



REPUBLIC OF KENYA
MINISTRY OF PUBLIC WORKS

**THE NAIROBI BYPASS PROJECT
DETAILED DESIGN STUDY
FINAL REPORT
PART II
VOLUME 4
(DRAWINGS)**

SEPTEMBER 1992

JAPAN INTERNATIONAL COOPERATION AGENCY

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AERIAL PHOTO BY _____
 MAPPING BY _____
 LOCATION BY _____
 SURVEYED BY _____
 TRACED BY _____
 CHECKED BY _____

M.O.P.W. ROADS DEPT. DRG. NO.

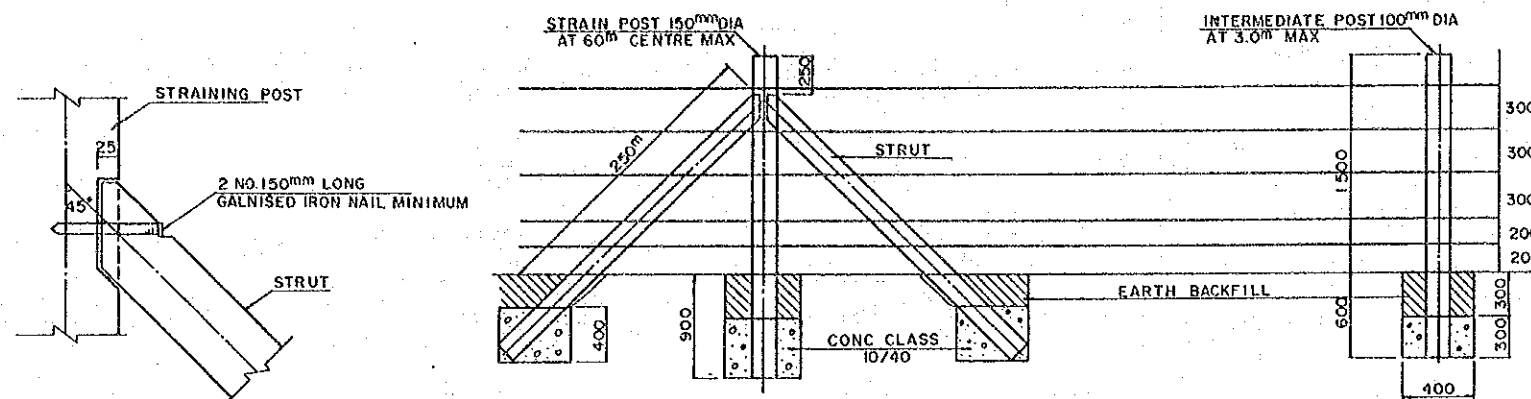
REVISIONS		JAPAN INTERNATIONAL COOPERATION AGENCY		CHIEF ENGINEER (ROADS)		SEN. SUPT. ENG. (DESIGN)		SCALES		NAIROBI BYPASS		SHEET OF
DESCRIPTION	DATE			CHIEF SUPT. ENG. (DESIGN)		SUPT. ENGINEER (DESIGN)						
						PROJECT ENGINEER						

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MAPPING BY	TRACED BY
LOCATION BY	CHECKED BY

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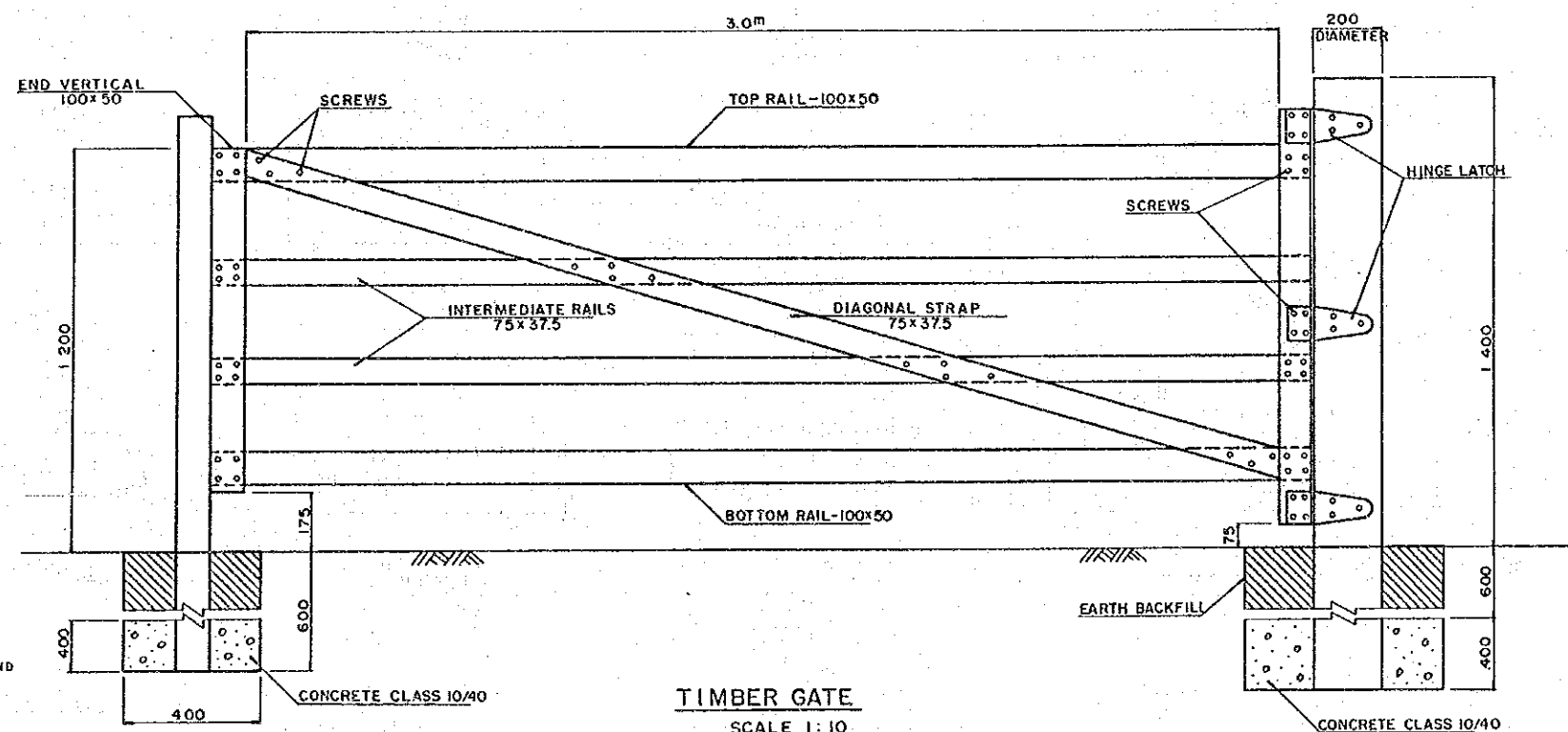
NOTES

- 1 THE CATTLE GRID AND/OR LOCKABLE GATES WHERE REQUIRED, WILL BE LOCATED BY RESIDENT ENGINEER.
- 2 FIVE STRANDS 12 S.W.G. TWO RLY GALVANISED STEEL WIRE FIXED TO POST WITH STAPLES.
- 3 ALL TIMBER FOR FENCING AND GATES SHALL BE WELL SEASONED STRAIGHT GRAINED CEDAR.
- 4 STRAINING POST SHALL BE ERECTED NOT FURTHER APART THAN 60m ON STRAIGHT LENGTHS AND AT EVERY CORNER AND OPENING AND ACUTE CHANGES OF DIRECTION OR LEVEL.
- 5 THERE SHALL BE ONE STRUT TO EACH LINE OF WIRES LEAVING THE POST.
- 6 SPACING OF STRANDS OF WIRE SHALL BE AS SHOWN OR SUCH OTHER SPACING AS DIRECTED BY RESIDENT ENGINEER.
- 7 ALL TENSIONERS NAILS, STAPLES AND WIRE SHALL BE GALVANISED.
- 8 THE POST ON WHICH THE GATE IS HUNG SHALL BE SUNK 100mm INTO THE GROUND.
- 9 THE STOP POST OF THE GATE SHALL BE STRAINER POST OF FENCE OR INTERMEDIATE POST.
- 10 THE LATCH AND HINGES SHALL BE OF APPROVED ROBUST DESIGN IN JAPANNED OR GALVANISED IRON.
- 11 ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.



DETAIL OF STRAINING POST JOINT
SCALE 1:5

TIMBER POST AND WIRE FENCING
SCALE 1:25



TIMBER GATE
SCALE 1:10

REVISIONS	
DESCRIPTION	DATE

JAPAN INTERNATIONAL
COOPERATION AGENCY

CHIEF ENGINEER (ROADS)
CHIEF SUPT. ENG. (DESIGN)

SEN SUPT. ENG. (DESIGN)
SUPT. ENGINEER (DESIGN)
PROJECT ENGINEER

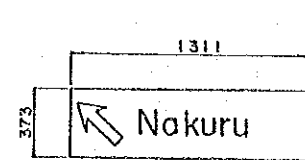
SCALES
AS SHOWN

NAIROBI BYPASS
DETAIL OF FENCE AND GATE

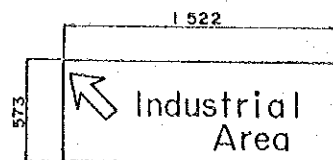
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SHEET 1 OF 11

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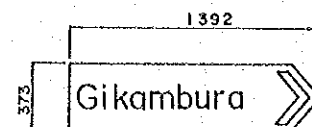
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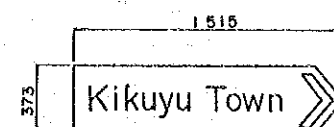
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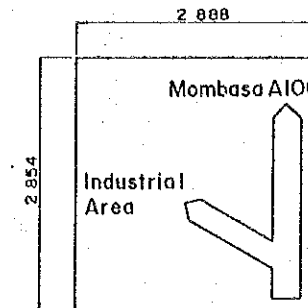
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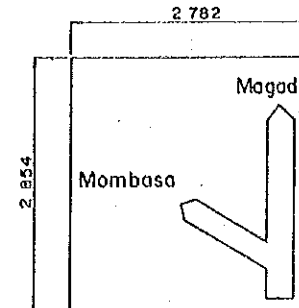
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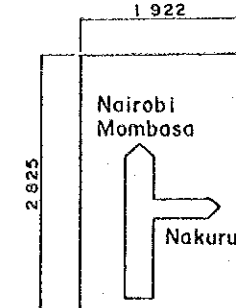
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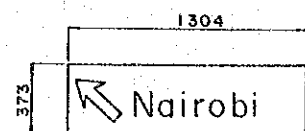
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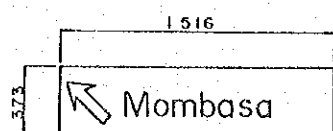
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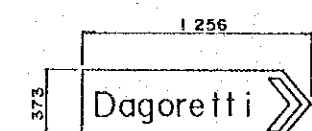
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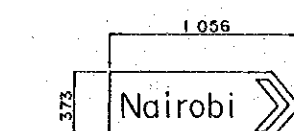
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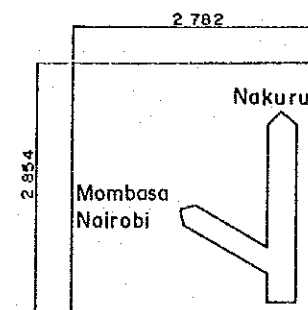
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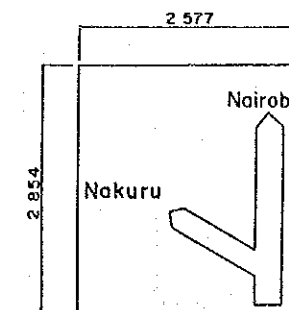
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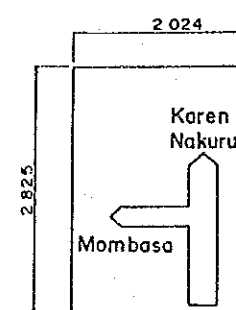
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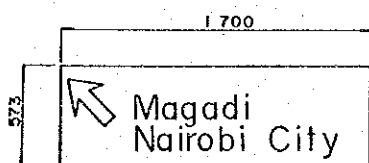
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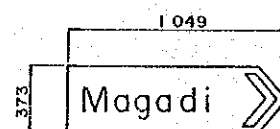
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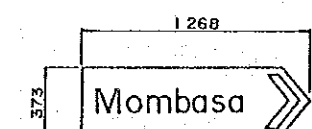
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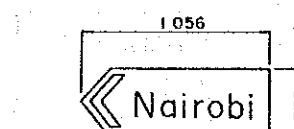
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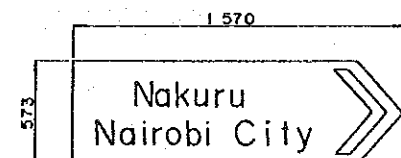
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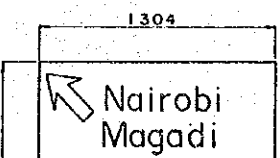
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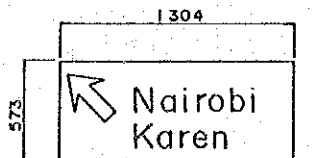
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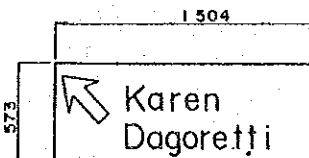
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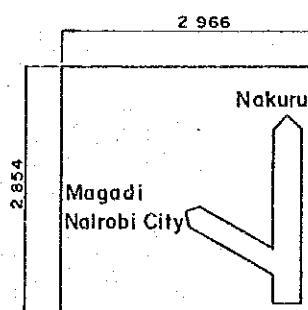
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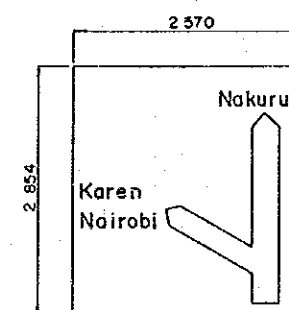
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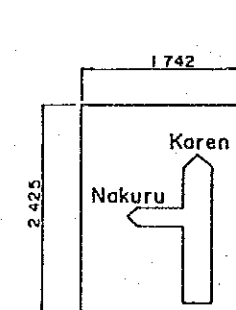
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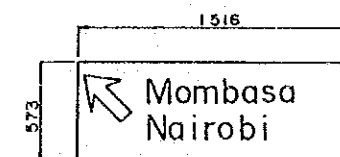
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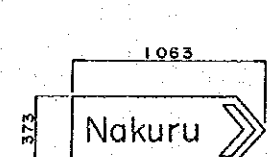
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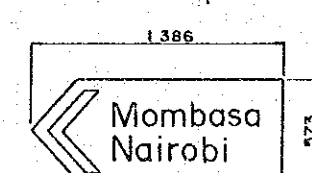
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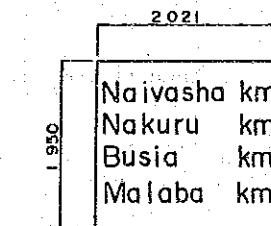
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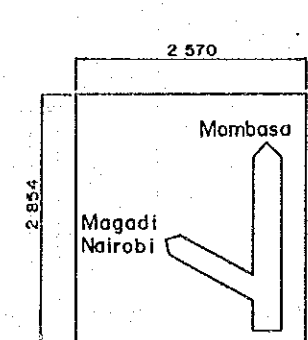
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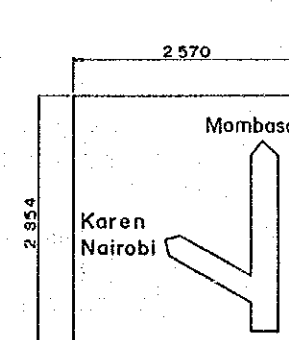
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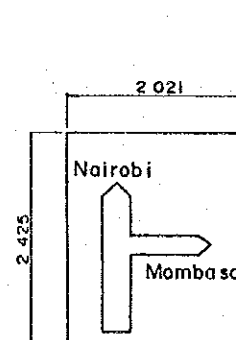
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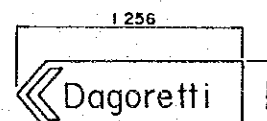
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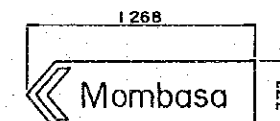
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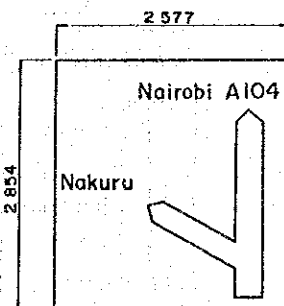
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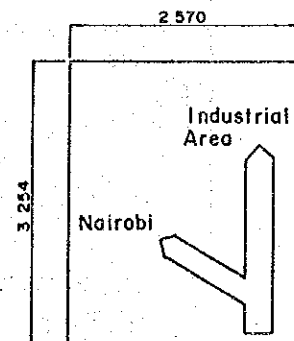
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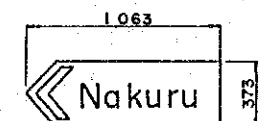
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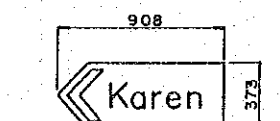
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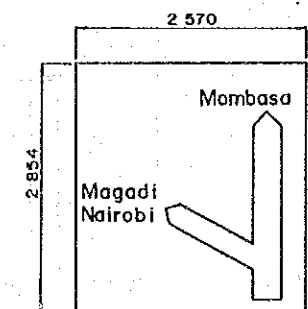
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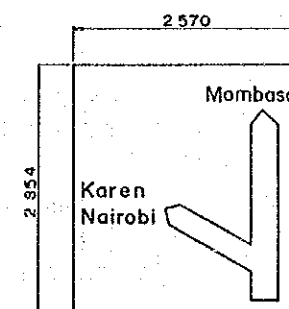
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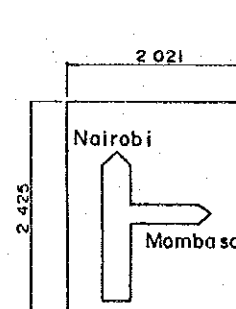
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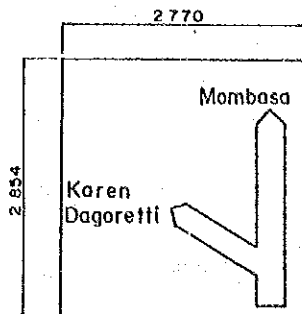


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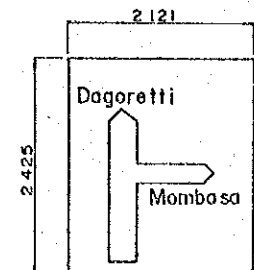


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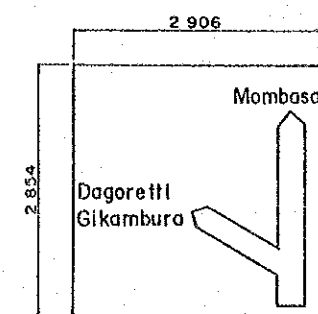
REVISIONS				JAPAN INTERNATIONAL COOPERATION AGENCY	CHIEF ENGINEER (ROADS)	SEN. SUPT. ENG. (DESIGN)			SCALES 1:40 , 1:20	NAIROBI BYPASS DETAIL OF NON-STANDARD ROAD SIGNS (1)	M SHEET 2 OF 11
DESCRIPTION	DATE				CHIEF SUPT. ENG. (DESIGN)	SUPT. ENGINEER (DESIGN)					
						PROJECT ENGINEER					



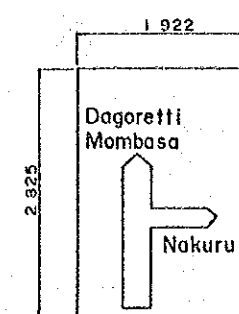
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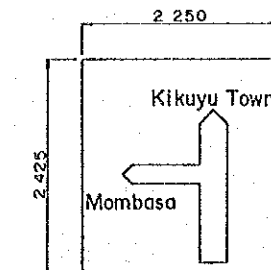
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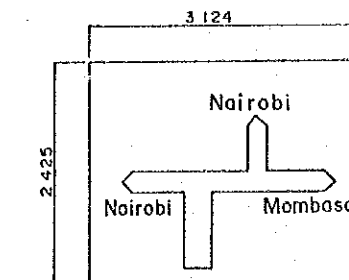
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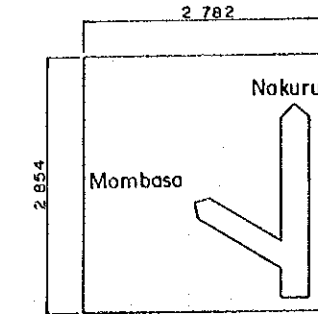
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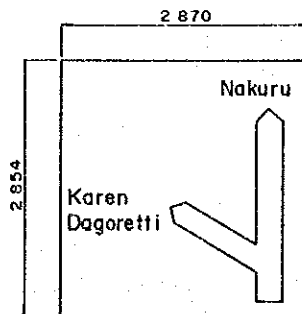
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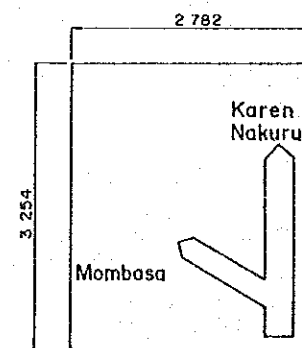
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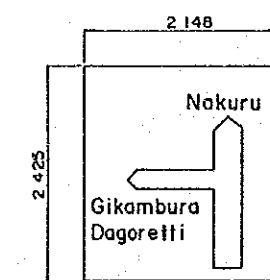
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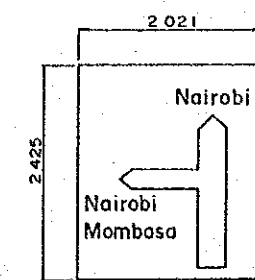
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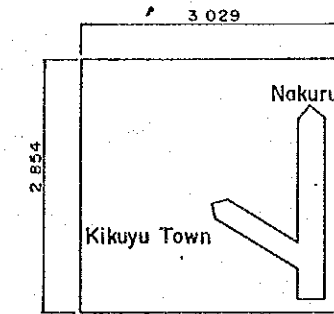
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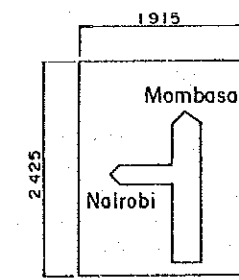
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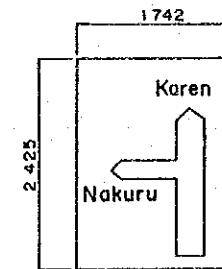
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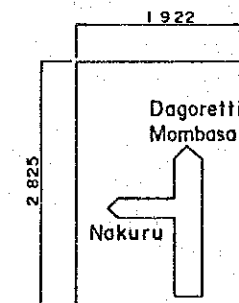
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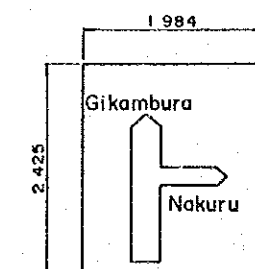
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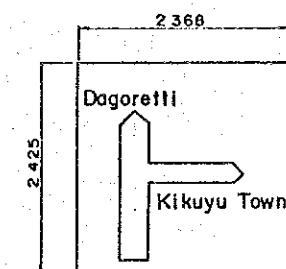
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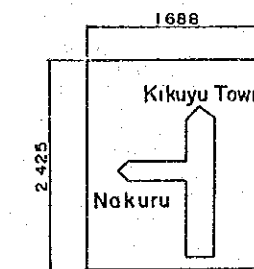
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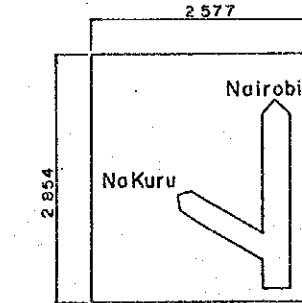
ADS 25
TYPE I



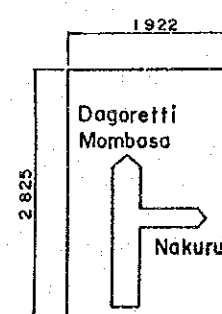
ADS 29
TYPE I



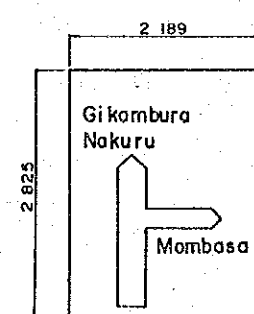
ADS 33
TYPE I



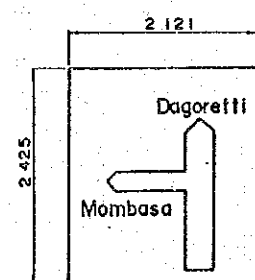
ADS 37
TYPE I



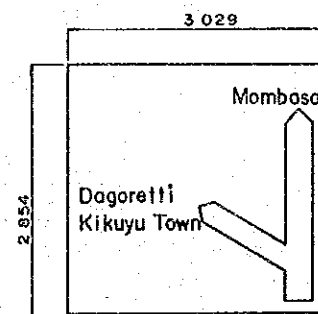
ADS 18
TYPE I



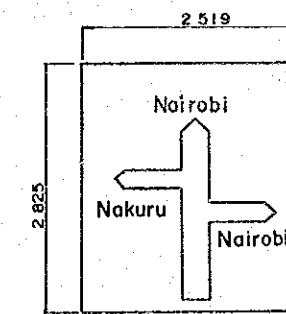
ADS 22
TYPE I



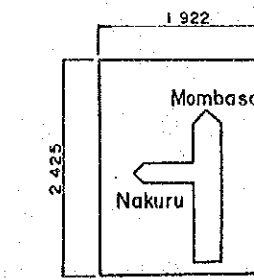
ADS 26
TYPE I



ADS 30
TYPE I



ADS 34
TYPE I



ADS 38
TYPE I

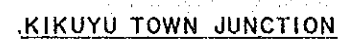
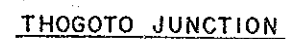
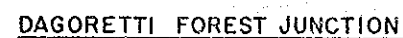
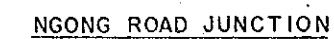
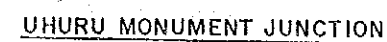
TYPE I	WHITE LETTERING, SYMBOL AND BORDER ON GREEN BACKGROUND AND YELLOW ROAD NUMBERS. "X" HEIGHT 200 mm
TYPE II	BLACK LETTERING, SYMBOL AND BORDER ON WHITE BACKGROUND "X" HEIGHT 100 mm

- NOTES
1. ALL SIGNS TO BE IN ACCORDANCE WITH H.O.M. MANUAL FOR ROAD SIGNS PART 1, 1973.
 2. ALL FLAG TYPE DIRECTION SIGNS TO BE CHAMFERED AT 12°
 3. ALL DIMENSIONS IN mm.

AERIAL PHOTO BY	SURVEYED BY
MAPPING BY	TRACED BY
LOCATION BY	CHECKED BY

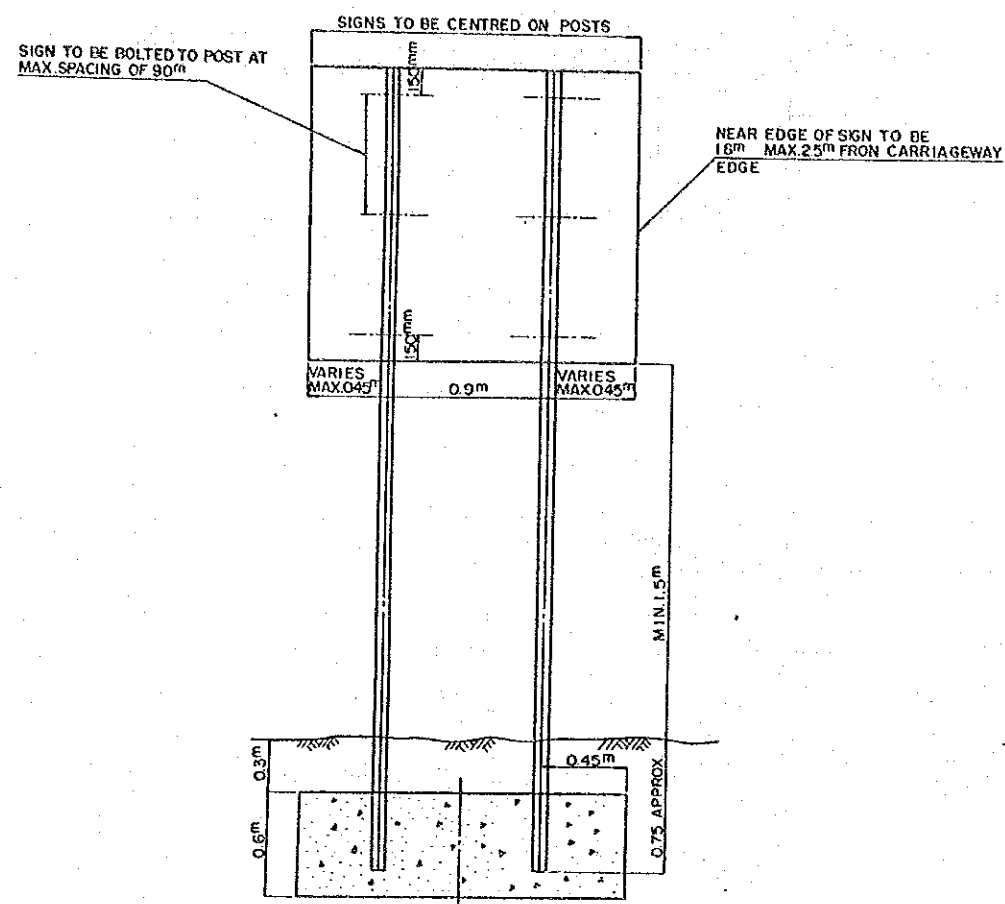
M.P.W. ROADS DEPT. DRG. NO.

REVISIONS		JAPAN INTERNATIONAL COOPERATION AGENCY	CHIEF ENGINEER (ROADS)	SEN. SUPT. ENG. (DESIGN)	SCALES	NAIROBI BYPASS	M
DESCRIPTION	DATE						
			CHIEF SUPT. ENG. (DESIGN)	SUPT. ENGINEER (DESIGN)	1:40	DETAIL OF NON-STANDARD ROAD SIGNS (2)	SHEET 3 OF 11
				PROJECT ENGINEER			



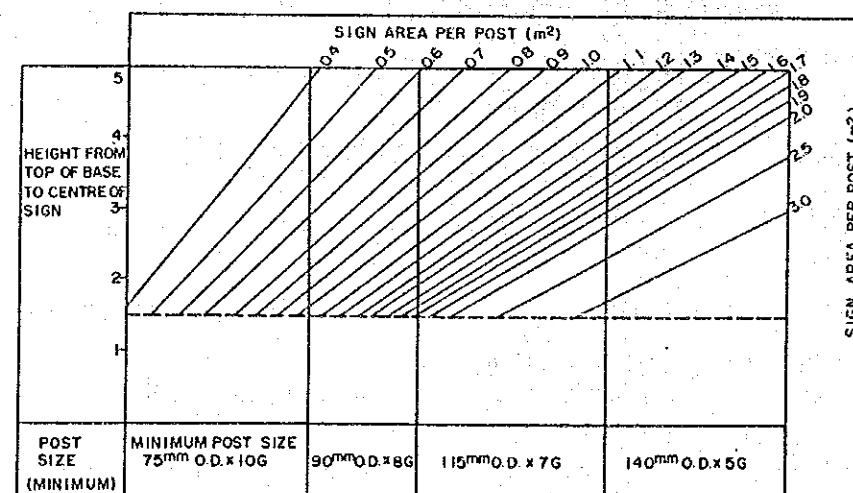
NOTES
FINAL LOCATION OF SIGNS TO BE AS DIRECTED BY THE
ENGINEER.

REVISIONS				JAPAN INTERNATIONAL COOPERATION AGENCY	CHIEF ENGINEER (ROADS)	SEN. SUPT. ENG. (DESIGN)			SCALES	NAIROBI BYPASS	M
DESCRIPTION	DATE					SUPT. ENGINEER (DESIGN)			AS SHOWN	DIAGRAMMATIC LAYOUT OF NON-STANDARD SIGN AT JUNCTIONS	
					CHIEF SUPT. ENG. (DESIGN)	PROJECT ENGINEER					SHEET 4 OF 11

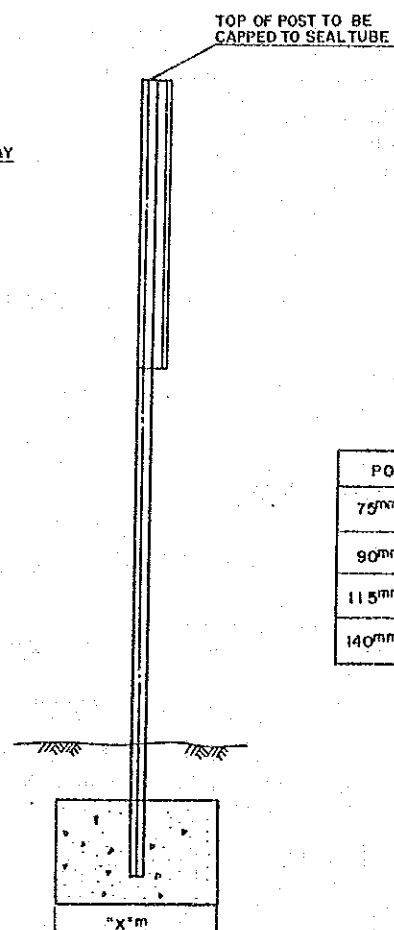


STANDARD SIGN POST DETAILS

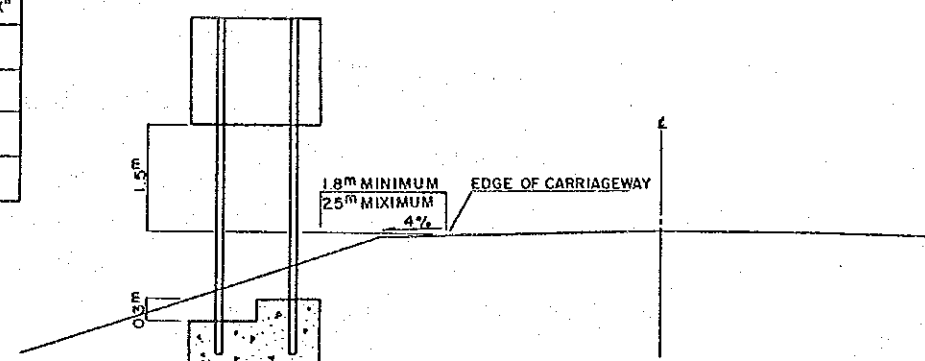
SCALE 1:20



DETERMINATION OF POST SIZES



POST	DIMENSION "X"
75mm O.D. x 10G	0.45
90mm O.D. x 8G	0.60
115mm O.D. x 7G	0.90
140mm O.D. x 5G	1.20

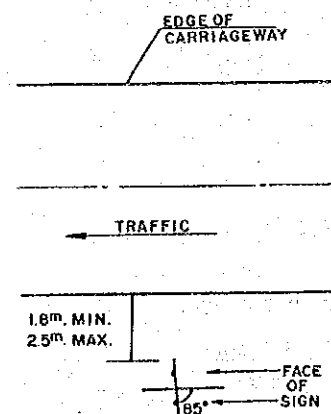


SIGN PLACEMENT

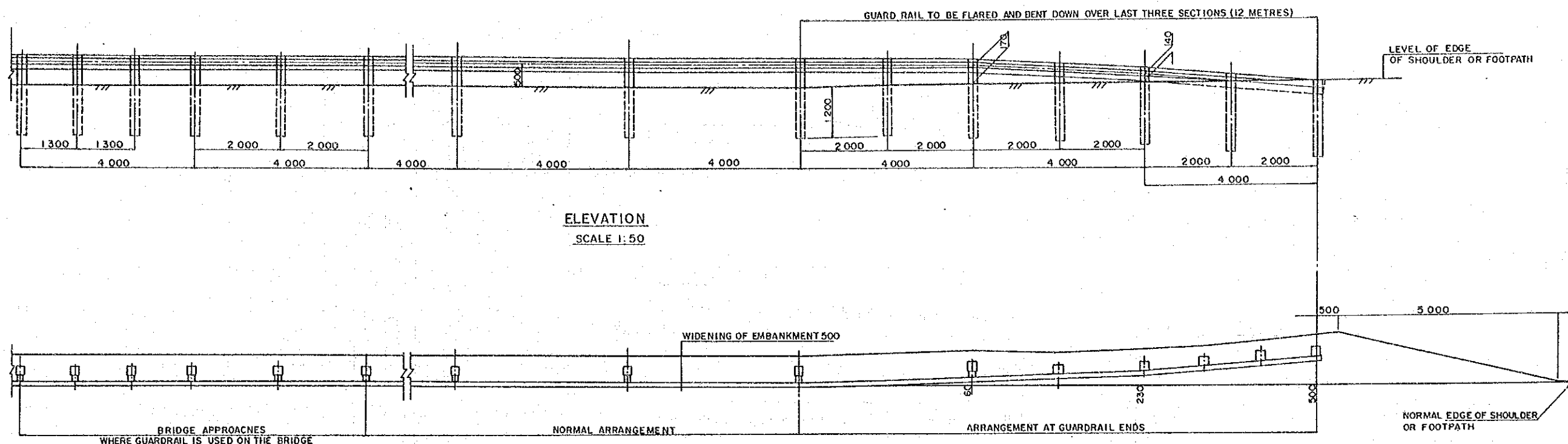
SCALE 1:50

NOTES

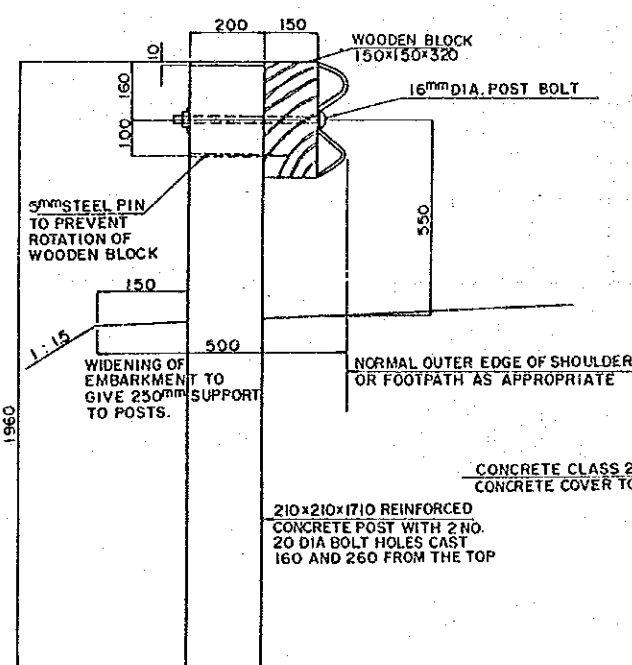
- WHERE POSTS ARE OF DIFFERENT LENGTH, FOOTING TO BE STEPPED AT POINT MIDWAY BETWEEN POSTS TO GIVE 0.3m COVER OF SOIL AT POST.
- FOOTING TO BE CLASS B CONCRETE.
- FOR A SINGLE POST THE SIZE OF THE CONCRETE FOOTING WILL BE 0.9m x 0.9m x 1.2m.
- FOR PROHIBITORY, WARNING, MANDATORY AND PRIORITY SIGNS THE SIZE OF THE CONCRETE FOOTING WILL BE 0.45m x 0.45m x 0.45m.
- SIGN POST SHALL BE CYLINDRICAL, GALVANIZED WROUGHT IRON TUBES OR SIMILAR APPROVED BY THE ENGINEER, OF SIZES IN ACCORDANCE WITH THE DESIGN TABLE BELOW.



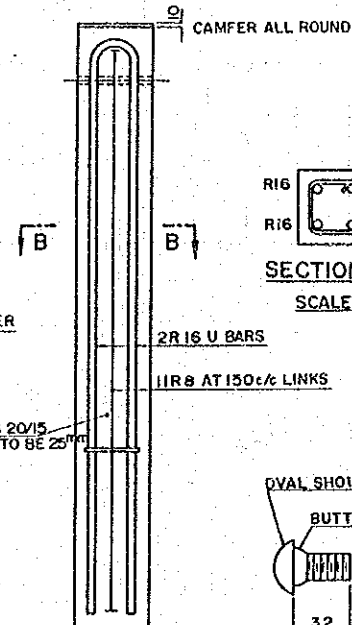
PLAN
SCALE 1:100



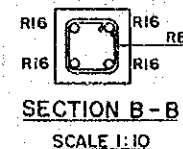
PLAN
GUARDRAIL ARRANGEMENT
SCALE 1:50



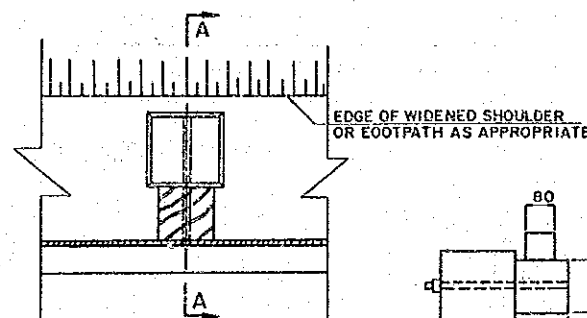
VIEW A-A
SCALE 1:10



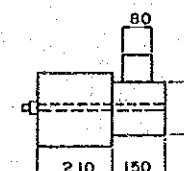
REINFORCEMENT DETAILS
SCALE 1:10



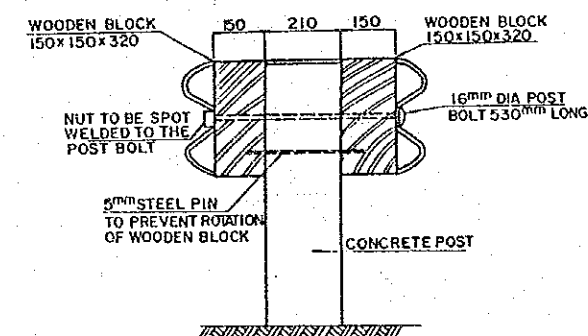
SECTION B - B
SCALE 1:10



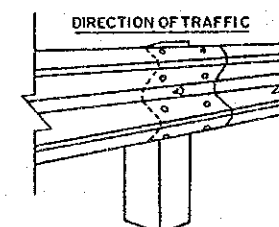
PLAN
SCALE 1:10



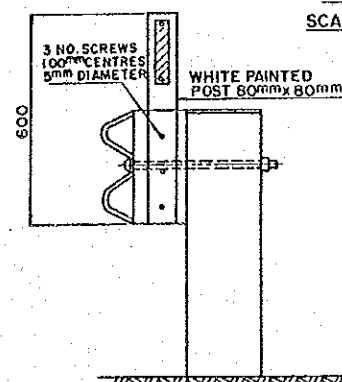
PLAN
SCALE 1:10



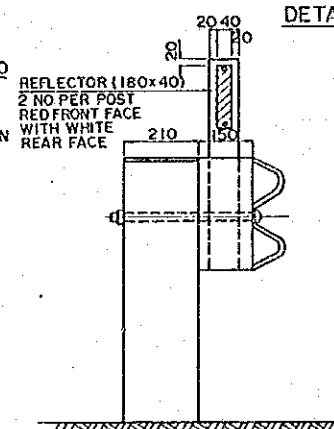
DETAIL OF DOUBLE HEADED GUARDRAIL



FLEX-BEAM JOINTS
N.T.S













REAR ELEVATION
SCALE 1:10



FRONT ELEVATION
SCALE 1:10

- ### NOTES
1. ALL DIMENSIONS IN MILLIMETRES.
 2. LAP GUARDRAIL SECTIONS IN DIRECTION OF TRAFFIC FLOW.
 3. ALL BOLTS SHALL BE BUTTON-HEADED AND GALVANIZED.
 4. THE GUARDRAIL SHALL BE GALVANIZED.
 5. START AND END OF GUARDRAIL SECTION TO BE IDENTICAL.
 6. COMPACTION AROUND THE POSTS SHALL BE THE SAME AS FOR THE SURROUNDING EARTHWORKS.
 7. NORMAL SHOULDER WIDTH TO BE INCREASED AS SHOWN WHERE GUARDRAIL IS REQUIRED.
 8. STANDARD UNITS ALSO TO BE USED ON THE END SECTIONS.
 9. ALL NUTS TO BE SPOT WELDED TO THE BOLT.
 10. MARKER POSTS SHALL BE FIXED ONTO THE GUARDRAIL POSTS AT 2m SPACING ABOVE THE CATTLE UNDERPASS ONLY.
 11. ALL SPACER BLOCKS SHALL BE WELL SEASONED CYPRESS AND TREATED WITH COPPER/CHROME/ ARSENIC COMPOSITION IN ACCORDANCE WITH BS 4072 TO CLASS 4 (AVERAGE NET DRY SALT RETENTION OF 4.4 %)
 12. THE POST SHALL BE BUG INTO THE FILL BY METHOD APPROVED BY THE ENGINEER.
 13. GUARDRAIL TO BE LOCATED AS INDICATED IN THE PLAN AND PROFILE DRAWINGS AND/OR AS OTHERWISE DIRECTED BY THE ENGINEER.

REVISIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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TYPE NO.			SPEED							
			< 65 km/h				> 65 km/h			
			a	b	c	d	a	b	c	d
I	YELLOW LINES BETWEEN OPPOSING TRAFFIC FLOWS									
	CENTER LINE									
	CONTINUOUS LINE			0.1				0.1		
	BROKEN LINE		20	60	0.1		30	90	0.1	
	COMBINED LINE		20	60	0.1	0.1	30	90	0.1	
4	COMBINED LINE		20	60	0.1	0.1	30	90	0.1	
5	DOUBLE CONTINUOUS LINE				0.1	0.1		0.1	0.1	
6	WHITE LINES FOR OTHER MARKINGS									
	LANE MARKING									
	BROKEN LINE		20	60	0.1		30	90	0.1	
7	EDGE MARKING									
8	CONTINUOUS LINE				0.1			0.1		
8	BROKEN LINE		20	20	0.1		20	20	0.1	
9	SEPERATION OF BUS BAY LANE FOR SLOW MOVING TRAFFIC		1.0	1.0	0.2		1.0	1.0	0.2	
10	GIVE WAY LINE									

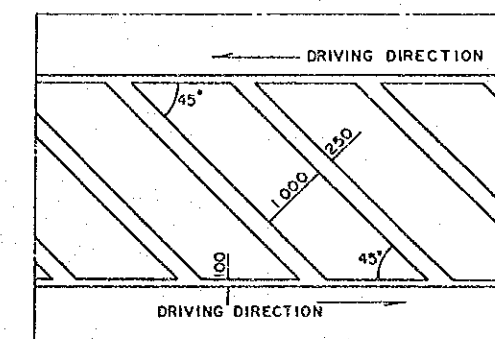
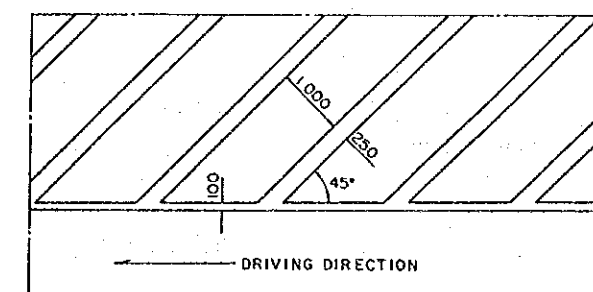
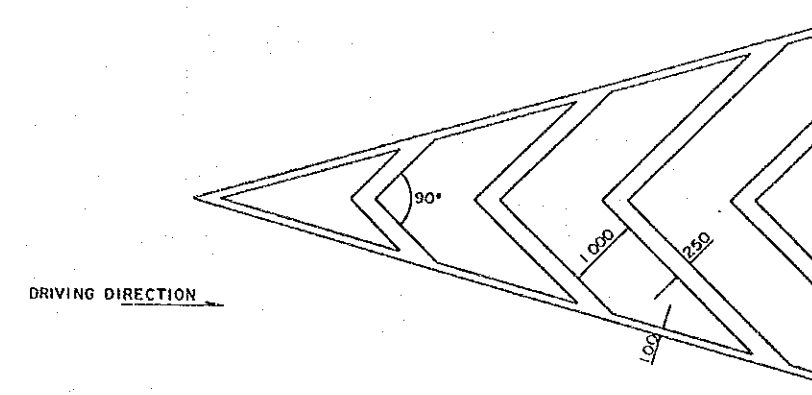
CONTINUOUS LINE

BROKEN LINE

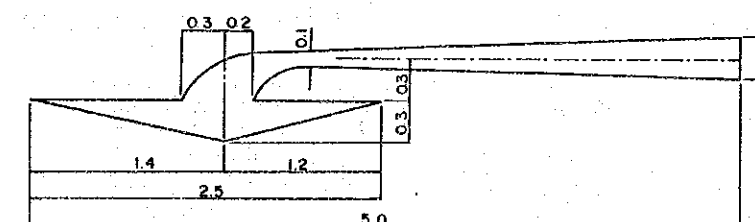
COMBINED LINE

DOUBLE CONTINUOUS LINE

GIVE WAY LINE



HACHED AND CHEVRON MARKINGS

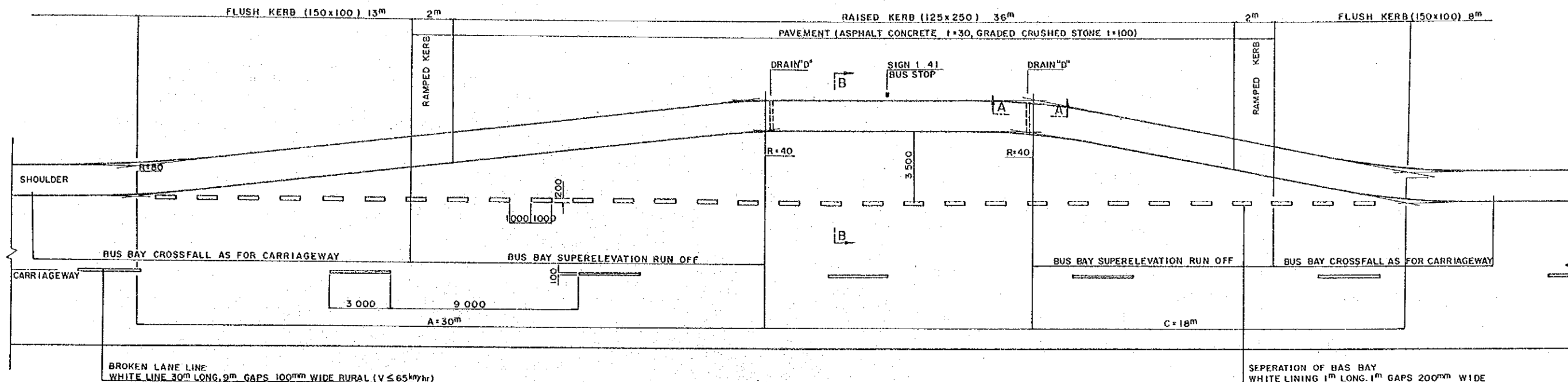


LANE INDICATION ARROW

NOTES

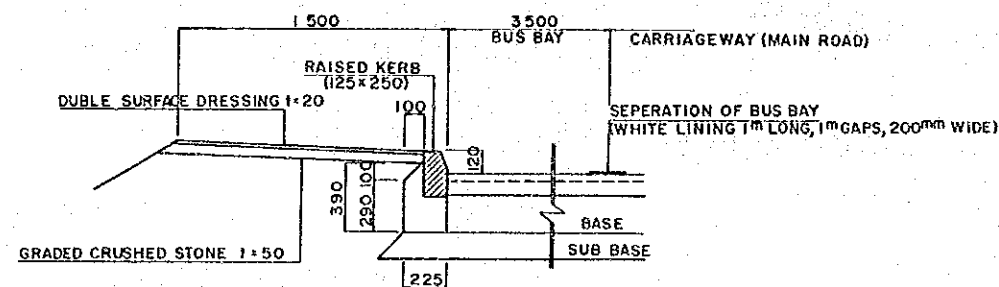
1. ROAD MARKING SHALL COMPLY WITH THE REQUIREMENTS OF THE "MANUAL FOR TRAFFIC SIGNS IN KENYA" PART I AND WITH CLAUSE 200# OF THE STANDARD SPECIFICATION.
2. FOR ROAD MARKINGS AT JUNCTIONS SEE JUNCTION DRAWINGS.
3. HATCHED AND CHEVRON MARKING MUST BE YELLOW WHEN THEY ARE USED AS DEMARCATION BETWEEN OPPOSING TRAFFIC FLOWS, ELSEWHERE THEY ARE WHITE.

REVISIONS			JAPAN INTERNATIONAL COOPERATION AGENCY	CHIEF ENGINEER (ROADS)	SEN SUPT. ENG (DESIGN)		SCALES	NAIROBI BYPASS	M
DESCRIPTION	DATE			SUPT. ENGINEER (DESIGN)			AS SHOWN	DETAIL OF ROAD MARKING, HATCHED AND CHEVRON MARKINGS	
				CHIEF SUPT. ENG. (DESIGN)	PROJECT ENGINEER				SHEET 7 OF

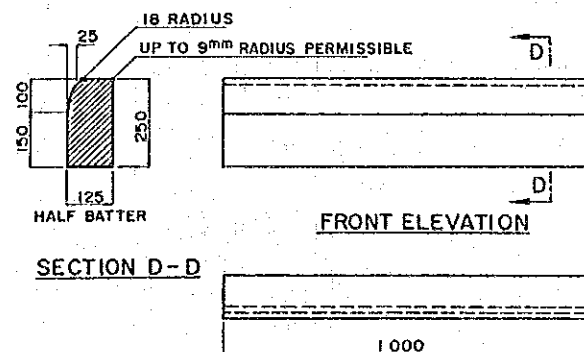


GENERAL LAYOUT STANDARD BUS BAY

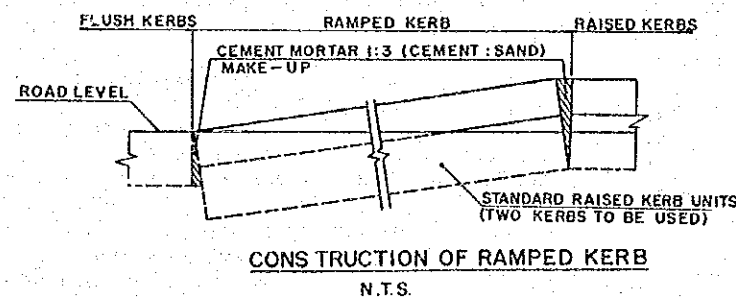
SCALE 1:100



SECTION B - B SCALE 1:20

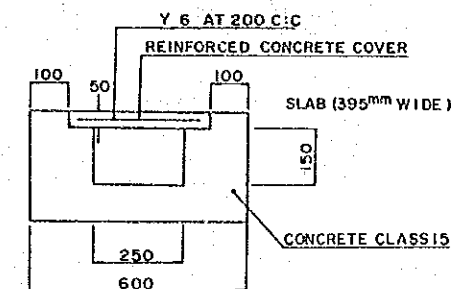


STANDARD RAISED KERB
SCALE 1:10



NOTES

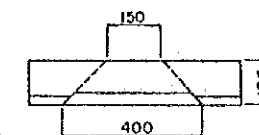
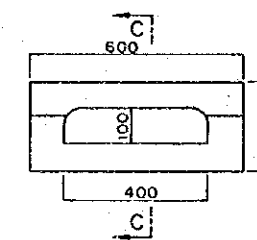
- 1 ALL DIMENSIONS IN MM UNLESS OTHERWISE STATED.
- 2 ALL PRECAST KERBS TO BE MANUFACTURED IN ACCORDANCE WITH BS 340:1979.
- 3 FOR MAIN CARRIAGE, KERBS SHALL BE LAID ON D.B.M. BASE AS SHOWN ON DRAWING E3.



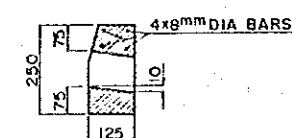
SECTION A - A

DETAIL OF CONCRETE DRAIN "D"

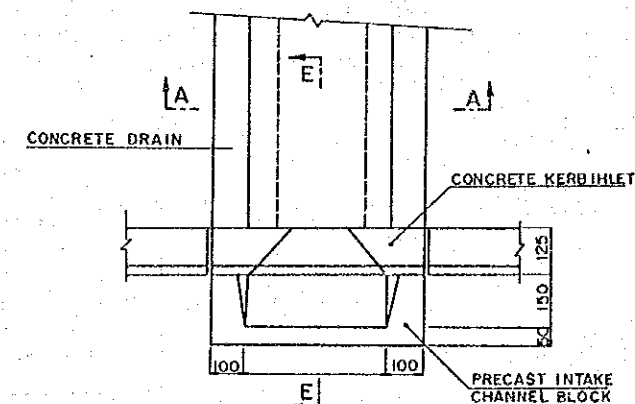
SCALE 1:10



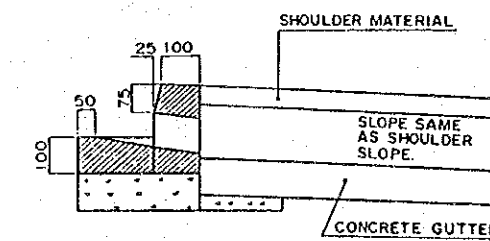
CONCRETE KERB INLET
SCALE 1:10



Name of bus stop	Left	Right
Nairobi road J.C	1+200 ~ 1+281	1+200 ~ 1+281
Uhuru monument J.C	7+300 ~ 7+351	7+300 ~ 7+351
Nairobi road J.C	15+100 ~ 15+151	15+100 ~ 15+151
Mutini	18+450 ~ 18+521	18+450 ~ 18+521
Dagoretti forest J.C	20+300 ~ 21+41	20+300 ~ 21+41
Thogoto J.C	23+200 ~ 23+281	23+40 ~ 23+141
Alliance highschool	25+100 ~ 25+151	25+100 ~ 25+151
Kileleshwa town J.C	27+60 ~ 27+121	27+60 ~ 27+121



DETAILS OF CONCRETE DRAIN "D"

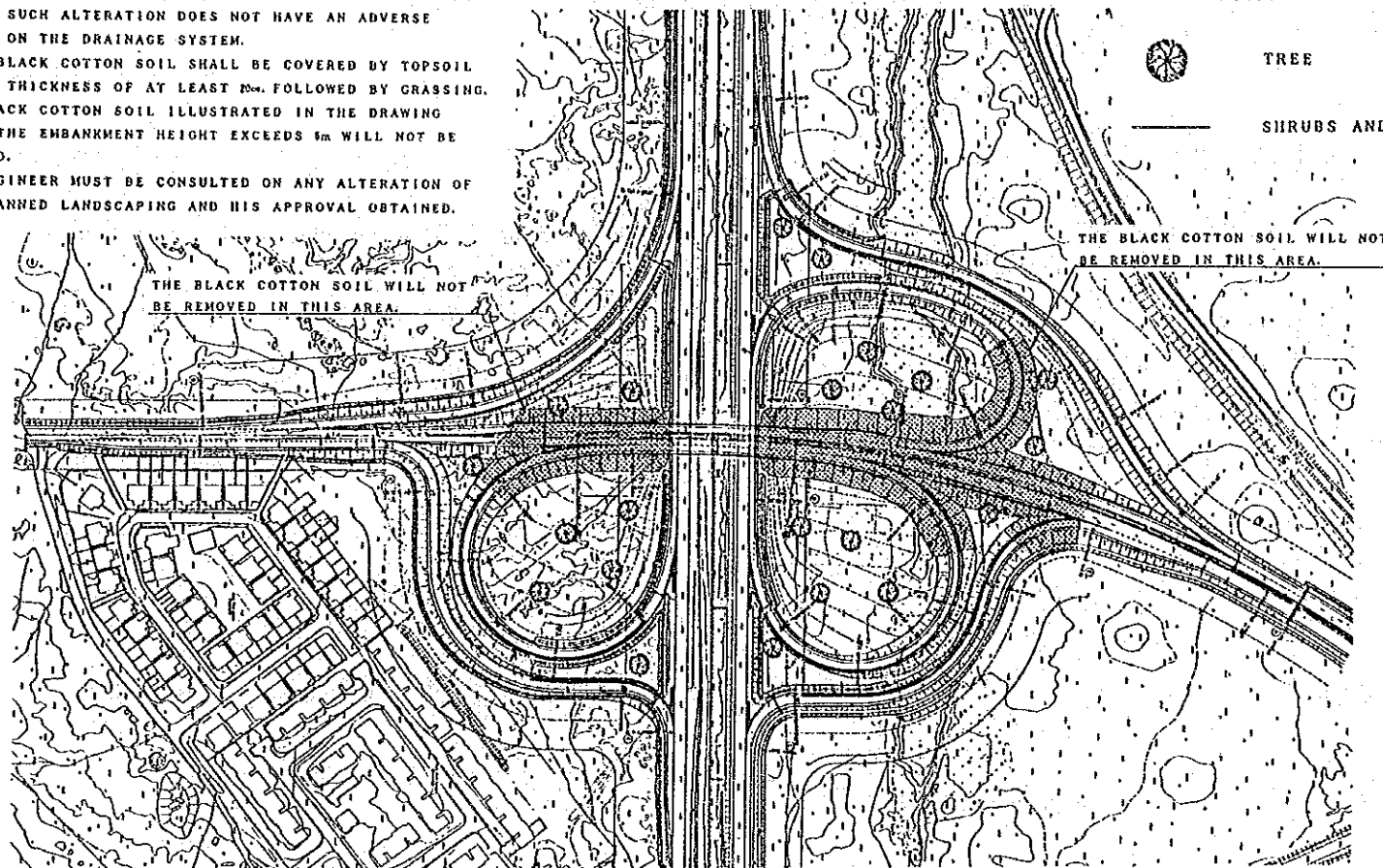


SURVEYED BY
 MAPPING BY
 LOCATION BY
 TRACED BY
 CHECKED BY
 MOPW ROADS DEPT DRG NO

REVISIONS				JAPAN INTERNATIONAL COOPERATION AGENCY	CHIEF ENGINEER (ROADS)	SEN SUPT. ENG. (DESIGN)			SCALES AS SHOWN	NAIROBI BYPASS STANDARD BUS BAY AND DETAIL OF KERB	M SHEET 9 OF 11	
DESCRIPTION	DATE					SUPT ENGINEER (DESIGN)						
						CHIEF SUPT. ENG. (DESIGN)	PROJECT ENGINEER					

NOTES

- (1) THIS IS THE BASIC PLAN FOR LANDSCAPING IN THE LOOPS. IT ASSUMES ALTERATIONS DEPENDING ON THE AMOUNT OF WAS TEBLACK COTTON SOIL AND, THEREFORE, CAN BE ALTERED AS FAR AS SUCH ALTERATION DOES NOT HAVE AN ADVERSE IMPACT ON THE DRAINAGE SYSTEM.
- (2) WASTE BLACK COTTON SOIL SHALL BE COVERED BY TOPSOIL WITH A THICKNESS OF AT LEAST 100mm. FOLLOWED BY GRASSING.
- (3) THE BLACK COTTON SOIL ILLUSTRATED IN THE DRAWING WHERE THE EMBANKMENT HEIGHT EXCEEDS 5m WILL NOT BE REMOVED.
- (4) THE ENGINEER MUST BE CONSULTED ON ANY ALTERATION OF THE PLANNED LANDSCAPING AND HIS APPROVAL OBTAINED.

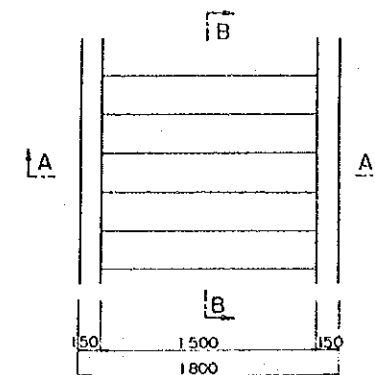


LEGEND

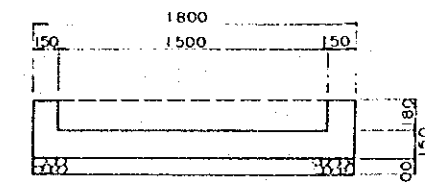


TREE

SHRUBS AND BUSHES



STEPS PLAN



A - A SECTION

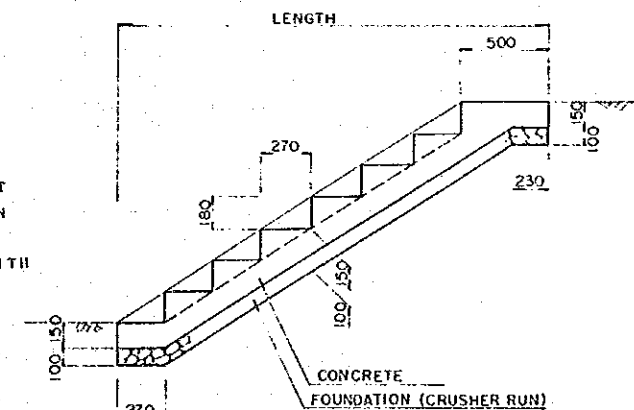
PLAN OF MOMBASA ROAD JUNCTION

NOTES

- (1) PLANT TREES AND SHRUBS AS SHOWN IN THE FIGURE IN THE SECTION HAVING CENTRAL RESERVE WITH 11M WIDTH (MOMBASA ROAD J.C. - UNURU MONUMENT J.C.)
- (2) PLANT SHRUBS AT 4M INTERVALS IN THE SECTIONS HAVING CENTRAL RESERVE WITH 11M WIDTH AND PROVIDED WITH GUARDRAILS, AND PLANT SHRUBS AT 6M INTERVALS IN THE SECTIONS WITHOUT GUARDRAILS.
- (3) PLANT SHRUBS AT 6M INTERVALS IN THE SECTIONS WITHOUT GUARDRAIL. PLANT SHRUBS AT 4M INTERVALS AT THE ROAD SHOULDER
- (4) PLANT TREES AND SHRUBS AS SHOWN IN THE FIGURE IN THE MOMBASA ROAD J.C.
- (5) THE SHRUBS SHOULD BE SIZED LESS THAN APPROXIMATELY 1M, AND THE TREES MORE THAN APPROXIMATELY 1M IN HEIGHT RESPECTIVELY.
- (6) WHEN PLANTING TREES AND SHRUBS ON BLACK COTTON SOIL, REPLACE 1M OF BLACK COTTON SOIL WITH TOP SOIL FOR TREES, AND 1M FOR SHRUBS, RESPECTIVELY.

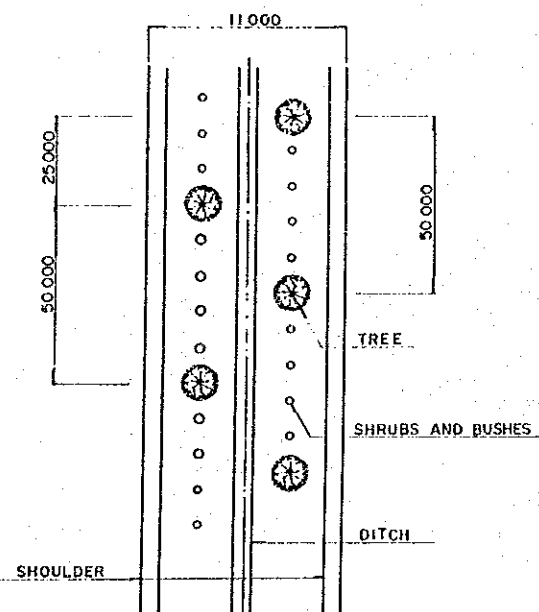
THE PLAN REGARDING THE SPECIES TO BE PLANTED MUST SUBMITTED AND APPROVED PRIOR TO ROAD CONSTRUCTION WORK. TEST PLANTING WILL BE CONDUCTED AT CUT AND EMBANKMENT SECTIONS AS WELL AS TRAFFIC ISLANDS WITH A VIEW TO OBTAINING THE FINAL APPROVAL OF THE ENGINEER.

Hibiscus rosa-sinensis
H. schizopetalus
H. arboreus
Dovyalis caffra
Bougainvillea spp.
Plumbago capensis
Lantana camara (hybrids)
Tecoma stans
Tecoma capensis
Nerium oleander



B - B SECTION

AERIAL PHOTO BY	SURVEYED BY
MAPPING	TRACED BY
LOCATION	CHECKED BY



CENTRAL RESERVES

SECTION OF WIDTH = 11 000

REVISIONS	DESCRIPTION	DATE

JAPAN INTERNATIONAL COOPERATION AGENCY

CHIEF ENGINEER (ROADS)
CHIEF SUPT. ENG. (DESIGN)

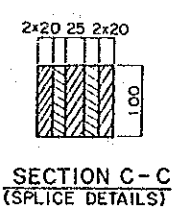
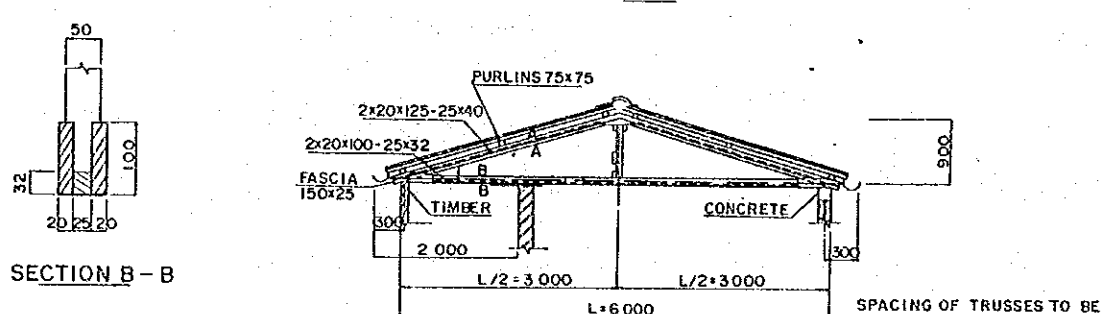
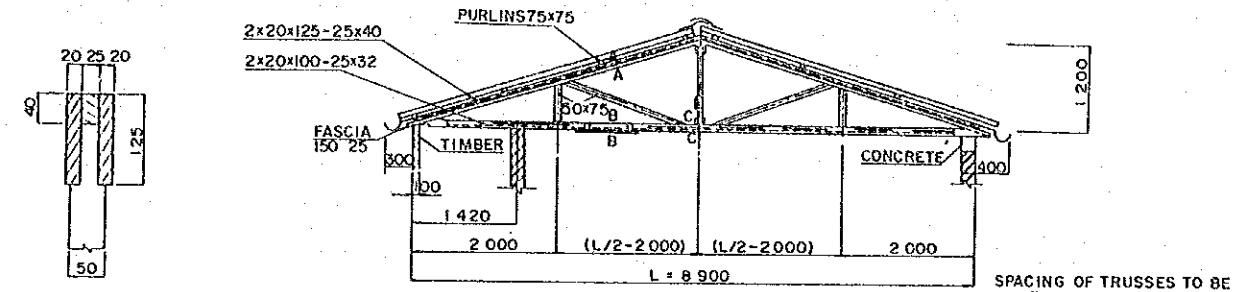
SEN SUPT. ENG. (DESIGN)
SUPT. ENGINEER (DESIGN)
PROJECT ENGINEER

SCALES
AS SHOWN

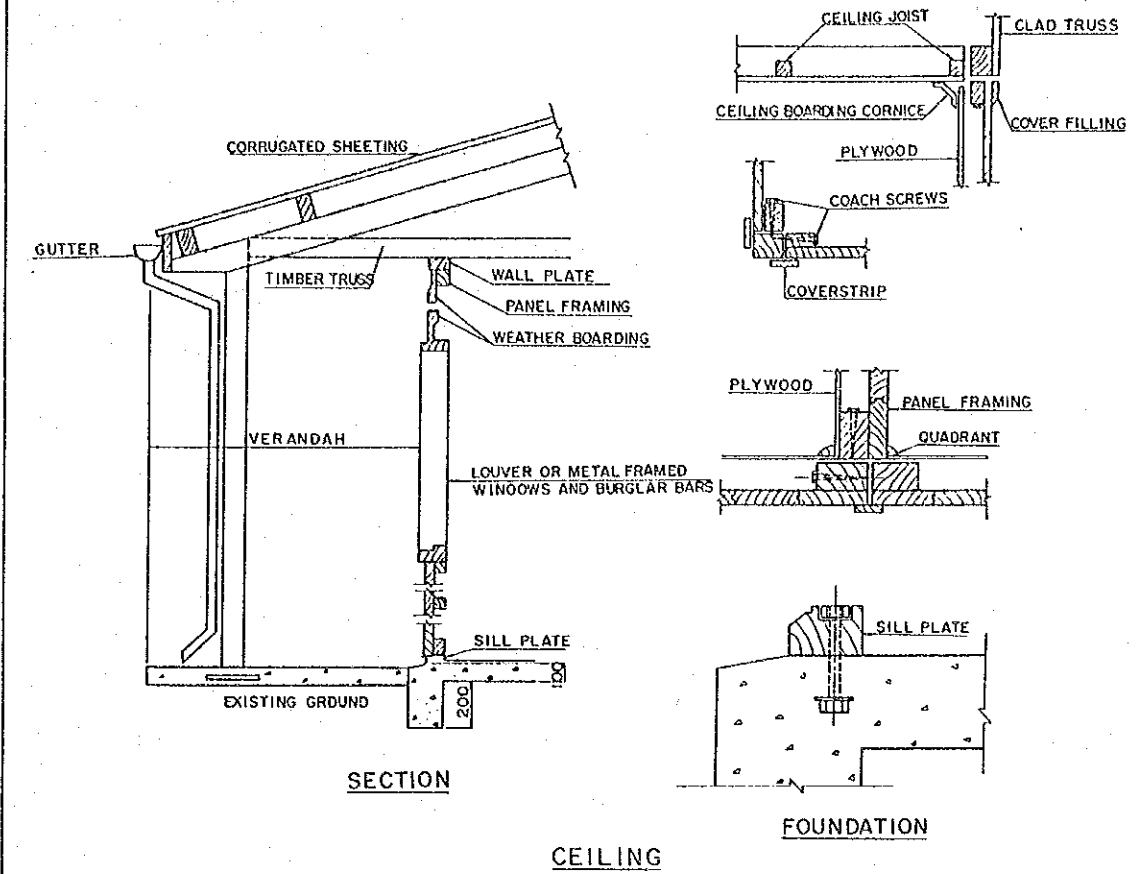
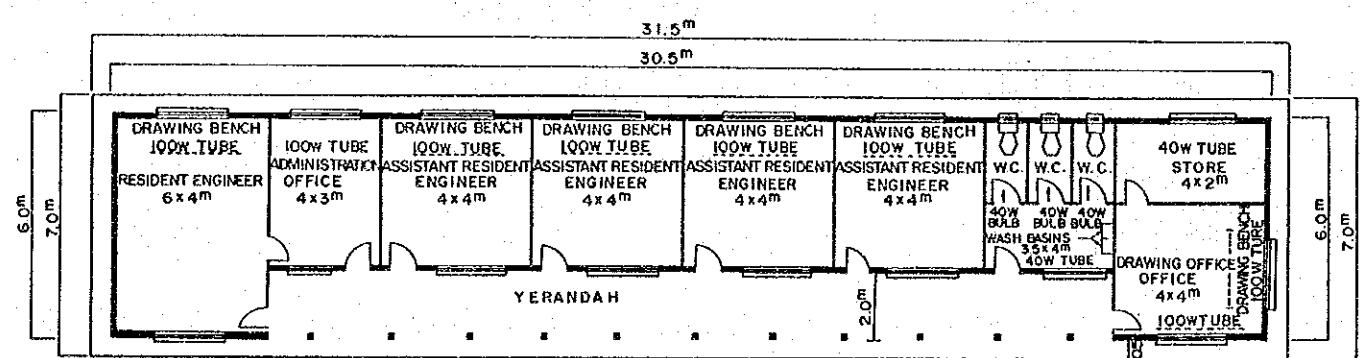
NAIROBI BYPASS
PLAN OF LANDSCAPING,
STEPS AND PLAN OF PLANTING

M
SHEET 10 OF 11

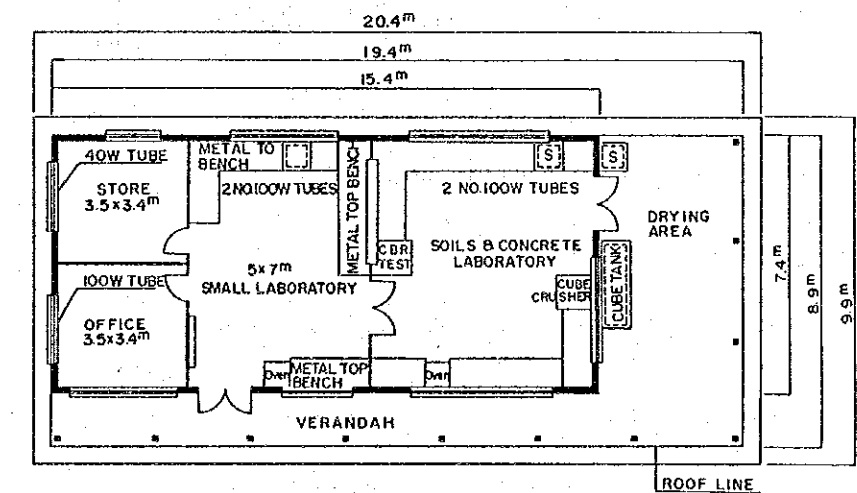
AERIAL PHOTO BY	SURVEYED BY
MAPPING BY	TRACED BY
LOCATION BY	CHECKED BY



TRUSS DETAILS



- NOTES**
- 1 SPECIAL SPECIFICATION CLAUSE III SHOULD BE READ IN CONJUNCTION WITH THIS DRAWING.
 - 2 ALL DOORS ARE TO BE FITTED WITH MORTICE LOCKS. THESE HAVE TO BE HEAVY DUTY ON EXTERNAL DOORS. ALL WINDOWS TO BE FITTED WITH BURGLAR BARS.
 - 3 ALL HOUSE ARE TO BE PROVIDED WITH A FIRE EXTINGUISHER AND FIRE AXE. 3 NO. FIRE EXTINGUISHERS AND 1 NO. AXE FOR THE RESIDENT ENGINEERS SITE OFFICE. 2 NO FIRE EXTINGUISHERS AND 1 NO. AXE FOR THE SITE LABORATORY. ALL AXES TO BE SECURED TO THE OUTSIDE OF THE BUILDINGS.
 - 4 ROOFING SHALL BE CORRUGATED IRON SHEETING S.W.G. 26 ON TIMBER TRUSSES.
 - 5 AT LEAST 3 SUBSTANTIAL SHELVEYS ARE TO BE FITTED IN ALL STORE ROOMS.
 - 6 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.



REVISIONS		JAPAN INTERNATIONAL COOPERATION AGENCY	CHIEF ENGINEER (ROADS)	SEN. SUPT. ENG. (DESIGN)	SUA. ENGINEER (DESIGN)	PROJECT ENGINEER	SCALES AS SHOWN	NAIROBI BYPASS RESIDENT ENGINEERS LAB AND OFFICE ACCOMMODATION	M
DESCRIPTION	DATE								
			CHIEF SUPT. ENG. (DESIGN)						

