

References:

Australian Standard 3959
 Building Amendment Regulations 2016
 Director of Building Control, Determinations

- Categories of Building Control and Demolition Work (July 2017)
- Requirements for Building in Bushfire Prone Areas. (July 2017)
- Application of Requirements for Building in Bushfire Prone Areas. (Feb 2017)
-

Director of Building Control (2021) Director's Determination for Bushfire Hazard Areas v1.1 2021

Substance of Certificate: (what it is that is being certified)

1. Assessment of the site Bushfire Attack Level (BAL) to Australian Standards 3959
 Assessed as - BAL 19, BAL 12.5, BAL Low
 2. Bushfire Hazard Management Plan
- Proposal is compliant with DTS requirements,
 clauses 4.1, 4.2, 4.3 & 4.4 Directors Determination Requirements for Building in Bushfire Prone Areas (v2.1)
- and Director of Building Control (2021) Director's Determination for Bushfire Hazard Areas v1.1 2021

Scope and/or Limitations

This report was commissioned to identify the Bushfire Attack Level for the existing property. All comment, advice and fire suppression measures are in relation to compliance with Planning Directive No 5.1, Bushfire-Prone Areas Code and Tasmanian Planning Scheme issued by the

Tasmanian Planning Commission, the Building Code of Australia and Australian Standards, AS 3959-2018, Construction of buildings in bushfire-prone areas.

Limitations:

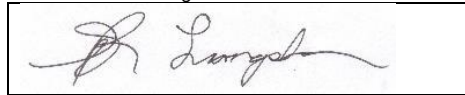
The inspection has been undertaken and report provided on the understanding that;-

1. The report only deals with the potential bushfire risk all other statutory assessments are outside the scope of this report.
2. The report only identifies the size, volume and status of vegetation at the time the site inspection was undertaken and cannot be relied upon for any future development.
3. Impacts of future development and vegetation growth have not been considered.

I certify the matters described in this certificate.

Qualified person:

Signed:



Certificate No:

SRL20/57S2

Date:

18/01/2022



NAPOLEON STREET, PERTH

RESIDENTIAL SUBDIVISION DEVELOPMENT

TRAFFIC IMPACT ASSESSMENT

DECEMBER 2021



Traffic Impact Assessment



Napoleon St, Perth Residential Subdivision Development

TRAFFIC IMPACT ASSESSMENT

- Final #2
- December 2021

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Document history and status

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Traffic Impact Assessment



1. Introduction

1.1 Background

This TIA reviews the proposal to develop Lot 1 Drummond Street, Perth (PID 9539821, Title Reference 174678/1) with a 116 residential subdivision with access via Napoleon St. The review considers the road network, road safety and impact of traffic generated by the development. This Traffic Impact Assessment (TIA) should be submitted with the development application for the proposal and has been prepared based on Department of State Growth guidelines and provides details as follows:

- Anticipated additional traffic and pedestrian movements
- The significance of the impact of these movements on the existing road network
- Any changes required to accommodate the additional traffic

1.2 Objectives

A traffic impact assessment is a means for assisting in the planning and design of sustainable development proposals that consider:

- Safety and capacity
- Equity and social justice
- Economic efficiency and the environment and
- Future development with traffic projections for 10 years

1.3 Scope of Traffic Impact Assessment (TIA)

This TIA considers in detail the impact of the proposal on the roads and intersections that will increase a significant increase in traffic activity due to the proposal. Intersections and junctions considered include:

- Haggerstone Road Roundabout
- Main Road / Youl Road junction
- Phillip Street intersections
- Edward Street junctions
- Drummond Street junctions
- Proposed northern junction with Napoleon Street
- Proposed southern junction with Napoleon Street

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1.4 References

- RTA Guide to Traffic Generating Developments – 2002
- Northern Midlands Interim Planning Scheme 2013
- Austroads Guidelines:
 - Road Design Part 4A: Unsignalised & Signalised Intersections 2021
 - Traffic Management Part 6: Intersections, Interchanges & Crossings 2020.
- Design of New Urban Networks (Traffic Engineering and Management by KW Ogden and S Y Taylor) – 1999

1.5 Statement of Qualifications and Experience

This TIA has been prepared by Richard Burk, an experienced and qualified traffic engineer in accordance with the requirements of the Department of State Growth's guidelines and Council's requirements. Richard's experience and qualifications include:

- 34 years professional experience in road and traffic engineering industry
 - Manager Traffic Engineering at the Department of State Growth until May 2017.
 - Previous National committee membership with Austroads Traffic Management Working Group and State Road Authorities Pavement Marking Working Group
- Master of Traffic, Monash University, 2004
- Post Graduate Diploma in Management, Deakin University, 1995
- Bachelor of Civil Engineering, University of Tasmania, 1987

Richard Burk

BE (Civil) M Traffic Dip Man. MIE Aust CPEng

Director Traffic and Civil Services Pty Ltd

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1.6 Glossary of Terms

AADT	Annual Average Daily Traffic - The total number of vehicles travelling in both directions passing a point in a year divided by the number of days in a year.
Acceleration Lane	An auxiliary lane used to allow vehicles to increase speed without interfering with the main traffic stream. It is often used on the departure side of intersections.
Access	The driveway by which vehicles and/or pedestrians enter and/or leave the property adjacent to a road.
ADT	Average Daily Traffic – The average 24-hour volume being the total number of vehicles travelling in both directions passing a point in a stated period divided by the stated number of days in that period.
Austroroads	The Association of Australian and New Zealand road transport and traffic authorities and includes the Australian Local Government Association.
Delay	The additional travel time experienced by a vehicle or pedestrian with reference to a base travel time (e.g. the free flow travel time).
DSG	Department of State Growth – The Tasmanian Government Department which manages the State Road Network.
GFA	Gross Floor Area
Intersection Kerb	The place at which two or more roads meet or cross. A raised border of rigid material formed at the edge of a carriageway, pavement or bridge.
km/h	Kilometres per hour
Level of Service	An index of the operational performance of traffic on a given traffic lane, carriageway or road when accommodating various traffic volumes under different combinations of operating conditions. It is usually defined in terms of the convenience of travel and safety performance.
m	Metres
Median	A strip of road, not normally intended for use by traffic, which separates carriageways for traffic in opposite directions. Usually formed by painted lines, kerbed and paved areas, grassed areas, etc.
Movement	A stream of vehicles that enters from the same approach and departs from the same exit (i.e. with the same origin and destination).
Phase	The part of a signal cycle during which one or more movements receive right-of-way subject to resolution of any vehicle or pedestrian conflicts by priority rules. A phase is identified by at least one movement gaining right-of-way at the start of it and at least one movement losing right-of-way at the end of it.

Traffic Impact Assessment



Sight Distance	The distance, measured along the road over which visibility occurs between a driver and an object or between two drivers at specific heights above the carriageway in their lane of travel.
Signal Phasing	Sequential arrangement of separately controlled groups of vehicle and pedestrian movements within a signal cycle to allow all vehicle and pedestrian movements to proceed.
SISD	Safe Intersection Sight Distance – The sight distance provides sufficient distance for a driver of a vehicle on the major road to observe a vehicle on a minor road approach moving into a collision situation and to decelerate to a stop before reaching the collision point.
Speed	Distance travelled per unit time.
85th Percentile	The speed at which 85% of car drivers will travel slower and 15% will travel faster. A control method that allows a variable sequence and variable duration of signal displays depending on vehicle and pedestrian traffic demands.
Traffic-actuated Control	A control method that allows a variable sequence and variable duration of signal displays depending on vehicle and pedestrian traffic demands.
Traffic Growth Factor	A factor used to estimate the percentage annual increase in traffic volume.
Trip	A one-way vehicular movement from one point to another excluding the return journey. Therefore, a vehicle entering and leaving a land use is counted as two trips. (RTA Guide to Traffic generating Developments).
Turning Movement	The number of vehicles observed to make a particular turning movement (left or right turn, or through movement) at an intersection over a specified period.
Turning Movement Count	A traffic count at an intersection during which all turning movements are recorded.
Vehicle Actuated Traffic Signals	Traffic signals in which the phasing varies in accordance with the detected presence of vehicles on the signal approaches.
vpd	vehicles per day – The number of vehicles travelling in both directions passing a point during a day from midnight to midnight.
vph	vehicles per hour – The number of vehicles travelling in both directions passing a point during an hour.

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2. Site Description

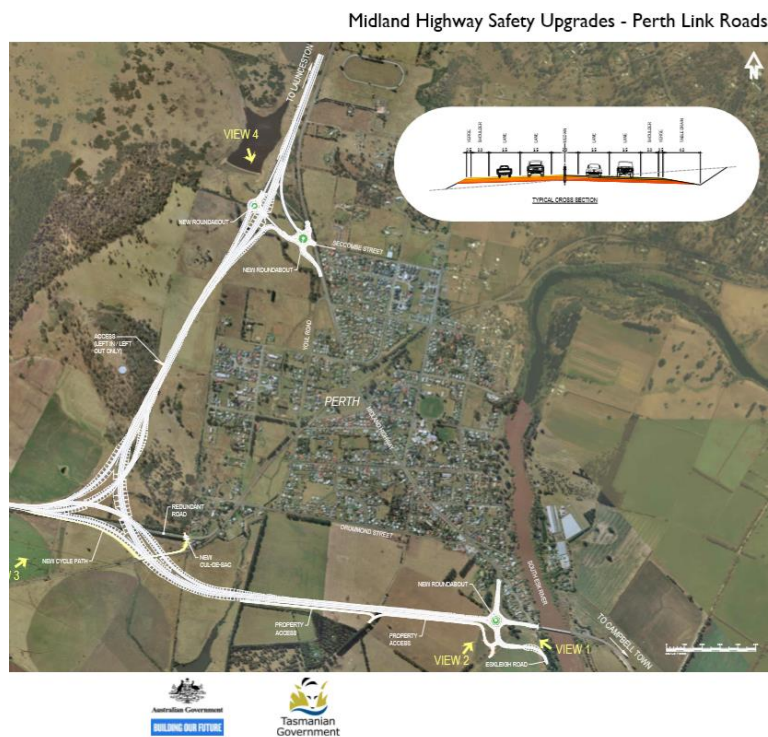
The proposed subdivision is some 17.5 km south of the Launceston CBD and within 1 km of the Perth CBD, see figure 1. The development site is between the Midlands Highway and Napoleon Street, south of Phillip St. The natural surface of the development site is undulating in nature. Figures 2 and 3 show the State Road network and Figure 4 shows the adjacent Council Road network. See Appendix G for layout plans showing Midland Highway accesses to Perth.

Figure 1 - Location of proposed development



Source: LISTmap

Figure 2 – State Road Network



Traffic Impact Assessment

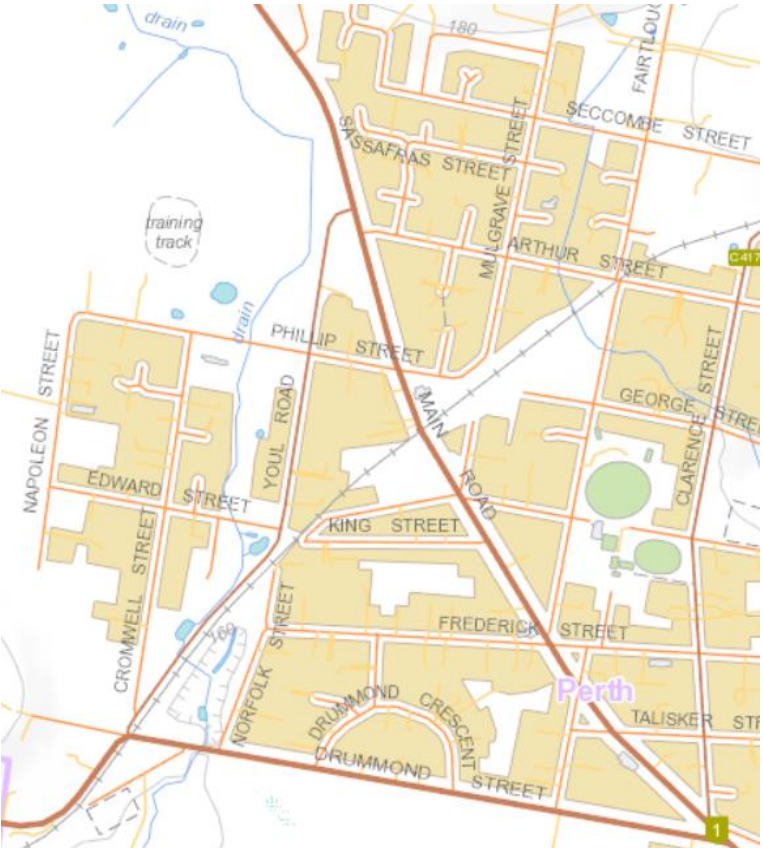


Figure 3 – State Road Network and Haggerstone roundabout connection with Perth.



Source: DSG

Figure 4 – Local road network – Haggerstone Road roundabout



Source: LISTmap

Traffic Impact Assessment

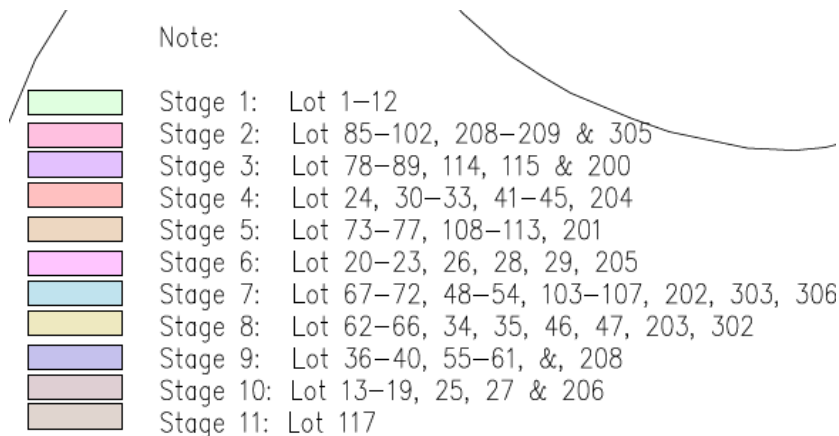


3. Proposal, Planning Scheme and Road Owner objectives

3.1 Description of Proposed Development

The proposal is to develop the Napoleon Rd property for residential use and subdivide to create 116 lots i.e lots 1-115 and 117. The parcel of land is approximately 13 Hectares in area. The development proposal includes a range of lot sizes, from 800m² to 1 Ha in area. See Figures 5a, 5b and 5c for proposed design plans. See Appendix B for complete site plans.

Figure 5a – Proposed development showing northern junction with Napoleon Street



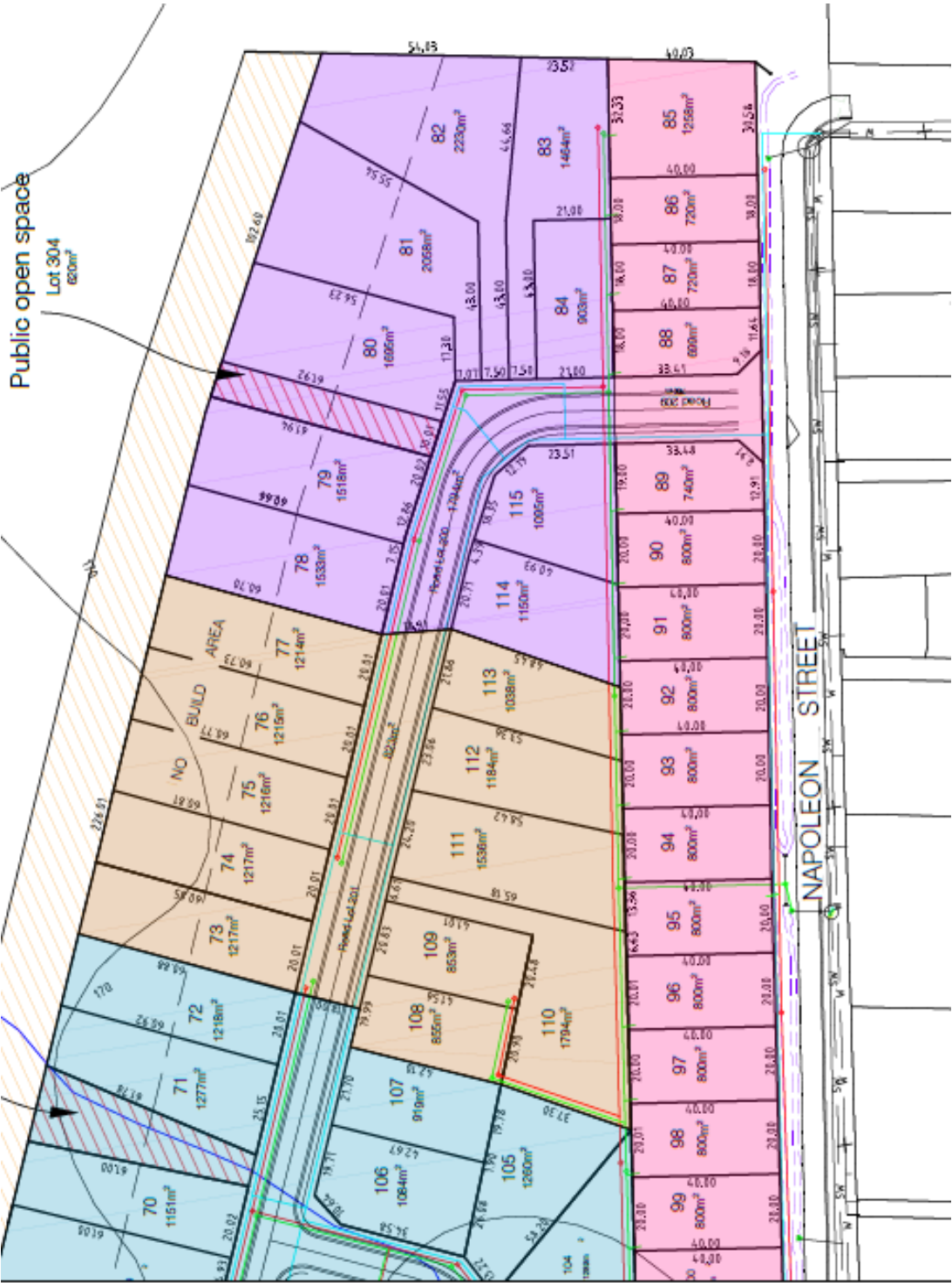
Any stage to be in any order

All Road Reserve to be a minimum of 18.0m Wide

Traffic Impact Assessment



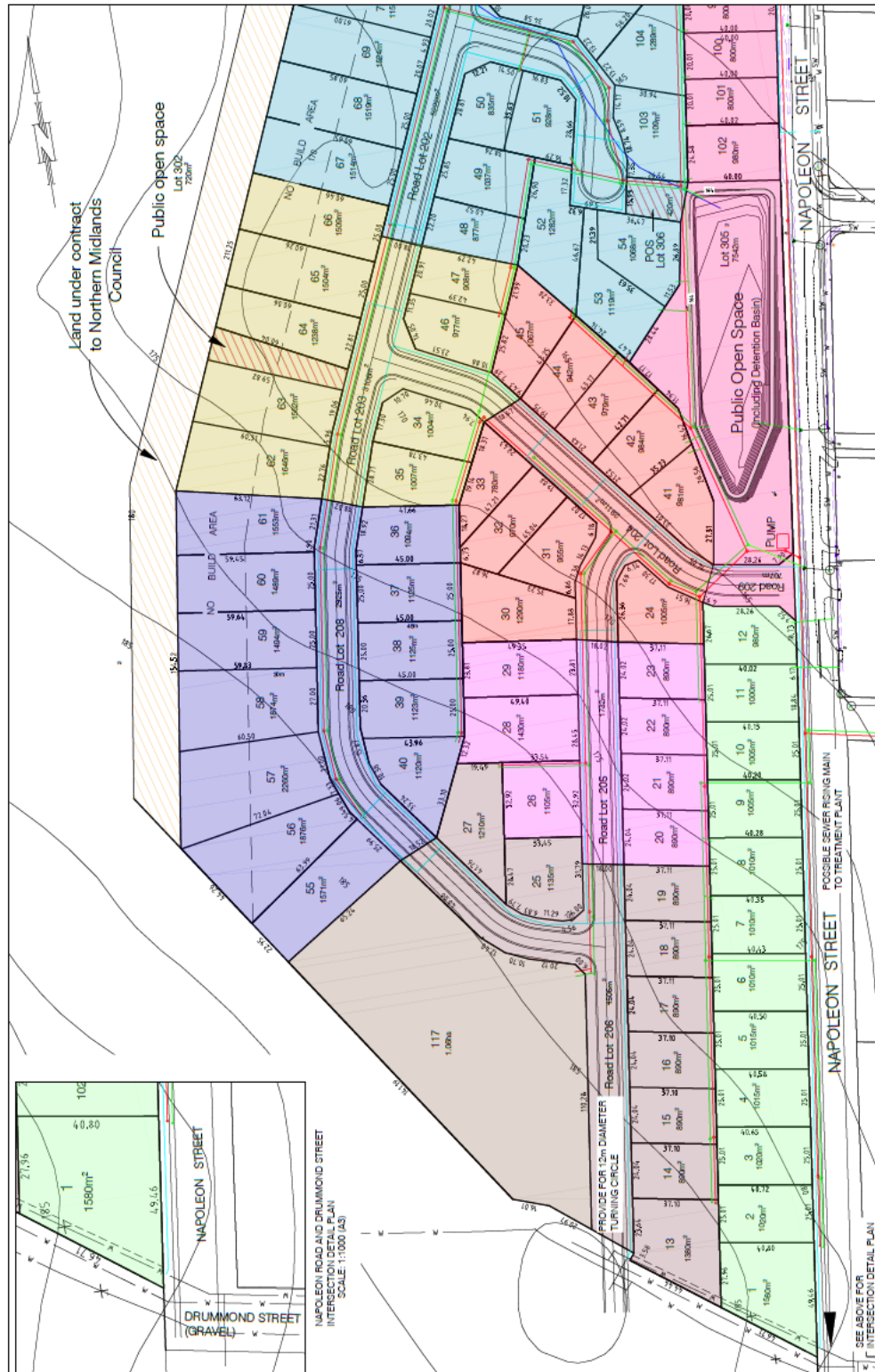
Figure 5b– Proposed development showing northern junction with Napoleon Street



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Figure 5c – Proposed development showing southern junction with Napoleon Street



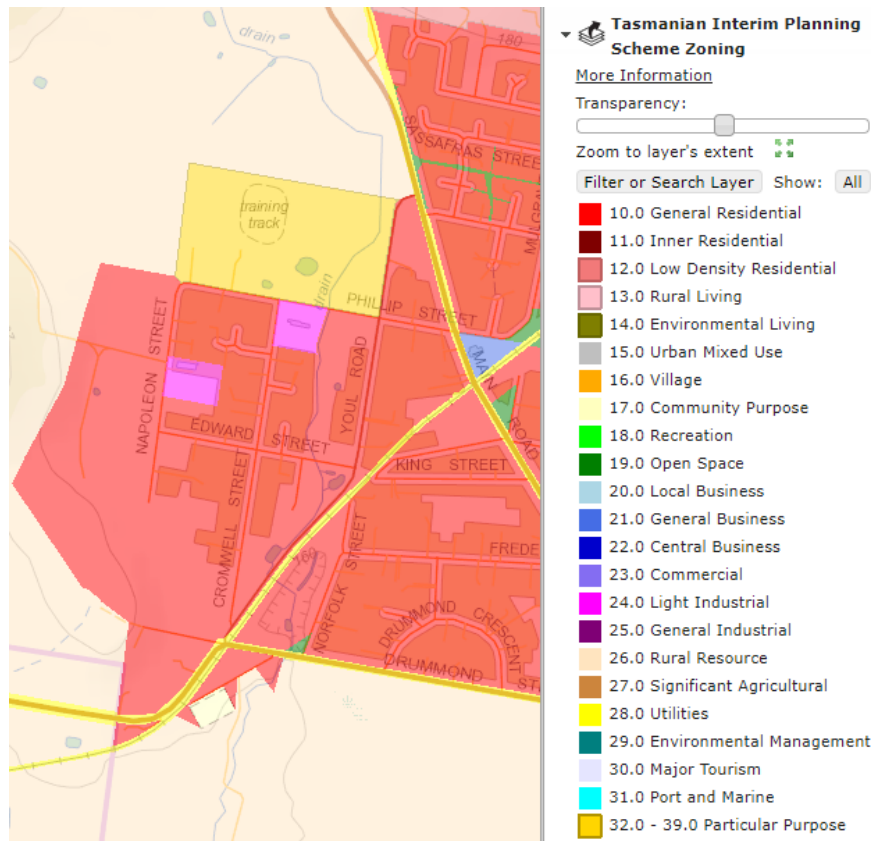
Traffic Impact Assessment



3.2 Council Planning Scheme

Northern Midlands Interim Planning Scheme 2013 land use zoning is shown in Figure 6.

Figure 6 – Proposed development site is zoned General Residential



Source: LISTmap

3.3 Local Road Network Objectives

The Northern Midlands Council Strategic Plan 2016-2026 outlines the future strategic directions for the Northern Midlands Municipality. The plan assists Council's future planning and aligns with the following Strategic Objectives in the plan:

- Ensure the provision and maintenance of an efficient and effective infrastructure network
- Encourage the sustainable growth and prosperity of the region

As of June 2020, the original Midlands Highway (now Haggerstone Road), Main Road Perth, Youl Road and Drummond Street are classified as Council roads.

Traffic Impact Assessment



3.4 State Road Network Objectives

The State Road authority (Department of State Growth) objectives are to maintain traffic safety and transport efficiency since the recent implementation of the Perth Bypass. Appendix G shows the Midlands Highway accesses to Perth. Figure 7 shows the western side of Perth, and the proposed development site is indicated.

Figure 7 – Development site relative to the Midlands Hwy / Illawarra Rd Interchange.

Midland Highway Safety Upgrades - Perth Link Roads



Source: DSG

Traffic Impact Assessment



4. Existing Conditions

4.1 Transport Network

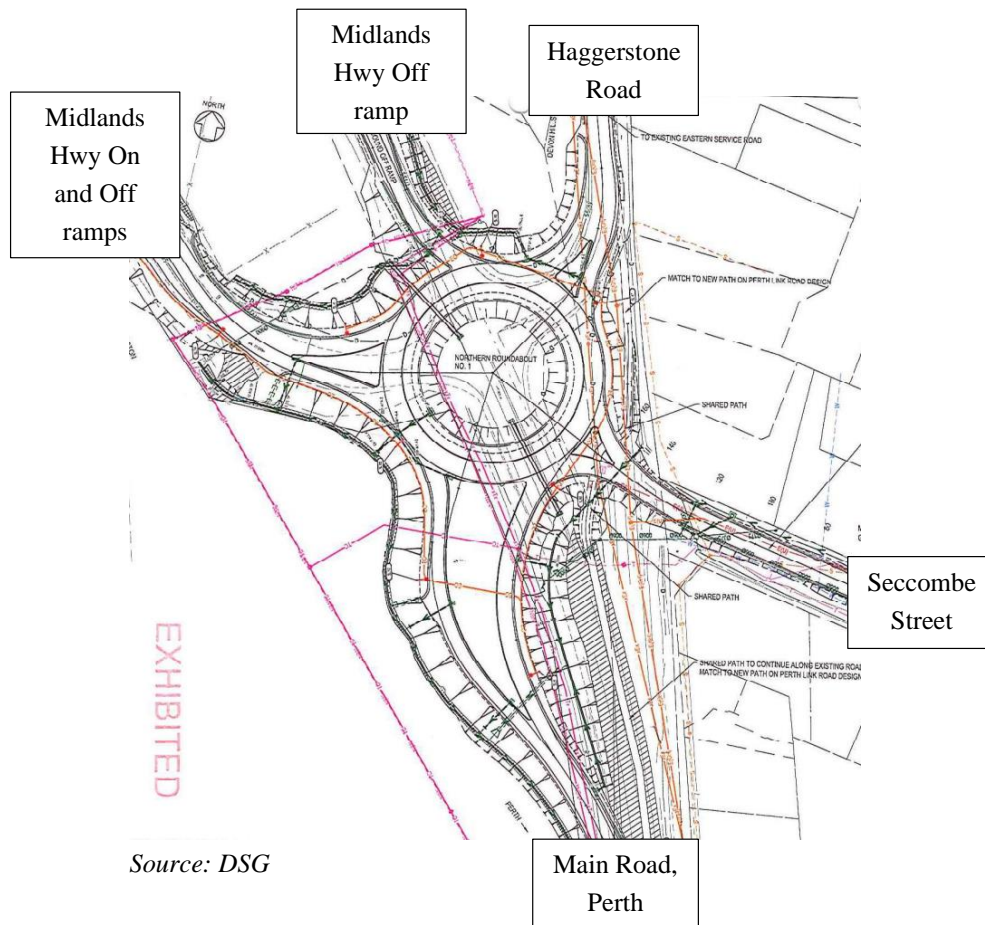
The proposal primarily impacts the Council Road network including the Haggerstone Road roundabout, Main Road, Youl Road, Phillip St, Edward St, Napoleon St and Drummond Street, Perth.

As the Haggerstone Road Roundabout is between the development site and the population centroid of the Tamar Valley (Launceston), it is anticipated it will experience commuter traffic due to the proposal.

4.1.1 Haggerstone Roundabout

With the Perth bypass completion in February 2020, the Haggerstone roundabout was installed to manage traffic at the northern access with Perth, see Figure 8. The roundabout has a single circulating lane and five legs however the eastern leg (Seccombe Street) has not yet been connected to the residential enclave to the east, Figures 9-12 show the active approaches. See Appendix F for roundabout design plan details.

Figure 8 – Haggerstone Roundabout, North of Perth.



Traffic Impact Assessment



Figure 9 – Midland Highway Off ramp approach to the Haggerstone roundabout



Figure 10 – Haggerstone Road Northern approach to the Haggerstone roundabout



Figure 11 – Main Road Southern approach to the Haggerstone roundabout



Figure 12 – Midland Highway Western approach to the Haggerstone roundabout



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4.1.2 Phillip Street

Phillip Street is intersected by Main Rd and Youl Rd and extends West to Napoleon Street. The road is typically 6.8m wide with no line marking and some streetlighting at intersections. The default urban speed limit of 50km/h applies.

4.1.3 Main Road / Phillip Street Intersection

The line marking at this Give Way controlled cross intersection with Main Street is in poor condition. Figures 13-15 show the nature of the intersection and available sight distances.

Figure 13 – Aerial view of the Main Road / Phillip Street intersection



Source: LISTmap

Figure 14 – View right (south) along Main Road from Phillip St



Sight distance
right is 200m.

Figure 15 – View left (North) along Main Road from Phillip St



Sight distance
left is 200m.

Trim trees to
maintain sight
distance.

Traffic Impact Assessment



4.1.4 Youl Road / Phillip Street Intersection

The line marking at this Give Way controlled cross intersection with Youl Road is in poor condition. The nature of the intersection and the sight distances are shown in figures 16-19.

Figure 16 – Aerial view of the Youl Road / Phillip Street intersection



Source: LISTmap

Figure 17 – Looking right (south) along Youl Rd from Phillip St



Sight distance
right is >200m

Figure 18 – Looking left (north) along Youl Rd from Phillip St



Sight distance
left is >200m

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Figure 19 – Western approach to Youl Rd/ Phillip St intersection



Approach sight distance to the intersection is over 100m.

4.1.5 Phillip Street / Cromwell Street junction

This junction is adequately managed and delineated.

4.1.6 Phillip Street / Napoleon Road Corner

This corner is reasonably delineated with guideposts and a hazard board for west bound traffic, a streetlight but no “corner” warning sign.

Kerb and channel is provided adjacent the developed subdivision with a 1.5m footpath installed for the length of Napoleon Street and Phillip Street. The road width is typically 7m from face of kerb to edge of road. There is a wide gravel shoulder on the north side of Phillip Street. Figures 20 - 22 show the nature of the corner.

Figure 20 – Aerial view of the Phillip Street / Napoleon Street corner



Source: LISTmap

Traffic Impact Assessment



Figure 21 – Phillip Street westbound approach to Napoleon Street



A Hazard board is provided for Phillip Street traffic approaching Napoleon Street

Figure 22 – Napoleon Street northbound approach to Phillip Street



4.1.7 Edward Street

Edward Street has a new seal, streetlights at each junction and is typically 9.6m wide with kerb and channel installed adjacent the developed land. Footpath is provided on the north side of the road for the length of the new subdivision.

4.1.8 Youl Road / Edward Street Junction

The Edward / Youl Road junction is in average condition with faded line marking. Figures 23-25 show the nature of the junction and available sight distances.

Traffic Impact Assessment



Figure 23 – Aerial view of the Youl Road / Edward Street junction



Source: LISTmap

Figure 24 – Looking right (south) along Youl Road from Edward Street



Sight distance
right is >200m

Figure 25 – Looking left (north) along Youl Road from Edward Street



Sight distance
left is 200m.

Tree trimming
is required to
maintain sight
lines.

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4.1.9 Edward Street / Cromwell Street Intersection

The proposal will minimally impact this intersection which has adequate delineation.

4.1.10 Edwards Street / Napoleon Street Junction

This junction is unsealed on the Napoleon Street southern approach which is a No Thru road. The junction has a hazard board and guideposts for delineation. The sealed approaches operate as the through road, there is no line marking or regulatory signs. There is a footpath on the north side of Edward Street adjacent the kerb. Figures 26-30 show the situation.

Figure 26 – Aerial view of the Edward Street / Napoleon Street junction



Source: LISTmap

Figure 27 – Edward Street eastern approach to Napoleon Street



Figure 28 – Napoleon Street northern approach to Edward Street



Traffic Impact Assessment



Figure 29 – Napoleon Street southern approach to Edward Street



Figure 30 – looking right (east) along Edward street from Napoleon Street, south



4.1.11 Youl Road

Youl Road has a collector function catering for traffic activity between Main Road and the west Perth residential precinct. The seal is in average condition, with a typical width of 5.6m and gravel shoulders either side. The centreline is in average condition. Youl Road is currently being upgraded by Council. Technically Youl Road is part of Tasmania's 26m B Double Network, see Appendix C, it is anticipated that the road will be limited to General Access in future.

4.1.12 Youl Road / Drummond Street junction

The Youl Road / Drummond Street junction has experienced a substantial reduction in traffic due to the Perth Bypass. Drummond Street now functions as a residential street. The level crossing at the western end of Youl Road is signalised, line marked and negligibly impacted by the proposal. Figures 31-35 show the situation and available sight distances.

Future traffic activity will be at low levels and no traffic capacity or safety issues as the situation is low risk due to low traffic volume, adequate standard and low traffic speed.

Traffic Impact Assessment



Figure 31 – Aerial view of the Youl Road / Drummond Street intersection



Source: LISTmap

Figure 32 – Eastern approach to Youl Road / Drummond Street junction



**Approach sight
distance is >200m**

Figure 33 – Northern approach to Youl Road / Drummond Street junction



**Approach sight
distance is >200m**

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Figure 34 – Looking left (east) along Drummond Street from Youl Road



Sight distance
left is >200m

Figure 35 – Looking right (south) along Drummond Street from Youl Road



Sight distance
right is 200m

4.1.13 Youl Rd / Cromwell St Junction

This junction provides access to Youl Road, Drummond Street, Main Road and the Midland Highway roundabout at the southern end of Perth so will attract some traffic, in the order of 15 vph due to the proposal but will have negligible impact. The junction line marking is faded. Figures 36-39 show the nature of the junction and available sight distances.

Figure 36 – Aerial view of the Youl Road / Cromwell Street junction



Source: LISTmap

Traffic Impact Assessment



Figure 37 – Looking right along Youl Road from Cromwell Street



**Sight distance
right is 200m**

Figure 38 – Looking left along Youl Road from Cromwell Street



**Sight distance
left is 200m**

Figure 39 – Cromwell Street approach to Youl Road



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**4.1.14 Main Road**

Main Road is the arterial road through Perth CBD. Main Road has a trafficable width of 7.7m, with on street parking available along its length. There are roundabouts at both ends which provide access to the Midland Highway. Main Road is a part of Tasmania's 26m B Double network, see Appendix C.

4.1.15 Main Road / Drummond Street Junction

Activity at this junction has been reduced by the Perth bypass. Figure 40 shows the junction arrangement. Future traffic activity will be at low levels and no traffic capacity or safety issues as the situation is low risk being low traffic volume, adequate standard and low speed.

Figure 40 – Aerial view of the Main Road / Drummond Street junction



Source: LISTmap

4.1.16 Main Road / Youl Road Junction

While traffic activity at this junction has been substantially reduced by the Perth bypass, the proposal will introduce traffic. From Figure 56 section 6.1.4, and figure 60 of this report the current channelised junction layout needs to be retained. Figure 41 shows the junction layout.

Figure 41 – Aerial view of the Main Road / Youl Road junction



Source: LISTmap

Traffic Impact Assessment



4.1.17 Napoleon Street / Proposed northern Junction

Visibility for this proposed junction is shown in Figures 42-46.

Figure 42 – Aerial view of the Napoleon Street / Proposed northern junction



Source: LISTmap

Figure 43 – Looking right along Napoleon Street from proposed northern junction



Sight distance
right is 200m

Figure 44 – Looking left along Napoleon Street from proposed northern junction



Sight distance
right is 80m

Traffic Impact Assessment



Figure 45 – Looking left along the Napoleon Street surface drain



Figure 46 – Looking south along the Napoleon Street surface drain



4.1.18 Napoleon Street / Proposed southern Junction

Visibility for this proposed junction is shown in Figures 47-49.

Figure 47 – Aerial view of the Napoleon Street / Proposed southern junction



Source: LISTmap

Traffic Impact Assessment



Figure 48 – Looking right along Napoleon Street from proposed southern junction



**Sight distance
right is 32m to the
end of the road.**

Figure 49 – Looking left along Napoleon Street from proposed southern junction



**Sight distance
left is 200m**

Traffic Impact Assessment



4.2 Traffic Activity

Traffic counts were conducted by TCS in July 2020 at the Haggerstone Road roundabout, see Appendix A. AADT is summarised below, see figure 50 for detailed peak hour activity.

Main Road:	5,440 vpd
Midland Hwy Off Ramp:	2,520 vpd
Midland Hwy On ramp:	2,430 vpd
Haggerstone Road:	190 vpd

Figure 50 – Haggerstone Roundabout Peak Hour traffic data summary 2020

Roundabout Leg	AM	PM
Main Rd NB	300	176
Main Rd SB	170	442
Midland Hwy Off ramp	134	370
Midland Hwy On Ramp	318	168
Haggerstone Rd NB	6	10
Haggerstone Rd SB	12	10

Estimated traffic activity on other Council Roads based on existing development:

Phillip Street:	600 vpd , 60 vph
Edwards Street:	500 vpd , 50 vph
Napoleon Street:	100 vpd , 10 vph
Youl Road:	1,200 vpd, 120vph

4.3 Crash History

The Department of State Growth is supplied with reported crashes by Tasmania Police. The Department maintains a crash database from the crash reports which is used to monitor road safety, identify problem areas and develop improvement schemes. 5 Year reported crash histories (as of Sept 2020) and locations are summarised in the following Figures 51 and 52.

As traffic activity patterns have changes since the Perth Bypass the past crash history is no longer an indicator of future crash propensity. The key observations are:

- 5 crashes involving Drummond / Youl Junction with 2 minor & 3 PDO
- 5 crashes involving Midland Hwy (Main Rd) / Youl Junction with 2 minor & 3 PDO
- No crashes were reported involving Napoleon Street.
- Minimal crashes at the other council road intersections and junctions.

The crash rate on Youl Road is expected to reduce with the changed and expected traffic activity and roadworks by Northern Midlands Council which will improve traffic safety.

Traffic Impact Assessment



Figure 51 – Crash data summary

ID	Description	Date	Time	Severity	Light	Location	Units
895004	131 - Vehicles in same lane/ left rear	06-Aug-2015	16:15	PDO	Daylight	Int Midland Hwy and Youl Rd	LVx2
1117896	110 - Cross traffic	19-Nov-2015	16:30	Minor	Daylight	Int Drummond St/Youl Rd	LVx2
1409851	131 - Vehicles in same lane/ left rear	12-Feb-2016	07:00	Minor	Daylight	Int Midland Hwy and Youl Rd	LV&HV
1574458	139 - Other same direction (inc. veh. rolling b/wards)	29-Mar-2016	00:01	FA	Darkness	Int Edward St and Youl Rd	LVx2
1858444	171 - Left off c/way into object or parked vehicle	09-Jul-2016	22:30	PDO	Darkness	Youl Rd	LV
1991848	181 - Off right bend into object/parked vehicle	03-Jan-2017	12:56	FA	Daylight	Youl Rd	LV
2005156	130 - Vehicles in same lane/ rear end	07-Feb-2017	17:45	PDO	Daylight	Int Drummond St/Youl Rd	LVx2
49122082	110 - Cross traffic	26-Dec-2017	13:35	PDO	Daylight	Int Drummond St/Youl Rd	LVx2
49159659	132 - Vehicles in same lane/ right rear	17-Mar-2018	16:30	PDO	Daylight	Int Main Rd/Phillip St	LVx2
49241693	130 - Vehicles in same lane/ rear end	08-May-2018	07:00	PDO	Dawn	Int Drummond St/Youl Rd	LVx2
49415964	110 - Cross traffic	16-Jul-2018	12:50	PDO	Daylight	Int Main Rd/Phillip St	LVx2
49887797	131 - Vehicles in same lane/ left rear	14-Aug-2018	16:30	Minor	Daylight	Int Midland Hwy and Youl Rd	LV&HV
49498109	110 - Cross traffic	15-Aug-2018	12:28	Minor	Daylight	Int Drummond St/Youl Rd	LV&HV
49651150	130 - Vehicles in same lane/ rear end	26-Oct-2018	06:10	PDO	Daylight	Int of Midland Hwy/Youl Rd	LVx2
49758184	131 - Vehicles in same lane/ left rear	23-Dec-2018	15:30	PDO	Daylight	Int Main Rd/Phillip St	LVx2
50071376	179 - Other straight	09-Jun-2019	12:20	PDO	Daylight	Youl Rd	LV
50137940	131 - Vehicles in same lane/ left rear	18-Jul-2019	06:30	PDO	Dawn	Int Midland Hwy and Youl Rd	LVx2
50187138	110 - Cross traffic	06-Aug-2019	15:05	Minor	Daylight	Int Phillip St/Youl Rd	LVx2

PDO | Property Damage Only
 FA | First Aid
 LV | Light Vehicle
 HV | Heavy Vehicle

Figure 52 – Crash Locations



Traffic Impact Assessment



4.4 Services

The proposal does not appear to disaffect above or below ground services.

4.5 Road Safety Review

From Road Safety Review of Napoleon Street and the local road network connecting to the Midlands Highway, the following hazards have been observed:

- Napoleon Street south of the Edward Street junction is unsealed
- Phillip - Napoleon Street bend is sharp with limited forward sight distance (38m)

4.6 Safe System Assessment

Napoleon Street has been assessed in accordance with the Austroads Safe System assessment framework. This framework involves consideration of exposure, likelihood and severity to yield a risk framework score. High risk crash types and vulnerable road user crash types are assessed for each site and aggregated to provide an overall crash risk. Crash risk is considered in terms of three components:

- Exposure (is low where low numbers of through and turning traffic) i.e. 1 out of 4
- Likelihood (is low where the infrastructure standard is high) i.e. 1 out of 4
- Severity (is low where the speed environment is low) i.e. 1 out of 4

The Austroads Safe System Assessment process enables the relative crash risk of an intersection or road link to be assessed. Vulnerable Road users are considered along with the most common crash types.

The crash risk score indicates how well the infrastructure satisfies the *safe system objective which is for a forgiving road system where crashes do not result in death or serious injury*.

From safe system assessment, see figure 53 and 54, Napoleon Street is determined to be well aligned with the safe systems objectives with a crash risk score of 18/448 which is a very low crash risk situation.

Figure 53 – Safe Systems Assessment Crash Score Risk guide

<40/448	Very low risk score
(40-80)/448	Low risk score
(80-180)/448	Moderate to high risk score
>180/448	High risk score
NS	Not suitable

Traffic Impact Assessment



Figure 54 – Napoleon Street Safe Systems Assessment

Safe System Assessment			Napoleon Street Existing situation					
Exposure		Run-off-road Low Traffic Volume	Head-on Low Traffic Volume	Existing Junctions Low Traffic Volume	Other Low Heavy Vehicle Use - 1%	Pedestrian Some Pedestrian Activity	Cyclist Low volumes	Motorcyclist Low volumes
Likelihood	Justification (AADT 529vpd)							
	Score / 4	1	1	1	1	2	1	1
	Justification	Adequate road width, kerb and channel on east side, wide shoulders on west, guideposts for delineation, no edge line	Adequate road width, kerb and channel on east side, wide shoulders on west, guideposts for delineation, no centreline	Good sight distance	Adequate road width, kerb and channel on east side, wide shoulders on west, guideposts for delineation, no centreline	Footpath installed adjacent kerb and channel on east side of road	No specific facilities provided	Good consistent road surface condition, no hazards in clearzone, good forward sight distance
Severity	Score / 4	1	1	1	1	1	2	1
	Justification (50km/h speed environment)	low speed, no roadside hazards	low speed, no roadside hazards	low speed, no roadside hazards	low speed, no roadside hazards	moderate to high speed for pedestrians	moderate to high speed for cyclists	moderate speed for motorcyclists
	Score / 4	1	1	1	1	3	3	2
Product	Total Score /64	1	1	1	1	6	6	2
	Total /448							18

Traffic Impact Assessment



5. Traffic Generation and Assignment

This section of the report describes how traffic generated by the proposal is distributed within the adjacent road network now and in ten years (2031).

5.1 Traffic Growth

The rate of background traffic growth on local arterial roads for projection purposes is assumed to be 1% to allow for future infill development due to other development.

- Estimated AADT (2021) - Main Road – 5,440vpd
- Estimated AADT (2031) - Main Road – 6,009vpd

5.2 Trip Generation

The proposal results in lots of the following sizes:

- 110 lots each of area < 1380m² with dwelling houses generating 9 vpd / house i.e 990vpd and 94 vph.
- 5 lots each of area 1380-1800m² with stratum subdivision potential for 16 medium density units generating 6 vpd /unit i.e. 96vpd and 10 vph.
- 1 lot of area 1.06 Ha with stratum subdivision potential for 12 high density units generating 4 vpd /unit i.e. 48vpd and 5 vph.

In aggregate traffic generation is estimated at 1134 vpd and 109 vph.

- It is estimated 20% of traffic will remain on the internal local road network within Perth i.e 226 vpd and 22 vph.
- It is estimated 80 % of traffic will transfer to the external state road network outside Perth i.e 908 vpd and 87 vph.

It is estimated that the external traffic will split evenly between Phillip Street and Edward Street and then travel via the Youl / Main Road junction and Haggerstone Roundabout.

Estimated traffic activity once fully developed is:

- Napoleon Street: 567 vpd and 55vph at both ends plus existing traffic(100vpd)
- Phillip Street: 567 vpd and 55vph at eastern end plus existing traffic (600vpd)
- Edward Street: 567 vpd and 55 vph at eastern end plus existing traffic (500vpd)
- Youl Road : 908 vpd and 87 vpd at northern end plus existing traffic (1,200 vpd)
- Main Road : 908 vpd and 87 vpd at northern end plus existing traffic (5,440 vpd)

This is consistent with Traffic Generation Rates for Key Land Uses sourced from the RTA Guide to Traffic Generating Developments under section 1.4 References.

Traffic Impact Assessment

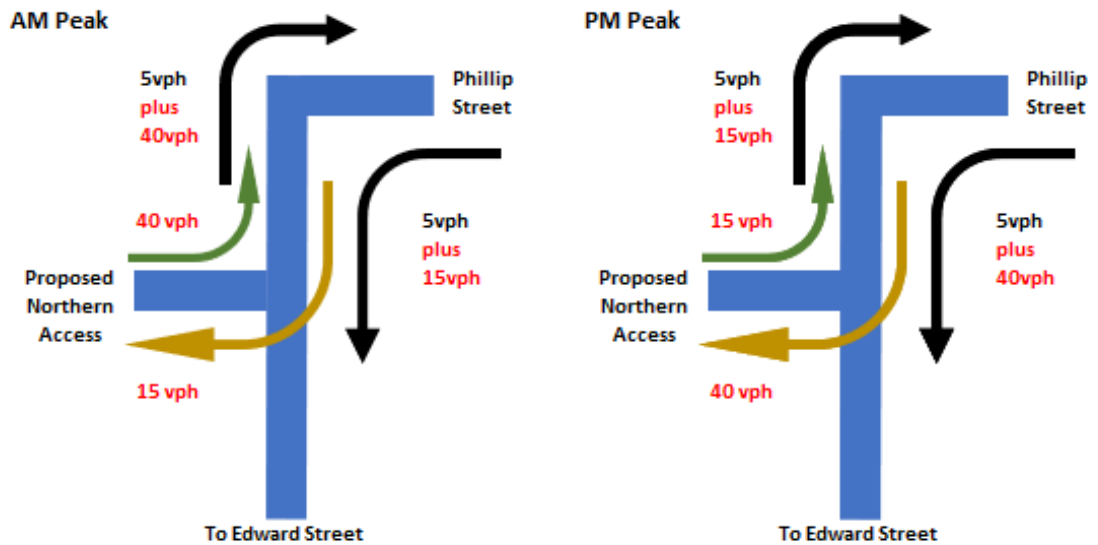


5.3 Trip Assignment

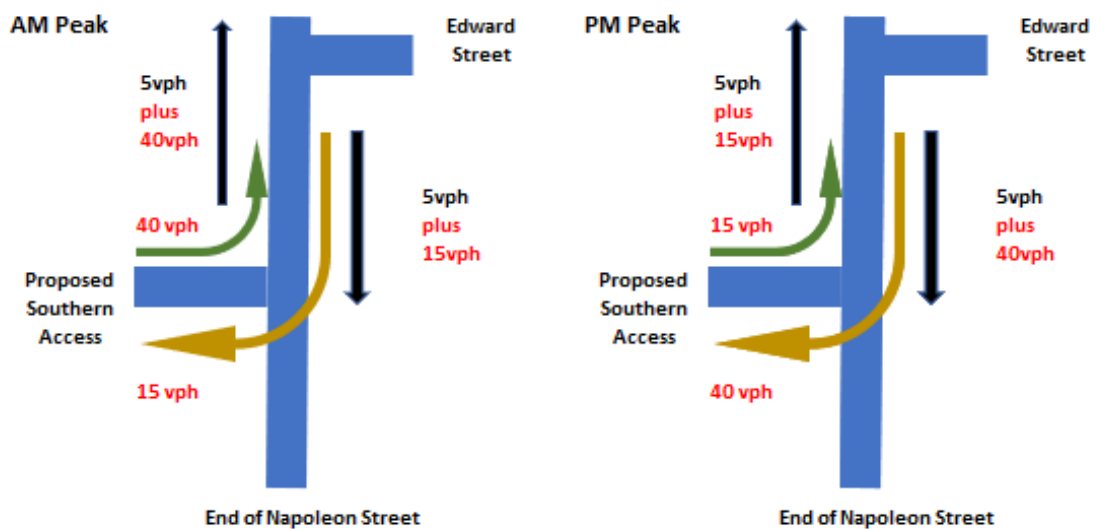
Figures 55 and 56 show traffic assignments and projections.

Figure 55 – Proposed Napoleon Street junctions

Napoleon Street, proposed northern access and Phillip Street 2031



Napoleon Street, proposed southern access and Edward Street 2031



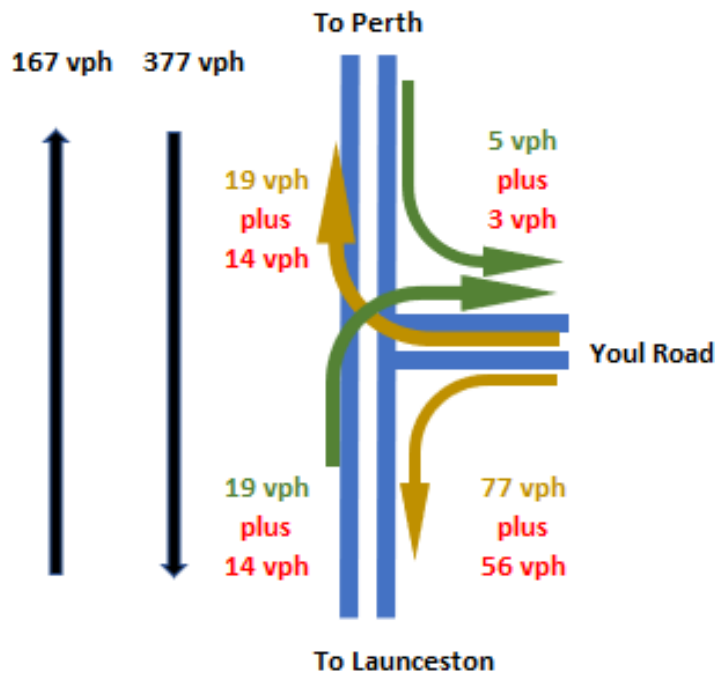
Traffic Impact Assessment



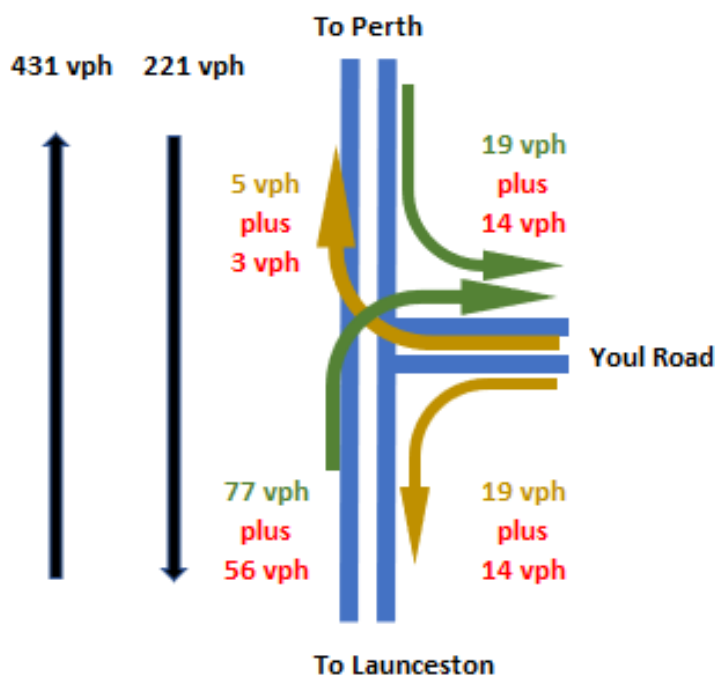
Figure 56 – Main Road / Youl Road junction

Main Road / Youl Road junction 2031

AM Peak



PM Peak



Traffic Impact Assessment



6. Impact on Road Network

6.1 Traffic impact

6.1.1 Impact on liveability, safety and amenity of the local area

Estimated future traffic activity with full development of the proposal is summarised in figure 57 for the Council Road network.

Figure 57 – Projected traffic activity levels on the impacted Council Roads.

Road	Location	Traffic Activity Summary					
		2021		Proposal		2031	
		vph	vpd	vph	vpd	vph	vpd
Napoleon St.	Philip St.	5	50	55	567	60	617
	Edward St.	5	50	55	567	60	617
Phillip St.	Youl Rd.	60	600	55	567	115	1,167
Edward St.	Youl Rd.	50	500	55	567	105	1,067
Youl Rd.	Main St.	120	1,200	87	908	207	2,108
Main Rd.	Haggerstone Rabt.	544	5,440	87	908	688	6,917

By 2031 residential lots will experience on:

- proposed subdivision roads less than 600vpd.
- Phillip Street: 600 to 1,200 vpd between the western and eastern ends
- Edward Street: 600 to 1,100 vpd between the western and eastern ends
- Youl Road: 100 to 2,100 vpd between the southern and northern ends
- Main Road: 6,009 to 6,917 vpd between the southern and northern ends

Phillip and Edward Streets are minor collector roads where lot exposure to 600 - 1,200 vpd is acceptable.

Youl Road is a collector road function where lot exposure to 2,500 vpd is acceptable.

Main Road has an arterial function where 5,000 -10,000 vpd is acceptable.

These operation levels are broadly consistent with guidelines described in *Chapter 2.2- Design of New Urban Networks (Traffic Engineering and Management by KW Ogden and S Y Taylor)*

Accordingly, the impact on liveability, safety and amenity of the local area is assessed as acceptable.

Traffic Impact Assessment



6.1.2 Impact on Perth access points with the Midland Highway

The northern interchange with the Midlands Highway, west of the Haggerstone Roundabout, will experience increased traffic activity of some 80-90 vph. Interchanges are very high-capacity traffic management facilities and the increased traffic will have a very minor impact on operation of the northern interchange.

Likewise, the proposal will increase traffic activity at the Midlands Highway roundabout south of Perth by some 20 vph which will have a very minor impact on operation.

6.1.3 Sight Distance

Sight distance requirements are summarised in Figure 58.

Figure 58 – Sight Distance Summary.

Junction Major Rd - Minor Rd	Speed Limit (km/h)	Speed Environment (km/h)	Road frontage sight distance		
			Table E4.6.4 SISD (m)	Available	
				Left(m)	Right(m)
Napoleon St - Proposed Northern Access	50	40	80	80	200
Napoleon St - Proposed Southern Access	50	50	80	200	32*

Compliant

*Compliant as this is a dead end road and there are no approaching vehicles past this point

6.1.4 Signage

Provide Curve warning and 25km/h Advisory Speed signs on the approaches to the Phillip Street / Napoleon Street corner, see Figure 59.

Figure 59 – Curve warning and Advisory Speed signs



Traffic Impact Assessment



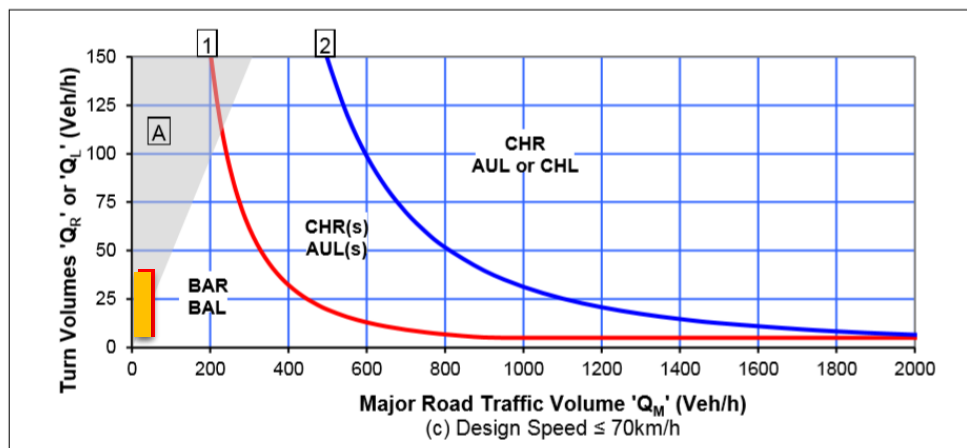
6.1.5 Junction warrants

Junction layout requirements are based on Austroads Guidelines which take into account the speed limit and volume of through and side road traffic.

Proposed Napoleon Street junctions

Simple Left and Right junction layouts are sufficient for the proposed Napoleon Street junctions as estimated peak hour traffic turning movements are low, see Figure 60a.

Figure 60a – Proposed Napoleon Street junction warrant for traffic activity by 2031



Junction traffic activity based on Figure 55:

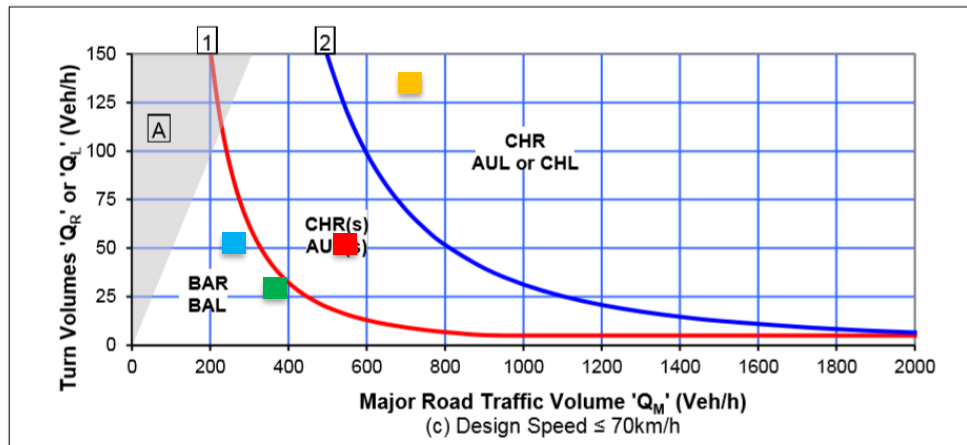
- Napoleon St / proposed northern access Right In
- Napoleon St / proposed southern access Right In

Traffic Impact Assessment

**Main Road / Youl Road junction**

The estimated peak hour traffic turning movements warrant a channelised right (CHR) turn lane and a basic left (BAL) turn lane, see Figure 60b. The existing junction layout is CHR and BAL, so no changes are required.

Figure 60b – Main Road / Youl Road junction warrant for traffic activity by 2031



Peak Hour Movement Summary(vph)		
AM	Turns	Total Effected Flow
Left In	8	385
Right In	33	552

Peak Hour Movement Summary(vph)		
PM	Turns	Total Effected Flow
Left In	33	255
Right In	131	686

Traffic Impact Assessment



6.2 Intersection Analysis

6.2.1 Main Road / Haggerstone Road Roundabout

Intersection analysis study has been undertaken to understand current 2021 and projected operation of the roundabout due to the proposal. Appendix D contains the Sidra Analysis Movement Summary and Appendix E shows the intersection layout model used.

Currently, the roundabout operates at Level of Service A. By 2031, with the proposal fully developed and with background growth on Main Road , Perth, analysis shows the roundabout will still operate at Level of Service A. Figure 61 summarises the results of the analysis.

Figure 61 – SIDRA analysis summary

Haggerstone Roundabout								
Approach		2021 As Is			2031 With Proposal			
		Delay	Queue	LOS	Delay	Queue	LOS	
		(secs)	(m)		(secs)	(m)		
AM	Main Road (SE)	2.7	4.2	A	2.7	5.8	A	
	Haggerstone Rd (N)	5.3	0.2	A	5.4	0.2	A	
	Midland Hwy Off (NW)	5.1	1.9	A	5.1	2.5	A	
	Midland Hwy On (SW)	9.3	0.3	A	9.3	0.4	A	
	All Vehicles	3.8	4.2	A	3.7	5.8	A	
PM	Main Road (SE)	2.8	2.5	A	2.7	3.3	A	
	Haggerstone Rd (N)	6.1	0.2	A	6.4	0.3	A	
	Midland Hwy Off (NW)	5.1	6.1	A	5.2	8.2	A	
	Midland Hwy On (SW)	9.2	0.9	A	9.2	1	A	
	All Vehicles	4.9	6.1	A	4.9	8.2	A	

Traffic Impact Assessment



7. Northern Midlands Interim Planning Scheme 2013

This section of the report addresses the requirements of the Road and Railway Assets Code (E4) and the Car Parking and Sustainable Transport Code (E6) from the Northern Midlands Interim Planning Scheme 2013.

7.1 Road and Railway Assets Code E4

Use and road or rail infrastructure (E4.6.1)

Acceptable solution A2: For roads with a speed limit of 60km/h or less the use must not generate more than a total of 40 vehicle entry and exit movements per day.

A2 is not satisfied as the proposed is estimated to generate some 1134 vpd and 109 vph at peak times.

Performance criteria P2: For roads with a speed limit of 60km/h or less, the level of use, number, location, layout and design of accesses and junctions must maintain an acceptable level of safety for all road users, including pedestrians and cyclists.

P2 is satisfied as:

- sight distance requirements at the proposed junctions are satisfied.
- there are no identified traffic safety issues with the existing road network.
- the projected increases in traffic activity will not exceed guidelines on acceptable impact on residential liveability safety and amenity, see discussion in section 6.1.1.

Development adjacent Arterial Roads & Railways (E4.7.1)

Not applicable.

Management of Road Accesses and Junctions (E4.7.2)

Acceptable solution A1: For roads with a speed limit of 60km/h or less the development must include only one access providing both entry and exit, or two accesses providing separate entry and exit.

A1 is not satisfied as the proposed is involves two new two-way junctions with Napoleon Street and 116 * two-way property accesses.

Performance criteria P1: For roads with a speed limit of 60km/h or less, the number, location, layout and design of accesses and junctions must maintain an acceptable level of safety for all road users, including pedestrians and cyclists.

Traffic Impact Assessment

**P1 is satisfied as:**

- The proposed junction layouts satisfy sight distance requirements at the proposed junctions are satisfied.
- From Austroads Safe System Assessment of Napoleon Street the road is assessed to be well aligned with the safe systems objectives and has a very low crash risk, see figures 53 and 54.
- Reported 5 Year Crash History shows no crash propensity on Napoleon Street
- there are no identified traffic safety issues with the existing road network.
- From the proposed subdivision layout over the flat and gently undulating natural surface of the site it is estimated that access sight distance requirements will be satisfied.
- Existing road network is being retrofitted with footpath on one side and similarly the proposed subdivision road network will include footpath at least on one side to cater for pedestrians and cyclists.

Management of Rail Level Crossings (E4.7.3)

Not applicable.

Sight Distance at Accesses, Junctions and Level Crossings (E4.7.4)

Acceptable solution A1: Sight distances at an access or junction must comply with the Safe Intersection Sight Distance shown in Table E4.7.4 of the Northern Midlands Interim Planning Scheme.

A1 is satisfied, see figure 58.

7.2 Car parking and Sustainable Transport Code E6

The proposal can satisfy the requirements of this code.

Traffic Impact Assessment



8. Northern Midlands Council Standards

Northern Midlands Council standards for road infrastructure are accessible at:

https://www.lgat.tas.gov.au/_data/assets/pdf_file/0021/321348/LGAT-Standard-Drawings-Release-Version-Dec-2013.pdf

8.1 Roads and lot layout

The lot layout appears to suit the contours of the site and allows for circulation of vehicular traffic and vulnerable road users.

Road requirements should comply with LGAT Standard Drawing TSD-R06-v1 which specifies road infrastructure requirements by road function.

8.2 Council urban access requirements

Accesses should comply with LGAT Standard Drawing TSD-R09-v1. Each lot should be provided with a minimum 3.6m reinforced concrete driveway.

Where there are stormwater surface drains driveway culverts should be provided with standard headwalls.

8.3 Footpaths and access ramps

Footpaths should comply with LGAT Standard Drawings TSD-R11-v1 and access ramps with TSD-R18-v1.

Footpaths and ramps are being retrofitted to Youl Road and Phillip Street by Council, providing connectivity between the Perth CBD and the development site, see figures 62-63.

Traffic Impact Assessment



Figure 62 – Looking north along Youl Road approaching Main Road, Perth



Figure 63 – Looking west along Phillip Street towards Napoleon Street



Traffic Impact Assessment



9. Recommendations and Conclusions

This traffic impact assessment has been prepared to support a 116-lot subdivision development accessing Napoleon Street in Perth. The assessment has reviewed the adjacent Council Road network, road conditions and crash history. No significant traffic safety issues were apparent, and the five-year crash history shows no crash propensity on Napoleon Street.

The traffic on Napoleon Street is currently in the order of 50vpd and is projected to increase to 617 vpd at each end by 2031 due to the proposal. Traffic on Phillip Street and Edward Street will vary between 600 and 1,200 vpd between the western and eastern ends of each street. These traffic activity levels are broadly consistent with guidelines on liveability, safety and amenity for residential streets and assessed as acceptable. See Figure 57 and discussion in section 6.1.1 of the report.

The impact of the proposal on the Midland Highway access points north and south of Perth is very minor. As the population centroid for the Tamar Valley is near Launceston it is estimated that 80 % of the traffic generated by the proposal will have origin/ destination north of Perth and will use Youl Road, Main Road and the Haggerstone roundabout to access the Midland Highway.

The reduction in traffic through Perth due to recent state road bypass work west of Perth, will be partly offset by traffic generated by the proposed development and the existing Main Road junctions and intersections should be retained accordingly. Apart from some minor improvements, the existing Council Road infrastructure, intersections and junctions are adequate and will easily cope with the traffic generated by the proposal.

Review of the Austroads junction warrants for the northern and southern junctions with Napoleon Street show that Simple Left and Right junction layouts are adequate. Austroads junction warrants for the Main Road / Youl junction shows that the existing channelised junction layout should be retained.

Intersection analysis of the Haggerstone roundabout was undertaken as this was identified as the intersection most affected by the proposal. The analysis demonstrates no capacity issues with the roundabout which is expected to operate at LOS A beyond 2031, see Figure 61.

Evidence is provided that demonstrates the proposal complies with the Northern Midlands Interim Planning Scheme 2013 - Road and Railway Assets Code E4. Recommended road infrastructure improvements are summarised in Figure 64.

Traffic Impact Assessment



Figure 64 – Recommended Council Road infrastructure improvements

Road	Site	Figures	Recommendations			
			Linemark	Sign	Trim	Construct
Main Rd	Haggerstone roundabout	8 to 12				
	Youl Rd junction	41				
	Phillip S intersection	13 to 15	Intersection		Tree	
	Drummond St junction	40				
Youl Rd	Phillip St intersection	16 to 19	Intersection			
	Edward St junction	23 to 25	Junction		Tree	
	Cromwell St junction	36 to 39	Junction			
	Drummond St intersection	31 to 35				
Phillip St	Cromwell St junction	4.1.5				
	Napoleon St corner	20 to 22	Centreline	Corner		
Edward St	Cromwell St intersection	4.1.8				
	Napoleon St corner	26 to 30	Junction	Give Way		South Leg
Napoleon St	Proposed southern junction	47 to 49	Junction	Give Way		West Leg
	Proposed northern junction	42 to 46	Junction	Give Way		West Leg

Council responsibility

No action required

Developer responsibility

Recommendations:

- *Proposed roads , junctions , property accesses and pedestrian facilities be constructed in accordance with Northern Midlands Council standards and the relevant LGAT standard drawings, see part 8 of this report.*
- *Implement the Council Road improvements summarised in Figure 64.*
- *Install a curve warning and 35km/h advisory speed signs on the approaches to the Phillip Street / Napoleon Street junction and a B1 barrier line, see Figure 58.*
- *Reconstruct and seal Napoleon Street from the proposed southern junction to Edward Street to form a junction with Napoleon Street as the priority road.*
- *Construct the proposed southern and northern junctions with Napoleon St. with Simple Right & Left layouts with culverts to cater for the existing surface stormwater drain on the west side of Napoleon St., see Figures 45,46,48 and 49.*

Overall, it has been concluded that the proposed development will not create any traffic issues and traffic will continue to operate safely and efficiently along Napoleon Street and the local road network.

Based on the findings of this report and subject to the recommendations above, the proposed development is supported on traffic grounds.

Traffic Impact Assessment



Appendices

Traffic Impact Assessment



Appendix A – Traffic Turning Count Surveys

A.1 - Haggerstone R/about

Turn Count Summary

Location: Midland Highway at Main Road, Perth

GPS Coordinates: -41.562632, 147.165861

Date: 2020-07-28

Day of week: Tuesday

Weather:

Analyst: Josh Haines

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:54	0	0	0	3	0	0	0	0	1	0	5	0	9
16:55	1	0	0	25	0	0	0	0	5	1	26	0	58
17:00	1	0	0	19	0	0	0	0	6	1	36	0	63
17:05	2	0	0	8	0	1	0	0	5	0	27	0	43
17:10	1	0	0	12	1	1	0	0	6	0	31	0	52
17:15	0	0	0	7	0	0	0	2	7	0	35	0	51
17:20	0	0	0	10	0	1	0	0	3	0	23	0	37

Car traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:54	0	0	0	3	0	0	0	0	1	0	5	0	9
16:55	1	0	0	25	0	0	0	0	4	1	26	0	57
17:00	1	0	0	19	0	0	0	0	6	1	35	0	62
17:05	2	0	0	8	0	1	0	0	4	0	28	0	41
17:10	1	0	0	12	1	1	0	0	6	0	31	0	52
17:15	0	0	0	7	0	0	0	2	7	0	34	0	50
17:20	0	0	0	9	0	1	0	0	2	0	23	0	35

Truck traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:54	0	0	0	0	0	0	0	0	0	0	0	0	0
16:55	0	0	0	0	0	0	0	0	1	0	0	0	1
17:00	0	0	0	0	0	0	0	0	0	0	1	0	1
17:05	0	0	0	0	0	0	0	0	1	0	1	0	2
17:10	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	1	0	1
17:20	0	0	0	1	0	0	0	0	1	0	0	0	2

Bicycle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16:54	0	0	0	0	0	0	0	0	0	0	0	0	0
16:55	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:05	0	0	0	0	0	0	0	0	0	0	0	0	0
17:10	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:20	0	0	0	0	0	0	0	0	0	0	0	0	0

Pedestrian volumes

Interval starts	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
16:54	0	0	0	0	0	0	0	0	0	0	0	0	0
16:55	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0
17:05	0	0	0	0	0	0	0	0	0	0	0	0	0
17:10	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0
17:20	0	0	0	0	0	0	0	0	0	0	0	0	0

Traffic Impact Assessment



Intersection Count Summary

16:54 - 17:24

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	5	0	0	84	1	3	0	2	33	2	183	0	313

Vehicle Summary

Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	5	0	0	83	1	3	0	2	30	2	180	0	306
Truck	0	0	0	1	0	0	0	0	3	0	3	0	7
Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0

Pedestrians Summary

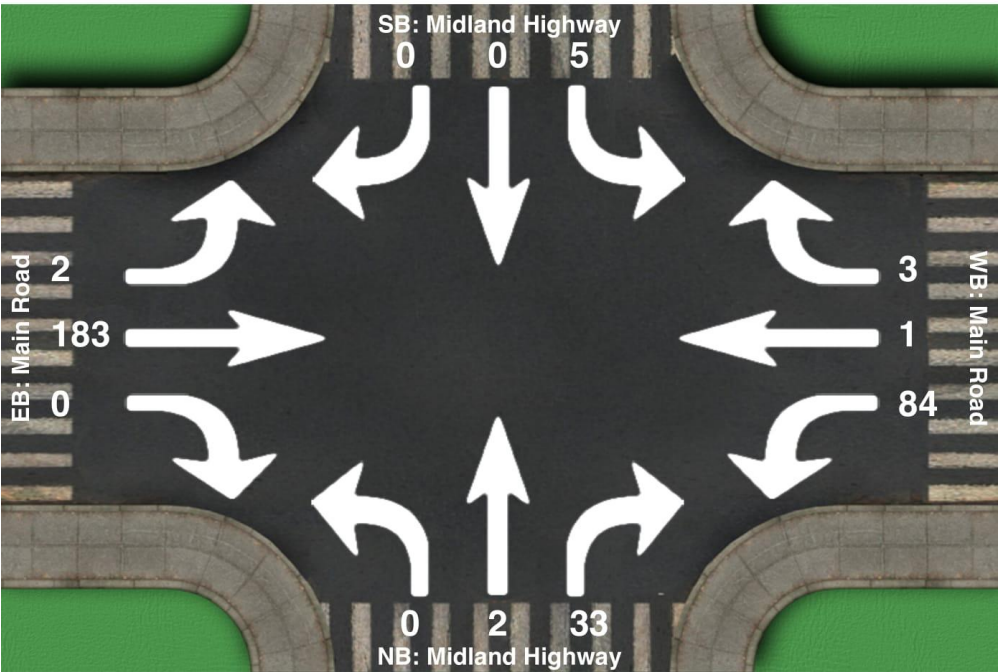
	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0

Traffic Impact Assessment



Intersection Count Summary

Location: Midland Highway at Main Road, Perth
GPS Coordinates: -41.562632, 147.165861
Date: 2020-07-28
Day of week: Tuesday
Weather:
Analyst: Josh Haines



Intersection Count Summary

16:54 - 17:24

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	5	0	0	84	1	3	0	2	33	2	183	0	313

Traffic Impact Assessment



Turn Count Summary

Location: Midland Highway at Main Road, Perth

GPS Coordinates: -41.562664, 147.1659546

Date: 2020-07-30

Day of week: Thursday

Weather:

Analyst: Josh Haines

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
08:34	0	0	0	1	0	0	0	0	0	0	1	0	2
08:35	0	0	0	33	0	0	0	0	1	0	16	0	50
08:40	0	0	0	33	0	2	0	0	1	0	20	0	56
08:45	0	0	0	17	0	0	0	0	3	0	9	0	29
08:50	3	0	0	24	0	1	0	0	2	0	9	0	39
08:55	2	0	0	22	0	0	0	0	1	0	8	0	33
09:00	1	0	0	17	0	0	0	0	4	0	4	0	26

Car traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
08:34	0	0	0	1	0	0	0	0	0	0	1	0	2
08:35	0	0	0	32	0	0	0	0	1	0	16	0	49
08:40	0	0	0	33	0	1	0	0	1	0	18	0	53
08:45	0	0	0	17	0	0	0	0	3	0	9	0	29
08:50	2	0	0	21	0	0	0	0	2	0	9	0	34
08:55	1	0	0	18	0	0	0	0	1	0	7	0	27
09:00	0	0	0	16	0	0	0	0	4	0	3	0	23

Truck traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
08:34	0	0	0	0	0	0	0	0	0	0	0	0	0
08:35	0	0	0	1	0	0	0	0	0	0	0	0	1
08:40	0	0	0	0	0	1	0	0	0	0	2	0	3
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0
08:50	1	0	0	3	0	1	0	0	0	0	0	0	5
08:55	1	0	0	4	0	0	0	0	0	0	1	0	6
09:00	1	0	0	1	0	0	0	0	0	0	1	0	3

Bicycle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
08:34	0	0	0	0	0	0	0	0	0	0	0	0	0
08:35	0	0	0	0	0	0	0	0	0	0	0	0	0
08:40	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0
08:50	0	0	0	0	0	0	0	0	0	0	0	0	0
08:55	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0

Pedestrian volumes

Interval starts	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
08:34	0	0	0	0	0	0	0	0	0	0	0	0	0
08:35	0	0	0	0	0	0	0	0	0	0	0	0	0
08:40	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0
08:50	0	0	0	0	0	0	0	0	0	0	0	0	0
08:55	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0

Traffic Impact Assessment



Intersection Count Summary

08:34 - 09:04

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	6	0	0	147	0	3	0	0	12	0	67	0	235

Vehicle Summary

Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	3	0	0	138	0	1	0	0	12	0	63	0	217
Truck	3	0	0	9	0	2	0	0	0	0	4	0	18
Bicycle	0	0	0	0	0	0	0	0	0	0	0	0	0

Pedestrians Summary

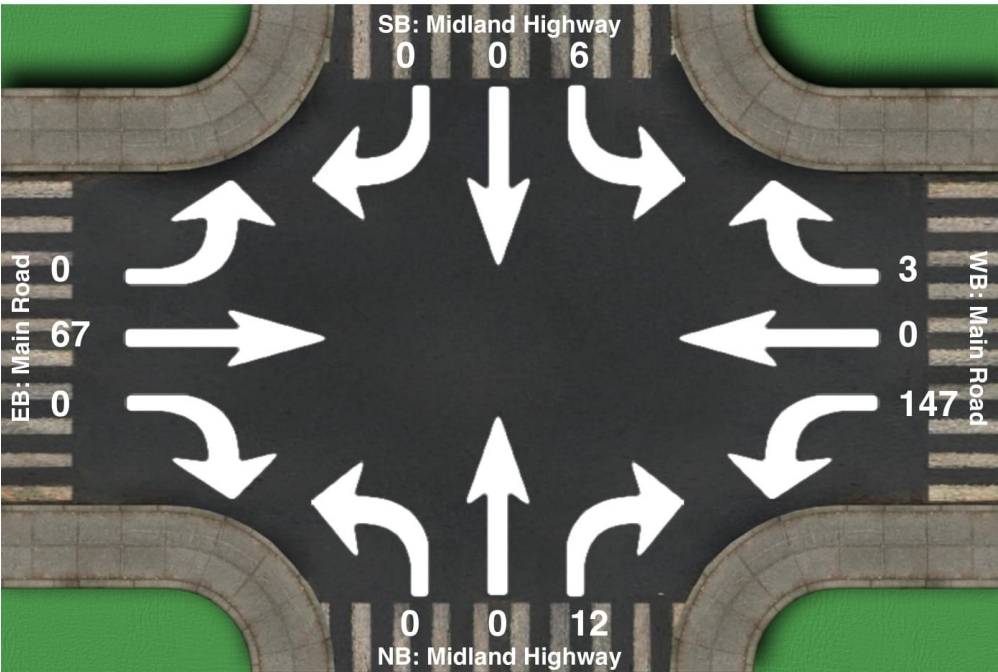
	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0

Traffic Impact Assessment



Intersection Count Summary

Location: Midland Highway at Main Road, Perth
GPS Coordinates: -41.562664, 147.1659546
Date: 2020-07-30
Day of week: Thursday
Weather:
Analyst: Josh Haines

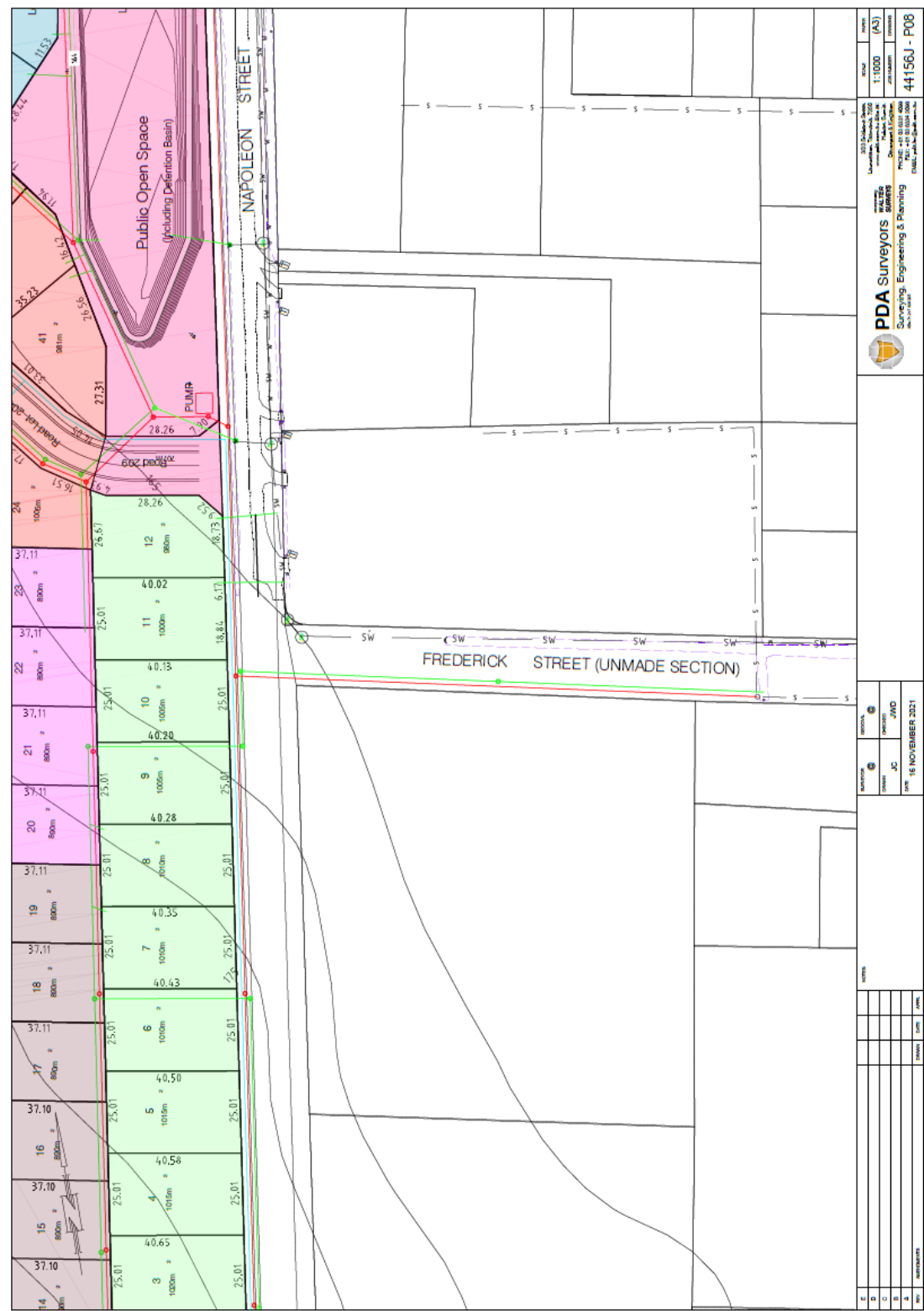


Intersection Count Summary

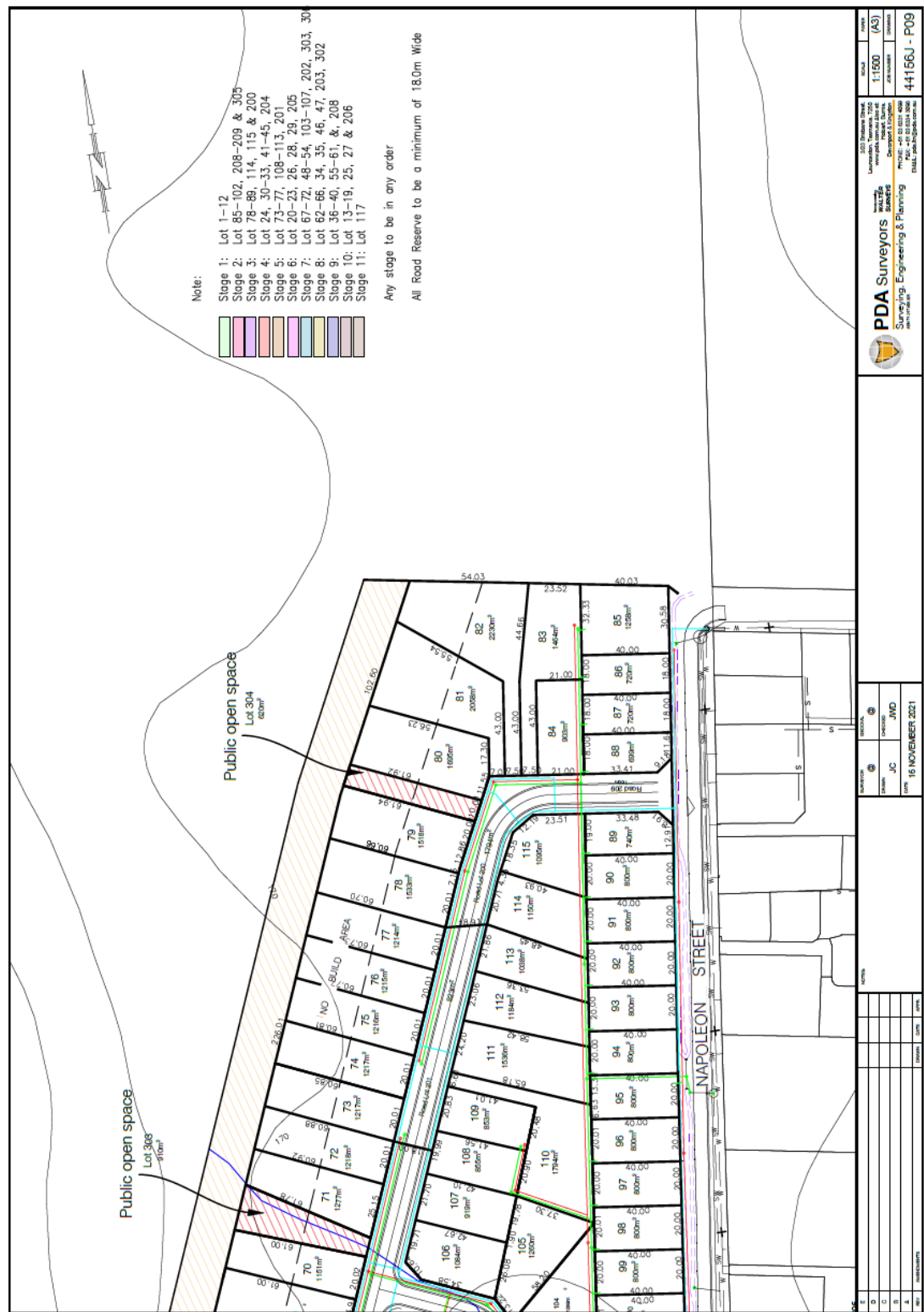
08:34 - 09:04

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	6	0	0	147	0	3	0	0	12	0	67	0	235

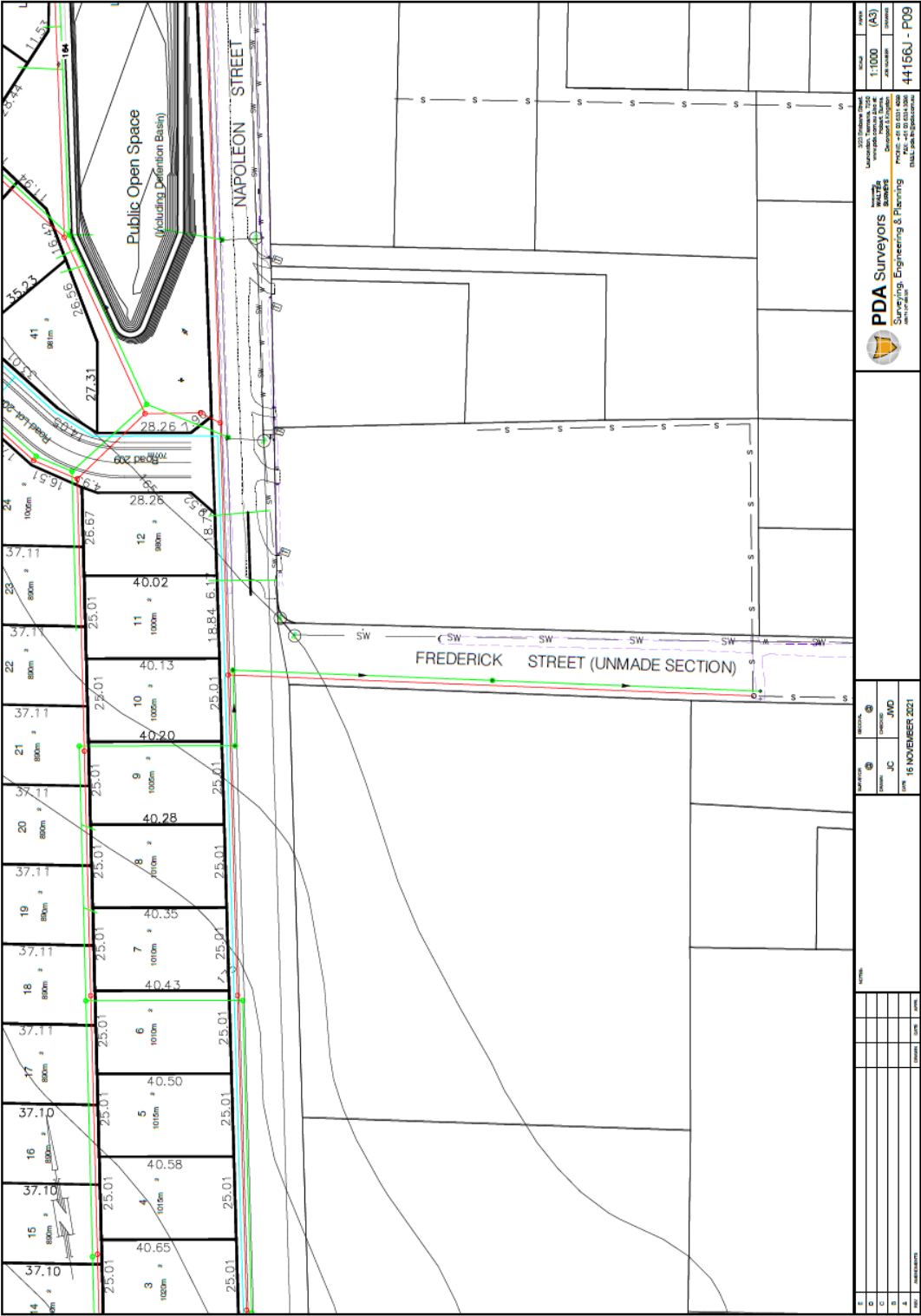
Traffic Impact Assessment



Traffic Impact Assessment



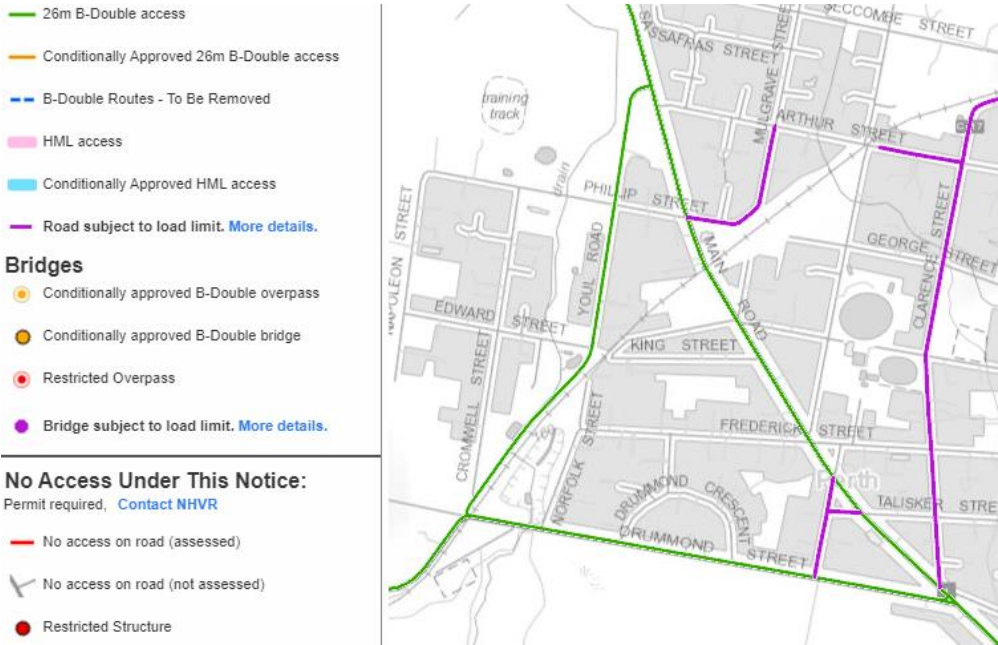
Traffic Impact Assessment



Traffic Impact Assessment



Appendix C – Tas. 26m B Double Network



Source: DSG

Traffic Impact Assessment



Appendix D – SIDRA Analysis Data

Applied as 2021 AM

MOVEMENT SUMMARY

Site: 101 [Roundabout AM 2020]

New Site

Site Category: (None)

Roundabout

Movement Performance - Vehicles									
Mov ID	Turn	Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	
SouthEast Main Road									
21	L2	309	3.0	0.172	2.6	LOS A	0.6	4.2	
23a	R1	6	3.0	0.172	8.3	LOS A	0.6	4.2	
Approach		316	3.0	0.172	2.7	LOS A	0.6	4.2	
North Haggerstone Road									
7a	L1	13	3.0	0.009	4.8	LOS A	0.0	0.2	
9a	R1	1	3.0	0.009	11.6	LOS B	0.0	0.2	
Approach		14	3.0	0.009	5.3	LOS A	0.0	0.2	
NorthWest Midland Highway Off Ramp									
27b	L3	1	3.0	0.085	4.7	LOS A	0.3	1.9	
28	T1	141	3.0	0.085	5.0	LOS A	0.3	1.9	
29	R2	1	3.0	0.085	13.0	LOS B	0.3	1.9	
Approach		143	3.0	0.085	5.1	LOS A	0.3	1.9	
SouthWest Midland Highway On Ramp									
30a	L1	1	3.0	0.015	1.9	LOS A	0.0	0.3	
32	R2	25	3.0	0.015	9.6	LOS A	0.0	0.3	
Approach		26	3.0	0.015	9.3	LOS A	0.0	0.3	
All Vehicles		499	3.0	0.172	3.8	LOS A	0.6	4.2	

Traffic Impact Assessment



Applied as 2021 PM

MOVEMENT SUMMARY

Site: 101 [Roundabout PM 2020]

New Site

Site Category: (None)

Roundabout

Movement Performance - Vehicles									
Mov ID	Turn	Total veh/h	Demand Flows HV %	Dep. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	
SouthEast: Main Road									
21	L2	179	3.0	0.101	2.6	LOS A	0.3	2.5	
23a	R1	6	3.0	0.101	8.3	LOS A	0.3	2.5	
Approach		185	3.0	0.101	2.8	LOS A	0.3	2.5	
North: Haggerstone Road									
7a	L1	11	3.0	0.009	5.5	LOS A	0.0	0.2	
9a	R1	1	3.0	0.009	12.3	LOS B	0.0	0.2	
Approach		12	3.0	0.009	6.1	LOS A	0.0	0.2	
NorthWest: Midland Highway Off Ramp									
27b	L3	4	3.0	0.235	4.9	LOS A	0.9	6.1	
28	T1	385	3.0	0.235	5.1	LOS A	0.9	6.1	
29	R2	1	3.0	0.235	13.1	LOS B	0.9	6.1	
Approach		391	3.0	0.235	5.1	LOS A	0.9	6.1	
SouthWest: Midland Highway On Ramp									
30a	L1	4	3.0	0.042	1.9	LOS A	0.1	0.9	
32	R2	69	3.0	0.042	9.6	LOS A	0.1	0.9	
Approach		74	3.0	0.042	9.2	LOS A	0.1	0.9	
All Vehicles		661	3.0	0.235	4.9	LOS A	0.9	6.1	

Traffic Impact Assessment



Applied as 2031 AM

MOVEMENT SUMMARY

Site: 101 [Roundabout AM 2030]

New Site

Site Category: (None)

Roundabout

Movement Performance - Vehicles									
Mov ID	Turn	Total veh/h	Demand Flows HV %	Dep. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	
SouthEast: Main Road									
21	L2	398	3.0	0.220	2.6	LOSA	0.8	5.8	
23a	R1	7	3.0	0.220	8.3	LOSA	0.8	5.8	
Approach		405	3.0	0.220	2.7	LOSA	0.8	5.8	
North: Haggerstone Road									
7a	L1	14	3.0	0.010	4.9	LOSA	0.0	0.2	
9a	R1	1	3.0	0.010	11.7	LOS B	0.0	0.2	
Approach		15	3.0	0.010	5.4	LOSA	0.0	0.2	
NorthWest: Midland Highway Off Ramp									
27b	L3	1	3.0	0.110	4.8	LOSA	0.3	2.5	
28	T1	183	3.0	0.110	5.0	LOSA	0.3	2.5	
29	R2	1	3.0	0.110	13.0	LOS B	0.3	2.5	
Approach		185	3.0	0.110	5.1	LOSA	0.3	2.5	
SouthWest: Midland Highway On Ramp									
30a	L1	1	3.0	0.017	1.9	LOSA	0.0	0.4	
32	R2	28	3.0	0.017	9.6	LOSA	0.0	0.4	
Approach		29	3.0	0.017	9.3	LOSA	0.0	0.4	
All Vehicles		635	3.0	0.220	3.7	LOSA	0.8	5.8	

Traffic Impact Assessment



Applied as 2031 PM

MOVEMENT SUMMARY

Site: 101 [Roundabout PM 2030]

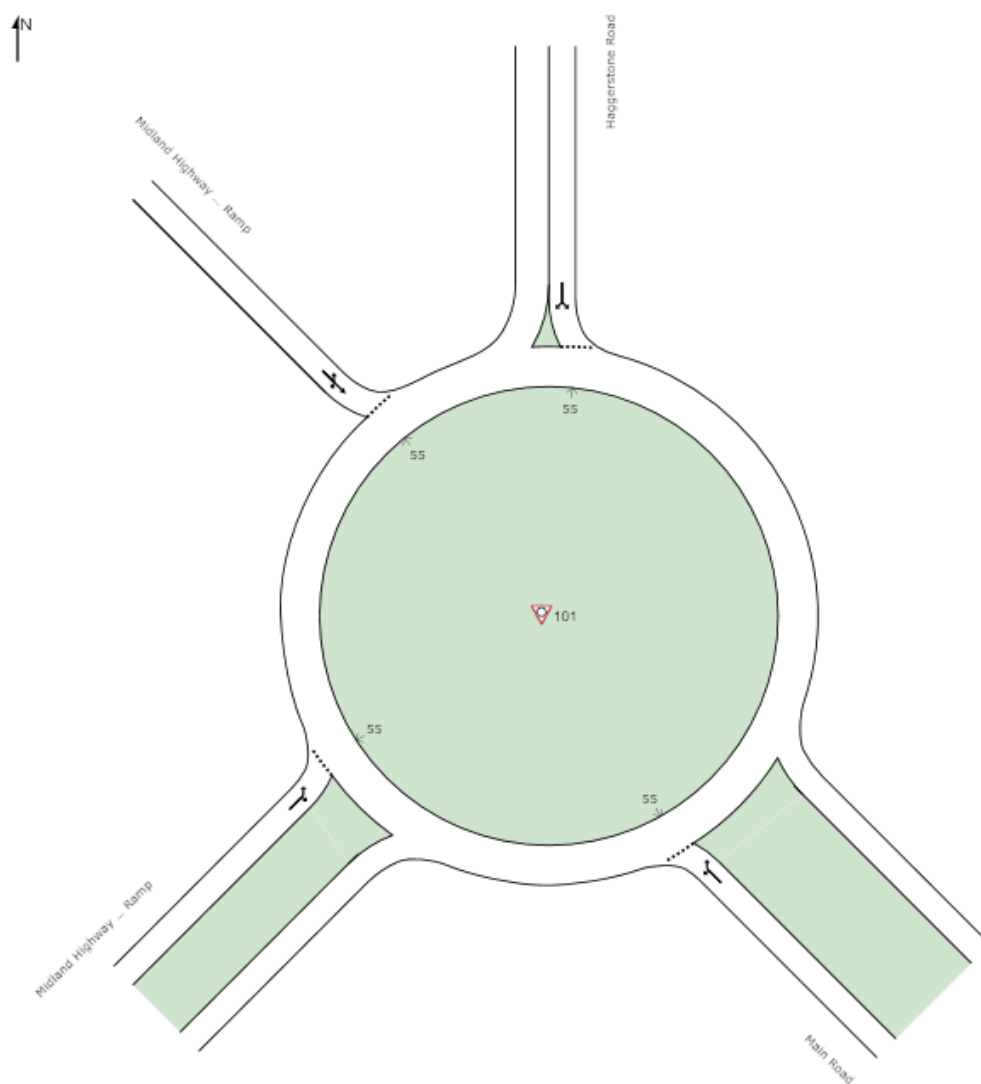
New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles									
Mov ID	Turn	Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	
SouthEast: Main Road									
21	L2	225	3.0	0.127	2.6	LOS A	0.5	3.3	
23a	R1	7	3.0	0.127	8.3	LOS A	0.5	3.3	
Approach		233	3.0	0.127	2.7	LOS A	0.5	3.3	
North: Haggerstone Road									
7a	L1	12	3.0	0.010	5.9	LOS A	0.0	0.3	
9a	R1	1	3.0	0.010	12.7	LOS B	0.0	0.3	
Approach		13	3.0	0.010	6.4	LOS A	0.0	0.3	
NorthWest: Midland Highway Off Ramp									
27b	L3	4	3.0	0.293	4.9	LOS A	1.1	8.2	
28	T1	481	3.0	0.293	5.2	LOS A	1.1	8.2	
29	R2	1	3.0	0.293	13.1	LOS B	1.1	8.2	
Approach		486	3.0	0.293	5.2	LOS A	1.1	8.2	
SouthWest: Midland Highway On Ramp									
30a	L1	4	3.0	0.046	1.9	LOS A	0.1	1.0	
32	R2	77	3.0	0.046	9.6	LOS A	0.1	1.0	
Approach		81	3.0	0.046	9.2	LOS A	0.1	1.0	
All Vehicles		813	3.0	0.293	4.9	LOS A	1.1	8.2	

Traffic Impact Assessment



Appendix E – SIDRA Model



Traffic Impact Assessment



Appendix G – Midlands Hwy access to Perth



Traffic Impact Assessment



Natural Values Report

Report for: PDA Surveyors

Property Location: 115 Napoléon Street

Prepared by: Scott Livingston
Livingston Natural Resource Services
299 Relbia Road
Relbia, 7258

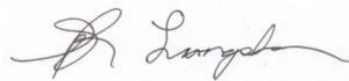
Date: 25th January 2022
Version 2



Client:	PDA Surveyors obo Mackinnon Estates P/L
Property identification	CT 236837/1, PID 6526599 115 Napoleon Street, Perth Current zoning is General Residential (<i>Northern Midlands Planning Scheme 2013</i>)
Proposal:	Subdivision 1 lot to 116 lots+ roads and public open space

Assessment by:
Scott Livingston,

Master Environmental Management,
Forest Practices Officer (Planning)
Natural Resource Management Consultant.



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INTRODUCTION

The property, 115 Napoleon Street, is around 21 ha and proposed for subdivision into 115 residential lots, 1 larger (1.0ha) lot and public open space and associated infrastructure. The western portion, 50m wide of the title, and 2 linkages to subdivision roads and a detention basin on Napoleon Street will become public open space.

A desktop assessment was undertaken followed by a field inspection on the 19th August 2020 to confirm or otherwise the desktop study findings in regard to the natural values present focusing on mapping of vegetation communities and threatened species habitat identification.

An updated Natural Values Atlas Report and Protected matters report were accessed on 18/1/2022, to establish if any additional threatened flora or fauna species had been recorded nearby or added to listing since the original reports on 17/8/2020.

METHODS

A Natural Values report was accessed from the DPIWE website on 18/1/2022. The Forest Practices Authority Biodiversity Values database was also accessed on 19/10/2020 to assess eagle nest probability and mature habitat classes. This report covers known threatened species sightings within 5km and fauna species whose predicted range boundaries overlay the site.

A site visit on 19/8/2020 was undertaken by Scott Livingston. All areas of the site were assessed. The assessment the site was inspected with a spaced wandering meander technique, with all areas of variation within the site vegetation inspected.

The survey was conducted in August, which is outside the flowering period of many flora species. No survey can guarantee that all flora will be recorded in a single site visit due to limitations on seasonal and annual variation in abundance and the presence of material for identification. While all significant species known to occur in the area were considered, species such as spring or autumn flowering flora may have been overlooked. A sample of all vegetation communities, aspects and variations in topographic location was achieved.

All mapping and Grid References in this report use GDA 94, Zone 55, with eastings and northings expressed as 6 & 7 digits respectively.

Flora taxonomy nomenclature used is consistent with Census of Vascular Plants of Tasmania, Tasmanian Herbarium 2015, From Forest to Fjeldmark, Descriptions of Tasmania's Vegetation (Edition 2) Harris & Kitchener, 2005, Little Book of Common Names for Tasmanian Plants, Wapstra et al.

DESCRIPTION

Natural Values Report

Livingston Natural Resource Services

2

The property, 115 Napoleon Street, Perth, is around 21 ha, and is predominately pasture, with some weed (mainly gorse) patches and woodland on the southern hill. The property falls to the north and east ranging from 165-185m ASL. The property contains 1 small farm dam.

The western boundary is formed by the Perth Bypass corridor, the northern boundary is pasture, the eastern boundary is formed and unformed sections of Napoleon Street, with residential development further to the east. The southern boundary is pasture/ woodland mosaic.

NATURAL VALUES

VEGETATION

TASVEG 4.0 mapping shows the vegetation on the property to include 2 Vegetation Communities, agricultural land (FAG) and native grassland (GCL). Native grass species occur with exotic pasture grasses across the site in varying proportions. The majority of the area mapped as native grassland has sufficient tree canopy to warrant classification as woodland and has been ascribed to Dry *Eucalyptus viminalis* grassy forest and woodland.

GROUP	Vegetation Community	Tas Veg 4.0 (ha)	Remapped (ha)
Agricultural, urban and exotic vegetation	(FAG) Agricultural land	11.8	20.1
Native grassland	(GCL) Lowland grassland complex	9.3	
Dry eucalypt forest and woodland	(DVG) Eucalyptus viminalis grassy forest and woodland		1.0
		21.1	

HABITAT CONTEXT

Mature habitat availability map version: March 2016, FPA website

search radius	1km	5km	10km
Land cover composition within the specified area			
Area of high mature habitat availability	0	0	77.52
Area of medium mature habitat availability	0	87.45	726.31
Area of low mature habitat availability	15.52	219.23	1259.6
Area of negligible mature habitat availability	298.64	7345.79	28593.47
Area of non-forest vegetation	0	202.21	759.75
Total search area	314.16	7853.98	31415.93
Total applicable area	314.16	7652.47	30656.89
Percentage of the applicable land area classified as high or medium mature habitat availability	0%	1.1%	2.6%

FLORA

The Natural Values Atlas (Department of Primary Industries, (accessed 18/1/2022) shows 3 threatened flora species within 500m of the property, *Caesia calliantha*, (blue grasslily), *Haloragis heterophylla* (variable raspwort), *Tricoryne elatior* (yellow rushlily)

Suitable habitat occurs for blue grass lily on the site, and it is difficult to detect at the time of the survey (late winter) however occurrences in the area are within less disturbed grassy woodland.

Habitat for variable raspwort is associated with a high component of *Themeda triandra* (kangaroo grass) and while present on the site kangaroo grass is not prevalent and habitat is considered marginal on the site.

Habitat for yellow rushlily is usually dense grassy habit and is in spring-summer the bright yellow flowers are present and make the species obvious. The known population in the areas is to the north and it is considered unlikely the specie is present on the site without being noted.

Habitat for *Rytidosperma indutum* (tall wallaby grass) may be suitable. No know occurrences occur within 2km and the species is considered unlikely to be present.

Appendix 3 provides habitat descriptions and habitat suitability for threatened flora species know within 5km of the property. Of the 95 other species know to occur within 5km many have marginal habitat suitability associated with water courses and dams.

FAUNA

The Natural Values Atlas has a records of 9 threatened species within 5km of the property with one *Lathamus discolor*, swift parrot, known within 500m. The site is outside the breeding range and no breeding season foraging habitat for swift parrot (*E. globulus* /*E. ovata*) is within the site.

Appendix 4 provides habitat descriptions and habitat suitability for threatened fauna species know within 5km of the property or within potential range of the species. Potential foraging habitat but no nesting/ denning habitat is present for wide ranging species such as devils, quolls, eagles and owls. The bushfire mitigation works are unlikely to significantly impact these species.

RAPTOR NESTS

There are no known nests for threatened raptors within 1km of the site. Masked owl and wedge tailed eagle nests occur within 5km. The majority of the property is not included (unsuitable) within probability modelling for Eagle Nest (FPA) a portion of the south western hill with woodland is mapped as 0/1 probability (very low), no nests were found on the site visit.. No evidence of existing nests or suitably sized hollows for masked owl was found on property. The property has a mature habitat rating of low to medium in the Forest Practices Biodiversity Database.

PROTECTED MATTERS REPORT

A Protected matters Report (EPBC) was access on 18/1/2022. This report lists a number of species and communities not shown in the natural values Atlas reports. All are marine/ aquatic species with no suitable habitat within the study area.

CONCLUSIONS

Suitable habitat occurs for blue grass lily on the site, and it is difficult to detect at the time of the survey (late winter) however occurrences in the area are within less disturbed grassy woodland and it is considered unlikely to occur.

Potential foraging habitat but no nesting/ denning habitat is present for wide ranging species such as devils, quolls, eagles and owls. The development is unlikely to have significant impact on the natural values of the site.

LEGISLATIVE IMPLICATIONS

Tasmanian Threatened Species Protection Act 1995

No threatened flora or fauna species listed under this Act were recorded on site.

Fauna species listed under this Act have been potential habitat on site:

- The following species have potential foraging habitat but no nesting/denning habitat on site
 - spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus*) –Vulnerable
 - Tasmanian devil (*Sarcophilus harrisii*) –Endangered
 - masked owl (Tasmanian) (*Tyto novaehollandiae* subsp. *castanops*) –Endangered
 - Tasmanian wedge-tailed eagle (*Aquila audax* subsp. *fleayi*) –Endangered
 - white-bellied sea-eagle (*Haliaeetus leucogaster*)Endangered

The proposed development is unlikely to have a significant impact on foraging area for these species.

Commonwealth Environment Protection and Biodiversity Conservation Act 1999

There were no threatened flora species or vegetation communities listed under this Act found on site.

No fauna species listed as threatened under this Act have been recorded on site:

Potential habitat was found for fauna species listed as threatened under this Act:

Natural Values Report

Livingston Natural Resource Services

- spotted-tailed quoll (*Dasyurus maculatus* subsp *maculatus*) –Vulnerable
- eastern quoll (*Dasyurus viverrinus*) – Endangered
- Eastern barred bandicoot (*Perameles gunnii*) –Vulnerable
- Tasmanian devil (*Sarcophilus harrisii*) – Endangered
- masked owl (Tasmanian) (*Tyto novaehollandiae* subsp. *castanops* –Vulnerable
- Tasmanian wedge-tailed eagle (*Aquila audax* subsp.*fleayi*) –Endangered
- white-bellied sea-eagle (*Haliaeetus leucogaster*)Endangered

The proposed development) is unlikely to have a significant impact (as defined under the Act) on the wide-ranging species below with potential foraging but no nesting/denning habitat available on site.

Tasmanian Nature Conservation Act 2002 and Wildlife Regulations 1999

No vegetation community listed as a threatened native vegetation community in Schedule 3A *Nature Conservation Act 2002* occurs on the site

Forest Practices Act 1985, Forest Practices Regulations 2017, Forest Practices Code2015

Clearing for development approved under LUPA is exempt from the Forest Practices Code, where the clearing is approved under LUPA. Where not approved under LUPA, clearing of <1ha in a twelve-month period on any property, where not classed as vulnerable land is also exempt from Forest Practices Code requirements. No vulnerable land occurs on the site.

Northern Midlands Interim Planning Scheme (2013)

E8.0 Biodiversity Code

E8.2.1 a) does not apply, the area is not identified as priority habitat in planning scheme overlays.
E8.2.1 b) applies, the development of the proposed subdivision will require the removal of some native vegetation.

E8.6.1 A1.2 – Development does not clear or disturb native vegetation within areas identified as priority habitat.

E8.6.1 A2 – clearing is not in accordance with a Forest Practices plan

E8.6.1 P2 –

- a) the clearing of native vegetation will be limited to removal of trees within pasture areas in the southwestern portion of the study area. This area is on the fringes of open woodland and provides no linkages (corridor) to other native vegetation.
- b) Trees to be felled/ pushed and utilised where possible, residues to be burnt on site or removed.
- c) The native vegetation is not within a riparian area.
- d) The removal of vegetation will have no impact on adjoining natural values.
- e) Tree removal will be required for infrastructure development and bushfire hazard management within the subdivision.
- f) With minimal impact no offset requirements are considered necessary.

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Northern Midlands Interim planning Scheme (2013)

APPENDIX 1 – MAPS

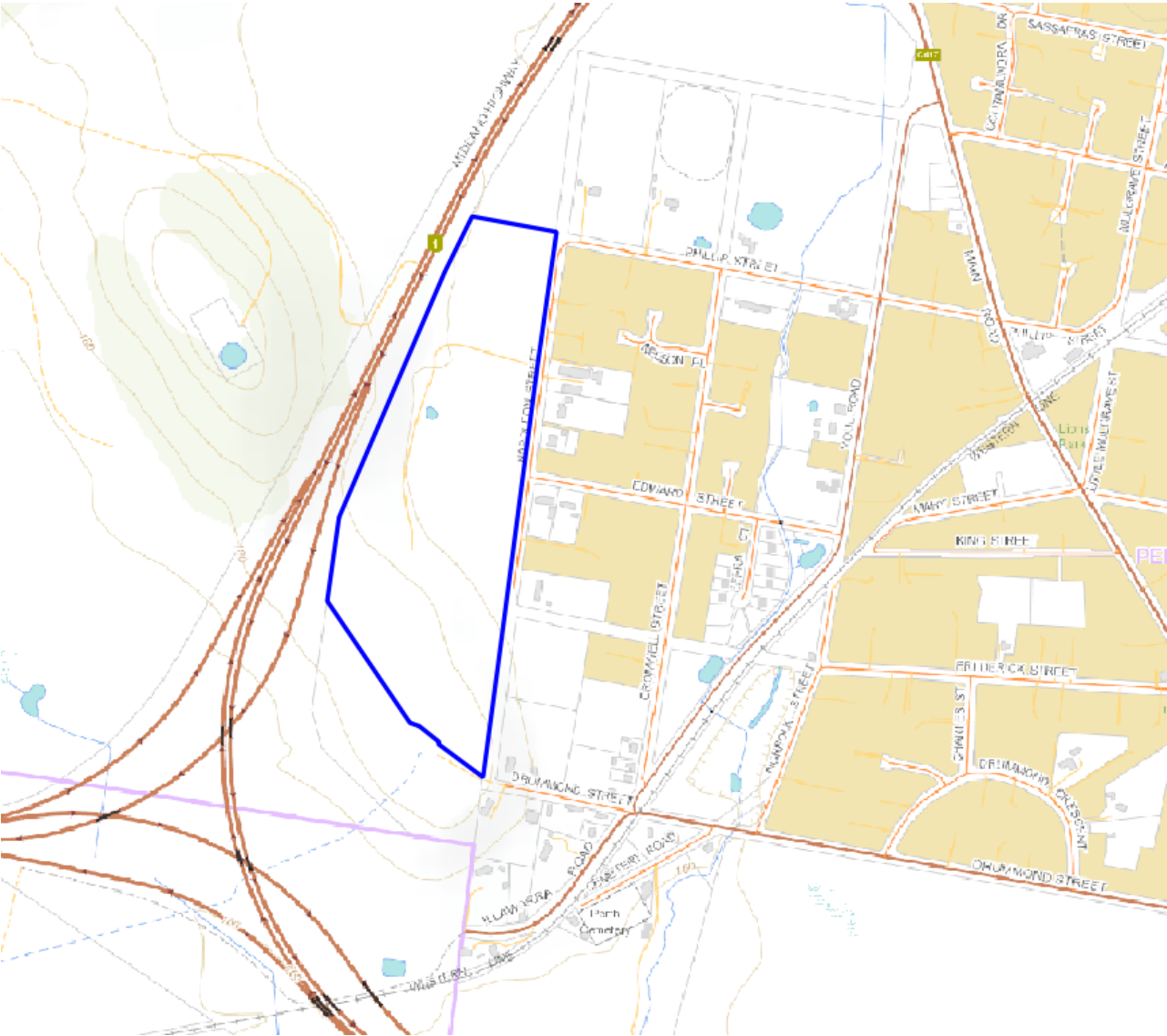


Figure 1: Location Map



Figure 2: Aerial Image, ESRI

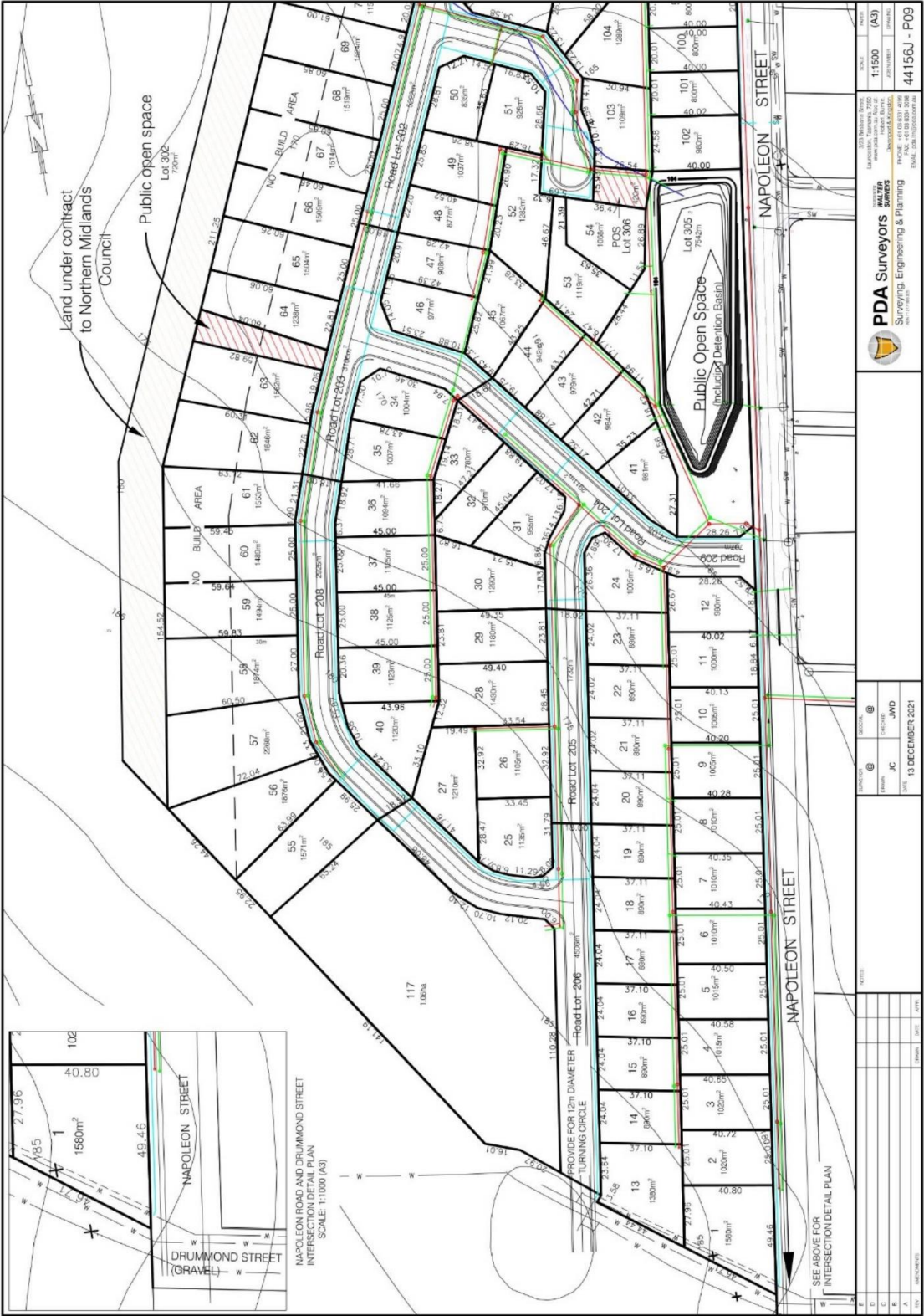


Figure 3: Plan of subdivision

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Figure 4: Plan of Subdivision 2

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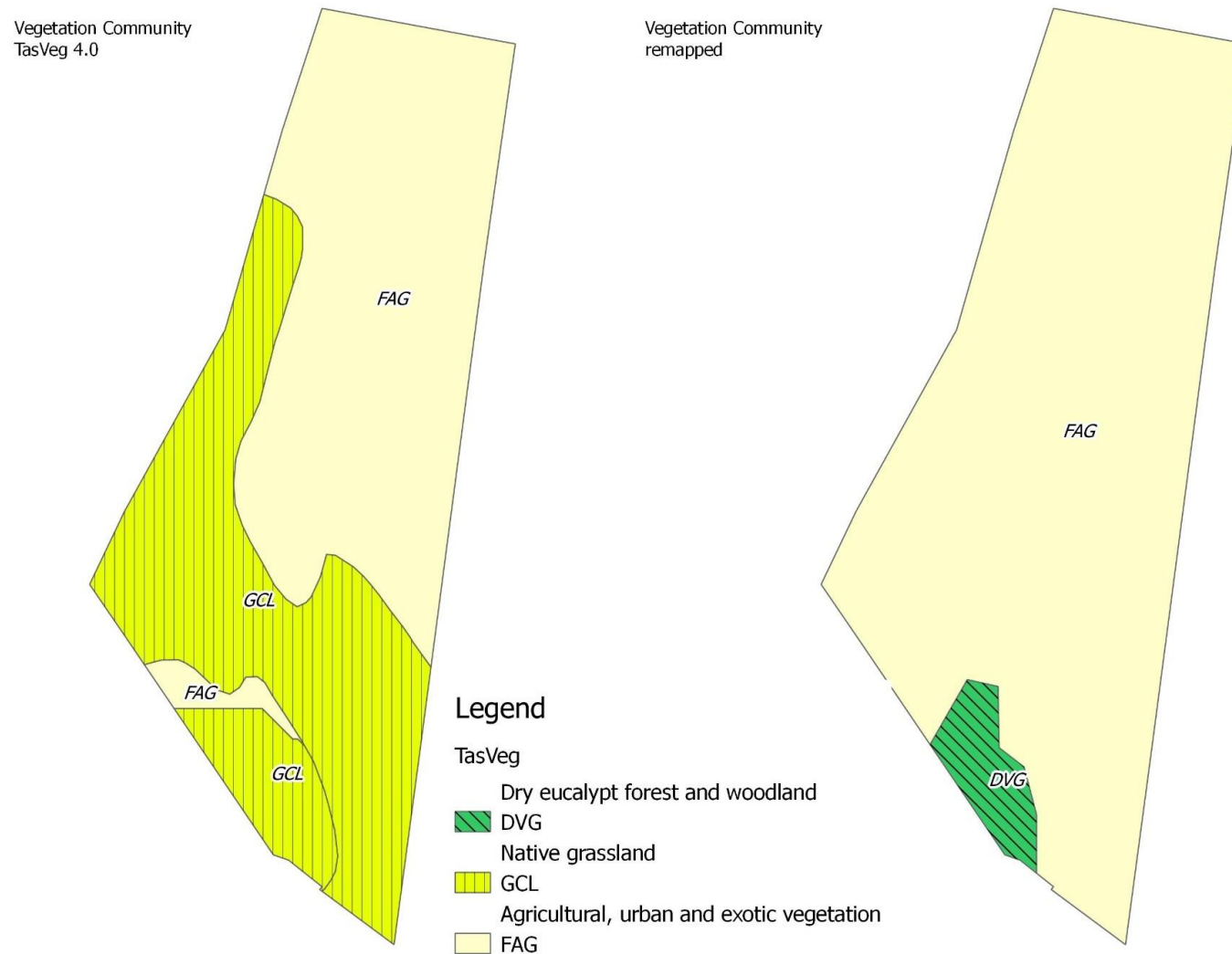


Figure 5: Vegetation, revised from TasVeg 4.0

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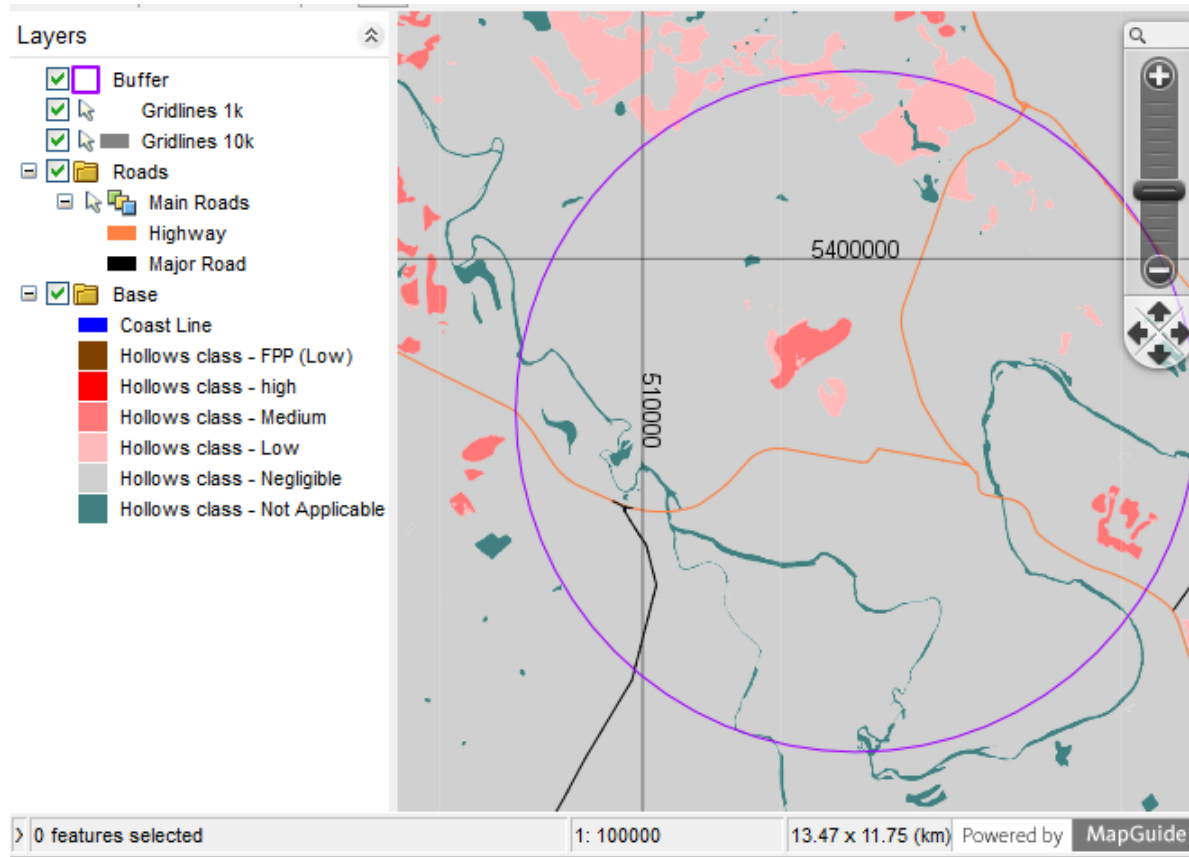


Figure 6: Mature Habitat Class, 5km radius

APPENDIX 2 – PHOTOS



4
Figure 7: south along Napoleon Street



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Figure 8: south west across lots



Figure 9: gorse patch



Figure 10: woodland patch



4
Figure 11: north along southern section of Napoleon St road reserve

APPENDIX 3 – THREATENED FLORA WITHIN 5KM

Species	Common Name	SS	NS	known within 500m	Habitat description	Habitat suitability
<i>Alternanthera denticulata</i>	lesser joyweed	e			Displays a preference for rocky (dolerite) river margins, but has also been recorded from disturbed <i>Melaleuca ericifolia</i> swamp forest and damp riparian grasslands.	no suitable habitat
<i>Aphelia gracilis</i>	slender fanwort	r			<i>Aphelia gracilis</i> inhabits damp sandy ground and wet places in the Midlands and northeast of the State. It may readily colonise sites after fire or other disturbance.	no suitable habitat
<i>Aphelia pumilio</i>	dwarf fanwort	r			<i>Aphelia pumilio</i> is found growing on damp flats, often with impeded drainage. The main vegetation types are lowland grassland (<i>Themeda triandra</i>) and dry sclerophyll forest and woodland dominated by <i>Eucalyptus viminalis</i> , <i>E. amygdalina</i> or <i>E. ovata</i> .	no suitable habitat
<i>Asperula subsimplex</i>	water woodruff	r			Inhabits damp areas, marshy places and riverbanks	no suitable habitat
<i>Bolboschoenus caldwellii</i>	sea clubsedge	r			Widespread in shallow, standing, sometimes brackish water, rooted in heavy black mud	no suitable habitat
<i>Brunonia australis</i>	blue pincushion	r			Typically occurs in grassy woodlands and dry sclerophyll forests dominated by black peppermint (<i>Eucalyptus amygdalina</i>) or less commonly white gum (<i>Eucalyptus viminalis</i>) or stringybark (<i>Eucalyptus obliqua</i>). elevations of between 10 and 350 metres. sandy and gravelly alluvial soils with a particular preference for ironstone gravels	marginal habitat
<i>Caesia calliantha</i>	blue grasslily	r		yes	<i>Caesia calliantha</i> is found predominantly in the Midlands in grassland or grassy woodland including wattle and prickly box "scrub" (occasionally extending into forest, then usually dominated by <i>Eucalyptus viminalis</i> or <i>E. amygdalina</i>). It has also been recorded from grassy roadsides.	suitable habitat
<i>Caladenia filamentosa</i>	daddy longlegs	r			Lowland heathy and sedgy open eucalypt forest and woodland on sandy soils.	no suitable habitat
<i>Caladenia patersonii</i>	patersons spider-orchid	v			Favours coastal and near coastal areas in the north from south of Marrawah to Bridport, occurs in low shrubby heathland in moist to well-drained sandy and clay loam	no suitable habitat
<i>Caladenia tonellii</i>	robust fingers	e	CR		Found in near coastal parts of the north coast, extending inland by a few Km's in the Railton -Latrobe area. Occurs in <i>Eucalyptus amygdalin</i> forest with a shrubby understorey on shallow clay loam and shallow gravelly loam	no suitable habitat

Species	Common Name	SS	NS	known within 500m	Habitat description	Habitat suitability
<i>Callitriche umbonata</i>	winged waterstarwort	r			<i>Callitriche umbonata</i> has a semi-aquatic habitat. It has been recorded from grassy wetlands, soaks in eucalypt forest and amongst rocks along stream banks in the Midlands, with an unconfirmed sighting from Apsley Marshes.	no suitable habitat
<i>Centipeda cunninghamii</i>	erect sneezeweed	r			Found in low soaks adjacent to rivers around the north and on King Island. This species is found in a wide variety of soil types usually in areas subject to flooding or where water is stagnant. Areas where wetlands and lagoons are drying, or the margins of wetlands are also possible habitats	no suitable habitat
<i>Corunastylis nuda</i>	tiny midge-orchid	r			Scrub, subalpine grassland, heathy open forest, open rock plates among forest, shrubby dry sclerophyll forest and open wet sclerophyll forest, from near sea level to 1000 m elevation on a range of different soil types	no suitable habitat
<i>Dianella amoena</i>	grassland flaxlily	r	EN		<i>Dianella amoena</i> occurs mainly in the northern and southern Midlands, where it grows in native grasslands and grassy woodlands.	suitable habitat
<i>Discaria pubescens</i>	spiky anchorplant	e			Occurs in native grassland on valley flats and moist slopes.	marginal habitat
<i>Gratiola pubescens</i>	hairy brooklime	r			Commonly in permanently or seasonally damp to swampy ground, and may colonise areas of cleared scrub and the margins of dams and reservoirs.	no suitable habitat
<i>Gynatrix pulchella</i>	fragrant hempbush	r			Occurs in riparian vegetation along St Pauls River. occurs as a riparian shrub, found along rivers and drainage channels predominantly in the north of the State	no suitable habitat
<i>Gyrostemon thesioides</i>	broom wheelfruit	r			Predominately in <i>Allocasuarina</i> forest in the north and east of the State	no suitable habitat
<i>Haloragis heterophylla</i>	variable raspwort	r		yes	<i>Haloragis heterophylla</i> occurs in poorly-drained sites (sometimes only marginally so), which are often associated with grasslands and grassy woodlands with a high component of <i>Themeda triandra</i> (kangaroo grass). It also occurs in grassy/sedgy <i>Eucalyptus ovata</i> forest and woodland, shrubby creek lines, and broad sedgy/grassy flats, wet pasture and margins of farm dams.	no suitable habitat
<i>Isoetes elatior</i>	tall quillwort	r			Occurs in aquatic riparian habitat	no suitable habitat
<i>Juncus amabilis</i>	gentle rush	r-			Endemic to Tasmania, occurring at low altitude with its roots in gravel or silt substrate in moderate to swiftly flowing waters. In calmer waters, it grows in mud or silt and is generally found in areas of seepage near roadsides.	no suitable habitat
<i>Juncus prismatocarpus</i>	branching rush	r			Commonly found along stream and river banks, irrigation supply channels and other very damp and periodically wet sites, including swampland	no suitable habitat

Species	Common Name	SS	NS	known within 500m	Habitat description	Habitat suitability
Lobelia pratioides	poison lobelia	v			Lobelia pratioides occurs in seasonally inundated to waterlogged soils at the margins of swamps, wetlands and drainage lines, and also in damp depressions within grassland and grassy woodland.	no suitable habitat
Lycopus australis	australian gypsywort	e			Lacustrine herbland, disturbed areas within Melaleuca ericifolia swamp forest, Phragmites australis reed beds, and rocky (dolerite) riverbeds fringed by riparian scrub	no suitable habitat
Lythrum salicaria	purple loosestrife	v			Swamps, streambanks and rivers mainly in the north and north east of the state. Has also been know to occur in gaps between Melaleuca ericifolia forest.	no suitable habitat
Muehlenbeckia axillaris	matted lignum	r			Muehlenbeckia axillaris is predominantly found in moist gravely or rocky places on the Central Plateau, extending out to the west, northwest and lower reaches of the South Esk River.	no suitable habitat
Myriophyllum integrifolium	tiny watermilfoil	v			Myriophyllum integrifolium occurs mostly in the Northern Midlands, with isolated populations in the States north, northeast and south. It grows at the margins of wetlands and in seasonally wet places, including depressions associated with small ephemeral lakes. It can occur in coastal heathland and in forest in the Midlands, where it is often associated with old muddy tracks.	no suitable habitat
Persicaria decipiens	slender waterpepper	v			Local on the banks of rivers and streams, most frequent in the north of the State	no suitable habitat
Persicaria subsessilis	bristly waterpepper	e			Recorded from rocky (dolerite) river margins, disturbed Melaleuca ericifolia (coast paperbark) swamp forest and lagoon margins sedgeland with the allied Persicaria praetermissa (arrow waterpepper) prominent; and within openings in riparian scrub on alluvium.	no suitable habitat
Pilularia novae-hollandiae	australian pillwort	r			Aquatic or semi-aquatic plant that grows in shallow swamps and waterways, often among grasses and sedges. It is most often recorded in drying mud as this is when it is most conspicuous. It is also found on the seasonally inundated margins of creeks and rivers.	no suitable habitat
Poa mollis	soft tussockgrass	r			Endemic to Tasmania and is found on dry open hillsides and cliffs, predominantly in the east of the State	marginal habitat
Prostanthera cuneata	alpine mintbush	x			On the mainland Prostanthera cuneata occurs in the alpine and subalpine heaths of Victoria and New South Wales. Apart from planted specimens, this species appears to be extinct in Tasmania, but was collected from a lowland site (but flood debris in the sample suggests it could have been washed down from higher elevations).	no suitable habitat
Prostanthera rotundifolia	roundleaf mintbush	v			Along riverbanks and on rocky hillsides	no suitable habitat

Species	Common Name	SS	NS	known within 500m	Habitat description	Habitat suitability
<i>Pterostylis grandiflora</i>	superb greenhood	r			Mostly in heathy and shrubby open eucalypt forests and in grassy coastal she-oak woodland on moderately to well drained sandy and loamy soils. It prefers to grow amongst undergrowth on lightly shaded sites	no suitable habitat
<i>Pterostylis ziegelieri</i>	grassland greenhood	v	VU		<i>Pterostylis ziegelieri</i> occurs in the States south, east and north, with an outlying occurrence in the northwest. In coastal areas, the species occurs on the slopes of low stabilised sand dunes and in grassy dune swales, while in the Midlands it grows in native grassland or grassy woodland on well-drained clay loams derived from basalt.	no suitable habitat
<i>Pultenaea prostrata</i>	silky bushpea	v			Occurs throughout the northern and southern midlands in native grasslands and grassy woodlands and forested sites on Tertiary basalt or Quaternary alluvium.	no suitable habitat
<i>Ranunculus pumilio</i> var. <i>pumilio</i>	ferny buttercup	r			occurs mostly in wet places from sea level to altitudes of 800-900m	no suitable habitat
<i>Rumex bidens</i>	mud dock	v			Perennial, semi-aquatic plant. It forms a vigorous mat of floating, hollow stems and upright leaves growing from a point on a muddy bank of wetlands, creeks and rivers. The stems seem to die back in winter, re-emerging and growing vigorously in warm months.	no suitable habitat
<i>Rytidosperma indutum</i>	tall wallabygrass	r-			In Tasmania the species is known from the Midlands, Southeast and East Coast of the State. It occurs on mudstone and dolerite in open, dry sclerophyll woodlands	suitable habitat
<i>Scleranthus fasciculatus</i>	spreading knawel	v			Vegetation at most known sites is silver tussock grassland / grassy woodland.	no suitable habitat
<i>Senecio longipilus</i>	longhair fireweed	?e			The extant Tasmanian site is at an elevation of about 870 m in a herb-rich patch of <i>Poa</i> species-dominated native grassland on Tertiary basalt.	no suitable habitat
<i>Senecio macrocarpus</i>	largefruit fireweed	x	VU		Occurs most commonly in grasslands on red-brown earth soils. It may also occur in grassy woodlands and open woodlands	marginal habitat
<i>Senecio squarrosus</i>	leafy fireweed	r			Associated with dry sclerophyll forest	marginal habitat
<i>Siloxerus multiflorus</i>	small wrinklewort	r			Found on rocks at river mouths, in coastal areas and inland dry forests	no suitable habitat
<i>Stylidium despectum</i>	small triggerplant	r			Prefers wet sandy heaths, moist depressions, soaks and hollows in near coastal situations	no suitable habitat
<i>Tricoryne elatior</i>	yellow rushlily	v		yes	<i>Tricoryne elatior</i> occurs in native grassland, grassy woodland and forest.	marginal habitat

Species	Common Name	SS	NS	known within 500m	Habitat description	Habitat suitability
<i>Triptilodiscus pygmaeus</i>	dwarf sunray	v			<i>Triptilodiscus pygmaeus</i> grows within grasslands, grassy woodlands or rockplates, with the underlying substrate being mostly Tertiary basalt or Jurassic dolerite. The elevation range of recorded sites in Tasmania is 30-470 m a.s.l., with an annual rainfall of about 450-600 mm. The species occurs within native grassland dominated by <i>Themeda triandra</i> (kangaroo grass).	no suitable habitat
<i>Vallisneria australis</i>	river ribbons	r			In Tasmania this species is found in riparian situations in the north, northeast, midlands and southeast.	no suitable habitat
<i>Velleia paradoxa</i>	spur velleia	v			Grows within forest, grassy woodlands or grasslands on dry sites on a variety of geologies, including Triassic sandstone, Jurassic dolerite and Tertiary basalt. It flowers from November to January. Plants may die back to rootstock by the end of summer. Species can be detected from old seedheads or early flowering rosettes	marginal habitat
<i>Vittadinia burbridgeae</i>	smooth new-holland-daisy	r			<i>Vittadinia burbridgeae</i> occurs in native grassland and grassy woodland.	marginal habitat
<i>Vittadinia cuneata</i> var. <i>cuneata</i>	fuzzy new-holland-daisy	r			Occurs in areas of low precipitation on both fertile and infertile soils. Predominantly found in dry sclerophyll forest around Hobart, into the midlands and extending up into the north-east.	marginal habitat
<i>Vittadinia muelleri</i> (broad sense)	narrow leaf new holland daisy	p			Occurs in areas of low precipitation on both fertile and infertile soils. Predominantly found in dry sclerophyll forest around Hobart, into the midlands and extending up into the north-east.	marginal habitat
<i>Xanthoparmelia jarmaniae</i>		v			This species is known from dolerite and sandstone in degraded, dry sclerophyll forest and native grassland, and from a sandstone gravestone in the Midlands.	marginal habitat

APPENDIX 4 – THREATENED FAUNA WITHIN 5KM, KNOW OR WITHIN RANGE

Threatened fauna recorded or with suitable habitat within 500m of the subject titles from the Natural Values Atlas (based on range boundaries).

Species	Common Name	SS	NS	known within 500m	known within 5km	Range Class	Habitat Description	Habitat suitability
Accipiter novaehollandiae	grey goshawk	e				Potential	Potential habitat for the grey goshawk is native forest with mature elements below 600 m altitude, particularly along watercourses. FPA's Fauna Technical Note 12 can be used as a guide in the identification of grey goshawk habitat. Significant habitat for the grey goshawk may be summarised as areas of wet forest, rainforest and damp forest patches in dry forest, with a relatively closed mature canopy, low stem density, and open understorey in close proximity to foraging habitat and a freshwater body (i.e. stream, river, lake, swamp, etc.). FPA's Fauna Technical Note 12 can be used as a guide in the identification of grey goshawk habitat.	no suitable habitat