Johannesburg Roads Agency
SOC Limited (JRA)

ROADS & STORMWATER MANUAL

VOLUME 2

STANDARD DESIGN DETAILS FOR
ROADS & STORMWATER

PART 1 – ROADS

JUNE 2015

PART 1 – ROADS

JUNE 2015

ACKNOWLEDGEMENTS

City of Tshwane:
Parts of drawings JRA-SD-RD-060 and
JRA-SD-RD-140.

DISCLAIMER

The drawings in this document are intended as Standard Design Details. As such their principles should be adhered to.

However, designers are responsible for their own final designs undertaken on behalf of the Johannesburg Roads Agency SOC Limited, and as such they should amend or supplement the Standard Design Details according to specific design requirements

CONTENTS

1.1 INTRODUCTION

The Johannesburg Roads Agency's *"Roads & Stormwater Manual"* comprises two volumes:

- Volume 1: Code of Procedure;
- Volume 2: Standard Design Details for Roads & Stormwater:
    - ❖ **Part 1: Roads;** and
    - ❖ Part 2: Stormwater.

In this part "Roadway Design" is divided into two sections, namely:

- Roads: General; and
- Roads: Design.

The "Roads: General" section deals with overarching details such a road hierarchy matrix and various typical road cross sections which include cross-over references to the basic location of stormwater pipes within the different road cross sections and which is not repeated in *Part 2: Stormwater.* The "Roads: Design" section deals individually with many of the elements which may comprise parts of the detailed design of a section of roadway.

- Disabled roadway users include those pedestrians with sight impairment and/or physical mobility limitations.

The Standard Design Details have been grouped into four sets, namely:

- Section 1.2: Roads – General covering:
    - ❖ Road Classification;
    - ❖ Urban Access Management;
    - ❖ Basic Road Reserve Services Cross Sections.
- Section 1.3: Roads – Design covering the following categories of details:
    - ❖ Kerb Types;
    - ❖ Entrances;
    - ❖ Public Transport Laybys;
    - ❖ Guardrails;
    - ❖ Enclosed Areas;
    - ❖ Parking Details;
    - ❖ Traffic calming.
- Section 1.4: Roads – Complete Streets covering RISFSA road classes developed to future potential including provision for BRT and NMT:
    - ❖ Mobility & Access;
    - ❖ RISFSA Classes 2 to 6;
    - ❖ Pedestrian/Disabled Persons Crossings Details.
- Section 1.5: Roads – BRT incorporating existing BRT standard details prepared by Royal Haskoning DHV.

It is understood that the *"Standard Design Details for Roads & Stormwater"* will be used within JRA and will be made available to developers and their consultant designers for application within the Greater Johannesburg Metropolitan area.

The numbering of drawings within sections has been carried out in open ended groups to permit additional drawings to be inserted in future in the most appropriate group. For example, in section 1.3 Roads: Design, if an additional parking detail is required it can be inserted as JRA-SD-RD-113. The index sheet for section 1.3 will be amended accordingly with the drawing issue. The section index may run to extra pages if required.

1.2 - ROADS: GENERAL

DRAWING NUMBER	DRAWING DESCRIPTION	REVISION NUMBER					
		0	1	2	3	4	5
		REVISION DATE					
JRA-SD-RG-010	Road Hierarchy Matrix-Urban Functional Road Classification	300615					
JRA-SD-RG-011	Road Hierarchy Matrix-Urban Access Management Requirements and Features	300615					
JRA-SD-RG-020	Contractor's Board	300615					
JRA-SD-RG-030	Services Cross Sections 10,5 m	300615					
JRA-SD-RG-031	Services Cross Sections 13 m	300615					
JRA-SD-RG-032	Services Cross Sections 16 m	300615					
JRA-SD-RG-033	Services Cross Sections 20 m or Greater	300615					
JRA-SD-RG-034	Services Cross Sections 30 m or Greater	300615					
JRA-SD-RG-050	Typical Cross Section – Lightly Surfaced	300615					
JRA-SD-RG-051	Typical Cross Section – Dust Palliative Road	300615					

1.2 - ROADS: GENERAL

1.2 - ROADS: GENERAL

URBAN FUNCTIONAL ROAD CLASSIFICATION

Function			Description		Mobility				Traffic	
Basic Function	Alternative Functional Descriptions	Determining Function	Class No. (U)	Class Name	Through Traffic Component	Distance Between Parallel Roads (km)	% of Built km	Reach of Connectivity	Expected Range of ADT (Average Daily Traffic)	% of Travel veh-km
Mobility	Vehicle priority, vehicle only, long distance, through, high order, high speed, numbered, commercial, economic, strategic; Route, arterial, road or highway	Movement is dominant, through traffic is dominant, the majority of traffic does not originate or terminate in the immediate vicinity, the function of the road is to carry high volumes of traffic	1	Principal arterial (freeway)	Exclusively	5 – 10 km	5%-10%(6%)	>10 km	40 000 – 140 000	33%
			2	Major arterial	Predominant	1.5 – 5 km		>5 km	20 000 – 60 000	17%
			3	Minor arterial	Major	0.8 – 2 km	5%-15%(8%)	1-10 km	10 000 – 40 000	25%
Access/ Activity	Access, mixed pedestrian and vehicle traffic, short distance, low order, low speed, community, street.	Access, turning and crossing movements are allowed, the majority of traffic has an origin or destination in the immediate area, the function of the road is to provide a safe environment for vehicles and pedestrians using access points.	4a	Collector street, commercial	Discourage		2%-5%(3%)	<2 km, max 3 km	2 000 – 25 000	5%
			4b	Collector street, residential	Discourage		5%-12%(10%)	0.5-2 km max	<10 000	10%
			5a	Local street, commercial	Prevent		10%-20%(15%)	<1 km	<5 000	3%
			5b	Local street, residential	Prevent		50%-70%(60%)	<0.5km; 1 km max	<1 000	7%
			6a	Walkway, pedestrian priority	Ban			<1 km		
			6b	Walkway, pedestrian only	Ban			<1 km		

LEGEND

NOTES

1. THIS TABLE IS A DIRECT REPRESENTATION OF TABLE C: URBAN FUNCTIONAL ROAD CLASSIFICATION AS GIVEN IN THE COMMITTEE OF TRANSPORT OFFICIALS (COTO) "TRH 26-SOUTH AFRICAN ROAD CLASSIFICATION AND ACCESS MANAGEMENT MANUAL" VERSION 1.0, AUGUST 2012
2. SEE ALSO JRA-SD-RG-011 "URBAN ACCESS MANAGEMENT REQUIREMENTS AND FEATURES."
3. NOTE THE INCLUSION OF BRT TRUNK ROUTES IN THE TABLE "COMPLETE STREETS- MOBILITY AND ACCESS" UNDER CLASS 2 - DRAWING JRA-SD-RCS-010.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: GENERAL DETAILS

ROAD HEIRARCHY MATRIX
URBAN FUNCTIONAL ROAD CLASSIFICATION

SCALE AS SHOWN: NTS

DATE: 11/11/2014

DRAWING NUMBER: JRA-SD RG-010

EXTN.

AMENDMENT NUMBER:

URBAN ACCESS MANAGEMENT REQUIREMENTS AND FEATURES

Basic Function	Description		Requirements					Typical Features (use appropriate context sensitive standards for design)								
	Class No. (U)	Class Name	Design Typology	Route No.	Intersection Spacing	Access to Property	Parking	Speed km/h	Intersection Control	Typical Cross Section	Lane Width	Road Reserve Width	Public Transport Stops and Pedestrian Crossings.	Pedestrian Footways (Constructed)	Cycle Lanes	Traffic Calming
Mobility	1	Principal arterial	Freeway	Yes (MR/N)	2.4 km (1.6 km - 3.6 km)	Not allowed	No	100-120	Interchange	4 / 6 / 8 lane freeway	3.3 - 3.7 m lanes	60 - 120 m (60 m)	No	No	No	No
	2	Major arterial	Highway	Yes (MR)	800 m (± 15%)	Not Allowed ./..	No	80	Co-ordinated traffic signal, Interchange	4 / 6 lane divided, kerbed	3.3 - 3.6 m lanes	38 - 62 m (40 m)	Yes at intersections	Off road	Yes – widen by 1.2 m	No
	3	Minor arterial	Main road	Yes (M)	480 m (± 20%)	Not Allowed ./..	No	70	Co-ordinated traffic signal, roundabout	4 lane divided or undivided, kerbed	3.3 - 3.5 m lanes	25 - 40 m (30 m)	Yes at intersections	Yes	Yes – widen by 1.2 m	No
Access / Activity	4a	Collector street, commercial	Commercial major collector	No (A for temp. routing)	> 150 m	Yes (larger properties)	Yes if conditions allow	60	Traffic signal, roundabout or priority	4 lane, median at ped. xing , boulevard CBD one-way		20 - 40 m (25 m)	Yes at intersections or mid-block	Yes	Yes, widen lane or on verge	Median for pedestrians, curved roadway
	4b	Collector street, residential	Residential Minor collector	No	> 150 m	Yes	Yes if appropriate	50	Roundabout, mini-circle or priority	2 / 3 lane undivided	< 3.3 m lanes (6 - 9m roadway)	16 - 30 m (20 m)	Yes anywhere	Yes	Yes, in road or on verge	Raised pedestrian median, narrow lanes
	5a	Local street, commercial	Commercial access street	No		Yes	Yes if conditions allow	40	Priority	2 lane plus parking		15 – 25 m (22 m)	If applicable, anywhere	Normally yes	Use roadway	Raised pedestrian crossing
	5b	Local street, residential	Local Residential street	No		Yes	Yes on verge	40	Mini-circle, priority or none	1 / 2 lane Mountable kerbs	>3.0 m (5.5 m roadway - two way)	10 - 16 m (14 m)	If applicable, anywhere	Not normally, pedestrians can use roadway	Use roadway	Yes, but should not be necessary
	6a	Walkway, non-motorized priority	Pedestrian priority	No	500 m maximum	Yes	Yes, if Parking lot or Woonerf	15	None, pedestrians have right of way	Surfaced			If applicable, anywhere	Yes or use roadway	Rare	Yes
	6b	Walkway, non-motorized only	Pedestrian only	No	500 m maximum	Yes	No vehicles	Peds. 80 m / minute	None, pedestrian signal	Block paving		6 m		Yes	Yes	

Access to properties sufficiently large to warrant a private intersection / interchange can be considered if access spacing requirement is met and there is no future need for a public road.

** Partial and marginal access at reduced spacing may be allowed to relieve congestion, reduce excessive travel distances, or remove the need for a full intersection*

LEGEND

NOTES

1. THIS TABLE IS A SLIGHTLY MODIFIED VERSIONOF TABLE E: URBAN ACCESS MANAGEMENT AS GIVEN IN THE COMMITTEE OF TRANSPORT OFFICIALS (COTO) "TRH 26- SOUTH AFRICAN ROAD CLASSIFICATION AND ACCESS MANAGEMENT MANUAL" VERSION 1.0, AUGUST 2012.
   BOXES OUTLINED IN BLUE HAVE BEEN AMENDED TO JRA REQUIREMENTS.
2. SEE ALSO JRA-SD-RG-010 "URBAN FUNCTIONAL ROAD CLASSIFICATION".
3. NOTE THE INCLUSIONS OF BRT TRUNK ROUTES IN THE TABLE "COMPLETE STREETS- MOBILITY AND ACCESS" UNDER CLASS 2 - DRAWING JRA-SD-RCS-010.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:

STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:

CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: GENERAL DETAILS

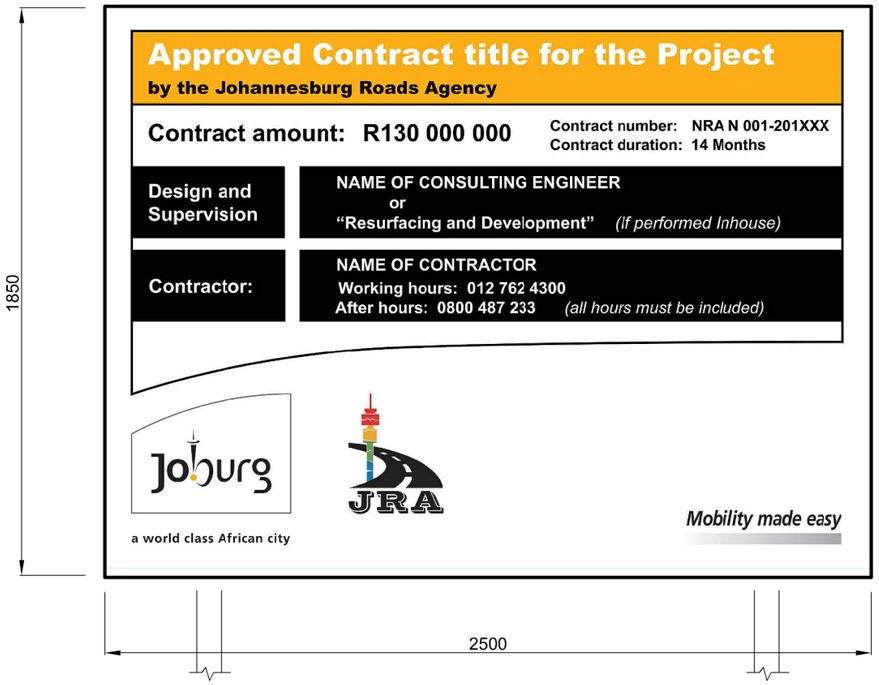
ROAD HEIRARCHY MATRIX
URBAN ACCESS MANAGEMENT REQUIREMENTS AND FEATURES

SCALE AS SHOWN: NTS

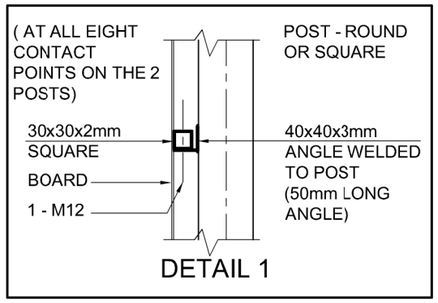
DATE: 11/11/2014

DRAWING NUMBER: JRA-SD RG-011 | EXTN.:

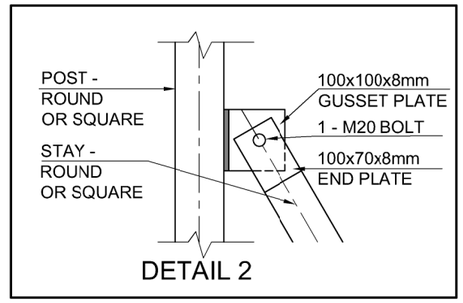
AMENDMENT NUMBER:



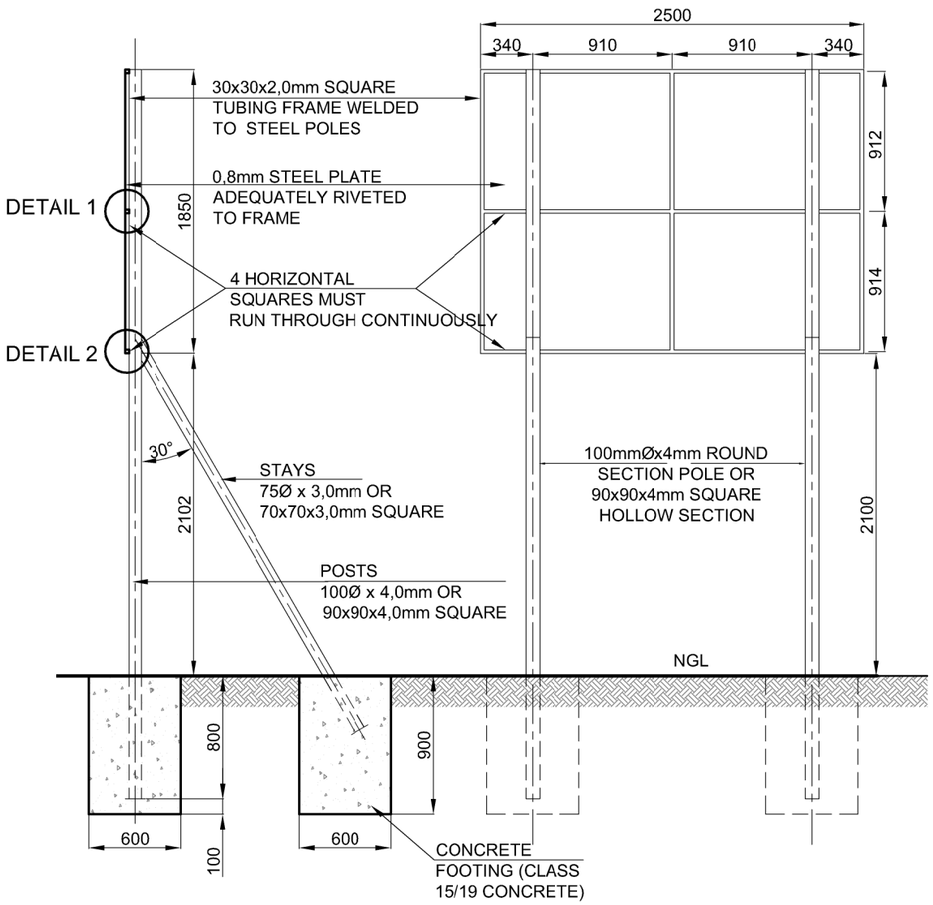
FRONT ELEVATION



DETAIL 1



DETAIL 2



TYPICAL SECTION

BACK ELEVATION

LEGEND

NOTES

1. ALL PAINTS TO HAVE GLOSS FINISH AND COMPLY WITH SANS 1519-2.
2. ALL WHITE AREAS AND LETTERING TO BE OFF-WHITE IN COLOUR. OFF-WHITE TO BE MADE UP BY ADDING 0,4 GRAMS BLACK AND 0,4 GRAMS RED PAINT TO ONE LITRE PURE WHITE PAINT
3. COLOUR OF PAINT TO CONFORM TO BS 2000 No.0/013
4. ALL LETTERING TO BE DONE ACCORDING TO THE PROVISION OF THE LATEST EDITION OF THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY ROAD TRAFFIC SIGNS MANUAL
5. ALL LETTERING ARE 49mm DIN 1451 PART 2 STYLE "B MOD" UNLESS OTHERWISE INDICATED
6. THIS DETAIL IS ALSO RELEVANT FOR STORMWATER CONTRACTS.

AMENDMENTS			
No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: GENERAL DETAILS

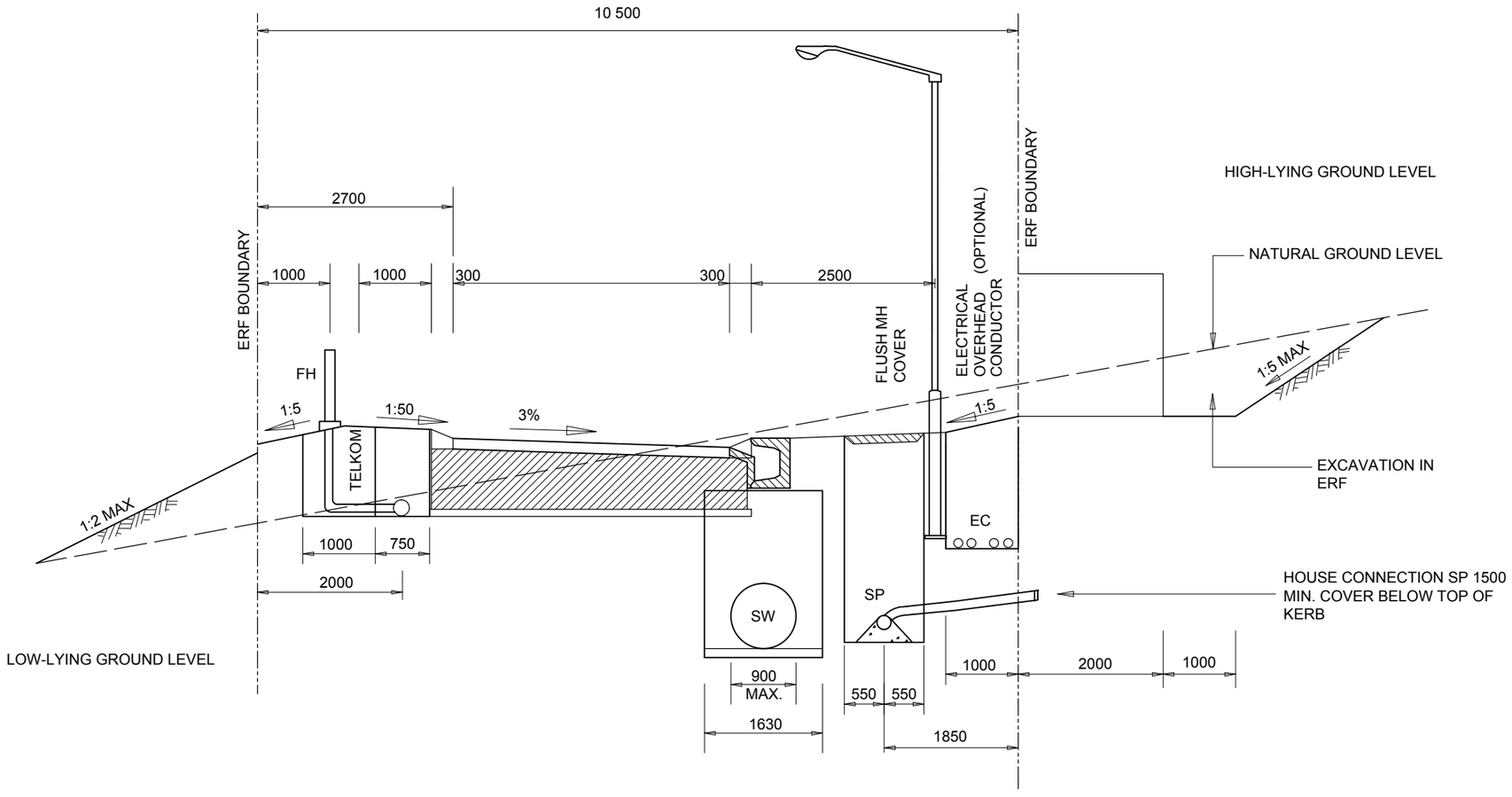
CONTRACT NAMEBOARD

SCALE AS SHOWN: NTS

DATE: 09/12/2015

DRAWING NUMBER: JRA-SD RG-020 | EXTN.

AMENDMENT NUMBER:



LEGEND

EC - ELECTRICAL CABLE
SW - STORMWATER
WP - WATER PIPE
FH - FIRE HYDRANT
SP - SEWER PIPE
PT - TELKOM AND OTHER COMMUNICATIONS SERVICES.

NOTES

1. ALL SLEEVES TO BE INSTALLED TO 1000mm BACK OF KERBING.
2. TREES AND LAMP POLES ALTERNATE AT 15m
3. REFER TO JRA-SD-SW-021 FOR PIPE DETAILS.
4. TREES AND LAMP POLES ON THE SAME SIDE.
5. CONCRETE GUTTER SHOULD BE PLACED ON THE LOW SIDE OF THE ROAD. REFER TO JRA-SD-RD-011 FOR DETAILS.
6. WHERE A PAVED SIDEWALK IS REQUIRED, IT SHOULD BE PLACED ON THE SAME SIDE OF LAMP POLES AND THE UNDERLYING LAYER SHOULD BE STABILISED.
7. MOUNTABLE KERB FIGURE 8C REQUIRED.
8. ALL ROAD RESERVES TO BE 10.5m MINIMUM (SUBJECT TO JRA APPROVAL).
9. WHEN PRACTICAL THE STORMWATER PIPE SHOULD NOT BE LOCATED UNDER THE ROAD.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

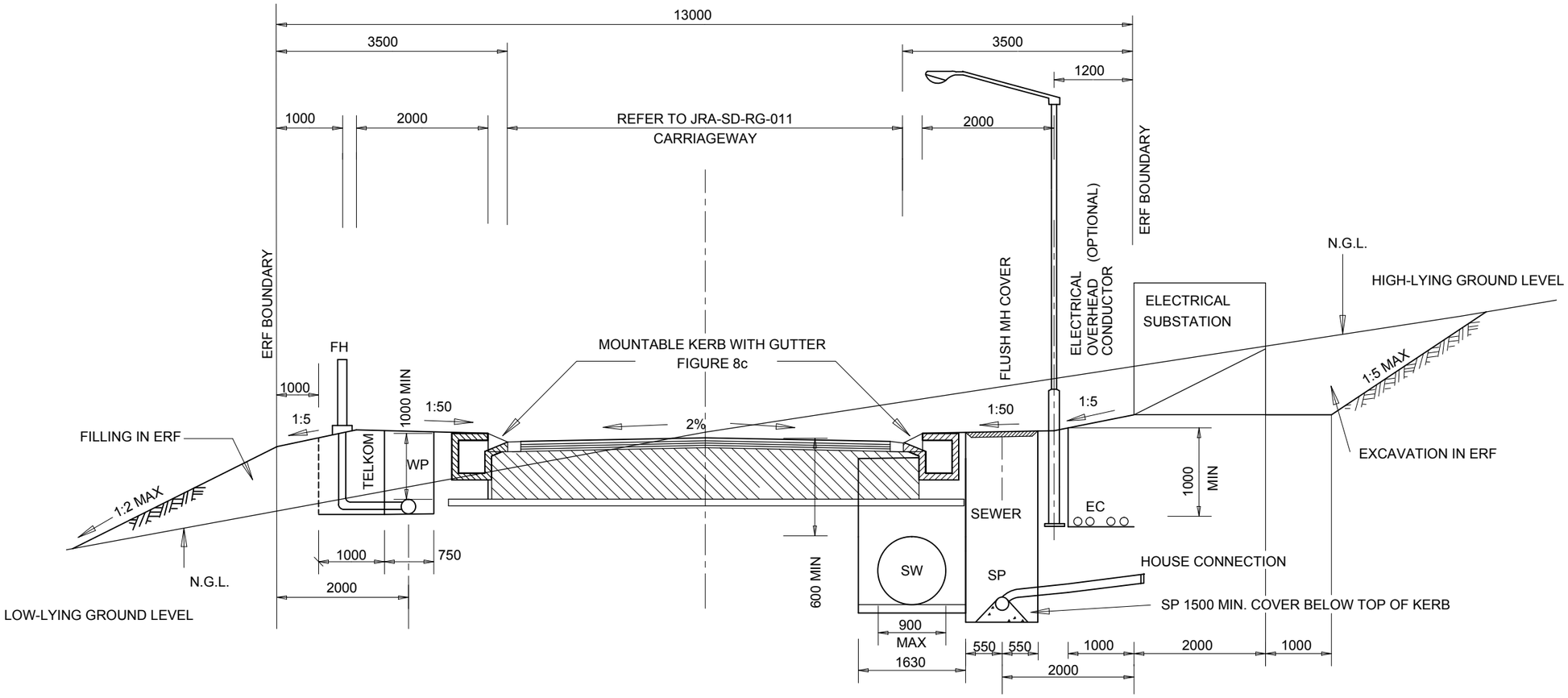
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS :GENERAL DETAILS

PLACING OF SERVICES WITHIN ROAD RESERVES (10.5m MINIMUM ROAD RESERVE)

SCALE AS SHOWN: NTS
DATE: 18/11/2014
DRAWING NUMBER: JRA-SD RG-030
EXTN.
AMENDMENT NUMBER:



LEGEND

EC - ELECTRICAL CABLE
SW - STORMWATER
WP - WATER PIPE
FH - FIRE HYDRANT
SP - SEWER PIPE
PT - TELKOM AND OTHER COMMUNICATIONS SERVICES

NOTES

1. ALL SLEEVES TO BE INSTALLED TO 1000mm BACK OF KERBING.
2. TREES AND LAMP POLES ALTERNATE AT 15m.
3. REFER TO JRA-SD-SW-021 FOR PIPE DETAILS.
4. TREES AND LAMP POLES ON THE SAME SIDE.
5. CONCRETE GUTTER SHOULD BE PLACED ON THE LOW SIDE OF THE ROAD, REFER TO JRA-SD-RD-011 FOR DETAILS.
6. WHERE A PAVED SIDEWALK IS REQUIRED,IT SHOULD BE PLACED ON SAME SIDE AS THE LAMP POLES AND THE UNDER-LYING LAYER SHOULD BE STABILISED (SEE JRA-SD-RD-040.)
7. MOUNTABLE KERB FIGURE 8c REQUIRED (SUBJECT TO JRA PRIOR APPROVAL).
8. ALL ROAD RESERVES TO BE 13m MINIMUM.
9. WHEN PRACTICAL THE STORMWATER PIPE SHOULD NOT BE LOCATED UNDER THE ROAD.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

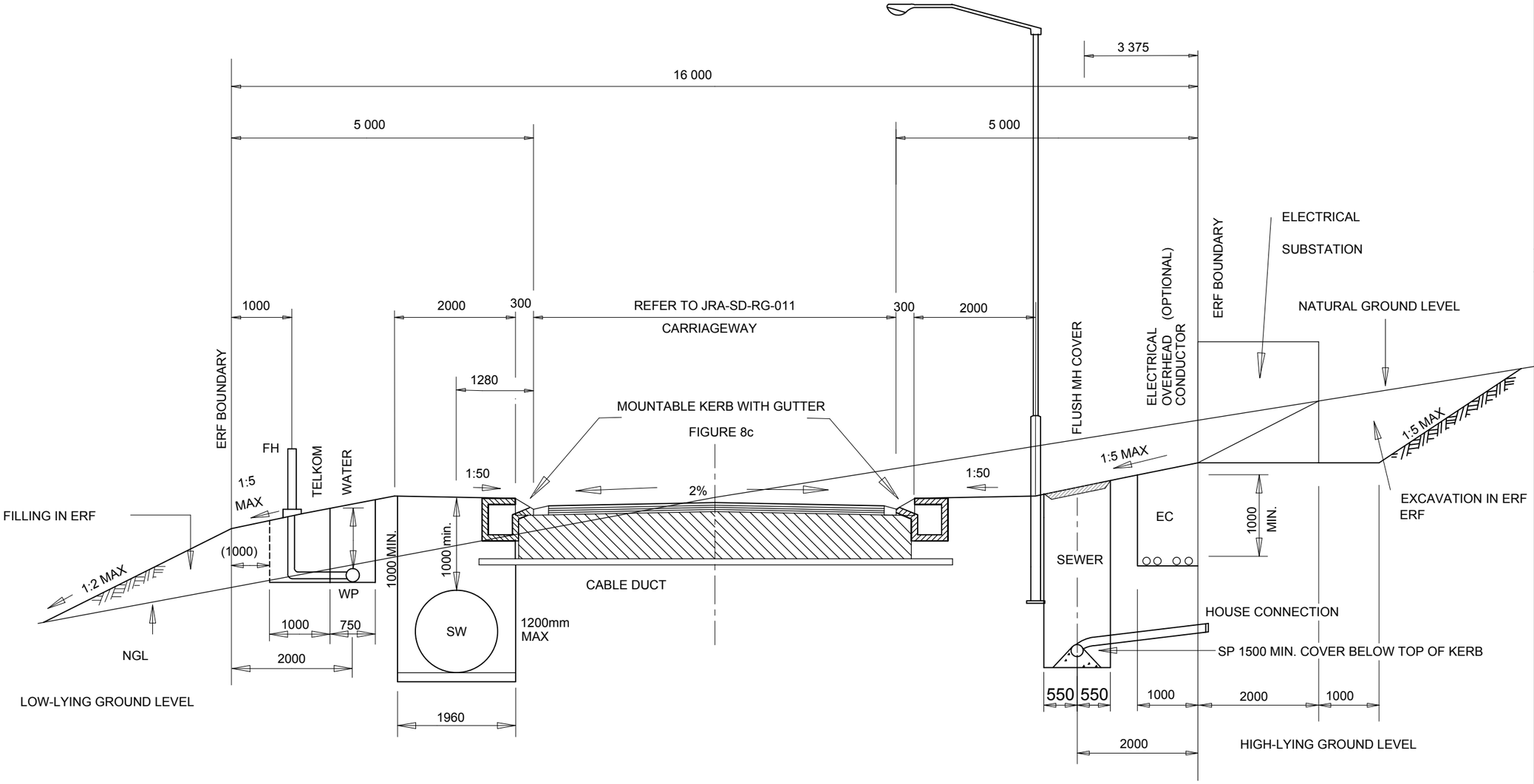
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS :GENERAL DETAILS

PLACING OF SERVICES WITHIN ROAD RESERVES (13m ROAD RESERVE)

SCALE AS SHOWN: NTS
DATE: 30/10/2014
DRAWING NUMBER: JRA-SD RG-031
EXTN.
AMENDMENT NUMBER:



LEGEND

EC - ELECTRICAL CABLE
SW - STORMWATER
WP - WATER PIPE
FH - FIRE HYDRANT
SP - SEWER PIPE
PT - TELKOM AND OTHER COMMUNICATIONS SERVICES

NOTES

1. ALL SLEEVES TO BE INSTALLED TO 1000mm BACK OF KERBING.
2. TREES AND LAMP POLES ALTERNATE AT 15m.
3. REFER TO JRA-SD-SW-021 FOR PIPE DETAILS.
4. TREES AND LAMP POLES ON THE SAME SIDE.
5. CONCRETE GUTTER SHOULD BE PLACED ON THE LOW SIDE OF THE ROAD ,REFER TO JRA-SD-RD-011 FOR DETAILS.
6. WHERE A PAVED SIDEWALK IS REQUIRED,IT SHOULD BE PLACED ON SAME SIDE OF LAMP POLES AND THE THE UNDER-LYING LAYER SHOULD BE STABILISED.
7. MOUNTABLE KERB FIGURE. 8c REQUIRED SUBJECT TO JRA PRIOR APPROVAL.
8. ALL ROAD RESERVES TO BE 16m MINIMUM.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:
DRAWN BY:
STRUCTURAL DESIGN BY:
DRAWING CHECKED BY:
CHECKED BY:
DRAWING APPROVED BY:

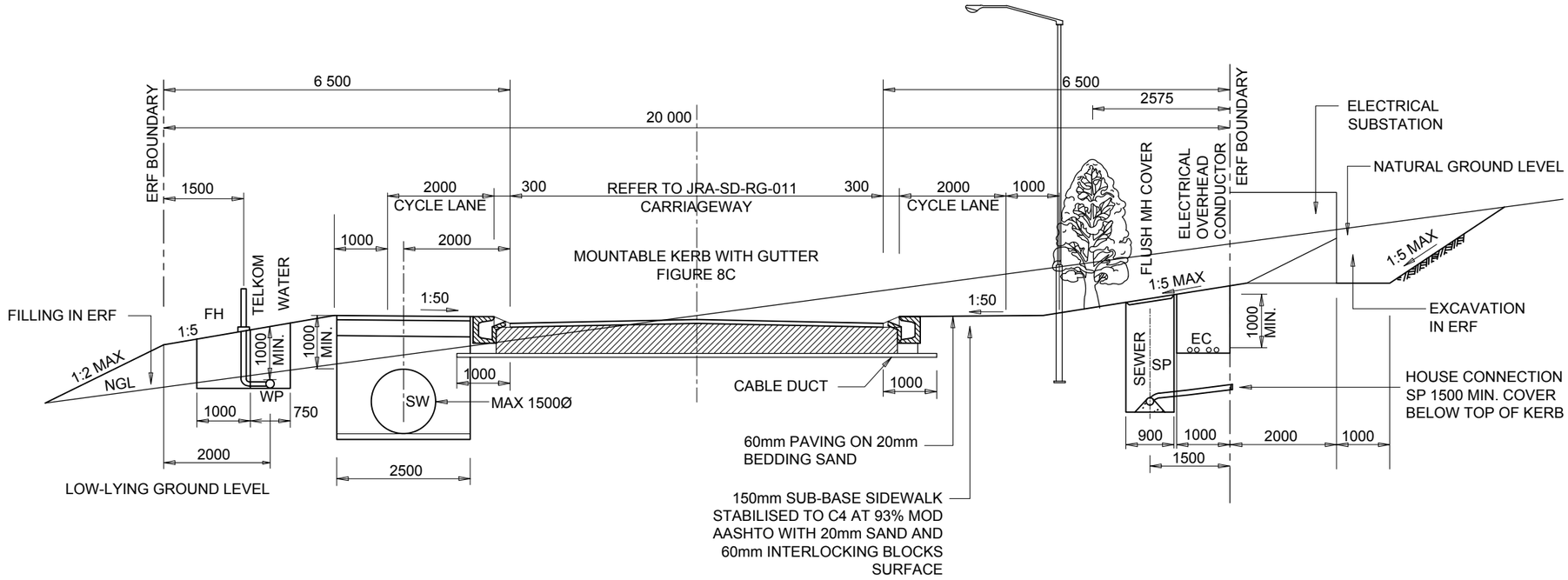
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: GENERAL DETAILS

PLACING OF SERVICES WITHIN ROAD RESERVES (16m ROAD RESERVE)

SCALE AS SHOWN: NTS
DATE: 11/11/2014
DRAWING NUMBER: JRA-SD RG-032
EXTN.
AMENDMENT NUMBER:



LEGEND

EC - ELECTRICAL CABLE
SW - STORMWATER
WP - WATER PIPE
FH - FIRE HYDRANT
SP - SEWER PIPE
PT - TELKOM AND OTHER COMMUNICATIONS SERVICES

NOTES

1. ALL CABLE DUCTS TO BE INSTALLED TO 1000mm BACK OF KERBING.
2. TREES AND LAMP POLES ALTERNATE AT 15m INTERVALS.
3. MINIATURE SUBSTATIONS ARE PLACED IN SERVITUDE ADJACENT TO ROAD RESERVE UNLESS PROBLEM THEN ON SIDEWALK ONLY IF WIDER THAN 4.5m.
4. REFER TO JRA-SD-SW-021 FOR PIPE DETAILS.
5. TREES AND LAMP POLES ON THE SAME SIDE.
6. CONCRETE GUTTER ON THE LOW SIDE OF THE ROAD.
7. WHERE A PAVED SIDEWALK IS REQUIRED, IT SHOULD BE PLACED ON THE SAME SIDE OF LAMP POLES AND THE UNDERLYING LAYER SHOULD BE STABILISED.
8. SURFACING OF CYCLE LANE SHOULD BE PREMIX ON 150mm SUBBASE(G7).
9. IF PAVED SIDEWALK IS SHARED AS A CYCLE LANE, SIDEWALK SHOULD BE HALF WIDTH PAVED WITH INTERLOCKING BLOCKS AND HALF WIDTH PREMIX.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS :GENERAL DETAILS

PLACING OF SERVICES WITHIN ROAD RESERVES (20m AND GREATER ROAD RESERVE FOR SINGLE CARRIAGEWAY)

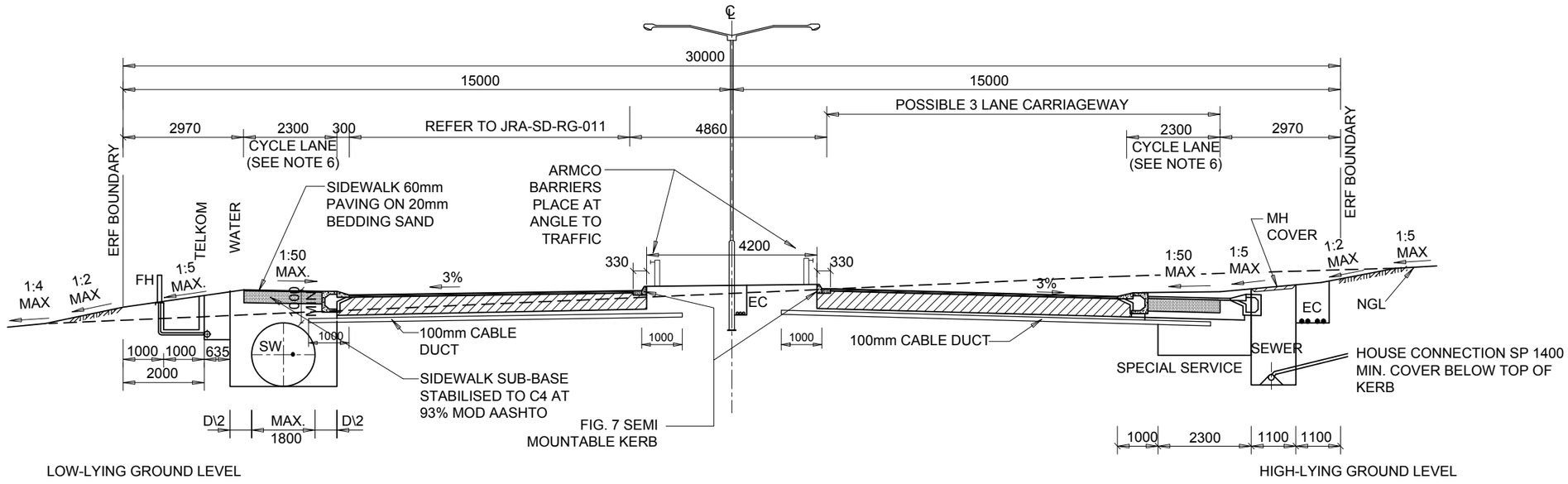
SCALE AS SHOWN: NTS

DATE: 18/11/2014

DRAWING NUMBER: JRA-SD RG-033

EXTN.

AMENDMENT NUMBER:



LEGEND

EC - ELECTRICAL CABLE
SW - STORMWATER
WP - WATER PIPE
FH - FIRE HYDRANT
SP - SEWER PIPE
PT - TELKOM AND OTHER COMMUNICATIONS SERVICES

NOTES

1. ALL CABLE DUCTS TO BE INSTALLED TO 1000mm BACK OF KERBING.
2. TREES AND LAMP POLES ALTERNATE AT 15m INTERVALS.
3. MINIATURE SUBSTATIONS ARE PLACED IN SERVITUDE ADJACENT TO ROAD RESERVE UNLESS PROBLEM THEN ON SIDEWALK ONLY IF WIDER THAN 4.5m
4. REFER TO JRA-SD-SW-021 FOR PIPE DETAILS.
5. KERBS, FIG 3 BARRIER AND CHANNEL.
6. SURFACING OF CYCLE LANE SHOULD BE PREMIX ON 150mm STABILISED SUBBASE TO G7 AT 93% MOD AASHTO.
7. WHERE A PAVED SIDEWALK IS REQUIRED THE UNDERLYING LAYER SHOULD BE STABILISED.
8. IF PAVED SIDEWALK IS SHARED AS A CYCLE LANE, SIDEWALK SHOULD BE HALF WIDTH PAVED WITH INTERLOCKING BLOCKS AND HALF WIDTH PREMIX.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

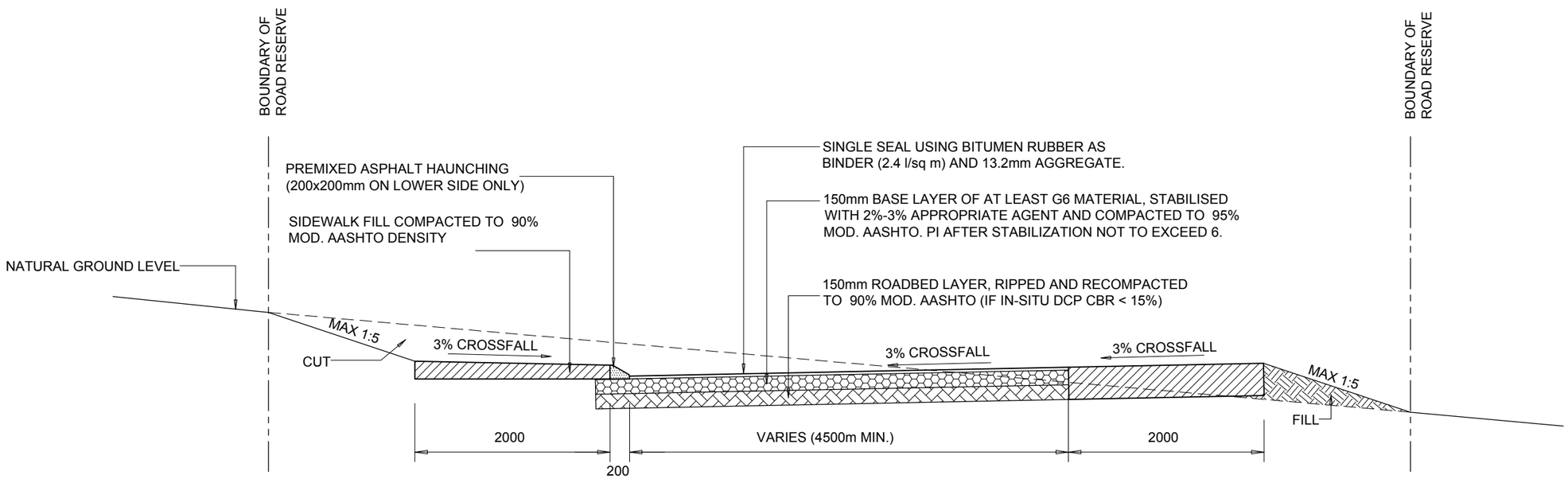
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS :GENERAL DETAILS

PLACING OF SERVICES WITHIN ROAD RESERVES (30m AND GREATER ROAD RESERVE FOR DUAL CARRIAGEWAY)

SCALE AS SHOWN: NTS
DATE: 17/11/2014
DRAWING NUMBER: JRA-SD RG-034
EXTN.
AMENDMENT NUMBER:



LEGEND

NOTES

1. SIDEWALKS IN CUT AND FILL TO HAVE A MIN. OF 2m WIDTH SLOPING TOWARDS THE ROAD SURFACE AT 2% GRADIENT.
2. ALL SIDE FILL TO BE COMPACTED TO A MINIMUM OF 90% OF MOD. AASHTO DENSITY.
3. ALL MATERIALS & CONSTRUCTION TO CONFORM TO THE REQUIREMENTS OF SANS 1200 DM.
4. SUB SOIL DRAINS MUST BE PLACED WHERE NECESSARY TO CONTROL HIGH WATER TABLES.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:

STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:

CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS :GENERAL DETAILS

TYPICAL CROSS SECTION OF LIGHTLY SURFACED ROAD FOR DUST PREVENTION

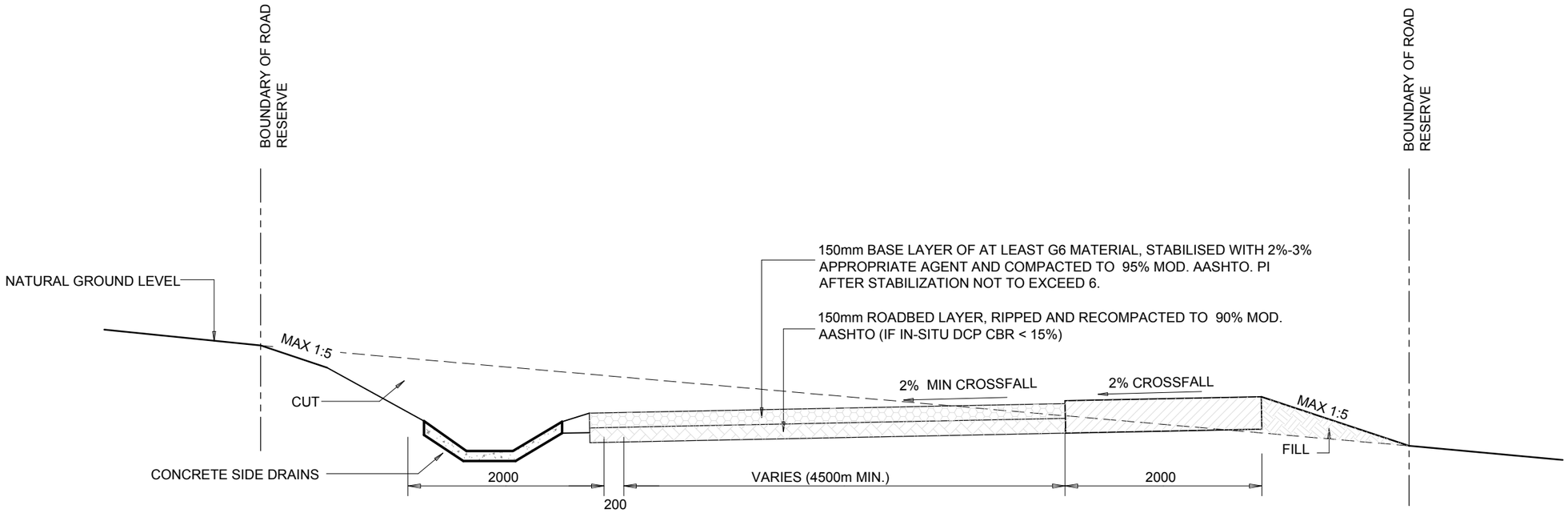
SCALE AS SHOWN: NTS

DATE: 17/11/2014

DRAWING NUMBER: JRA-SD RG-050

EXTN.

AMENDMENT NUMBER:



LEGEND

NOTES

1. SIDEWALKS IN CUT AND FILL TO HAVE A MIN. OF 2m WIDTH SLOPING TOWARDS THE ROAD SURFACE AT 2% GRADIENT.
2. ALL SIDE FILL TO BE COMPACTED TO A MINIMUM OF 90% OF MOD. AASHTO DENSITY.
3. ALL MATERIALS & CONSTRUCTION TO CONFORM TO THE REQUIREMENTS OF SANS 1200 DM.
4. CONCRETE DRAINS MUST BE PLACED WHERE SLOPES EXCEED 2%.
5. GRADIENTS STEEPER THAN 5% REQUIRE SPECIAL DESIGN BY ENGINEER TO PREVENT UNDUE EROSION.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS :GENERAL DETAILS

TYPICAL CROSS SECTION OF UNSURFACED ROAD

SCALE AS SHOWN: NTS

DATE: 07/06/2015

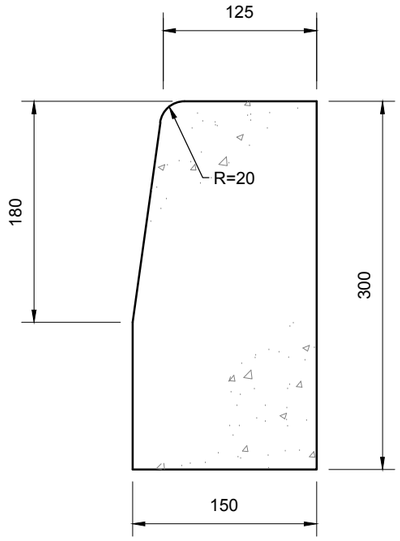
DRAWING NUMBER: JRA-SD RG-051

EXTN.

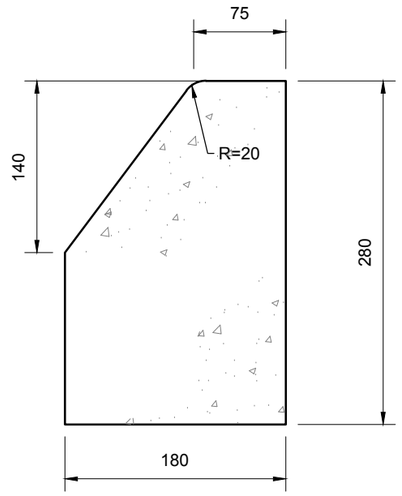
AMENDMENT NUMBER:

1.3 – ROADS: DESIGN

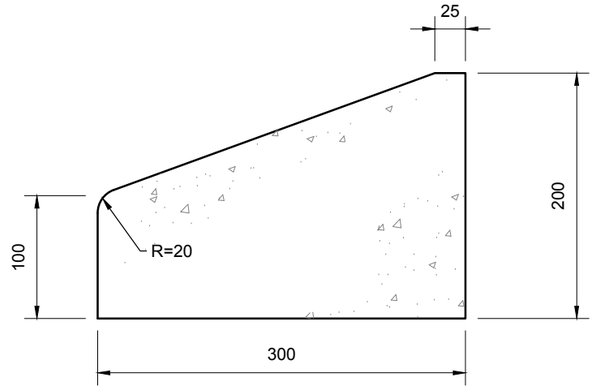
DRAWING NUMBER	DRAWING DESCRIPTION	REVISION NUMBER					
		0	1	2	3	4	5
		REVISION DATE					
JRA-SD-RD-010	Standard Type Kerbs - 1	300615					
JRA-SD-RD-011	Standard Type Kerbs - 2	300615					
JRA-SD-RD-020	Kerb Transitions	300615					
JRA-SD-RD-030	Vehicle Entrance Slab	300615					
JRA-SD-RD-031	Mid to High Order Priority Access	300615					
JRA-SD-RD-040	Typical Minibus Taxi Layby	300615					
JRA-SD-RD-041	Typical Bus Layby	300615					
JRA-SD-RD-050	Guardrails - 1	300615					
JRA-SD-RD-051	Guardrails - 2	300615					
JRA-SD-RD-052	Guardrails - 3	300615					
JRA-SD-RD-060	Handrails, Balustrades, Bollards	300615					
JRA-SD-RD-070	Standard Splays	300615					
JRA-SD-RD-071	Splays on Curves	300615					
JRA-SD-RD-080	Standard Turning Circles	300615					
JRA-SD-RD-081	Hammerhead Turning Circle	300615					
JRA-SD-RD-090	Controlled Access for Security Purposes	300615					
JRA-SD-RD-091	Enclosed Area: Type 1 Access Detail	300615					
JRA-SD-RD-092	Enclosed Area: Type 2A Closure Detail	300615					
JRA-SD-RD-093	Time Controlled Enclosed Area: Type 2B Closure Detail	300615					
JRA-SD-RD-094	Enclosed Area: Type 3 Closure Detail	300615					
JRA-SD-RD-110	Parking Details - Design Vehicle (Red Book)	300615					
JRA-SD-RD-111	Parking Details – 90° Parking	300615					
JRA-SD-RD-112	Parking Details – 60° & 40° Angle Parking with Interlocking	300615					
JRA-SD-RD-120	Traffic Calming/Speed Hump Detail	300615					
JRA-SD-RD-121	Typical Raised Pedestrian Crossing	300615					
JRA-SD-RD-122	Raised pedestrian Crossings – Disabled Friendly	300615					
JRA-SD-RD-123	Other Traffic Calming Options	300615					
JRA-SD-RD-130	Typical Layout Mini Circle	300615					
JRA-SD-RD-140	Walkways and Cycle Tracks	300615					



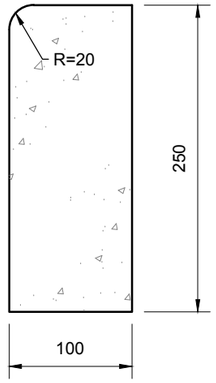
BARRIER KERB
SANS (FIG. 3)
CAN ALSO BE USED AS MOUNTABLE KERBS



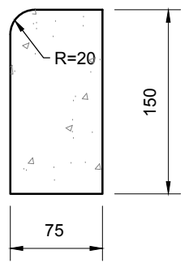
SEMI-MOUNTABLE KERB
SANS (FIG. 7)
FOR USE IN MEDIANS ONLY



MOUNTABLE KERB
SANS (FIG. 8c)
FOR INDUSTRIAL USE



RECTANGULAR KERB
SANS (FIG. 10)
FOR HIGH SIDE KERBING IN LOW COST DEVELOPMENTS



RECTANGULAR KERB
SANS (FIG. 12)
EDGE RESTRAINS FOR PAVING BLOCKS

LEGEND

NOTES

1. MOUNTABLE KERBS TO BE FIG. 8C UNLESS OTHERWISE SPECIFIED.
2. ALL KER SHAPES AND STRENGTH TO COMPLY WITH SANS 927.
3. CONCRETE HAUNCHING TO BE PLACED AT BACK OF KERBS AT ALL JOINTS ON STRAIGHTS.
4. EXCLUDING THE USE OF CAST-IN-SITU CONCRETE KERBING IN EXISTING DEVELOPED SUBURBS AND TOWNSHIPS,

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

STANDARD TYPE KERBS - 1

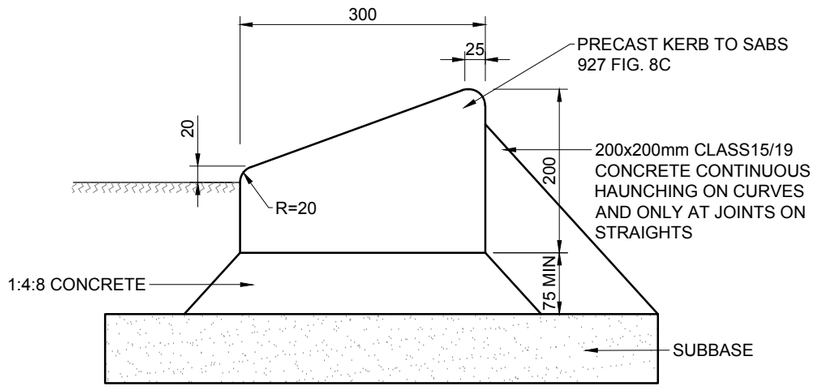
SCALE AS SHOWN: NTS

DATE: 25/11/2014

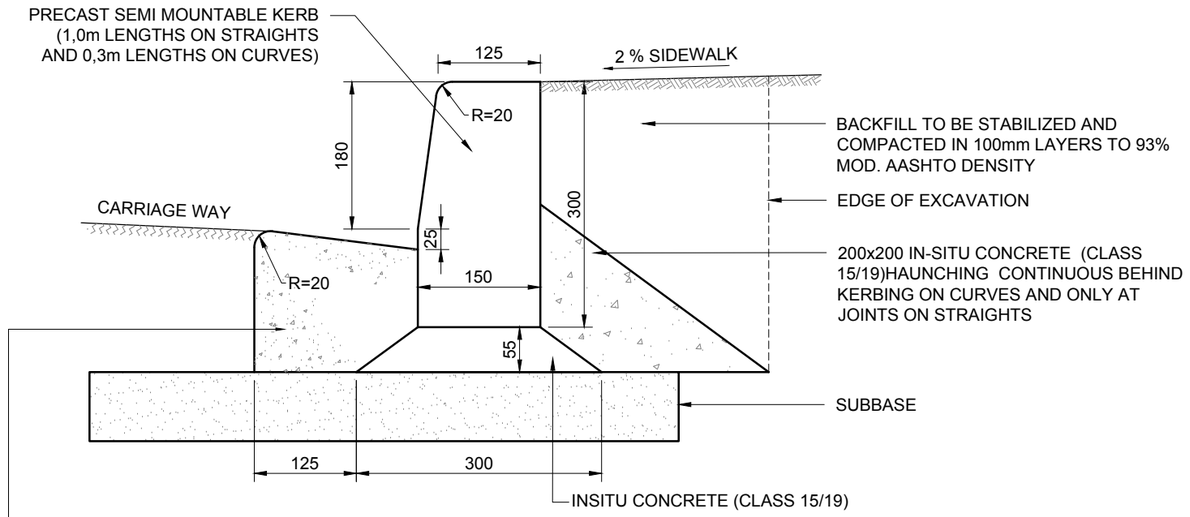
DRAWING NUMBER: JRA-SD RD-010

EXTN.

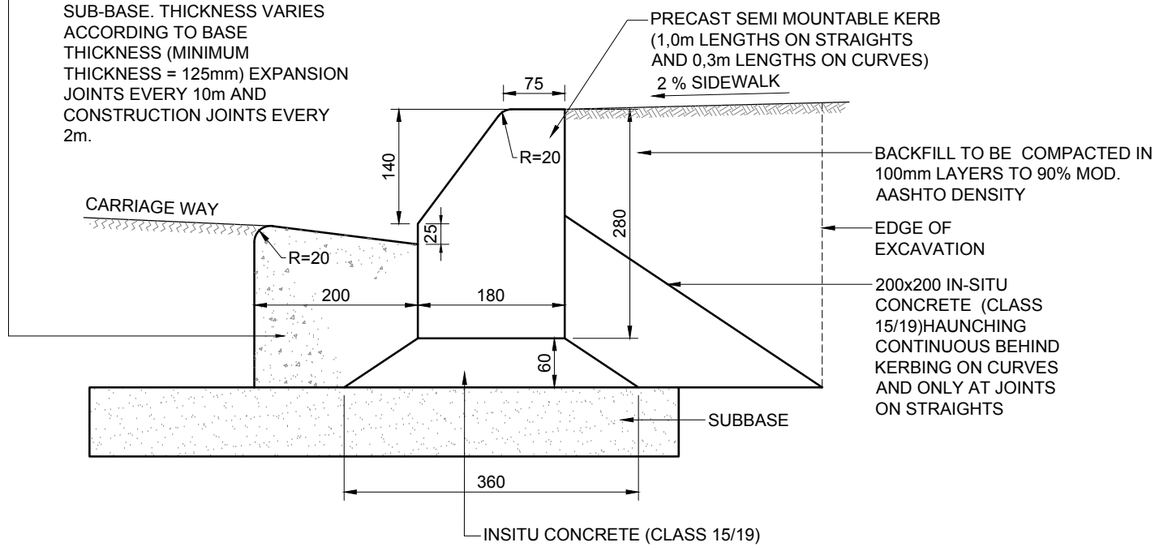
AMENDMENT NUMBER:



PRECAST MOUNTABLE KERB (FIG. 8B OR 8C)



DETAIL OF BARRIER KERB (FIG. 3)



DETAIL OF BARRIER KERB (FIG. 7)

LEGEND

NOTES

1. MINIMUM CONCRETE STRENGTH OF ALL CAST IN-SITU KERBS TO BE CLASS 25/19.
2. CONCRETE GUTTER TO HAVE A STEEL TROWEL FINISH.

AMENDMENTS			
No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

STANDARD TYPE KERBS - 2

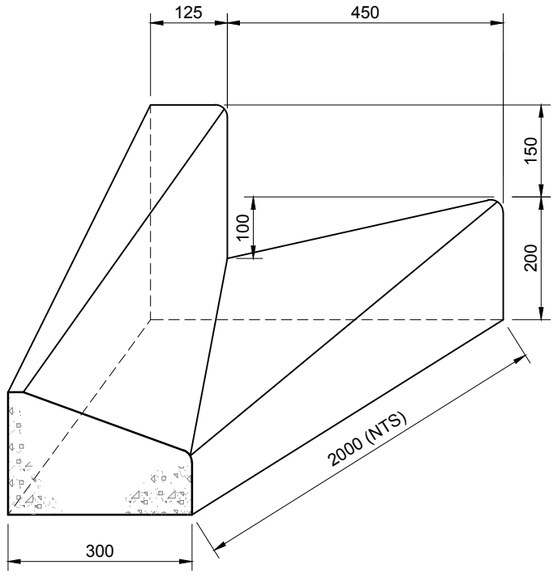
SCALE AS SHOWN: NTS

DATE: 25/11/2014

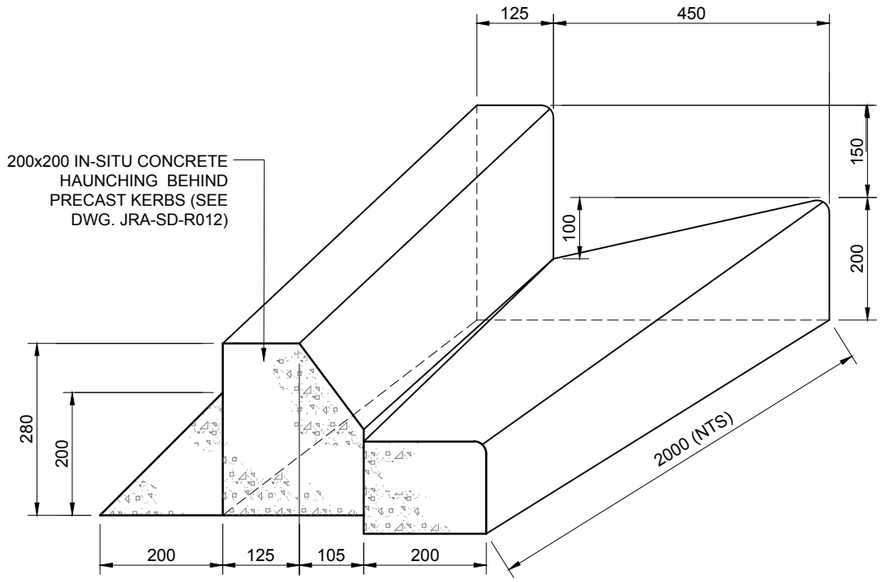
DRAWING NUMBER: JRA-SD RD-011

EXTN.

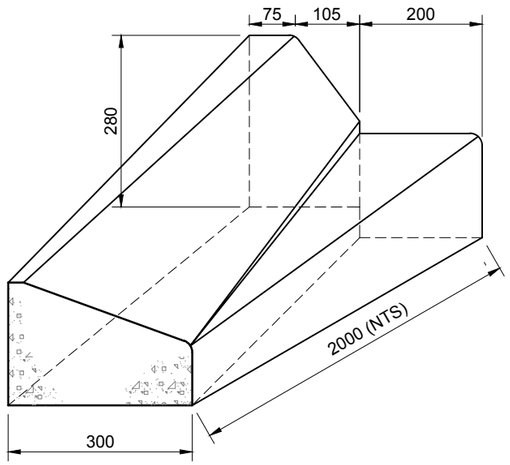
AMENDMENT NUMBER:



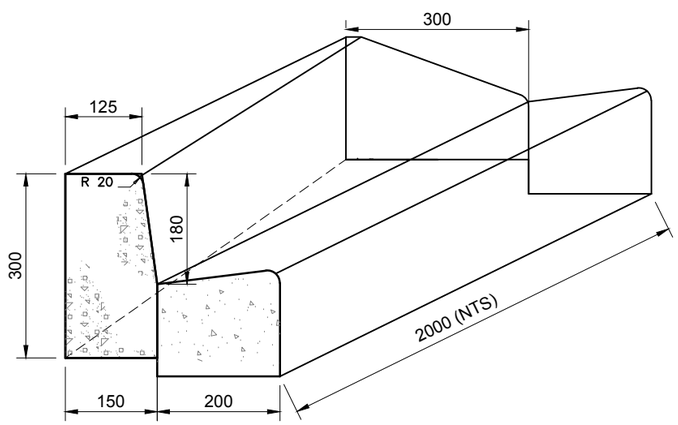
MOUNTABLE KERB TO KERB INLET



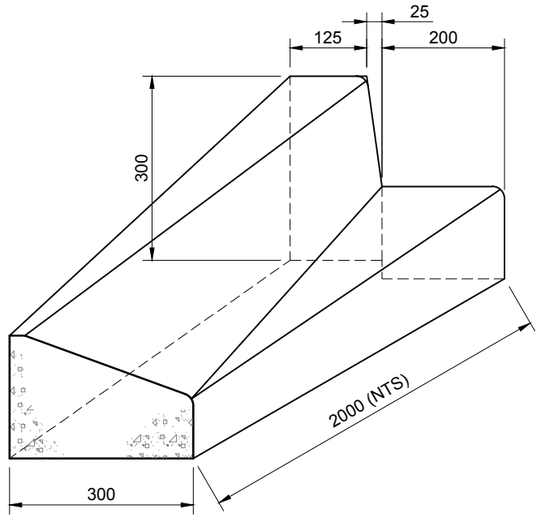
SEMI-MOUNTABLE KERB TO KERB INLET



MOUNTABLE KERB TO SEMI-MOUNTABLE KERB



MOUNTABLE KERB AND GUTTER TO BARRIER KERBAND GUTTER



MOUNTABLE KERB TO BARRIER KERB

LEGEND

NOTES

1. MINIMUM CONCRETE STRENGTH OF ALL CAST IN-SITU KERBS TO BE CLASS 25/19.
2. CONCRETE GUTTER TO HAVE A STEEL TROWEL FINISH.
3. TRANSITIONS NEED TO BE STEEL TROWEL FINISHED.

AMENDMENTS			
No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:

STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:

CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

TYPICAL KERB TRANSITIONS

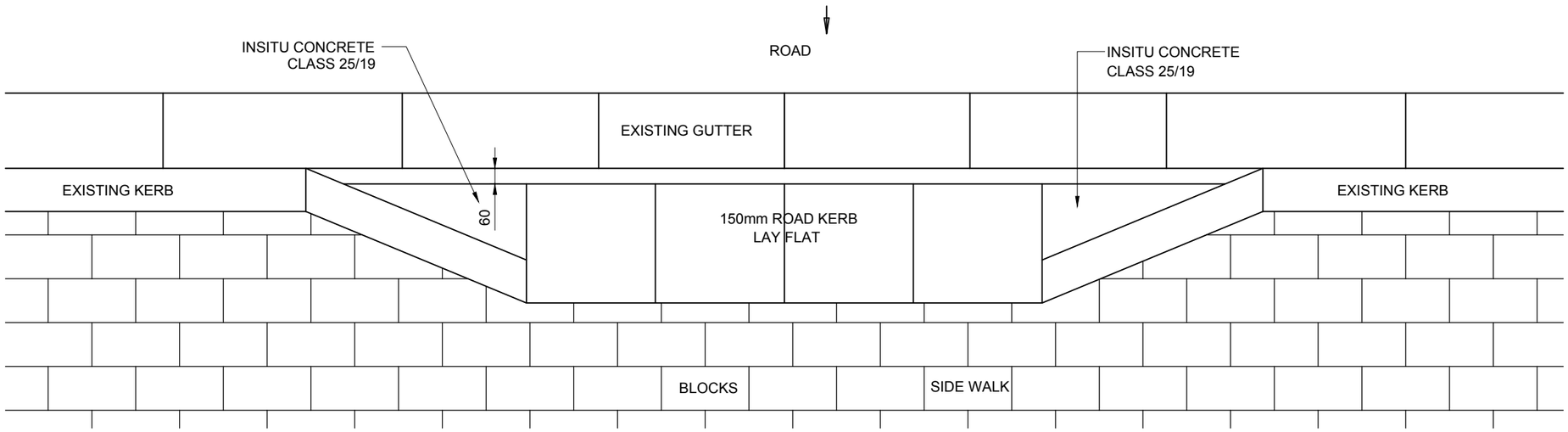
SCALE AS SHOWN: NTS

DATE: 27/11/2014

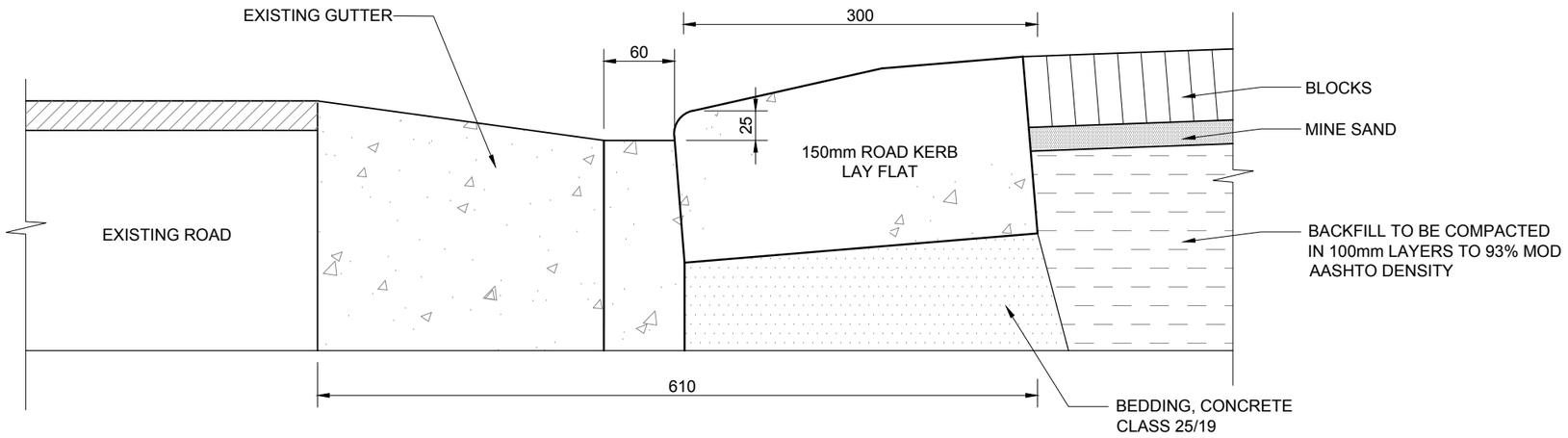
DRAWING NUMBER: JRA-SD RD-020

EXTN.

AMENDMENT NUMBER:



PLAN



VEHICLE ENTRANCE
(KERB OPENING)

LEGEND

NOTES

AMENDMENTS			
No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

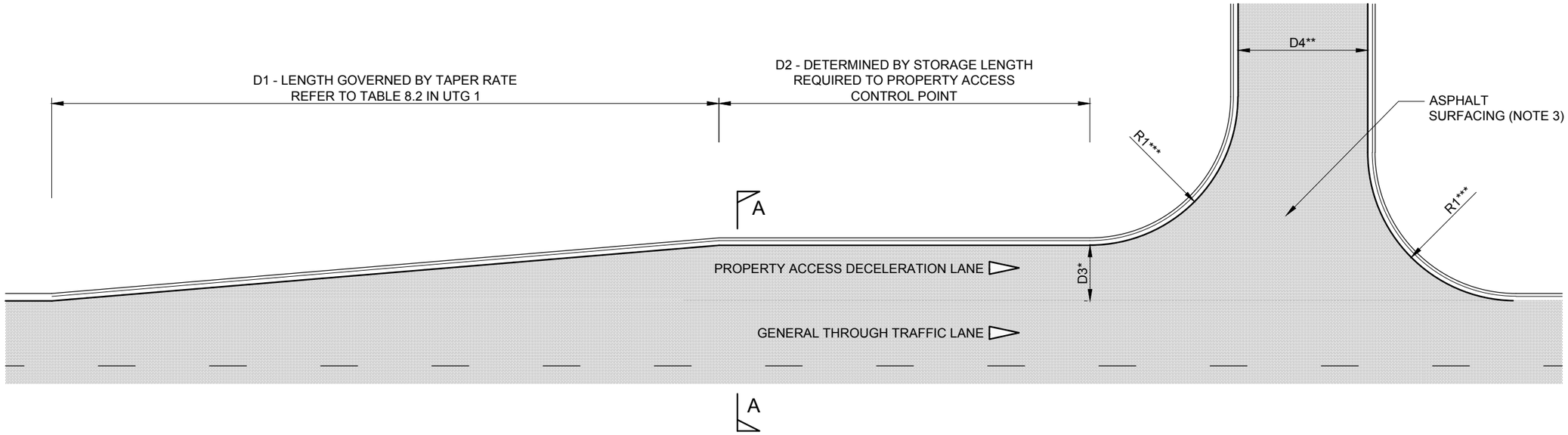
JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

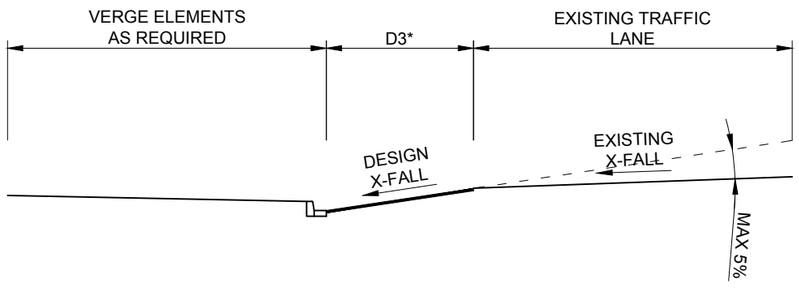
TYPICAL VEHICLE ENTRANCE SLAB

SCALE AS SHOWN: NTS	
DATE: 23/01/2015	
DRAWING NUMBER	EXTN.
JRA-SD RD-030	
AMENDMENT NUMBER:	

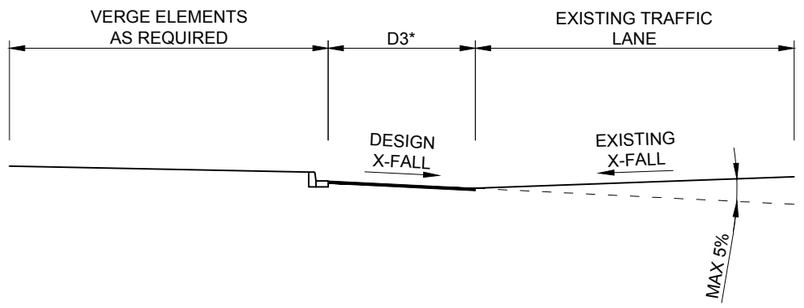
* D3 - WIDTH OF ACCESS DECELERATION / STORAGE LANE. MINIMUM = 2.5m
** D4 - WIDTH OF PROPERTY ACCESS DEPENDENDENT ON ACCEES CONTROL FACILITY WIDTH
*** R1 - MINIMUM OF 8.0m BUT SHALL BE ADJUSTED TO SUIT THE TURNING CIRCLES OF THE REQUIRED DESIGN VEHICLE



DETAIL OF MID TO HIGH ORDER PROPERTY ACCESS



SECTION A-A
CHANGE IN REGULAR CROSSFALL BETWEEN TRAVEL LANES
NTS



SECTION A-A
CHANGE IN REVERSE CROSSFALL BETWEEN TRAVEL LANES
NTS

LEGEND

NOTES

1. MID TO HIGH ORDER PROPERTY ACCESS FOR TYPICAL PROPERTY TYPES AS FOLLOWS (BUT NOT LIMITED TO):
   1.1. RESIDENTIAL DEVELOPMENT
   1.2. SMALL SHOPPING CENTER
   1.3. TEACHING INSTITUTION
   1.4. INDUSTRIAL DEVELOPMENT
2. TURNING RADII ARE INDICATIVE ONLY AND SHOULD SUIT THE TURNING CIRCLE OF THE REQUIRED DESIGN VEHICLE.
3. THE PAVEMENT STRUCTURE IS TO SUIT ANTICIPATED TRAFFIC LOADING.
4. ROAD MARKINGS TO SUIT APPLICATION ON SITE.
5. THE MINIMUM LONGITUDINAL GRADE IN THE ACCESS LANE TO BE 0.5%.

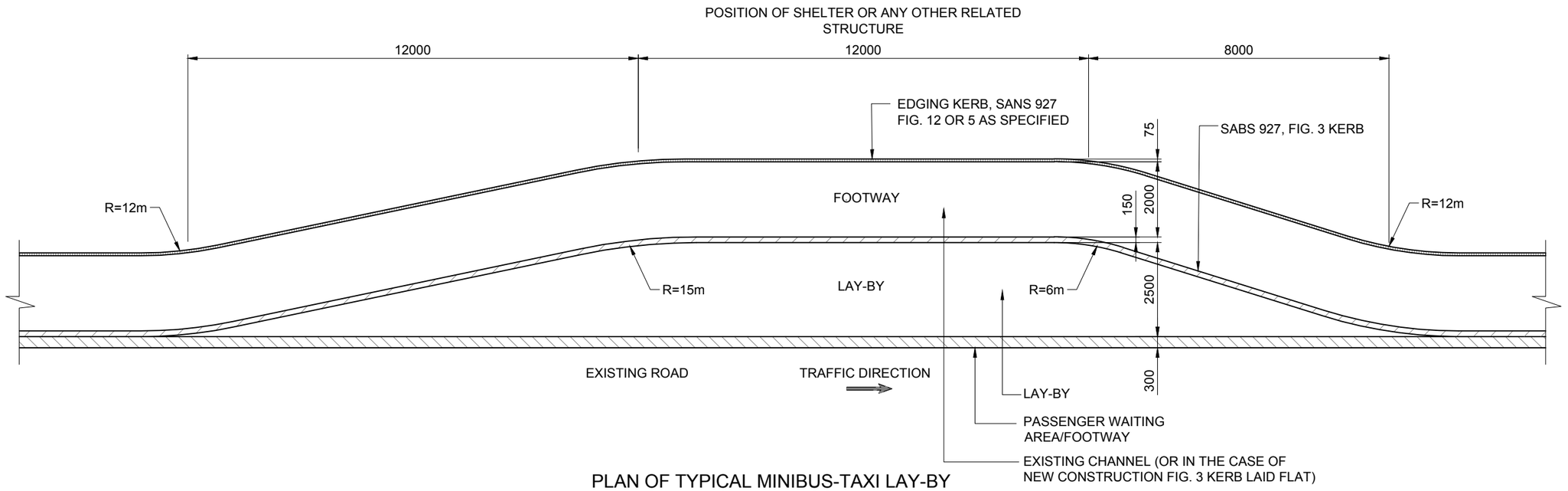
AMENDMENTS			
No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

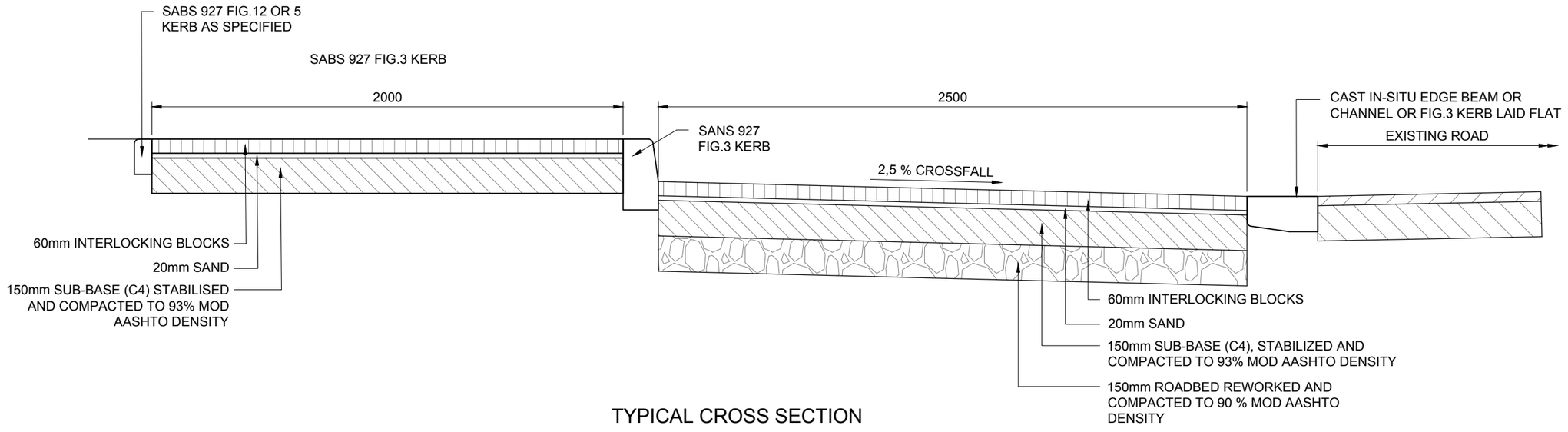
CITY OF JOHANNESBURG
JOHANNESBURG ROADS AGENCY (PTY) LTD
Drawing Sub-set: ROADS: DESIGN

MID TO HIGH ORDER PROPERTY ACCESS

SCALE AS SHOWN: NTS
DATE: 07/01/2015
DRAWING NUMBER: JRA-SD RD-031
EXTN.
AMENDMENT NUMBER:



PLAN OF TYPICAL MINIBUS-TAXI LAY-BY



TYPICAL CROSS SECTION

LEGEND

- 60mm INTERLOCKING BLOCK PAVING
- PROPOSED KERB
- EXISTING CHANNEL

NOTES

1. SHOULD NO CHANNEL EXIST A SANS 927 FIGURE 3 KERB SHALL BE LAID ON IT'S BACK TO FORM THE CHANNEL.
2. NO KERB INLET ALLOWED WITHIN LAY-BY.
3. WHERE FIGURE 3 KERBING IS TO BE USED, 1m LENGTHS WILL BE REQUIRED ON STRAIGHT PORTIONS AND 0,3m LENGTHS ON TRANSITIONAL CURVES WITH RADII < 15m.
4. SUBJECT TO FORMALISATION OF MINI-BUS ROUTES TACTILE PAVING, A SHELTER AND MINI-BUS STOP SIGN R326 MAY BE PROVIDED IN THE MANNER SHOWN ON JRA-SD-RD-041.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

TYPICAL MINIBUS-TAXI LAY-BY

SCALE AS SHOWN: NTS

DATE: 27/11/2014

DRAWING NUMBER: JRA-SD RD-040

EXTN.

AMENDMENT NUMBER:

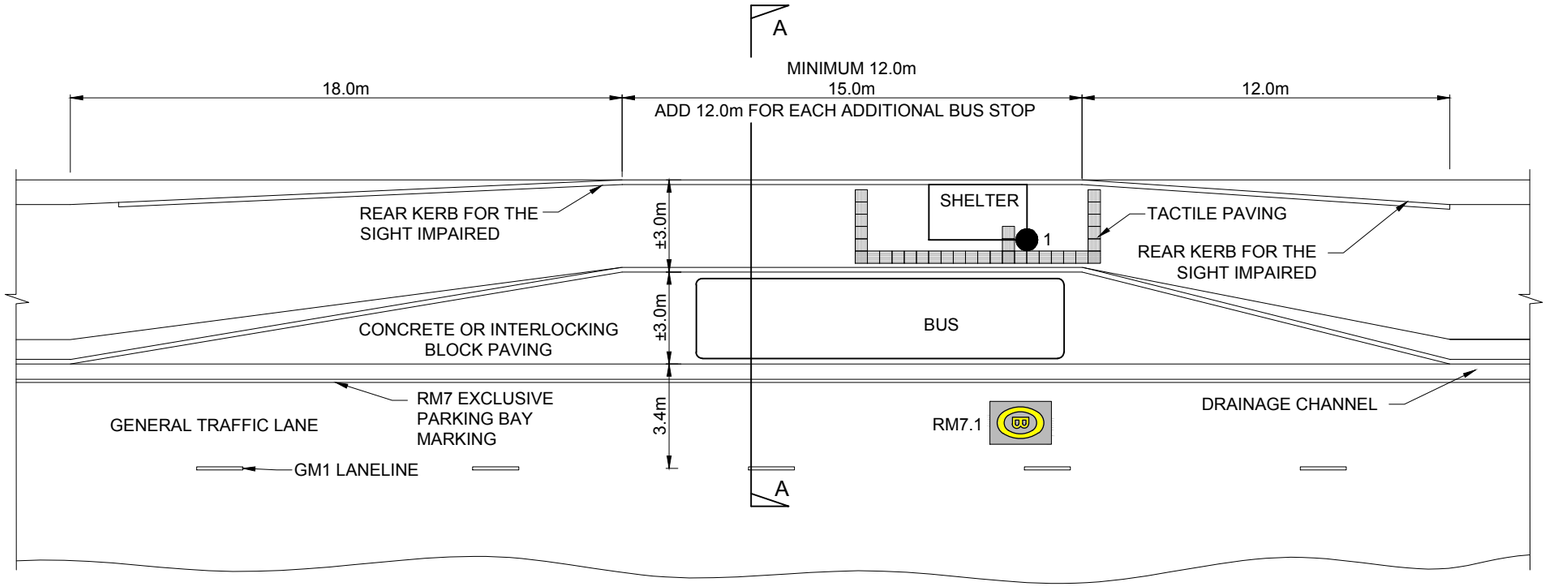
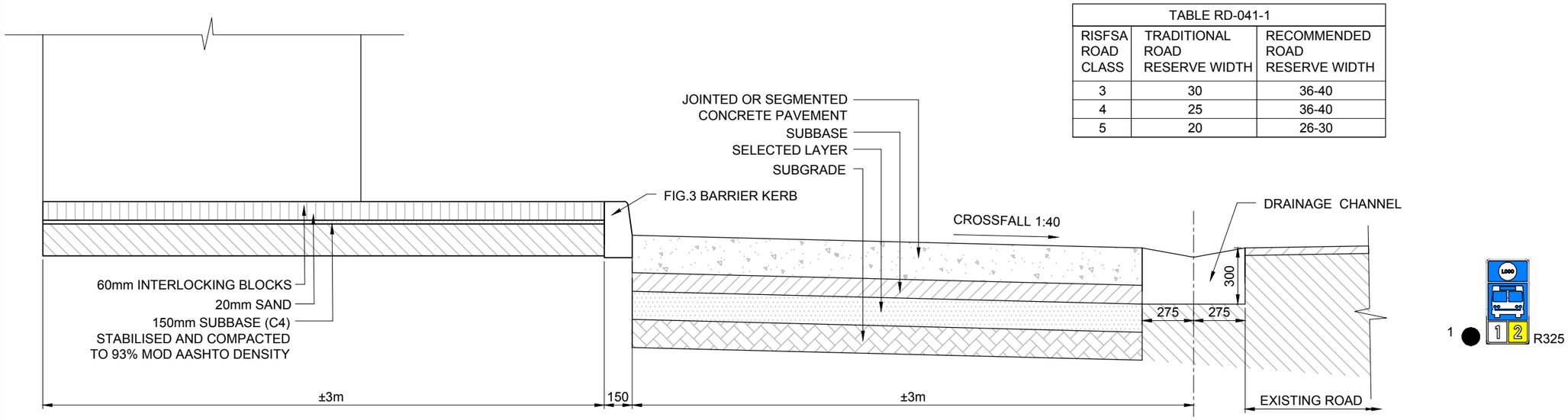


TABLE RD-041-1		
RISFSA ROAD CLASS	TRADITIONAL ROAD RESERVE WIDTH	RECOMMENDED ROAD RESERVE WIDTH
3	30	36-40
4	25	36-40
5	20	26-30



CROSS SECTION A-A THROUGH SIDEWALK AND LAYBY

LEGEND

NOTES

1. THIS BUS LAYBY DETAIL IS APPROPRIATE FOR REA VAYA FEEDER SERVICES AND OTHER JOHANNESBURG BUS SERVICES OPERATING ON RISFSA CLASS 3, 4 OR 5 CATEGORY ROADS.
2. IN THE CONTEXT OF NMT PROVISION, HOWEVER, THE INSTALLATION OF A BUS SHELTER SEVERELY RESTRICTS THE SIDEWALK AVAILABLE TO PASSING PEDESTRIANS AND CYCLISTS. IT IS THEREFORE RECOMMENDED THAT IF A NEW RISFSA CLASS 3, 4 OR 5 CATEGORY ROAD IS BEING PLANNED FOR NMT AND PUBLIC TRANSPORT THE ROAD RESERVE WIDTHS SHOULD BE INCREASED. SEE TABLE RD041-1.
3. IF A BUS LAYBY IS REQUIRED FOR MULTIPLE STOPS THE LENGTH SHOULD BE INCREASED BY 15m PER STOP. BUS STOP SIGNS R325 SHOULD SHOW THE SERVICE PROVIDER LOGO ON THE SIGN AND ROUTES ON A SUPPLEMENTARY PLATE.
4. FOR FURTHER DETAILS ON THE DESIGN AND CONSTRUCTION OF BUS BAYS IN URBAN AREAS WITH JOINTED/SEGMENTED CONCRETE PAVEMENT REFER TO PCI ROAD NOTE 3.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

TYPICAL BUS LAYBY (RISFSA CLASS 3, 4 & 5 ROADS)

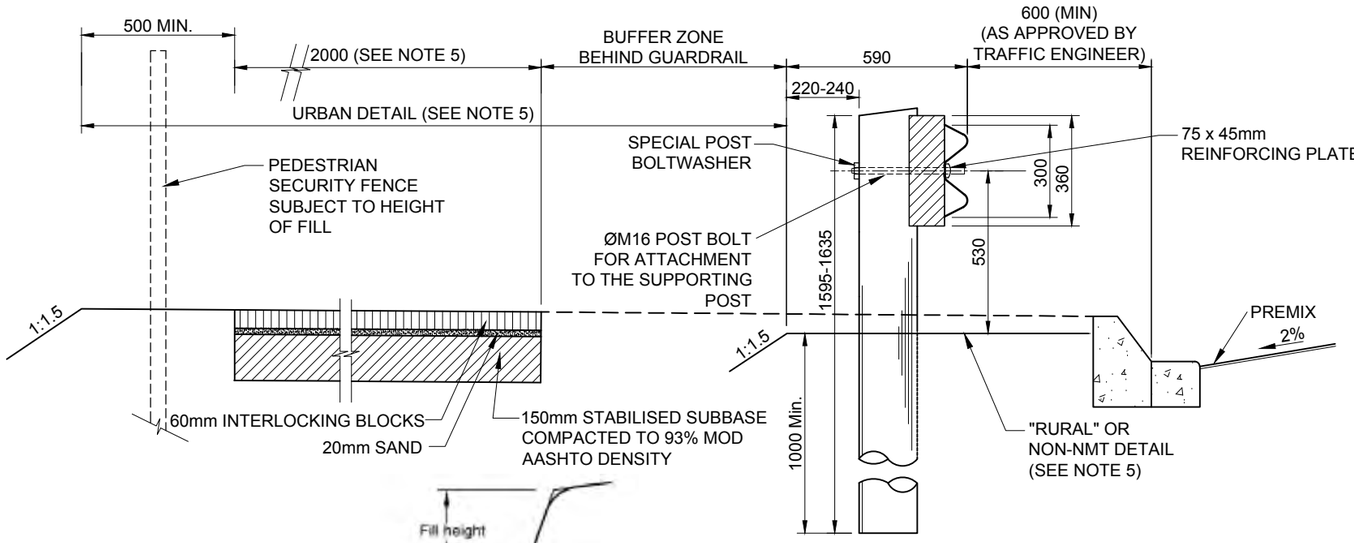
SCALE AS SHOWN: NTS

DATE:20/02/2015

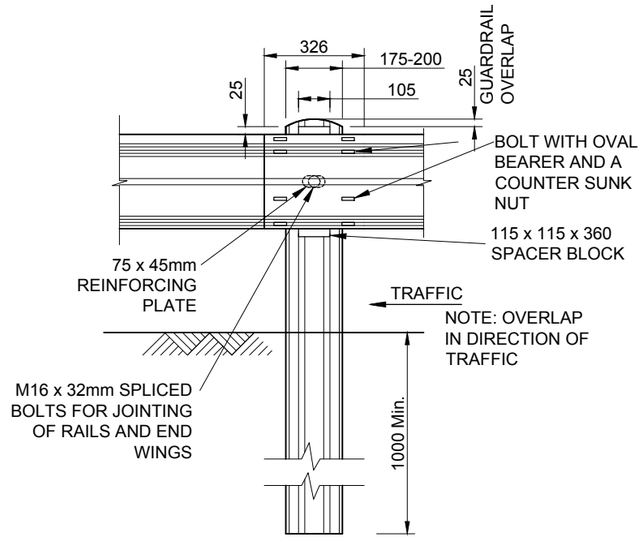
DRAWING NUMBER: JRA-SD RD-041

EXTN.

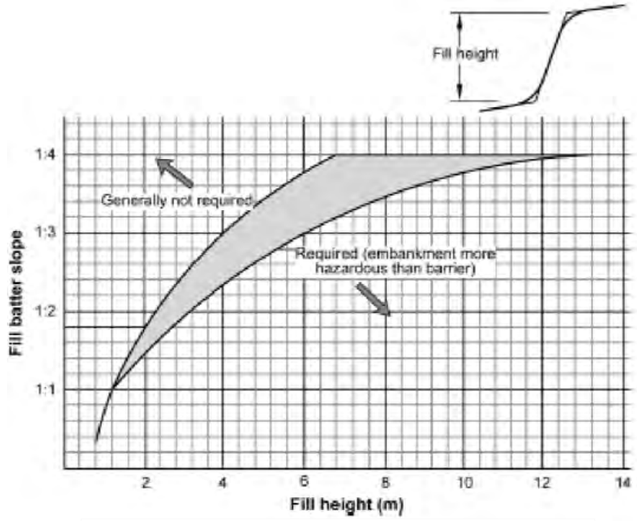
AMENDMENT NUMBER:



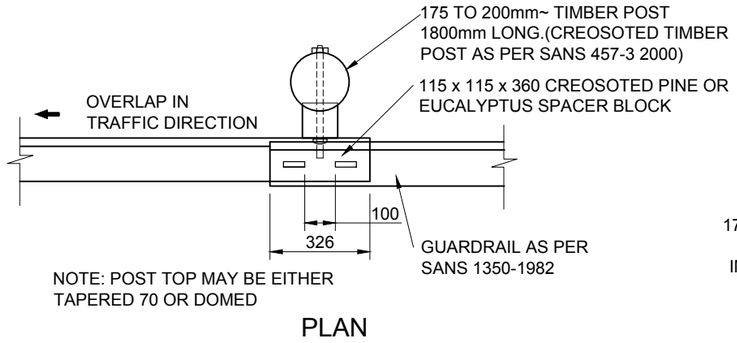
SIDE ELEVATION



FRONT ELEVATION OF OVERLAP

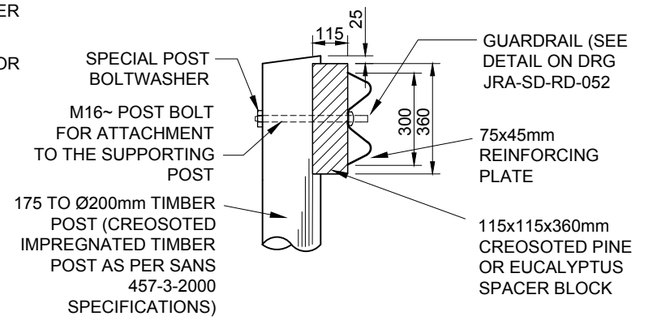


WARRANTS FOR USE OF ROADSIDE BARRIERS

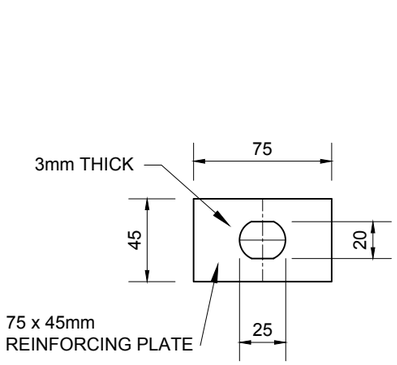


NOTE: POST TOP MAY BE EITHER TAPERED 70 OR DOMED

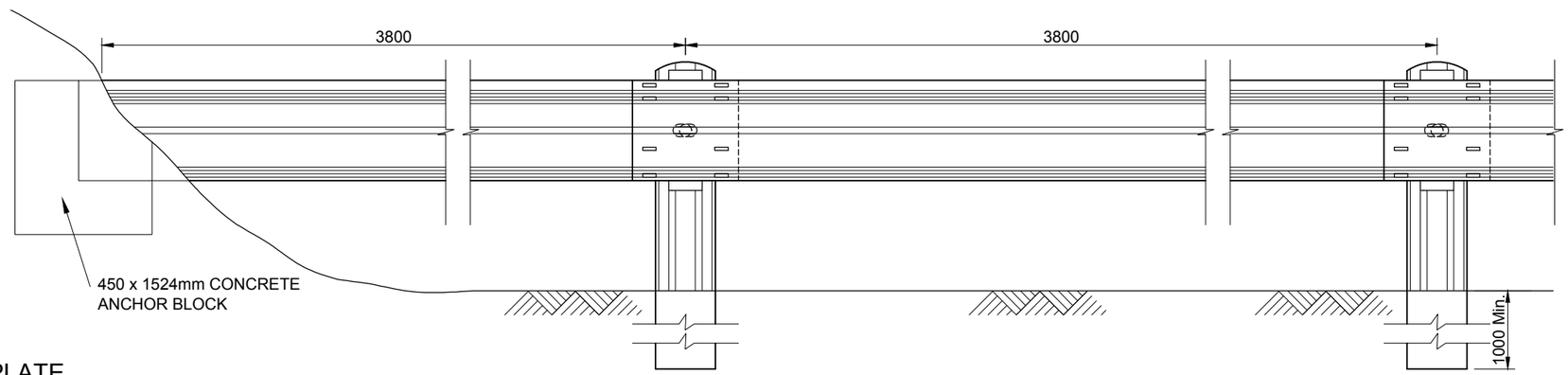
PLAN



DETAIL OF FIXING



75x45mm REINFORCING PLATE



PORTION OF GUARDRAIL ANCHORED IN WALL OF EXCAVATION OR SIDE OF FILLING

LEGEND

NOTES

1. GUARDRAILS ARE REQUIRED IN THE FOLLOWING CASES:
   - 1.1. WHERE WATER NEXT TO THE RD FORMATION IS DEEPER THAN 1,5m.
   - 1.2. AT ALL BRIDGES ON SIDE OF ROAD.
   - 1.3. ON THE OUTSIDE OF CURVES WITH RADII LESS THAN 300m WITHOUT RECOVERY AREAS.
   - 1.4. WHERE OBSTRUCTIONS ARE LESS THAN 1m FROM THE SHOULDER BREAKPOINT.
   - 1.5. WHERE AN OBSTRUCTION APPEARS TO BE MORE DANGEROUS THAN A GUARDRAIL WOULD BE.
   - 1.6. IN THE CASE OF EMBANKMENTS / FILLS, THE WARRANTS DIAGRAM WILL APPLY.
2. BEFORE GUARDRAILS ARE ERECTED APPROVAL MUST BE OBTAINED FROM THE EXECUTIVE DIRECTOR: ROADS AND STORMWATER.
3. SPECIFICATIONS:
   - 3.1. BOLT : HIGH TENSILE STEEL 16mm
   - 3.2. WASHER : STEEL SPRING 10mm THICK.
   - 3.3. CREOSOTE SHALL COMPLY WITH SANS 538 OR SANS 539.
   - 3.4. SPACERBLOCK : GUM OR PINE. TREATED WITH CREOSOTE ACCORDING TO ANY METHOD IN SANS 1999.
   - 3.5. POLE : 150mm TO 230mm GUM OR PINE TREATED WITH CREOSOTE ACCORDING TO ANY METHOD IN SANS 1999.
   - 3.6. ALL GUARDRAILS SHALL BE GALVANIZED AS SPECIFIED (NOT PAINTED).
   - 3.7. ALL STRUCTURAL STEEL, INCLUDING TUBES, SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF SANS 32/EN 10240 FOR TYPE A1 OR B1 ARTICLES AS APPLICABLE (OR LATEST).
4. ALSO REFER TO SECTION 611 OF THE STANDARD SPECIFICATION FOR MUNICIPAL CIVIL ENGINEERING WORKS, 3rd EDITION, 2005.
5. NMT FACILITIES SHALL BE PROVIDED IN TERMS OF RISFSA ROAD CLASSIFICATION (SEE RCS-010 AND RCS-011). IF A CYCLIST FACILITY IS "OFF-ROAD" SURFACING SHALL BE AN APPROPRIATE QUALITY PREMIX NOT INTERLOCKING BRICKS.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

GUARDRAILS - 1

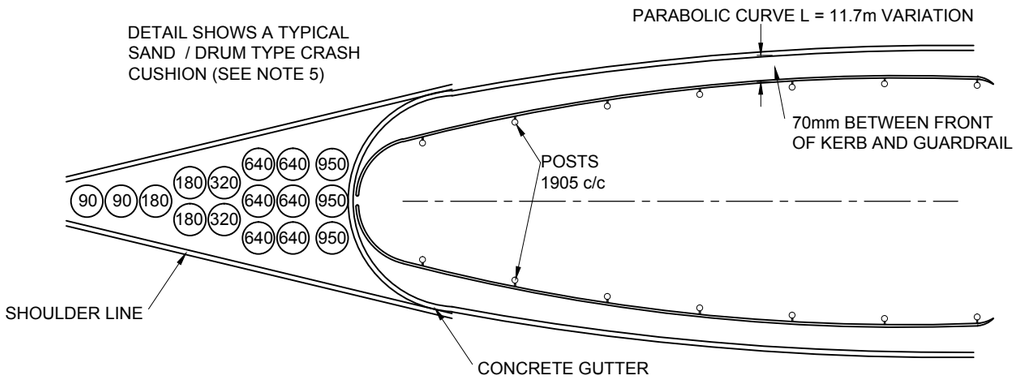
SCALE AS SHOWN: NTS

DATE: 08/12/2014

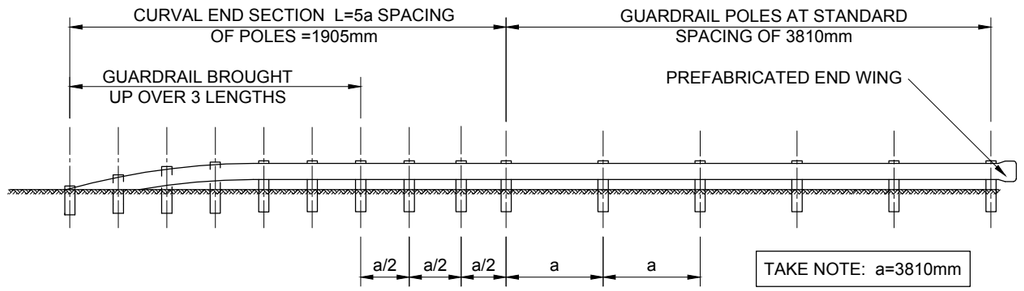
DRAWING NUMBER: JRA-SD RD-050

EXTN.

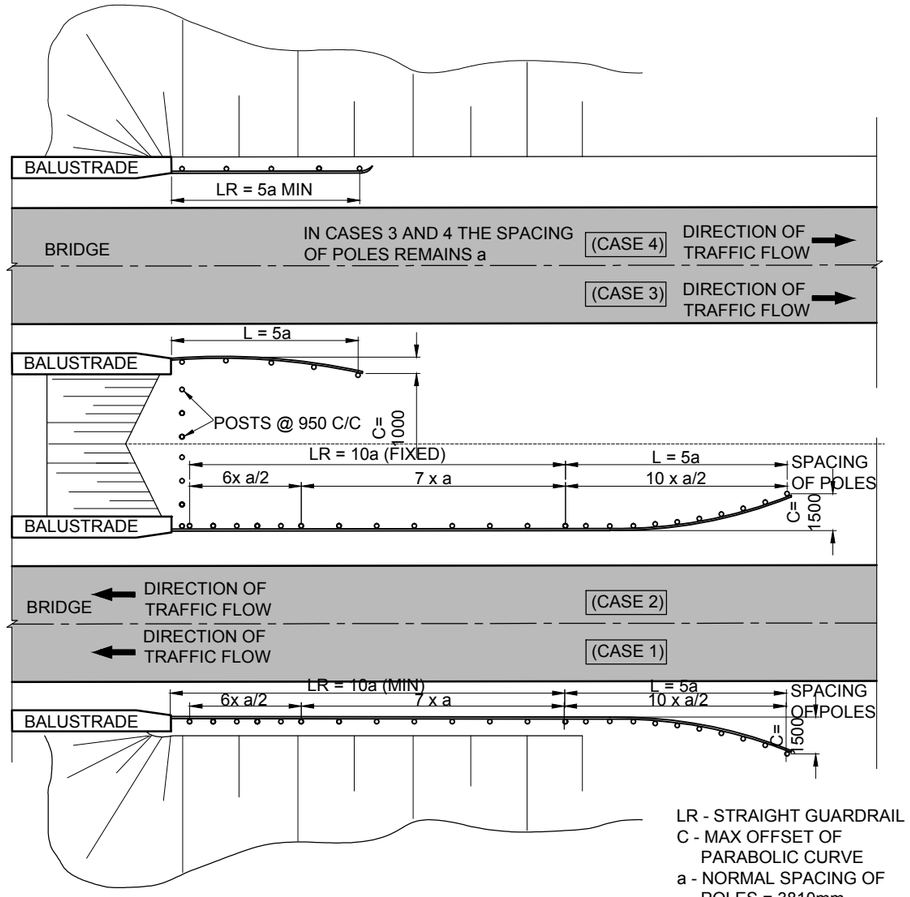
AMENDMENT NUMBER:



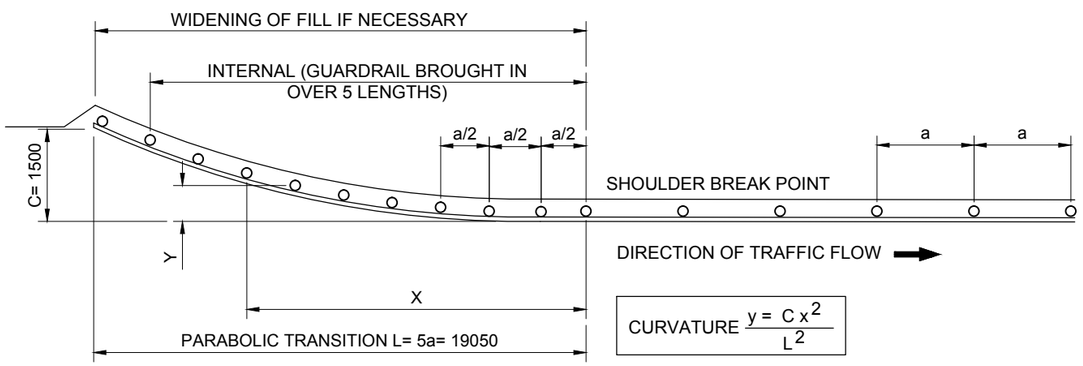
TYPICAL GUARDRAIL AT NOSE WITH CRASH CUSHION

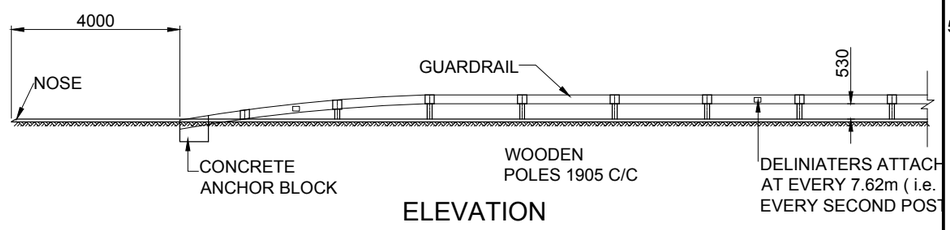


FRONT ELEVATION



LAYOUT PLAN
DETAIL OF MINIMUM GUARDRAIL LAYOUT AT STRUCTURES





ELEVATION

NOTES

1. GUARDRAILS ARE REQUIRED IN THE FOLLOWING CASES:
   - 1.1. WHERE WATER NEXT TO THE RD FORMATION IS DEEPER THAN 1,5m.
   - 1.2. AT ALL BRIDGES ON SIDE OF ROAD.
   - 1.3. ON THE OUTSIDE OF CURVES WITH RADII LESS THAN 300m WITHOUT RECOVERY AREAS.
   - 1.4. WHERE OBSTRUCTIONS ARE LESS THAN 1m FROM THE SHOULDER BREAKPOINT.
   - 1.5. WHERE AN OBSTRUCTION APPEARS TO BE MORE DANGEROUS THAN A GUARDRAIL WOULD BE.
   - 1.6. IN THE CASE OF EMBANKMENTS / FILLS, THE WARRANTS DIAGRAM WILL APPLY.
2. BEFORE GUARDRAILS ARE ERECTED APPROVAL MUST BE OBTAINED FROM THE EXECUTIVE DIRECTOR: ROADS AND STORMWATER.
3. SPECIFICATIONS:
   - 3.1. BOLT : HIGH TENSILE STEEL 16mm
   - 3.2. WASHER : STEEL SPRING 10mm THICK.
   - 3.3. SPACERBLOCK : GUM OR PINE. TREATED WITH CREOSOTE ACCORDING TO ANY METHOD IN SANS 10005-1999.
   - 3.4. POLE : 150mm TO 230mm GUM OR PINE TREATED WITH CREOSOTE ACCORDING TO ANY METHOD IN SANS 10005-1999.
   - 3.5. CREOSOTE SHALL COMPLY WITH THE PROVISIONS OF SANS 538 OR SANS 539.
   - 3.6. ALL GUARDRAILS SHALL BE GALVANIZED AS SPECIFIED (NOT PAINTED).
   - 3.7. ALL STRUCTURAL STEEL, INCLUDING TUBES, SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF SANS 32 / EN 10240 FOR TYPE A1 OR B1 ARTICLES AS APPLICABLE (OR LATEST).
4. ALSO REFER TO SECTION 611 OF THE STANDARD SPECIFICATION FOR MUNICIPAL CIVIL ENGINEERING WORKS, 3rd EDITION, 2005.
5. THE USE OF A CRASH CUSHION SHALL BE SUBJECT TO ENGINEERING ASSESSMENT AND DESIGN. SPECIFIC CUSHION TYPE SHOULD BE BASED ON JRA REQUIREMENTS.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

GUARDRAILS - 2

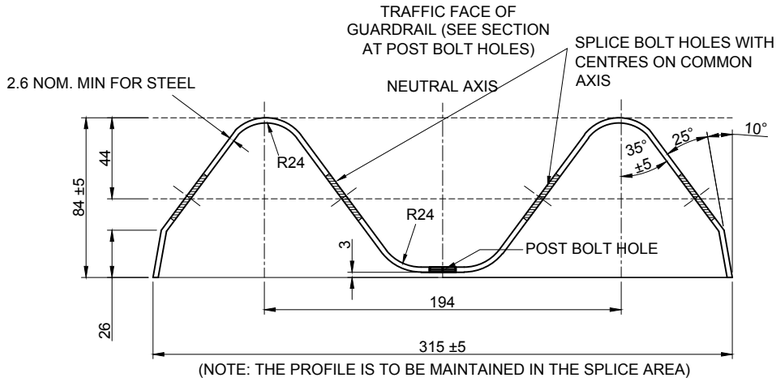
SCALE AS SHOWN: NTS

DATE: 06/01/2015

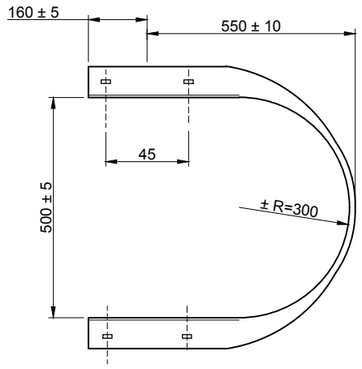
DRAWING NUMBER: JRA-SD RD-051

EXTN.

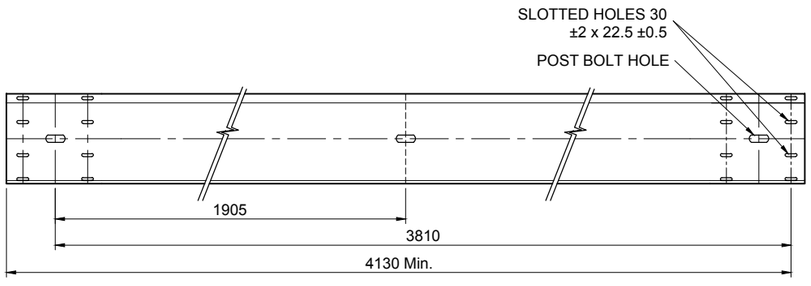
AMENDMENT NUMBER:



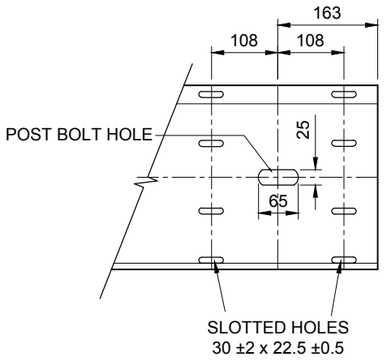
CROSS-SECTION OF GUARDRAIL

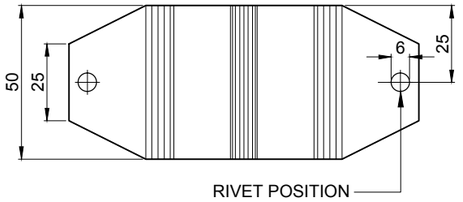


BULLNOSE ENDWING - PLAN

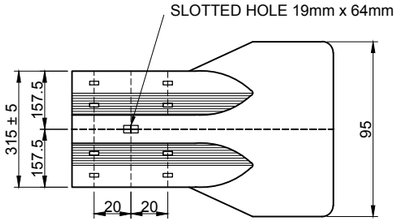


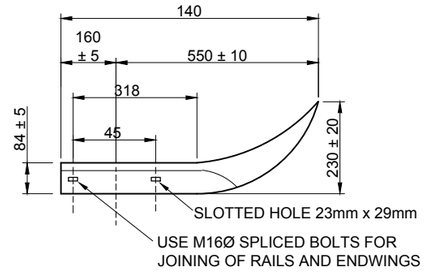
GUARDRAIL



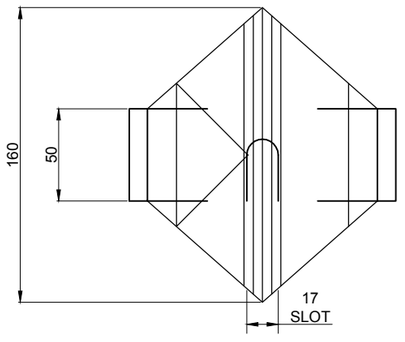


FRONT ELEVATION

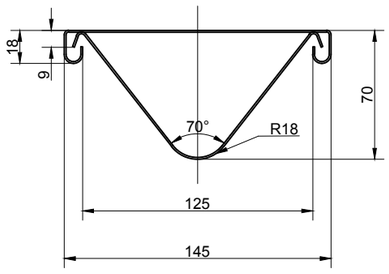




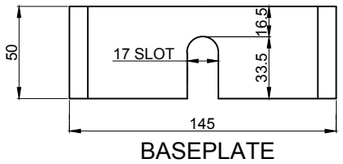
STANDARD TYPICAL FLARED ENDWING



FRONT ELEVATION



SECTIONAL PLAN
OF ASSEMBLY



BASEPLATE

GUARDRAIL DELINEATOR D1/TD1
(SEE SADC-RTSM VOL. 4, CH12, PAGE 12.6.1)

LEGEND

NOTES

1. GUARDRAILS ARE REQUIRED IN THE FOLLOWING CASES:
   - 1.1. WHERE WATER NEXT TO THE RD FORMATION IS DEEPER THAN 1,5m.
   - 1.2. AT ALL BRIDGES ON SIDE OF ROAD.
   - 1.3. ON THE OUTSIDE OF CURVES WITH RADII LESS THAN 300m WITHOUT RECOVERY AREAS.
   - 1.4. WHERE OBSTRUCTIONS ARE LESS THAN 1m FROM THE SHOULDER BREAKPOINT.
   - 1.5. WHERE AN OBSTRUCTION APPEARS TO BE MORE DANGEROUS THAN A GUARDRAIL WOULD BE.
   - 1.6. IN THE CASE OF EMBANKMENTS / FILLS, THE WARRANTS DIAGRAM WILL APPLY.
2. BEFORE GUARDRAILS ARE ERECTED APPROVAL MUST BE OBTAINED FROM THE EXECUTIVE DIRECTOR: ROADS AND STORMWATER.
3. SPECIFICATIONS:
   - 3.1. BOLT : HIGH TENSILE STEEL 16mm
   - 3.2. WASHER : STEEL SPRING 10mm THICK.
   - 3.3. SPACERBLOCK : GUM OR PINE. TREATED WITH CREOSOTE ACCORDING TO ANY METHOD IN SANS 1999.
   - 3.4. POLE : 150mm TO 230mm GUM OR PINE TREATED WITH CREOSOTE ACCORDING TO ANY METHOD IN SANS 1999.
   - 3.5. CREOSOTE SHALL COMPLY WITH THE PROVISIONS OF SANS 538 OR SANS 539.
   - 3.6. ALL GUARDRAILS SHALL BE GALVANIZED AS SPECIFIED (NOT PAINTED).
   - 3.7. ALL STRUCTURAL STEEL, INCLUDING TUBES, SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF SANS 32/EN 10240 FOR TYPE A1 OR B1 ARTICLES AS APPLICABLE (OR LATEST).
4. ALSO REFER TO SECTION 611 OF THE STANDARD SPECIFICATION FOR MUNICIPAL CIVIL ENGINEERING WORKS, 3rd EDITION, 2005.

AMENDMENTS			
No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

GUARDRAILS - 3

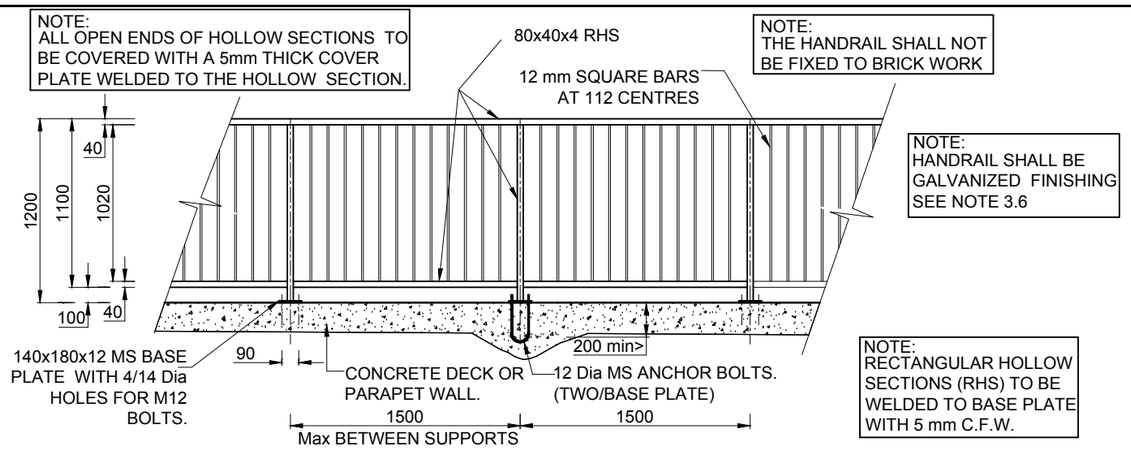
SCALE AS SHOWN: NTS

DATE: 07/01/2015

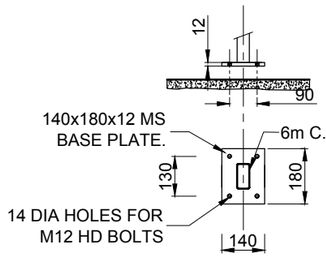
DRAWING NUMBER: JRA-SD RD-052

EXTN.

AMENDMENT NUMBER:



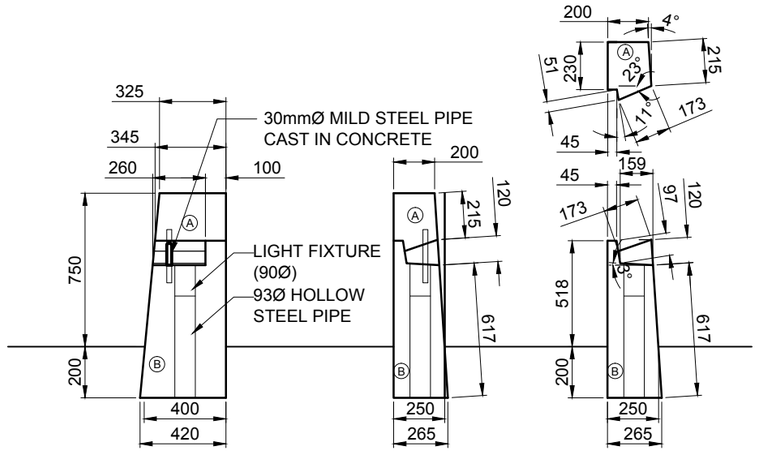
ELEVATION ON HANDRAIL/BALUSTRADE



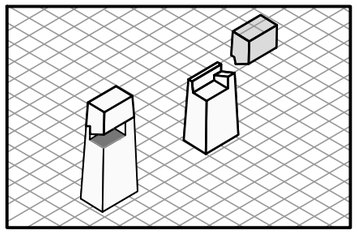
BASE PLATE DETAIL FOR STEEL HANDRAIL

HOLDING DOWN BOLTS.

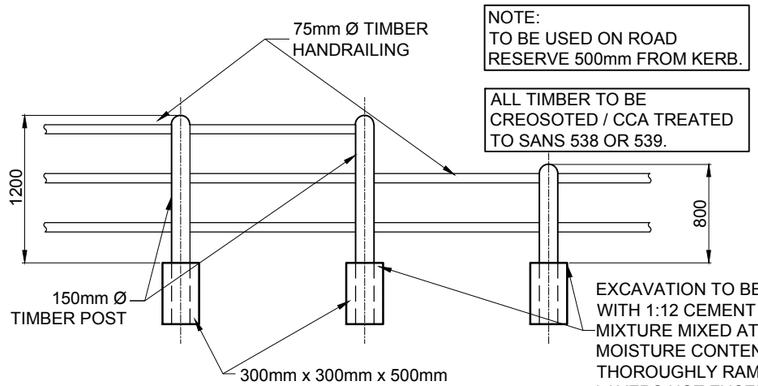
1. THE FOLLOWING SHALL APPLY TO HOLDING DOWN BOLTS:
   (i) BOLT AND WASHER PLATE MATERIAL SHALL BE GRADE 43 UNLESS OTHERWISE SPECIFIED.
   (ii) BOLTS SHALL BE KEPT IN POSITION WHILE CONCRETING BY MEANS OF A TEMPLATE.
   (iii) ROUND WASHERS TO BE USED UNDER NUTS SHALL BE OF SUFFICIENT SIZE TO PROVIDE ADEQUATE BEARING ON BASE PLATE.
   (iv) BOLT SHANKS SHALL BE DEGREASED BEFORE EMBEDDING IN CONCRETE.
   (v) HOLDING DOWN BOLTS SHALL BE SUPPLIED COMPLETE WITH NUTS AND WASHERS.
2. NOTE: IF HILTI, RAWLBOLTS OR A SIMILAR TYPE OF BOLT IS USED, EACH BOLT MUST BE ABLE TO RESIST A FORCE IN DIRECT TENSION OF NOT LESS THAN 10kN.



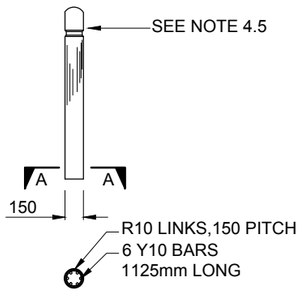
FRONT AND SIDE ELEVATION



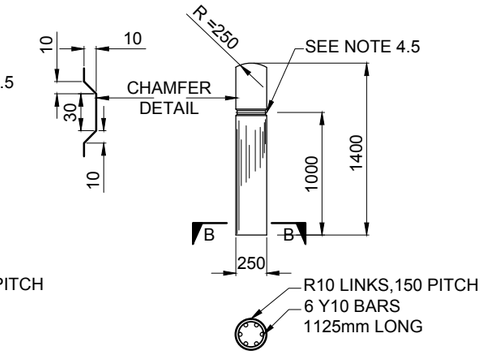
3D VIEW CONCRETE BOLLARD (EXPOSED AGGREGATE FINISH)



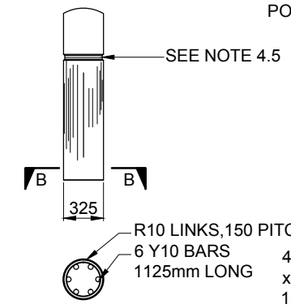
TYPICAL POST AND RAIL TIMBER BALUSTRADE



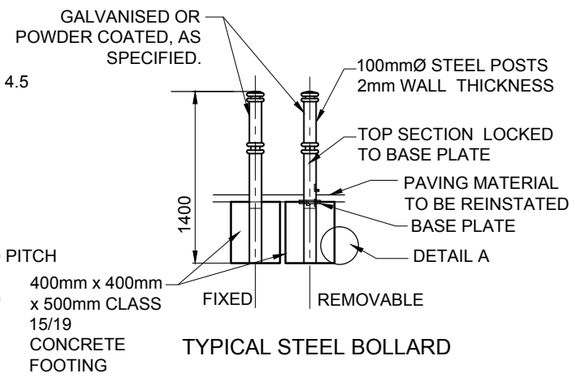
SECTION A-A
150 CONCRETE BOLLARD
(SMOOTH FINISH)



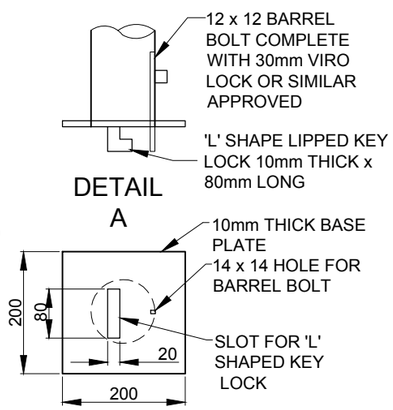
SECTION B-B
250 CONCRETE BOLLARD
(SMOOTH OR EXPOSED AGGREGATE FINISH)



SECTION C-C



TYPICAL STEEL BOLLARD



BASE PLATE DETAIL

LEGEND

NOTES

1. GENERAL:
1.1 ALL MATERIAL AND WORKMANSHIP MUST COMPLY WITH THE REQUIREMENTS OF THE LATEST RELEVANT SANS REQUIREMENTS.
1.2 ALL DIMENSIONS ARE IN MILLIMETERS. (UNLESS OTHERWISE SPECIFIED)
1.3 ALL DIMENSIONS MUST BE CHECKED AND APPROVED ON SITE.
2. REINFORCED CONCRETE:
2.1 REINFORCED CONCRETE WORK SHALL BE IN STRICT ACCORDANCE WITH SECTIONS 702, 703 AND 704 OF THE STANDARD SPECIFICATIONS FOR MUNICIPAL CIVIL ENGINEERING WORKS, 3rd EDITION, 2005.
2.2 CONCRETE COVER SHALL BE AS INDICATED ON THE DRAWINGS OR SPECIFICATIONS.
3. STRUCTURAL STEELWORK:
3.1 STRUCTURAL STEELWORK SHALL BE IN STRICT ACCORDANCE WITH SECTION 809 OF THE STANDARD SPECIFICATIONS FOR MUNICIPAL CIVIL ENGINEERING WORKS, 3rd EDITION, 2005.
3.2 STRUCTURAL STEEL SHALL BE GRADE 300W UNLESS OTHERWISE INDICATED OR SPECIFIED.
3.3 COLD FORMED SECTIONS SHALL BE MADE FROM COMMERCIAL QUALITY STEEL UNLESS OTHERWISE SPECIFIED.
3.4 HOLDING DOWN BOLTS SHALL BE OF THE GRADE SPECIFIED ON THE DRAWINGS.
3.5 PAINTING OF STRUCTURAL STEELWORK SHALL BE IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF SECTION 806 OF THE STANDARD SPECIFICATIONS FOR MUNICIPAL CIVIL ENGINEERING WORKS, 3rd EDITION, 2005.
3.6 ALL STRUCTURAL STEEL, INCLUDING TUBES, SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF SANS 121/ISO1461 AND SANS 32/EN10240 FOR TYPE A1 OR B1 ARTICLES AS APPLICABLE (OR LATEST).
4. CONCRETE BOLLARDS:
4.1 CONCRETE TYPE CLASS 30/19.
4.2. CONCRETE FINISH AS SPECIFIED ON DRAWINGS.
4.3. STEEL REINFORCEMENT TO BE 6Y10 BARS WITH R10 LINKS AT 150mm PITCH.
4.4. 20mm CONCRETE COVER TO REINFORCEMENT.
4.5. UNLESS OTHERWISE SPECIFIED, REFLECTIVE TAPE MUST BE FIXED IN THE RECESS TO ENHANCE VISIBILITY.
4.6. EXPOSED CONCRETE BACKFILL AROUND BOLLARD SPACE TO BE DETERMINED BY PAVING PROFILE.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

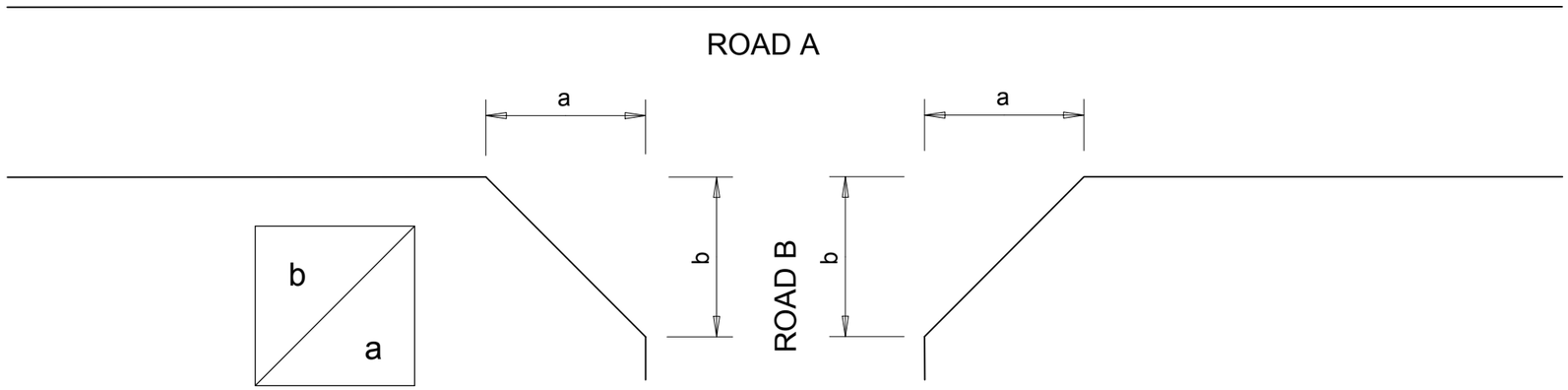
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

HANDRAILS/BALUSTRADE AND BOLLARDS

SCALE AS SHOWN: NTS	
DATE: 21/01/2015	
DRAWING NUMBER	EXTN.
JRA-SD RD-060	
AMENDMENT NUMBER:	



ROAD A \ ROAD B	RESERVE WIDTH	10m	13m	16m	20m	25m	32m	40m
	10m	5 / 5	5 / 5	5 / 5	5 / 5	- / -	- / -	- / -
	13m	5 / 5	5 / 5	5 / 5	5 / 5	5 / 15	- / -	- / -
	16m	5 / 5	5 / 5	5 / 5	5 / 5	5 / 15	5 / 15	5 / 20
	20m	5 / 5	5 / 5	5 / 5	5 / 5	5 / 15	5 / 15	5 / 20
	25m	- / -	15 / 5	15 / 5	15 / 5	15 / 15	15 / 15	15 / 20
	32m	- / -	- / -	15 / 5	15 / 5	15 / 15	15 / 15	15 / 20
	40m	- / -	- / -	20 / 5	20 / 5	20 / 15	20 / 15	20 / 20

LEGEND

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:

DRAWN BY:

STRUCTURAL DESIGN BY:

DRAWING CHECKED BY:

CHECKED BY:

DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

STANDARD SPLAYS

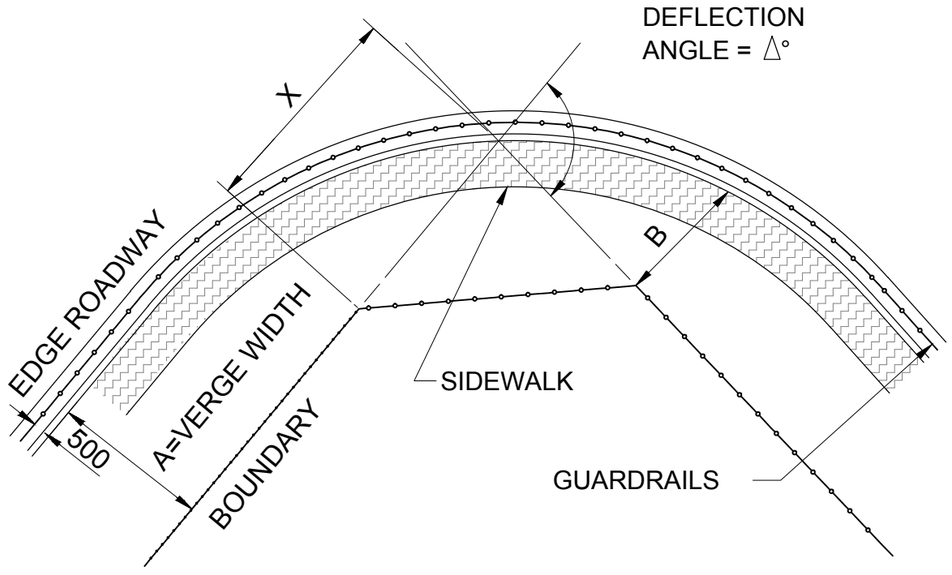
SCALE AS SHOWN: NTS

DATE: 27/11/2014

DRAWING NUMBER: JRA-SD RD-070

EXTN.

AMENDMENT NUMBER:



MINIMUM B = 3.5 EXCEPT AT INTERSECTIONS

$$"X" = (R\text{-}A)\ TAN\ -\ \frac{\triangle^{\circ}}{2}\ \sqrt{(R\text{-}B)\ -\ (R\text{-}A)}$$

TABLE OF SPLAY DIMENSIONS "X"

R	A	B = 4 △°								B = 3.5 △°							
		90	80	70	60	50	40	30	20	90	80	70	60	50	40	30	20
20	4.0	16	13	11	9	7				12	9	7					
	4.5	12	9	7						10	7						
	5.0	9	7							8							
30	4.0	26	22	18	15	12	9	7		21	17	13	10				
	4.5	20	16	13	10	7				18	14	11	8				
	5.0	18	14	10	7					16	12	9					
50	4.0	46	39	32	27	21	17	12	8	39	32	25	20	15	10		
	4.5	38	31	25	20	14	10			36	29	22	17	12			
	5.0	35	28	22	16	11				33	26	20	14				
80	4.5	67	54	44	35	26	19	12			51	41	31	23	15		
	5.0	62	50	40	31	20	20	20			48	37	28	20			
100	4.5			57	45	35	25	16				53	41	31	21	12	
	5.0			53	41	30	21	12				50	38	27	18		
200	4.5						57	38	20						51	33	15
	5.0						51	32	14						47	28	10
300	4.5							62	35							62	28
	5.0							55	28							49	22

LEGEND

NOTES

1. WHEN CONSIDERING SPLAY REQUIREMENTS DESIGNERS SHOULD DETERMINE THE ULTIMATE SPATIAL NEEDS FOR THE PROVISION OF EFFECTIVE NMT FACILITIES.
2. REFER TO COMPLETE STREETS DETAILS IN THE CONTEXT OF RISFSA ROAD CLASSIFICATION REQUIREMENTS.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

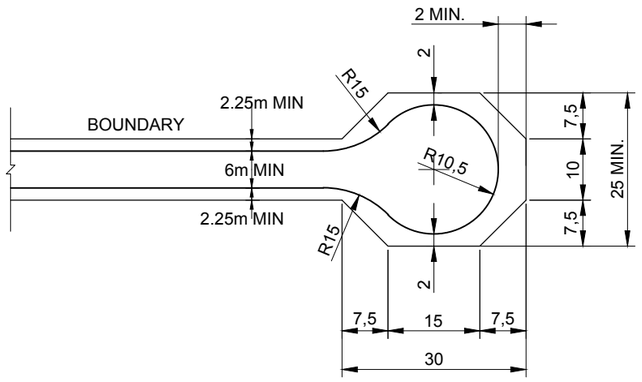
SPLAY DIMENSIONS AT CURVES

SCALE AS SHOWN: NTS

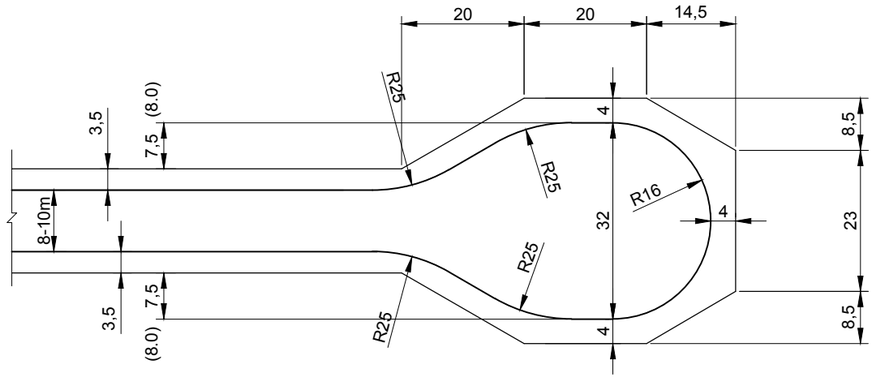
DATE: 27/11/2014

DRAWING NUMBER: JRA-SD RD-071 | EXTN.

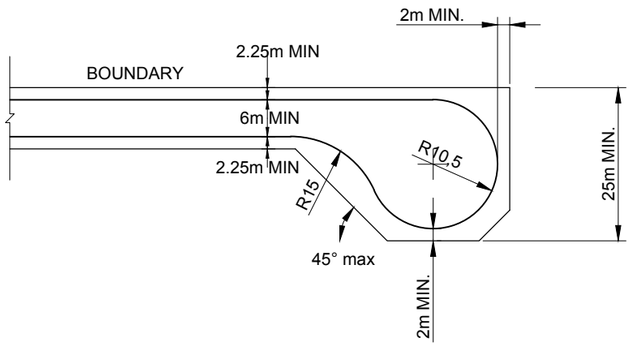
AMENDMENT NUMBER:



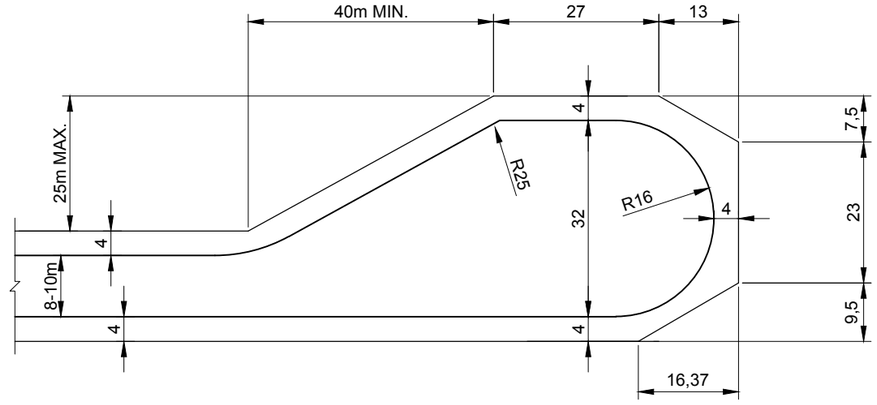
SYMMETRICAL TURNING CIRCLE



SYMMETRICAL TURNING CIRCLE



OFFSET TURNING CIRCLE
RESIDENTIAL AREAS
DETAIL - 080 -1



OFFSET TURNING CIRCLE
COMMERCIAL / INDUSTRIAL AREAS
DETAIL - 080 - 2

LEGEND

NOTES

RESIDENTIAL AREAS:

1. USE 25m RESERVES FOR SHORT CULS-DE-SAC.
2. "HAMMER HEAD" TURNING BAYS (T, Y OR L) ARE NOT FAVOURED AS THE REVERSING MANOEUVRE IS HAZARDOUS FOR TRUCKS, BUT THEIR USE IN CERTAIN CIRCUMSTANCES MAY BE PERMITTED (SEE JRA-SD-RD-081).
3. NO PARKING PERMITTED WITHIN THE TURNING CIRCLE.

COMMERCIAL / INDUSTRIAL AREAS:

1. OFFSET TURNING CIRCLE IS NORMALLY PREFERABLE.
2. DESIRABLE MAX. CROSSFALL ON SURFACE OF 4%.
3. TURNING CIRCLE (BETWEEN STRAIGHTS) TO HAVE BARRIER KERBS WITH 0.2m WIDE GUTTER.
4. ALL ROAD WORKS TO COMPLY WITH SANS 1200 SERIES.
5. AN ISLAND MAY BE CONSTRUCTED IN THE CIRCLE AND LANDSCAPED IF DESIRED. REFER TO JRA-SD-RD-081.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

STANDARD TURNING CIRCLES

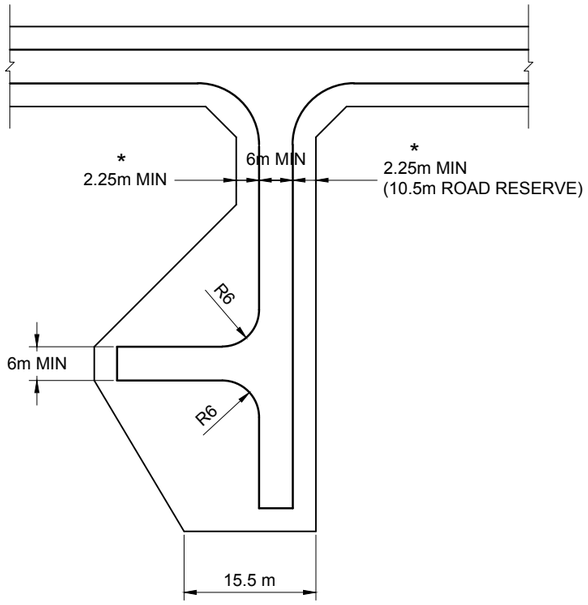
SCALE AS SHOWN: NTS

DATE: 27/11/2014

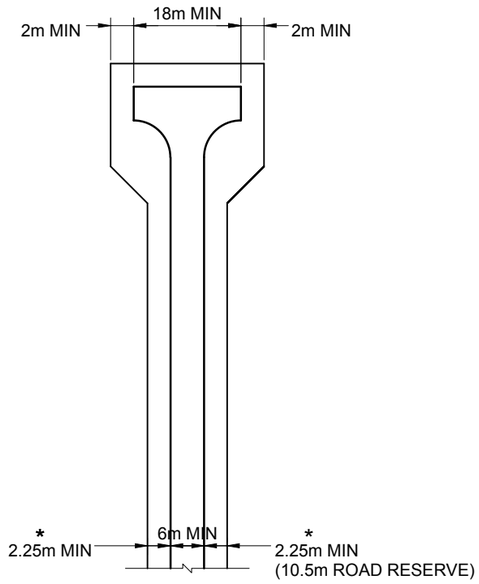
DRAWING NUMBER: JRA-SD RD-080

EXTN.

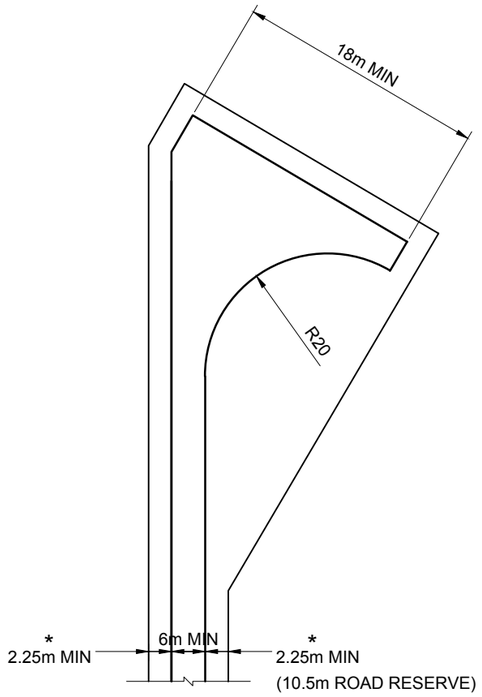
AMENDMENT NUMBER:



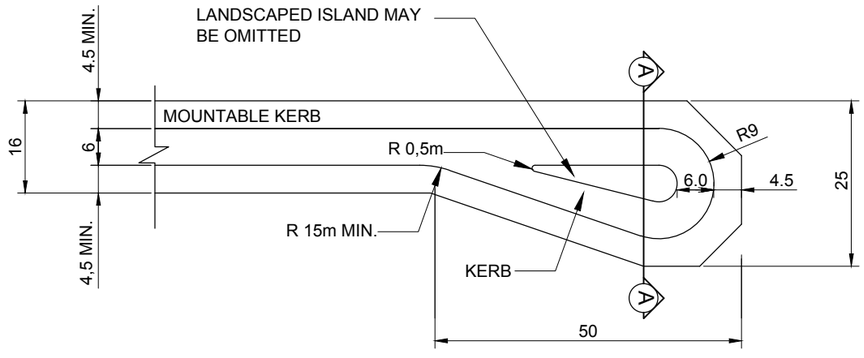
DETAIL - 081 - 1



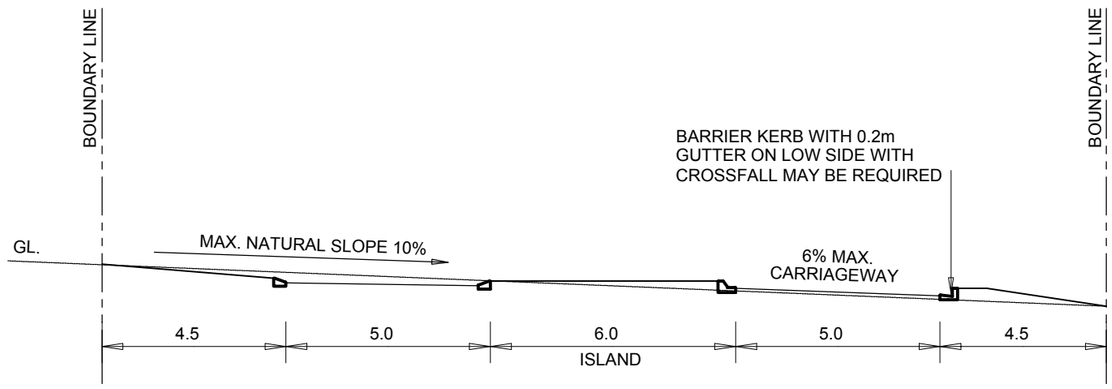
DETAIL - 081 - 2



DETAIL - 081 - 3



DETAIL - 081 - 4
PRFERRED OFFSET TURNING CIRCLE



CROSS SECTION A-A
THROUGH TURNING CIRCLE SHOWING
MAX. SLOPES WITH CROSSFALL

LEGEND

NOTES

1. MINIMUM OF 2m SIDEWALK MUST BE PROVIDED.
2. ALL ROAD WORKS TO COMPLY TO SANS 1200.
3. KERB TYPE 8C IS TO BE USED THROUGHOUT.
4. OFFSET TURNING IS PREFERABLE
5. DESIRABLE MAX. CROSS-FALL ON SURFACE 4%.
6. * DIMENSIONS VARY ACCORDING TO RESERVE WIDTH.
7. ALL ROAD DIMENSIONS ARE EDGE OF "BLACK TOP".
8. "HAMMER HEAD" TURNING BAYS (T, Y or L) ARE NOT FAVOURED AS THE REVERSING MANOEUVRE IS HARZARDOUS FOR TRUCKS, BUT THEIR USE IN CERTAIN CIRCUMSTANCES MAY BE PERMITTED.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

HAMMER HEAD TURNING CIRCLES

SCALE AS SHOWN: NTS

DATE: 27/11/2014

DRAWING NUMBER: JRA-SD RD-081

EXTN.

AMENDMENT NUMBER:

NOTES

A. GENERAL

1. Any application deviating from these standards will be subject to approval by the Johannesburg Roads Agency.
2. Professional Investigations required to accompany application for road closures for safety and security purposes:
   (i) Traffic Impact Study addressing the effect on all adjoining primary and secondary roads.
   (ii) Drainage investigation required if any permanent structure affects the existing roadway width.
   (iii) Engineering design for road layout if roadway is restricted by centre island for gate support.
3. After approval for the road closures for safety and security purposes has been granted,application must be made for a wayleave to be issued by the Johannesburg Roads Agency, prior to proceeding with the installation of the various structures.

   NO WORK SHALL BE UNDERTAKEN WITHOUT AN APPROVED WAYLEAVE (SEE VOLUME I CODE OF PROCEDURE).

B. STANDARD REQUIREMENTS CLOSURE TYPE 1: ACCESS CONTROL, ENTRY INTO SECURE AREA

1. All access gates shall be manned. No remote access control shall be erected.
2. Gateway:
   a. Distance from intersecting road.
      (i) Distance to be determined by Traffic Impact Study.
      (ii) Minimum 10m.
   b. Width of throughway :
      (i) Roadway less than 7.4m (See Detail 1 - JRA-SD-RD-091).
         (1) Minimum - width of roadway.
         (2) Permanent structure to be outside roadway behind the kerbline.
      (ii) Roadway width greater than 7.4m (See Detail 2 - JRA-SD-RD-091).
         (1) Minimum road reserve10.5m
         (2) Centre support for boom to be provided and subject to special application. Engineering design will be required(See 2(iii) above).
3. Barrier :
   The barrier shall be constructed of steel pallisade or other approved material to a maximum height of 2.4m. Barbed or razor wire shall not be used.

4. Pedestrian access:
   Applications must ensure that pedestrian, bicycle and wheelchair access is available at all times. The access configuration shall also be disabled user friendly, BUT shall require cyclists to dismount through the access.

C. STANDARD REQUIREMENTS CLOSURE TYPE 2a, 2b AND 3: PERMANENTLY CLOSED GATE OR PERIOD CLOSURE

1. A gateway with closing leaves shall be provided in all cases. No permanent structure shall be erected within the roadway save the provisions of (4) below.
2. Locking may only be done by using a chain and padlock. The gates may be kept in position by a solid bolt.
3. The gates are to open towards the inside of the closed area unless otherwise detailed on application.
4. Closure Type 1, gateway, barrier and pedestrian access requirements and dimensions shall apply.

D. ROAD SIGNS AND OTHER SIGNS

1. No advertising shall be allowed.
2. All road signs shall be subject to the conditions of the SADC Road Traffic Signs Manual.
3. Description of Information Type Sign:

   All materials to comply with SANS 1519 standards.

Border radius:	57mm
Border colour:	Black semi-matt
Border width:	14mm
Panel background:	Yellow class: Retroreflective - Class 1
Text Mod:	Text-B Mod
Text height:	100mm
Text colour:	Black semi-matt
Distance from left edge:	42mm min
Distance between text:	42mm

4. Mounting position and height of prohibition and warning signs:
   a. The distance from the ground level to the bottom of sign must be between 1.8m and 2.1m.
   b. The distance from the back of kerb must be between 0.3m and 0.5m.
   c. The applicant shall ensure that signs are located in positions according to the recommended guidelines and are visible to the travelling public taking note of obstructions on the road edge.

LEGEND

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

CONTROLLED ACCESS FOR SECURITY PURPOSES

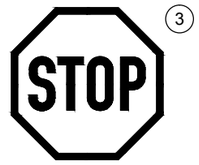
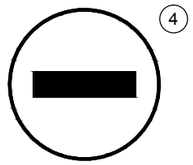
SCALE AS SHOWN: NTS

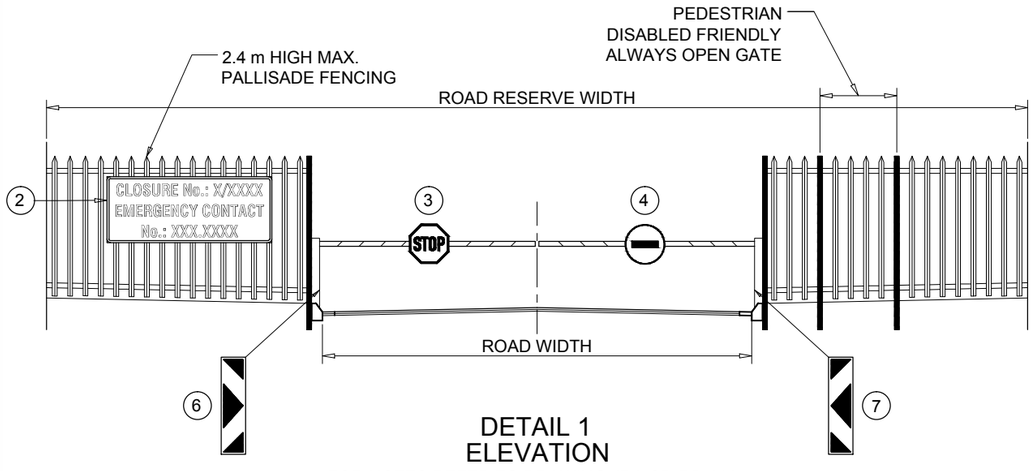
DATE: 07/01/2015

DRAWING NUMBER: JRA-SD RD-090

EXTN.

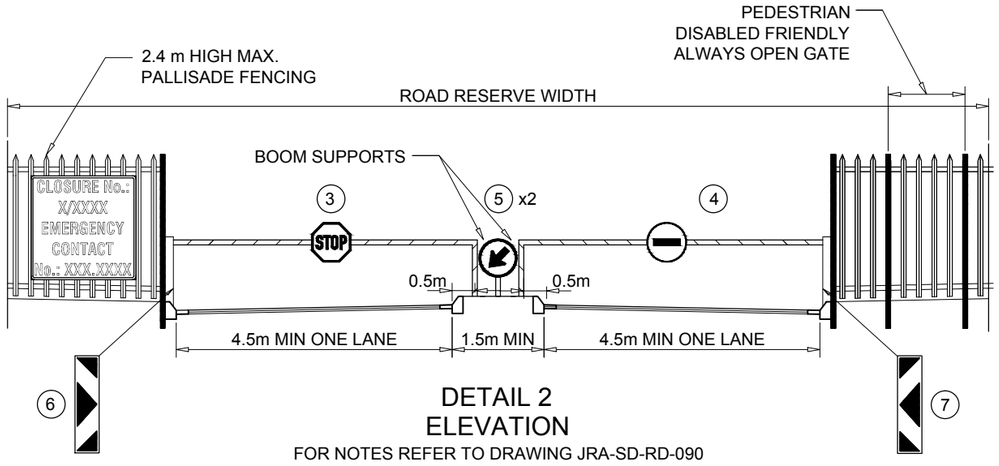
AMENDMENT NUMBER:

FROM/DISTANCE / SIGN DESCRIPTION	1	2	3	4	DETAIL 2 5
					
WC TYPE (1400 x 1000)			R1 (600)	R3 (600)	R103 (600) TO BE PLACED
X/10m - 15m		TO BE PLACED ON OUTSIDE OF PALLISADE FENCE	(900 AT ROAD JUNCTION)	TO BE PLACED BEHIND R1	EACH END OF ISLAND



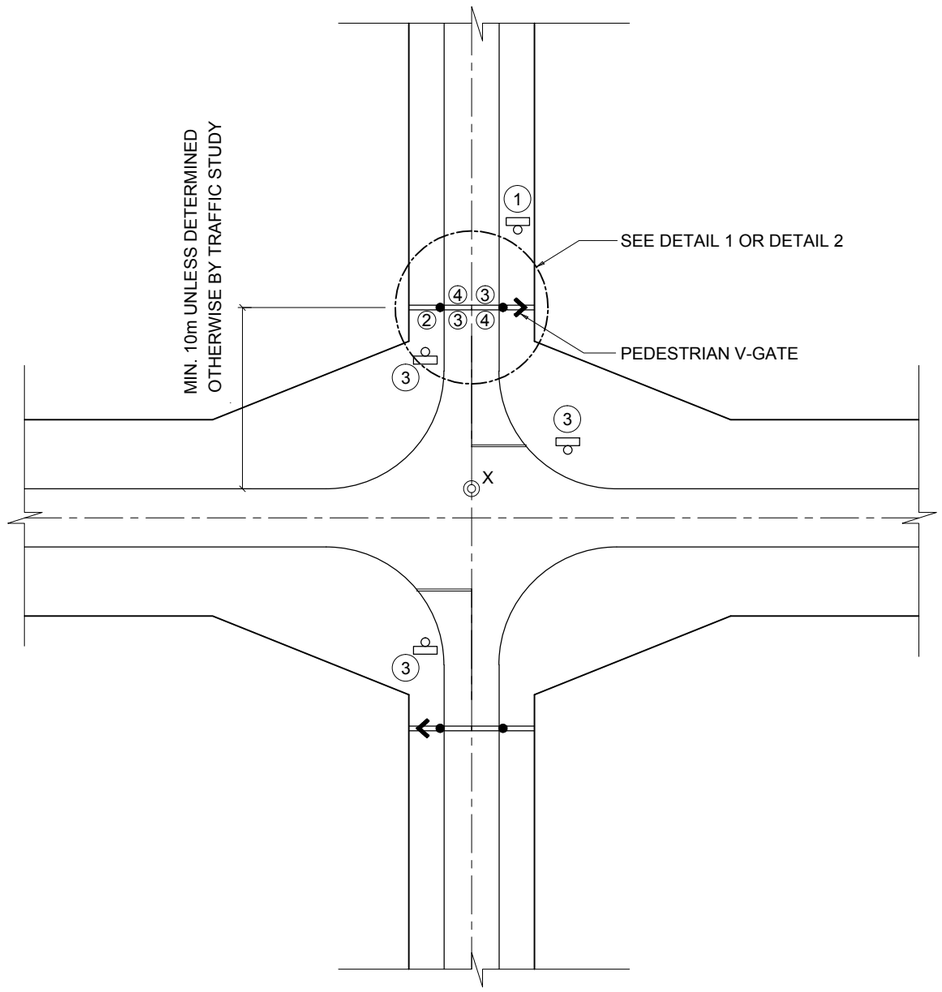
DETAIL 1
ELEVATION

FOR NOTES REFER TO DRAWING JRA-SD-RD-090



DETAIL 2
ELEVATION

FOR NOTES REFER TO DRAWING JRA-SD-RD-090



FROM/DISTANCE	TO BE PLACED ON BOTH SIDES OF BOOM SUPPORT	TO BE PLACED ON BOTH SIDES OF BOOM SUPPORT
	W401 (600 x 150)	W402 (600 x 150)
	6 	7 

LEGEND

NOTES

1. ALL BOOMS TO BE WRAPPED IN ALTERNATING RED AND WHITE CLASS 1 RETRO-REFLECTIVE MATERIAL.
2. ALL SIGNS AND BOOMS TO BE MAINTAINED IN EFFECTIVE VISIBLE CONDITION FOR NIGHT-TIME USE.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

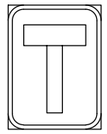
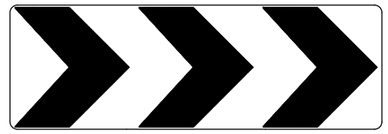
CITY OF JOHANNESBURG

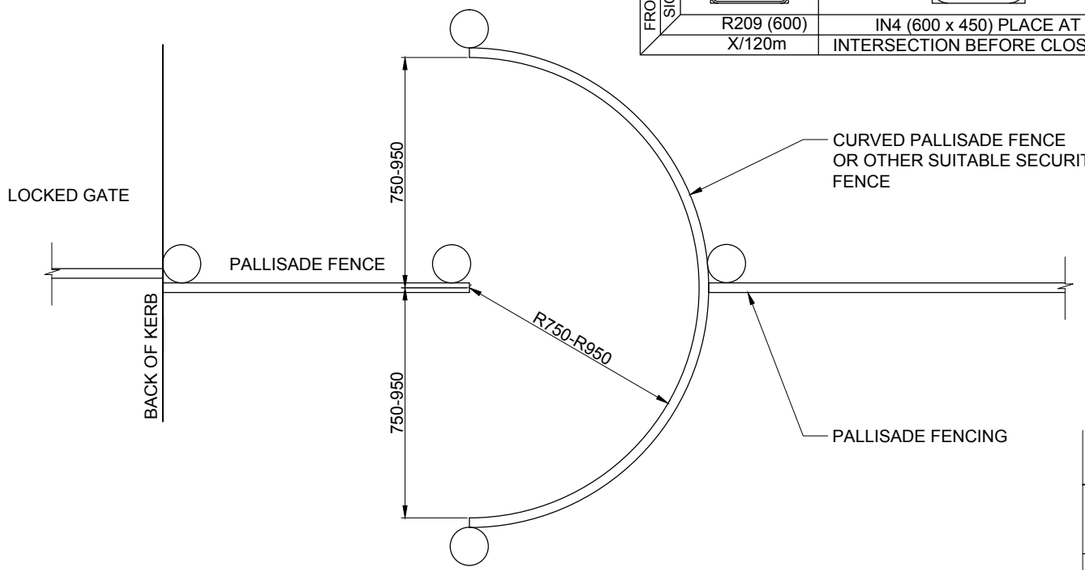
JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

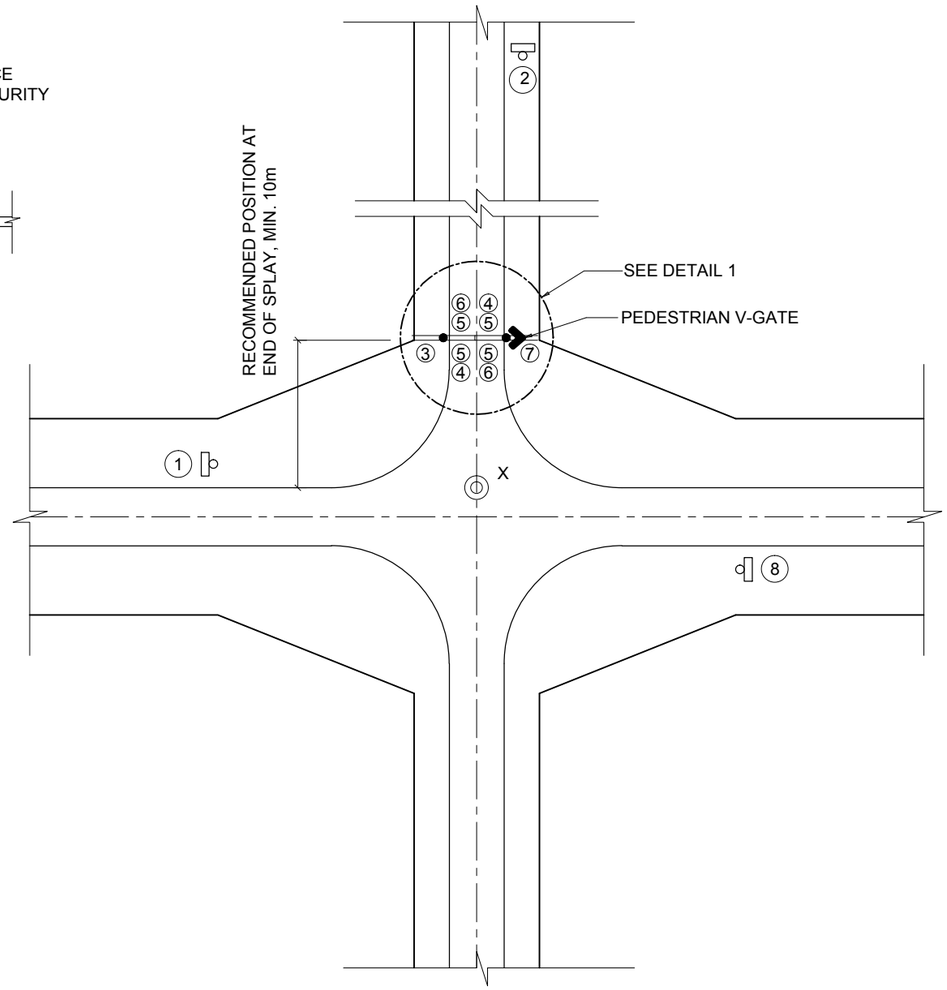
ENCLOSED AREA: TYPE 1 ACCESS DETAIL

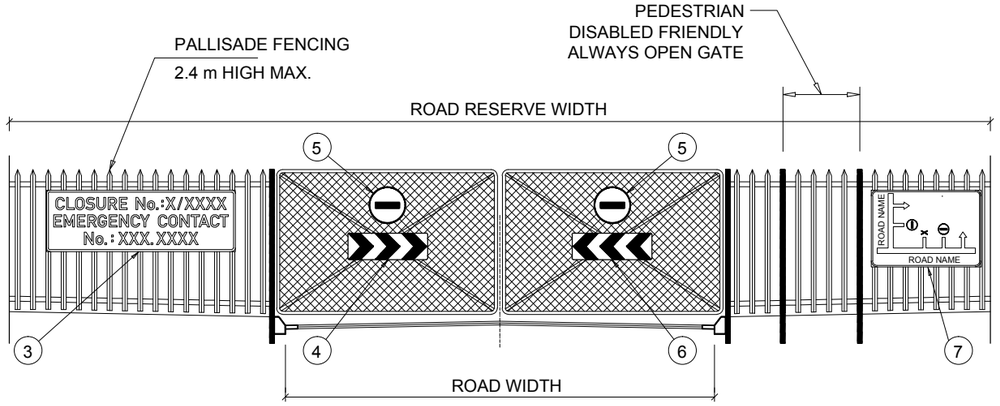
SCALE AS SHOWN: NTS	
DATE: 07/01/2015	
DRAWING NUMBER	EXTN.
JRA-SD RD-091	
AMENDMENT NUMBER:	

FROM/DISTANCE SIGN DESCRIPTION	1	2	3	4
				
R209 (600)	IN4 (600 x 450) PLACE AT			W407 (1350 x 450)
X/120m	INTERSECTION BEFORE CLOSURE		TO BE PLACED ON OUTSIDE OF PALLISADE FENCE	TO BE PLACED ON BOTH SIDES OF GATE



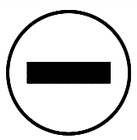
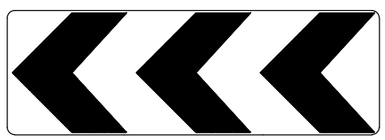
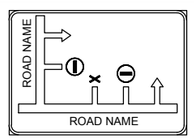
DETAIL OF PEDESTRIAN /WHEELCHAIR FRIENDLY CRITERIA





DETAIL 1
ELEVATION

FOR NOTES REFER TO DRAWING JRA-SD-RD-090

FROM/DISTANCE SIGN DESCRIPTION	5	6	7	8
				
TO BE PLACED ON BOTH SIDES OF GATE - R3 (600)		TO BE PLACED ON BOTH SIDES OF GATE W408 (1350 x 450)	TO BE PLACED ON OUTSIDE OF PALLISADE FENCE	X/120m R210 (600)

LEGEND

NOTES

1. THE SALIENT CRITERIA FOR A PEDESTRIAN/WHEELCHAIR FRIENDLY OPENING IN A PALISADE FENCE ARE ILLUSTRATED OPPOSITE. SPECIFIC MATERIALS ARE NOT GIVEN TO TO ALLOW SOME FREEDOM IN DESIGN AND AESTHETICS.
2. APPLICANTS FOR AREA CLOSURE SHOULD SUBMIT SPECIFIC DETAILS WITH THEIR APPLICATION.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

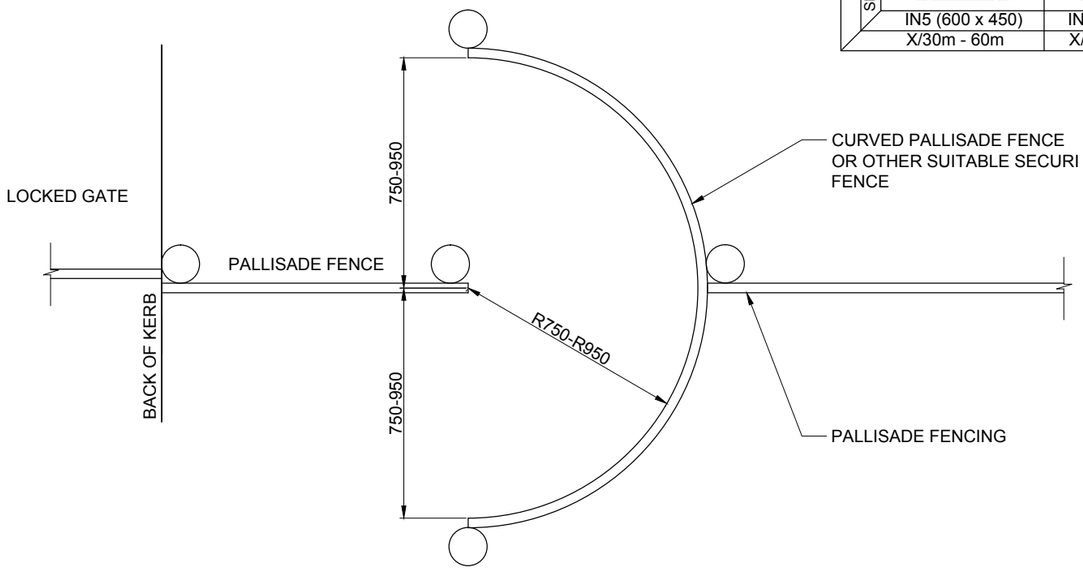
JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

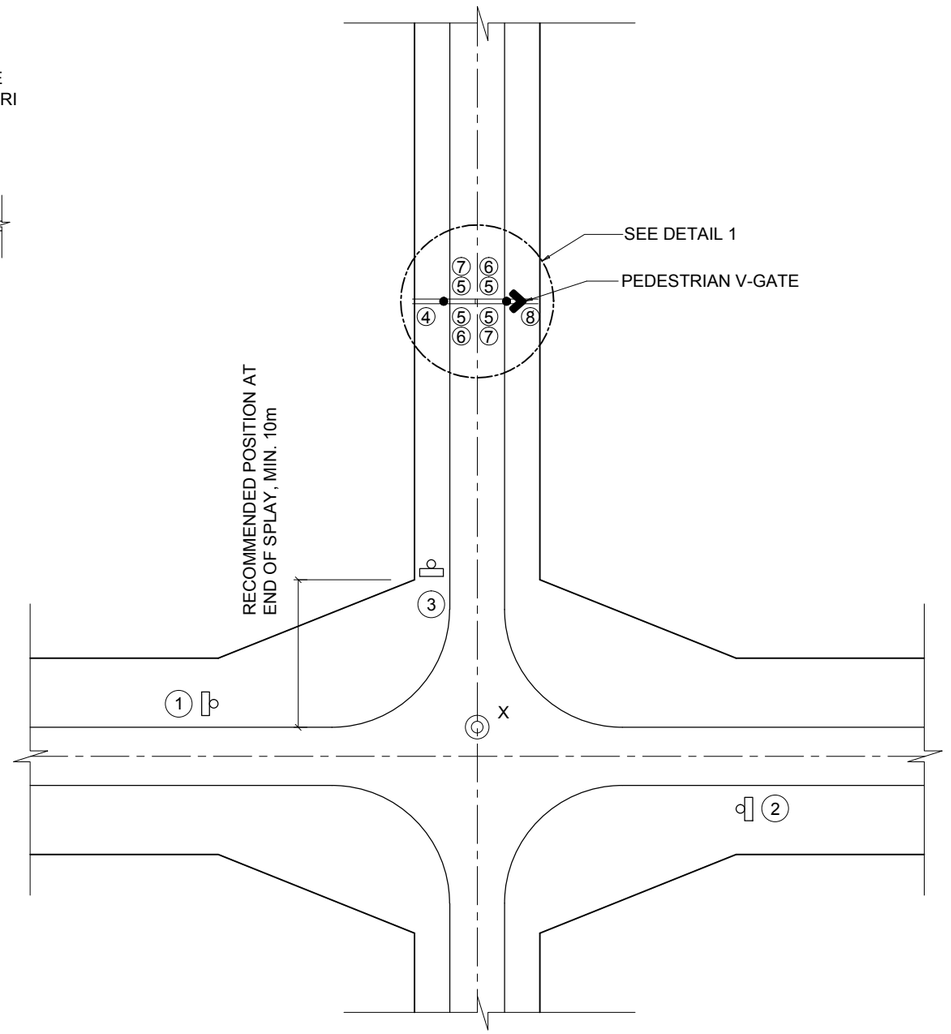
ENCLOSED AREA: TYPE 2A CLOSURE DETAIL

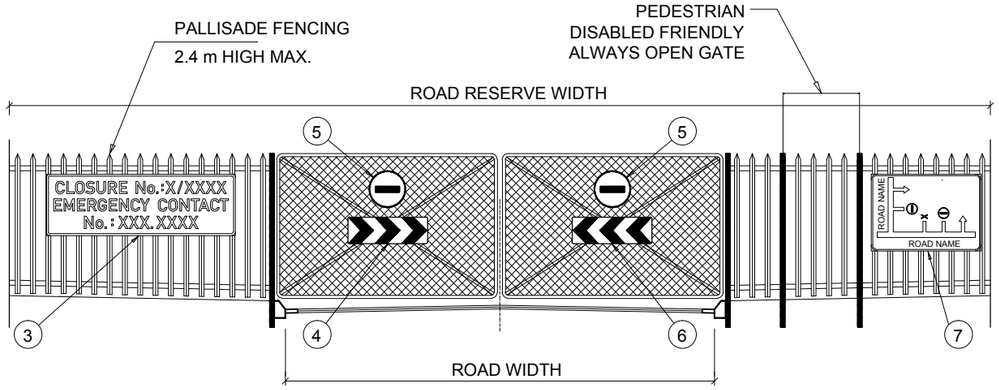
SCALE AS SHOWN: NTS	
DATE: 07/01/2015	
DRAWING NUMBER	EXTN.
JRA-SD RD-092	
AMENDMENT NUMBER:	

FROM/DISTANCE SIGN DESCRIPTION	①	②	③	④	⑤
	IN5 (600 x 450)	IN6 (600 x 450)	IN4 (600 x 450)		R3 (600) - TO BE PLACED
	X/30m - 60m	X/30m - 60m	X/10m - 40m	TO BE PLACED ON OUTSIDE OF PALLISADE FENCE	BOTH SIDES OF GATE



DETAIL OF PEDESTRIAN /WHEELCHAIR FRIENDLY CRITERIA





DETAIL 1
ELEVATION

FOR NOTES REFER TO DRAWING JRA-SD-RD-090

FROM/DISTANCE SIGN DESCRIPTION	TO BE PLACED ON BOTH SIDES OF GATE W407 (1350 x 450) ⑨	TO BE PLACED ON BOTH SIDES OF GATE W408 (1350 x 450) ⑦	TO BE PLACED ON OUTSIDE OF PALLISADE FENCE ⑧
			ROAD NAME / ROAD NAME

LEGEND

NOTES

1. THE SALIENT CRITERIA FOR A PEDESTRIAN/WHEELCHAIR FRIENDLY OPENING IN A PALISADE FENCE ARE ILLUSTRATED OPPOSITE. SPECIFIC MATERIALS ARE NOT GIVEN TO TO ALLOW SOME FREEDOM IN DESIGN AND AESTHETICS.
2. APPLICANTS FOR AREA CLOSURE SHOULD SUBMIT SPECIFIC DETAILS WITH THEIR APPLICATION.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

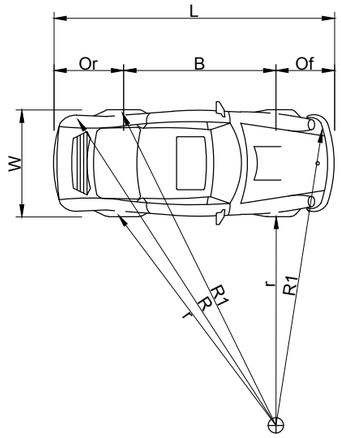
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

ENCLOSED AREA: TYPE 3 CLOSURE DETAIL

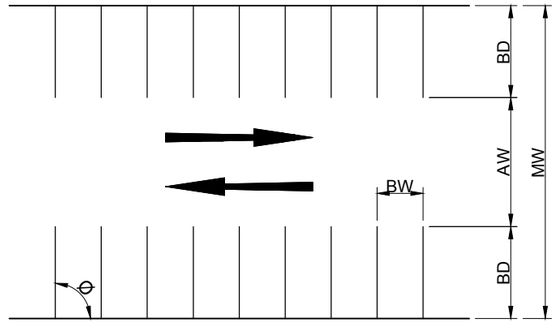
SCALE AS SHOWN: NTS	
DATE: 07/01/2015	
DRAWING NUMBER	EXTN.
JRA-SD RD-094	
AMENDMENT NUMBER:	



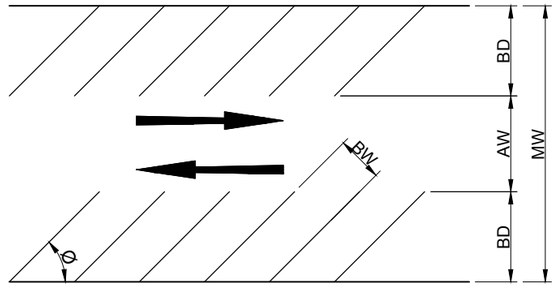
SYMBOL	DIMENSION	VALUE
VEHICLE DIMENSIONS		
L	OVERALL LENGTH	4,80m
W	OVERALL WIDTH	1,80m
B	WHEEL BASE	2,85m
Of	FRONT OVERHANG	0,75m
Or	REAR OVERHANG	1,20m
h	OVERALL HEIGTH	2,00m
MINIMUM TURNING RADII**		
r	INSIDE REAR WHEEL	3,10m
R	OUTSIDE POINT, FRONT BUMPER	6,20m
R1	OUTSIDE FRONT WHEEL	5,85m

** TURNING CIRCLE KERB-TO-KERB = 2 X R1
TURNING CIRCLE WALL-TO-WALL = 2 X R

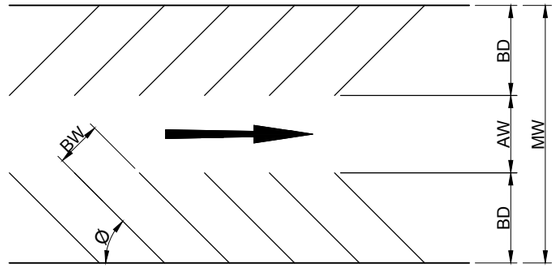
PROPOSED SOUTH AFRICAN DESIGN VEHICLE
FROM THE 'RED BOOK'



PERPENDICULAR PARKING
ONE & TWO WAY



ANGULAR PARKING
TWO WAY



ANGULAR PARKING
ONE WAY

SUMMARY OF PROPOSED PARKING DIMENSIONS						
PARKING ANGLE Ø	BAY WIDTH BW (m)	BAY DEPTH BD (m)	AISLE WIDTH AW (m)		MODULE WIDTH MW (m)	
			2-WAY	1-WAY	2-WAY	1-WAY
90 *	2,4	5,0	8,0	8,0	18,0	18,0
	2,5	5,0	7,5	7,5	17,5	17,5
	2,6	5,0	7,0	7,0	17,0	17,0
60	2,5	5,3	5,4	4,4	16,0	15,0
45	2,5	4,9	5,2	4,2	15,0	14,0

* BASIC PROPOSED STANDARD

SUMMARY OF PROPOSED PARKING DIMENSIONS
NO INTERLOCKING

LEGEND

NOTES

AMENDMENTS			
No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

PARKING DETAILS (SHEET 1 OF 3)

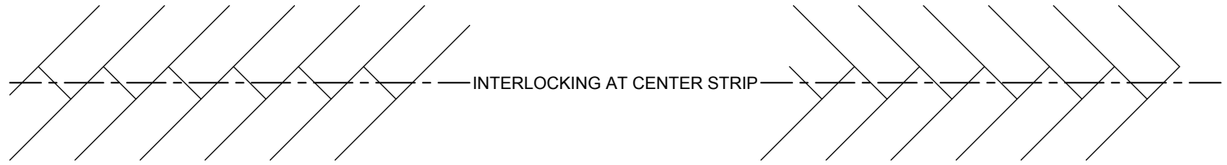
SCALE AS SHOWN: NTS

DATE: 27/11/2014

DRAWING NUMBER: JRA-SD RD-110

EXTN.

AMENDMENT NUMBER:

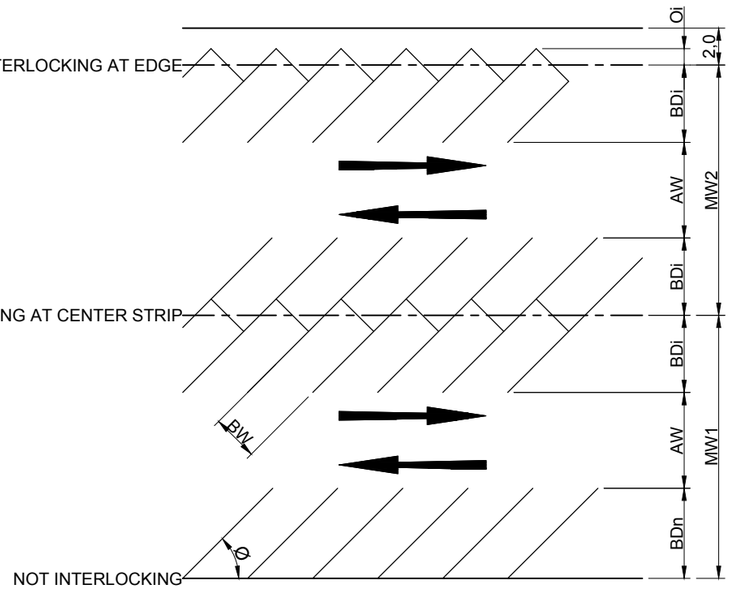


INTERLOCKING NOSE TO NOSE PARKING BAYS

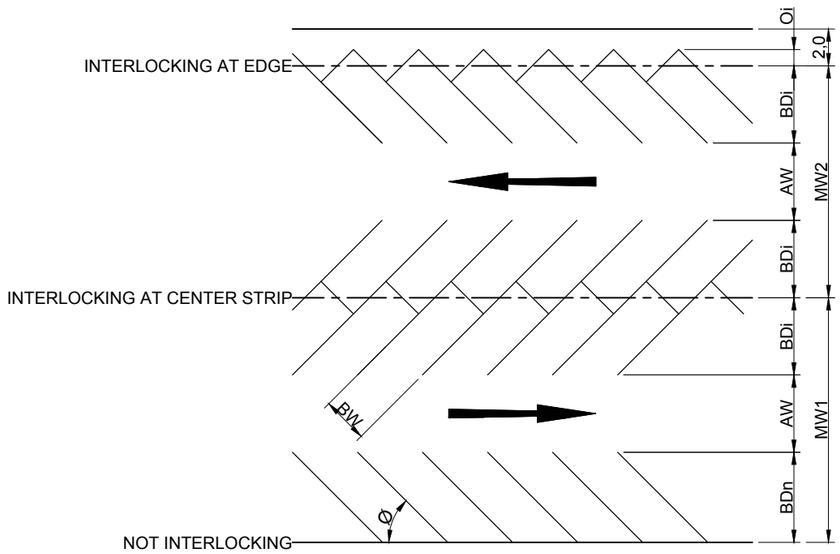
INTERLOCKING 45° DIAGONAL PARKING BAYS

INTERLOCKING PATTERNS

INTERLOCKING AT CENTRE STRIP



ANGULAR PARKING
TWO WAY



ANGULAR PARKING
ONE WAY

SUMMARY OF PROPOSED PARKING DIMENSIONS										
PARKING ANGLE Ø	BAY WIDTH BW (m)	BAY DEPTH BDn * (m)	BAY DEPTH BDi ** (m)	INTERLOCK OVERLAP Oi (m)	AISLE WIDTH AW (m)		MODULE WIDTH MW1 *** (m)		MODULE WIDTH MW2 **** (m)	
					2-WAY	1-WAY	2-WAY	1-WAY	2-WAY	1-WAY
60	2,5	5,3	4,8	0,5	5,4	4,4	15,5	14,5	15,0	14,0
45	2,5	4,9	4,2	0,7	5,2	4,2	14,3	13,3	13,6	12,6

* BDn - BAY DEPTH FOR NON INTERLOCKING
** BDi - BAY DEPTH FOR INTERLOCKING
*** MW1 - MODULE WIDTH WITH BAYS ON ONE SIDE INTERLOCKING
**** MW2 - MODULE WIDTH WITH BAYS ON TWO SIDES INTERLOCKING

SUMMARY OF PROPOSED PARKING DIMENSIONS

INTERLOCKING

LEGEND

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

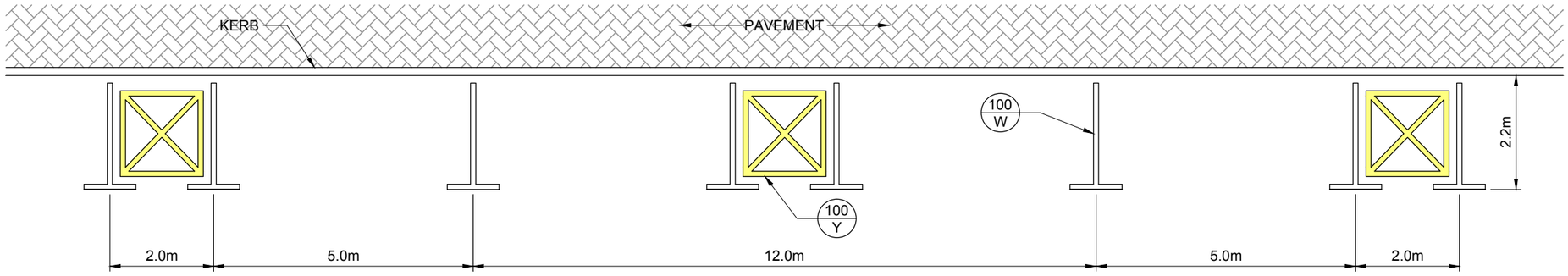
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

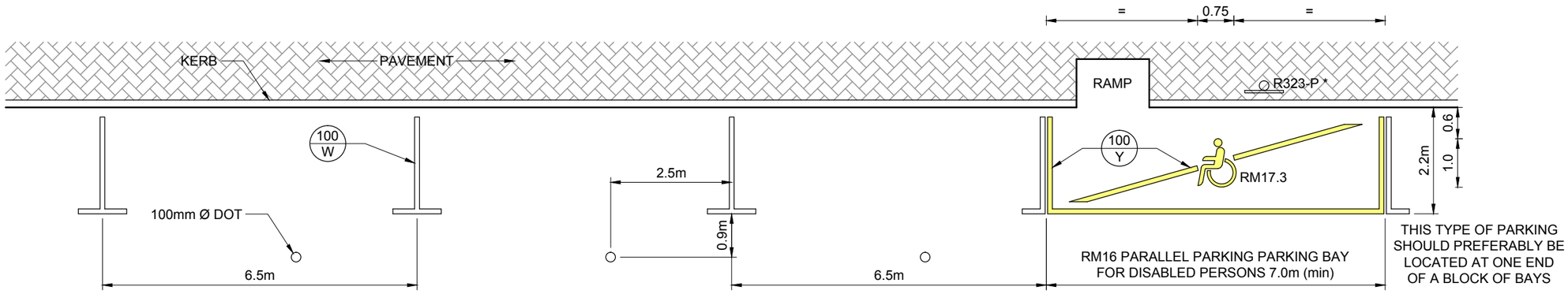
Drawing Sub-set: ROADS: DESIGN

PARKING DETAILS (SHEET 2 OF 3)

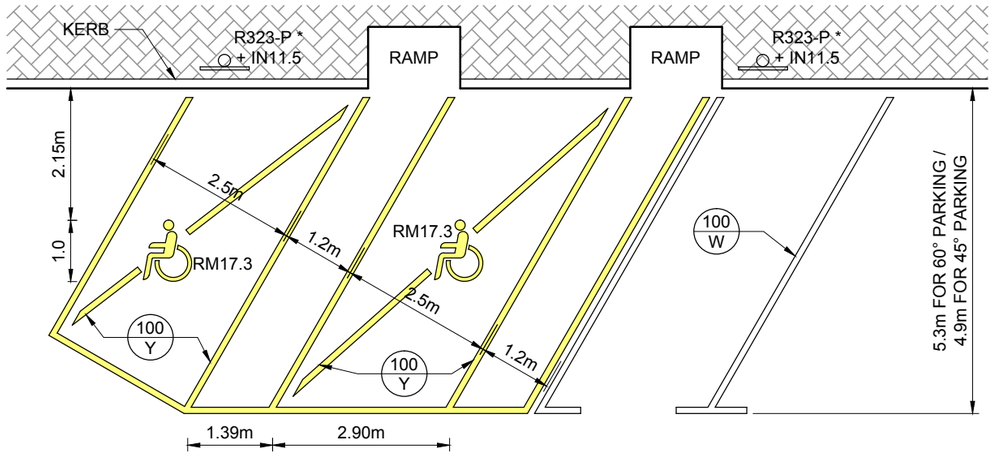
SCALE AS SHOWN: NTS
DATE: 27/11/2014
DRAWING NUMBER: JRA-SD RD-111
EXTN.
AMENDMENT NUMBER:



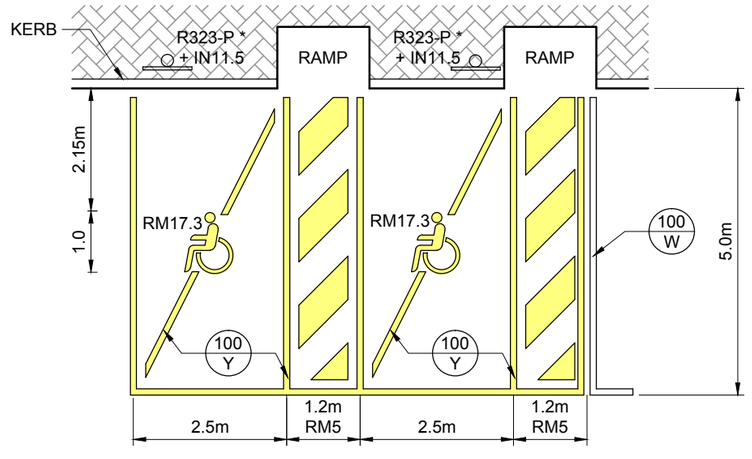
PARALLEL PARKING
PAIRED PARKING



PARALLEL PARKING
ON STREET PARKING



ANGLED PARKING
PARKING BAYS FOR DISABLED PERSONS RM16



PERPENDICULAR PARKING
PARKING BAYS FOR DISABLED PERSONS RM16

* = OPTIONAL SIGNS AND MARKING

LEGEND

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

PARKING DETAILS (SHEET 3 OF 3)

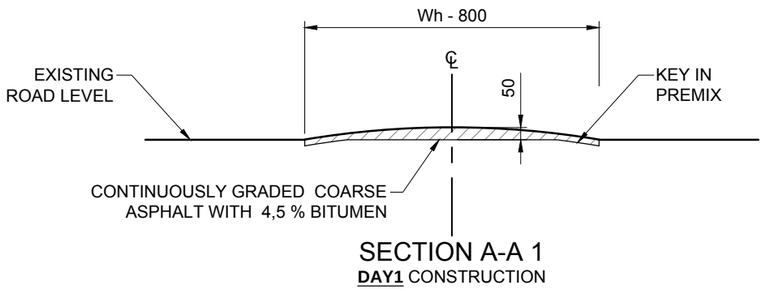
SCALE AS SHOWN: NTS

DATE: 04/12/2014

DRAWING NUMBER: JRA-SD RD-112

EXTN.

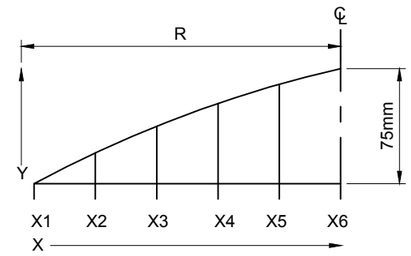
AMENDMENT NUMBER:

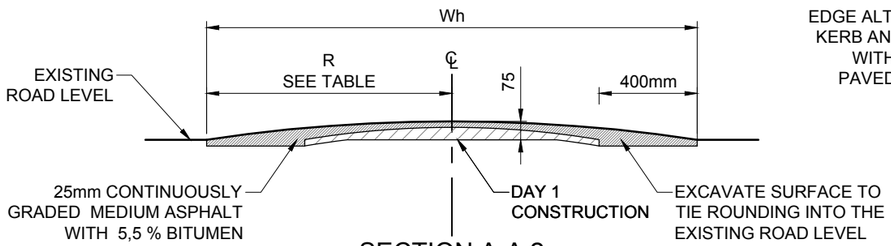


SECTION A-A 1
DAY1 CONSTRUCTION

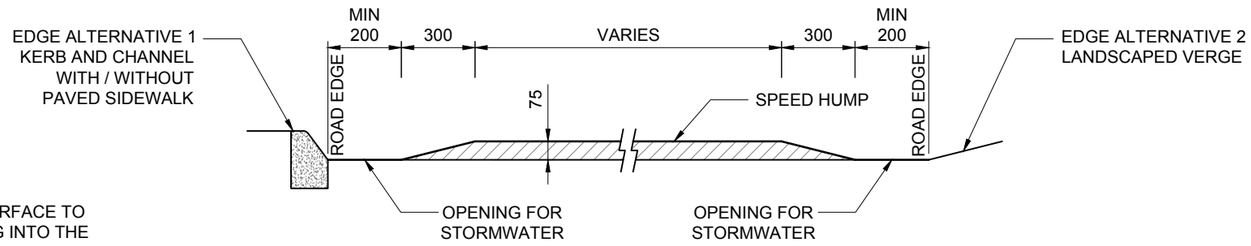
SPEED HUMP CURVE DIMENSIONS - R

Wh		4.0m		Wh		3.0m		Wh		2.0m	
R		2.0m		R		1.5m		R		1.0m	
X1	0	Y1	0	X1	0	Y1	0	X1	0	Y1	0
X2	400	Y2	27	X2	300	Y2	27	X2	200	Y2	27
X3	800	Y3	46	X3	600	Y3	46	X3	400	Y3	46
X4	1200	Y4	63	X4	900	Y4	63	X4	600	Y4	63
X5	1600	Y5	72	X5	1200	Y5	72	X5	800	Y5	72
X6	2000	Y6	75	X6	1500	Y6	75	X6	1000	Y6	75

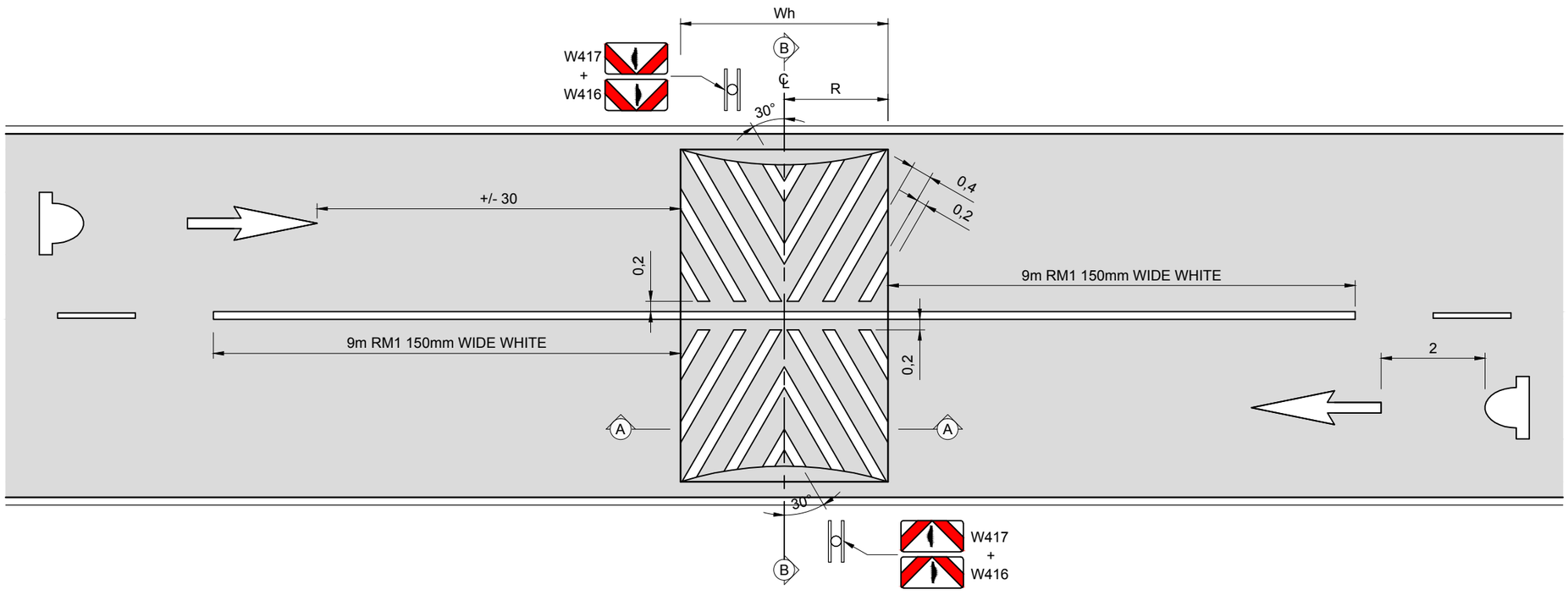




SECTION A-A 2
DAY2 CONSTRUCTION



SECTION B-B
DETAIL OF SPEEDHUMP



SPEED HUMP LAYOUT

LEGEND

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

TRAFFIC CALMING / SPEED HUMP DETAIL

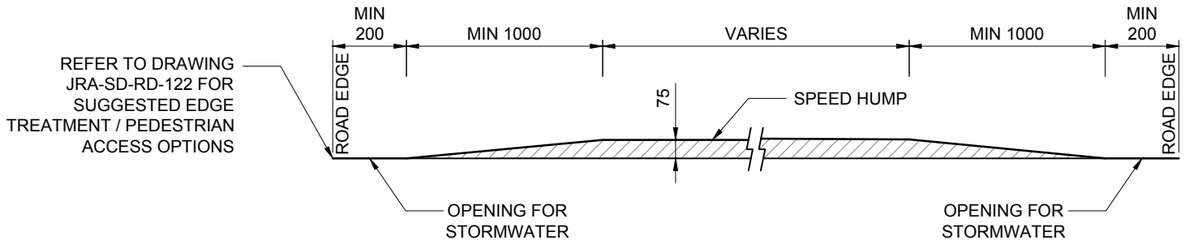
SCALE AS SHOWN: NTS

DATE: 04/12/2014

DRAWING NUMBER: JRA-SD RD-120

EXTN.

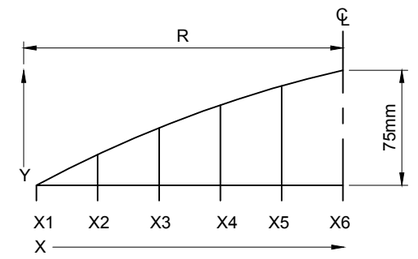
AMENDMENT NUMBER:

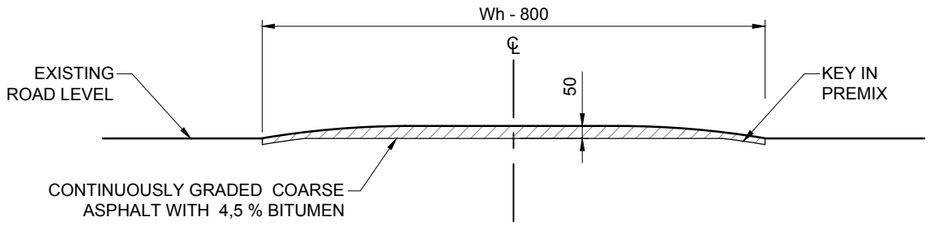


SECTION B-B
DETAIL OF SPEEDHUMP
NO PROVISION OF DISABLED ACCESS

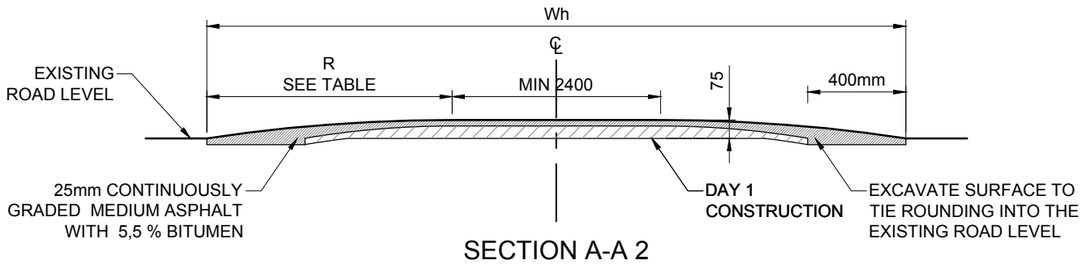
SPEED HUMP CURVE DIMENSIONS - R

Wh		VARIES	
R		2.0m	
X1	0	Y1	0
X2	400	Y2	27
X3	800	Y3	46
X4	1200	Y4	63
X5	1600	Y5	72
X6	2000	Y6	75

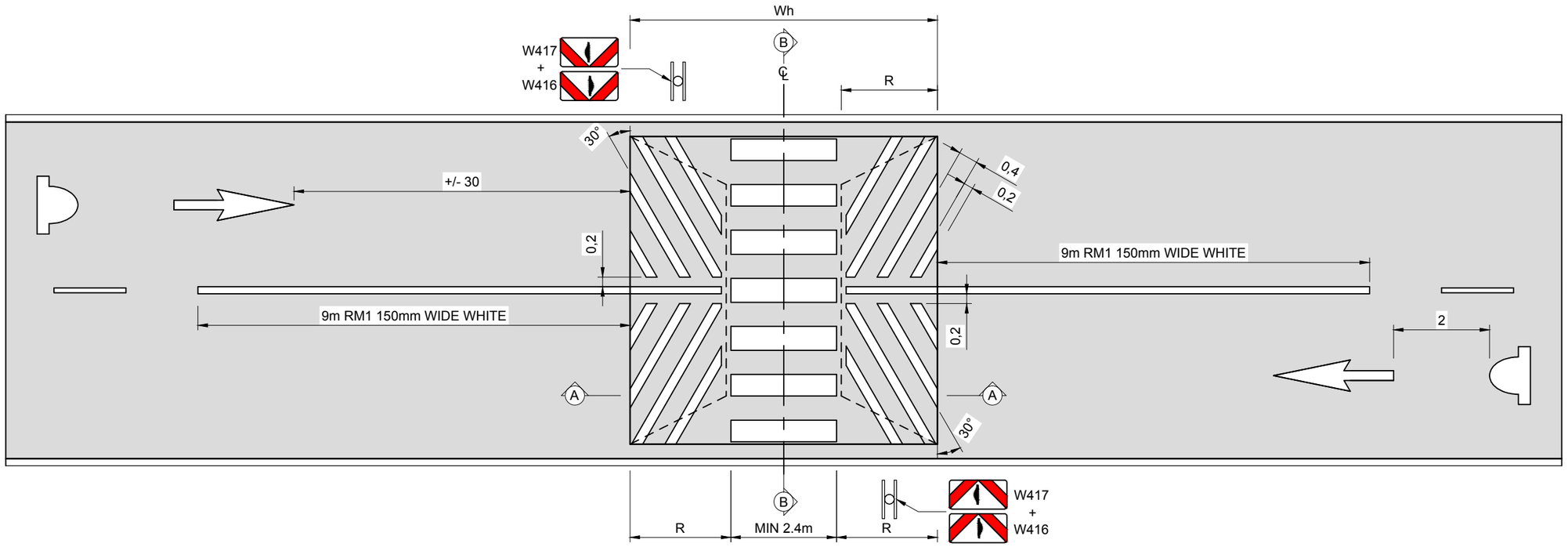




SECTION A-A 1
DAY1 CONSTRUCTION



SECTION A-A 2
DAY2 CONSTRUCTION



SPEED HUMP LAYOUT

LEGEND

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

RAISED PEDESTRIAN CROSSING (SHEET 1 OF 2)

SCALE AS SHOWN: NTS

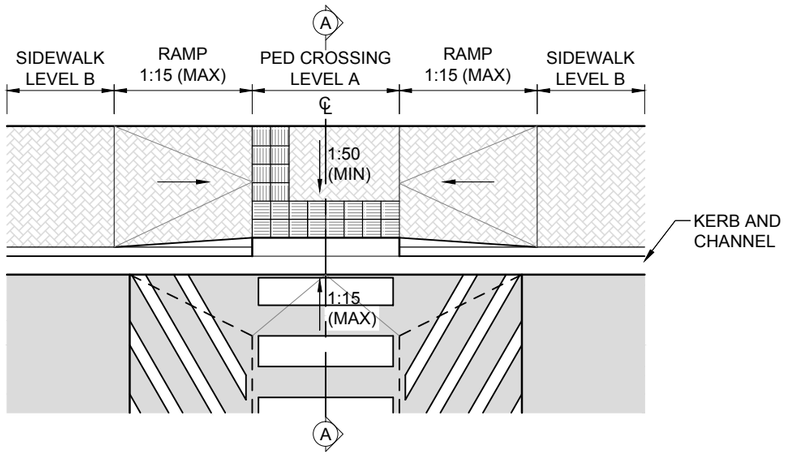
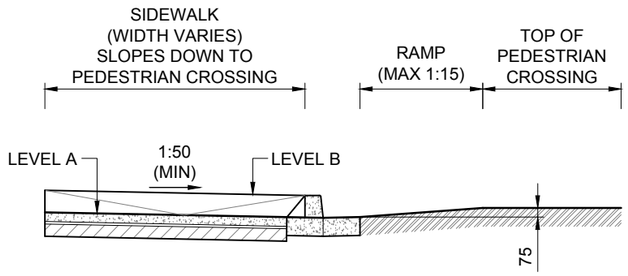
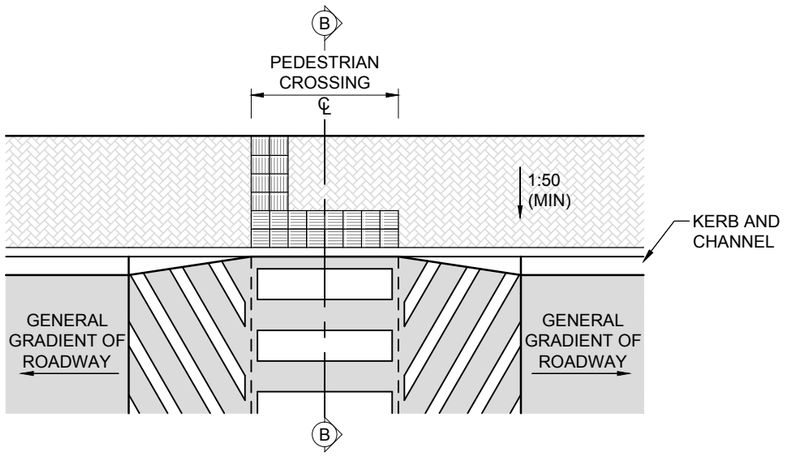
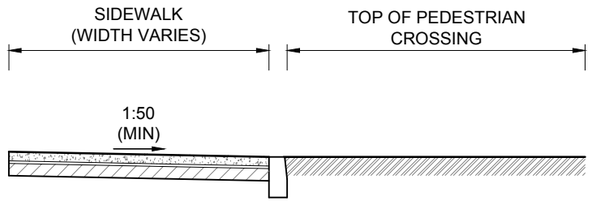
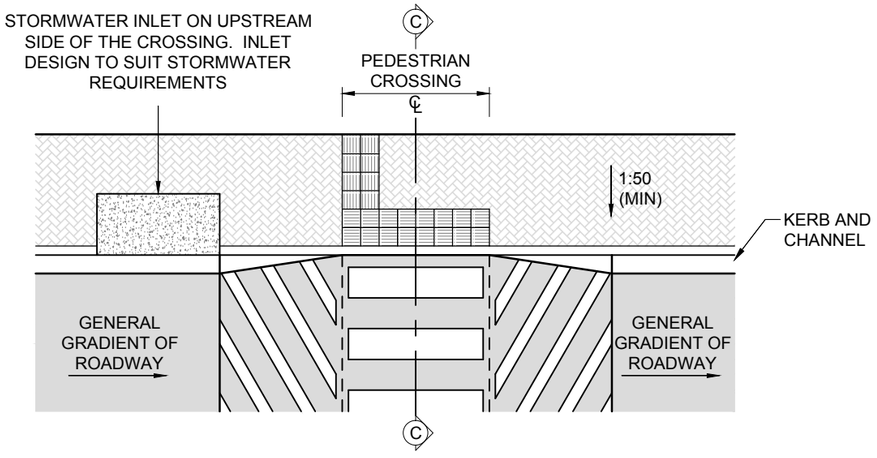
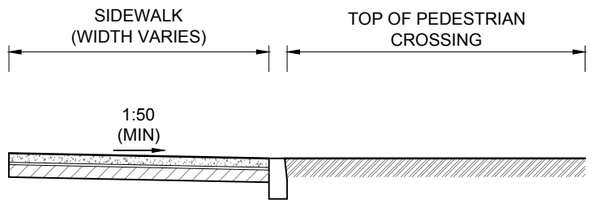
DATE: 04/12/2014

DRAWING NUMBER: JRA-SD RD-121

EXTN.

AMENDMENT NUMBER:

RAISED PEDESTRIAN CROSSING SUGGESTED EDGE TREATMENT / PEDESTRIAN ACCESS OPTIONS

OPTION	DESCRIPTION	PLAN	SECTION
1	PEDESTRIAN RAMPS SUITABLE FOR DISABLED ACCESS		 SECTION A-A
2	RAISED PEDESTRIAN CROSSING FROM TOP OF KERB TO TOP OF KERB AT A CREST IN THE ROADWAY		 SECTION B-B
3	RAISED PEDESTRIAN CROSSING FROM TOP OF KERB TO TOP OF KERB WITH PROVISION OF STORMWATER INLET ON UPSTREAM SIDE OF THE PEDESTRIAN CROSSING. THIS WILL NEED TO TIE INTO AN EXISTING PIPED STORMWATER SYSTEM.		 SECTION C-C

LEGEND

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

RAISED PEDESTRIAN CROSSING (SHEET 2 OF 2)

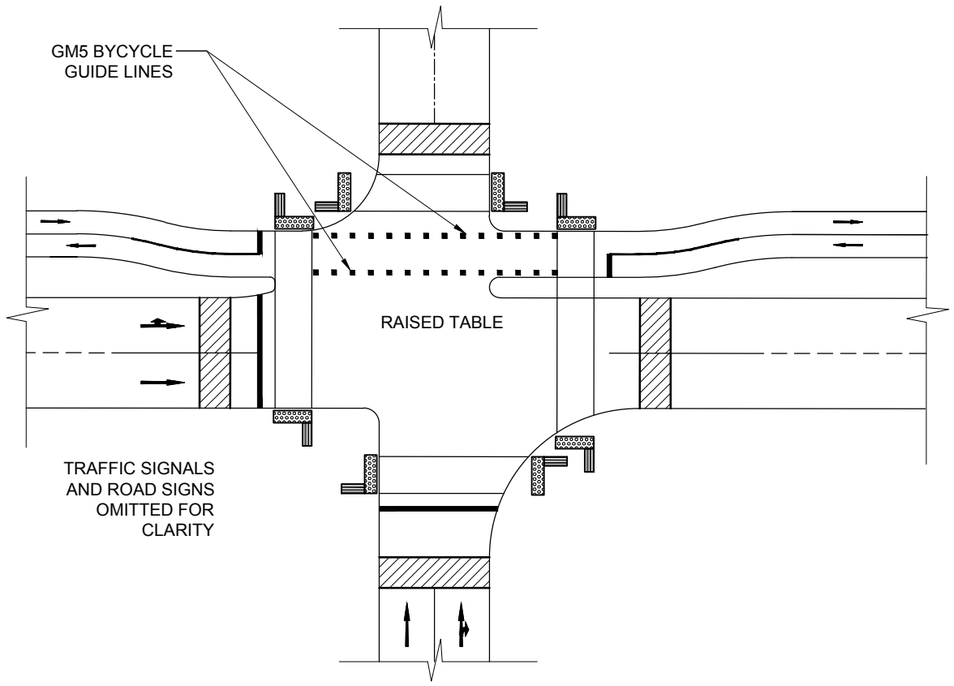
SCALE AS SHOWN: NTS

DATE: 04/12/2014

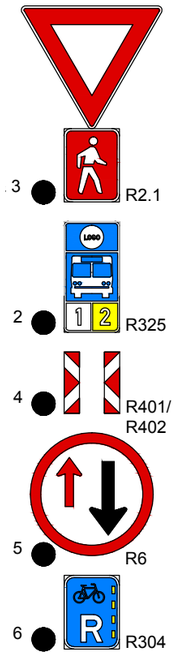
DRAWING NUMBER: JRA-SD RD-122

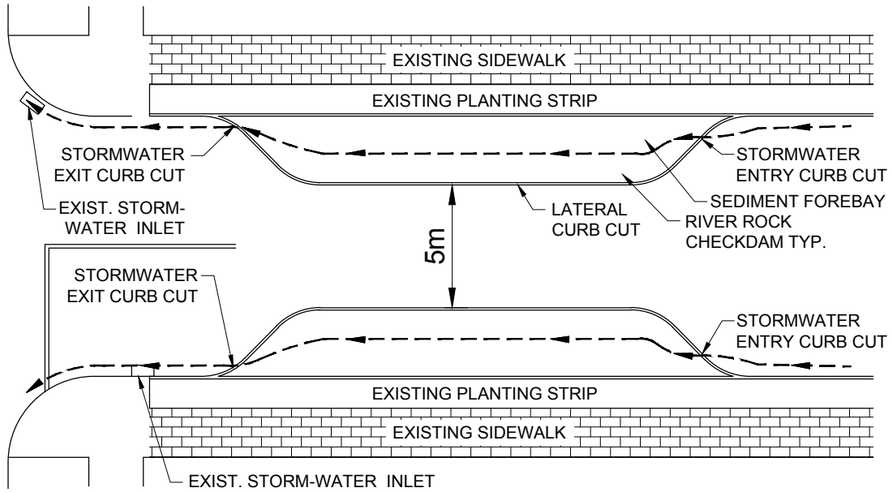
EXTN.

AMENDMENT NUMBER:

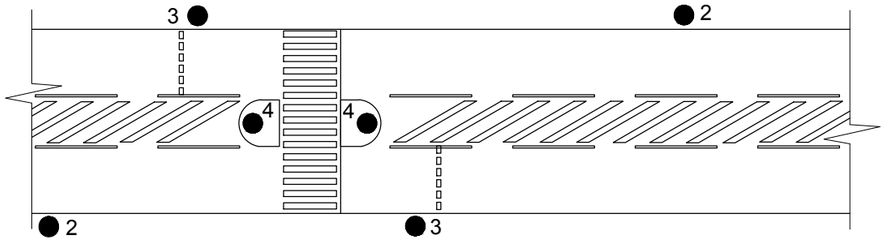


DETAIL 122-1 : RAISED TABLE INTERSECTION

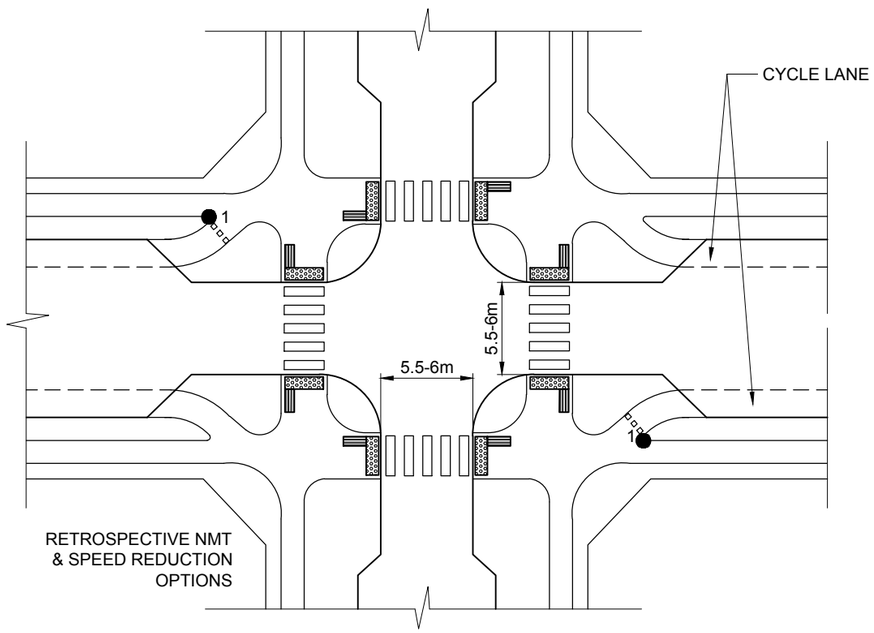




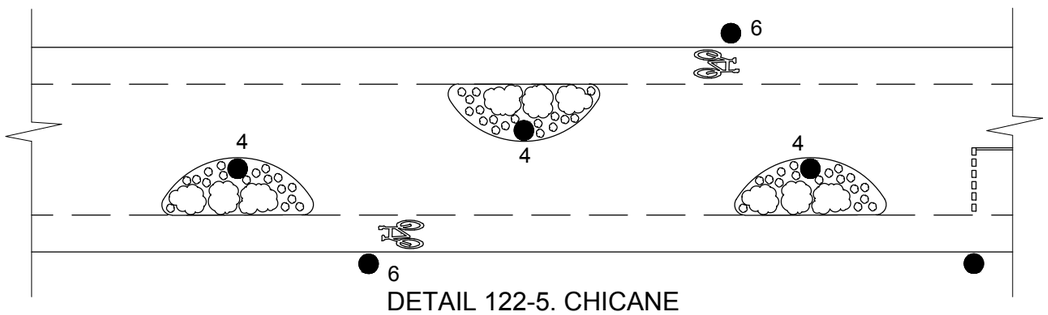
DETAIL 122-2 : DECORATIVE WIDTH REDUCTION



DETAIL 122-4. SPEED REDUCTION BY ROAD NARROWING



DETAIL 122-3 : BULBOUTS - RESIDENTIAL AREA



DETAIL 122-5. CHICANE

LEGEND

NOTES

1. THE EXAMPLES SHOWN HAVE ONE REPRESENTATIVE. IN THE MAIN THEY ARE TECHNIQUES WHICH CAN BE USED AS PART OF A RETRO-FIT TRAFFIC CALMING/COMPLETE STREETS PROGRAMME.
2. DETAIL 122-1 SHOWS TWO ONE WAY STREETS CONVERTED WITH A RAISED TABLE JUNCTION WITH RELATED NMT FACILITIES.
3. DETAIL 122-2INDICATES A DECORATIVE STREET WIDTH REDUCTION. DETAIL 122-5 SHOWS A SIMILAR TECHNIQUE WHERE ALTERNATING ONE-WAY OPERATION & TRAFFIC CALMING WITH CYCLE LANES HAS BEEN INTRODUCED.
4. DETAIL 122.3 SHOWS BULB-OUTS TO REDUCE TRAFFIC SPEEDS. NMT FACILITIES UTILISE THESE BULB-OUTS FOR IMPROVED SAFETY.
5. DETAIL 122-4 ILLUSTRATES HOW A WIDE STREET CAN BE CONSTRAINED BY A MARKED MEDIAN TO REDUCE SPEEDS. SUCH AN ARRANGEMENT MAY SUIT A LOCAL OR COLLECTOR BUS ROUTE.

AMENDMENTS			
No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

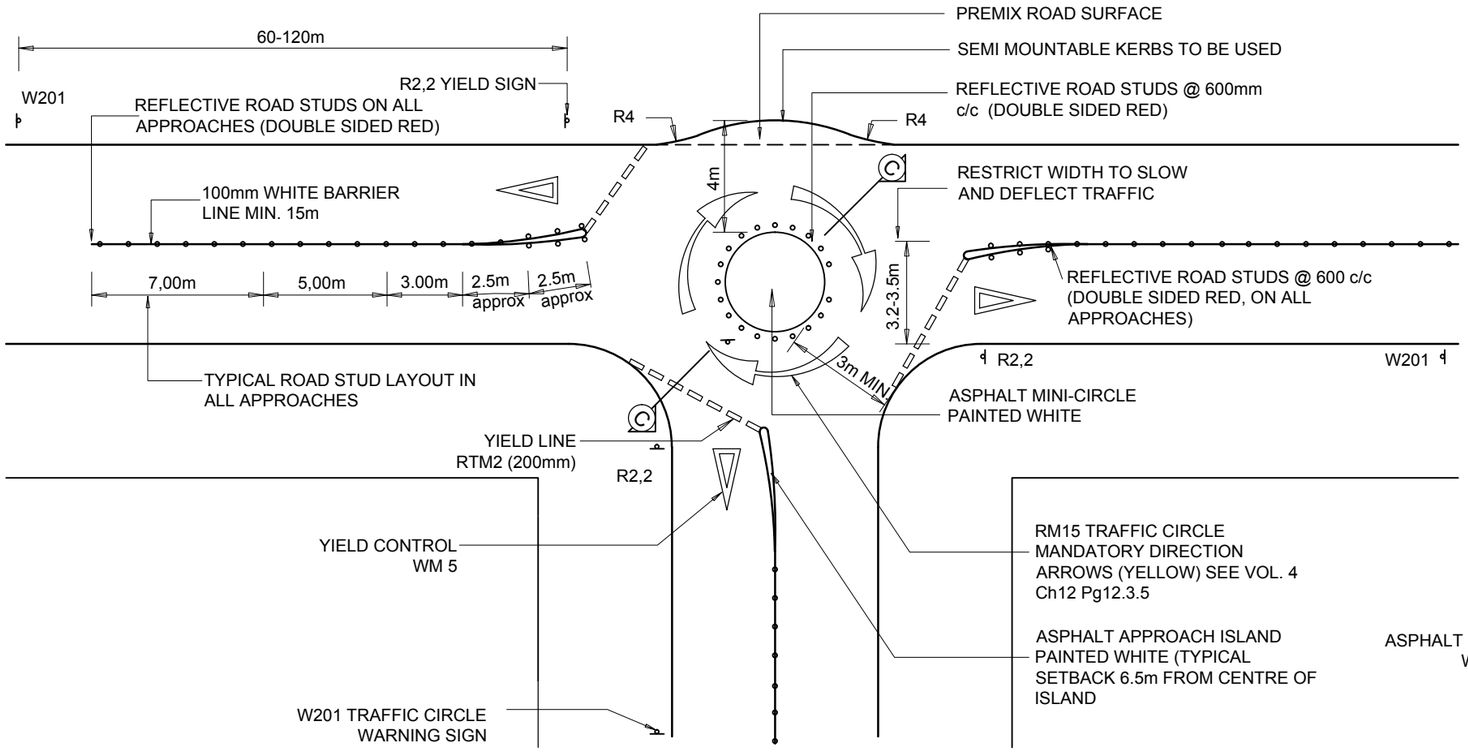
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

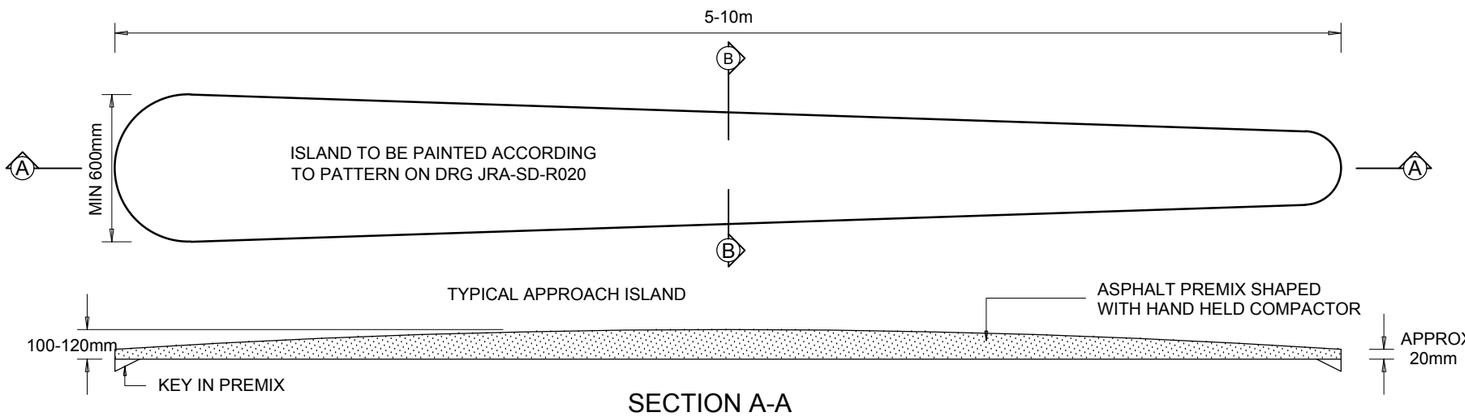
TRAFFIC CALMING MEASURES VARIOUS TECHNIQUES

SCALE AS SHOWN: NTS	
DATE:18/02/2015	
DRAWING NUMBER	EXTN.
JRA-SD RD-123	
AMENDMENT NUMBER:	



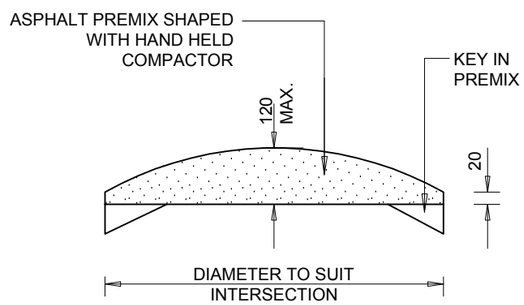
TYPICAL MINI TRAFFIC CIRCLE LAYOUT

(ISLAND TO BE LOCATED AT CENTRE OF INTERSECTION)

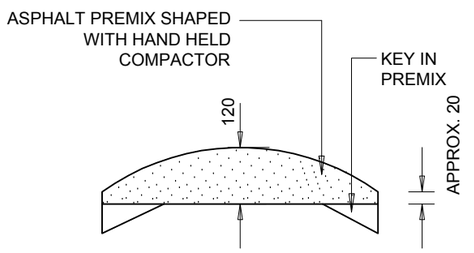


SECTION A-A

MINI-CIRCLE ROAD SIGNS



SECTION C-C



SECTION B-B

LEGEND

NOTES

1. ALL ROAD SIGNS AND MARKINGS TO BE MANUFACTURED ACCORDING TO THE SPECIFICATIONS OF SADC-RTSM, MAY 2012.
2. IT IS RECOMMENDED THAT THE MAXIMUM DIAMETER OF A MINI-CIRCLE, CONTROLLED BY SIGN R2.2 BE 6m.
3. IF A LARGER CIRCLE IS REQUIRED IT SHOULD BE TREATED AS A TRAFFIC CIRCLE OR ROUNDABOUT. IN THIS CASE CONTROL IS BY R2 YIELD SIGN AND THE ISLAND IS IDENTIFIED BY R137 ROUNDABOUT SIGNS, ON THE CIRCLE, FACING ALL APPROACHES.
4. TRAFFIC CIRCLE WARNING SIGN W201 MAY BE USED IN ADVANCE OF BOTH MINI-CIRCLES AND ROUNDABOUTS.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

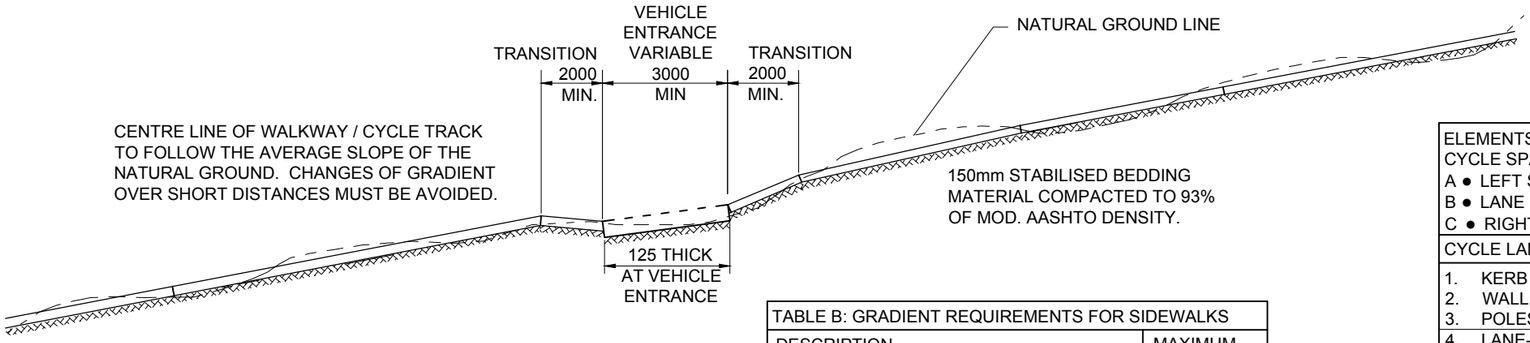
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

TYPICAL LAYOUT OF MINI-CIRCLE

SCALE AS SHOWN: NTS	
DATE: 05/12/2014	
DRAWING NUMBER	EXTN.
JRA-SD RD-130	
AMENDMENT NUMBER:	



TYPICAL LONGITUDINAL SECTION OF WALKWAY / CYCLE TRACK

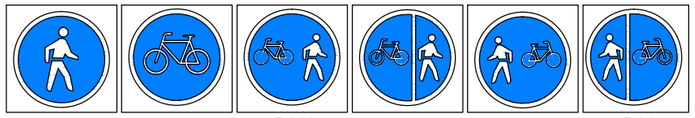
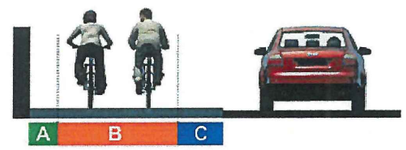


FIGURE 1

(SEE NOTE 1.2)

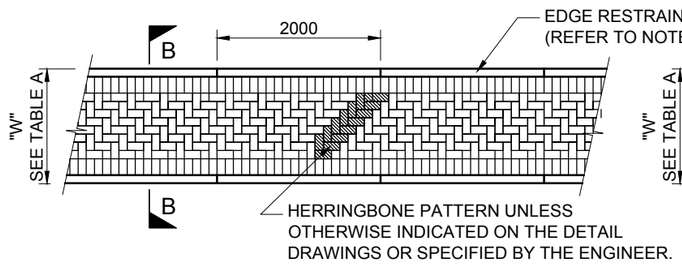
TABLE B: GRADIENT REQUIREMENTS FOR SIDEWALKS	
DESCRIPTION	MAXIMUM
GRADIENT OF SIDE WALK OR WALK WAY ROAD GRADIENT LESS THAN 5% ROAD GRADIENT MORE THAN 5%	MAXIMUM 5% ROAD GRADIENT
TRANSITION SECTIONS (e.g. KERB RAMPS)	8,3% (1:12)
MAXIMUM CROSS FALL IS 2% (1:50)	

TABLE A: MINIMUM PEDESTRIAN AND CYCLIST PROVISION

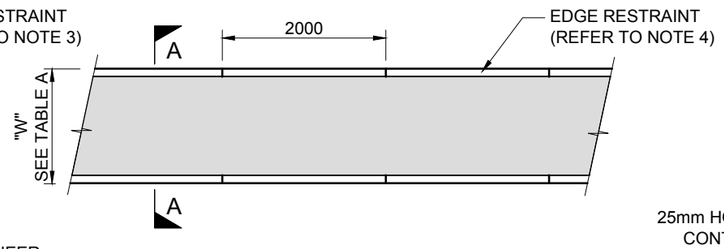


ELEMENTS OF CYCLE SPACE
A ● LEFT SPACE
B ● LANE
C ● RIGHT SPACE

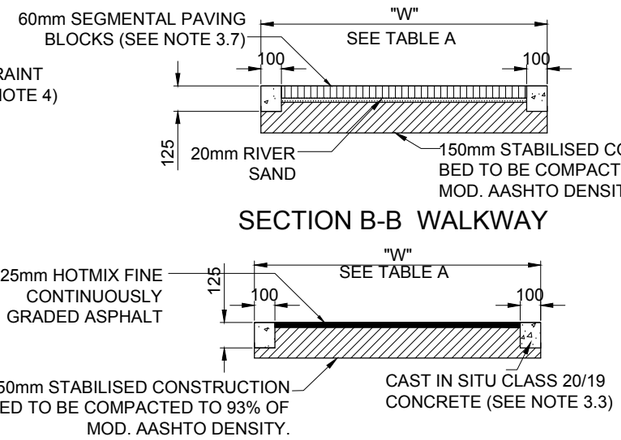
CYCLE LANES (VERTICAL CLEARANCE)		2.5m
1. KERB OR CHANNEL GULLY 2. WALL, FENCE, BARRIER 3. POLES OR BOLLARDS	A	0.25m 0.65m 0.50m
4. LANE- SINGLE FILE AND OVERTAKE 5. LANE- 2ABREAST AND OVERTAKE	B	1.25m 2.50m
6. OUTSIDE EDGE- 3m LANE - 30km/h 7. OUTSIDE EDGE- 3m LANE - 60km/h 8. OUTSIDE EDGE- BARRIER, RAISED KERB 9. OUTSIDE EDGE- VEGETATION	C	0.50m 0.75m 0.50m 0.25m
COMBINE RELEVANT ELEMENTS A+B+C		2.5m MAX.
SIDEWALKS - NO BUFFER STRIPS SIDEWALKS - BUSINESS CENTRE CYCLE TRACK - ONE WAY CYCLE TRACK - TWO WAY SHARED CYCLE TRACK/SIDEWALK (2 WAY PEDESTRIAN + 1 WAY CYCLE)		2.00m 2.50m - 3.50m 1.80m 1.80m 3.20m



PLAN OF SEGMENTED PAVING WALKWAY

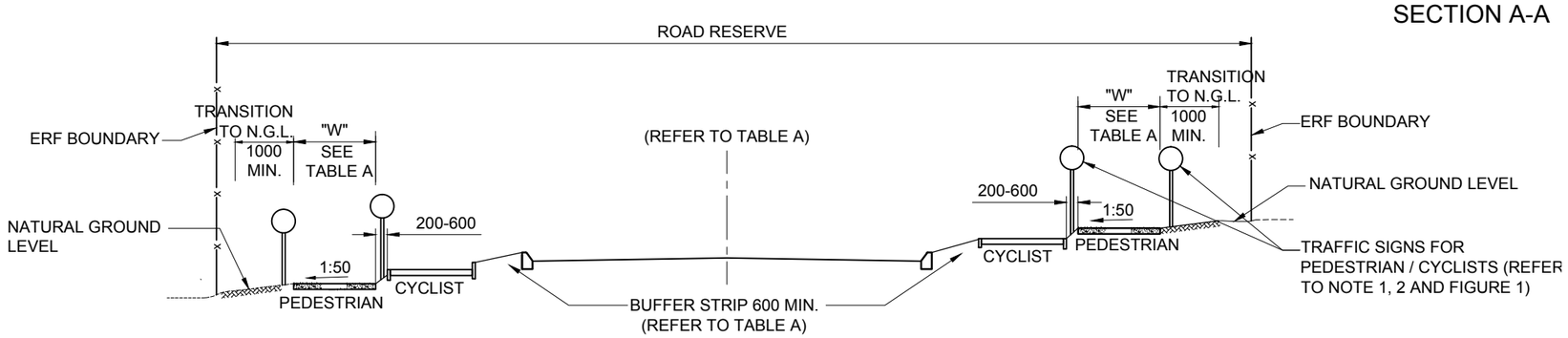


PLAN OF PREMIX SURFACED CYCLE TRACK



SECTION B-B WALKWAY

SECTION A-A CYCLE TRACK



TYPICAL CROSS-SECTION OF ROAD RESERVE WITH WALKWAY / CYCLE TRACK

LEGEND

NOTES

1. GENERAL
   - 1.1 THE WIDTH OF ALL WALKWAYS AND CYCLE TRACKS SHALL BE ACCORDING TO TABLE A UNLESS OTHERWISE INDICATED ON THE DETAIL DRAWINGS OR SPECIFIED BY THE ENGINEER.
   - 1.2 IF REQUIRED REGULATORY TRAFFIC SIGNS R110 TO R115, APPROPRIATE TO THE APPLICATION, SHALL BE ERECTED AT POSITIONS INDICATED ON THE DETAIL DRAWINGS OR SPECIFIED BY THE ENGINEER.
   - 1.3 SIDEWALKS AND WALKWAYS SHALL BE DESIGNED FOR A MAXIMUM CROSS FALL OF 2% (1:50).
2. CAST IN-SITU CONCRETE
   - 2.1 CONCRETE TO BE CLASS 25/19.
   - 2.2 CONCRETE TO BE CURED FOR A MINIMUM PERIOD OF 7 DAYS.
   - 2.3 UNFORMED CONCRETE SURFACES SHALL BE FINISHED TO A CLASS U2 SURFACE FINISH.
   - 2.4 ALSO REFER TO SECTIONS 610, 702, 703 AND 704 THE STANDARD SPECIFICATIONS FOR MUNICIPAL CIVIL ENGINEERING WORKS, 3rd EDITION, 2005.
3. SEGMENT PAVING
   - 3.1 ALL PRECAST CONCRETE SEGMENTAL BLOCKS SHALL COMPLY WITH THE REQUIREMENTS OF SANS 1058, AND SHALL BE SUPPLIED BY A MANUFACTURER APPROVED BY THE ENGINEER.
   - 3.2 THE BEDDING SAND AND SAND FOR JOINTING SHALL BE ACCORDING TO SECTION 609 OF THE STANDARD SPECIFICATION FOR MUNICIPAL CIVIL ENGINEERING WORKS, 3rd EDITION, 2005.
   - 3.3 PRECAST EDGE RESTRAINTS ARE PERMITTED IF INDICATED ON THE DETAIL DRAWINGS OR SPECIFIED BY THE ENGINEER.
   - 3.4 CONCRETE FOR CAST IN-SITU EDGE RESTRAINTS TO BE CLASS 20/19.
   - 3.5 CONCRETE FOR CAST IN-SITU EDGE RESTRAINTS TO BE CURED FOR A MINIMUM PERIOD OF 7 DAYS.
   - 3.6 CAST IN-SITU EDGE RESTRAINTS SHALL BE CAST IN ALTERNATE SECTIONS. THE EXPOSED END SURFACES OF THE FIRST CAST SHALL BE COATED WITH BITUMINIOUS EMULSION BEFORE THE INTERMEDIATE SECTION IS CAST. 6mm JOINTS SHALL BE PROVIDED WITH APPROVED JOINT FORMING MATERIAL AT 6m INTERVALS MAXIMUM.
   - 3.7 THE COLOUR OF SEGMENTAL PAVING BLOCKS SHALL BE AS FOLLOWS: WALKING AND CYCLING AREAS: LIGHT GREY. FILL-IN AREAS: TERRA COTTA.
   - 3.8 ALSO REFER TO SECTION 609 OF THE STANDARD SPECIFICATIONS FOR MUNICIPAL CIVIL ENGINEERING WORKS, 3rd EDITION, 2005.

AMENDMENTS			
No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: DESIGN

WALKWAYS AND CYCLE TRACKS

SCALE AS SHOWN: NTS

DATE: 19/01/2015

DRAWING NUMBER: JRA-SD RD-140

EXTN.

AMENDMENT NUMBER:

1.4 – COMPLETE STREETS: DESIGN

DRAWING NUMBER	DRAWING DESCRIPTION	REVISION NUMBER					
		0	1	2	3	4	5
		REVISION DATE					
JRA-SD - RCS-010	Mobility & Access	300615					
JRA-SD - RCS-011	Summary of Design Elements (CoJ – Complete Streets)	300615					
JRA-SD - RCS-020	RISFSA Class 2: Arterial/Regional Distributor – Typical Details	300615					
JRA-SD - RCS-021	RISFSA Class 2: Arterial/Regional Distributor – Typical Intersection with BRT Station	300615					
JRA-SD - RCS-022	RISFSA Class 2: Arterial/Regional Distributor – Typical Station Details – Mid-Block	300615					
JRA-SD - RCS-023	RISFSA Class 2: Arterial/Regional Distributor – 62 m Cross Section	300615					
JRA-SD - RCS-024	RISFSA Class 2: Arterial/Regional Distributor – 62 m Cross Section – Additional Details	300615					
JRA-SD - RCS-025	RISFSA Class 2: Arterial/Regional Distributor – Road Marking Details for BRT Lanes	300615					
JRA-SD - RCS-030	RISFSA Class 3: District Distributor – Typical Details	300615					
JRA-SD - RCS-031	RISFSA Class 3: District Distributor – Typical Details with BRT	300615					
JRA-SD - RCS-040	RISFSA Class 4: CBD/Activity Street/Local Distributor/Boulevard – Typical Details	300615					
JRA-SD - RCS-041	RISFSA Class 4: Industrial Road – Typical Details	300615					
JRA-SD - RCS-050	RISFSA Class 5: Residential Collector – Typical Details	300615					
JRA-SD - RCS-051	RISFSA Class 5: Residential Streets – Typical Details	300615					
JRA-SD - RCS-060	RISFSA Class 6: NMT/Greenway/Multi-User Path – Typical Details	300615					
JRA-SD – RCS-070	Basic Pedestrian/Disabled Persons Crossing Ramp Types	300615					
JRA-SD – RCS-072	Typical Tactile Pedestrian Crossing – Signalised Intersection – Combination Ramping	300615					
JRA-SD – RCS-073	Typical Tactile Pedestrian Crossing – Signalised Intersection – Parallel Ramping	300615					
JRA-SD – RCS-074	Typical Tactile Pedestrian/Disabled Persons Ramp – Typical Section	300615					

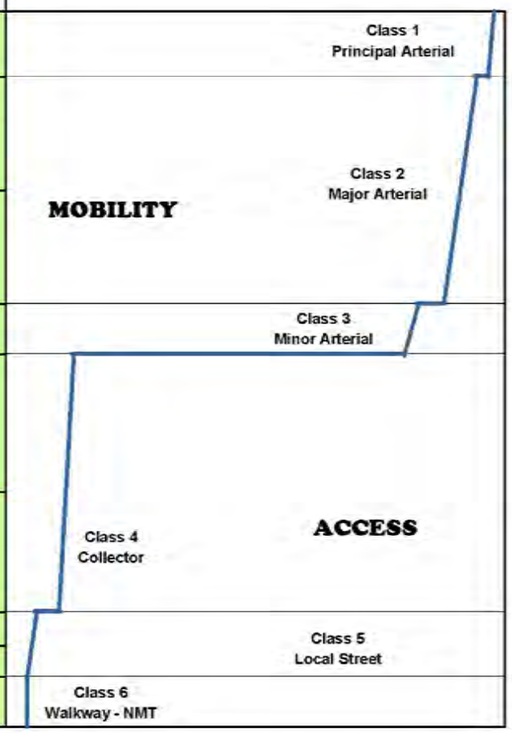
1.4 - COMPLETE STREETS: DESIGN

1.4 - COMPLETE STREETS: DESIGN

COMPLETE STREETS: MOBILITY & ACCESS

RISFSA Classification	Complete Streets Considerations	New Typology	Pedestrians	Bicycles	Public Transport	Motor Vehicles	Goods Vehicles	Emergency Vehicles
Class 1	The primary function is high mobility, hence complete streets principles are applicable primarily in ensuring adequate provision of grade separated crossings for pedestrians and cyclists.	Motorway/ Primary Distributor						
Class 2	This class of road represents major arterials and have historically catered for need of motorised travel. In the context of Complete Streets, the following needs to be taken into account: • These routes are the most direct linkages between home and work centres, hence cyclists are prone to use these routes. Consider providing Class II cycling facilities; • Some of these roads have low income residential settlements adjacent to them, hence special attention needs to be provided to pedestrian crossing facilities and access to public transport. Where these roads form part of the Strategic Public Transport Network, public transport modes need to be given priority.	Arterial/ Regional Distributor						
		BRT Trunk Route						
Class 3	Special care needs to be taken in separating motorised vehicles and pedestrians. Class III cycling facilities are appropriate.	District Distributor						
Class 4	Due to high numbers of pedestrians along these roads, Class III cycling facilities are more appropriate. In CBD areas: • On-street parking is important, hence special care needs to be taken when providing cycling facilities adjacent to on-street parking; • Minimum sidewalk width is not appropriate due to high numbers of pedestrians and the presence of other activities in the verge. In Industrial Areas: • Kerb radii need to accommodate heavy vehicle turning movements, hence the presence of long crossing paths at intersections may not be avoidable.	CBD Road/ Activity Road/ Local Distributor/ Boulevard						
		Industrial Road						
Class 5	Speed reduction measures should be used to keep speeds within acceptable levels for the safe movement of pedestrians and cyclists.	Residential Collector						
		Residential Street						
Class 6	Motorised vehicles are not permitted except for emergency vehicles in an emergency situation.	NMT Route/ Greenway/ Multi-Use Pathway						

RISFSA: MOBILITY & ACCESS



CYCLIST FACILITIES:			
Class I	Bicycle Roads	Have an independent alignment in a bicycle reserve.	3.5 m width; 0.5 m lateral clearance; at least 2.5 m vertical clearance; typically grade separated intersections
Class II	Bicycle Ways	Are provided within a road reserve, either on or adjacent to the carriageway.	3.0 m 2-way/1.8 m 1-way; 3.0 m clearance at property entrances; ensure route continuity
Class III	Bicycle Lanes	Are specifically marked on the roadway pavement, usually unprotected.	Preferably with 60/70 km/h speed limit (optional to 80 km/h); allow for vehicle aerodynamic forces
Class IV	Bicycle Routes	Are accommodated on the roadway and indicated by road signs	Max. vehicle speed 50 km/h (40 km/h preferred) shared lane width 4.5 m preferred

LEGEND

- Not required, or poor performance is acceptable (low quality or no facilities, high travel delay
- Accommodated with variable standards(average quality facilities, average travel delay)
- Accommodated with high standards(high quality facility, low travel delay)

NOTES

1. THE LEFT PORTION OF THIS TABLE IS A DIRECT REPRESENTATION OF THE TABLE ON PAGES 10 AND 11 OFTHE CITY OF JOHANNESBURG "COMPLETE STREETS" GUIDELINE WITH CYCLIST FACILITY CLASSES ADDED - THIS INFO. ALSO FROM "COMPLETE STREETS" GUIDELINE.
2. THE RIGHT PORTION IS A ROTATED VERSION OF THE RISFSA MOBILITY AND ACCESS DIAGRAM.
3. REFER AS NECESSARY TO DRAWING JRA-SD-RG-010 "URBAN FUNCTIONAL ROAD CLASSIFICATION" AND DRAWING JRA-SD-RG-011 "URBAN ACCESS MANAGEMENT REQUIREMENTS AND FEATURES".

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

MOBILITY AND ACCESS

SCALE AS SHOWN: NTS

DATE: 14/11/2014

DRAWING NUMBER: JRA-SD RCS-010 | EXTN.:

AMENDMENT NUMBER:

COMPLETE STREETS: SUMMARY OF DESIGN ELEMENTS

		REQUIREMENTS			TYPICAL FEATURES (use appropriate context sensitive standards for design)								
RISFSA Road Class	**Complete Streets Typology**	**Intersection Spacing**	**Access to Property**	**Parking**	**Speed km/h**	**Intersection Control**	**Typical Cross Section**	**Roadway Lane Width**	**Road Reserve Width**	**Public Transport Stops & Ped. Xing**	**Pedestrian Footways (constructed)**	**Cycle Lanes**	**Traffic Calming**
Class 1	**Freeway/Primary Distributor**	2,4 km (1,6 km to 3,6km)	Not allowed	No	100 – 120	Interchange	4/6/8 lane freeway	3,3 m - 3,7 m lanes	60 m – 120 m (60 m)	No	No	No	No
Class 2	**Arterial/Regional Distributor**	800 m (+/- 15%)	Not allowed *	No	80	Coordinated traffic signal/ interchange	4/6 lane divided, kerbed	3,3 m - 3,6 m lanes	38 m – 62 m (40 m)	Yes at intersections	Off road	Yes, on verge	No
	BRT Trunk Route	500 m	Not allowed	No	70	Coordinated traffic signal with bus priority/roundabout	2 lane BRT right of way in median, 2-4 mixed traffic lanes	3,3 m – 3,5 m lanes	30 m – 40 m	Only at BRT stations	Yes	Yes, in road or on verge	No
Class 3	**District Distributor**	600 m (+/- 20%)	Not Allowed *	No	70	Coordinated traffic signal/roundabout	4 lane divided or undivided, kerbed	3,3 m – 3,5 m lanes	25 m – 40 m (30 m)	Yes, at intersections	Yes	Yes, in road or on verge	No
Class 4	**(Main) CBD Road Activity Street/Local Distributor/Boulevard**	>150 m	Yes (larger properties)	Yes if conditions allow	60	Traffic signal, roundabout, or priority	4 lane, median at ped x-ing, boulevard, CBD one-way	3,0 m – 3,5 m lanes	20 m – 40 m (25 m)	Yes at intersections, or mid-block	Yes	Yes, in road or on verge	Median for peds, curved roadway
	Industrial Road	>150 m	Yes	No	60	Traffic signal or priority	4 lane, median at ped x-ing	3,2 m – 3,5 m lanes	25 m – 40 m (30 m)	Yes at intersections, or mid-block	Yes	Yes, on verge	Median for peds.
No RISFSA Class	**(Small) CBD Road/ Activity Street**	>150 m	Yes	Yes	40	Traffic signal or priority	2 – 4 lane plus parking	2,8 m – 3,3 m lanes	15 m – 25 m (22 m)	If applicable, anywhere	Normally yes	Yes, in road	Raised ped. crossing
Class 5	**Residential Collector**	>150 m	Yes	Yes, if appropriate	50	Roundabout, mini-circle or priority	2 - 3 lane undivided	6 m – 9 m roadway ?3,3 m lanes	16 m – 30 m (20 m)	Yes anywhere	Yes	Yes, in road or on verge	Raised ped. median, narrow lanes
	Residential Street		Yes	Yes on verge	40	Mini-circle, priority or none	1 - 2 lane mountable kerbs	3 m–5,5 m roadway (2 way)	10 m – 16 m (14 m)	If applicable anywhere	Not normally, pedestrians can use roadway	Use roadway	Yes, but should not be necessary
Class 6	**NMT Route Greenway Multi-use Pathway**	500 m maximum	Yes	No vehicles	15	None, pedestrians have right of way	Surfaced/block paving	3 m – 5 m	6 m	If applicable anywhere	Yes	Yes	Yes

LEGEND

NOTES

1. THIS TABLE IS A REARRANGED VERSION TABLE 6.1 "SUMMARY OF DESIGN ELEMENTS" FROM CoJ "COMPLETE STREETS".
2. THE REARRANGEMENTS HAVE BEEN MADE TO CORRELATE WITH THE RISFSA ROAD CLASSIFICATION, AND INCLUDE:
   - ADDITION OF COLUMN 1- RISFSA ROAD CLASS;
   - LOCATING "BRT TRUNK ROUTE" LINE IN CLASS 2;
   - HIGHLIGHTING OF "(Small) CBD ROAD/ACTIVITY STREET" WHICH IS NOT CLASSIFIED BY RISFSA/COTO.
3. IN ROAD CYCLE LANES ARE OPTIONAL IN CLASS 2, 3 AND 4 ROAD RESERVES SUBJECT TO A PRIOR SAFETY AUDIT.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

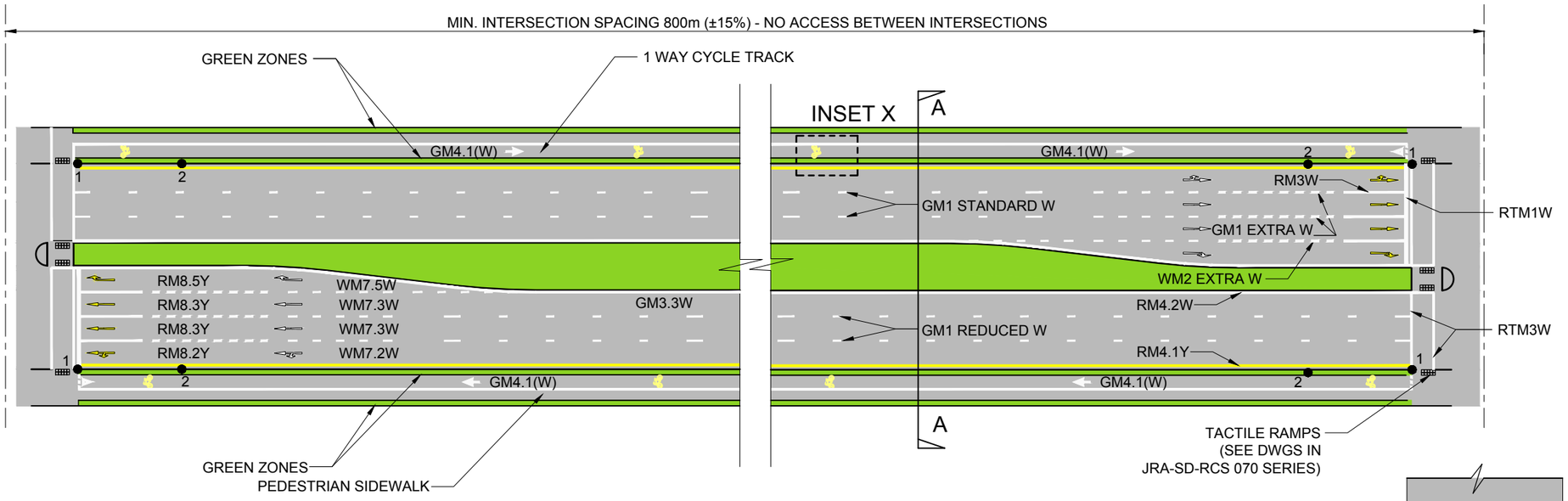
SUMMARY OF DESIGN ELEMENTS

SCALE AS SHOWN: NTS

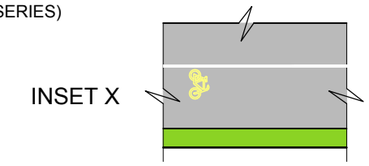
DATE: 04/02/2015

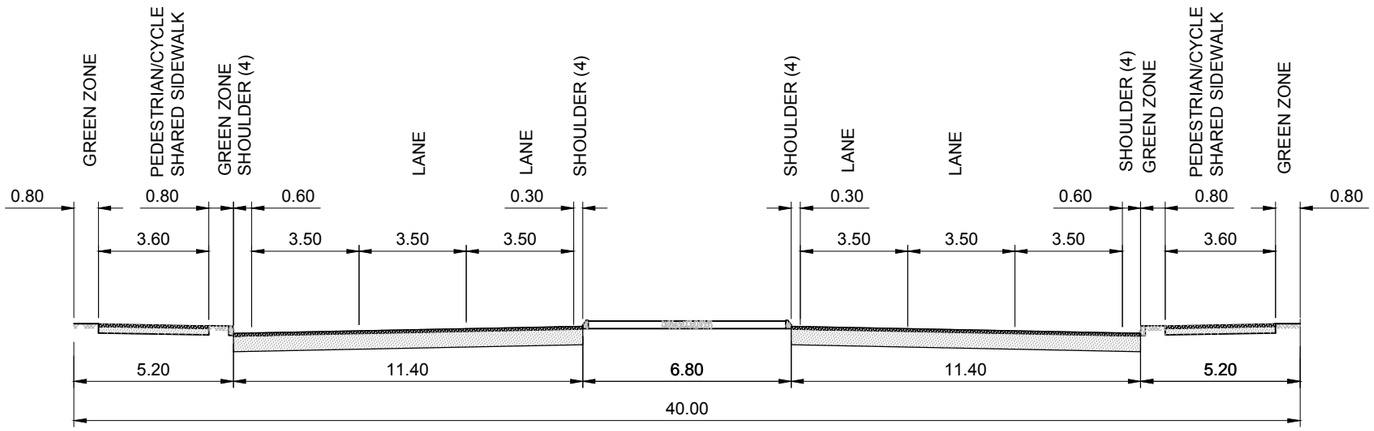
DRAWING NUMBER: JRA-SD RCS-011 | EXTN.

AMENDMENT NUMBER:

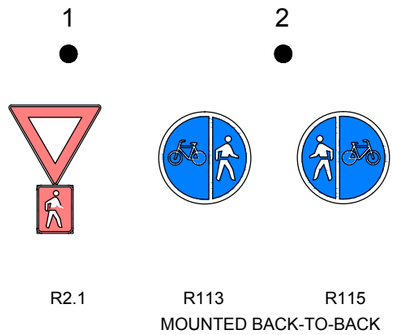


TYPICAL 40m ROAD RESERVE - URBAN





A - A
CROSS SECTION
TYPICAL 40m ROAD RESERVE - URBAN



NON MOTORISED TRANSPORT
TYPICAL ROAD SIGNS

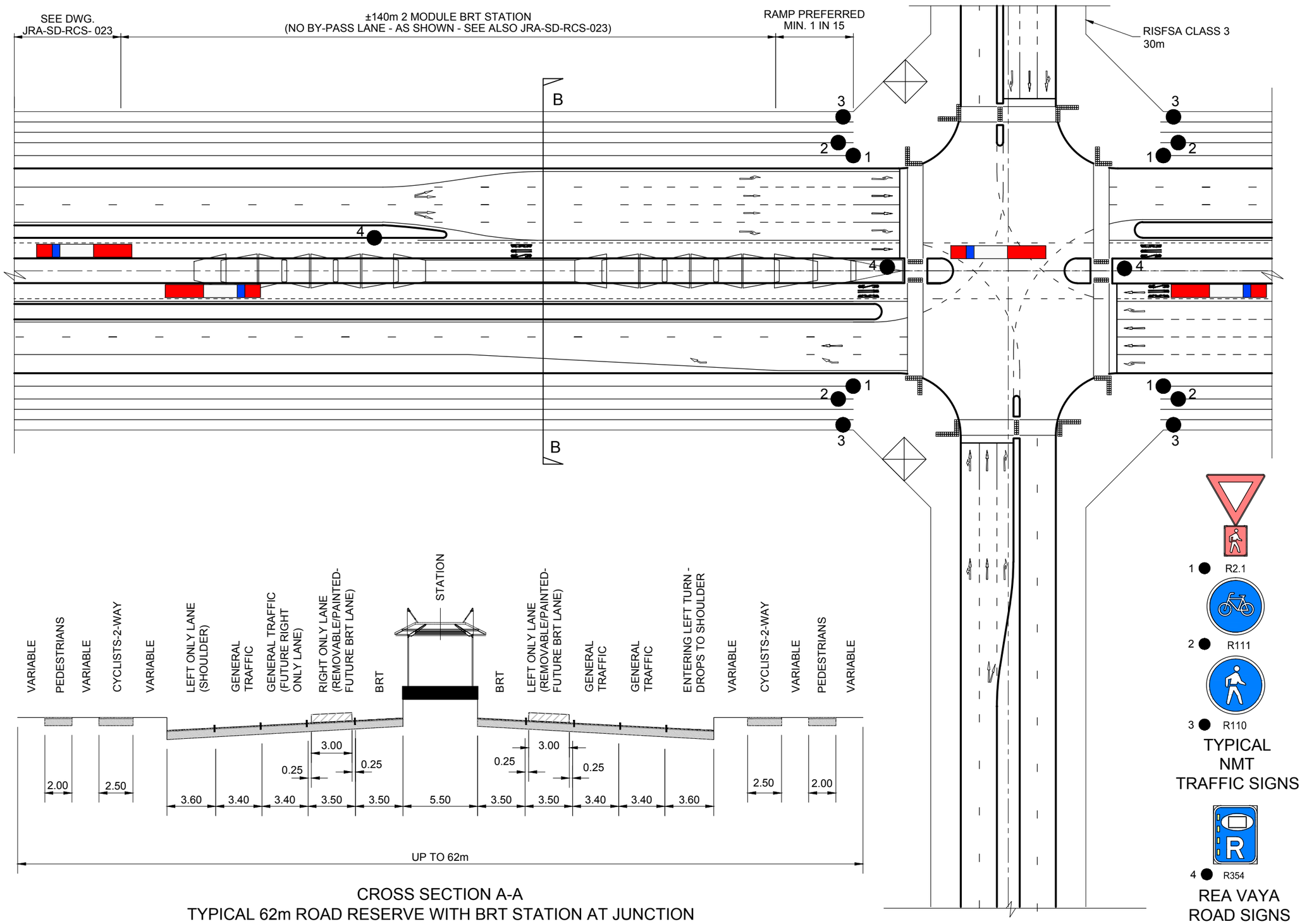
LEGEND

Y	YELLOW ROAD MARKING
W	WHITE ROAD MARKING
▦	NOTIONAL TACTILE PEDESTRIAN FACILITIES

NOTES

1. ROAD MARKING DETAILS ARE REPRESENTATIVE BUT NOTIONAL. REFER TO SADC-RTSM VOLUMES 1, 2 & 4 FOR FULLY DIMENSIONED DETAILS.
2. REFER TO JRA-SD- RCS-021 FOR DETAILS WITH BRT.
3. THIS ROAD CLASS MAY BE PROVIDED IN ROAD RESERVES UP TO 62m IN WIDTH. SUBJECT TO PLANNED REQUIREMENTS ANY EXTRA WIDTH MAY BE DISTRIBUTED BY PROVIDING SHOULDERS(1.8m MIN. TO 3.0m MAX) WITHIN GREEN ZONES AND CENTRAL MEDIAN.
4. "SHOULDERS" INDICATED ARE NOMINAL CLEARANCES FOR ROAD MARKINGS RM4.1 AND RM4.2.
5. TRAFFIC SIGNALS OMITTED FOR CLARITY (REFER TO JRA-SD-RCS-070 SERIES).
6. ROAD SIGN OPTIONS RELATED TO NMT FACILITY USE ONLY ARE SHOWN.
7. CYCLE PATHS ARE ONE-WAY FACILITIES.

AMENDMENTS				DESIGNED BY:	DRAWN BY:	CITY OF JOHANNESBURG	SCALE AS SHOWN: NTS	
No.	DATE	APPROVED	DESCRIPTION			JOHANNESBURG ROADS AGENCY (PTY) LTD	DATE: 26/01/2015	
				STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:	Drawing Sub-set: ROADS: COMPLETE STREETS	DRAWING NUMBER	EXTN.
				CHECKED BY:	DRAWING APPROVED BY:	RISFSA CLASS 2: ARTERIAL/REGIONAL DISTRIBUTOR TYPICAL DETAILS	JRA-SD RCS-020	
							AMENDMENT NUMBER:	



CROSS SECTION A-A
TYPICAL 62m ROAD RESERVE WITH BRT STATION AT JUNCTION

TYPICAL NMT TRAFFIC SIGNS

REA VAYA ROAD SIGNS

LEGEND

- TACTILE PAVING
- RAMP DOWN IN DIRECTION OF ARROW - MAX.1 IN 15
- REPRESENTS THE WORD BUS IN YELLOW (RM17.2).
- OPTIONAL BICYCLE STORAGE.
- PROPERTY BOUNDARIES

Details on this drawing are subject to operational assessment with respect to traffic signal provision

NOTES

1. A DETAIL OF THIS NATURE SHOULD BE CONSIDERED AS ILLUSTRATIVE. ACTUAL LANE CONFIGURATIONS WILL BE DICTATED BY PUBLIC TRANSPORT POLICY AND GENERAL TRAFFIC DEMAND RESULTING FROM THE IMPLEMENTATION OF SUCH POLICY. REFER ALSO TO DWGS JRA-SD-RCS-022 AND 023.
2. THE FULL DEVELOPMENT OF A RISFSA CLASS 2 ROAD IN A 62m RESERVE IS SHOWN.
3. REMOVABLE ISLANDS ARE SHOWN ON THE LINE OF FUTURE BRT BY-PASS LANES. THESE MAY ALTERNATIVELY BE PROVIDED AS PAINTED ISLANDS.
4. DRAWING JRA-SD-RCS-022 SHOWS A TYPICAL MID-BLOCK BRT STATION WITH BY-PASS LANES(50m ROAD RESERVE).
5. IF BRT BY-PASS LANES ARE PROVIDED IN FUTURE THE GENERAL TRAFFIC RIGHT TURN ONLY LANES WILL MOVE TO THE LEFT. THESE LANES MAY THEN REQUIRE BLOCKING ISLANDS ON THE FAR SIDE OF THE JUNCTION. SUCH TREATMENT WILL RESULT IN A SUBSEQUENT LANESHIFT TO THE RIGHT BEYOND THE JUNCTION.

AMENDMENTS			
No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

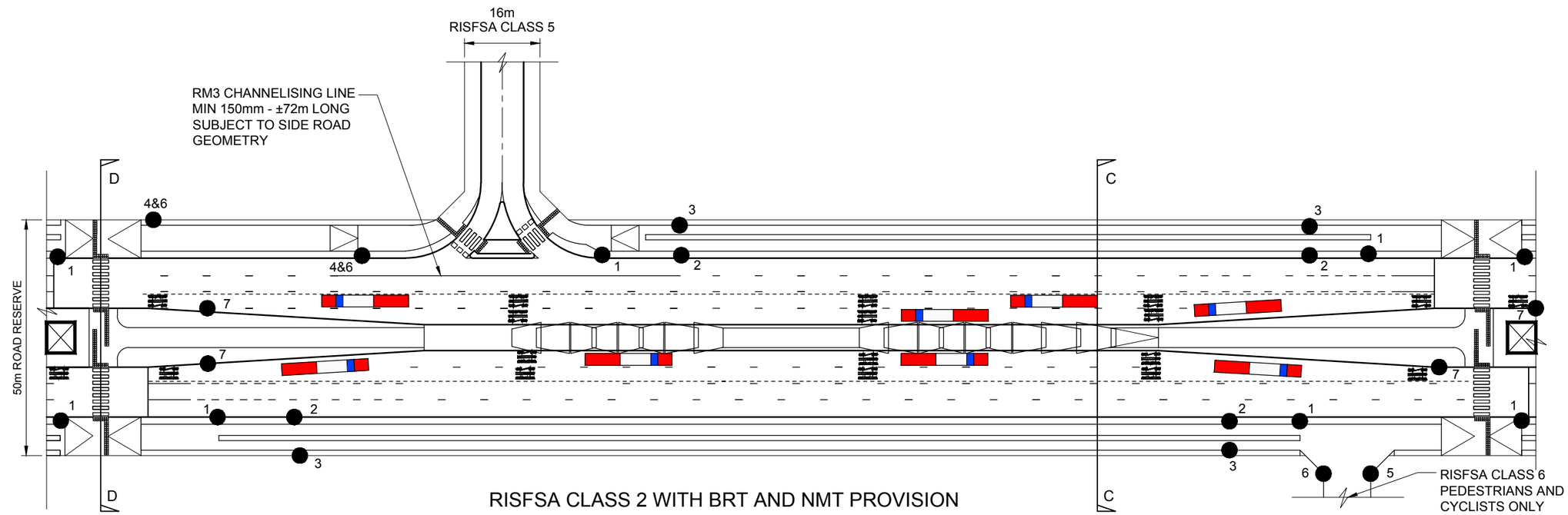
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

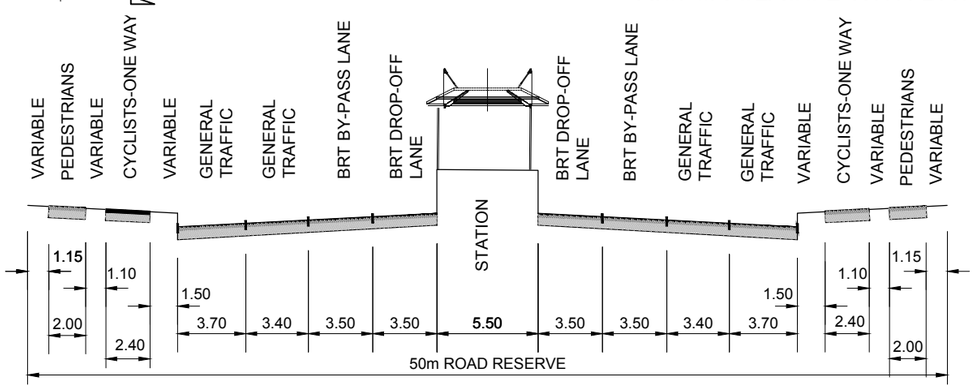
Drawing Sub-set: ROADS: COMPLETE STREETS

RISFSA CLASS 2: ARTERIAL/REGIONAL DISTRICT DISTRIBUTOR TYPICAL INTERSECTION WITH BRT STATION

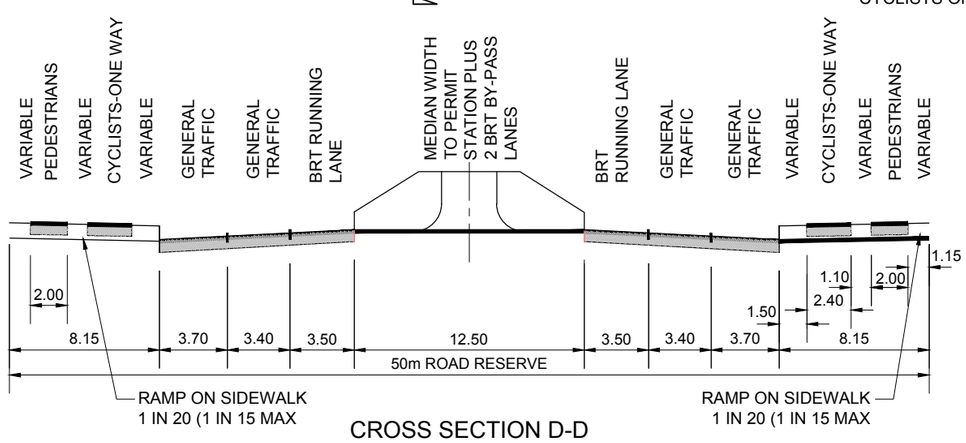
SCALE AS SHOWN: NTS	
DATE: 08/05/2015	
DRAWING NUMBER	EXTN.
JRA-SD RCS-021	
AMENDMENT NUMBER:	



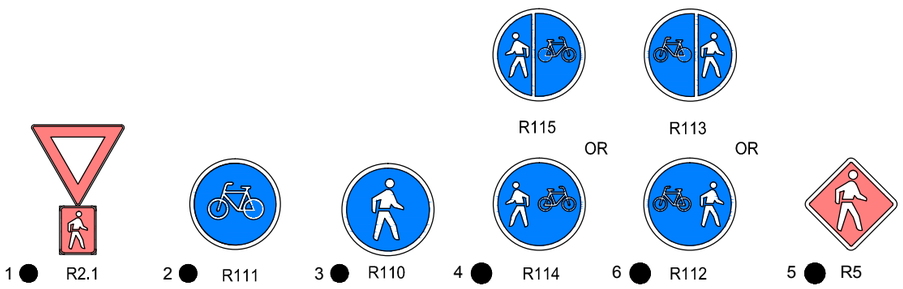
RISFSA CLASS 2 WITH BRT AND NMT PROVISION



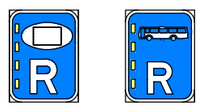
CROSS SECTION C-C
TYPICAL CROSS SECTION AT STATION



CROSS SECTION D-D
TYPICAL CROSS SECTION AT PEDESTRIAN CROSSING



TYPICAL NMT TRAFFIC SIGNS



REA VAYA TRAFFIC SIGNS

LEGEND

- TACTILE PAVING
- RAMP DOWN IN DIRECTION OF ARROW - MAX.1 IN 15
- REPRESENTS THE WORD BUS IN YELLOW (RM17.2).
- OPTIONAL BICYCLE STORAGE.
- PROPERTY BOUNDARIES

Details on this drawing are subject to operational assessment with respect to traffic signal provision

NOTES

1. SEE ALSO NOTES ON DWGS JRA-SD-RCS-021 AND 023.
2. R348-BUS LANE- RIGHT RESERVATION SIGN OR R354-AUTHORISED PASSENGER TRANSPORT VEHICLE LANE-RIGHT RESERVATION (REA VAYA) SIGN SHOULD BE PLACED ON BOTH SIDES OF THE MEDIAN ISLAND AT APPROX. 250m INTERVALS.
3. NMT SIGNS 4-6 (R114-R112) OR (R115-R113) MOUNTED BACK-TO-BACK APPROPRIATE TO PEDESTRIAN/ CYCLE USE.
4. THIS DETAIL ILLUSTRATES A MID-BLOCK BRT STATION WITH ADDITIONAL BY-PASS LANES. THIS CONFIGURATION REQUIRES A WIDE MEDIAN FOR A STANDARD STATION PLUS BY-PASS LANES.
5. THE DECISION TO PROVIDE THIS LANE CONFIGURATION WILL BE BASED ON GENERAL TRAFFIC DEMAND, BRT ROUTE SCHEDULING AND PUBLIC TRANSPORT POLICY.
6. FOR TACTILE PAVEMENT TREATMENT REFER TO JRA-SD-RCS-070 SERIES.
7. THIS DETAIL REPRESENTS A MINIMUM CROSS SECTION FOR A 6 LANE CARRIAGEWAY IN A 50m ROAD RESERVE WITH MINIMAL SHOULDERS. SEE DRAWINGS JRA-SD-RCS-021 &023 FOR DETAILS WITH FULL SHOULDERS.
8. FOR BRT MARKINGS REFER TO JRA-SD-RCS-024.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

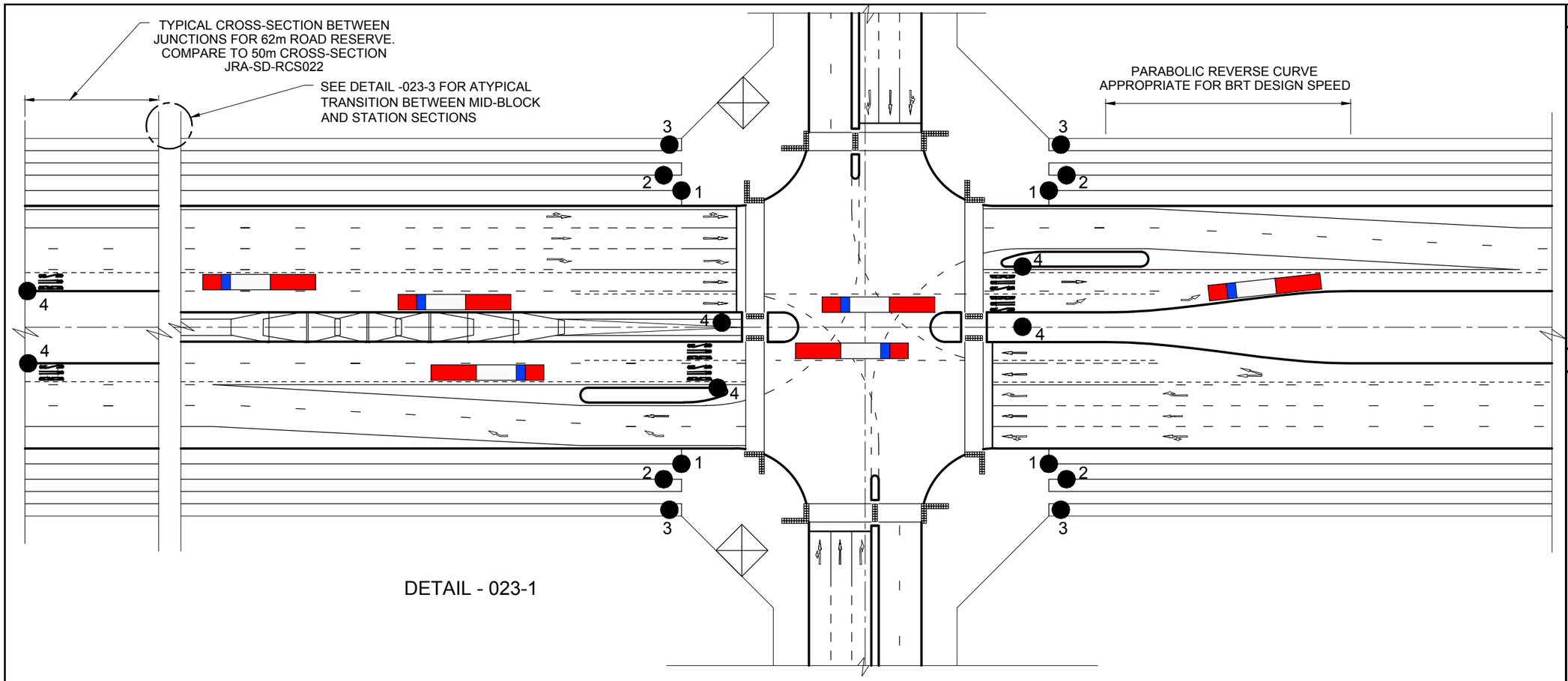
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

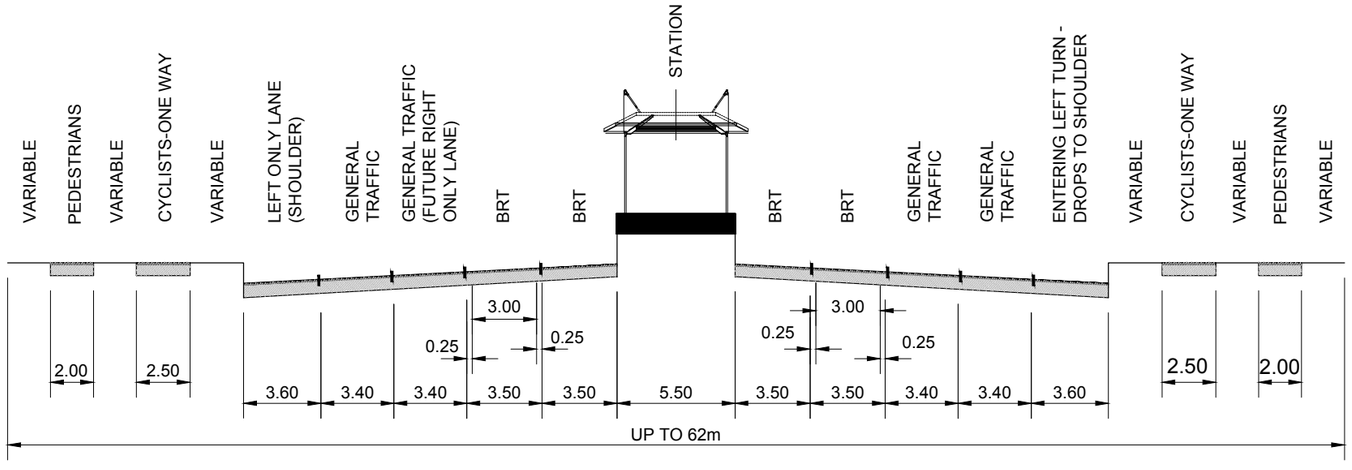
Drawing Sub-set: ROADS: COMPLETE STREETS

RISFSA CLASS 2: ARTERIAL/REGIONAL DISTRICT DISTRIBUTOR TYPICAL INTERSECTION WITH BRT STATION

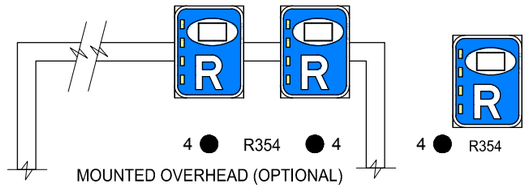
SCALE AS SHOWN: NTS	
DATE: 11/05/2015	
DRAWING NUMBER	EXTN.
JRA-SD RCS-022	
AMENDMENT NUMBER:	



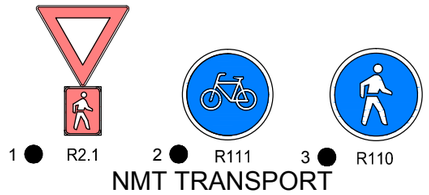
DETAIL - 023-1



DETAIL - 023-2 TYPICAL 62m ROAD RESERVE CROSS SECTION SYMMETRICAL - INCLUDING BRT



REA VAYA BUS LANE SIGN



NMT TRANSPORT TYPICAL ROAD SIGNS

LEGEND

- TACTILE PAVING
- RAMP DOWN IN DIRECTION OF ARROW - MAX.1 IN 15
- REPRESENTS THE WORD BUS IN YELLOW (RM17.2).
- OPTIONAL BICYCLE STORAGE.
- PROPERTY BOUNDARIES

NOTES

1. DETAIL 023-1 REPRESENTS A POSSIBLE UPGRADE TO THE CROSS-SECTION IN JRA-SD-RCS-21. THE RIGHT TURN LANE HAS BEEN CONVERTED TO A BRT BY-PASS LANE.
2. DETAIL 023-1 SIGNIFICANTLY INCREASES BRT CAPACITY BUT REDUCES GENERAL TRAFFIC CAPACITY.
3. SHORT PHYSICAL ISLANDS ARE INTRODUCED OPPOSITE GENERAL TRAFFIC RIGHT TURN LANES TO INHIBIT STRAIGHT ON MOVEMENT.
4. DETAIL 023-2 SHOWS THE MAXIMUM DEVELOPMENT OF BRT PROVISION IN A 62m ROAD RESERVE.
5. THESE DETAILS INDICATE A HIGH ORDER OF PROVISION WITHIN THE 62m ROAD RESERVE FOR CYCLISTS AND PEDESTRIANS IN SUPPORT OF THE POTENTIAL BRT CAPACITY.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

RISFSA CLASS 2: ARTERIAL/REGIONAL DISTRICT DISTRIBUTOR 62m CROSS SECTION

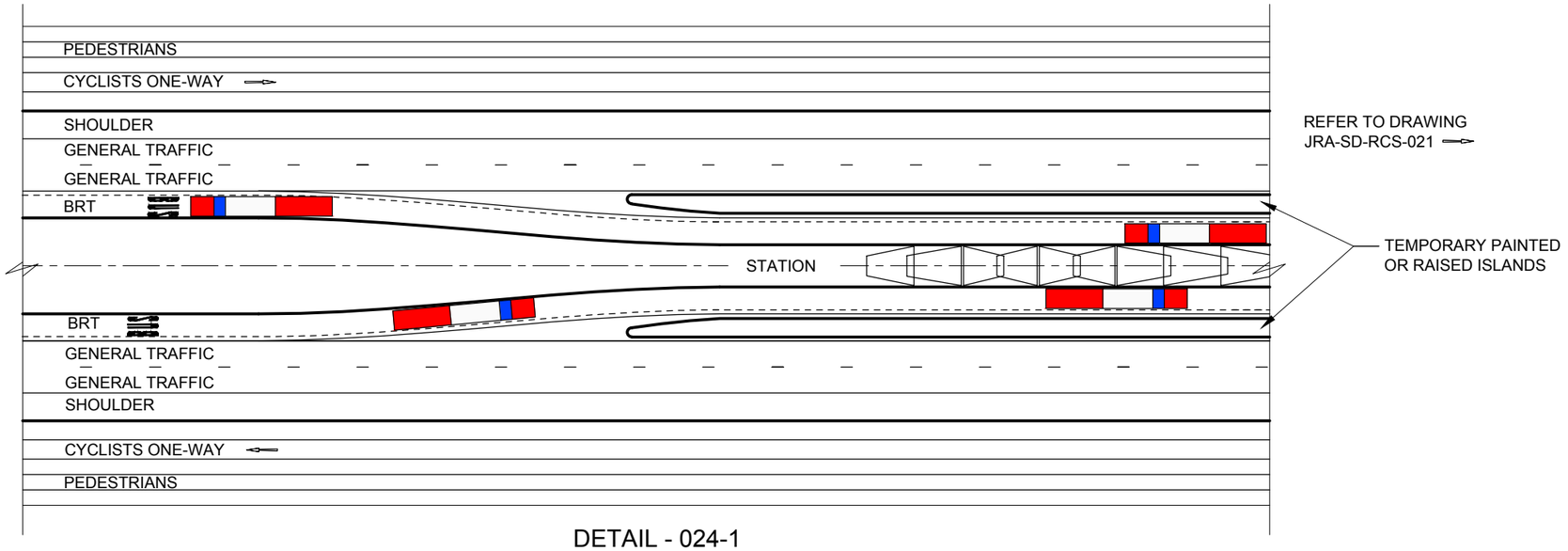
SCALE AS SHOWN: NTS

DATE: 01/06/2015

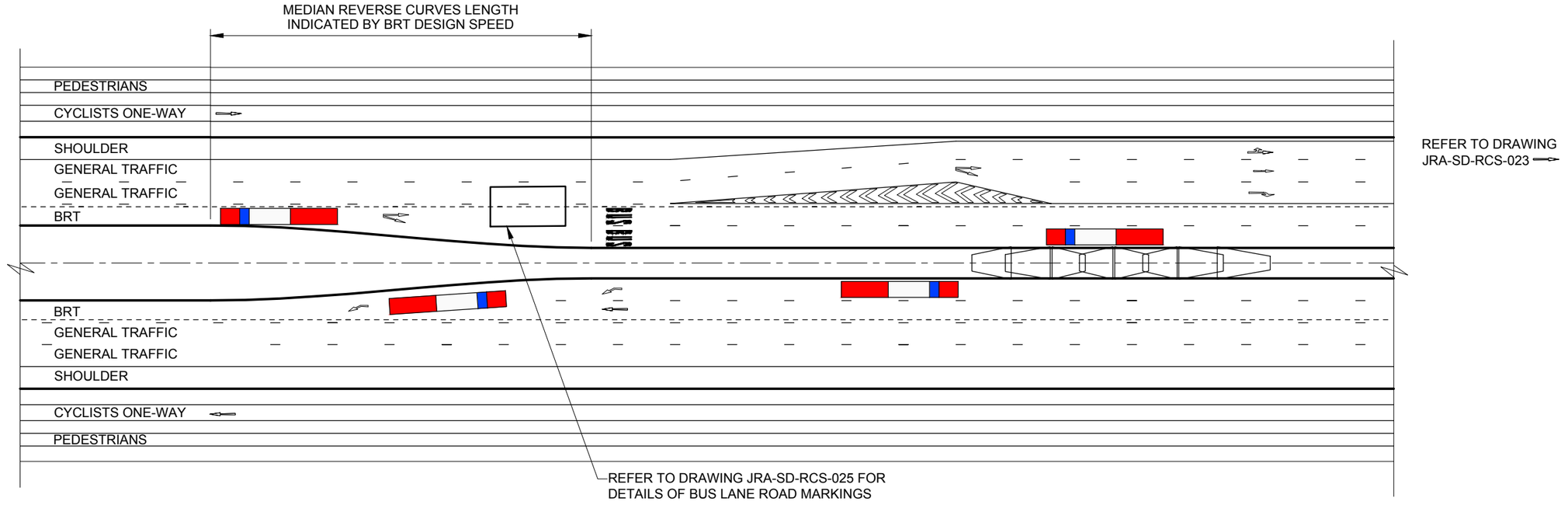
DRAWING NUMBER: JRA-SD RCS-023

EXTN.

AMENDMENT NUMBER:



DETAIL - 024-1
TRANSITION APPROACH TO SINGLE LANE STATION



DETAIL - 024-2
TRANSITION APPROACH TO TWO LANE SECTION/STATION

LEGEND

REPRESENTS THE WORD BUS IN YELLOW (RM17.2).

NOTES

1. DETAIL 024-1: ILLUSTRATES A TRANSITION FROM A SINGLE BRT LANE NEXT TO AN 11m MEDIAN ISLAND TO A SINGLE BRT LANE SERVING A STATION ON A 5.5m MEDIAN ISLAND.
2. DETAIL 024-2 ILLUSTRATES A TRANSITION FROM A SINGLE BRT LANE NEXT TO AN 11m MEDIAN ISLAND TO A DUAL LANE BRT FACILITY SERVING A STATION ON A 5.5m MEDIAN ISLAND WITH BY-PASS LANE CAPACITY. BRT BUSES WILL POTENTIALLY WEAVE BETWEEN LANES ON THE DUAL LANE STATION SECTION.
3. DETAIL 024-2 ALSO ILLUSTRATES HOW GENERAL TRAFFIC LANES NEED TO MOVE TO THE LEFT, TAKING UP THE SHOULDER SPACE, IN ORDER TO GENERATE A GENERAL TRAFFIC RIGHT TURN LANE AT THE APPROACHING JUNCTION.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

RISFSA CLASS 2: ARTERIAL/REGIONAL DISTRICT DISTRIBUTOR 62m CROSS SECTION - ADDITIONAL DETAIL

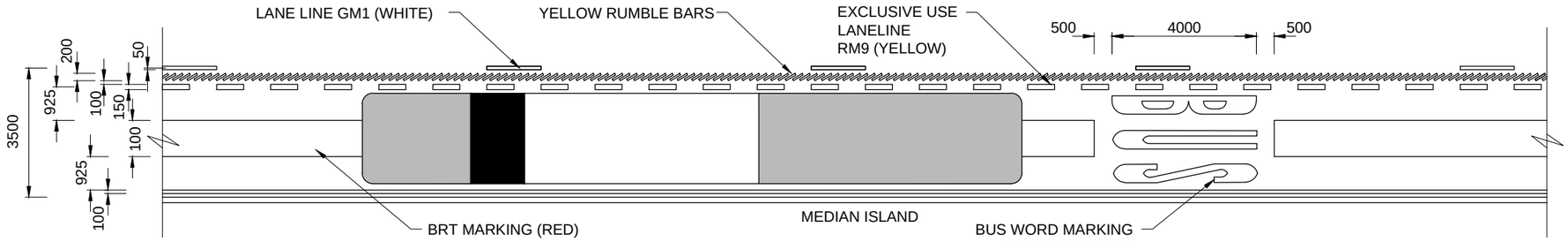
SCALE AS SHOWN: NTS

DATE: 02/06/2015

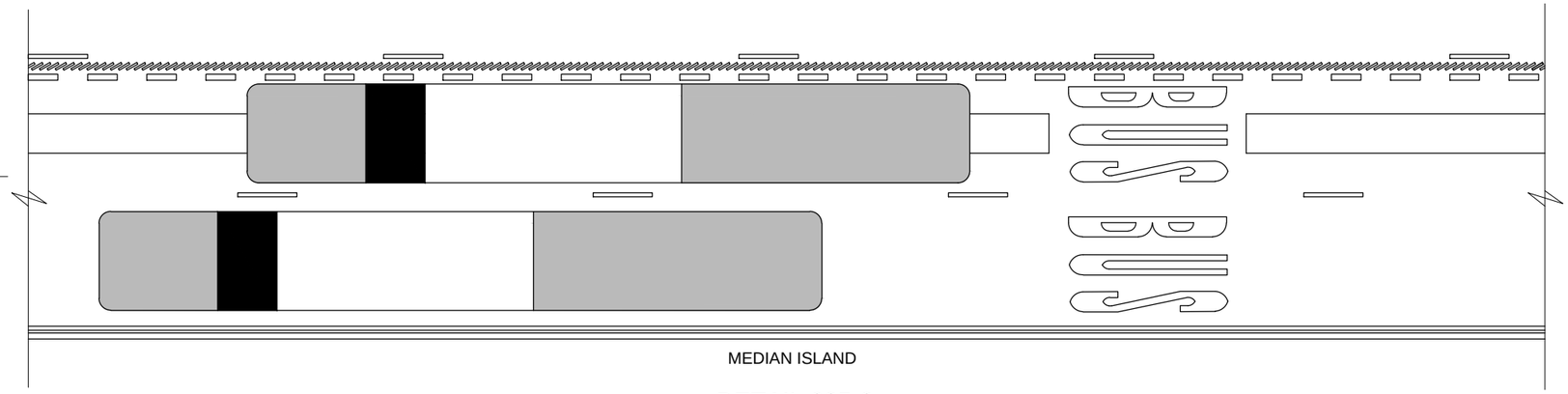
DRAWING NUMBER: JRA-SD RCS-024

EXTN.

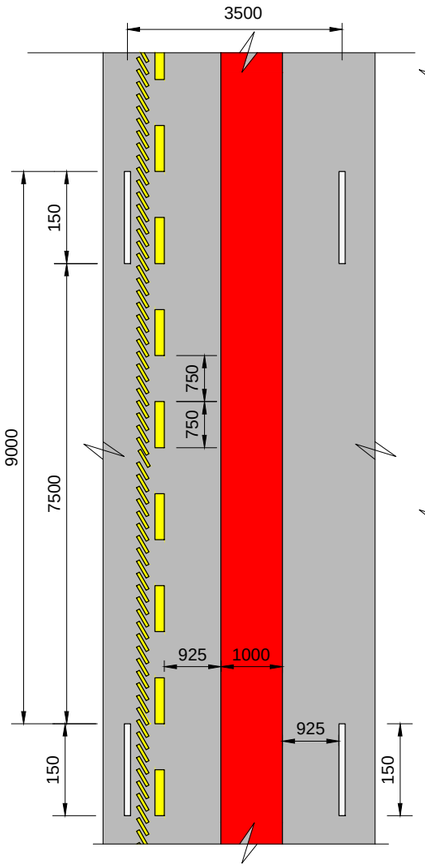
AMENDMENT NUMBER:



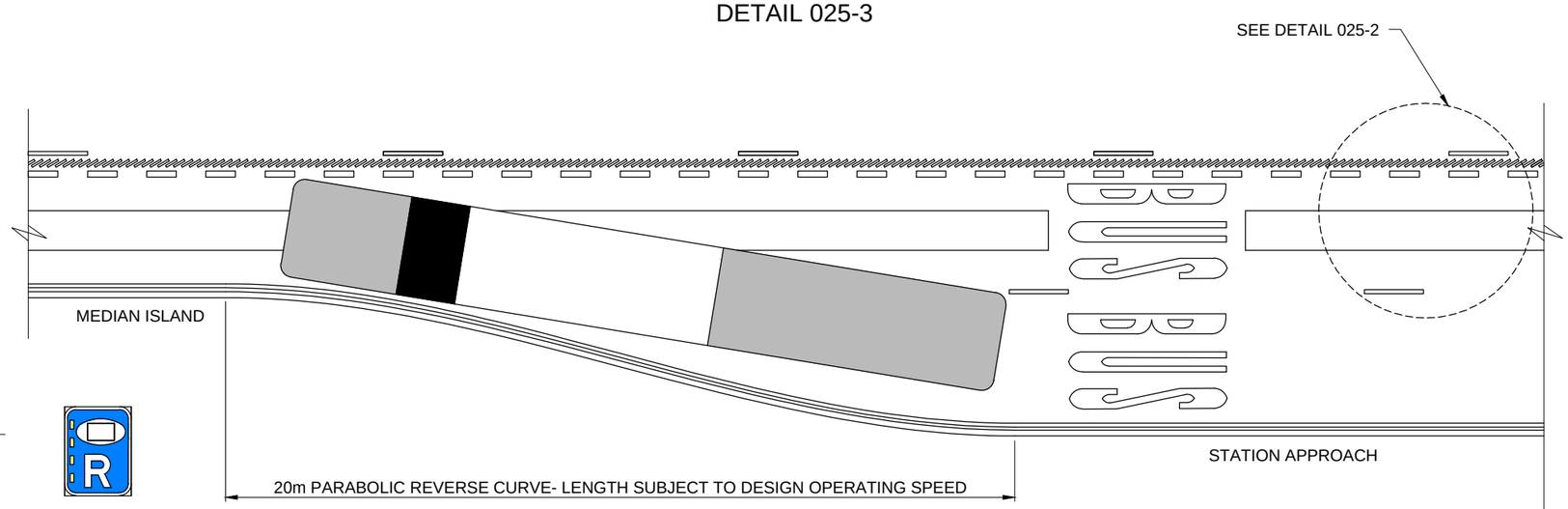
DETAIL 025-1



DETAIL 025-3



DETAIL 025-2



DETAIL 025-4

R354 (WITH RM17.2) AT 250m INTERVALS

REGULATORY SIGNS

LEGEND

NOTES

1. DETAIL 024-1 REFERS TO A SINGLE LANE BRT SERVICE.
2. DETAIL 024-2 SHOWS AN ENLARGEMENT OF THE PRINCIPLE ROAD MARKINGS USED IN JOHANNESBURG BRT LANES.
3. DETAIL 024-3 REFERS TO A 2 LANE, HIGH ORDER, BRT CONFIGURATION.
4. DETAIL 024-4 SHOWS A SITUATION WHERE A 2ND LAN ADDED, EITHER LOCALLY AT A STATION, OR PRIMARILY TO INCREASE RUNNING CAPACIT OVER SOME DISTANCE.
5. THE LEGAL SIGNIFICANCE OF ENFORCEMENT OF BUS LANE PROVIDED FOR BY THE USE C
   - REGULATORY SIGNS R302, R303, R353 OR OTHER VARIANTS- AND
   - EXCLUSIVE USE LANE LINE MARKING RM9 AND RM17.2 "BUS" WORD MARKING.
6. THE ADDITIONAL USE OF YELLOW RUMBLE BARS TO TH LEFT OF REGULATORY LINE R (IN BRT LANES) AND CONTINUOUS 1m WIDE RED ROAD MARKING ARE TACTILE/VISUAL BUT NON-REGULATORY TRAFFIC CONTROL DEVICES EMPLOYE ON JOHANNESBURG BRT LAN
7. REGULATORY SIGNS SUCH AS R302, R303, R353 OR R354 AND REGULATORY "BUS" WORD MARKING RM17.2 ARE REQUIF AT A MAXIMUM OF 250m INTERVALS.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

RISFSA CLASS 2: ARTERIAL/REGIONAL DISTRICT DISTRIBUTOR ROAD MARKING DETAILS FOR BRT LANES

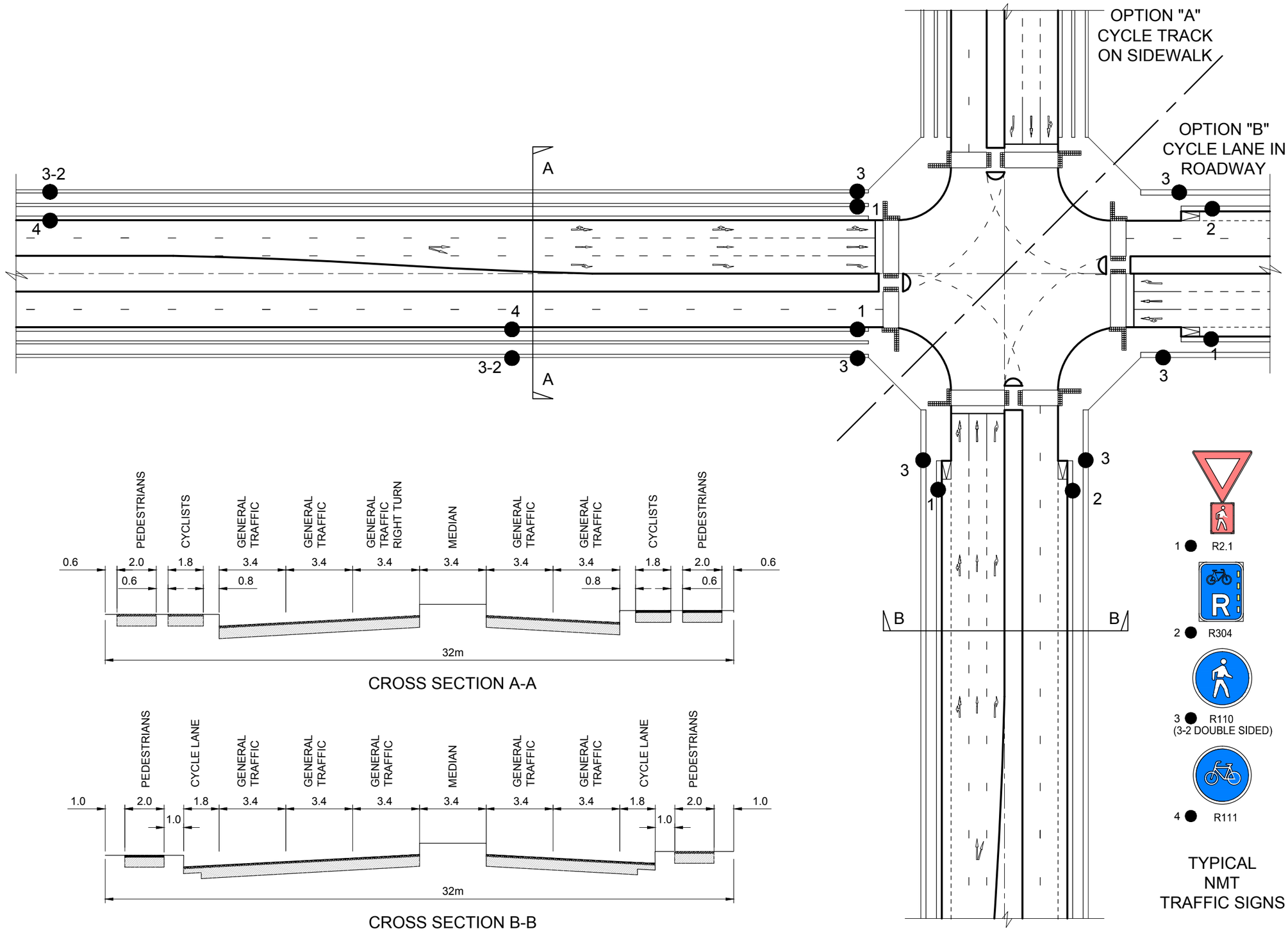
SCALE AS SHOWN: NTS

DATE: 27/11/2015

DRAWING NUMBER: JRA-SD RCS-025

EXT

AMENDMENT NUMBER:



LEGEND

- TACTILE PAVING
- RAMP TO/FROM SIDEWALK TO CYCLE LANE

NOTES

1. THIS DRAWING SHOWS TWO OPTIONS FOR THE PROVISION OF CYCLIST FACILITIES IN THE ONE DIAGRAM AND IN TWO CROSS SECTIONS.
2. THE ROAD RESERVE WIDTH OF A RISFSA CLASS 3 ROAD IS IN THE RANGE 25m TO 40m. THESE EXAMPLES HAVE A WIDTH OF 32m TO PROVIDE ADEQUATELY FOR NMT.
3. OPTION "A" SHOWS SEPARATE MANDATORY LANES DESIGNATED BY SIGNS R110 AND R111. WHILST THE SIDEWALKS CAN TAKE 2 WAY PEDESTRIAN TRAFFIC THE CYCLE PATHS SHOULD OPERATE ONE WAY IN THE DIRECTION OF GENERAL VEHICULAR TRAFFIC.
4. OPTION "B" SHOWS IN ROAD CYCLE LANES WHICH ARE RESTRICTED TO CYCLIST USE BY SIGN R304 AND YELLOW MARKING RM9, PLUS BICYCLE SYMBOL MARKING GM6.1. THESE LANES SHOULD OPERATE IN A ONE WAY DIRECTION WITH GENERAL TRAFFIC.
5. FEEDER ROUTE BUS STOPS MAY BE REQUIRED - SEE JRA-SD-RCS-040.
6. SEE JRA-SD-RCS-031 FOR EXAMPLE WITH BRT.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

RISFSA CLASS 3: DISTRICT DISTRIBUTOR TYPICAL DETAILS

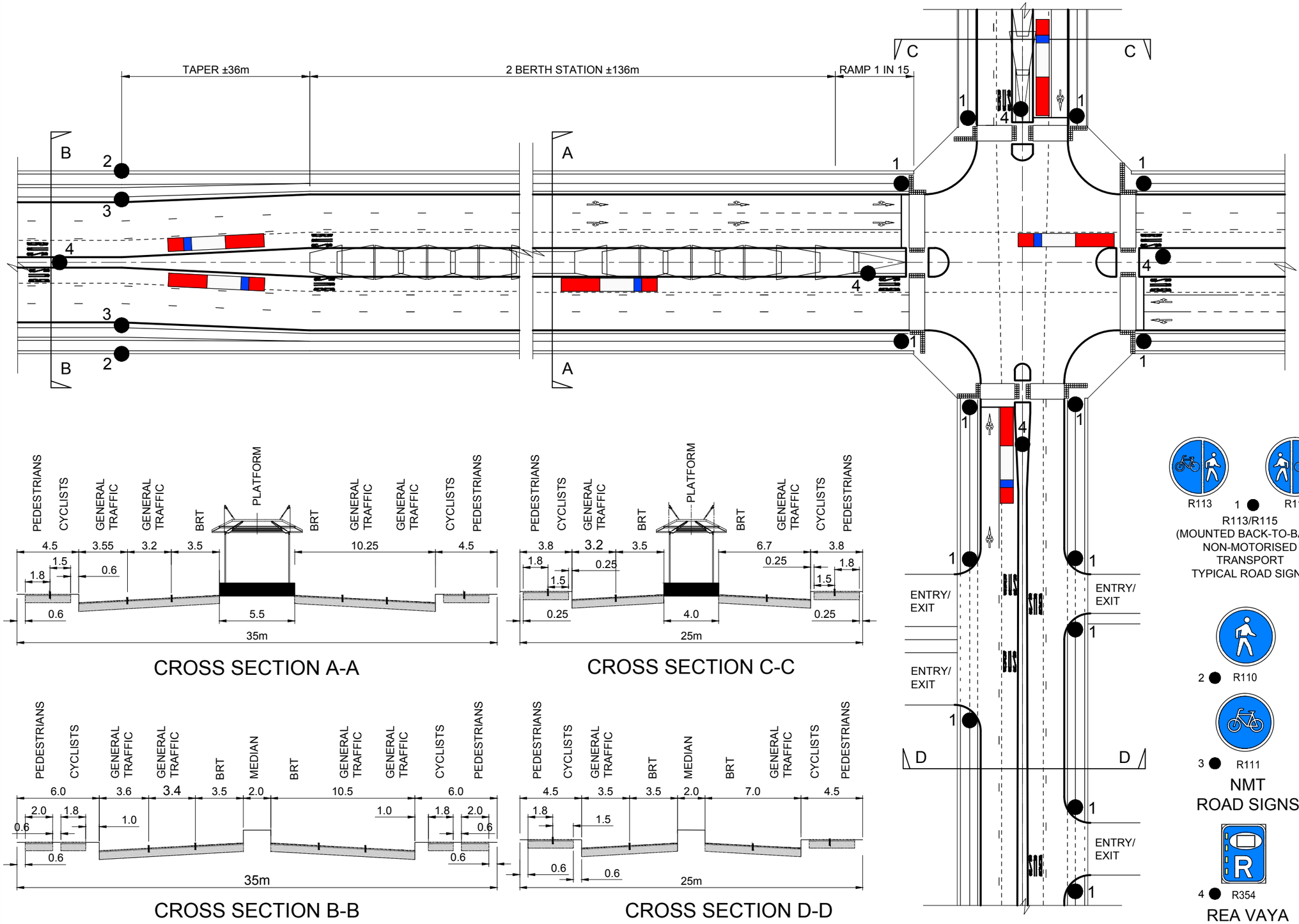
SCALE AS SHOWN: NTS

DATE: 04/05/2015

DRAWING NUMBER: JRA-SD RCS-030

EXTN.

AMENDMENT NUMBER:



CROSS SECTION A-A

CROSS SECTION C-C

CROSS SECTION B-B

CROSS SECTION D-D

R113/R115
(MOUNTED BACK-TO-BACK)
NON-MOTORISED
TRANSPORT
TYPICAL ROAD SIGNS

2 R110

3 R111

NMT
ROAD SIGNS

4 R354

REA VAYA
ROAD SIGNS

LEGEND

- TACTILE PAVING
- RAMP DOWN AT 1 IN 15 IN DIRECTION OF ARROW.
- E — PROPERTY ENTRANCE
- PROPERTY BOUNDARIES

Details on this drawing are subject to operational assessment with respect to traffic signal provision

NOTES

1. THIS DETAIL SHOWS A POSSIBLE JUNCTION BETWEEN BRT ROUTES.
2. ONE ROAD HAS A RESERVE WIDTH OF 35m WITH ONE BRT LANE AND 2 GENERAL TRAFFIC LANES IN EACH DIRECTION.
3. IT HAS BEEN ASSUMED THAT PROPERTY ADJACENT TO THIS ROAD HAS ACCESS FROM AN INTERNAL ROAD SYSTEM.
4. THE INTERSECTING ROAD RESERVE WIDTH IS 25m. PROPERTIES HAVE DIRECT ACCESS.
5. THE 35M ROAD REQUIRES THE NMT STANDARD TO BE REDUCED TO ACCOMMODATE THE BRT STATION WIDTH OF 5.5m.
6. THE 25m ROAD CAN ONLY FIT A 4.0m NARROW WIDTH STATION, PLUS A BRT LANE AND ONE NARROW GENERAL TRAFFIC LANE IN EACH DIRECTION. NMT PROVISION IS OF REDUCED STANDARD.
7. THIS BRT/GENERAL TRAFFIC CONFIGURATION IS COMPLEX, AND IS SUBJECT TO THE ABILITY TO PROVIDE ADEQUATE AND SAFE TRAFFIC SIGNAL OPERATION. SUCH OPERATION MAY NEED TO INCLUDE PROVISION FOR TURNING BRT SERVICES.
8. THIS DRAWING DOES NOT INTEND TO PROPOSE THE BRT OPERATION SHOWN. RATHER ITS FUNCTION IS TO HIGHLIGHT THE POTENTIAL COMPLEXITIES OF SUCH OPERATION.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

RISFSA CLASS 3: DISTRICT DISTRIBUTOR TYPICAL DETAILS WITH BRT

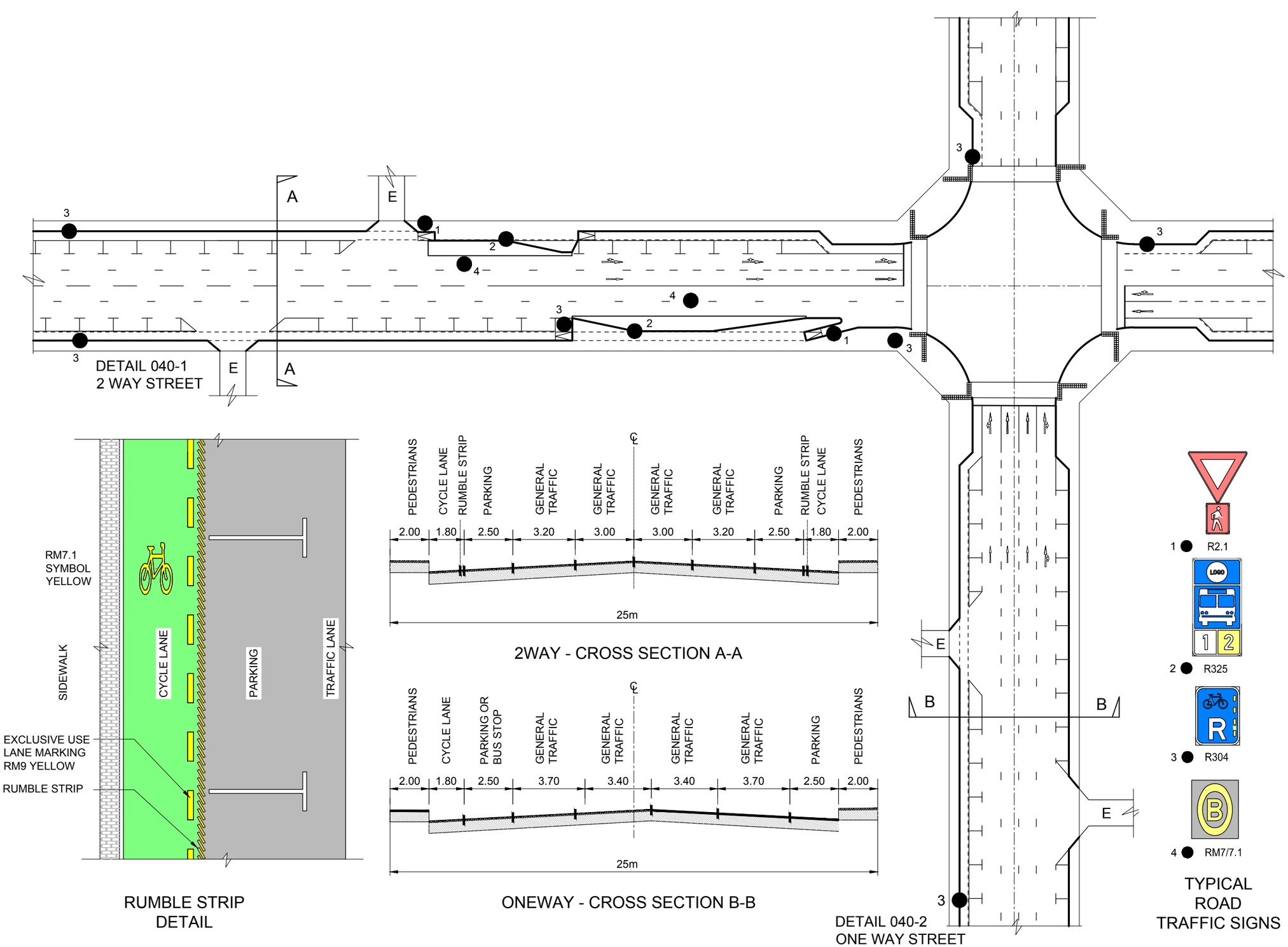
SCALE AS SHOWN: NTS

DATE: 05/05/2015

DRAWING NUMBER: JRA-SD RCS-031

EXTN.

AMENDMENT NUMBER:



DETAIL 040-2
ONE WAY STREET

RUMBLE STRIP
DETAIL

2WAY - CROSS SECTION A-A

ONEWAY - CROSS SECTION B-B

TYPICAL
ROAD
TRAFFIC SIGNS

LEGEND

- E — PROPERTY ENTRANCE- ON CLASS 4 PRIMARILY TO OFF-STREET PARKING
- TACTILE PAVING
- PROPERTY BOUNDARIES

NOTES

1. THE ROAD RESERVE WIDTH OF A RISFSA CLASS 4 ROAD IS IN THE RANGE 20m TO 40m.
2. THIS EXAMPLES HAS A WIDTH OF 25m AND ILLUSTRATES CROSSING ONE WAY AND 2-WAY ROADS.
3. CYCLE LANES ARE SHOWN IN BOTH CATEGORIES OF ROAD IN ADDITION TO PARALLEL PARKING. THIS FORMAT REPRESENTS LOW QUALITY NMT PROVISION. A HIGHER LEVEL OF NMT FACILITY WILL REQUIRE A GREATER ROAD RESERVATION WIDTH.
4. FEEDER OR GENERAL SERVICE BUS STOPS, WITH LAYBYS ARE SHOWN IN THE 2-WAY ROAD. THE PROVISION OF LAYBYS REQUIRES THE INTEGRATION OF PEDESTRIAN AND CYCLISTS ON THE SIDEWALK AROUND THE LAYBYS. IF A BUS SHELTER IS TO BE PROVIDED THE REMAINING SPACE FOR PEDESTRIANS AND CYCLISTS MAY COMMONLY BECOME SUB-STANDARD, SUBJECT TO VOLUMES.
5. SEE JRA-SD-RCS-041 FOR AN EXAMPLE OF THIS ROAD CLASS IN AN INDUSTRIAL AREA.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

RISFSA CLASS 4: CBD/ACTIVITY/LOCAL DISTRIBUTOR/BOULEVARD - TYPICAL DETAILS

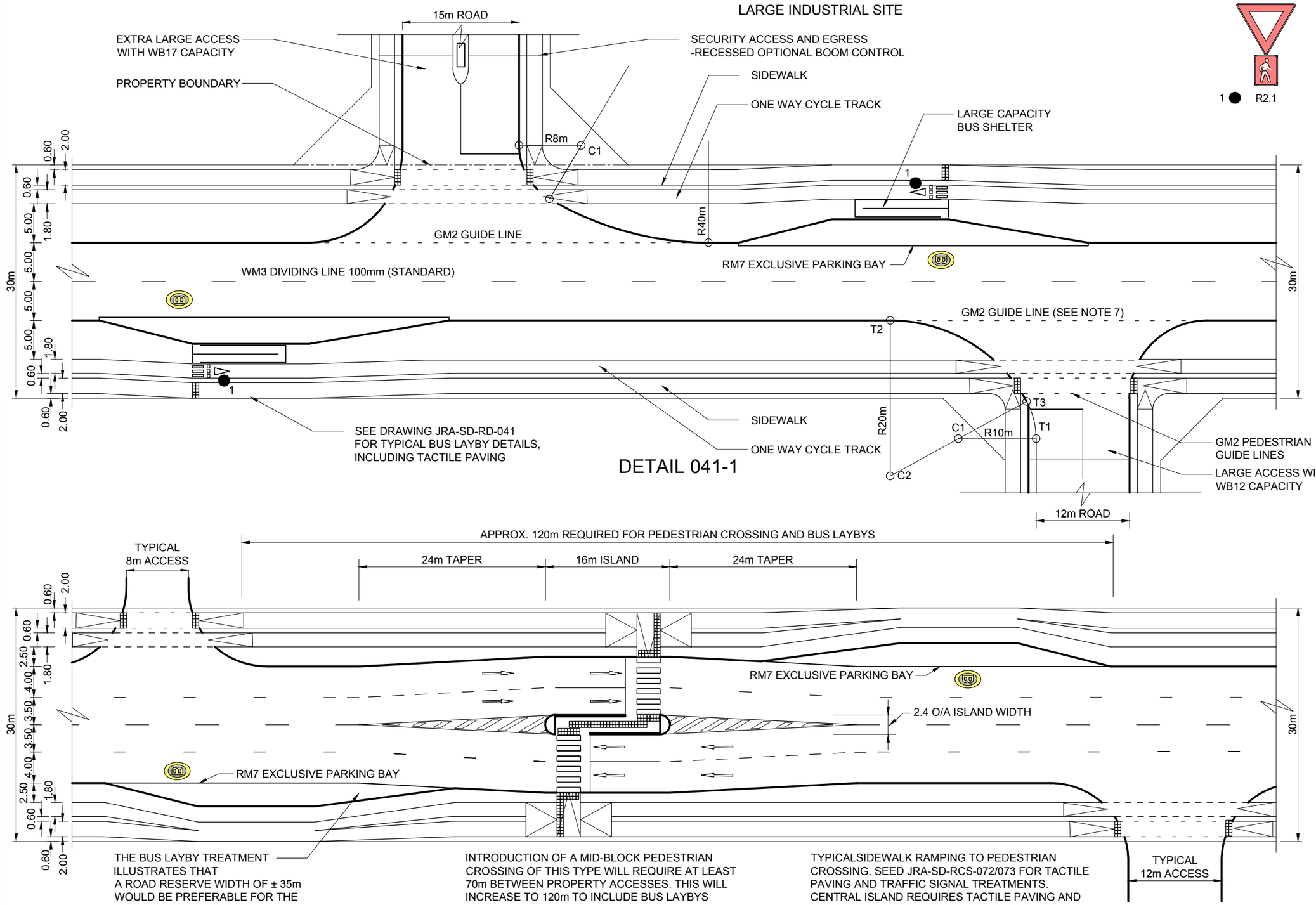
SCALE AS SHOWN: NTS

DATE: 13/05/2015

DRAWING NUMBER: JRA-SD RCS-040

EXTN.

AMENDMENT NUMBER:



LEGEND

RAMP DOWN AT 1 IN 15 IN DIRECTION OF ARROW.

TACTILE PAVING

NOTES

1. FOR NEW PLANNING, A TYPICAL MINIMUM ROAD RESERVE WIDTH SHOULD BE ±/30m TO PROVIDE A HIGH STANDARD NMT CROSS SECTION.
2. A 30m ROAD RESERVE CAN PROVIDE 4 LANES WITH NO PARKING OR 2 LANES WITH 90° PARKING/BUS LAYBYS.
3. DETAIL 041-1 SHOWS LARGE INDUSTRIAL STANDS WITH ENTRANCE ROADS OF 15m AND 12m.
4. DETAIL 041-1 SHOWS ENTRANCE SPLAYS AS PART OF A HIGH STAND AND AND ENTRANCE DESIGN, INCLUDING SET-BACK ACCESS CONTROL.
5. NMT FACILITIES SHOULD BE ACCORDED FORMAL PRIORITY AND BE PROVIDED WITH TACTILE RAMPING FOR PEDESTRIANS.
6. DETAIL 041-2 SHOWS A 4 LANE CROSS SECTION WITH MID BLOCK SIGNALISED PEDESTRIAN CROSSING, AND BUS LAYBYS.
7. USE OF GM2 MARKING IS OPTIONAL - SUGGEST USE FOR TANGENT TO TANGENT OPENINGS >30m.
8. TRAFFIC SIGNALISED ROADSIGNS OMITTED FOR CLARITY.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

RISFSA CLASS 4: INDUSTRIAL ROAD - TYPICAL DETAILS

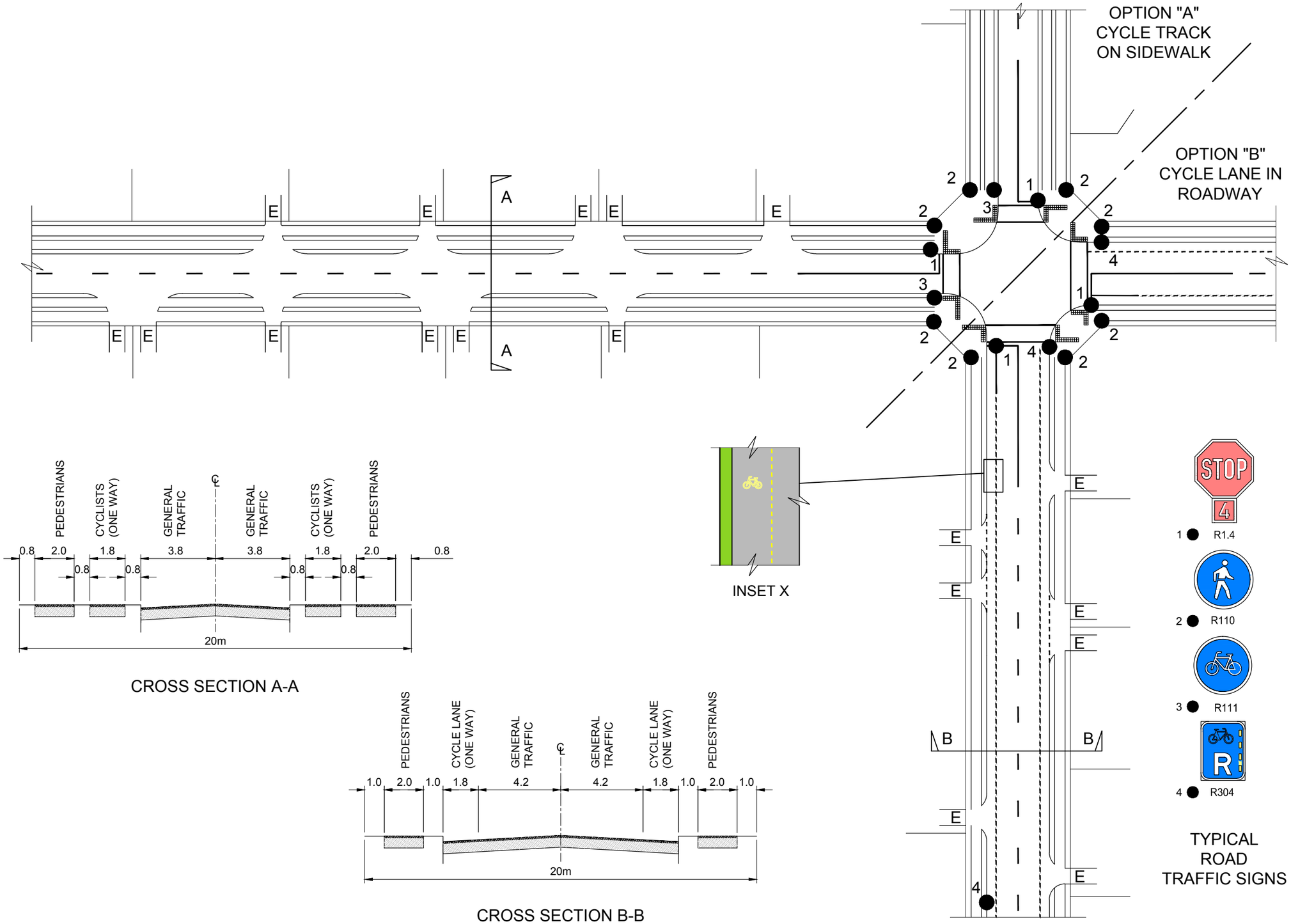
SCALE AS SHOWN: NTS

DATE: 15/05/2015

DRAWING NUMBER: JRA-SD RCS-041

EXTN.

AMENDMENT NUMBER:



LEGEND

- E — PROPERTY ENTRANCE
- TACTILE PAVING
- PROPERTY BOUNDARIES

NOTES

1. THIS DRAWING SHOWS TWO OPTIONS FOR THE PROVISION OF CYCLIST FACILITIES IN THE ONE DIAGRAM AND IN TWO CROSS SECTIONS.
2. THE ROAD RESERVE WIDTH OF A RISFSA CLASS 5 ROAD IS IN THE RANGE 16m TO 30m. THE EXAMPLES SHOWN HAVE A WIDTH OF 20m.
3. FOR THIS CLASS OF ROAD DIRECT PROPERTY ACCESS HAS BEEN SHOWN. IT IS EVIDENT THAT PEDESTRIANS AND CYCLISTS WILL HAVE REDUCED QUALITY OF USE COMPARED TO HIGHER ORDER ROAD CLASSES.
4. OPTION "B" SHOWS CYCLE LANES IN THE ROADWAY. SEE JRA-SD-RCS-040 FOR POSSIBLE TREATMENT AT A BUS STOP.
5. OPTION "A" SHOWS CYCLE TRACKS ON THE SIDEWALK.
6. A 4-WAY STOP INTERSECTION HAS BEEN SHOWN. SUBJECT TO TRAFFIC NEEDS AND THE LOCAL ENVIRONMENT, TRAFFIC SIGNALS MAY BE SPECIFIED; A RAISED TABLE INTERSECTION OR A TRAFFIC CIRCLE (WHICH PERMITS AN EFFECTIVE U-TURN) MAY ALSO BE USED (SEE RCS-051).

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

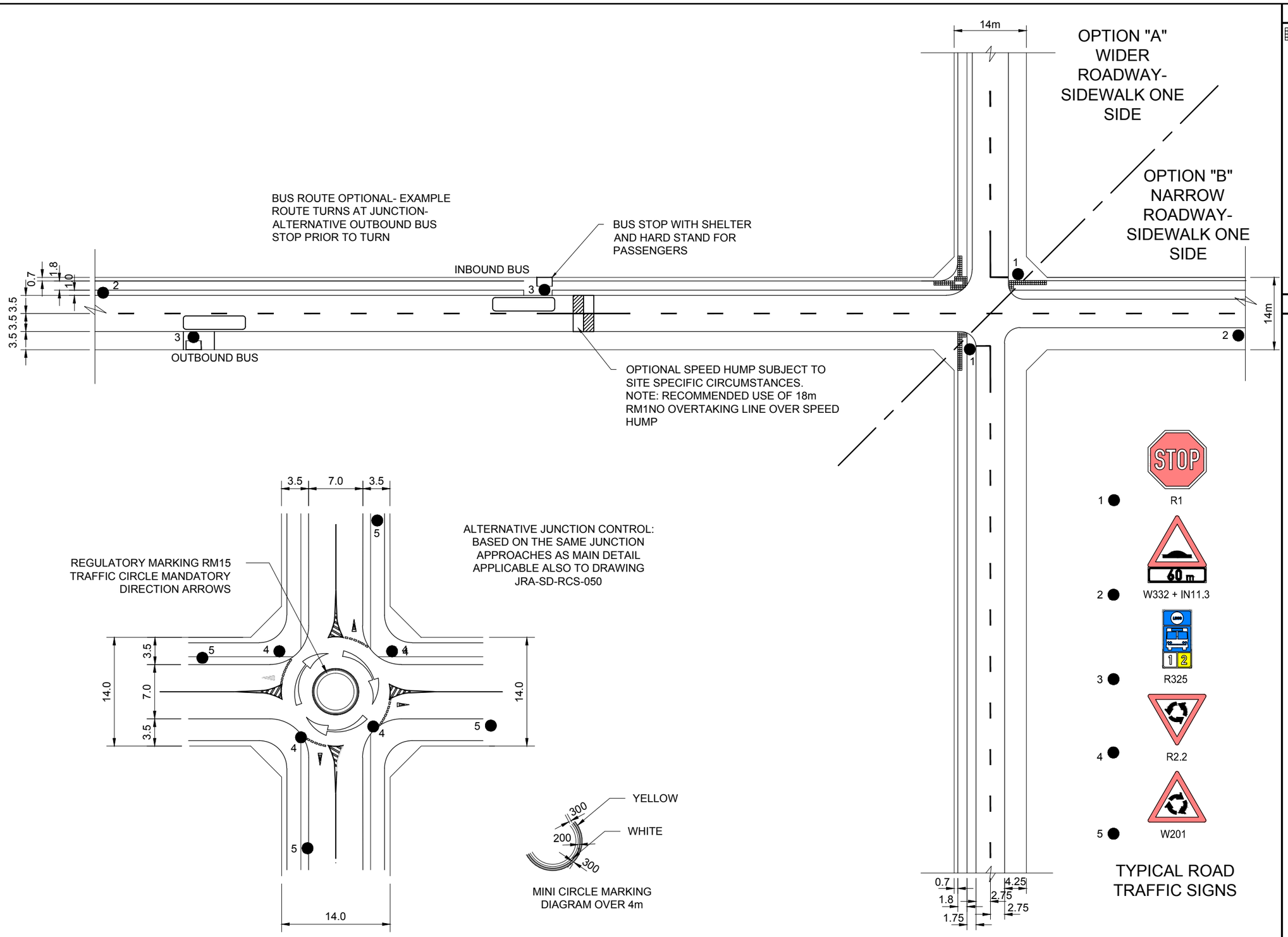
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

RISFSA CLASS 5: RESIDENTIAL COLLECTOR STREET TYPICAL DETAILS

SCALE AS SHOWN: NTS	
DATE: 21/04/2015	
DRAWING NUMBER	EXTN.
JRA-SD RCS-050	
AMENDMENT NUMBER:	



LEGEND

TACTILE PAVING

PROPERTY BOUNDARIES

NOTE: PROPERTY ENTRANCES OMITTED FOR CLARITY.

NOTES

1. THIS DETAIL ILLUSTRATES TWO OPTIONS FOR RESIDENTIAL STREETS:-
   - 7.0m ROAD IN 14m RESERVE-"A"
   - 5.6m ROAD IN 14m RESERVE-"B"
2. 5.6m ROAD ASSUMED TO HAVE LOW TRAFFIC VOLUMES.
3. 7.0m ROAD ASSUMED TO SERVE HIGHER RESIDENTIAL DENSITIES AND HIGHER TRAFFIC VOLUMES INCLUDING CYCLISTS.
4. SURFACED PEDESTRIAN SIDEWALKS MAY BE PROVIDED WITHOUT KERBING OF ROADS, SUBJECT TO TOPOGRAPHY AND DRAINAGE NEEDS.
5. TRAFFIC CALMING MEASURES MAY BECOME NECESSARY.
6. 7.0m ROADWAY MAY ACCOMODATE A BUS ROUTE IF REQUIRED.
7. SEE DRAWING JRA-SD-RD-130 FOR MINI-CIRCLE DESIGN DETAIL.
8. TACTILE PAVING HAS BEEN INDICATED. THIS SHOULD BE SUBJECT TO THE DEVELOPMENT OF A BASIC WARRANT (SUCH AS BUS ROUTE/STOP).

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

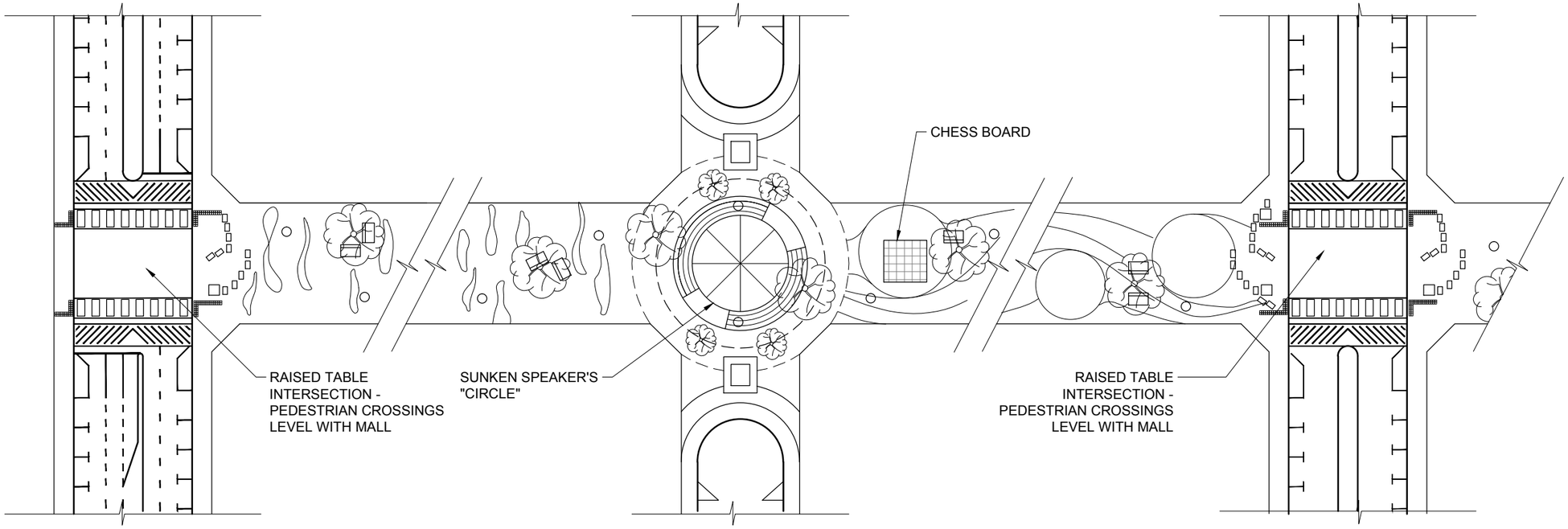
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

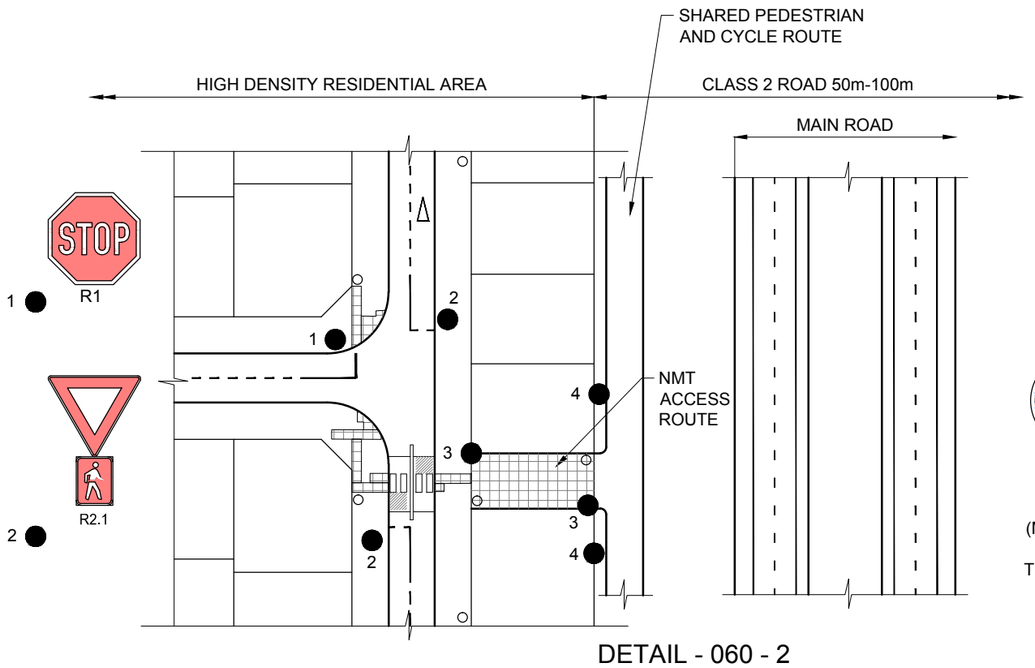
Drawing Sub-set: ROADS: COMPLETE STREETS

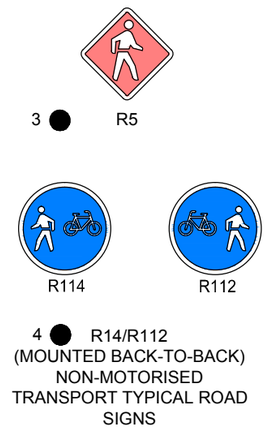
RISFSA CLASS 5: RESIDENTIAL STREETS TYPICAL DETAILS

SCALE AS SHOWN: NTS	
DATE: 23/04/2015	
DRAWING NUMBER	EXTN.
JRA-SD RCS-051	
AMENDMENT NUMBER:	



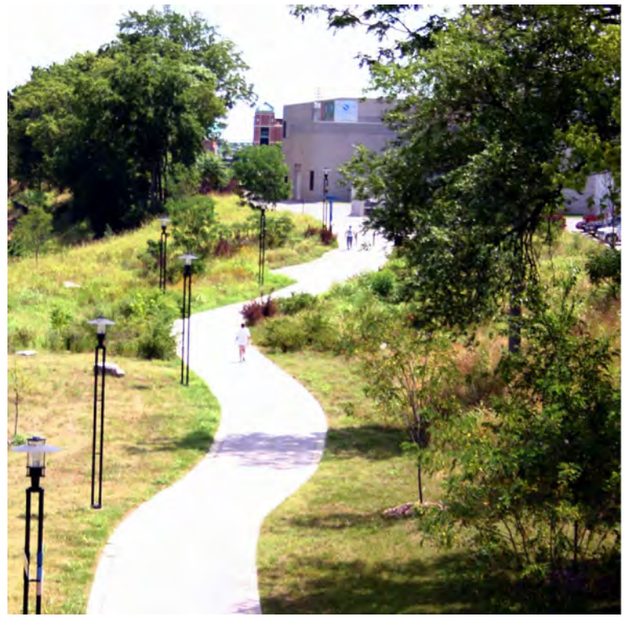
DETAIL - 060 - 1





4 R14/R112 (MOUNTED BACK-TO-BACK) NON-MOTORISED TRANSPORT TYPICAL ROAD SIGNS

DETAIL - 060 - 2



DETAIL - 060 - 3

LEGEND

- STREET LIGHTING
- ROAD TRAFFIC SIGNS
- SPEED HUMP CROSSING
- SHADE TREE
- PLINTH FOR ART/STATUE WITH SEATING
- BENCH
- BOLLARDS/RUBBISH BIN
- TACTILE PAVING

NOTES

1. THE 3 DETAILS INDICATE DIFFERENT FORMS OF CLASS 6 NON-MOTORISED TRANSPORT ADAPTATIONS OF "COMPLETE STREETS".
2. DETAIL -060-1 ILLUSTRATES A TYPICAL PEDESTRIAN/ CYCLE STREET MALL CREATED BY A ROAD CLOSURE.
3. DETAIL -060-2 SHOWS HOW A PEDESTRIAN/CYCLE "ACCESS" CAN BE PROVIDED FOR IN THE PLANNING PROCESS TO SERVE RESIDENTS OF A HIGH DENSITY SUBURB WITH CONNECTION TO A MAIN ROAD AND PUBLIC TRANSPORT.
4. DETAIL -060-3 REPRESENTS VISUALLY HOW AN NMT PATHWAY, WITH LIGHTING, COULD CONNECT A SHOPPING CENTRE TO AN ADJACENT PUBLIC TRANSPORT ROUTE.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

RISFSA CLASS 6: NMT/GREENWAY/MULTIUSER PATH - TYPICAL DETAILS

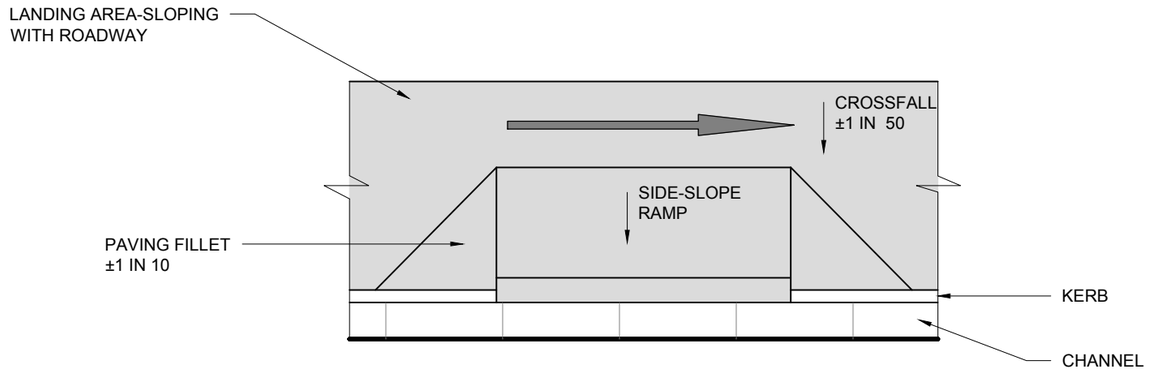
SCALE AS SHOWN: NTS

DATE: 15/04/2015

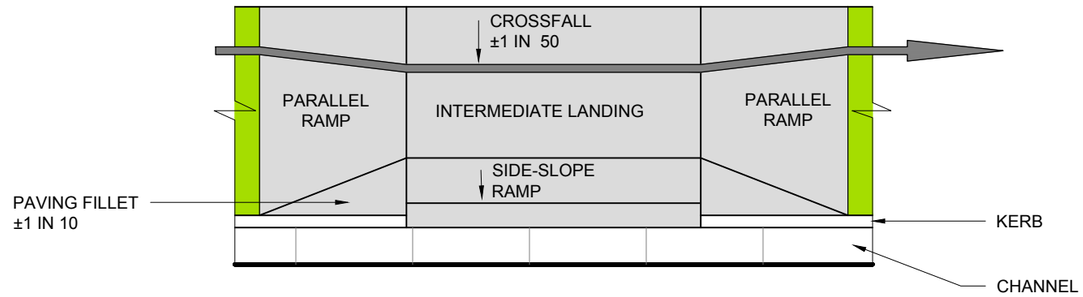
DRAWING NUMBER: JRA-SD RCS-060

EXTN.

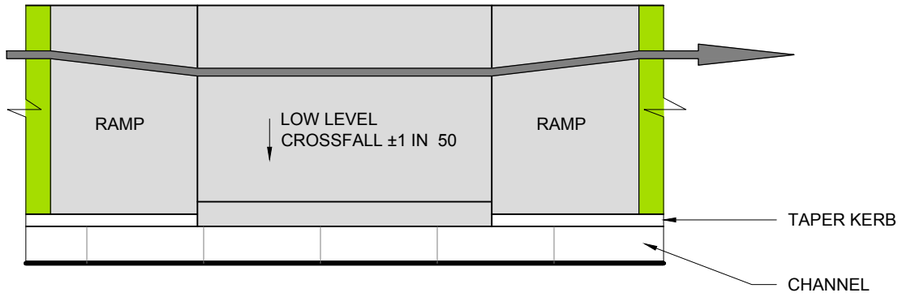
AMENDMENT NUMBER:



PERPENDICULAR



COMBINATION



PARALLEL

DETAIL SHOWN AT LEFT REPRESENT THE BASIC WAYS IN WHICH SIDEWALKS MAY BE RAMPED IN ORDER TO ASSIST DISABLED USERS TO REACH THE CHANNEL LINE/LEVEL PRIOR TO CROSSING A STREET . (THE DETAILS RELATE MOST CORRECTLY TO MID-BLOCK PEDESTRIAN CROSSINGS).
ULTIMATELY RAMPING SOLUTIONS WILL DEPEND ON INDIVIDUAL SITE SLOPES, SIDEWALK WIDTHS & PROVISION ON THE SIDEWALK FOR CYCLISTS.
DRAWINGS JRA-SD-RCS-072 & 073 SHOW EXAMPLES OF COMBINATION & PARALLEL RAMPS.
THE BEST END PRODUCT IS LIKELY TO BE OBTAINED IF THE PEDESTRIAN CROSSINGS & TACTILE PAVING ARE LOCATED ON THE STRAIGHT APPROACH TO THE INTERSECTION i.e. AT 90° TO THE KERB BEFORE THE START OF THE CURVE RADIUS.

LEGEND

NOTES

1. THERE ARE 3 BASIC WAYS IN WHICH RAMPING TO FACILITATE DISABLED OR SIGHT IMPAIRED USERS OF PEDESTRIAN CROSSINGS MAY BE PROVIDED:
   - PERPENDICULAR
     WHERE THE CHANGE IN LEVEL OCCURS WHOLLY ON A RAMP ACROSS THE SIDEWALK;
   - COMBINATION
     WHERE THE CHANGE IN LEVEL OCCURS PARTLY ALONG THE SIDEWALK TO AN INTERMEDIATE LEVEL AND PARTLY ACROSS THE SIDEWALK FROM THE INTERMEDIATE LEVEL;
   - PARALLEL
     WHERE THE CHANGE IN LEVEL OCCURS ALONG THE SIDEWALK.
2. AN EXAMPLE OF THE COMBINATION TYPE RAMP IS SHOWN IN DRAWING JRA-SC-RCS-072.
3. AN EXAMPLE OF THE PARALLEL TYPE RAMP IS SHOWN IN DRAWING JRA-SC-RCS-073.
4. THE BEST RAMPING SOLUTION IS LIKELY TO DEPEND ON INDIVIDUAL SITE CONDITIONS.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

BASIC TYPES OF SIDEWALK RAMPING FOR DISABLED PERSONS AT INTERSECTIONS

SCALE AS SHOWN: NTS

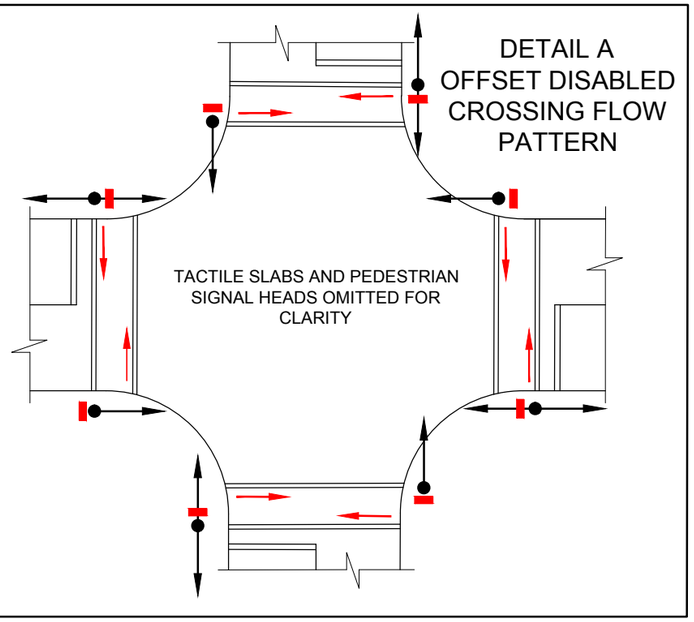
DATE: 07/04/2015

DRAWING NUMBER: JRA-SD RCS-070

EXTN.

AMENDMENT NUMBER:

DETAIL A
OFFSET DISABLED CROSSING FLOW PATTERN



DETAIL B
TYPICAL BUTTON CONTROL AT TACTILE CROSSING

LEGEND

- AUDIBLE/PUSH BUTTON FOR FOR BLIND PERSONS
- PEDESTRIAN SIGNAL
- VEHICULAR SIGNAL
- PATH OF BLIND OR PARTIALLY SIGHTED PERSONS AND WHEELCHAIRS ON CROSSING

NOTES

1. THE DETAILS FOR TACTILE PAVING STANDARDS IN SOUTH AFRICA ARE CURRENTLY UNDER REVIEW. THE DETAILS ON THIS DRAWING ARE THEREFORE SUBJECT TO ALTERATION ONCE THE STANDARD IS FINALISED.
2. THIS DETAIL SHOWS PARTIAL DOWNWARD RAMPING ON THE SIDEWALK ON THE APPROACH TO THE PEDESTRIAN CROSSINGS. THE BALANCE OF RAMPING TO THE TOP OF CHANNEL WILL OCCUR IN THE AREA OF TACTILE PAVING. RAMP SLOPES WILL DEPEND ON INDIVIDUAL SITE CONDITIONS.
3. THE KERB SIDE TACTILE PAVING IN THIS DETAIL IS STAGGERED TO ACCOMMODATE THE CURVE IN THE KERBLINE. SEE JRA-SD-RCS073 FOR AN ALTERNATIVE WHICH INVOLVES CUTTING THE TACTILE PAVING.
4. THE DETAIL RECOMMENDS CAREFUL SITING OF TRAFFIC SIGNAL POLES WITH CONTROL BUTTONS IN ORDER TO MAINTAIN CLEAR PATHS FOR PEDESTRIANS WITH SIGHT DISABILITIES.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

TYPICAL TACTILE PEDESTRIAN CROSSING - SIGNALISED INTERSECTION - COMBINATION RAMPING

SCALE AS SHOWN: NTS

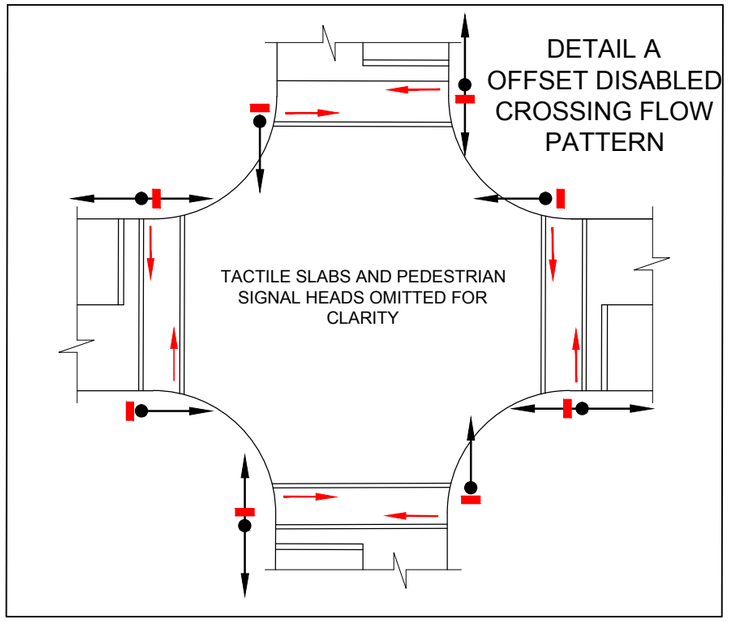
DATE: 15/04/2015

DRAWING NUMBER: JRA-SD RCS-072

EXTN.

AMENDMENT NUMBER:

DETAIL A
OFFSET DISABLED CROSSING FLOW PATTERN



DETAIL B
TYPICAL BUTTON CONTROL AT TACTILE CROSSING

LEGEND

- AUDIBLE/PUSH BUTTON FOR FOR BLIND PERSONS
- PEDESTRIAN SIGNAL
- VEHICULAR SIGNAL
- PATH OF BLIND OR PARTIALLY SIGHTED PERSONS AND WHEELCHAIRS ON CROSSING

NOTES

1. THE DETAILS FOR TACTILE PAVING STANDARDS IN SOUTH AFRICA ARE CURRENTLY UNDER REVIEW. THE DETAILS ON THIS DRAWING ARE THEREFORE SUBJECT TO ALTERATION ONCE THE STANDARD IS FINALISED.
2. THIS DETAIL SHOWS FULL RAMPING ON EACH APPROACH TO A LOW LEVEL SIDEWALK LINKING BOTH PEDESTRIAN CROSSINGS. THIS LOW LEVEL AREA SHOULD HAVE A 1 IN 50 CROSSFALL TOWARDS THE CHANNEL LINE, INCLUDING THE TACTILE PAVING. THIS TREATMENT MAY REQUIRE A DRAIN BEHIND THE KERB LINE. THE APPROACH RAMP SLOPES WILL DEPEND ON INDIVIDUAL SITE CONDITIONS BUT SHOULD BE GRADED AS GENTLY AS IS PRACTICAL.
3. THE KERB SIDE TACTILE PAVING IN THIS DETAIL HAS BEEN ALIGNED TO THE CHANNEL LINE ON THE CURVE AND REQUIRES SEVERAL PAVERS TO BE CUT TO FORM THIS CURVE. THIS PROBLEM CAN BE AVOIDED OR REDUCED BY ALIGNING THE PEDESTRIAN CROSSINGS WITH THE TANGENTS TO THE CORNER CURVE.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

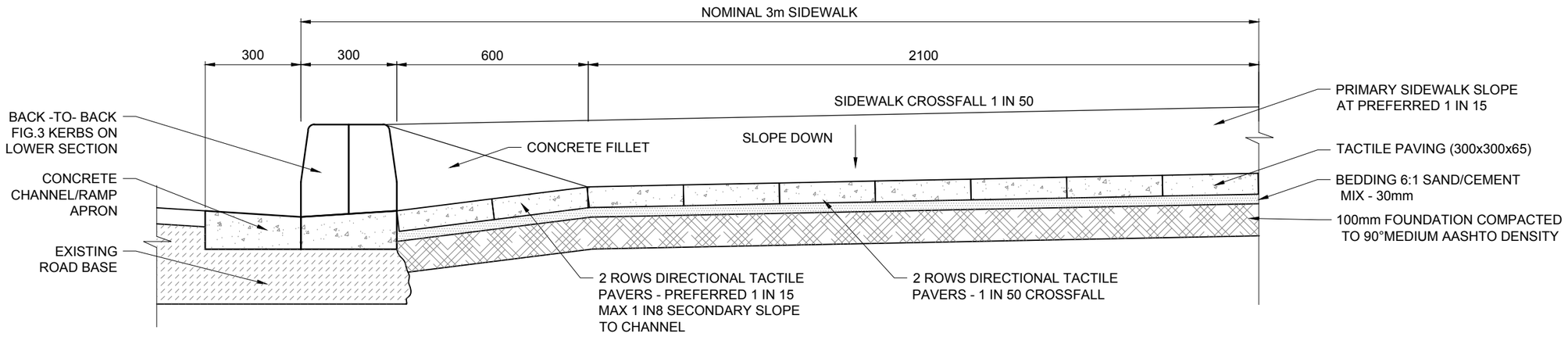
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

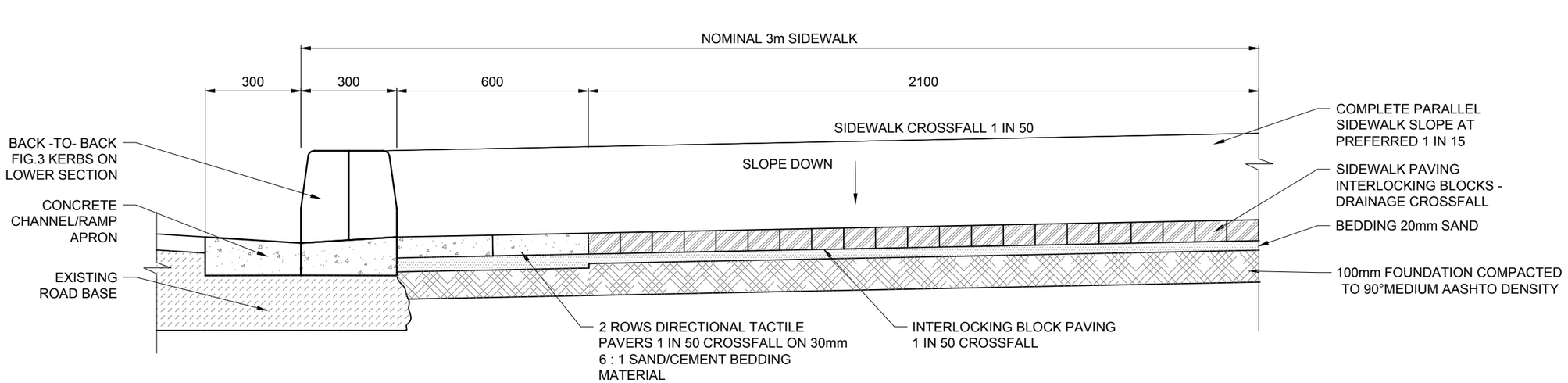
Drawing Sub-set: ROADS: COMPLETE STREETS

TYPICAL TACTILE PEDESTRIAN CROSSING - SIGNALISED INTERSECTION - PARALLEL RAMPING

SCALE AS SHOWN: NTS	
DATE: 02/04/2015	
DRAWING NUMBER	EXTN.
JRA-SD RCS-073	
AMENDMENT NUMBER:	



TYPICAL CROSS-SECTION - COMBINATION RAMP (ON LINE OF TACTILE PAVERS) - INTERMEDIATE LANDING



TYPICAL CROSS-SECTION - PARALLEL RAMP - LOW LEVEL LANDING

LEGEND

NOTES

1. THE CROSS SECTIONS SHOWN COVER THE 2 MOST LIKELY BASIC TYPES OF SIDEWALK RAMPING LIKELY TO BE SPECIFIED IN JOHANNESBURG. SEE DRAWING JRA-SD-RCS-070.
2. THE SECTIONS SHOW 300x300x65 TACTILE PAVERS WHICH MAY OFFER BENEFITS IN SIDEWALK SHAPING. 400x400x65 TACTILE PAVERS MAY BE SPECIFIED IN WHICH CASE THE RISE OF THE SECONDARY SLOPE WILL INCREASE SLIGHTLY.
3. THE RATES OF SLOPE SHOWN FOR RAMPS ARE NOTIONAL & SUBJECT TO INDIVIDUAL SIGHT DESIGN. A SLOPE OF 1 IN 8 MAY BE USED ONLY OVER VERY SHORT DISTANCES. IN STEEPLY SLOPING SITUATIONS IT MAY BE NECESSARY TO DEVELOP A PRIMARY SIDEWALK RAMP IN MORE THAN ONE STAGE WITH SHORT, LEVEL, INTERMEDIATE SECTIONS.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: COMPLETE STREETS

TYPICAL TACTILE PAVING RAMP DETAILS IN SECTION

SCALE AS SHOWN: NTS

DATE: 02/04/2015

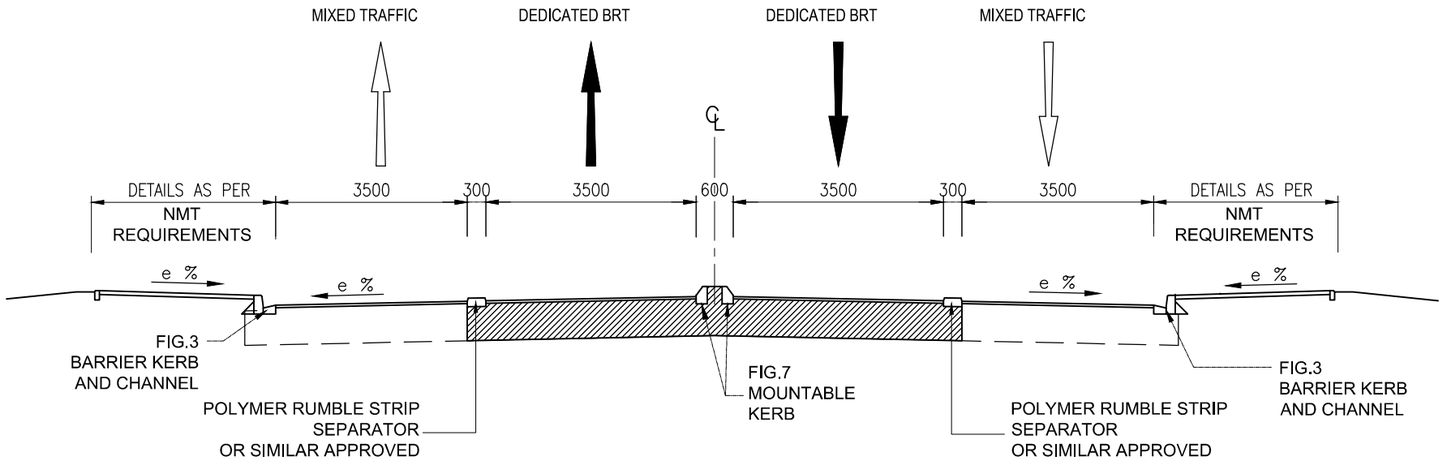
DRAWING NUMBER: JRA-SD RCS-074

EXTN.

AMENDMENT NUMBER:

1.5 – ROADS: BRT

DRAWING NUMBER	DRAWING DESCRIPTION	REVISION NUMBER					
		0	1	2	3	4	5
		REVISION DATE					
JRA-SD-RBRT-010	Typical Cross Section between Intersections	300615					
JRA-SD-RBRT-020	Typical Cross Section at Intersections	300615					
JRA-SD- RBRT-030	Typical Cross Section at BRT Stations	300615					
JRA-SD- RBRT-040	Long Section – Road @ 5% - Station @ 0%	300615					
JRA-SD- RBRT-041	Cross Section - Road @ 5% - Station @ 0%	300615					
JRA-SD- RBRT-050	Long Section – Road @ 5% - Station @ 3%	300615					
JRA-SD- RBRT-051	Cross Section - Road @ 5% - Station @ 3%	300615					
JRA-SD- RBRT-060	Typical Details	300615					
JRA-SD- RBRT-080	Typical Pavement Structure – ES100	300615					
JRA-SD- RBRT-081	Typical Pavement Structure – ES30	300615					
JRA-SD- RBRT-082	Typical Pavement Structure – ES10	300615					
JRA-SD- RBRT-100	Station Modules - 1	300615					
JRA-SD- RBRT-101	Station Modules - 2	300615					
JRA-SD- RBRT-							
JRA-SD- RBRT-							
JRA-SD- RBRT-							
JRA-SD- RBRT-							
JRA-SD- RBRT-							
JRA-SD- RBRT-							
JRA-SD- RBRT-							



TYPICAL TRUNK ROUTE CROSS-SECTION BETWEEN ROAD INTERSECTIONS

DESCRIPTION	RECOMMENDED (MINIMUM)	ABSOLUTE (MINIMUM)
MEDIAN ISLAND	0.60 m	-
BRT LANE	3.50 m	3.00 m
RUMBLE STRIP SEPARATOR	0.30 m	0.25 m
MIXED TRAFFIC LANE	3.50 m	3.20 m

LEGEND

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)

TYPICAL CROSS SECTION BETWEEN INTERSECTIONS

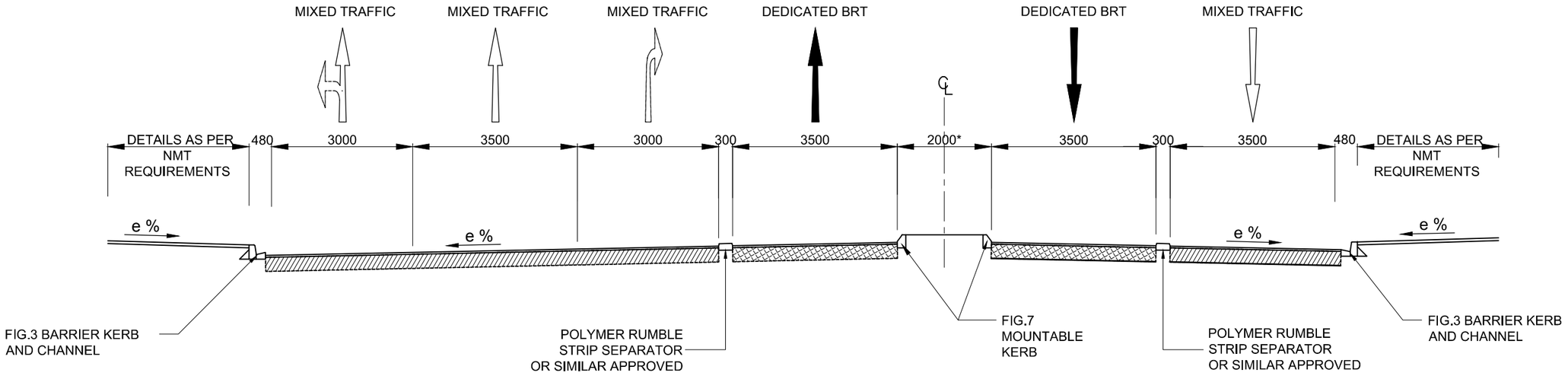
SCALE AS SHOWN: NTS

DATE: 29/04/2015

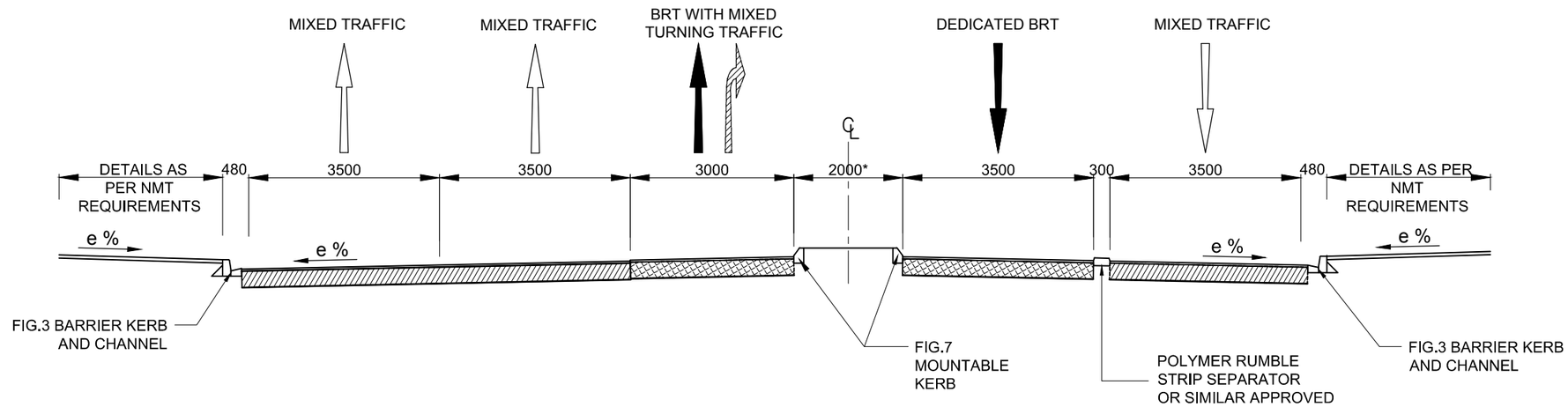
DRAWING NUMBER: JRA-SD RBRT-010

EXTN.

AMENDMENT NUMBER:



TYPICAL CROSS-SECTION AT INTERSECTION WITH DEDICATED BRT LANES



TYPICAL CROSS-SECTION AT INTERSECTION WITH SHARED LANE FOR MIXED TRAFFIC AND BRT LANE

DESCRIPTION	RECOMMENDED (MINIMUM)	ABSOLUTE (MINIMUM)
MEDIAN ISLAND	2.00 m*	1.50 m
BRT LANE	3.50 m	3.00 m**
RUMBLE STRIP SEPARATOR	0.30 m	0.25 m
MIXED TRAFFIC LANE	3.50 m	3.20 m
RIGHT TURNING LANE	3.00 m	2.70 m
LEFT TURNING LANE	3.00 m	2.70 m

LEGEND

NOTES

1. * MINIMUM MEDIAN WIDTH TO BE USED AT THE INTERSECTION TO BE 2M IN ORDER TO ACCOMMODATE TRAFFIC LIGHT HEAD IF REQUIRED.
2. ** WIDTH OF SHARED RIGHT TURNING LANE AND BRT LANE TO BE DROPPED TO 3m ONLY AT LOCALISED PINCH POINTS OR AT BRT STOP AREAS.

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:

STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:

CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)

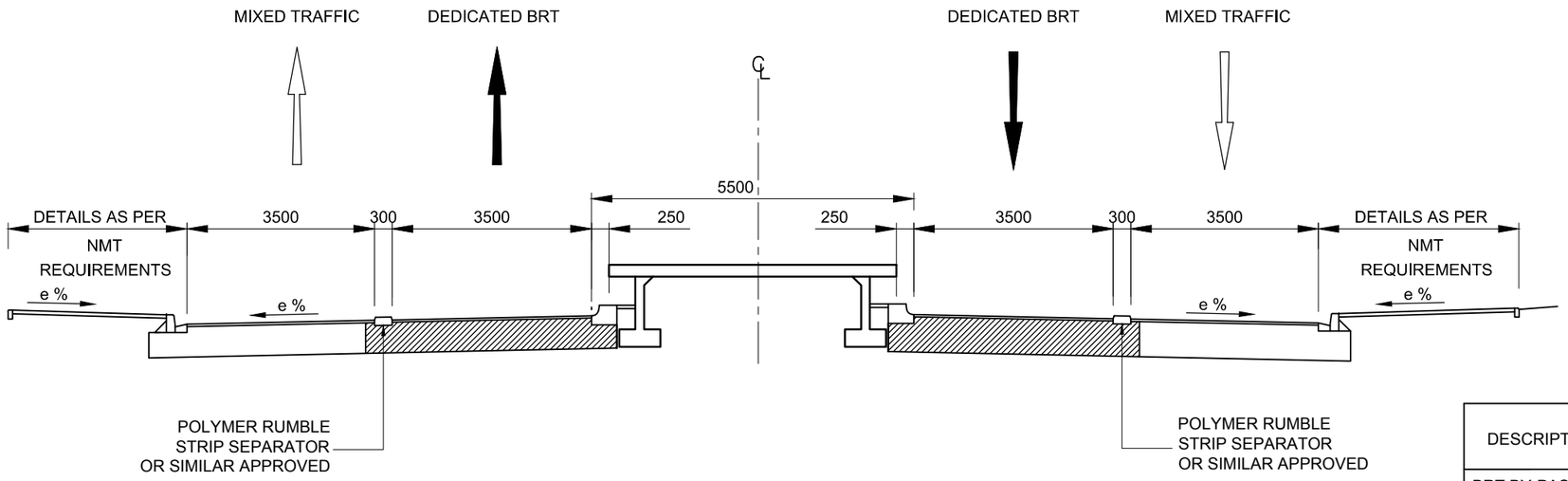
TYPICAL CROSS SECTION AT INTERSECTIONS

SCALE AS SHOWN: NTS

DATE: 29/04/2015

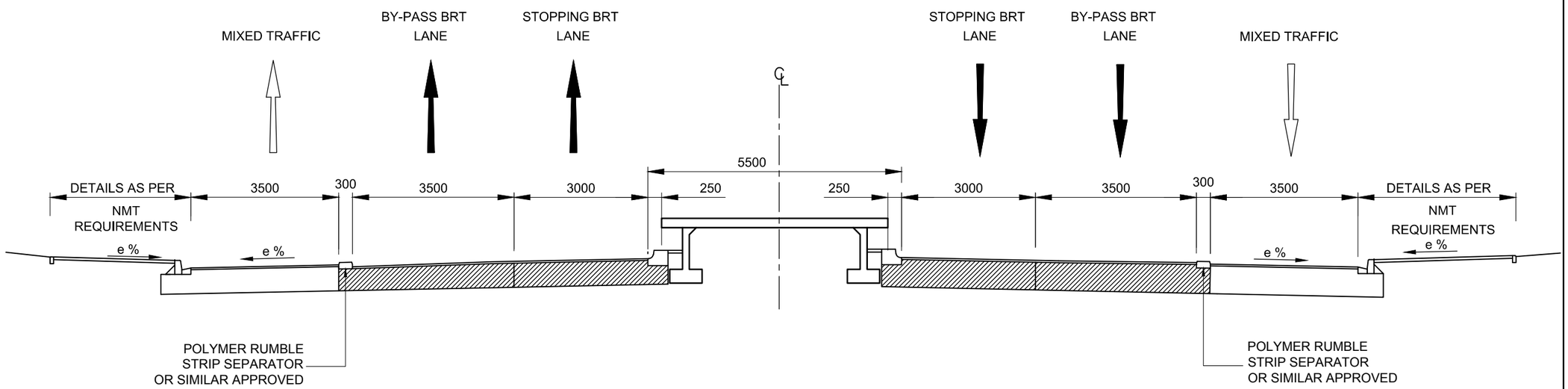
DRAWING NUMBER: JRA-SD RBRT-020 | EXTN.

AMENDMENT NUMBER:



TYPICAL CROSS-SECTION AT BRT STATION
(WITHOUT BY-PASS LANE)

DESCRIPTION	RECOMMENDED (MINIMUM)	ABSOLUTE (MINIMUM)
BRT BY-PASS LANE	3.50 m	3.30 m
BRT STOPPING LANE	3.00 m	-
MIXED TRAFFIC LANE	3.50 m	3.20 m
SEPARATOR	0.30 m	0.25 m



TYPICAL CROSS-SECTION AT BRT STATION
(WITH BY-PASS LANE)

LEGEND

NOTES

1. WHERE A BYPASS LANE IS PROVIDED THE WIDTH OF THE STOPPING LANE SHOULD BE 3.0 m. WITH THE BYPASS LANE HAVING A WIDTH OF 3.5 m
2. WHERE NO BYPASS LANE IS PROVIDED THE WIDTH OF THE BRT LANE SHOULD BE 3.5 m

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)

TYPICAL CROSS SECTION AT BRT STATIONS

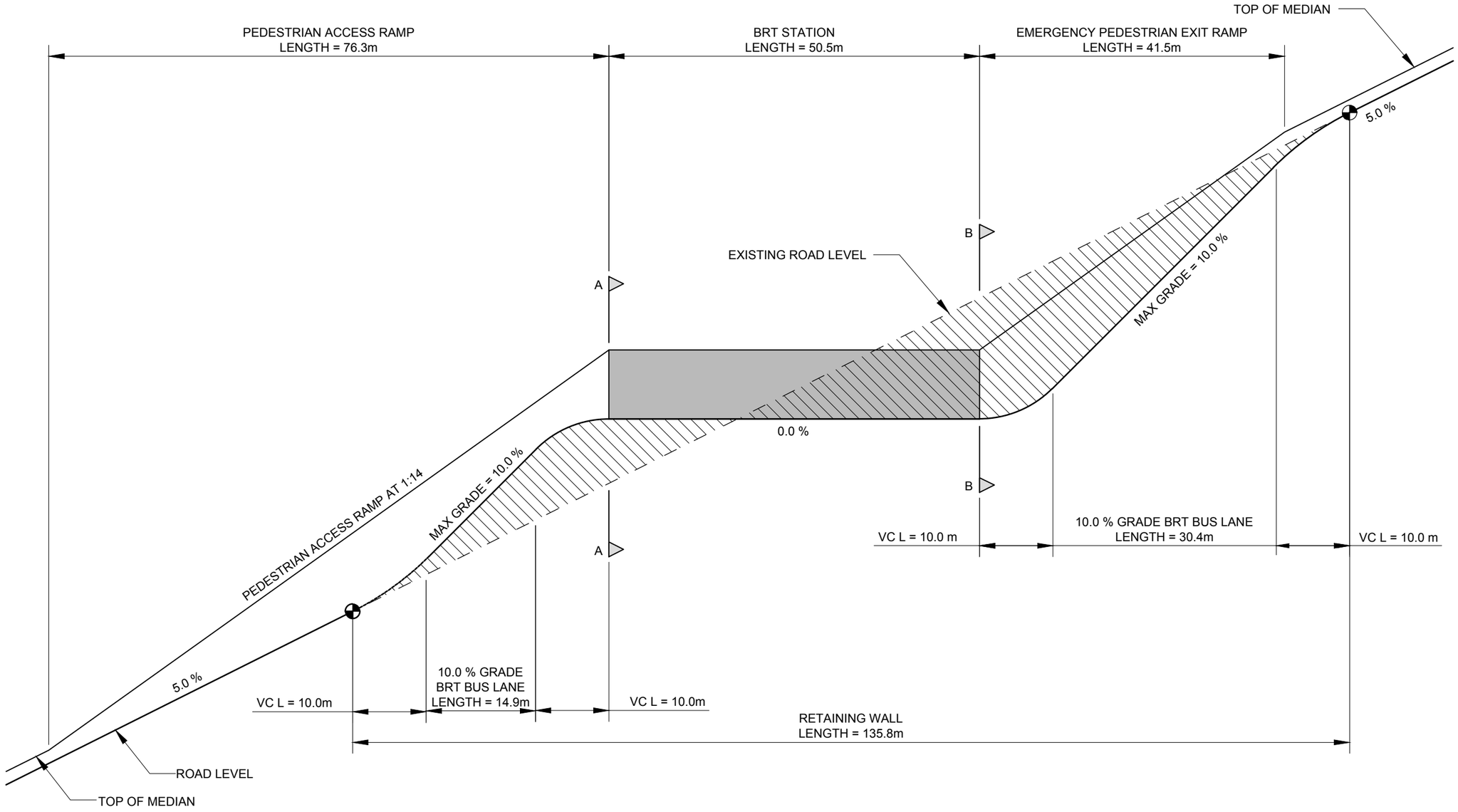
SCALE AS SHOWN: NTS

DATE: 29/04/2015

DRAWING NUMBER: JRA-SD RBRT-030

EXTN.

AMENDMENT NUMBER:



TYPICAL TREATMENT TO PROVIDE BRT STATION AT 0.0 % GRADE WHERE EXISTING ROAD IS AT 5.0 % GRADE

LEGEND

- RETAINING WALL BETWEEN BRT LANES AND MIXED TRAFFIC LANES.
- BRT STATION PLATFORM
- BRT BUS LANE GRADE LINE JOIN POINT WITH EXISTING ROAD GRADE LINE

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)

LONG SECTION - TYPICAL TREATMENT TO PROVIDE BRT STATION AT 0.0 % GRADE WHERE EXISTING ROAD IS AT 5.0 % GRADE

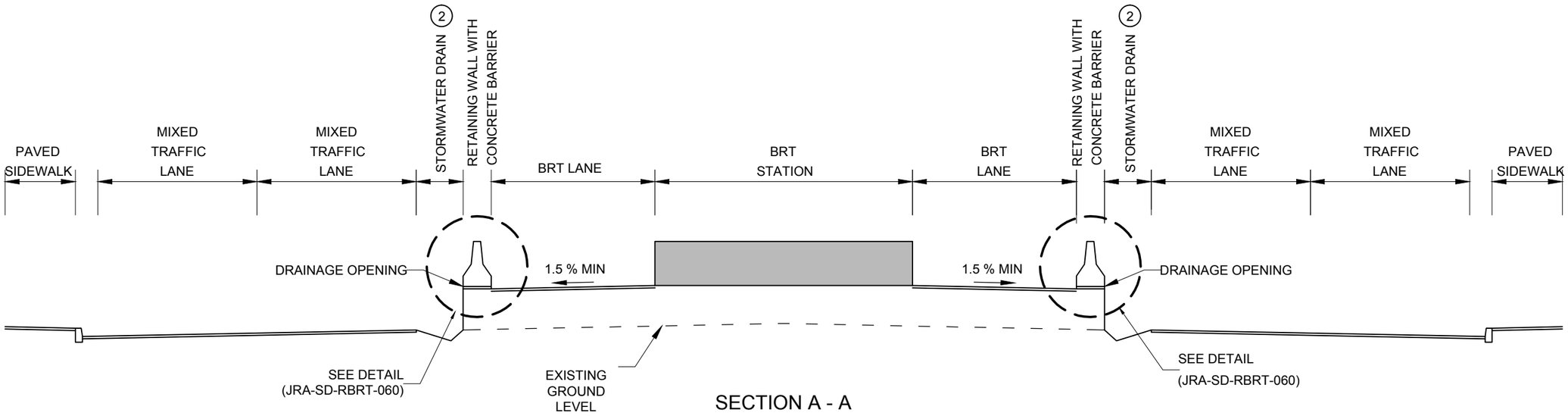
SCALE AS SHOWN: NTS

DATE: 29/04/2015

DRAWING NUMBER: JRA-SD RBRT-040

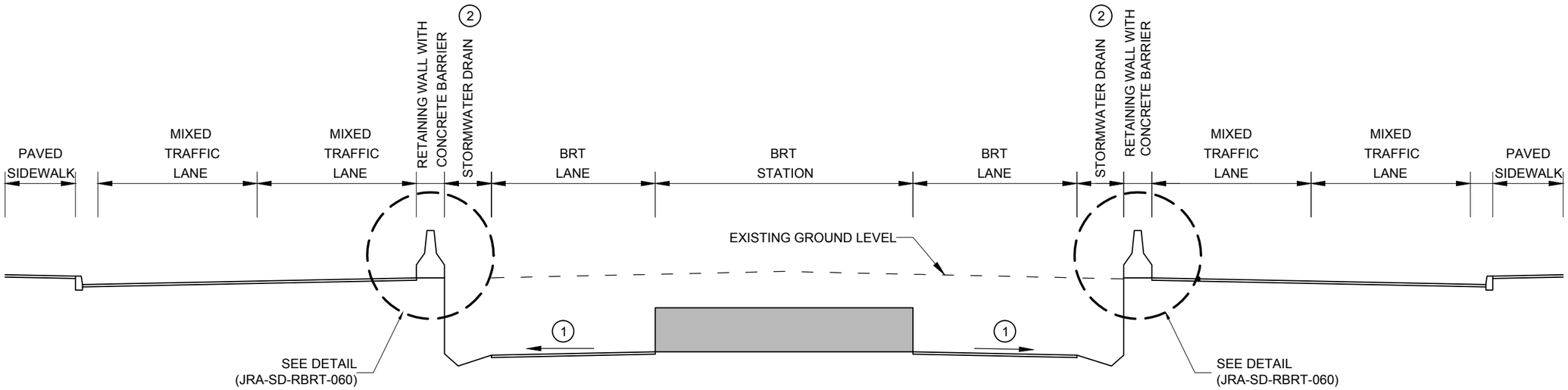
EXTN.

AMENDMENT NUMBER:



SECTION A - A

TYPICAL SECTION THROUGH STATION IN FILL
GRADE OF EXISTING ROAD = 5.0 %
GRADE OF BRT STATION = 0.0 %



SECTION B - B

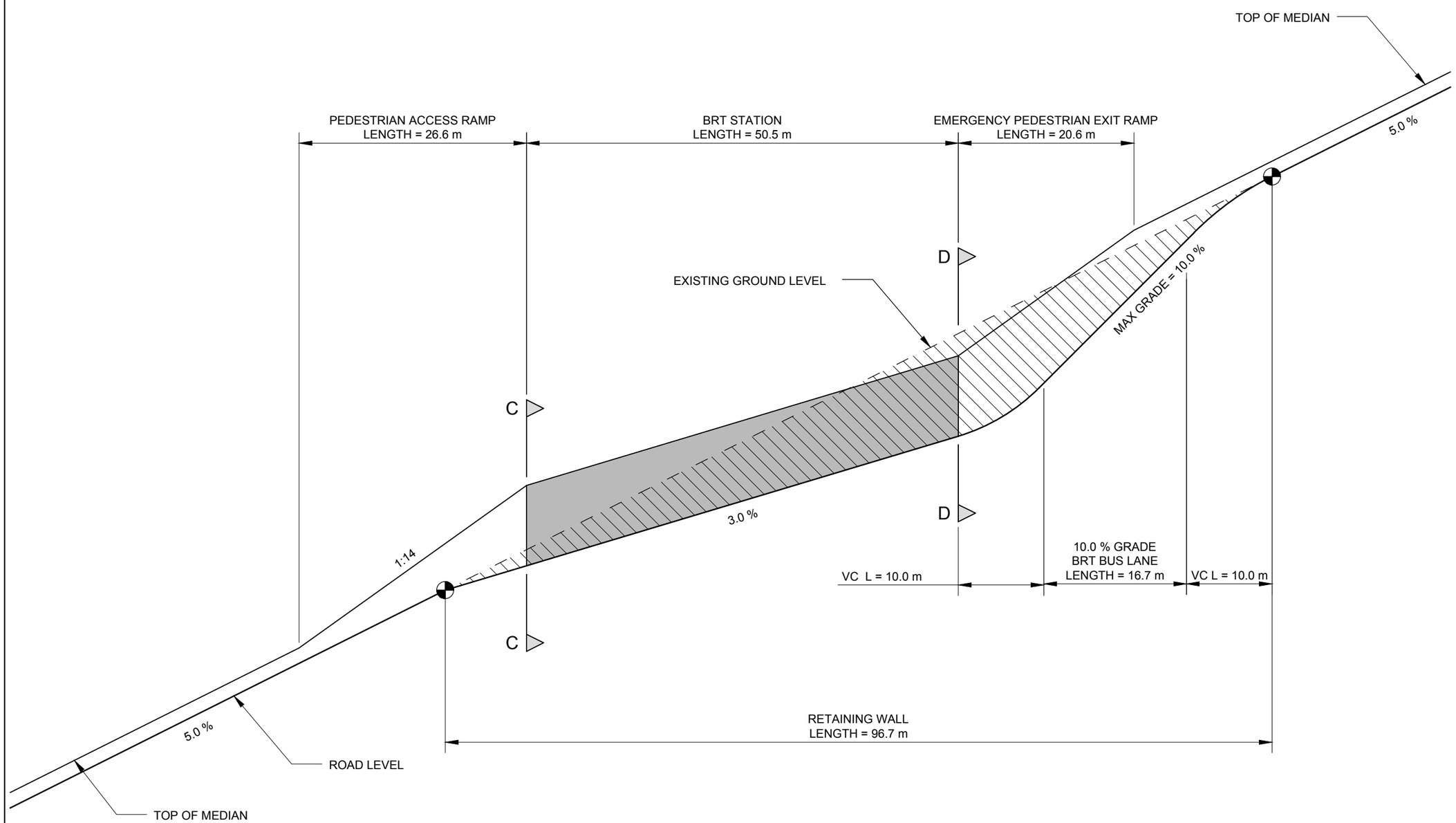
TYPICAL SECTION THROUGH STATION IN CUT
GRADE OF EXISTING ROAD = 5.0 %
GRADE OF BRT STATION = 0.0 %

LEGEND

1. CROSSFALL VARIES: (0.0 % TO 4.0 % TO ALLOW LONGITUDINAL GRADIENT OF 0.5 % FOR DRAINAGE.)
2. PROJECT SPECIFIC STORMWATER DESIGN REQUIRED IN ORDER TO SIZE DRAIN.

NOTES

AMENDMENTS				DESIGNED BY:	DRAWN BY:	CITY OF JOHANNESBURG	SCALE AS SHOWN: NTS	
No.	DATE	APPROVED	DESCRIPTION			JOHANNESBURG ROADS AGENCY (PTY) LTD	DATE: 29/04/2015	
				STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:	Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)	DRAWING NUMBER	EXTN.
				CHECKED BY:	DRAWING APPROVED BY:	CROSS SECTION - TYPICAL TREATMENT TO PROVIDE BRT STATION AT 0.0 % GRADE WHERE EXISTING ROAD IS AT 5.0 % GRADE	JRA-SD RBRT-041	
							AMENDMENT NUMBER:	



TYPICAL TREATMENT TO PROVIDE BRT STATION AT 3.0 % GRADE WHERE EXISTING ROAD IS AT 5.0 % GRADE

LEGEND

- RETAINING WALL BETWEEN BRT LANES AND MIXED TRAFFIC LANES.
- BRT STATION PLATFORM
- BRT BUS LANE GRADE LINE JOIN POINT WITH EXISTING ROAD GRADE LINE

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)

LONG SECTION - TYPICAL TREATMENT TO PROVIDE BRT STATION AT 3.0 % GRADE WHERE EXISTING ROAD IS AT 5.0 % GRADE

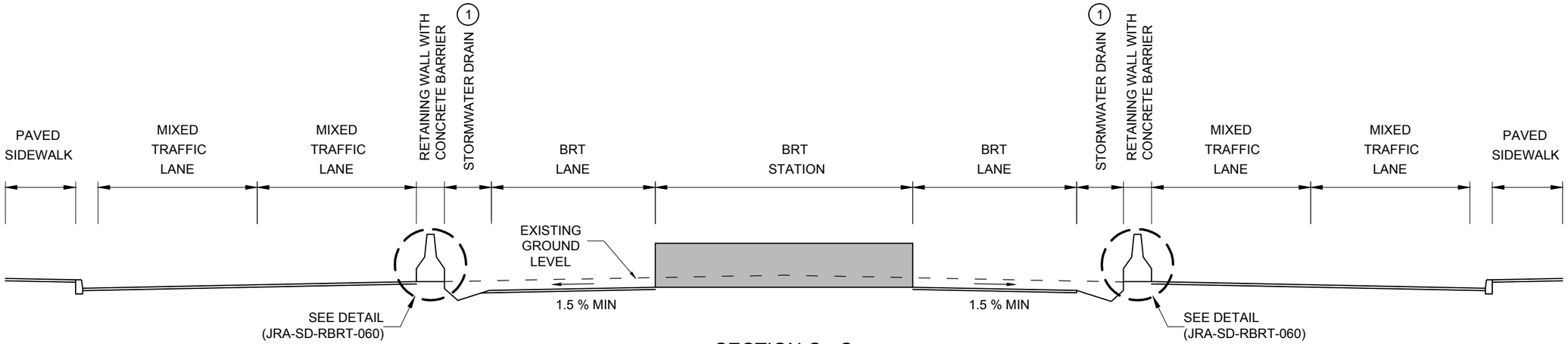
SCALE AS SHOWN: NTS

DATE: 29/04/2015

DRAWING NUMBER: JRA-SD RBRT-050

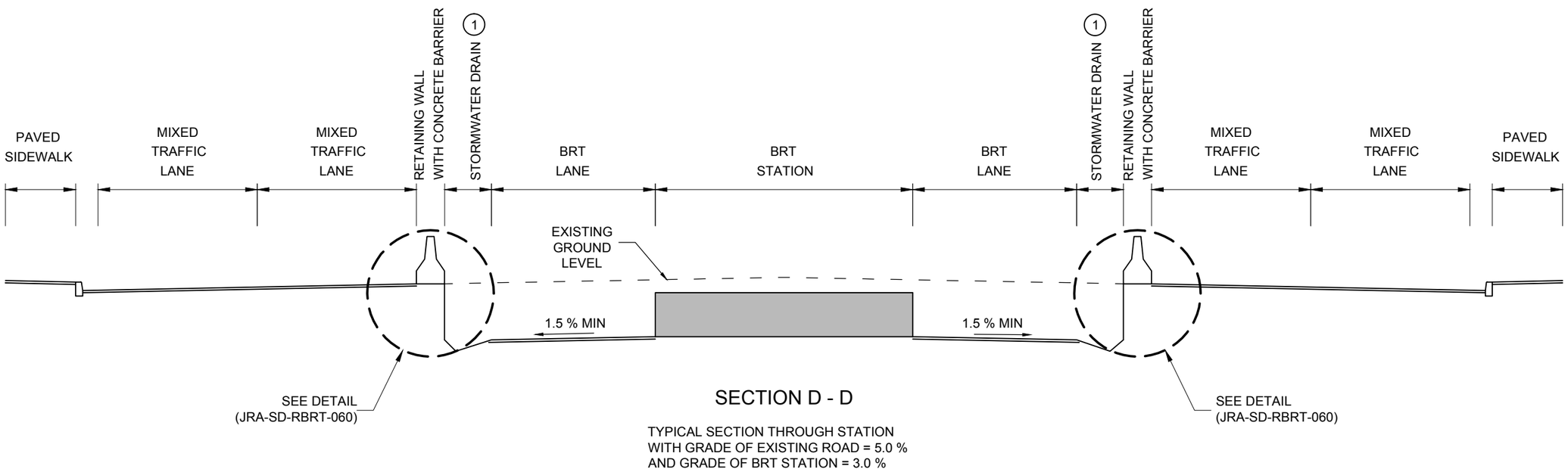
EXTN.

AMENDMENT NUMBER:



SECTION C - C

TYPICAL SECTION THROUGH STATION
GRADE OF EXISTING ROAD = 5.0 %
GRADE OF BRT STATION = 3.0 %



SECTION D - D

TYPICAL SECTION THROUGH STATION
WITH GRADE OF EXISTING ROAD = 5.0 %
AND GRADE OF BRT STATION = 3.0 %

LEGEND

1. PROJECT SPECIFIC STORMWATER DESIGN REQUIRED IN ORDER TO SIZE DRAIN.

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)

CROSS SECTION - TYPICAL TREATMENT TO PROVIDE BRT STATION AT 3.0 % GRADE WHERE EXISTING ROAD IS AT 5.0 % GRADE

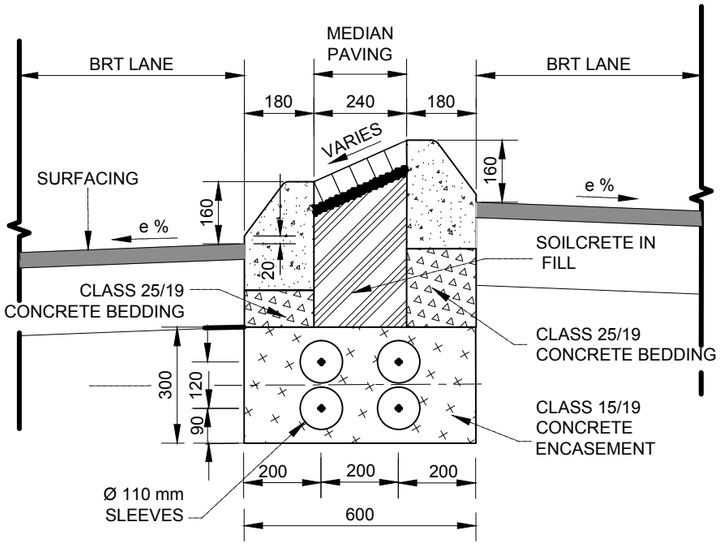
SCALE AS SHOWN: NTS

DATE: 29/04/2015

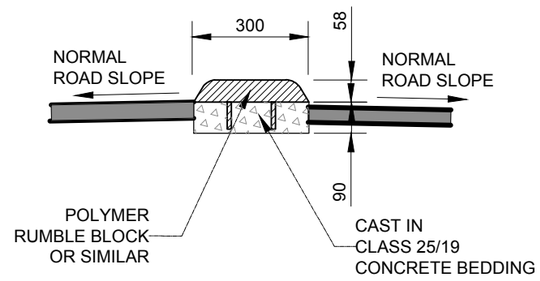
DRAWING NUMBER: JRA-SD RBRT-051

EXTN.

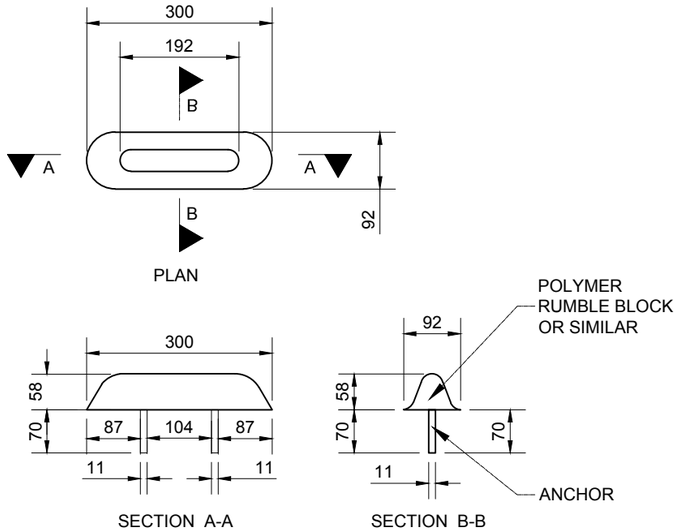
AMENDMENT NUMBER:



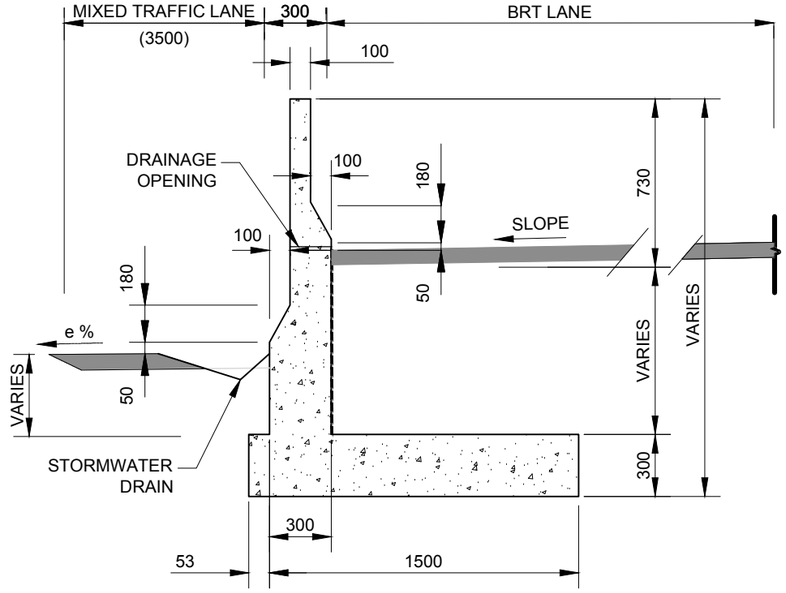
TYPICAL MEDIAN KERB AND SLEEVE INSTALLATION
DETAILS WHERE BRT LANES DIFFER IN LEVEL



TYPICAL RUMBLE STRIP INSTALLATION DETAIL BETWEEN
BRT LANE AND MIXED TRAFFIC LANES



TYPICAL DETAIL OF RUMBLE BLOCK BETWEEN
BRT AND MIXED TRAFFIC LANES



TYPICAL RETAINING WALL DETAIL AT BRT STATIONS
WHERE THE MIXED TRAFFIC AND BRT LANES
ARE AT DIFFERENT LEVELS

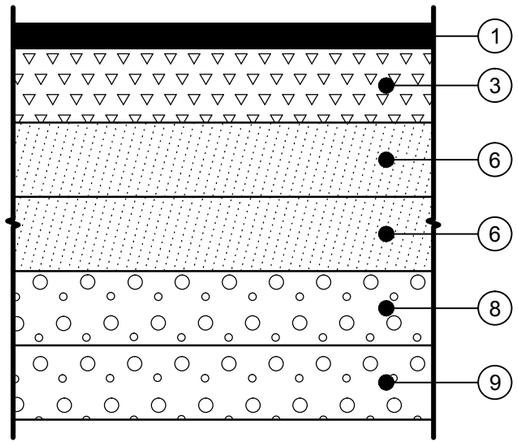
LEGEND

NOTES

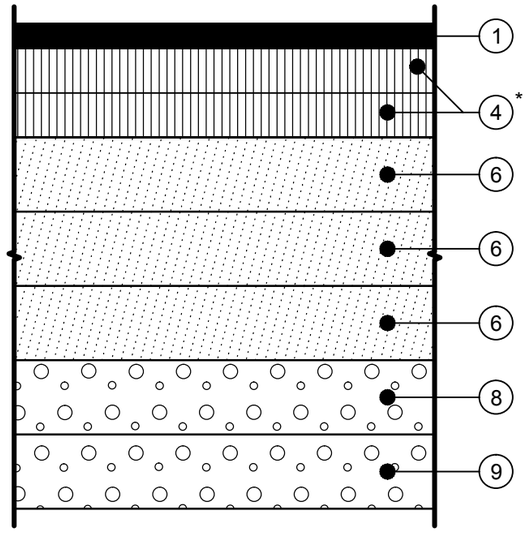
AMENDMENTS				DESIGNED BY:	DRAWN BY:	CITY OF JOHANNESBURG	SCALE AS SHOWN: NTS	
No.	DATE	APPROVED	DESCRIPTION			JOHANNESBURG ROADS AGENCY (PTY) LTD	DATE: 29/04/2015	
				STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:	Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)	DRAWING NUMBER	EXTN.
				CHECKED BY:	DRAWING APPROVED BY:	TYPICAL DETAILS	JRA-SD RBRT-060	
							AMENDMENT NUMBER:	

ES100 PAVEMENT STRUCTURE

CRUSHED STONE BASE

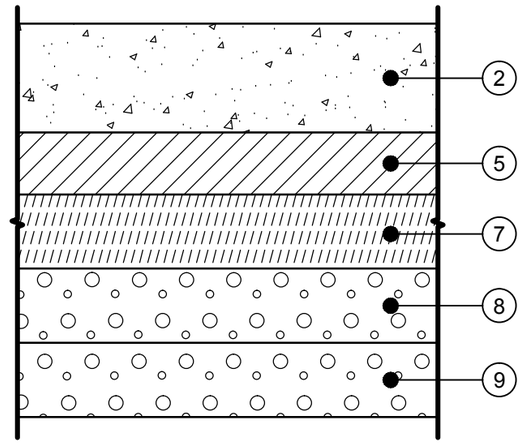


HOT MIX ASPHALT BASE



*(2 x 90 mm LAYERS)

CONCRETE PAVEMENT



LEGEND

1 - CONTINUOUSLY MEDIUM GRADED ASPHALT SURFACING
2 - CONCRETE PAVEMENT
3 - CRUSHED STONE BASE
4 - CONTINUOUSLY GRADED ASPHALT BASE
5 - STABILIZED CRUSHED STONE BASE
6 - STABILISED NATURAL GRAVEL SUBBASE
7 - STABILISED NATURAL GRAVEL SUBBASE
8 - SELECTED GRAVEL SUBGRADE
9 - SELECTED INSITU GRAVEL SUBGRADE

NOTES

Layer N°	Thickness (mm)	TRH 14 Material Type	Description	COLTO Section of Specification	Compaction as % of Mod AASHTO Density (min)	PI (max)	GM (min)	UCS/CBR @ % of Mod AASHTO	Max CBR Swell	ITS (kPa) min	Concrete Strength (MPa)	Concrete Flexural Strength (MPa)
1	50	ACM	Continuously Medium Graded Asphalt Surfacing	4200	–	–	–	_	–	–	–	–
2	220	JCP or CRCP	Concrete Pavement	7100	–	–	–	_	–	–	40	4.2
3	150	G1	Crushed Stone Base	3600	88% of ARD	4	–	_	–	–	–	–
4	180 (2 x 90)	BC3	Continuously Graded Asphalt Base	4200	–	–	–	_	–	–	–	–
5	125	C2	Stabilised Crushed Stone Base	3400 & 3500	98%	SP	1,5	3.0 - 6.0 Mpa @ 100%	–	–	–	–
6	150	C3	Stabilised Natural Gravel Subbase	3400 & 3500	97%	6 (after stabilisation)	1,5	1.5 - 3.0 Mpa @ 100%	–	250 @ 100%	–	–
7	150	C4	Stabilised Natural Gravel Subbase	3400 & 3500	95%	6 (after stabilisation)	1,5	0.75 - 1.5 Mpa @ 100%	–	200 @ 100%	–	–
8	150	G7	Selected Gravel Subgrade	3400	93%	12 or 3GM+10	0.75	15 @ 93%	1.5	–	–	–
9	150	G7	Selected Insitu Gravel Subgrade	3400	93%	12 or 3GM+10	0.75	15 @ 93%	1.5	–	–	–

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

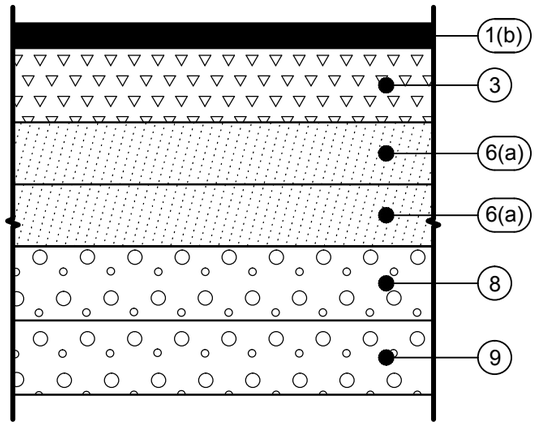
Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)

TYPICAL PAVEMENT STRUCTURE - ES100

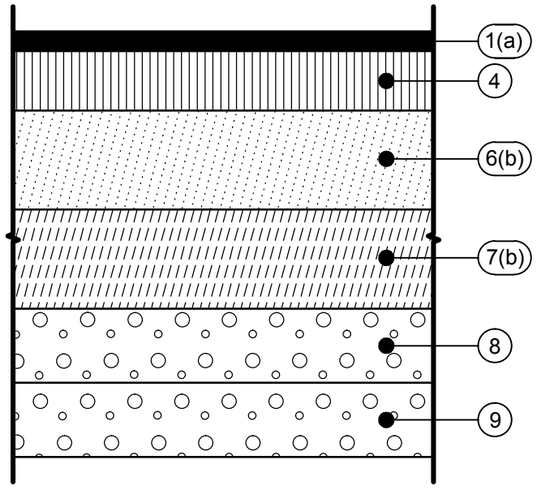
SCALE AS SHOWN: NTS
DATE: 29/04/2015
DRAWING NUMBER: JRA-SD RBRT-080
EXTN.
AMENDMENT NUMBER:

ES30 PAVEMENT STRUCTURE

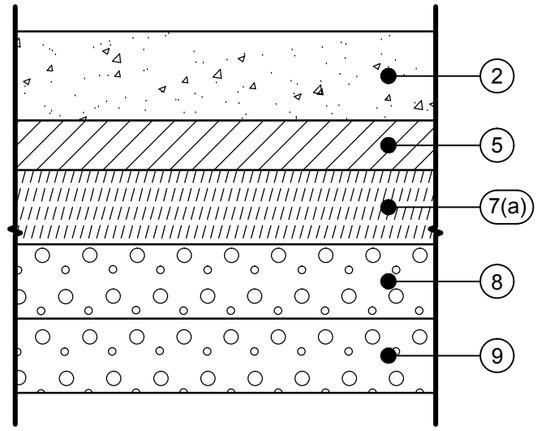
CRUSHED STONE BASE



HOT MIX ASPHALT BASE



CONCRETE PAVEMENT



Layer N°	Thickness (mm)	TRH 14 Material Type	Description	COLTO Section of Specification	Compaction as % of Mod AASHTO Density (min)	PI (max)	GM (min)	UCS/CBR @ % of Mod AASHTO	Max CBR Swell	ITS (kPa) min	Concrete Strength (MPa)	Concrete Flexural Strength (MPa)
1(a)	40	ACM	Continuously Medium Graded Asphalt Surfacing	4200	–	–	–	_	–	–	–	–
1(b)	50	ACM	Continuously Medium Graded Asphalt Surfacing	4200	–	–	–	_	–	–	–	–
2	180	JCP or CRCP	Concrete Pavement	7100	–	–	–	_	–	–	40	4.2
3	150	G1	Crushed Stone Base	3600	88% of ARD	4	–	_	–	–	–	–
4	120	BC3	Continuously Graded Asphalt Base	4200	–	–	–	_	–	–	–	–
5	100	C2	Stabilised Crushed Stone Base	3400 & 3500	98%	SP	1,5	3.0 - 6.0 Mpa @ 100%	–	–	–	–
6(a)	125	C3	Stabilised Natural Gravel Subbase	3400 & 3500	97%	6 (after stabilisation)	1,5	1.5 - 3.0 Mpa @ 100%	–	250 @ 100%	–	–
6(b)	200	C3	Stabilised Natural Gravel Subbase	3400 & 3500	97%	6 (after stabilisation)	1,5	1.5 - 3.0 Mpa @ 100%	–	250 @ 100%	–	–
7(a)	150	C4	Stabilised Natural Gravel Subbase	3400 & 3500	95%	6 (after stabilisation)	1,5	0.75 - 1.5 Mpa @ 100%	–	200 @ 100%	–	–
7(b)	200	C4	Stabilised Natural Gravel Subbase	3400 & 3500	95%	6 (after stabilisation)	1,5	0.75 - 1.5 Mpa @ 100%	–	200 @ 100%	–	–
8	150	G7	Selected Gravel Subgrade	3400	93%	12 or 3GM+10	0.75	15 @ 93%	1.5	–	–	–
9	150	G7	Selected Insitu Gravel Subgrade	3400	93%	12 or 3GM+10	0.75	15 @ 93%	1.5	–	–	–

LEGEND

1 - CONTINUOUSLY MEDIUM GRADED ASPHALT SURFACING
2 - CONCRETE PAVEMENT
3 - CRUSHED STONE BASE
4 - CONTINUOUSLY GRADED ASPHALT BASE
5 - STABILIZED CRUSHED STONE BASE
6 - STABILISED NATURAL GRAVEL SUBBASE
7 - STABILISED NATURAL GRAVEL SUBBASE
8 - SELECTED GRAVEL SUBGRADE
9 - SELECTED INSITU GRAVEL SUBGRADE

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

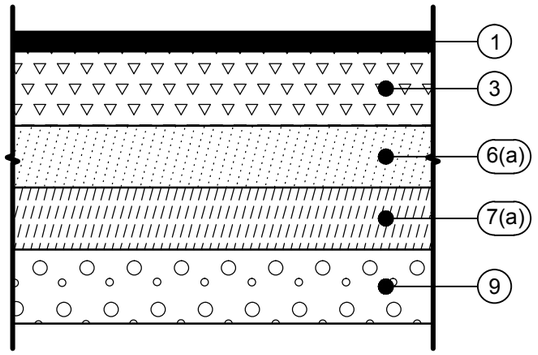
Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)

TYPICAL PAVEMENT STRUCTURE - ES030

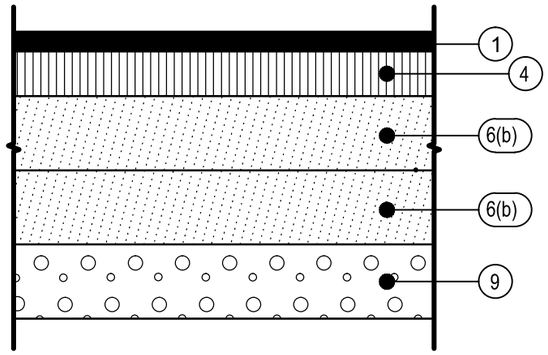
SCALE AS SHOWN: NTS
DATE: 29/04/2015
DRAWING NUMBER: JRA-SD RBRT-081
EXTN.
AMENDMENT NUMBER:

ES10 PAVEMENT STRUCTURE

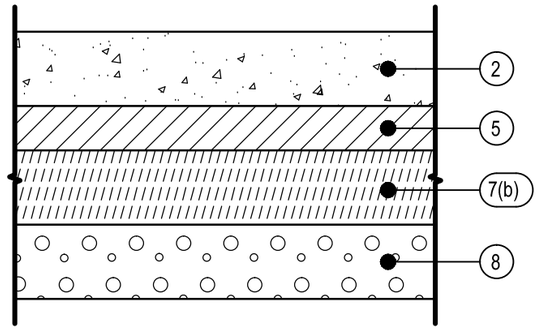
CRUSHED STONE BASE



HOT MIX ASPHALT BASE



CONCRETE PAVEMENT



LEGEND

1 - CONTINUOUSLY MEDIUM GRADED ASPHALT SURFACING
2 - CONCRETE PAVEMENT
3 - CRUSHED STONE BASE
4 - CONTINUOUSLY GRADED ASPHALT BASE
5 - STABILIZED CRUSHED STONE BASE
6 - STABILISED NATURAL GRAVEL SUBBASE
7 - STABILISED NATURAL GRAVEL SUBBASE
8 - SELECTED GRAVEL SUBGRADE
9 - SELECTED INSITU GRAVEL SUBGRADE

NOTES

Layer N°	Thickness (mm)	TRH 14 Material Type	Description	COLTO Section of Specification	Compaction as % of Mod AASHTO Density (min)	PI (max)	GM (min)	UCS/CBR @ % of Mod AASHTO	Max CBR Swell	ITS (kPa) min	Concrete Strength (MPa)	Concrete Flexural Strength (MPa)
1	40	ACM	Continuously Medium Graded Asphalt Surfacing	4200	–	–	–	_	–	–	–	–
2	150	JCP or CRCP	Concrete Pavement	7100	–	–	–	_	–	–	40	4.2
3	150	G1	Crushed Stone Base	3600	88% of ARD	4	–	_	–	–	–	–
4	90	BC3	Continuously Graded Asphalt Base	4200	–	–	–	_	–	–	–	–
5	100	C2	Stabilised Crushed Stone Base	3400 & 3500	98%	SP	1,5	3.0 - 6.0 Mpa @ 100%	–	–	–	–
6(a)	125	C3	Stabilised Natural Gravel Subbase	3400 & 3500	97%	6 (after stabilisation)	1,5	1.5 - 3.0 Mpa @ 100%	–	250 @ 100%	–	–
6(b)	150	C3	Stabilised Natural Gravel Subbase	3400 & 3500	97%	6 (after stabilisation)	1,5	1.5 - 3.0 Mpa @ 100%	–	250 @ 100%	–	–
7(a)	125	C4	Stabilised Natural Gravel Subbase	3400 & 3500	95%	6 (after stabilisation)	1,5	0.75 - 1.5 Mpa @ 100%	–	200 @ 100%	–	–
7(b)	150	C4	Stabilised Natural Gravel Subbase	3400 & 3500	95%	6 (after stabilisation)	1,5	0.75 - 1.5 Mpa @ 100%	–	200 @ 100%	–	–
8	150	G7	Selected Gravel Subgrade	3400	93%	12 or 3GM+10	0.75	15 @ 93%	1.50	–	–	–
9	150	G7	Selected Insitu Gravel Subgrade	3400	93%	12 or 3GM+10	0.75	15 @ 93%	1.50	–	–	–

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY: | DRAWN BY:
STRUCTURAL DESIGN BY: | DRAWING CHECKED BY:
CHECKED BY: | DRAWING APPROVED BY:

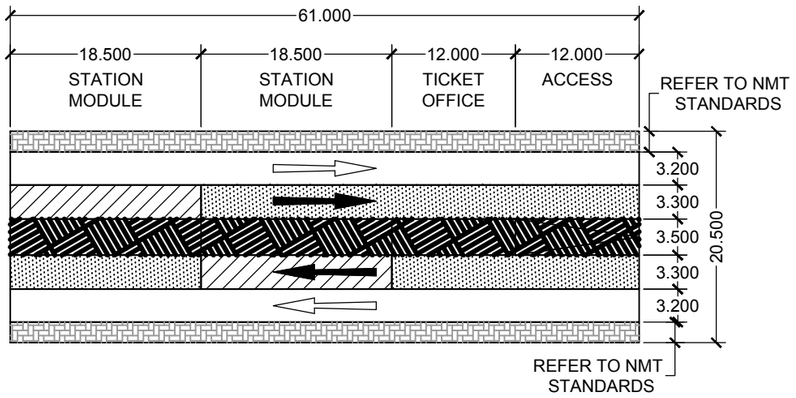
CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

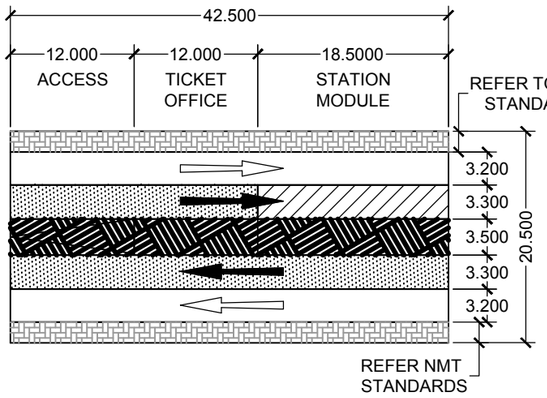
Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)

TYPICAL PAVEMENT STRUCTURE - ES010

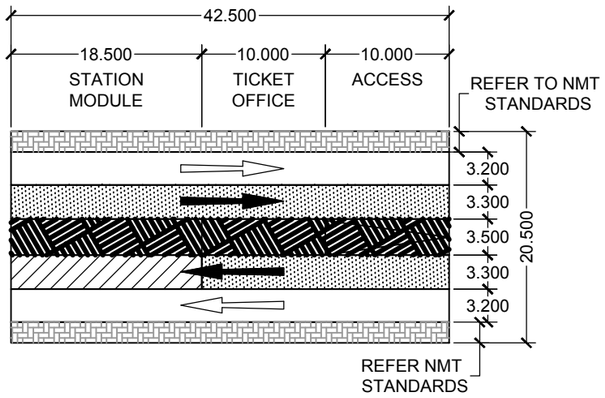
SCALE AS SHOWN: NTS
DATE: 29/04/2015
DRAWING NUMBER: JRA-SD RBRT-082
EXTN.
AMENDMENT NUMBER:



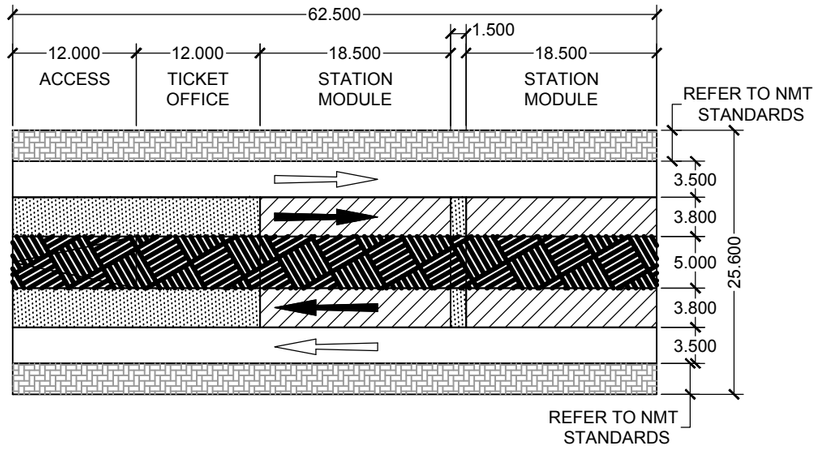
1 MODULE STAGGERED (NO BYPASS)



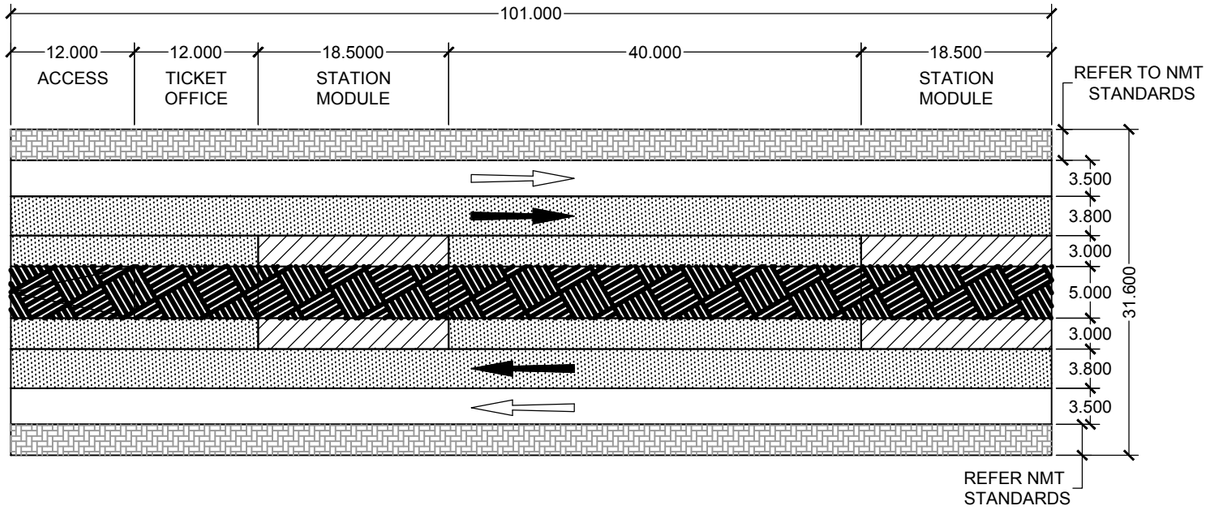
1 MODULE SINGLE SIDE (NO BYPASS)



1 MODULE SINGLE SIDE (NO BYPASS)



2 MODULES (NO BYPASS)



2 MODULES (WITH BYPASS)

LEGEND

- BRT LANE
- BRT BUS STOP
- PLATFORM
- SIDEWALK

NOTES

AMENDMENTS

No.	DATE	APPROVED	DESCRIPTION

DESIGNED BY:	DRAWN BY:
STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:
CHECKED BY:	DRAWING APPROVED BY:

CITY OF JOHANNESBURG

JOHANNESBURG ROADS AGENCY (PTY) LTD

Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)

STATION MODULES - SHEET 1 OF 2

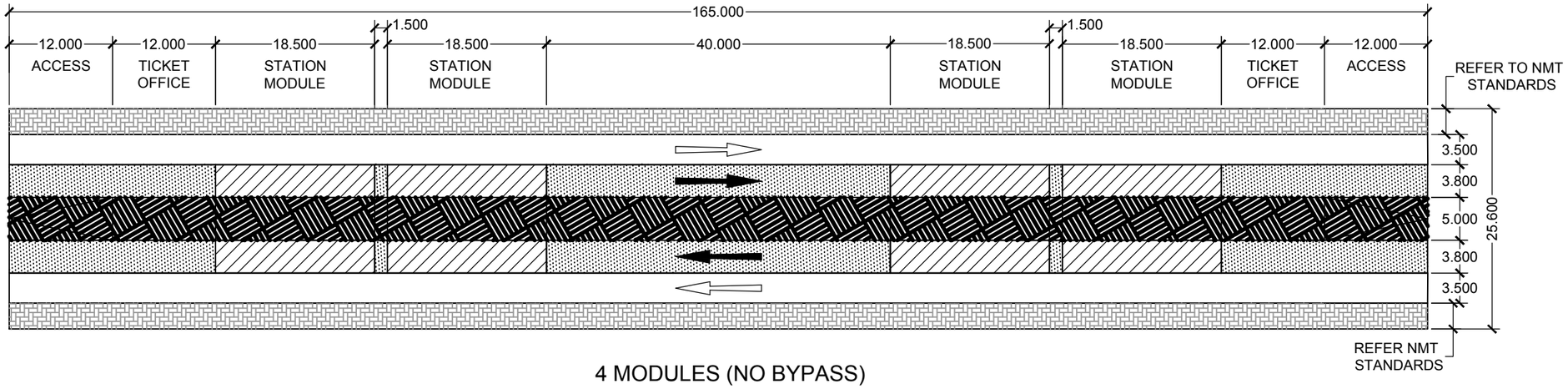
SCALE AS SHOWN: NTS

DATE: 29/04/2015

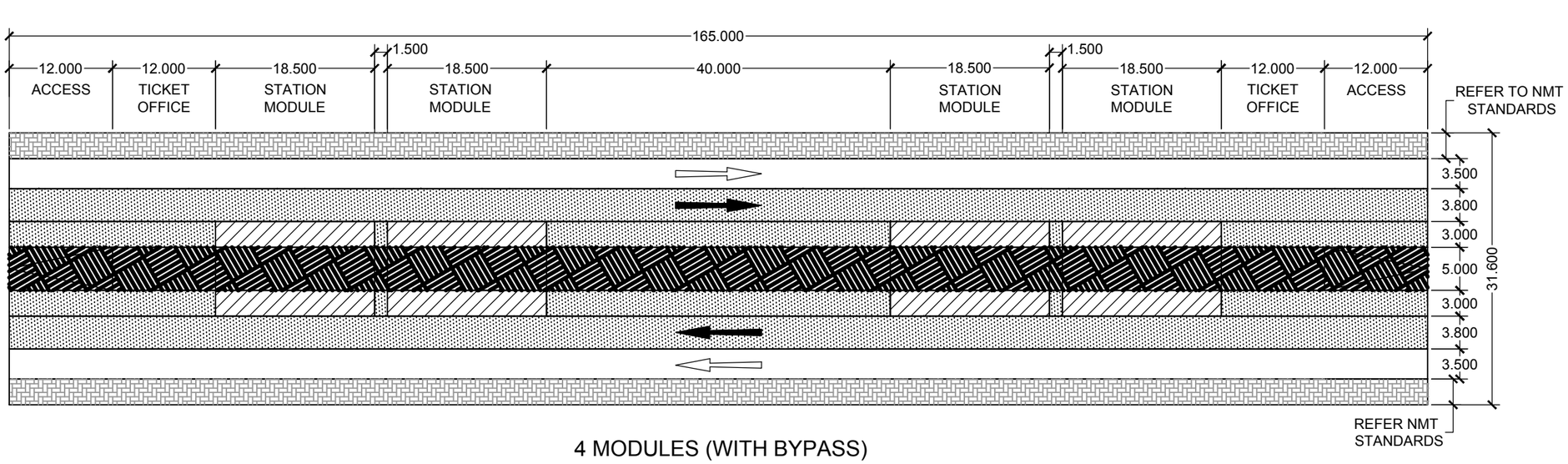
DRAWING NUMBER: JRA-SD RBRT-100

EXTN.

AMENDMENT NUMBER:



4 MODULES (NO BYPASS)



4 MODULES (WITH BYPASS)

LEGEND

- BRT LANE
- BRT BUS STOP
- PLATFORM
- SIDEWALK

NOTES

AMENDMENTS				DESIGNED BY:	DRAWN BY:	CITY OF JOHANNESBURG	SCALE AS SHOWN: NTS	
No.	DATE	APPROVED	DESCRIPTION			JOHANNESBURG ROADS AGENCY (PTY) LTD	DATE: 29/04/2015	
				STRUCTURAL DESIGN BY:	DRAWING CHECKED BY:	Drawing Sub-set: ROADS: BUS RAPID TRANSIT (BRT)	DRAWING NUMBER	EXTN.
				CHECKED BY:	DRAWING APPROVED BY:	STATION MODULES - SHEET 2 OF 2	JRA-SD RBRT-101	
							AMENDMENT NUMBER:	

Joburg
a world class african city

Directors:
Chairman: K Shubane. Managing Director: D S Macozoma. Non-Executive Directors:
M Miamane. Dr J Maina. E. Ngomane. L Masamaife. J Nxumalo. H Mashele
Company Secretary: Adv. T P Bokako

Registration No. 2000/028993/07

JRA

66 Sauer Street, Johannesburg, 2000
JRA, Private Bag X70, Braamfontein, 2017
Tel: (011) 298-5000
Fax:(011) 298-5178
www.jra.org.za