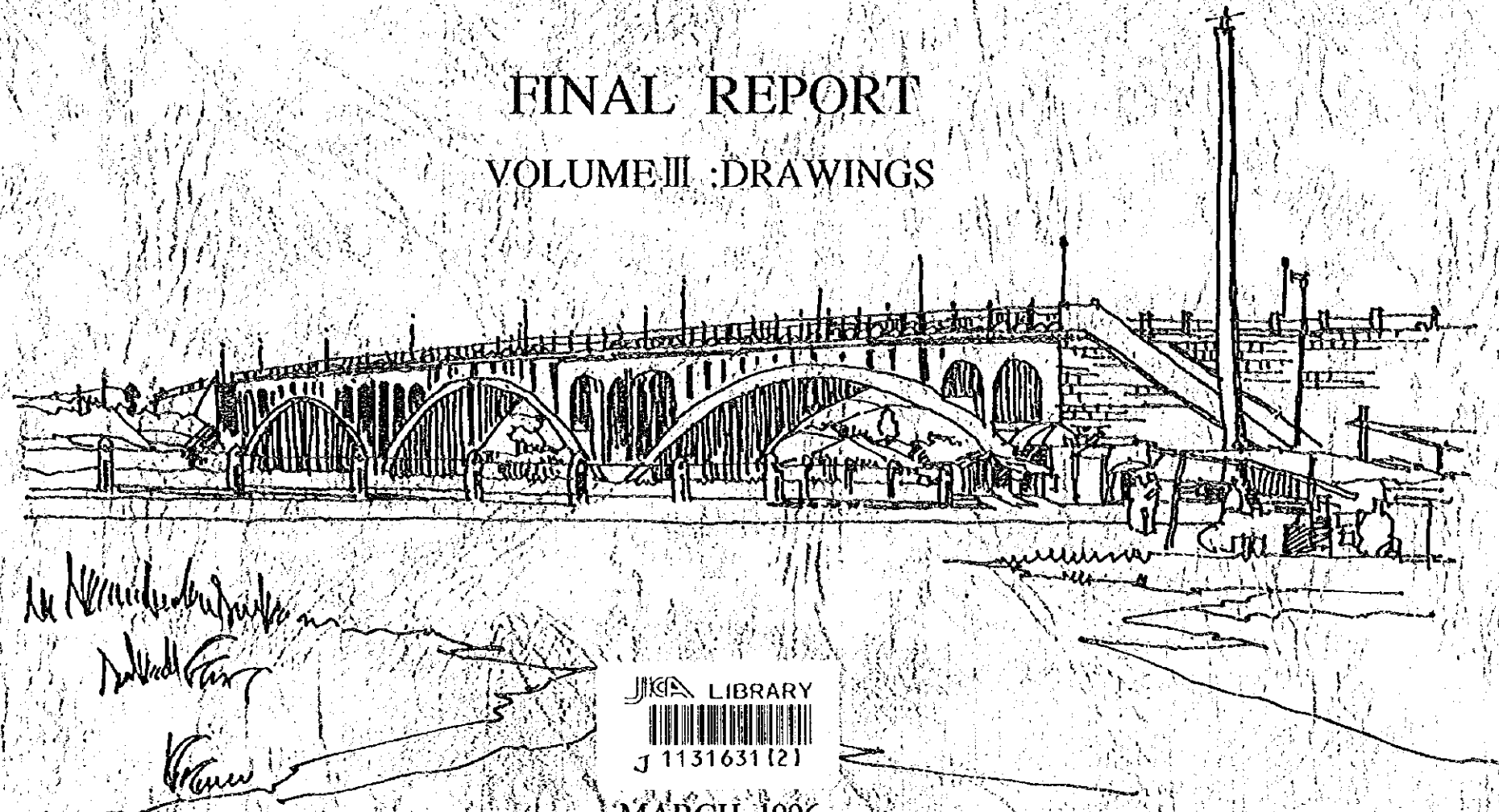


JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF TRANSPORT
THE SOCIALIST REPUBLIC OF VIETNAM

FEASIBILITY STUDY ON THE HIGHWAY NO.18 IMPROVEMENT IN VIETNAM

FINAL REPORT VOLUME III : DRAWINGS



Handwritten signatures and notes:
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J 1131631 (2)

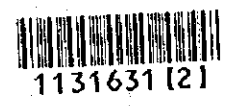
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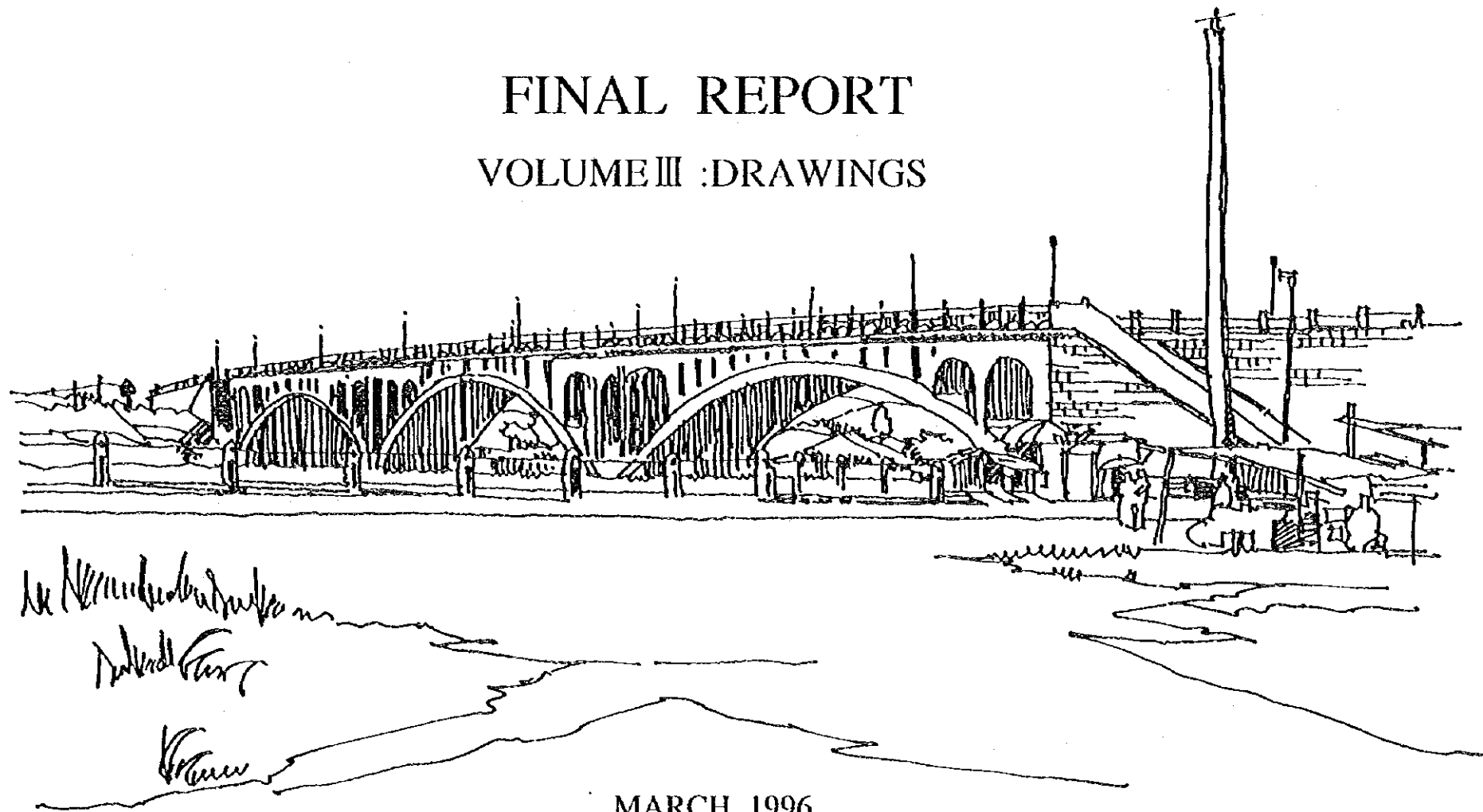
1131631 (2)

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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ON
THE HIGHWAY NO.18 IMPROVEMENT IN VIETNAM

FINAL REPORT
VOLUME III :DRAWINGS

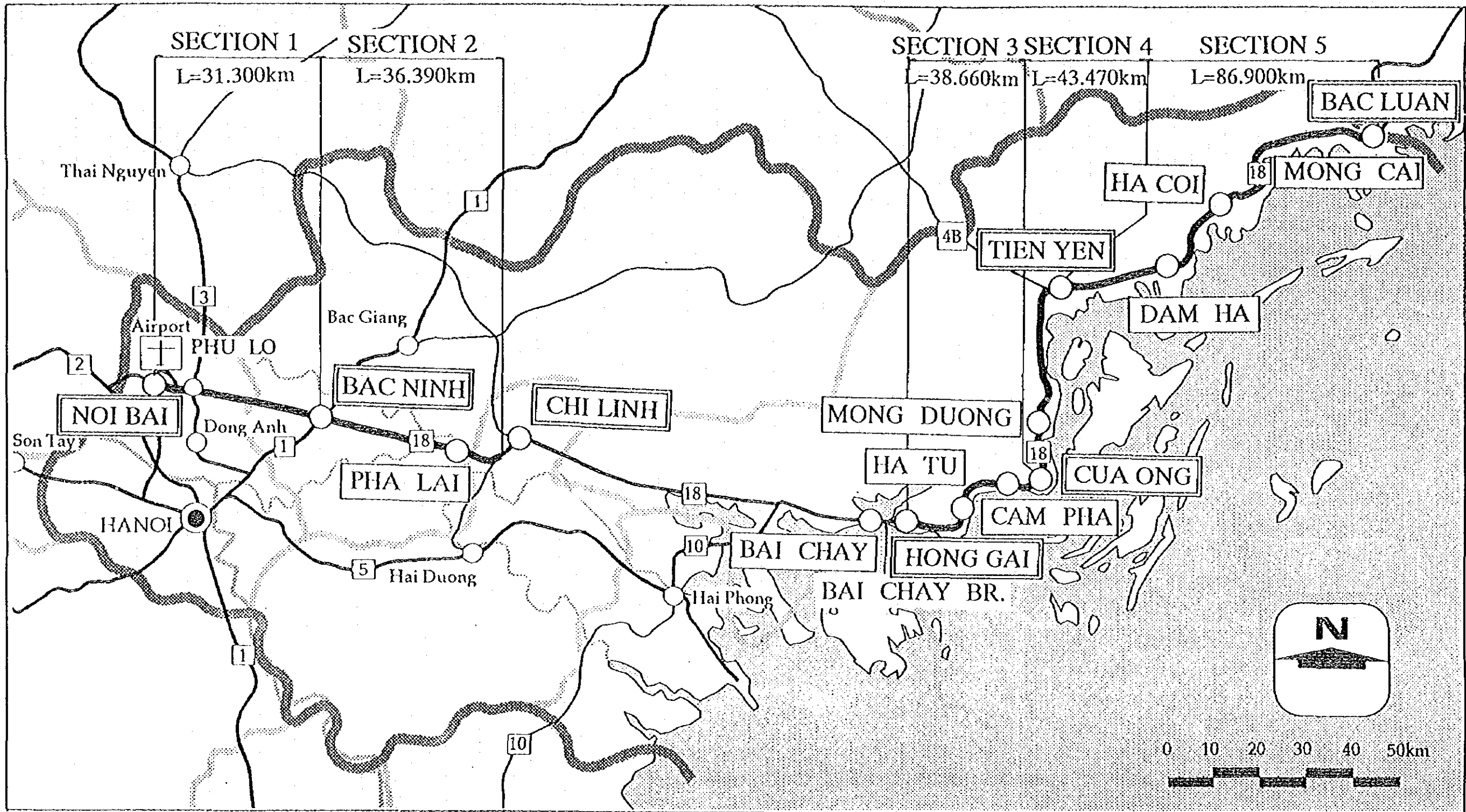


PACIFIC CONSULTANTS INTERNATIONAL

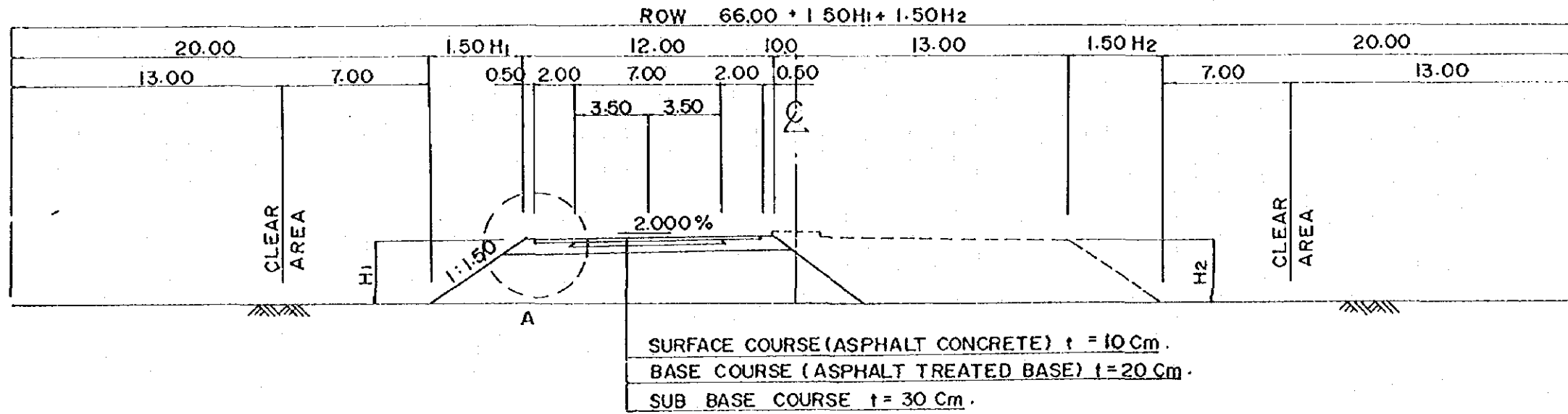
ORIENTAL CONSULTANTS CO.,LTD

LIST OF DRAWINGS

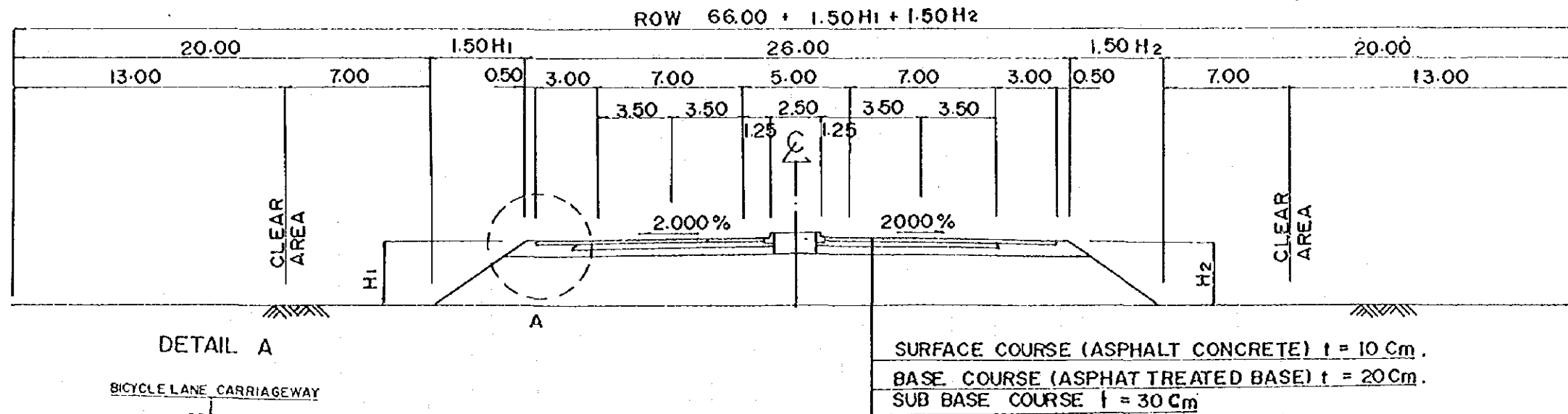
SHEET CONTENTS	DRAWING NUMBER	NUMBER OF SHEETS	REMARKS
1. LOCATION MAP	1	1	
2. TYPICAL CROSS SECTION	(1) NOI BAI ~ BAC NINH SECTION	2	1
	(2) BAC NINH ~ CHI LINH SECTION	3	1
	(3) HONG GAI ~ CUA ONG SECTION	4 ~ 6	3
	(4) CUA ONG ~ BAC LUAN SECTION	7 ~ 9	3
3. PLAN AND PROFILE	(1) NOI BAI ~ BAC NINH SECTION	10 ~ 32	23
	(2) BAC NINH ~ CHI LINH SECTION	33 ~ 57	25
	(3) HONG GAI ~ CUA ONG SECTION	58 ~ 85	28
	(4) CUA ONG ~ BAC LUAN SECTION	86 ~ 137	52
4. INTERCHANGES	138 ~ 140	3	
5. INTERSECTIONS	141 ~ 149	9	
6. TYPICAL METHOD OF RUN - OFF	150	1	
7. DRAINAGES	(1) SUMMARY OF MAJOR BOX CULVERT	151	1
	(2) TYPICAL BOX CULVERTS	152	1
	(3) TYPICAL PIPE CULVERTS	153 ~ 154	2
8. TYPICAL SLOPE PROTECTION WORKS	155	1	
9. LOCATION MAP FOR PROPOSED BRIDGES	156 ~ 161	6	
10. SUMMARY OF PROPOSED BRIDGES	162 ~ 165	4	
11. APPLICATION OF STANDARD DESIGN FOR BRIDGES	166	1	
12. STANDARD DESIGN FOR SUPERSTRUCTURE	(1) PC-I GIRDER	167	1
	(2) RC-T GIRDER	168	1
	(3) RC-HOLLOW	169	1
	(4) RC-SLAB	170	1
13. STANDARD DESIGN FOR ABUTMENT	171	1	
14. STANDARD DESIGN FOR PIER	172	1	
15. RAILWAY AND NATIONAL HIGHWAY No.1 FLYOVER	173	1	
16. PHA LAI BRIDGE	174	1	
17. APPROACH BRIDGE FOR BAI CHAY BRIDGE	175	1	
18. CONSTRUCTION PROCEDURE OF BORED PILE BY REVERSE CIRCULATION METHOD AND PIER BODY	176	1	
19. ERECTION OF SUPERSTRUCTURE BY PRECAST SEGMENTAL METHOD	177	1	



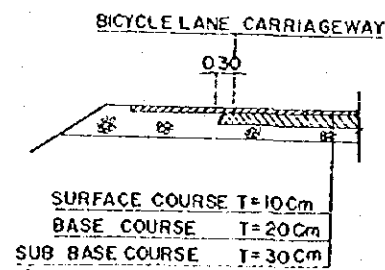
INITIAL STAGE (TYPE A - 1)



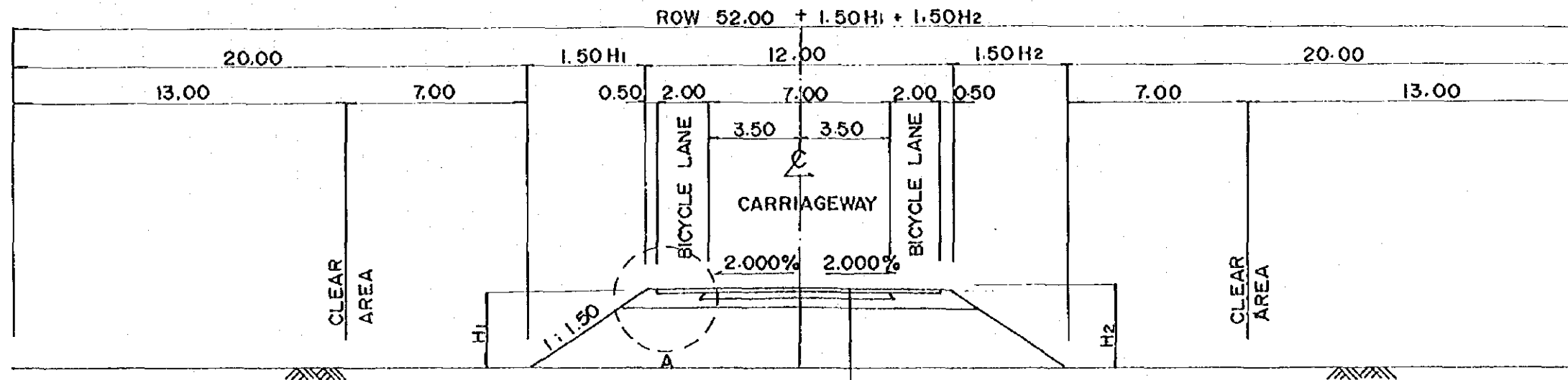
FINAL STAGE (TYPE - D)



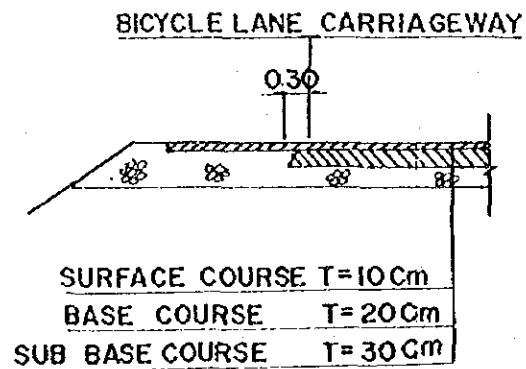
DETAIL A



INITIAL STAGE (TYPE A - 1)

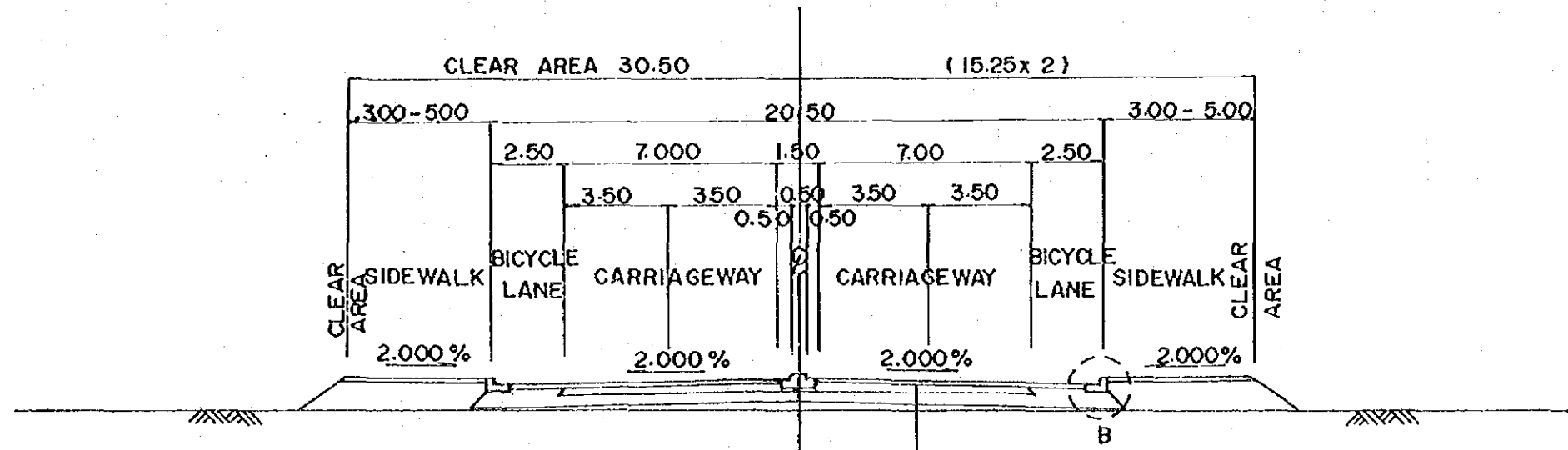


DETAIL A



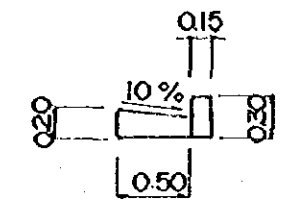
SURFACE COURSE (ASPHALT CONCRETE) t = 10 Cm.
 BASE COURSE (ASPHALT TREATED BASE) t = 20 Cm
 SUB BASE COURSE t = 30 Cm.

INITIAL STAGE (TYPE C-2)

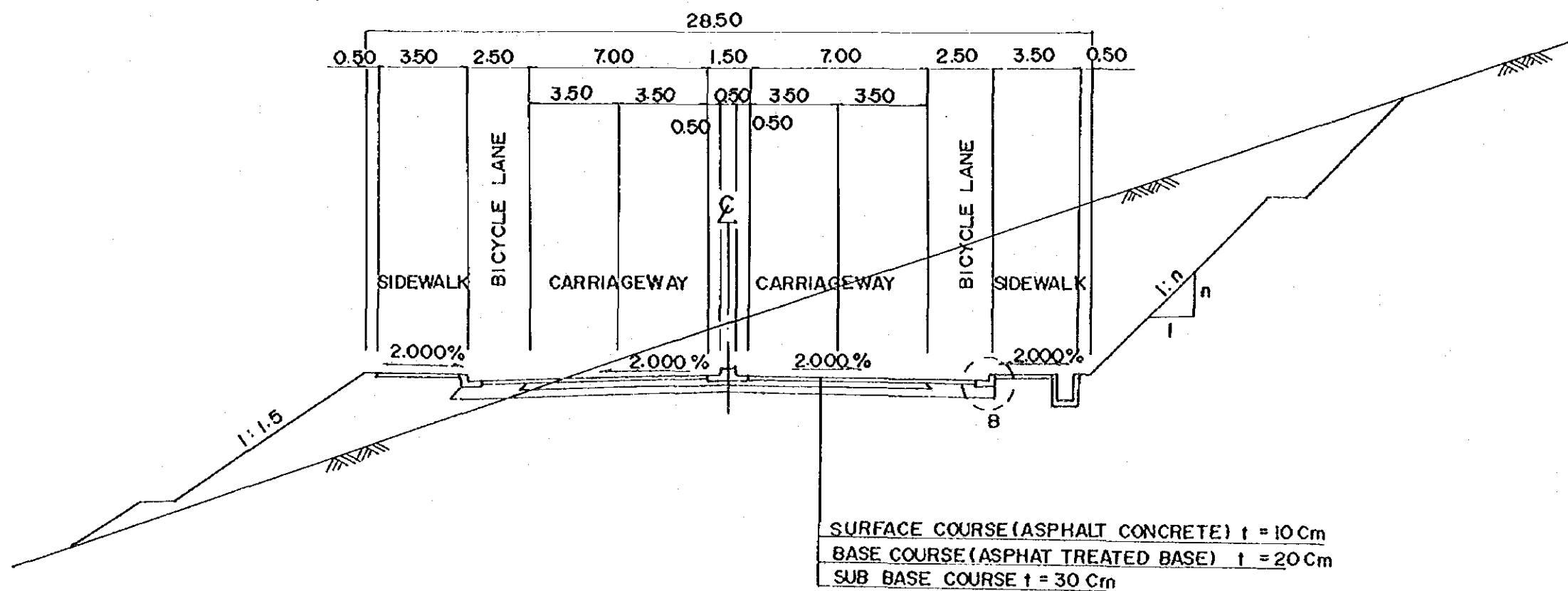


SURFACE COURSE (ASPHALT CONCRETE)	t = 10 Cm
BASE COURSE (ASPHALT TREATED BASE)	t = 20 Cm
SUB BASE COURSE	t = 30 Cm

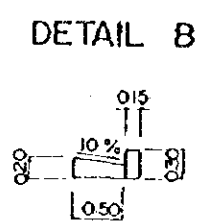
DETAIL B



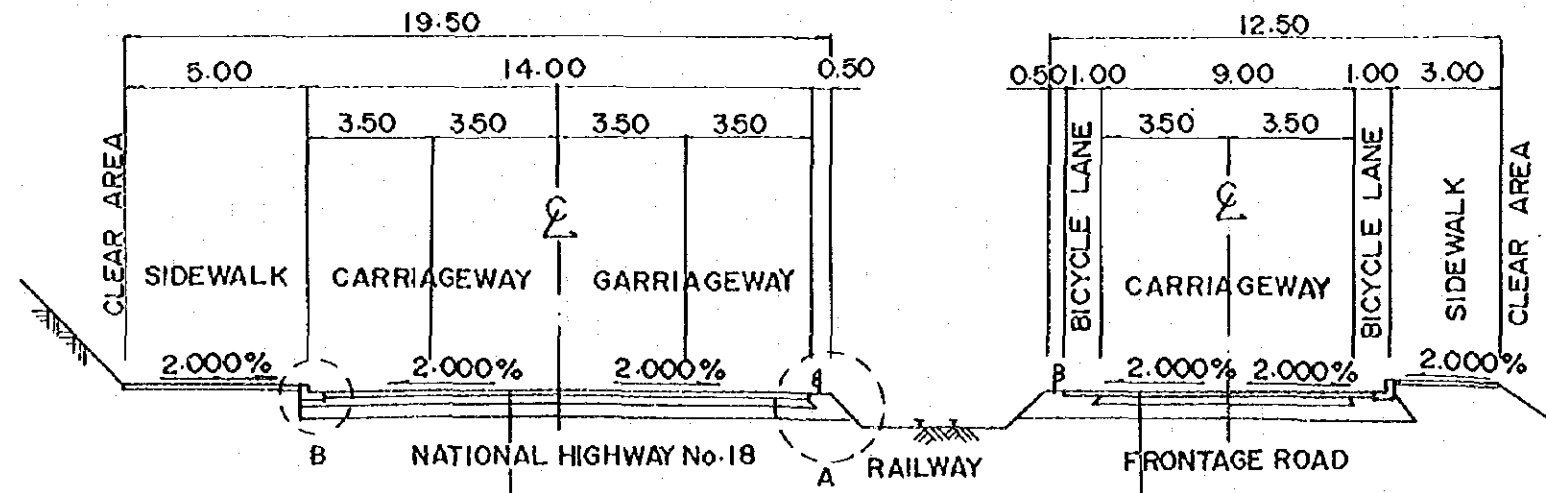
INITIAL STAGE (TYPE C - 2, BAI CHAY BRIDGE ACCESS)



Note ;
n : Varies based on geological condition



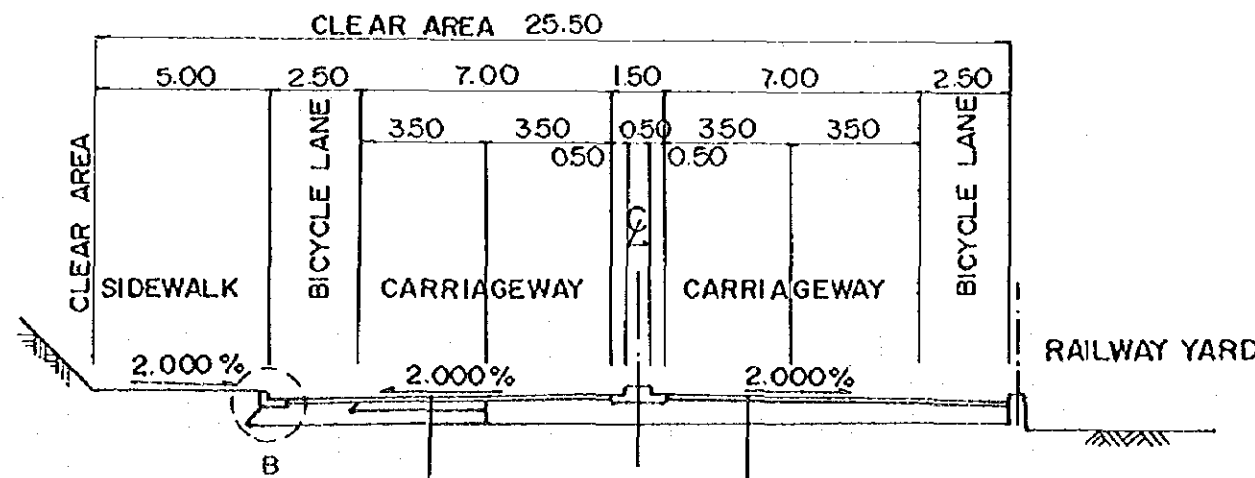
INITIAL STAGE (TYPE C - 3, STA. 124 + 500 ~ STA. 128 + 500)



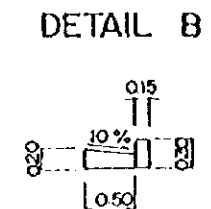
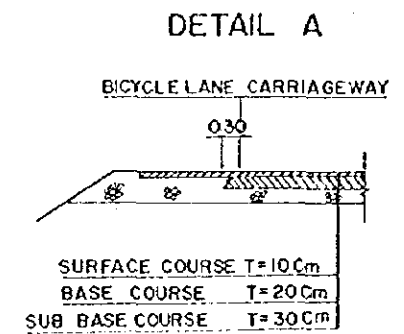
SURFACE COURSE (ASPHALT CONCRETE) $t = 10\text{Cm}$
 BASE COURSE (ASPHALT TREATED BASE) $t = 20\text{Cm}$
 SUB BASE COURSE $t = 30\text{Cm}$

SURFACE COURSE (ASPHALT CONCRETE) $t = 10\text{Cm}$
 BASE COURSE (ASPHALT TREATED BASE) $t = 20\text{Cm}$
 SUB BASE COURSE $t = 30\text{Cm}$

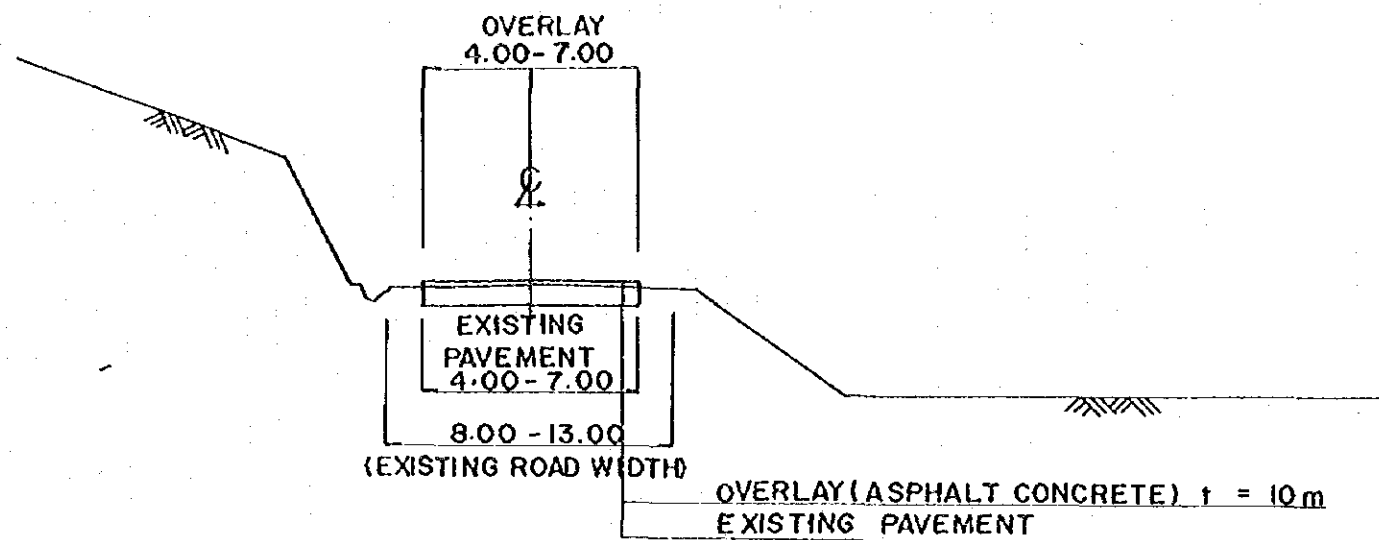
INITIAL STAGE (TYPE C - 2, STA. 156 + 300 ~ STA. 159 + 300)



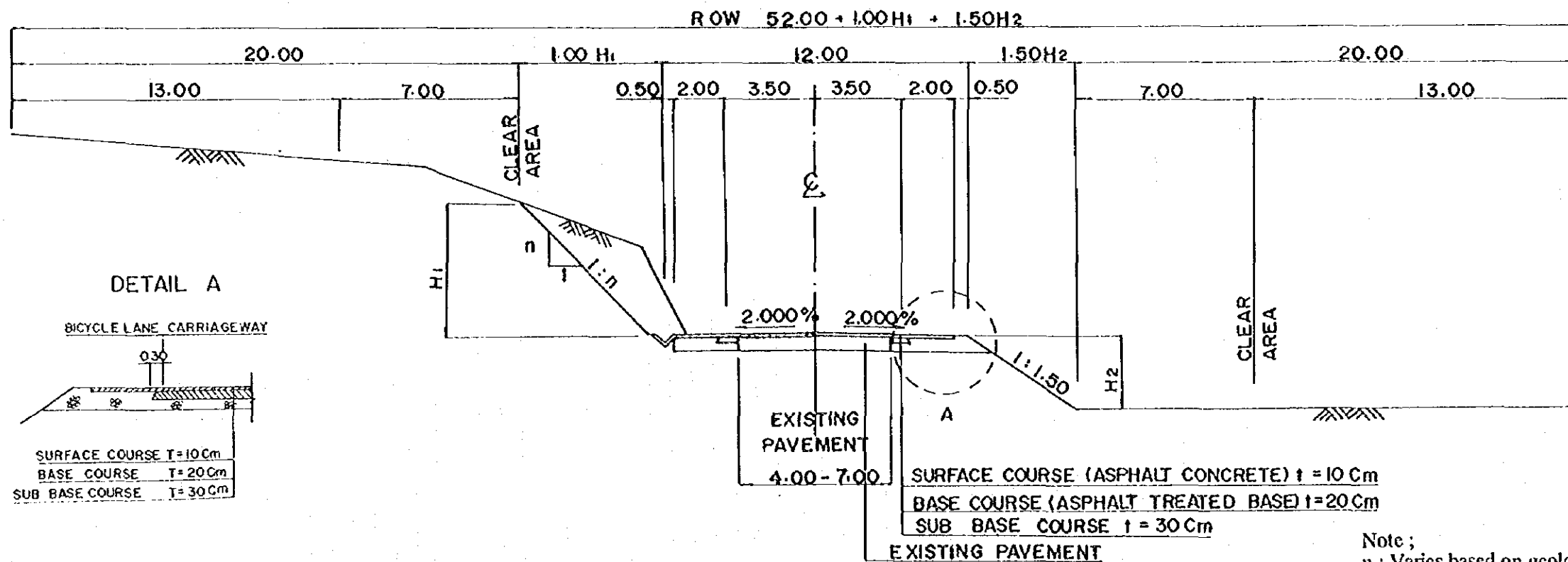
SURFACE COURSE (ASPHALT CONCRETE) $t = 10\text{Cm}$
 BASE COURSE (ASPHALT TREATED BASE) $t = 20\text{Cm}$
 SUB BASE COURSE $t = 30\text{Cm}$



INITIAL STAGE (OVERLAY STA. 161 + 500 ~ STA. 169 + 500)

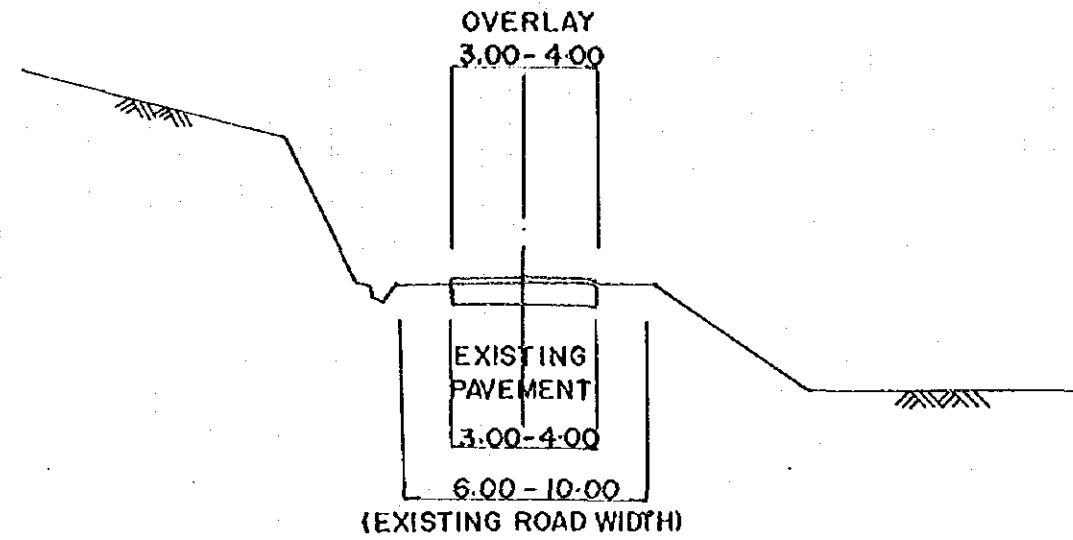


FINAL STAGE (TYPE A - 1, STA. 161 + 500 ~ STA. 169 + 500)

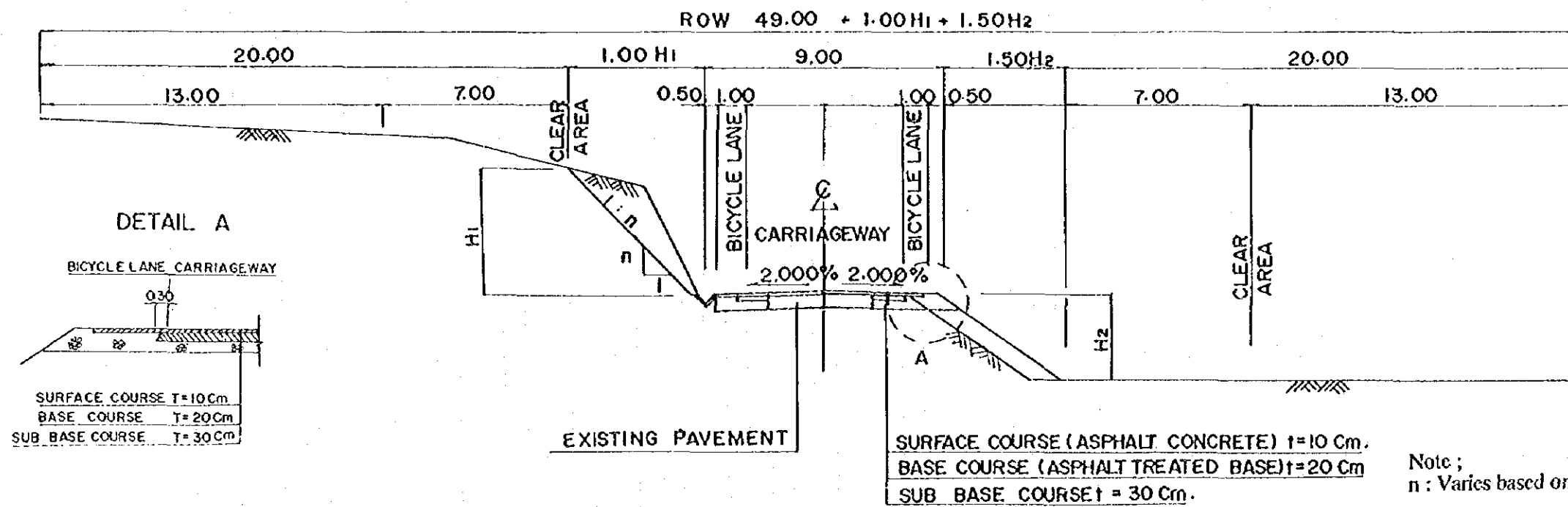


Note ;
n : Varies based on geological condition

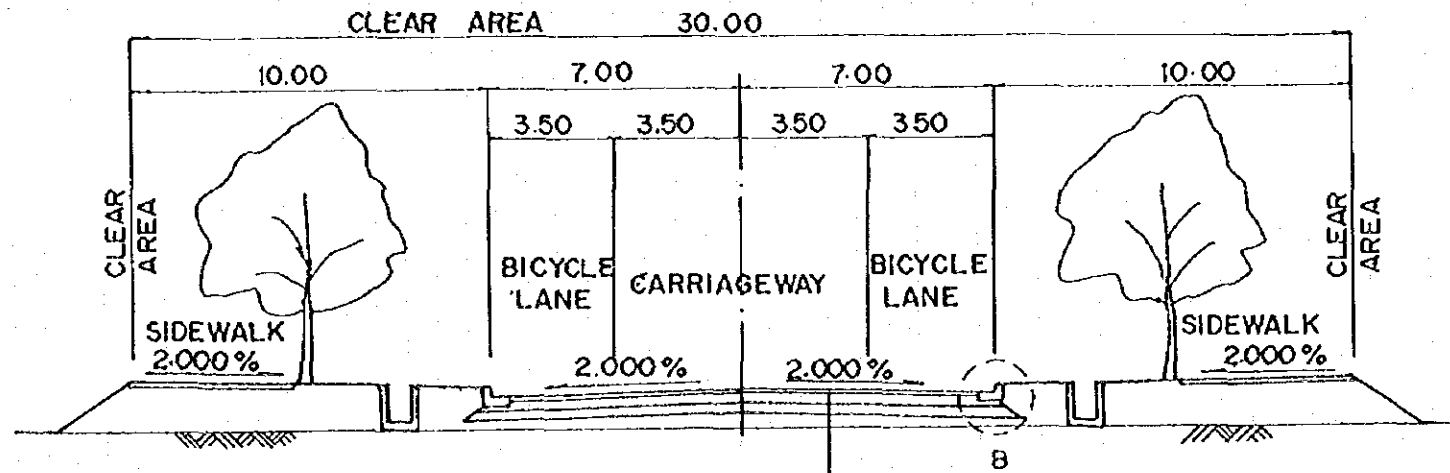
INITIAL STAGE (OVERLAY STA. 169 + 500 ~ STA. 299 + 000)



FINAL STAGE (TYPE - B STA. 169 + 500 ~ STA. 299 + 000)

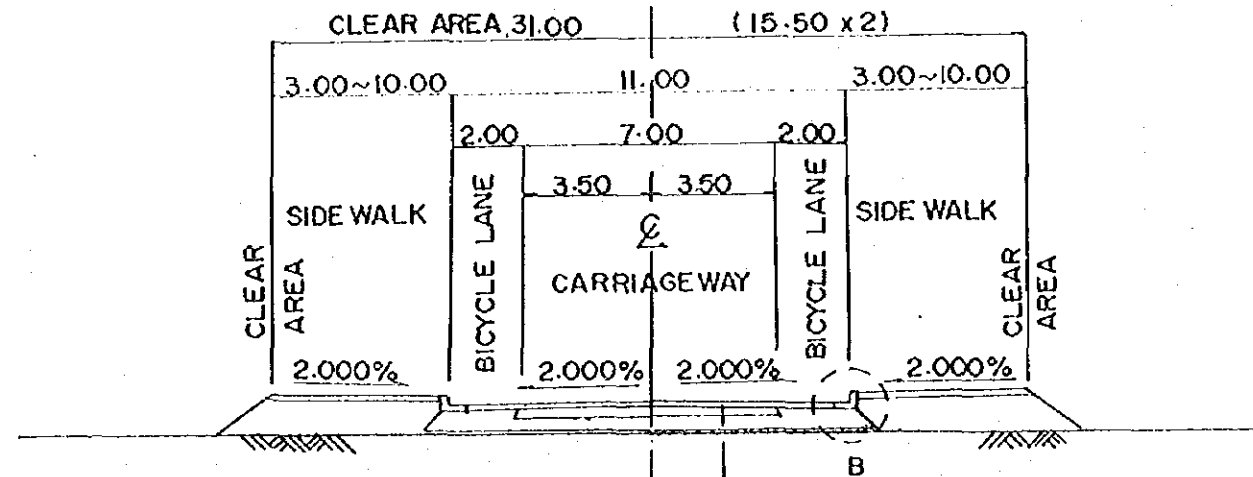


INITIAL STAGE (TYPE A - 3, STA. 299 + 000 ~ STA. 299 + 700)

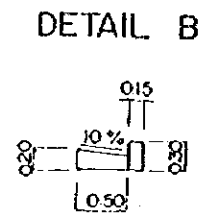


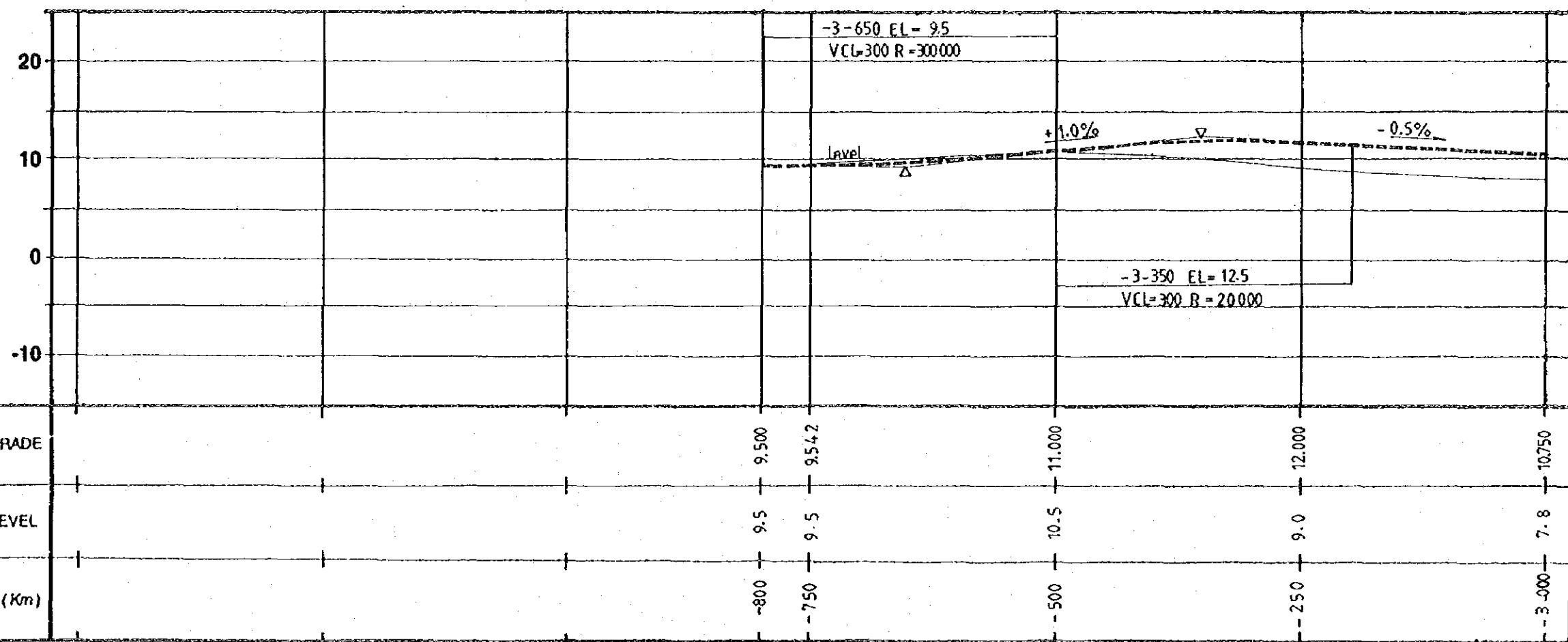
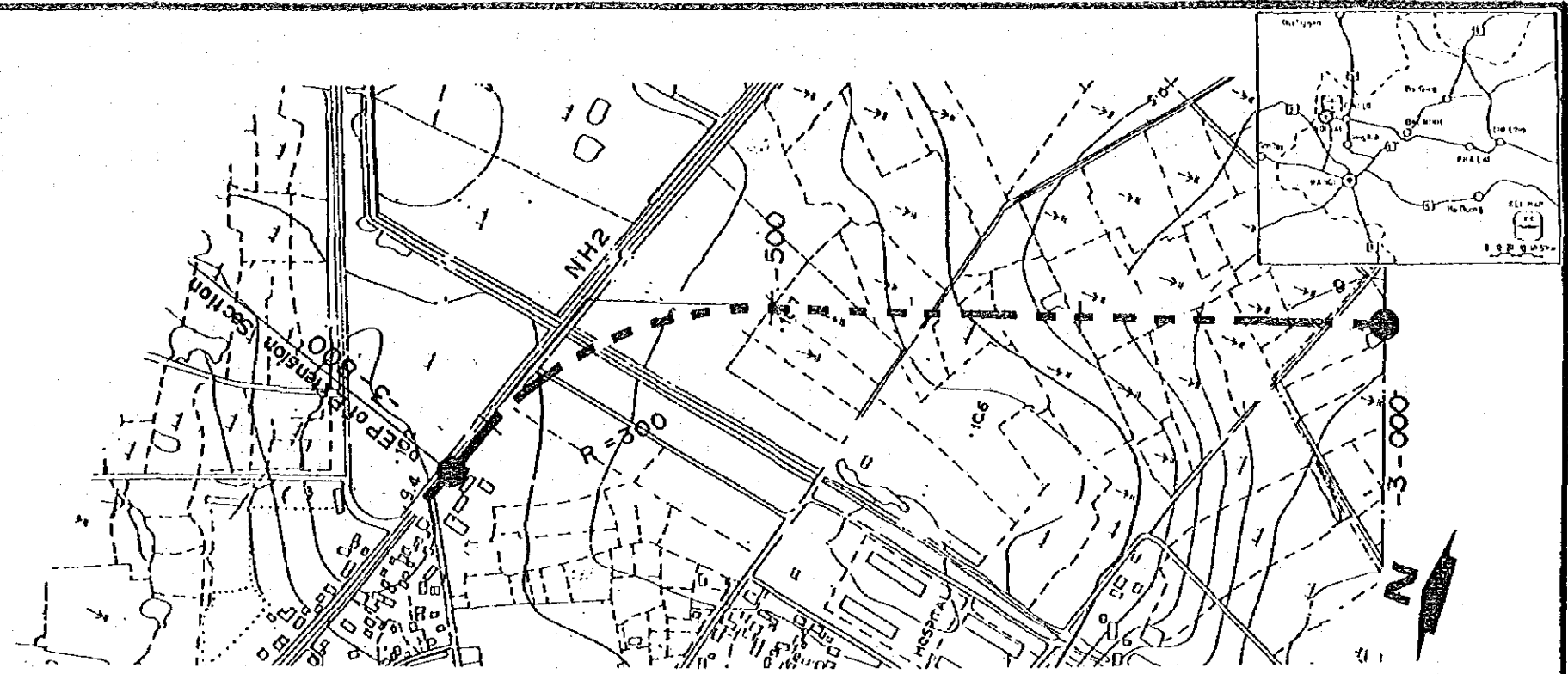
SURFACE COURSE (ASPHALT CONCRETE) t = 10 Cm
 BASE COURSE (ASPHALT TREATED BASE) t = 20 Cm
 SUB BASE COURSE t = 30 Cm

FINAL STAGE (TYPE A - 2, STA. 300 + 000 ~ STA. 300 + 640)

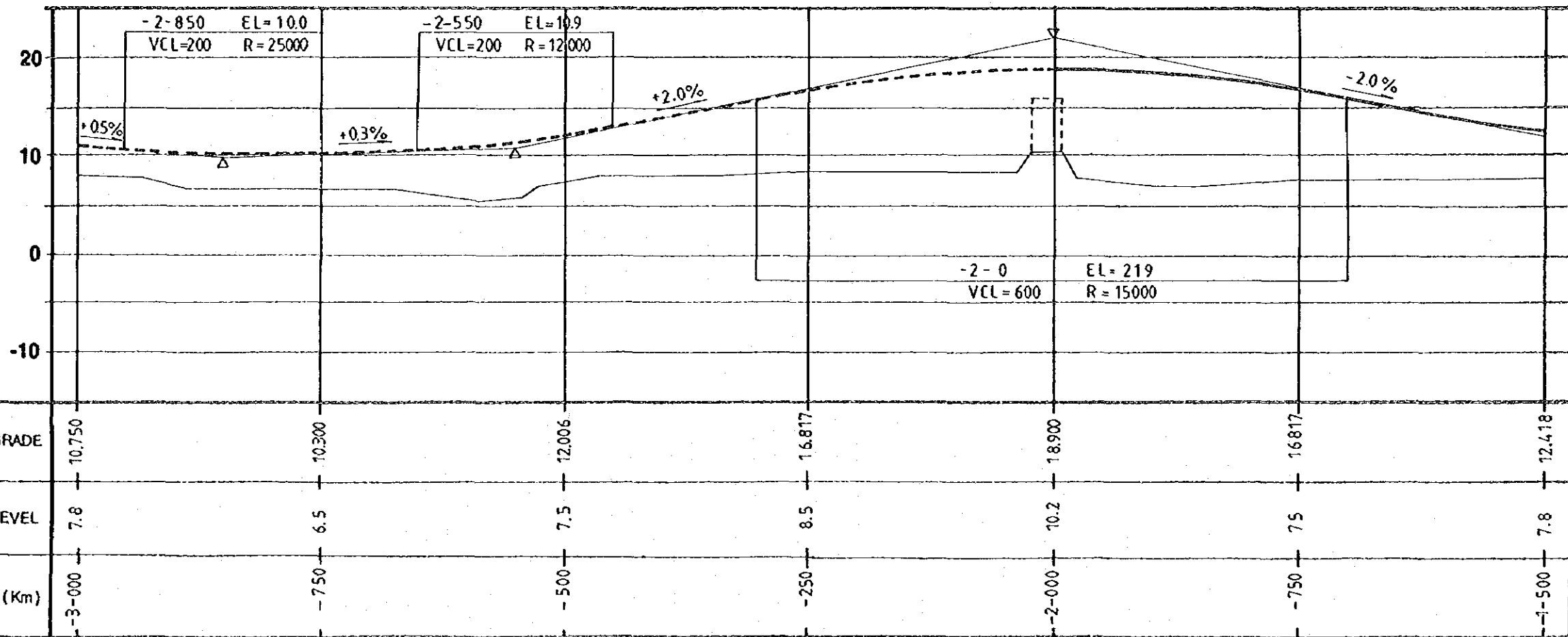
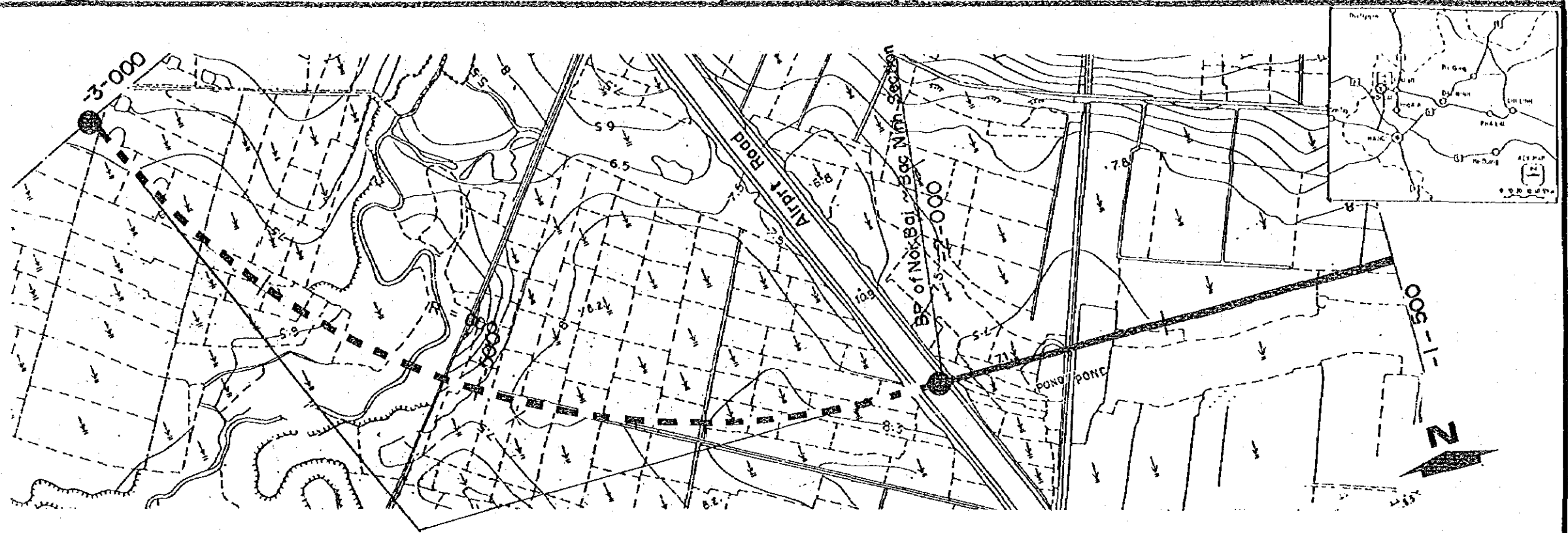


SURFACE COURSE (ASPHALT CONCRETE) t = 10 Cm .
 BASE COURSE (ASPHALT TREATED BASE) t = 20 Cm .
 SUB BASE COURSE t = 30 Cm .





FINISHED GRADE								
GROUND LEVEL								
STATION (Km)			-800	-750	-500	-250	-3-000	
			9.500	9.542	11.000	12.000	10.750	
			9.5	9.5	10.5	9.0	7.8	



HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (2)

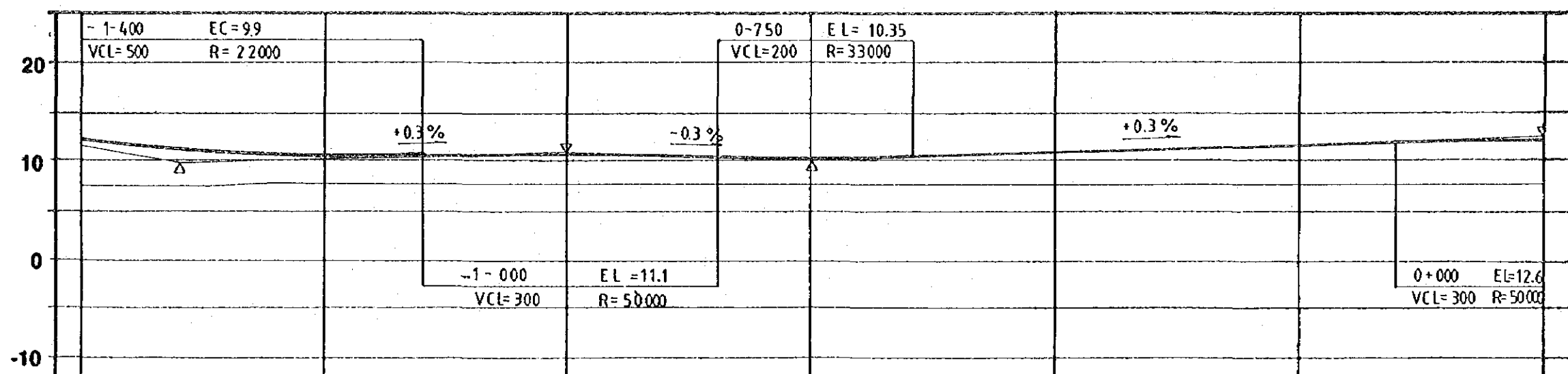
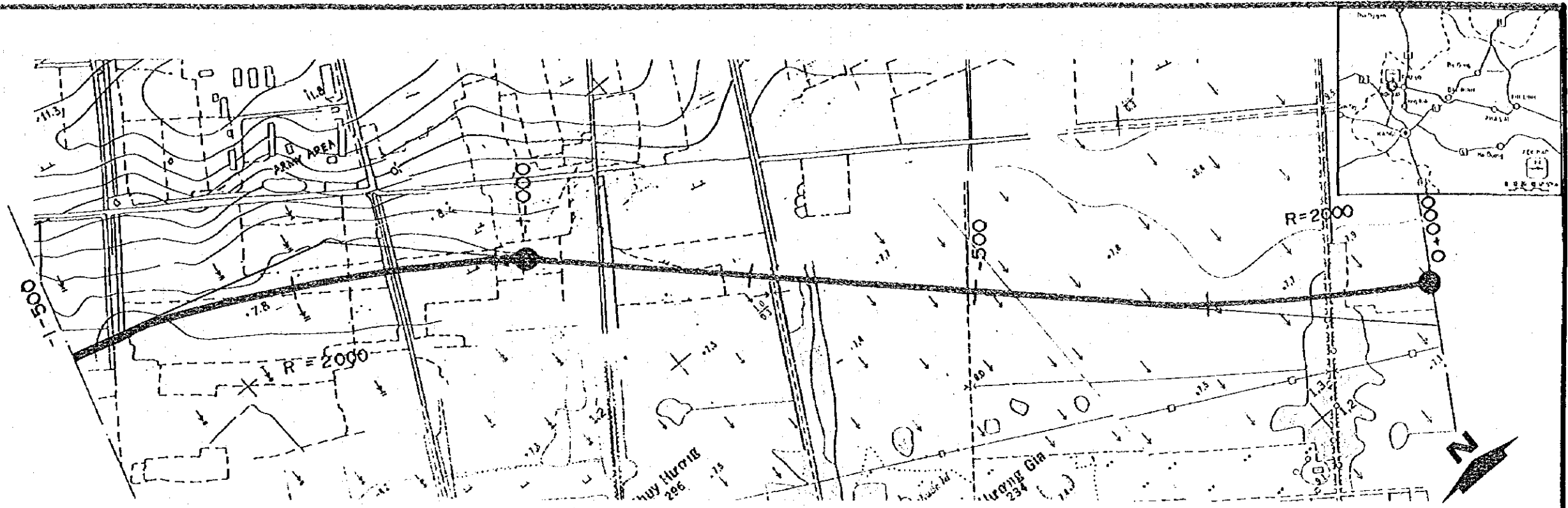
SCALE

HORIZONTAL 1 : 5000

VERTICAL 1 : 500

SHEET NO.

11

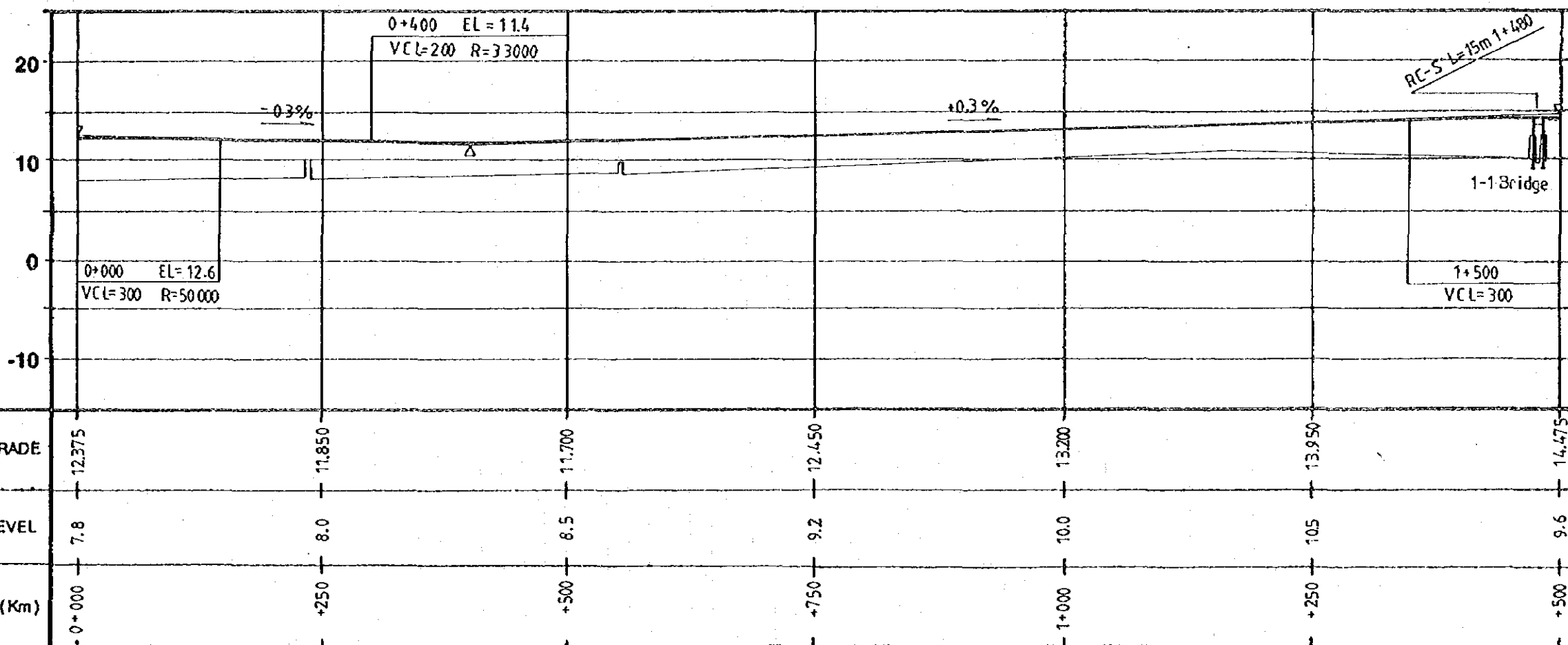
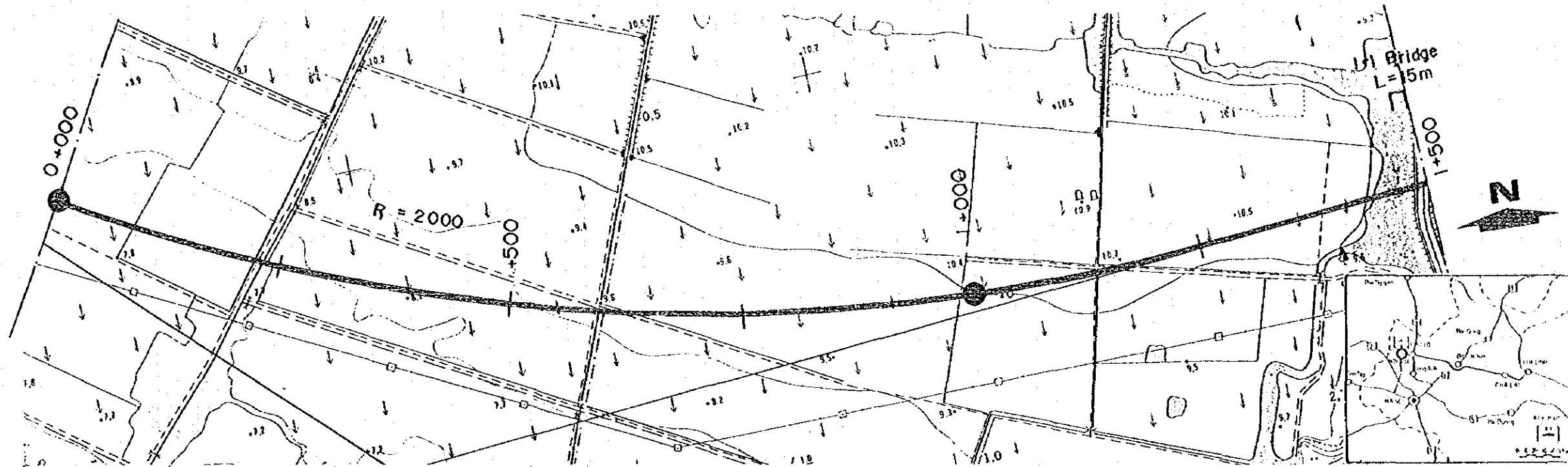


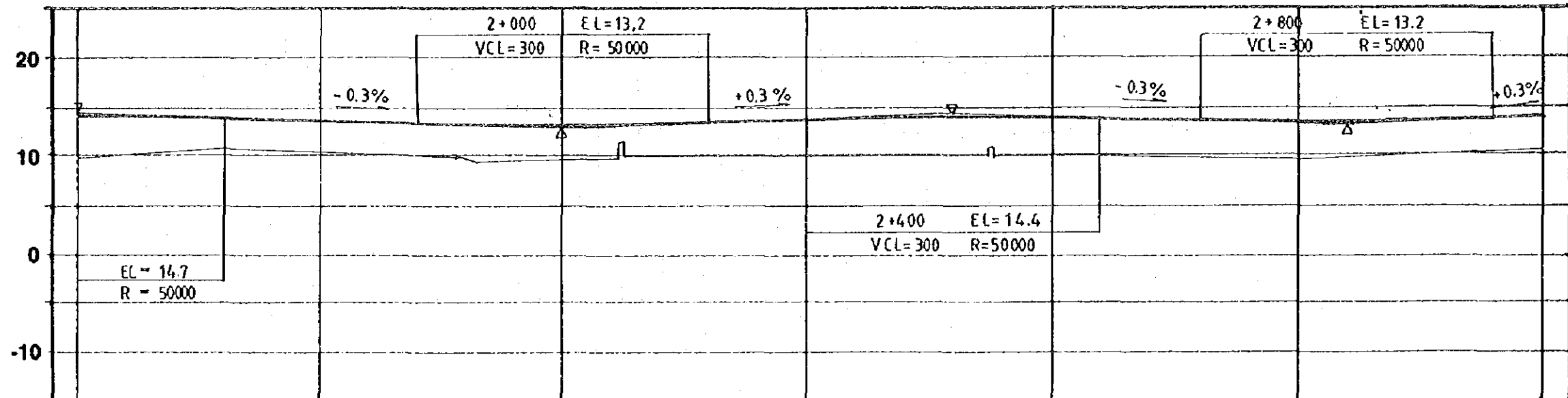
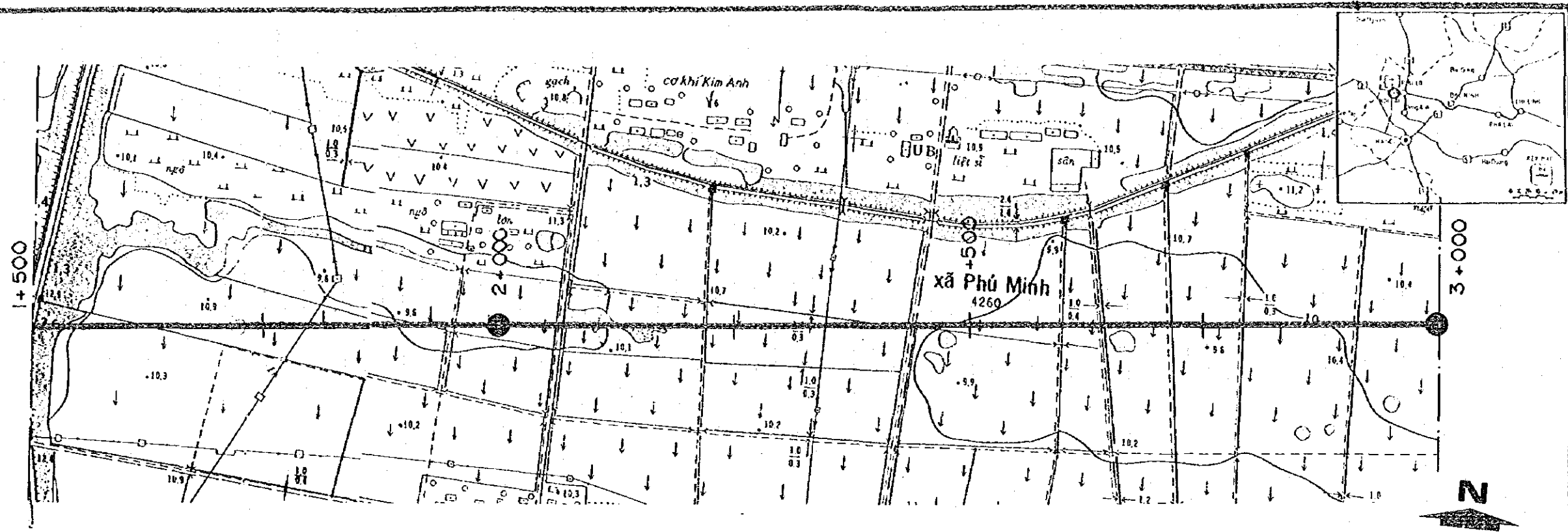
FINISHED GRADE	-1+500	-1+250	-1+000	-0+750	-0+500	-0+250	0+000
	12.418	10.580	10.875	10.500	11.100	11.850	12.375
GROUND LEVEL	-1+500	-1+250	-1+000	-0+750	-0+500	-0+250	0+000
	7.8	7.5	7.8	7.4	7.8	7.8	7.8
STATION (Km)	-1+500	-1+250	-1+000	-0+750	-0+500	-0+250	0+000

HIGHWAY NO.18 IMPROVEMENT

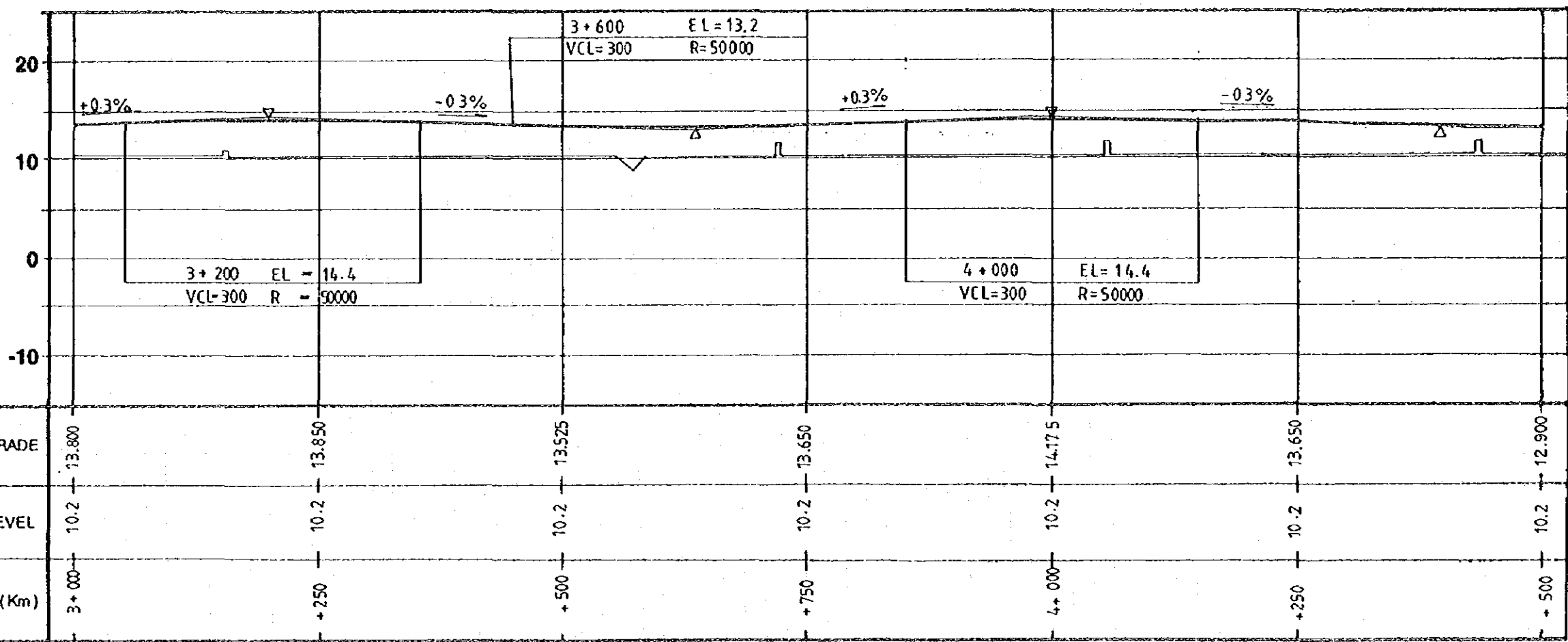
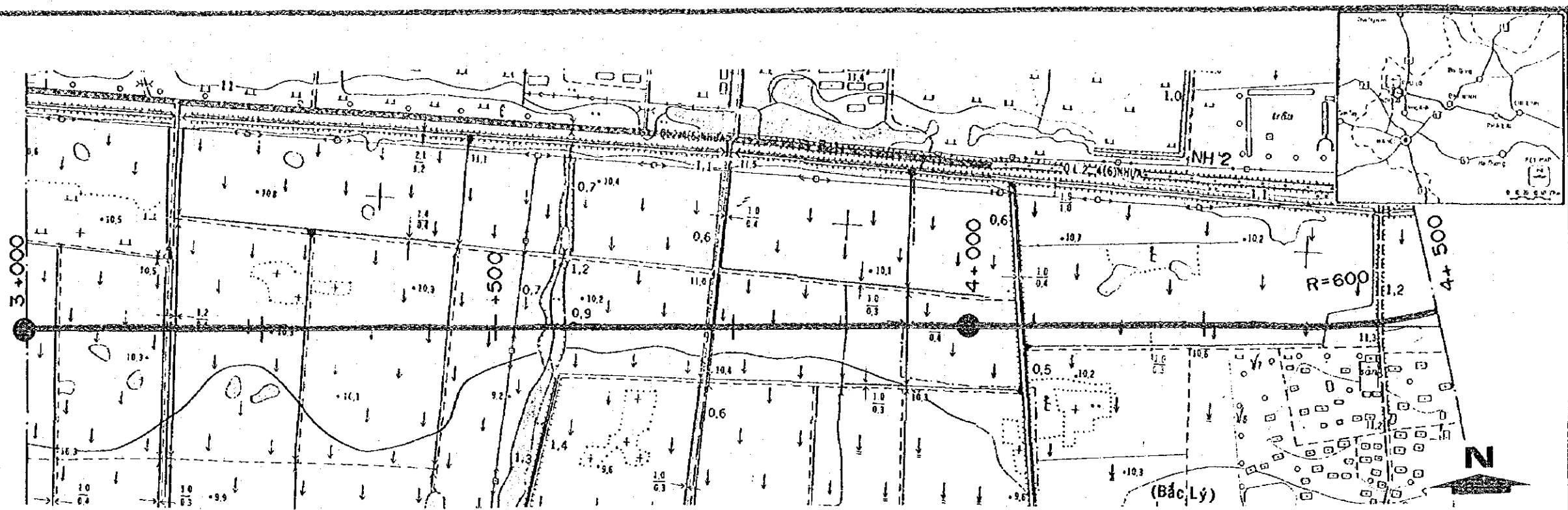
PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (3)

SCALE HORIZONTAL 1:5000 SHEET NO. 12
 VERTICAL 1:500





FINISHED GRADE	1+500 — 14.475	+ 750 — 13.950	2+000 — 13.425	+ 250 — 13.950	+ 500 — 14.075	+ 750 — 13.450	3+000 — 13.800
GROUND LEVEL	9.6	9.7	9.5	10.0	10.0	9.5	10.2
STATION (Km)	1+500	+ 750	2+000	+ 250	+ 500	+ 750	3+000

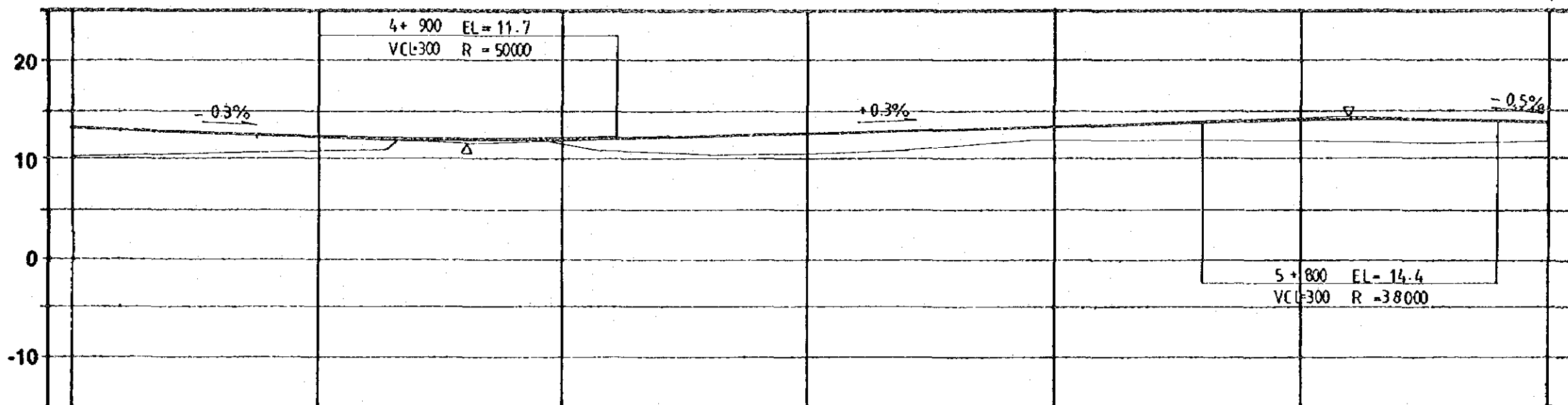
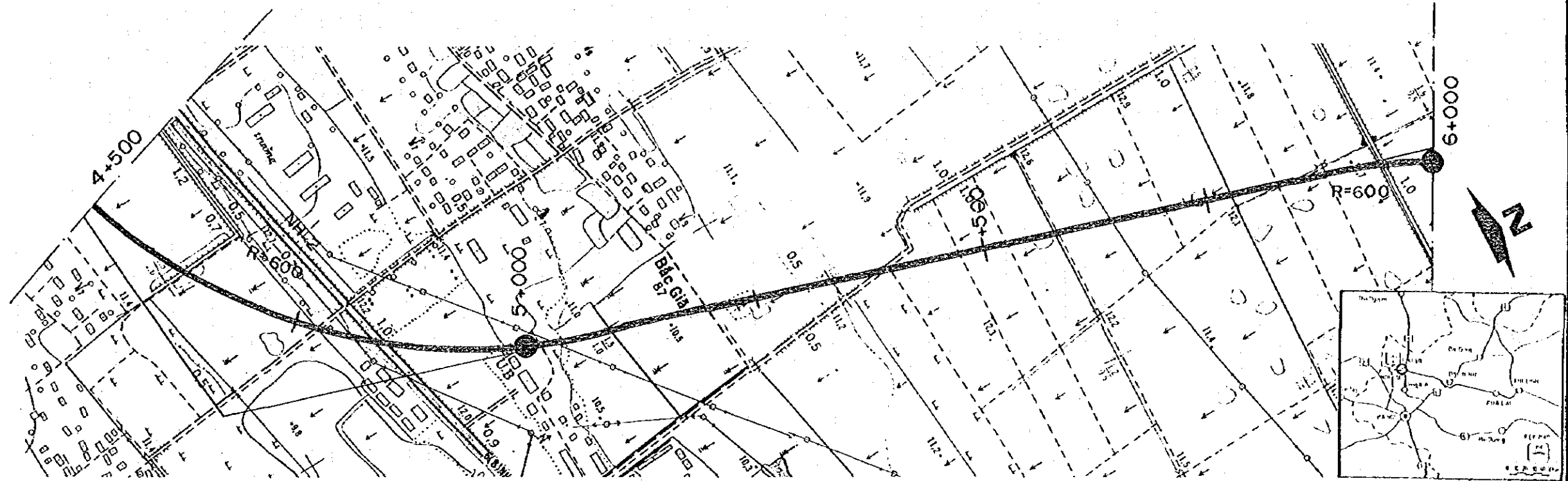


HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (6)

SCALE HORIZONTAL 1:5000
VERTICAL 1:500

SHEET NO.
15



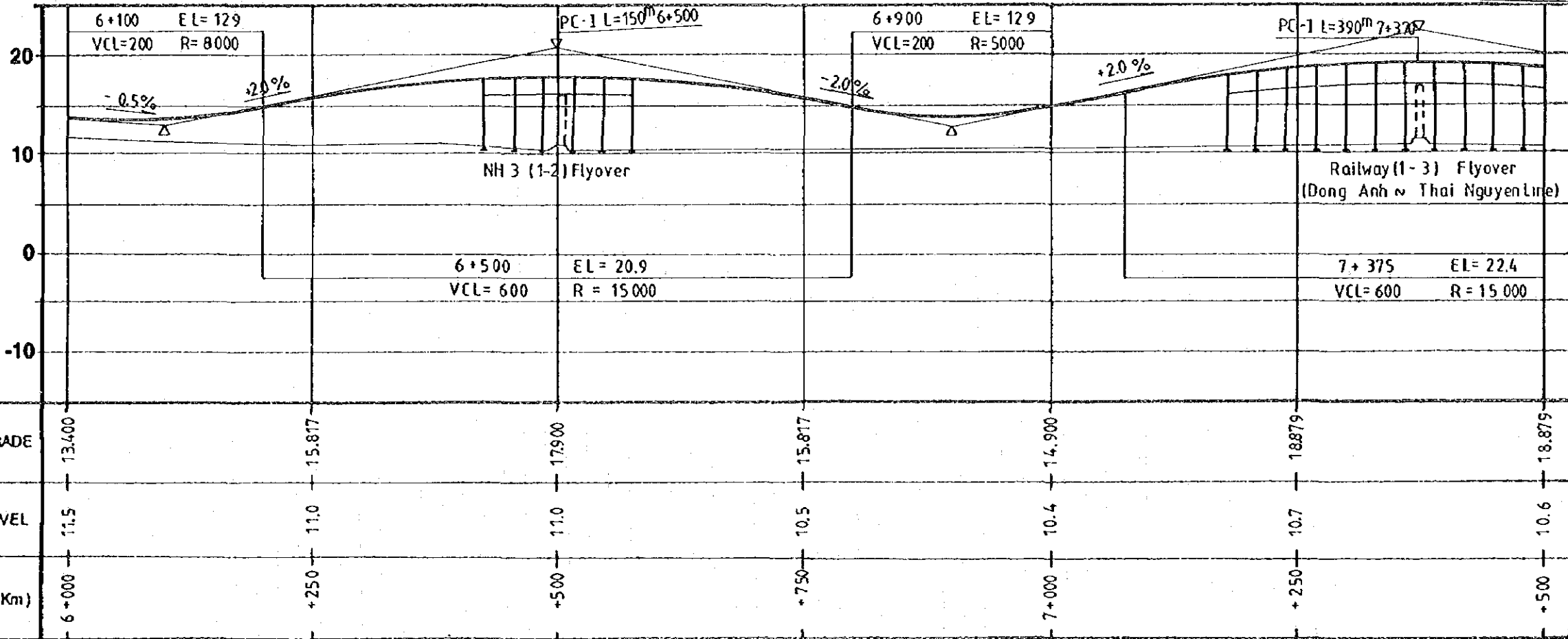
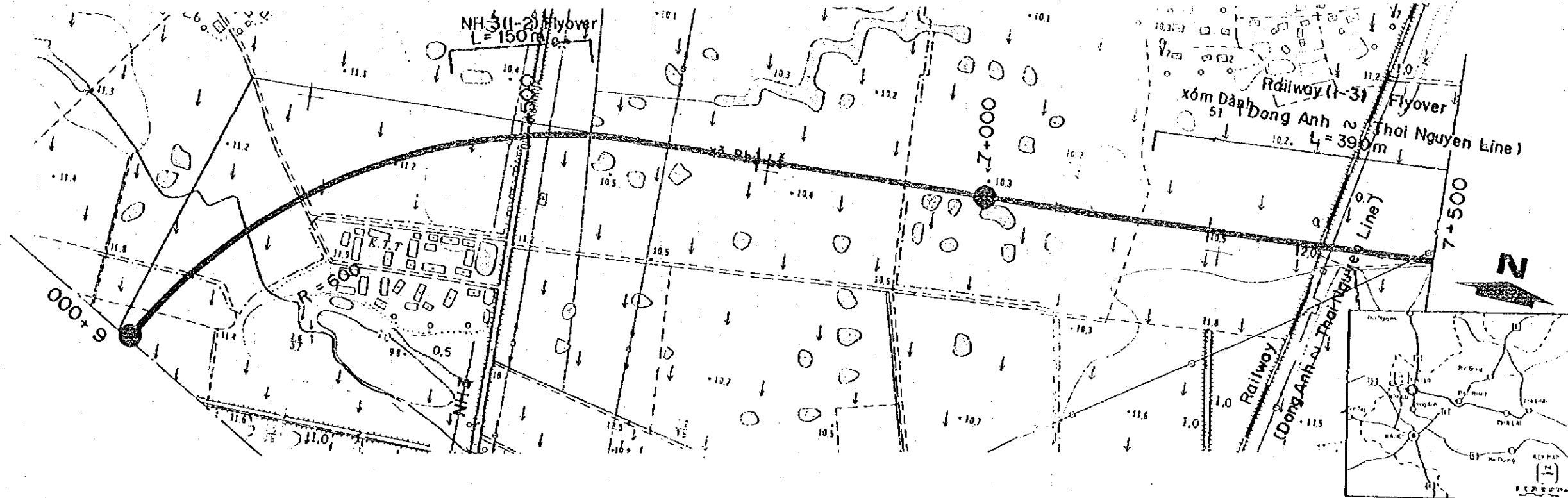
FINISHED GRADE	12.900	12.150	12.025	12.750	13.500	14.150	13.400
GROUND LEVEL	10.2	10.7	11.5	10.5	12.0	12.0	11.5
STATION (Km)	4+500	+750	5+000	+250	+500	+750	6+000

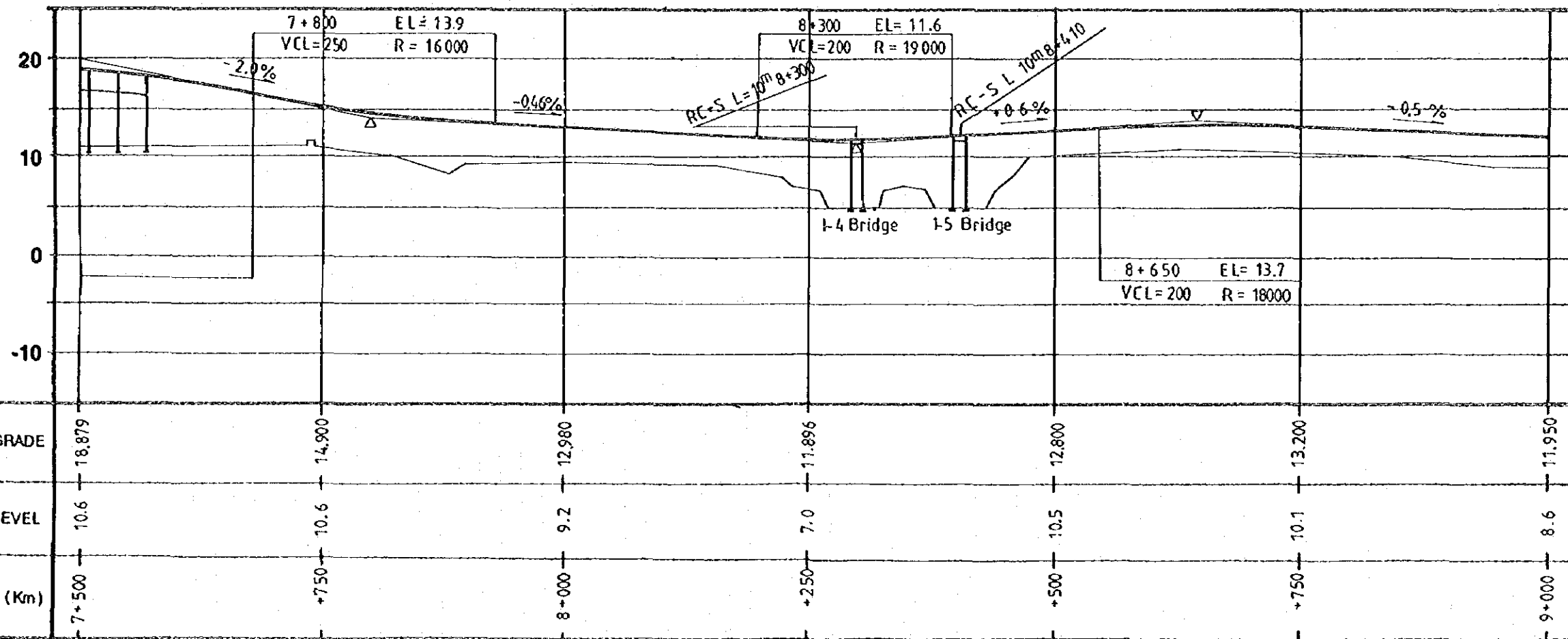
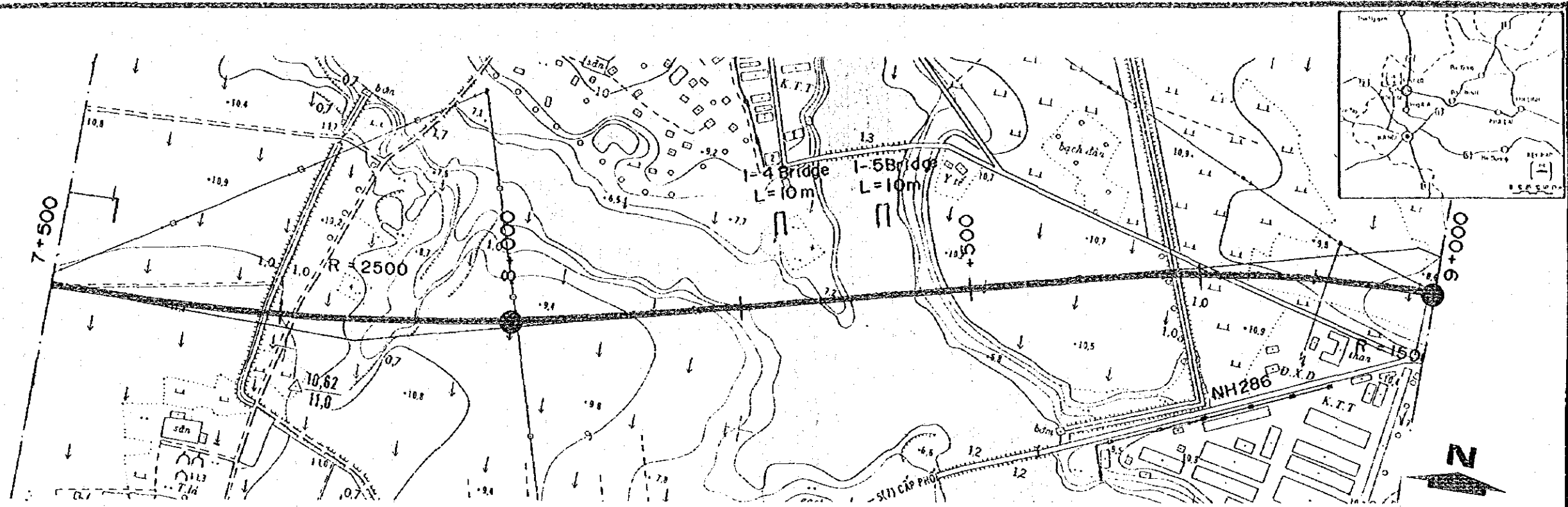
HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (7)

SCALE
 HORIZONTAL 1:5000
 VERTICAL 1:500

SHEET NO.
 16





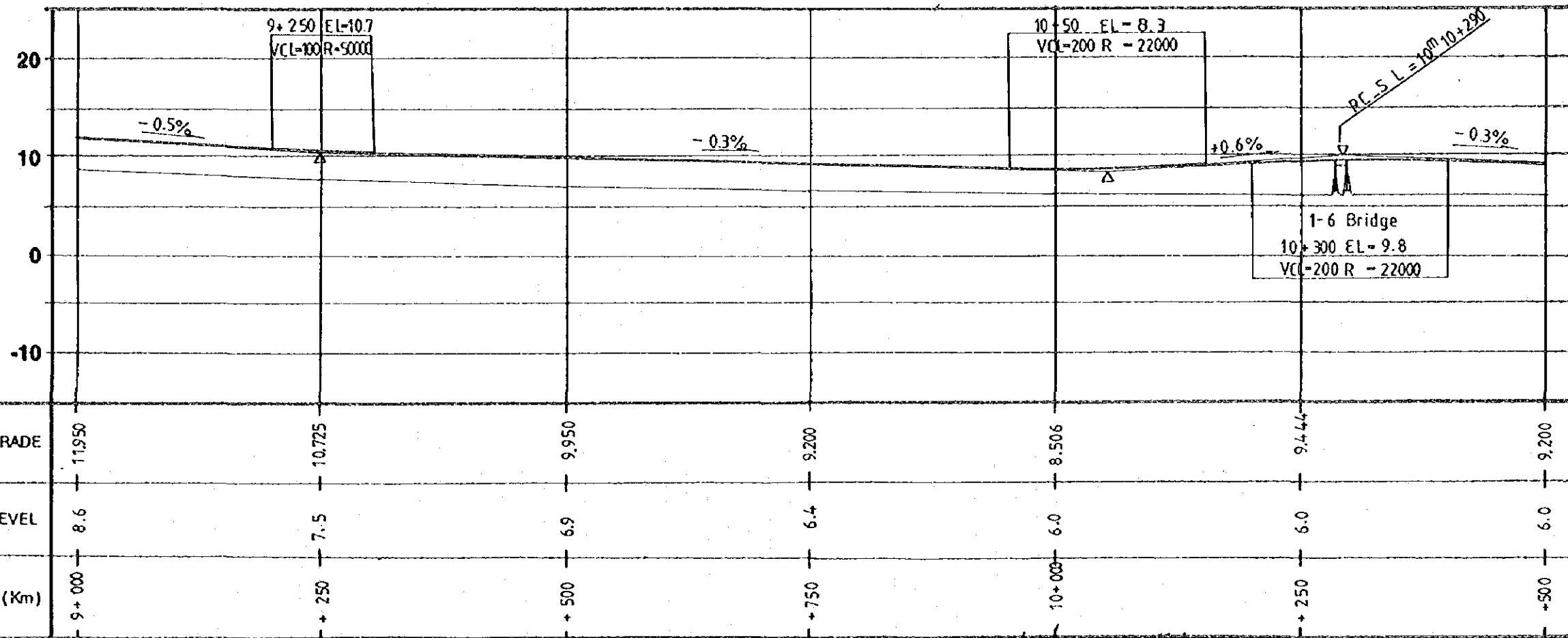
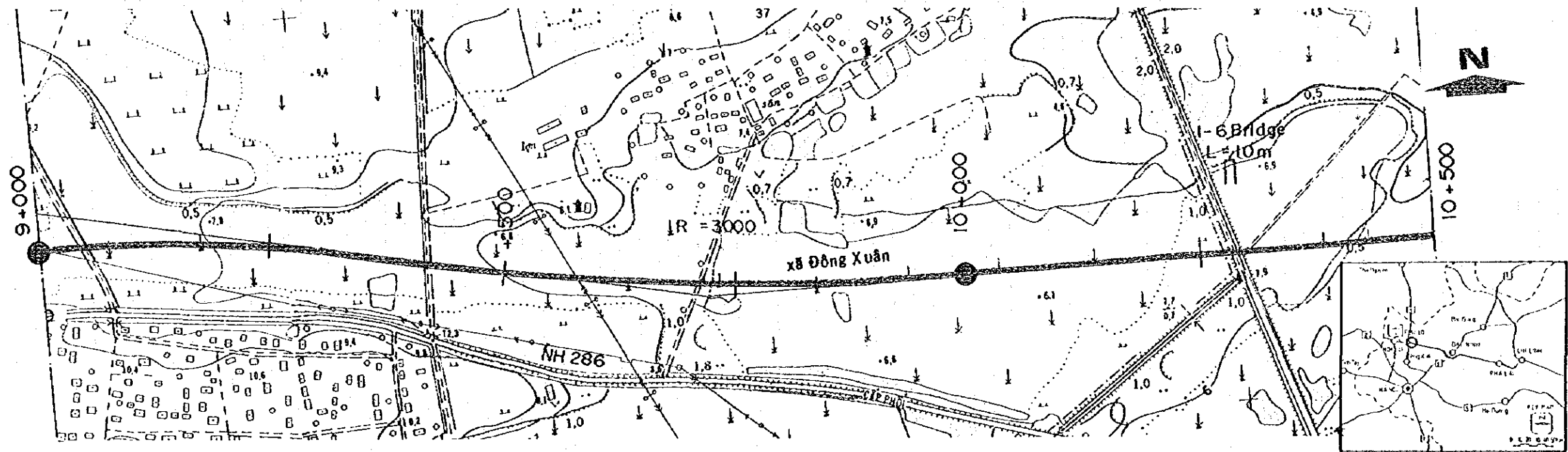
HIGHWAY NO.18 IMPROVEMENT

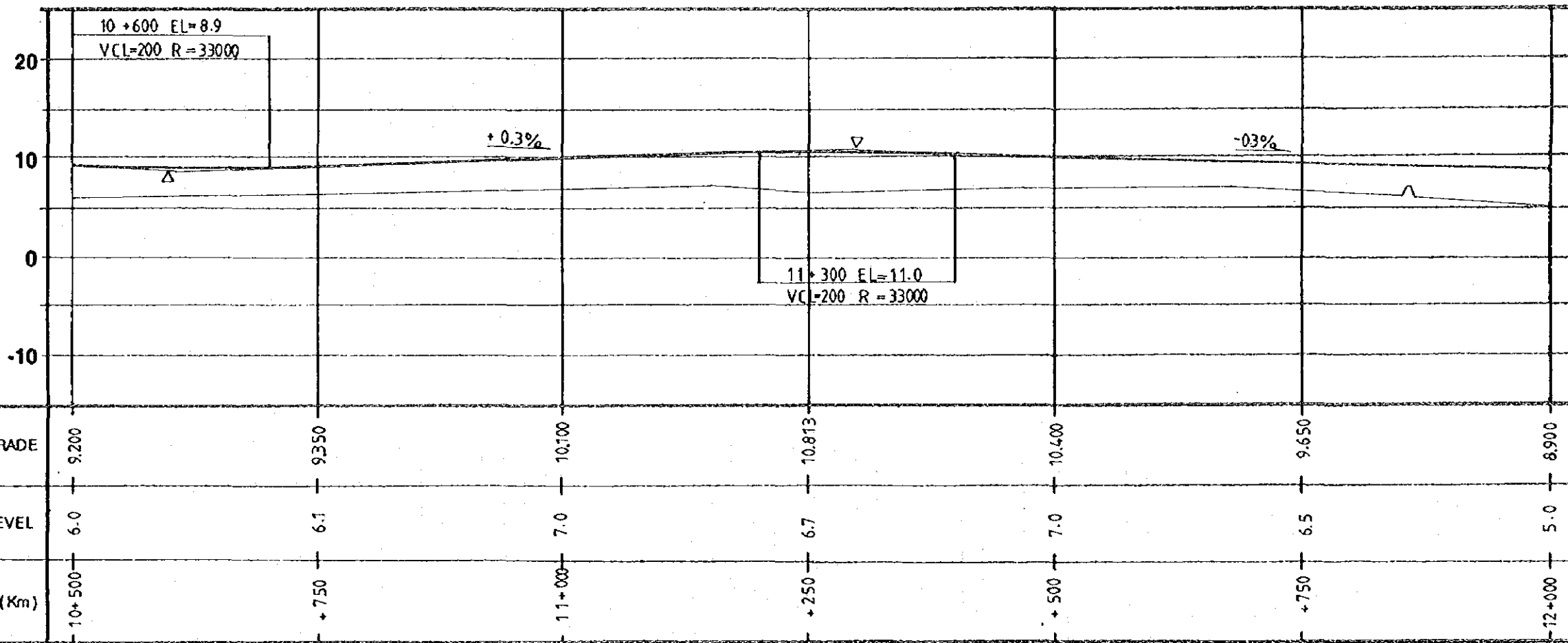
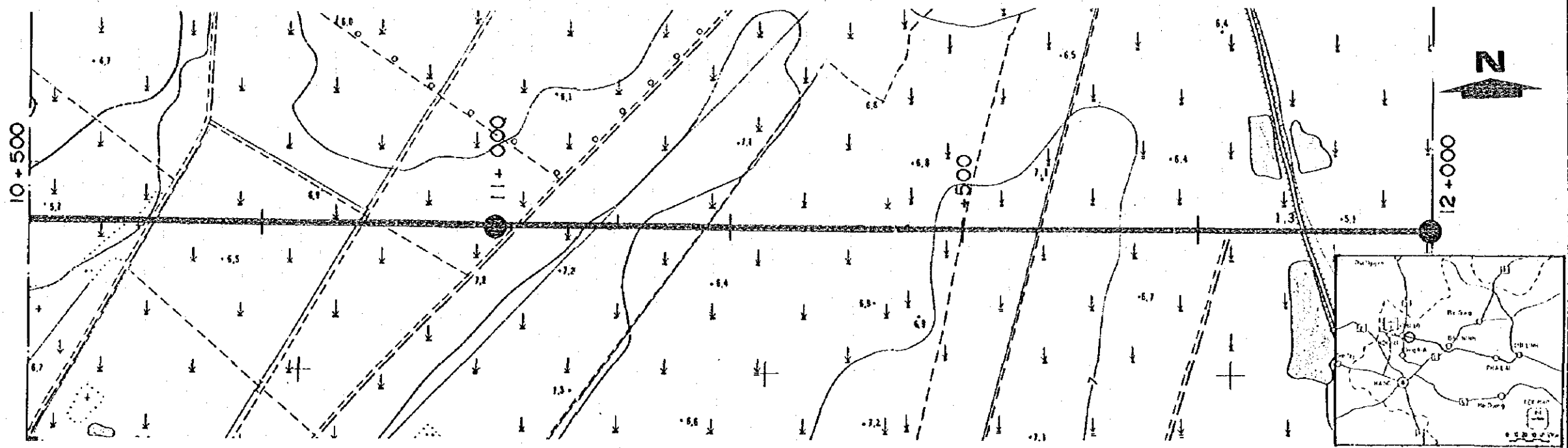
PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (9)

SCALE

HORIZONTAL 1:5000
VERTICAL 1:500

SHEET NO.
18





HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (11)

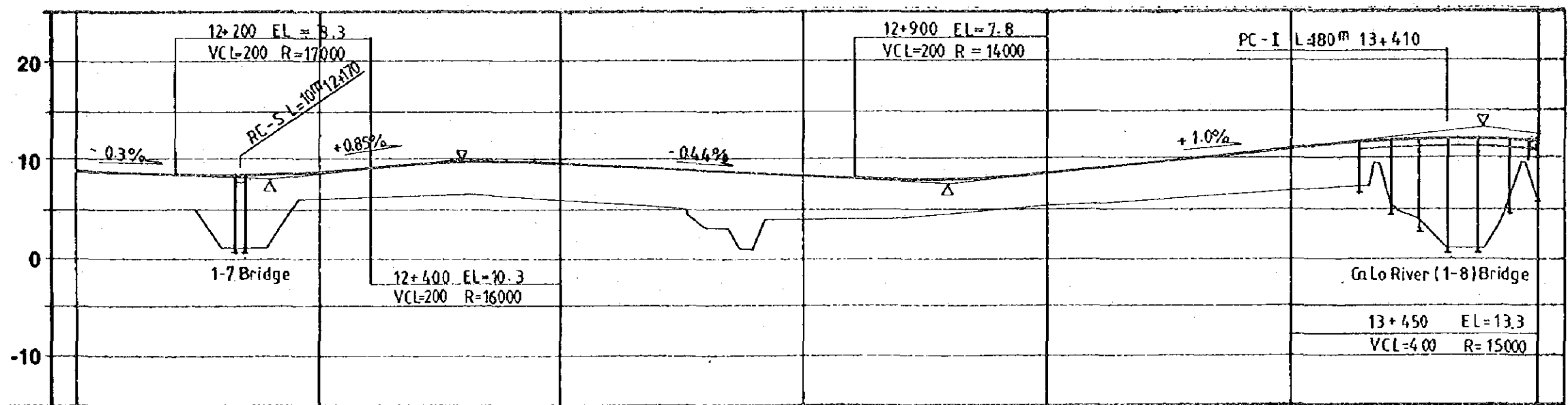
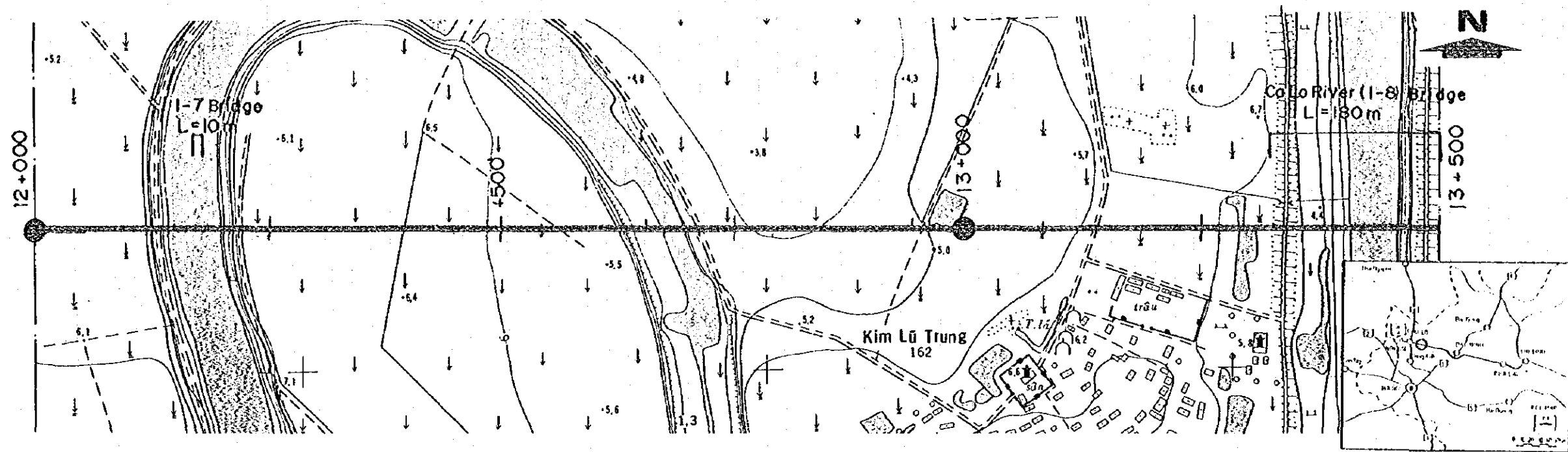
SCALE

HORIZONTAL 1:5000

VERTICAL 1:500

SHEET NO.

20



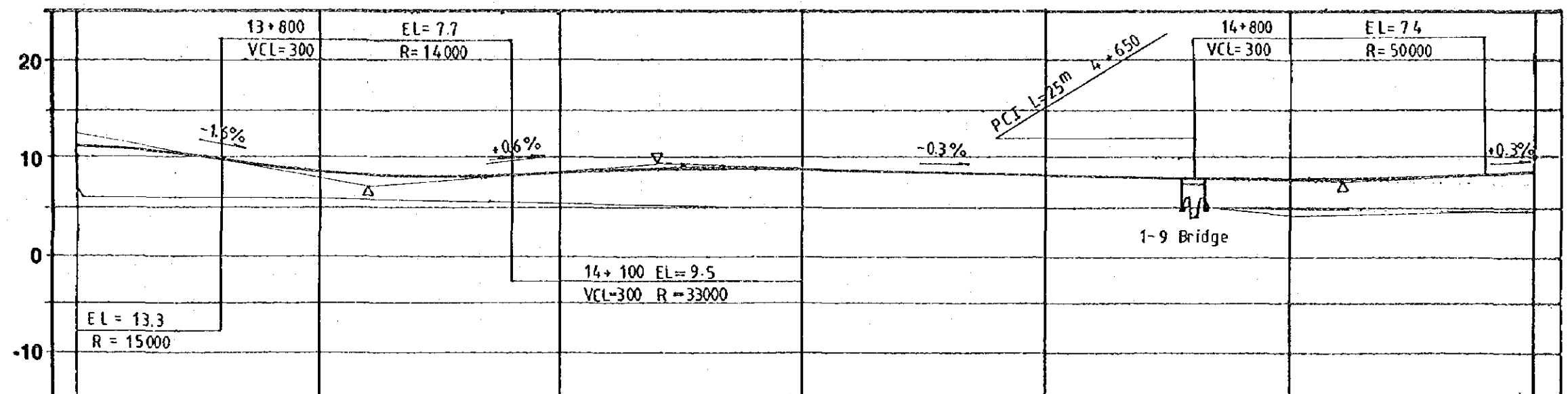
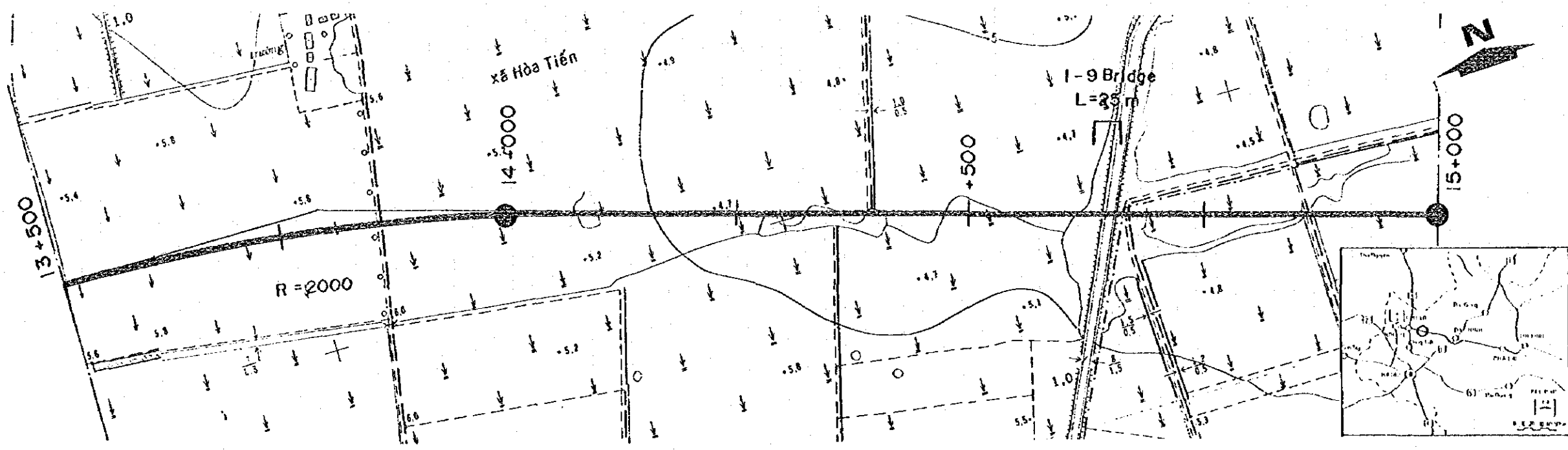
FINISHED GRADE	8.900	8.797	9.560	8.460	8.800	11.300	11.769
GROUND LEVEL	5.0	5.8	6.0	4.0	5.5	7.0	7.0
STATION (Km)	12+000	+250	+500	+750	13+000	+250	+500

HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (12)

SCALE
HORIZONTAL 1:5000
VERTICAL 1:500

SHEET NO.
21



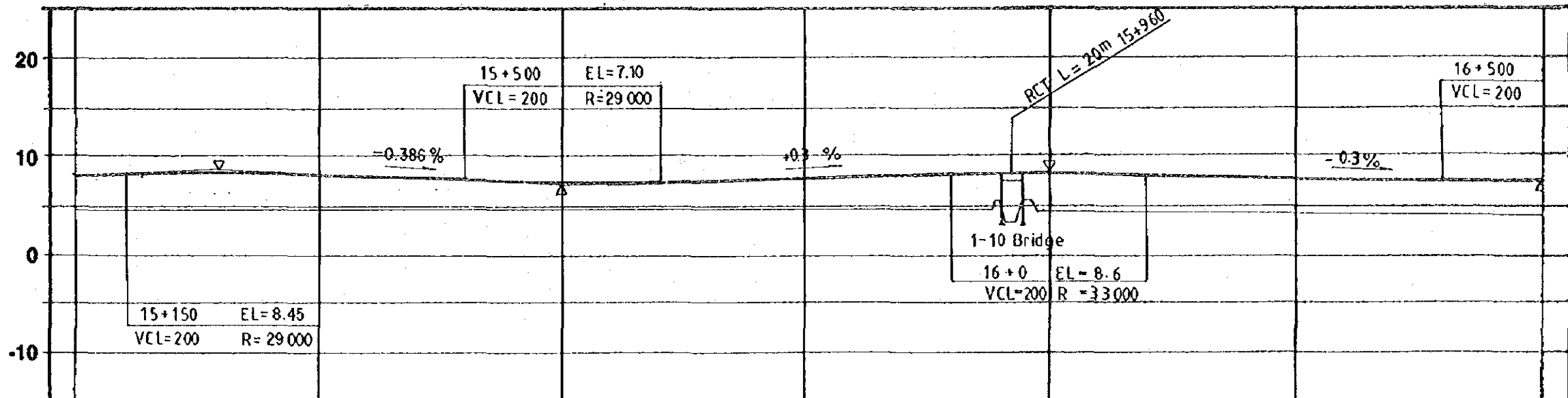
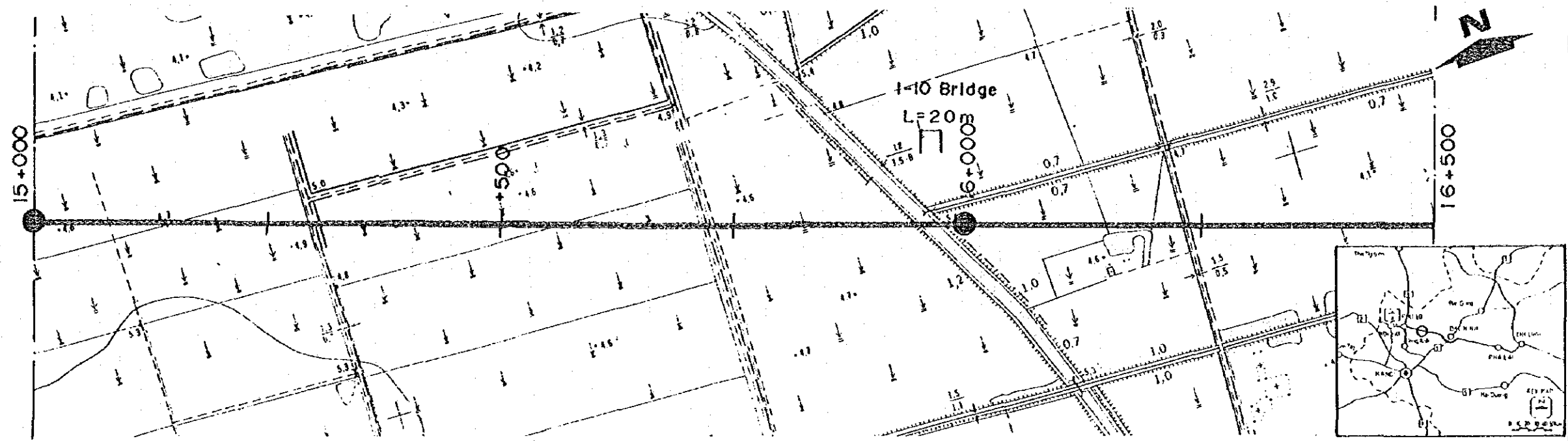
FINISHED GRADE	13+500	13+750	14+000	14+250	14+500	14+750	15+000
	11.769	8.867	8.863	9.050	8.300	7.650	8.000
GROUND LEVEL	7.0	5.8	5.3	5.0	5.0	4.5	4.6
STATION (Km)	13+500	+750	14+000	+250	+500	+750	15+000

HIGHWAY NO.18 IMPROVEMENT

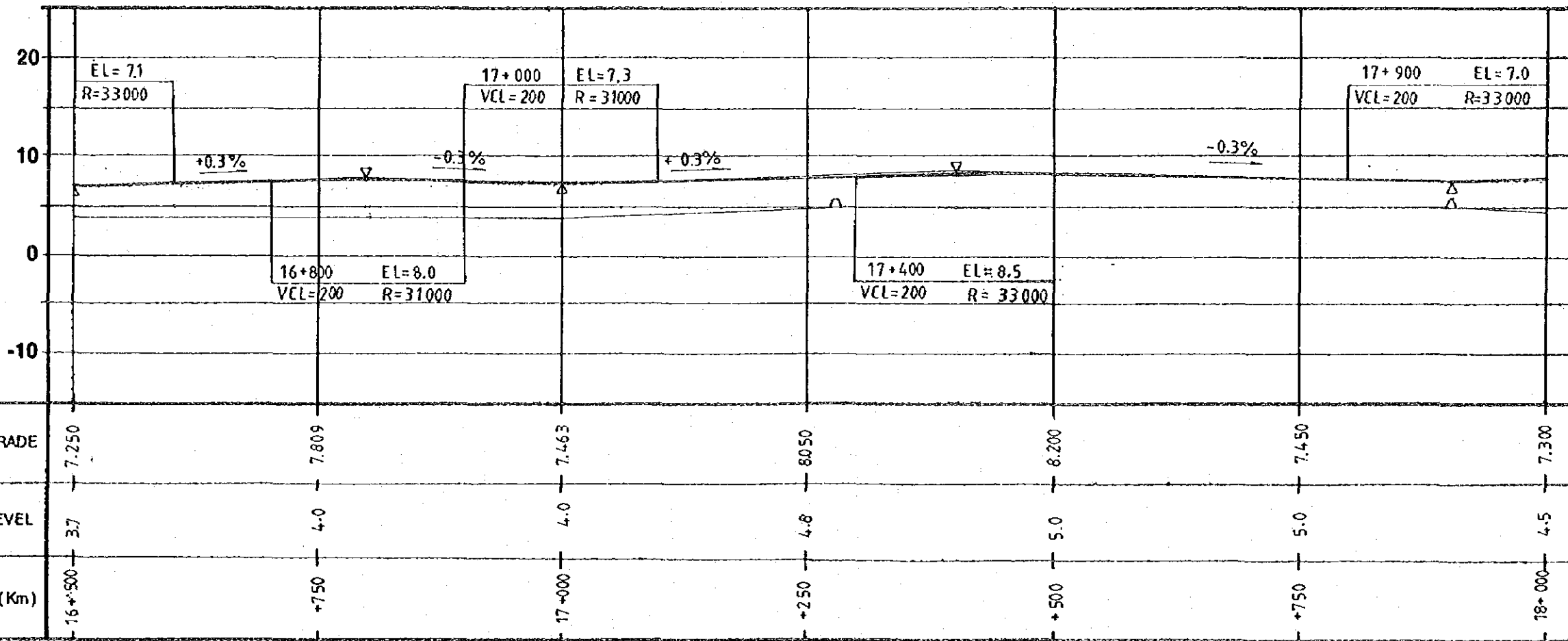
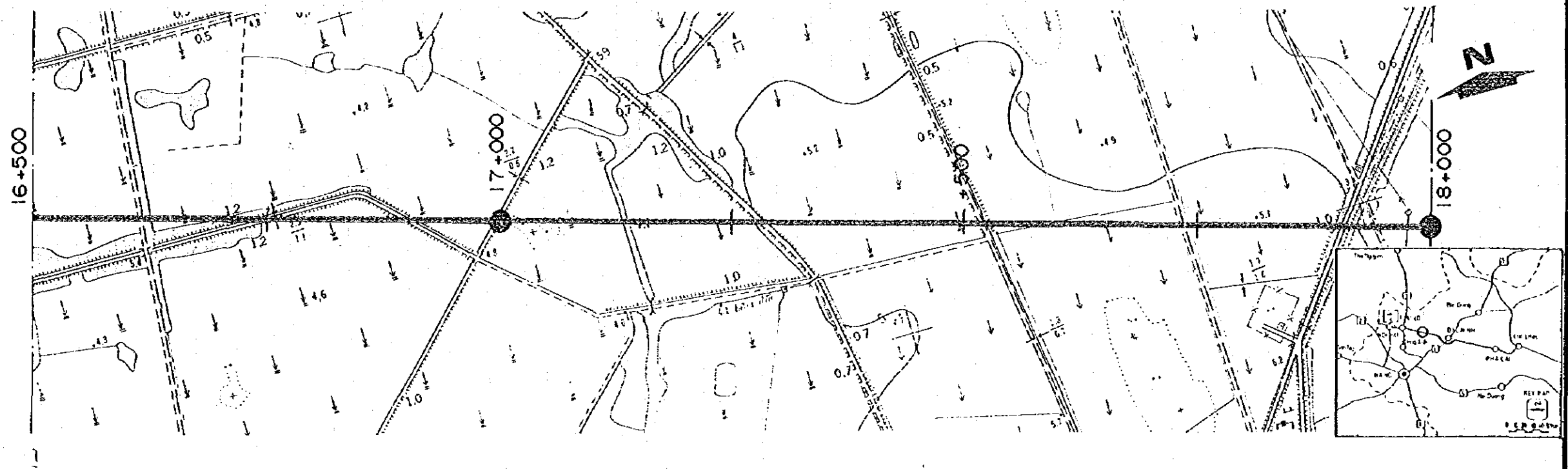
PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (13)

SCALE HORIZONTAL 1:5000
VERTICAL 1:500

SHEET NO. 22



FINISHED GRADE	15+000	+250	+500	+750	16+000	+250	16+500
	8.000	8.064	7.272	7.850	8.450	7.850	7.250
GROUND LEVEL	4.6	4.6	4.6	4.6	4.5	4.2	3.7
STATION (Km)	15+000	+250	+500	+750	16+000	+250	16+500



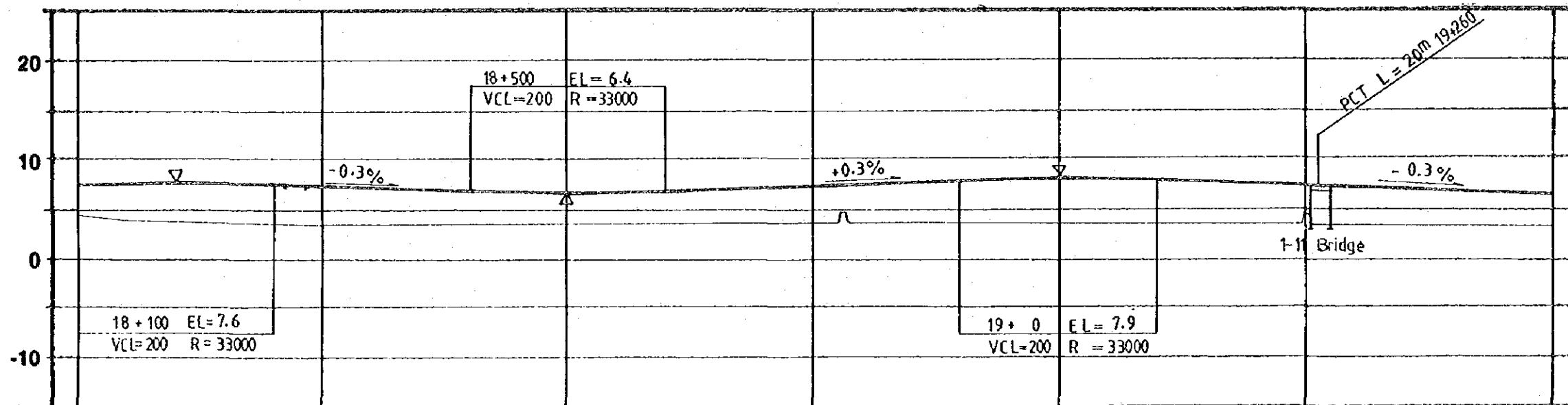
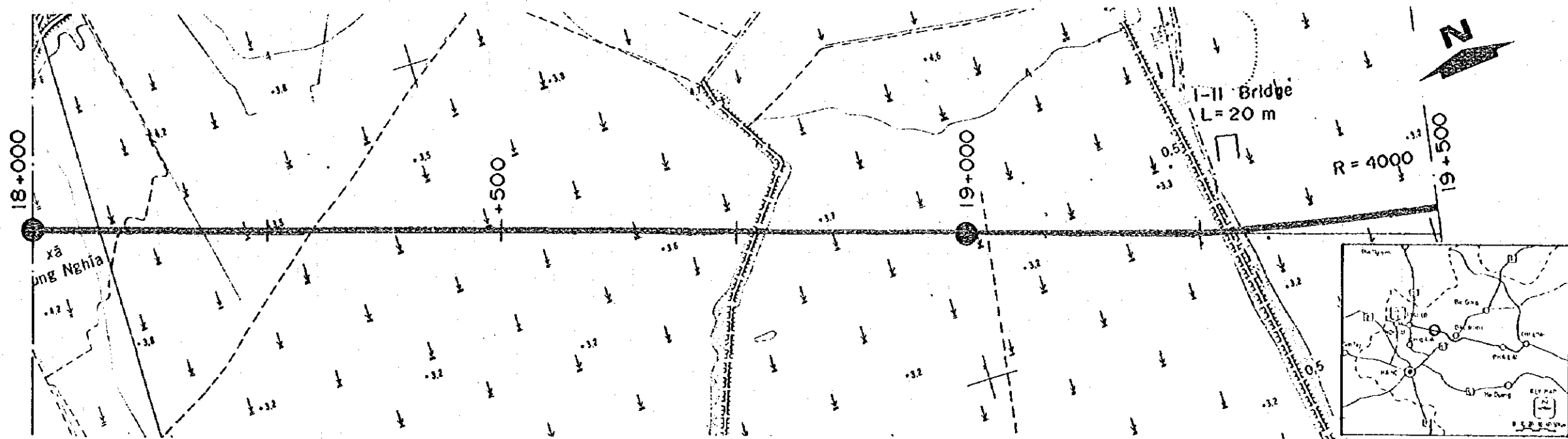
HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (15)

SCALE

HORIZONTAL 1:5000
VERTICAL 1:500

SHEET NO.
24



FINISHED GRADE	18+000	+250	+500	+750	19+000	+250	+500
	7.300	7.150	6.550	7.150	7.750	7.150	6.400
GROUND LEVEL	4.5	3.5	3.6	3.5	3.6	4.5	3.2
STATION (Km)	18+000	+250	+500	+750	19+000	+250	+500

HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (16)

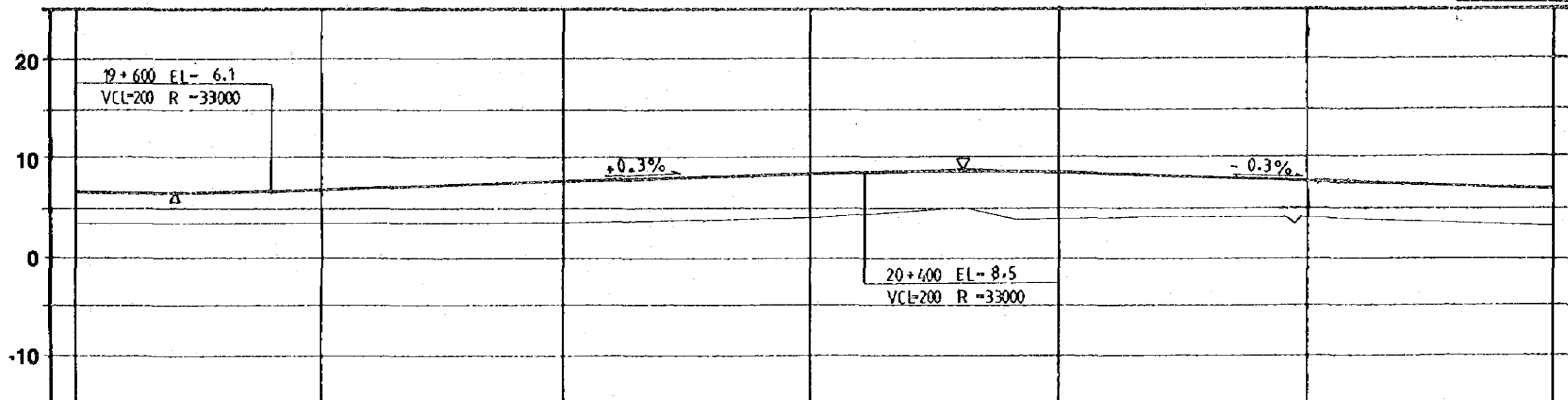
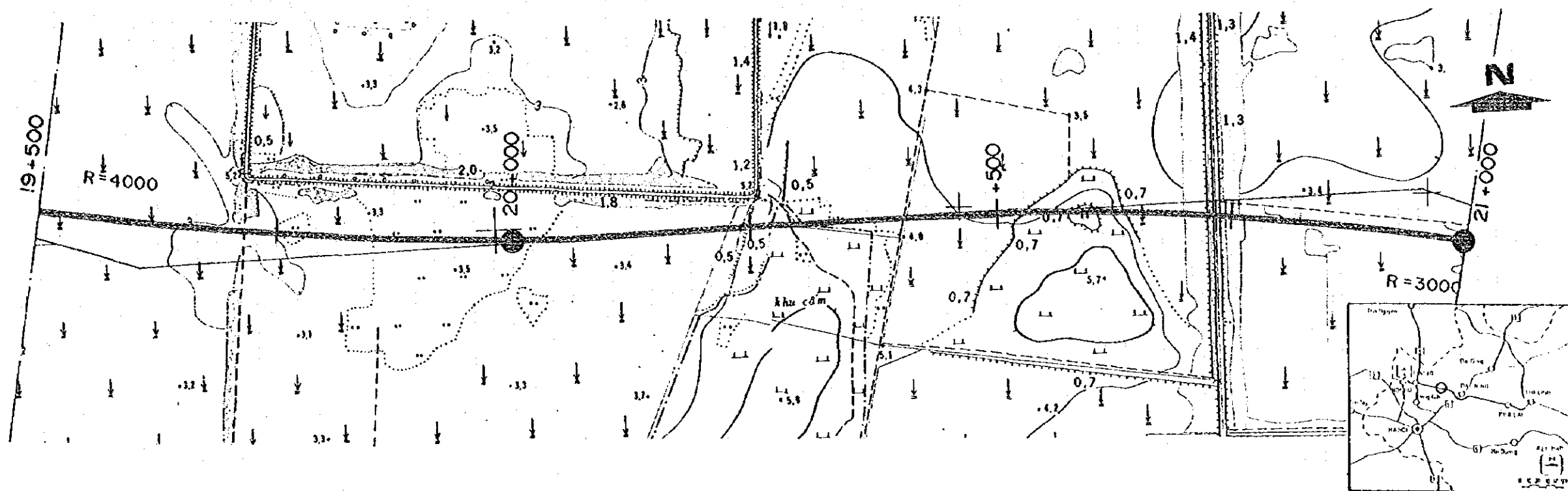
SCALE

HORIZONTAL 1:5000

VERTICAL 1:500

SHEET NO.

25



FINISHED GRADE	19+500 — 6.400	19+750 — 6.550	20+000 — 7.300	20+250 — 7.150	20+500 — 8.200	20+750 — 7.450	21+000 — 6.700
GROUND LEVEL	19+500 — 3.2	19+750 — 3.5	20+000 — 3.5	20+250 — 4.0	20+500 — 4.0	20+750 — 4.2	21+000 — 3.2
STATION (Km)	19+500	+750	20+000	+250	+500	+750	21+000

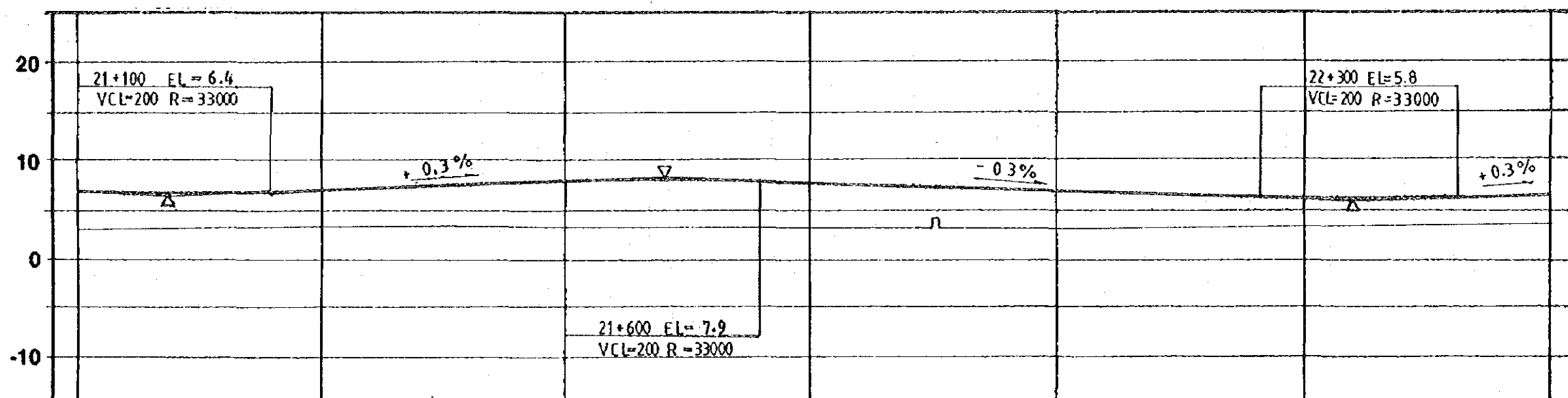
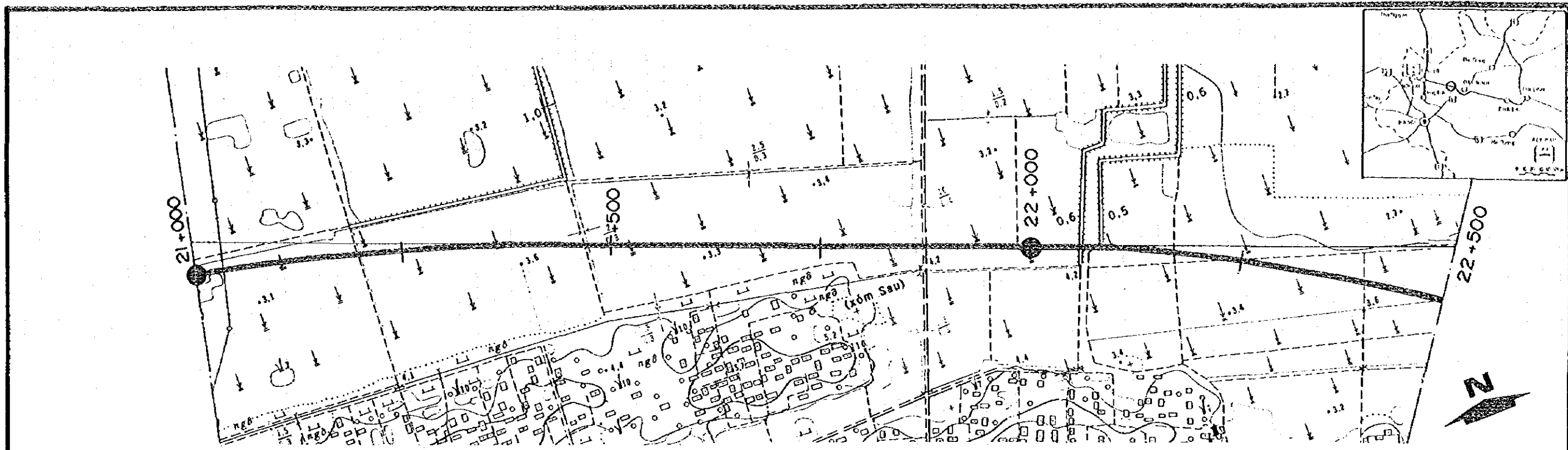
HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (17)

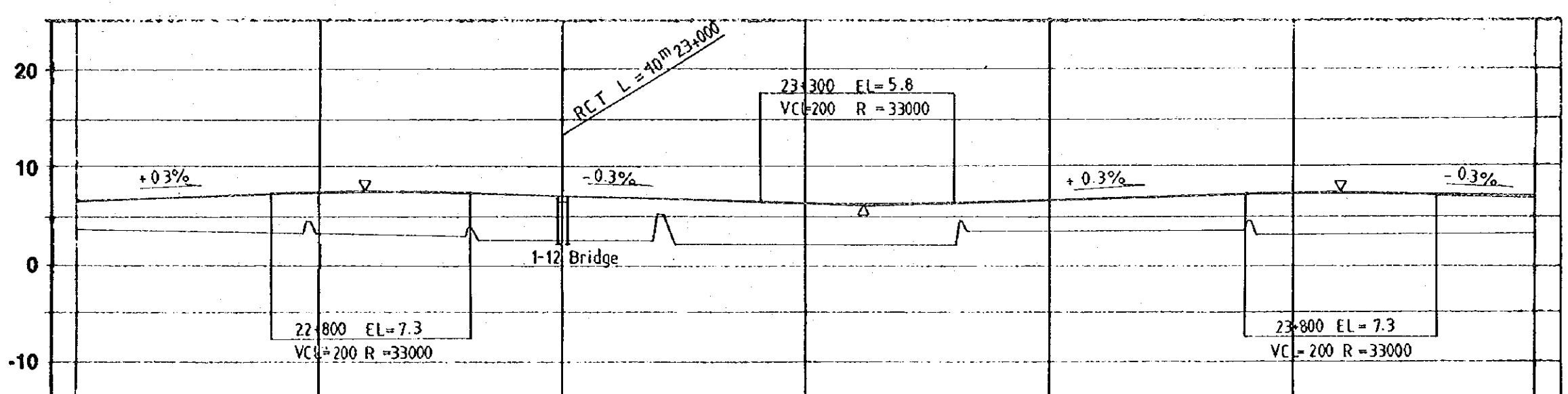
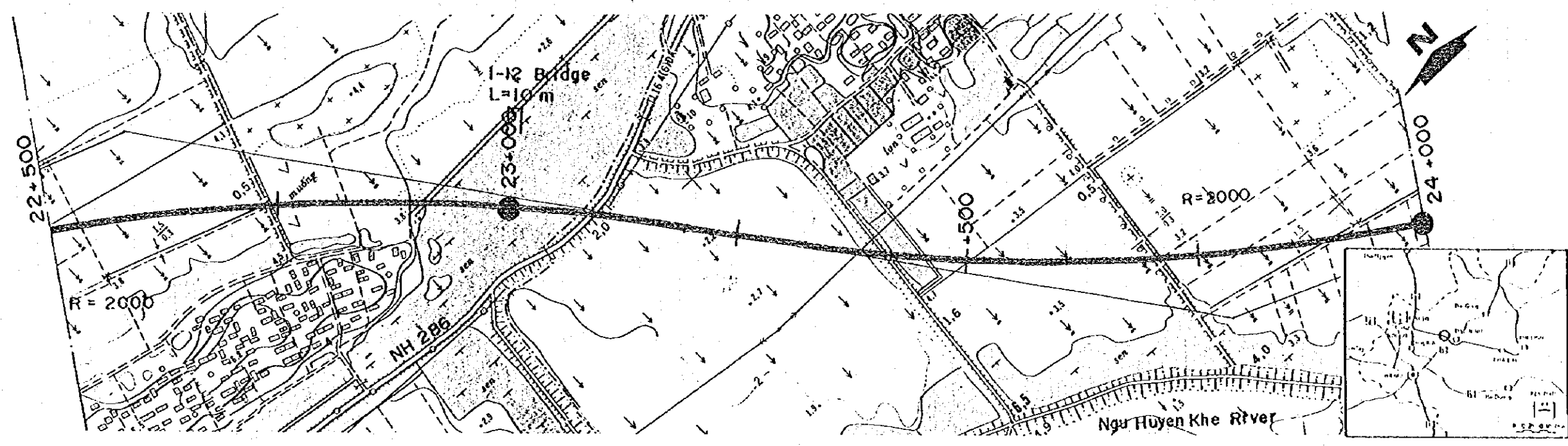
SCALE

HORIZONTAL 1:5000
VERTICAL 1:500

SHEET NO.
26



FINISHED GRADE	21+000	21+250	21+500	21+750	22+000	22+250	22+500
	6.700	6.650	7.600	7.450	6.700	5.988	6.400
GROUND LEVEL	3.2	3.5	3.5	3.2	3.5	3.3	3.5
STATION (Km)	21+000	+250	+500	+750	22+000	+250	+500



FINISHED GRADE	6.400	7.113	6.700	5.988	6.400	7.113	6.700
GROUND LEVEL	3.5	3.5	2.5	2.2	3.5	3.2	3.2
STATION (Km)	22+500	+750	23+000	+250	+500	+750	24+000

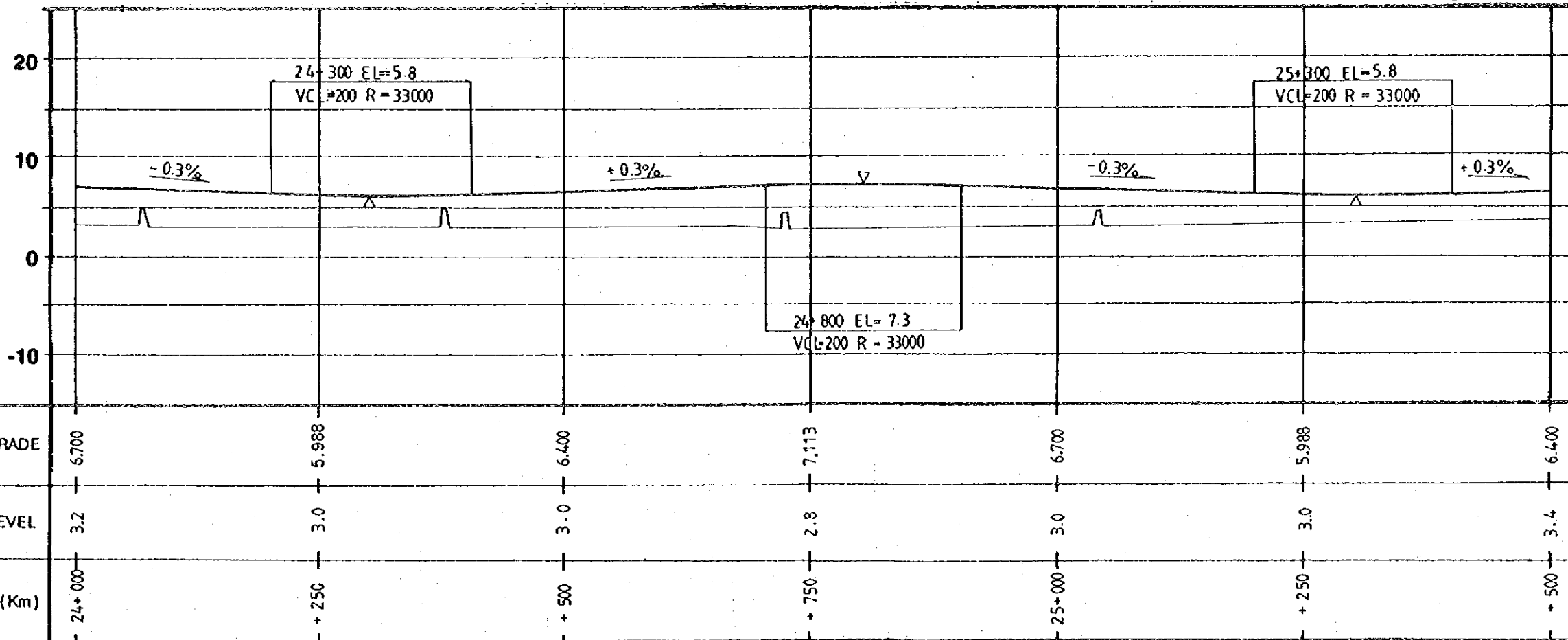
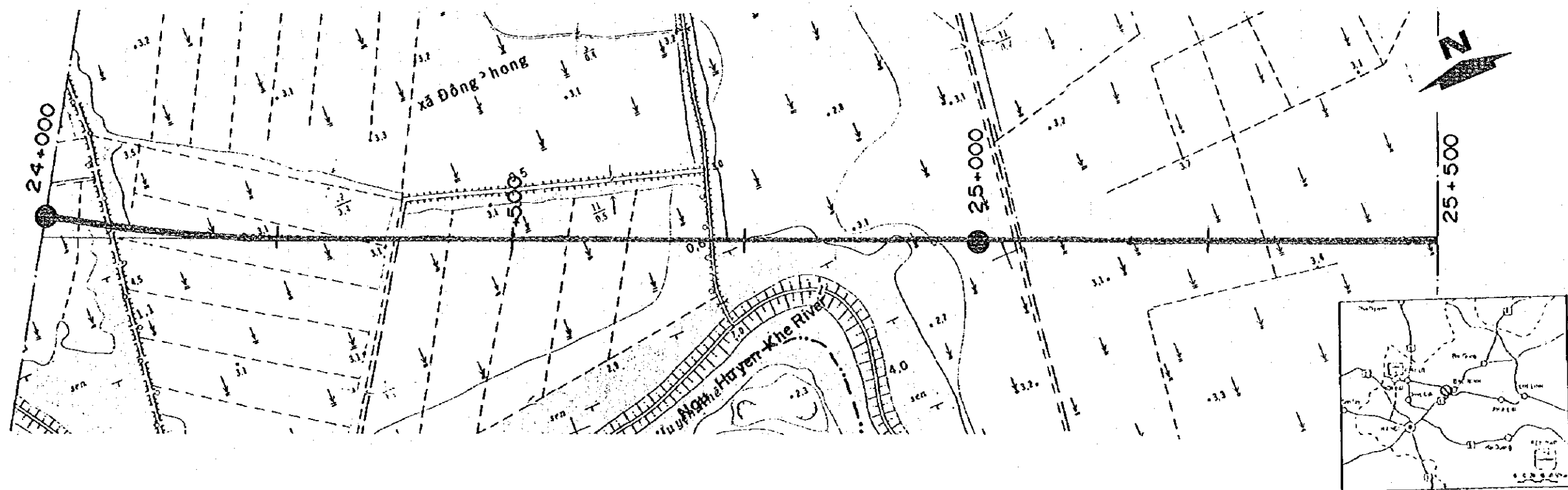
HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (19)

SCALE

HORIZONTAL 1:5000
VERTICAL 1:500

SHEET NO.
28



HIGHWAY NO.18 IMPROVEMENT

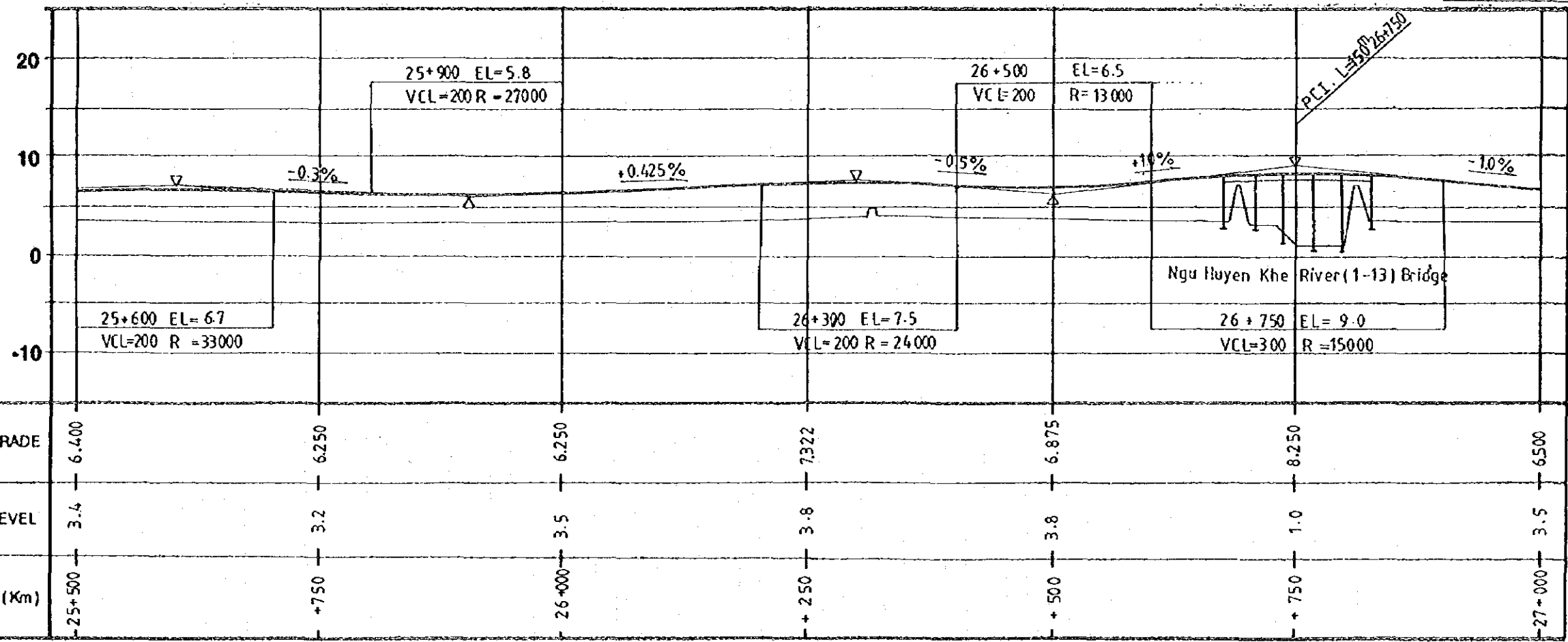
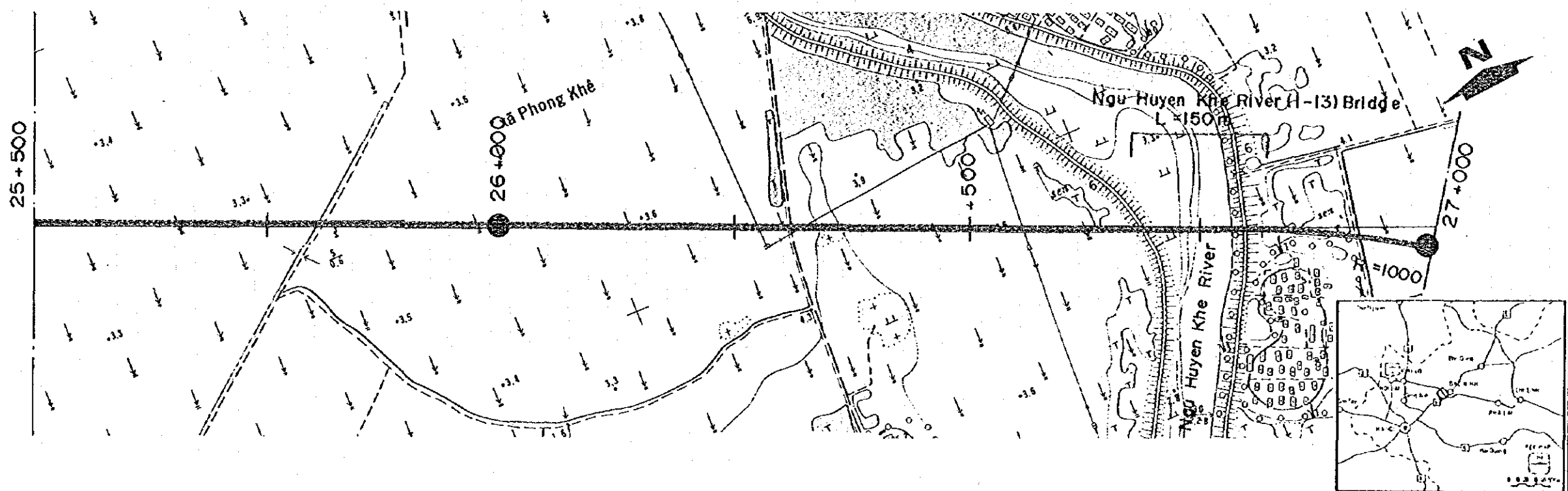
PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (20)

SCALE

HORIZONTAL 1:5000
VERTICAL 1:500

SHEET NO.

29

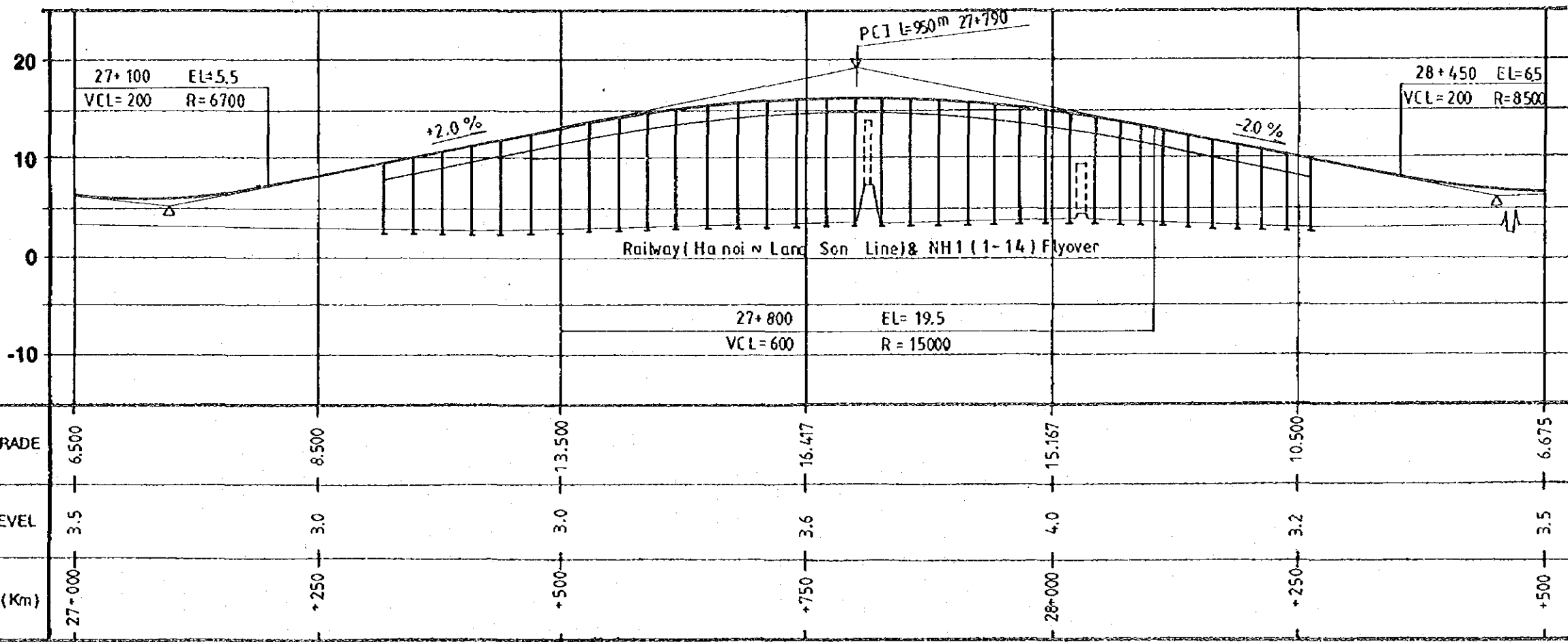
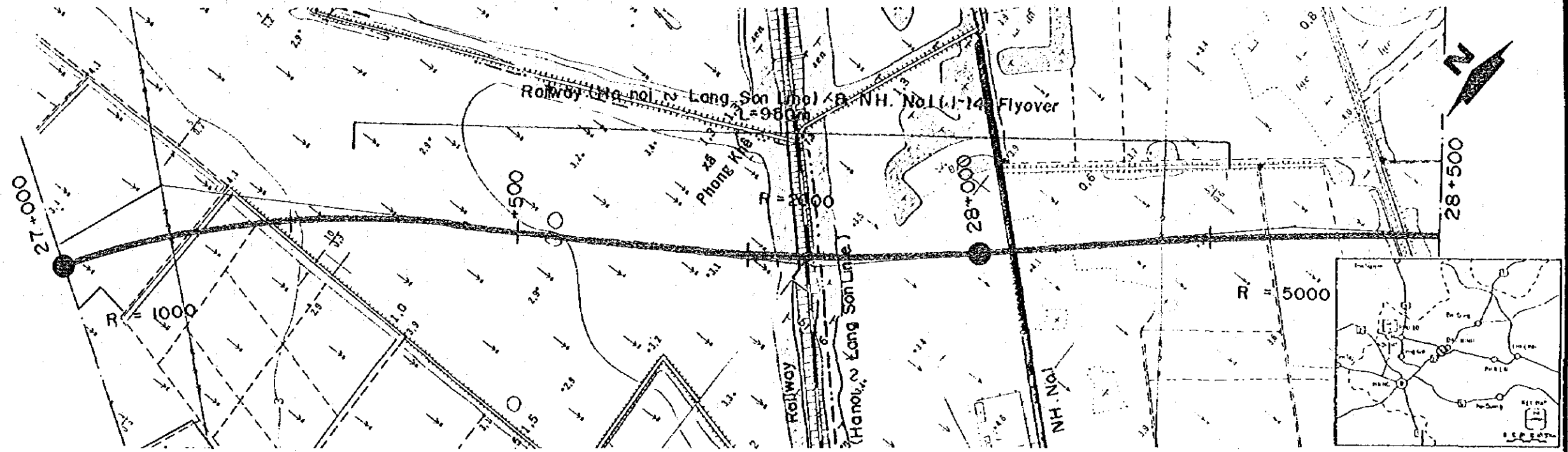


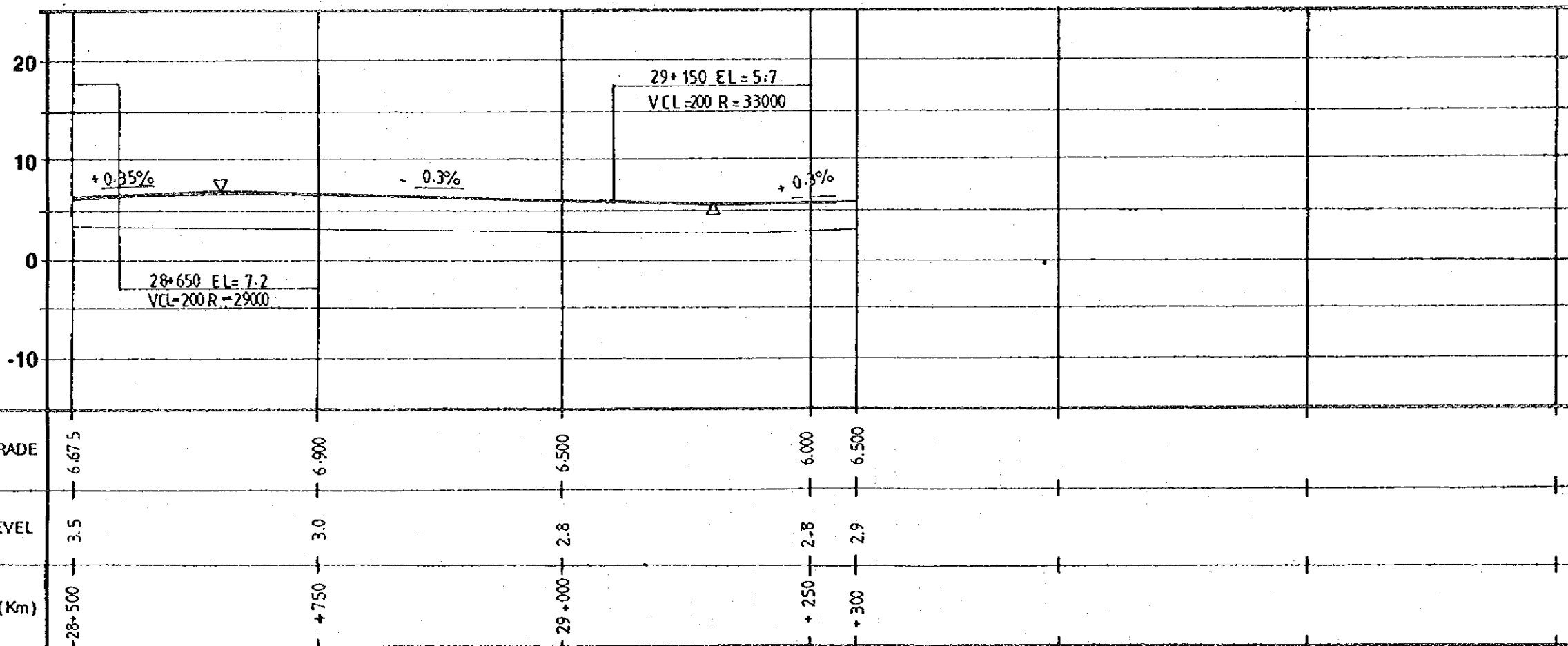
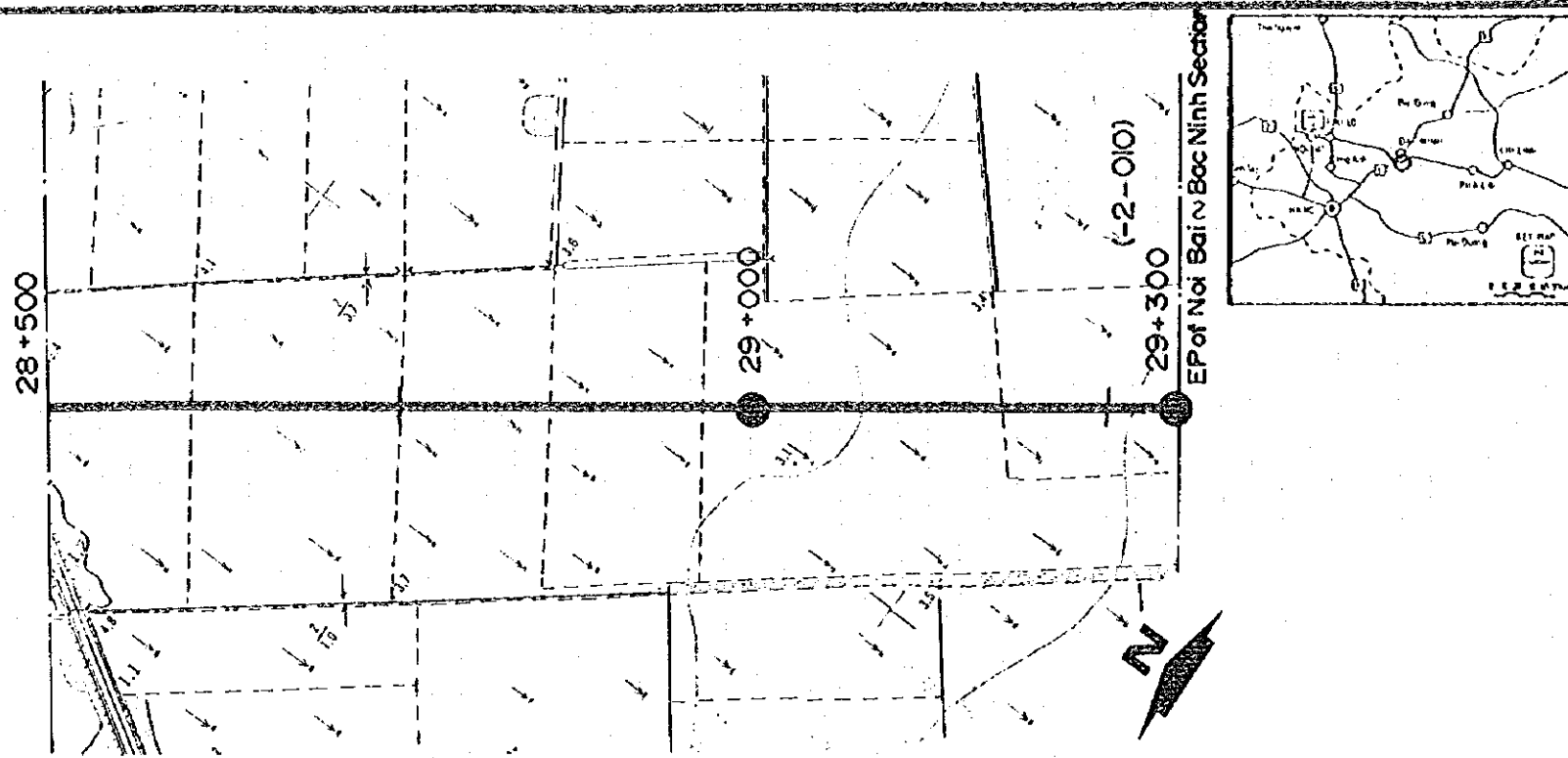
FINISHED GRADE	25+500	25+750	26+000	26+250	26+500	26+750	27+000
	6.400	6.250	6.250	7.322	6.875	8.250	6.500
GROUND LEVEL	3.4	3.2	3.5	3.8	3.8	1.0	3.5
STATION (Km)	25+500	+750	26+000	+250	+500	+750	27+000

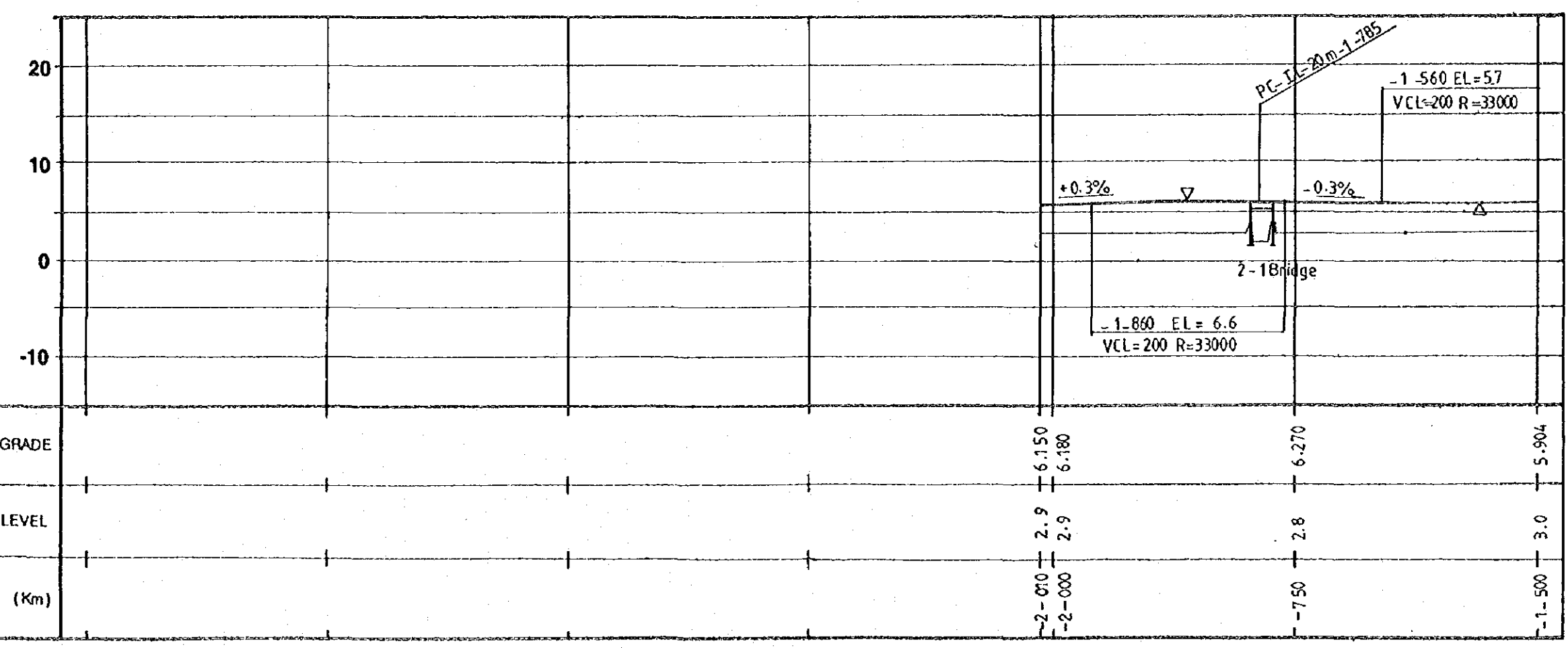
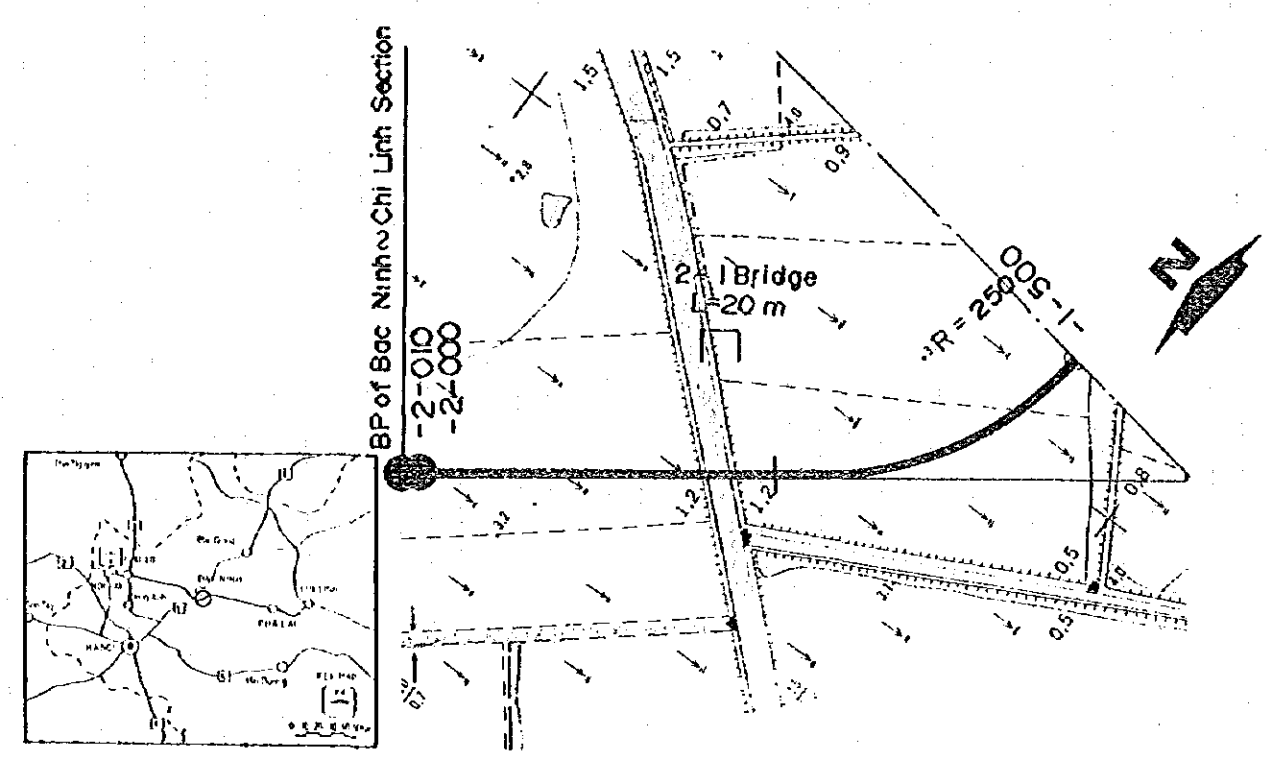
HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF NOI BAI - BAC NINH SECTION (21)

SCALE HORIZONTAL 1:5000
VERTICAL 1:500
SHEET NO. 30





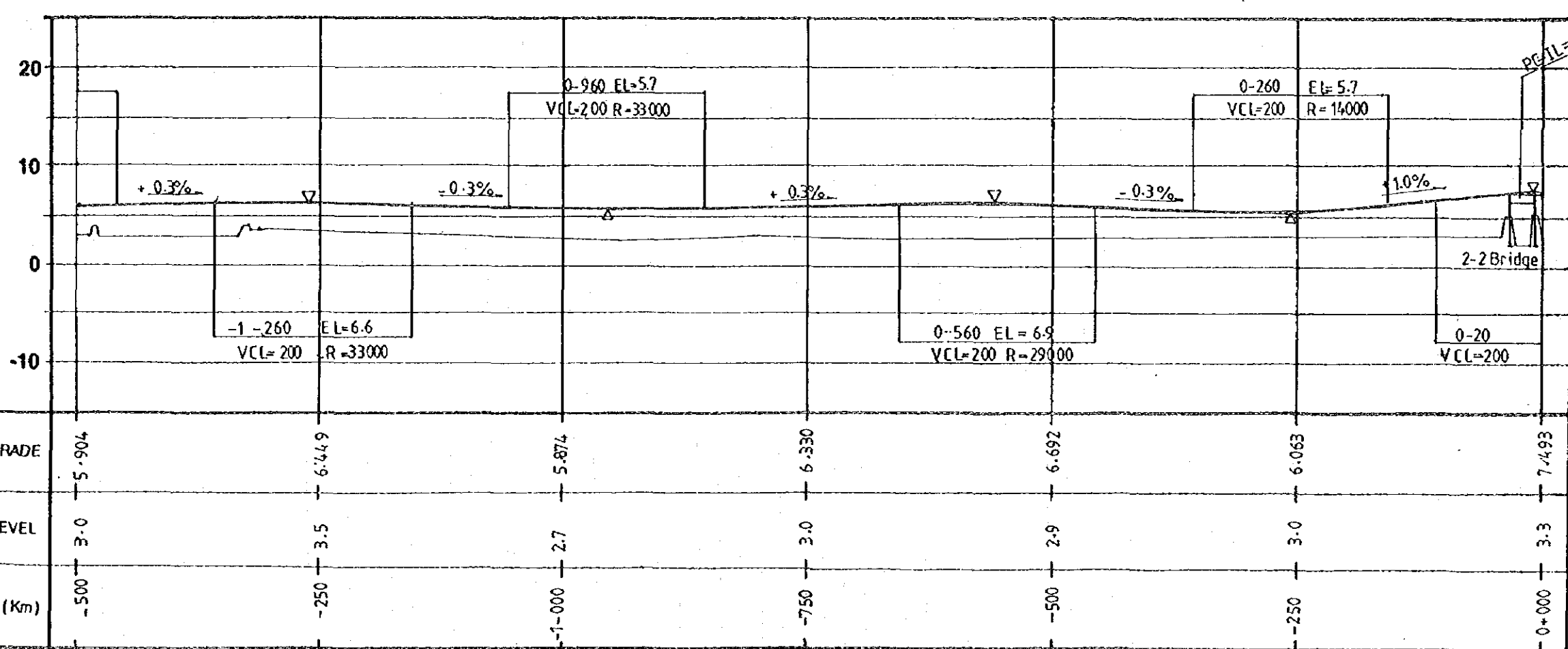
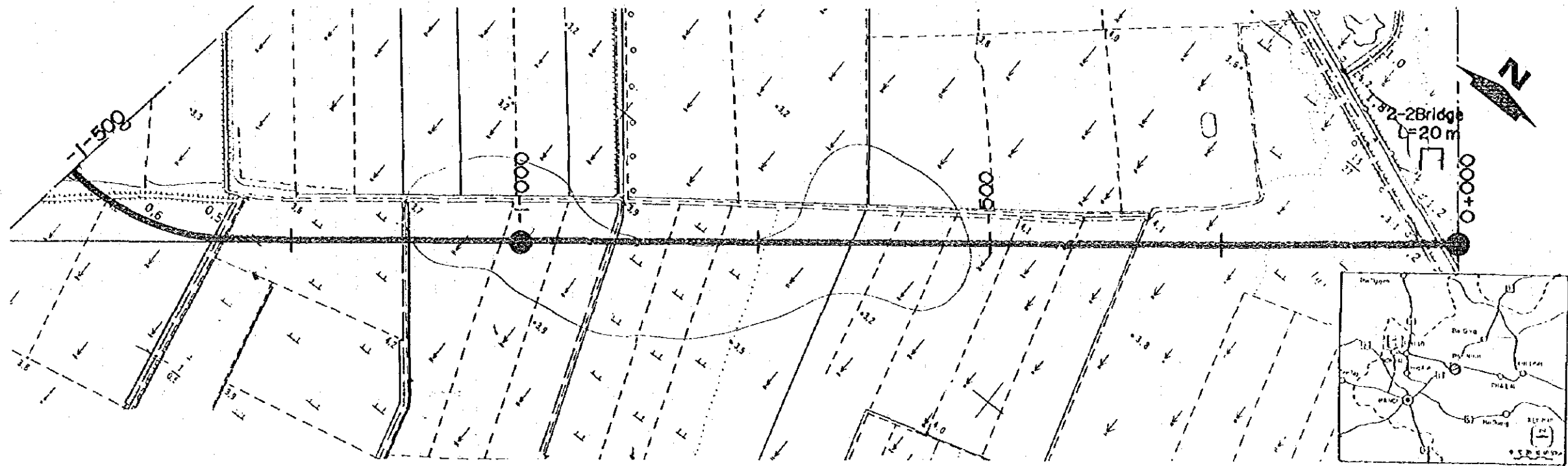


HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF BAC NINH - CHI LINH SECTION (1)

SCALE
 HORIZONTAL 1:5000
 VERTICAL 1:500

SHEET NO.
 33



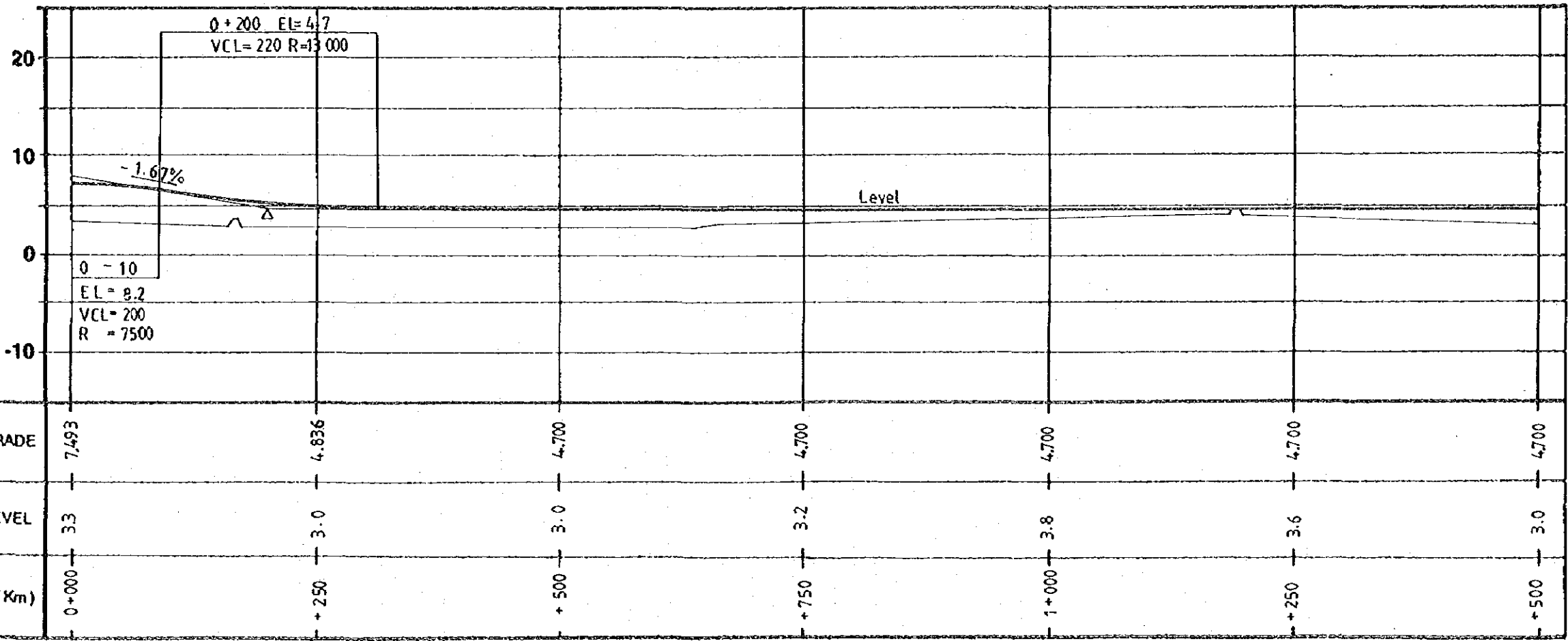
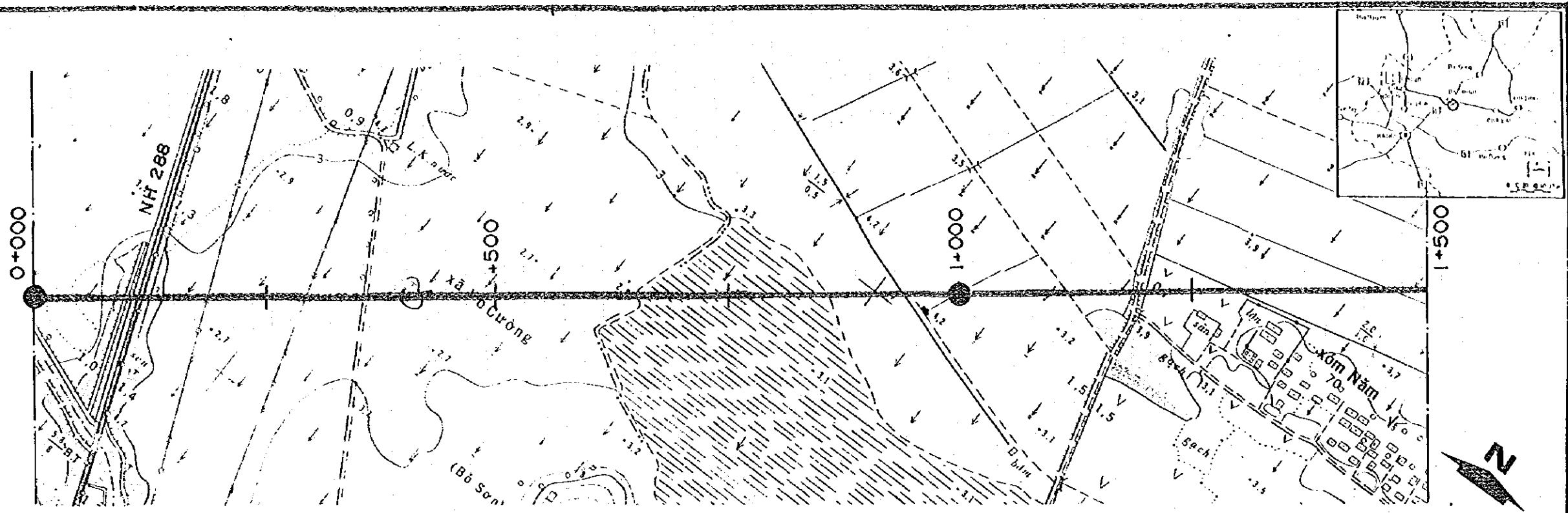
FINISHED GRADE	-500	-250	-1000	-750	-500	-250	0+000
	5.904	6.449	5.874	6.330	6.692	6.063	7.493
GROUND LEVEL	-500	-250	-1000	-750	-500	-250	0+000
	3.0	3.5	2.7	3.0	2.9	3.0	3.3
STATION (Km)	-500	-250	-1000	-750	-500	-250	0+000

HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF BAC NINH - CHI LINH SECTION (2)

SCALE
HORIZONTAL 1:5000
VERTICAL 1:500

SHEET NO.
34

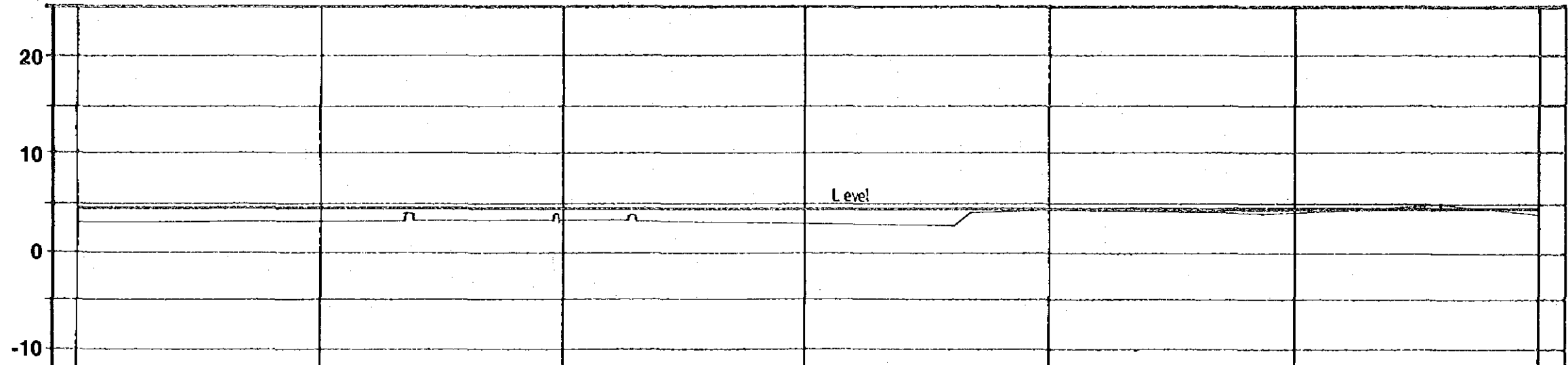
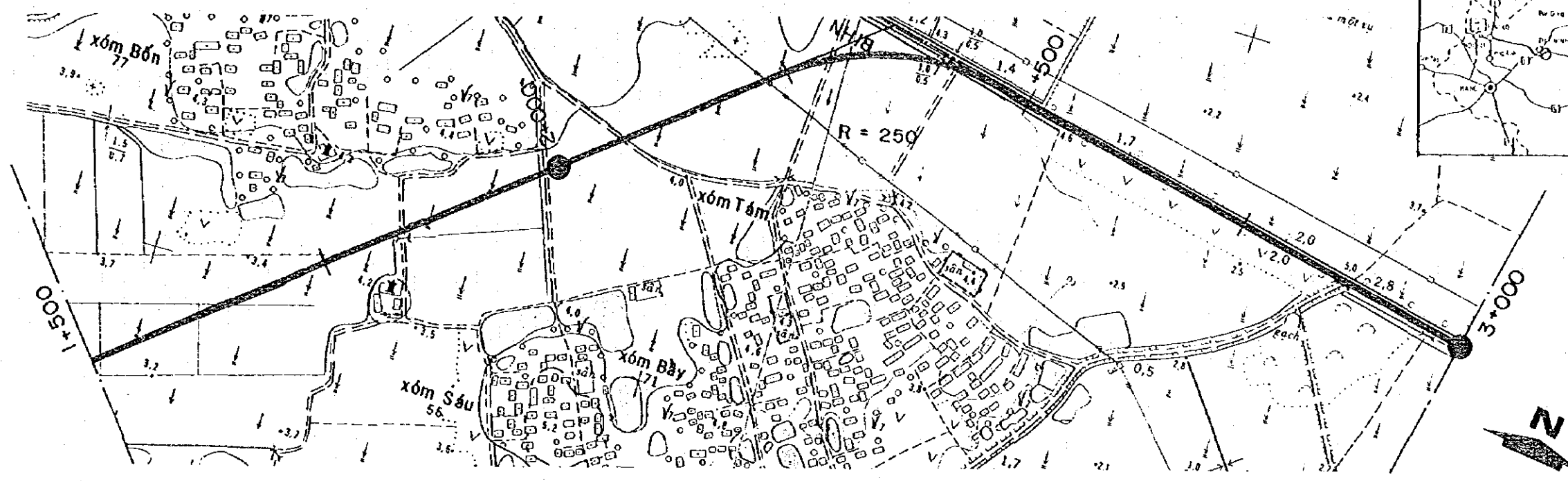


HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF BAC NINH - CHI LINH SECTION (3)

SCALE HORIZONTAL 1:5000
VERTICAL 1:500

SHEET NO. 35



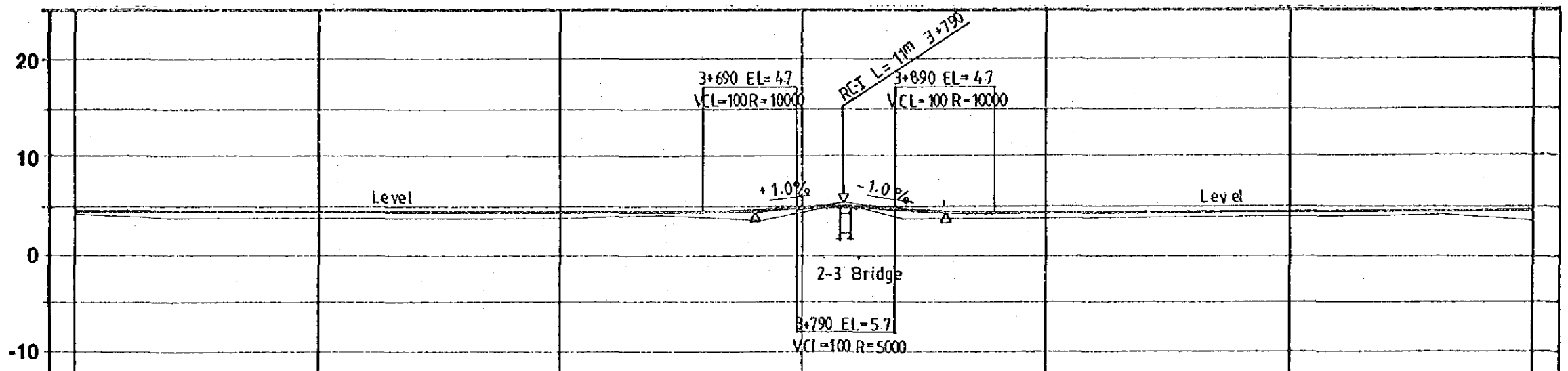
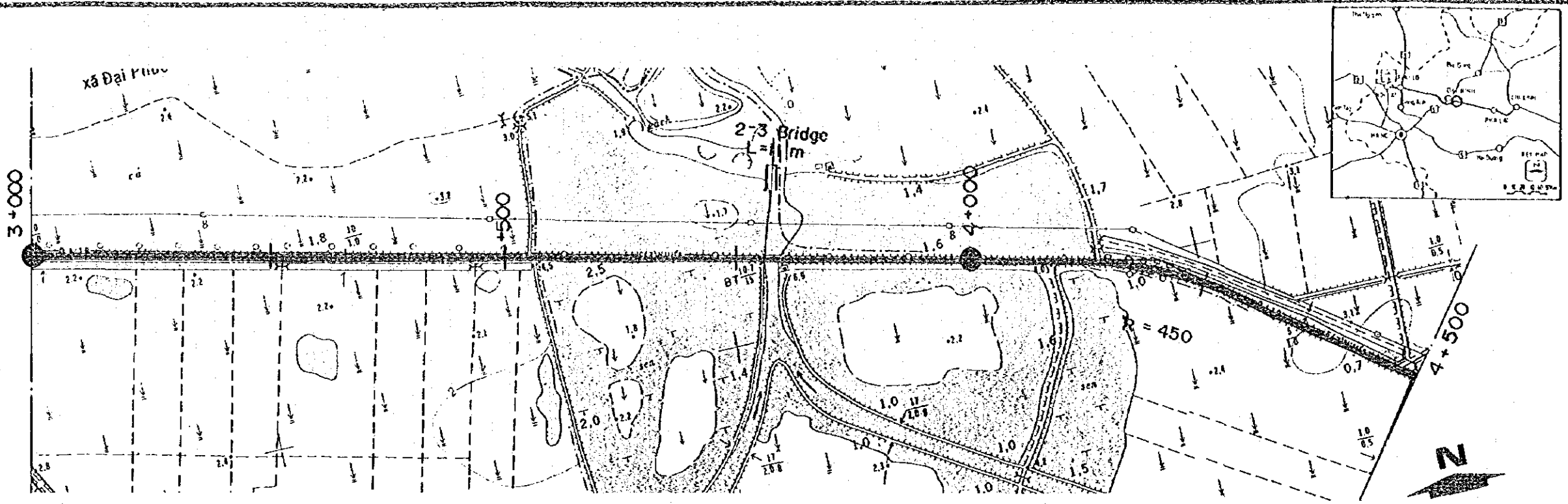
FINISHED GRADE	1+500	1+750	2+000	2+250	2+500	2+750	3+000
	4.700	4.700	4.700	4.700	4.700	4.700	4.700
GROUND LEVEL	1+500	1+750	2+000	2+250	2+500	2+750	3+000
	3.0	3.0	3.2	3.0	4.3	4.0	4.0
STATION (Km)	1+500	1+750	2+000	2+250	2+500	2+750	3+000

HIGHWAY NO.18 IMPROVEMENT

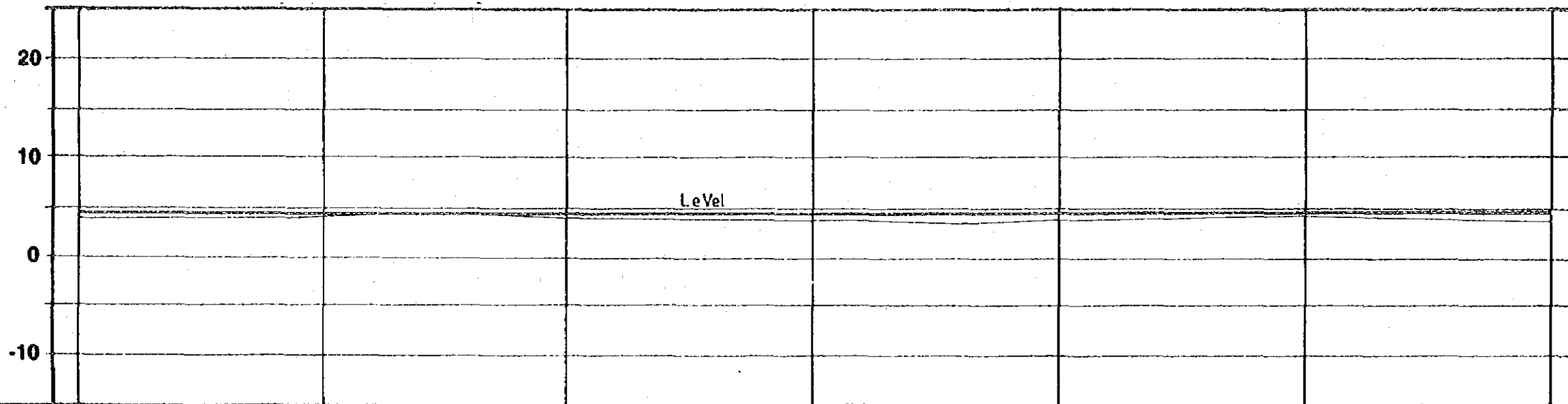
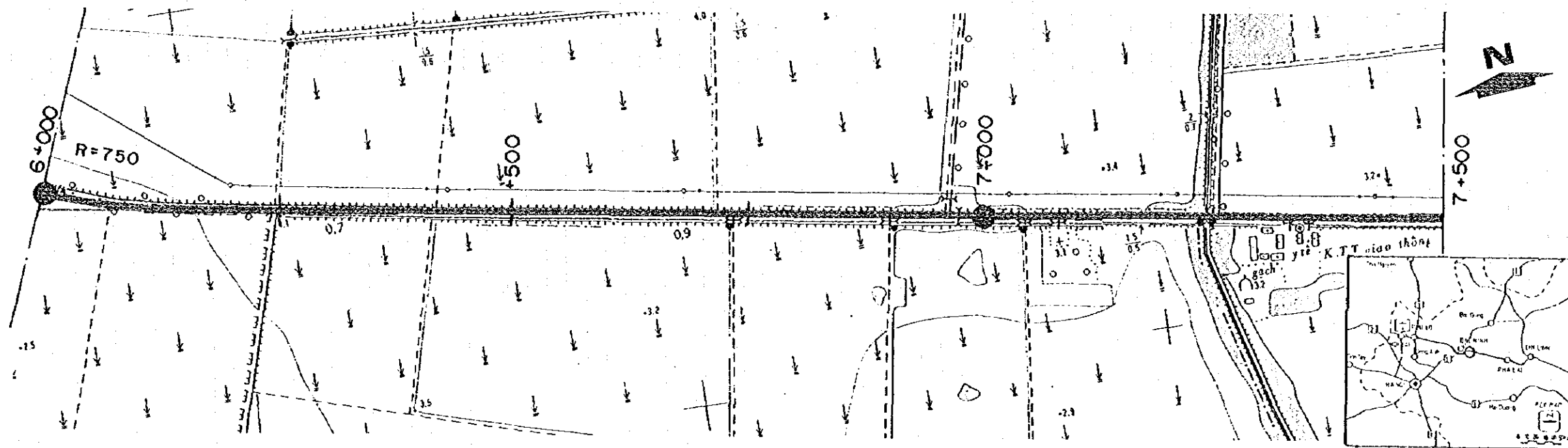
PLAN AND PROFILE OF BAC NINH - CHI LINH SECTION (4)

SCALE
 HORIZONTAL 1:5000
 VERTICAL 1:500

SHEET NO.
 36



FINISHED GRADE	3+000	3+250	3+500	3+750	3+800	3+850	3+900	4+150	4+500
	4.700	4.700	4.700	5.290	4.700	4.700	4.700	4.700	4.700
GROUND LEVEL	3+000	3+250	3+500	3+750	3+800	3+850	3+900	4+150	4+500
	4.0	3.7	3.7	4.5	4.0	4.0	4.0	4.0	3.5
STATION (Km)	3+000	3+250	3+500	3+750	3+800	3+850	3+900	4+150	4+500



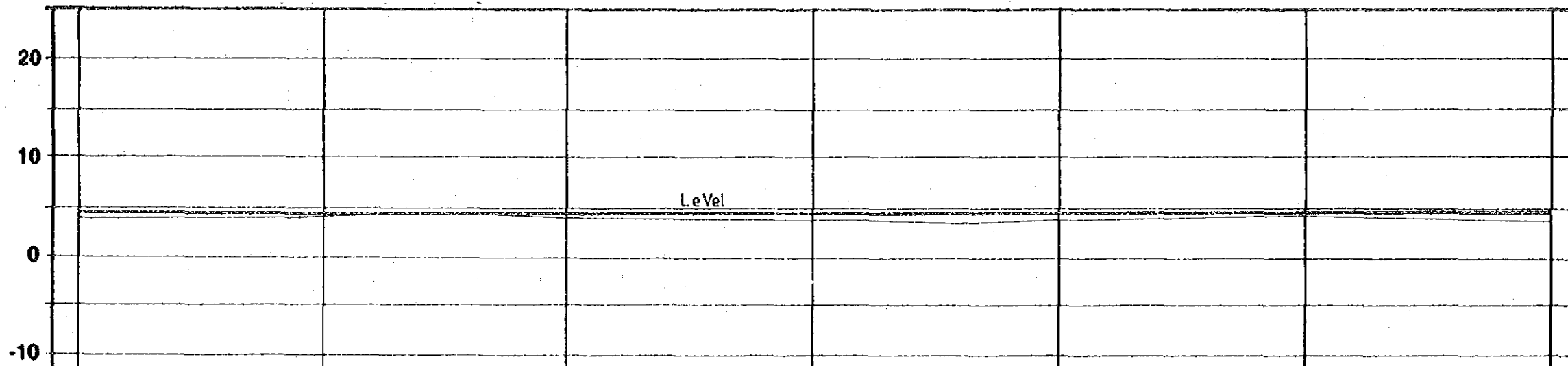
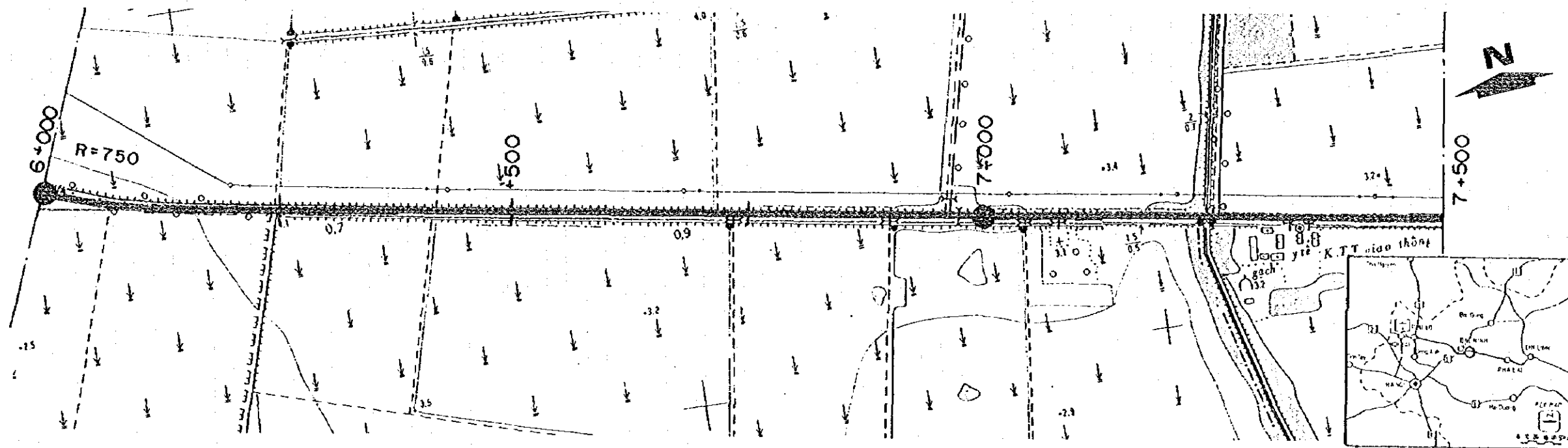
FINISHED GRADE	6+000	6+250	6+500	6+750	7+000	7+250	7+500
	4.700	4.700	4.700	4.700	4.700	4.700	4.700
GROUND LEVEL	6+000	6+250	6+500	6+750	7+000	7+250	7+500
	4.0	4.2	4.0	3.6	3.8	4.2	3.5
STATION (Km)	6+000	6+250	6+500	6+750	7+000	7+250	7+500

HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF BAC NINH - CHI LINH SECTION (7)

SCALE HORIZONTAL 1:500
VERTICAL 1:500

SHEET NO. 39



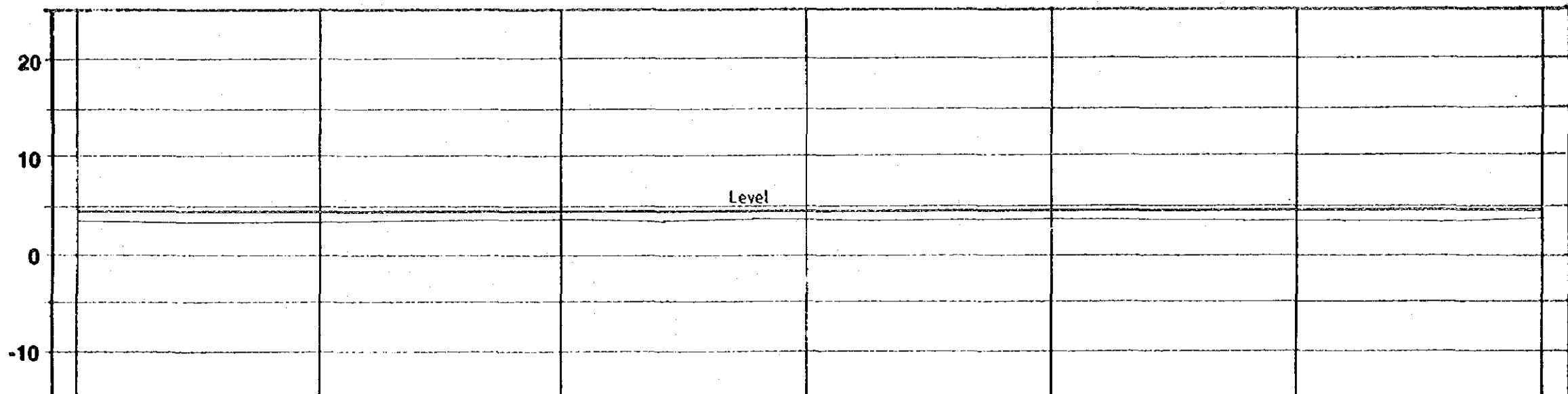
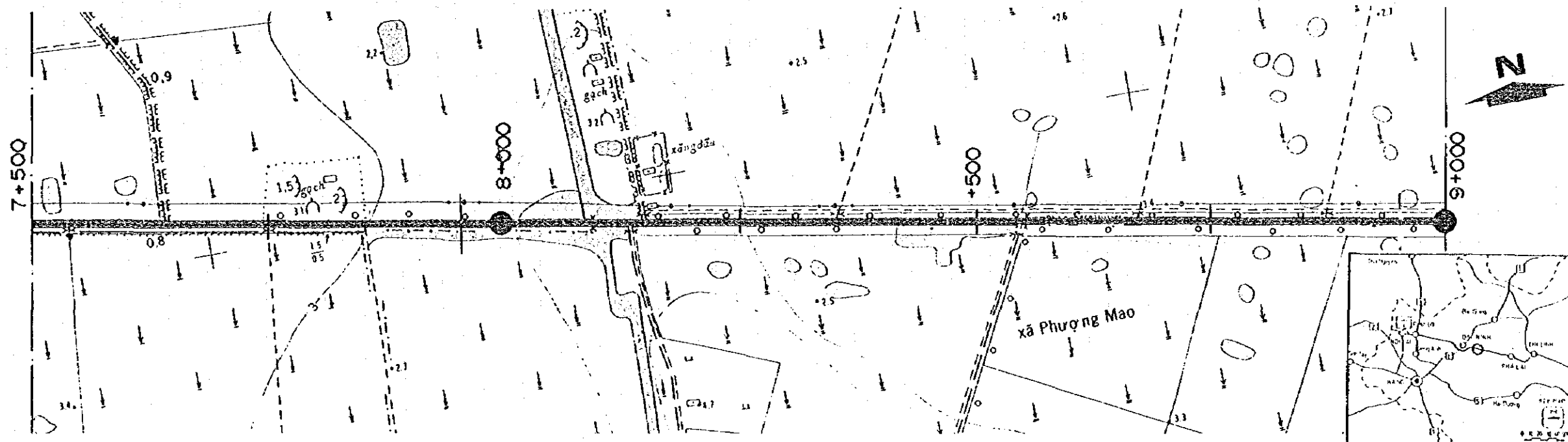
FINISHED GRADE	6+000	6+250	6+500	6+750	7+000	7+250	7+500
	4.700	4.700	4.700	4.700	4.700	4.700	4.700
GROUND LEVEL	6+000	6+250	6+500	6+750	7+000	7+250	7+500
	4.0	4.2	4.0	3.6	3.8	4.2	3.5
STATION (Km)	6+000	6+250	6+500	6+750	7+000	7+250	7+500

HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF BAC NINH - CHI LINH SECTION (7)

SCALE
HORIZONTAL 1:500
VERTICAL 1:500

SHEET NO.
39



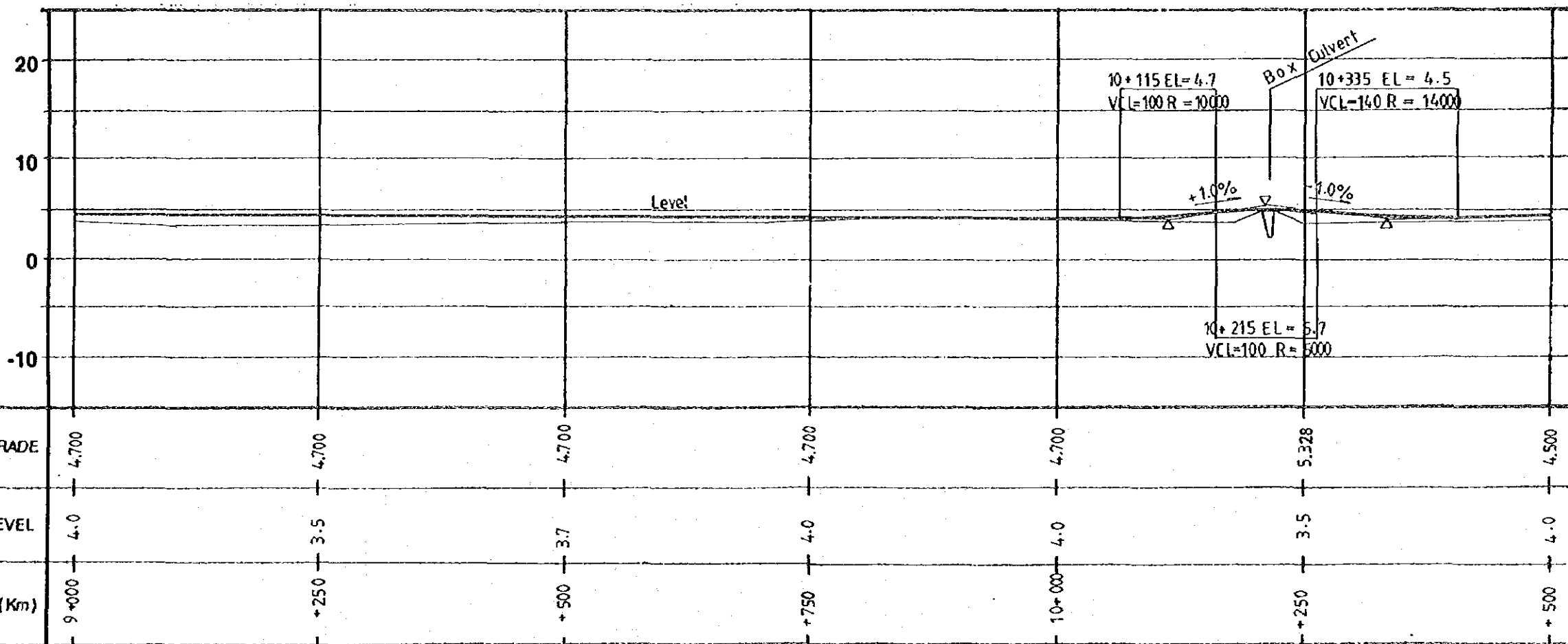
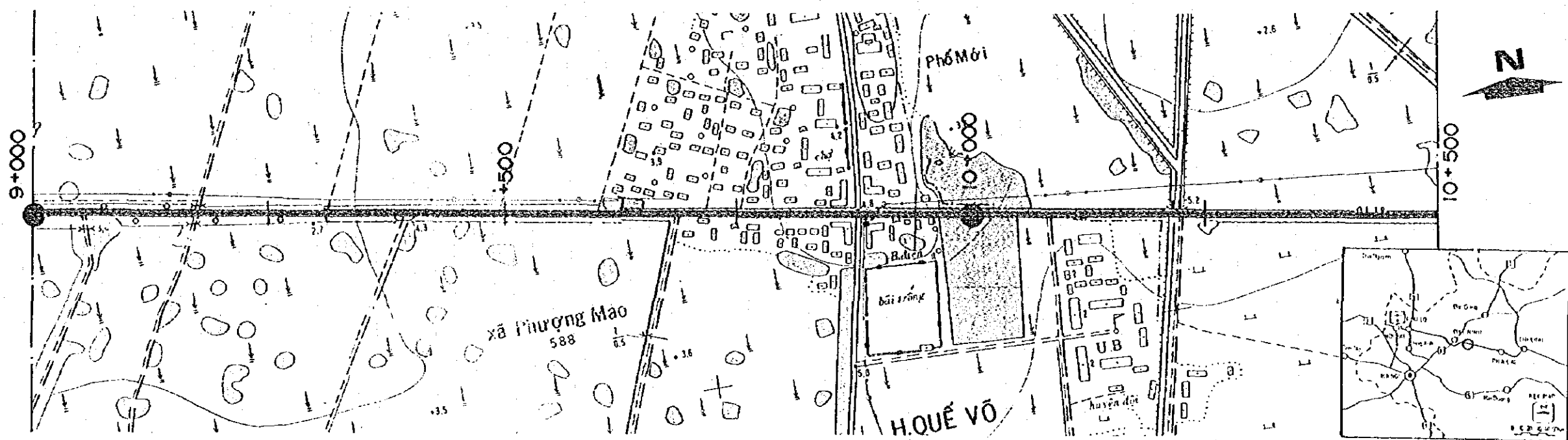
FINISHED GRADE	7+500	7+750	8+000	8+250	8+500	8+750	9+000
	4.700	4.700	4.700	4.700	4.700	4.700	4.700
GROUND LEVEL	7+500	7+750	8+000	8+250	8+500	8+750	9+000
	3.5	3.5	3.6	3.7	3.7	3.6	4.0
STATION (Km)	7+500	7+750	8+000	8+250	8+500	8+750	9+000

HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF BAC NINH - CHI LINH SECTION (8)

SCALE HORIZONTAL 1:5000
VERTICAL 1:500

SHEET NO. 40



HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF BAC NINH - CHI LINH SECTION (9)

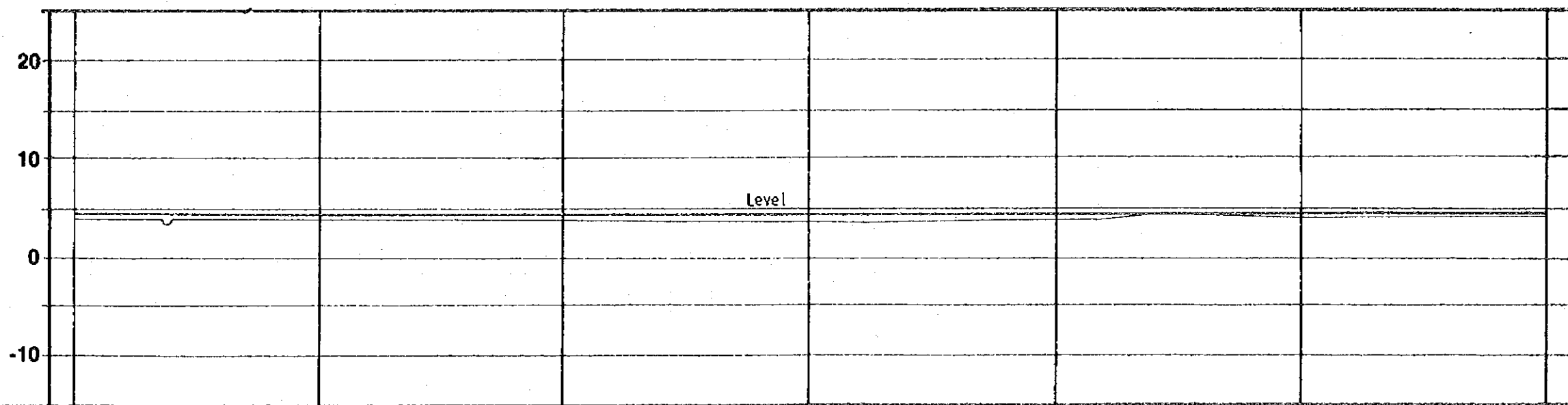
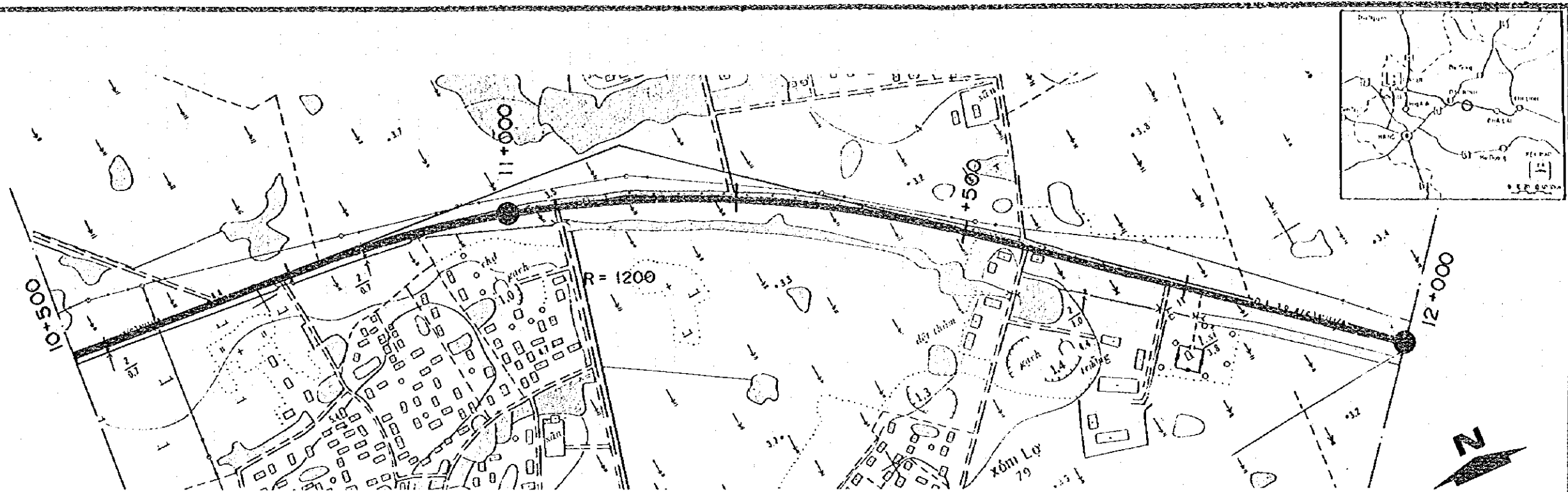
SCALE

HORIZONTAL 1:5000

VERTICAL 1:500

SHEET NO.

41



FINISHED GRADE	4.500	4.500	4.500	4.500	4.500	4.500	4.500
GROUND LEVEL	4.0	4.0	3.9	3.7	4.0	4.0	4.2
STATION (Km)	10+500	+750	11+000	+250	+500	+750	12+000

HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF BAC NINH - CHI LINH SECTION (10)

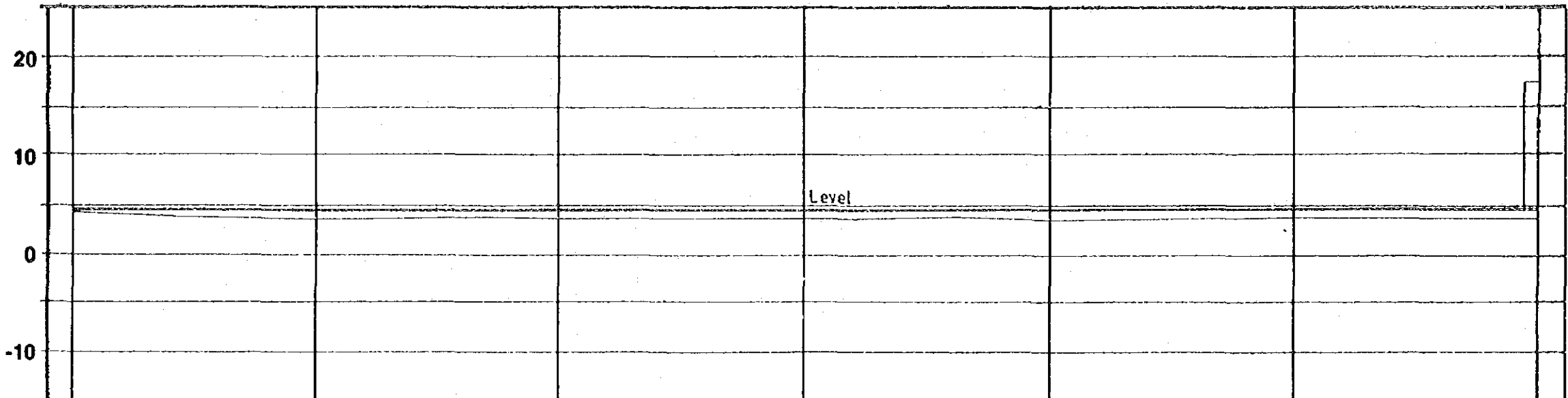
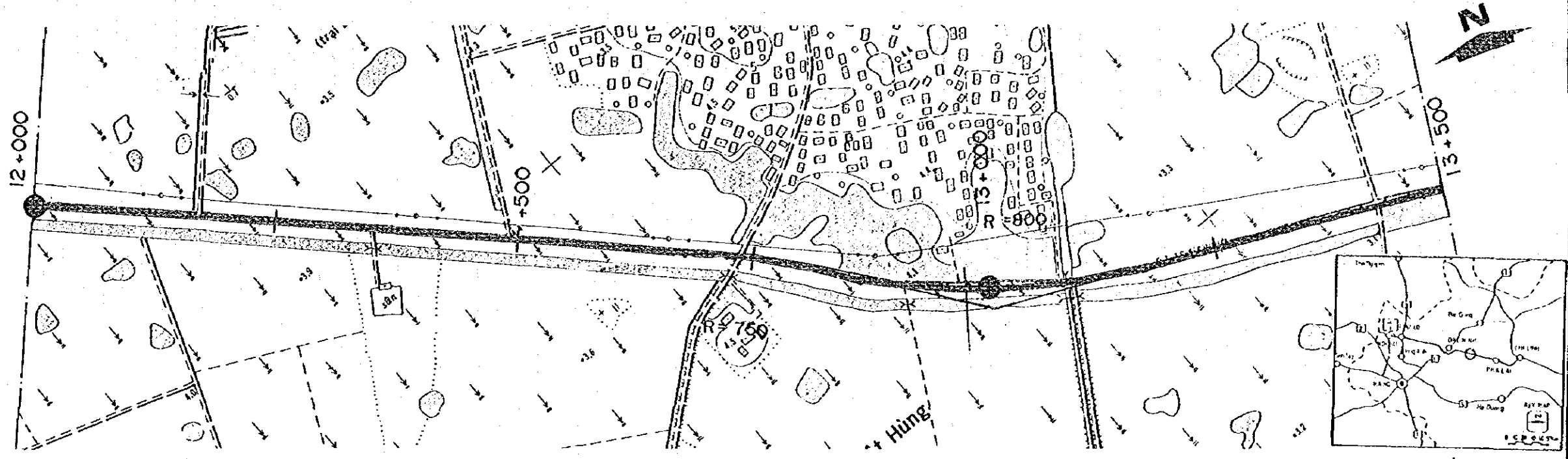
SCALE

HORIZONTAL 1:5000

VERTICAL 1:500

SHEET NO.

42



FINISHED GRADE	4.500	4.500	4.500	4.500	4.500	4.500	4.505
GROUND LEVEL	4.2	3.5	3.6	3.7	3.7	4.0	3.6
STATION (Km)	12+000	+250	+500	+750	13+000	+250	+500

HIGHWAY NO.18 IMPROVEMENT

PLAN AND PROFILE OF BAC NINH - CHI LINH SECTION. (11)

SCALE	HORIZONTAL	1:5000	SHEET NO.
	VERTICAL	1:500	