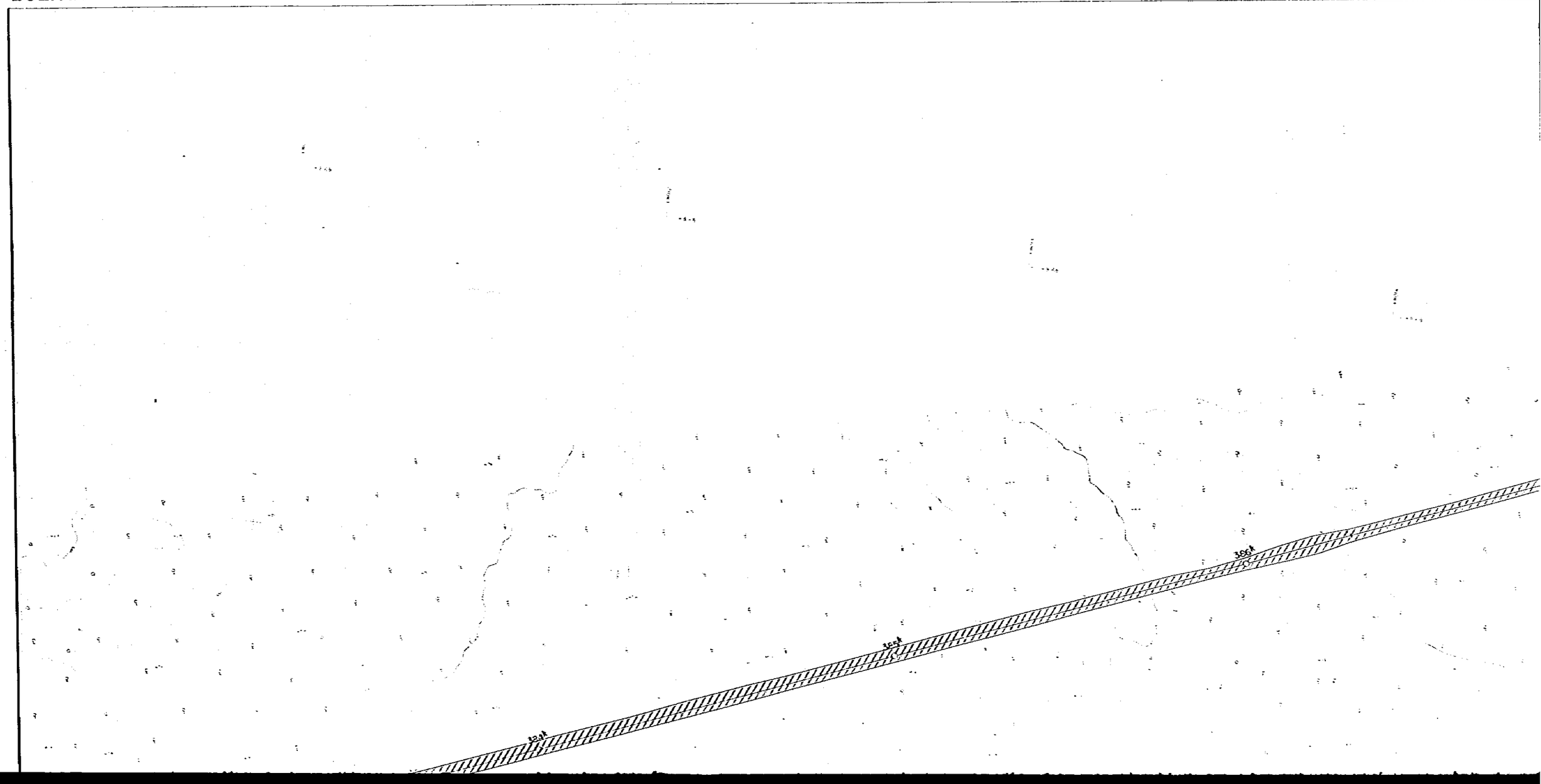
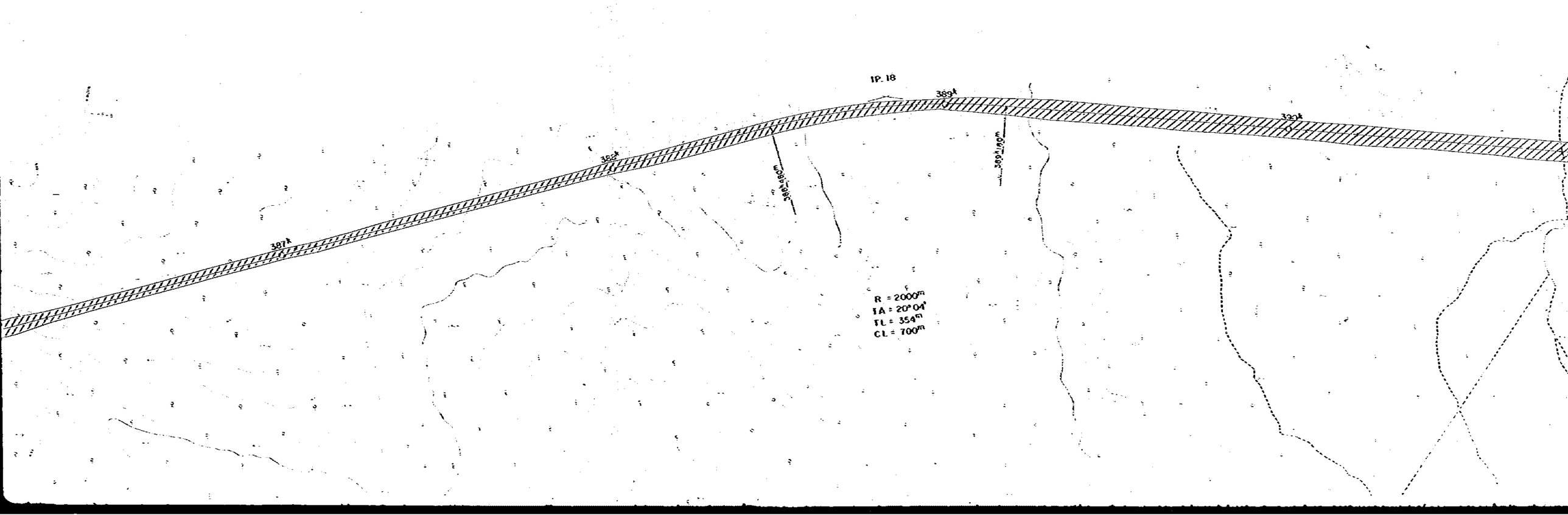
1 : 5000
BOLIVIA

RAILWAY



RAILWAY CONSTRUCTION PROJECT (TAPERAS – ROBORÉ)



NO.8

392k

393k

392k

LEGEND

FOCUS TRACKS ETC.

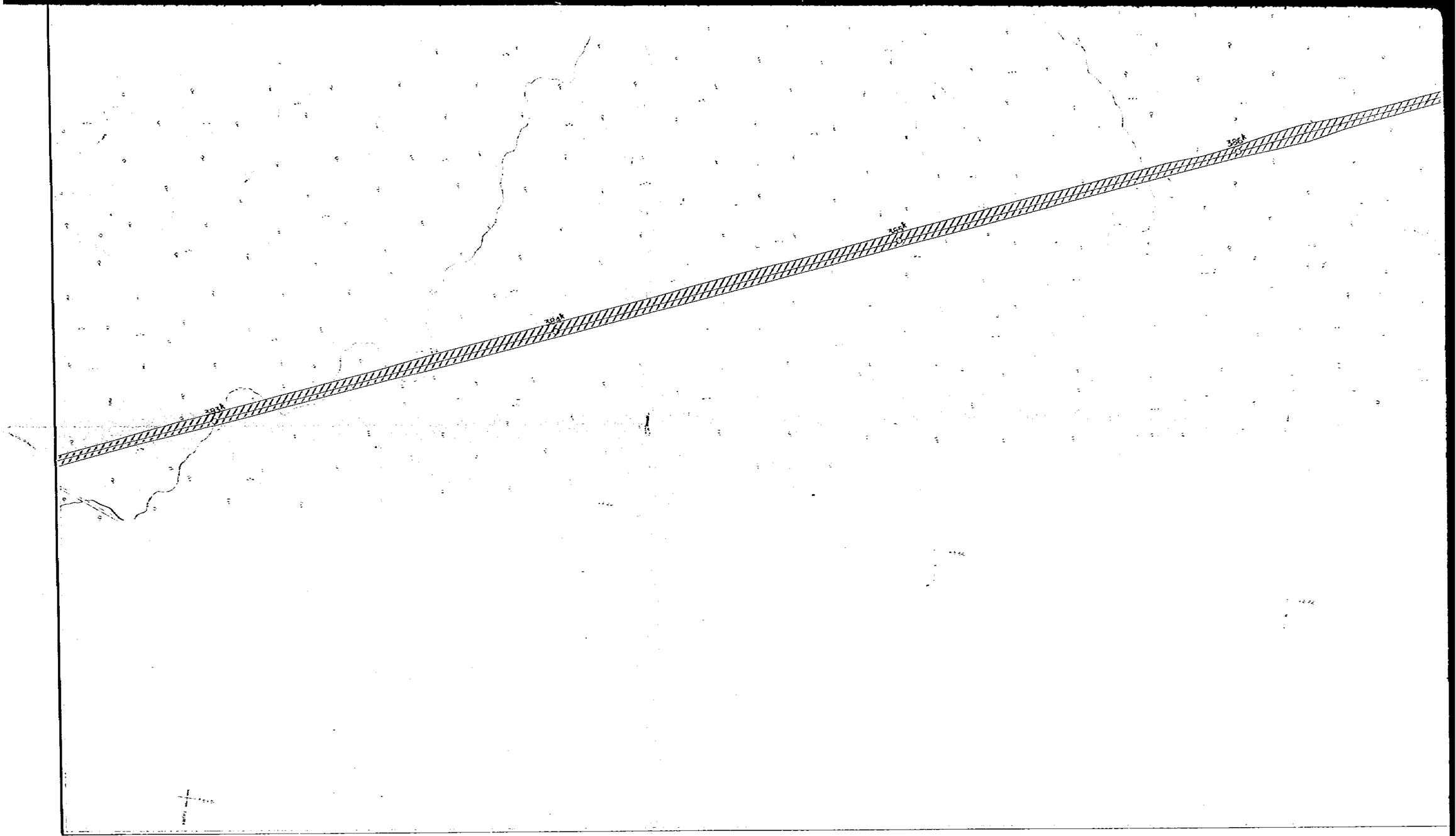
RAILWAYS ETC.

VEGETATIONS

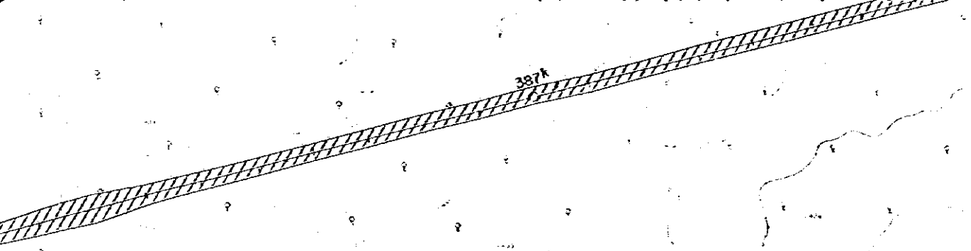
MISCELLANEOUS

HYDROGRAPHY

CROSSINGS AND TRANSFER POINTS



NO.8 JAPAN INTERNATIONAL COOPERATION AGENCY



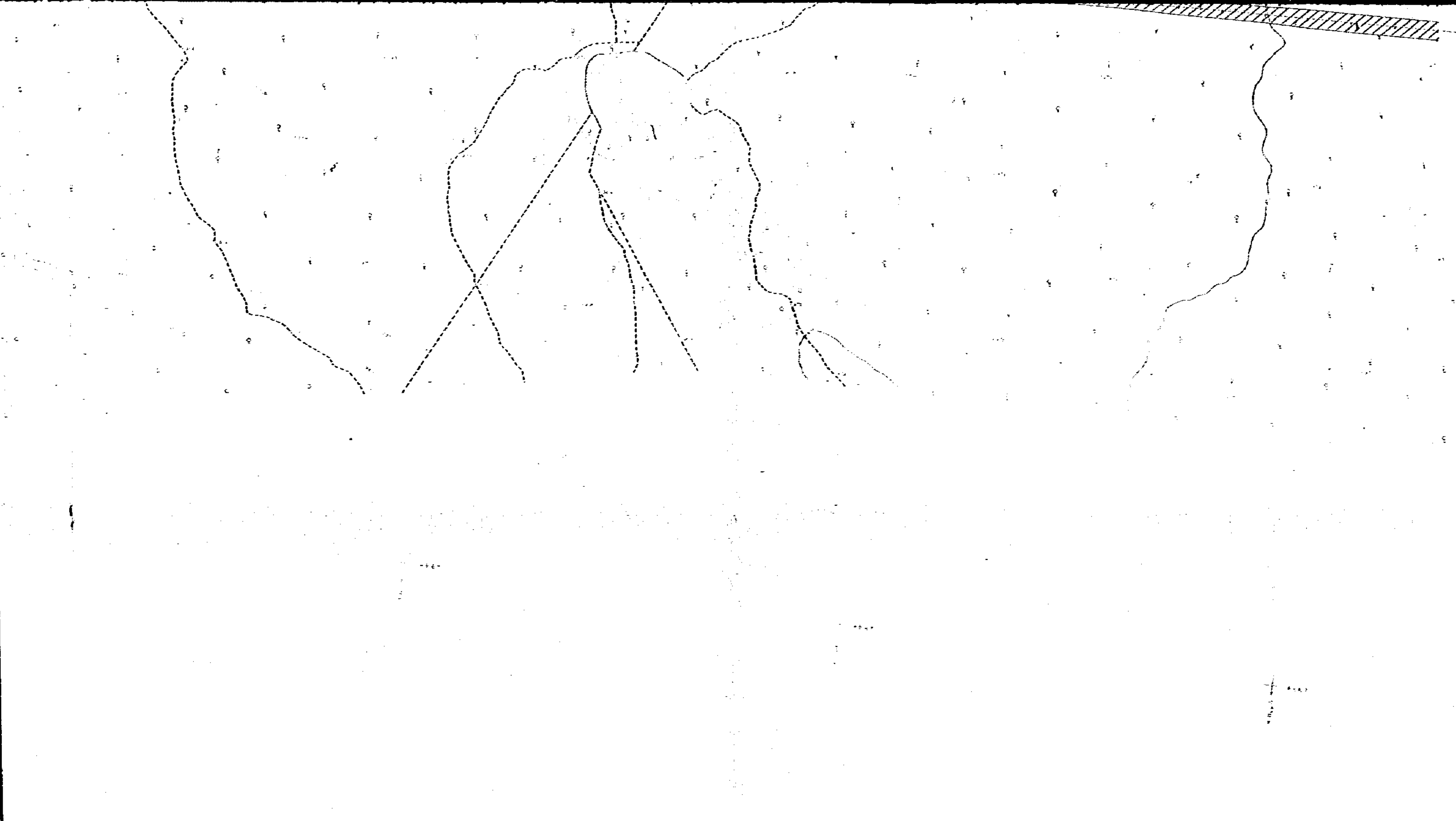
Limits of Felling	
Kilometerage	Wide (m)
382K500V00	30
600	"
700	"
800	31.1
900	36.3
383K000	"
100	"
200	"
300	"
400	"
500	"
600	40.3
700	"
800	"
900	"
384K000	"
100	"
200	"
300	40.3
400	44.3
500	"
600	"
700	40.3
800	"
900	"
385K000	"
100	"
200	"
300	"
400	"
500	36.3
600	"
700	"
800	"
900	30
386K000	35
100	47
200	53
300	36

Limits of Felling	
Kilometerage	Wide (m)
386K300V00	36
400	33
500	30
560	"
600	"
700	31.1
800	32.2
900	31.1
387K000	"
100	30
200	"
250	"
300	"
400	"
500	"
600	"
700	"
800	"
900	"
388K000	36.3
100	"
200	40.3
300	"
400	"
500	"
600	"
700	36.3
800	"
900	31.1
980	30
389K000	34
100	44
200	51
300	60
400	58
500	55
600	56
700	60
800	56

Limits of Felling	
Kilometerage	Wide (m)
389K800V00	56
900	53
390K000	"
100	55
200	60
300	56
400	53
500	51
600	53
700	58
800	"
900	60
391K000	56
100	46
200	44
300	46
400	44
500	44
600	44
700	42
800	37
900	33
392K000	34
100	36
200	"
300	"
400	42
500	"
600	"
700	"

SCALE 1:5,000
METRES

ce (m)
56
53
•
55
60
56
53
51
53
59
•
60
56
45
44
46
44
44
44
42
37
33
34
36
•
•
42
•
•
•



MISCELLANEOUS

HYDROGRAPHY

CONTOURS AND TRAVERSE POINTS

EMPRESA NACIONAL DE FERROCARRILES

RAILWAY CONSTRUCTION PROJECT EASTERN LINE

LIMIT OF FELLING

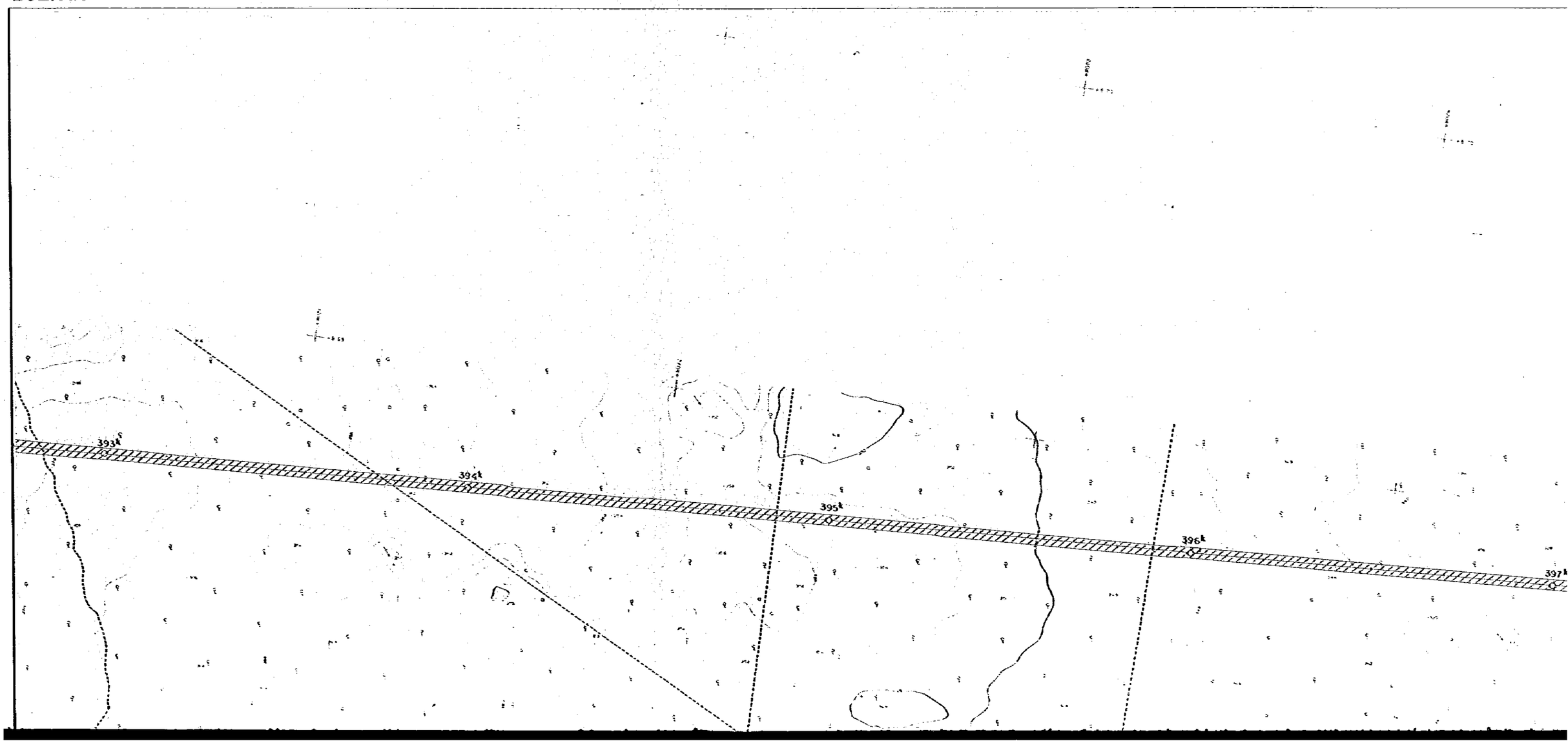
(sheet 9 of 12)

Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date

Contracting Enterprise		
Checked by Date	Approved by Date	No 26

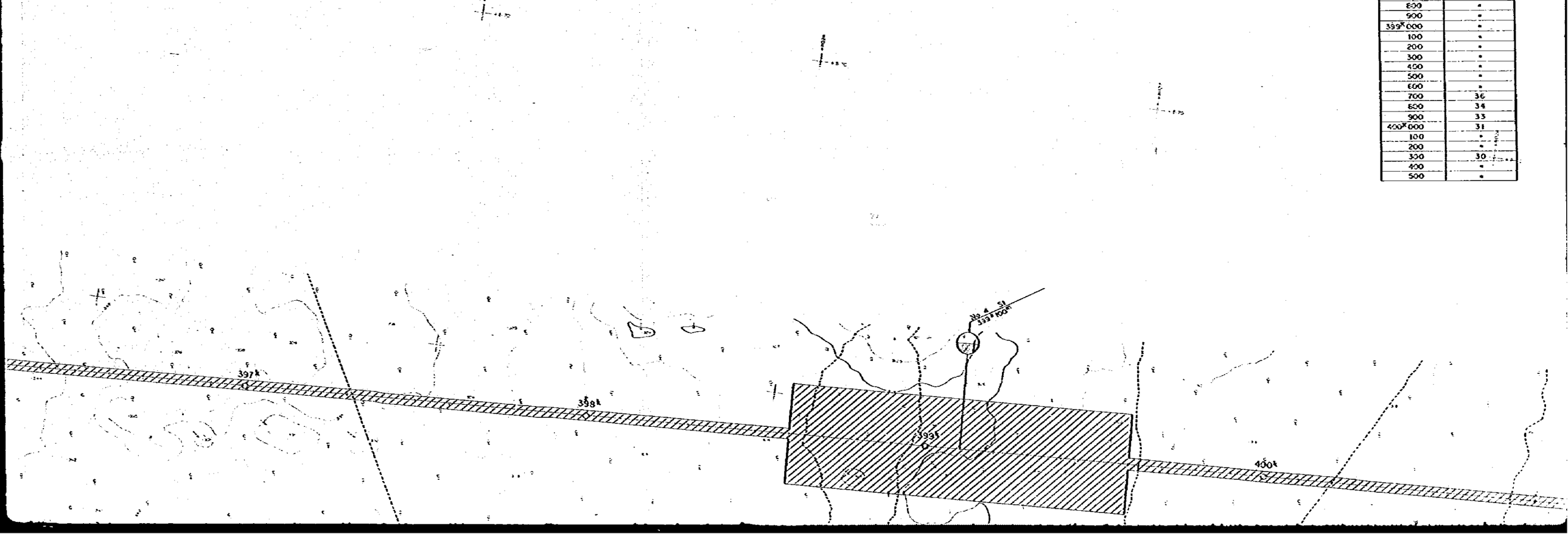
1 : 5000
BOLIVIA

RAILWAY CO



RAILWAY CONSTRUCTION PROJECT (TAPERAS – ROBORE)

Limits of Felling	
Kilometerage	Wide (m)
398K200M00	30
300	"
400	"
500	"
600	300
700	"
800	"
900	"
399K000	"
100	"
200	"
300	"
400	"
500	"
600	"
700	36
800	34
900	33
400K000	31
100	"
200	"
300	30
400	"
500	"



Limits of Felling	
Kilometerage	Wide (m)
398K200M00	30
300	"
400	"
500	"
600	300
700	"
800	"
900	"
399K000	"
100	"
200	"
300	"
400	"
500	"
600	"
700	36
800	34
900	33
400K000	31
100	"
200	"
300	30
400	"
500	"

Limits of Felling	
Kilometerage	Wide (m)
400K500M00	30
600	"
700	"
800	"
900	"
401K000	"
100	"
200	"
300	"
400	"
500	"
600	"
700	"
800	"
900	"
402K000	"
100	"
200	"
300	"
400	"
500	"
600	"
700	"

LEGEND

ROADS TRACKS ETC.

RAILWAYS ETC.

VEGETATION

MISCELLANEOUS

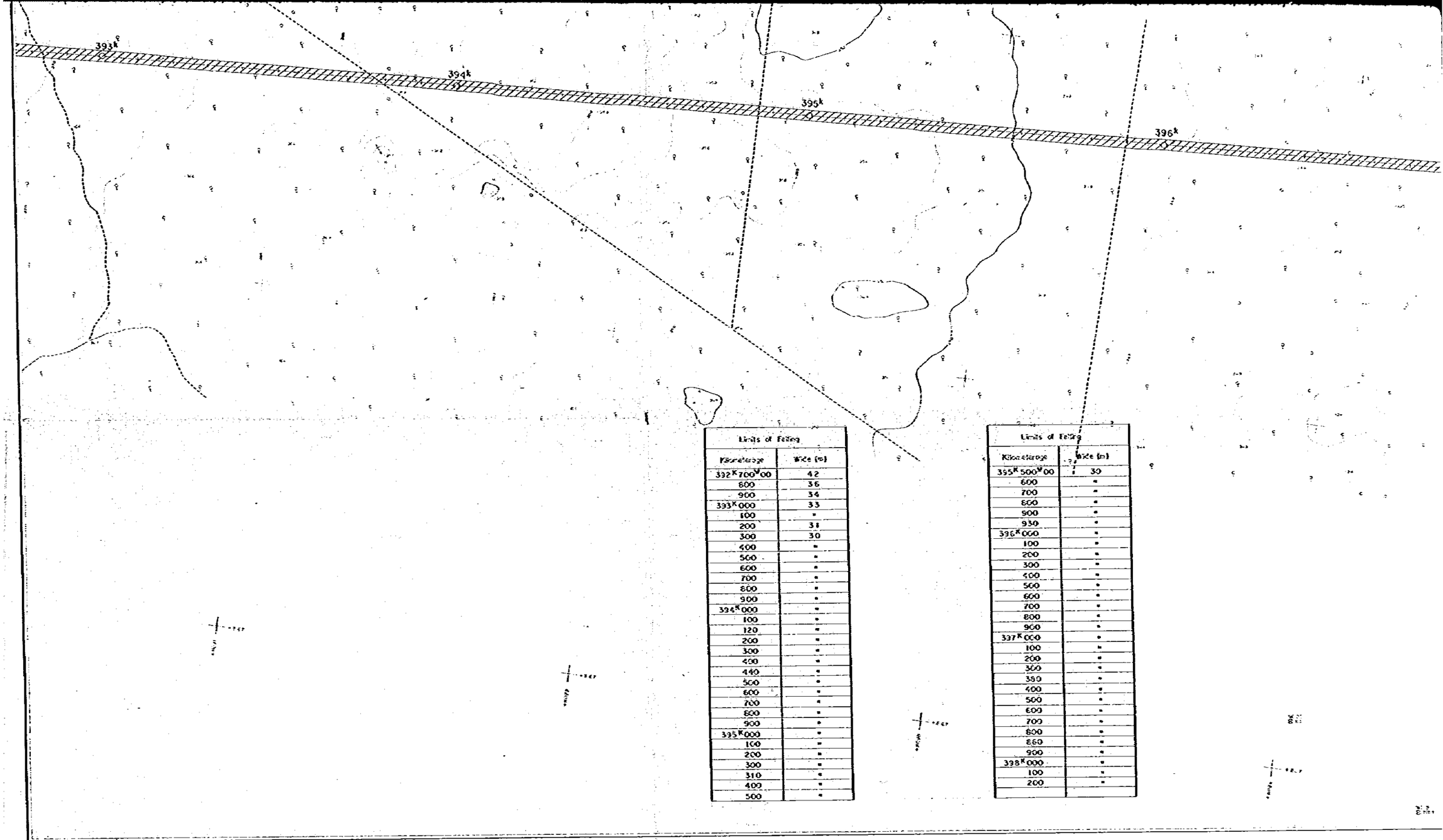
HYDROGRAPHY

CONTOURS AND TRAVERSE POINTS

400K

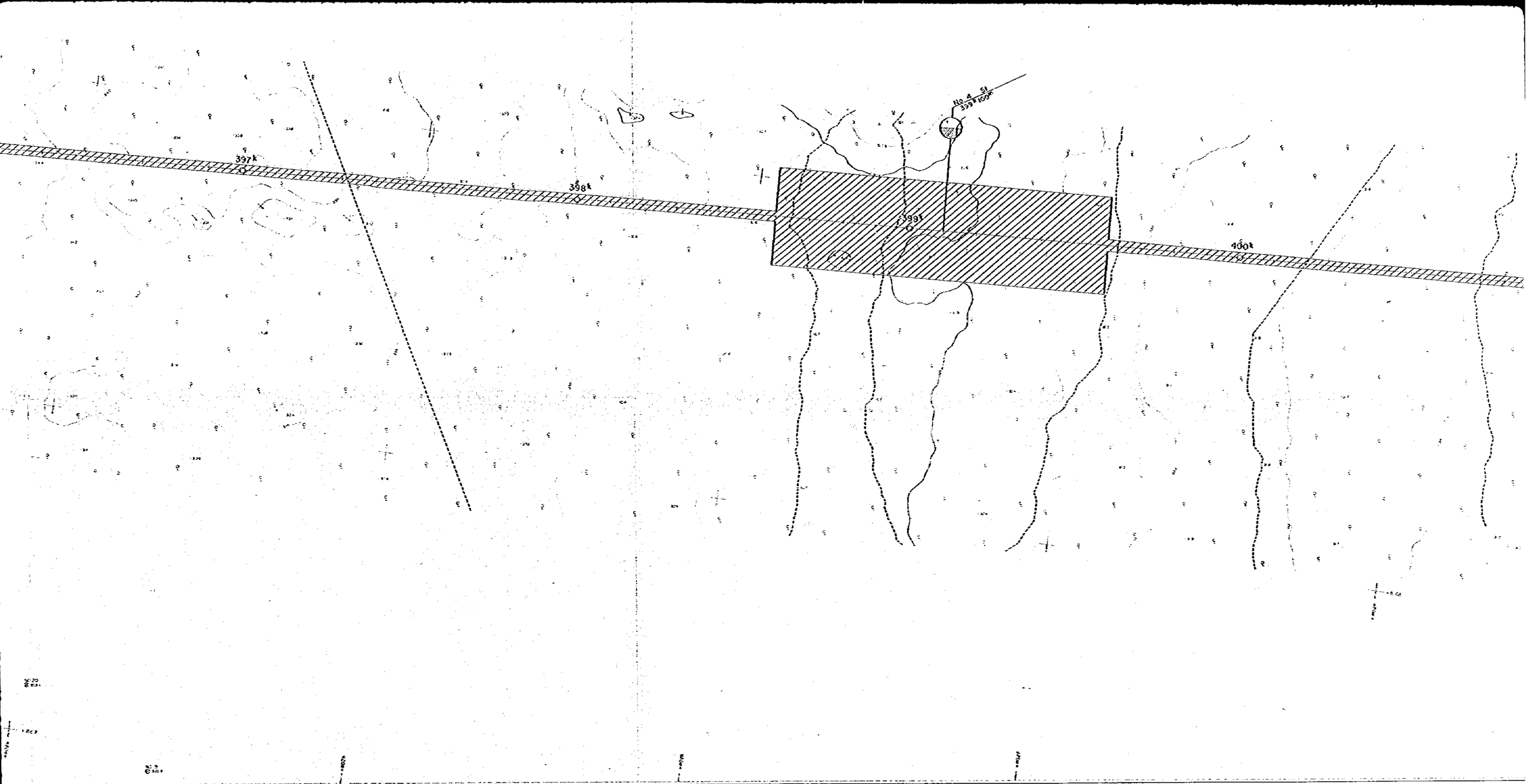
401K

402K



Limits of Felling	
Kilometerage	Wide (m)
332K700W00	42
800	36
900	34
333K000	33
100	"
200	31
300	30
400	"
500	"
600	"
700	"
800	"
900	"
334K000	"
100	"
120	"
200	"
300	"
400	"
440	"
500	"
600	"
700	"
800	"
900	"
335K000	"
100	"
200	"
300	"
310	"
400	"
500	"

Limits of Felling	
Kilometerage	Wide (m)
335K500W00	30
600	"
700	"
800	"
900	"
930	"
336K000	"
100	"
200	"
300	"
400	"
500	"
600	"
700	"
800	"
900	"
337K000	"
100	"
200	"
300	"
380	"
400	"
500	"
600	"
700	"
800	"
860	"
900	"
338K000	"
100	"
200	"


397k
398k
399k
400k
No 4 St
SCALE 1:5,000
METRES

MISCELLANEOUS

HYDROGRAPHY

CONTOURS AND TRAVERSE POINTS

400k

401k

402k

EMPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE
(HAINAN-BOHAI)

LIMIT OF FELLING
(Sheet 10 of 12)

Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No 27

1. Photographic Flight ——June 1980
2. Control Point Survey ——June 1980
3. Detail Compilation ——October 1980
4. Datum Station ——IGM Triangulation Point
Mine
IGM Leveling Point
LL 151 LL 153
LL 189 LL 191
LL 193 BS 27

1 : 5000
BOLIVIA

RAILWAY C

Limits of Felling	
Kilometerage	Wide (m)
402K700M00	30
800	"
900	"
403K000	"
100	"
200	"
300	"
400	"
500	"
600	"
700	"
800	"
900	"
404K000	"
100	"
200	"
300	"
360	"
400	"
500	"
600	"
700	"
750	"
800	"
900	"
405K000	"
100	"
200	"
350	"
400	"
500	"
600	"
700	"
800	"
900	"
406K000	"

Limits of Felling	
Kilometerage	Wide (m)
406K000M00	30
100	"
200	"
300	"
400	"
500	"
600	"
610	"
700	36.3
800	"
900	40.3
407K000	"
100	"
200	36.3
300	"
400	"
500	"
600	"
700	38.1
800	30
900	32.2
408K000	36.3
100	"
200	36.3
300	30
330	"
400	"
500	58
600	53
700	51
800	55
900	49
409K000	37
100	33
200	30

RAILWAY CONSTRUCTION PROJECT (TAPERAS – ROBORE)

NO.10

IP.20

R = 1000m
IA = 40°44'
TL = 371m
CL = 711m

LEGEND

ROADS TRACKS ETC.

EARTHWORKS ETC.

VEGETATION

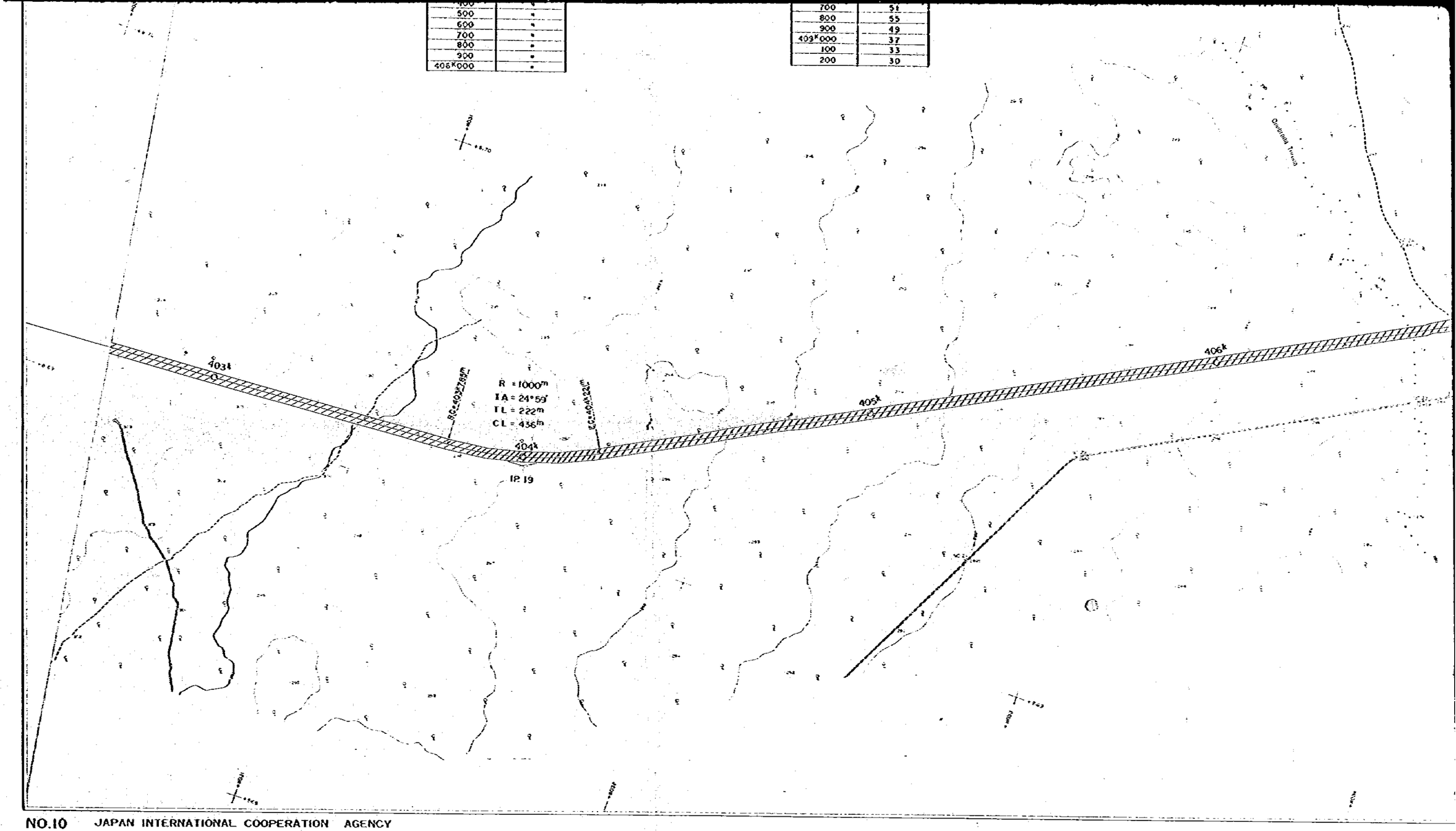
MISCELLANEOUS

HYDROGRAPHY

CONTOURS AND TRAVERSE POINTS

100	
500	"
600	"
700	"
800	"
900	"
406K000	"

700	51
800	55
900	49
403K000	37
100	33
200	30



NO.10 JAPAN INTERNATIONAL COOPERATION AGENCY

Limits of Fencing	
Kilometerage	Width (m)
409K200M00	30
300	"
400	"
500	"
600	"
700	"
800	34
900	"
410K000	36
100	42
200	46
300	36
400	30
500	"
600	"
700	33
800	36
900	31
411K000	30
650	"
100	31.1
200	30
300	"
400	"
500	"

SCALE 1 : 5,000
METRES

Limits of Felling	
Kilometerage	Wide (m)
409K200V00	30
300	"
400	"
500	"
600	"
700	"
800	34
900	"
410K000	36
100	42
200	46
300	36
400	30
500	"
600	"
700	33
800	36
900	31
411K000	30
050	"
100	31.1
200	30
300	"
400	"
500	"

MISCELLANEOUS

HYDROGRAPHY

CONTOURS AND TRAVERSE POINTS

ENPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE
(PUERTO-ROBORE)

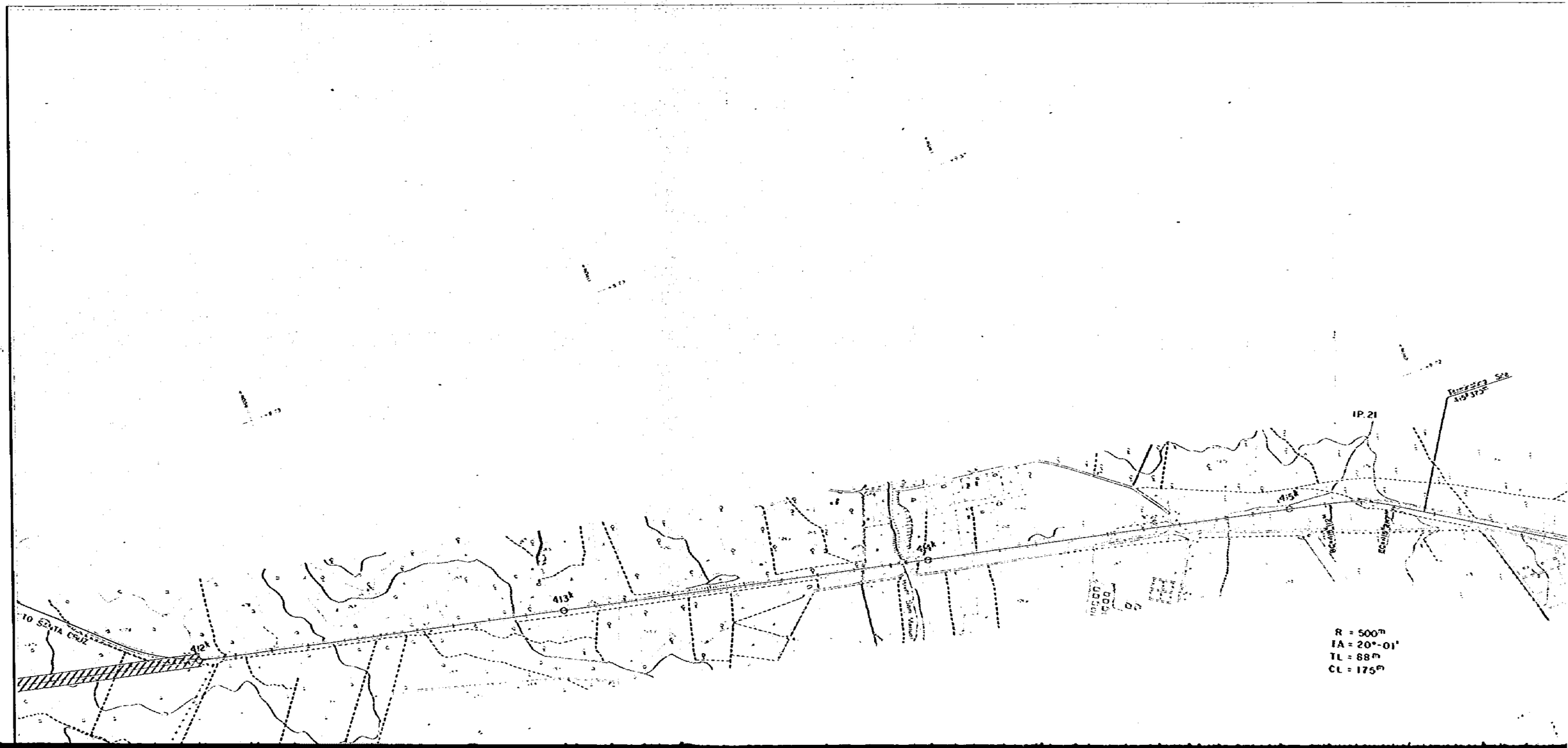
LIMIT OF FELLING
(sheet 11 of 12)

Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No 28

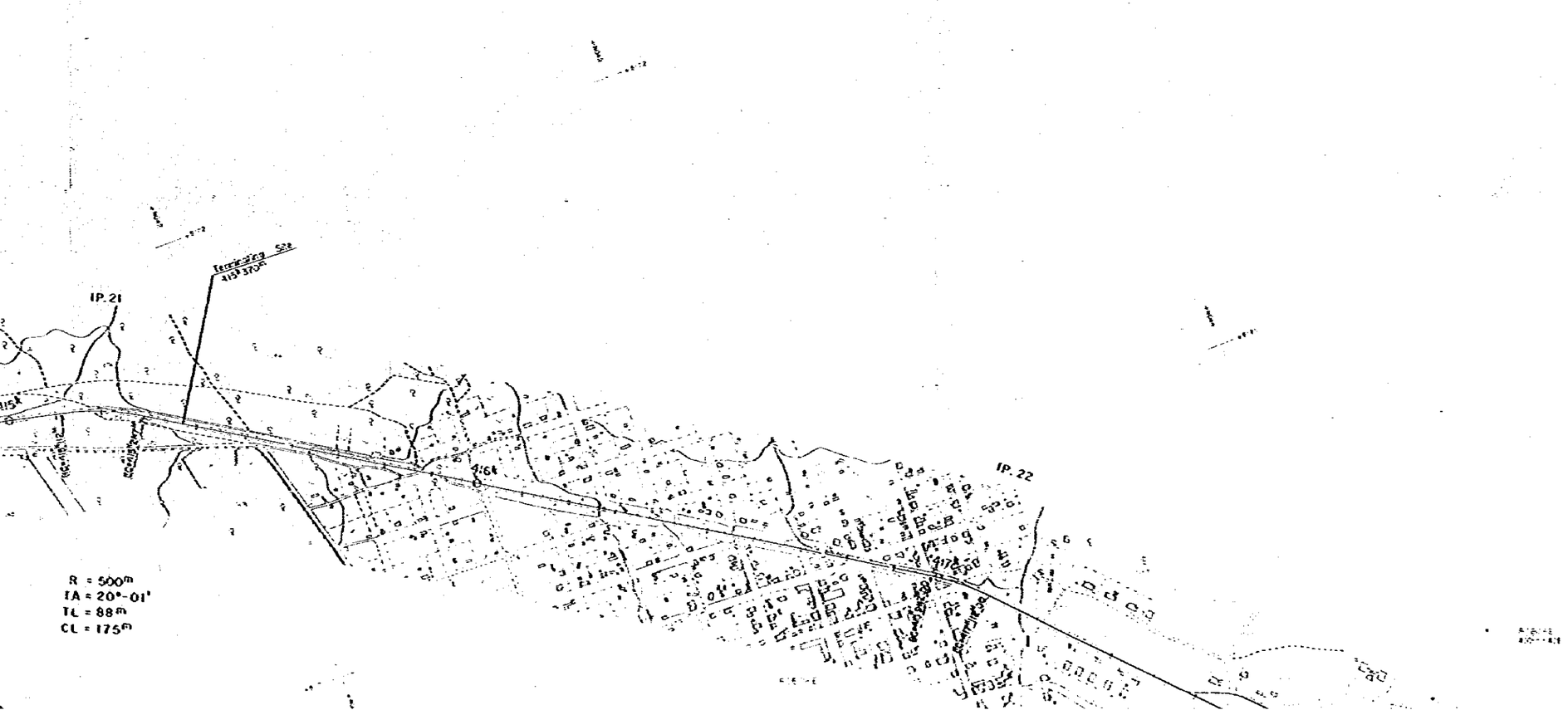
1. Photographic Flight——June 1989
2. Control Point Survey——June 1989
3. Detail Compilation——October 1989
4. Datum Station——LGM Pangaloma Point
   Mark
   LGM Leveling Point
   LL 151 LL 153
   LL 189 LL 191
   LL 193 BG 27

1 : 5000
BOLIVIA

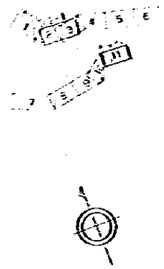
RAILWAY C



RAILWAY CONSTRUCTION PROJECT (TAPERAS – ROBORE)



NO.11



LEGEND

ROADS TRACKS ETC.

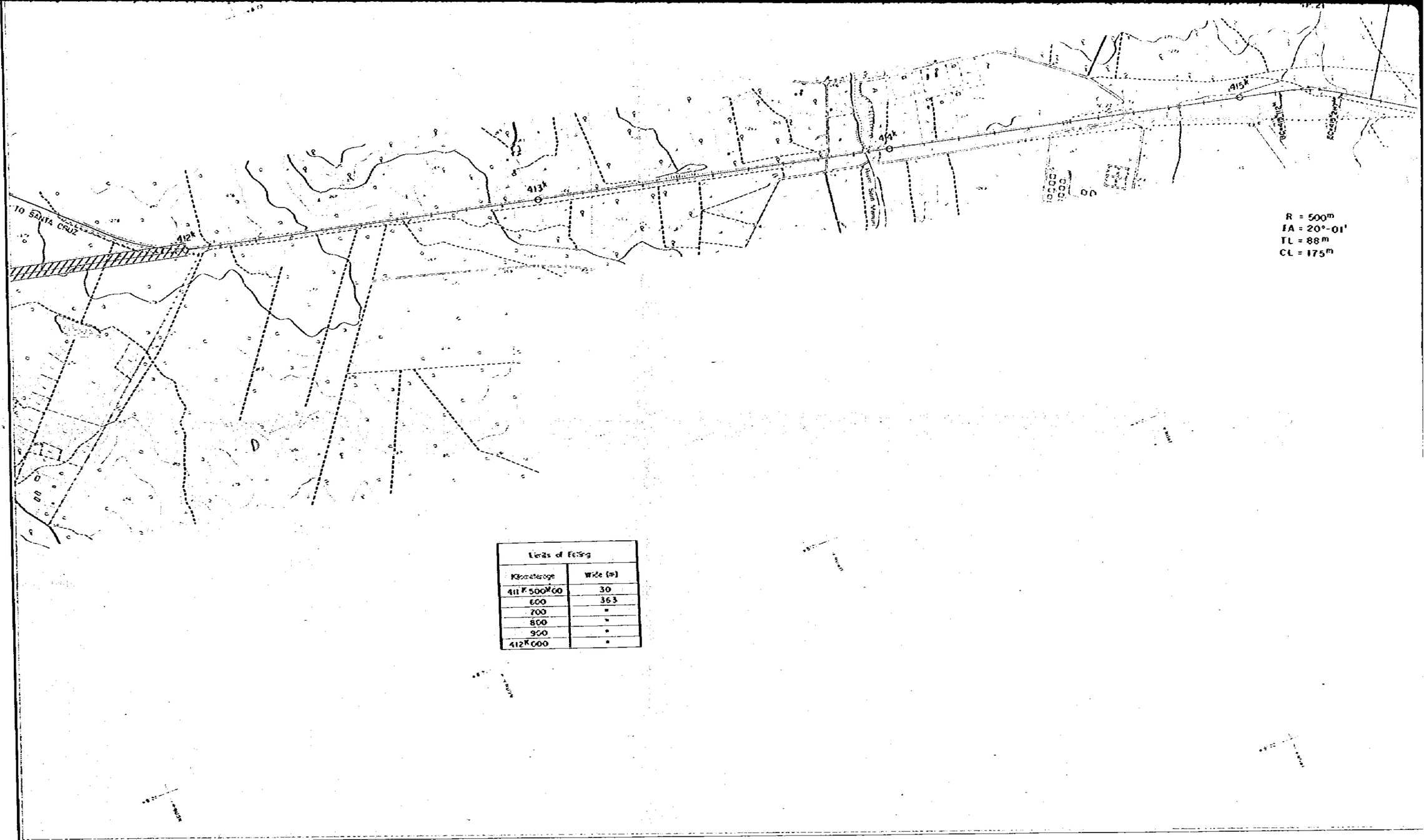
PALAYS ETC.

VEGETATIONS

MISCELLANEOUS

HYDROGRAPHY

CONTOURS AND TRAVERSE POINTS



Limits of Felling	
Kilometerage	Wide (m)
411K500M00	30
600	363
700	"
800	"
900	"
412K000	"

IP. 21

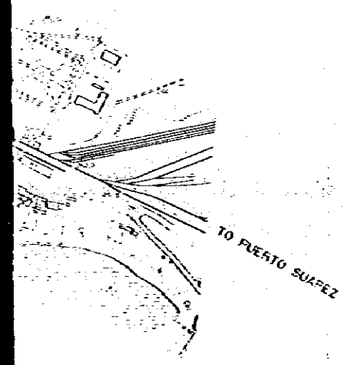
R = 500m
IA = 20°-01'
TL = 88m
CL = 175m

IP. 22

R = 500m
IA = 14°-51'
TL = 65m
CL = 130m

TO PUERTO SUAREZ

SCALE 1 : 5,000
METERS



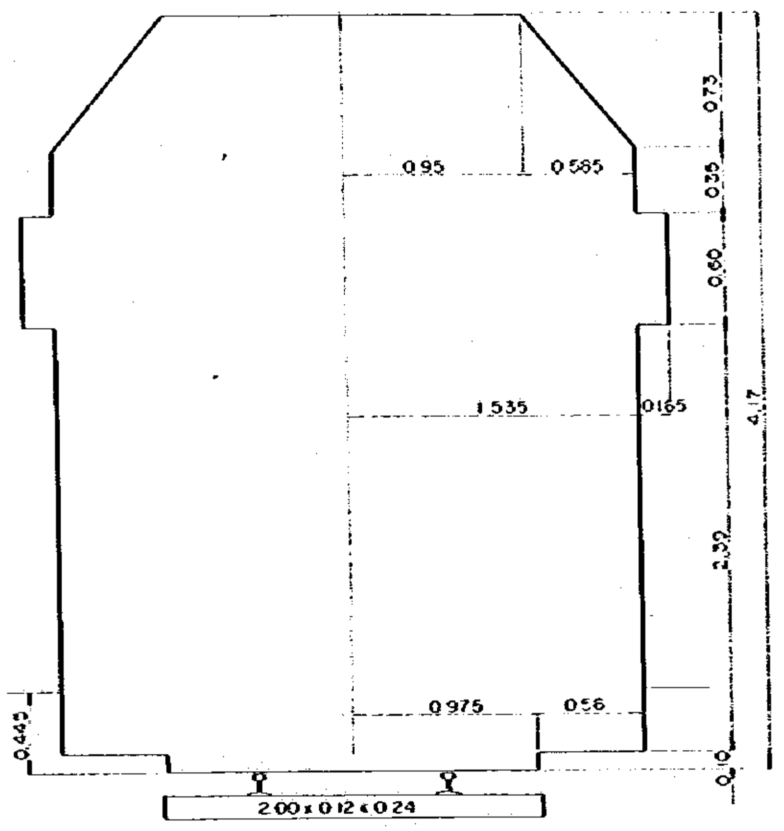
MISCELLANEOUS

HYDROGRAPHY

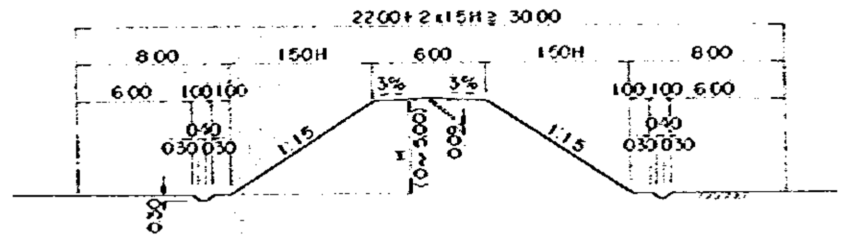
CONTOURS AND TRAVERSE POINTS

EMPRESA NACIONAL DE FERROCARRILES RAILWAY CONSTRUCTION PROJECT EASTERN LINE (TAPERAS-ROBORE)		
LIMIT OF FELLING (sheet 12 of 12)		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No 29

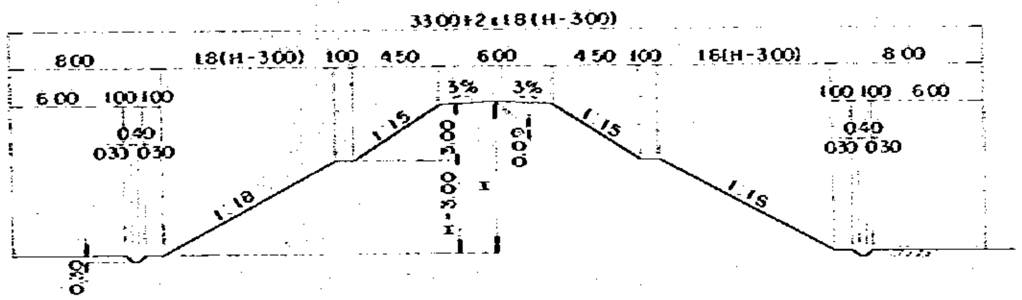
1. Photographic Flight ——— June 1980
2. Control Point Survey — June 1980
3. Detail Compilation ——— October 1980
4. Datum Station ——— 1:50 M Triangulation Point
Vera
1:50 M Leveling Point
LL 151 LL 153
LL 189 LL 191
LL 153 BG 27



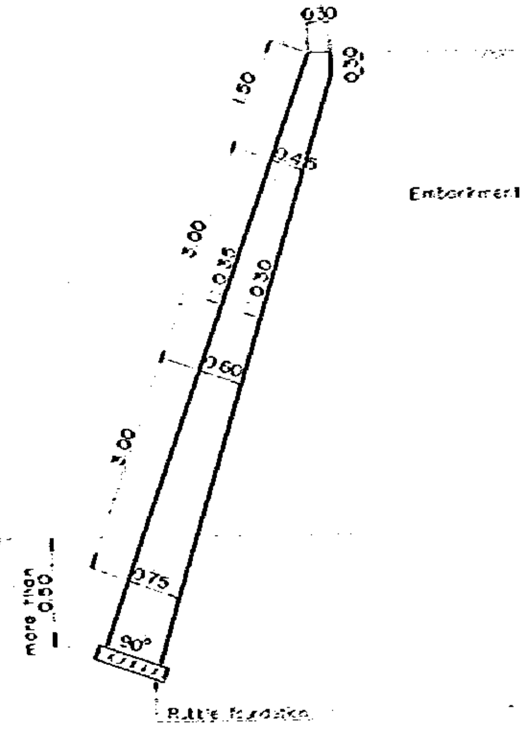
Track Clearance S=1/20



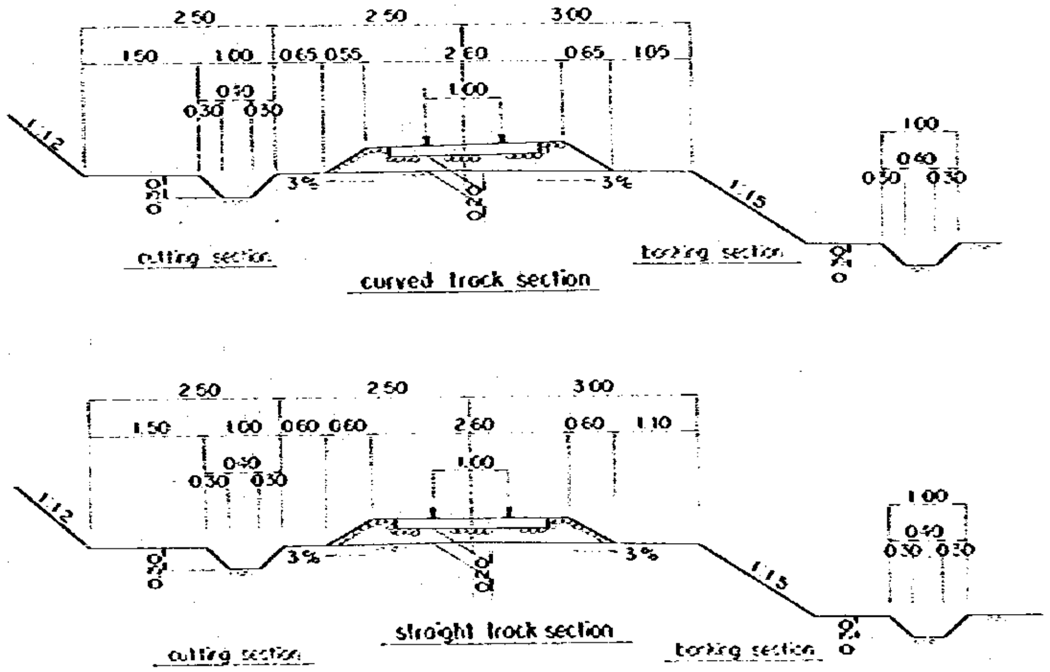
banking section (In case of embankment of less than 5.0m)



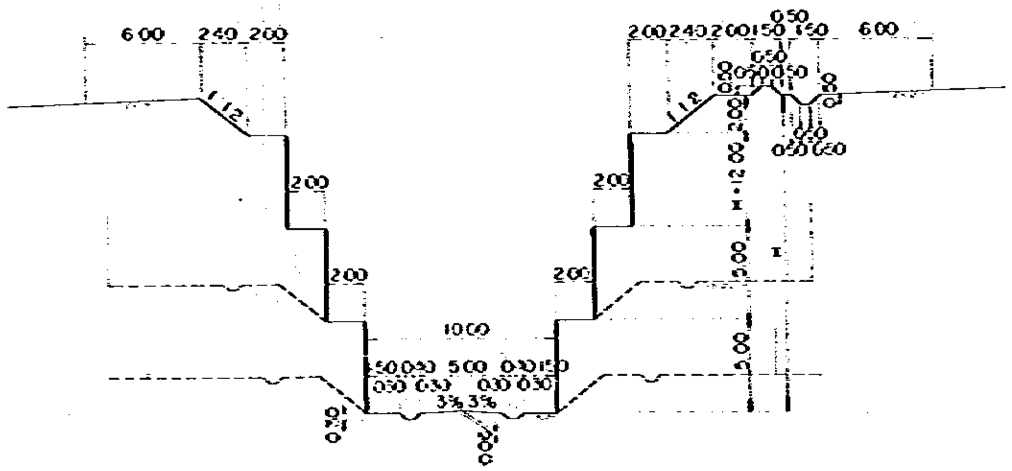
banking section (In case of embankment of more than 5.0m)



Typical section of plain concrete sheathing S=1/50



Track Construction



cutting section

Roadway Dimension

EMPRESA NACIONAL DE FERROCARRILES

RAILWAY CONSTRUCTION PROJECT EASTERN LINE

ROADWAY DIVENSION

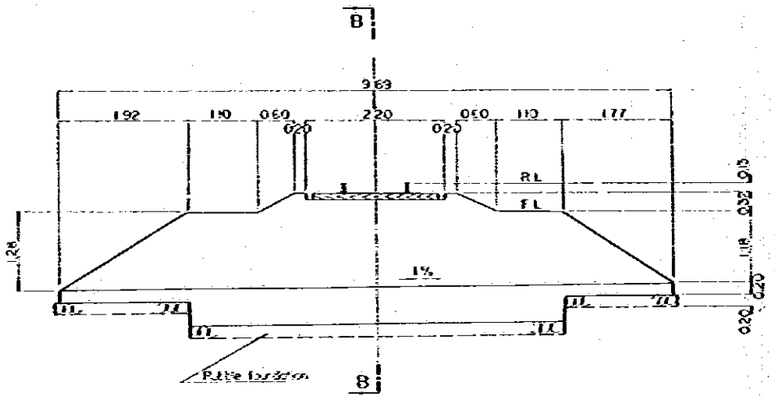
Executing Enterprise

Drawn by Date	Checked by Date	Approved by Date

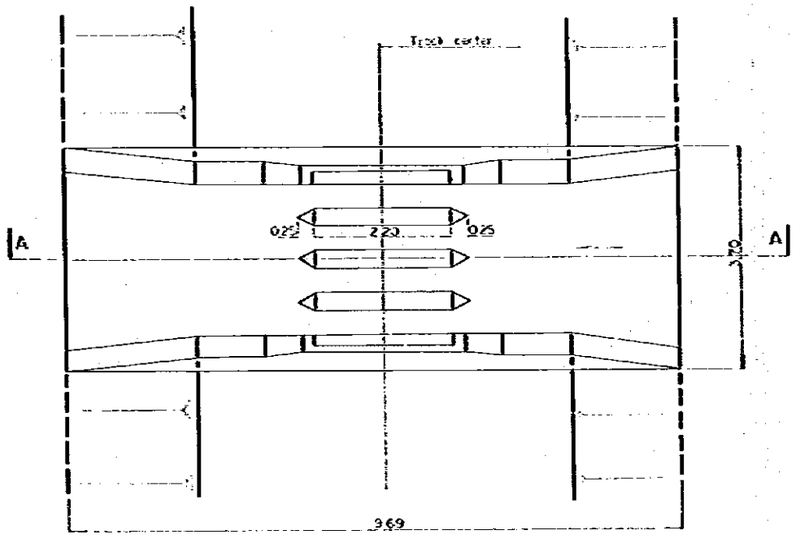
Controlling Enterprise

Checked by Date	Approved by Date

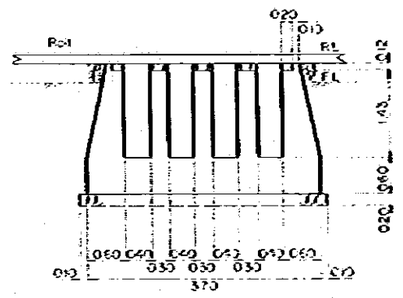
30



SECTION A – A S:1/50



PLAN S:1/50



SECTION B – B S:1/50

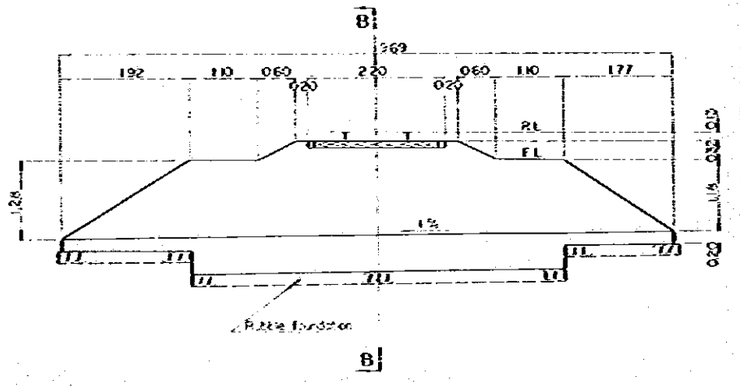
Note

- Concrete : class B

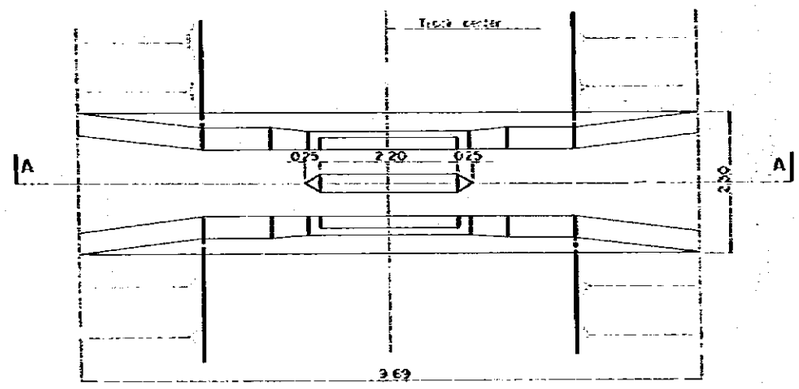
TYPICAL OF OPEN DRAINAG (Do 4)

GENERAL VIEW

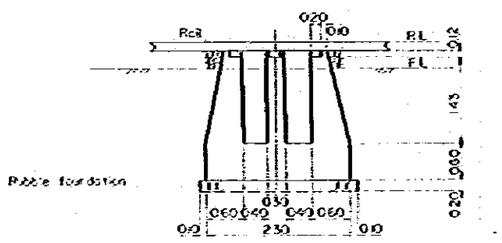
31



SECTION A – A S:1/50



PLAN S:1/50



SECTION B – B S:1/50

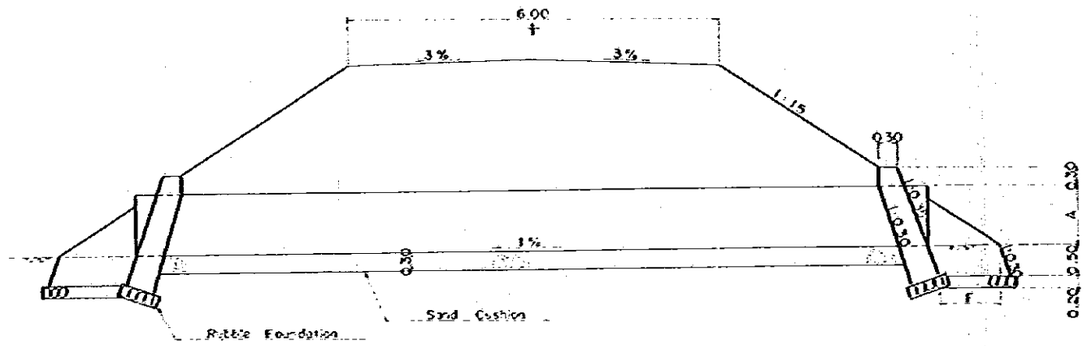
Note

Concrete : class B

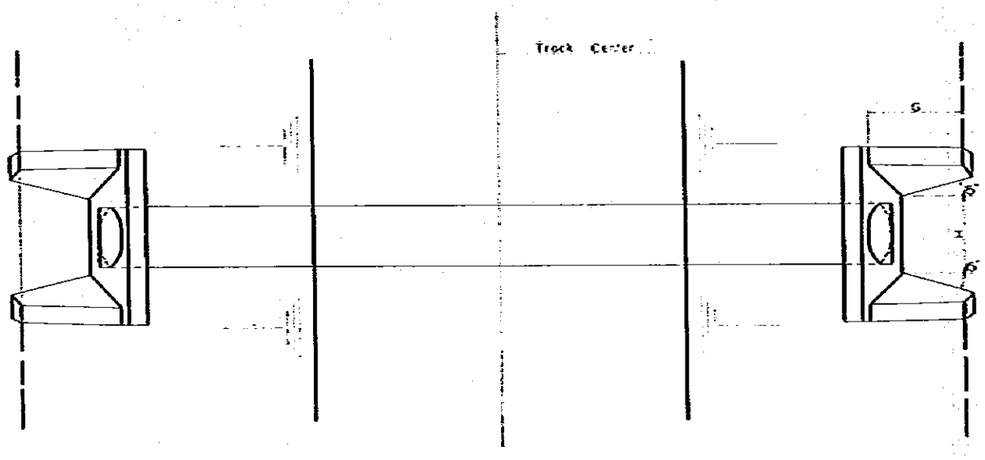
TYPICAL OF OPEN DRAINAG (Do 2)

GENERAL VIEW

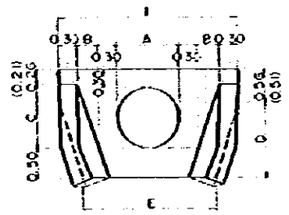
32



TYPICAL SECTION S=1/50



PLAN S=1/50



Note
( ) Incase of embankment higher than 50m. in height

FRONT VIEW S=1/50

TABLE OF DIMENSTION (UNITE m)

1. Embankment Hight than 50m. in height

A (ø)	B	C	D	E	F	G	H	I
0.80 m	029	084	104	196	080	127	105	258
100	036	104	124	218	102	156	125	292
120	043	124	144	240	125	186	145	326

2. Embankment higher than 50m. in height

A (ø)	B	C	D	E	F	G	H	I
0.80 m	031	089	109	196	111	160	105	262
100	038	109	129	218	140	196	125	296
120	045	129	149	240	169	232	145	330

Note
Concrete : Class C

ENTERPRISE NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE

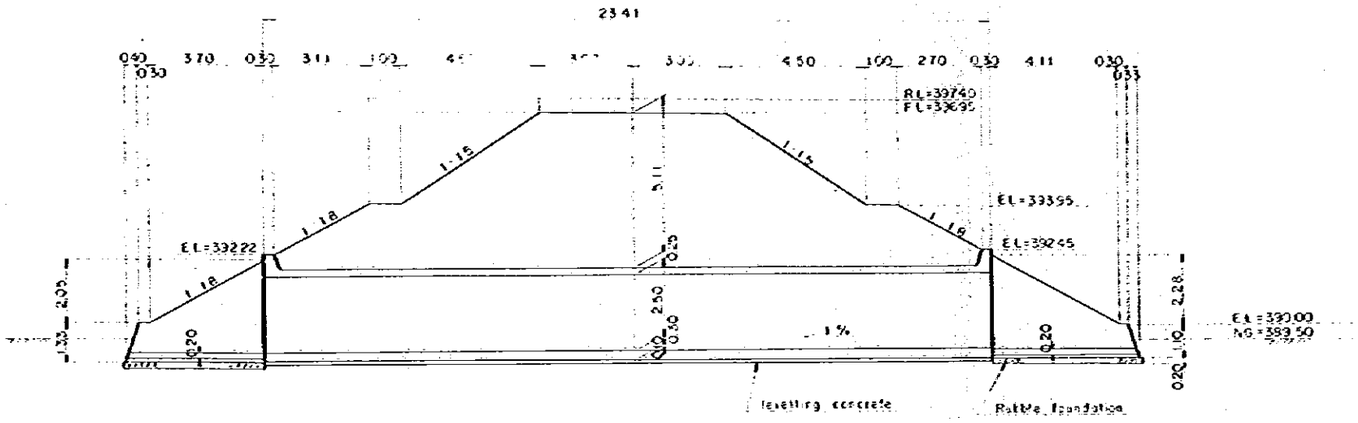
TYPICAL OF DRAINAGE PIPE (Dp)

GENERAL VIEW

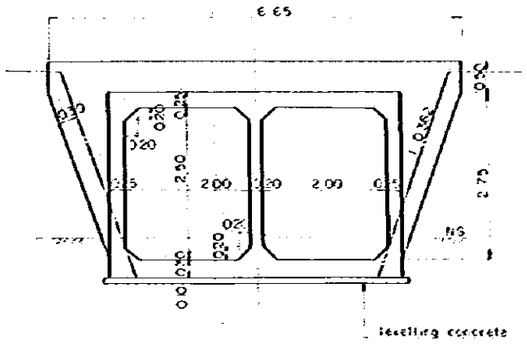
Design by Engineer

Drawn by Date Checked by Date Approved by Date

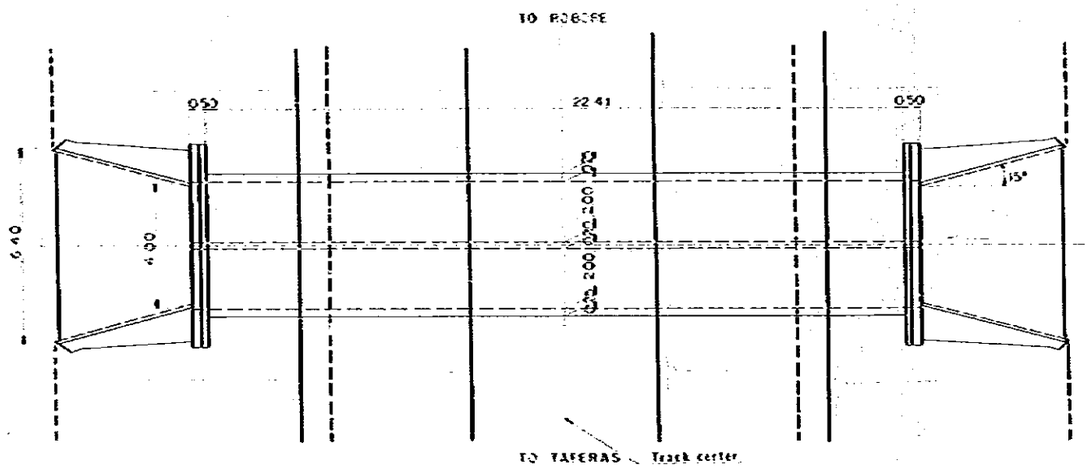
Checked by Date Approved by Date



Section S=1/100

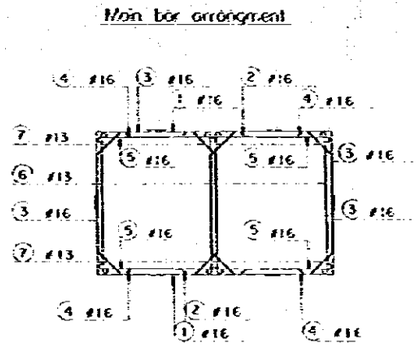


Front View S=1/50

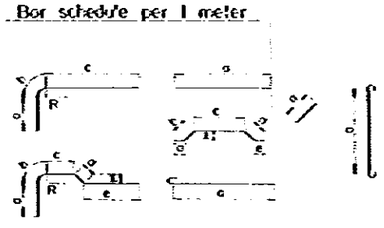


Plan S=1/100

Main bar arrangement



Bar schedule per 1 meter



No	DIA (mm)	a	b	c	d	e	R	H	TOTAL NUMBER	LENGTH (mm)
1	#16	2660							8	2660
2	"	240	113	1000	113	240		60	8	1710
3	"	1460	267	1210			170		16	2910
4	"	1460	267	470	113	1800	170	80	16	4110
5	"	2400							16	2630
6	#13	2670							16	3070
7	"	600							32	600

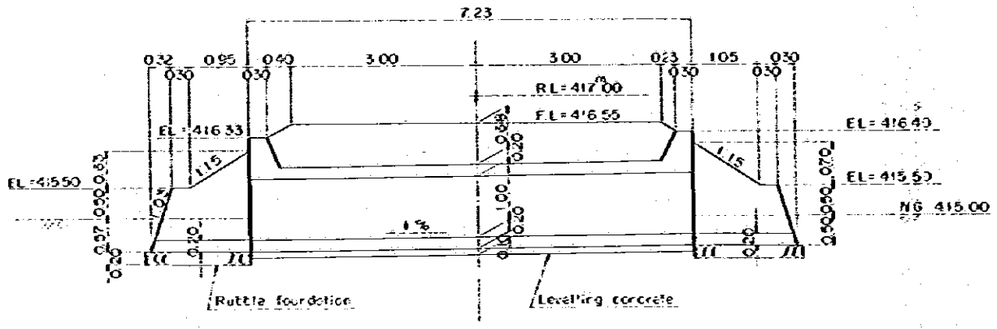
Note

The class of concrete

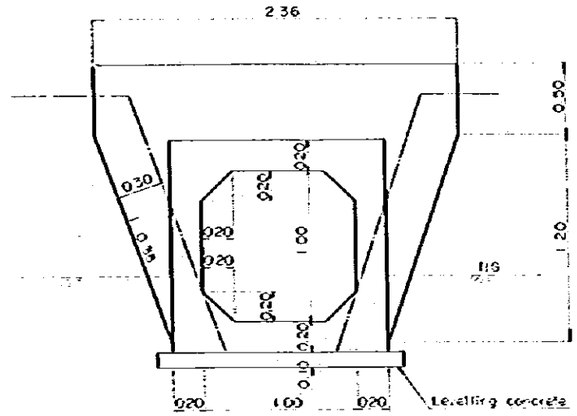
Box culvert	class A
Sheathing	class C
Levelling	class D

EMPRESA NACIONAL DE FERROVIARIOS

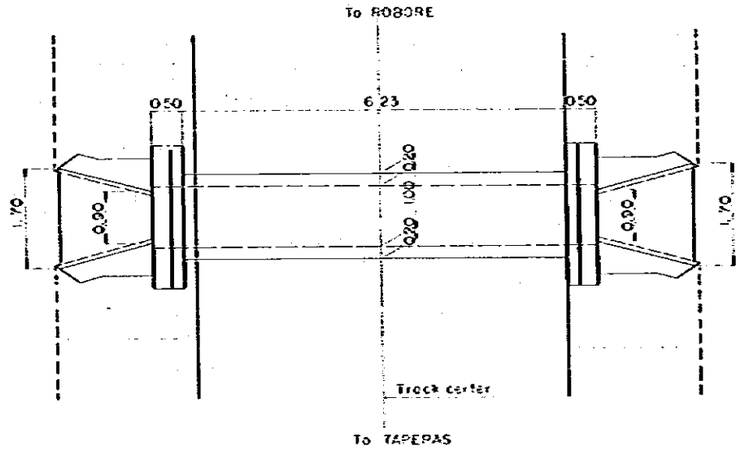
312[R]740[M] No 1 Cb
BOX CULVERT
GENERAL VIEW



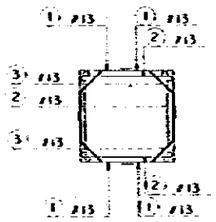
Section S=1/50



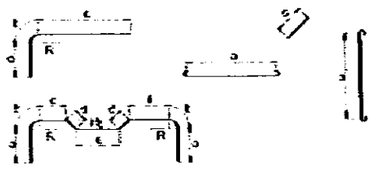
Front View S=1/20



Plan S=1/50



Main bar Arrangment



Bar schedule per 1 meter

No	C.A (mm)	a	b	c	d	e	f	R	H	No. of bars	Length (mm)
1	Ø13	345	220	345				130		32	2110
2	"	1670								24	2070
3	"	550								16	553

Note

The class of concrete

a Box culvert : class A

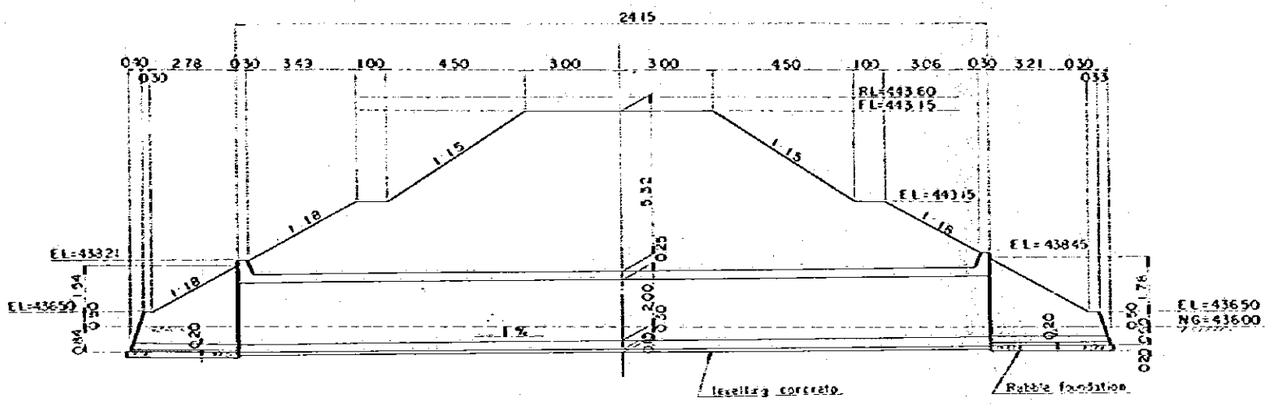
b Sreathing : class C

c Levelling : class D

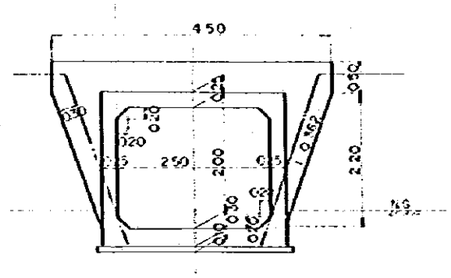
EXPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE
(KUTUS-ENCED)

$3.14^{M} \times 7.00^{M}$ NO 2 Cb
BOX CULVERT
GENERAL VIEW

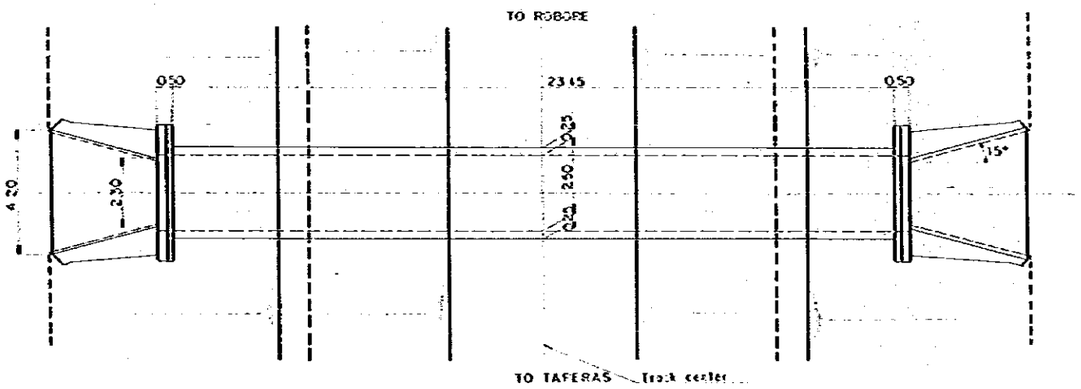
Executing Enterprise		
Drawn by Date	Checked by Date	Agreed by Date
Contracting Enterprise		
Checked by Date	Agreed by Date	No 35



Section s=1/100

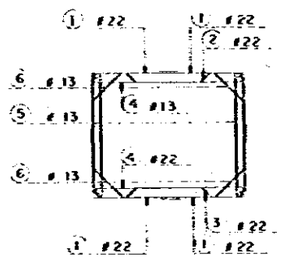


Front View s=1/50

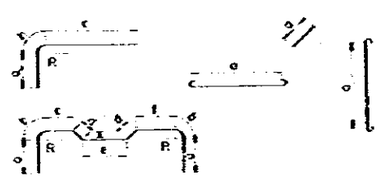


Plan s=1/100

Main bar Arrangment



Bar schedule per 1 meter



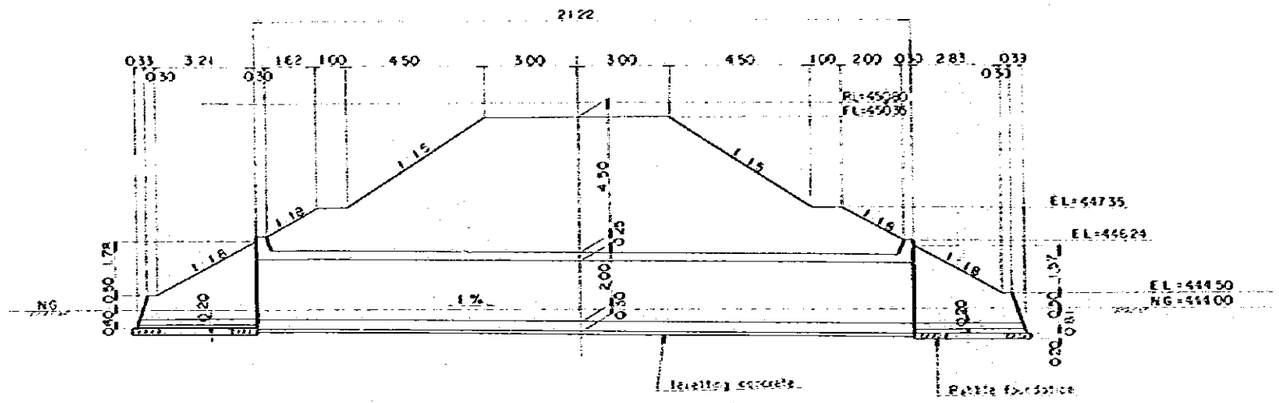
No	DIA (mm)	c	b	a	d	e	f	R	H	No. of BARS	LENGTH (mm)
①	ϕ22	1330	377	1530				240		16	3 240
②	"	1330	377	330	164	1360	330	240	130	4	5 930
③	"	1330	377	330	255	1260	330	240	130	4	5 970
④	"	2710								8	3 310
⑤	ϕ13	2320								8	2 720
⑥	"	800								16	800

Note

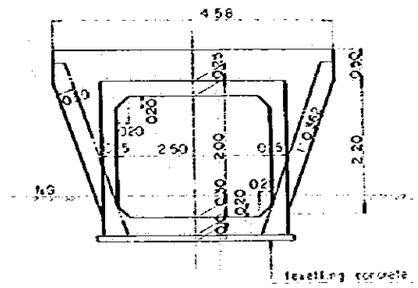
The class of concrete

Box culvert : class A
Steeling : class C
Levelling : class D

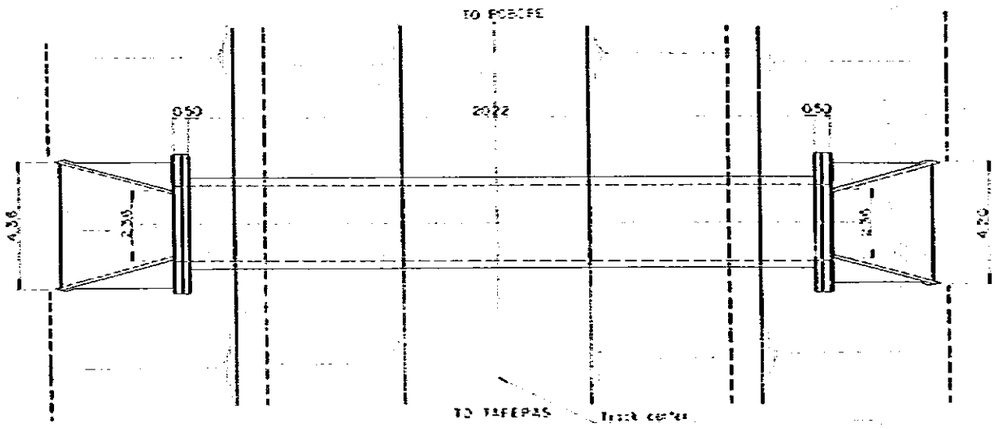
ENTREPRISE NATIONALE DES TRAVAUX AUX PUBLICS
317E360M No 3 CB
BOX CULVERT
GENERAL VIEW
Dessiné le
Vérifié le
Approuvé le
36



Section S=1/100

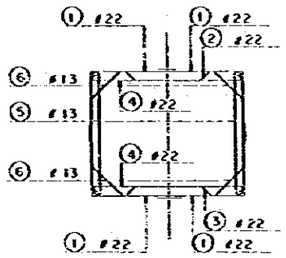


Front View

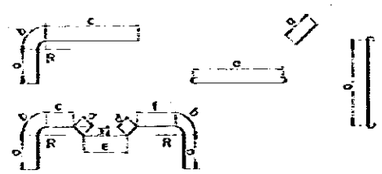


Plan S=1/100

Main bar Arrangment



Bar schedule per 1 meter



No	DIA (ø)	a	b	c	d	e	f	R	H	TOTAL NUMBER	LENGTH (cm)
①	ø22	1350	377	1530				240		16	3 240
②	"	1330	377	330	184	1360	330	240	130	4	5 930
③	"	1333	377	390	255	1260	330	240	180	4	5 970
④	"	2710								8	3 310
⑤	ø13	2 300								8	2 720
⑥	"	800								16	830

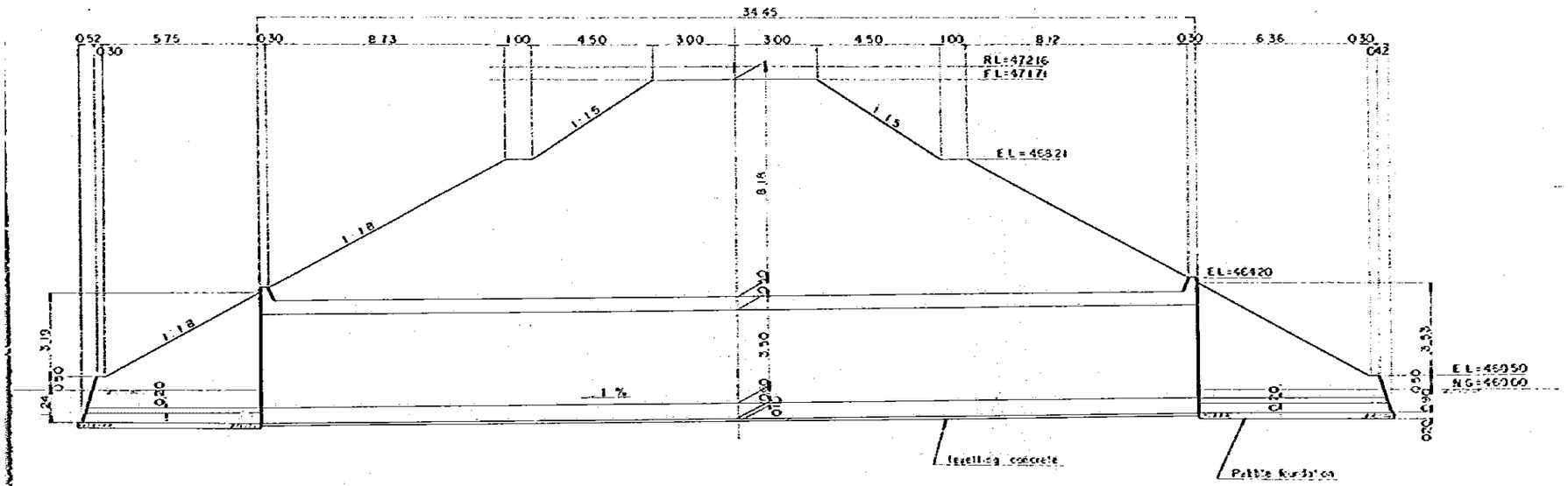
Note

The class of concrete

Box culvert	class	A
sheathing	class	C
Levelling	class	D

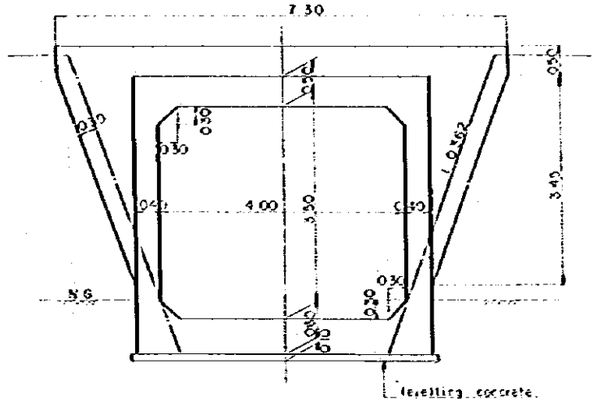
ENTREPRISE NATIONALE DES PRODUITS MINIERS
DIRECTION CONSTRUCTION SERVICE BASSIN LINE

324*400M No 4 Cb
BOX CULVERT
GENERAL VIEW

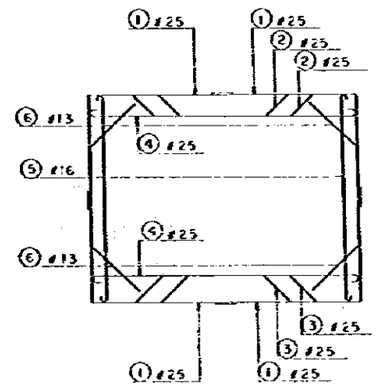


Section S=1/100

Plan S=1/100

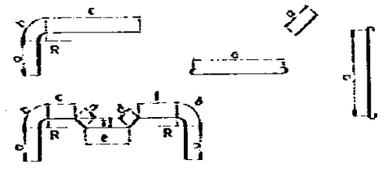


Front View S=1/50



Main Bar Arrangment

Bar schedule per 1 meter



No	Dia (mm)	a	b	c	d	e	f	R	H	TOTAL NUMBER	LENGTH (m)
①	ø25	2 135	424	2 695				270		16	5 320
②	"	2 135	424	600	608	2 288	1100	270	430	4	10 240
③	"	2 135	424	600	750	1 880	1100	270	530	4	10 320
④	"	5 003								8	5 700
⑤	ø16	4 000								8	4 460
⑥	ø13	1 200								16	1 200

Note

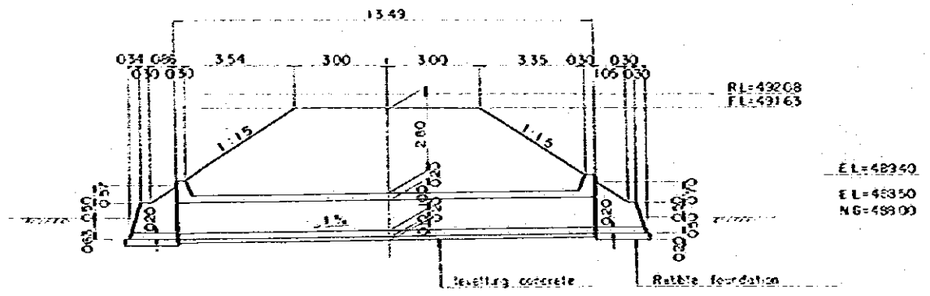
The class of concrete

Box culvert	class A
Strutting	class C
Leveling	class D

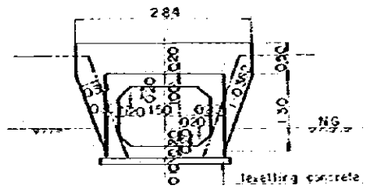
EMPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE

326K180M No 5 Cb
BOX CULVERT
GENERAL VIEW

Designed by
Traced by
Checked by
Approved by
Date
No 38

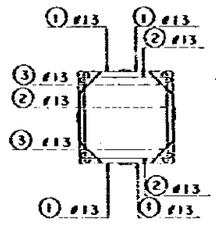


Section S=1/100



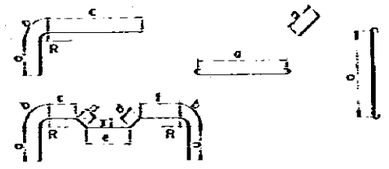
Front View S=1/50

Main bar Arrongment



Plan S=1/100

Bar schedule per 1 meter



No	DIA (mm)	a	b	c	d	e	f	R	H	No. of Bars	Length (cm)
①	ø13	345	220	345				140		32	2.110
②	"	1670								24	2.070
③	"	550								16	550

Note

The class of concrete

Box culvert	:	class A
Sheating	:	class C
Levelling	:	class D

EMPRESA NACIONAL De FERROCARRILES
RAILWAY CONSTRUCTION [illegible] OUT ERITREA LINE

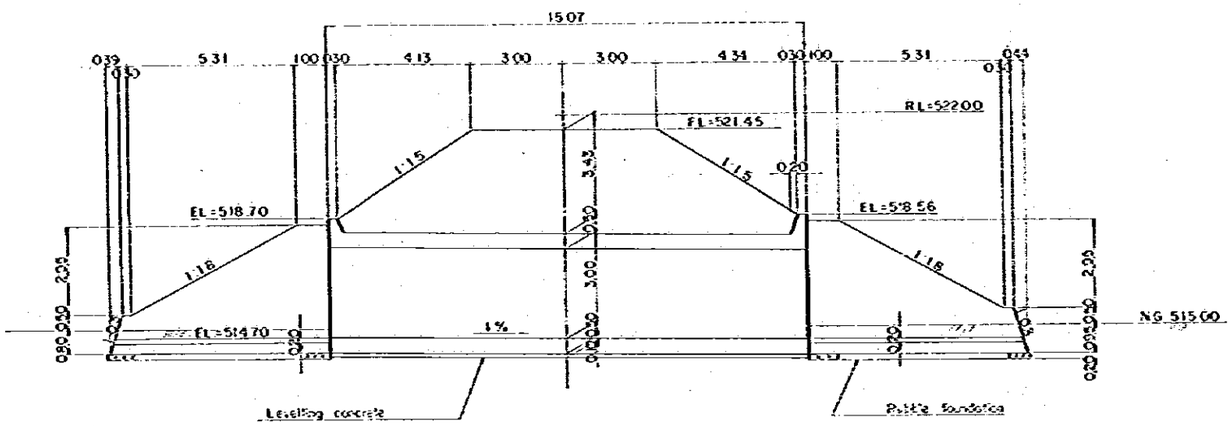
327K840M No 6 Cb
BOX CULVERT
GENERAL VIEW

Engineering Enterprise

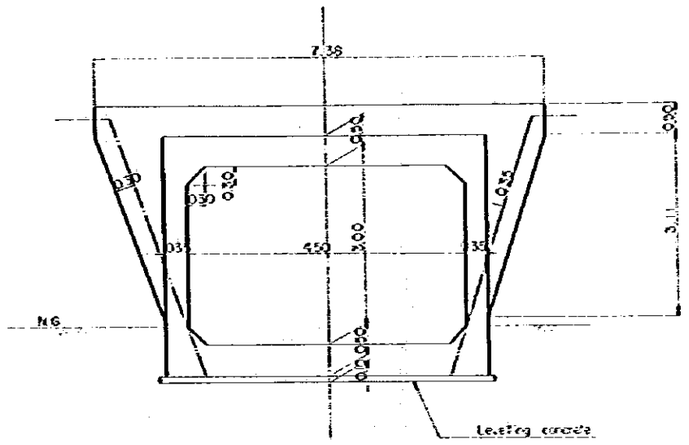
Drawn By [illegible] | Checked By [illegible] | Approved By [illegible]

Checked By [illegible] | Approved By [illegible]

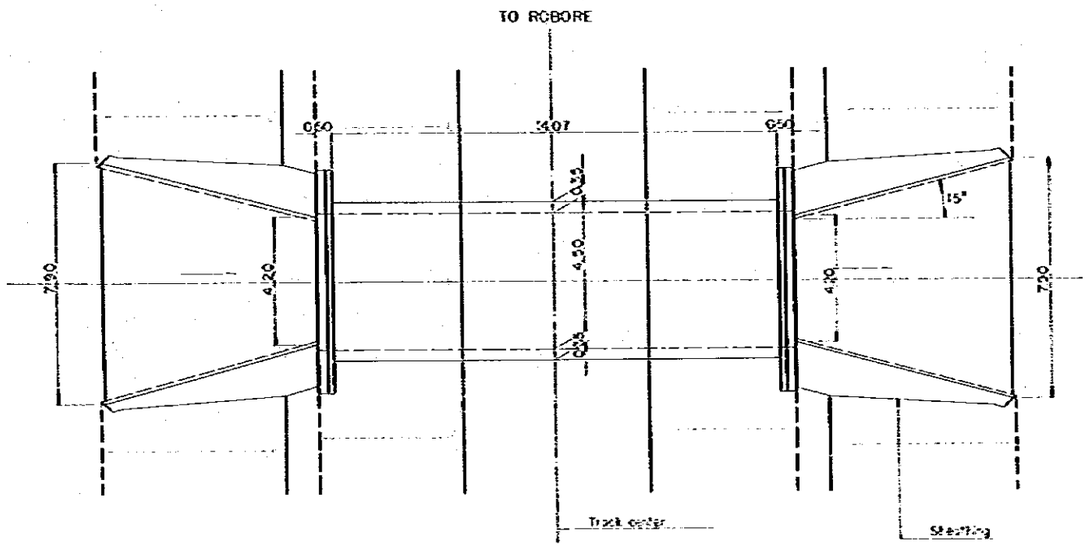
No. 39



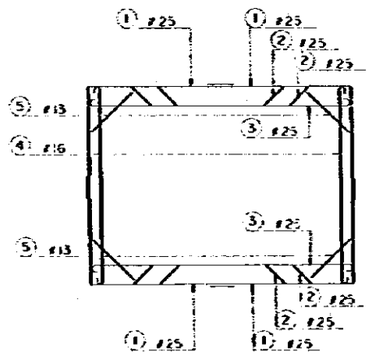
Section S=1/100



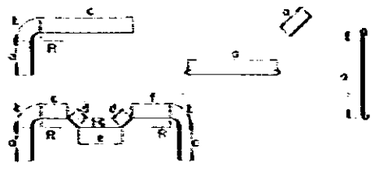
Front View S=1/50



Plan S=1/100



Main bar Arrangment



Bar schedule per 1 meter

No	DIA (mm)	a	b	c	d	e	f	R	H	No. PIECES	LENGTH (cm)
①	#25	2065	424	2645				270		15	5120
②	"	2645	424	650	537	2080	1100	270	360	8	3800
③	"	4880								8	5580
④	#16	3750								8	4210
⑤	#13	1200								15	1200

Note
The class of concrete
ⓐ Box culvert : class A
ⓑ Sleeping : class C
ⓒ Leveling : class D

EXPRESSA NACIONAL 17 PANAMERICANA
RAILWAY CONSTRUCTION PROJECT PANAMA LINE
(CHORRERA-SANTIAGO)

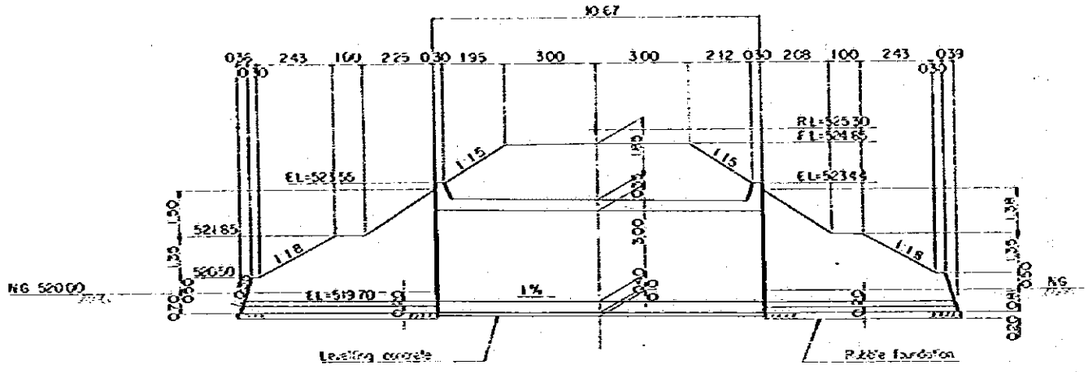
363K900M NO 7 Cb
BOX CULVERT
GENERAL VIEW

Executing Enterprise

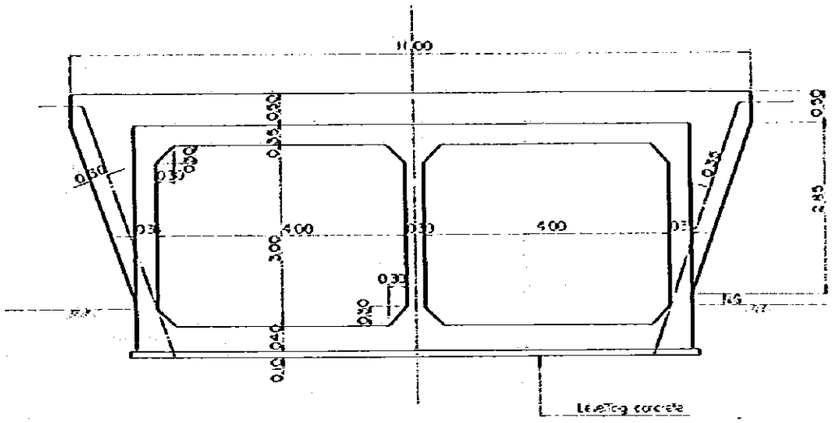
Drawn by Date	Checked by Date	Approved by Date

Contracting Enterprise

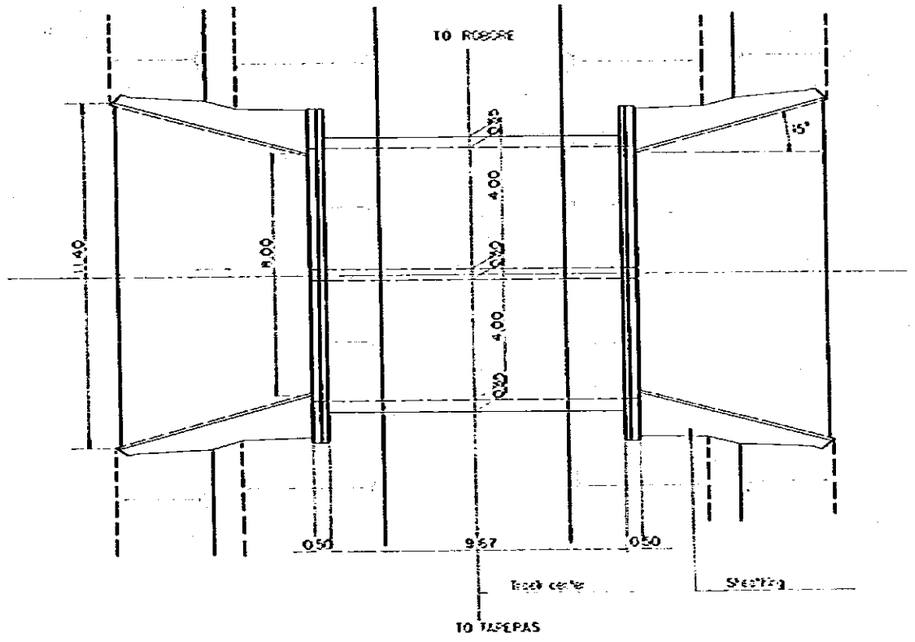
Checked by Date	Approved by Date	No. 40



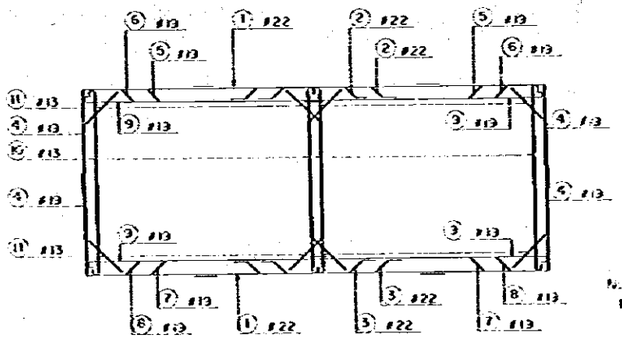
Section S=1/100



Front View S=1/50



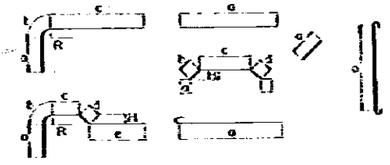
Plan S=1/100



Main bar Arengment

Note :
Bar interval 125mm

Note
The class of concrete
a) Box culvert : class A
b) Shotting : class C
c) Leveling : class D



Bar schedule per 1 meter

No	DIA (mm)	a	b	c	s	e	R	H	TOTAL NUMBER	LENGTH
①	#22	4870							8	4870
②	"	330	325	1700	325	330		230	4	3510
③	"	330	336	1700	336	330		280	4	3160
④	#13	1925	314	2375			200		16	4620
⑤	"	1325	314	1050	325	3200	200	230	4	6820
⑥	"	1325	314	550	325	3700	200	230	4	6820
⑦	"	1325	314	1050	336	3150	200	280	4	6840
⑧	"	1325	314	550	336	3650	200	280	4	6840
⑨	"	4600							16	4870
⑩	#13	3520							16	3320
⑪	"	1000							32	1000

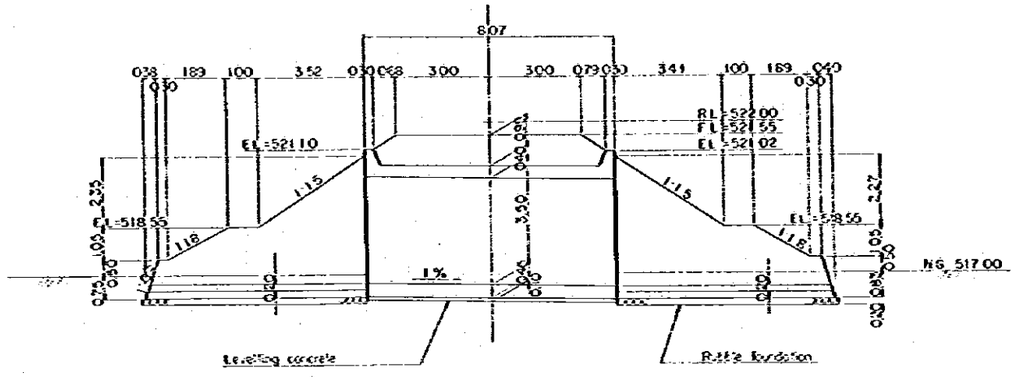
EMPRESA NACIONAL DE FERROCARRILES
NATIONAL CONSTRUCTION COMPANY EASTERN LINE

364K 860M NO.8 Cb
BOX CULVERT
GENERAL VIEW

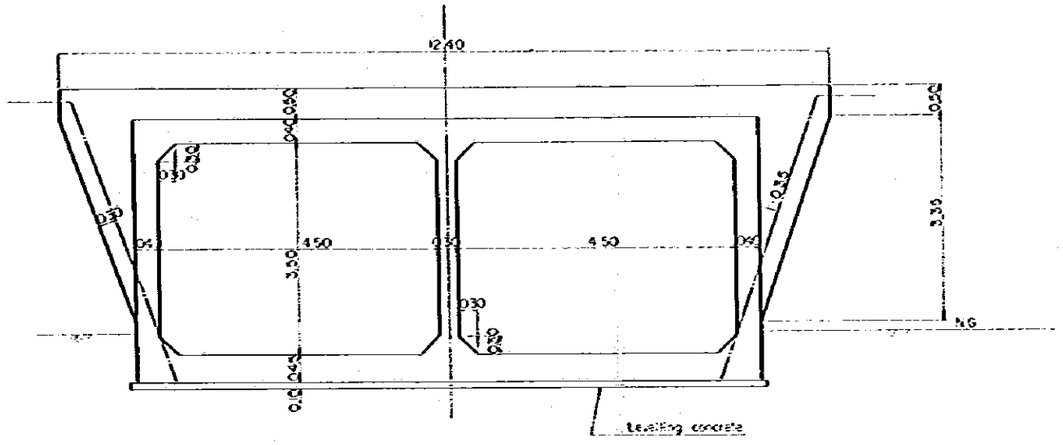
Existing

Drawn by Date | Checked by Date | Approved by Date
Contracting Enterprise

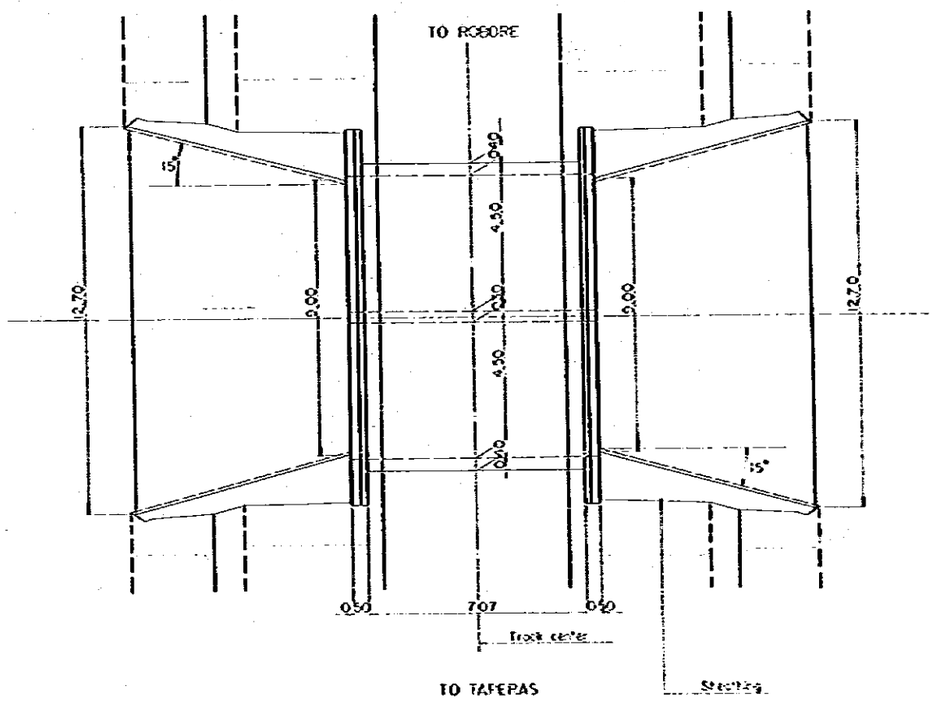
41



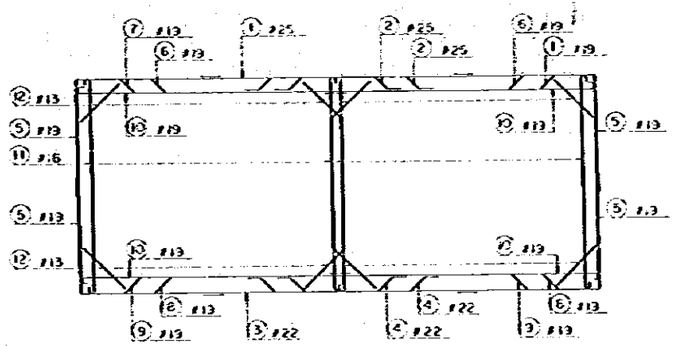
Section S=1/100



Front View S=1/50



Plan S=1/100



Main bar Arrangment

Bar schedule per 1 meter

No	DIA (mm)	a	b	c	d	e	f	g	NOS.	LENGTH (cm)
①	#25	5550							4	5550
②	"	375	336	2000	336	375		280	4	3550
③	#22	5460							4	5460
④	"	330	467	2000	467	33		330	4	3600
⑤	#13	2165	314	2705			200		16	5130
⑥	"	2165	314	1250	330	3500	200	280	4	7630
⑦	"	2165	314	650	330	4100	200	280	4	7630
⑧	"	2165	314	1250	467	3450	200	330	4	7650
⑨	"	2163	314	650	467	4050	200	330	4	7650
⑩	"	5150							16	5420
⑪	#16	4100							16	4560
⑫	#13	1100							32	1100

Note
The class of concrete
ⓒ Box culvert : class A
ⓔ Shearing : class C
ⓒ Leveling : class D

ENTES NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE

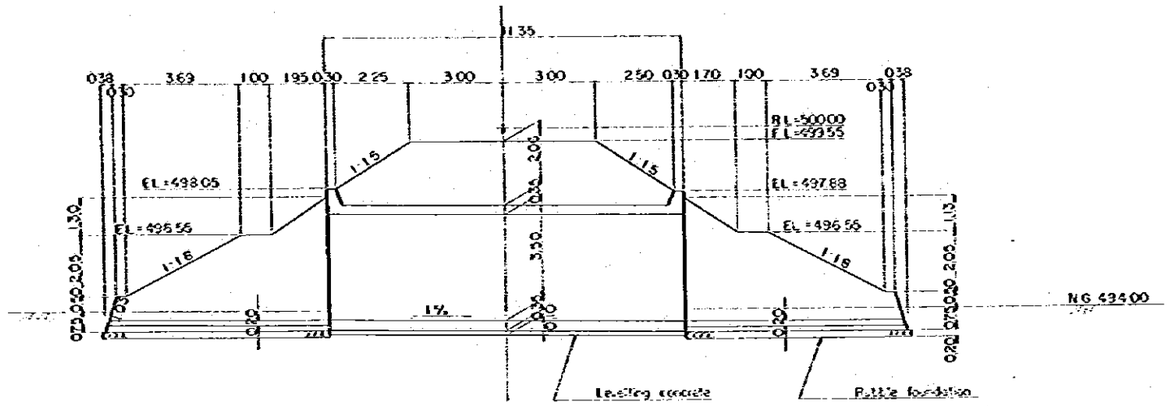
368*930M NO.9 Cb
BOX CULVERT
GENERAL VIEW

Executing Enterprise

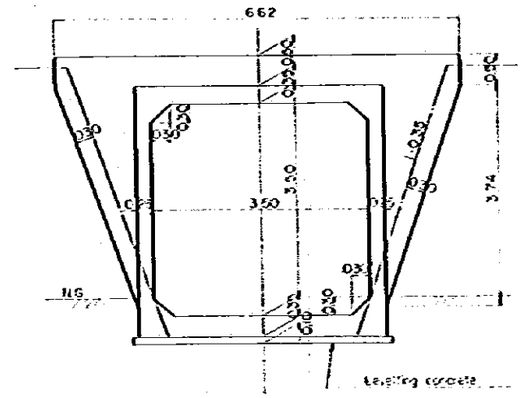
Drawn by Date | Checked by Date | Approved by Date

Construction Enterprise

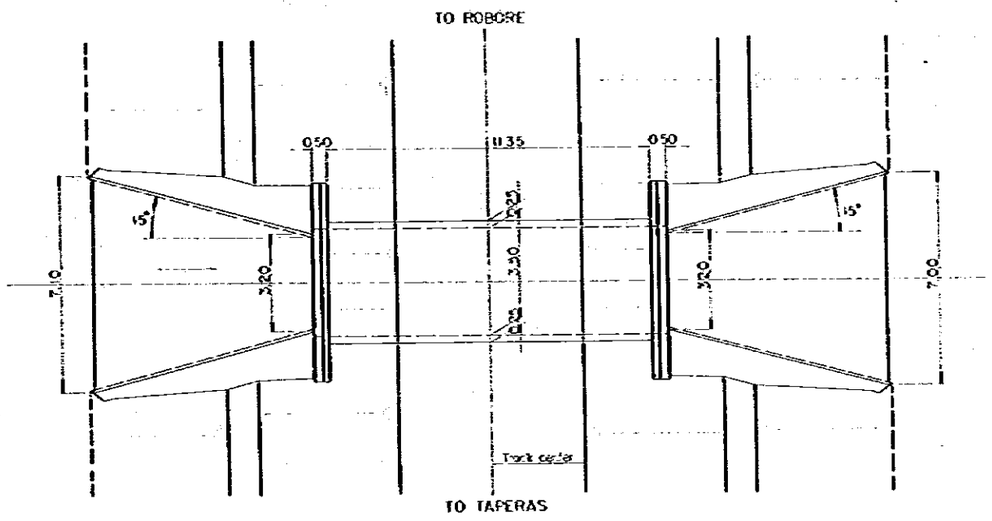
No. 42



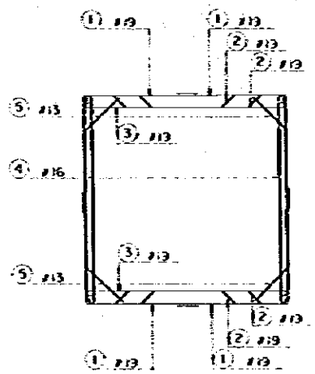
Section S=1/100



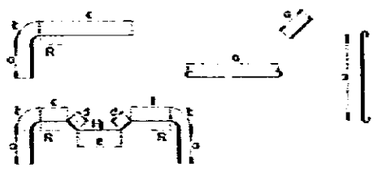
Front View S=1/50



Plan S=1/100



Main bar Arrangment



Bar schedule per 1 meter

No	DIA (Ø)	a	b	c	d	e	f	R	H	No. OF PIECES	LENGTH (cm)
①	#13	2125	314	2025				230		12	4370
②	"	2125	314	350	325	1820	650	200	230	8	6550
③	"	3730								8	4270
④	#16	3350								5	4410
⑤	#13	1000								16	1000

Note

The class of concrete

ⓐ Box culvert : class A
ⓑ Shooting : class C
ⓒ Leveling : class D

EMPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE

376K700M NO.10 CB
BOX CULVERT
GENERAL VIEW

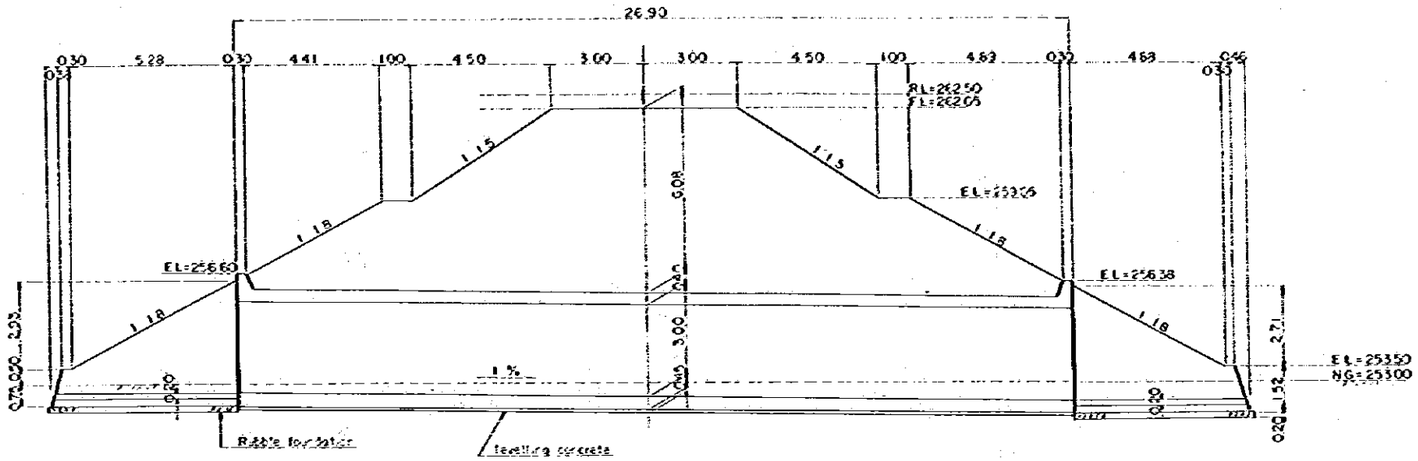
Executing Enterprise

Drawn by Date | Checked by Date | Approved by Date

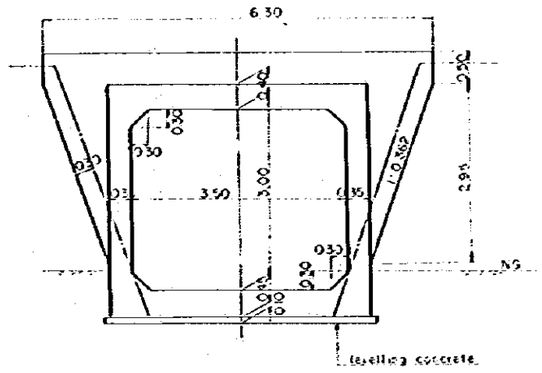
Contracting Entity Date

Approved by Date

No. 43

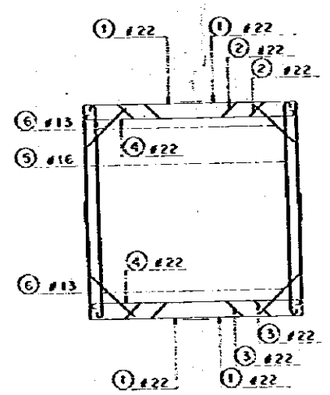


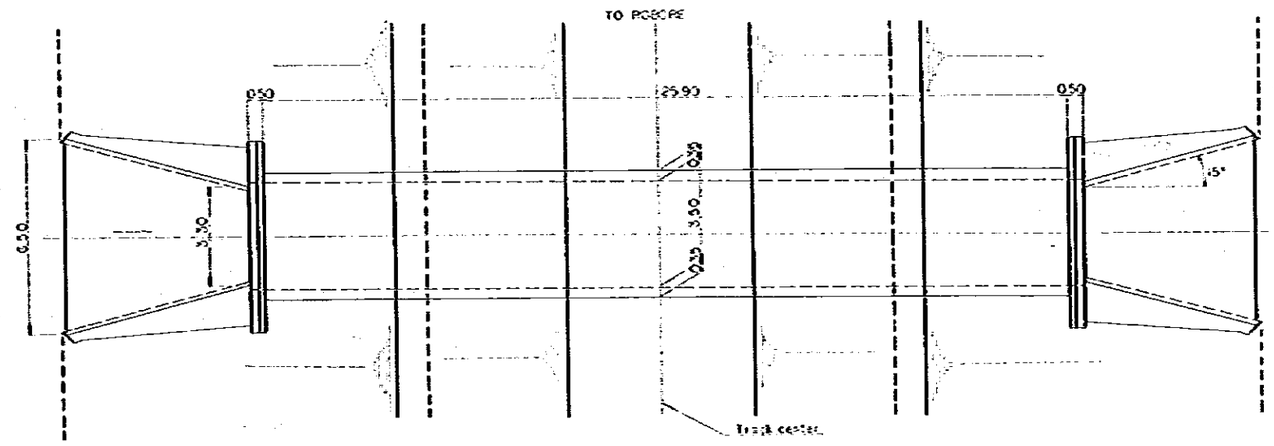
Section S=1/100



Front View S=1/50

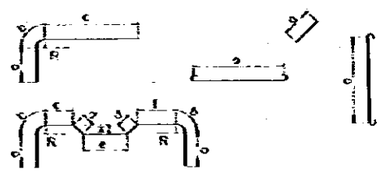
Main bar Arrangement





Plan S=1/100

Bar schedule per 1 meter



No	DIA (ø)	a	b	c	d	e	f	R	H	NOS/M (NOS)	LENGTH (cm)
①	ø22	2 230	377	2 083				240		16	4 690
②	"	2 233	377	400	336	1640	900	240	280	4	8 350
③	"	2 230	377	400	457	1540	900	240	330	4	8 930
④	"	3 610								8	4 410
⑤	ø16	4 100								8	4 560
⑥	ø13	1 000								16	1 000

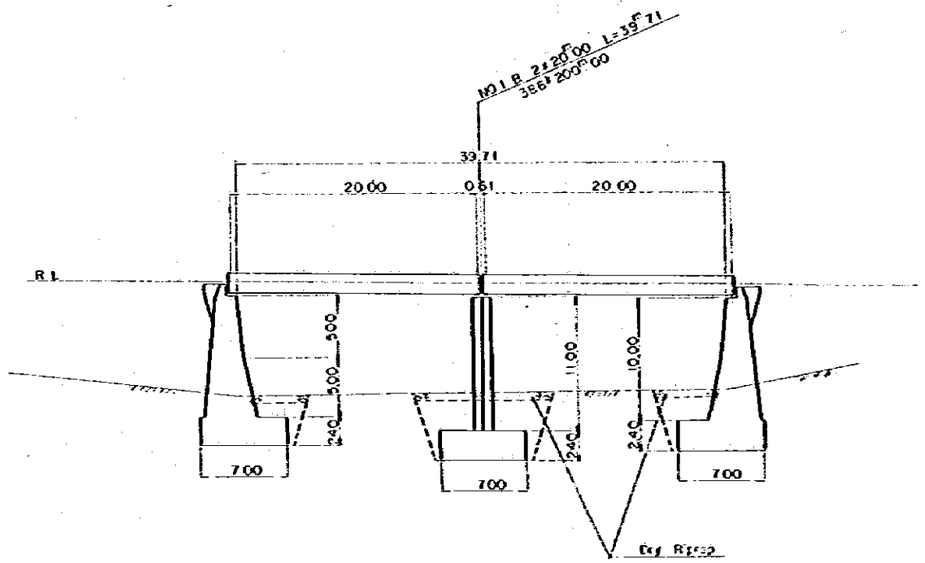
Note

The class of concrete

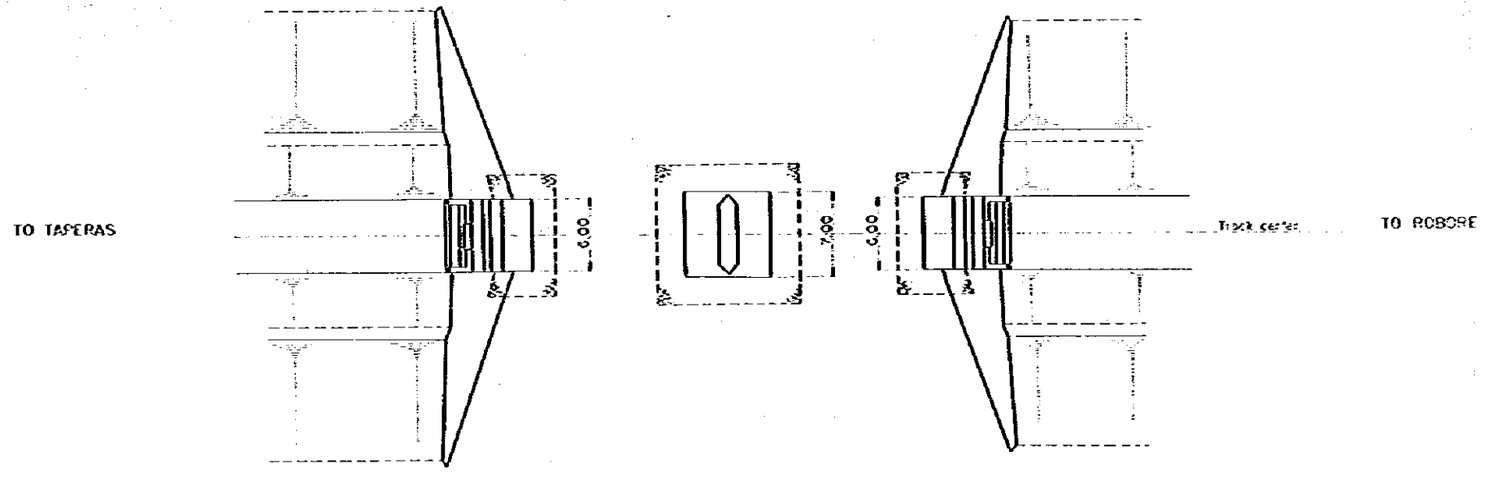
Box culvert	class A
Sheeting	class C
Levelling	class D

SOCIETE NATIONALE DES CHEMINS DE FER CAMEROUNAIS

408[R]950[M] No II Cb
BOX CULVERT
GENERAL VIEW

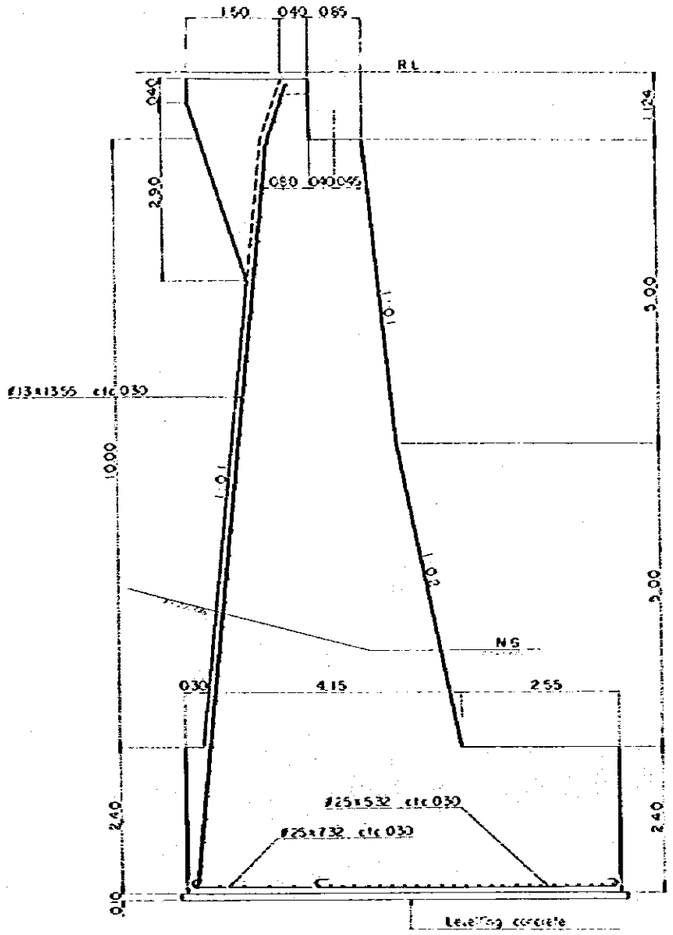


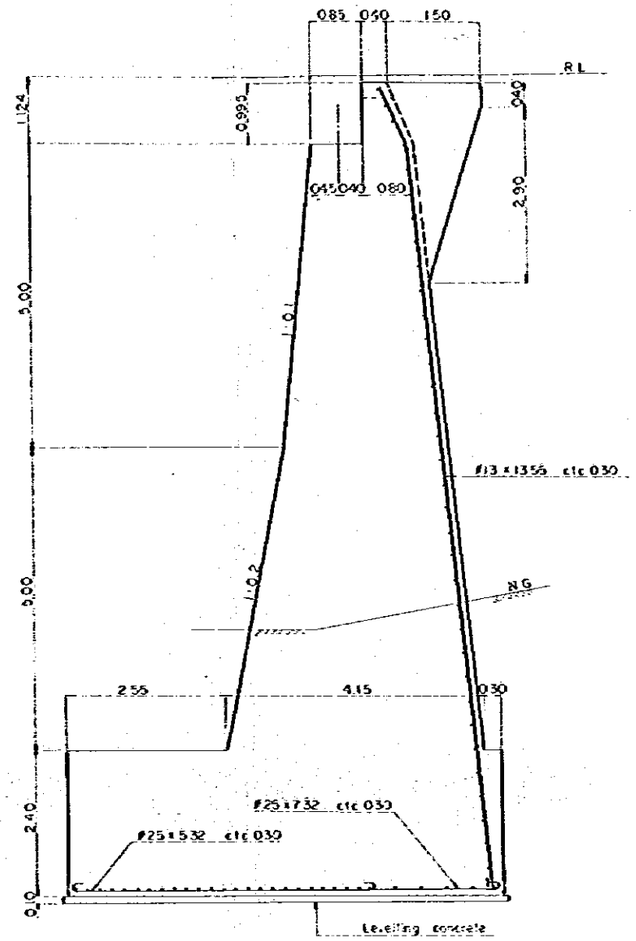
longitudinal section



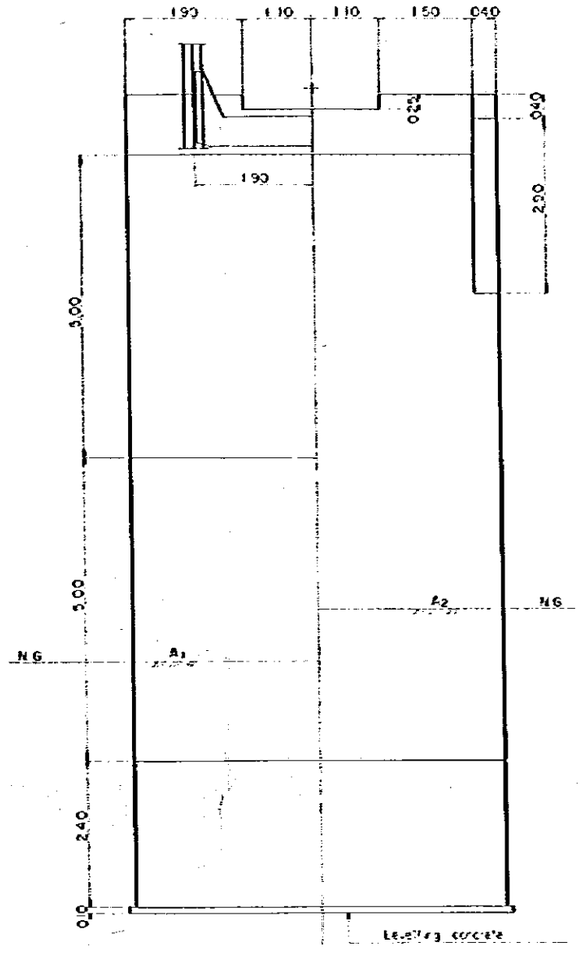
Plan S=1/250

EMPRESA NACIONAL DE FERROCARRILES RAILWAY CONSTRUCTION PROJECT EASTERN LINE (TAZARA)
NO.1 BRIDGE GENERAL VIEW
Executing Enterprise
Drawn by Date / Checked by Date / Approved by Date
Contracting Enterprise
Checked by Date / Approved by Date / No. 45



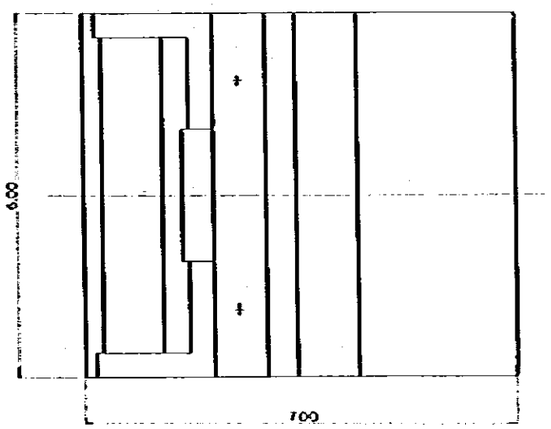


Side View s=1/100

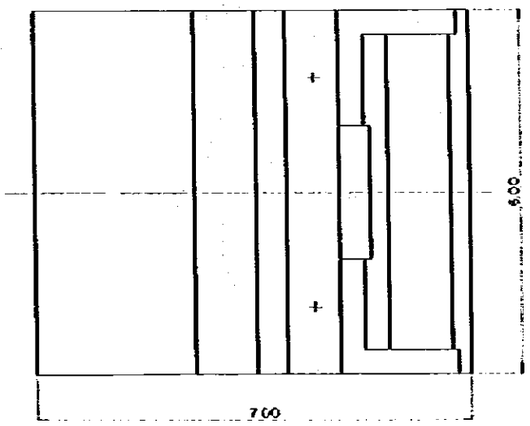


(A1) Abutment side Front View

(A2) Abutment side Back View



TO TAPERAS



TO ROBORE

Plan s=1/100

Note

Structure concrete class B

Levelling concrete class D

EMPRESA NACIONAL DE FERROCARRILES

RAILWAY CONSTRUCTION PROJECT EASTERN LINE

NO. 1 BRIDGE

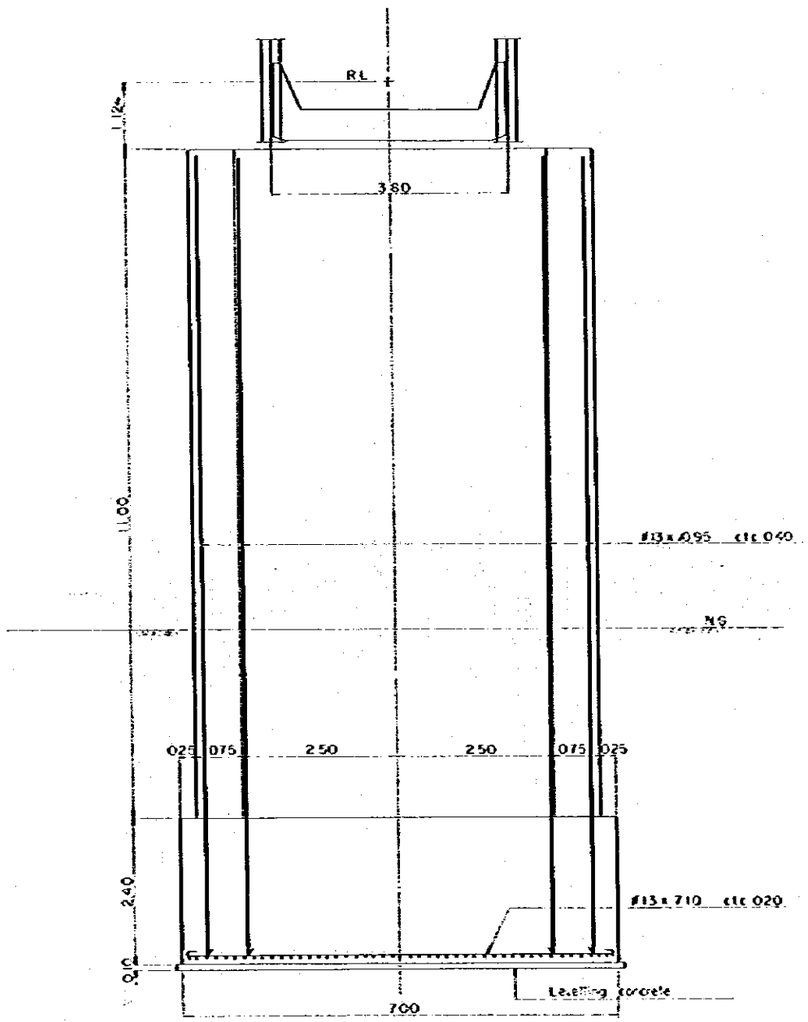
(A1) (A2) ABUTMENT

GENERAL VIEW

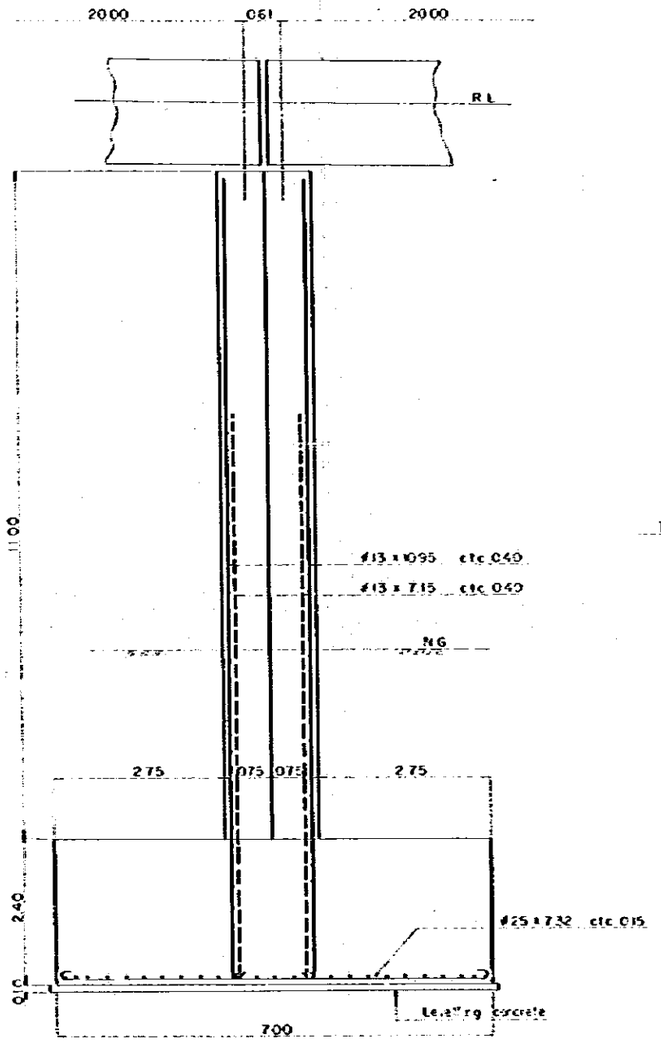
Drawn by Date | Checked by Date | Approved by Date

For the Enterprise

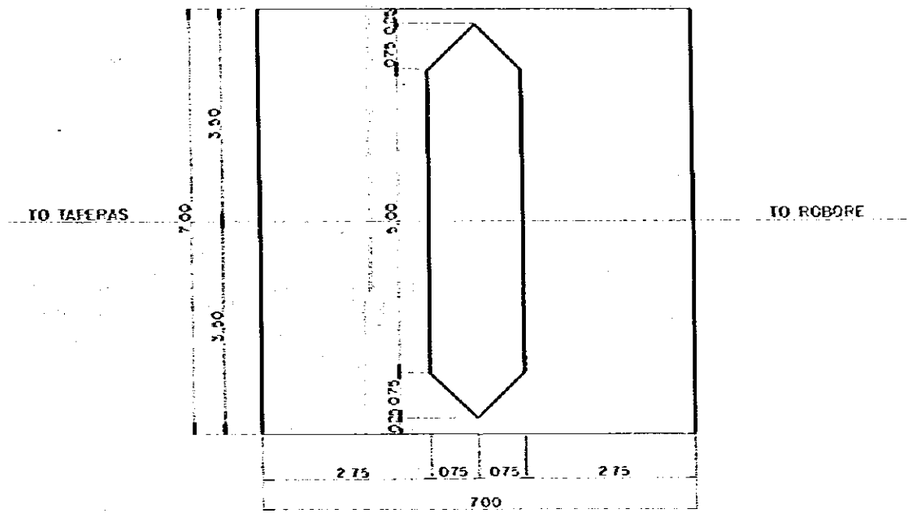
No. 46



Front View



Side View



Plan

Note

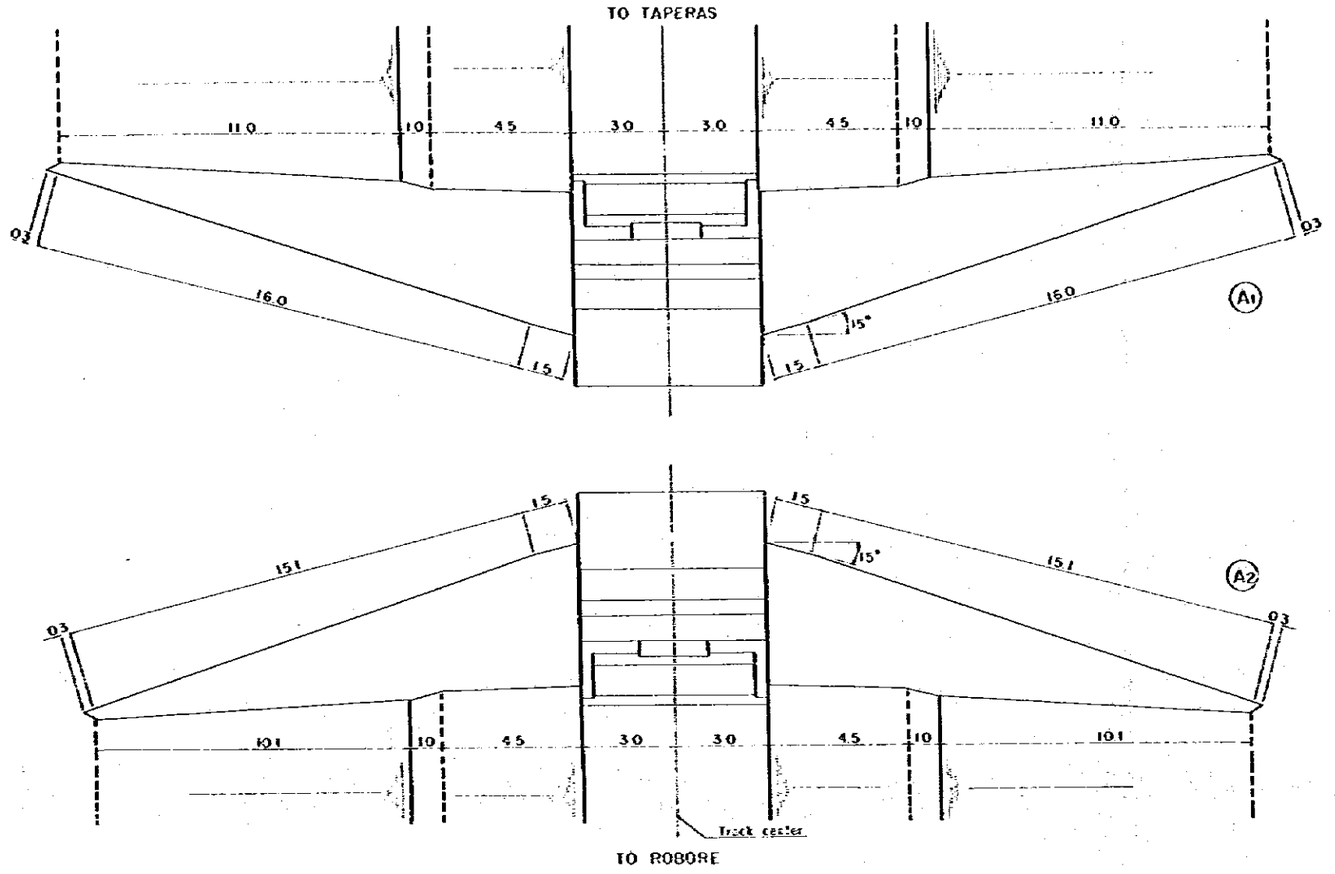
Structure concrete : class B
Leveling concrete : class D

EMPRESA NACIONAL DE FERROCARRILES
RURAL CONSTRUCTION PROJECT BASHAN LINE

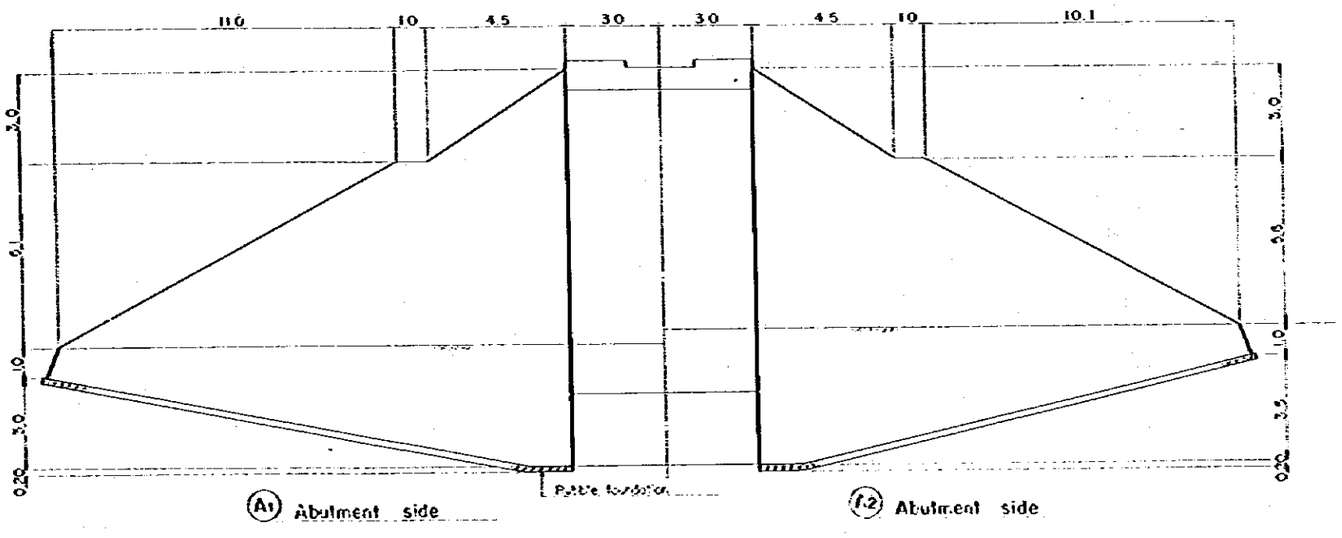
NO. 1 BRIDGE
PIER
GENERAL VIEW

Executive Enterprise

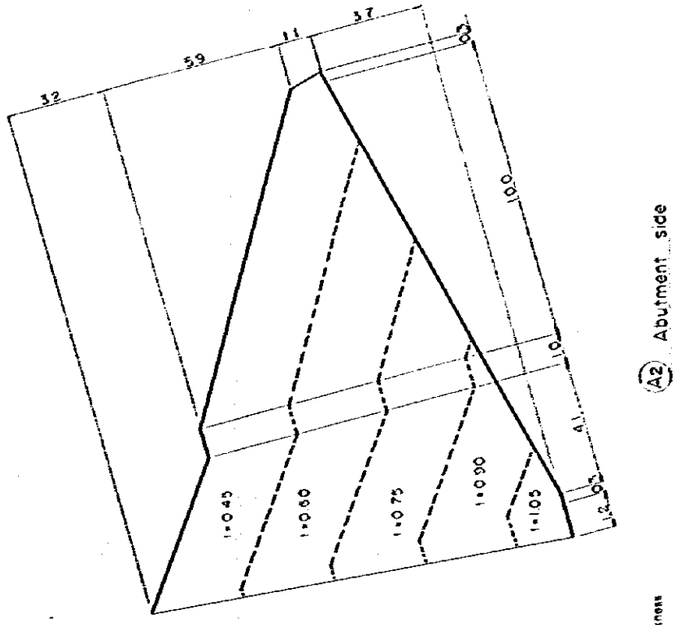
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No. 47

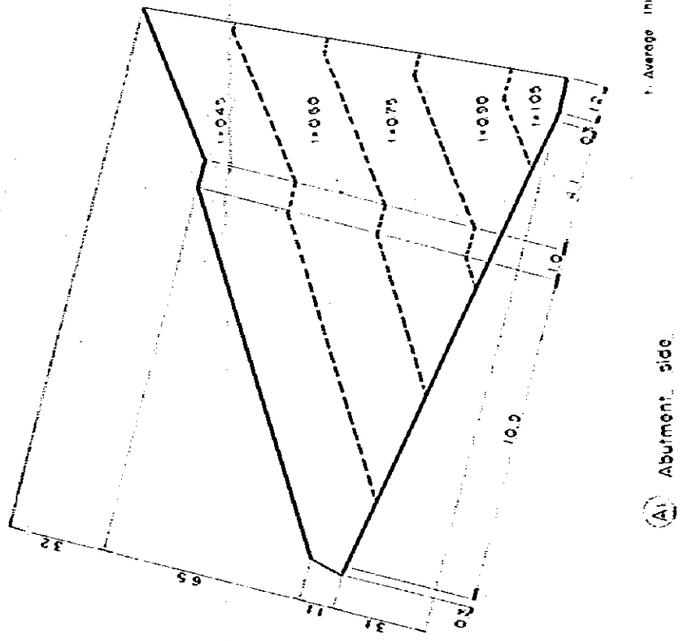


Plan S=1/100

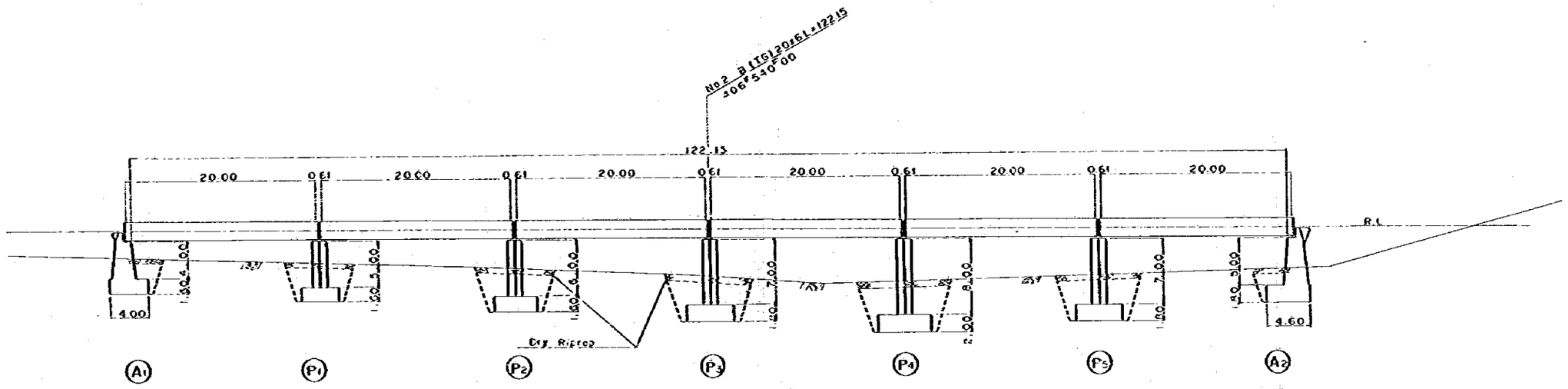


Front View S=1/100

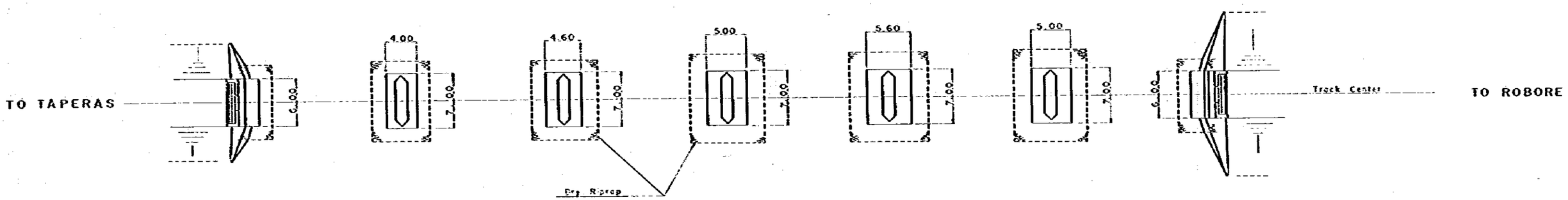




EMPRESA NACIONAL DE FERROCARRILES RURAL CONSTRUCTION PROJECT EASTERN LINE
NO. 1 BRIDGE SHEATHING WALL GENERAL VIEW
Designed by Date / Checked by Date / Approved by Date
Contracting Enterprise
Checked by Date / Approved by Date / No. 48



LONGITUDINAL SECTION S=1/250



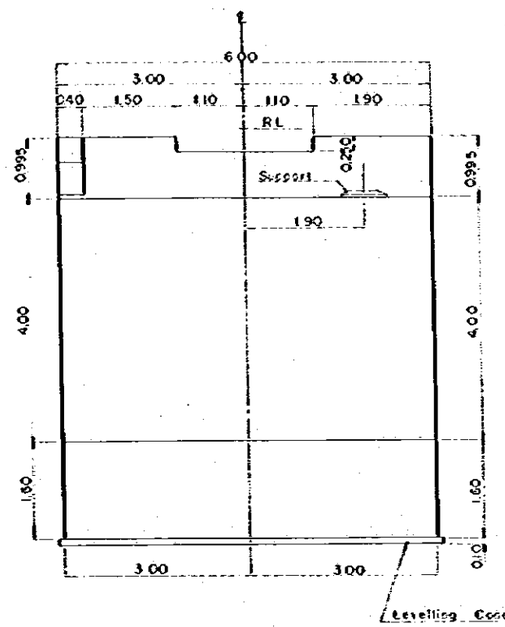
PLAN S=1/250

EXPRESA NACIONAL DE FERROCARRILES

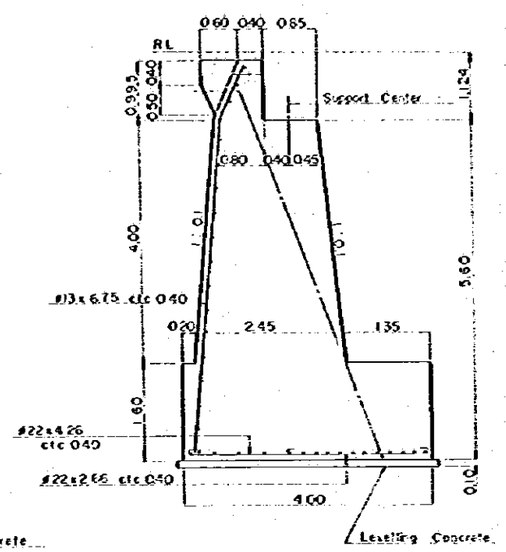
NO.2 BRIDGE

GENERAL VIEW

49

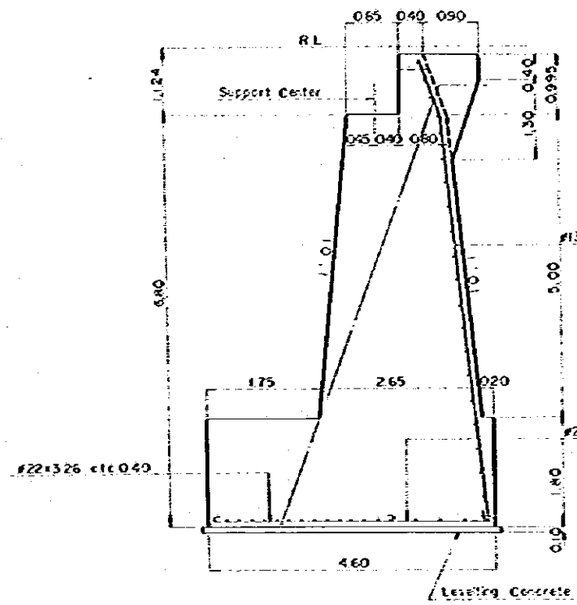


back View Front View

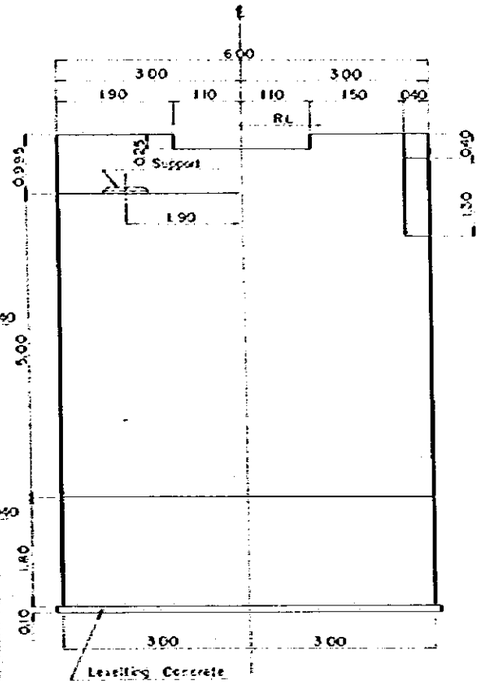


Side View

(A1) Abutment S=1/50



Side View



Front View back View

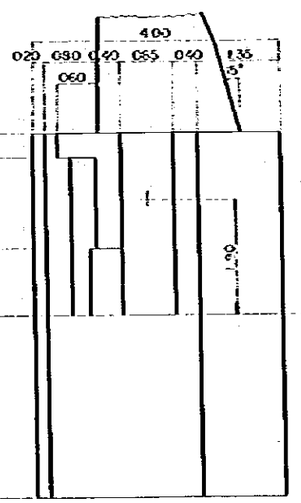
(A2) Abutment S=1/50

Note:

Structure Concrete : Class B

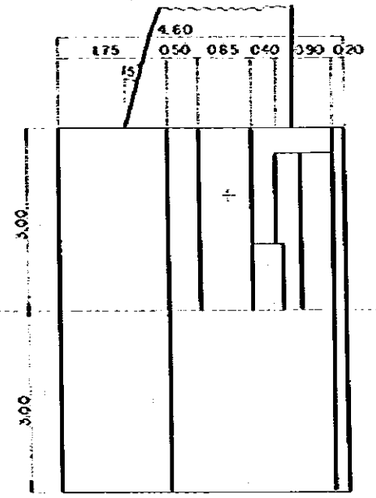
Levelling Concrete : Class D

Plan



Foundation plan

Plan



Foundation plan

ENTIDAD NACIONAL DE FERROCARRILES

RAILWAY CONSTRUCTION PROJECT ESPERAS LINE

NO 2 BRIDGE

(A1) (A2) ABUTMENT

GENERAL VIEW

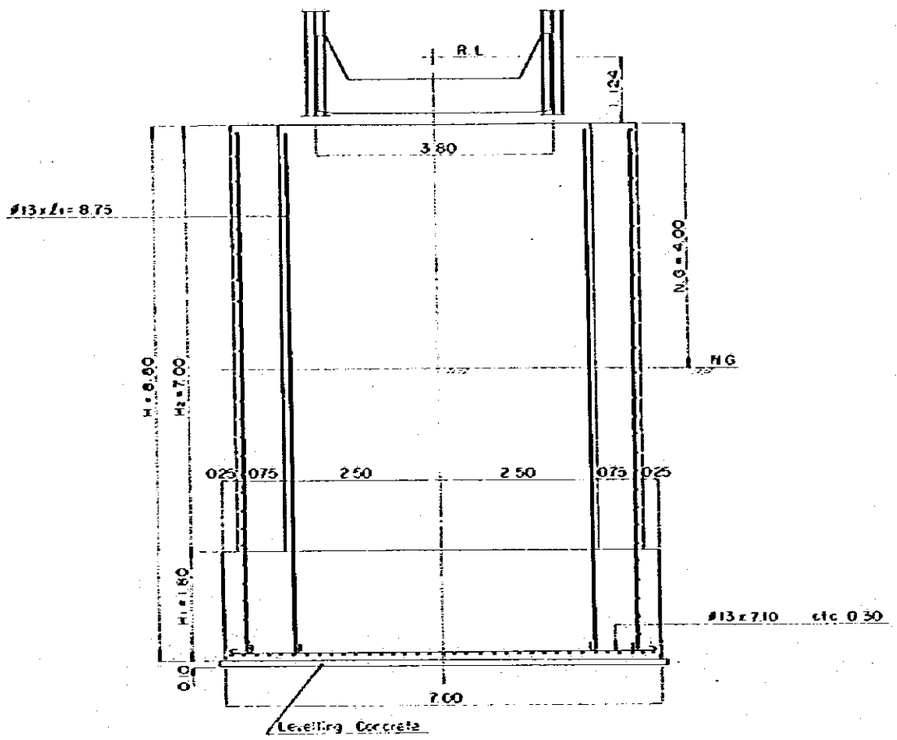
Designed By

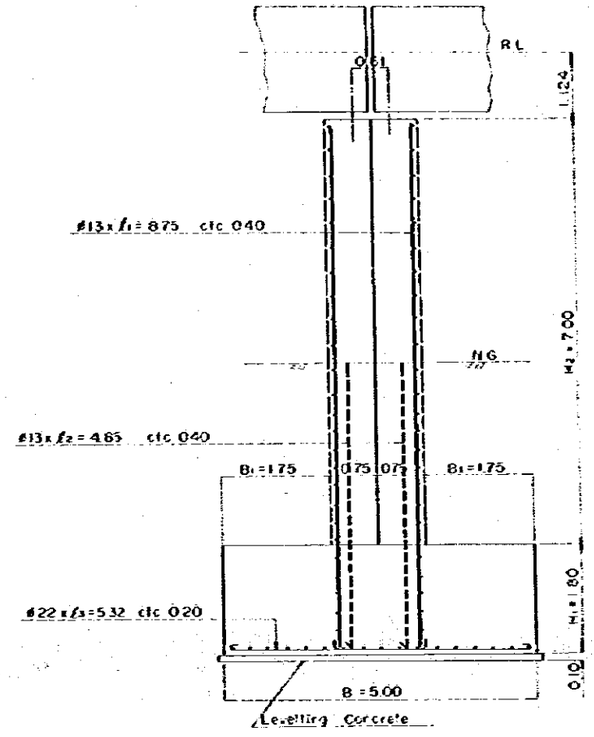
Drawn By Date | Checked By Date | Approved By Date

Quantity Surveyed

Copyright Date | Revised By Date | 50

③ ⑤ Pier S=1/50





Note

Structure concrete : Class B

Levelling concrete : Class D

Front View

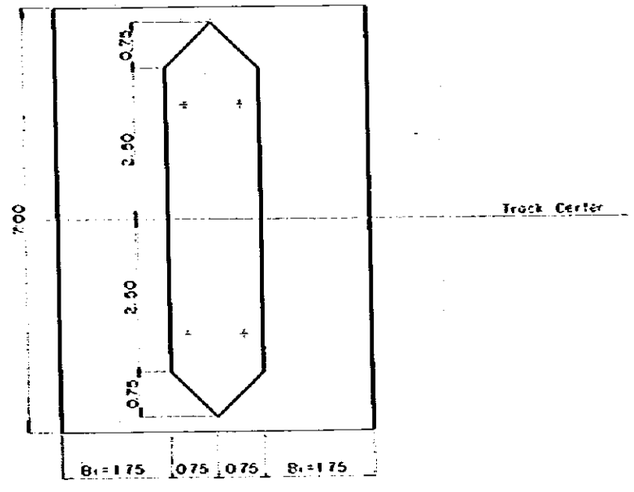
Dimension of each piers

Pier number	H	H1	H2	B	B1	N.G
①	6.60	1.60	5.00	4.00	1.25	2.50
②	7.60	1.60	6.00	4.60	1.55	3.00
③	8.80	1.80	7.00	5.00	1.75	4.00
④	10.00	2.00	8.00	5.60	2.05	4.50
⑤	8.80	1.80	7.00	5.00	1.75	3.50

Bars length of each piers

Pier number	l_1	l_2	l_3
①	6.55	2.65	4.32
②	7.55	3.65	4.92
③	8.75	4.85	5.32
④	9.95	6.05	5.92
⑤	8.75	4.85	5.32

Side View



Plan

ENPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE

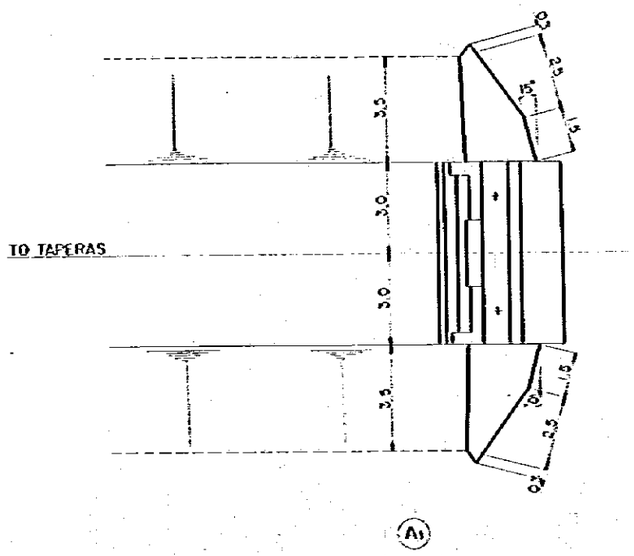
NO 2 BRIDGE
PIER
GENERAL VIEW

Executive Enterprise

Drawn by Date	Checked by Date	Approved by Date

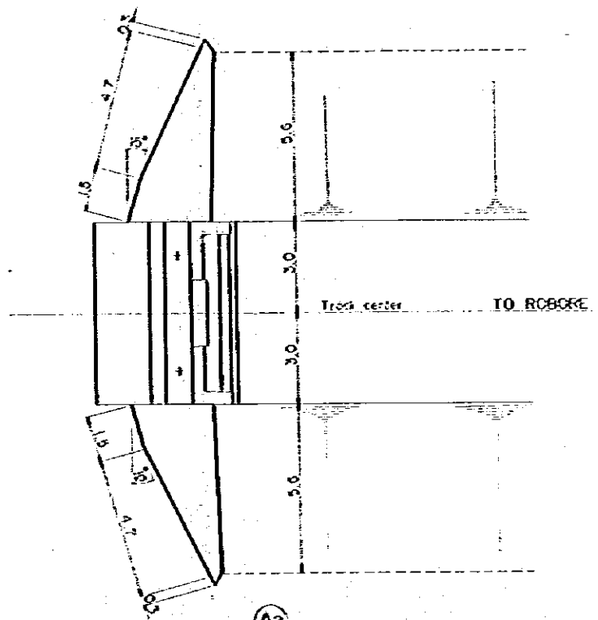
Contracting Enterprise

Checked by Date	Approved by Date	No. 51

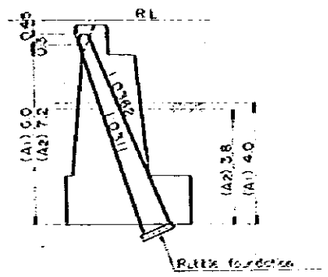


(A1)

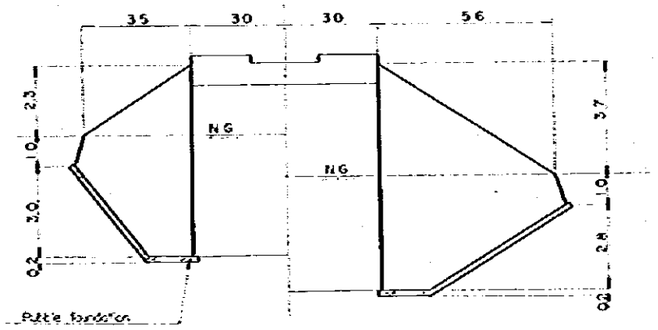
Plan S=1/100



(A2)

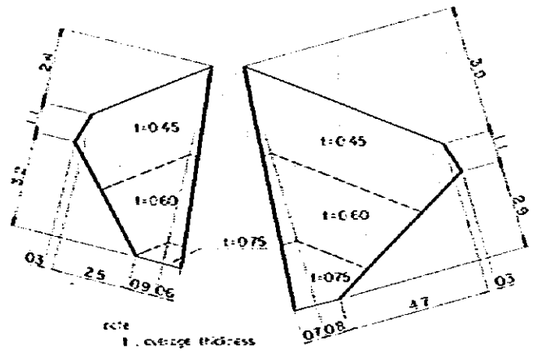


Typical section S=1/100



(A1) Abutment side (A2) Abutment side

Front View S=1/100

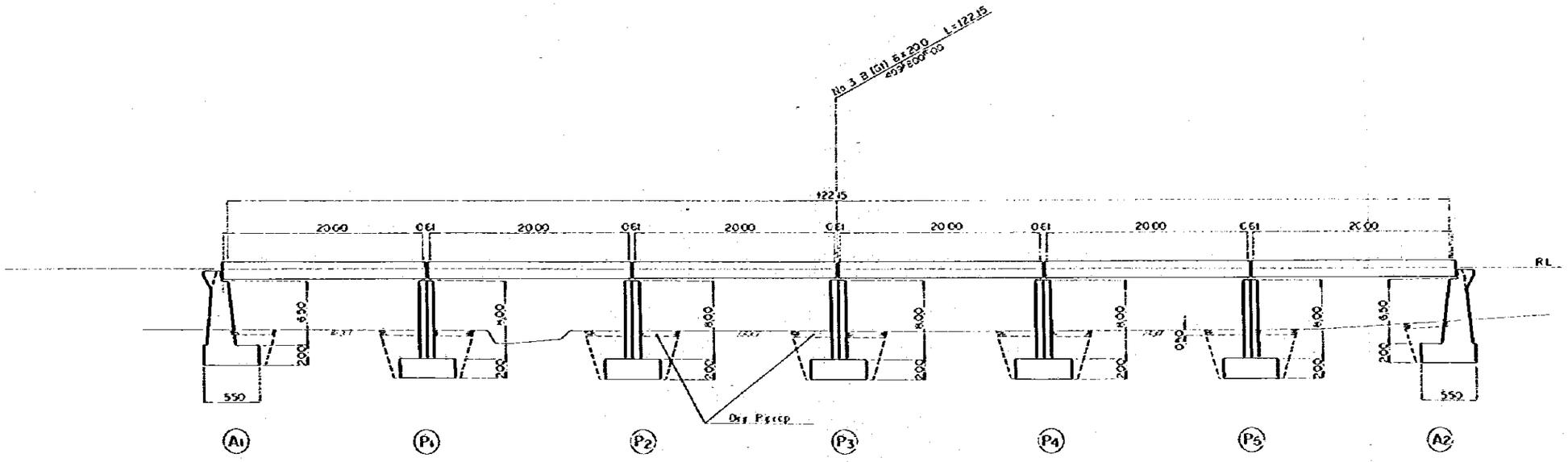


(A1) Abutment side (A2) Abutment side

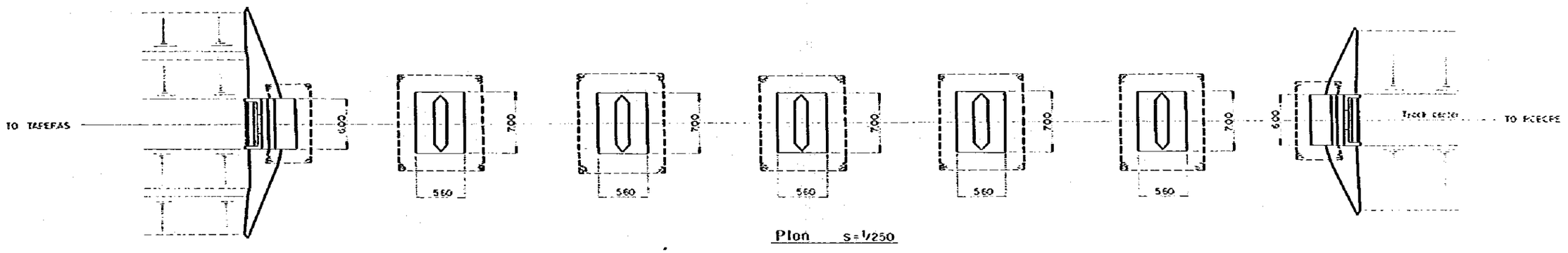
Development S=1/100

Note
The class of concrete
class C

ENPRESA NACIONAL DE FERROCARRILES		
RAILWAY CONSTRUCTION PROJECT EASTERN LINE		
NO.2 BRIDGE		
SHEATHING WALL		
GENERAL VIEW		
Executive Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No. 52



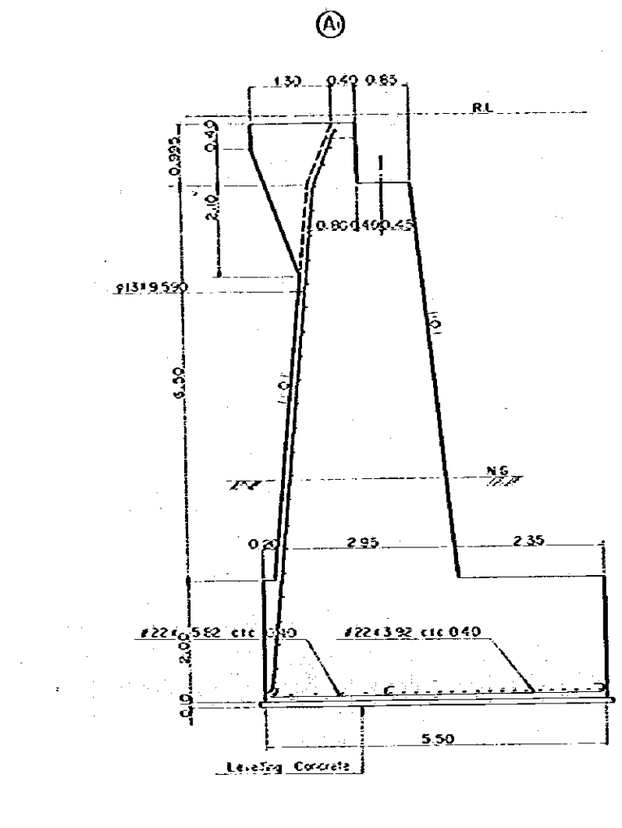
Longitudinal section S=1/250



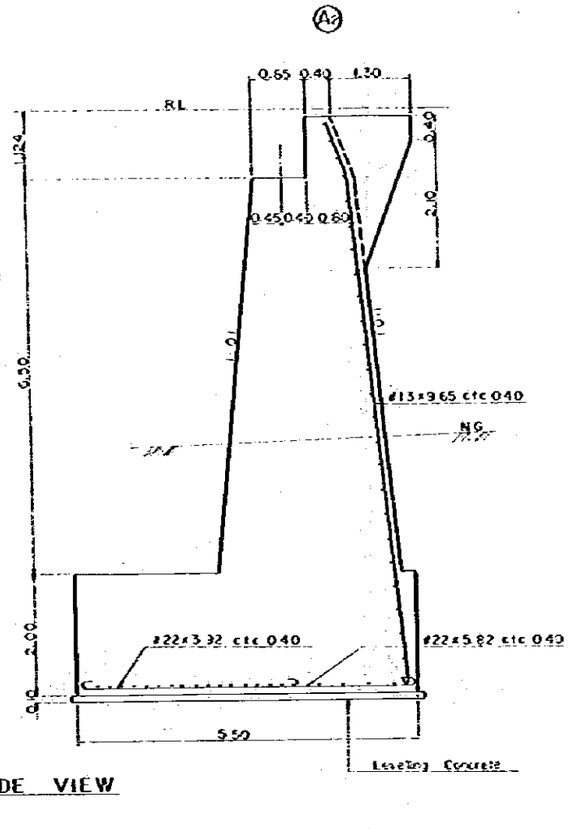
Plan S=1/250

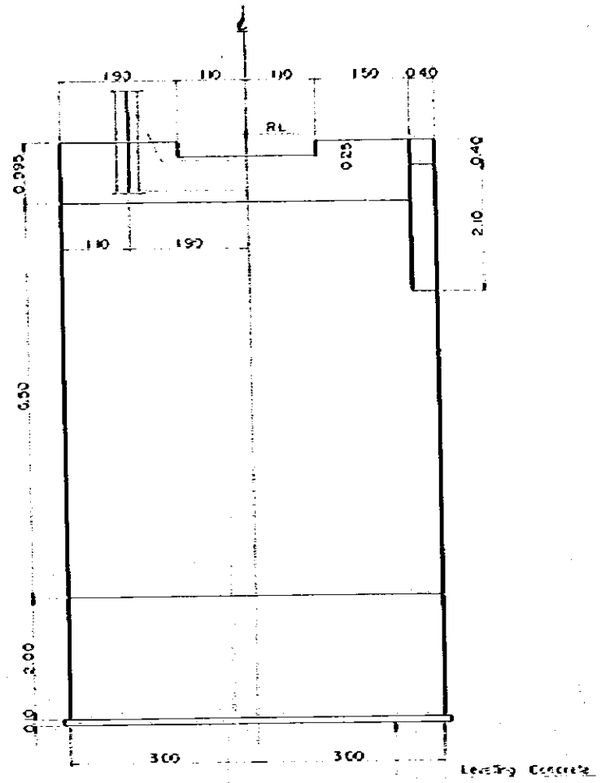
ENPRESA NACIONAL DE FERROCARRILES	
RAILWAY CONSTRUCTION PROJECT EASTERN LINE	
NO.3 BRIDGE	
GENERAL VIEW	
Executing Enterprise	
Drawn by Date	Checked by Date / Approved by Date
Contracting Enterprise	
Scale Date / Passed by Date	No 53

Ⓐ₁ Ⓐ₂ ABUTMENT S=1/50



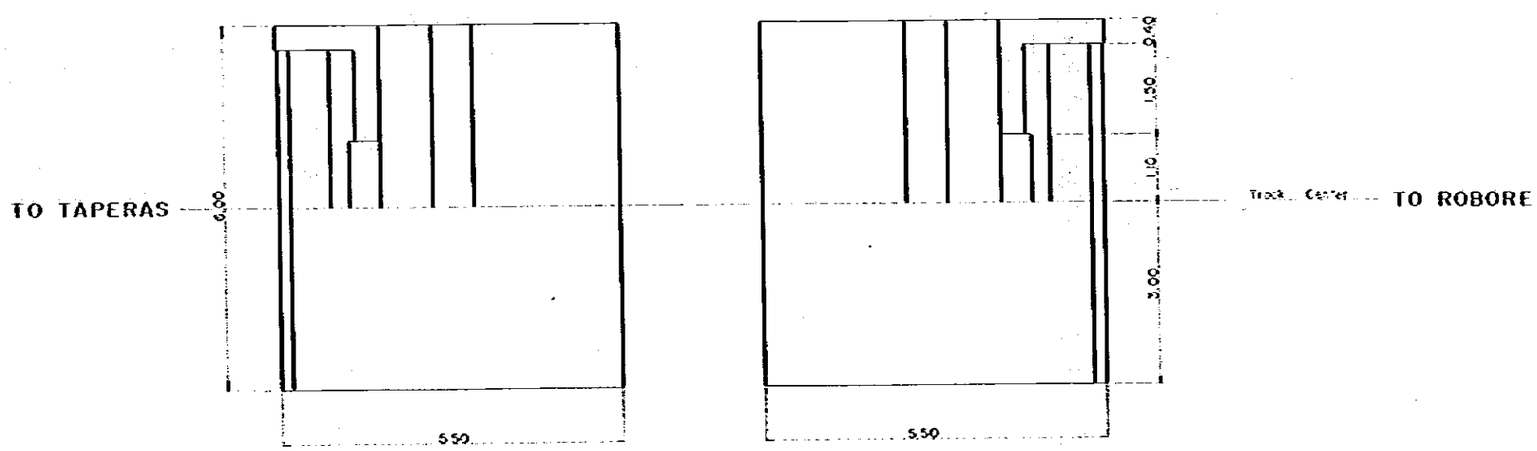
SIDE VIEW





FRONT VIEW BACK VIEW

PLAN



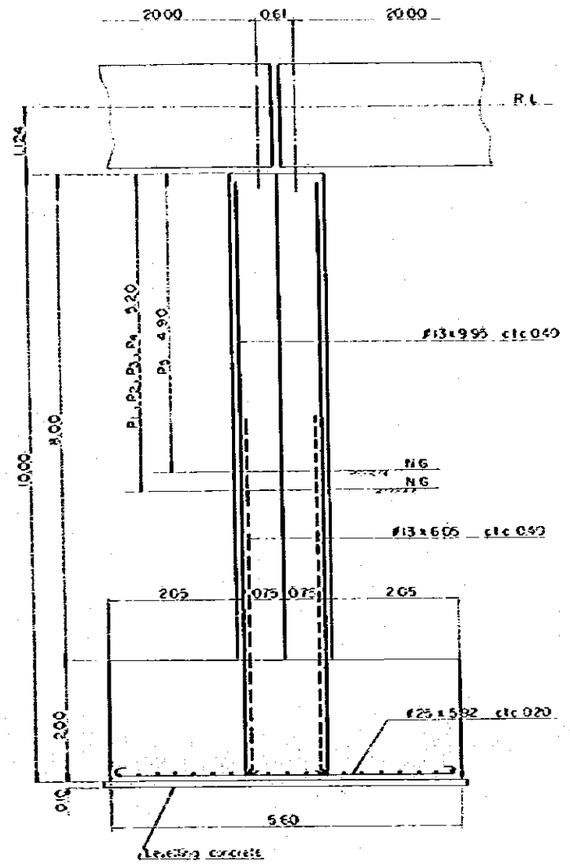
FOUNDATION PLAN

Note:

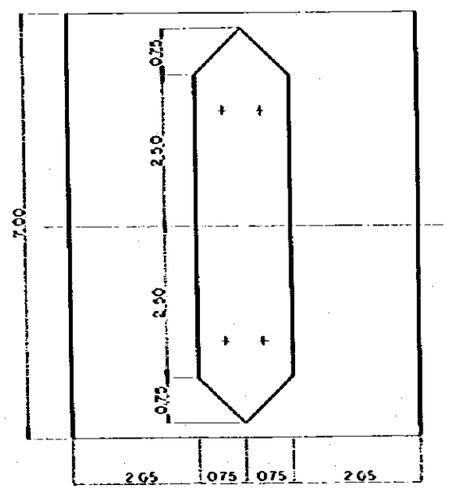
Structure Concrete : Class B

Leveling Concrete : Class D

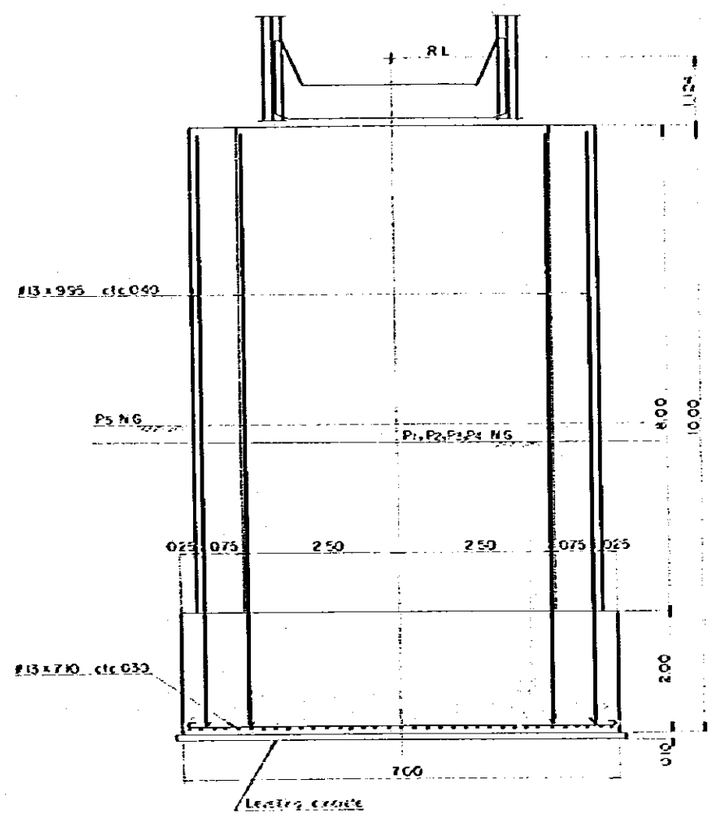
EMPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE
NO.3 BRIDGE
Ⓐ₁ Ⓐ₂ ABUTMENT
GENERAL VIEW
Executing Enterprise
Drawn by Date / Checked by Date / Approved by Date
Contracting Enterprise
Checked by Date / Approved by Date / No. 54



Side View S=1/50



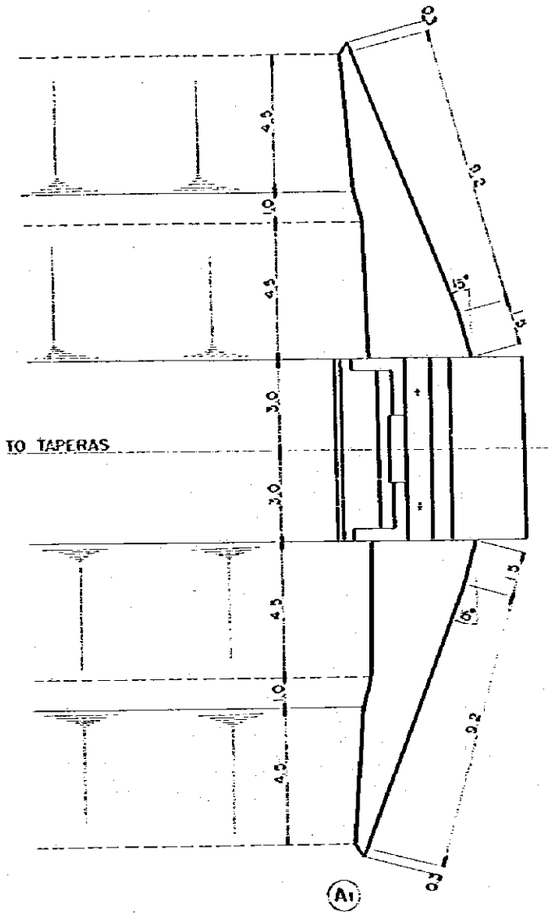
Plan S=1/50



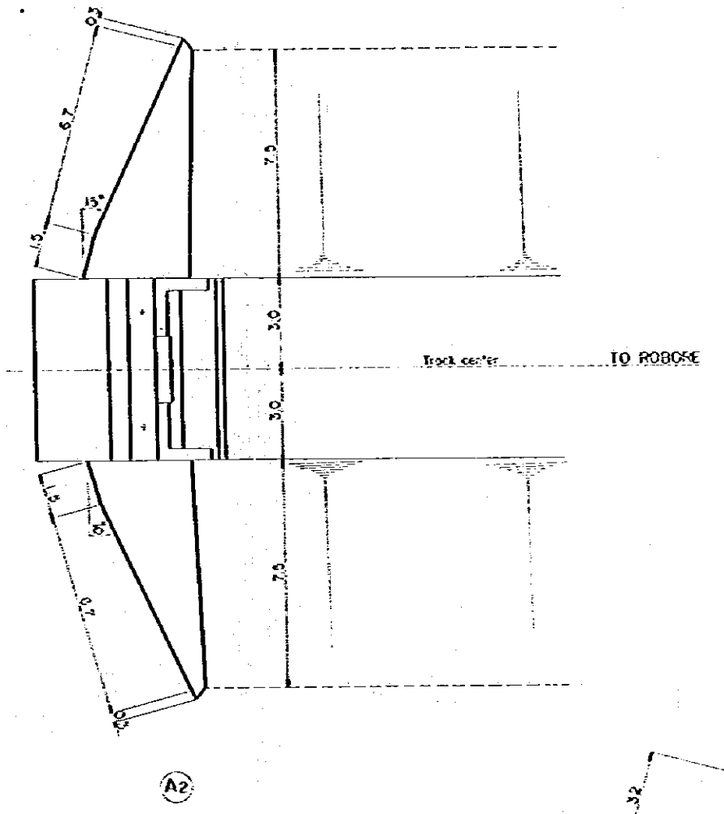
Front View S=1/50

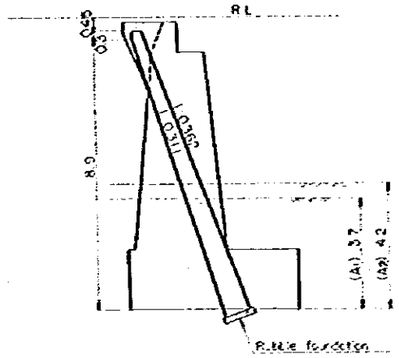
Note :
Structure concrete : Class B
Leveling concrete : Class D

ST PRESA NACIONAL DE FERROCARRILES RAILWAY CONSTRUCTION PROJECT EASTERN LINE (CUBITAS BRANCH)		
NO. 3 BRIDGE PIER GENERAL VIEW		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No. 55



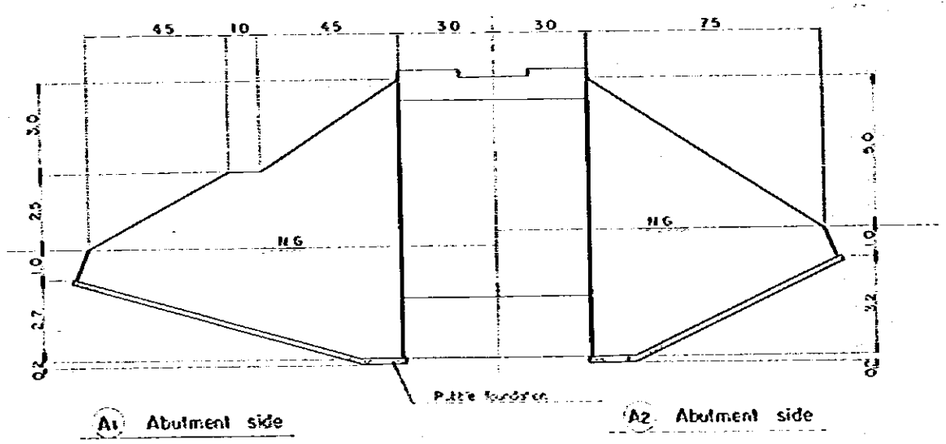
Plan S=1/100



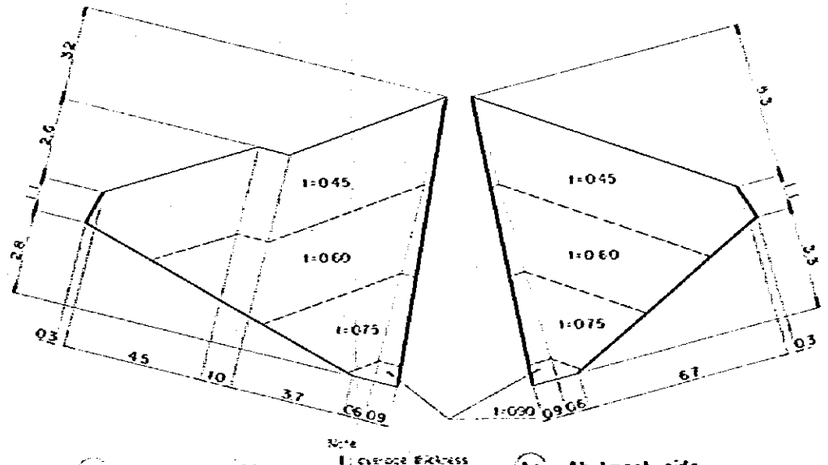


Typical section S=1/100

Note :
The class of concrete
class C

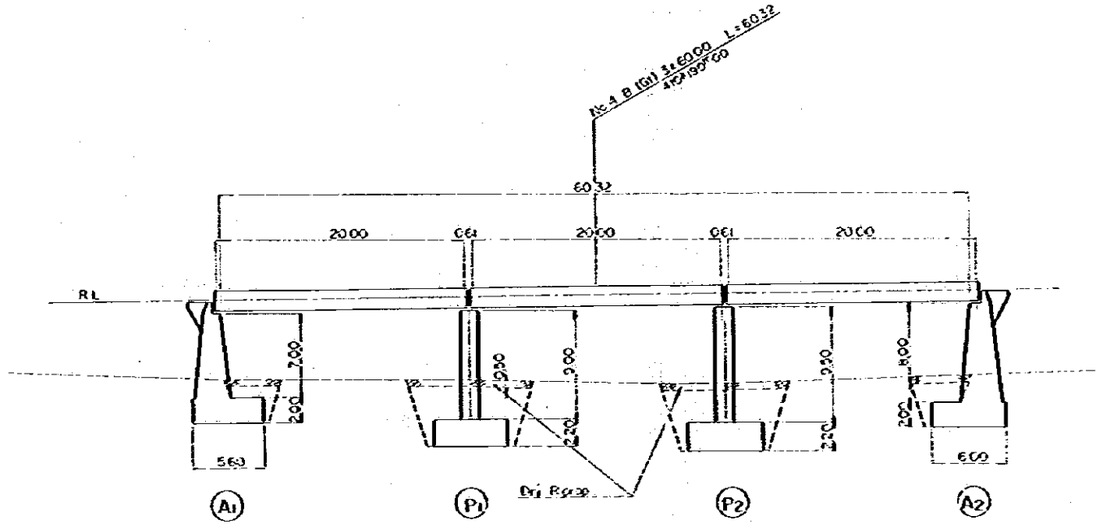


Front View S=1/100

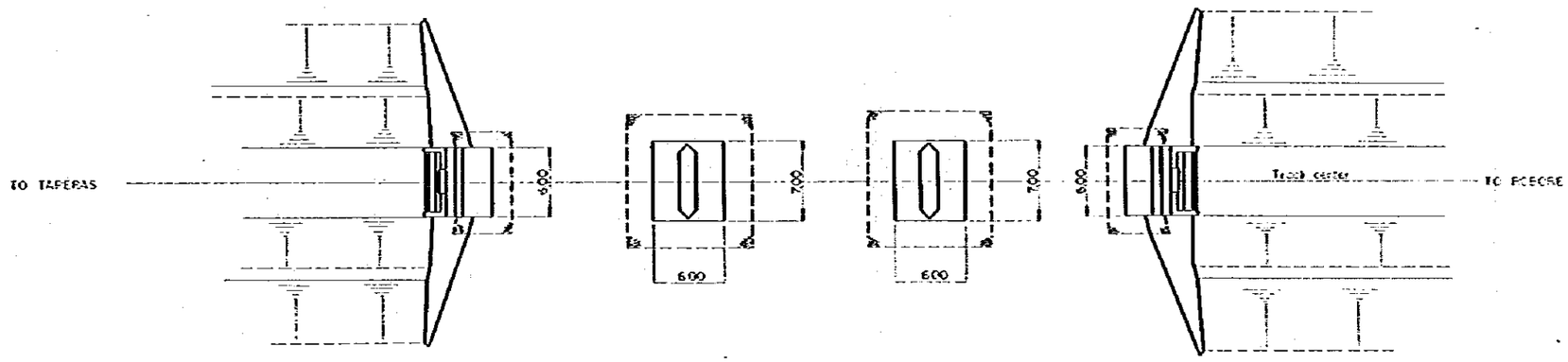


Development S=1/100

EXPRESA NACIONAL DE FERROCARRILES RAILWAY CONSTRUCTION PROJECT EASTERN LINE (UNDERGROUND)	
NO.3 BRIDGE SHEATHING WALL GENERAL VIEW	
Executive Enterprise	
Drawn by Date	Checked by Date / Approved by Date
Contractor Enterprise	
Checked by Date	Approved by Date / No. 56

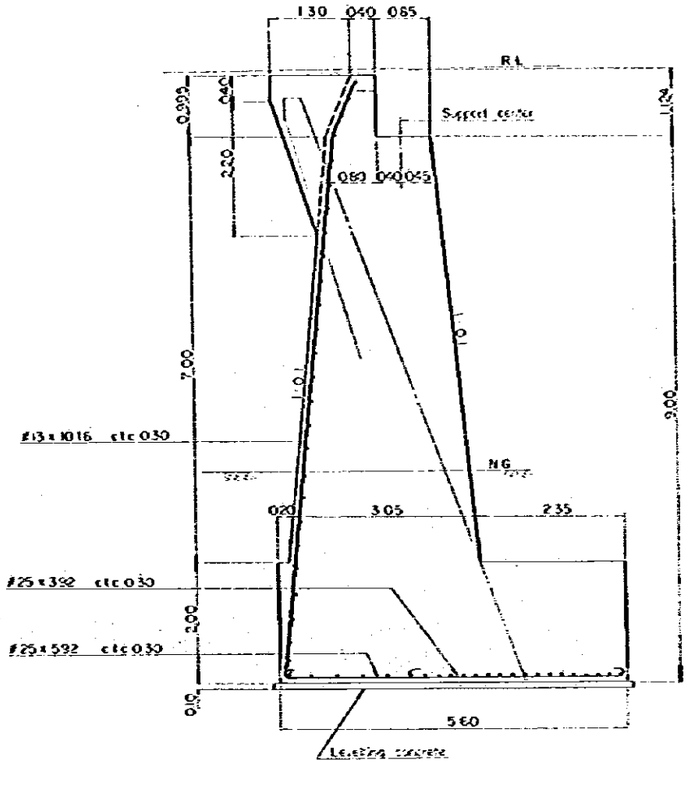


Longitudinal section S=1/250

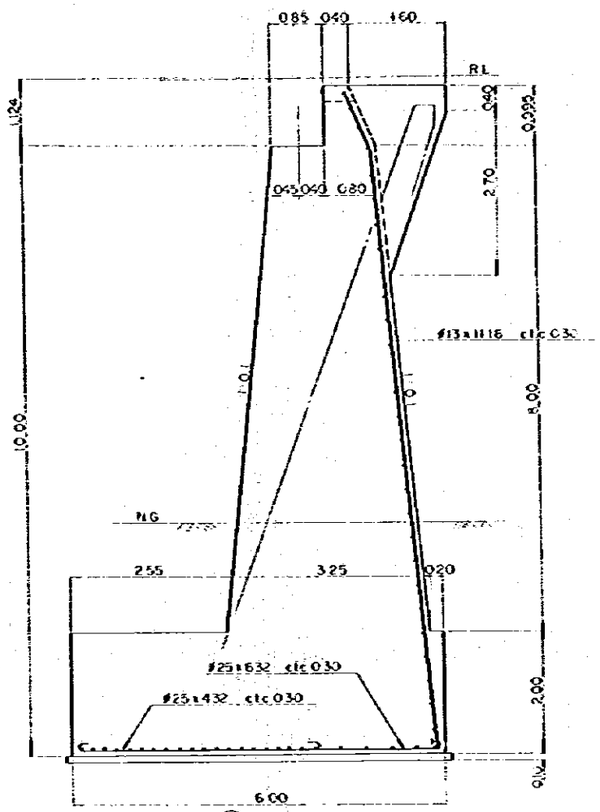


Plan S=1/250

EMPRESA NACIONAL DE FERROCARRILES RAILWAY CONSTRUCTION ENTERPRISE EASTERN LINE		
NO.4 BRIDGE GENERAL VIEW		
Executive Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No. 57

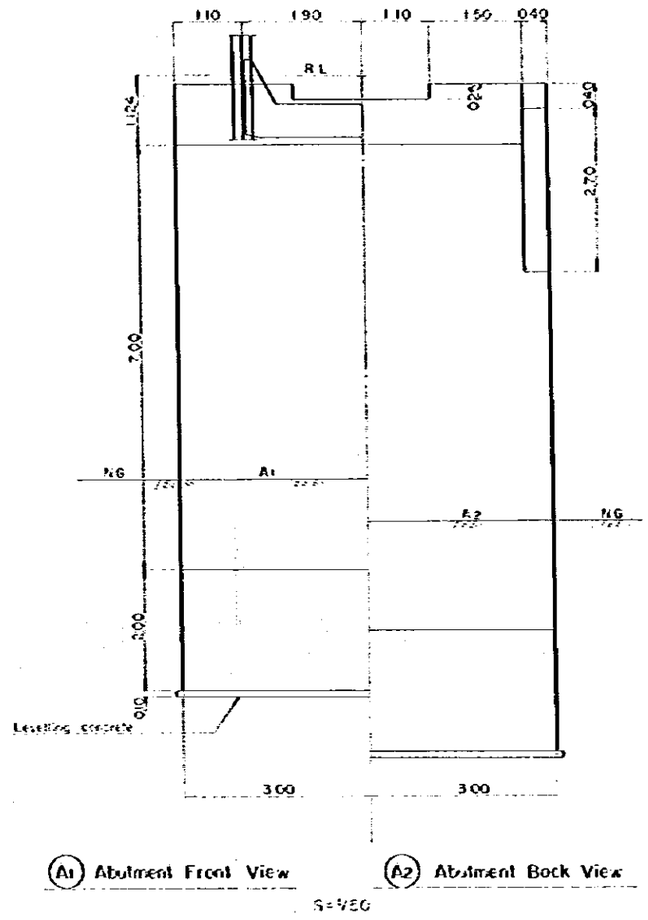


(A1) Abutment



(A2) Abutment

Side View S=1/50

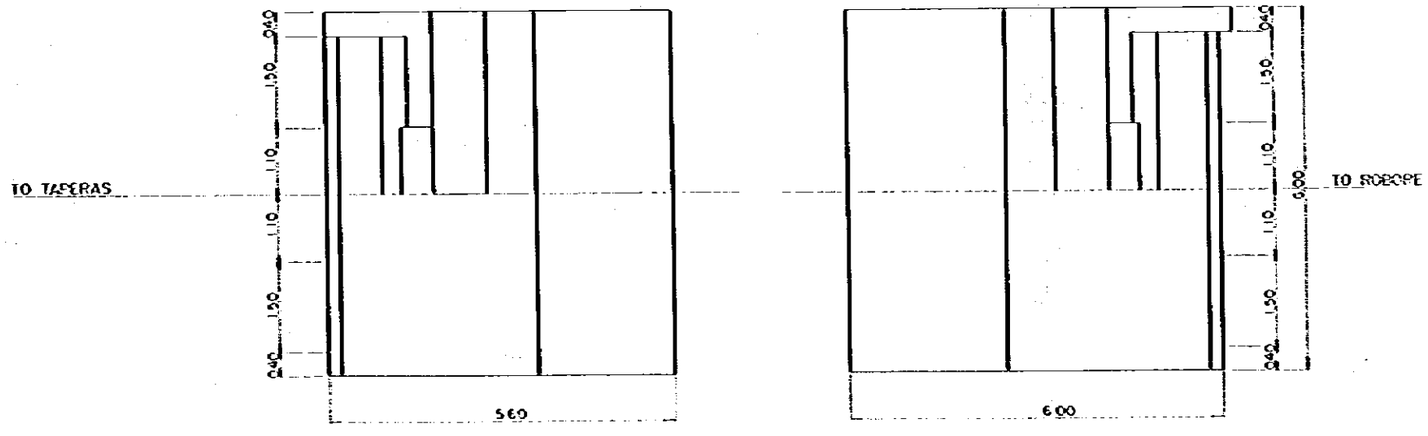


(A1) Abutment Front View (A2) Abutment Back View

S=1/50

Note
Structure concrete : Class B
Leveling concrete : Class D

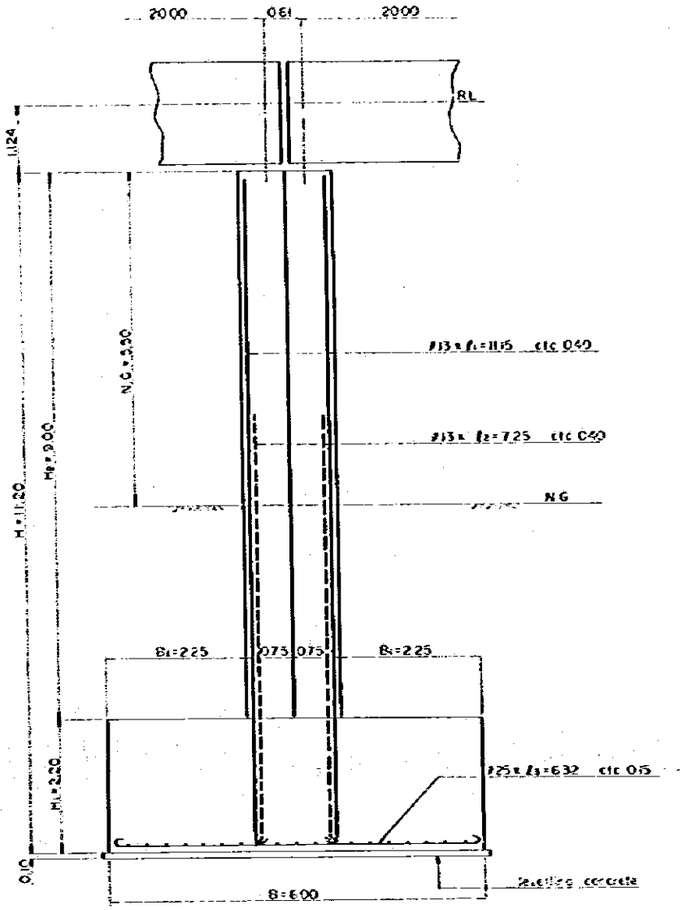
Plan S=1/50



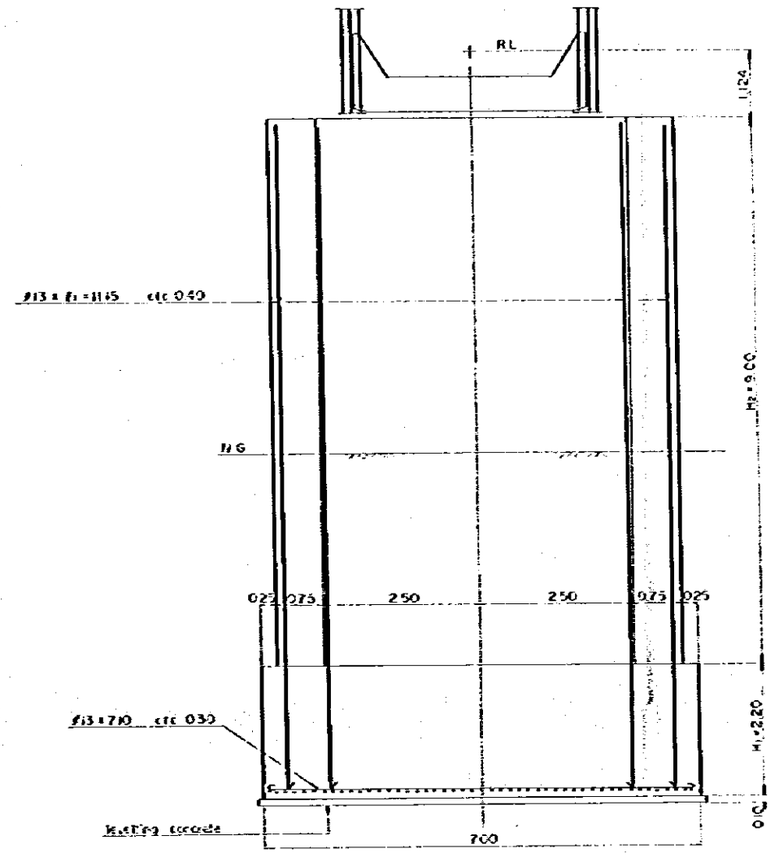
Foundation Plan S=1/50

EXPRESS REGIONAL DE FERROCARRILES
NO.4 BRIDGE
(A1) (A2) ABUTMENT
GENERAL VIEW
Detailed Engineering

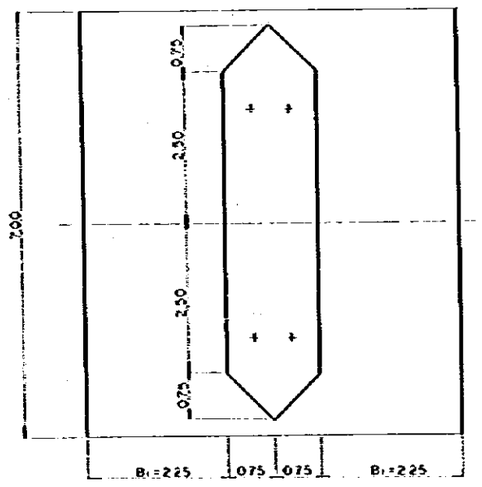
58



Side View S=1/50



Front View S=1/50



Plan S=1/50

Dimension of each piers (m)

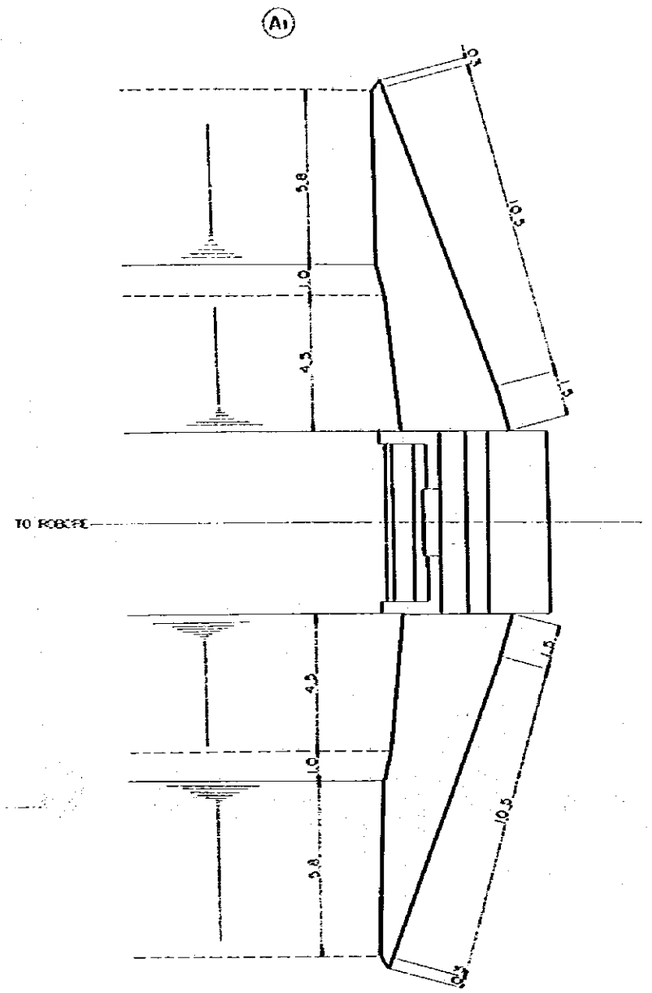
Pier number	H	H1	H2	B	B1	N G
P1	11.20	2.20	9.00	6.00	2.25	5.50
P2	11.70	2.20	9.50	6.00	2.25	6.20

Bar length of each piers (m)

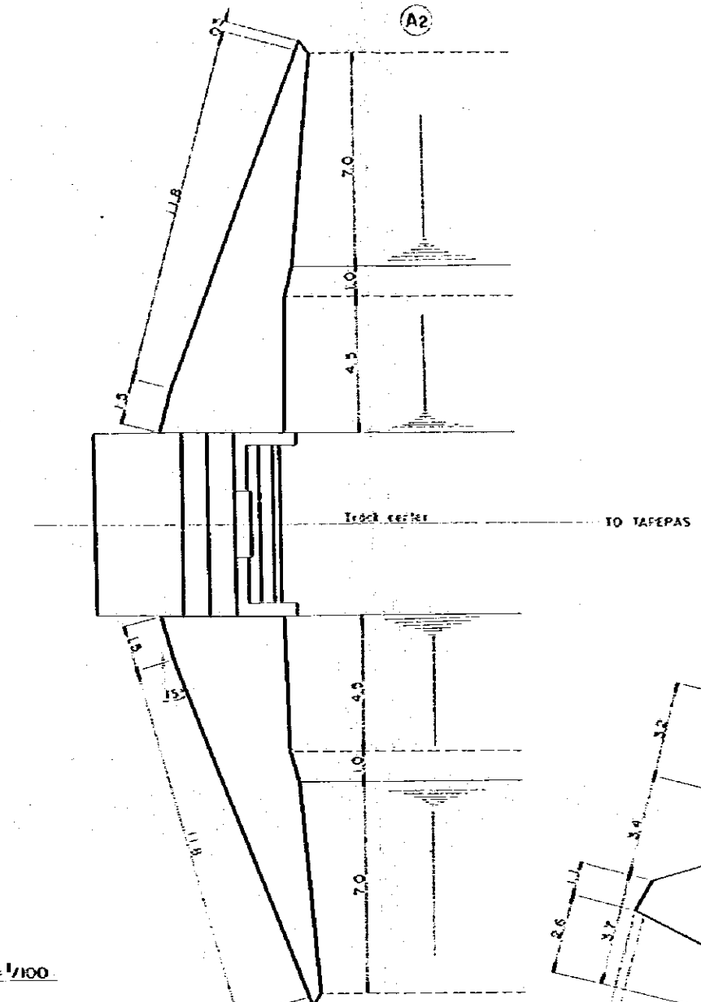
Pier number	ℓ1	ℓ2	ℓ3
P1	11.50	7.250	6.320
P2	11.650	7.750	6.320

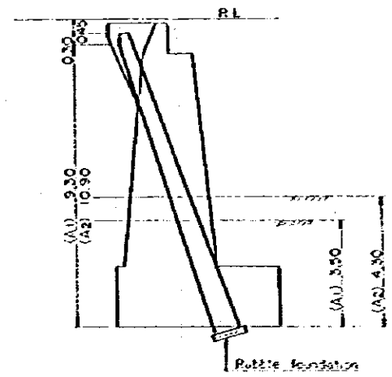
Note
structural concrete : class B
leveling concrete : class D

ENTRESA NACIONAL DE FERROCARRILES RAILWAY CONSTRUCTION PROJECT EASTERN LINE (TEHERAN-BOGHAZ)		
NO.4 BRIDGE PIER GENERAL VIEW		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contractor's Engineer		
Checked by Date	Approved by Date	No 59

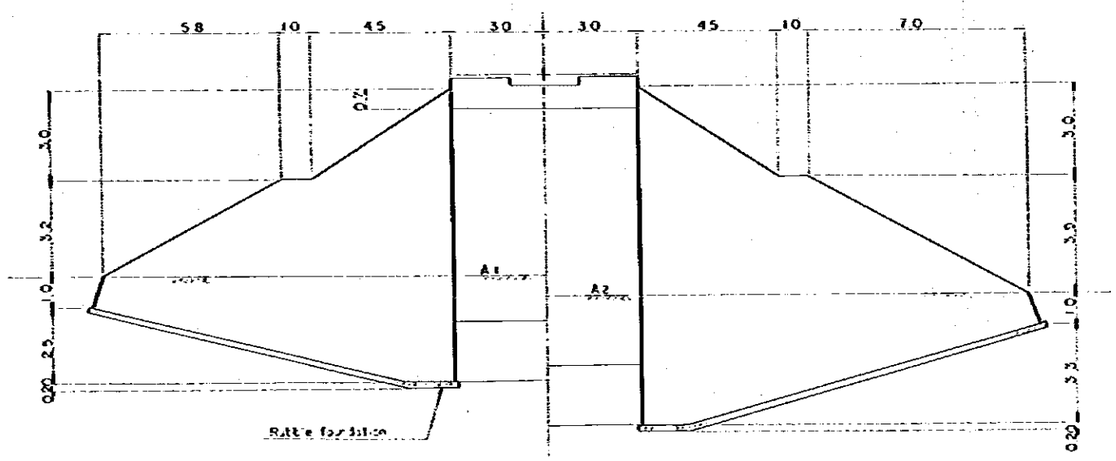


Plan s=1/100





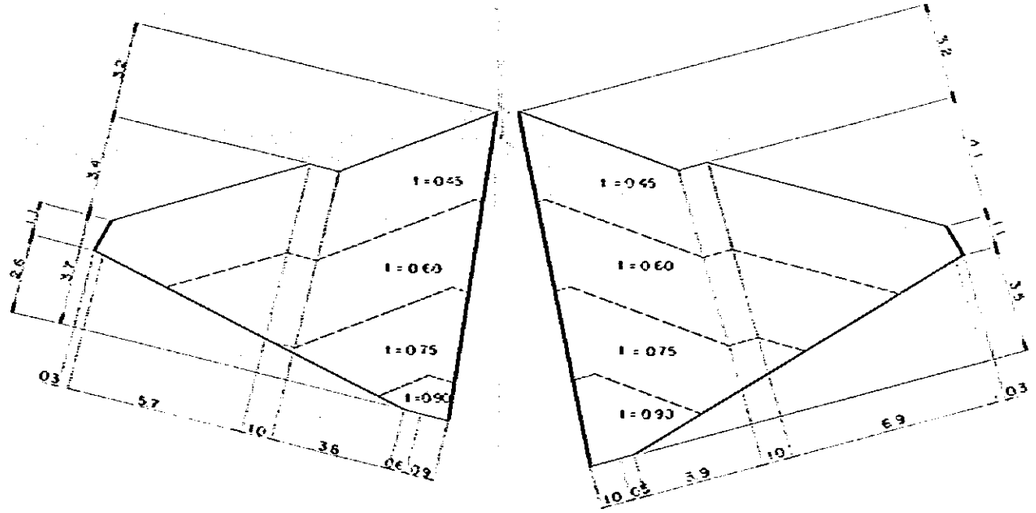
Typical section s=1/100



A1 Abutment side

A2 Abutment side

Front View s=1/100



Note

1" AVERAGE thickness

A1 Abutment side

A2 Abutment side

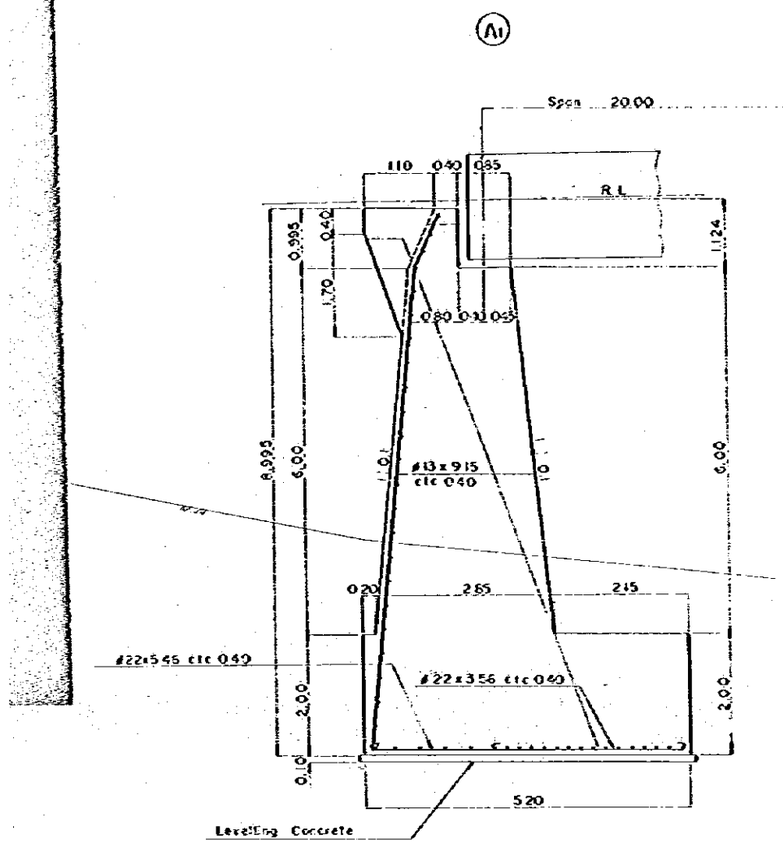
Development s=1/100

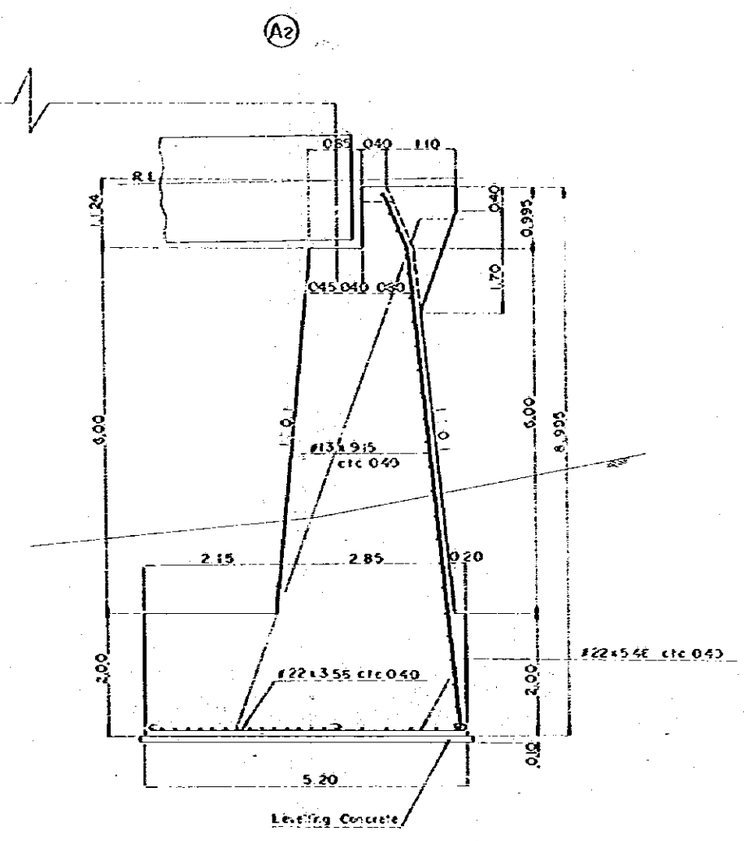
Note

concrete class C

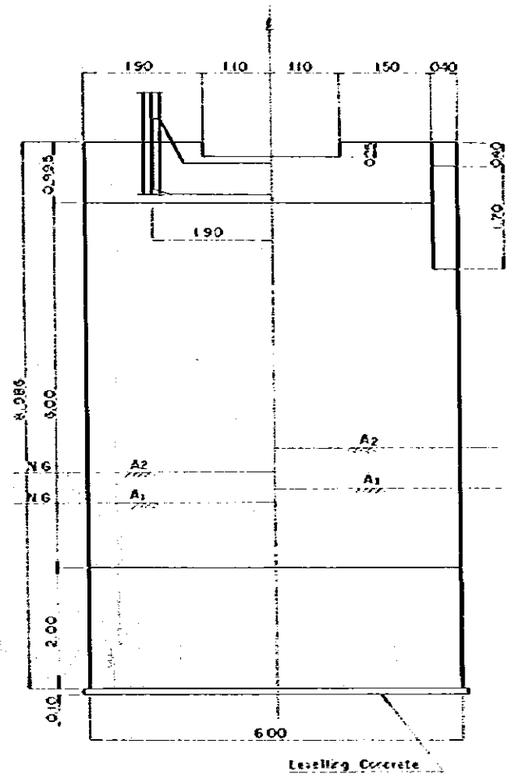
EMPRESA NACIONAL DE FERROCARRILES	
RAILWAY CONSTRUCTION IN SOUTH EASTERN LINE	
NO.4 BRIDGE	
SHEATHING WALL	
GENERAL VIEW	
Executive Enterprise	
Drawn by Date	Checked by Date / Approved by Date
Construction Enterprise	
Checked by Date	Approved by Date
No. 60	

(A1) (A2) Abutment S=1/50



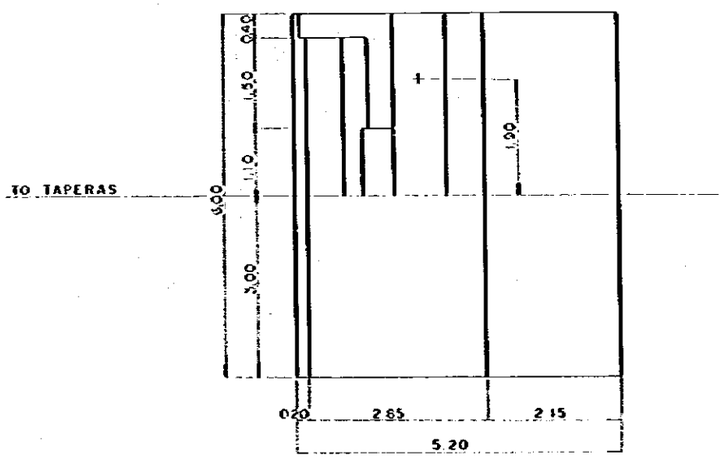


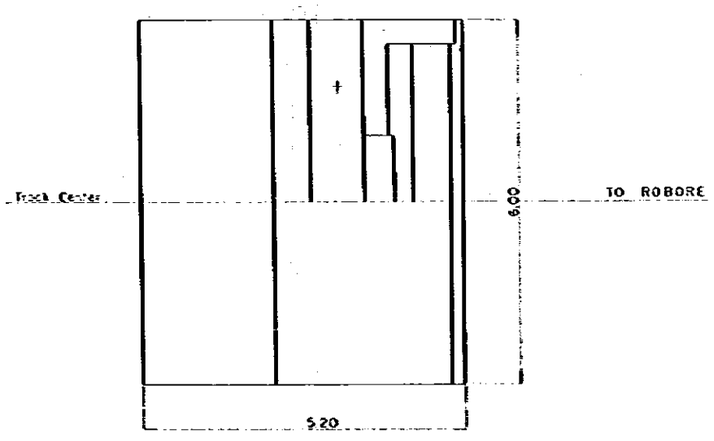
Side View



Front View Back View

Plan





Foundation Plan

Note:

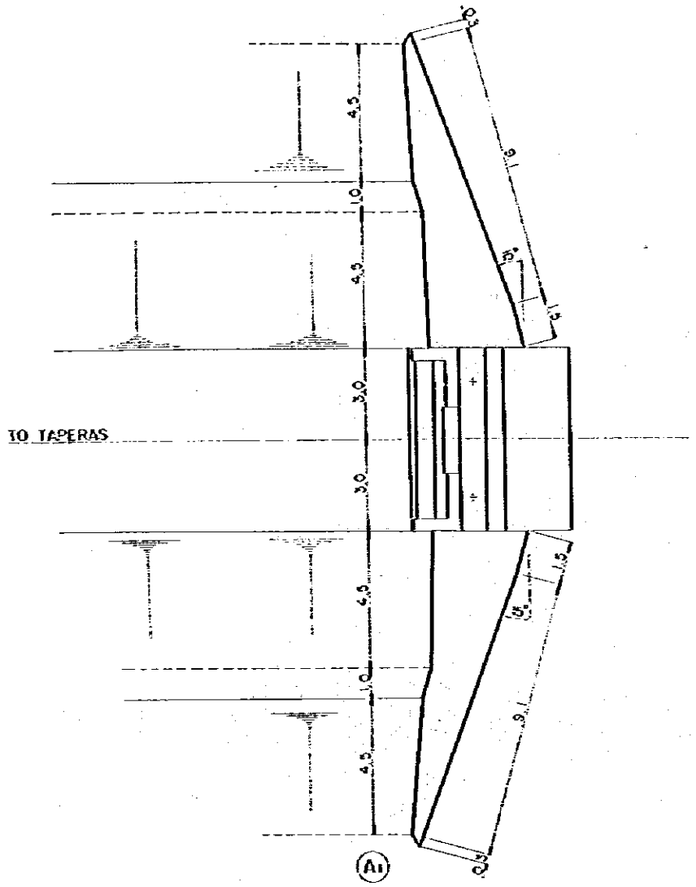
Structure Concrete Class B

Leveling Concrete Class D

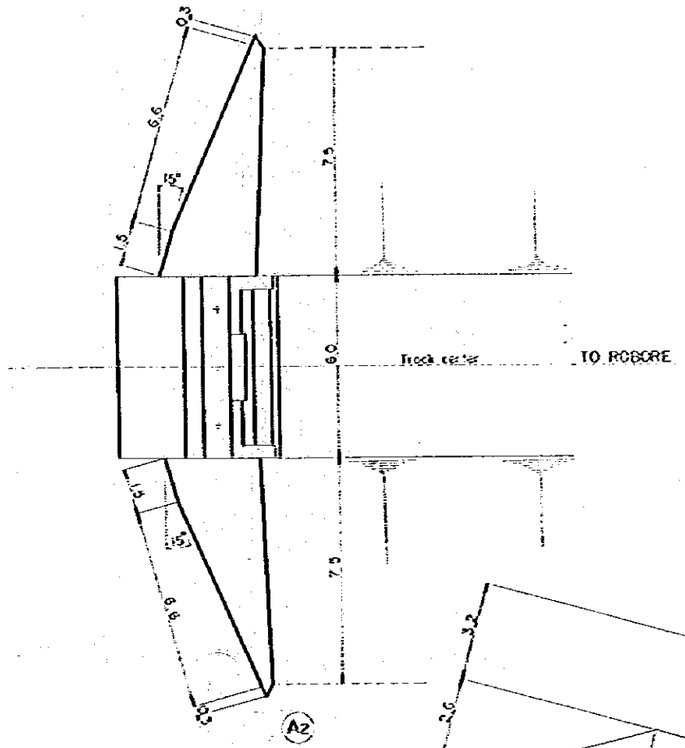
EMPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION FAMILY SYSTEM BASE

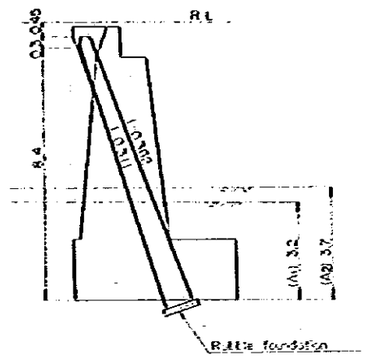
NO.5 BRIDGE
(A1) (A2) ABUTMENT
GENERAL VIEW

61

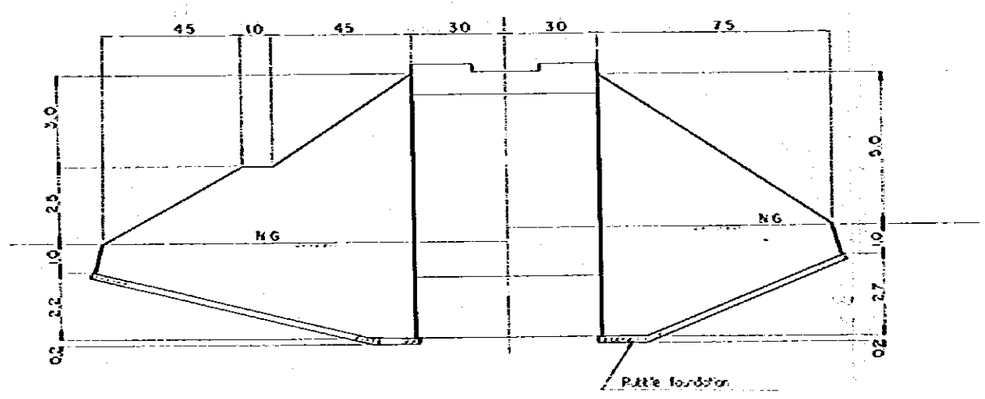


Plan S=1/100



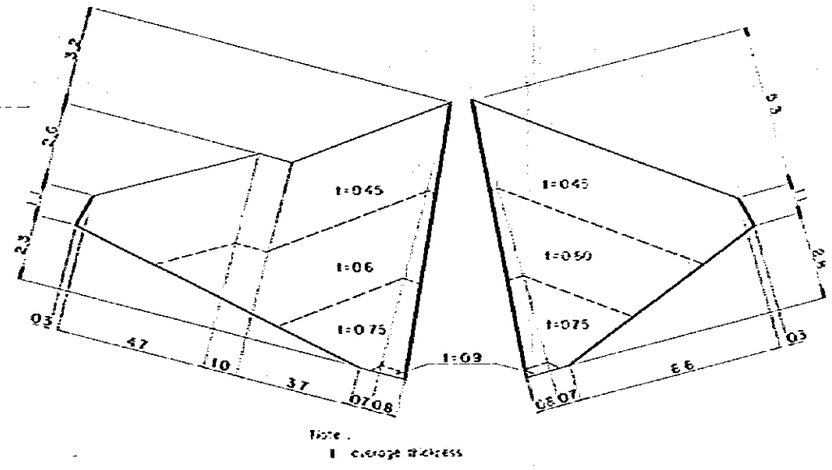


Typical section S=1/100



A1 Abutment side A2 Abutment side

Front View S=1/100



Note.
1 average thickness

A1 Abutment side A2 Abutment side

Development S=1/100

Note
The class of concrete
class C

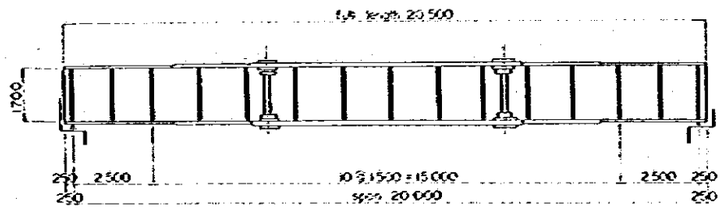
EXPRESS NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE

NO 5 BRIDGE
SHEATHING WALL
GENERAL VIEW

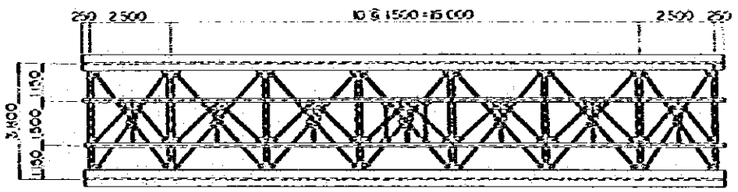
Drawn by Date | Checked by Date | Approved by Date

Contracting Enterprise

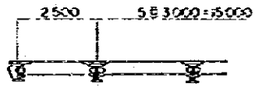
Checked by Date | Accepted by Date | No. 62



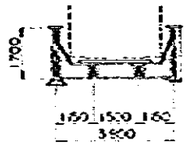
Side View S=1/100



Plan S=1/100



side View of stringer S=1/100



End floor beam Intermediate floor beam

S=1/100

Reaction

(Per one support)

live load	53.3[t]
impact load	32.0[t]
dead load	9.8[t]
Total	95.1[t]

Weights of the steel

SM41	23.8[t]
SS41	5.6[t]
HTB	1.3[t]
FC-15	0.6[t]
Total	31.3[t]
Painting area	451.0[m2]
Total length of welded	636.75[m]

Distance

Rail-base ~ bearing surface		Rail-base ~ bottom of the main girder	
bridge-wood tie	250	bridge-wood tie	250
stringer	335	stringer	335
stringer lower flange surface of the end floor beam	133	stringer lower flange surface of the end floor beam	130
lower flange thickness of the end floor beam	22	lower flange thickness of the end floor beam	25
gusset	9	gusset	9
lower flange thickness of the main girder	19	lower flange thickness of the main girder	34
side plate	22	splice plate	19
support	120	high-strength bolt	20
metal fastener	25		
Total distance	335[cm]	Total distance	832[cm]

Purport for designing

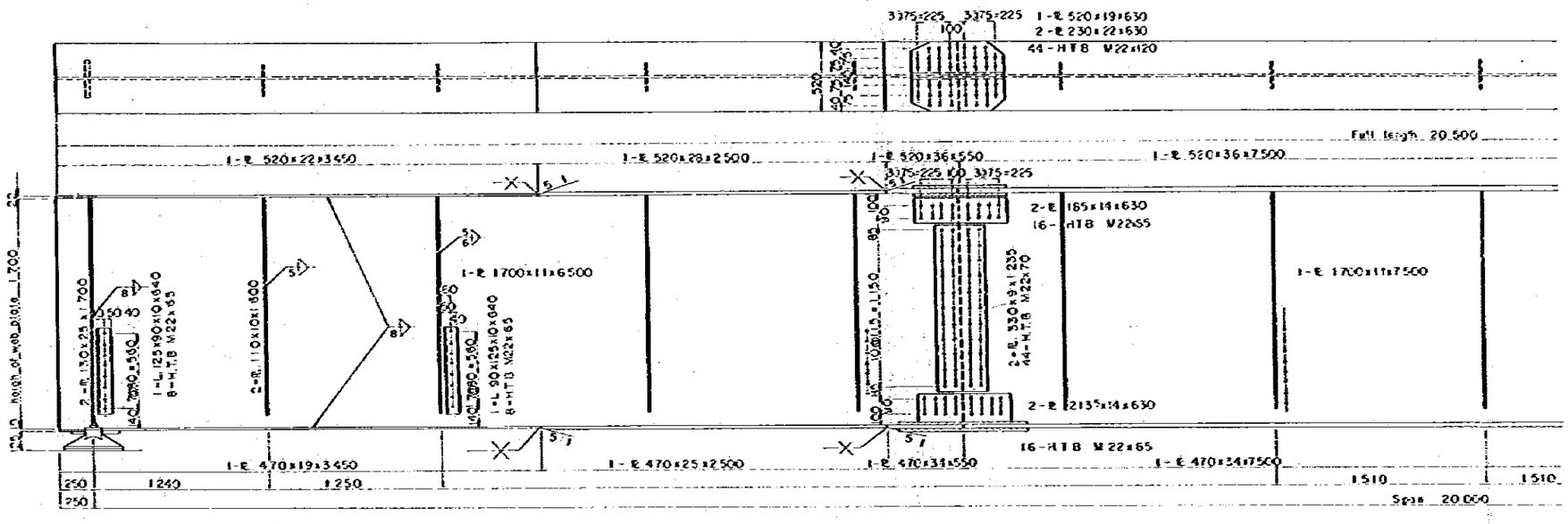
1. The live load is cooper E-45
2. The stringer is of the continuous beam
3. The main girder is of the three (3) blocks
4. The high-strength bolts (HTB) is of fastening system of the site as its entirety
5. The high-strength bolts of the flange surface of the string and of the lateral bracing of the stringer are fitted through driving

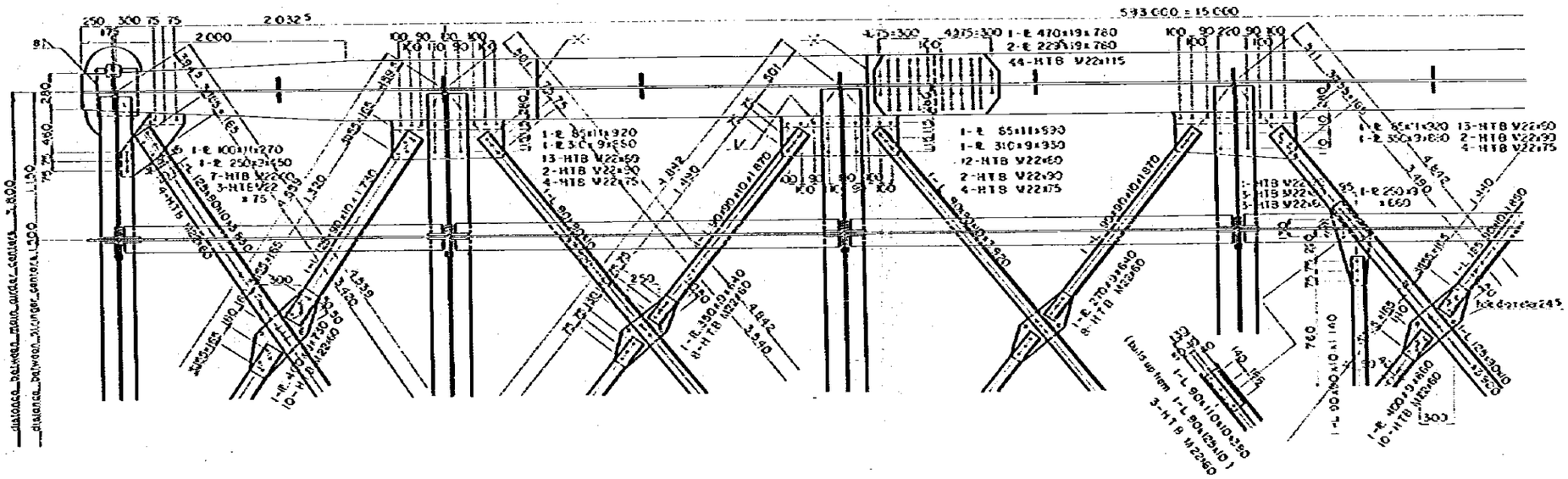
ENPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE

STEEL GIRDER (ℓ=20[m]0)
GENERAL VIEW
(sheet 1 of 3)

Executive Enterprise

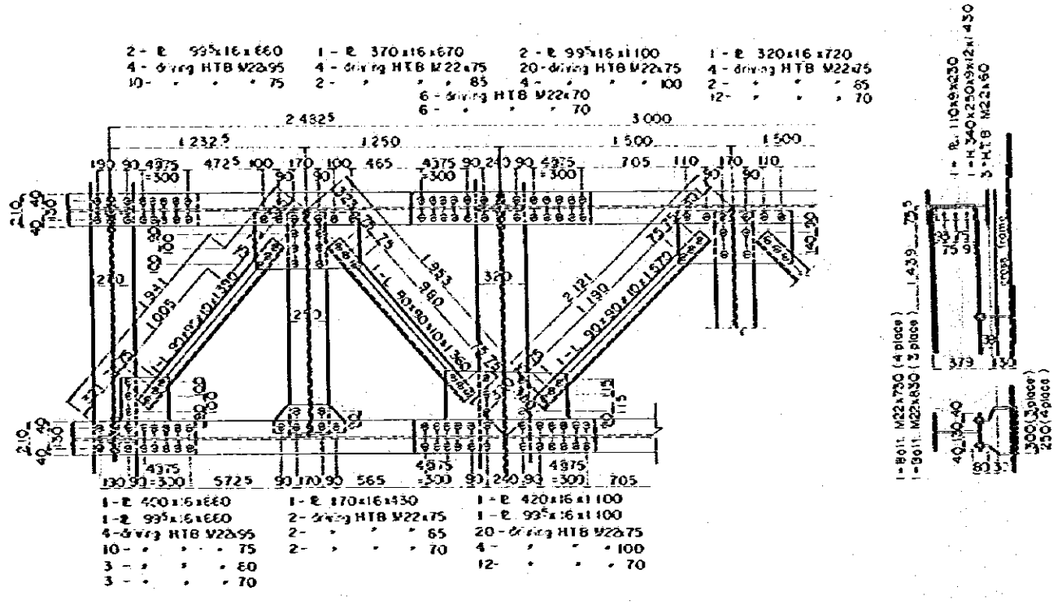
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
[illegible]	[illegible]	No 63



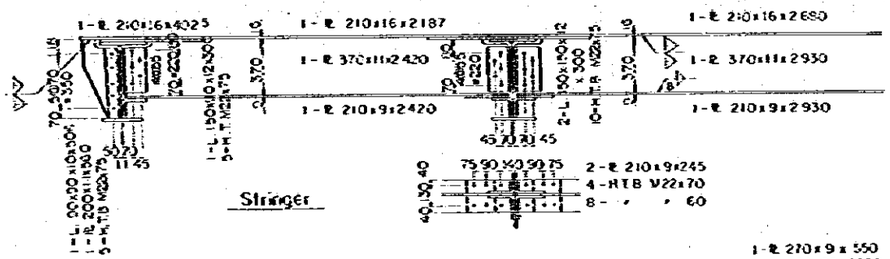


Maine Girder and Lower lateral bracing

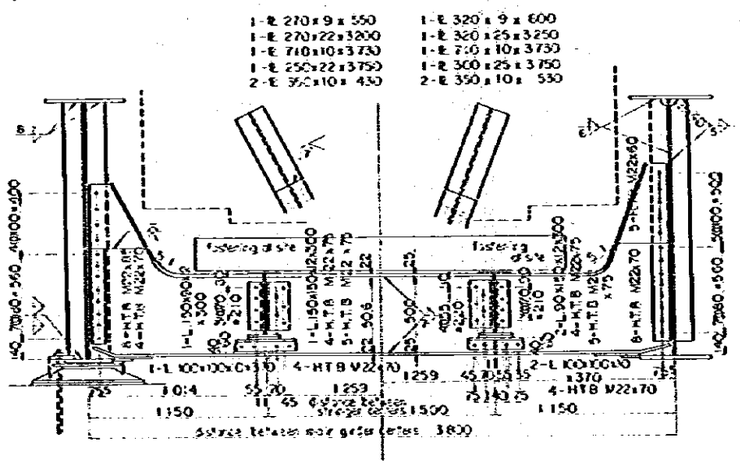
EMPRESA NACIONAL DE FERROCARRILES	
RAILWAY CONSTRUCTION PROJECT EASTERN LINE	
STEEL GIRDER (ℓ=20'0)	
GENERAL VIEW	
(sheet 2 of 3)	
Engineering Enterprise	
Drawn by Date / Checked by Date	Approved by Date
Contracting Enterprise	
Checked by Date / Approved by Date	No. 64



Upper lateral bracing

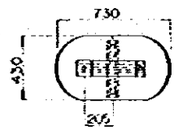


Stringer



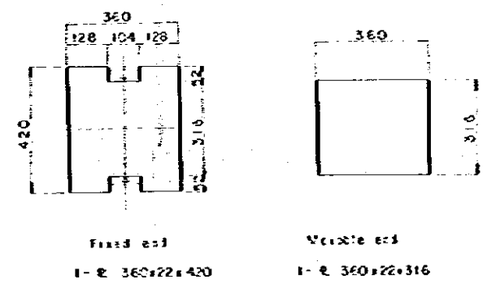
End floor beam

Intermediate floor beam



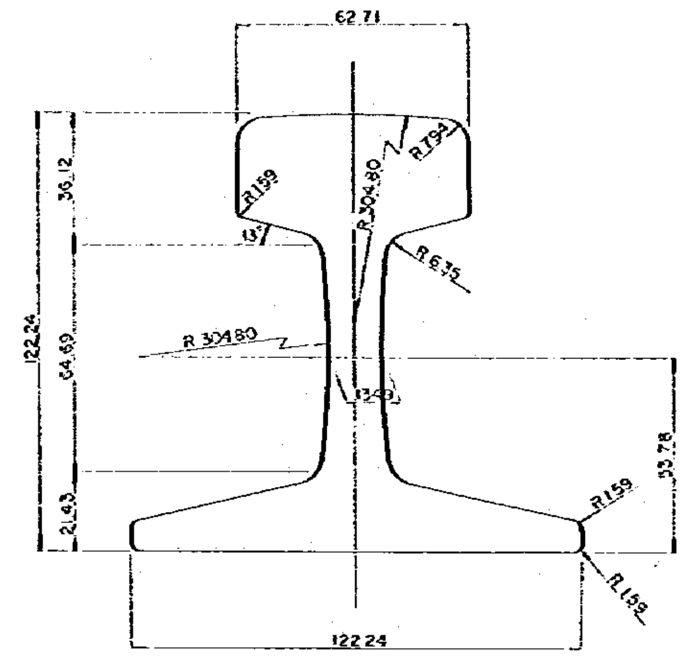
730x430x120 (material FC-15)
anchor bolt #38x650 (• SS41)

Support S=1/20

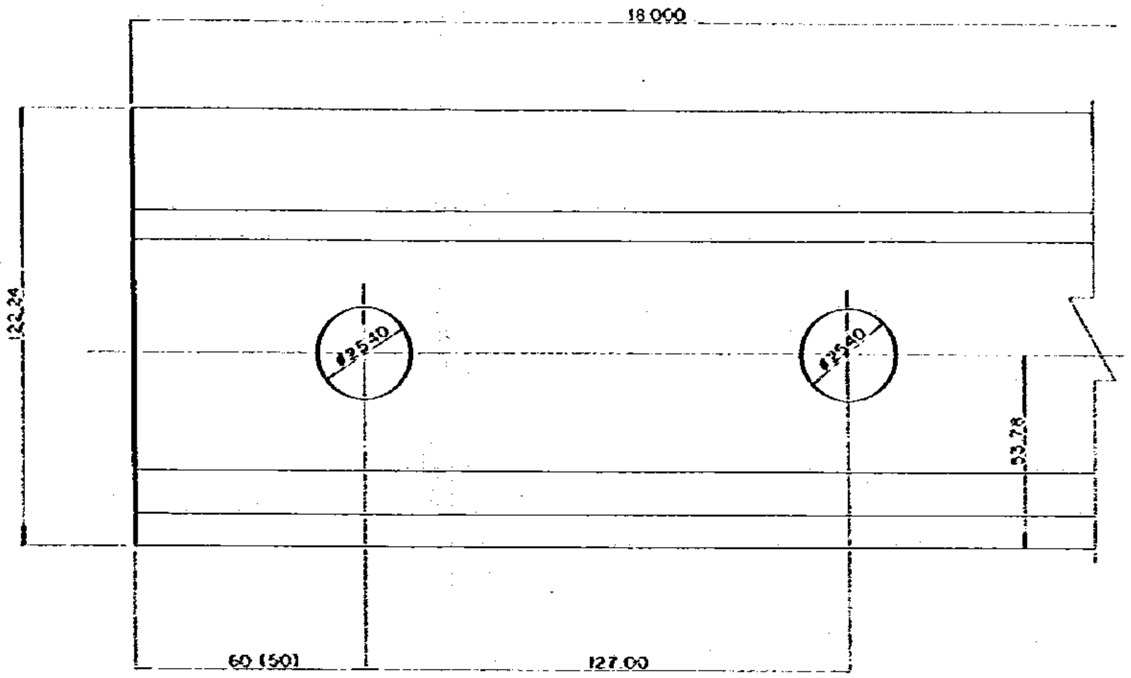


Sole plate S=1/10

ENFRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE
STEEL GIRDER (ℓ=20m0)
GENERAL VIEW
(sheet 3 of 3)
Drawing Enterprise
Drawn by Date
Checked by Date
Approved by
Contracting Enterprise
Checked by Date
Approved by Date
65

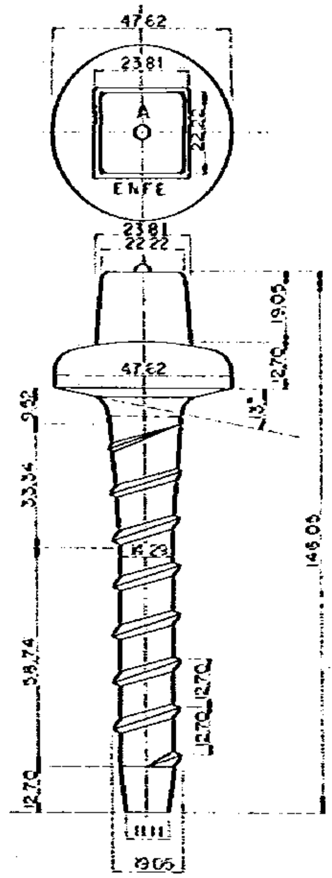


Section

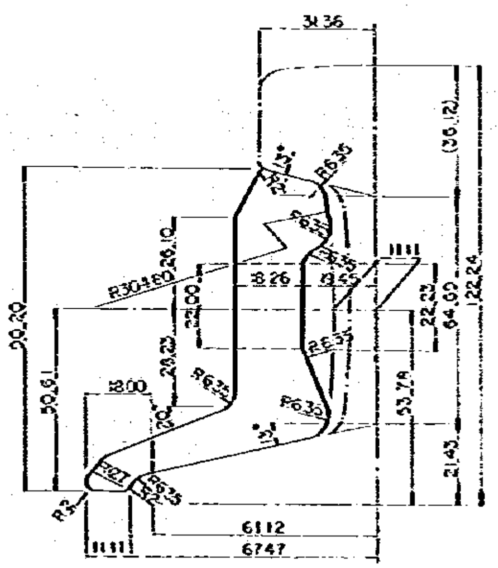


Side View

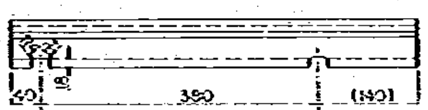
Rail (37.2 kg/m) s=1/1



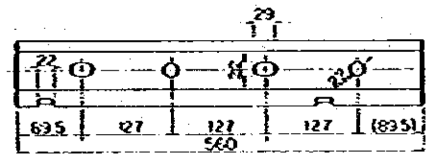
Drive spike s=1/1



Section s=1/1

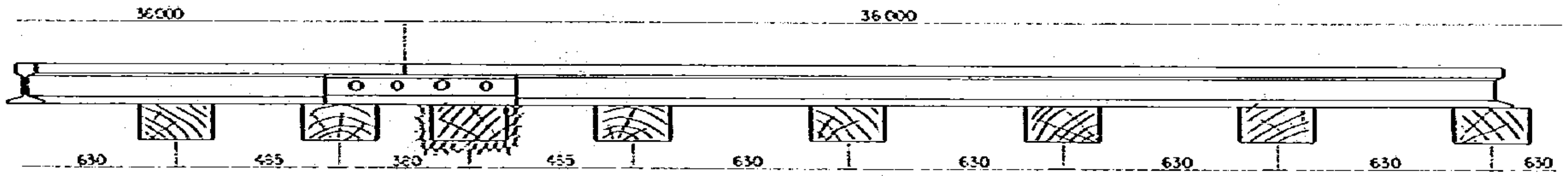


Plan s=1/50

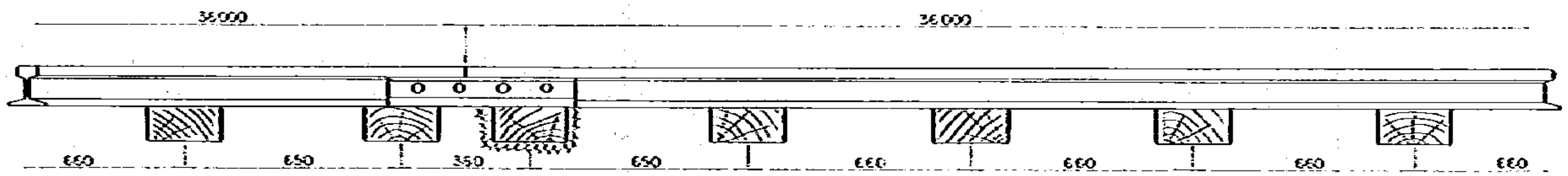


Side View s=1/50

Joint Bar



Tie interval (main track) s=1/10



Tie interval (Side track) s=1/10

Unit mm

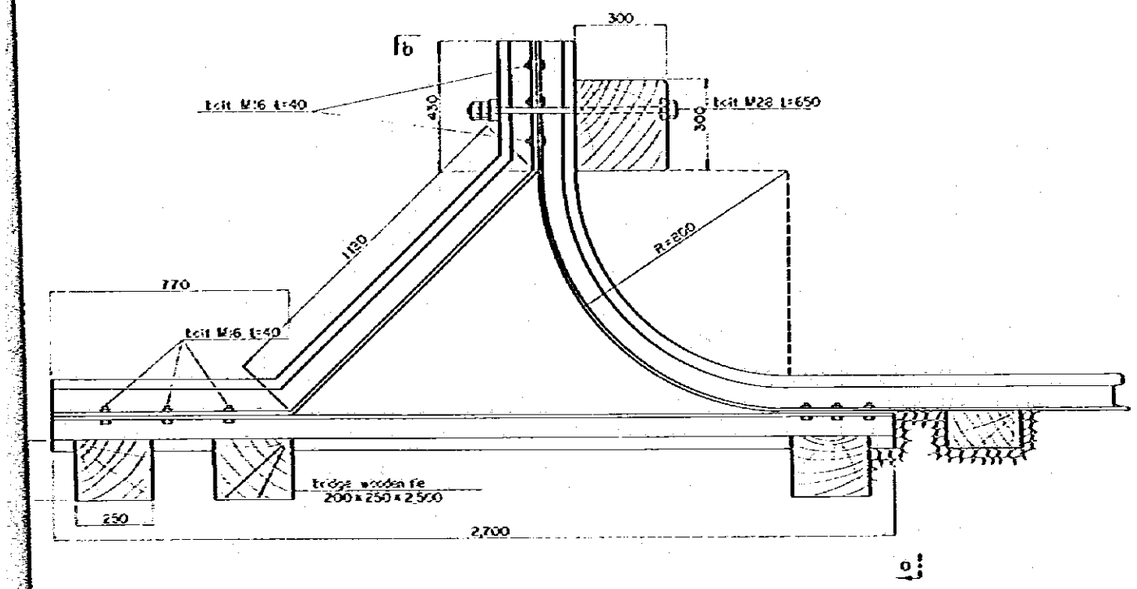
EMPRESA NACIONAL DE FERROCARRILES

TYPICAL TRACK STRUCTURE
RAIL, DRIVE SPIKE, JOINT BAR
TIE INTERVAL (sheet 1 of 2)

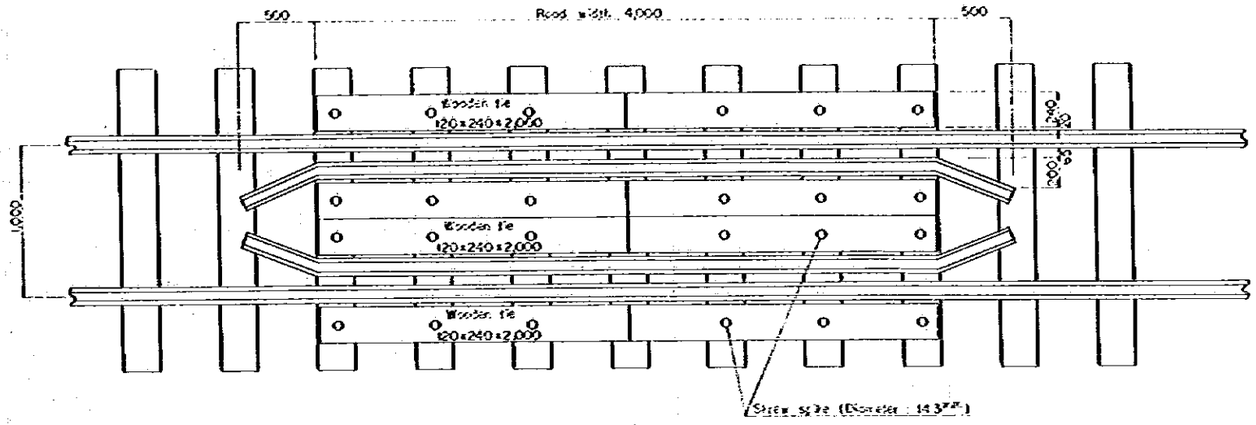
Executing Enterprise

Contracting Enterprise

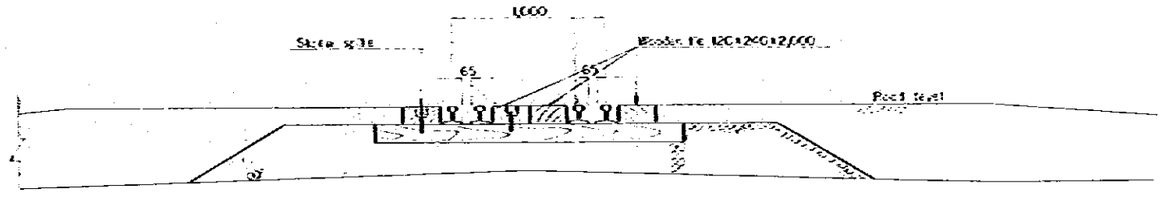
No. 66



Side View

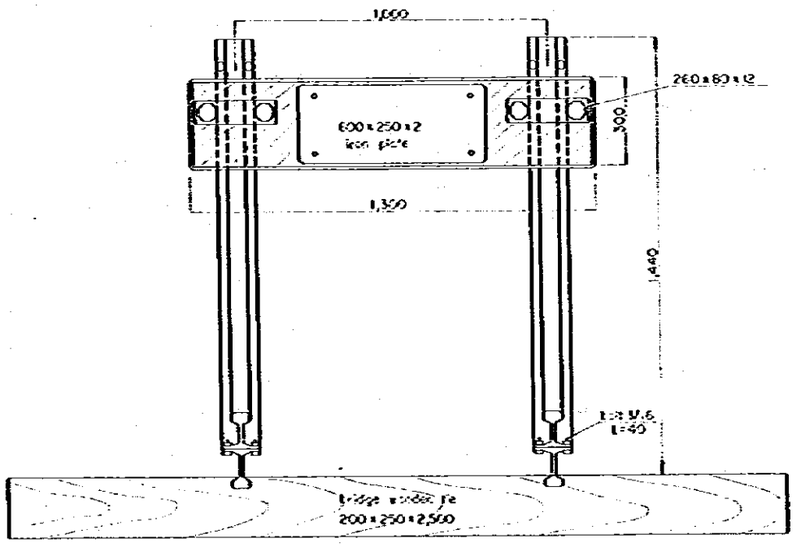


Plan S=1/200

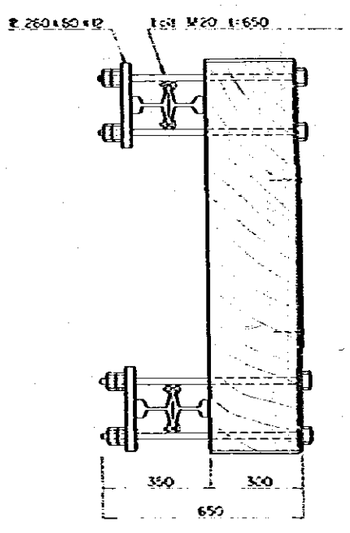


section c – c

Level Crossing S=1/200



section a – a



section b – b

Buffer stop S=1/100

EMPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PRAVET EASTERN LINE

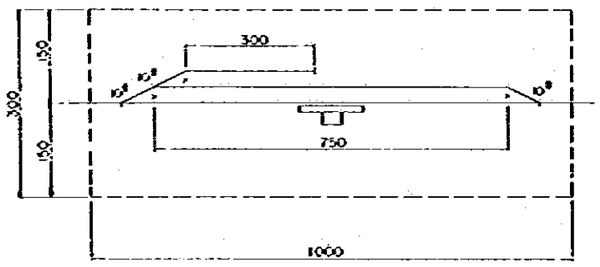
TYPICAL TRACK STRUCTURE
BUFFER STOP, LEVEL CROSSING
(sheet 2 of 2)

Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No. 67

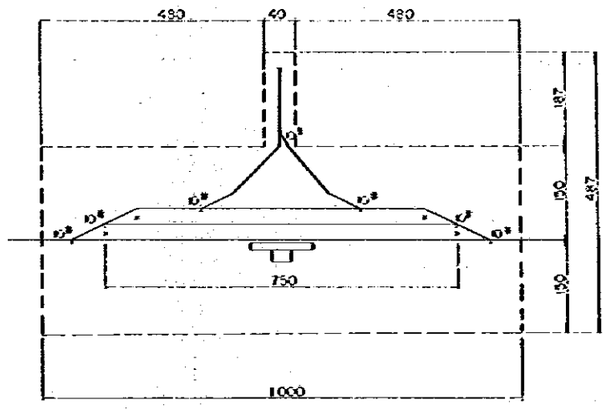
Sketch of track layout

Unit : m

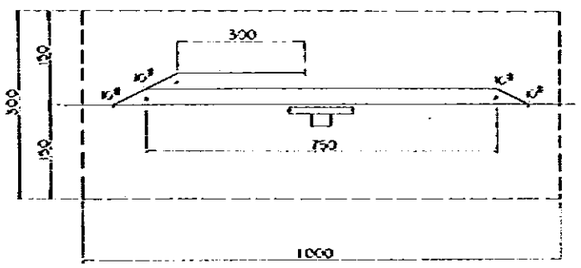
No. 1 Station



No. 2 Station

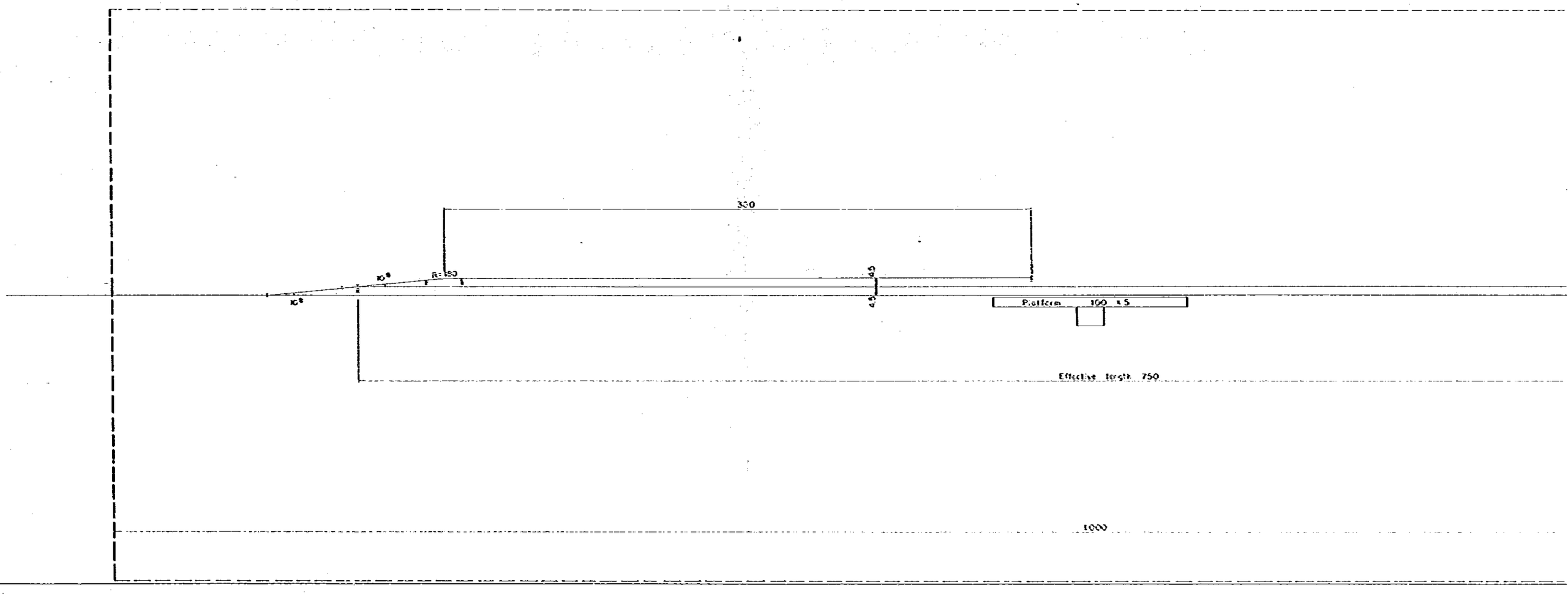


No. 3 Station



Track layout of Station yard (TYPE A) S=1/1000

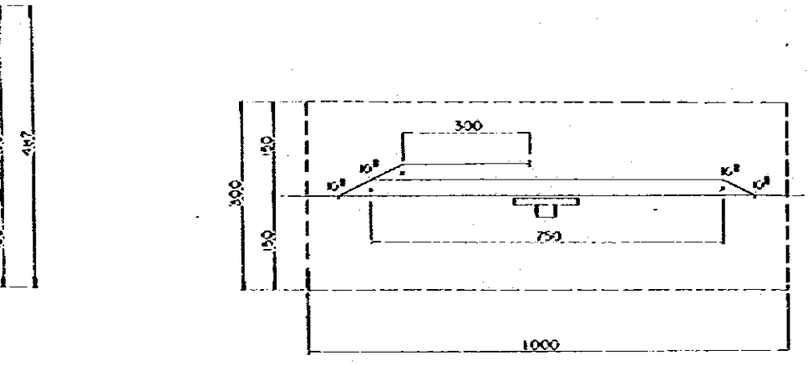
Unit : m



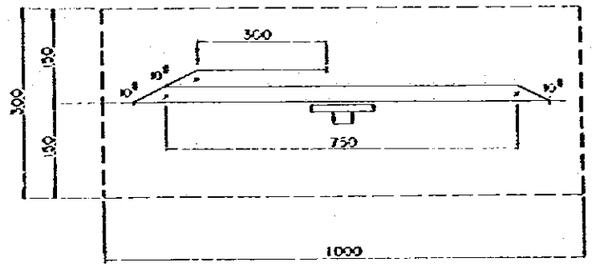
etch of track layout

Unit : m

No. 3 Station

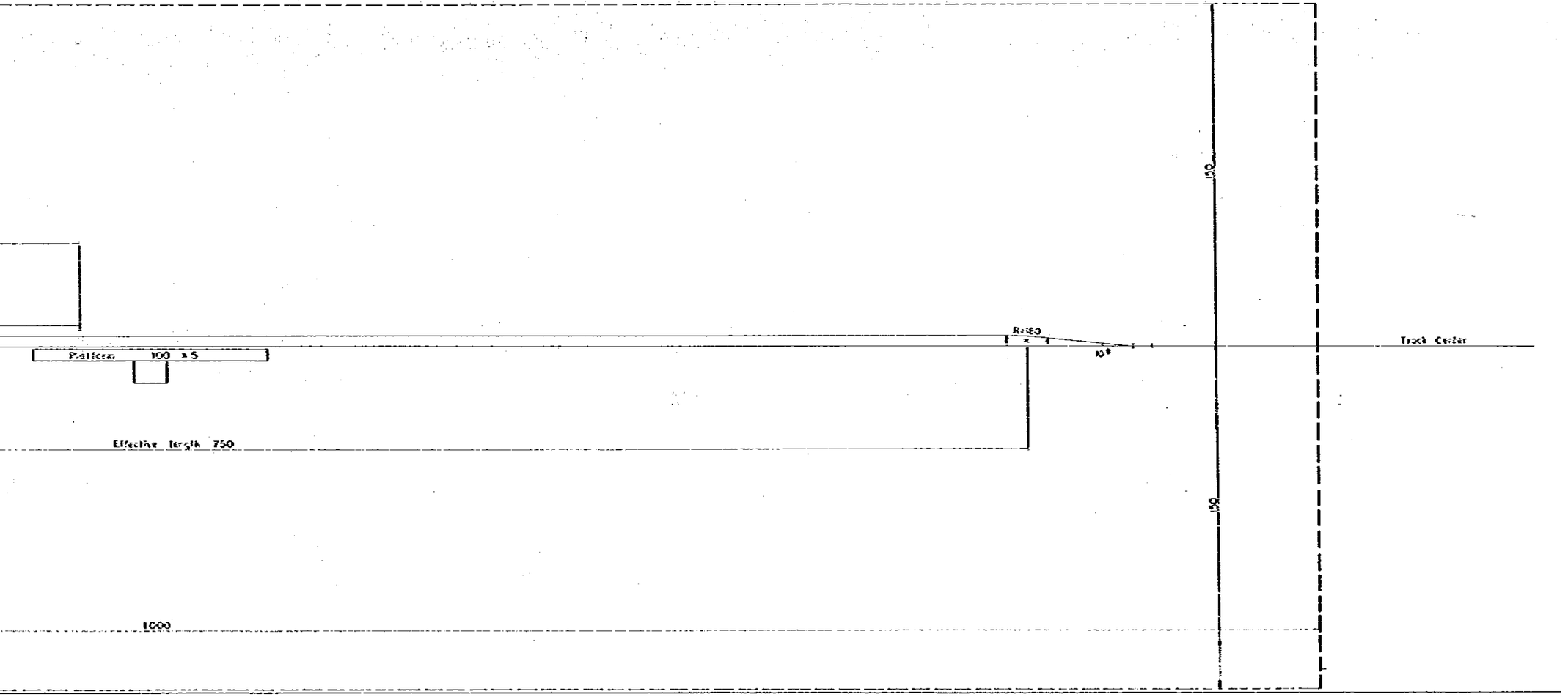


No. 4 Station



ack layout of Station yard (TYPE A) S=1/1000

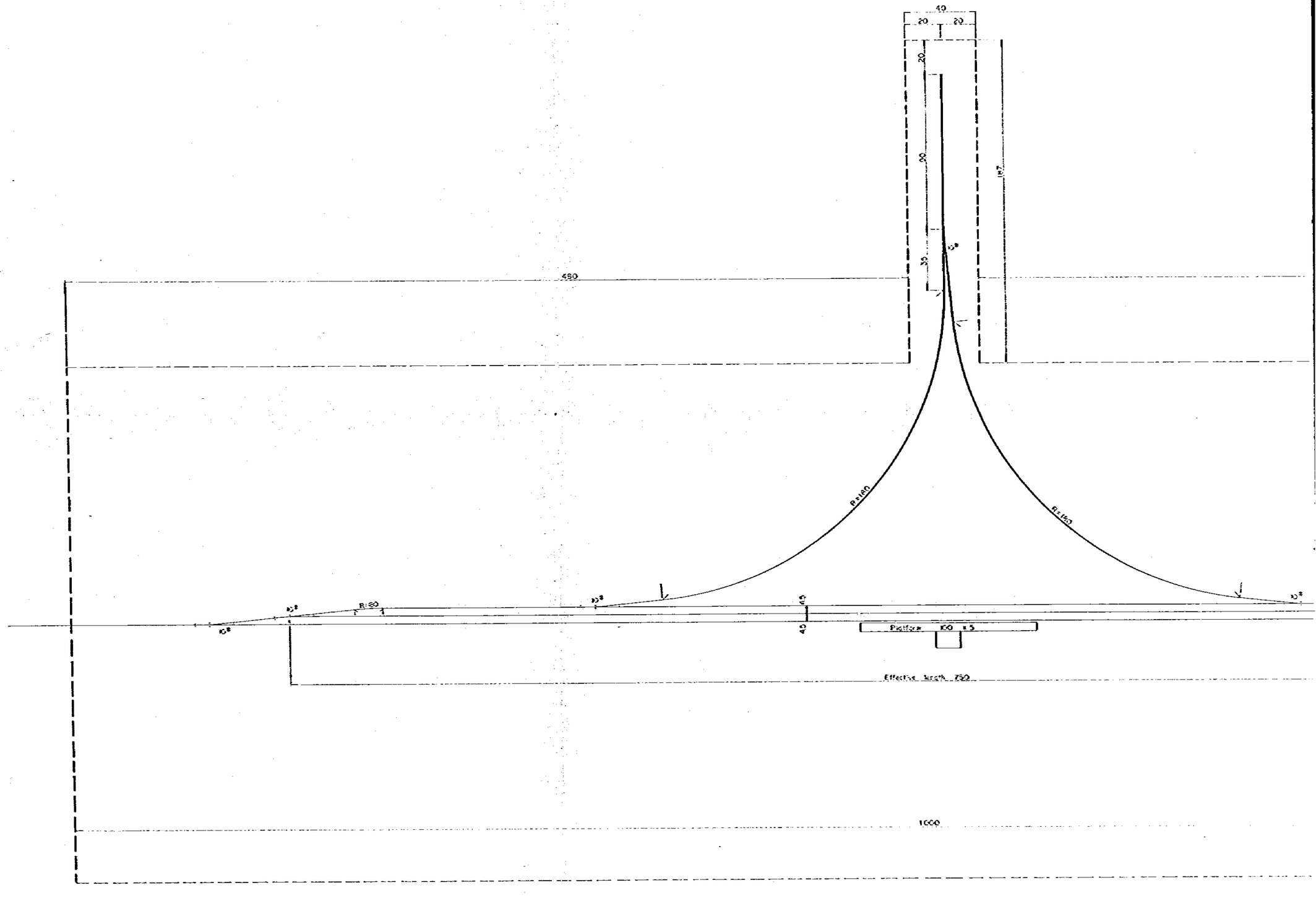
Unit : m



ENPRESA NACIONAL DE FERROCARRILES		
RAILWAY CONSTRUCTION PROJECT EASTERN LINE		
TRACK LAYOUT OF STATION YARD		
(Sheet 1 of 2)		
Executing Enterprise		
Drawn by Date	Checked by Date	Approved by Date
Executing Enterprise		
Checked by Date	Approved by Date	No 68

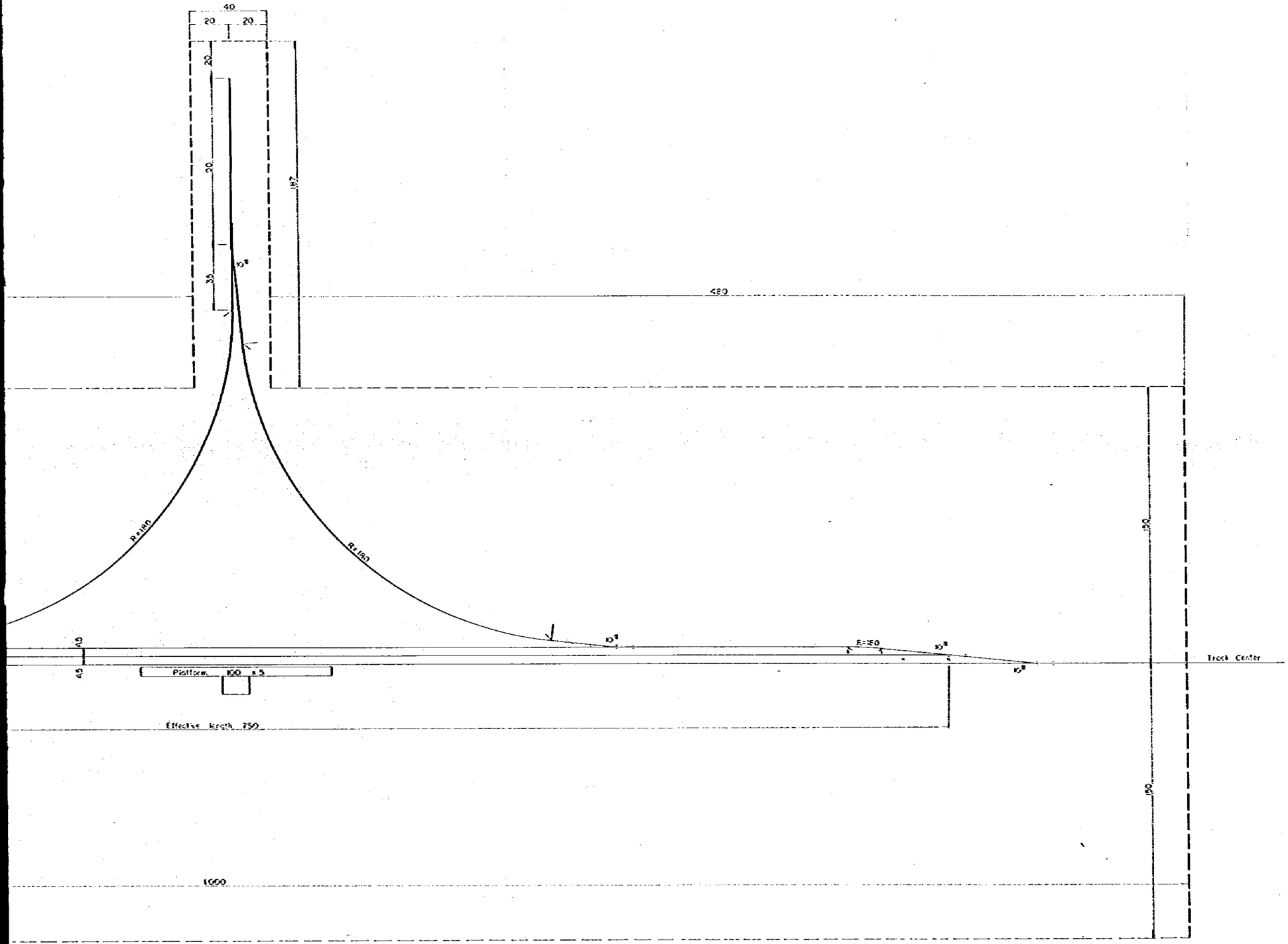
Track layout of Station yard (TYPE B) s=1/1000

Unit : m

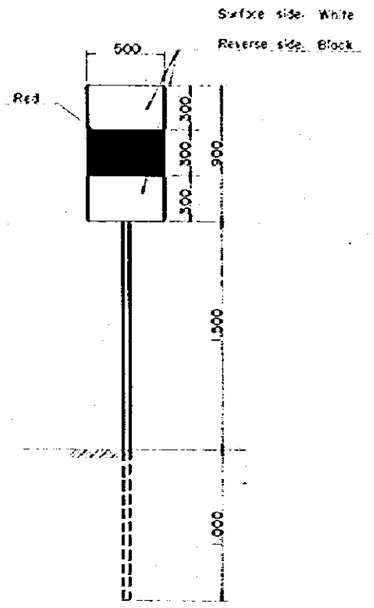


Track layout of Station yard (TYPE B) S=1/1000

Unit : m



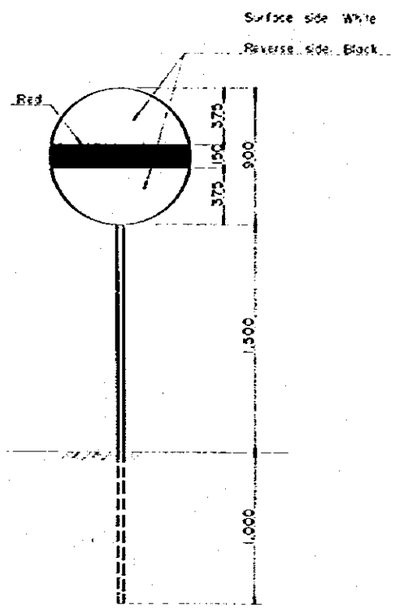
EMPRESA NACIONAL DE FERROCARRILES	
RAILWAY CONSTRUCTION PROJECT EASTERN LINE (LAPAAS-BAYUD)	
TRACK LAYOUT OF STATION YARD	
(sheet 2 of 2)	
Executing Enterprise	
Drawn by Date	Checked by Date / Approved by Date
Contracting Enterprise	
Checked by Date / Approved by Date	No 69



MARSHALLING BOUNDARY INDICATOR S=1/20

Note:

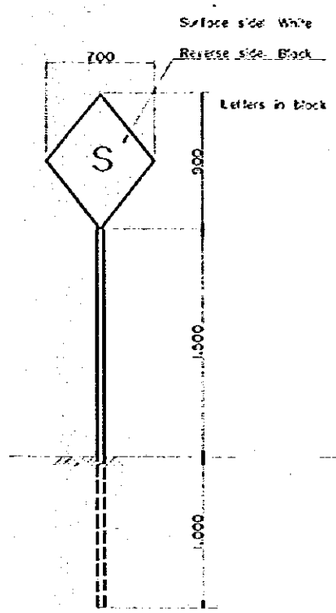
To be erected at the site 200m inside of turnout-point within the station yard.



STATION BOUNDARY INDICATOR S=1/20

Note:

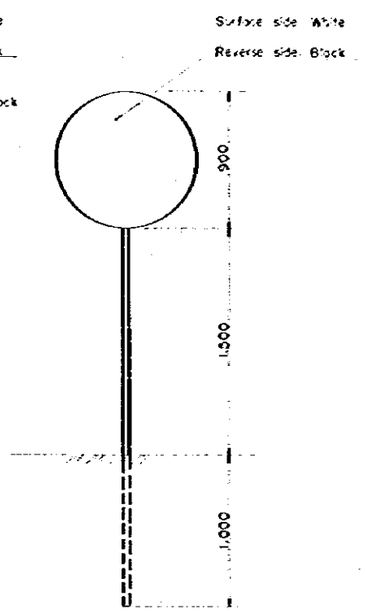
To be erected at the site 500m inside of station entrance turnout-point.



WHISTLE POST S=1/20

Note:

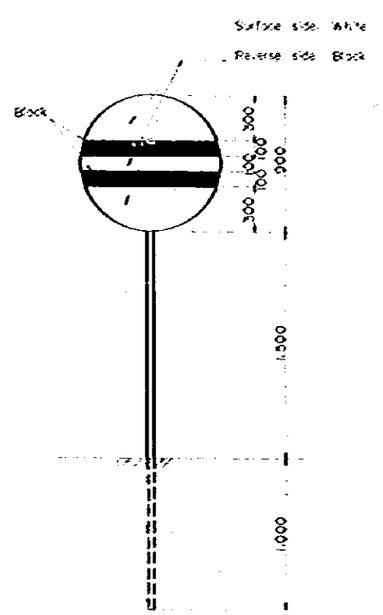
To be erected at the site 1500m inside of station entrance turnout-point and 600m inside of the related level crossing.



STATION APPROACH INDICATOR S=1/20

Note:

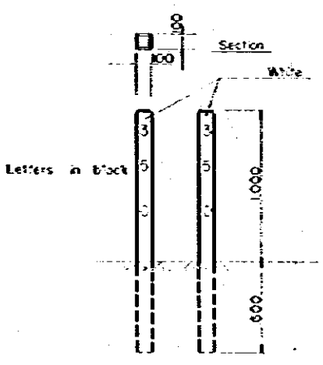
To be erected at the site 2000m inside of station entrance turnout-point.



BRIDGE APPROACH INDICATOR S=1/20

Note:

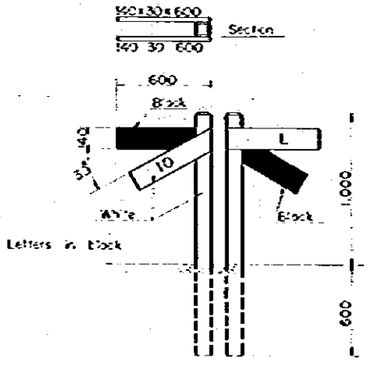
To be erected at the site 300m inside of the related bridge



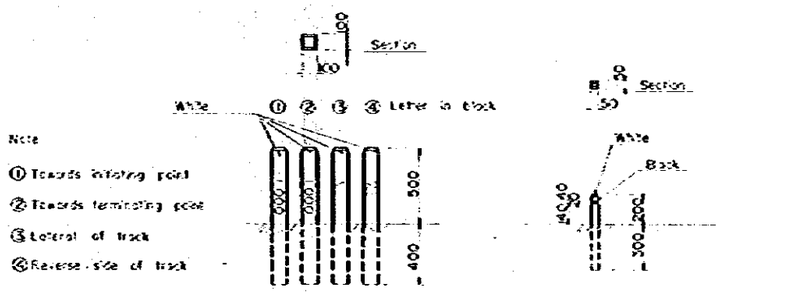
KILOMETER POST S=1/20

Note:

To be erected at the site every one Km



GRADE POST S=1/20



BCC. ECC POST S=1/20 B.T.C. E.T.C POST S=1/20

CIRCULAR CURVE AND TRANSITION CURVE POST

Unit: mm

ENPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE

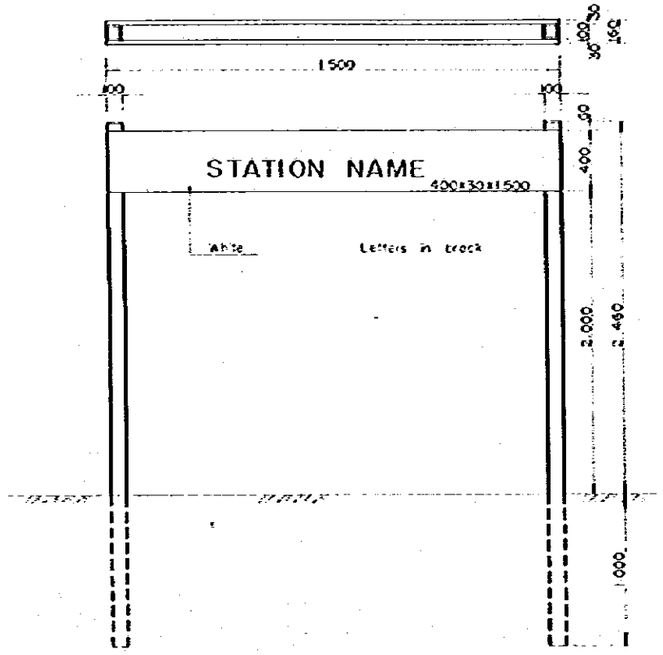
TYPICAL OF ROADWAY SIGN
(Sheet 1 of 2)

Planning Enterprise

Checked By Date | Checked By Date | Approved By Date

Contracting Enterprise

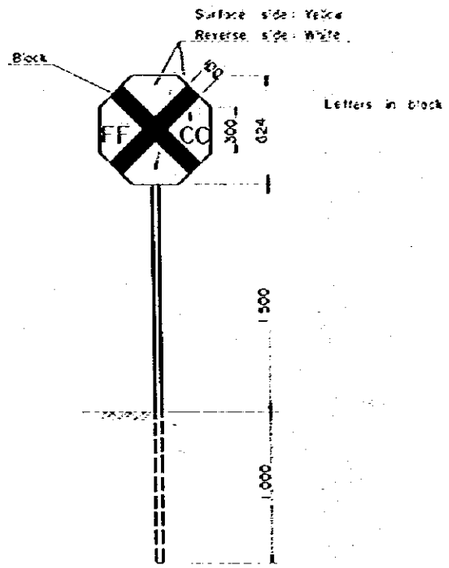
Checked By Date | Approved By Date | No. 70



INDICATION BOARD OF STATION NAME S=1/20

Note

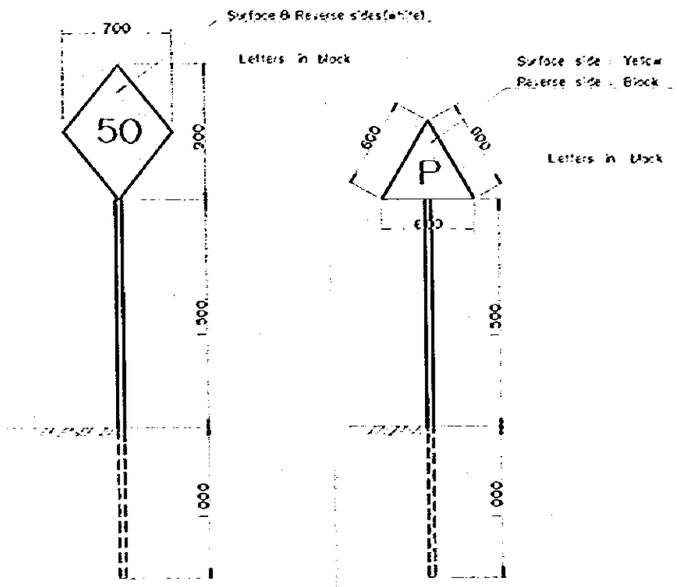
To be erected at the site 50m inside of junction of the station entrance



WARNING POOT FOR CROSSING S=1/20

Note

Right-hand side of road-shoulder

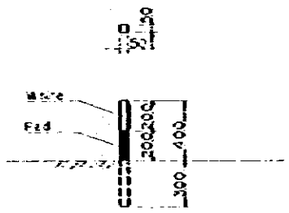


SPEED LIMIT INDICATOR S=1/20

WARNING SIG POST S=1/20

Note

To be erected at the precarious site 500m inside thereof



CLEARANCE POST S=1/20

Note

To be erected at the site 1.85m distant from the centerline with the interval of 3.7m distant between centerlines of adjoining tracks

EXPRESA NACIONAL DE FERROCARRILES

TYPICAL OF ROADWAY SIGN
(sheet 2 of 2)

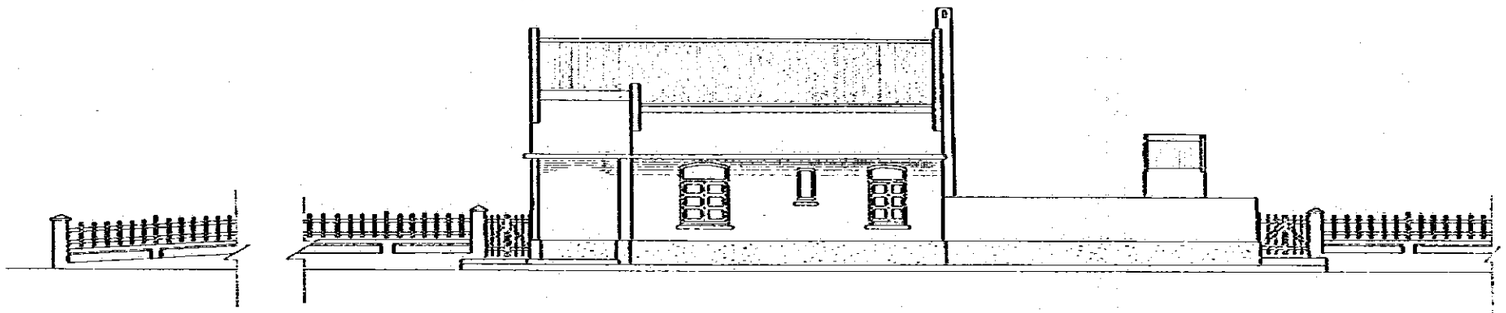
Executing Enterprise

Drawn by Date | Checked by Date | Approved by Date

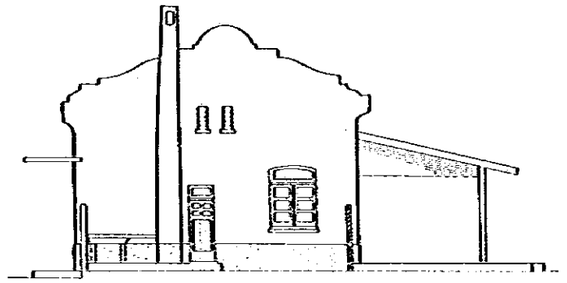
Contracting Enterprise

Checked by Date | Approved by Date

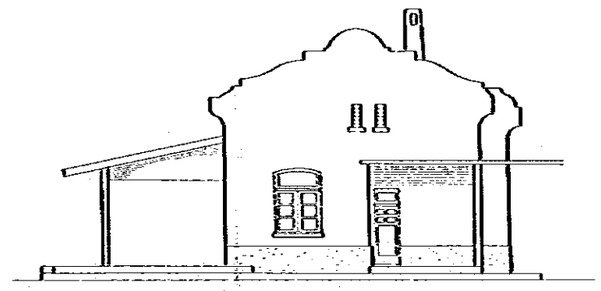
71



Importance appearance



Front – E



Front – D

Finish schedule

Outside					
Station building	Roof	Brick type roof tile or long size zinc galvanized sheet (thickness : ≧0.4$^{m/m}$)	Platform	Floor	Concrete plate Gravel bed Dia 40$^{m/m}$, Thickness 100$^{m/m}$, Area 420m^2
	External wall	Spraying with cement (white)		Fence	Steel fence H=80^{cm} L=73^{m}
	Drain pipe	Hard vinyl chloride or steel pipe		Roof	Brick type roofing or long size zinc galvanized sheet (thickness : ≧0.4$^{m/m}$)
Courtyard	External wall	Spraying with cement (white) high : 60 width , 1 place		External wall	Oil paint
	Unfloored part	Concrete plate (vertical site)		Ceiling	Dolomite plaster Colour : oil paint, light : 60 watt, 3 place (same shall be installed at office)

Inside							
Room name	Floor	Baseboard		Floor unit	Wall	Ceiling	
Office	Tile of porcelain type for floor	Wooden	OP	Portion thickness 2/$^{m/m}$ H 900$^{m/m}$	Dolomite plaster	Dolomite plaster	
Bed room (1)	"	Wood H 100$^{m/m}$	OP		"	"	
" (2)	"	"	"		"	"	
Living room	"	"	"		"	"	
Kitchen	"			Tile of porcelain type H 1300$^{m/m}$	"	"	
Bath room	"			"	Ceramics tile	Spraying with cement (white)	
Passage	"	Wood H 100$^{m/m}$	OP		Dolomite plaster	Dolomite plaster	
Vestibule	"				Spraying with cement (white)	"	
Water closet	Artificial stone			Artificial stone H 600$^{m/m}$	Dolomite plaster	"	

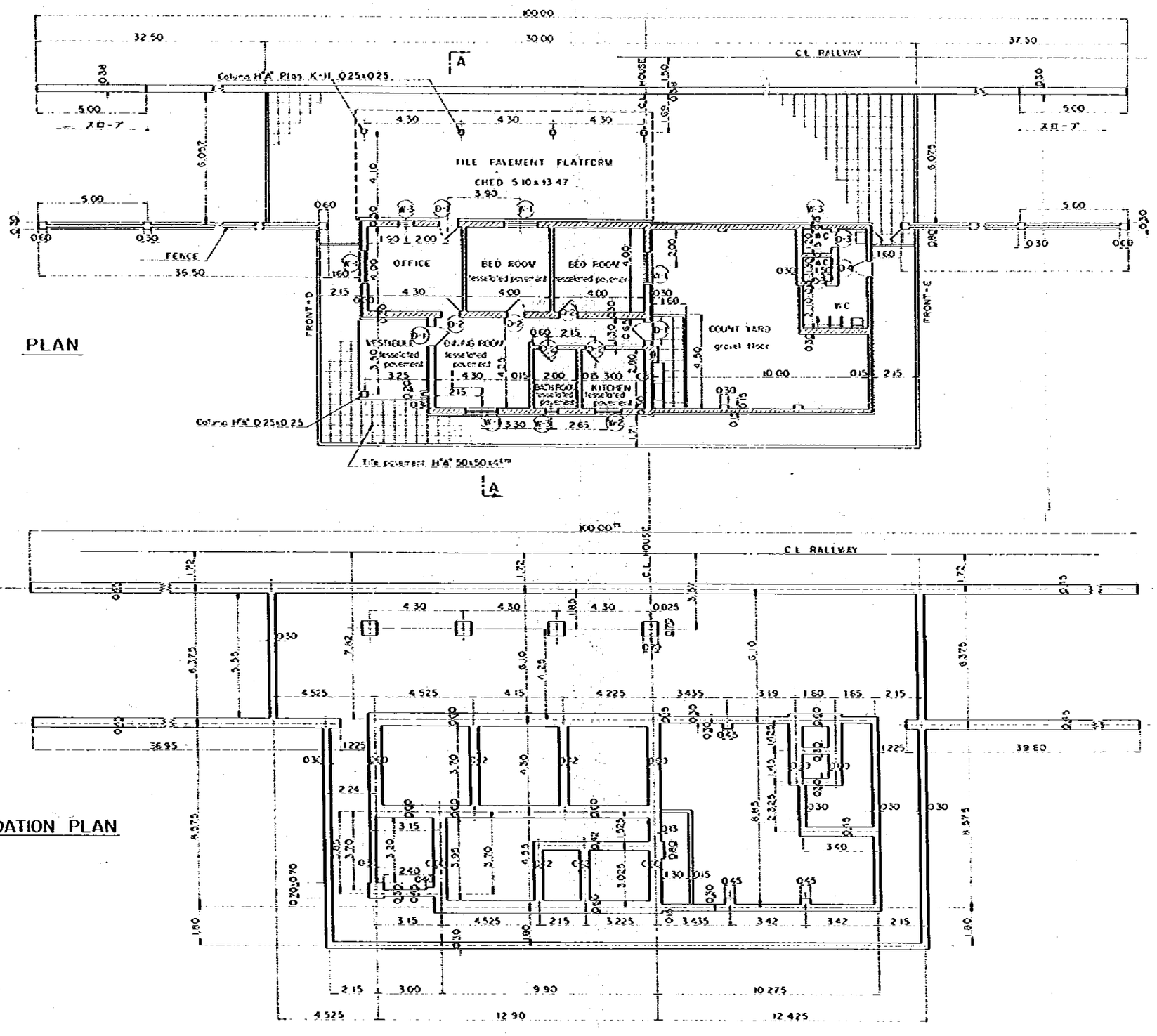
ENTIDAD NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT ENTIDAD NACIONAL DE FERROCARRILES

STATION BUILDING AND FACILITY
GENERAL VIEW
(sheet 1 of 5)

Supervising Engineer

Drawn by | Checked by | Approved by

Checked by | Traced by | No. 72



EMPRESA NACIONAL DE FERROCARRILES
RAILWAY RECONSTRUCTION PROJECT EASTERN LINE

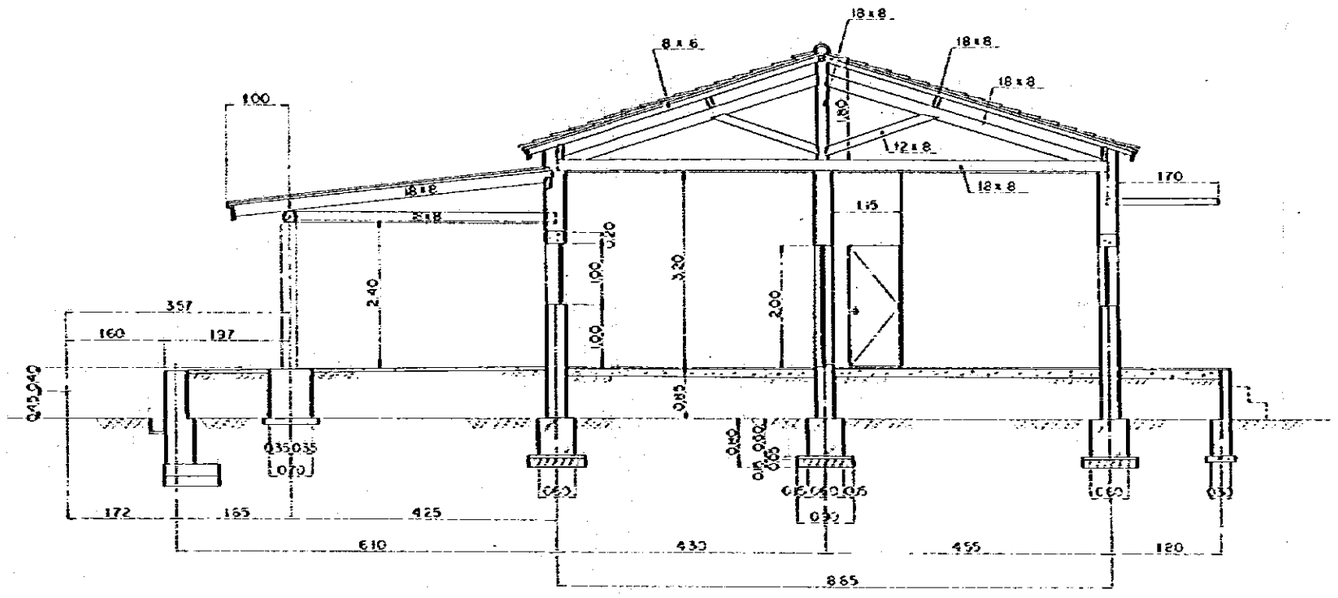
STATION BUILDING AND FACILITY
GENERAL VIEW
(sheet 2 of 5)

Executing Enterprise

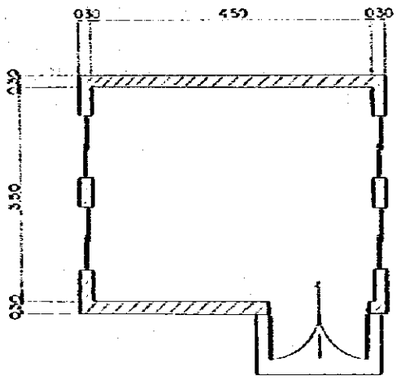
Drawn by Date | Checked by Date | Approved by Date

Consulting Enterprise

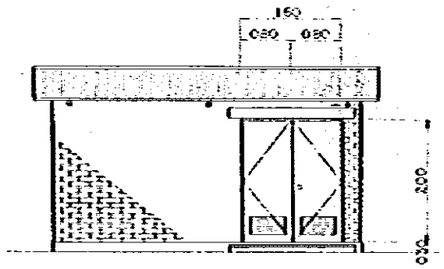
Checked by Date | Approved by Date | No. 73



Section

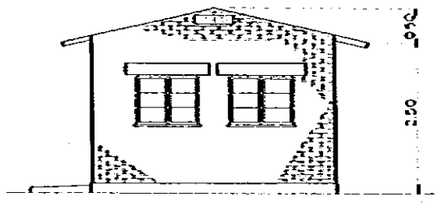


Plan S=1/50



Elevation S=1/50

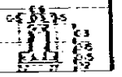
Pump – Chamber



Elevation S=1/50

Finish schedule

Roof	Corrugated steel sheet roofing
External wall	Brick
Floor	Material : concrete Finish : steel trowel
Fittings	Metal
Base	Reinforced concrete



ENGRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION OFFICE EASTERN LINE

STATION BUILDING AND FACILITY
GENERAL VIEW
(sheet 3 of 5)

Executive Engineer

Prepared by Date | Checked by Date | Approved by Date

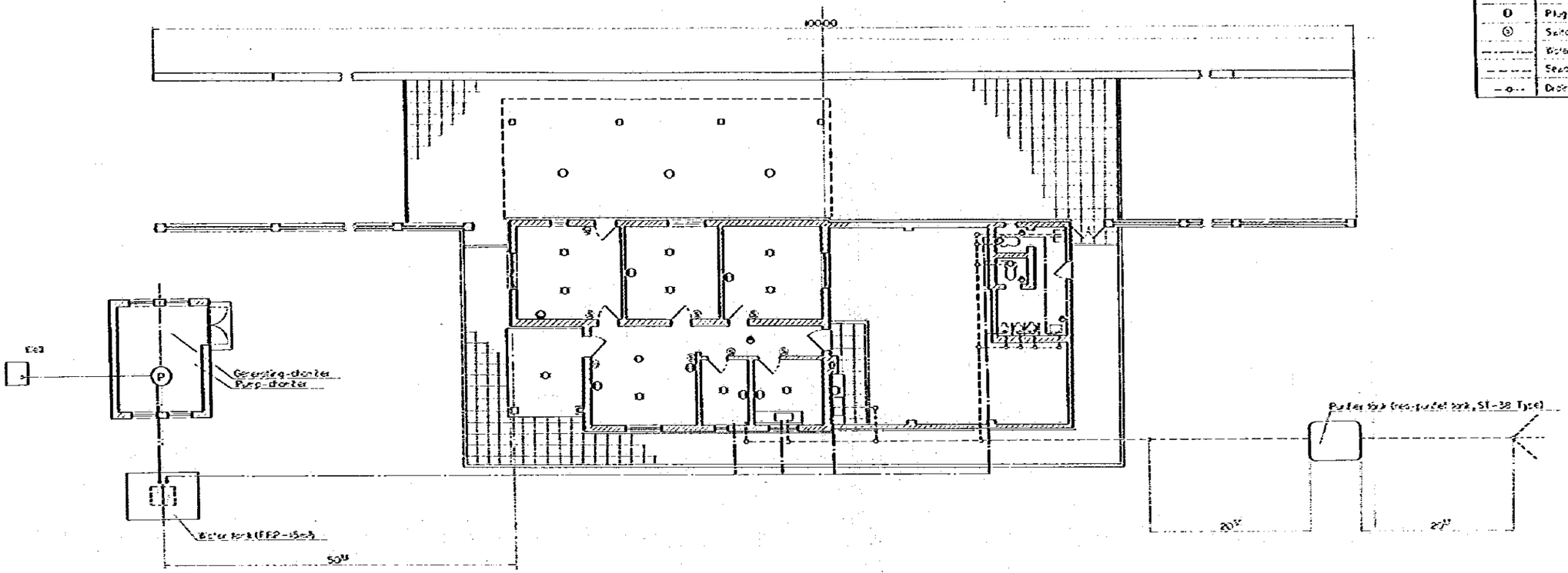
Contractor's Engineer

Checked by Date | Approved by Date

No. 74

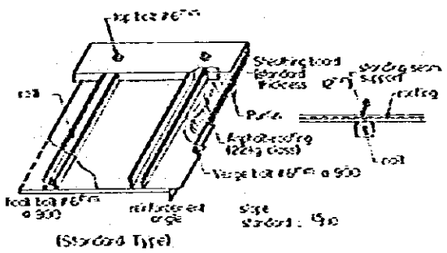
Marking

○	100 kcal Reflector downward light
☼	60 kcal "
○	40 kcal "
▯	Plug
Ⓢ	Switch ⓈB Switch (2 place)
———	Water-supply pipe
- - - -	Sewage pipe
—o—	Drainage basin



Application method

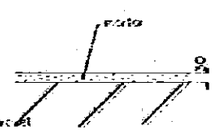
Ribbed seam roofing with zinc galvanized sheet



(Standard Type)

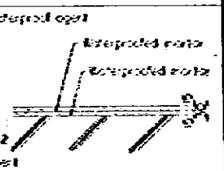
Cement mortar (for floor)

Type of Materials	Cement-Sand
Base Material	Concrete
Standard Thickness	30 mm
Finish	Steel trowel
Joint	"V" type steel bead
Admixture	Cement 1 : Sand 2
Remarks	The thickness of plastering may be varied according to the circumstances



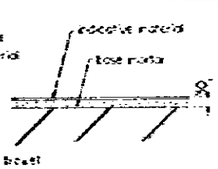
Water-proofed mortar

Type of Materials	Cement sand waterproof agent
Base Material	Concrete
Standard Thickness	15+15=30 mm
Finish	Steel trowel
Joint	No joint
Admixture	Cement 1 : Sand 2 +Waterproof Agent
Remarks	Depending upon the type of waterproof chemical agent, the standard thickness and the admixture may be varied



Special mortar

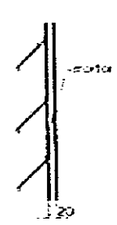
Type of Materials	Cement-sand Special surface finishing material
Base	Concrete
Standard Thickness	30 mm
Finish	Steel trowel
Joint	"V" type steel bead
Admixture	Cement 1 : Sand 2



Application method

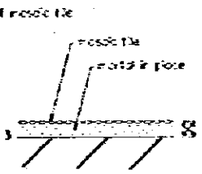
Cement mortar (for wall)

Type of Materials	Cement : Sand
Base	Concrete
Standard Thickness	6+11+3=20 mm
Finish	Wooden trowel Steel trowel Brush finish
Admixture	Basic plastering : Cement 1 : Sand 2 Intermediate plastering : Cement 1 : Sand 3 Final plastering : Cement 1 : Sand 3 : Hydrated lime 0.3



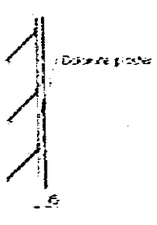
Tile hanging (for floor)

Type of Materials	Porcelain type of mosaic tile
Base Material	Concrete
Standard Thickness	50 mm
Joint	2 mm
Admixture	Water in place Cement 1 : Sand 3 Finishing joint : Cement 1 : Sand 2
Remarks	In the event of providing water-proof layer, the thickness shall be 50+20=70



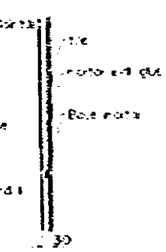
Dolomite plaster

Type of Materials	Dolomite plaster
Base	Concrete
Standard Thickness	7+6+2=15 mm
Finish	Steel trowel
Admixture Basic plaster	Dolomite plaster 0.8 Cement 0.2 Sand 2 + glue
Intermediate plaster	Dolomite plaster 0.9 Cement 0.1 sand glue
Final plaster	Dolomite plaster 1 + glue



Tile hanging (for wall)

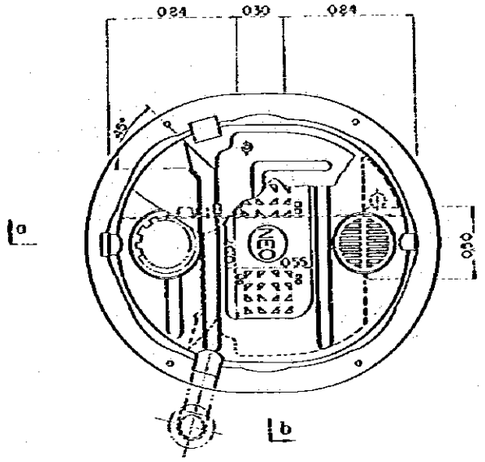
Type of Materials	Semi-glass type porcelain tile
Base Material	Concrete, Brick
Standard thickness	30 mm
Joint	3 mm
Admixture	Base Mortar, with glue Cement 1 : Sand 3 Finishing joint : Cement (white) 1 : Sand 1



EMPRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE

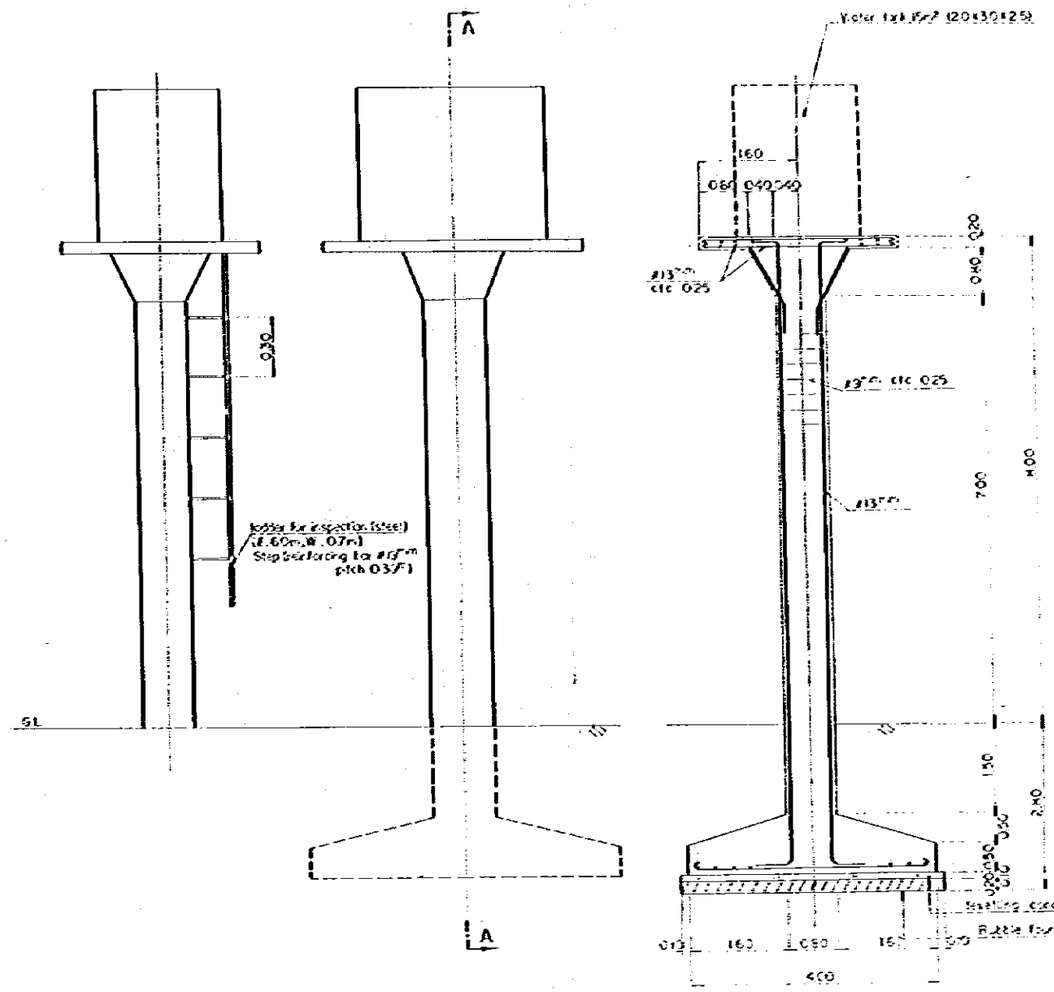
STATION BUILDING AND FACILITY
GENERAL VIEW
(sheet 4 of 5)

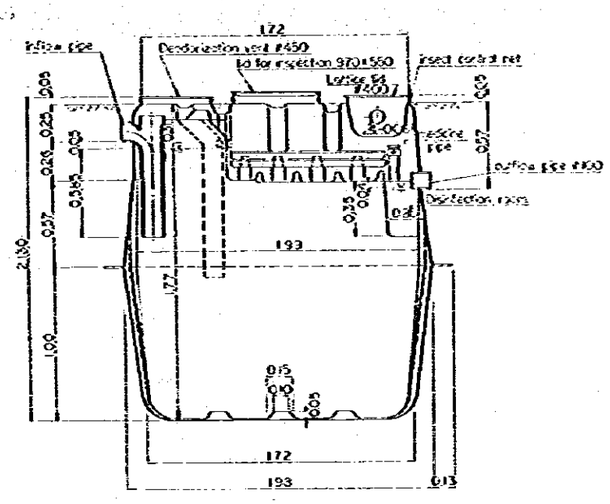
Designed by Date		
Drawn by Date	Checked by Date	Approved by Date
Contracting Enterprise		
Checked by Date	Approved by Date	No. 75



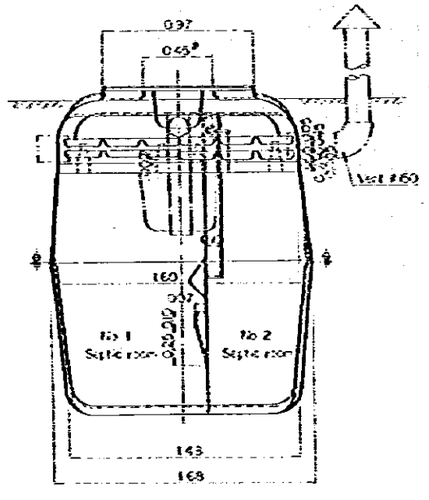
Plan

Septic tank, ST 38 TYPE S=1/20





Section a – a



Section b – b

Water tower S=1/50 Unit : m

Septic Tank ST38 TYPE S=1/20 Unit : m/m

EMPRESA NACIONAL DE FERROCARRILES	
STATION BUILDING AND FACILITY	
GENERAL VIEW (sheet 5 of 5)	
Drawing Engineer	
Checked by	Approved by
Chief Engineer	
Drawing No.	76

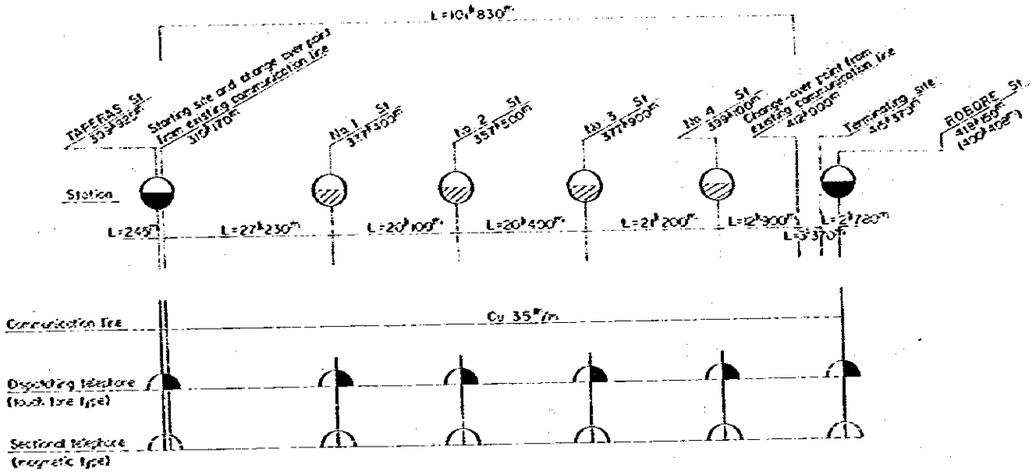
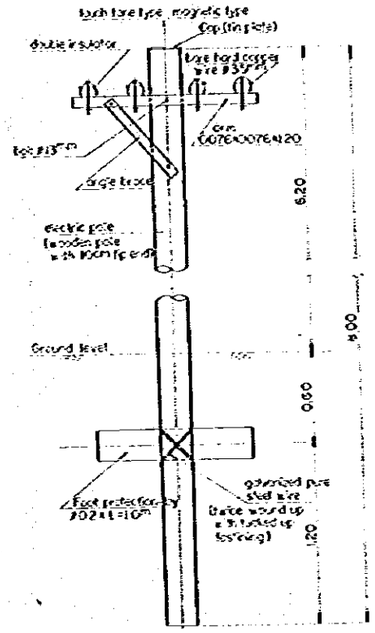
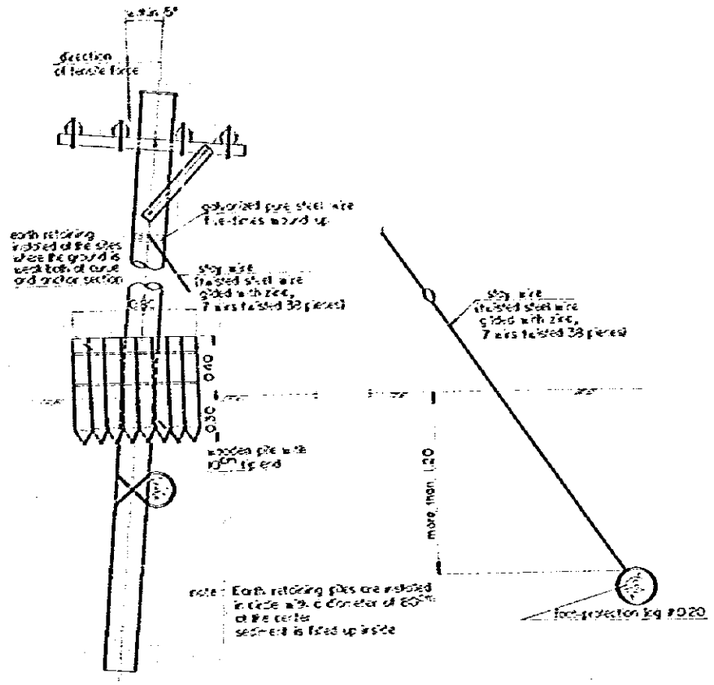


Figure of Communication circuit

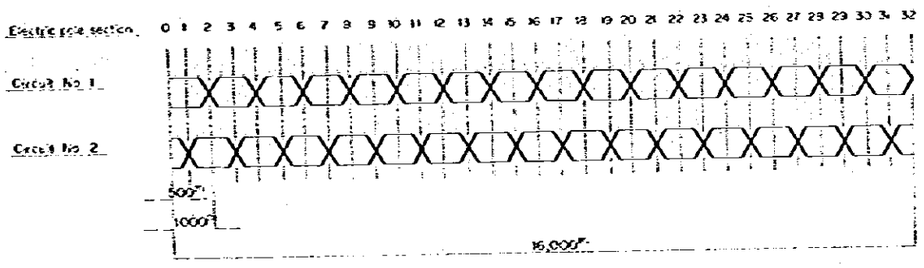


General section



Curv section or Anchor section

Figure of Erected Electric Poles



Ordinary Transposition Figure of Bore Communication line (standard section)

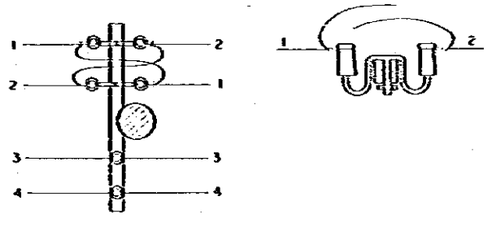
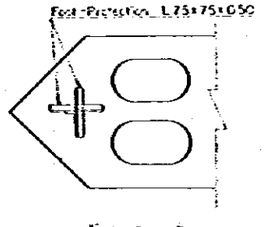
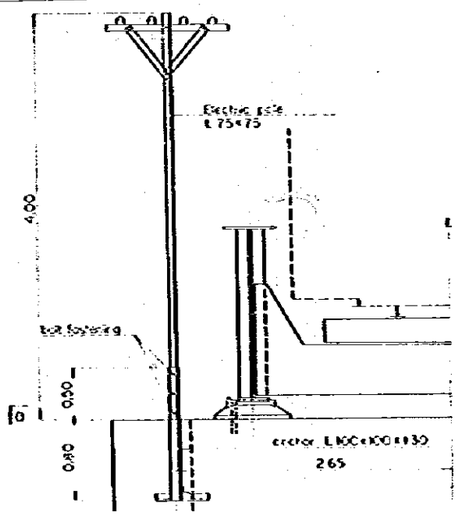


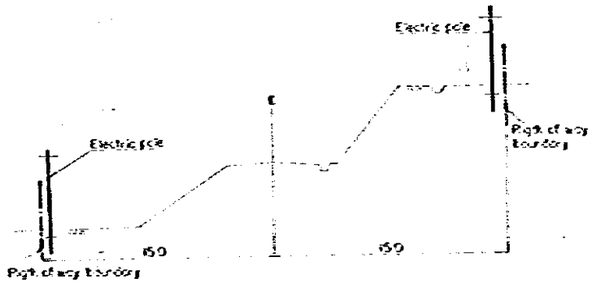
Diagram for ordinary transposition



section 0 – 0



Bridge section S=1/30



Banking section S=1/200 Cutting section S=1/200

Location Figure of Erected Electric Poles (standard)

ENTRESA NACIONAL DE FERROCARRILES
RAILWAY CONSTRUCTION PROJECT EASTERN LINE

COMMUNICATION FACILITY

GENERAL VIEW

Prepared by Date | Checked by Date | Approved by Date

No. 77