

**NATIONAL ROAD ADMINISTRATION (ANE)
GOVERNMENT OF REPUBLIC OF MOZAMBIQUE**

**PREPARATORY SURVEY
FOR
NACALA CORRIDOR ROAD NETWORK
UPGRADING PROJECT
IN
THE REPUBLIC OF MOZAMBIQUE**

**FINAL REPORT
DRAWINGS (HIGH SPEC OPTION)**

MAY 2018

JAPAN INTERNATIONAL COOPERATION AGENCY

**ORIENTAL CONSULTANTS GLOBAL CO., LTD.
EIGHT-JAPAN ENGINEERING CONSULTANTS INC.
KOKUSAI KOGYO CO., LTD.**

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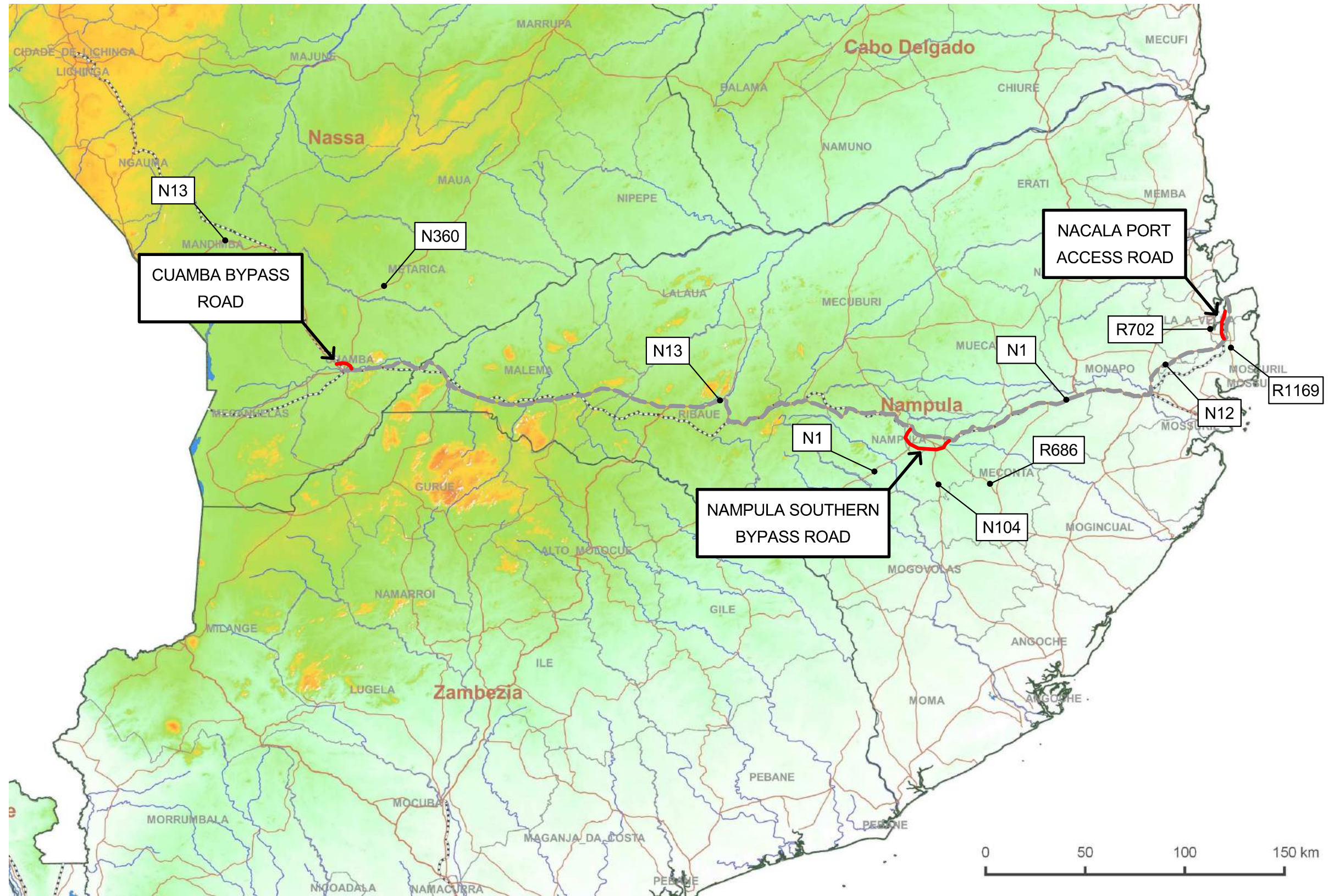
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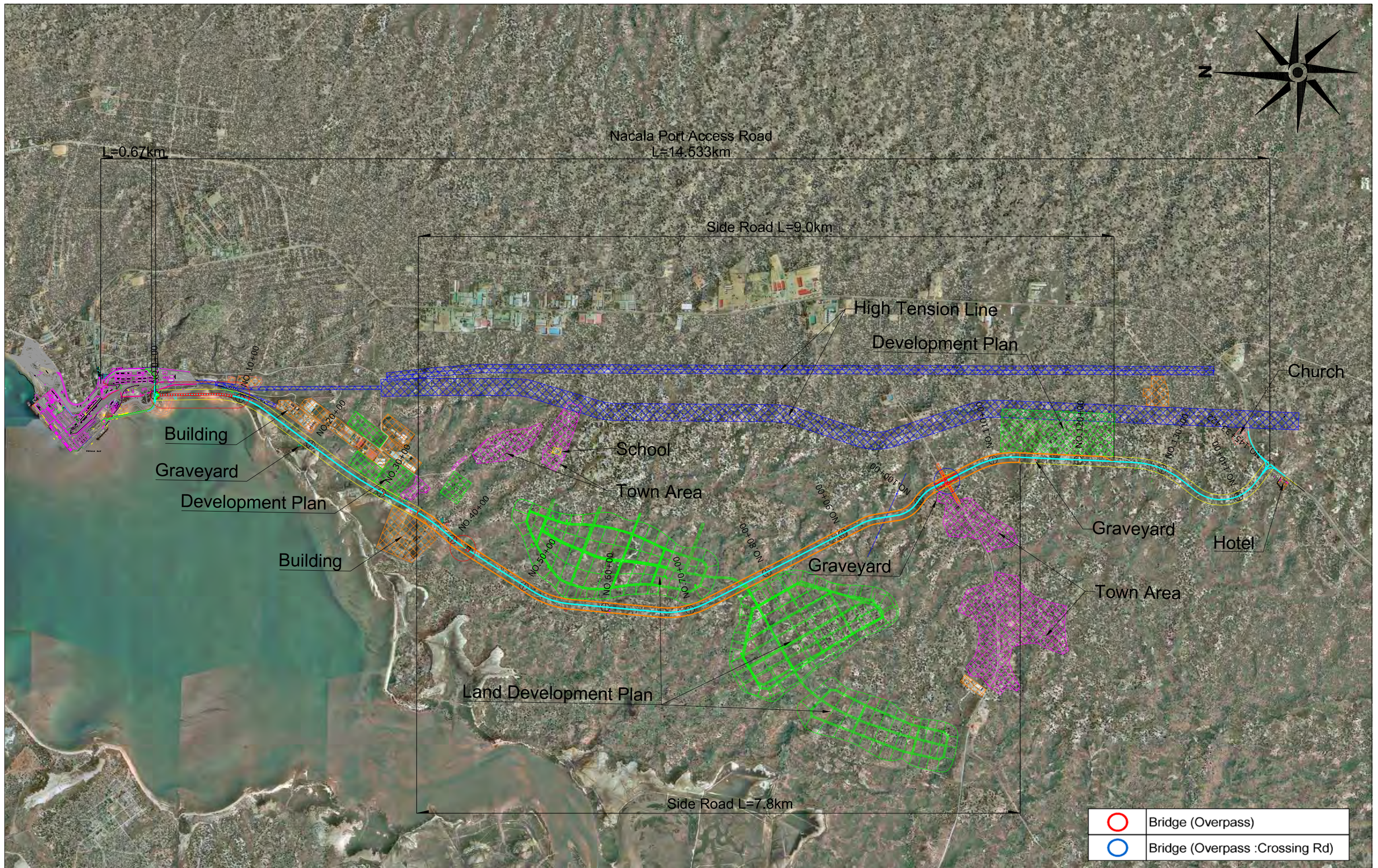
(A) GENERAL



Project Location Map






	Oriental Consultants Global Co., Ltd	PREPARED BY	CHECKED BY	APPROVED BY	PROJECT TITLE: The Preparatory Survey for Nacala Corridor Road Network Improvement Project	DRAWING TITLE: Project Location Map			
	Eight-Japan Engineering Consultants Inc.	NAME				SCALE	SHEET NO.	DRAWING NO.	REV. NO.
	Kokusai Kogyo Co., Ltd	SIGNATURE						A-1	
National Road Administration (ANE)		DATE							

(B) NACALA PORT ACCESS ROAD



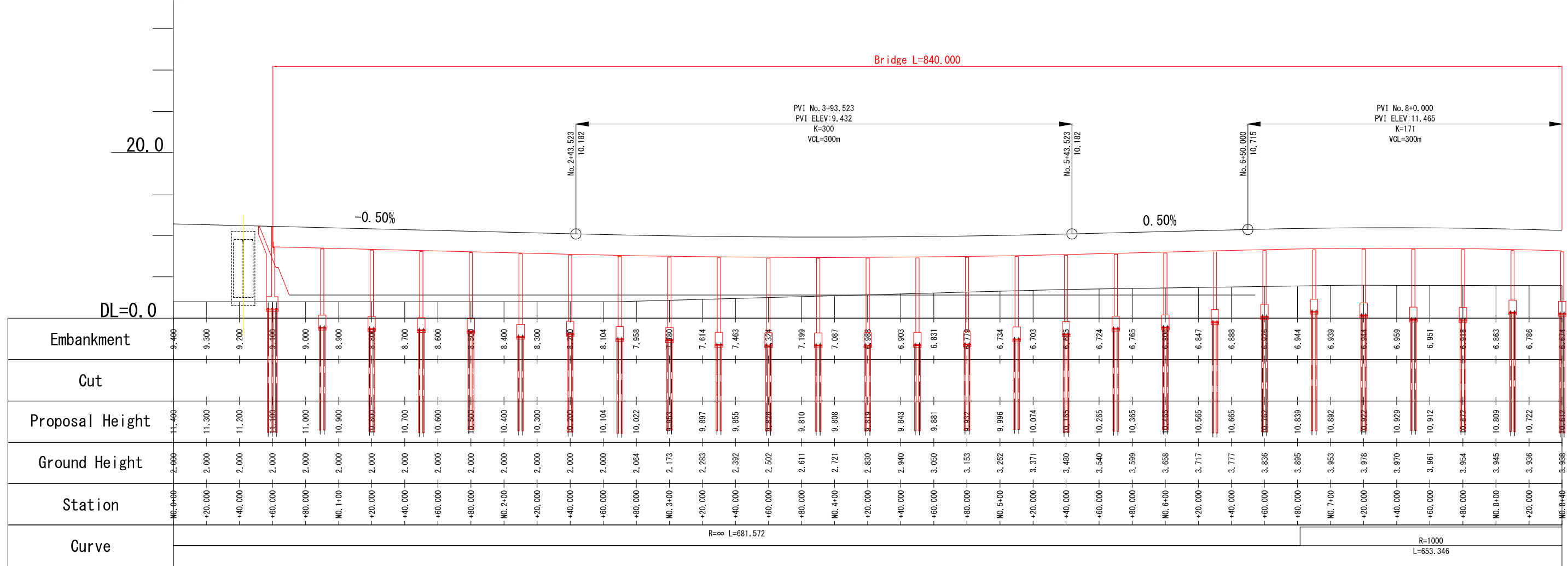
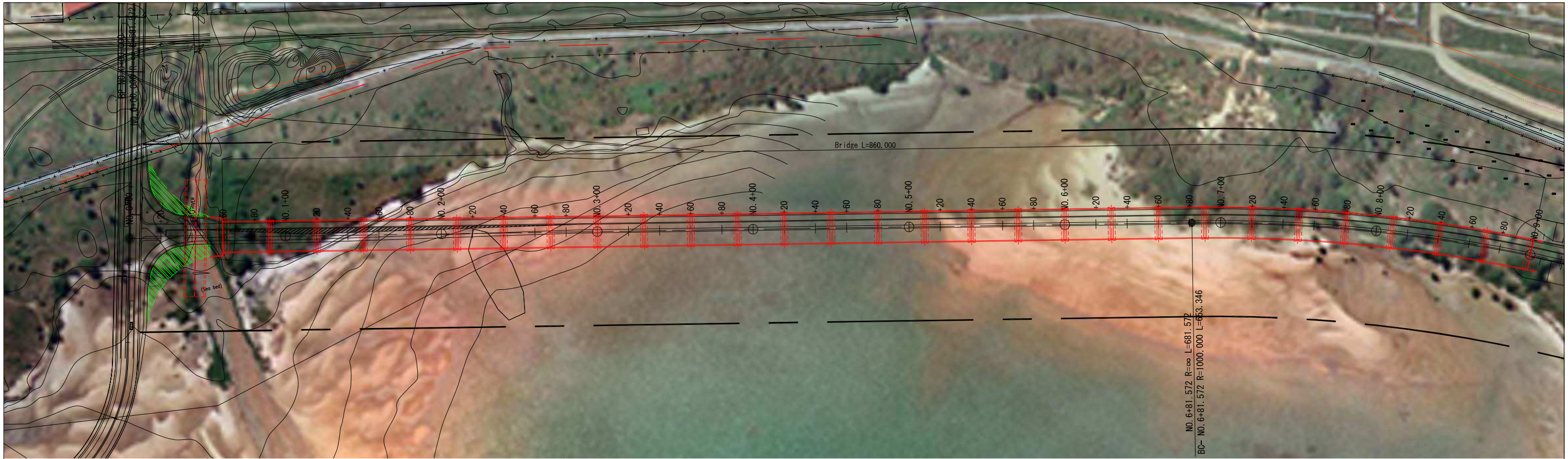
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DATE			

PROJECT TITLE:
**Preparatory Survey for Nacala Corridor
 Road Network Upgrading Project
 (Nacala Port Access Road)**

DRAWING TITLE: High-Spec Option (Initial Stage) ROUTE MAP			
SCALE	SHEET NO.	DRAWING NO.	REV. NO.
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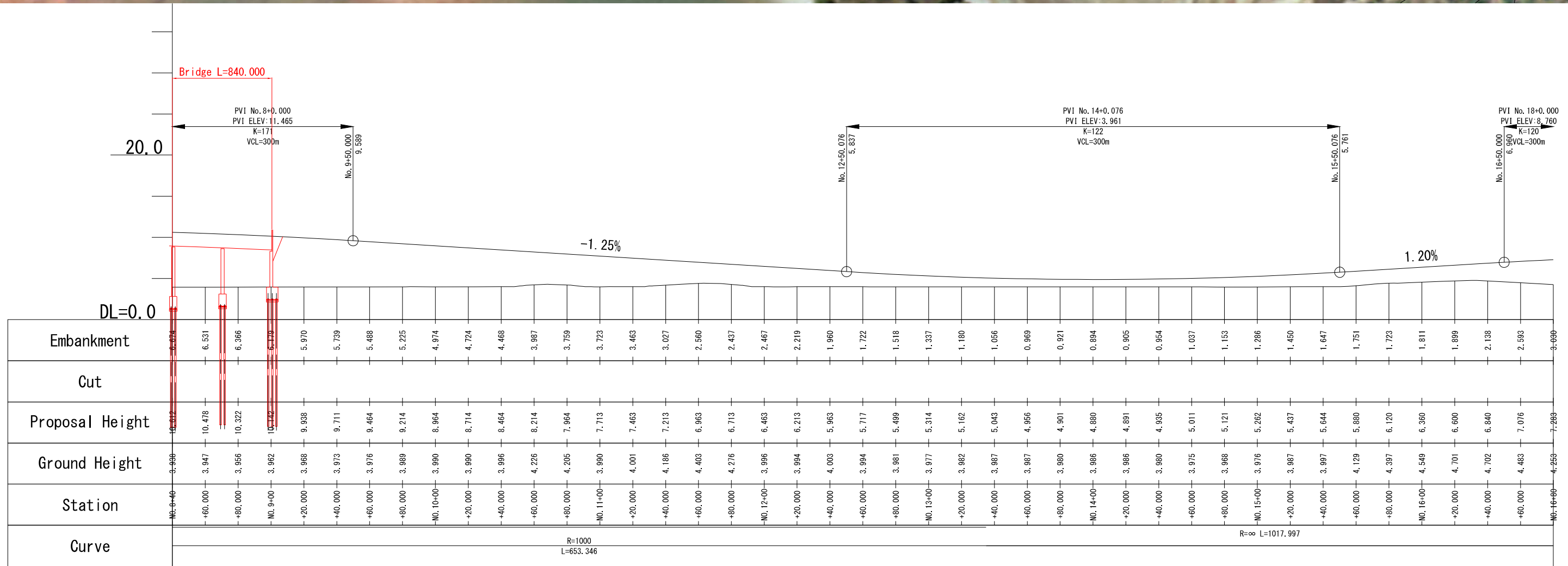
Japan International Cooperation Agency
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 Eight-Japan Engineering Consultants Inc.
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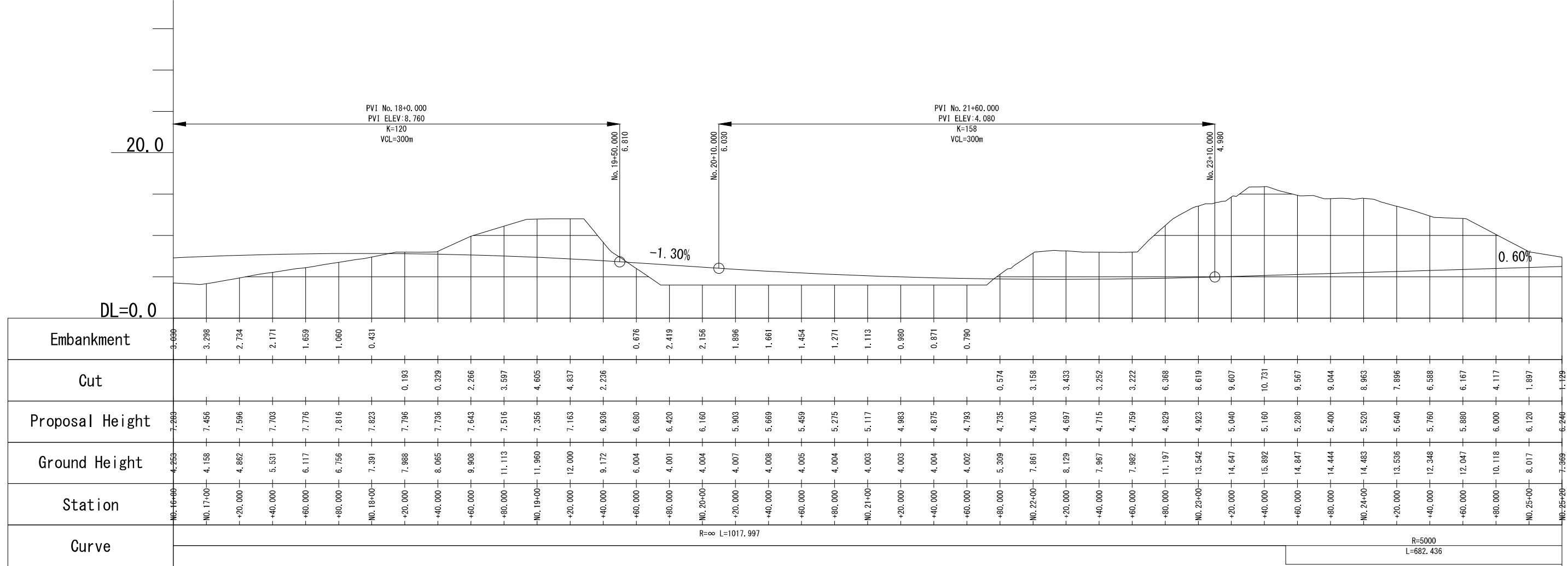
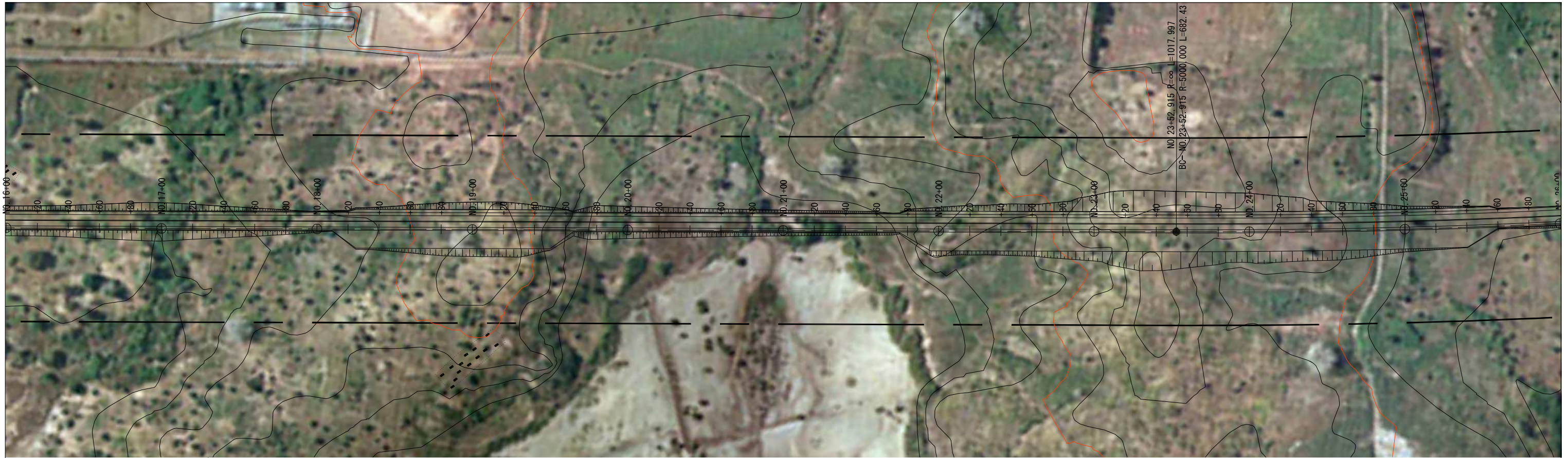
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PROJECT TITLE:
**Preparatory Survey for Nacala Corridor
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 (Nacala Port Access Road)**

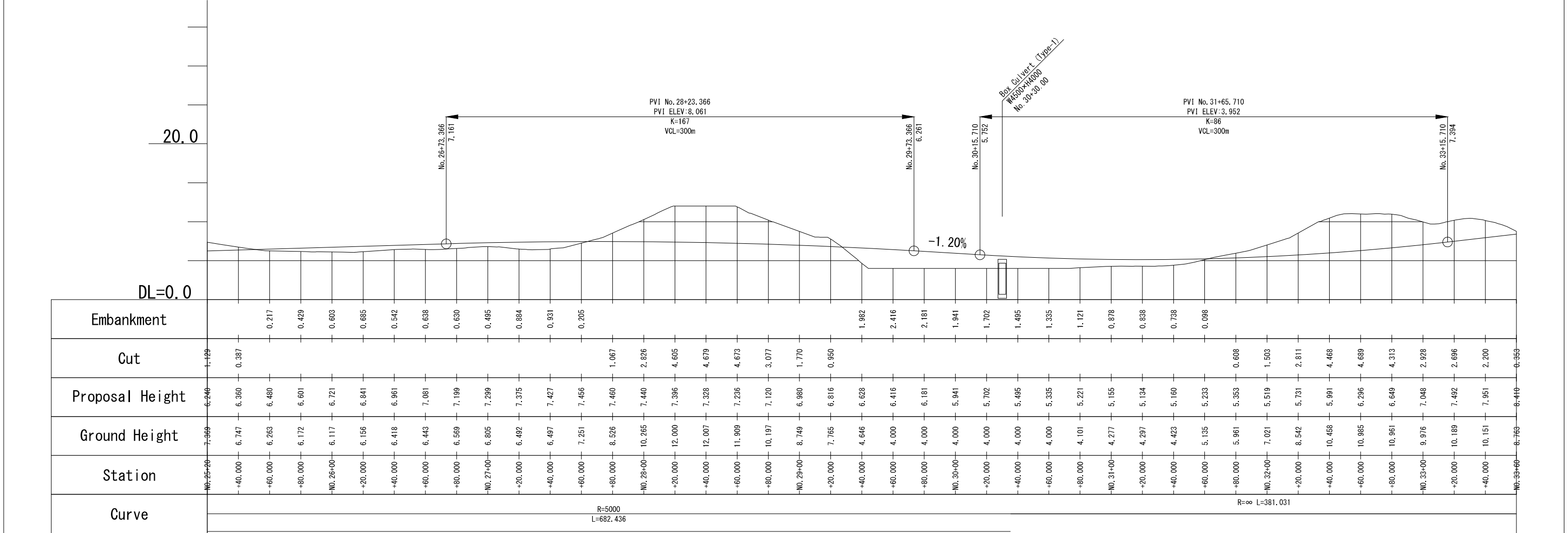
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 Plan and Profile**
 SCALE: 1/2500
 SHEET NO.:
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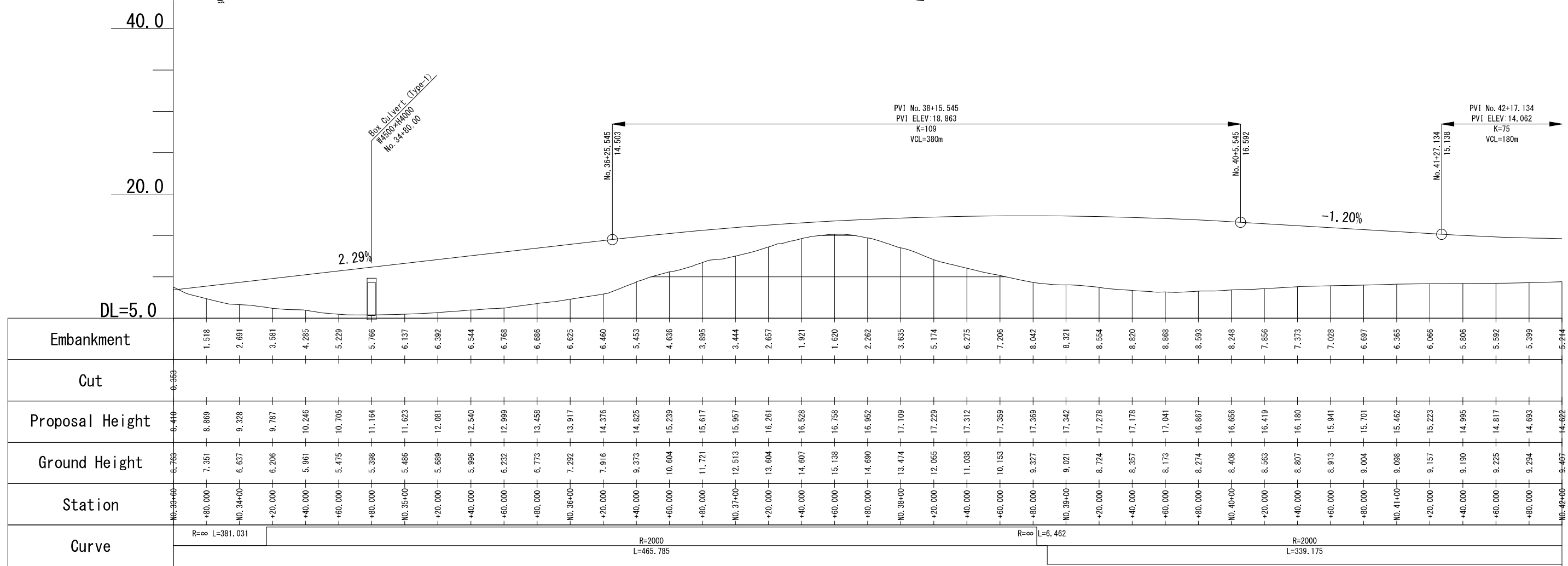
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 Eight-Japan Engineering Consultants Inc.
 Kokusai Kogyo Co., Ltd.

NAME	PREPARED BY	CHECKED BY	APPROVED BY
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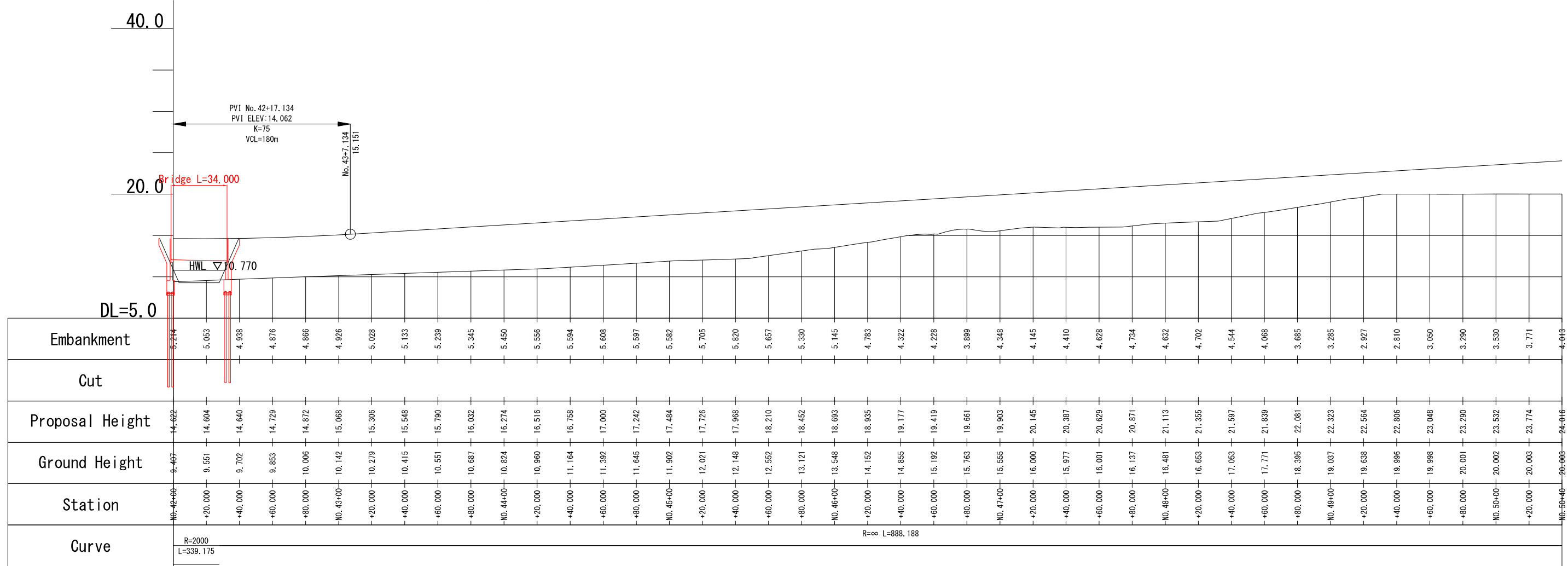
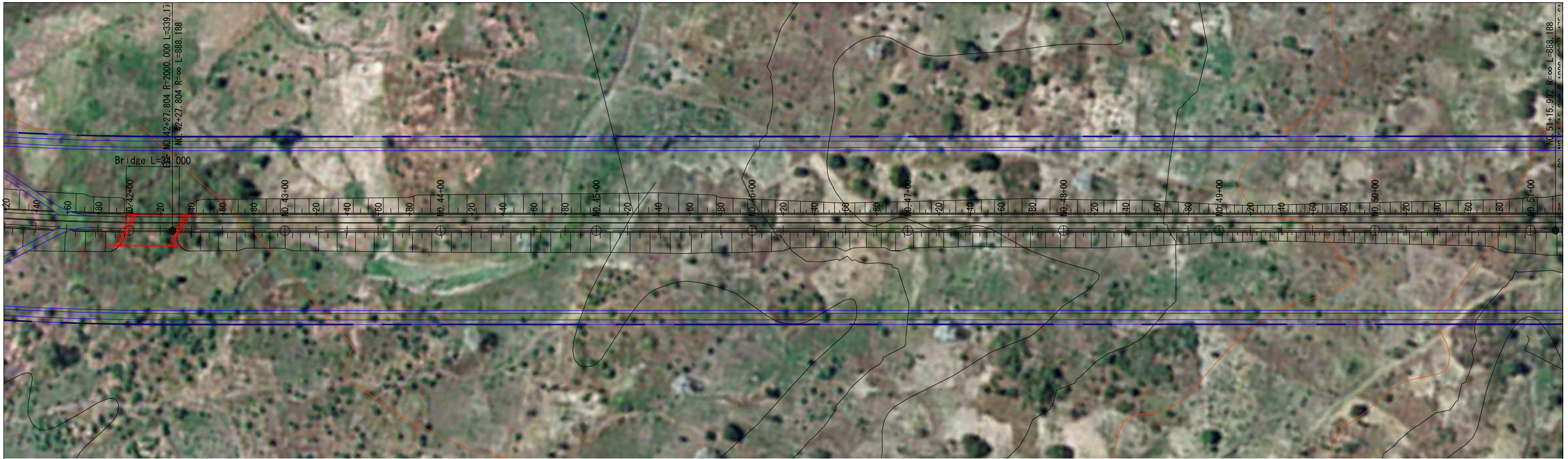
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 (Nacala Port Access Road)**

DRAWING TITLE: **High-Spec Option (Initial Stage)
Plan and Profile**

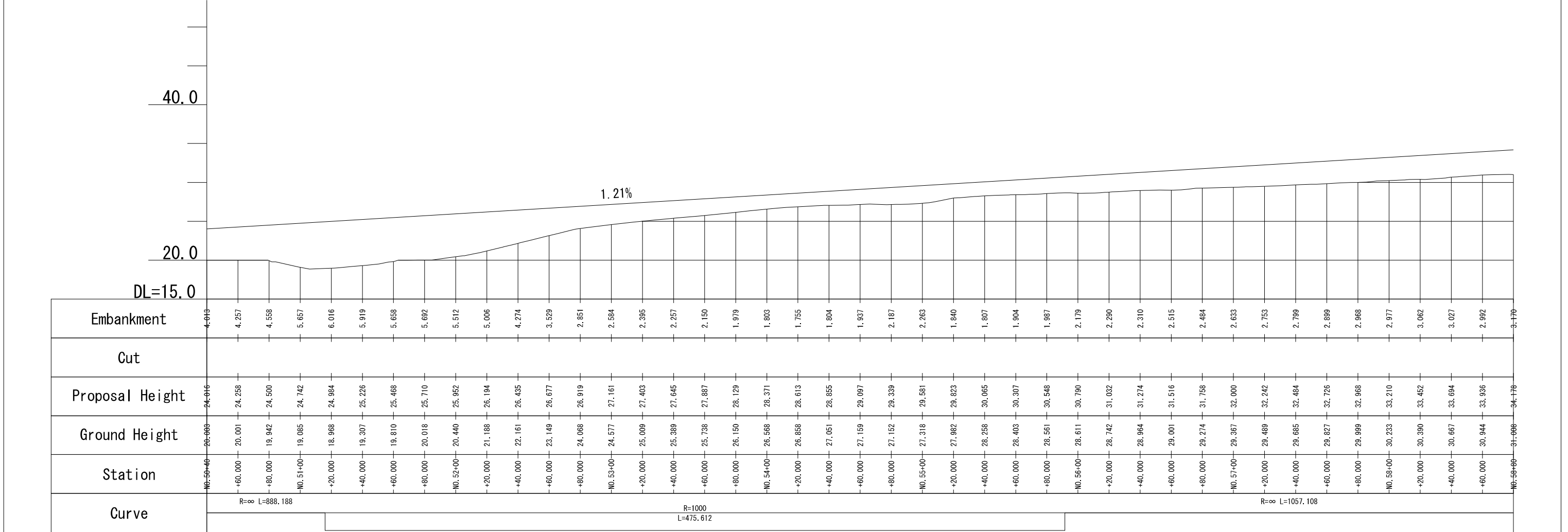
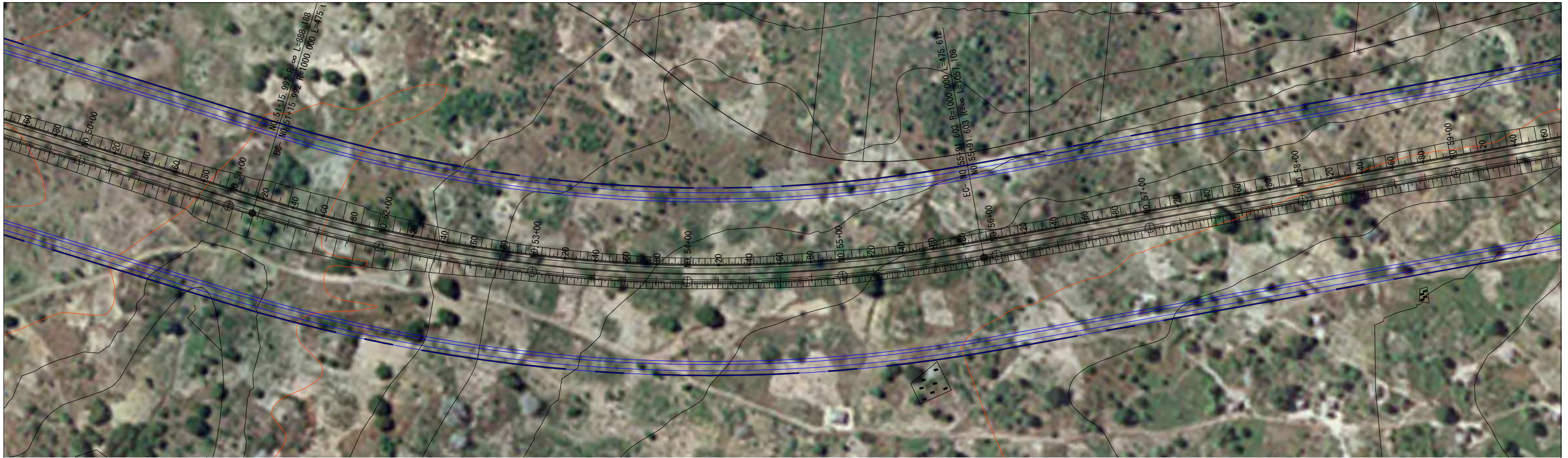
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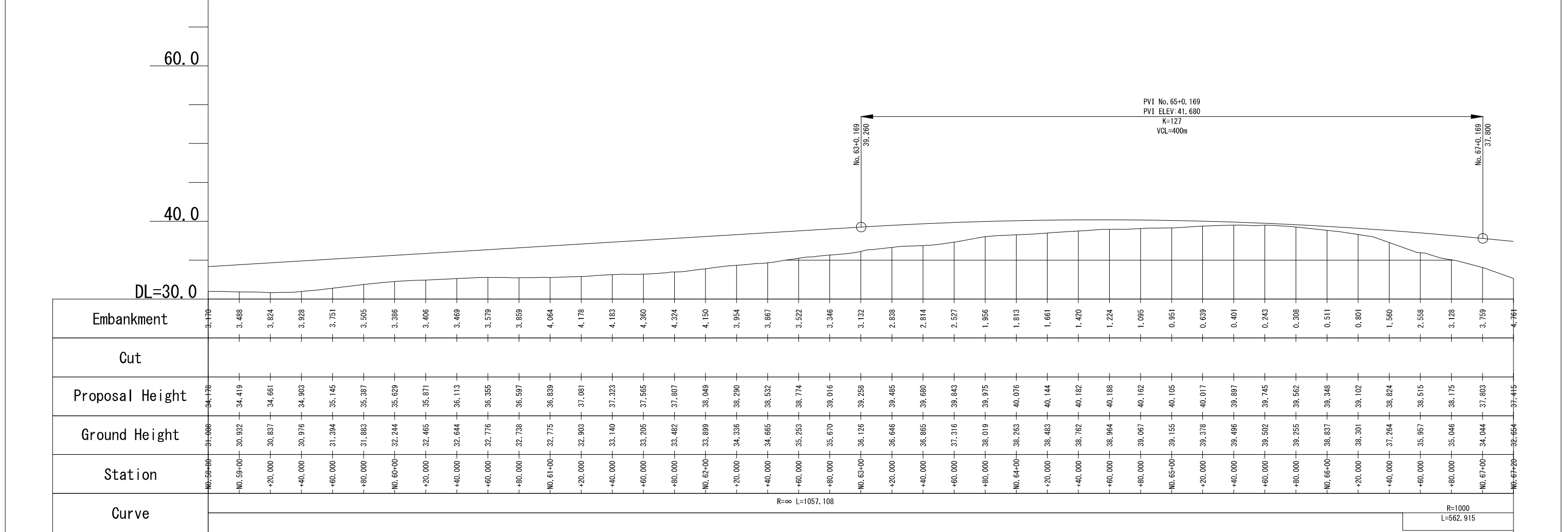
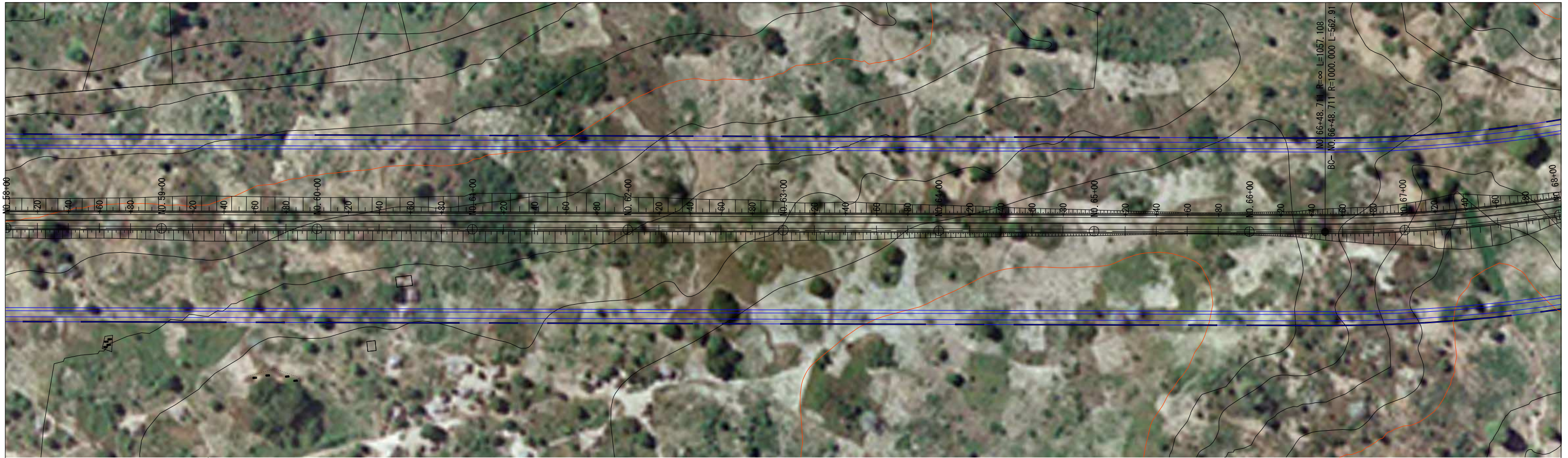
 Japan International Cooperation Agency
 National Road Administration (ANE)



 Oriental Consultants Global Co., Ltd.
 Eight-Japan Engineering Consultants Inc.
 Kokusai Kogyo Co., Ltd.




NAME	PREPARED BY	CHECKED BY	APPROVED BY
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PROJECT TITLE:
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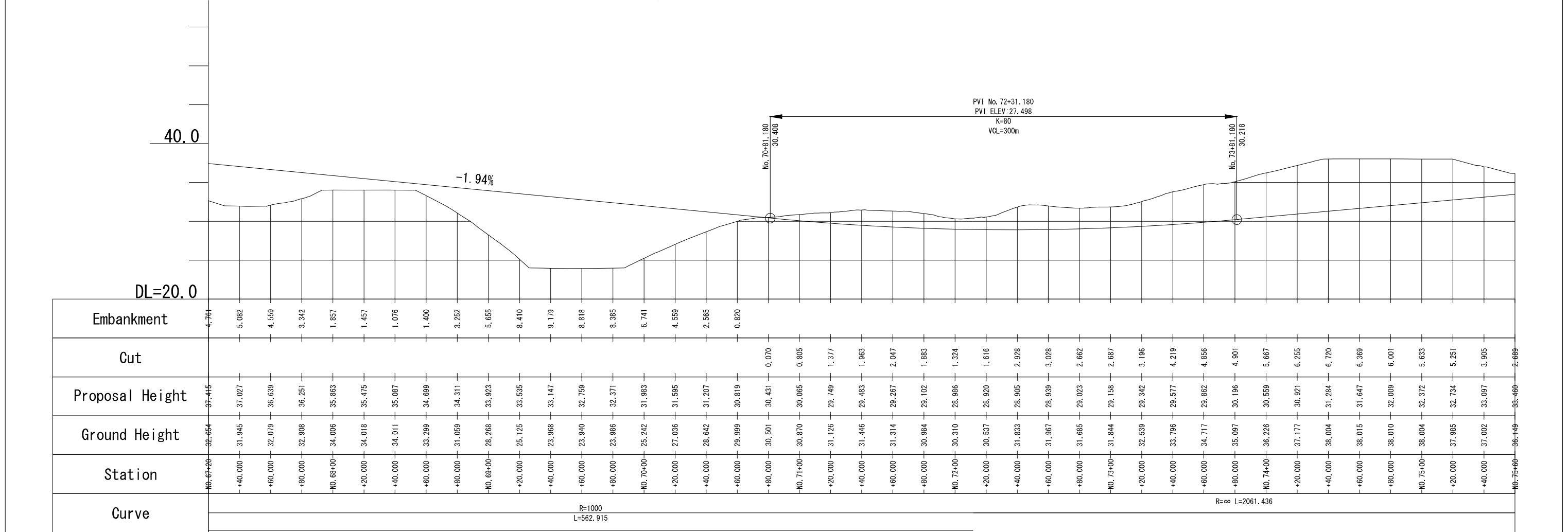
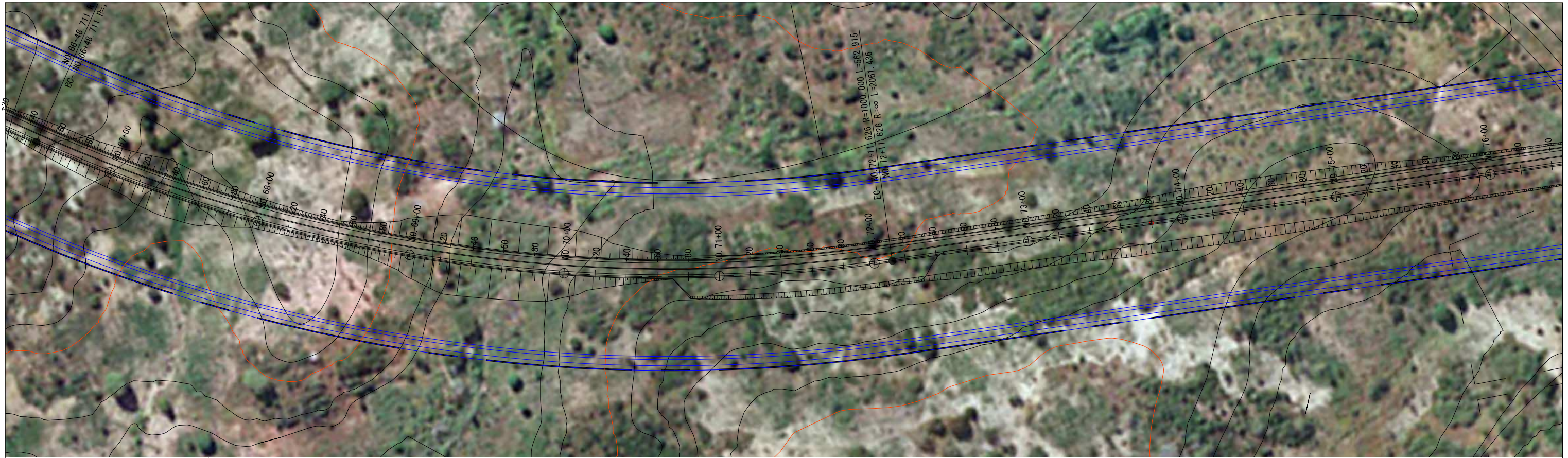
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 Kokusai Kogyo Co., Ltd.

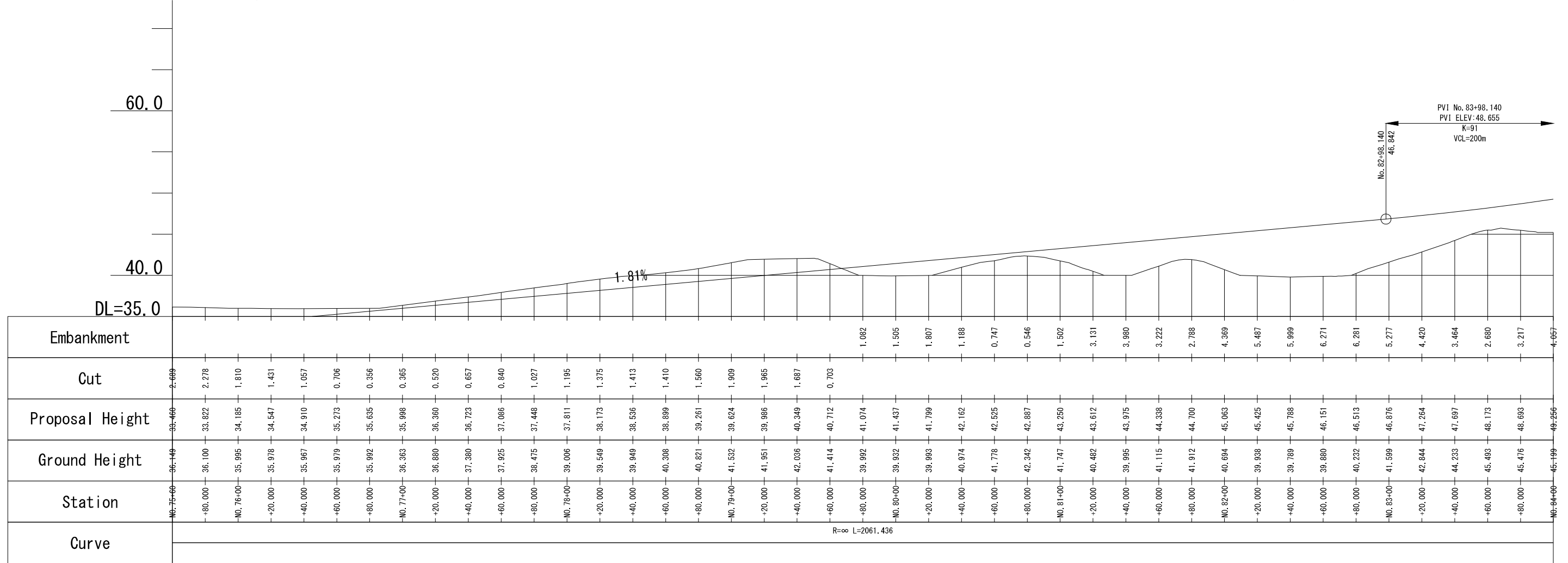
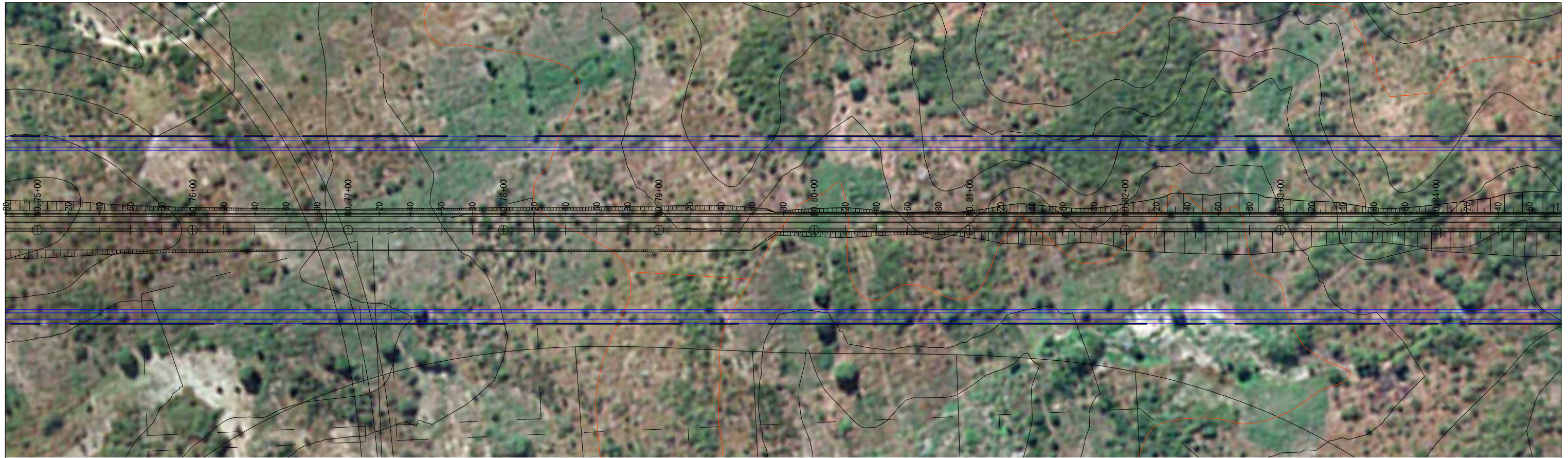
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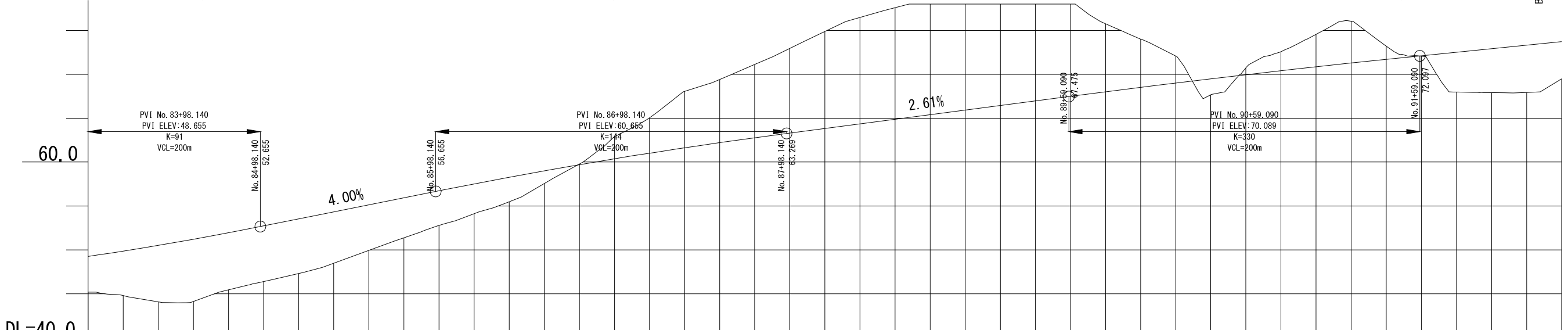
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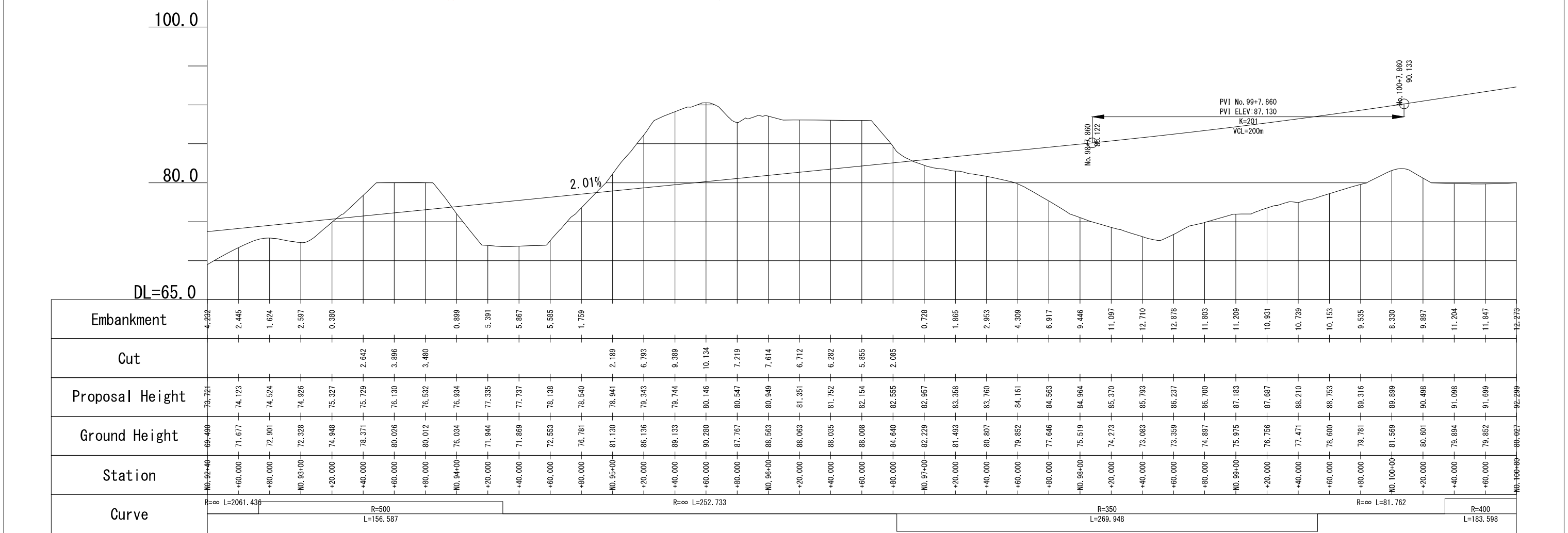
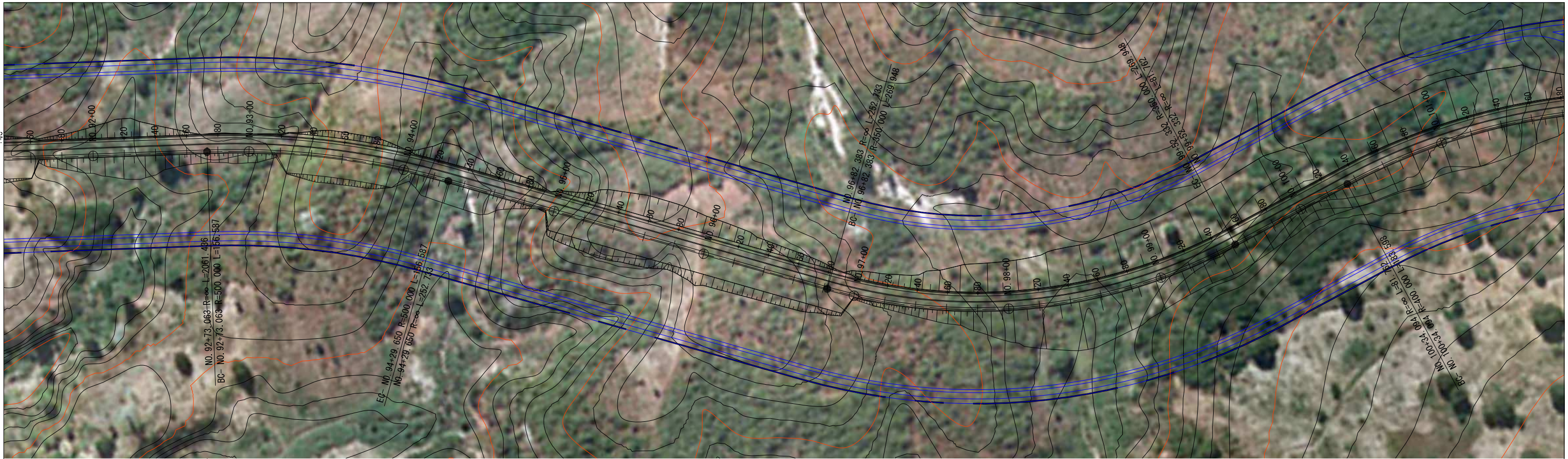


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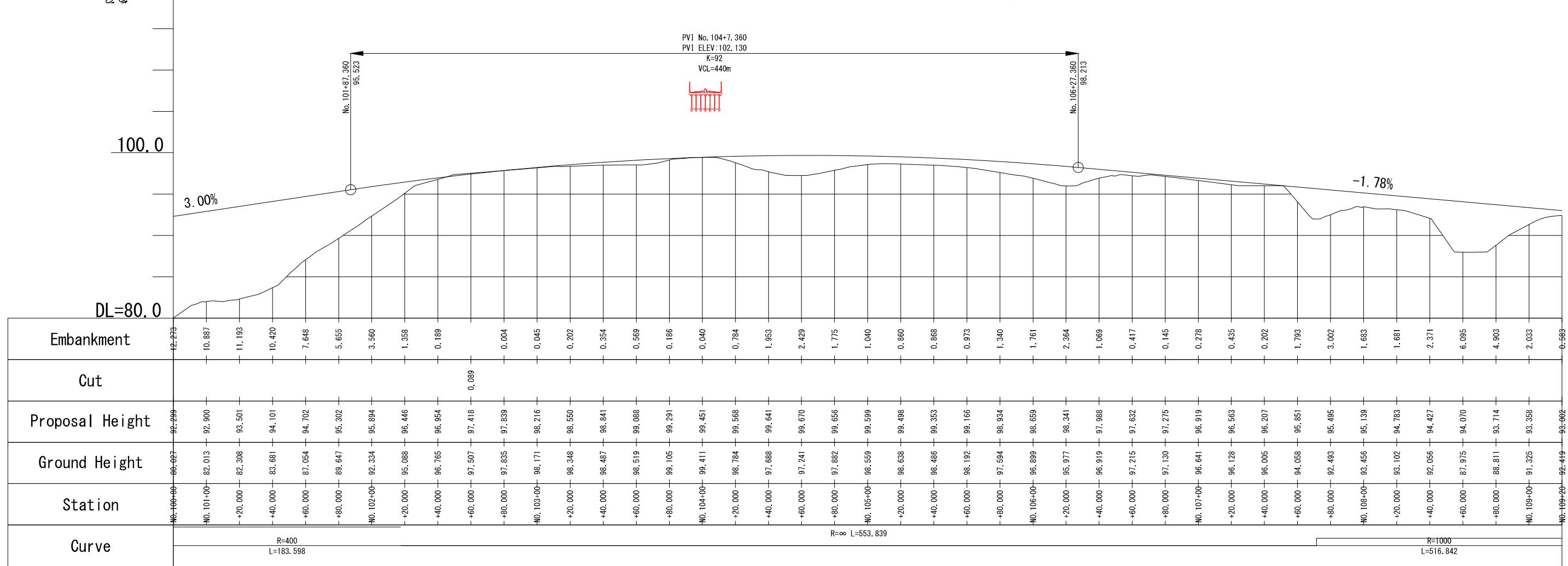
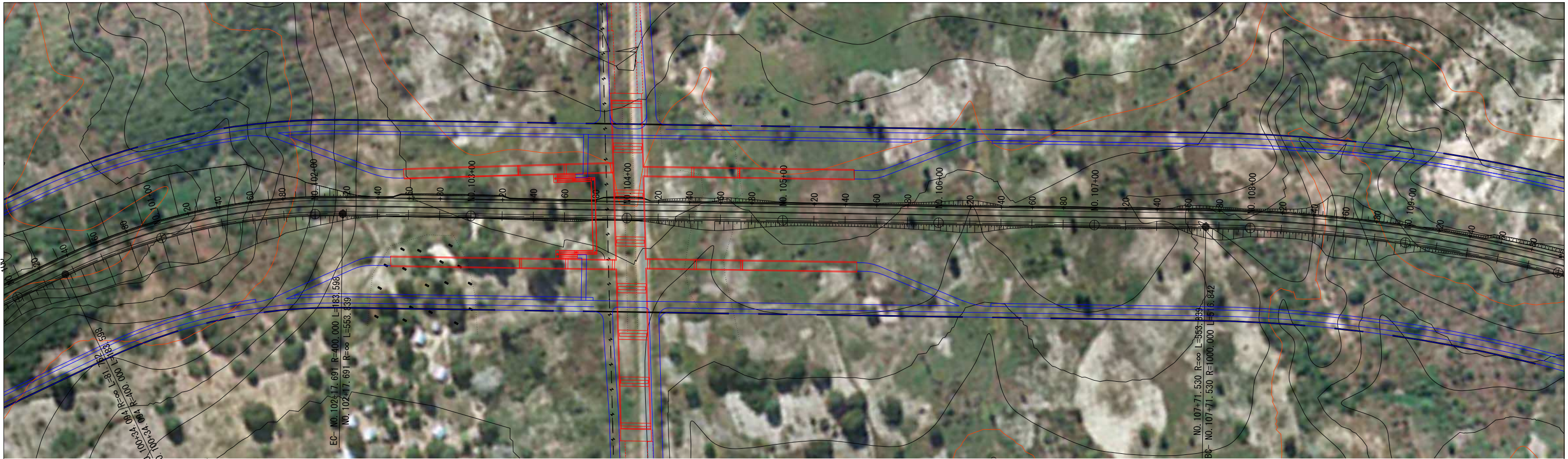


Station	Ground Height	Proposal Height	Cut	Embankment
No. 84+00	45.199	49.256		4.657
-20.000	44.810	49.863		5.054
-40.000	44.078	50.514		6.436
-60.000	44.121	51.209		7.088
-80.000	45.460	51.947		6.488
No. 85+00	46.393	52.729		6.336
-20.000	47.313	53.529		6.217
-40.000	48.474	54.329		5.856
-60.000	49.940	55.129		5.189
-80.000	51.374	55.929		4.556
No. 86+00	52.784	56.729		3.945
-20.000	54.112	57.513		3.401
-40.000	55.476	58.269		2.792
-60.000	57.549	58.997		1.448
-80.000	59.761	59.697	0.064	
No. 87+00	62.903	60.370	2.533	
-20.000	65.040	61.015	4.025	
-40.000	68.051	61.632	6.419	
-60.000	69.412	62.221	7.191	
-80.000	71.119	62.783	8.336	
No. 88+00	72.948	63.317	9.631	
-20.000	74.879	63.840	11.039	
-40.000	76.474	64.363	12.111	
-60.000	77.591	64.885	12.705	
-80.000	78.000	65.408	12.592	
No. 89+00	78.000	65.931	12.069	
-20.000	78.000	66.454	11.546	
-40.000	78.000	66.976	11.024	
-60.000	78.000	67.499	10.501	
-80.000	75.747	68.015	7.782	
No. 90+00	74.005	68.519	5.485	
-20.000	72.070	69.011	3.059	
-40.000	67.675	69.491	1.816	
-60.000	70.737	69.959	0.779	
-80.000	72.583	70.414	2.169	
No. 91+00	74.565	70.857	3.708	
-20.000	76.038	71.289	4.749	
-40.000	73.204	71.708	1.496	
-60.000	72.065	72.115	0.052	
-80.000	67.986	72.517	4.530	
No. 92+00	67.914	72.918	5.004	
-20.000	67.938	73.320	5.381	
No. 92+40	69.490	73.721	4.292	

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		NAME SIGNATURE DATE		SCALE 1/2500	SHEET NO.	DRAWING NO. B-12	REV. NO.



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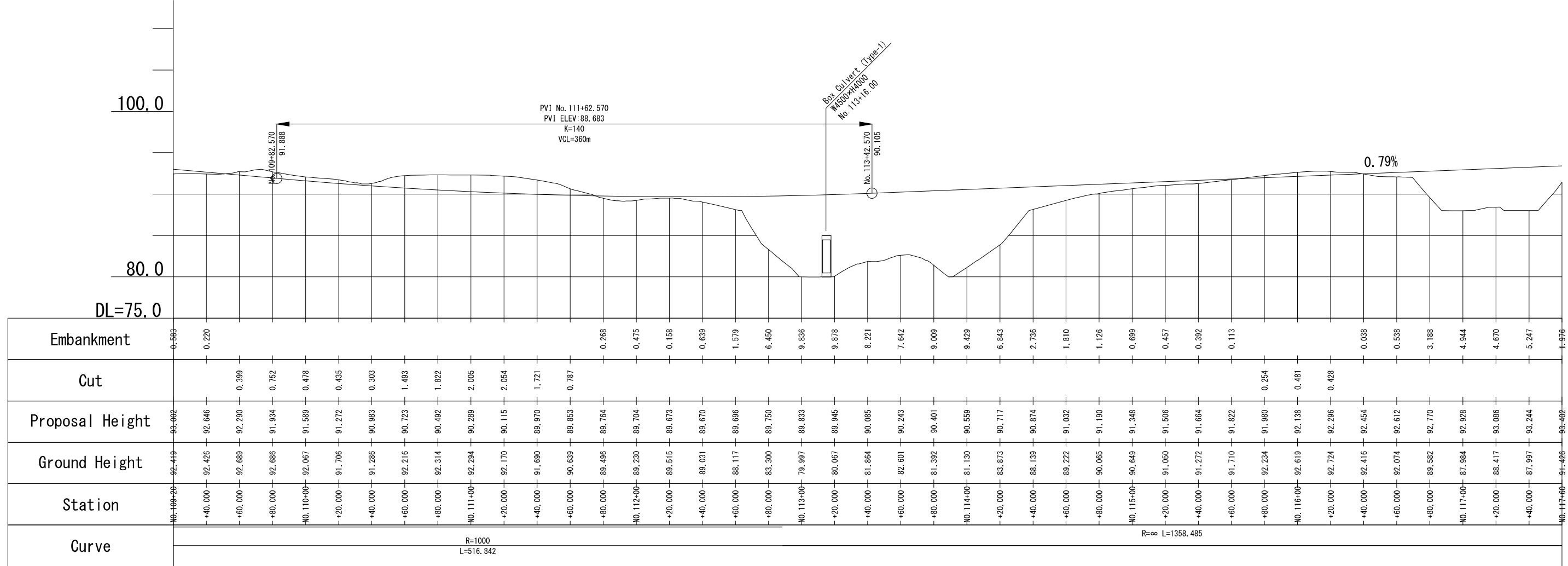
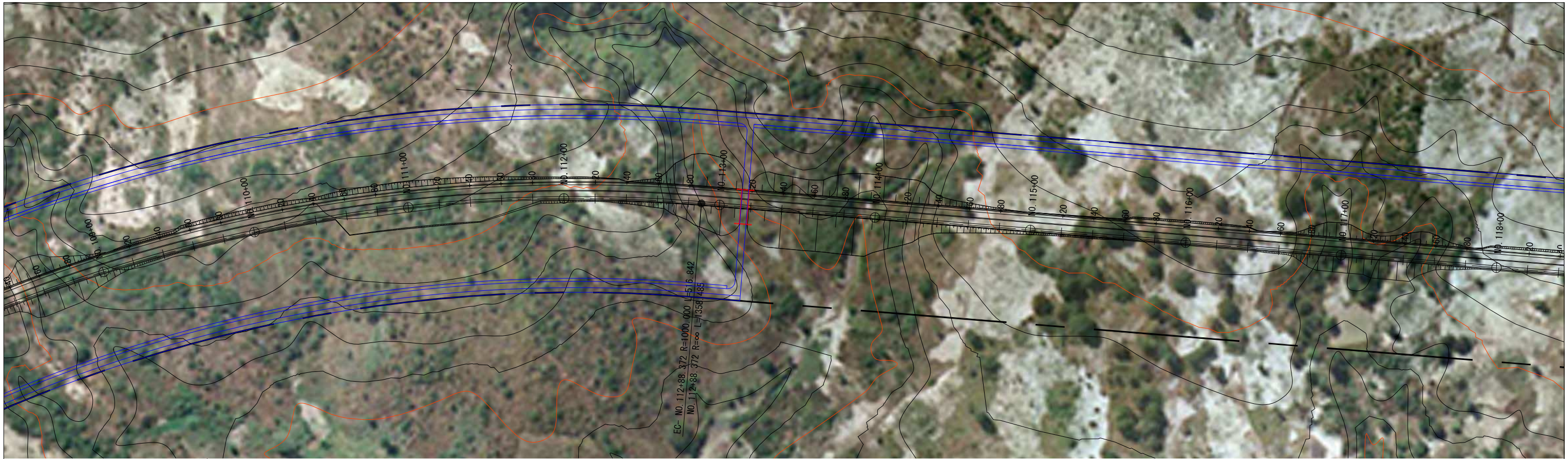
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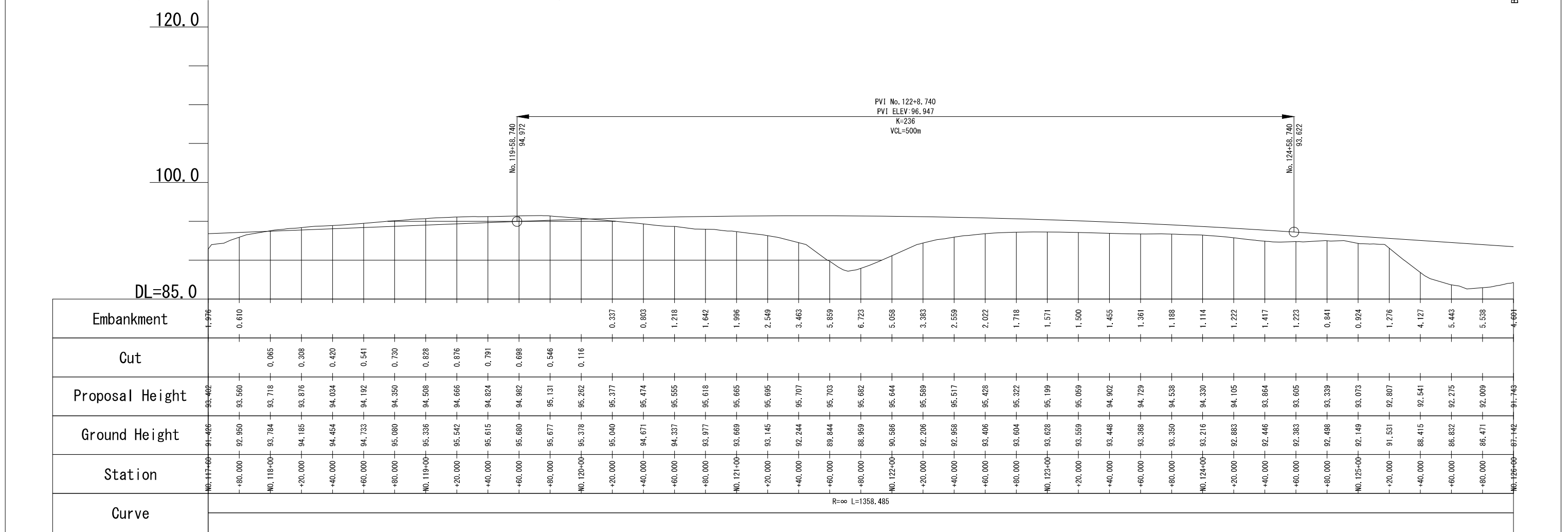
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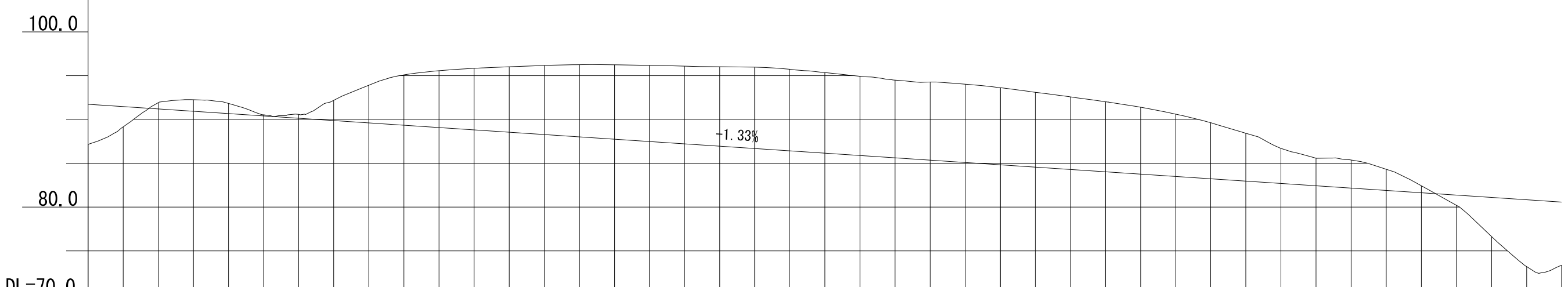
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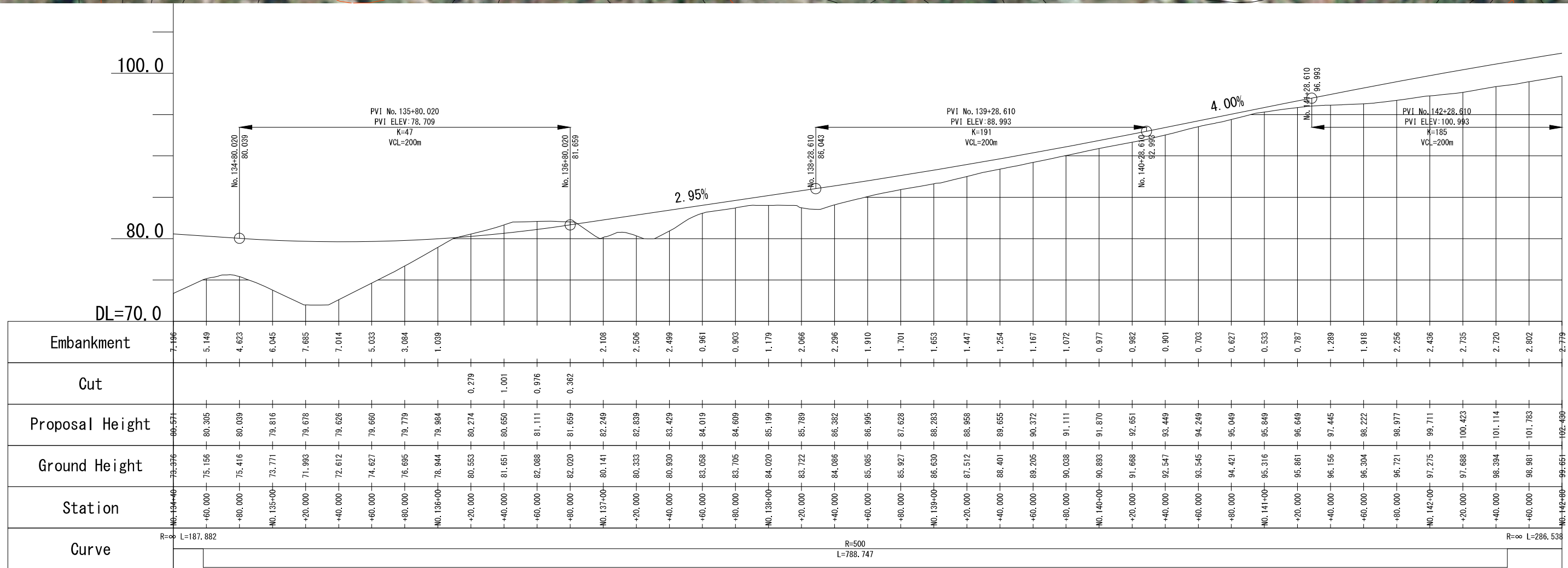


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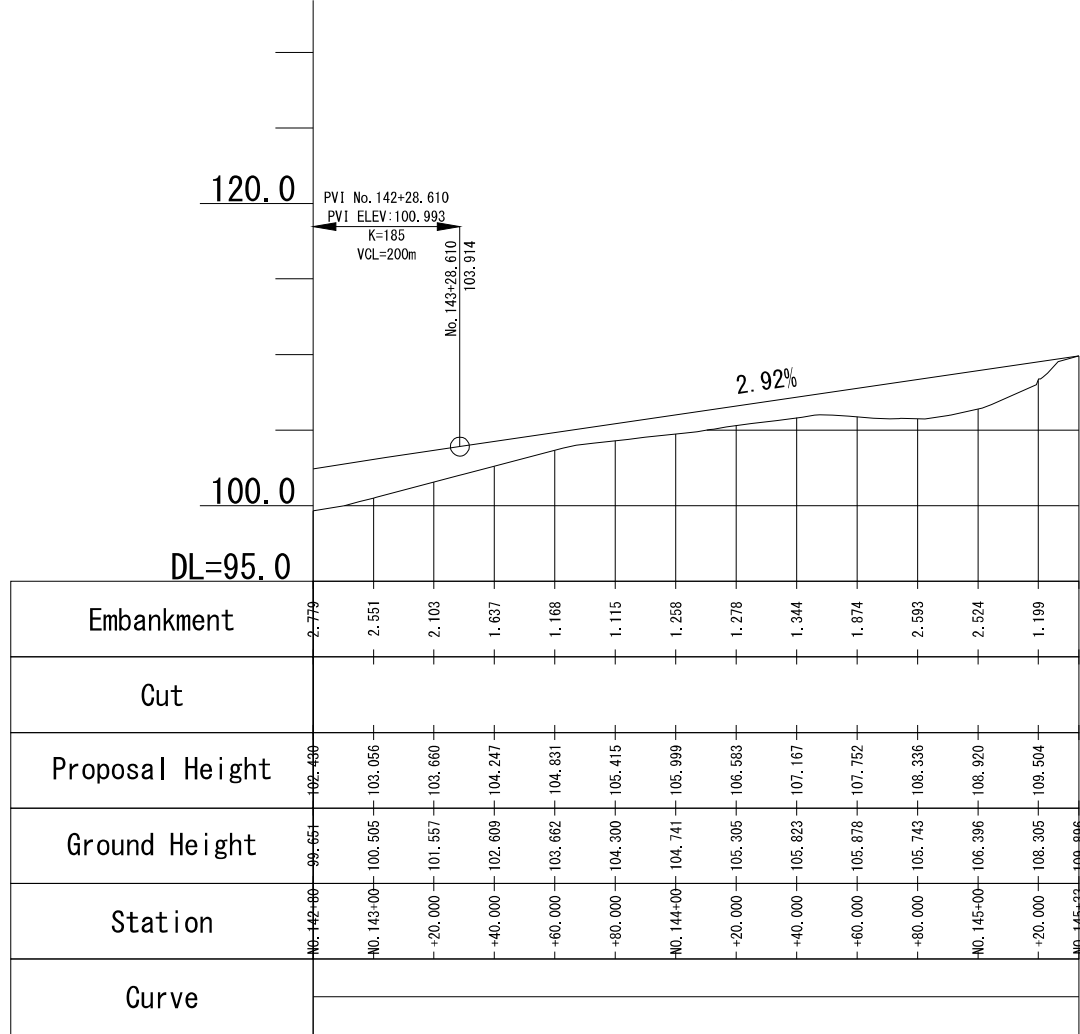
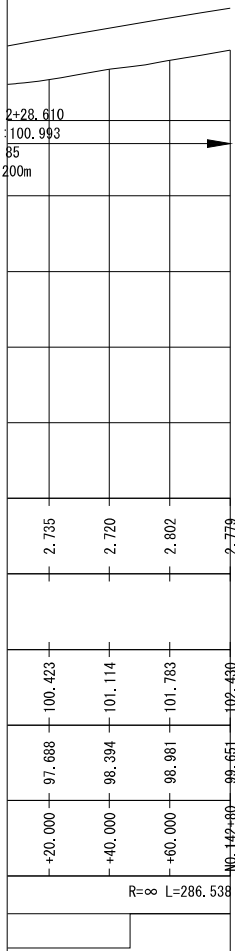


Station	Ground Height	Proposal Height	Cut	Embankment
NO. 126+00	87.142	91.743		4.601
+20,000	89.144	91.477		2.333
+40,000	91.921	91.211	0.709	
+60,000	92.260	90.945	1.315	
+80,000	91.835	90.679	1.156	
NO. 127+00	90.513	90.413	0.100	
+20,000	90.567	90.147	0.419	
+40,000	92.187	89.881	2.306	
+60,000	93.912	89.615	4.297	
+80,000	95.096	89.349	5.747	
NO. 128+00	95.564	89.083	6.480	
+20,000	95.638	88.817	7.021	
+40,000	96.025	88.551	7.473	
+60,000	96.162	88.285	7.877	
+80,000	96.261	88.019	8.242	
NO. 129+00	96.241	87.753	8.488	
+20,000	96.175	87.487	8.688	
+40,000	96.088	87.221	8.867	
+60,000	96.020	86.955	9.065	
+80,000	95.952	86.689	9.262	
NO. 130+00	95.722	86.423	9.299	
+20,000	95.361	86.157	9.204	
+40,000	94.932	85.891	9.041	
+60,000	94.500	85.625	8.874	
+80,000	94.266	85.359	8.926	
NO. 131+00	94.022	85.093	8.929	
+20,000	93.628	84.827	8.801	
+40,000	93.112	84.561	8.550	
+60,000	92.584	84.295	8.288	
+80,000	92.032	84.029	8.002	
NO. 132+00	91.404	83.763	7.641	
+20,000	90.607	83.497	7.110	
+40,000	89.611	83.231	6.380	
+60,000	88.425	82.965	5.460	
+80,000	86.700	82.699	4.001	
NO. 133+00	85.578	82.433	3.144	
+20,000	85.358	82.167	3.191	
+40,000	84.304	81.901	2.403	
+60,000	82.421	81.635	0.786	
+80,000	80.197	81.369		1.173
NO. 134+00	76.631	81.103		4.473
+20,000	73.202	80.837		7.635
NO. 134+40	73.976	80.571		7.196

Japan International Cooperation Agency National Road Administration (ANE)	Oriental Consultants Global Co., Ltd. Eight-Japan Engineering Consultants Inc. Kokusai Kogyo Co., Ltd.	PREPARED BY	CHECKED BY	APPROVED BY	PROJECT TITLE: Preparatory Survey for Nacala Corridor Road Network Upgrading Project (Nacala Port Access Road)	DRAWING TITLE: High-Spec Option (Initial Stage) Plan and Profile			
		NAME				SCALE	SHEET NO.	DRAWING NO.	REV. NO.
		SIGNATURE				1/2500		B-17	
		DATE							



Japan International Cooperation Agency National Road Administration (ANE)	Oriental Consultants Global Co., Ltd. Eight-Japan Engineering Consultants Inc. Kokusai Kogyo Co., Ltd.	PREPARED BY	CHECKED BY	APPROVED BY	PROJECT TITLE: Preparatory Survey for Nacala Corridor Road Network Upgrading Project (Nacala Port Access Road)	DRAWING TITLE: High-Spec Option (Initial Stage) Plan and Profile			
		NAME				SCALE	SHEET NO.	DRAWING NO.	REV. NO.
		SIGNATURE				1/2500		B-18	
		DATE							



Japan International Cooperation Agency
 National Road Administration (ANE)

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 Kokusai Kogyo Co., Ltd.

PREPARED BY	CHECKED BY	APPROVED BY
NAME		
SIGNATURE		
DATE		

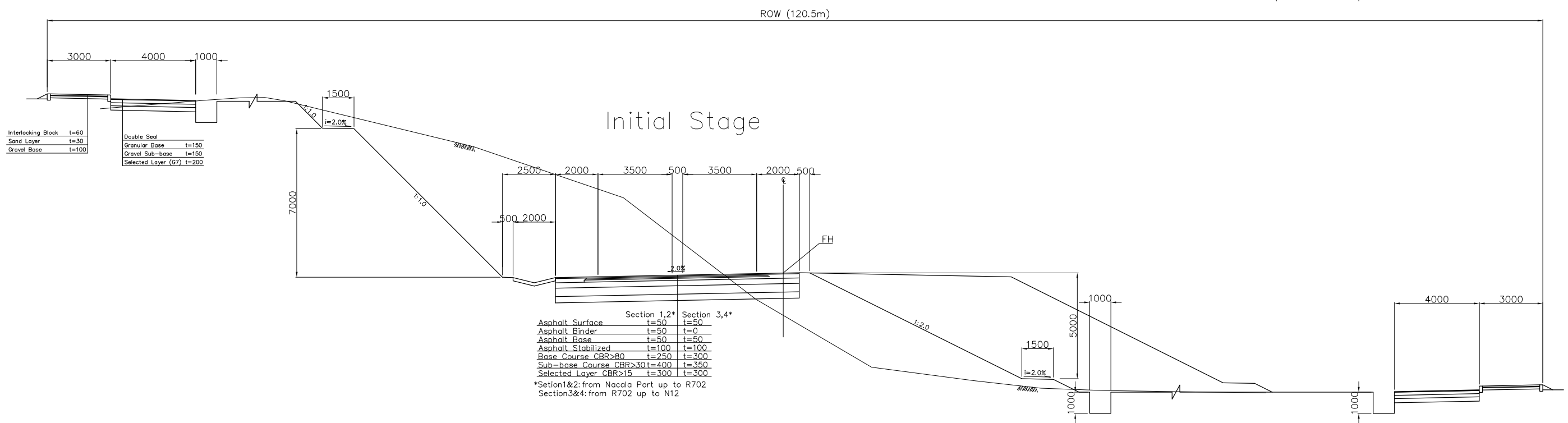
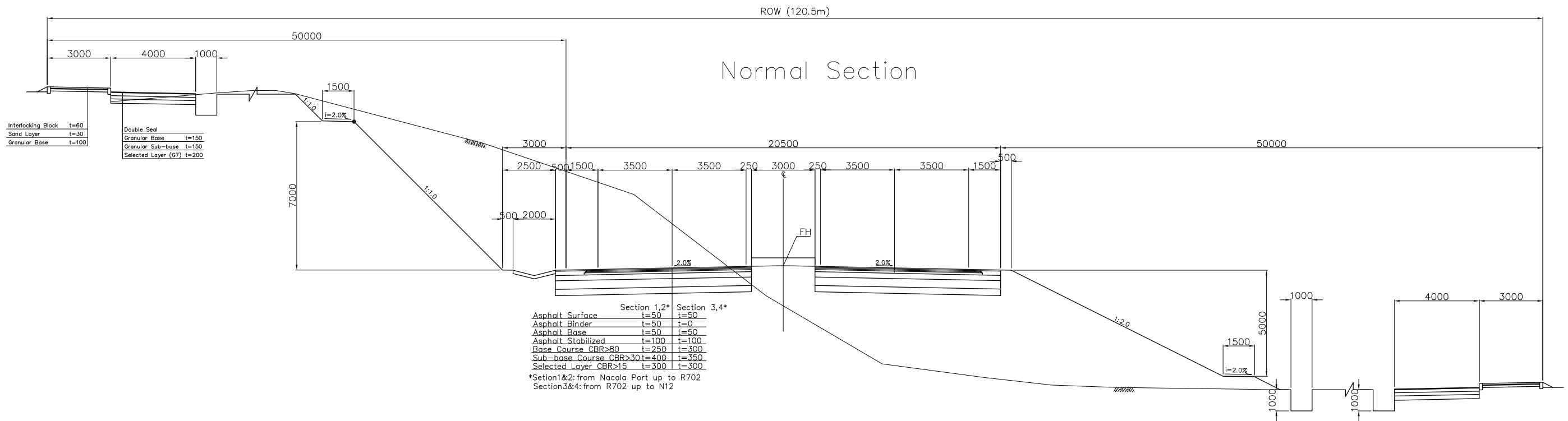
PROJECT TITLE:
**Preparatory Survey for Nacala Corridor
 Road Network Upgrading Project
 (Nacala Port Access Road)**

DRAWING TITLE: High-Spec Option (Initial Stage)
 Plan and Profile

SCALE	SHEET NO.	DRAWING NO.	REV. NO.
1/2500		B-19	

NACALA PORT ACCESS ROAD

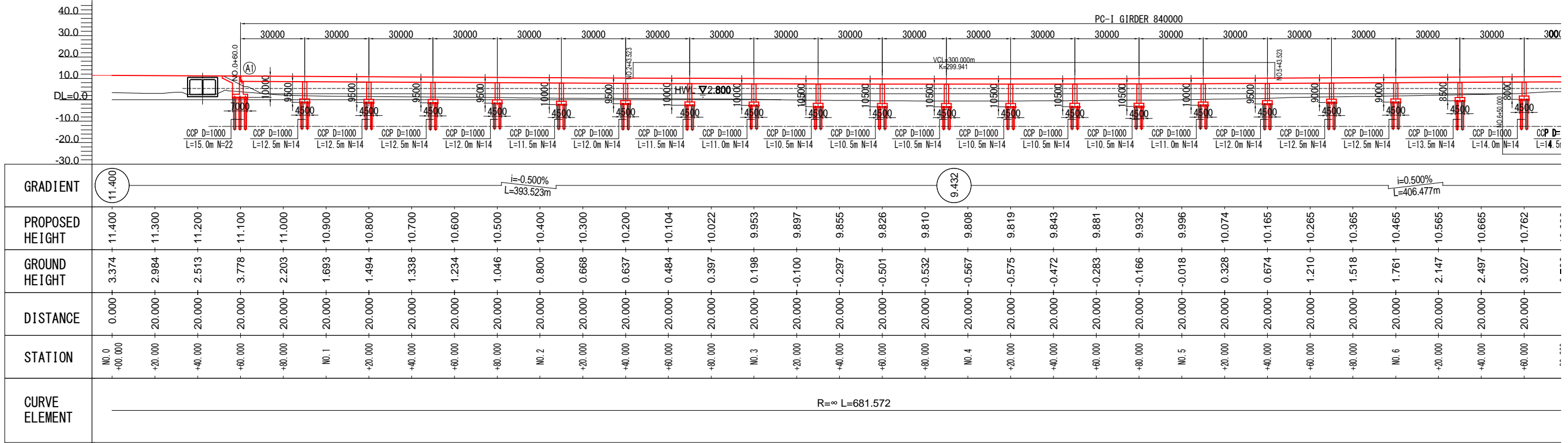
Typical Cross Section



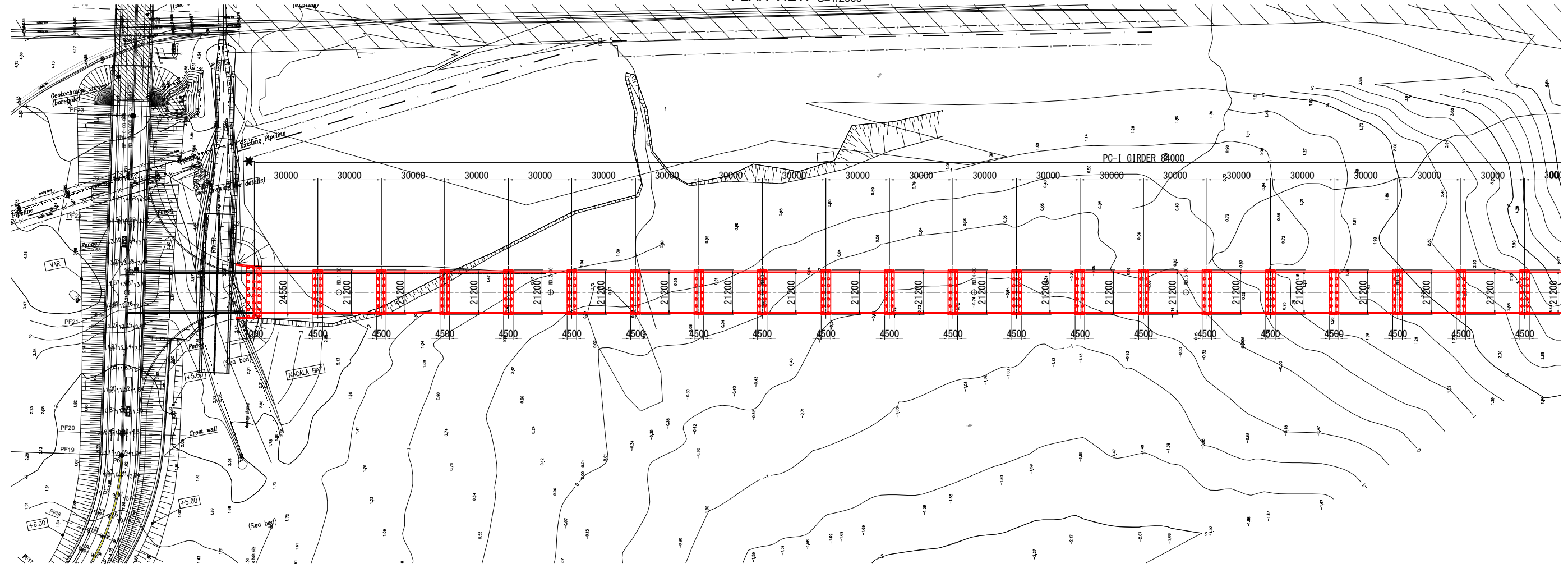
Japan International Cooperation Agency	Oriental Consultants Global Co., Ltd. Eight-Japan Engineering Consultants Inc. Kokusai Kogyo Co., Ltd.	PREPARED BY	CHECKED BY	APPROVED BY	PROJECT TITLE: Preparatory Survey for Nacala Corridor Road Network Upgrading Project (NACALA PORT ACCESS ROAD)	DRAWING TITLE: High-Spec Option (Initial Stage)			
		NAME				Typical Cross Section			
National Road Administration (ANE)		SIGNATURE				SCALE	SHEET NO.	DRAWING NO.	REV. NO.
		DATE				1/200		B-20	

SIDE VIEW S=1/2000

GENERAL VIEW 1-2
(NACALA PORT ACCESS BRIDGE)



PLAN VIEW S=1/2000

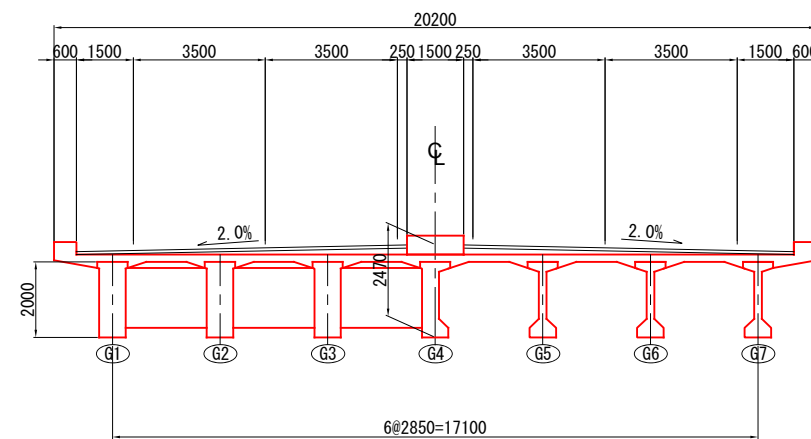
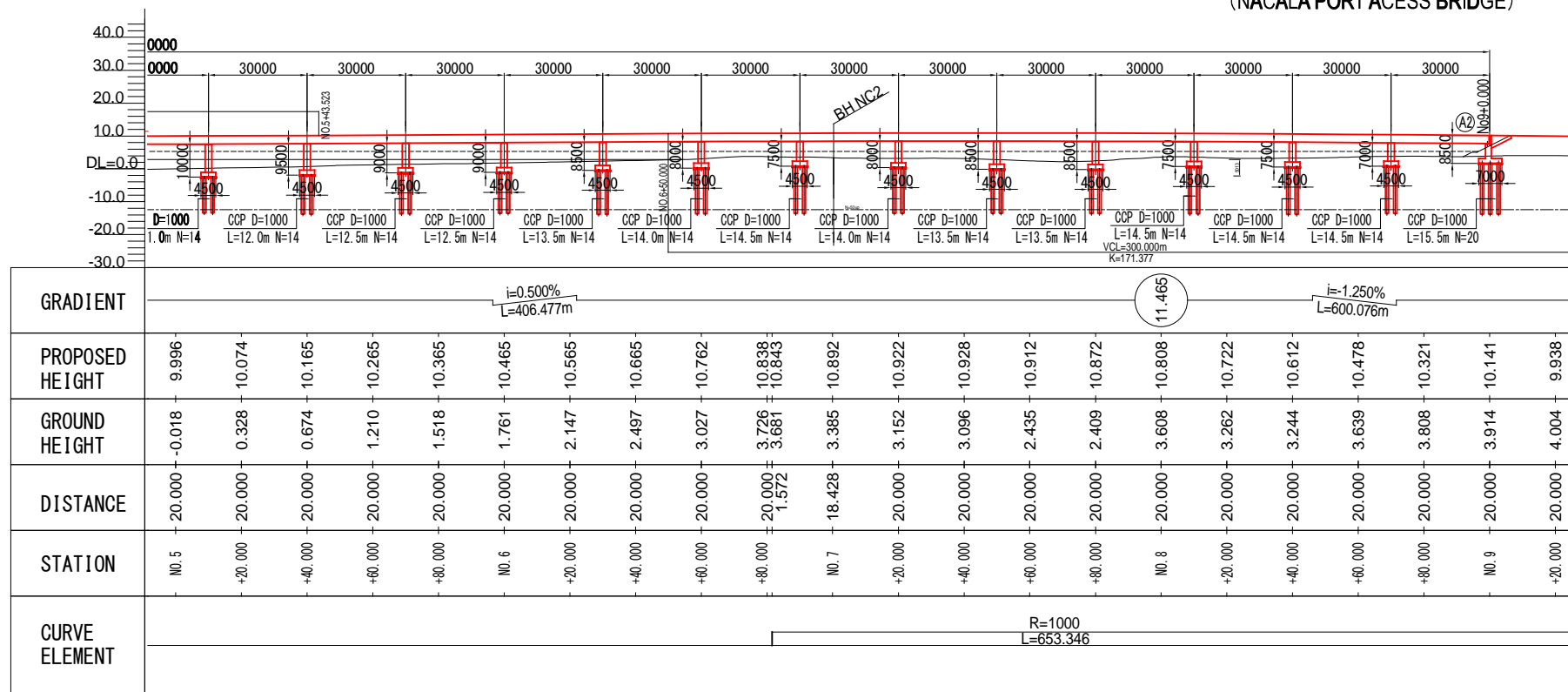


Japan International Cooperation Agency National Road Administration (ANE)	Oriental Consultants Global Co., Ltd. Eight-Japan Engineering Consultants Inc. Kokusai Kogyo Co., Ltd.	PREPARED BY	CHECKED BY	APPROVED BY	PROJECT TITLE: Preparatory Survey for Nacala Corridor Road Network Upgrading Project (Nacala Port Access Road)	DRAWING TITLE: High-Spec. Option (Initial Stage)			
		NAME				GENERAL VIEW - 1/2 (NACALA PORT ACCESS BRIDGE)	SCALE	SHEET NO.	DRAWING NO.
		SIGNATURE							
		DATE							

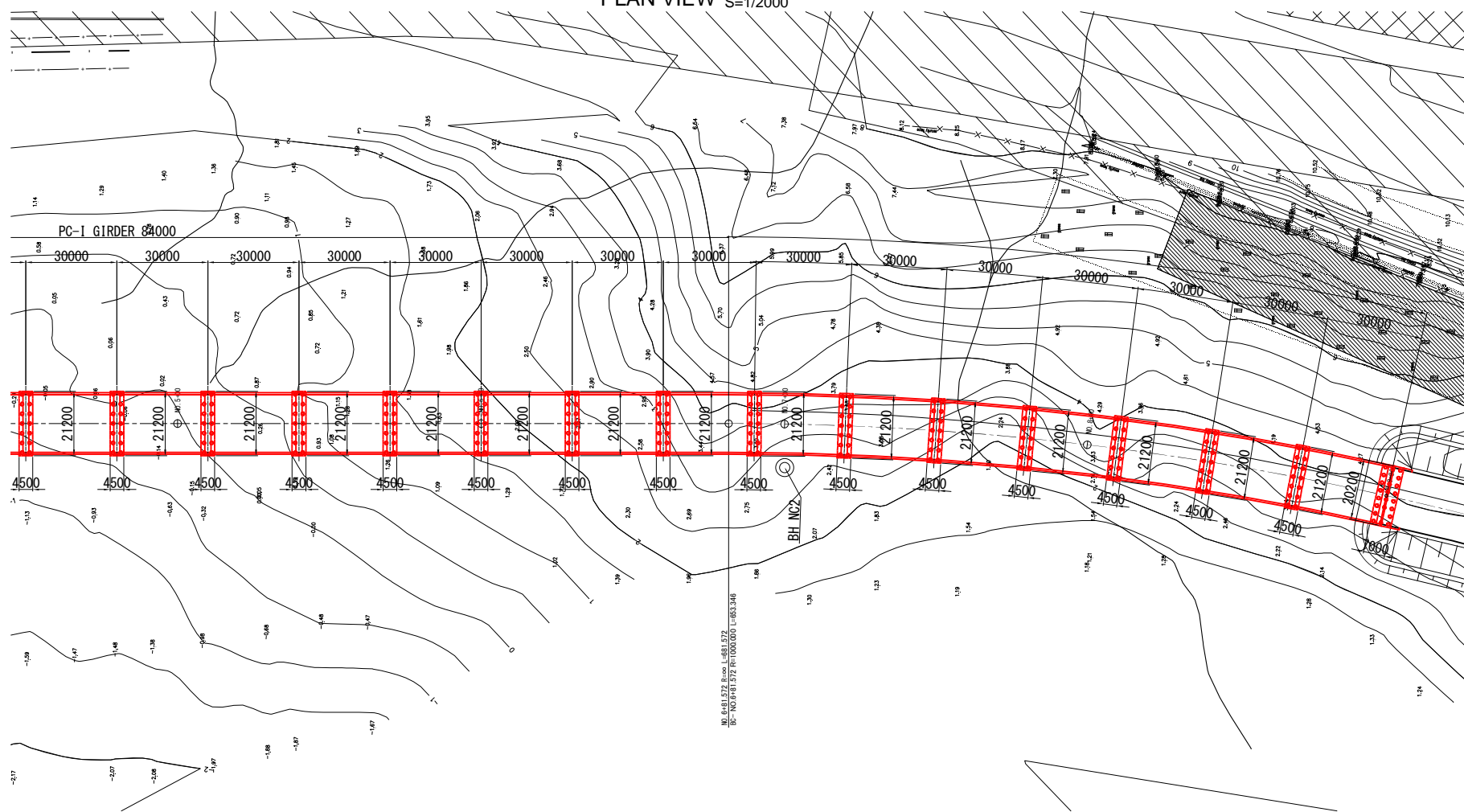
SIDE VIEW S=1/2000

GENERAL VIEW 1-2
(NACALA PORT ACCESS BRIDGE)

SUPERSTRUCTURE CROSS SECTION S=1/200

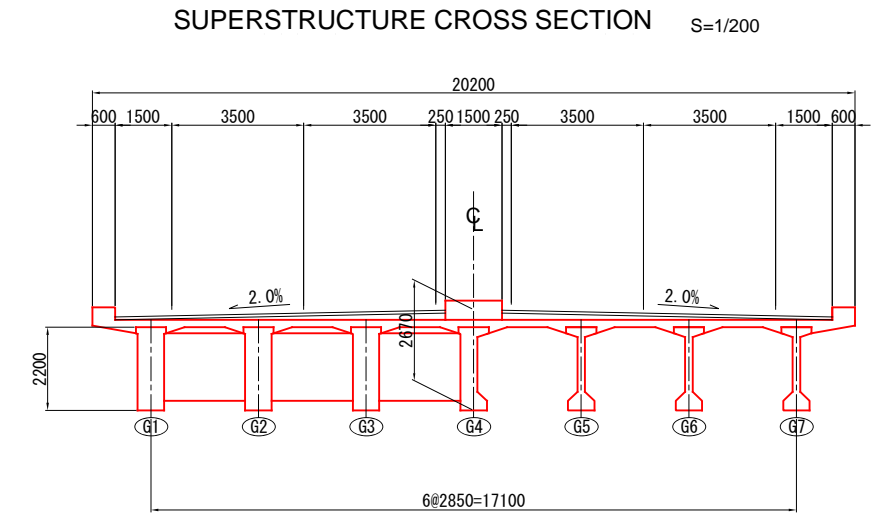
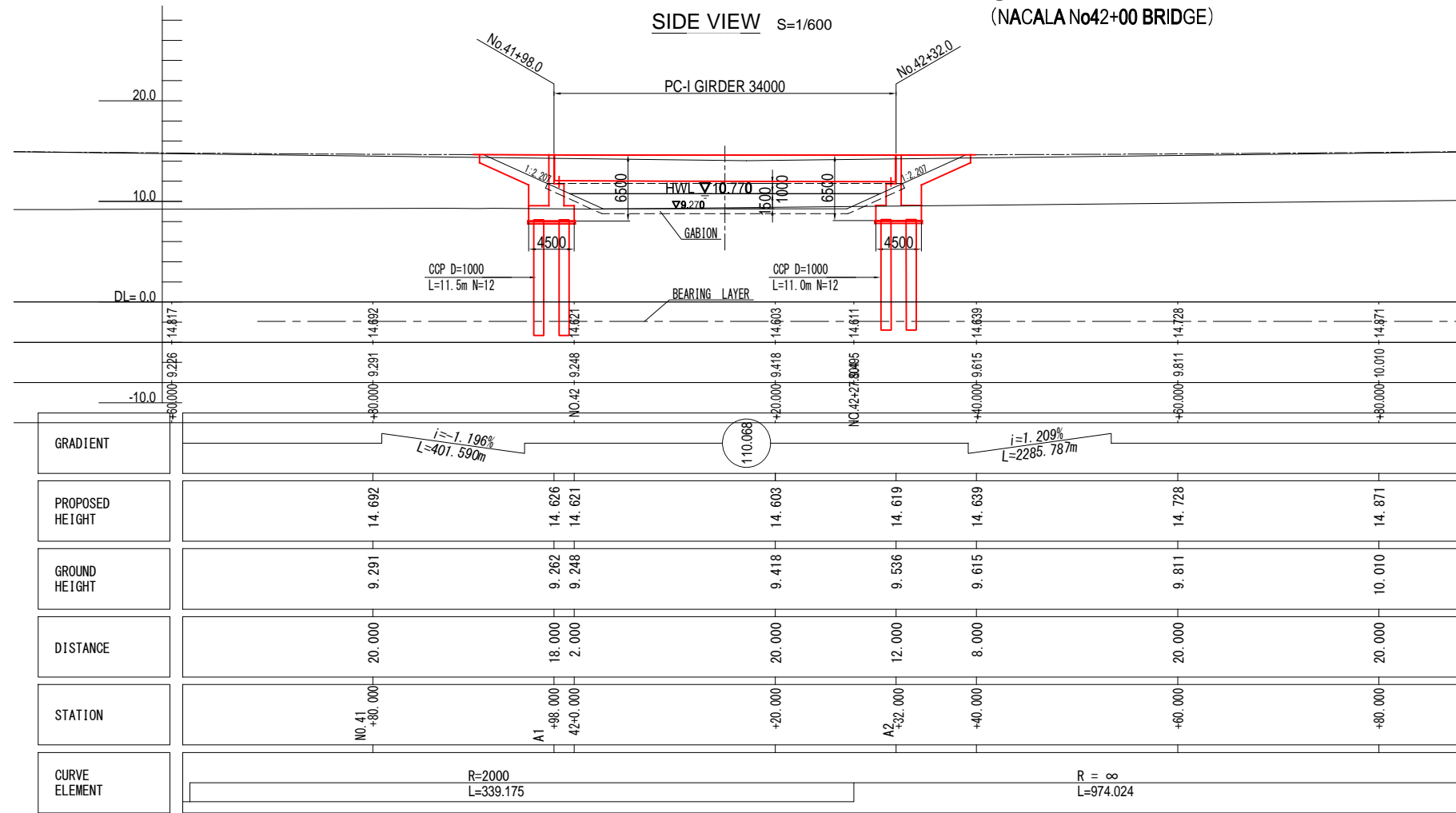


PLAN VIEW S=1/2000



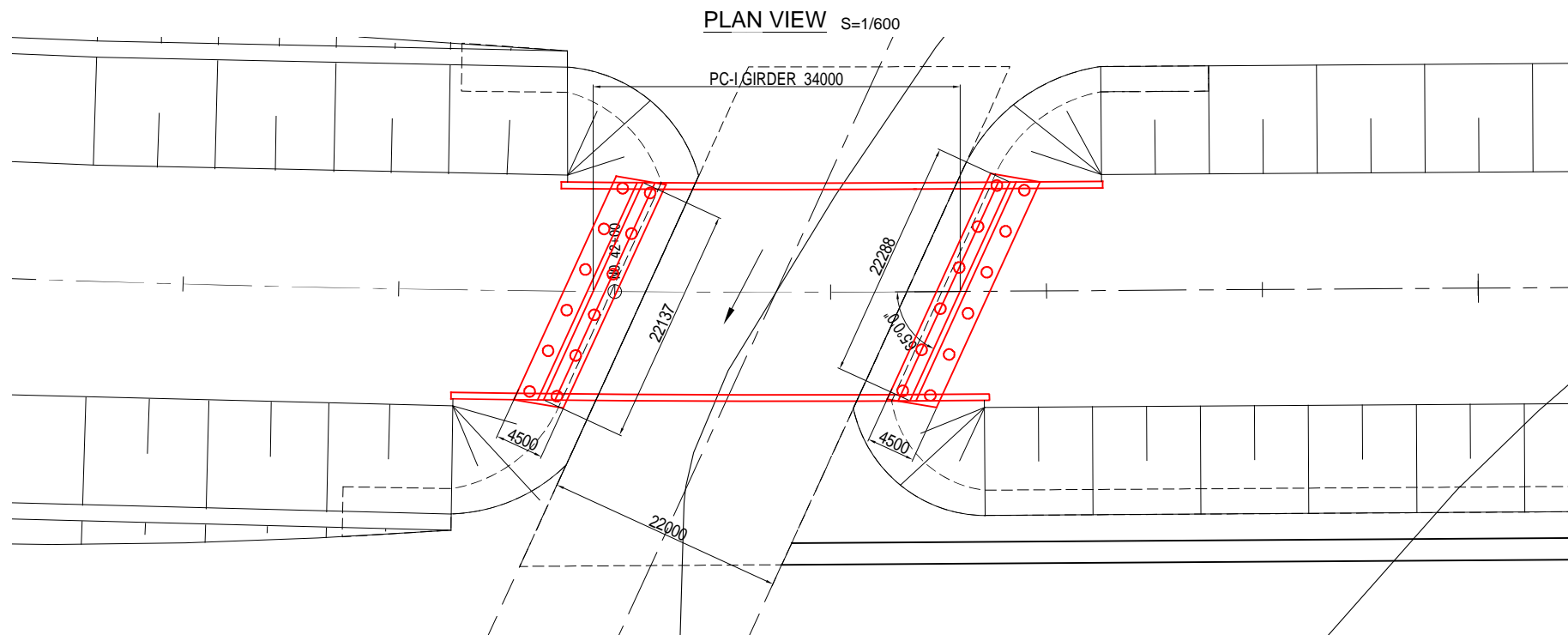
	Japan International Cooperation Agency National Road Administration (ANE)	Oriental Consultants Global Co., Ltd. Eight-Japan Engineering Consultants Inc. Kokusai Kogyo Co., Ltd.	PREPARED BY CHECKED BY APPROVED BY	PROJECT TITLE: Preparatory Survey for Nacala Corridor Road Network Upgrading Project (Nacala Port Access Road)	DRAWING TITLE: High-Spec. Option (Initial Stage) GENERAL VIEW - 2/2 (NACALA PORT ACCESS BRIDGE)
	SCALE SHEET NO. DRAWING NO. REV. NO.	B-22			

GENERAL VIEW (NACALA No42+00 BRIDGE)



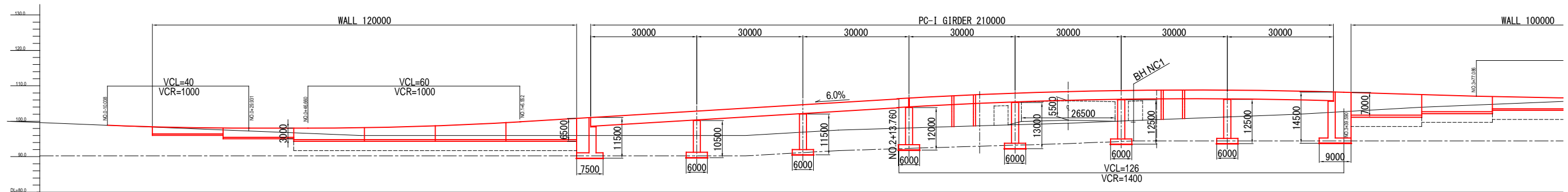
DESIGN CONDITION

TOTAL BRIDGE LENGTH	34.000m
GIRDER LENGTH	33.800m
SPAN	33.000m
WIDTH	20.200m
ANGLE OF SKEW	65°00'00"
RADIUS OF CURVATURE	R=2000 - ∞
LONGITUDINAL SLOPE	4.000% -4.000%
COMPRESSIVE STRENGTH	Main Girder: $\sigma_{ck}=40\text{N/mm}^2$ Floor Slab: $\sigma_{ck}=30\text{N/mm}^2$



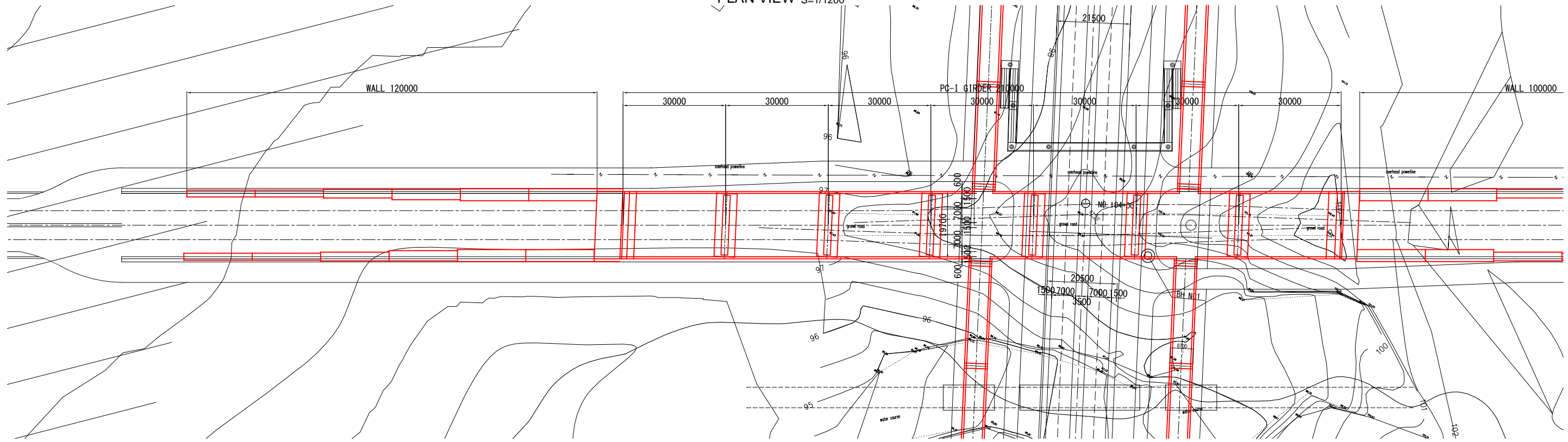
GENERAL VIEW 1-2 (NACARA702 OVER BRIDGE)

SIDE VIEW S=1/1200



GRADIENT	i=4.000% L=100.000m		LEVEL L=66.694m		i=6.000% L=200.000m		i=3.000% L=135.402m																													
PROPOSED HEIGHT	99.265	98.867	98.516	98.268	98.117	98.068	98.068	98.157	98.517	98.468	99.470	99.863	100.670	101.068	101.865	102.868	103.070	104.270	104.668	105.470	106.465	106.656	107.623	107.880	108.303	108.651	108.698	108.807	108.780	108.630	108.265	108.167	107.567	106.971	106.629	
GROUND HEIGHT	99.265	98.867	98.465	98.068	97.665	97.268	96.865	96.599	96.065	96.000	96.000	96.000	96.000	96.000	96.000	96.550	96.929	97.604	98.115	98.219	98.834	99.026	99.412	100.089	100.206	100.976	101.231	101.745	102.589	102.761	103.900	104.727	105.574			
DISTANCE	0.000	9.962	10.038	9.939	10.061	9.931	10.069	6.660	13.340	16.633	3.367	20.000	6.552	13.448	6.633	13.367	16.633	3.367	20.000	6.633	13.367	16.633	3.367	20.000	6.633	13.367	16.633	3.367	20.000	6.633	13.367	16.633	3.367	20.000	20.000	
STATION	NO.0 +20.000	-10.038	NO.0 +00.000	+9.939	+20.000	+29.931	+40.000	+46.660	+60.000	+76.633	+80.000	NO.1 +00.000	+6.552	+20.000	A1 +26.633	+40.000	P1 +56.633	+60.000	+80.000	P2 +86.633	NO.2 +00.000	P3 +16.633	+20.000	+40.000	P4 +46.633	+60.000	P5 +76.633	+80.000	NO.3 +00.000	P6 +6.633	+20.000	A2 +36.633	+40.000	+60.000	+80.000	NO.4 +00.000
CURVE ELEMENT																					R=∞ CL=446.972															

PLAN VIEW S=1/1200



Japan International Cooperation Agency
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PREPARED BY	CHECKED BY	APPROVED BY
NAME		
SIGNATURE		
DATE		

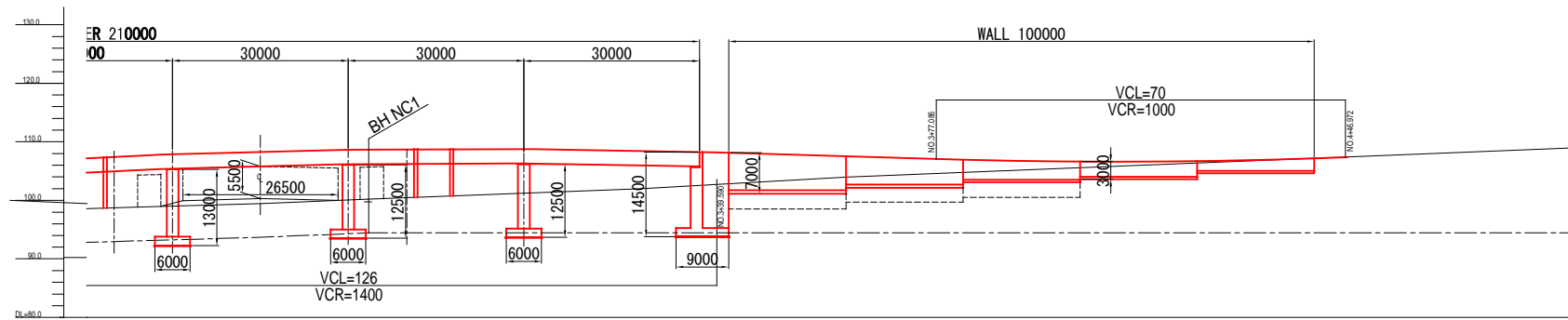
PROJECT TITLE:
**Preparatory Survey for Nacala Corridor
Road Network Upgrading Project
(Nacala Port Access Road)**

DRAWING TITLE: High-Spec. Option (Initial Stage)
GENERAL VIEW - 1/2 (NACARA702 OVER BRIDGE)

SCALE	SHEET NO.	DRAWING NO.	REV. NO.
		B-24	

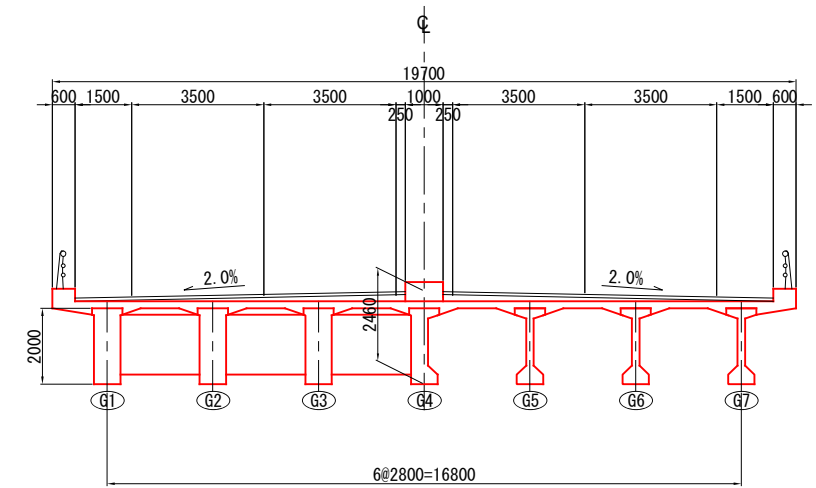
GENERAL VIEW 2-2 (NACARA R702 OVER BRIDGE)

SIDE VIEW S=1/1200



GRADIENT																	
PROPOSED HEIGHT	107.623	107.880	108.303	108.651	108.698	108.807	108.780	108.630	108.265	108.167	107.567	106.971	106.629	106.688	107.147	107.921	108.720
GROUND HEIGHT	98.834	99.026	99.412	100.069	100.206	100.976	101.231	101.745	102.569	102.761	103.900	104.727	105.574	106.324	107.122	107.921	108.720
DISTANCE	20.000	6.633	13.367	16.633	3.367	20.000	6.633	13.367	16.633	3.367	20.000	20.000	20.000	20.000	20.000	20.000	20.000
STATION	+40.000 P4	+46.633	+60.000	+76.633 P5	+80.000	+100.000 NO.3	+106.633 P6	+120.000	+136.633 A2	+140.000	+160.000	+180.000	+200.000	+220.000	+240.000	+260.000	+280.000
CURVE ELEMENT	$R = \infty$ $CL = 446.972$																

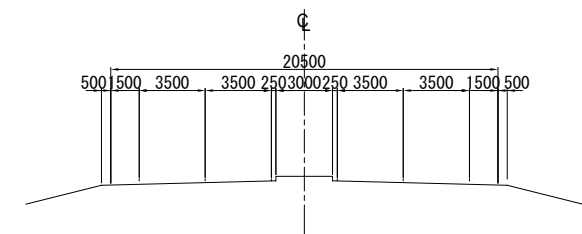
R702 CROSS SECTION S=1/200



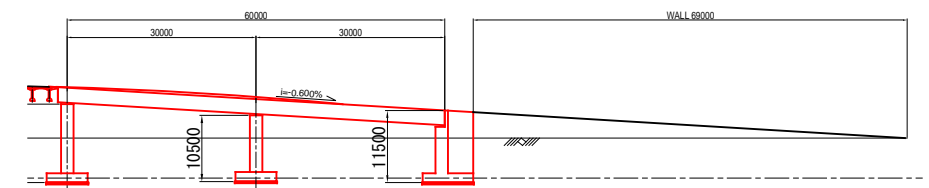
DESIGN CONDITION

TOTAL BRIDGE LENGTH	210.000m
GIRDER LENGTH	29.850m+5@29.800m+29.850m
SPAN	29.050m+5@29.000m+29.050m
WIDTH	19.700m
ANGEL OF SKEW	90°00'00"
RADIUS OF CURVATURE	R=∞
LONGITUDINAL SLOPE	← 6.000% -3.000% →
COMPRESSIVE STRENGTH	Main Girder: $\sigma_{ck}=40N/mm^2$
	Floor Slab: $\sigma_{ck}=30N/mm^2$

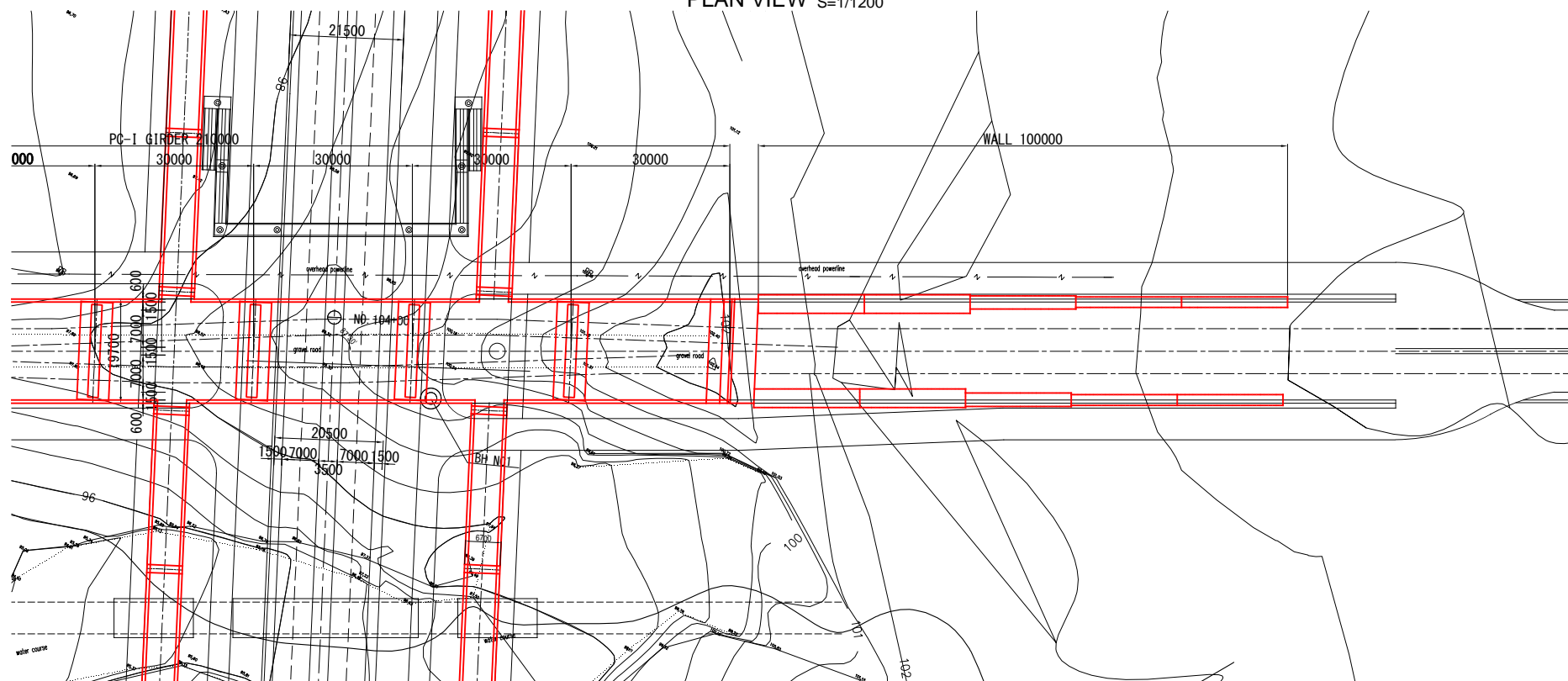
PORT ACCESS CROSS SECTION S=1/400



RAMP SIDE VIEW S=1/1200



PLAN VIEW S=1/1200



Japan International Cooperation Agency

National Road Administration (ANE)

Oriental Consultants Global Co., Ltd.

Eight-Japan Engineering Consultants Inc.

Kokusai Kogyo Co., Ltd.

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NAME		
SIGNATURE		
DATE		

PROJECT TITLE:
**Preparatory Survey for Nacala Corridor
 Road Network Upgrading Project
 (Nacala Port Access Road)**

DRAWING TITLE: High-Spec. Option (Initial Stage)			
GENERAL VIEW - 2/2 (NACARA R702 OVER BRIDGE)			
SCALE	SHEET NO.	DRAWING NO.	REV. NO.
		B-25	

