

“PRESTONS INDUSTRIAL ESTATE”
PROPOSED LOT 1 WAREHOUSE FACILITIES
MOD 7 APPLICATION
YARRUNGA STREET, PRESTONS
Assessment of Traffic and Parking
Implications

September 2018
(Rev B)

Reference 15168

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1. INTRODUCTION

This report has been prepared to accompany a MOD 7 Application to Planning and Environment NSW for a proposed modification to the approved Warehouse 1 development scheme for the “Prestons Industrial Estate” which is located in the southern part of the large industrial precinct at Prestons (Figure 1).

The Prestons area is a developing mixed industrial precinct which has evolved on largely vacant land bound by Kurrajong Road, Westlink M7 and Cabramatta Creek. There is a wide range of industrial, manufacturing, warehouse, waste recycling and other uses in the area which has excellent access to the arterial road system that links to the regional motorway systems.

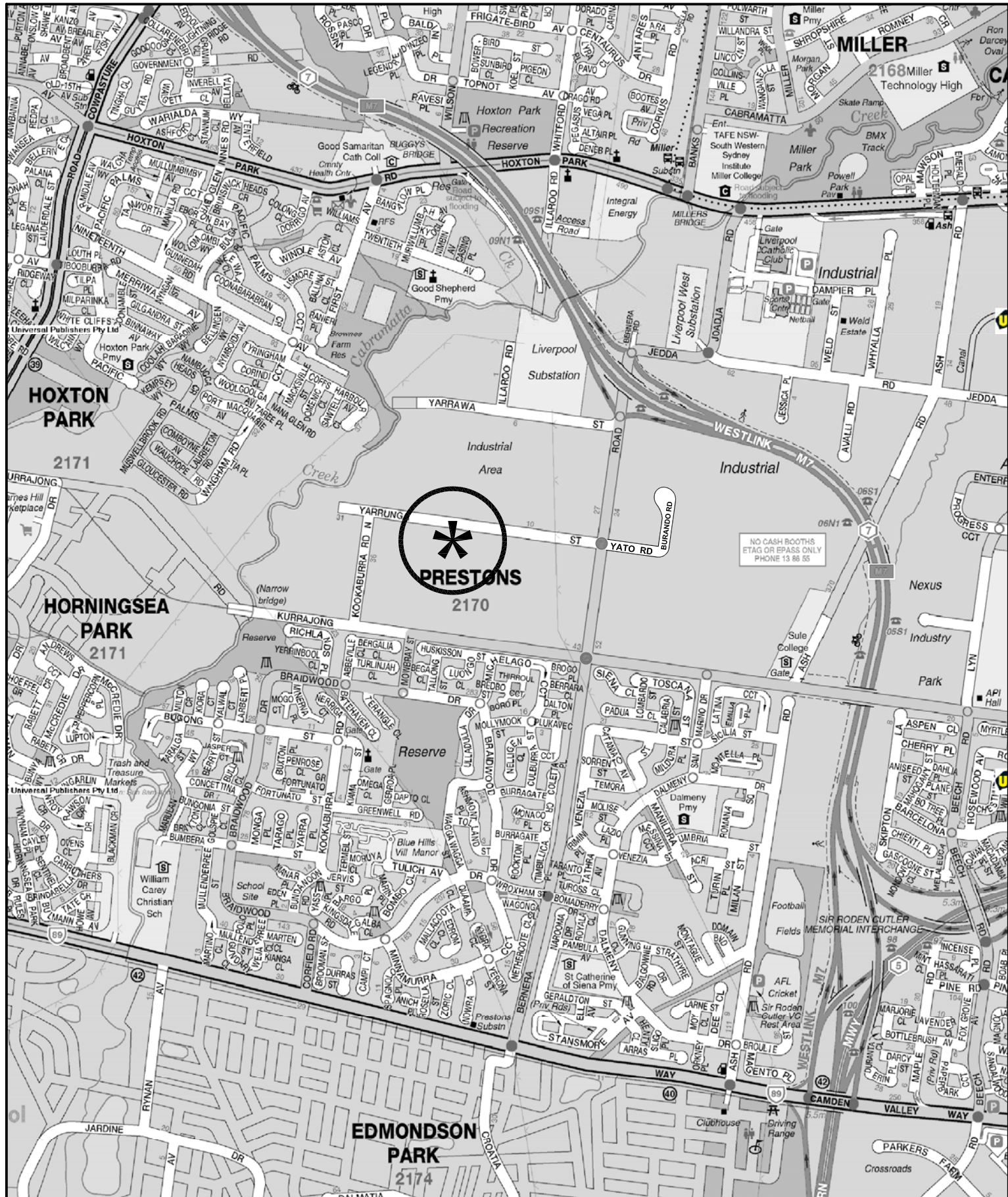
Approval was granted for a staged development of the “Prestons Industrial Estate” comprising 5 warehouse buildings with ancillary offices. Warehouses 2 and 5 have been constructed and occupied by Toll while applications (MOD’s 2 and 3) propose modifications to the Warehouse 1, 3 & 4 outcomes. A MOD 6 application has been submitted to extend the site to the west and construct an additional warehouse facility for “Toll”.

The subject MOD 7 Application proposes to modify the approved Warehouse 1 scheme to:

- construct a warehouse facility for “Intertrading” on the eastern part of the site (Lot 1)
- construct a Spec. warehouse on the western part of the site (Lot 1A)

The purpose of this report is to:

- * describe the site, the approved development scheme and the proposed MOD 7 scheme
- * describe the road network serving the site and the prevailing traffic conditions
- * assess the potential traffic implications in the context of the current approvals having regard for the proposed access intersection upgrade
- * assess the adequacy of the proposed parking provision
- * assess the suitability of the proposed vehicle access, internal circulation and servicing arrangements



LEGEND



LOCATION

FIG 1

2. PROPOSED DEVELOPMENT

2.1 SITE AND CONTEXT

The Prestons Industrial Estate site (Figure 2) has been expanded to incorporate Lots A and B in DP408207 and now occupies an irregular shaped total area of approximately 24.34ha with frontages to the Yarrunga Street, Bernera Road and Kookaburra Road in the southern part of the Prestons Industrial Precinct.

The nearby uses comprise:

- * the surrounding existing and developing industrial uses
- * the residential area extending to the south of Kurrajong Road

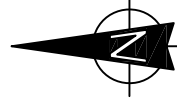
2.2 APPROVED DEVELOPMENT

The approved development scheme (including MOD's 2 & 3) for the Prestons Industrial Estate comprises:

WAREHOUSE FACILITY 1		BUILDING 4	
Warehouse	35,370m ²	Indoor Sports	3,500m ²
Office	1,200m ²		
WAREHOUSE FACILITY 2		WAREHOUSE FACILITY 5	
Warehouse	30,005m ²	Warehouse	32,400m ²
Office	820m ²	Warehouse Mezzanine	6,560m ²
		Office & Dock Office	705m ²
WAREHOUSE FACILITY 3 (A, B & C)		VOLVO FACILITY	
Warehouse	11,000m ²	Building	5,899m ²
Office Area	1,115m ²		



LEGEND



SITE

Details of the current approved development scheme are provided on the plan prepared by Axis Architectural which are reproduced in part in Appendix A.

2.3 OTHER DEVELOPMENT

A relevant major nearby development is the Charter Hall warehouse complex (M5M7 Logistics Estate) which has frontages to Yato Road and Kurrajong Road. This development scheme involves 4 large warehouse buildings together with an extension of Yato Road and comprises Warehouse 80,000m² and Office 1,619m².

This warehouse complex will have its main vehicle access through the Bernera Road, Yarrunga Road and Yato Road intersection and a secondary access on Kurrajong Road.

2.4 PROPOSED MOD 7 SCHEME

The proposal is to replace the previously proposed Warehouse 1 with two warehouse facilities and the proposed changed development comprises:

	Inter-trading	Spec.
Warehouse	24,917m ²	11,546m ² GLA
Office	2,358m ²	250m ² GLA
Total:	27,275m² GLA	11,796m² GLA
Car Parking	88 spaces	45 spaces
Vehicle Access	Yarrunga Street & Walbanga Place	Walbanga Place

Details of the proposed MOD 7 development scheme are provided on the plans prepared by LOGOS which accompany the Application and are reproduced in part in Appendix B.

3. ROAD NETWORK AND TRAFFIC CONDITIONS

3.1 ROAD NETWORK

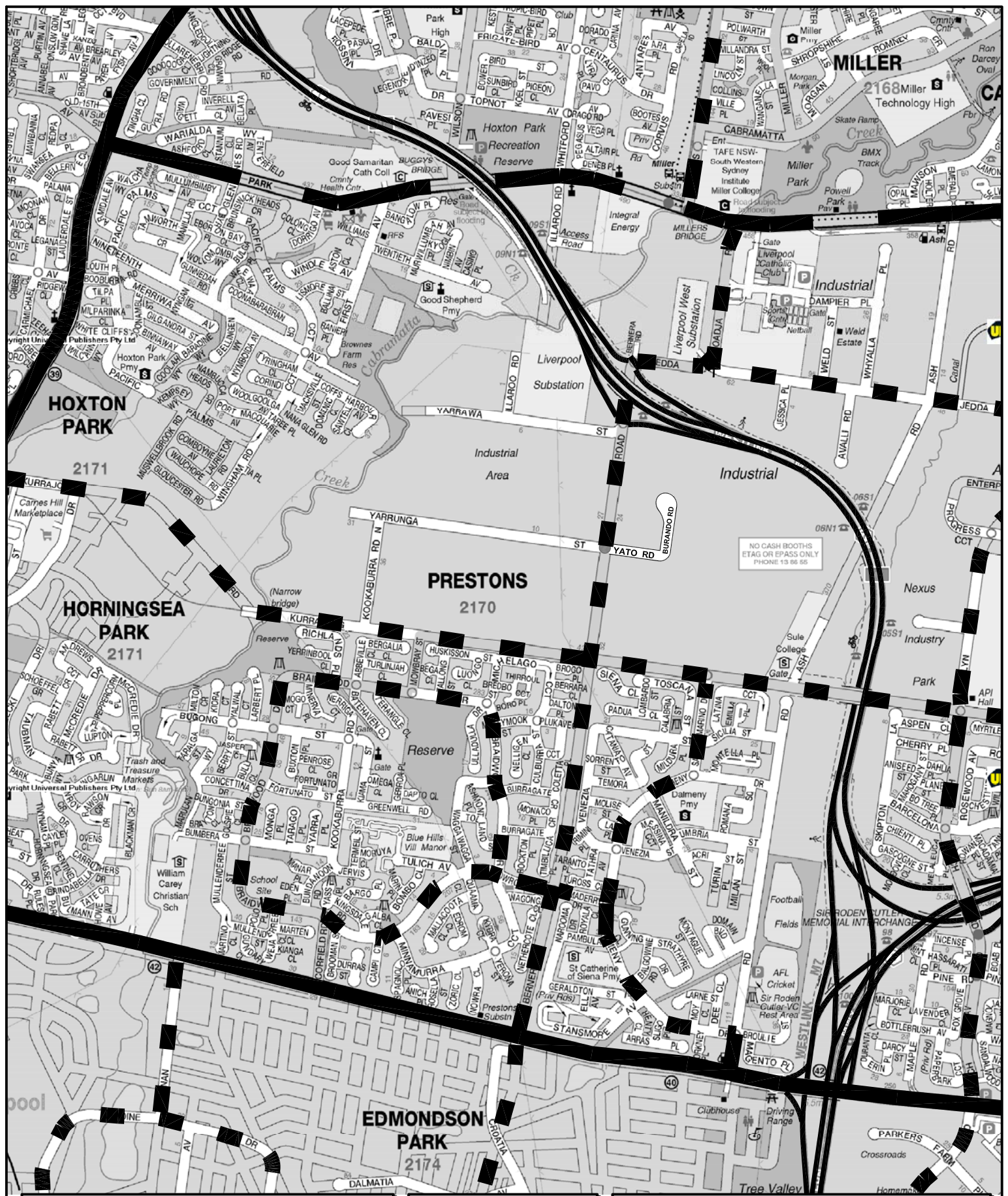
The road network serving the Prestons area (Figure 1) comprises:

Arterial and Sub-Arterial Routes

- * *Westlink (M7) Motorway* which links between the M2 Motorway at Seven Hills and the M5 Motorway at Prestons
- * *South Western (M5) Motorway* which links across the Georges River and continues southwards past Campbelltown
- * *Hume Highway* which runs along the western edge of Liverpool CBD to The Crossroads
- * *Camden Valley Way* which extends from The Crossroads across Cowpasture Road to Camden
- * *Hoxton Park Road* which extends from Hume Highway to Cowpasture Road
- * *Cowpasture Road* which extends northwards from Camden Valley Way across Hoxton Park Road

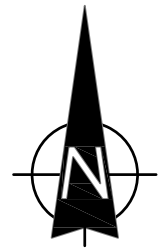
Collector Road Routes

- * *Kurrajong Road* which extends westerly from Hume Highway and will connect to Cowpasture Road when the current upgrading over Cabramatta Creek is completed
- * *Bernera Road* which extends (north-south) between Camden Valley Way and Hoxton Park Road (via sections of Jedda Road and Joadja Road)
- * *Ryan Avenue* which extends which extends to the south of Camden Valley Way
- * *Croatia Avenue* which extends to the south of Camden Valley Way



LEGEND

- ARTERIAL**
- SUB-ARTERIAL**
- COLLECTOR**



ROAD NETWORK

FIG 3

There are also numerous other 'lower order' collector routes through the Prestons, Hoxton Park, Horningsea Park, Casula and Lurnea areas including Yarrunga Street / Kookaburra Road North.

3.2 TRAFFIC CONTROLS

The existing traffic controls on the road system (Figure 4) are largely concentrated on the arterial and sub-arterial perimeter roads. Numerous intersections are controlled by traffic signals particularly along the Hume Highway and Camden Valley Way routes providing controlled access and crossing for the collector and local road system.

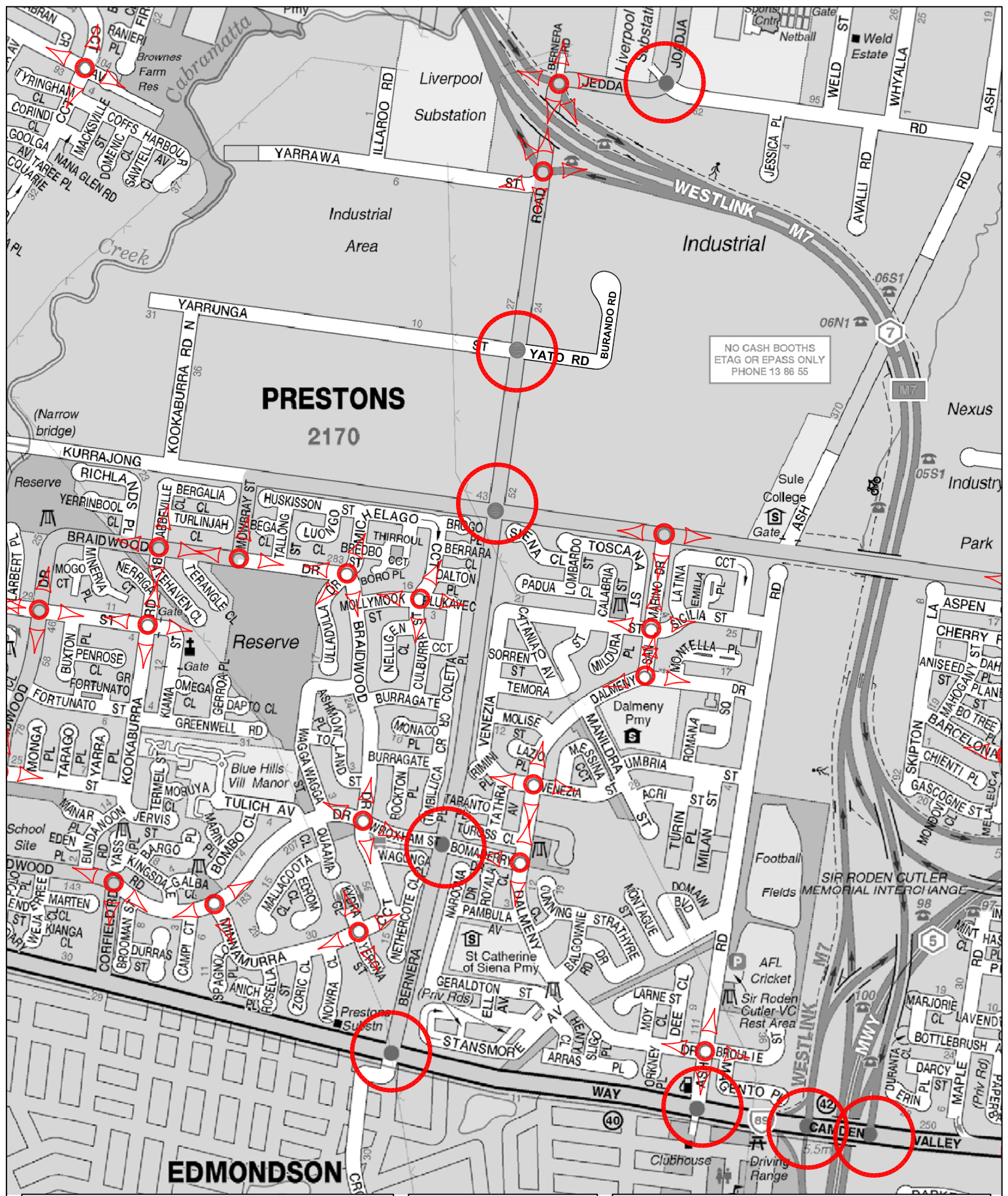
Of particular relevance to the access provisions for the development site are:

- * traffic signal control at the Camden Valley Way, Bernera Road and Croatia Avenue intersection
- * traffic signal control at the Kurrajong Road and Bernera Road intersection
- * traffic signal control at the Bernera Road and Yarrunga Street intersection
- * roundabout controls at the intersections of Bernera Road and Jedda Road with the M7 ON/OFF Ramp intersections

A 70 kmph speed restriction applies along the Camden Valley Way route, however the speed limit on the local and collector road systems is generally 50 kmph.

3.3 TRAFFIC CONDITIONS

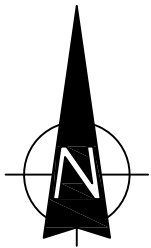
An indication of the existing morning and afternoon peak traffic conditions in the area is provided by traffic surveys undertaken at the principal intersections relevant to the site. The results of these surveys are summarised in Figure 5 and the operational performance of these intersections was assessed using SIDRA for the earlier application. The results for the morning and afternoon peak periods are summarised in the following while the criteria for interpreting SIDRA output is reproduced overleaf:



NO CASH BOOTHS
ETAG OR EPASS ONLY
PHONE 13 86 55

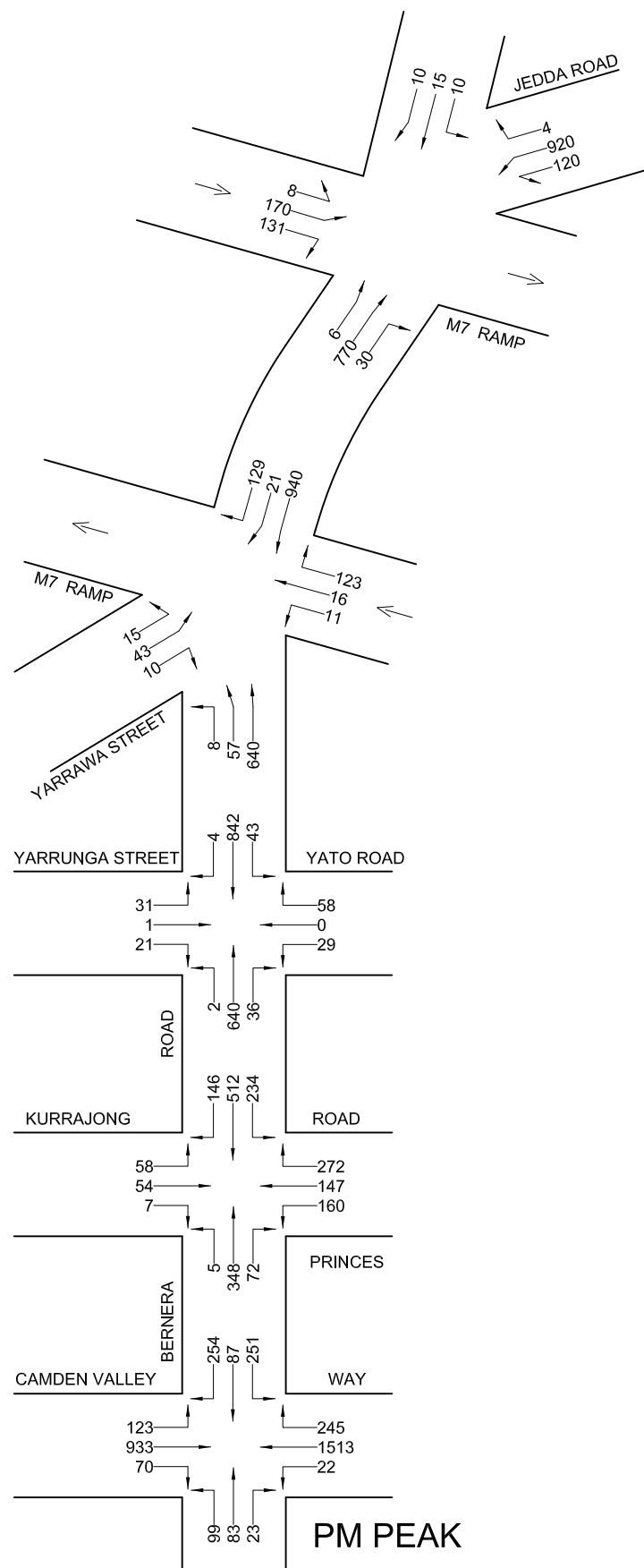
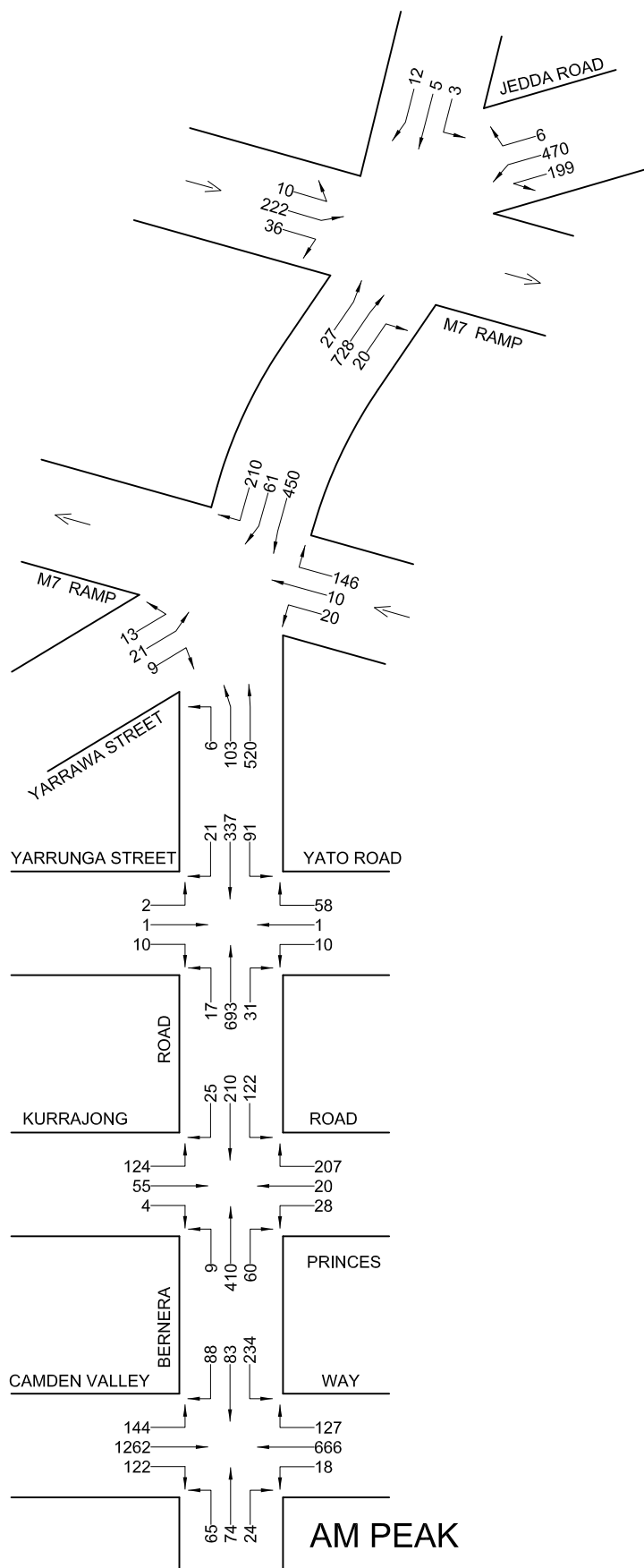
LEGEND

-  TRAFFIC SIGNAL CONTROL
-  ROUNDABOUT
-  RESTRICTED TURNING MOVEMENT



TRAFFIC CONTROLS

FIG 4



LEGEND



EXISTING PEAK TRAFFIC MOVEMENTS

FIG 5

	AM		PM	
	LOS	AVD	LOS	AVD
Bernera/Yarrunga	A	9.4	A	10.4
Bernera/Kurrajong	B	23.5	B	25.1
CVWY/Bernera	B	17.2	B	25.9
Bernera/M7	A	5.8	A	4.6
Jedda/M7	A	6.6	A	6.7

The results of this assessment indicate that these intersections currently operate with a satisfactory level of service.

3.4 PROPOSED INTERSECTION UPGRADE

In order to accommodate the additional traffic demands of development on both the Prestons Industrial Estate and the M5M7 Logistic Estate, it has been agreed that the Bernera Road, Yarrunga Street and Yato Road intersection will be significantly upgraded. Details of the upgrading scheme are provided on the plan prepared by Costin Roe Consulting which is reproduced in Appendix C.

3.5 TRANSPORT SERVICES

At the present time, there is only somewhat limited public transport servicing of the Prestons area. The railway stations at Edmondson Park, Glenfield, and Casula are some 3 to 4km from the site where the Cumberland, Airport and East Hills, Inner West and Southern Railway lines provide connections to the Liverpool, Campbelltown, Fairfield, Bankstown, Parramatta and the Sydney CBD areas.

'Busabout' currently operates along Camden Valley Way with the Route 864 and 867 services providing connection to Glenfield Railway Station and Route 856 and 857 providing connection to Liverpool Railway Station and Interchange (see Appendix D details).

Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good	Good
'B'	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
'C'	Satisfactory	Satisfactory but accident study required
'D'	Operating near capacity	Near capacity and Accident Study required
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
'F'	Unsatisfactory and requires additional capacity	Unsatisfactory and requires other control mode

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below, which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**¹ both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

¹ the values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs

4. TRAFFIC

The traffic assessment for the recent MOD 3 Application concluded the following:

Network peak traffic generation (Warehouse + Office)	0.19 vtpm per 100m ²
Total Warehouse 119,070m ²	226 vtpm
Volvo	65 vtpm AM, 59 PM
Building 4	42 vtpm AM, 132 PM
Total:	333 vtpm AM, 417 PM

Application of the assessed network peak traffic generation criteria to the proposed MOD 6 Toll warehouse would indicate the following:

$$14,806\text{m}^2 @ 0.19 \text{ vtpm per } 100\text{m}^2 - 28 \text{ vtpm}$$

Data from the recent RMS surveys of the Erskine Park and Wonderland Industrial precincts reveals a “truck” component of the total generated traffic of 29% in the AM and 26% in the PM peak periods. Thus, the projected distribution of movements is some 8 truck trips (4 IN & OUT) on Walbanga Place and 20 car trips (15 in peak direction IN & OUT) on Kurrajong Road.

The approach and departure trips to/from the site will involve movements in all directions and unlike the other sites in the Prestons Industrial Estate, these movements will not be concentrated through the Bernera Road / Yarrunga Road / Yato Road intersection. The generated movements will be relatively quite minor and once distributed to the various geographic directions and approach / depart factors, the numbers will be quite meaningless in terms of the capacity of the access intersections.

The proposed MOD 7 floorspace outcome is as follows:

Approved Building 1	Proposed Building 1A & 1B	Change
36,570m ²	39,071m ²	+2,501m ²

The additional floorspace equates to only some 4 – 5 vtpd which will be an absolutely imperceptible increase while the provision for vehicles to access Building 1A from Walbanga Place will result in fewer vehicles passing through the Bernera Road / Yarrunga Road intersection. Accordingly, the operational performance of this critical intersection will be better than forecast previously.

5. PARKING

The parking provision criteria for 'warehouse' use contained in a number of Metropolitan Councils DCP's do not reflect the realities of contemporary warehouse and distribution centre type uses. Liverpool City Councils parking criteria is typical in specifying the following.

Warehouse

- * 1 space per 35m² of office LFA
- * 1 space per 75m² of warehouse LFA

It has been the accepted practice for large contemporary warehouse developments to assess parking provision with reference to the RMS Guidelines which specify a parking provision for warehouse use of 1 space per 300m² (warehouse and office floorspace) and this was the accepted approach for the previous approvals for the Prestons Industrial Estate and M5M7 Logistic Estate developments.

For these developments, it has been accepted that a parking provision in the range of 1 space per 200m² to 300m² is applicable and the overall parking provision for the proposed MOD 7 warehouse outcome are as follows:

Total GFA	39,071m ²
@ 133 spaces	~ 1 space per 294m ²

It is apparent that the proposed parking provisions will be consistent with the RMS criteria and accepted practice for contemporary warehouses.

6. ACCESS, INTERNAL CIRCULATION AND SERVICING

ACCESS

The proposed changed/additions to the approved vehicle access provisions for the proposed MOD 7 scheme comprise:

- * Relocation of the proposed combined ingress/egress carpark access for Building 1 on the new cul-de-sac access roadway
- * Provision of separate combined ingress/egress driveway for trucks and the carpark for the Spec. warehouse on Walbanga Place

The proposed vehicle accesses will be located where good sight distances are available and there will be appropriate separation from intersections and each other. The truck accesses will accommodate all vehicles requiring access to the site as indicated on the turning path diagrams in Appendix E.

INTERNAL CIRCULATION

The design of the carpark areas complies with the requirements of AS2830.1 and 6 with quite satisfactory provision for turning and manoeuvring.

The ability for trucks to manoeuvre on the site is confirmed by the turning path assessments for representative movements which are depicted on the diagrams in Appendix E.

SERVICING

Refuse will be removed by contract vehicle and this vehicle as well as other service vehicles will be able to utilise the large hardstand areas provided.

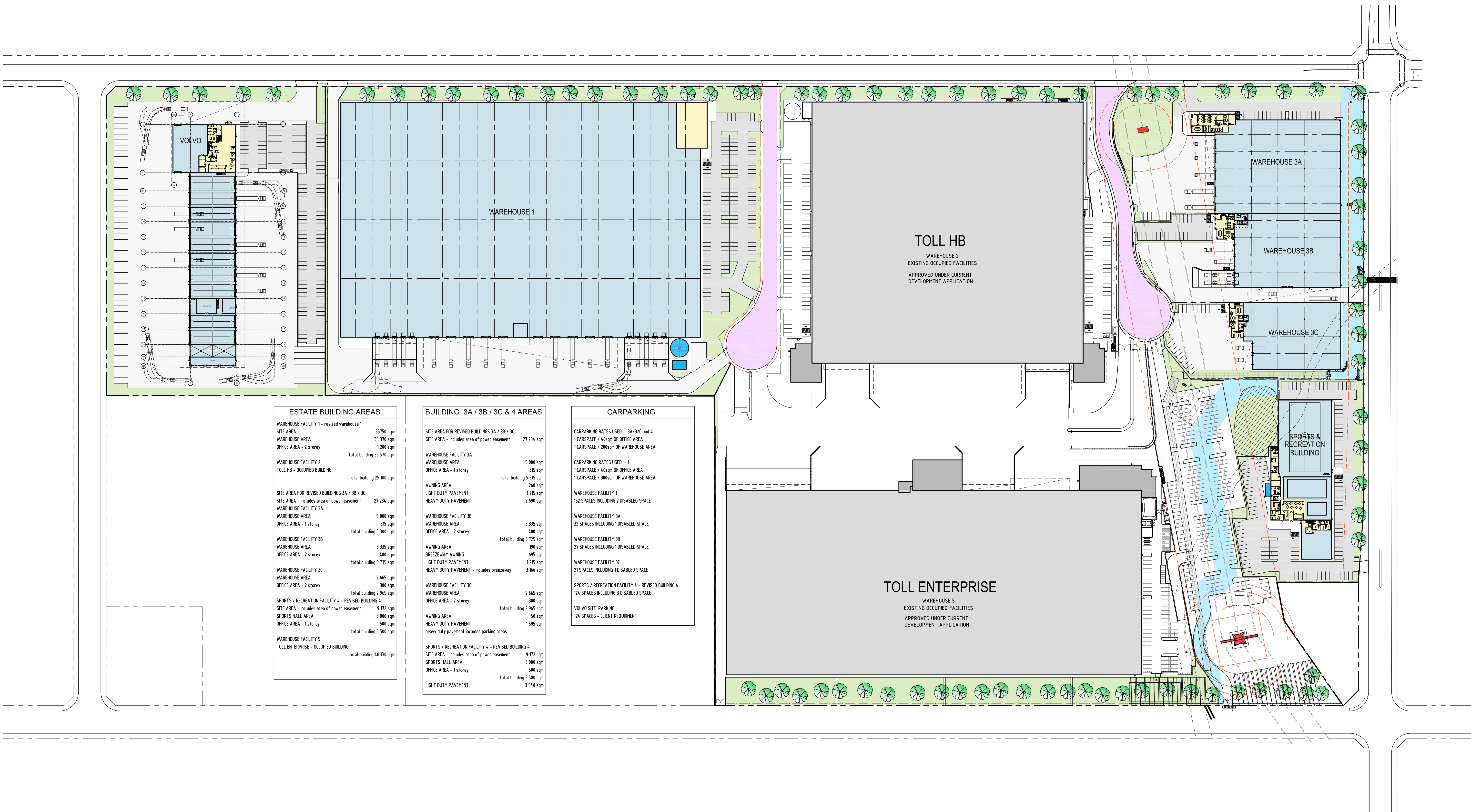
7. CONCLUSION

This assessment of the potential traffic and parking implications of the proposed MOD7 development scheme for the Prestons Industrial Estate has concluded that:

- * there will not be any unsatisfactory traffic implications
- * the proposed parking provision will be suitable and adequate
- * the proposed vehicle access arrangements will be appropriate and will accommodate all vehicles requiring to access the site
- * the proposed internal circulation arrangements will be suitable and appropriate for the manoeuvring and standing of trucks and cars

APPENDIX A

APPROVED PLANS



ESTATE BUILDING AREAS	
WAREHOUSE FACILITY 1 - revised warehouse 1	
SITE AREA	55750 sqm
WAREHOUSE AREA	35 370 sqm
OFFICE AREA - 2 storey	1 200 sqm
total building 36 570 sqm	
WAREHOUSE FACILITY 2	
TOLL HB - OCCUPIED BUILDING	
total building 25 100 sqm	
SITE AREA FOR REVISED BUILDINGS 3A / 3B / 3C	
SITE AREA - includes area of power easement	27 234 sqm
WAREHOUSE FACILITY 3A	
WAREHOUSE AREA	5 000 sqm
OFFICE AREA - 1 storey	315 sqm
total building 5 300 sqm	
WAREHOUSE FACILITY 3B	
WAREHOUSE AREA	3 335 sqm
OFFICE AREA - 2 storey	400 sqm
total building 3 735 sqm	
WAREHOUSE FACILITY 3C	
WAREHOUSE AREA	2 665 sqm
OFFICE AREA - 2 storey	300 sqm
total building 2 965 sqm	
SPORTS / RECREATION FACILITY 4 - REVISED BUILDING 4	
SITE AREA - includes area of power easement	9 172 sqm
SPORTS HALL AREA	3 000 sqm
OFFICE AREA - 1 storey	500 sqm
total building 3 500 sqm	
WAREHOUSE FACILITY 5	
TOLL ENTERPRISE - OCCUPIED BUILDING	
total building 48 130 sqm	

BUILDING 3A / 3B / 3C & 4 AREAS	
SITE AREA FOR REVISED BUILDINGS 3A / 3B / 3C	
SITE AREA - includes area of power easement	27 234 sqm
WAREHOUSE FACILITY 3A	
WAREHOUSE AREA	5 000 sqm
OFFICE AREA - 1 storey	315 sqm
total building 5 315 sqm	
AWNING AREA	
LIGHT DUTY PAVEMENT	1 215 sqm
HEAVY DUTY PAVEMENT	2 690 sqm
WAREHOUSE FACILITY 3B	
WAREHOUSE AREA	3 335 sqm
OFFICE AREA - 2 storey	400 sqm
total building 3 735 sqm	
AWNING AREA	
BREEZEWAY AWNING	190 sqm
LIGHT DUTY PAVEMENT	695 sqm
HEAVY DUTY PAVEMENT - includes breezeway	3 166 sqm
WAREHOUSE FACILITY 3C	
WAREHOUSE AREA	2 665 sqm
OFFICE AREA - 2 storey	300 sqm
total building 2 965 sqm	
AWNING AREA	
HEAVY DUTY PAVEMENT	50 sqm
heavy duty pavement includes parking areas	1 595 sqm
SPORTS / RECREATION FACILITY 4 - REVISED BUILDING 4	
SITE AREA - includes area of power easement	9 172 sqm
SPORTS HALL AREA	3 000 sqm
OFFICE AREA - 1 storey	500 sqm
total building 3 500 sqm	
LIGHT DUTY PAVEMENT	3 540 sqm

CARPARKING	
CARPARKING RATES USED - 3A/B/C and 4	
1 CARSPACE / 40sqm OF OFFICE AREA	
1 CARSPACE / 200sqm OF WAREHOUSE AREA	
CARPARKING RATES USED - 1	
1 CARSPACE / 40sqm OF OFFICE AREA	
1 CARSPACE / 300sqm OF WAREHOUSE AREA	
WAREHOUSE FACILITY 1	
152 SPACES INCLUDING 2 DISABLED SPACE	
WAREHOUSE FACILITY 3A	
32 SPACES INCLUDING 1 DISABLED SPACE	
WAREHOUSE FACILITY 3B	
27 SPACES INCLUDING 1 DISABLED SPACE	
WAREHOUSE FACILITY 3C	
21 SPACES INCLUDING 1 DISABLED SPACE	
SPORTS / RECREATION FACILITY 4 - REVISED BUILDING 4	
124 SPACES INCLUDING 3 DISABLED SPACE	
VOLVO SITE PARKING	
124 SPACES - CLIENT REQUIREMENT	

SITE PLAN
1: 1200 scale

Issue Date Amendment

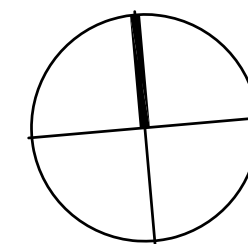
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Project Manager:

Project:

PRESTONS INDUSTRIAL ESTATE
PROPOSED WAREHOUSE DEVELOPMENT
Cnr YARRUNGA STREET & BERNERA ROAD , PRESTONS NSW

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AXIS ARCHITECTURAL Pty Ltd - ABN 18 086 853 376
Nominated Architect - David McDonald NSW ARB No. 7997



Drawing:
**SITE PLAN - COLOURED
OVERALL ESTATE PLAN**

Drawn: AA
Date: November 2015
Scale: 1: 1200 @ A1
1: 2400 @ A3

Project No:
140604

Drawing No:
S96 - A 103

Issue:
P2

APPENDIX B

MOD 7 PLANS

G-SLD	gate - sliding
G-H	gate - hinged
PR	pump room for fire service
PS	pylon sign
RSD	roller shutter door - power operated
RWT	rain water tank
SWT	sprinkler water tank for fire service

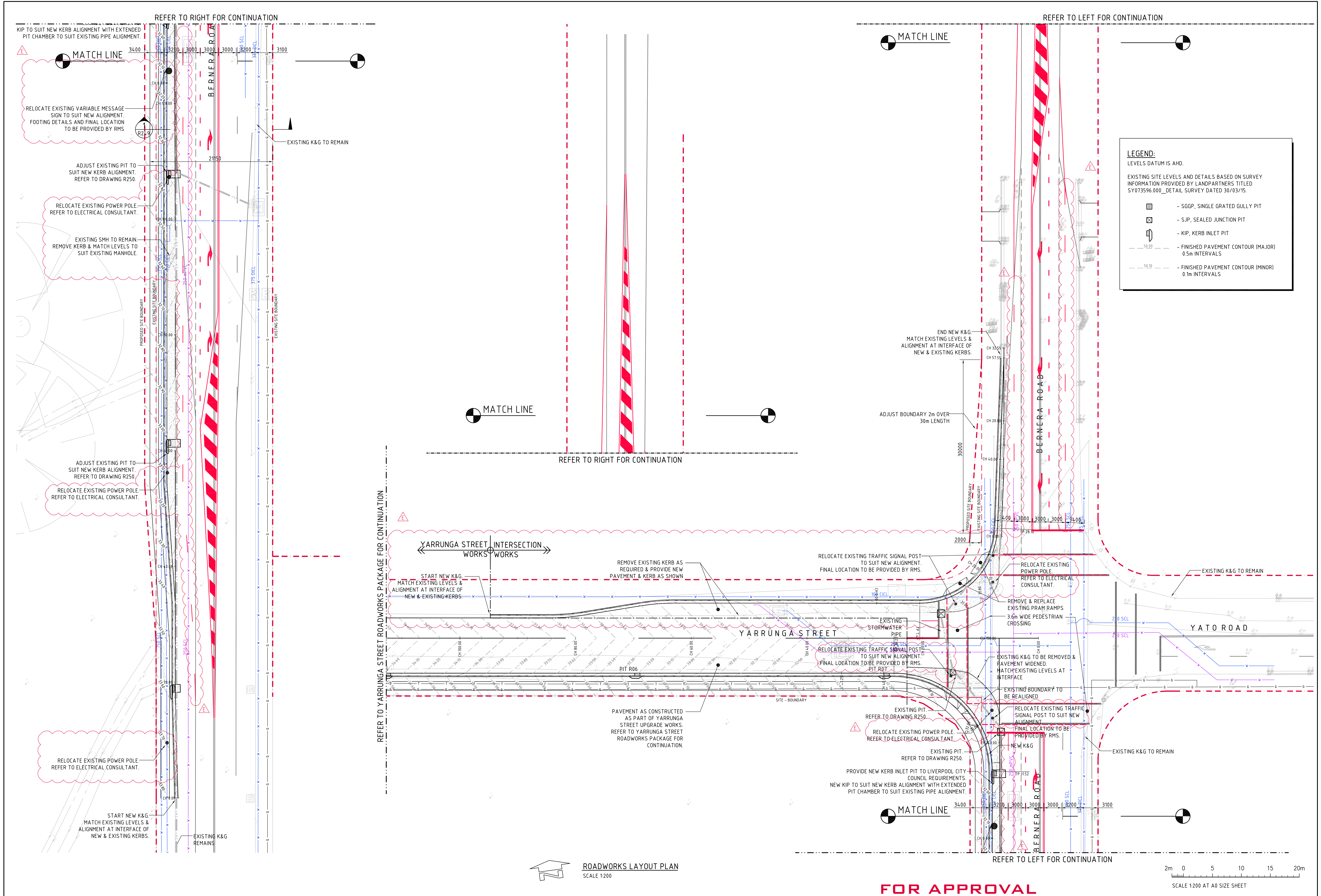


S 4.55 / No.7 APPLICATION TO MODIFY
EXISTING DEVELOPMENT APPLICATION

Drawing: _____			
SITE PLAN OVERALL ESTATE PLAN			
Drawn: AA Date: AUGUST 2018 Scale: 1: 1200 @ A1 1: 2400 @ A3	Project No: 140604	Drawing No: DA - A 101	Issue: O

APPENDIX C

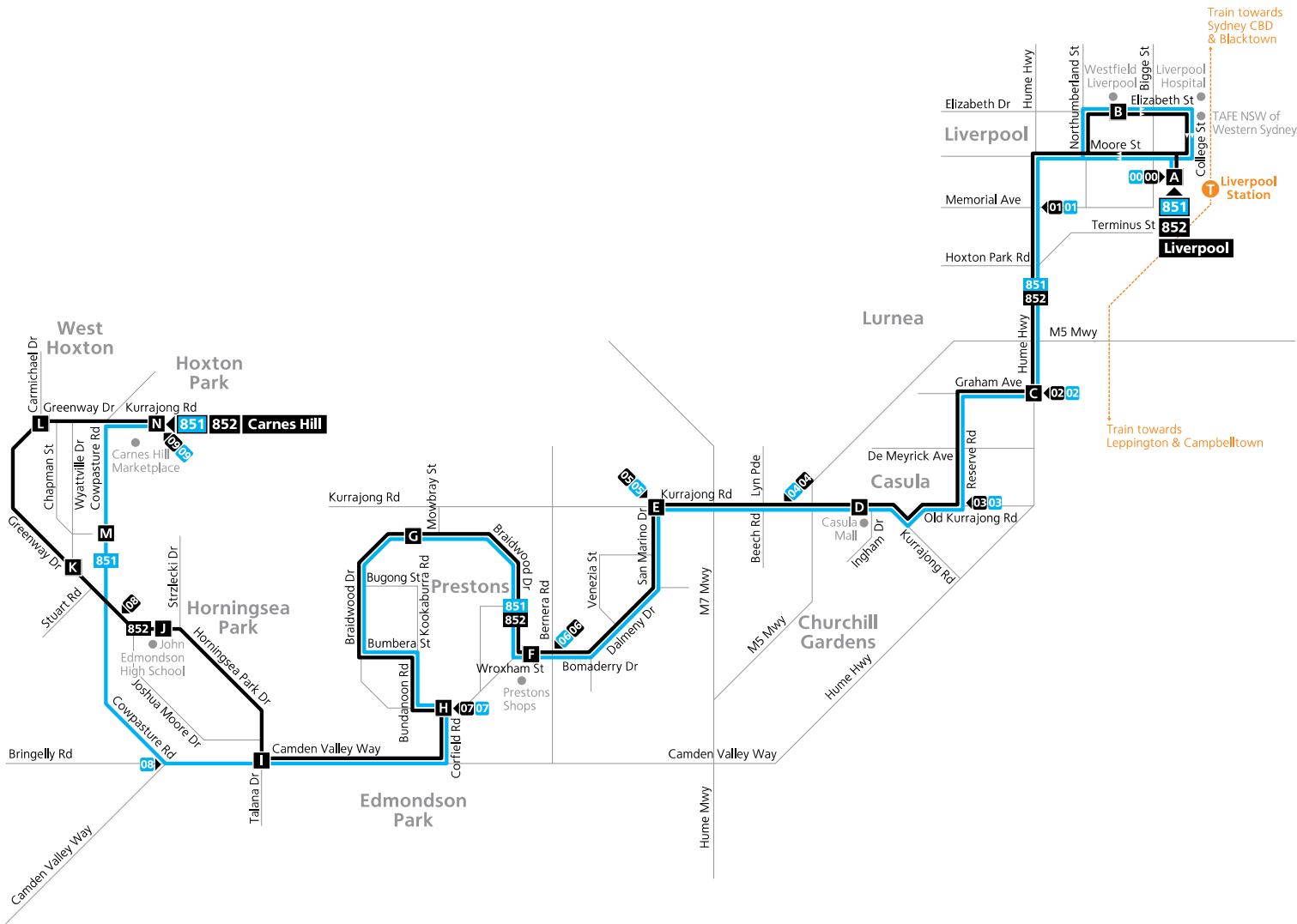
INTERSECTION DETAILS



EXTENT OF WORKS & LINEMARKING REVISED AS CLOUDED			19.01.17	E				ARCHITECT			CLIENT			PROJECT			 Costin Roe Consulting Pty Ltd. Consulting Engineers 32 YARRUNGA ROAD PRESTONS NSW Level 1, 8 Windmill Street Wahib Bay, Sydney NSW 2000 Tel: (02) 9251-7699 Fax: (02) 9241-3721 email: mail@costinroe.com.au ©			Costin Roe Consulting PRECISION COMMUNICATION ACCOUNTABILITY			DRAWING TITLE		
VERGE WIDTH & SITE BOUNDARY REVISED AS CLOUDED			02.12.16	D				LOGOS PROPERTY			PROPOSED DEVELOPMENT			ROADWORKS LAYOUT PLAN											
VERGE WIDTH & SITE BOUNDARY REVISED AS CLOUDED			06.10.16	C				SUITE 02, LEVEL 12			32 YARRUNGA ROAD														
KERB LAYOUT REVISED AS CLOUDED			28.09.16	B				167 MACQUARIE STREET			PRESTONS NSW														
ISSUED FOR APPROVAL			09.09.16	A				SYDNEY NSW																	
AMENDMENTS			DATE	ISSUE	AMENDMENTS	DATE	ISSUE							DESIGNED			CAD REF:			DRAWING No			ISSUE		
														MW			C08753.11-R240			C08753.11-R240			E		
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APPENDIX D

BUS SERVICES

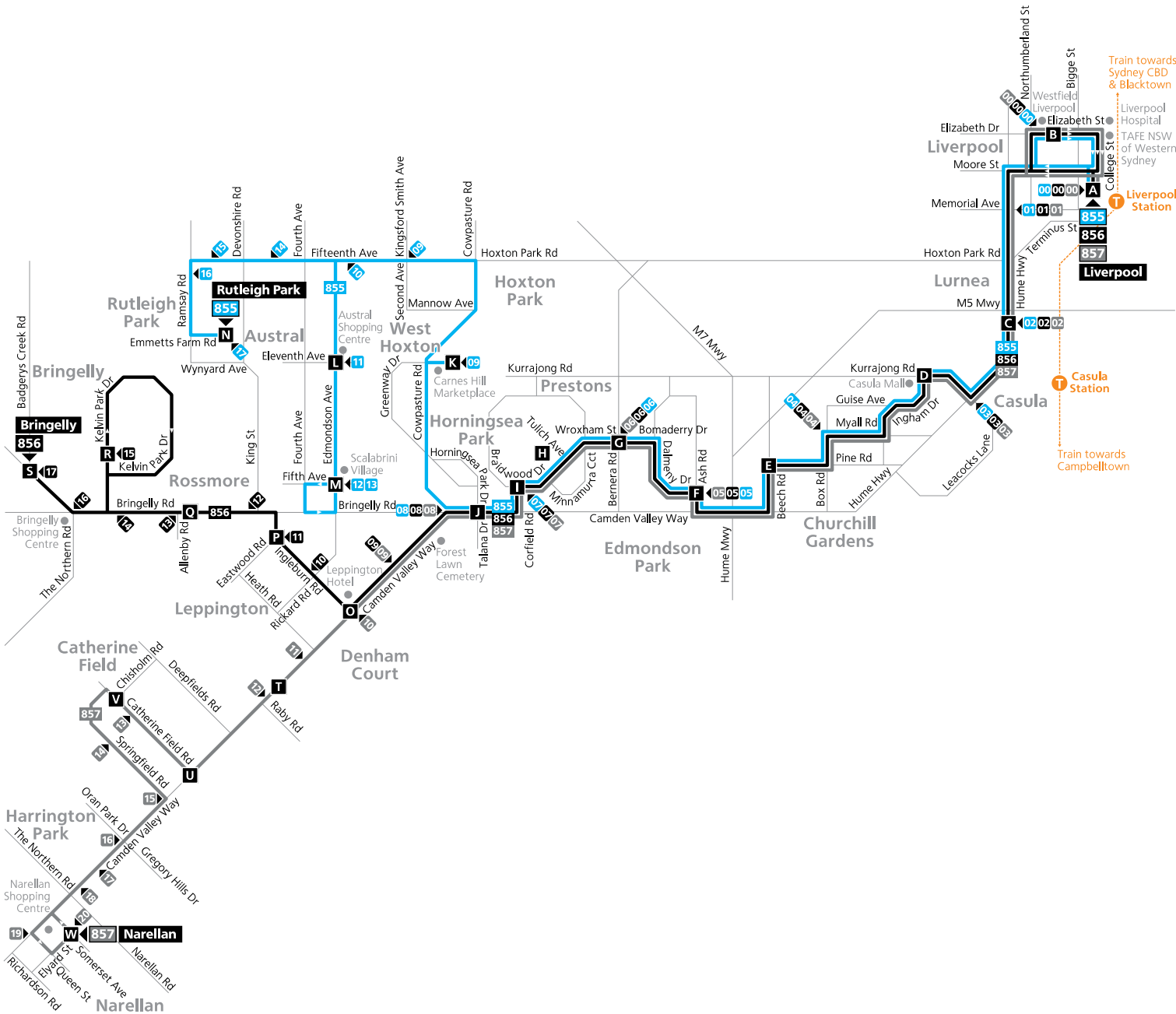


Legend

-  Bus route
-  A Timing point
-  T Train line/station
-  851 Bus route number
-  00 Section point

 Diagrammatic Map
North
Not to Scale



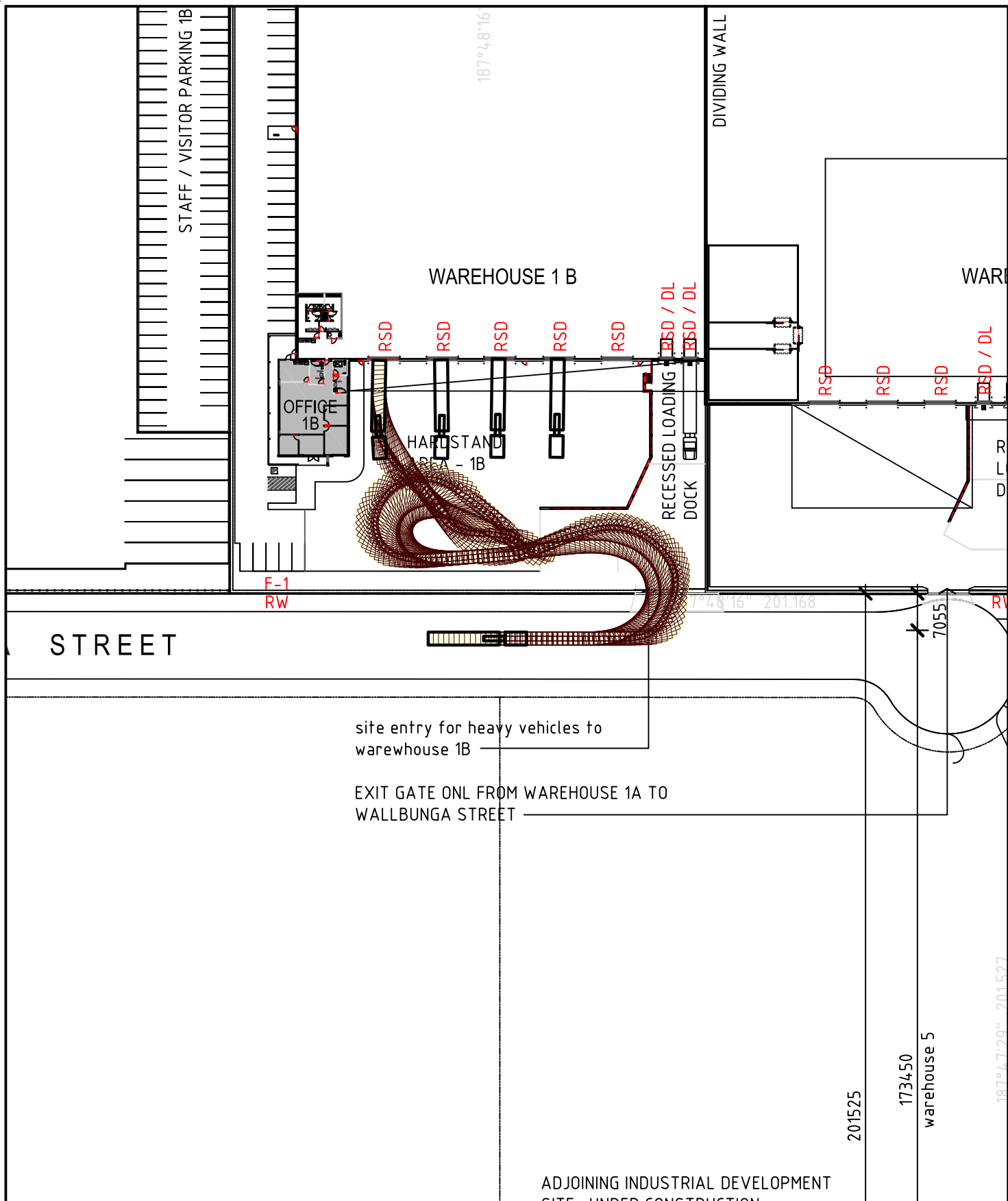


Diagrammatic Map
Not to Scale



APPENDIX E

TURNING PATH ASSESSMENT



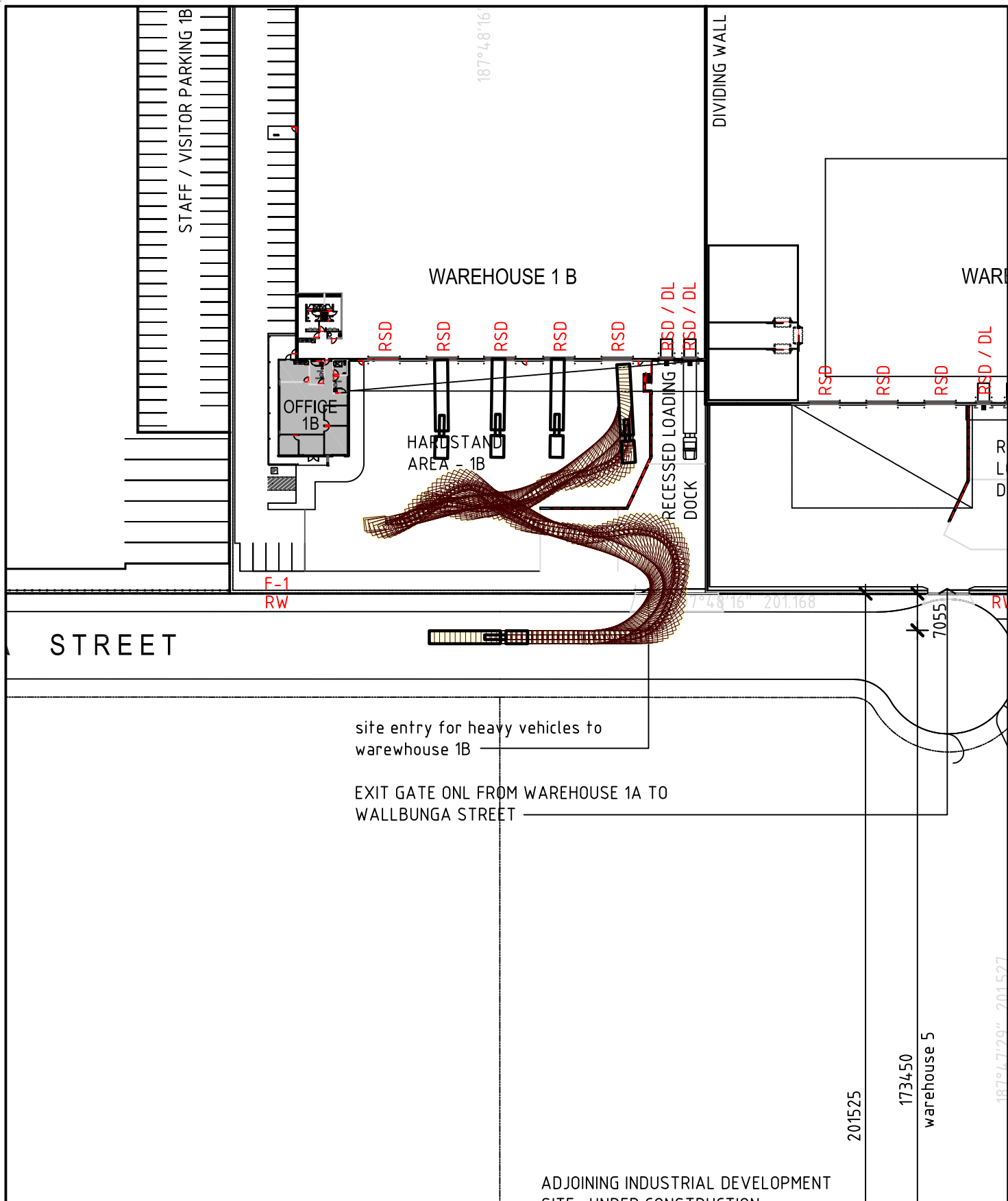
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE ENTERING THE SITE

SP 1



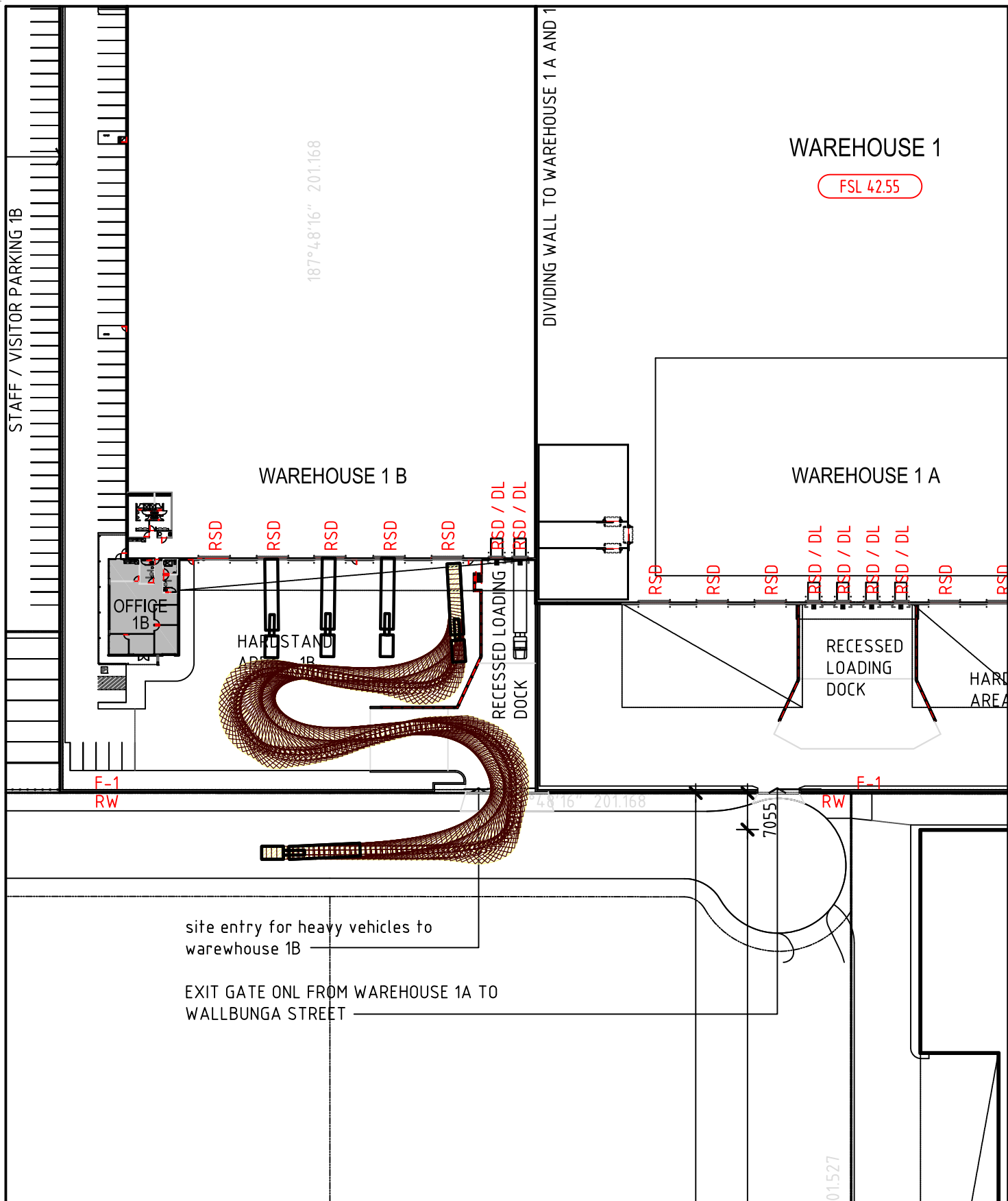
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**SWEPT PATH ANALYSIS
OF A 19m ARTICULATED
VEHICLE ENTERING THE SITE**

SP 5



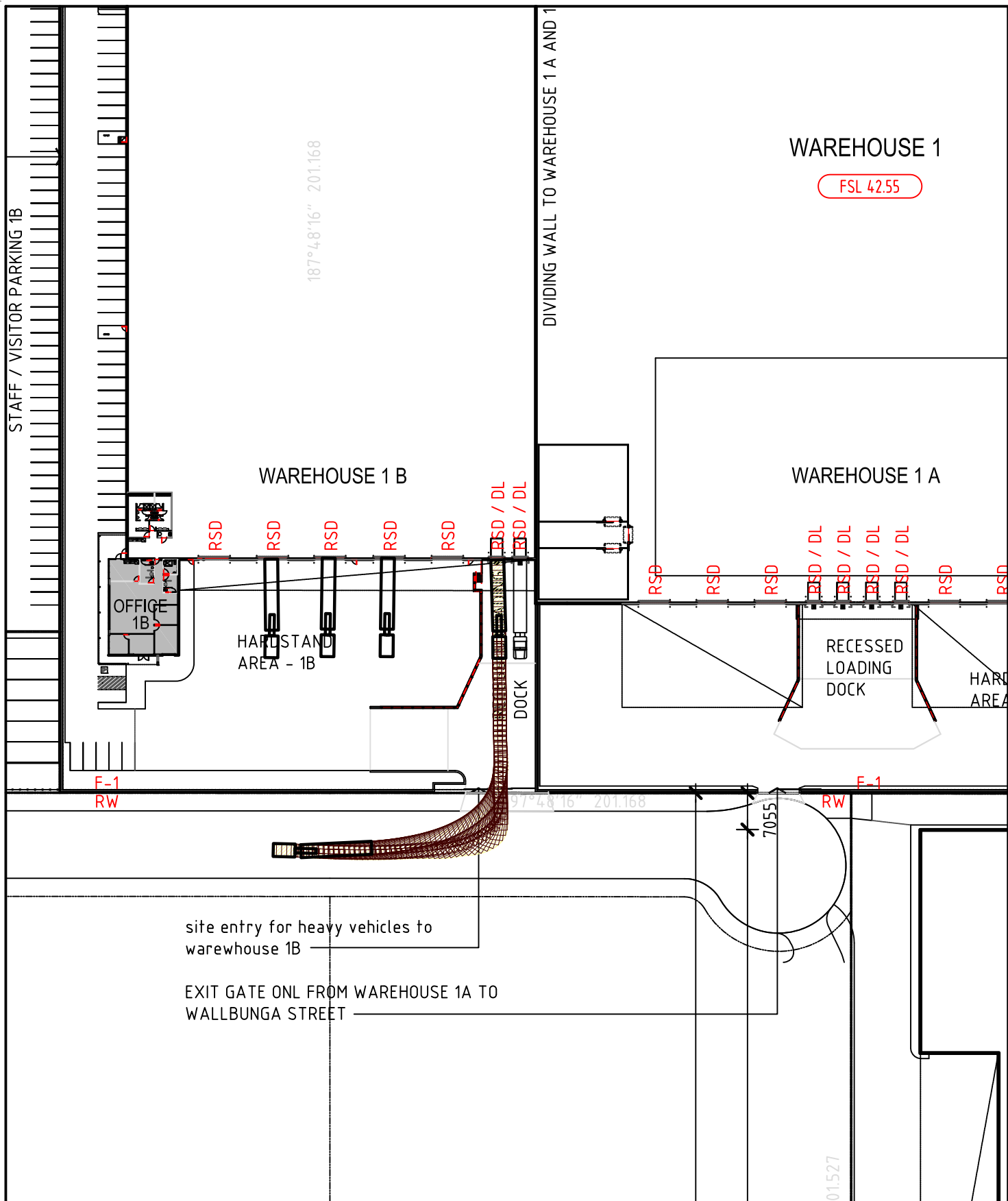
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V5.00a in conjunction with AutoCAD 2013. The vehicle used is based upon vehicle data provided by Austroads and incorporates a reasonable degree of tolerance. However, it is not possible to account for all vehicle types/characteristics and/or driver ability.



SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE EXITING THE SITE

SP 6



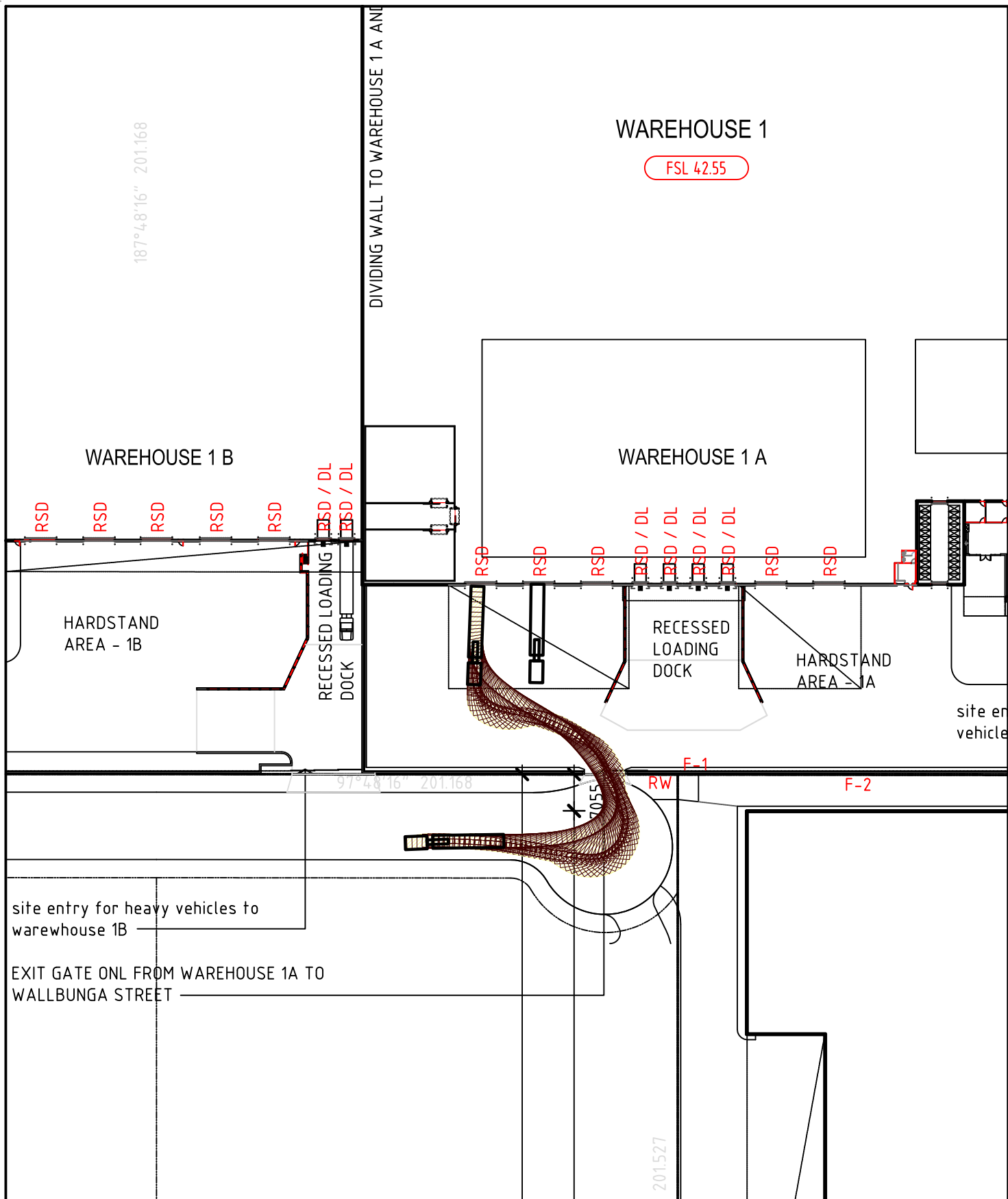
LEGEND

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SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE EXITING THE SITE

SP 8



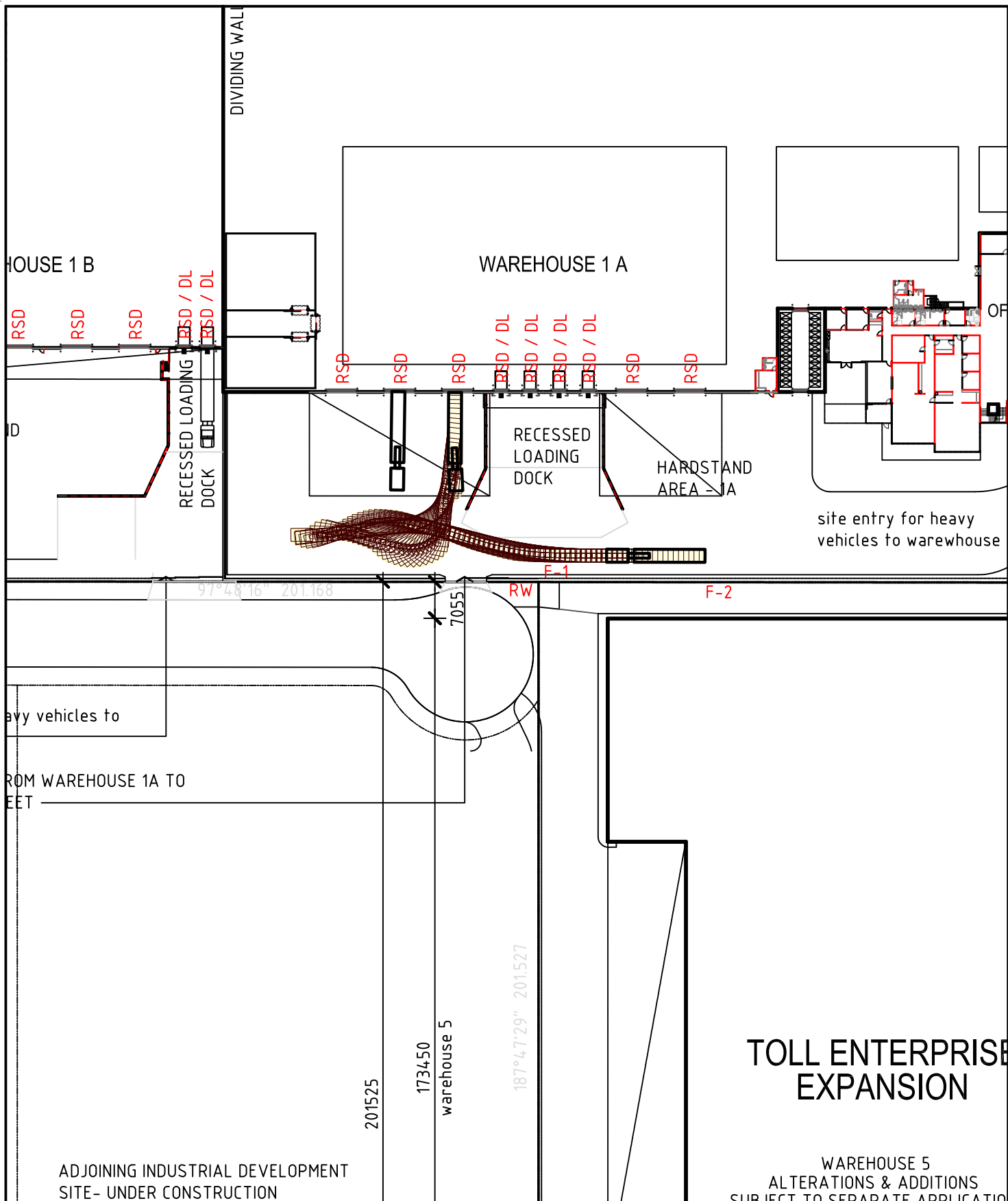
LEGEND

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SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE EXITING THE SITE

SP 12



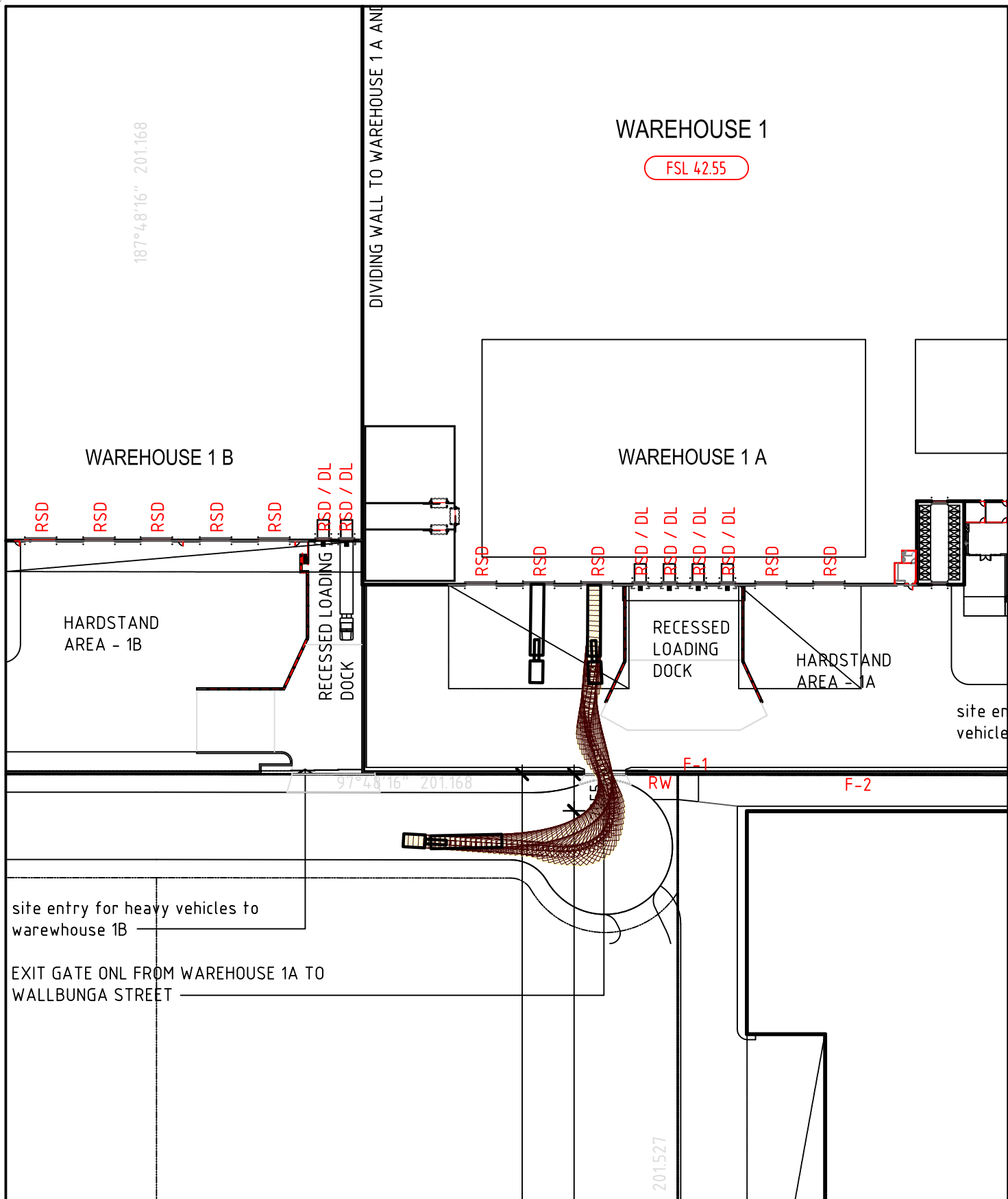
LEGEND

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SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE ENTERING THE SITE

SP 13



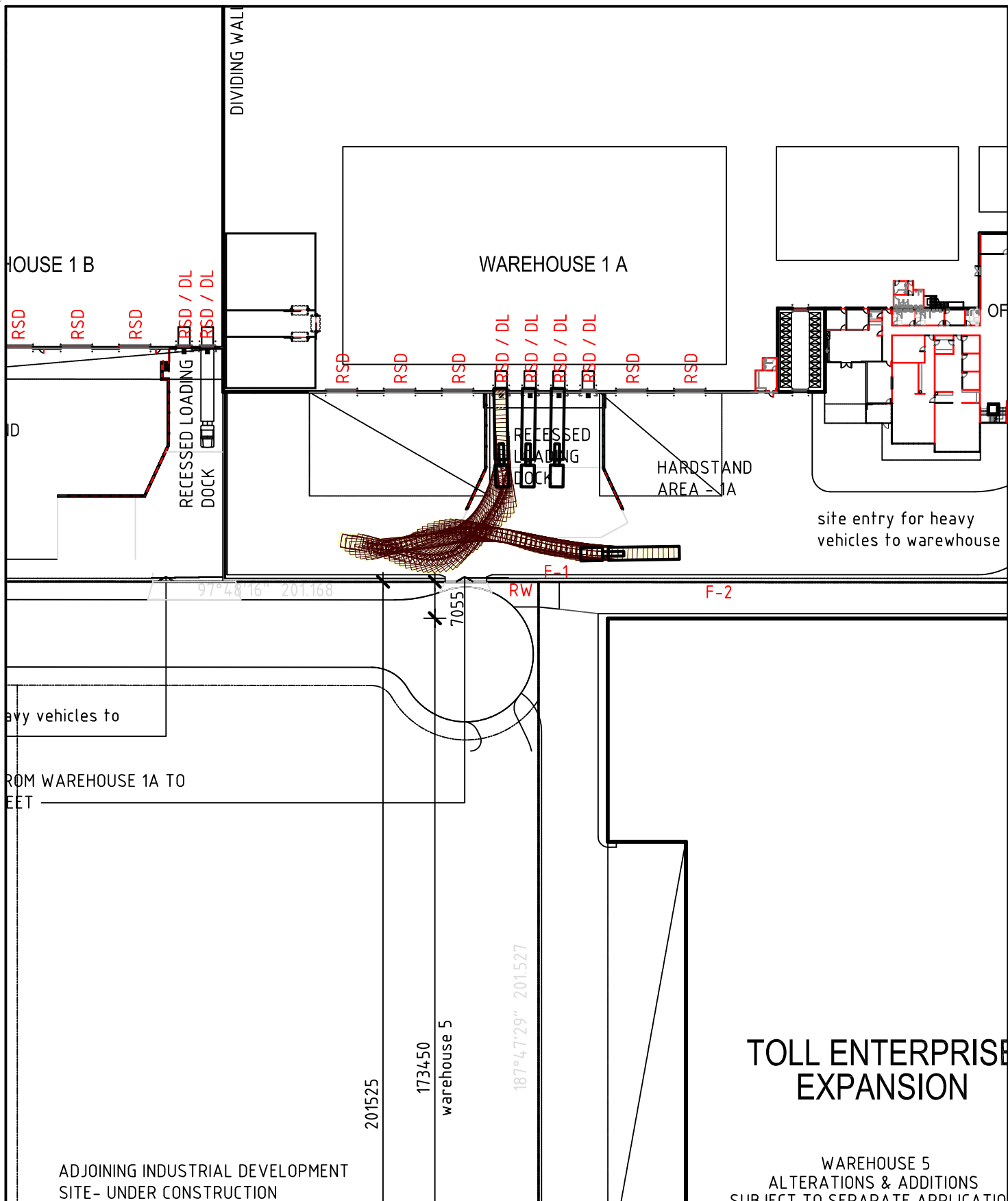
LEGEND

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SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE EXITING THE SITE

SP 14



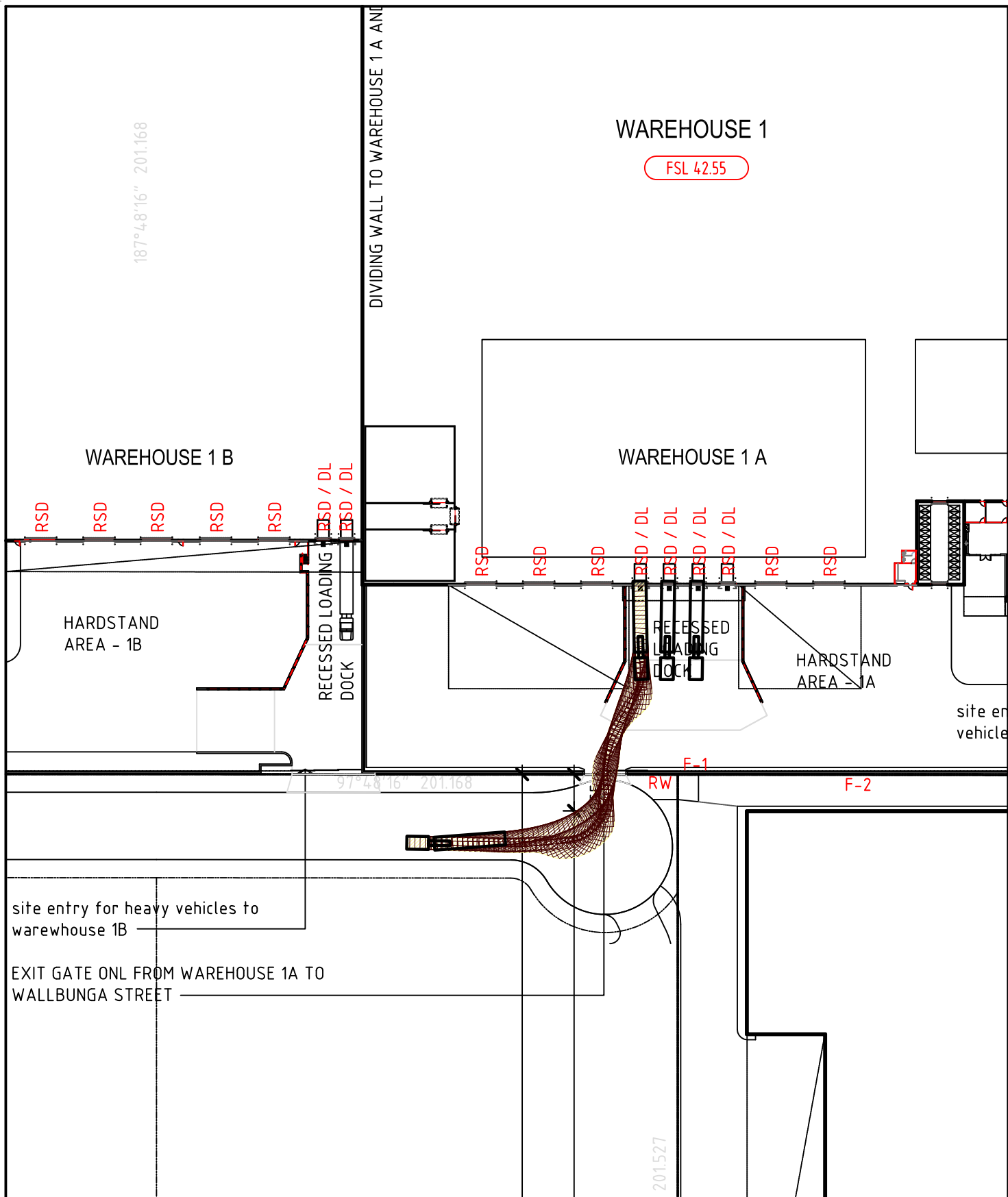
LEGEND

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SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE ENTERING THE SITE

SP 15



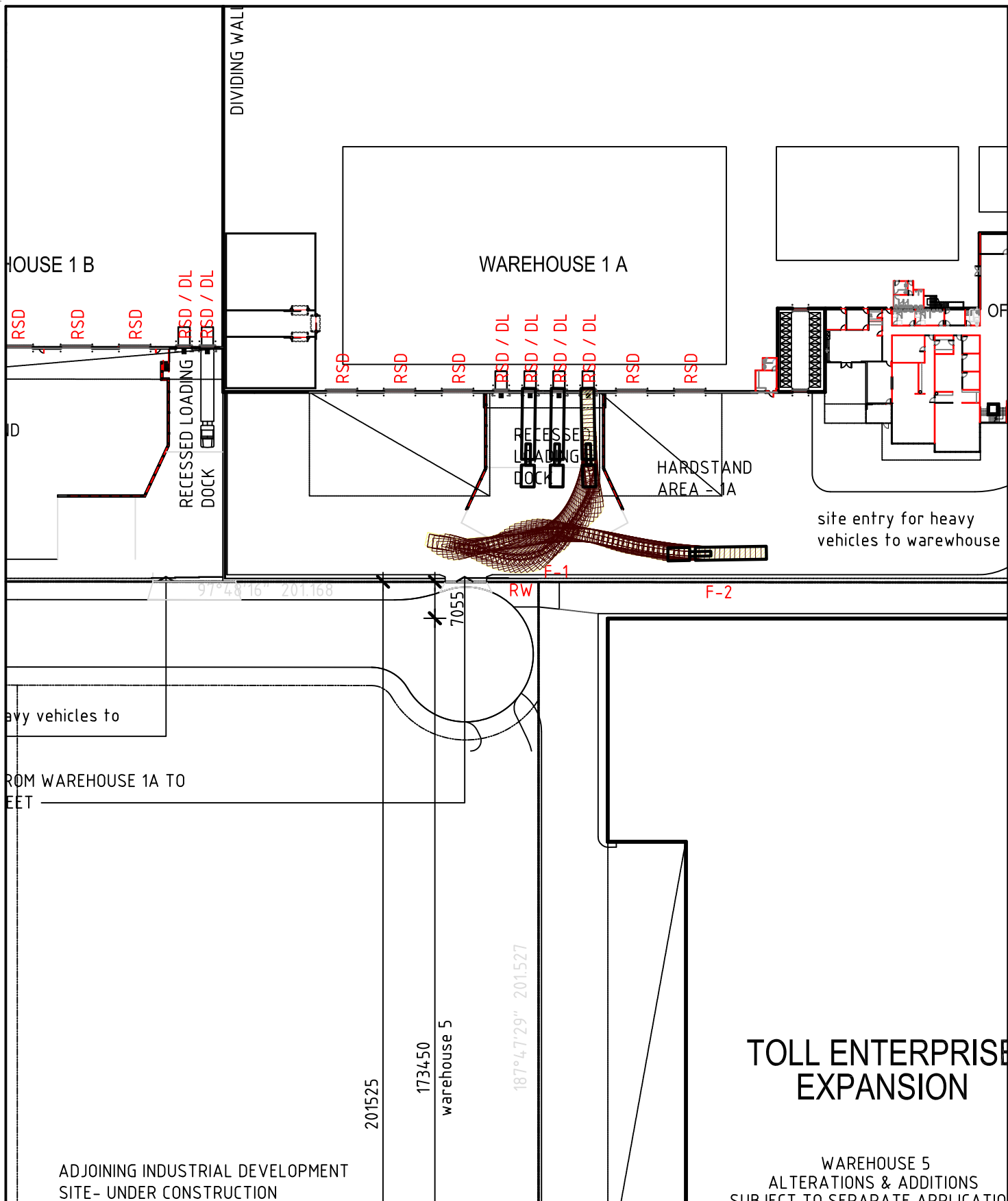
LEGEND

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SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE EXITING THE SITE

SP 16



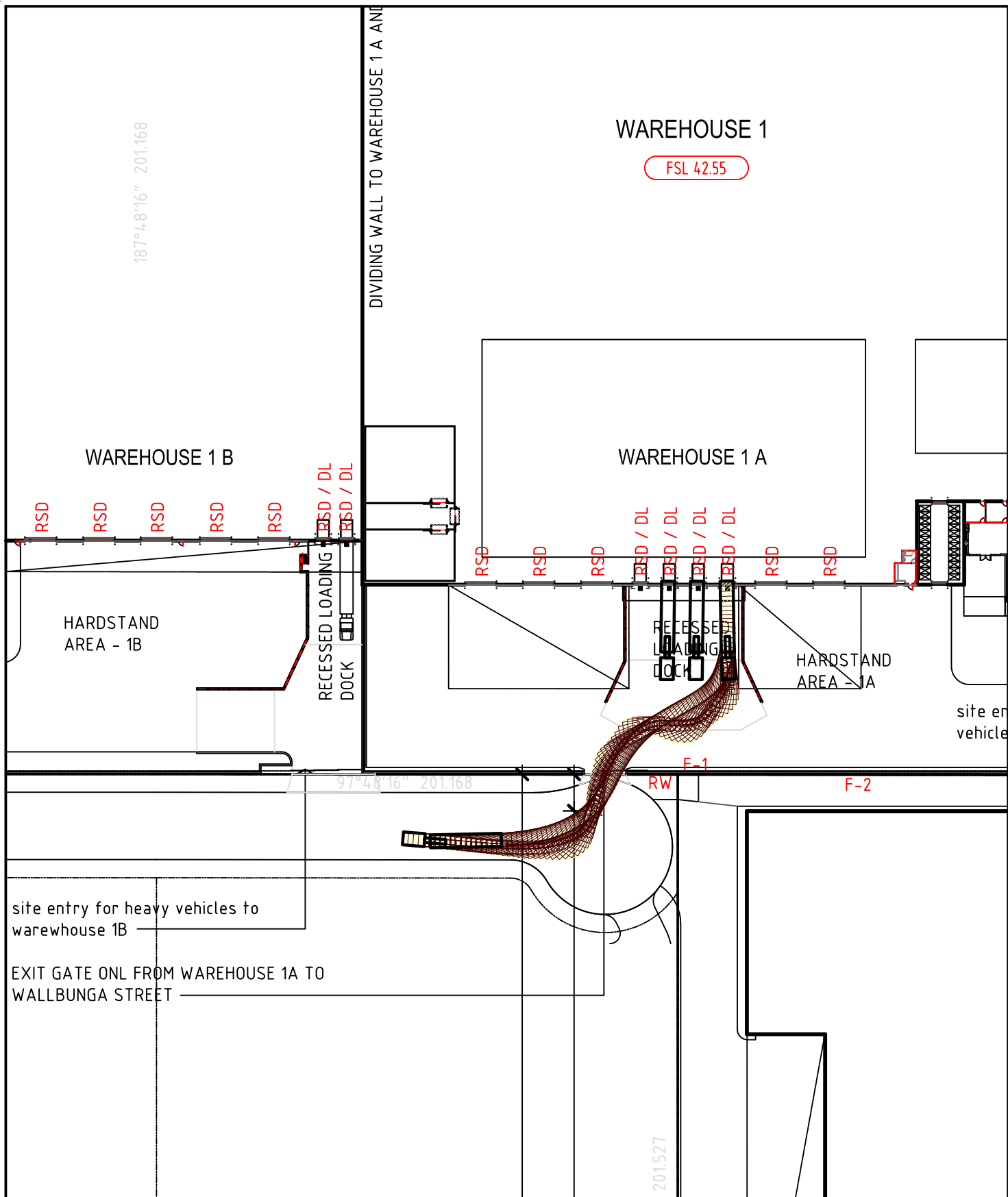
LEGEND

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SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE ENTERING THE SITE

SP 17



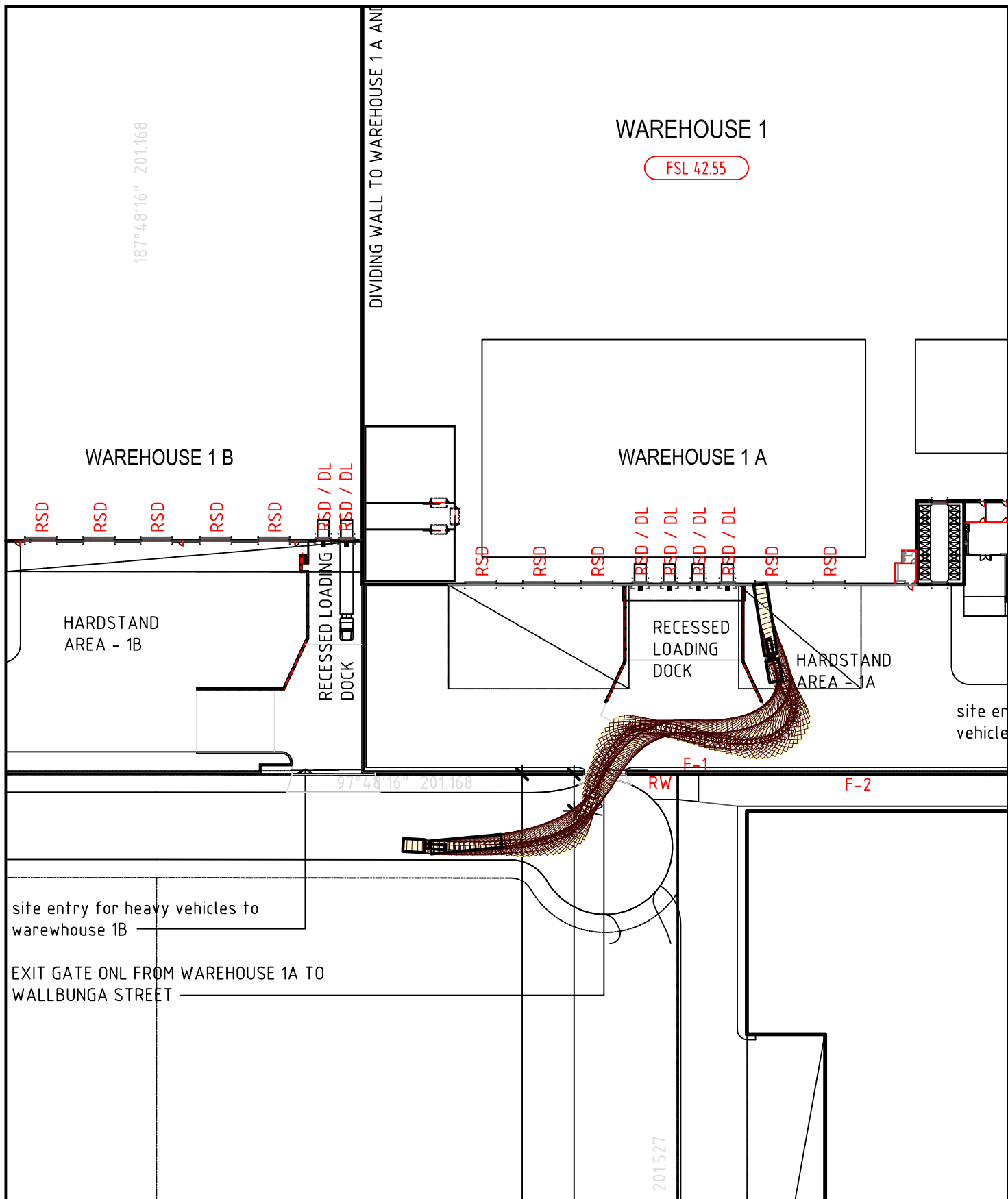
LEGEND

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SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE EXITING THE SITE

SP 18



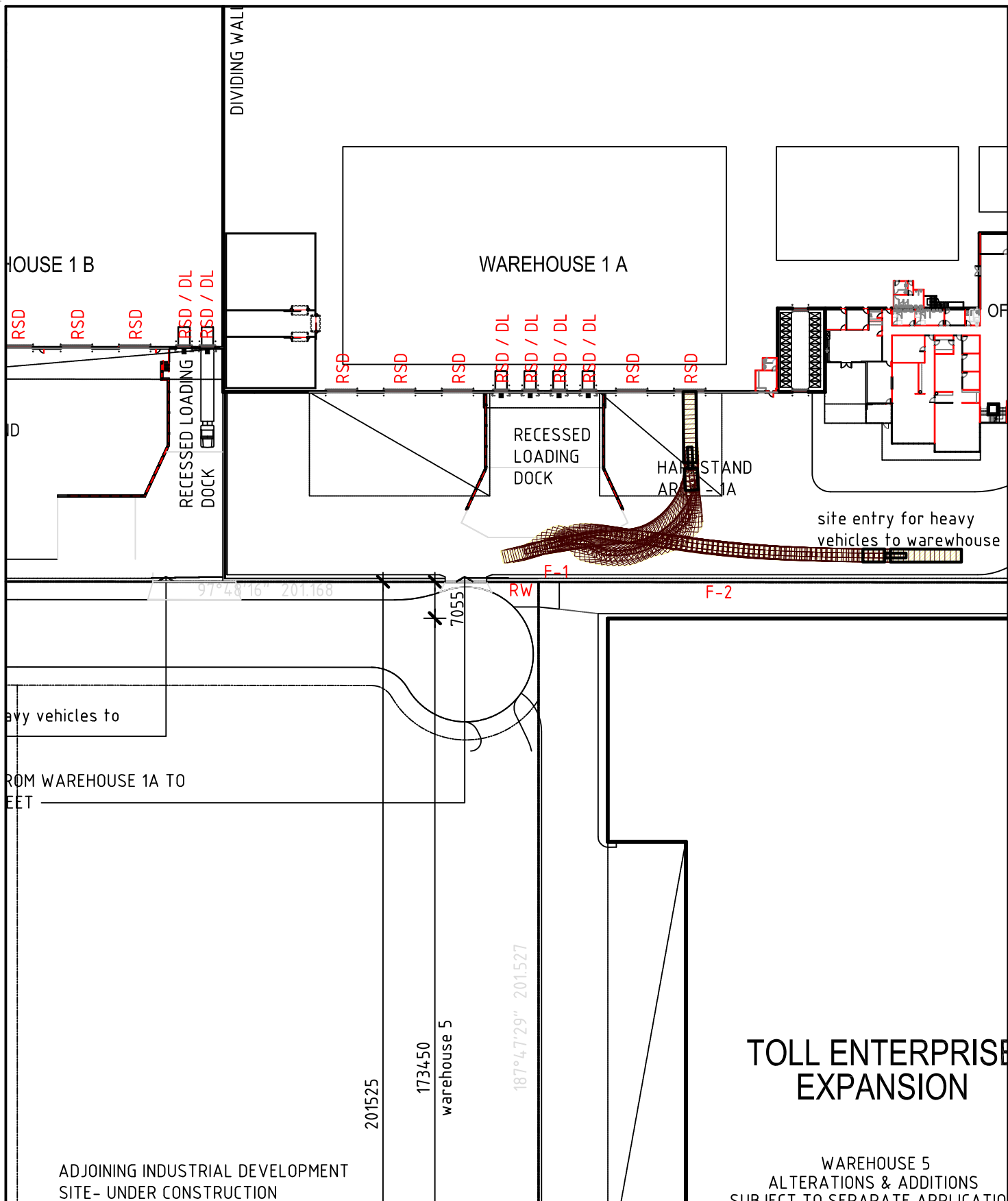
LEGEND

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SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE EXITING THE SITE

SP 20



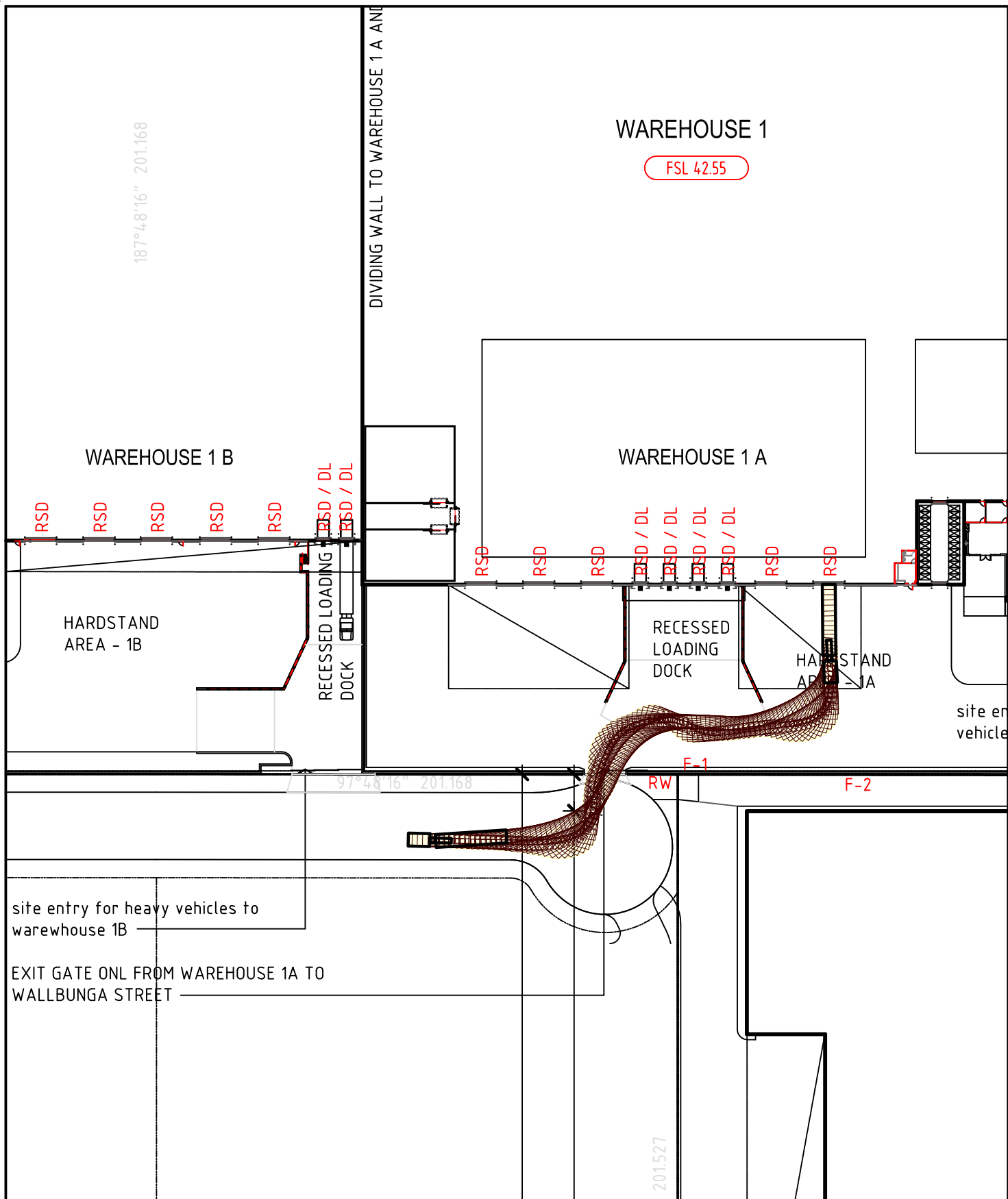
LEGEND

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SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE ENTERING THE SITE

SP 21



LEGEND

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SWEPT PATH ANALYSIS OF A 19m ARTICULATED VEHICLE EXITING THE SITE

SP 22