PROPOSED TNT WAREHOUSE AND DISTRIBUTION FACILITY

LOCKWOOD ROAD, ERSKINE PARK

Assessment of Traffic and Parking Implications

August 2013
(Rev B)

Reference 13087

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LIST OF ILLUSTRATIONS

1. INTRODUCTION

This report has been prepared to accompany an Environmental Impact Statement to the Department of Planning and Infrastructure for a proposed Warehouse and Distribution Facility in Lockwood Road at Erskine Park (Figure 1).

The site is located within the Erskine Park Employment Area (EPEA), being part of the Western Sydney Employment Area (WSEA), which is subject to ongoing development for industrial uses in the area extending between Mamre Road and Ropes Creek. The precinct is located with convenient access to the developing arterial road system and this has acted to encourage the establishment of large warehouse, industrial and transport facilities.

The proposed development is defined as a "Freight Terminal Facility" under State Environmental Planning Policy 2011 (SRD SEPP) and will have a capital investment in excess of $50 million. The proposed development comprises:

- Warehouse 29,740m^2
- Main office 1,000m^2
- Operations offices 1,000m^2
- Parking 350 spaces
- Truck/Trailer Parking

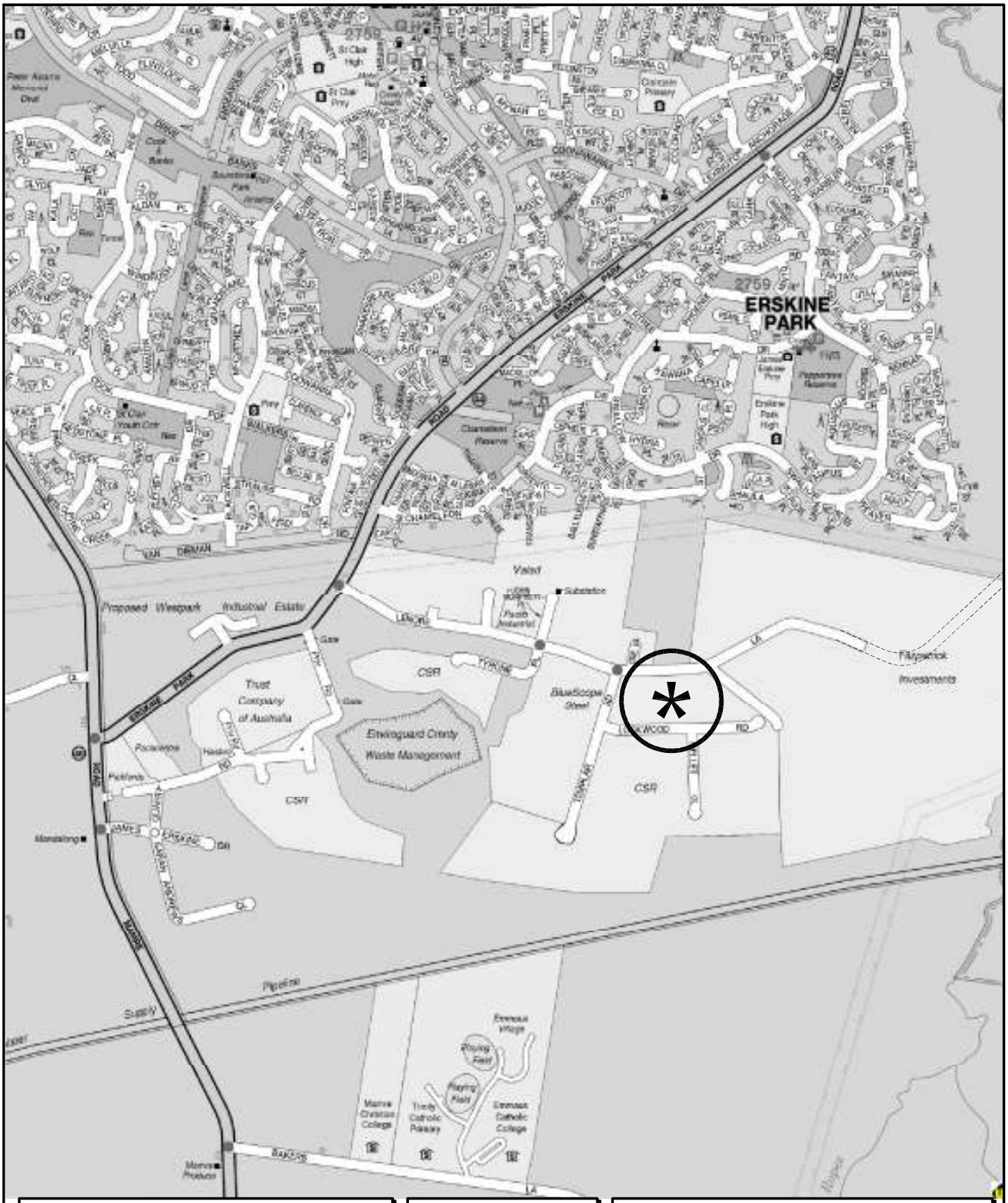
The Director General's requirements in response to the Preliminary Planning Report included:

- ***Transport, Access and Parking*** *– including:*
  - *details of key transport routes and traffic types and volumes likely to be generated during construction and operation;*
  - *assessment of predicted impacts on road safety and the capacity of the road network to accommodate the facility including current traffic counts, details of truck routes and modelling of key intersections including the intersections of Lenore Drive and Templar Road and Lenore Drive and Erskine Park Road;*

- *assessment of where off-site infrastructure works are required as a result of traffic impacts including detailed plans of any proposed road upgrades;*
- *access, including detailed consideration of various access options and justification for the proposed location of the main access points;*
- *measures to encourage employee use of non-car travel modes such as public transport or cycling to and from the facility; and*
- *provision of parking in accordance with the relevant guidelines.*

The purpose of this report is to:

* describe the site and the proposed development scheme
* describe the road network serving the site
* describe the developing road network
* assess the adequacy of the proposed parking provision
* assess the potential traffic implications of the proposed development
* assess the suitability of the proposed vehicle access, internal circulation and servicing arrangements.



LEGEND

LOCATION

FIG 1

2. PROPOSED DEVELOPMENT SCHEME

2.1 SITE AND CONTEXT

The development site (Figure 2) is Lot 201 in DP 1133028 located on the northern side of Lockwood Road bounded to the south by Templar Road and to the north by Lenore Drive/Erskine Park Link Road. The rectangular shaped site, which occupies an area of some 78,189 m^2, has been cleared and levelled.

The site is located in the south eastern part of the EPEA just to the north of the Sydney Water Pipeline and the other elements of the WSEA include the precinct south of the pipeline and the Ropes Creek and Eastern Creek precincts to the east. The locational relationship of EPEA is shown on the diagram overleaf reproduced from the Strategic Transport Assessment for the WSEA Southern Link Road Network.

The Erskine Park and St Clair residential areas extend to the north while lands to the east are largely vacant former grazing lands and the adjacent uses are predominantly warehouse and industrial uses including Bluescope Steel, Target, Goodman Fielder, Strandbags and Midway Metals.

2.2 ERSKINE PARK EMPLOYMENT AREA

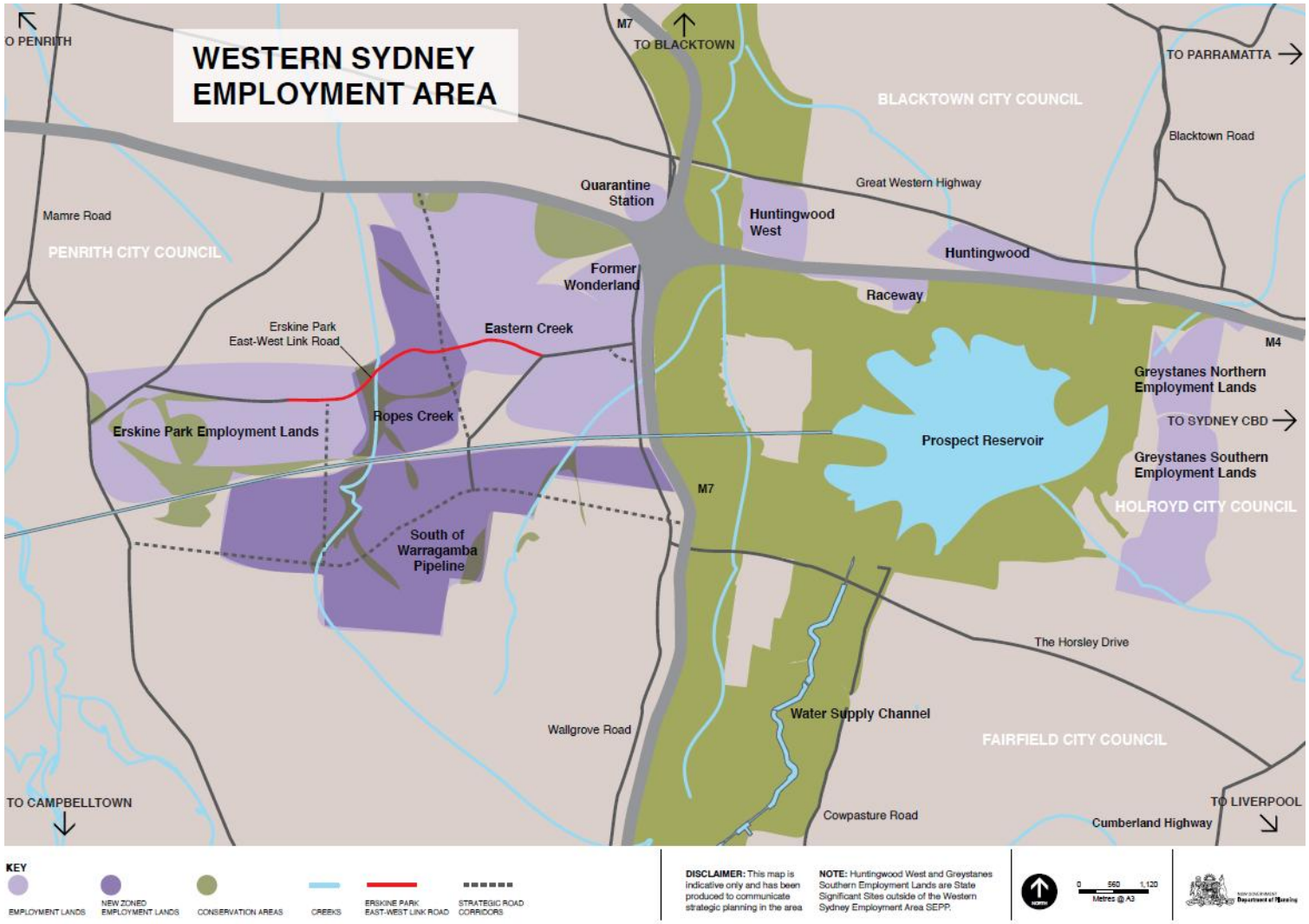
The Erskine Park Employment Area (EPEA) comprises a total developable area of some 227 ha and the Local Environmental Plan and Development Control Plan express the purpose of *'enabling a diversity of employment generating development to locate within the area'.*

LEGEND

SITE

FIG 2

Figure 1.1 – SEPP (Western Sydney Employment Area) Map



The DCP, in relation to transport and carparking, specifies the objectives of:

- creating a road network which enables safe and efficient access for all users while minimising through traffic on minor roads
- encouraging the use of efficient alternative transport including public transport bicycles and pedestrians
- minimising the number of access points to designated roads (i.e. Mamre Road and Erskine Park Road) and the principal access road
- providing for a link to the Westlink M7 Route.

The principal access routes for the EPEA comprise Mamre Road, Erskine Park Road and Lenore Drive/Erskine Park Link Road.

2.3 PROPOSED DEVELOPMENT

The proposed development will involve some minor earthworks and the construction of an integrated building complex through the central part of the site. The development will comprise:

∗ Warehouse	29,740m^2
∗ Main office	1,000m^2
∗ Operations offices	1,000m^2
∗ Gate House and Truck Maintenance	162m^2
∗ **Total:**	**31,902m^2**

There will be a total pavement area of 35,529 m^2 to accommodate vehicle circulation with a car parking provision of 350 spaces and provision for the parking of various types of trucks and trailers.

The proposed facility will operate on a 24 hours/7 days a week basis and the assessed vehicle movements during the morning and afternoon 'on-street' peak periods, based on the requirements and experience of the company in operating comparable facilities, is as follows:

	AM 7.30 – 8.30		**PM 5.00 – 6.00**	
	IN	**OUT**	**IN**	**OUT**
Staff Cars	70	-	-	95
PUD (5t)	-	15	15	-
Bulk (8L)	-	10	10	-
Linehaul (S/T & B/D)	20	6	10	-

The vehicle access provisions will comprise:

- ingress and egress for trucks on Lockwood Road located at the western boundary

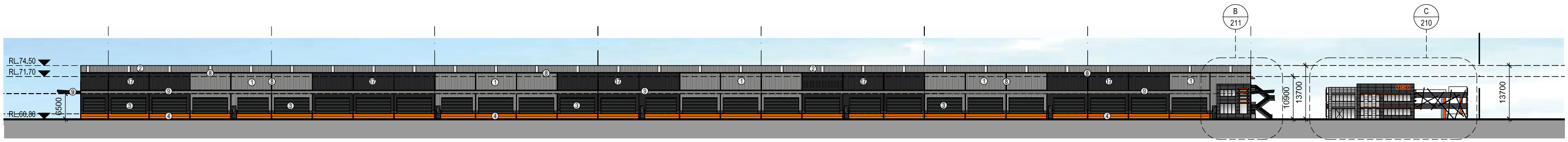
- ingress and egress for the car park on Lockwood Road at the eastern boundary

Full details of the proposed development scheme are provided on the architectural plans prepared by Commercial & Industrial Property, which accompany the Development Application and are reproduced in part overleaf.

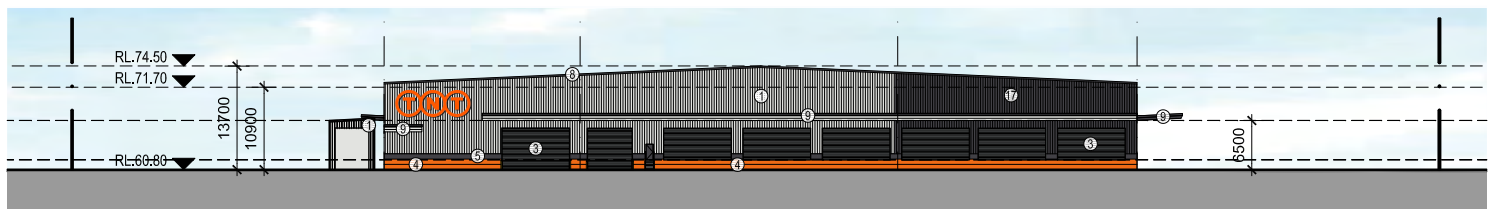
REVISIONS

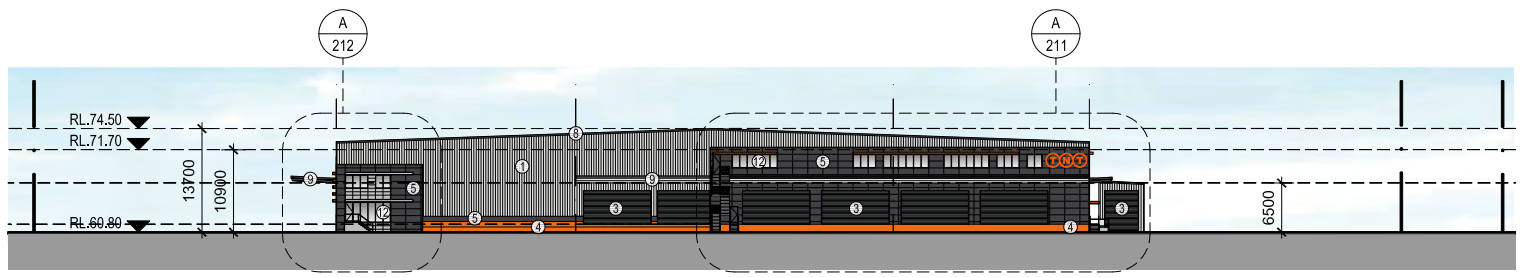
A	DEVELOPMENT APPLICATION	21.08.13

A 200 NORTH ELEVATION
Scale 1:1000

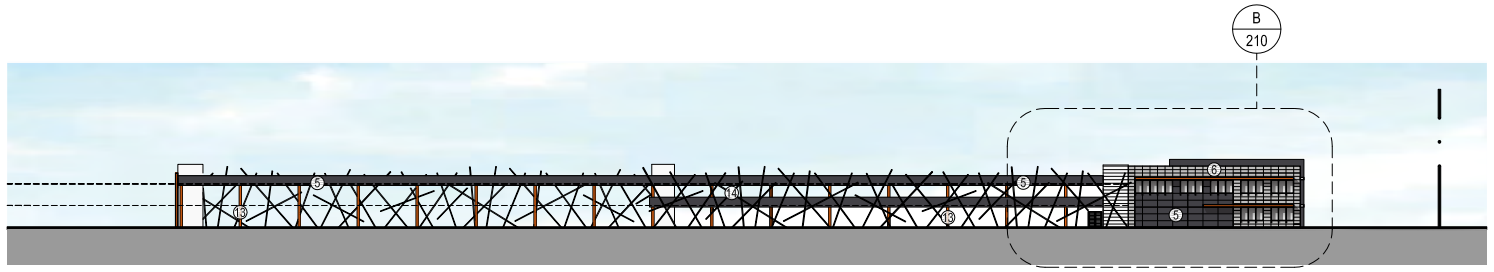


B 200 SOUTH ELEVATION
Scale 1:1000

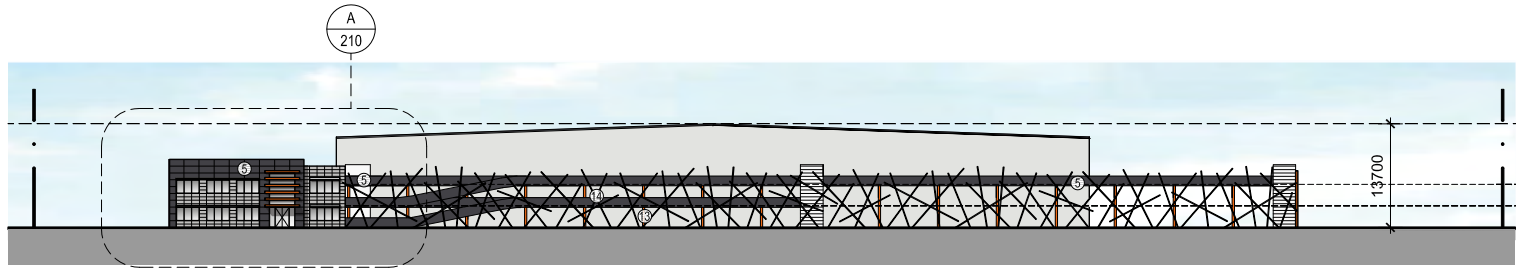




C 200 WEST ELEVATION- WAREHOUSE
Scale 1:1000



D 200 EAST ELEVATION- WAREHOUSE
Scale 1:1000



E 200 WEST ELEVATION- OFFICE & CARPARK
Scale 1:1000

F 200 EAST ELEVATION- OFFICE & CARPARK
Scale 1:1000

EXTERNAL FINISHES LEGEND

1. COLORBOND METAL CLADDING 1- 'SURFMIST'
2. ZINCALUME ROOF SHEETING WITH 10% TRANSLUCENT SHEETING
3. ROLLER SHUTTER DOORS - COLORBOND 'WINDSPRAY'
4. PAINTED CONCRETE PRECAST - PAINT FINISH TO MATCH PANTONE ORANGE 021
5. PAINTED CONCRETE PRECAST - PAINT FINISH (DARK GREY) TO MATCH COLORBOND 'MONUMENT'
6. PAINTED CONCRETE PRECAST - PAINT FINISH (LIGHT GREY)
7. PAINTED CONCRETE PRECAST - PAINT FINISH (WHITE)
8. GUTTERS, DOWNPIPES & TRIMS - COLORBOND 'MONUMENT'
9. WAREHOUSE AWNING- COLORBOND 'MONUMENT'
10. FEATURE PAINTED STEEL AWNINGS TO OFFICE- 'WHITE'
11. FEATURE PAINTED STEEL AWNINGS TO OFFICE- PANTONE ORANGE 021
12. SELECTED GLAZING TO COMPLY WITH SECTION J OF BCA
13. PAINTED CONCRETE COLUMNS TO CARPARK- PANTONE ORANGE 021
14. CARPARK FEATURE ELEMENT- PAINTED ALUMINIUM
15. ALUCOBOND CLADDING OR SIMILAR- DARK GREY
16. ALUCOBOND LOUVERS- 'WHITE'
17. COLORBOND METAL CLADDING 1- 'MONUMENT'

FILE LOCATION: J:\Arch\Enquiries\NSW\2-047 CBRE Transport Terminal\02_DA\2-047-275903-DA

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PROJECT
TNT WAREHOUSE & DISTRIBUTION FACILITY
LOT 201, DP 1133028
LOCKWOOD RD, ERSKINE PARK NSW

DRAWING TITLE
ELEVATIONS- OVERALL

GPT The GPT Group

0 5 10 15 20 25 50m
SCALE: 1 : 1000 @ A3

CREATE DATE : 21.08.2013 PLOT DATE : 23.08.2013
LAST SAVED BY: abullivant

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REVISIONS

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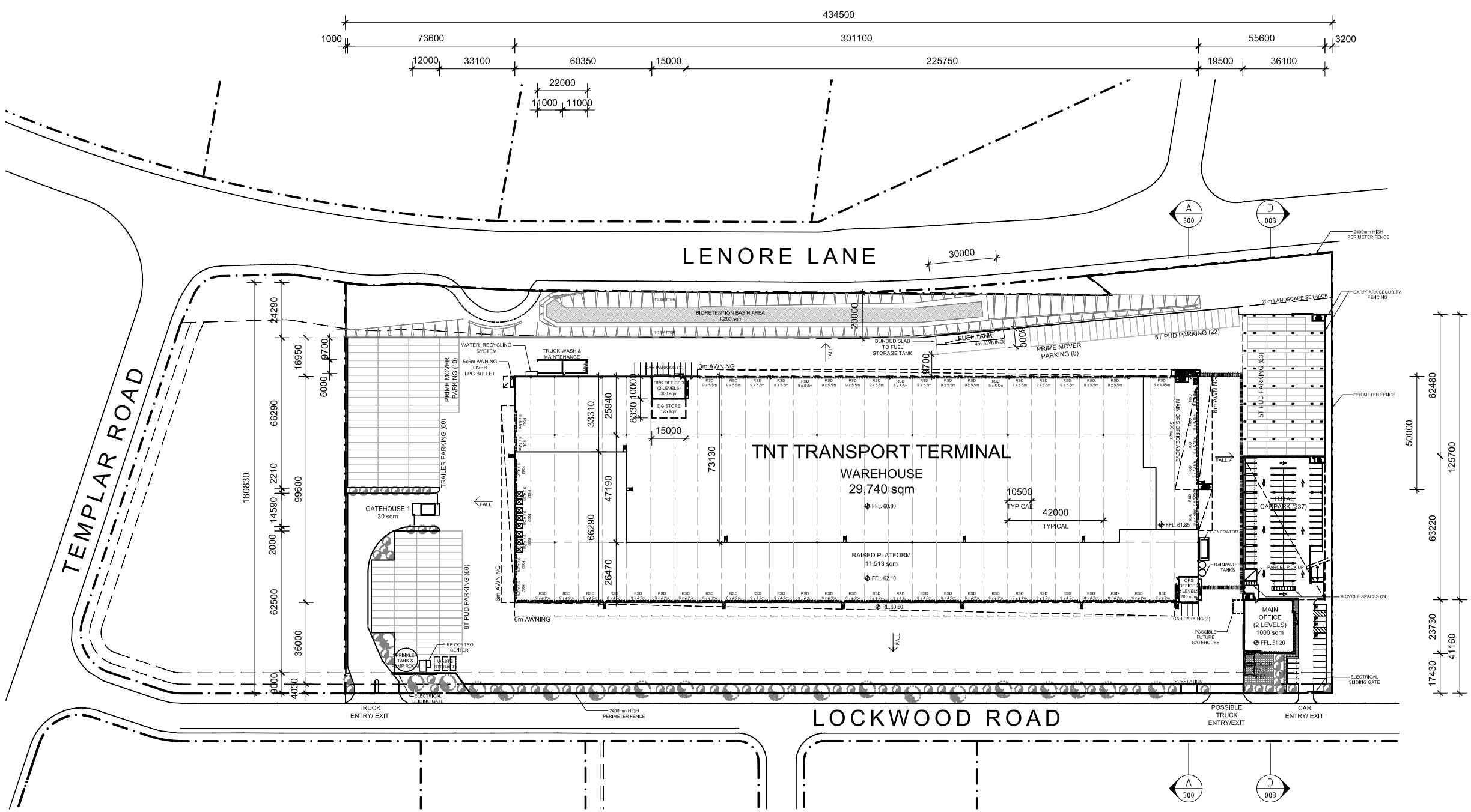
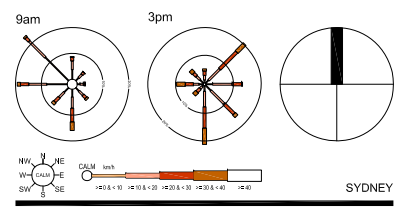


CARPARKING REQUIRED (AS PER COUNCIL DCP)	
WAREHOUSE - 1 per 100 sqm	300 spaces
OFFICE - 1 per 40 sqm	50 spaces
TOTAL CARPARKING REQUIRED	350 spaces

DEVELOPMENT SUMMARY

TOTAL SITE AREA	78,189 sqm
WAREHOUSE (INCLUDING RAISED DOCK 11,513 sqm)	29,740 sqm
MAIN OPS OFFICE 1 (MEZZANINE)	500 sqm
OPS OFFICE 2 (2 LEVELS)	200 sqm
OPS OFFICE 3 (2 LEVELS)	300 sqm
MAIN OFFICE (2 LEVELS)	1,000 sqm
GATEHOUSE	30 sqm
TRUCKWASH & MAINTENANCE BAY	132 sqm
TOTAL BUILDING AREA	31,902 sqm
EFFICIENCY	40.8 %
AWNING (3m)	630 sqm
AWNING (6m)	2,658 sqm
FUEL TANK AWNING (4m)	120 sqm
CARPARK DECK- LEVEL 1	2,285 sqm
CARPARK DECK- LEVEL 2	4,538 sqm
TOTAL CARPARK DECK AREA	6,823 sqm
ACCESSIBLE CARPARKING- GF	4 spaces
CARPARKING PROVIDED- GF	87 spaces
CARPARKING PROVIDED- L1	74 spaces
CARPARKING PROVIDED- L2	172 spaces
CARPARKING- HARDSTAND	13 spaces
TOTAL CARPARK SPACES	350 spaces
BICYCLE SPACES	24 spaces
TRAILER PARKING (13.5m LONG)	60 spaces
PRIME MOVERS	18 spaces
5T PUDS	85 spaces
8T PUDS	60 spaces
OUTDOOR STAFF AREA	180 sqm
HEAVY DUTY PAVEMENT (H)	32,940 sqm
LIGHT DUTY PAVEMENT (L)	2,589 sqm



PROJECT

TNT WAREHOUSE & DISTRIBUTION FACILITY

LOT 201, DP 1133028
LOCKWOOD RD, ERSKINE PARK NSW

DRAWING TITLE

SITE PLAN- OVERALL

0 10 20 30 40 50 75 100m

SCALE: 1:2000 @ A3

CREATE DATE: 21.08.2013 PLOT DATE: 23.08.2013

LAST SAVED BY: abullivant

2-047-275903-DA - 002 A

The GPT Group

FILE LOCATION: J:\Arch\Enquiries\NSW\2-047 CBRE Transport Terminal\02_DA\2-047-275903-DA

REVISIONS

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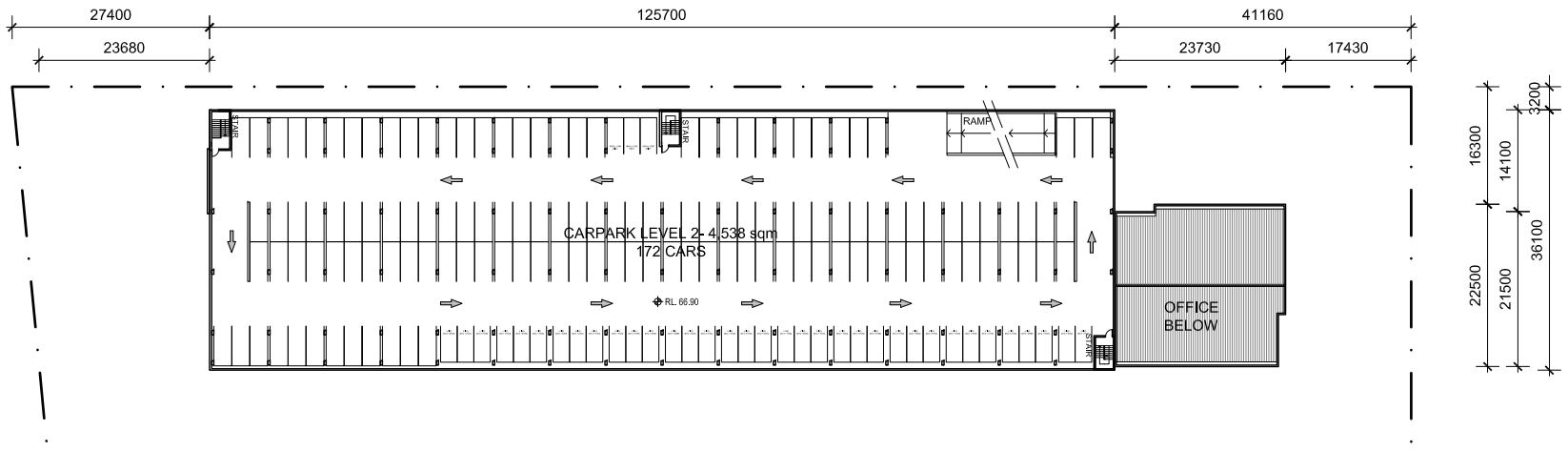
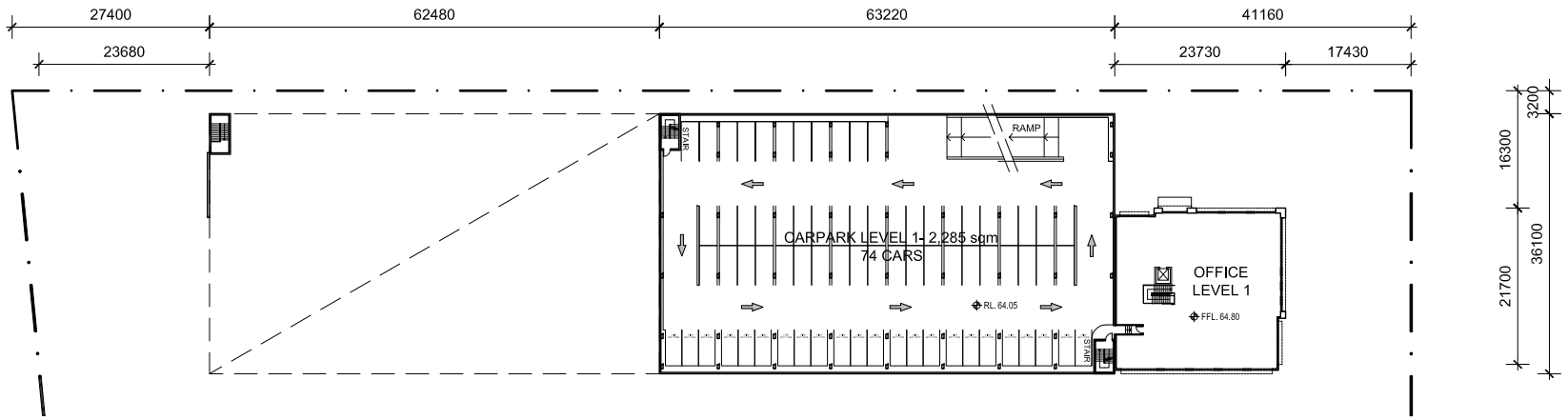
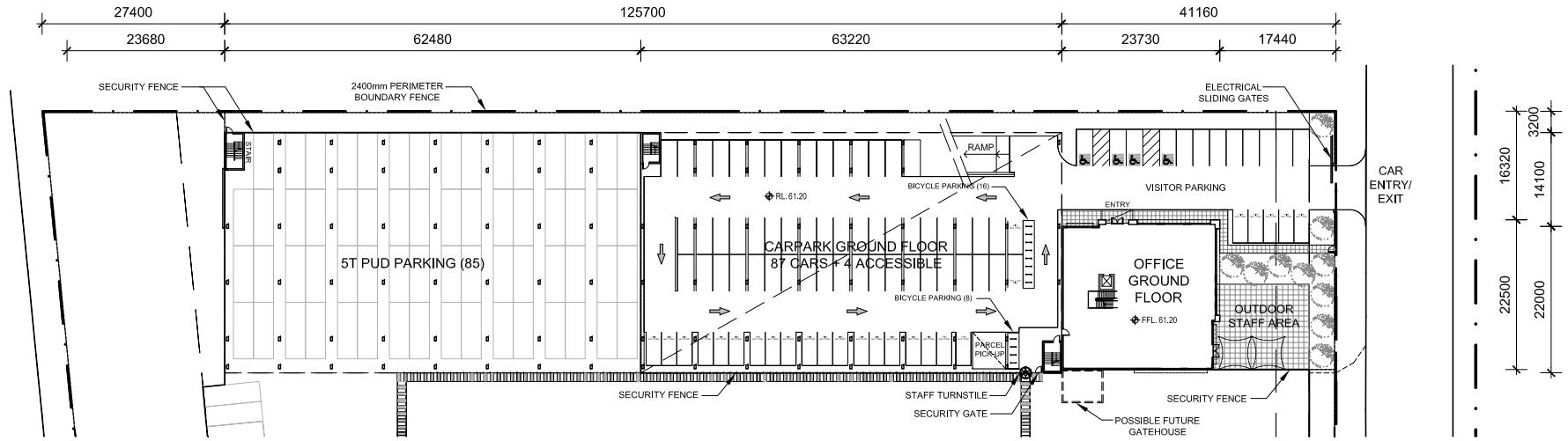


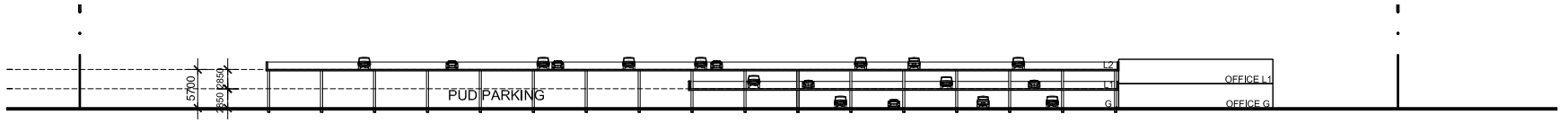
A 003 CARPARK PLAN- LEVEL 2
Scale 1:1000



B 003 CARPARK PLAN- LEVEL 1
Scale 1:1000



C 003 CARPARK PLAN- GROUND FLOOR
Scale 1:1000

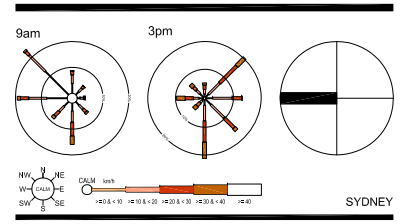


D 003 CARPARK SECTION
Scale 1:1000

CAR PARKING NUMBERS

ACCESSIBLE CARS- GROUND FLOOR	4 spaces
CARS- GROUND FLOOR	87 spaces
CARS- LEVEL 1	74 spaces
CARS- LEVEL 2	172 spaces
TOTAL CAR SPACES	337 spaces

TOTAL STANDARD CAR SPACES	250 spaces
TOTAL SMALL CAR SPACES	87 spaces
TOTAL BICYCLE SPACES	24 spaces



PROJECT
TNT WAREHOUSE & DISTRIBUTION FACILITY
LOT 201, DP 1133028
LOCKWOOD RD, ERSKINE PARK NSW

DRAWING TITLE
FLOOR PLANS- CARPARK

0 5 10 15 20 25 50m
SCALE: 1:1000 @ A3

CREATE DATE: 21.08.2013 PLOT DATE: 23.08.2013
LAST SAVED BY: abullivant

2-047-275903-DA - 003 A

The GPT Group

FILE LOCATION: J:\Arch\Enquiries\NSW\2-047 CBRE Transport Terminal\02_DA\2-047-275903-DA

3. ROAD NETWORK AND TRAFFIC CONDITIONS

3.1 ROAD NETWORK

The road network serving the site (Figure 3) comprises:

* the *M4 Motorway* - a State Road and arterial route linking between Concord and Penrith

* *the Great Western Highway* - a State Road and arterial road route which provides a connection between the City and the Blue Mountains crossing

* *Mamre* Road - a State Road and sub-arterial route linking between the Great Western Highway and Elizabeth Drive

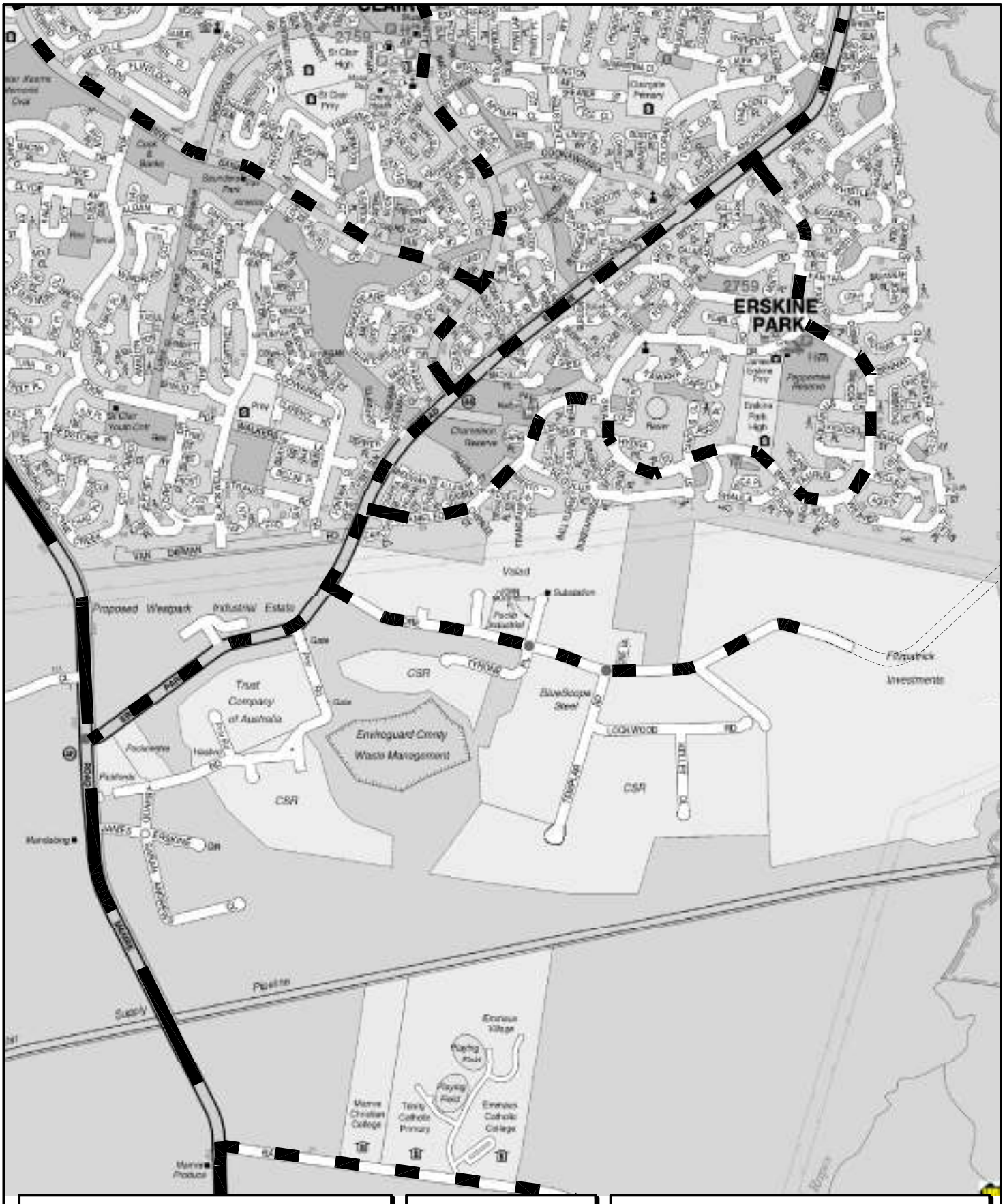
* *Erskine Park Road* - a State Road and collector route connecting between the M4 and Mamre Road continuing northward along Roper Road and Carlisle Avenue (Regional Road)

* *Lenore Drive/Erskine Park Link Road* – a collector road route connecting between Erskine Park Road and Old Wallgrove Road and the M7

Templar Road and Lockwood Place are local industrial road cul-de-sacs which have carriageway widths of approximately 13 metres.

3.2 TRAFFIC CONTROLS

The existing traffic controls, which have been applied to the road system serving the site, (Figure 4) comprise:



LEGEND

- ARTERIAL
- SUB-ARTERIAL
- COLLECTOR

N

ROAD NETWORK

FIG 3

- the traffic signals at the Lenore Drive/Erskine Park Link Road and Templar Road intersection (details provided in Appendix A)

- the traffic signals at the Lenore Drive/Erskine Park Link Road and Tyrone Place intersection (details provided in Appendix A)

- the traffic signals at the intersection of Erskine Park Road and Lenore Drive/ Erskine Park Link Road

- the 70 kmph speed restriction on Erskine Park Road and 50 kmph restriction along Lenore Drive/Erskine Park Link Road

- the central median island along Lenore Drive/Erskine Park Link Road

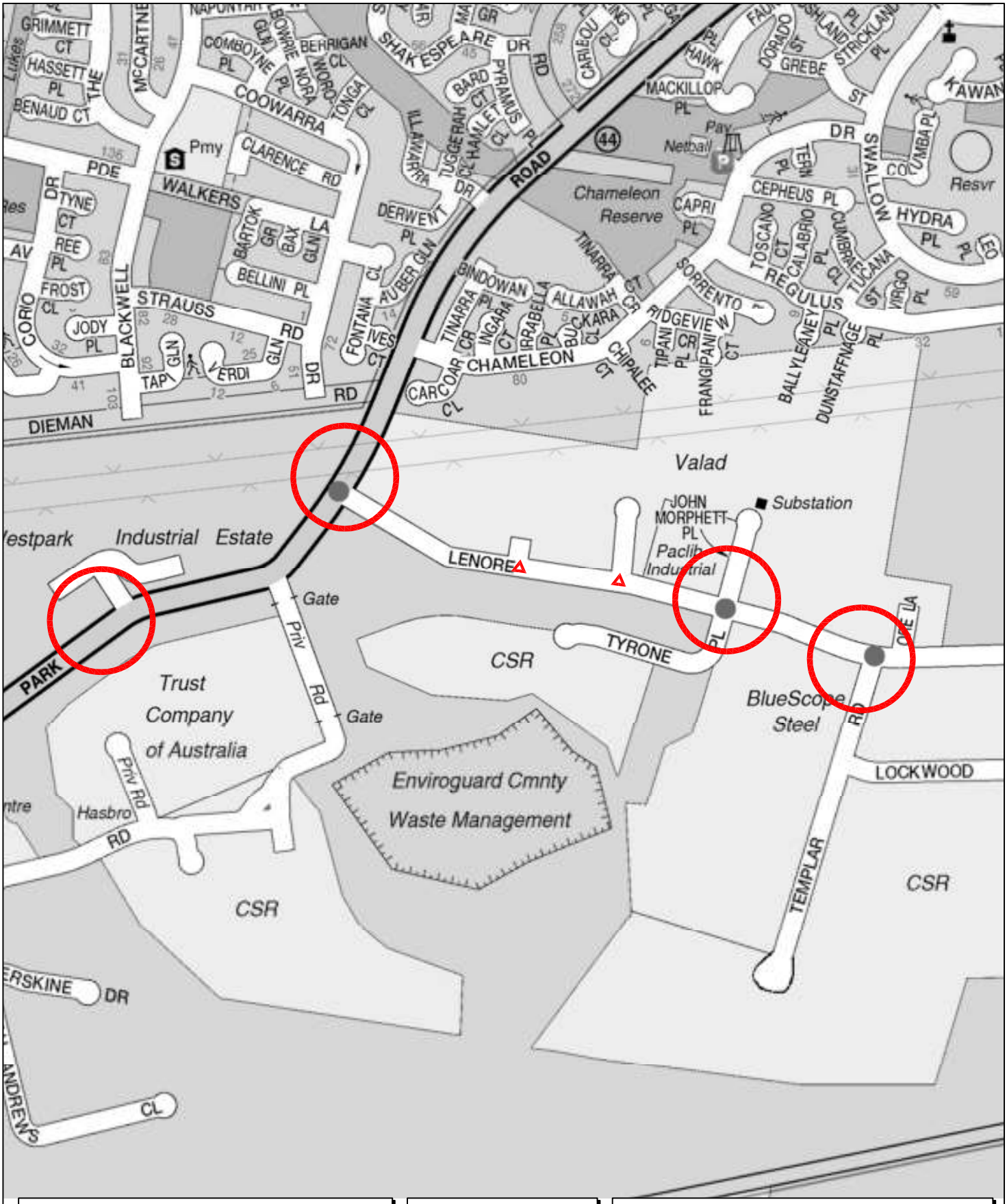
- the approved 'B double' truck routes along Mamre Road, Erskine Park Road and Lenore Drive/Erskine Park Link Road

3.3 TRAFFIC CONDITIONS

An indication of the traffic conditions on the road system serving the site is provided by data published by RMS. The data published by RMS is expressed in terms of Annual Average Daily Traffic (AADT) and the most recent published volumes are provided in the following:

Location	**AADT**
Mamre Road at water pipeline	12,446
Erskine Park Road south of M4 Motorway	25,724

The road system serving the EPEA has been planned and constructed to accommodate the projected traffic generated by the completed development and other regional growth influences. Numerous sites in the EPEA remain to be developed and the existing traffic circumstances at this time are quite satisfactory.



LEGEND

- TRAFFIC SIGNAL CONTROL
- ROUNDABOUT
- RESTRICTED TURNING MOVEMENT
- SEAGULL ISLAND

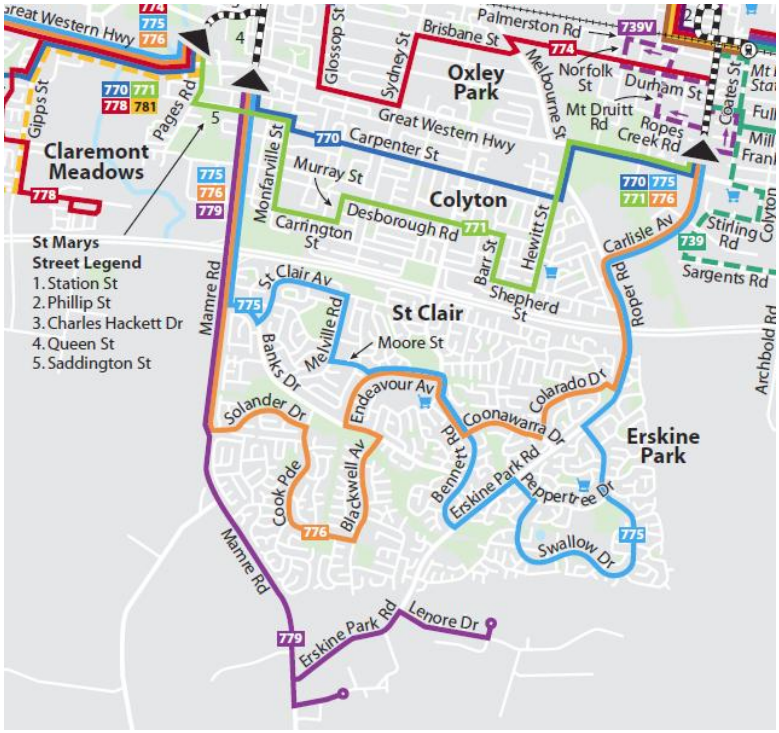
TRAFFIC CONTROLS

FIG 4

Sites with frontage to Tyrone Place, Templar Road and Lockwood Road benefit from the traffic signal control access at the Lenore Drive/Erskine Park Link Road intersections where there are no delays or congestion in peak traffic periods.

3.4 PUBLIC TRANSPORT

Public transport services in the vicinity of the site are provided by the 'Busways' bus routes 779 which operates on 5 days per week and runs along Mamre Road and Erskine Park Road and Lenore Drive past the site, linking to Penrith Railway Station. It is expected that additional bus services will be introduced as further development occurs in the EPEA.



4. FUTURE CIRCUMSTANCES

The principal elements of the developing road network are:

* the extension of Lenore Drive (Erskine Park Link Road) to connect with Old Wallgrove Road and the M7

* the provision of the Southern Link Road between Mamre Road and M7/Wallgrove Road

* the provision of north-south connecting roadways

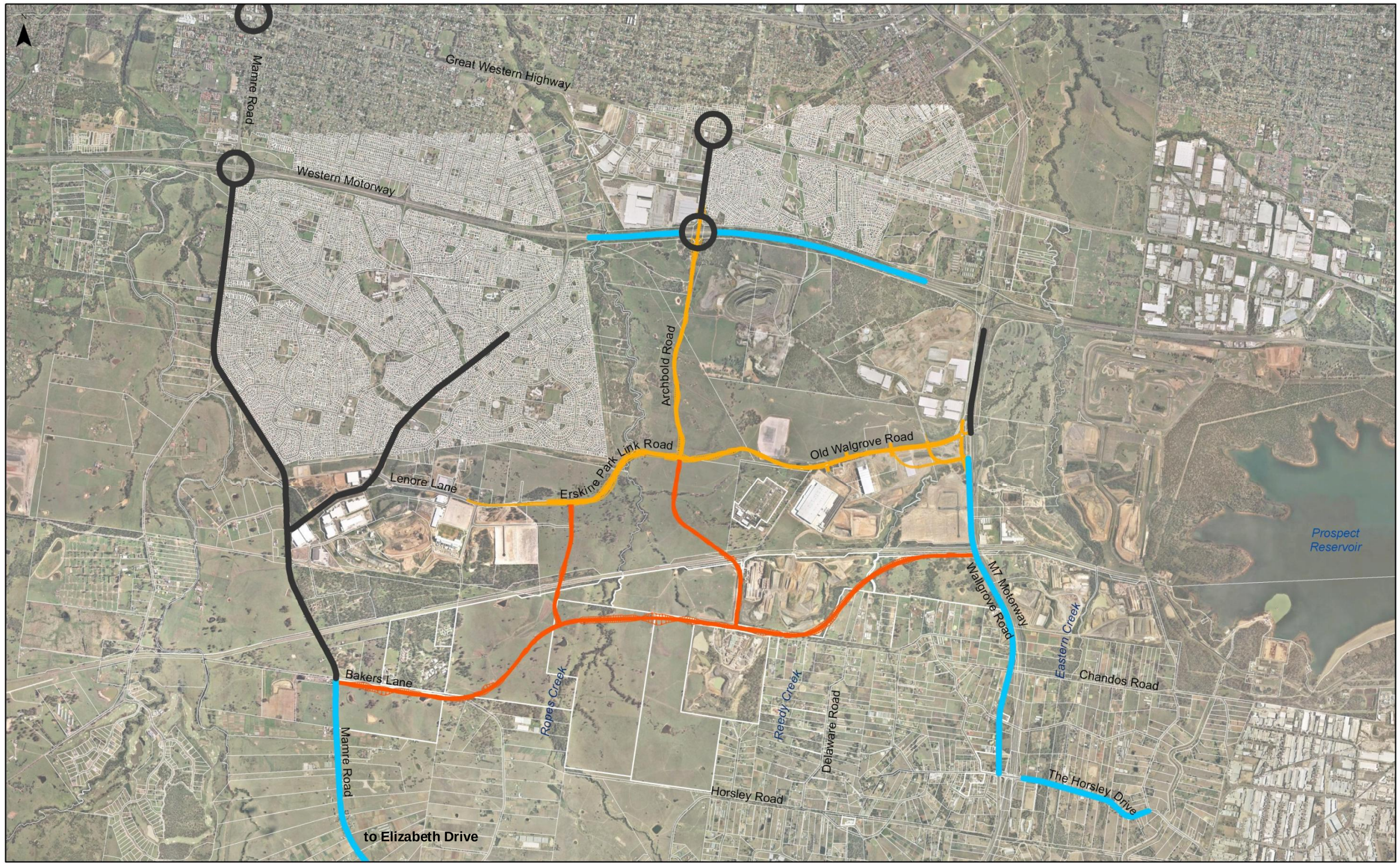
Details of the planned future road network are provided on the diagram from the Southern Link Road Strategic Transport Assessment document reproduced overleaf.

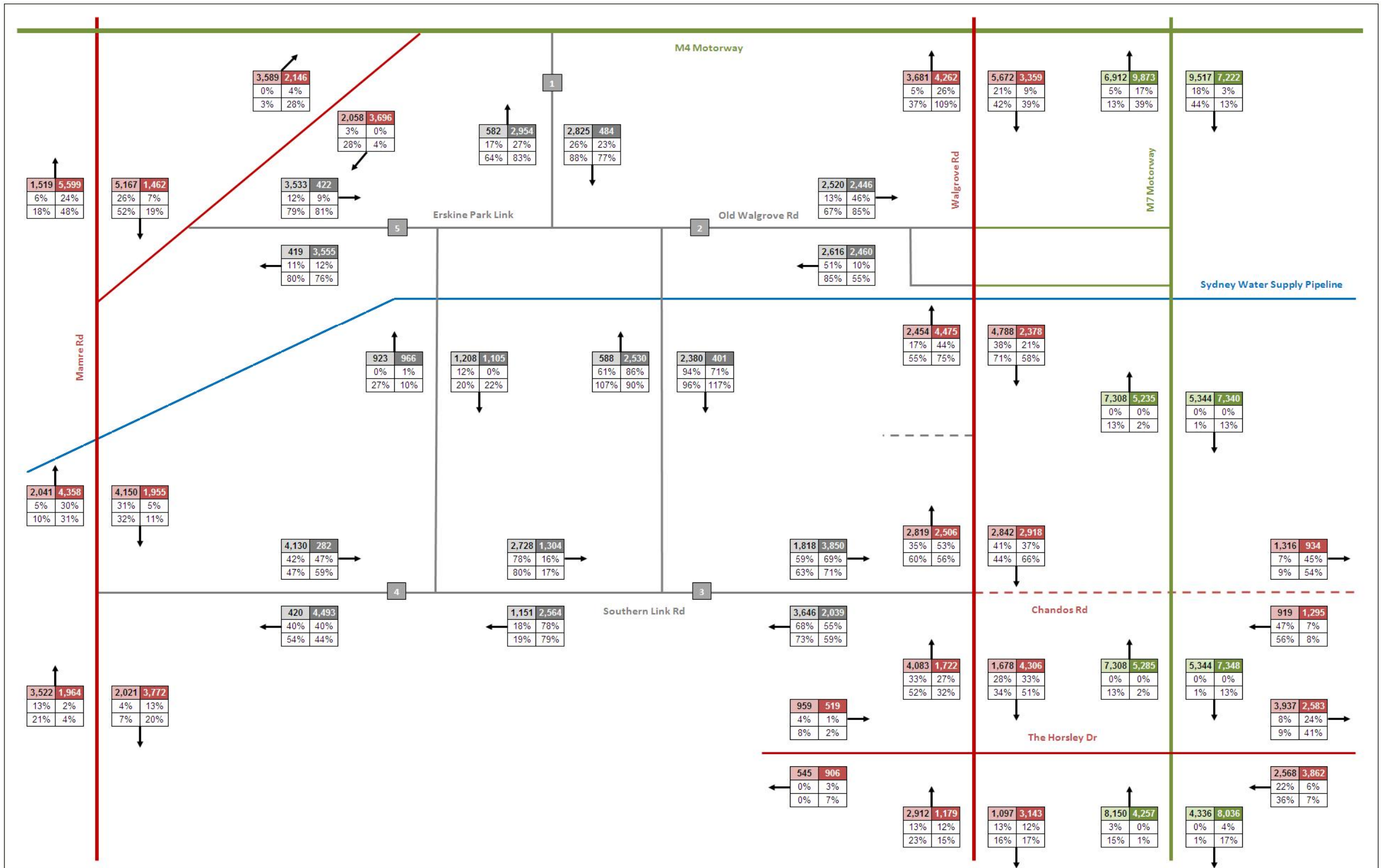
Traffic modelling for the future road network outcome for the WSEA is presented in the forecast 2 hour peak periods for 2031 as established in the Strategic Transport Assessment for the Southern Road Network on Lenore Drive/Erskine Park Link Road as follows:

	AM		PM	
Lenore Drive	**Eastbound**	**Westbound**	**Eastbound**	**Westbound**
East of Erskine Park Road	3,533	419	422	3,555
West of Wallgrove Road	2,520	2,616	2,446	2,460

It is apparent that the traffic flows on Lenore Drive/Erskine Park Link Road will be quite “peak directional” as indicated on the network summary reproduced overleaf for the periods 7am-9am and 4pm-6pm. The Erskine Park Link Road connection between Lenore Drive and Old Wallgrove Road was opened to traffic in early August 2013.

Figure 3.3 Overview of potential requirements for network upgrade




M4 Motorway
Erskine Park Link
Old Walgrove Rd
Walgrove Rd
M7 Motorway
Mamre Rd
Sydney Water Supply Pipeline
Southern Link Rd
Chandos Rd
The Horsley Dr
1
2
3
4
5
3,589 2,146 0% 4% 3% 28%
2,058 3,696 3% 0% 28% 4%
582 2,954 17% 27% 64% 83%
2,825 484 26% 23% 88% 77%
3,681 4,262 5% 26% 37% 109%
5,672 3,359 21% 9% 42% 39%
6,912 9,873 5% 17% 13% 39%
9,517 7,222 18% 3% 44% 13%
1,519 5,599 6% 24% 18% 48%
5,167 1,462 26% 7% 52% 19%
3,533 422 12% 9% 79% 81%
2,520 2,446 13% 46% 67% 85%
419 3,555 11% 12% 80% 76%
2,616 2,460 51% 10% 85% 55%
923 966 0% 1% 27% 10%
1,208 1,105 12% 0% 20% 22%
588 2,530 61% 86% 107% 90%
2,380 401 94% 71% 96% 117%
2,454 4,475 17% 44% 55% 75%
4,788 2,378 38% 21% 71% 58%
7,308 5,235 0% 0% 13% 2%
5,344 7,340 0% 0% 1% 13%
2,041 4,358 5% 30% 10% 31%
4,150 1,955 31% 5% 32% 11%
4,130 282 42% 47% 47% 59%
2,728 1,304 78% 16% 80% 17%
1,818 3,850 59% 69% 63% 71%
2,819 2,506 35% 53% 60% 56%
2,842 2,918 41% 37% 44% 66%
1,316 934 7% 45% 9% 54%
420 4,493 40% 40% 54% 44%
1,151 2,564 18% 78% 19% 79%
3,646 2,039 68% 55% 73% 59%
4,083 1,722 33% 27% 52% 32%
1,678 4,306 28% 33% 34% 51%
7,308 5,285 0% 0% 13% 2%
5,344 7,348 0% 0% 1% 13%
919 1,295 47% 7% 56% 8%
3,522 1,964 13% 2% 21% 4%
2,021 3,772 4% 13% 7% 20%
959 519 4% 1% 8% 2%
3,937 2,583 8% 24% 9% 41%
545 906 0% 3% 0% 7%
2,912 1,179 13% 12% 23% 15%
1,097 3,143 13% 12% 16% 17%
8,150 4,257 3% 0% 15% 1%
2,568 3,862 22% 6% 36% 7%
4,336 8,036 0% 4% 1% 17%
6015904 - Southern Link Road Network - Strategic Transport Assessment
2031 Emme/2 Strategic Traffic Modelling
Average 2 Hour AM Peak (07:00 - 09:00) | PM Peak (16:00 - 18:00)
Preferred Option - Dual lane Wallgrove Road to Horsley Drive and Four lane carriageway on The Horsley Drive
Scenarios: 46501 | 45502
Wednesday, 02 March, 2011
Key:
AM Peak Volumes
% South of Pipeline
% All WSEA
PM Peak Volumes
% South of Pipeline
% All WSEA
AECOM

5. TRAFFIC

The RMS Development Guidelines* specify peak traffic generation rates for "warehouse" and "transport terminal" uses as follows:

Warehouse	0.5 vtph per 100m^2 GFA
Transport Terminal	1.0 vtph per 100m^2 GFA

This traffic generation criteria was utilised for the original assessment of the road network for the EPEA, however RMS have recently published a Technical Direction TDT 2013/04 (see Appendix C extract) which has provided updates to a number of landuses including Business Parks and Industrial Estates. Data provided in that Technical Direction includes the results of "detailed survey and assessment" process for the EPEA which provides the following details:

Erskine Park Employment Area

No. occupied lots	36
Factories	5
Factories/Warehouses	2
Warehouses	27
Offices	1
Workshops	1

Occupied GFA	**693,605 m^2**
Peak Hour Trips	1,128 vtph
Peak Hour Trips per 100m^2	0.163 vtph
Car Occupancy	1.1 persons
Car Driver	62.5%
Comm. Vehicle	28.3%
Other	9.2%

** Guide to Traffic Generating Developments*
Roads and Traffic Authority – December 2002

The RMS recorded traffic generation rate for existing development in the EPEA reflects the dominant large "warehouse" uses with contemporary operational characteristics of extended shifts which result in staff arrivals and departures outside of the normal on-street commuter peak periods. The result of the significant development which has so far occurred in the EPEA is that the traffic generation (per $100m^2$) is significantly less than that envisaged during the planning processes and substantially less than the previously established RMS rate for industrial/warehouse uses.

The traffic generation of the proposed TNT Warehouse and Distribution Facility will however reflect:

- timing of shift start/finish times
- truck delivery and dispatch timing

From the projected operational data (Section 2.3) the peak staff and truck movements will be as follows:

	CARS		**TRUCKS**		**TOTAL**
	IN	**OUT**	**IN**	**OUT**	
Road Network Peak					
AM 7.30 – 8.30am	70	-	20	31	121
PM 5.00 – 6.00pm	-	95	45	-	140
Generation per $100m^2$	AM 0.38 vtph		PM 0.44 vtph		

It is apparent that:

- the projected traffic generation of the proposed development during the on-street morning peak period will be less than the RMS Development Guideline rate for warehouse use but significantly less than the rate for transport terminal

- the projected traffic generation of the proposed development during the on-street afternoon period will be slightly less than the RMS Development Guideline rate for warehouse use but significantly less than the rate for transport terminal

However, there will always be differentials between the traffic generation of various developments. The experience with development in EPEA to date (as established in the RMS survey data) is that the traffic generation of the large warehouse developments which have been occurring has been unexpectedly low (ie some 700,000 m^2 @ 0.163 vtph per 100 m^2) even though there are 5 factory developments which have been completed.

It is apparent therefore that although the traffic generation of the proposed development will be somewhat higher than the average rate which has eventuated at EPEA, to date this will not in any way skew or invalidate the projected overall traffic outcome for development in EPEA.

It is understood that the issue regarding traffic modelling of intersections was raised in the RMS response to Department of Planning and Infrastructure. This matter was discussed with RMS when the proposal was recently considered by the Sydney Regional Development Advisory Committee and the advice was provided and accepted that:

- the projected traffic generation was entirely consistent with the road infrastructure planning for the area
- the current traffic flows on Lenore Drive (Erskine Park Link Road only recently opened) were not relevant because of the development still to occur in the area
- in the future vehicle access will also be available via the Lockwood Road – north/south connector road – Erskine Park Link Road route
- the volumes predicted for 2031 incorporate allowance for development on this site and in fact significantly overstate the volumes which are actually being generated by completed development in the area

- there was no basis available for undertaking traffic modelling of the current interim circumstances

- the access intersection (Appendix B details) has been specifically designed to maximise capacity for ingress from Lenore Drive/Erskine Park Link Road (separate right and left turn lanes) and egress to Lenore Drive/Erskine Park Link Road (2 right turn lanes and a left turn lane)

It follows that the operational performance of the access intersections will be satisfactory and reflective of the traffic modelling assessments undertaken for the Erskine Park Link Road (and the earlier planning for EPEA).

6. PARKING

Council's DCP specifies the following parking requirements in respect of the proposed development scheme:

Office (ancillary)	1 space per 40m^2
Warehouse	1 space per 100m^2

Application of the DCP criteria to the proposed development scheme would indicate the following:

Warehouse 29,480 m^2 @ 1 per 100 m^2	-	294.8 spaces
Office 2,000 m^2 @ 1 per 40 m^2	-	50 spaces
Total:		**345 spaces**

It is proposed to provide a total of 350 car parking spaces in the development in full compliance with the DCP requirements. This provision will:

- include four disabled driver spaces (AS2890.6)
- accommodate the arrival/departure accumulation of cars as indicated on the vehicle movement schedule (Section 2.3)

There will be a very 'staggered' arrival and departure pattern for warehouse staff, office staff and drivers and this will avoid any mass arrival/departure looking for parking spaces.

There will also be a provision of 24 bicycle parking spaces.

7. ACCESS, INTERNAL CIRCULATION AND SERVICING

ACCESS

The proposed vehicle access arrangements will comprise:

Truck Access

There will be a 22m wide ingress and egress driveway located on Lockwood Road at the western site boundary for truck access. The location of the access driveway will provide satisfactory sight distances where the only other vehicle movements will essentially be limited to that generated by the immediately adjacent uses.

The location of the ingress controls will ensure that stationary ingress trucks are contained within the site while ability of trucks (including B Doubles) to access the site satisfactorily is demonstrated on the turning path diagrams provided in Appendix C.

Car Access

There will be a combined 6m wide ingress/egress driveway for the car park located on Lockwood Road at the eastern site boundary.

There will be satisfactory sight distances available and the geometry of this access arrangement will comply with the design requirements of AS2890.1.

INTERNAL CIRCULATION

Truck Circulation

Trucks will circulate to and from the relevant dock areas located along each side of the building. Details of the turning path assessment for trucks indicating a satisfactory provision for circulation and manoeuvring are provided in Appendix C.

Car Park Circulation

There will be a general one way circulation arrangement in the car park area which is designed in accordance with the AS2890.1 and 6 requirements. The design of the aisles and bays etc will be entirely suitable for the "all day" employee parking circumstances as indicated on the turning path assessment provided in Appendix C.

SERVICING

There will only be a relatively minor level of servicing required for the development (ie other than the receipt and dispatch movements). Refuse removal will be undertaken using the expansive truck parking areas, which will adequately provide for the standing service vehicles.

8. CONCLUSION

This traffic and parking assessment has been undertaken in relation to the proposed TNT Warehouse and Distribution Facility in Lockwood Road at Erskine Park. The assessment has concluded that:

- the traffic generation of the proposed development will be consistent with the planned development for the EPEA

- the traffic generation of the proposed development will not present any adverse traffic implications

- the proposed parking provision will satisfy the demands of the proposed facility

- the proposed access, internal circulation and parking arrangements will be suitable and appropriate for the use

APPENDIX A

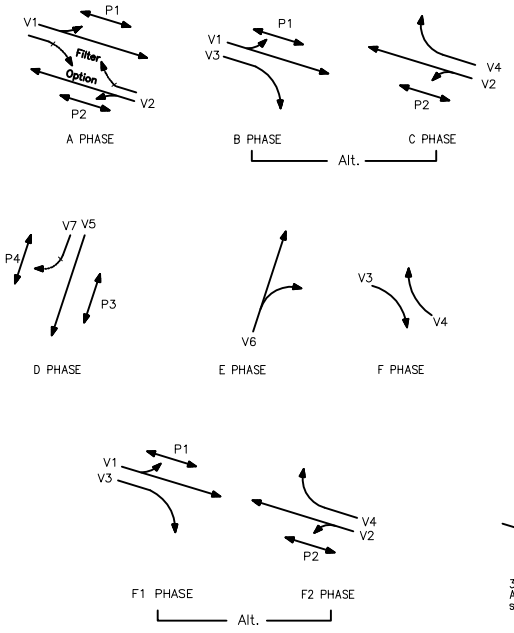
INTERSECTION DETAILS

DRAWN BY CADD
DO NOT AMEND MANUALLY

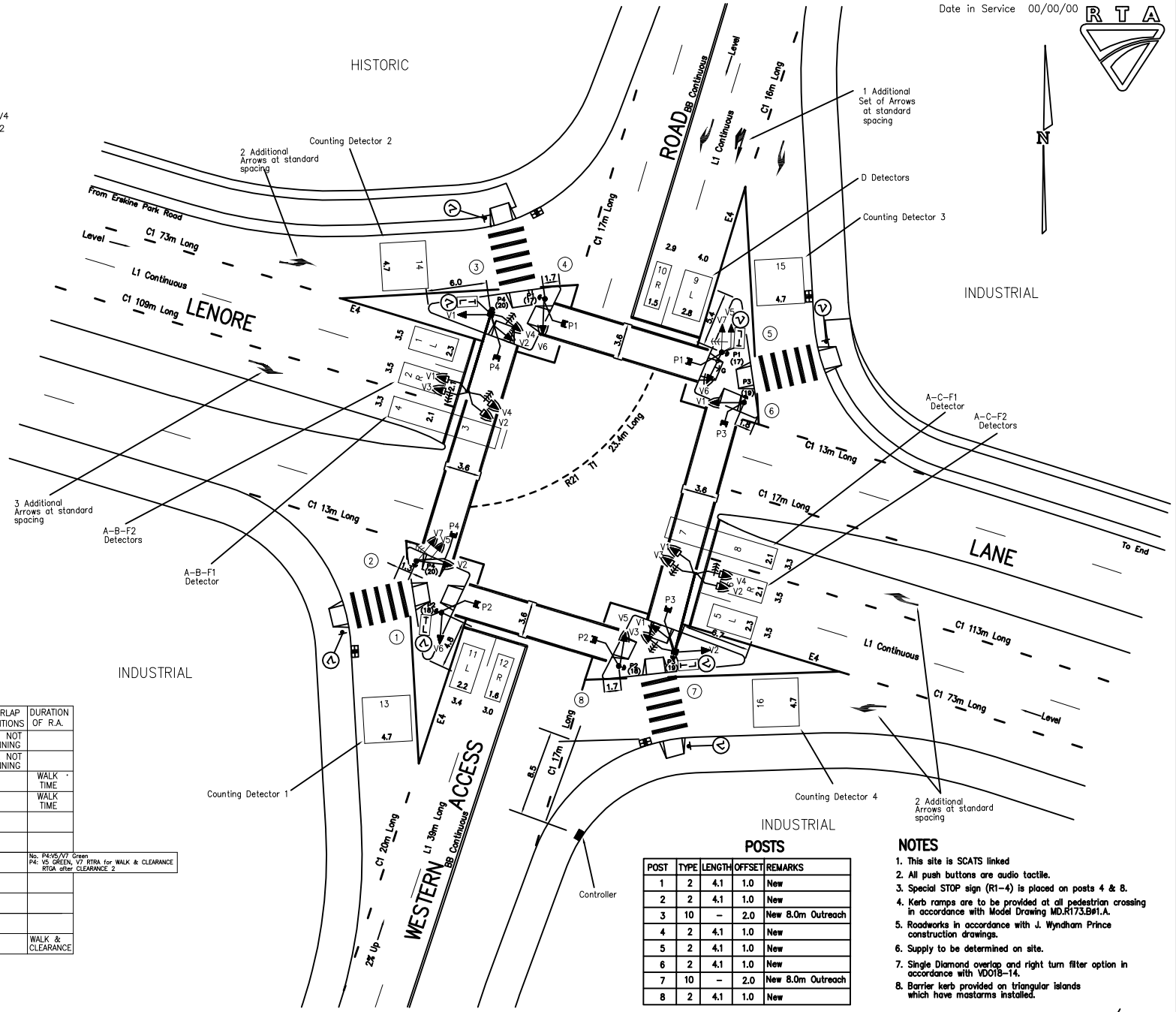
PROPOSED 7000.358.VV.4046

Date in Service 00/00/00

RTA



MOVEMENTS



SIGNAL GROUP PHASE CHART

SIGNAL GROUP	PHASE DURING WHICH GREEN DISPLAYED								OVERLAPS PERMITTED	OVERLAP CONDITIONS	DURATION OF R.A.
	A	B	C	D	E	F	F1	F2			
V1	X	X					X		F1/A/B B/A A/F1*	*P1 NOT RUNNING	
V2	X		X					X	F2/A/C C/A A/F2*	*P2 NOT RUNNING	
V3		X				X	X		F/F1 B/F		WALK TIME
V4			X			X		X	F/F2 C/F		WALK TIME
V5				X							
V6					X						
V7				X							No. P4-V5/V7 Green P4: V5 GREEN, V7 RTRA for WALK & CLEARANCE RTGA after CLEARANCE 2
P1	X	X					X		F1/A/B		
P2	X		X					X	F2/A/C		
P3				X							
P4				X							WALK & CLEARANCE

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.0	New
2	2	4.1	1.0	New
3	10	–	2.0	New 8.0m Outreach
4	2	4.1	1.0	New
5	2	4.1	1.0	New
6	2	4.1	1.0	New
7	10	–	2.0	New 8.0m Outreach
8	2	4.1	1.0	New

NOTES

1. This site is SCATS linked
2. All push buttons are audio tactile.
3. Special STOP sign (R1–4) is placed on posts 4 & 8.
4. Kerb ramps are to be provided at all pedestrian crossing in accordance with Model Drawing MD.R173.B01.A.
5. Roadworks in accordance with J. Wyndham Prince construction drawings.
6. Supply to be determined on site.
7. Single Diamond overlap and right turn filter option in accordance with VD018–14.
8. Barrier kerb provided on triangular islands which have mastarms installed.

A ORIGINAL ISSUE

PUBLIC UTILITY LEGEND		REFERENCE PLANS	
HYDRANT	□	SYMBOLS/ABBS.	VD003–6
STOP VALVE	▲	STD POSIT	VD001–5
GAS VALVE	✱	DET SCHED EXP	VD018–10
SEWER MANHOLE	●	PRES. DETECT	VC005–17
TELECOM PIT	▣	SSG DIS. SEQ.	VD018–8
ELECT LIGHT POLE	○		
POWER POLE	◇		
STAY POLE	◈		
TELEPHONE BOX	⊡	SURVEYOR : J. Wyn Prince	
TELECOM PILLAR	◍	DATE : 2004	

U.B.D. Ref. Map 205 N4
I.S.G. E 280 822
CO-ORDS N 1 256 905
DESIGNED JS
CHECKED AM
AM SITE CHECKED
RW RECOMMENDED

DESIGN APPROVAL
APPROVED
POSITION APPROVED BY DIRECTOR
DATE 24.03.05
DESIGN PREPARED BY TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

RTA ACCEPTANCE
RECOMMENDED
POSITION .....
DATE .....
ACCEPTED
POSITION .....
DATE .....

Roads and Traffic Authority, N.S.W

PENRITH CITY COUNCIL AREA
TRAFFIC SIGNALS AT THE INTERSECTION OF LENORE LANE AND WESTERN ACCESS ROAD
ERSKINE PARK

DESIGN LAYOUT TCS No 4046

EXISTING ☐ PROPOSED ☑
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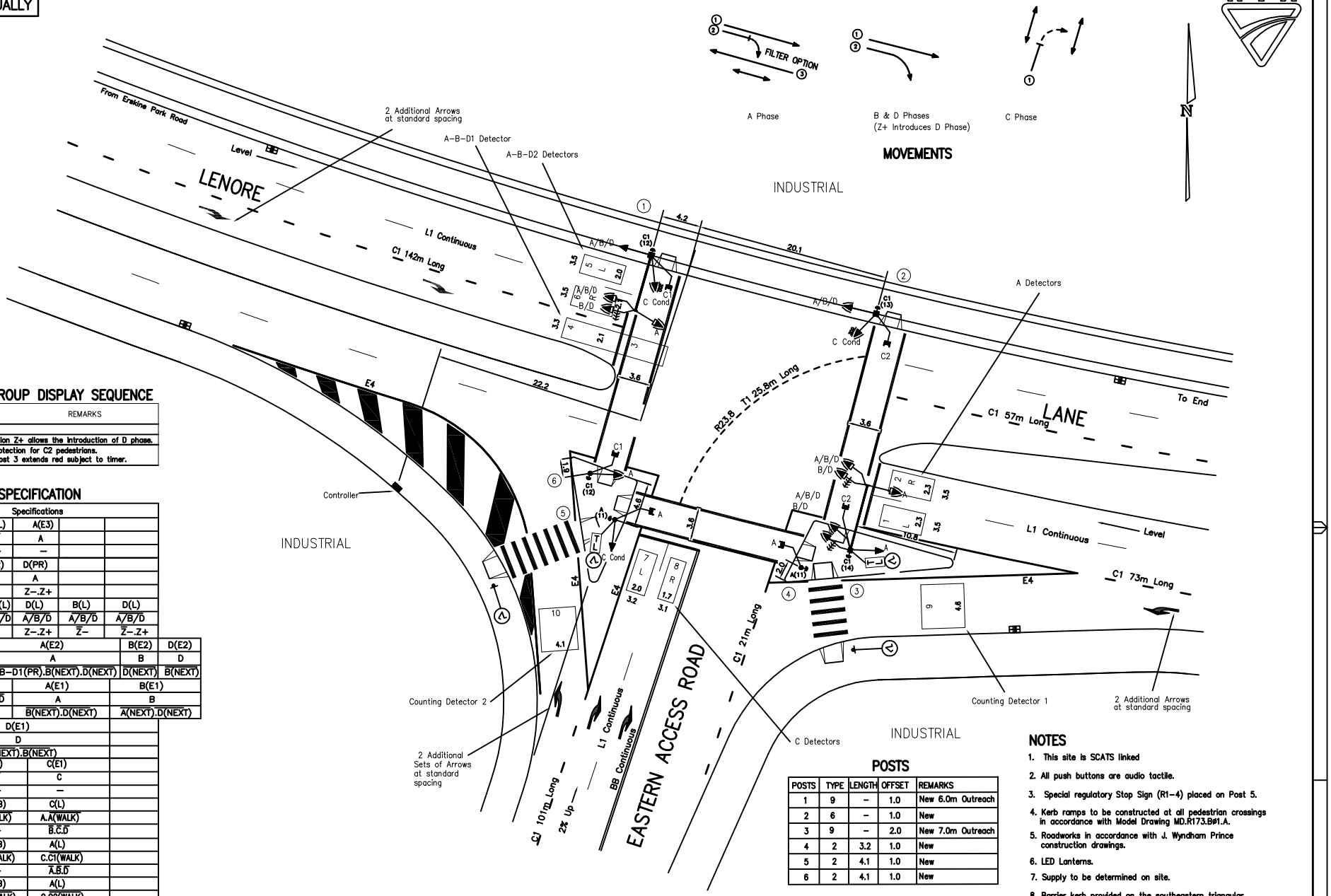
SCALE 5 0 (1:200) 5 10
ISSUE A
FILE 000 TS 000
SUPERSEDES SHEET/ISSUE –
REGN. 7000.358.VV.4046
SHEET 1

DRAWN BY CADD
DO NOT AMEND MANUALLY

Date in Service 00/00/00

R T A

PROPOSED 7000.358.VV4047



SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B/D	3	–
B/D (RT)	39	Filter Option Z+ allows the introduction of D phase.
C Cond	74	Timed protection for C2 pedestrians. P.B on post 3 extends red subject to timer.

DETECTOR SPECIFICATION

Detector		Specifications			
A	FN	A(L)	A(E3)		
	SG/PS	$\overline{A}$	A		
	DS	–	–		
A-B-D1 Depart. & Approach	FN	B(PR)	D(PR)		
	SG/PS	A	A		
	DS	Z–	Z–.Z+		
A-B-D1 Approach	FN	A(L).B(L)	D(L)	B(L)	D(L)
	SG/PS	$\overline{A/B/D}$	$\overline{A/B/D}$	$\overline{A/B/D}$	$\overline{A/B/D}$
	DS	Z–	Z–.Z+	$\overline{Z}$–	$\overline{Z}$–.Z+
cont. A-B-D1 Approach	FN	A(E2)		B(E2)	D(E2)
	SG/PS	A		B	D
	DS	Z–.A–B–D1(PR).$\overline{B(NEXT)}$.$\overline{D(NEXT)}$		$\overline{D(NEXT)}$	$\overline{B(NEXT)}$
A-B-D2	FN	A(L)	A(E1)	B(E1)	
	SG/PS	$\overline{A/B/D}$	A	B	
	DS	–	$\overline{B(NEXT)}$.$\overline{D(NEXT)}$	$\overline{A(NEXT)}$.$\overline{D(NEXT)}$	
cont. A-B-D2	FN	D(E1)			
	SG/PS	D			
	DS	$\overline{A(NEXT)}$.$\overline{B(NEXT)}$			
C	FN	C(L)	C(E1)		
	SG/PS	$\overline{C}$	C		
	DS	–	–		
A P.B.	FN	A(PB)	C(L)		
	SG/PS	$\overline{A(WALK)}$	A.$\overline{A(WALK)}$		
	DS	–	$\overline{B.C.D}$		
C1 P.B.	FN	C(PB)	A(L)		
	SG/PS	$\overline{C1(WALK)}$	C.$\overline{C1(WALK)}$		
	DS	–	$\overline{A.B.D}$		
C2 P.B.	FN	C(PB)	A(L)		
	SG/PS	$\overline{C2(WALK)}$	C.$\overline{C2(WALK)}$		
	DS	–	$\overline{A.B.D}$		

POSTS

POSTS	TYPE	LENGTH	OFFSET	REMARKS
1	9	–	1.0	New 6.0m Outreach
2	6	–	1.0	New
3	9	–	2.0	New 7.0m Outreach
4	2	3.2	1.0	New
5	2	4.1	1.0	New
6	2	4.1	1.0	New

NOTES

1. This site is SCATS linked
2. All push buttons are audio tactile.
3. Special regulatory Stop Sign (R1-4) placed on Post 5.
4. Kerb ramps to be constructed at all pedestrian crossings in accordance with Model Drawing MD.R173.B01.A.
5. Roadworks in accordance with J. Wyndham Prince construction drawings.
6. LED Lanterns.
7. Supply to be determined on site.
8. Barrier kerb provided on the southeastern triangular island which has the Type 9 mastarm installed.

A ORIGINAL ISSUE

PUBLIC UTILITY LEGEND		REFERENCE PLANS	
HYDRANT	□	SYMBOLS/ABBS.	VD003-6
STOP VALVE	▲	STD POSIT	VD001-5
GAS VALVE	✻	DET SCHED EXP	VD018-10
SEWER MANHOLE	●	PRES. DETECT	VC005-17
TELECOM PIT	▣	SSG DIS. SEQ.	VD018-8
ELECT LIGHT POLE	○		
POWER POLE	◇		
STAY POLE	◈		
TELEPHONE BOX	⊠	SURVEYOR : J. Wyn Prince	
TELECOM PILLAR	⊛	DATE : 2005	

U.B.D. Ref. Map 206 A5
I.S.G. E: 281 100
CO-ORDS N: 1 256 805

DESIGNED J.S
CHECKED A.M

A.M
SITE CHECKED

R.W
RECOMMENDED

DESIGN APPROVAL
APPROVED
POSITION APPROVED BY DIRECTOR
DATE 21.03.05
DESIGN PREPARED BY TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

RTA ACCEPTANCE
RECOMMENDED
POSITION .....
DATE .....
ACCEPTED
POSITION .....
DATE .....

Roads and Traffic Authority, N.S.W

PENRITH CITY COUNCIL AREA
TRAFFIC SIGNALS AT THE INTERSECTION OF LENORE LANE AND EASTERN ACCESS ROAD
ERSKINE PARK

DESIGN LAYOUT TCS No 4047

EXISTING ☐ PROPOSED ☑
CADD FILE: VV4047-1A.DGN
SCALE 5 0 (1:200) 5 10
FILE 000 TS 000
SUPERSEDES SHEET/ISSUE –
ISSUE A
REGN. 7000.358.VV.4047
SHEET 1

APPENDIX B

RMS DATA

Technical Direction

For traffic, safety and transport practitioners

OPERATIONAL POLICY – GUIDELINES – ADVICE

Transport Roads & Maritime Services

Published May 2013

Supersedes/Amends None

TDT 2013/ 04

Guide to Traffic Generating Developments

Updated traffic surveys

Introduction

The *Guide to Traffic Generating Developments* was first released in 1991. It was revised in 2001 and is in the process of being further revised. It provides guidance on a number of matters related to the traffic impacts of land use developments, most notably on matters relating to traffic generation and parking. Its audience extends beyond that of traffic authorities (RMS and Councils) and is widely used throughout Australia.

Over the past few years a number of surveys have been undertaken to update trip generation and parking information as part of the *Guide*. This Technical Direction provides a summary of the updated information. The information herein should be used to supplement the current Guide and replace those sections of the *Guide* indicated. The information is provided in two parts; (i) a very brief summary below and (ii) more extended summaries in Appendices A-H. More detailed information may be obtained by referral to the RMS Library where reports on each land use may be found.

Summaries of land use traffic generation

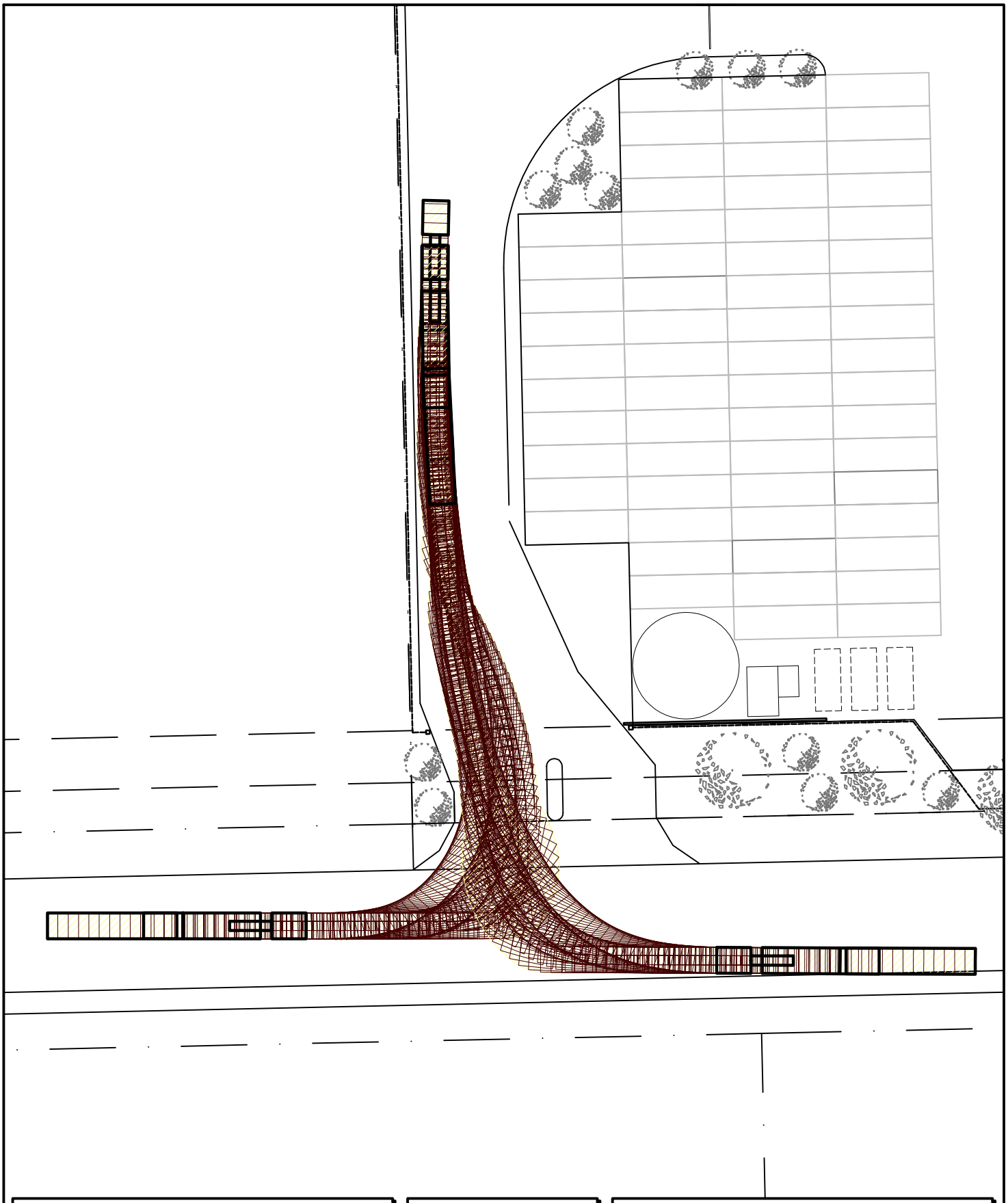
– BUSINESS PARKS AND INDUSTRIAL ESTATES – SITE

Traffic results summary

Survey area ID	Sydney areas				
	Site 1 Erskine Park Industrial Estate, Erskine	Site 2 Helensburgh Business Park, Helensburgh	Site 3 Wonderland Business Park, Eastern Creek	Site 4 Riverwood Business Park, Riverwood	Si Bu Tu
Date of survey	29/03/2012	28/03/2012	27/03/2012	28/03/2012	1/
Day of survey	Thursday	Wednesday	Tuesday	Wednesday	Tu
Duration of survey	06:00-19:00	07:00-19:00	07:00-19:00	07:00-19:00	07
Surrounding area characteristics:					
Surrounding landuse (eg residential, commercial, open space, etc)	Commercial	Residential	Residential	Residential	Co
Indicative Public Transport Accessibility Score	2	2	4	8	
Principal adjacent road- AM peak period (weekday	8.00 to 9.00 am	8.30 to 9.30 am	7.30 to 8.30 am	8.15 to 9.15 am	8.
Principal adjacent road - PM peak period (weekday	3.30 to 4.30pm	4.30 to 5.30pm	4.15 to 5.15pm	5.00 to 6.00pm	3.
Principal adjacent road – daily peak period (weeke	1.00 to 2.00 pm	11.00 am to 12.00 p	12.15 to 1.15 pm	1.15 to 2.15 pm	1
Estate characteristics:					
Year opened	2003	2011	2007	2004	
Total site area (hectares)	326.9	0.6	114.6	4.7	
No. of units/lots (including vacant units/lots)	38	21	26	16	
No. of occupied units/lots	36	13	22	16	
Predominant business types within estate:					
no. of factories	5	0	0	0	
no. of factories/warehouses	2	0	0	0	
no. of warehouses	27	0	20	15	
no. of offices	1	9	0	1	
no of retailers	0	0	0	0	
no. of workshops	1	0	0	0	
no. of manufacturers	0	3	2	0	
no. of others commercial businesses	0	1	0	0	
Gross Floor Area in estate m^2 (occupied)	693,605	1,605	406,600	29,983	
No. of employees	incomplete data from businesses			231	
Person Trips:					
Peak 1-hour person-trips	1294	29	927	173	
Time of peak 1-hour person-trips	14:45-15:45	14:45-15:45	14:00-15:00	08:15-09:15	
Peak person-trips per business	35.9	2.2	42.1	10.8	
Peak person-trips per hectare	4	49.4	8.1	37.0	
Peak person-trips per 100 m^2 of GFA	0.187	1.807	0.228	0.577	
Peak person-trips per employee	incomplete data from businesses			0.749	
Total daily person-trips	14056	168	9929	1410	
Total daily person-trips per business	390.4	13.0	451.3	88	
Total daily person-trips per hectare	43.0	287.0	86.6	301.5	
Total daily person-trips per 100 m^2 of GFA	2.026	10.492	2.442	4.703	
Total daily person-trips per employee	Incomplete data from businesses			6.105	
Person-trips during adjacent road AM peak	976	24	789	173	
Person-trips during adjacent road PM peak	1073	7	858	94	
Vehicle Trips:					
Peak 1-hour vehicle-trips	1128	24	820	129	
Time of peak 1-hour vehicle-trips	14:45-15:45	14:45-15:45	08:00-09:00	08:15-09:15	
Peak vehicle-trips per business	31	1.8	37.3	8.1	
Peak vehicle-trips per hectare	3.5	40.9	7.2	27.6	
Peak vehicle-trips per 100 m^2 of GFA	0.163	1.495	0.202	0.430	
Peak vehicle-trips per employee	Incomplete data from businesses			0.558	
Total daily vehicle-trips	13125	168	9384	1116	
Total daily vehicle-trips per business	364.6	12.9	426.5	69.75	
Total daily vehicle-trips per hectare	40.1	286.3	81.9	238.6	
Total daily vehicle-trips per 100 m^2 of GFA	1.892	10.467	2.308	3.722	
Total daily vehicle-trips per employee	Incomplete data from businesses			4.83	
Vehicle-trips in adjacent road AM peak (Average)	1165	126	2749	1608	
Vehicle-trips in adjacent road PM peak (Average)	972	149	2593	1613	
Vehicle-trips during adjacent road AM peak	929	19	724	129	
Vehicle-trips during adjacent road PM peak	965	5	714	69	
Average vehicle occupancy	1.10	1.10	1.12	1.16	
% of total trips by principal mode:					
% Car (as driver)	62.5%	81.9%	63.2%	68.8%	
% Car (as passenger)	8.0%	8.3%	8.3%	12.3%	
% Commercial Vehicles	28.3%	4.2%	25.9%	12.6%	
% Bus	0.8%	0.0%	2.1%	0.5%	
% Cycle	0.1%	0.0%	0.3%	0.1%	
% Motorbike	0.1%	0.0%	0.0%	0.0%	
% On foot	0.1%	5.6%	0.2%	5.7%	
% Other	0.0%	0.0%	0.0%	0.0%	

APPENDIX C

TURNING PATH DIAGRAMS



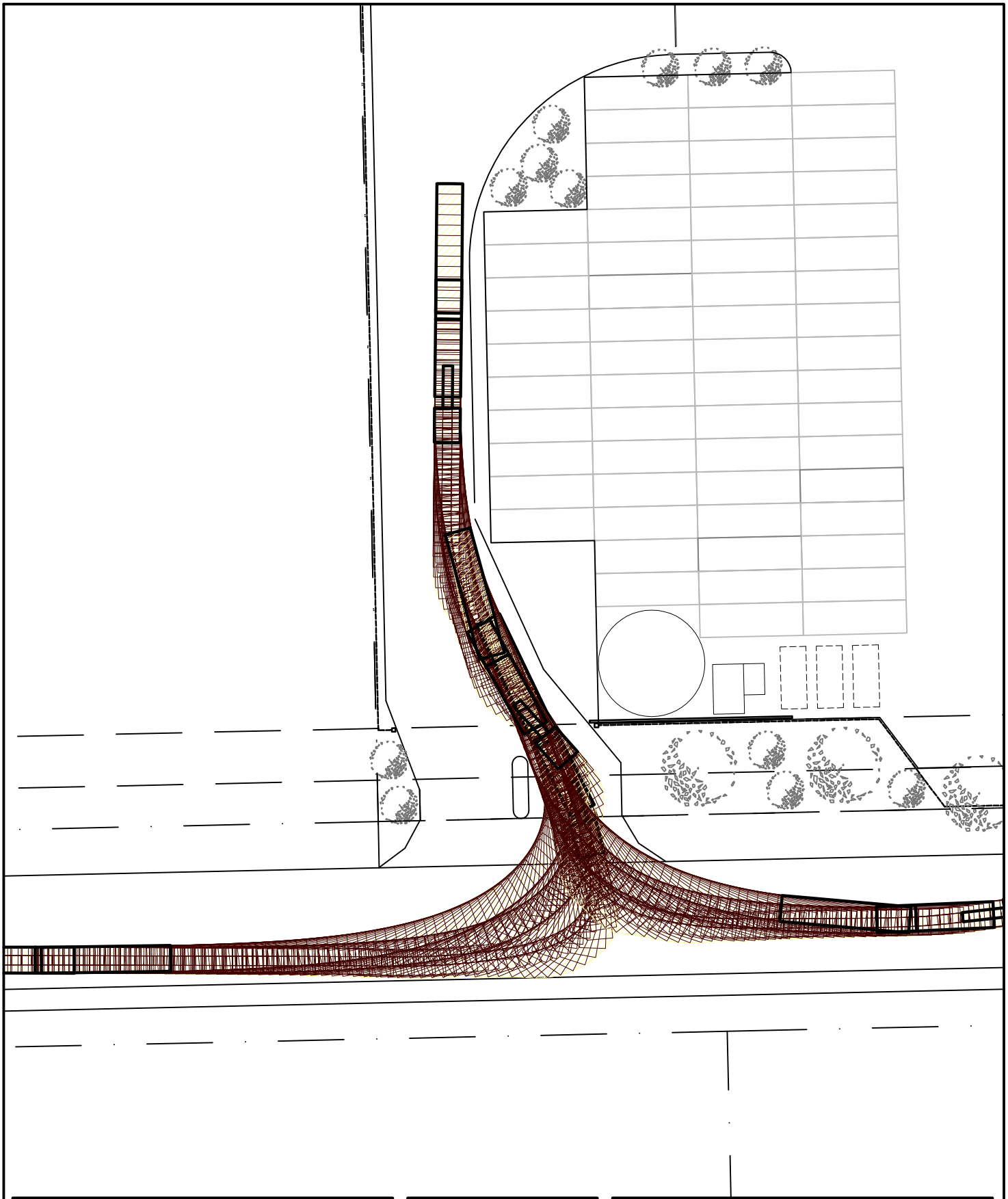
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 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.

N

SWEPT PATH ANALYSIS OF 25m ARTICULATED VEHICLES ENTERING THE SITE

SP 1



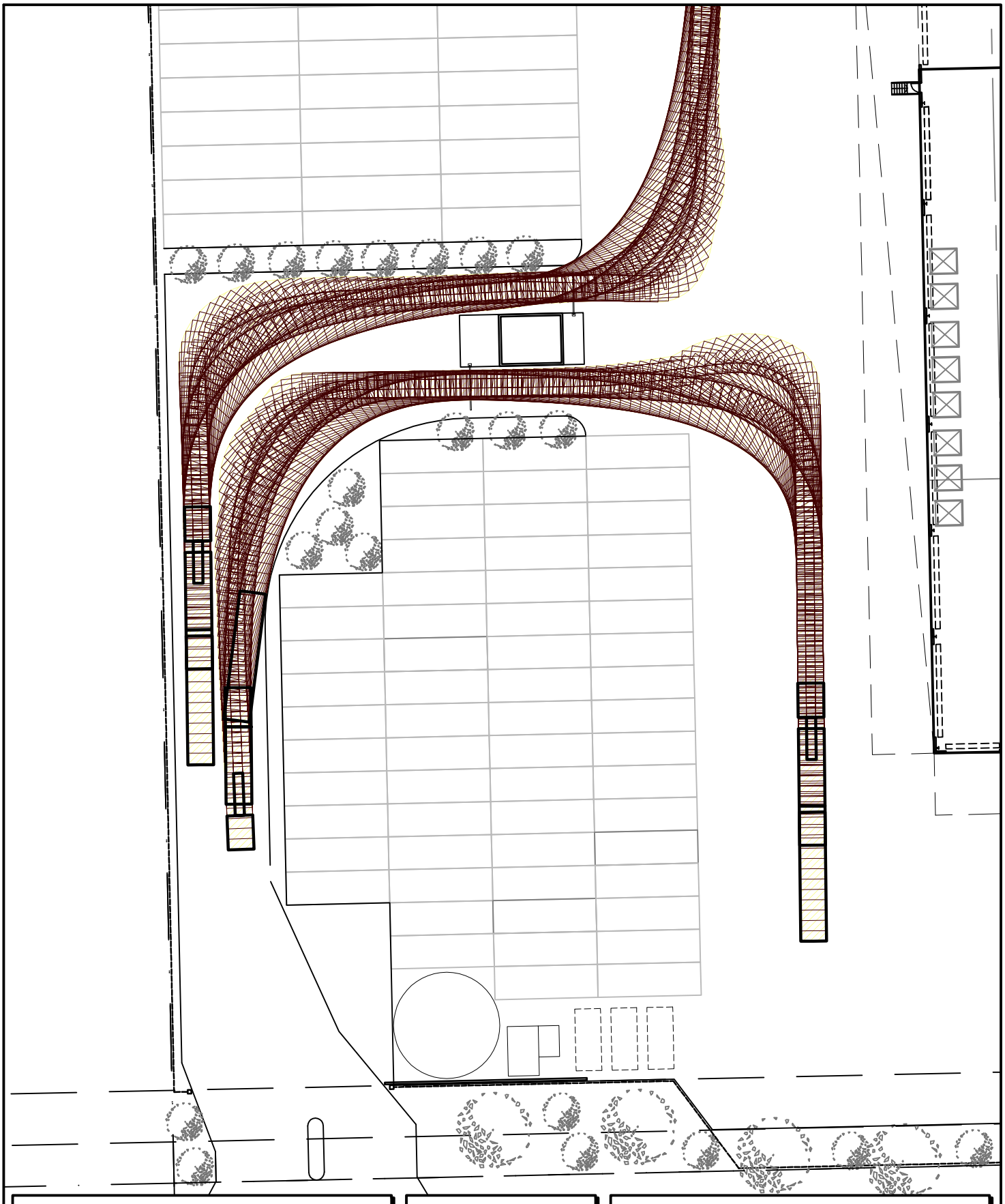
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 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.

N

SWEPT PATH ANALYSIS OF 25m ARTICULATED VEHICLES EXITING THE SITE

SP 2



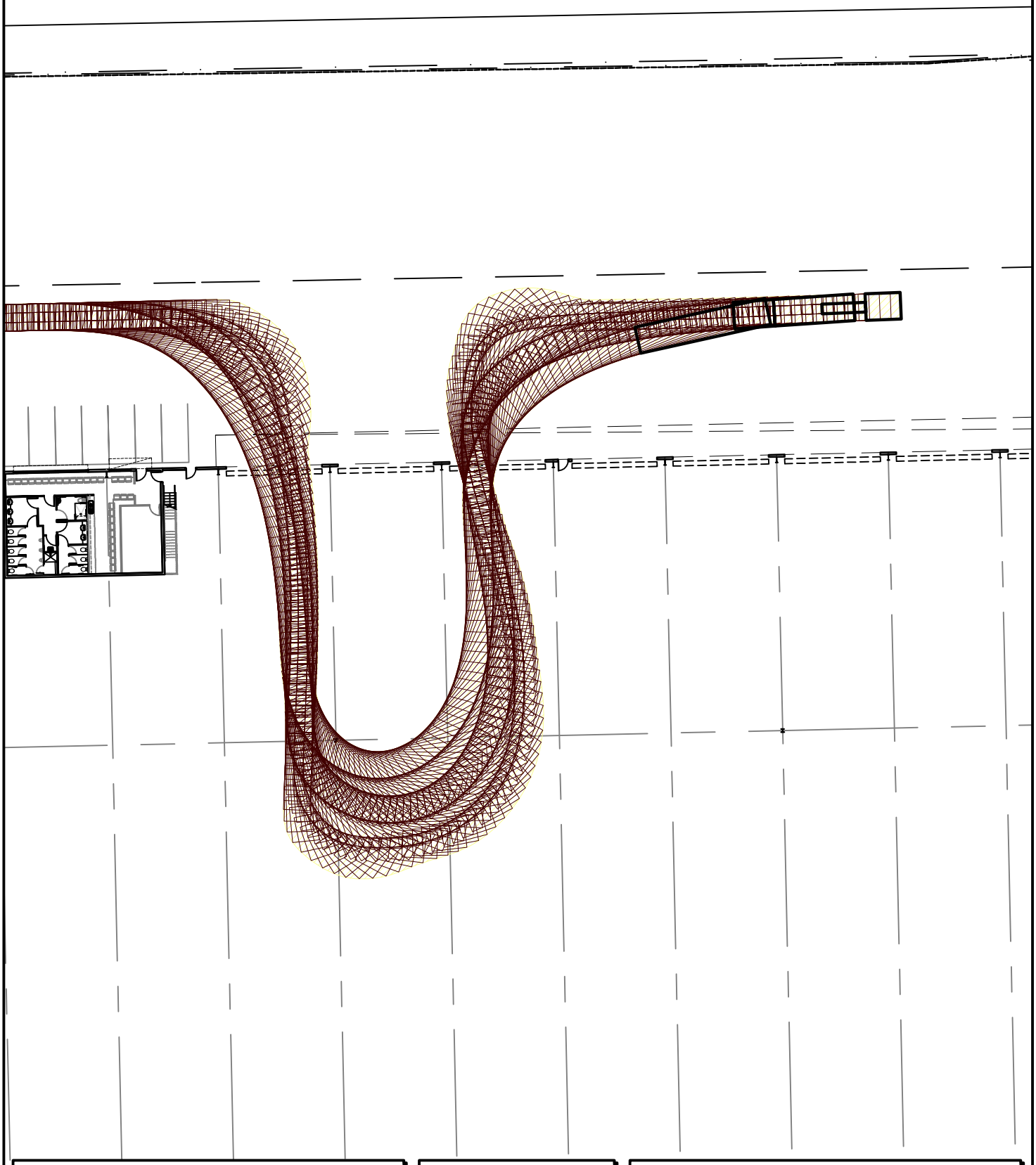
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 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.

N

SWEPT PATH ANALYSIS OF 25m ARTICULATED VEHICLES

SP 3



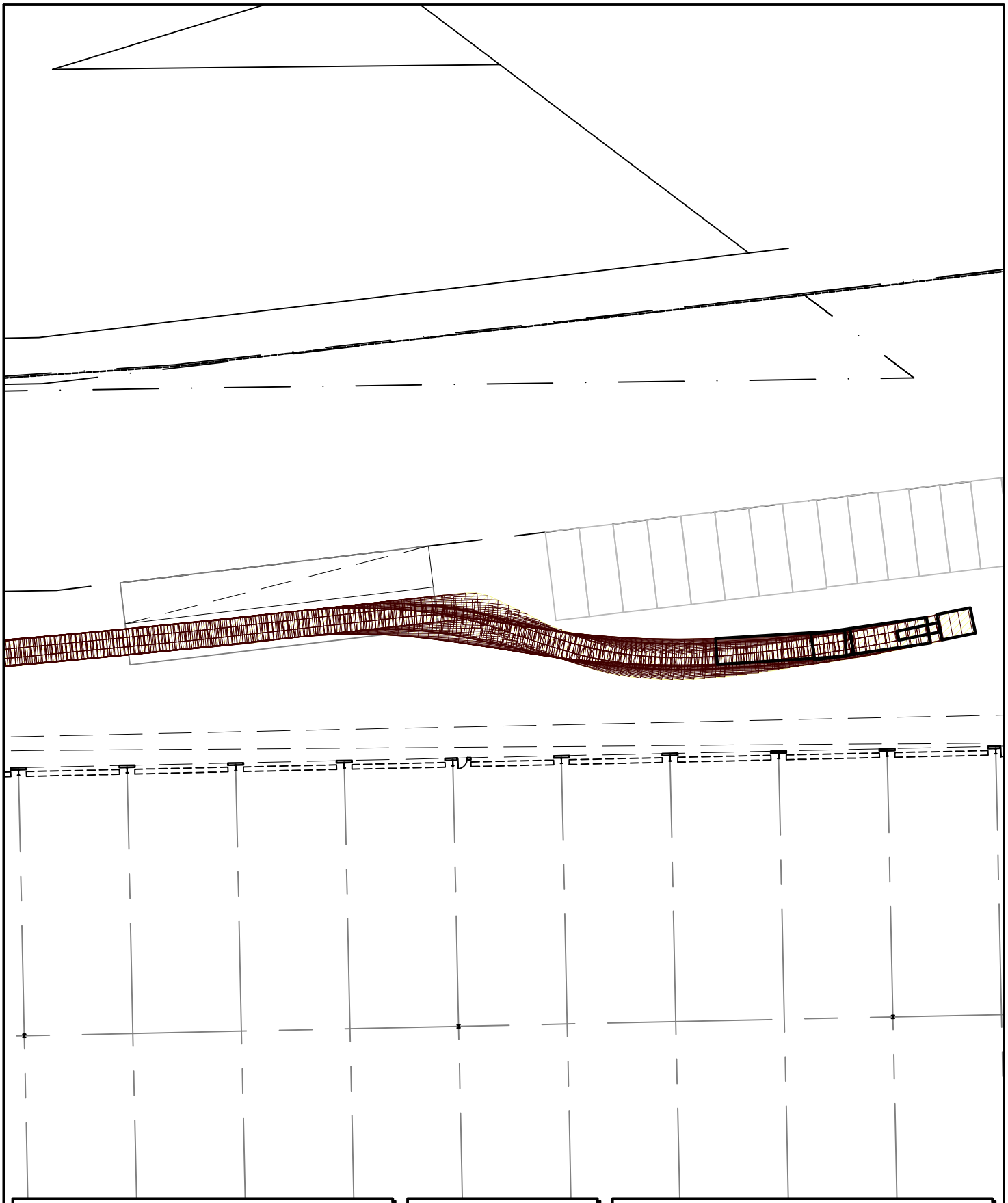
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 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.

N

SWEPT PATH ANALYSIS OF A 25m ARTICULATED VEHICLE

SP 4



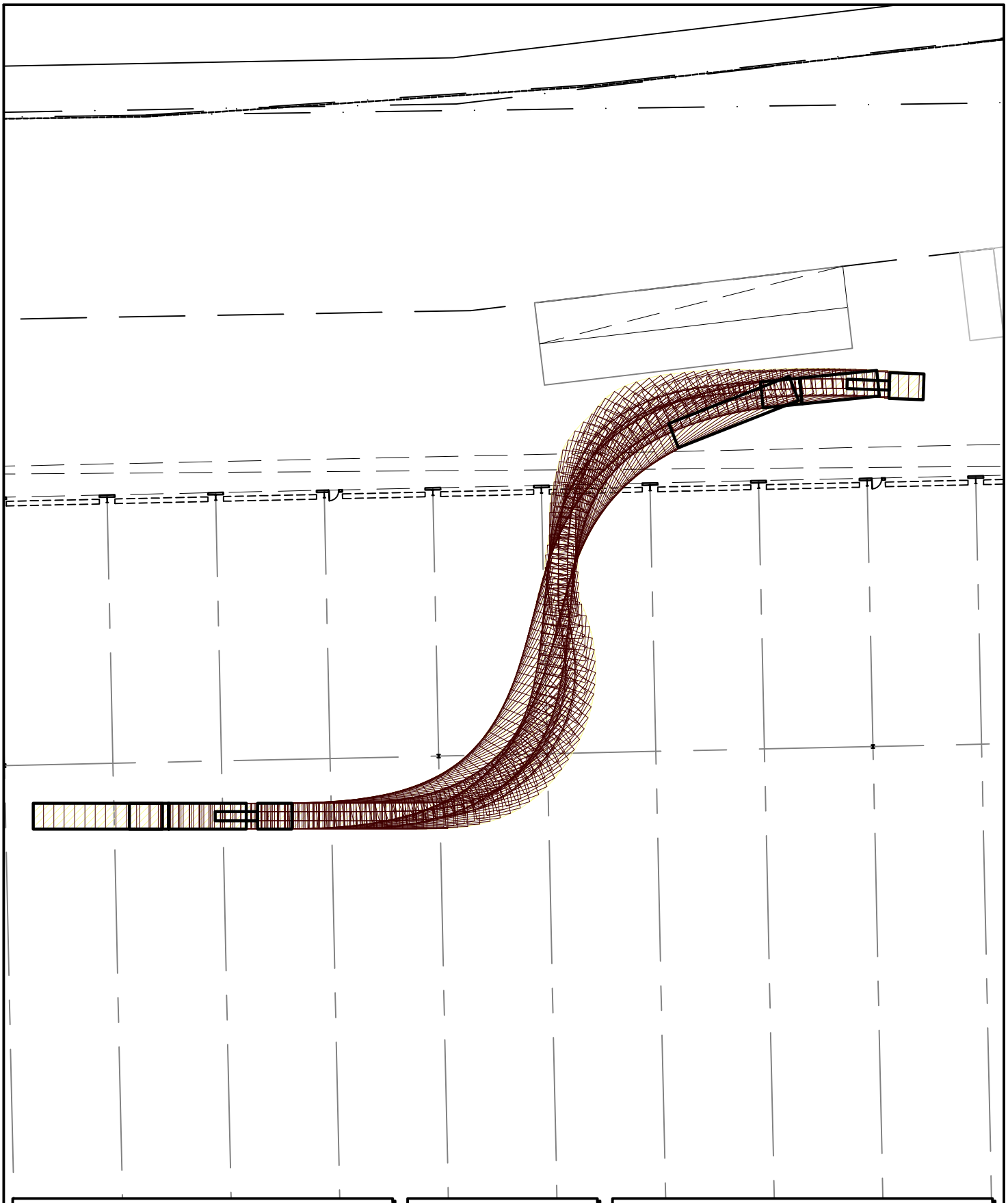
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 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.

N

SWEPT PATH ANALYSIS OF A 25m ARTICULATED VEHICLE

SP 5



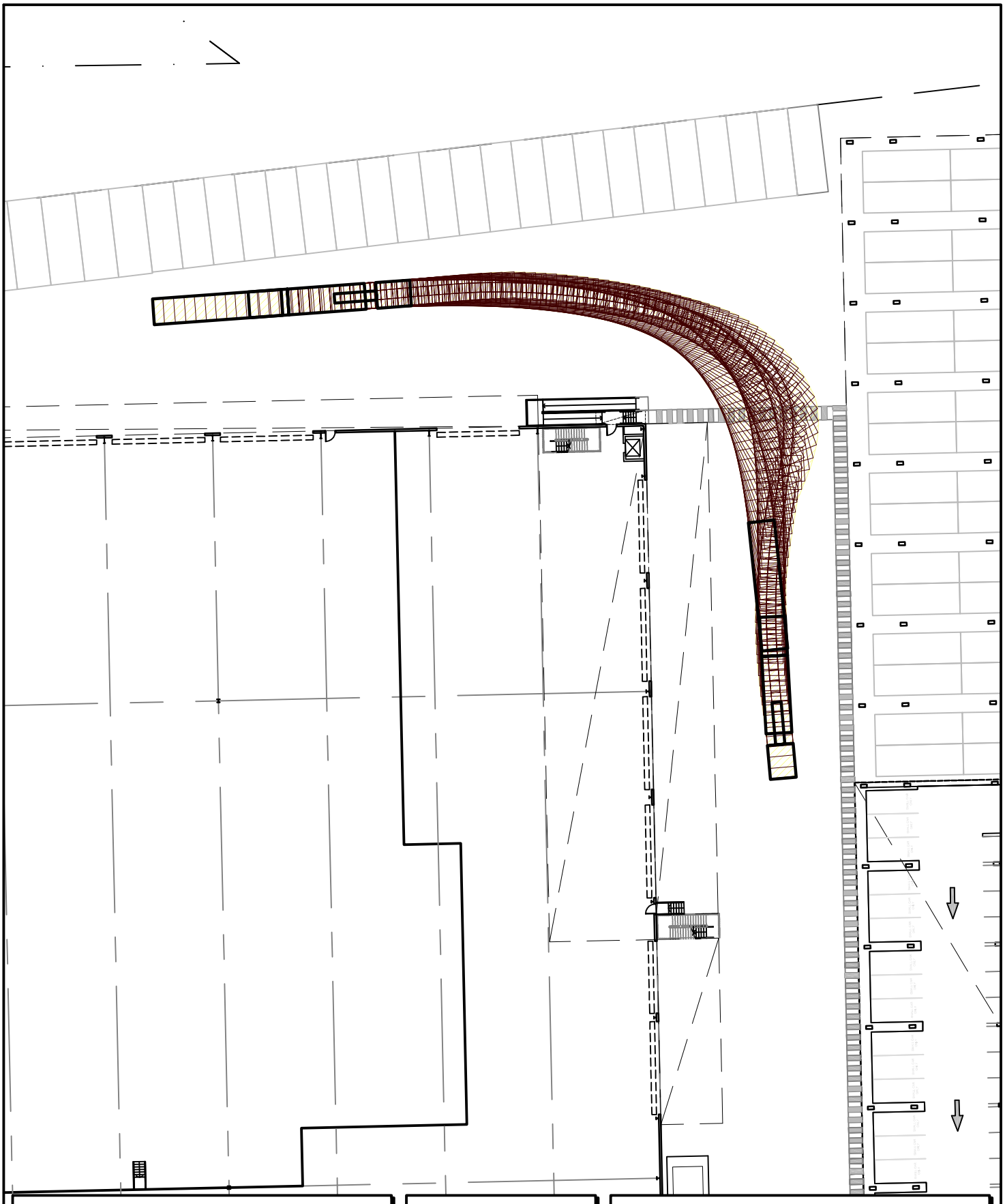
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 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.

N

SWEPT PATH ANALYSIS OF A 25m ARTICULATED VEHICLE

SP 6



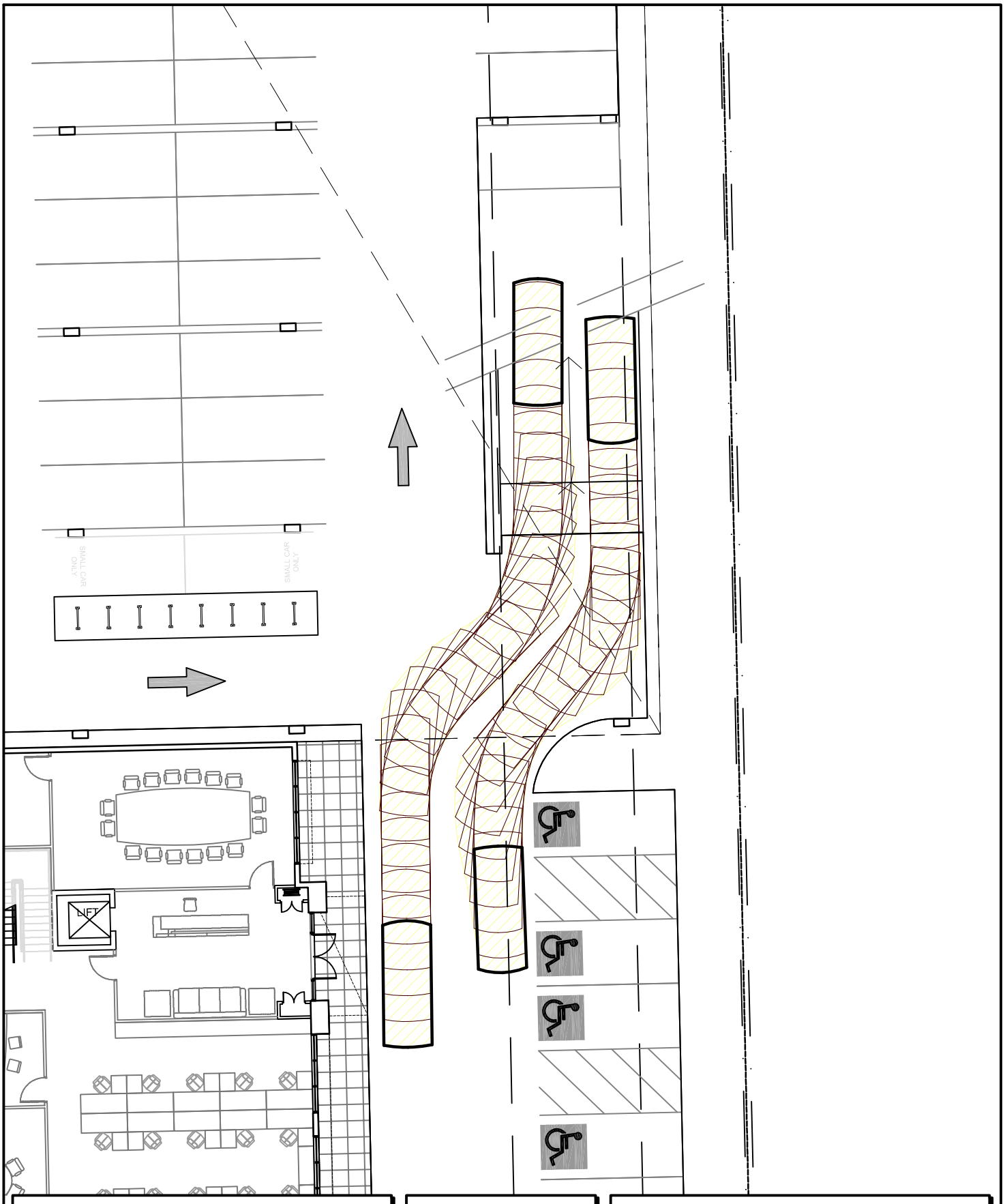
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 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.

N

SWEPT PATH ANALYSIS OF A 25m ARTICULATED VEHICLE

SP 7



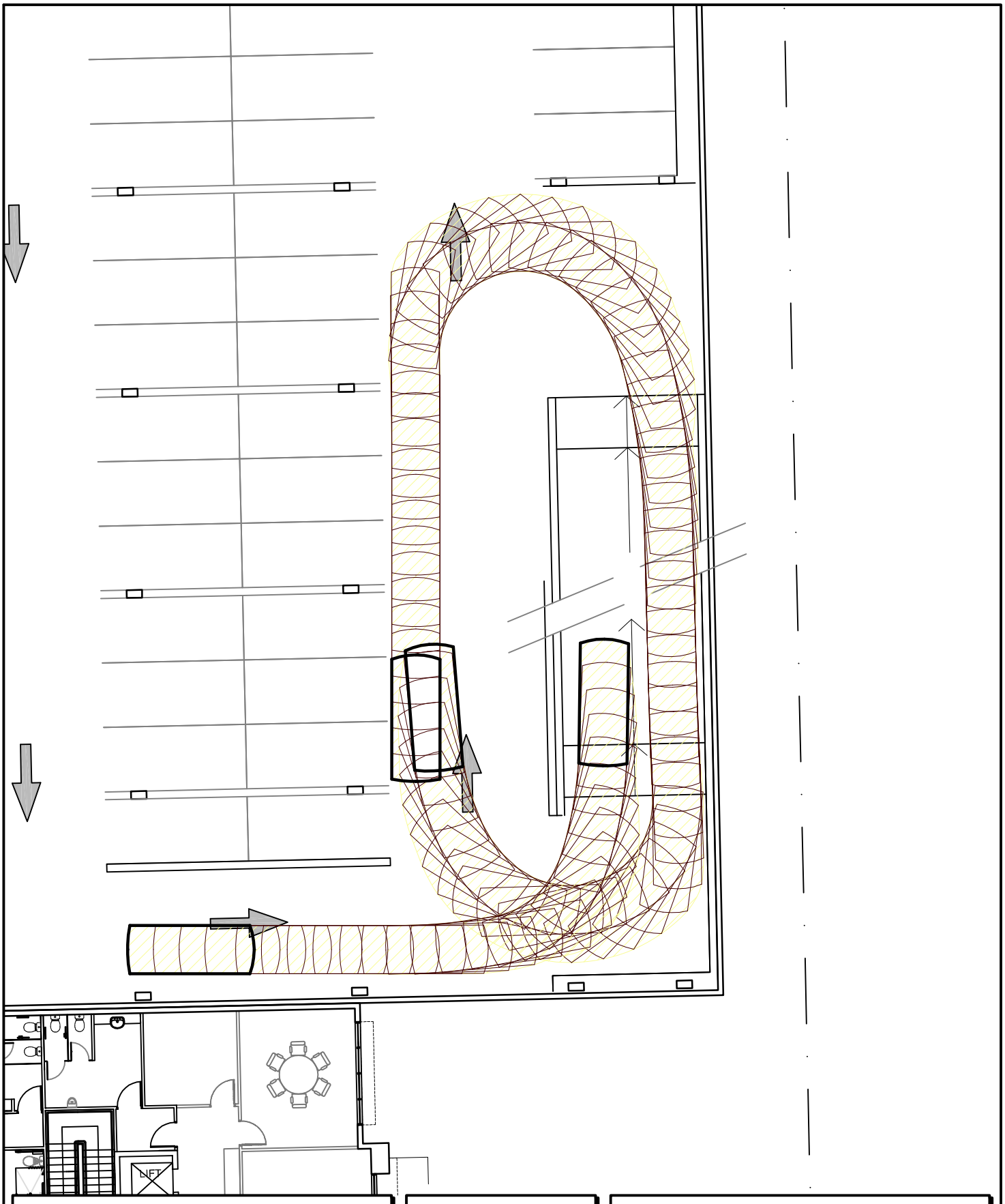
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 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.

N

SWEPT PATH ANALYSIS OF 85th PERCENTILE VEHICLES (GROUND LEVEL)

SP 8



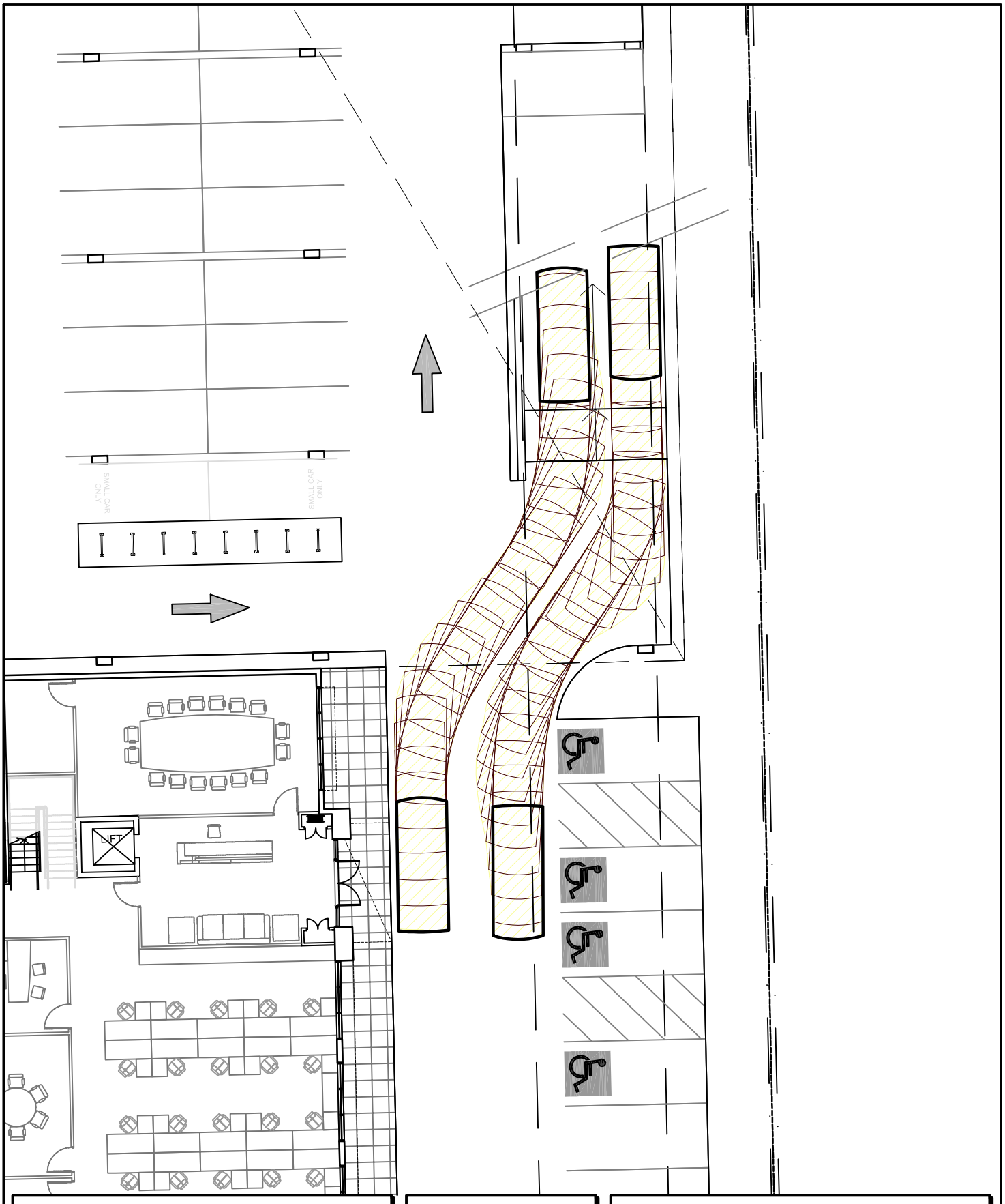
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 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.

N

SWEPT PATH ANALYSIS OF 85th PERCENTILE VEHICLES (LEVEL 1)

SP 9



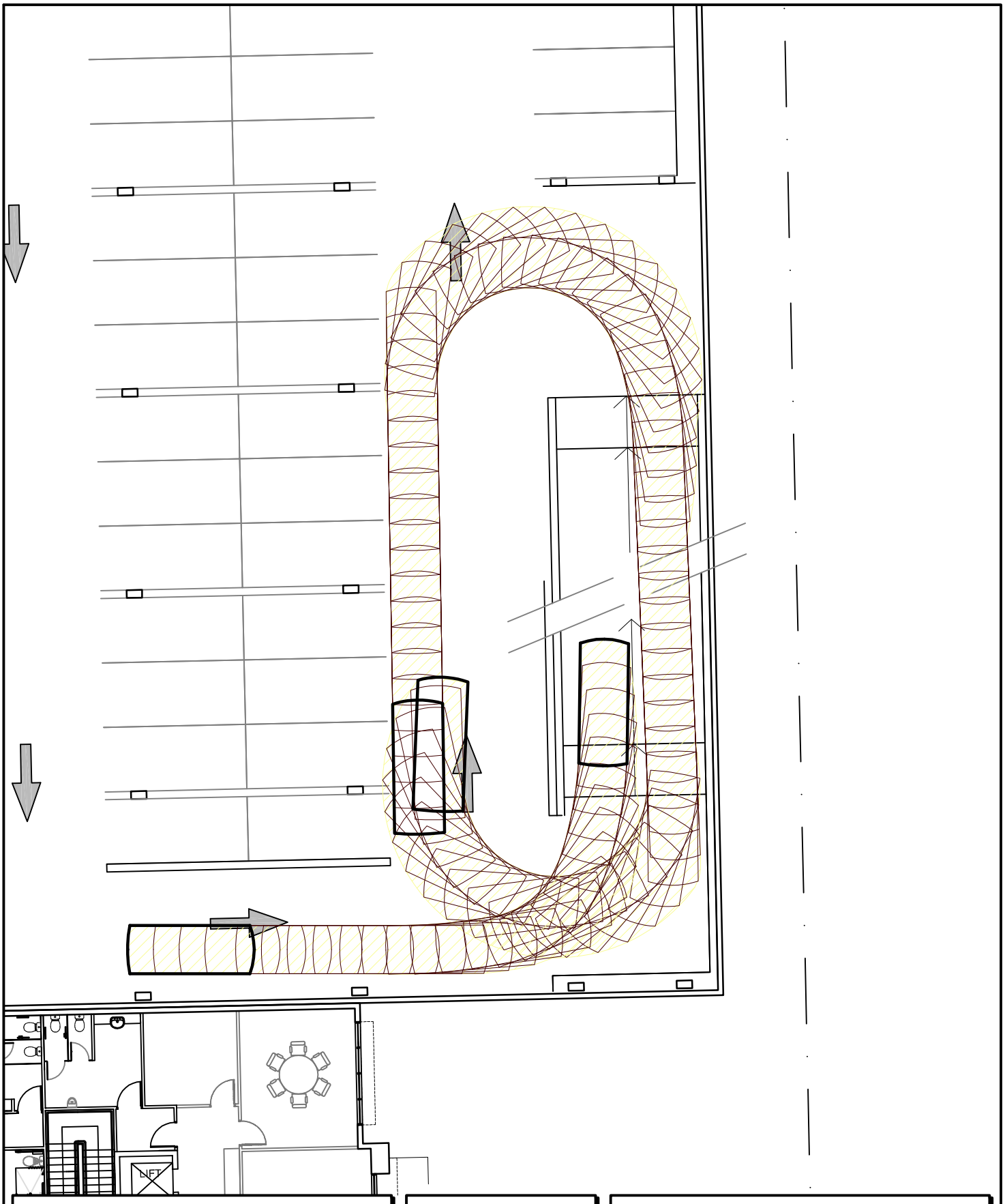
LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 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.

N

SWEPT PATH ANALYSIS OF 99th PERCENTILE VEHICLES (GROUND LEVEL)

SP 10



LEGEND

This drawing has been prepared using vehicle modelling computer software AutoTrack V9.21 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.

N

SWEPT PATH ANALYSIS OF 99th PERCENTILE VEHICLES (LEVEL 1)

SP 11