0	1,809.64	61,528.00
1.5	Bituminous Prime Coat,	m2	170.0	37.29	6,339.00
1.6	Bituminous Tack Coat	m2	170.0	33.90	5,763.00
1.7	Anti-Rutting Bituminous Concrete Binder Course, Hot Laid (t=5 cm)	m2	170.0	1,035.57	176,047.00
1.8	Anti-Rutting Bituminous Wearing Concrete Course, Hot Laid (t=5 cm)	m2	510.0	1,114.64	568,466.00
1.9	Concrete Piles Cast in Drilled Holes, 1.0m	m	180.0	20,479.66	3,686,339.00
1.10	Railing	l.m.	80.0	6,158.51	492,681.00
1.11	Reinforcing Steel	kg	102,730.0	78.60	8,074,578.00
1.12	Lean Concrete 17Mpa	m3	10.7	5,010.71	53,675.00
1.13	Structural Concrete, Class A Pile Cap	m3	202.0	6,916.29	1,397,091.00
1.14	Structural Concrete Class AA 28MPa for Abutment	m3	151.5	14,345.79	2,173,387.00
1.15	Structural Concrete, Class AA Deck Slab	m3	92.9	9,401.27	873,566.00
1.16	Structural Concrete, Class A Parapet	m3	44.0	10,363.83	456,009.00
1.17	Structural Steel (Super Structure)	kg	85,000.0	223.69	19,013,650.00
1.18	Metal Decking (8 mm thk)	sq.m	404.0	2,986.75	1,206,647.00
1.19	Elastomeric Bearing Pad (800 x 800 x 60mm)	each	6.0	19,995.35	119,972.00
1.20	Rubber Filler (400 x 150 x 50mm)	each	6.0	1,064.97	6,390.00
1.21	Hard Rubber Filer & Restrainer Bolt dia 30mm	set	6.0	1,935.79	11,615.00
1.22	Expansion Joint (For Steel Girder)	m	17.0	36,184.91	615,143.00
1.23	Cast Iron Deck Drain	each	8.0	24,205.87	193,647.00
1.24	Rainwater Downspout (PVC 150)	l.m.	12.0	973.79	11,685.00
1.25	Rainwater Downspout (PVC 200)	l.m.	60.0	1,418.44	85,106.00
1.26	Road Lighting	each	2.0	195,166.47	390,333.00
1.27	Traffic Sign and Safety Facilities	l.m.	40.0	10,382.99	415,320.00
1.27	General Requirement (32.5% of Civil Work)	L.S	1.0		13,307,168.23
Total					55,563,622.23
Unit Cost (Item 3 -Million Peso / Location)					55.56
Unit Cost (Item 3 -Peso /sq.m)					163,422.42

7. Underpass

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
1	Cost of Underpass Box Culvert W=5.0m, L=31m				
1.1	Structure Excavation	m3	364.56	772.82	281,739.00
1.2	Embankment from Borrow Excavation	m3	90.68	1,361.67	123,469.00
1.3	Subbase Course	m2	55.35	33.90	1,876.00
1.4	Bituminous Tack Coat	m2	184.50	33.90	6,255.00
1.5	Bituminous Concrete Surface Course (t=5cm)	m2	184.50	1,114.64	205,651.00
1.6	Reinforcing Steel	kg	178,096.8	78.60	13,998,408.00
1.7	Lean Concrete 17Mpa	m3	24.18	5,010.71	121,159.00
1.8	Structural Concrete, Class AA Box Culvert	m3	794.08	6,916.29	5,492,088.00
1.9	Structural Concrete, Class AA Approach, Parapet	m3	63.00	10,363.83	652,921.00
1.10	Grouted Riprap, Class "A"	m3	36.00	4,854.33	174,756.00
1.11	Traffic Sign and Safety Facilities	l.m.	31.0	10,382.99	321,873.00
1.12	General Requirement (32.5% of Civil Work)	L.S	1.0		6,948,563.38
	Total				28,328,758.38
	Unit Cost (Item 3 -Million Peso / each)				28.33
	Unit Cost (Item 3 -Peso /sq.m)				182,766.18

No.	Description	Unit	Quantities	Unit Price (Pesos)	Cost (Pesos)
1	Cost of Underpass Box Culvert W=8.5m, L=31m				
1.1	Structure Excavation	m3	524.52	772.82	405,360.00
1.2	Embankment from Borrow Excavation	m3	141.05	1,361.67	192,064.00
1.3	Subbase Course	m2	98.40	33.90	3,336.00
1.4	Bituminous Tack Coat	m2	328.00	33.90	11,119.00
1.5	Bituminous Concrete Surface Course (t=5cm)	m2	328.00	1,114.64	365,602.00
1.6	Reinforcing Steel	kg	335,113.8	78.60	26,339,945.00
1.7	Lean Concrete 17Mpa	m3	37.51	5,010.71	187,952.00
1.8	Structural Concrete, Class AA Box Culvert	m3	1,541.78	6,916.29	10,663,398.00
1.9	Structural Concrete, Class AA Approach, Parapet	m3	63.00	10,363.83	652,921.00
1.10	Grouted Riprap, Class "A"	m3	36.00	4,854.33	174,756.00
1.11	Traffic Sign and Safety Facilities	l.m.	31.0	10,382.99	321,873.00
1.12	General Requirement (32.5% of Civil Work)	L.S	1.0		12,778,455.95
	Total				52,096,781.95
	Unit Cost (Item 3 -Million Peso / each)				52.10
	Unit Cost (Item 3 -Peso /sq.m)				336,108.27