Future Urban

WATERLOO CORNER CODE AMENDMENTS

TRAFFIC STUDY

February 2025

23-0013

Traffic • Parking • Transport

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CONTENTS

1.0 INTRODUCTION

An amendment to the Planning and Design Code (Code Amendment) has been proposed for three sites within the land bound by Heaslip Road, Mill Road, Greyhound Road and Mumford Road in Waterloo Corner. The land is located in Greater Edinburgh Parks which has been identified for industrial and commercial development.

This report details the traffic investigation that has been completed to inform the transport infrastructure needs for the development of the broader land area. The fragmented land complicates transport planning for developing the highest and best use for the area as connectivity and access will need to be maintained for each site (be it retaining status quo or being redeveloped).

While this report focusses on three specific parcels of land, it has reviewed the traffic criteria for the envisaged future land use in both the context of the broader network and potential rezoning of adjacent land as well as having regard to access requirements for parcels of land in individual ownership who may seek to develop prior to infrastructure improvements being constructed.

The existing infrastructure in Waterloo Corner is not adequate to cater for the volume or type of vehicle envisaged to be generated by future development. The Department for Transport and Infrastructure (DIT) is currently planning an upgrade of Heaslip Road which is likely to result in the duplication of the lanes to a four lane divided road. While DIT has yet to provide information to inform the assessment, this review has assumed the upgrade will occur, given that the capacity of the road will be exceeded.

This report has encompassed the land bounded by Heaslip Road, Mumford Road, Greyhound Road and Mill Road. It should be read in conjunction with the specific traffic reports for the independent land parcels.

2.0 BACKGROUND

Greater Edinburgh Parks is located partly within the City of Salisbury and the City of Playford, with the boundary of the two Council areas being located along Port Wakefield Road. Both Councils have separately completed traffic investigations to understand that potential traffic growth in the vicinity of Greater Edinburgh Parks to gain an understanding of the likely traffic growth and the potential infrastructure requirements to cater for future development.

MFY completed a review of both studies in order to gauge an appreciation of the current thinking in respect to access requirements but also understand the limitations of existing infrastructure in catering for the future traffic growth. The purpose of the review was to identify the basis for the road hierarchy to inform a holistic traffic strategy for Greater Edinburgh Parks. Figure 2.1 identifies the potential road hierarchy developed by MFY for the development of the area.

Figure 2.1: Potential road hierarchy for Greater Edinburgh Parks

While not endorsed by DIT or either Council, the above figure provides context of the significant increase in capacity required on the road network to accommodate future traffic volumes if development of all land in Greater Edinburgh Parks is realised.

3.0 EXISTING SITUATION

The investigation surrounds sites located at the western end of the Greater Edinburgh Parks. Figure 3.1 identifies the sites that are being investigated as part of the Code Amendment.

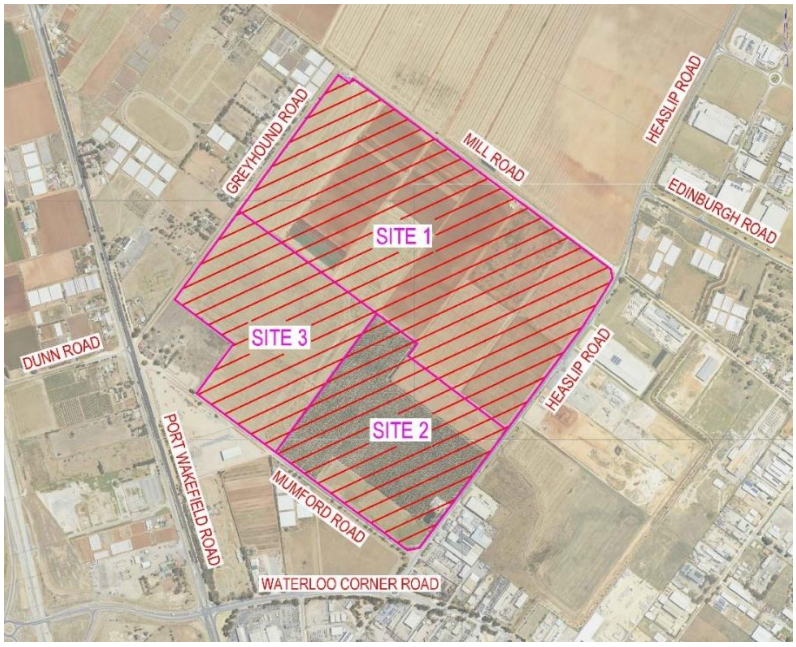

Figure 3.1: Subject land

The North-eastern portion of the subject land is located within the City of Salisbury while the balance of the land is within the City of Playford. Figure 3.2 illustrates the municipality boundaries as they relate to the subject land.

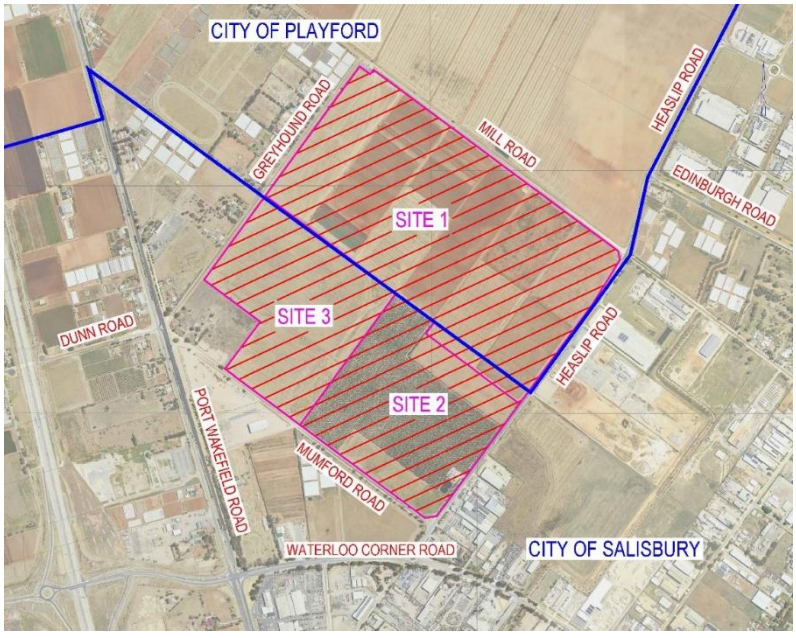

Figure 3.2: Council boundaries

3.1 ROAD NETWORK

Heaslip Road is an arterial road in the care and control of the Commissioner of Highways. The road has a two-lane carriageway with a posted speed limit of 70 km/h which transitions to 90 km/h along the frontage of the site. It has an average annual daily traffic (AADT) volume in the order of 17,400 vehicles. It is gazetted for the use of PBS Level 3A vehicles (36.5 m road trains).

Heaslip Road forms an intersection with Waterloo Corner Road to the west of the site. This intersection is treated with a roundabout. Waterloo Corner Road forms intersections with Port Wakefield Road and the North South Motorway. The Port Wakefield Road/Waterloo Corner Road intersection is treated with a traffic signal while the Waterloo Corner Road/North South Motorway intersection is treated with an interchange. East of the site, Heaslip Road forms an intersection with Womma Road and the Northern Expressway. This intersection is treated with an interchange.

The analysis undertaken for Greater Edinburgh Parks identified that the duplication of Heaslip Road will be required to cater for the forecast growth on the road associated with broader development. Accordingly, any treatment on Heaslip Road requires the consideration of the future road widening. DIT is currently investigating potential future infrastructure requirements to identify the anticipated road widening requirements along Heaslip Road. It is expected that this will include a land acquisition requirement on the subject land.

Greyhound Road intersects with Mill Road and Port Wakefield Road. All movements are permitted at the Greyhound Road/Mill Road intersection, while the Greyhound Road/Port Wakefield Road intersection is limited to left-in and left-out movements.

Mumford Road intersects with Greyhound Road and Heaslip Road. All movements are permitted at both the Mumford Road/Greyhound Road and Mumford Road/Heaslip Road intersections, albeit the Safe Intersection Sight Distance (SISD) criteria are not satisfied at the intersection with Greyhound Road.

Mill Road is located along the north-eastern edge of the site and extends north-west beyond the subject land to Calvengrove Road. It forms a four-way intersection with Heaslip Road and Diment Road where all movements are permitted. Mill Road and Diment Road are treated with Stop signage and line marking at the intersection.

4.0 CODE AMENDMENT REQUIREMENTS

The Code Amendment will result in the rezoning of approximately 120 hectares of land to Strategic Employment Zone. The type of land uses envisaged in this zone include light industrial, service trade, motor repair and other compatible businesses.

4.1 TRAFFIC FORECAST

The *Trip Generation Surveys Business Parks and Industrial Estates Analysis Report* for the Transport for New South Wales (TfNSW) identifies the following definitions for business parks and industrial estates:

> *Business parks refers to developments that permit a range of land uses in an integrated complex. The developments generally incorporate a mix of office, retail and wholesale stores, warehousing, workshops, manufacturing, light industrial, showrooms and scientific research establishments.*

The land uses described above are consistent with the anticipated uses and hence the traffic generation rates for business parks and industrial estates provide a balanced outcome when forecasting the potential traffic generation rates, namely:

- am peak hour: 0.52 trips per 100 m^2;
- pm peak hour: 0.56 trips per 100 m^2; and
- daily traffic generation rate: 4.6 trips per 100 m^2.

A developable area of 25% has been adopted based on the information in the surveyed data. Accordingly, the proposed rezoning is forecast to generate the following traffic during the peak hours:

- am peak hour: 1,560 trips per hour;
- pm peak hour: 1,680 trips per hour; and
- daily traffic: 13,800 trips per day.

It is anticipated that there will be some complementary uses within the development. Accordingly, 5% of the traffic has been identified as internal trips. As such, the following traffic is anticipated to occur via the external road network:

- am peak hour: 1,480 trips per hour;
- pm peak hour: 1,600 trips per hour;
- daily traffic: 13,100 trips per day.

4.2 DISTRIBUTION

The following traffic distribution has been adopted for the assessment:

- 20% of the traffic will occur to/from the north;
- 30% of the traffic will occur to/from the east; and
- 50% of the traffic will occur to/from the south.

The traffic will be distributed to the arterial roads adjacent to the subject site. Figure 4.1 identifies the forecast distribution for the assessment.

Figure 4.1: Forecast distribution

Figure 4.2 identifies the forecast traffic volume generated by the potential development on the land.

Figure 4.2 Forecast traffic volumes (vpd)

5.0 TRAFFIC INVESTIGATIONS

The key investigation for this site relates to the provision of vehicle accessibility to cater for the forecast traffic. In identifying access options for the land, consideration has been given to the following:

- anticipated traffic volumes;
- requirement for heavy vehicle access;
- interconnectivity between the individual sites; and
- access requirements for other land adjacent to the site.

Analysis completed as part of the investigations have considered 2036 design year with a 0.5% annual growth on the road network and the potential duplication of Heaslip Road in the design year.

5.1 ROAD NETWORK CAPACITY

The existing road network has sufficient capacity to accommodate a portion of the development. Analysis was completed to understand the area that could be developed without compromising the operation of the existing road network. The assessment was completed for the following intersections:

- Port Wakefield Road/Waterloo Corner Road intersection; and
- Waterloo Corner Road/Heaslip Road intersection.

The assessment has been undertaken with a development growth of 10 ha per year. Table 1 identifies the results of the assessment.

Table 1: Area that could be developed with existing road network infrastructure

Developable Area	Degree of Saturation	
	Port Wakefield Rd/Waterloo Corner Rd	Heaslip Rd/Waterloo Corner Rd
30 ha	0.73 (0.73)	0.81 (0.75)
40 ha	0.73 (0.76)	0.84 (0.80)
50 ha	0.76 (0.78)	0.88 (0.81)

The trigger point analysis identifies that up to 40 ha (i.e. 33%) of the subject land could be developed before the proposed signal on Port Wakefield Road is required.

In the event that Heaslip Road is duplicated before the development of the subject land, there will be additional capacity at the Heaslip Road/Waterloo Corner Road intersection as a result of the upgrade. An assessment has, therefore, been completed to identify the trigger point for the new signal on Port Wakefield Road should Heaslip Road be

duplicated before the development of the subject land progresses. Table 2 summarises the results which has been based on the 2036 design year volumes.

Table 2: Area that could be developed with the duplication of Heaslip Road

Developable Area	Degree of Saturation	
	Port Wakefield Rd/Waterloo Corner Rd	Heaslip Rd/Waterloo Corner Rd
30 ha	0.75 (0.77)	0.68 (0.76)
40 ha	0.76 (0.79)	0.70 (0.79)
50 ha	0.78 (0.81)	0.72 (0.82)
60 ha	0.80 (0.83)	0.74 (0.84)
70 ha	0.82 (0.85)	0.76 (0.86)

The above assessment identifies that if Heaslip Road is upgraded, approximately 70 ha (i.e. 58%) of the land could be developed before a signal on Port Wakefield Road is triggered.

5.2 PORT WAKEFIELD ROAD

5.2.1 PORT WAKEFIELD ROAD/GREYHOUND ROAD/DUNN ROAD INTERSECTION

The above analysis confirms that there will be insufficient capacity on the road network to realise the full potential of the subject land. Preliminary investigations also identifies that there will be insufficient frontage to create the acceleration and deceleration lanes required to facilitate an unsignalised intersection on Port Wakefield Road due to the existing adjacent intersections.

Based on the above, it has been identified that a signalised intersection will be required on Port Wakefield Road to adequately cater for the forecast traffic. In order to minimise any impact associated with the future signal, the following were considered in identifying its location:

- appropriate separation to Port Wakefield Road/Waterloo Corner Road intersection;
- the ability to service development on both sides of Port Wakefield Road; and
- minimal impact on adjacent existing and planned intersections.

The current road alignment effectively results in the intersection of the Greyhound Road and Mumford Road road reserves terminating at an acute angle at Port Wakefield Road opposite Dunn Road. This scenario is currently addressed through turning restrictions to reduce the conflict associated with the angle and the five roads within the intersection.

The Code Amendment provides an opportunity to realign Greyhound Road and create a four-way signalised intersection with Dunn Road. Such a treatment will not only cater for the subject development, but also provide for future developments on either side of Port Wakefield Road.

SIDRA modelling was completed to inform the required intersection layout to cater for the forecast traffic volumes. Figure 5.1 identifies a potential signal concept adopted for the modelling.

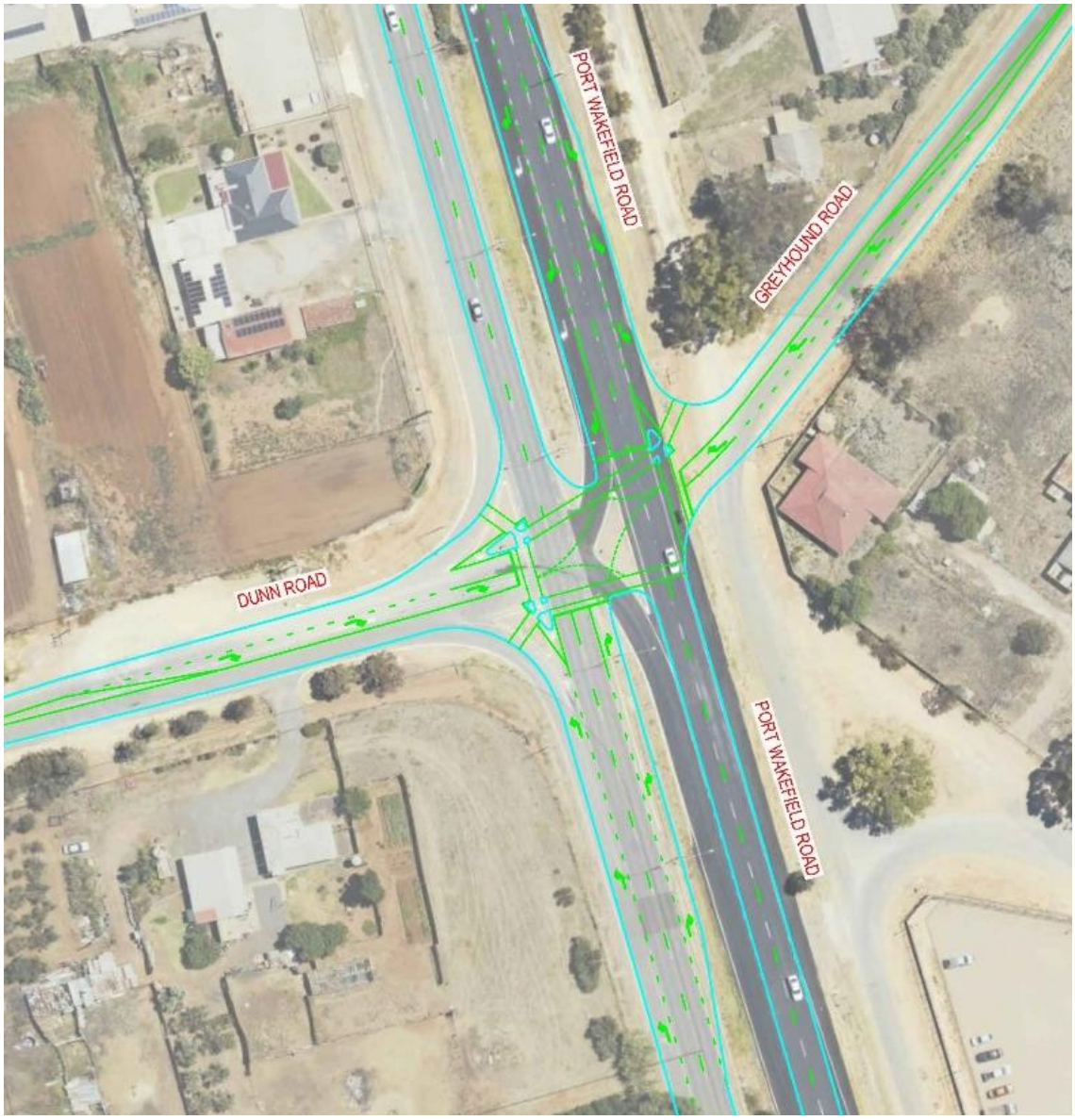

Figure 5.1: Potential signal on Port Wakefield Road

The provision of a signal will accommodate the majority of the northbound traffic and a significant portion of traffic to and from the south to limit impact on the Waterloo Corner Road/Heaslip Road intersection. Figure 5.2 identifies the forecast traffic at the proposed intersection.

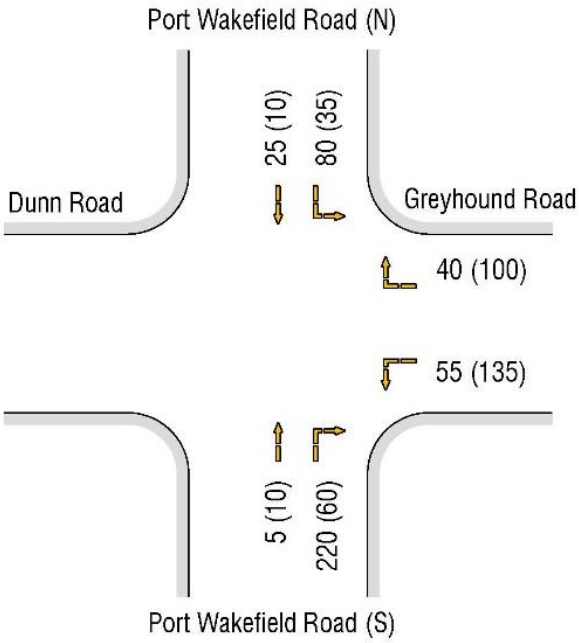

Figure 5.2: Port Wakefield Road/Greyhound Road intersection

Traffic volumes in and out of Dunn Road will be dependent on the types of developments that could be established on the adjacent land. For the purpose of this assessment nominal turning volumes to and from Dunn Road have been adopted.

Table 2 identifies the results of the modelling for the proposed signalisation of the Port Wakefield Road/Dunn Road/Greyhound Road intersection based on the above layout.

Table 2: SIDRA modelling results of the Port Wakefield Road/Dunn Road/Greyhound Road intersection

Approach	2024		2036	
	Degree of Saturation	Average Delay (s)	Degree of Saturation	Average Delay (s)
Port Wakefield Road (N)	0.64 (0.61)	41.3 (39.0)	0.64 (0.63)	41.3 (39.2)
Greyhound Road	0.63 (0.61)	63.0 (54.6)	0.63 (0.61)	56.5 (55.0)
Port Wakefield Road (S)	0.62 (0.55)	37.1 (31.3)	0.64 (0.63)	37.0 (31.0)
Dunn Road	0.43 (0.55)	45.5 (43.9)	0.43 (0.56)	45.1 (44.0)

The above results indicate that the intersection will operate well within its capacity. A review of the 95th-percentile queue lengths in the modelling identified that the forecast queues will be accommodated within the proposed storage in the design. The modelling confirms that the adopted layout will appropriately cater for the forecast traffic volumes.

The above treatment would result in Mumford Road being closed at its northern end such that it does not intersect with Greyhound Road adjacent the proposed signalised intersection. Figure 5.3 identifies the potential treatment to close Mumford Road.

Figure 5.3: Potential cul-de-sac on Mumford Road

5.2.2 PORT WAKEFIELD ROAD/WATERLOO CORNER ROAD INTERSECTION

Modelling of the Port Wakefield Road/Waterloo Corner Road intersection was completed to identify the performance of the intersection considering the potential new signal to the north.

A base case model and a 2036 model were developed and Table 3 identifies the performance of the intersection in these scenarios.

Table 3: SIDRA results of the 2024 and 2036 models of the Port Wakefield Road /Waterloo Corner Road intersection

Approach	Movement	2024		2036	
		DOS	95th-percentile Queue Length (m)	DOS	95th-percentile Queue Length (m)
Port Wakefield Road (N)	Left	0.21 (0.22)	33 (25)	0.23 (0.23)	38 (28)
	Through	0.67 (0.66)	102 (109)	0.71 (0.70)	110 (119)
	Right	0.12 (0.22)	6 (13)	0.12 (0.22)	6 (13)
Waterloo Corner Road (E)	Left	0.23 (0.28)	30 (38)	0.26 (0.30)	35 (45)
	Through	0.41 (0.67)	88 (155)	0.43 (0.71)	93 (170)
	Right	0.63 (0.64)	79 (79)	0.70 (0.72)	86 (89)
Port Wakefield Road (S)	Left	0.32 (0.35)	42 (50)	0.35 (0.38)	49 (55)
	Through	0.32 (0.35)	58 (58)	0.35 (0.38)	63 (62)
	Right	0.66 (0.65)	90 (60)	0.71 (0.70)	98 (65)
Waterloo Corner Road (W)	Left	0.67 (0.36)	150 (72)	0.69 (0.37)	161 (76)
	Through	0.67 (0.36)	151 (73)	0.69 (0.37)	162 (78)
	Right	0.09 (0.12)	10 (13)	0.10 (0.13)	11 (14)

Figure 5.4 identifies the forecast traffic volumes at the intersection associated with the potential development.

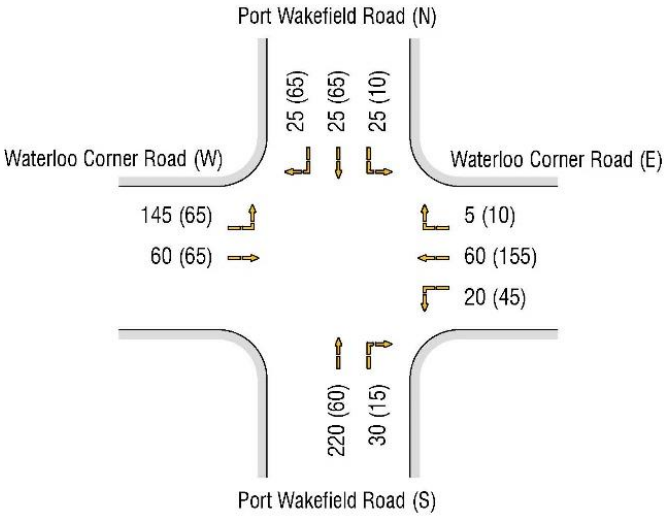

Figure 5.4: Port Wakefield Road/Waterloo Corner Road intersection

Table 4 identifies the future operation of the Port Wakefield Road/Waterloo Corner Road intersection with the potential development.

Table 4: SIDRA modelling results of the potential operation of the Port Wakefield Road/Waterloo Corner Road intersection

Approach	Movement	2024		2036	
		DOS	95th-percentile Queue Length (m)	DOS	95th-percentile Queue Length (m)
Port Wakefield Road (N)	Left	0.27 (0.26)	48 (34)	0.29 (0.27)	54 (38)
	Through	0.74 (0.78)	113 (134)	0.78 (0.82)	122 (146)
	Right	0.49 (0.79)	21 (51)	0.49 (0.79)	21 (51)
Waterloo Corner Road (E)	Left	0.25 (0.32)	35 (51)	0.27 (0.34)	41 (57)
	Through	0.43 (0.77)	100 (207)	0.45 (0.84)	105 (244)
	Right	0.77 (0.78)	87 (91)	0.82 (0.70)	41 (98)
Port Wakefield Road (S)	Left	0.57 (0.48)	105 (70)	0.63 (0.48)	101 (79)
	Through	0.57 (0.48)	110 (74)	0.63 (0.48)	121 (79)
	Right	0.77 (0.80)	105 (68)	0.82 (0.80)	116 (73)
Waterloo Corner Road (W)	Left	0.72 (0.42)	177 (77)	0.75 (0.44)	197 (84)
	Through	0.72 (0.42)	184 (95)	0.75 (0.44)	193 (101)
	Right	0.10 (0.13)	10 (14)	0.11 (0.13)	11 (14)

The above results confirm that the provision of an additional signal will minimise impact on the Port Wakefield Road/Waterloo Corner Road signal. The modelling shows that the Port Wakefield Road/Waterloo Corner Road intersection will operate within capacity

and the 95th-percentile queue lengths will be within the available storage in the existing and 2036 scenarios.

5.3 HEASLIP ROAD

5.3.1 WATERLOO CORNER ROAD/HEASLIP ROAD INTERSECTION

A base case model of the Waterloo Corner Road/Heaslip Road intersection was completed to identify the existing operation of the intersection. Table 5 summarises the results.

Table 5: SIDRA results of the existing Waterloo Corner Road/Heaslip Road model am (pm)

Approach	Degree of Saturation	95th-percentile Queue Length (m)
Waterloo Corner Rd (W)	0.41 (0.41)	64 (28)
Heaslip Road	0.37 (0.65)	25 (57)
Waterloo Corner Rd (E)	0.69 (0.42)	18 (20)

Figure 5.3 identifies the forecast additional traffic at the Waterloo Corner Road/Heaslip Road intersection.

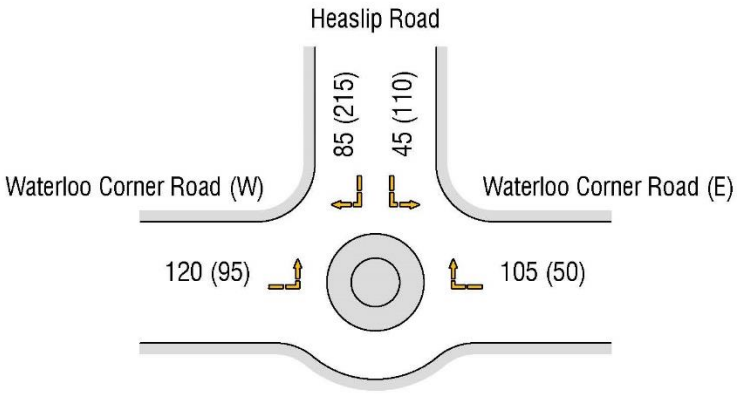

Figure 5.5: Waterloo Corner Road/Heaslip Road intersection

Table 6 identifies the modelling results of the intersection with the additional development volumes and the future operation of the Waterloo Corner Road/Heaslip Road intersection with the potential development.

Table 6: SIDRA results of the existing Waterloo Corner Road/Heaslip Road model with development volumes am (pm)

Approach	Degree of Saturation	95th-percentile Queue Length (m)
Waterloo Corner Rd (W)	0.85 (0.44)	137 (31)
Heaslip Road	0.45 (0.85)	33 (132)
Waterloo Corner Rd (E)	0.52 (0.63)	27 (38)

The above results identify that the intersection will operate within capacity. The forecast queues will not impact on adjacent intersections. Importantly, the increase in average delay will be minimal.

A 2036 model of the intersection was completed with consideration to the potential duplication of Heaslip Road. The adopted layout for the intersection considered the high left turn volume from Waterloo Corner Road to Heaslip Road. Table 7 identifies the results of the 2036 model without the forecast development volumes.

Table 7: SIDRA results of the 2036 Waterloo Corner Road/Heaslip Road model am (pm)

Approach	Degree of Saturation	95th-percentile Queue Length (m)
Waterloo Corner Rd (W)	0.61 (0.35)	14 (20)
Heaslip Road	0.38 (0.66)	21 (53)
Waterloo Corner Rd (E)	0.37 (0.36)	15 (15)

Table 8 identifies the results of the 2036 model with the forecast development volumes.

Table 8: SIDRA results of the 2036 Waterloo Corner Road/Heaslip Road model with development volumes am (pm)

Approach	Degree of Saturation	95th-percentile Queue Length (m)
Waterloo Corner Rd (W)	0.69 (0.37)	16 (22)
Heaslip Road	0.46 (0.84)	28 (110)
Waterloo Corner Rd (E)	0.45 (0.51)	22 (26)

The above results identify that the intersection will operate within capacity in 2036. The forecast queues will not impact on adjacent intersections. Importantly, the increase in average delay will be minimal.

5.3.2 HEASLIP ROAD/MILL ROAD

The Mill Road/Heaslip Road intersection is four-way and currently treated with give-way signs. Give-way treatments at the intersection would not have sufficient capacity to accommodate the forecast turning volumes and there would be a need to improve safety at this intersection.

In its investigations for the Heaslip Road upgrade, DIT has identified that a roundabout may be an appropriate form of treatment at this intersection. Such a device could be designed for the longer term solution as part of the Heaslip Road duplication but could also be considered (in a different form) in the shorter term as development triggers the need for safety treatments at intersections.

Figure 5.6 identifies the potential treatment at the intersections.

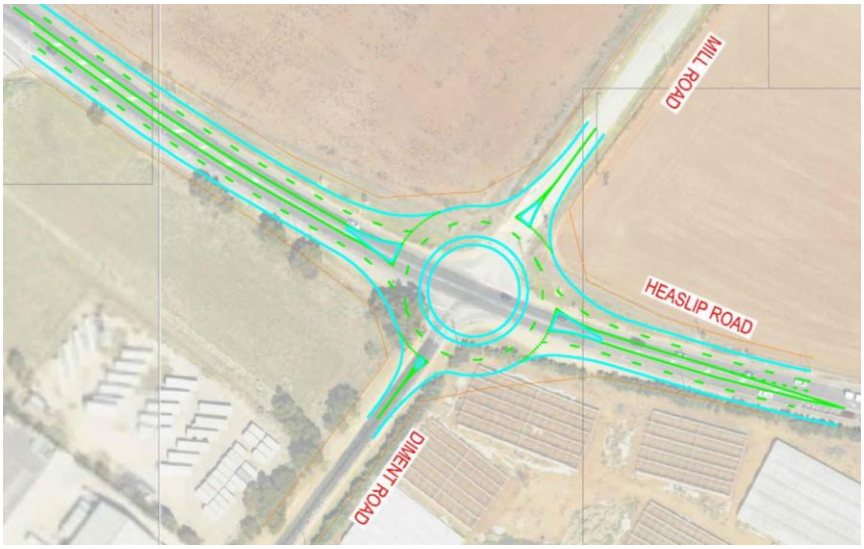

Figure 5.6 Potential roundabout at the Mill Road/Heaslip Road/Diment Road intersection

The intersection will cater for a high proportion of traffic entering to and from the east. Figure 5.7 identifies the forecast turning movements at the intersection.

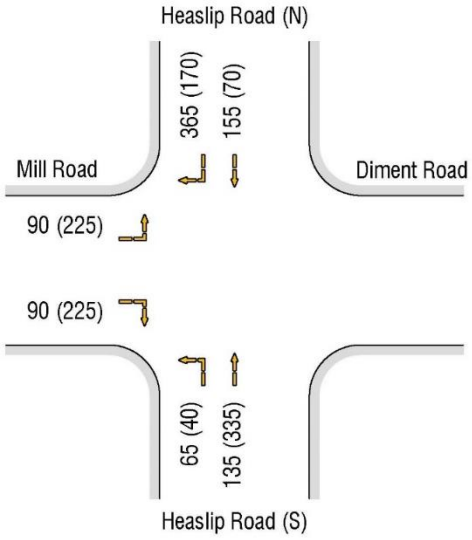

Figure 5.7: Heaslip Road/Mill Road intersection

Table 7 identifies the performance of the Mill Road/Heaslip Road/Diment Road intersection.

Table 7: SIDRA results of the Mill Road/Heaslip Road/Diment Road roundabout

Approach	Degree of Saturation	Average Delay (s)	95th-percentile Queue Length (m)
Heaslip Road (W)	0.70 (0.43)	10.3 (4.7)	92 (37)
Mill Road	0.52 (0.84)	15.9 (24.1)	24 (68)
Heaslip Road (E)	0.49 (0.65)	5.9 (7.0)	44 (77)
Diment Road	0.08 (0.13)	9.5 (11.5)	3 (5)

The above modelling identifies the forecast traffic volumes will be readily accommodated at the Mill Road/Heaslip Road/Diment Road intersection.

5.3.3 HEASLIP ROAD/MUMFORD ROAD

The Mumford Road/Heaslip Road intersection is currently an untreated T-intersection which is in close proximity to the Heaslip Road/Waterloo Corner Road intersection. Analysis of the Waterloo Corner Road intersection identified that ultimately the westbound queue would extend beyond the Mumford Road/Heaslip Road intersection.

SIDRA analysis of the Waterloo Corner Road/Heaslip Road intersection identified that the queue will obstruct drivers waiting to turn right to or from Mumford Road. This will result in potential conflict on Heaslip Road.

In addition, the increase in volumes on Heaslip Road will result in the warrant requirements for a channelised right turn lane to be provided at the intersection with Mumford Road.

While a right turn treatment could be provided, the longer term growth will likely result in the extension of a median on Heaslip Road such that the Mumford Road/Heaslip Road intersection could to be limited to left-in and left-out movements only. Figure 5.8 identifies a concept design of the Mumford Road/Heaslip Road intersection.

Figure 5.8: Concept design of the Mumford Road/Heaslip Road intersection

5.4 EXTERNAL ROAD UPGRADES

Mumford Road, Mill Road and Greyhound Road fronting the subject land will require upgrading to facilitate traffic movements associated with future development of the land. The SA Infrastructure Guidelines specifies that industrial roads should have a road width of 20.0 m and a 10.2 m sealed carriageway.

Accordingly, Mumford Road and Mill Road will require widening and sealing while Greyhound Road will be upgraded to provide a wider carriageway. Figure 5.10 identifies the concept cross section required for the upgrade of the roads.

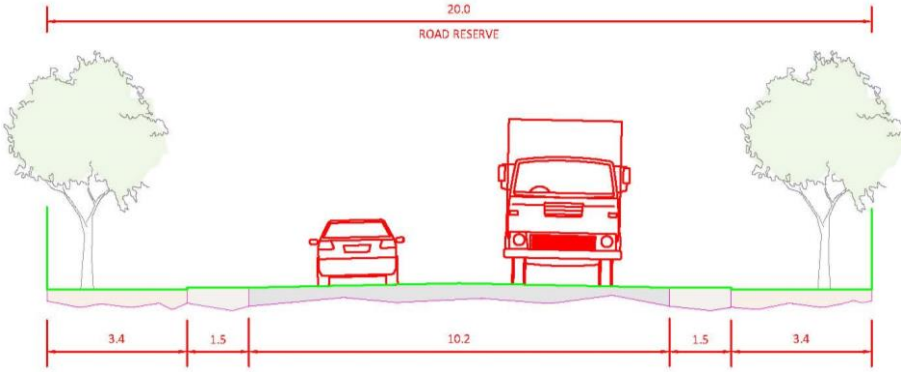

Figure 5.10: Concept cross section as per the recommendation in SA Infrastructure Guideline

5.5 ADDITIONAL ROAD NETWORK

There is potential for additional public roads to be created as part of the development of the sites, albeit whether these are realised will be heavily dependent on the ultimate development proposals. It is desirable that there be flexibility for these roads to be created to provide connectivity to the arterial road network and through the land while not compromising development opportunities.

Figure 5.11 illustrates a potential road link through the site.

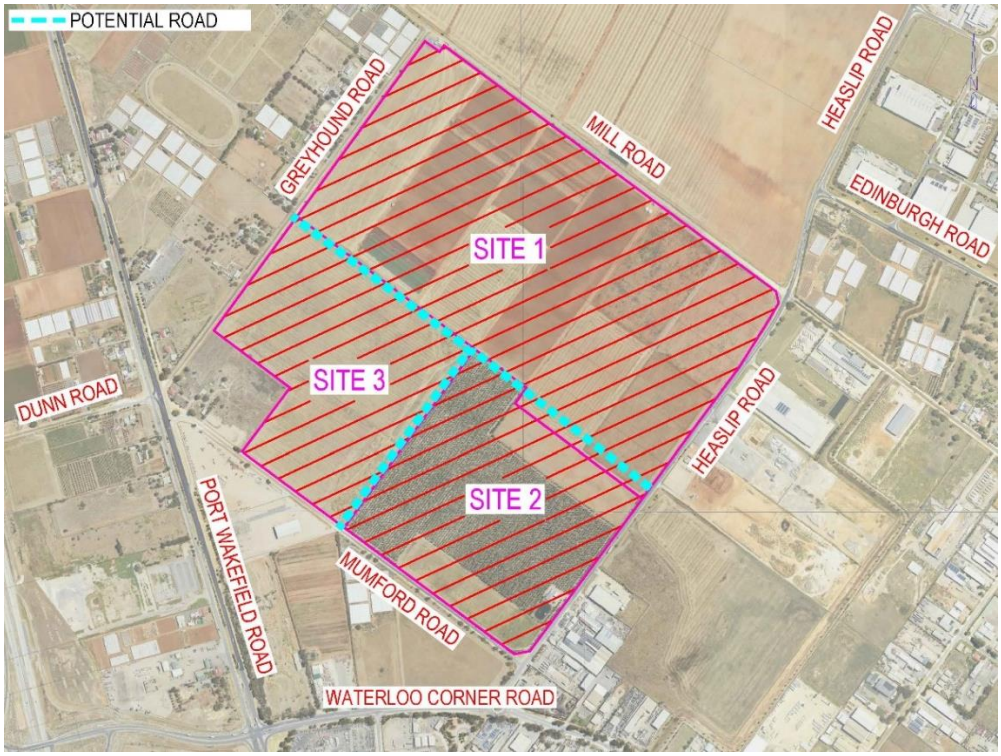

Figure 5.11: Potential road link through the site

In addition to the above, the Structure Plan illustrates possible primary access locations for road connections to the subject land. These road connections will result in intersections on adjacent roads. These intersections should be located to cater for appropriate treatment requirements and should consider existing access points on the roads.

6.0 SUMMARY

The traffic investigations associated with this Code Amendment have identified a requirement for improved infrastructure to provide for safe and convenient access and facilitate the movement of people and goods to and from the site.

The growth of broader Adelaide has necessitated the introduction of development on land previously used for low traffic generating developments which have not required infrastructure to the same specification as would now be expected.

This report has identified the need for upgraded roads and intersections to provide increased capacity and safety in the longer term. Importantly, the recommendations have been tailored to provide flexibility in how development delivery is staged and to not compromise potential future Code Amendments which will consider requirements for other land parcels in this precinct.

Consideration has also been given to staged development requirements. This is important due to the multiple land owners and relatively small parcels of land on which access for development will need to be accommodated.