

Bobs Farm Sand Quarry

Newcastle Sand

Traffic Impact Assessment

April 2026

Bobs Farm Sand Extraction development

Traffic Impact Assessment

Client: Newcastle Sand

Issue: Ver A.02

Reference: P3289

21 April 2026

Quality Review and Document History

Version	Date	Description	Prepared By	Approved By
Ver0.01	15/3/26	Draft	C.Thomas/J.Carreon	M.Palamara
VerA.01	14/04/26	Final	C.Thomas/J.Carreon	M.Palamara
VerA.02	21/04/26	Updated images	C.Thomas/J.Carreon	M.Palamara



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1 Introduction

1.1 Background

Seca Solution was commissioned by ADW Johnson on behalf of Newcastle Sand to prepare a Traffic Impact Assessment for the proposed sand extraction quarry located at 3631 Nelson Bay Road, Bobs Farm. This report has been prepared to support a state significant development (SSD-99860959) and to respond to SEARS issued for the project.

The project is located adjacent to Nelson Bay Road which forms part of the regional road network. Whilst Council is the road authority the project will be reviewed by Transport for NSW (TfNSW) to provide concurrence for the project given that access is proposed from Nelson Bay Road.

The site was the subject of a past SSDA which proposed access to Marsh Road however due to traffic and safety concerns associated with the use of this local road was amended in consultation with both Council and TfNSW to provide all access, both entry and exit, off Nelson Bay Road with a left in left out concept.

This traffic impact assessment has been prepared in accordance with the TfNSW Guide to Transport Impact Assessment (November 2024).

1.2 Scope of Report

The scope of this report is to review the traffic and access impacts associated with the proposed development and to assess the access arrangements for the development. The report provides advice on road network capacity, access issues and safety review.

1.3 Issues and Objectives of the study

The issues relative to the proposal are:

- Determine the future traffic generation for the development;
- Assess impact on the local road network due to the additional flows;
- Review the access arrangements for the development;
- Assess any other transport impacts associated with the development including a safety review.

The objective of the report is to document the impacts of the proposed development and provide advice on any infrastructure work required on the external road network as part of the development.

1.4 Planning Context

In preparing this document, the following guides and publications were used:

- Austroads Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments
- TfNSW Guide to Transport Impact Assessment November 2024;

1.5 Authority Requirements

This Traffic and Transport Impact Assessment has been prepared to respond to the SEARs issued for this project (SSD-99860959).

■ Table 1-1 SEARs Response

Comment	Report Inclusion
Accurate predictions of the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products;	Sec 4.1 Traffic Generation
a detailed assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State Road network (as identified above), including a road safety audit detailing the nature of the traffic generated, transport routes, traffic volumes and potential impacts on local and regional roads;	Sections 4.2, 4.3 and 4.4 No RSA has been undertaken as the site connects directly to a State road (MR0108). The haulage routes are primarily on main roads with approval to carry B-Double trucks including the M1 Pacific motorway, Hunter Expressway, New England Highway. End users vary depending upon market demands
an assessment of cumulative traffic impacts, having regard to any other proposed developments in the locality;	Sec 4.3.3 Background Traffic and Other Developments
a description of the measures that would be implemented to mitigate any impacts, including concept plans of any proposed upgrades, developed in consultation with the relevant road authorities (if required);	Sec 5.2 Improvements to Allow for Development Traffic
evidence of any consultation with relevant roads authorities, regarding the establishment of agreed contributions towards road upgrades or maintenance; and	Pre-lodgement agency advice was received from TfNSW
a description of existing and proposed access roads.	Sec 1 Existing Situation Sec 3.2 Access

2 Existing Situation

2.1 Site Description and Proposed Activity

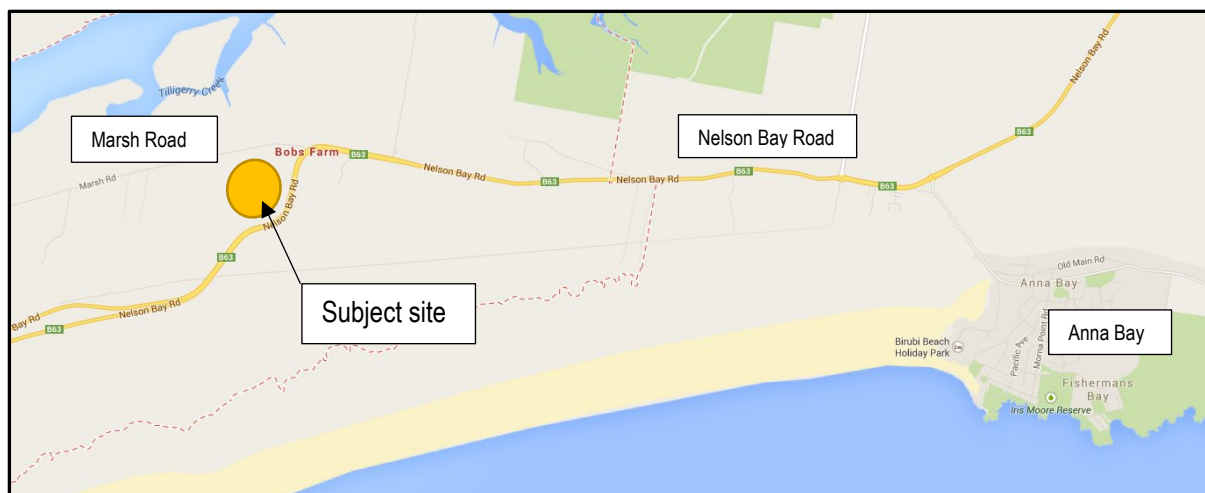
2.1.1 Site Location and Access

The site is located within the general locality of Bobs Farm with road frontage to Nelson Bay Road. An easement on the north-east of the site to Marsh Road does not form part of this project.

All access will be from Nelson Bay Road.

The site is vacant except for a single cottage and ancillary development associated with existing horticultural uses at the site (fig and olive orchards).

The location of the site is shown below in Figure 2-1.



Source: Google maps

■ Figure 2-1 - Site Location

Existing land use adjacent to the site is a mixture of rural residential, tourist (Shark and Ray Centre) and a local primary school.

2.2 Existing Traffic Conditions

2.2.1 Road Hierarchy

The major road through the locality is **Nelson Bay Road (B63 – MR 00108)** which provides an important road link between the Nelson Bay area to the east of the site and Newcastle, Williamtown airport and the Pacific Highway to the west of the site. In the locality of the subject site, it provides two lanes of travel in both directions with a sealed shoulder. There are verges to both sides and there is a central median to restrict right turn movements to intersections with a number of U turn bays provided along its length to cater for local traffic demands.

The speed limit varies along its length and in the vicinity of the subject site is 80 km/h.

Marsh Road, to the east of the site is a local road providing access to a number of local rural and rural residential holdings. It provides a single lane of travel in both directions and operates under the posted speed limit of 60 km/h. There is a school zone located close to the intersection with Nelson Bay Road with a school zone restricting speed to 40 km/h during the morning and afternoon school activity periods.

2.2.2 Roadworks

There are currently no road works occurring within the immediate vicinity of the of the subject site. Nelson Bay Road has seen extensive upgrades in the past to provide two lanes of travel in both directions.

There are roadworks associated with the extension of the M1 Motorway extension to Raymond Terrace. This project sees significant works to allow for a new crossing over the Hunter River and a bypass of Hexham and Heatherbrae. This project is expected to be completed in 2028.

The project includes:

- 15 kilometres of dual carriageway motorway with two lanes in each direction
- four new interchanges at Black Hill, Tarro, Tomago and Raymond Terrace
- a 2.6-kilometre viaduct over the Hunter River and floodplain, the Main North Rail Line and the New England Highway
- new and upgraded bridges and local road connections.

2.2.3 Traffic Management Works

No further traffic management works are proposed along Nelson Bay Road in this locality.

The provision of U-Turn facilities sees a number of turn areas on side roads or widening of the carriageway to allow for turns as is seen in the vicinity of the subject site.

2.2.4 Pedestrian and Cycling Facilities

There are minimal pedestrian and cycling facilities in the general locality of the site, reflective of the very low demands in this area. Pedestrians and cyclists are able to use the sealed shoulder provided in both directions along Nelson Bay Road. During the site work cyclists were observed on Nelson Bay Road but no pedestrians. This is reflective of the relatively remote location of the area from major centres.

2.3 Traffic Flows

2.3.1 Peak Hour Flows

As part of the study work, Seca Solution commissioned traffic surveys at the roundabout intersection of Nelson Bay Road and Port Stephens Drive. These surveys were completed during both the morning (7-930am) and afternoon (3-5.30pm) periods on Wednesday 18th February 2026 during term time.

The two-way traffic flows on Nelson Bay Road (west of Port Stephen Drive) were:

- 1,776 vph (vehicles per hour), split 817 vph westbound towards Newcastle (54%) in the morning peak between 7.30 and 8.30 AM and
- 1,974vph, split 1008 eastbound towards Nelson Bay (51%) and 966 vph westbound in the afternoon peak between 3.15 and 4.15 PM.

These peak periods are consistent with past data collected by Seca Solution including a 7 day count.

The peak hour traffic flows are shown below in Figure 2-2 below.

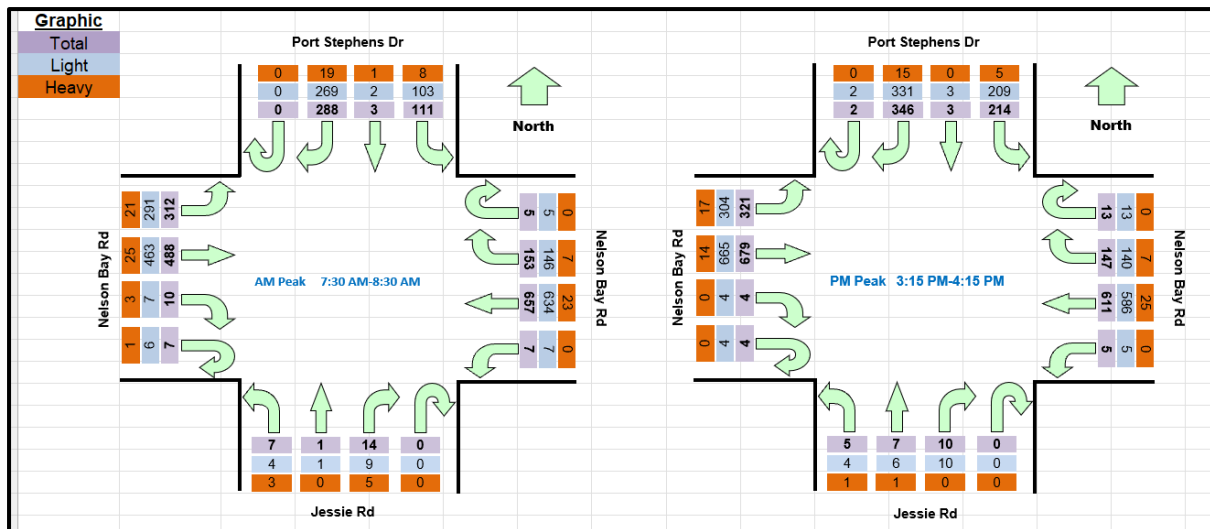


Figure 2-2 - peak surveyed numbers

Traffic demands past the site are considered similar or less than these given there are no major road connections between the site and this roundabout.

2.3.2 Daily Traffic Flows

There is no recent published data in this area with the AADT at count station 05400 east of Gan Gan Road being from 2008.

A summary of the tube count data commissioned by Seca Solution on Nelson Bay Road in 2014 is provided below:

- The eastbound AADT on Nelson Bay Road was recorded at 7,612 vehicles per day.
- The westbound AADT on Nelson Bay Road was recorded at 7,699 vehicles per day.
- The combined two-way AADT for this section of Nelson Bay Road was 15,311 vehicles per day.

A review of TfNSW Travel Zone Projections Map Explorer indicates growth in the area is projected to be between 0.6-0.8% per annum.

Applying a 10% growth factor (0.8% pa for the 12 years 2014-2026) to this data would indicate flows on Nelson Bay Road could be in the order of 16,850 vehicles per day.

2.3.3 Daily Traffic Flow Distribution

The daily traffic volumes are reasonably balanced in both directions, with the above data indicating a bias in traffic movements westbound in the morning and eastbound in the afternoon. This would be reflective of the commuter demands, with commuters travelling from the Nelson Bay area towards greater Newcastle, Maitland and the Lower Hunter Valley and the reverse occurring in the afternoon period.

2.3.4 Vehicle Speeds

No speed surveys were completed as part of the study work. It is considered that drivers on Nelson Bay Road could travel at speeds over the posted speed limit given the quality of the road and the road alignment.

2.3.5 Existing Site Flows

The site currently generates minimal traffic flows.

2.3.6 Heavy Vehicle Flows

Heavy vehicle movements in the vicinity of the subject site are relatively low, reflective of the limited through traffic movements along Nelson Bay Road. As a road that serves the Nelson Bay peninsula, there are no through traffic movements, with the heavy vehicle movements mainly those associated with deliveries to the various urban centres and some industrial users along with bus services.

During the traffic surveys, the vast majority of the traffic were light vehicles with the heavy vehicle content representing some 5% of the overall traffic movements in the AM peak and less (3%) in the PM peak.

2.3.7 Current Road Network Operation

Observations on site during the peak periods showed that the road network currently operates very well with traffic movements along Nelson Bay Road flows well with no delays or congestion, and the two lanes of travel allow faster moving traffic to pass slow vehicles as appropriate. Traffic movements in and out of side roads have minimal delays with drivers able to determine suitable gaps.

Traffic flows along Nelson Bay Road are also influenced by seasonal demands, with summer demands increasing due to the tourist's facilities in the Nelson Bay area. Similarly, the weekend traffic demands can be relatively high, reflective of weekend and day trips to the Nelson Bay area.

2.4 Traffic Safety and Accident History

Published accident data for the five years 2020-24 shows there have been six accidents recorded in the vicinity of the site between the site and Marsh Road.

Two of these resulted in serious injury, one being an off road crash whilst the other was a rear end collision.

Only one crash involved speeding, an off road crash resulting in moderate injury.

There have been no crashes on Nelson Bay Road during this period involving heavy trucks.

2.5 Parking Supply and Demand

2.5.1 On-street Parking Provision

There is no restriction to parking along Nelson Bay Road with a sealed shoulder allowing for vehicles to stop if necessary.

2.5.2 Off-Street Parking Provision

Given the rural nature of the area parking is provided within individual lots.

2.5.3 Parking Demand and Utilisation

During the site work, there were no vehicles parked on Nelson Bay Road. It is considered that any vehicles parking on this road would be associated with emergency or breakdowns only, as there is no demand to park on the roadside in this location.

2.5.4 Set down or pick up areas

There is an indented bus drop off / pick up zone outside the entrance to the local school on Marsh Road.

2.6 Public Transport

2.6.1 Rail Station Locations

The subject site is not served by trains. The nearest train station is in Hexham, approximately 25kms from the subject site.

2.6.2 Bus Stops and Associated Facilities

There are bus stops located on both sides of Nelson Bay Road including to the west of the site, to service patron demands for buses that operate along Nelson Bay Road. The stops on Nelson Bay Road provide a sign only with no seats or shelter.

There is a bus drop off zone located outside the local school on Marsh Road together with a bus stop on the opposite side of the road. There is a single shelter on Marsh Road to service these bus stops.

2.7 Other Proposed Developments

There are no other major developments occurring in the immediate vicinity of the subject site.

3 Proposed Development

3.1 The Development

The Proponent seeks to develop the site for an extractive industry as a sand quarry. Consent is sought for annual extraction of 530,000tpa for 10 years, equating to a total life-of-quarry sand extraction of approximately 4.4 million tonnes. It is anticipated the proposal would average sales of 10,000 to 12,000 tonnes per week.

The site has an area of approximately 40.9ha with the proposal seeking to use the entirety of the subject site for extractive industry purposes with the exception of:

- A 15m buffer between the site boundary and any areas of extraction
- The existing right-of-carriage way in the north-east of the site including the small area east of this right-of-carriageway;
- The existing electricity easement at the southern end of the site and the vegetated area to the south of this easement.

No dredging activity or below-groundwater-level extraction is proposed with only dry (surface) sand extraction being employed.

Preparation of the site and proposed sand quarry operations would broadly comprise:

- Construction of a new left-in left-out intersection
- Establishment of processing and sales area including installation of onsite office (Atco structure), installation of screening and wash facilities, designation of stockpiling areas, and use of the existing dwelling at the site for a manager's residence;
- Staged vegetation clearing and topsoil stripping *in accordance with the approved staging plan with topsoil stored onsite to be used for future rehabilitation works;*
- Dry extraction methods only down to a maximum of 0.7m above the ground water table;
- Ongoing rehabilitation

Day-to-day operations would require two (2) articulated haul trucks (Volvo A40G) loaded by a hydraulic excavator (Volvo EC350) to transport raw sand from the extraction area to the on-site processing facility being a full electric screen and wash plant. Equipment will include excavators, front-end loaders, haul trucks, conveyors and water carts. Operations would utilise modern, well-maintained equipment incorporating advanced noise attenuation and water saving measures as well as fuel efficiency technology to reduce operational impacts on the surrounding environment.

The site benefits from a Water Access Licence (WAL5960) for 40ML per annum which is proposed to be used for sand washing purposes. Approximately 85% of extracted sand will be washed requiring a total of approximately 32ML per annum which is within the current Water Access Licence.

All essential services are available, or able to be made available, at the site including electricity, water tanks for potable water, pump-out system for sewage management, stormwater drainage and suitable vehicular access.

Sales would be by haulage truck at a maximum of ten (10) loaded trucks per hour equating to a maximum of 120 loaded trucks per day. This allows for peak activity periods however shall equate to an average of 46 loaded trucks per day. All transport trucks would travel east along Nelson Bay Road and complete a U-turn at the Port Stephens Drive roundabout. Haulage trucks will be prohibited from using Marsh Road.

The site will be accessed by way of a new left-in left-out intersection onto Nelson Bay Road. The existing access to the site at the electricity easement is proposed to be retained for light vehicle access for the quarry as well as access to the manager's residence.

Progressive rehabilitation of exhausted areas will take place in accordance with an approved rehabilitation plan. The proposed post-quarry use of the site is to return the site to its current condition, being the same ratio of vegetated land and land used for the purpose of extensive agriculture.

The peak use on the site would allow for 120 trucks to enter and exit the site per day being 240 daily truck movements.

3.1.1 Phasing and Timing

No staging of the project has been allowed for in this assessment which has allowed for peak operational demands. The sand extraction is staged allowing for ongoing rehabilitation of the site.

3.1.2 Access and Circulation Requirements

A new left in left out access is proposed from Nelson Bay Road which is the frontage road for the site. The existing access from the electricity easement will be retained for light vehicle use.

No vehicle access is proposed via Marsh Road as this has been previously considered unsuitable by the road authority due to the proximity to the public school.

All vehicles will access and egress the site in a forward direction.

This access will be designed and constructed in accordance with Council and TfNSW design requirements. A concept plan for the access is included in **Attachment B**.

3.2 Access

A vehicle access point providing a separated driveway with a single entry and exit lane is proposed to allow for direct access off Nelson Bay Road. This access will be used by both light and heavy vehicles and allow for both entry and exit movements being left in and left out only.

Trucks will approach from the west along Nelson Bay Road to turn left into the site. Exiting trucks will continue east along Nelson Bay Road to undertake a U-turn at the roundabout at Port Stephens Drive.

Demands for trucks to approach from the east are considered low with the majority of markets to the west however there is an existing U-turn facility provided to the west of the site access, with a deceleration lane for the traffic turning off the westbound traffic lane.

The existing driveway at the electricity easement from Nelson Bay Road will be retained to provide ongoing access to the dwelling, a future manager's residence, both now and following the end of the quarry's life. This will also provide access for light vehicles associated with workers and can provide an emergency exit from the site if required.

Circulation within the site will be determined by the operational requirements of the development. All vehicles will be able to enter the site and manoeuvre as required within the site and exit in a forward direction. The site plan (Attachment A) provides for an indicative layout of the site.

3.2.1 Driveway Location

The proposed new access shall be via a new intersection providing left in left out access onto Nelson Bay Road. This is located on a straight section of Nelson Bay Road with the entrance proposed to be designed to provide separation between entering and exiting vehicles as well as the lane widening which accommodates U-turns in this location.

Nelson Bay Road provides two lanes of travel in both directions, and the trucks will turn off the through lane and enter a left turn deceleration before entering the site. This entry point on the approach occurs prior to the existing U-turn lane on Nelson Bay Road and will only allow for left turn inbound traffic movements. A raised central median shall prohibit vehicles using the U-turn facility to enter the site. Exit movements will be accommodated through a separate acceleration lane which shall merge with Nelson Bay Road to the east of the site access.

Access to the dwelling shall be retained through the existing driveway associated with the electricity easement south-west of the new intersection.



Figure 3-1 –Aerial image showing road alignment in vicinity of site access (left hand side of image)

3.2.2 Service Vehicle Access.

Site servicing requirements are expected to be low. There will be a requirement for a fuel truck to access the site as well as occasional maintenance vehicles for the quarry vehicles and equipment which will be located permanently on site.

3.2.3 Access to Public Transport

The site has limited access to public transport, with limited bus services provided along Nelson Bay Road. While future workers could use these bus services, it is considered that the proposed development will generate no demand for public transport use.

3.3 Circulation

3.3.1 Pattern of circulation

All vehicles will be able to enter and exit the site in a forward direction from the local road network. All trucks will enter and exit the site in a forward direction to Nelson Bay Road via the newly designed access.

Light vehicles will also use the new access although the existing driveway is being maintained to provide access to the manager's accommodation and other workers as per the existing situation.

3.3.2 Road width

The access on Nelson Bay Road will be designed and constructed in accordance with Council and TfNSW requirements and will allow for the movement of trucks. An internal roadway will provide for the movement of trucks to and from the loading area via the weighbridge. An informal road will also connect to the layover area for quarry vehicles. All internal roads will consider the swept path requirement of a truck and trailer combination as well as the internal haulage truck.

3.3.3 Internal Bus Movements

None required.

3.3.4 Service Area Layout

The site has two main areas, the sand extraction area and the processing and sales area (Attachment A)

A hardstand is provided connecting to the extraction area along with a parking area for the quarry vehicles.

Trucks for sand transportation will not remain on site overnight.

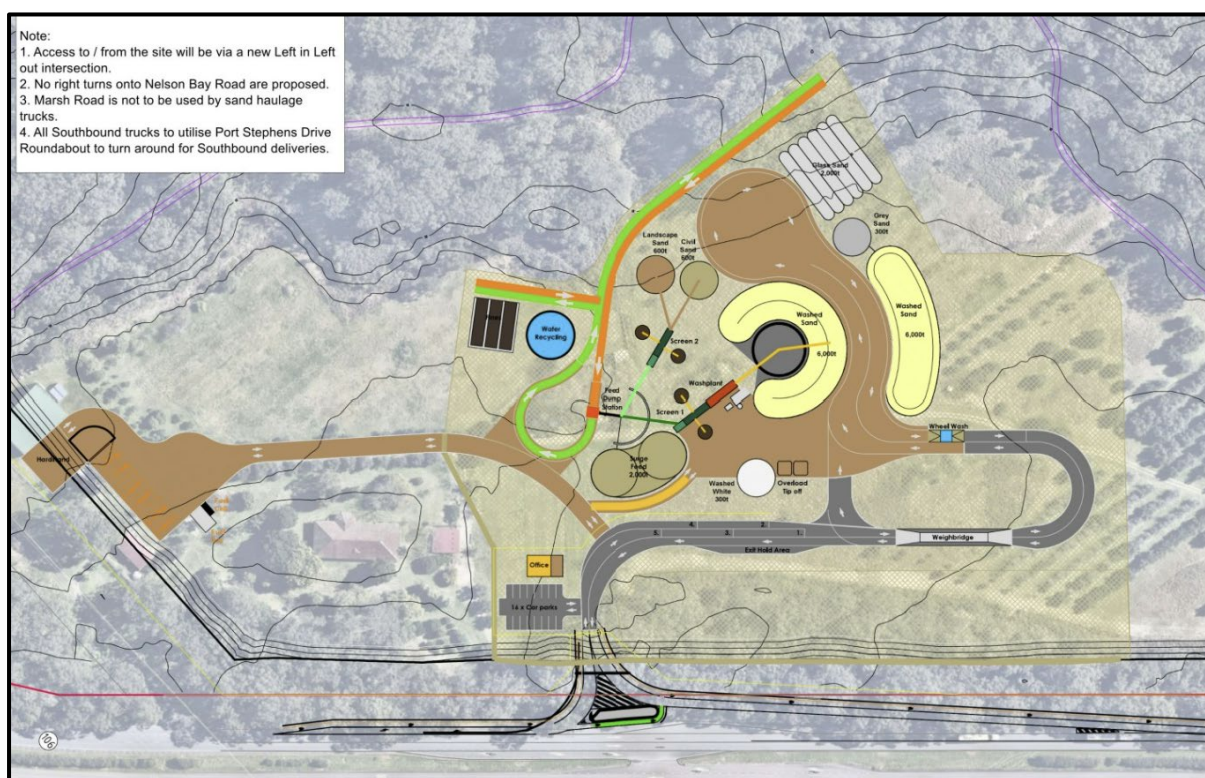


Figure 3-2 Site layout for access and wash area with extraction (Stage 1) to left of image

3.4 Parking

The parking for the development will be provided for the staff located on site. This area is adjacent to the office on the site.

There will be no requirement for the trucks to park on the site overnight. Equipment associated with the quarry operations will stand on site.

3.5 Pedestrian and Bicycle Facilities

The site is relatively remote and as such it is considered that there will be no demand for pedestrian or cyclists' access. There will be no demand or provision for internal movement of pedestrians or cyclists within the site except for staff which shall be covered by a suitable management plan.

4 Transportation Analysis

4.1 Traffic Generation

Allowing for the annual extraction of 530,000tpa, based on 40tonnes per truck this equates to 13,250 laden trucks per year. Divided by 288 days per year (48 weeks @ 6 days) this sees an average of 46 loaded trucks per day. The site is proposed to operate between 6.00 am and 6.00 pm Monday to Friday, 7.00am to 4.00pm Saturday with sand processing, washing and production occurring 7:00 am to 5:00 pm, Monday to Friday, 7:00 am to 4:00 pm, Saturdays. The site will be closed Sundays and Public Holidays.

Traffic associated with the development will however vary based upon the market demands and weather conditions. During peak periods daily throughput could see 120 laden trucks per day based on an hourly output of 10 trucks. This is a peak period, and at other times, there would be much lower demands, whilst during particularly quiet periods, there would be no demand for trucks to enter and exit the site at all. This maximum daily output will not be continuous as it is not sustainable given the annual extraction

This peak scenario has however been applied to provide a robust assessment. This would see 120 trucks entering and 120 trucks exiting the site per day (240 truck movements) seeing some 10 inbound and 10 outbound trucks per hour when the site is working at maximum capacity.

Given the proposed work hours and operational staff demands, staff arrivals are expected to be spread across several hours in the morning and departures similarly in the afternoon. Staff arrivals could therefore be 5-8 per hour.

4.1.1 Daily and Seasonal Factors

The nature of the development will lead to significant variation in daily traffic flows, dependent upon market demands. During quiet periods, it is expected that there would be no demand for trucks to enter or exit the site. Flows could be lower on a Saturday, and the site will not operate on Sundays or public holidays.

4.1.2 Sight Distances

The site access point on Nelson Bay Road is located within an 80 km/h speed zone. The access shall be designed to allow for the safe egress of trucks with a separate acceleration lane allowing vehicles to reach speed and merge with through traffic on Nelson Bay Road. For drivers entering the site a deceleration lane allows for a truck to move from the through lane and reduce speed prior to entering the site.

For the 80 km/h, the stopping sight distance requirements is 100 metres and this distance is available based upon the on-site assessment. This distance will allow a driver approaching the site access to observe the start of the left turn deceleration lane and allow for safe manoeuvring into this lane for the trucks. This will also allow drivers following the trucks to adjust their vehicle speeds or move into the right hand lane on Nelson Bay Road and ensure that the trucks can safely enter the left turn slip lane.

The separated acceleration lane and merge taper will be designed to allow for the safe entry of trucks onto Nelson Bay Road to the east of the site access. This includes consideration of sight lines for the driveway on the adjacent site.

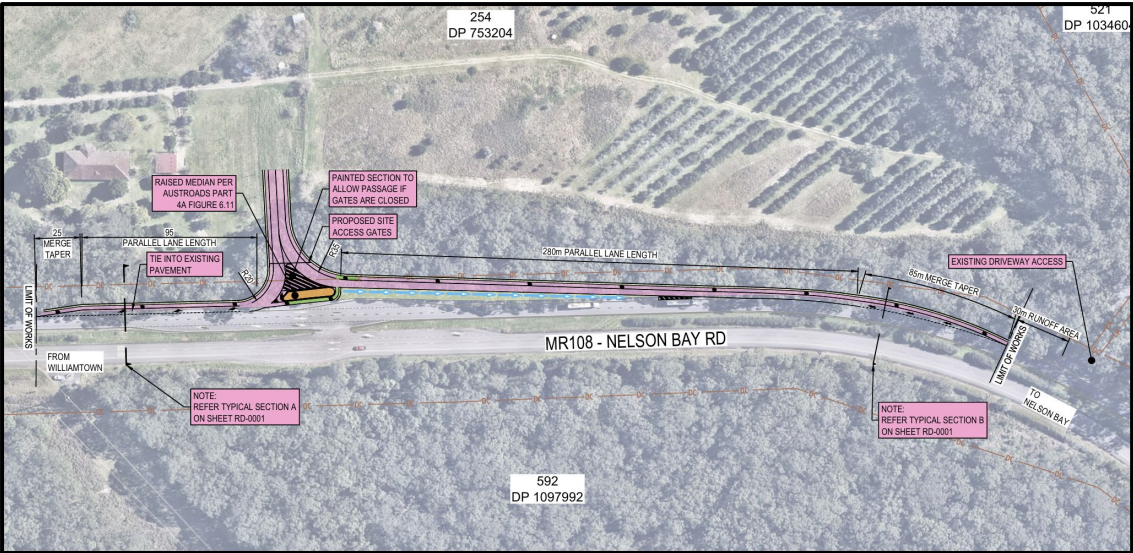


Figure 4-1 Concept plan for site access

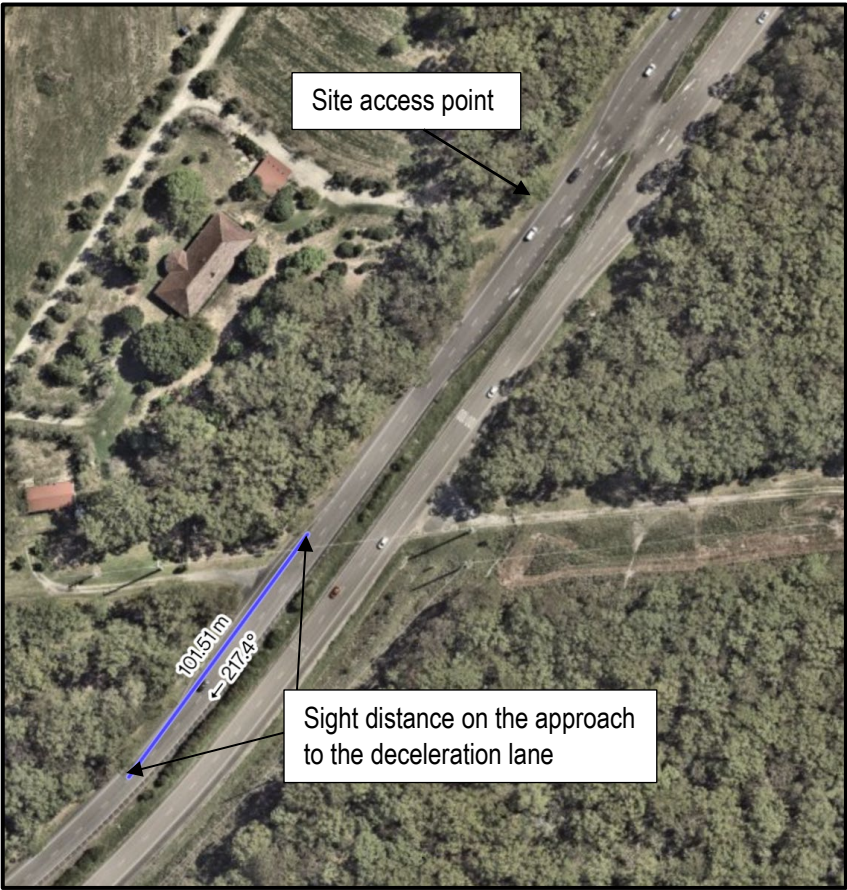


Figure 4-2 Aerial of site distance on approach to deceleration lane



Photo 1 – View along Nelson Bay Road south-west of the site in the vicinity of the proposed deceleration lane



Photo 2 – View looking south-west along Nelson Bay Road in the vicinity of the proposed access at the U-turn facility

Overall, it is considered that the proposed access can be located to enable vehicles entering and exiting the site via Nelson Bay Road to achieve acceptable sight lines given the road alignment and the vehicle speeds.

4.1.3 Queuing at entrance to site

There is no vehicle queue expected at the site entry / exit point. Given the low overall traffic demands associated with the future development and the left in traffic arrangement on Nelson Bay Road all vehicles will be able to enter the site without delay. Gaps are created for outbound trucks given the time required for loading and exiting via the weighbridge however should any queues associated with exit movements form; these are expected to be minimal and will be contained within the site. This will be ensured through operational plan commitments.

Similarly light vehicle movements associated with staff are expected to be low (up to 15 working at different times across the day) with no delays for entering or exiting vehicles.

4.1.4 Comparison with existing site access

The site currently has a dwelling with access to Nelson Bay Road. This will provide accommodation for a site manager with a driveway from the electricity easement being retained to provide access. The current use on site involves the occasional use of truck and dog combinations and these trucks operate in a safe manner with no reported issues or concerns.

As detailed above the new intersection providing access shall be located east of the electricity easement and existing driveway.

4.1.5 Pedestrian Movements

The development is not expected to be a generator of pedestrian movements external to the site. Pedestrian demands within the site will also be minimal, primarily associated with the start and finish of the day.

4.2 Traffic Distribution and Assignments

Given the location of Bobs Farm on the Nelson Bay peninsula, through traffic is limited.

Based on data for a sand quarry operated by Newcastle Sand at Cabbage Tree Road all traffic is expected to have an origin/destination to the west of the site to then be distributed to the broader market as shown below.

Given the left in left out access, and the alignment of Nelson Bay Road with a central median and separated carriageway all trucks will exit the site and initially travel east to the roundabout at Port Stephens Drive to undertake a U-turn to then travel west. This will be reinforced through an Operational Management plan including Drivers Code of Conduct for the site operations.

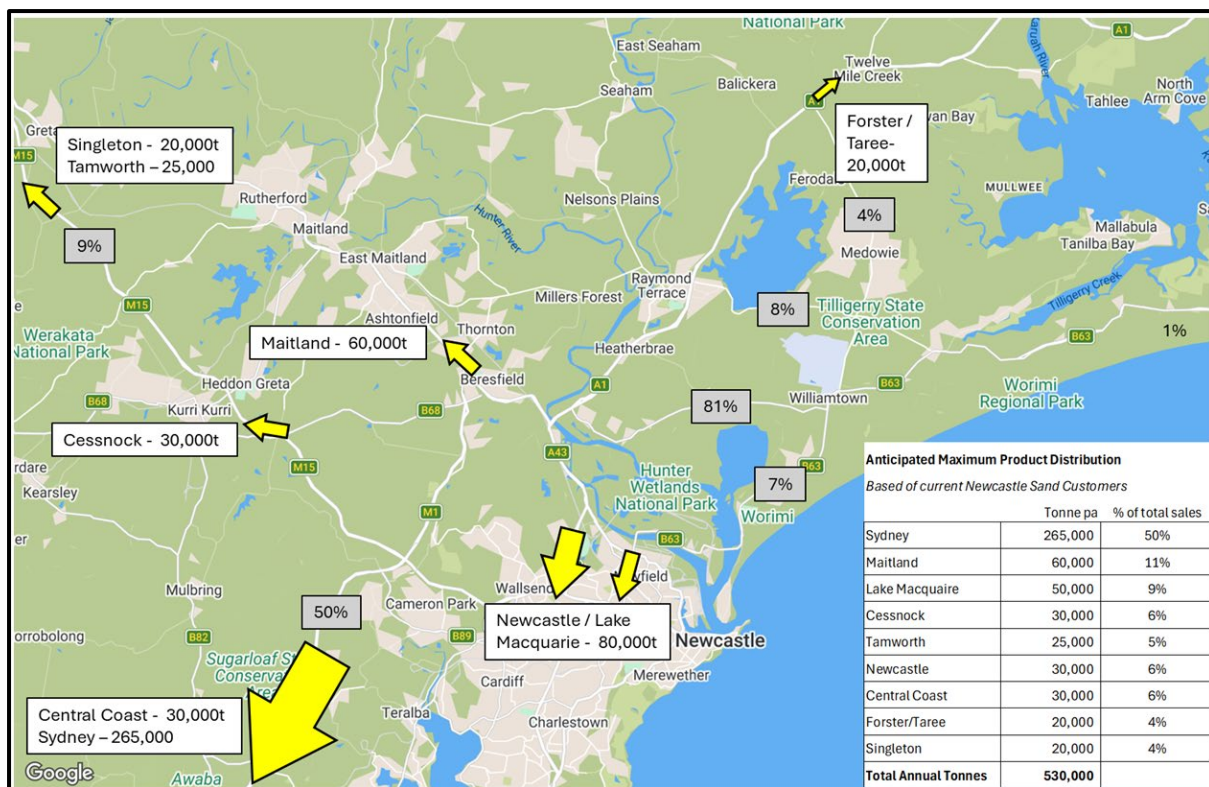


Figure 4-3 End markets for sand products (Source Newcastle Sand)

4.2.1 Origin / destinations assignment

Haulage routes are expected to be dispersed along existing local roads with:

- north bound deliveries travelling along Richardson Road to the Pacific Highway and Raymond Terrace
- west bound deliveries travelling along Cabbage Tree Road to Tomago and west along the New England Highway
- southbound deliveries travelling to Tomago to then travel south along the M1 Pacific Motorway
- Newcastle based deliveries travelling along Nelson Bay Road to Kooragang and connecting with the local road network as appropriate

Both Nelson Bay Road, Cabbage Tree Road, Richardson Road and Medowie Road are approved routes suitable for B-doubles and similar heavy haulage. (source NHVR)

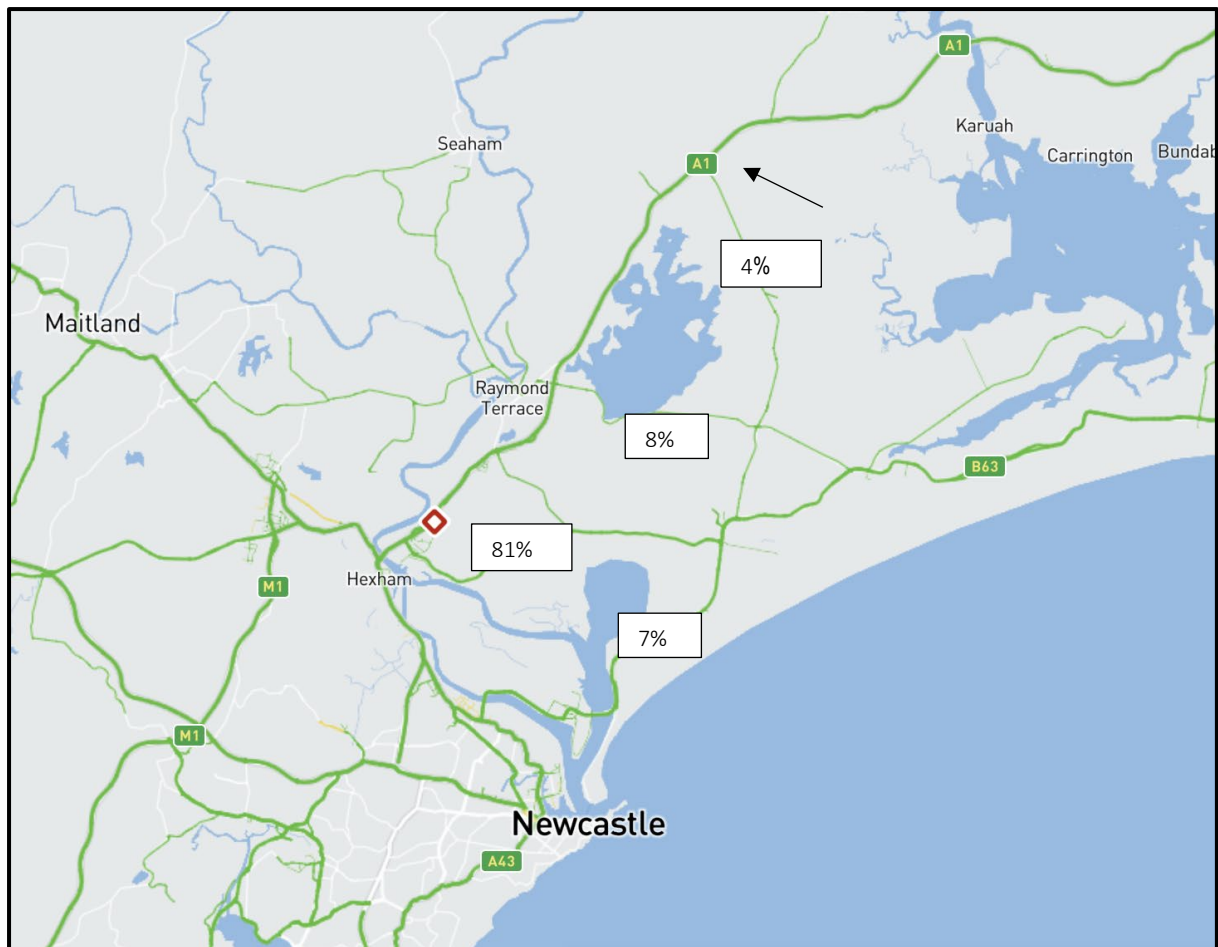


Figure 4-4 Traffic movements associated with outbound material movements

4.3 Impact of Generated Traffic

4.3.1 Impact on daily Traffic Flows

It can be seen that the development will have a low impact upon the overall daily traffic movements in the general locality of the subject site. At peak operations, there will be 240 truck movements per day (120 in and 120 out of the site) with these movements primarily heading west along Nelson Bay Road having initially headed east to undertake a U-turn at Port Stephens Drive on their outbound journey. Daily staff movements maybe 30-46 trips daily given the likelihood most staff would remain on site throughout the day given the lack of local shops or attractions. This will potentially increase flows in Nelson Bay Road to the west of the site by 285 (240 + 45) vehicles. Based on the adjusted AADT for this length of Nelson Bay Road flows are 16,850 which could increase to 17,135 vehicles per day during peak operations, an increase of 1.7% over the existing flows.

With peak flows of 1008 eastbound in the PM Nelson Bay Road is operating well within its capacity based on Austroads lane capacity for multi-lane roads with a free flow speed of 80 km/hr. The impact of up to 18 additional vehicles per hour per direction (10 + 8) in the peak hour, and less throughout the day, will have a minimal impact in the PM peak with background flows outside of this time less again.

Free-flow speed	Criteria	A	B	C	D	E
100 km/h	Maximum density (pc/km/ln)	7	11	16	22	25
	Average speed (km/h)	100.0	100.0	98.4	91.5	88.0
	Maximum volume to capacity ratio (v/c)	0.32	0.50	0.72	0.92	1.00
	Maximum service flow rate (pc/h/ln)	660	1080	1550	1980	2200
90 km/h	Maximum density (pc/km/ln)	7	11	16	22	26
	Average speed (km/h)	90.0	90.0	89.8	84.7	80.8
	Maximum volume to capacity ratio (v/c)	0.30	0.47	0.68	0.89	1.00
	Maximum service flow rate (pc/h/ln)	600	990	1430	1850	2100
80 km/h	Maximum density (pc/km/ln)	7	11	16	22	27
	Average speed (km/h)	80.0	80.0	80.0	77.6	74.1
	Maximum volume to capacity ratio (v/c)	0.28	0.44	0.64	0.85	1.00
	Maximum service flow rate (pc/h/ln)	550	900	1300	1710	2000
70 km/h	Maximum density (pc/km/ln)	7	11	16	22	28
	Average speed (km/h)	70.0	70.0	70.0	69.6	67.9
	Maximum volume to capacity ratio (v/c)	0.26	0.41	0.59	0.81	1.00
	Maximum service flow rate (pc/h/ln)	290	810	1170	1550	1900

Source: Austroads (2020)

Figure 4-5 Capacity levels for Multi-Lane roads

4.3.2 Peak Hour Impacts on Intersections

The peak hour traffic volumes associated with the development have been determined based upon first principals. The development, at peak operations, will generate up to 120 inbound and 120 outbound truck movements per day with the maximum hourly output of 10 inbound and 10 outbound movements per hour. Staff numbers are low and disbursed across the morning and afternoon allowing for varying shift times and staff demands.

The key intersection that could be impacted upon by the proposed development would be the roundabout intersection of Nelson Bay Road and Port Stephens Drive which shall be utilised for trucks to undertake a U-turn to travel west along Nelson Bay Road. Light vehicles shall be able to use existing U-turn facilities and therefore not rely on this roundabout.

The operation of this intersection has been assessed using SIDRA intersection modelling based upon traffic data collected for the project. This traffic data was collected Wednesday 18th February 2026 outside of school holidays. The results for the intersection analysis for the morning peak period (7.30 to 8.30) and afternoon peak period (15.15 to 16.15) are shown below.

Table 4-1 – Sidra results, 2026 existing situation Nelson Bay Road and Port Stephens Drive

Approach	Level of Service	Delay (seconds)	Queue (metres)
Nelson Bay Road (Nelson Bay)	A / A	6.6 / 7.0	20.4 / 21.0
Port Stephens Drive	A / A	10.4 / 10.7	12.9 / 18.5
Nelson Bay Road (Newcastle)	A / A	4.5 / 4.5	17.0 / 22.0
Jessie Road	A / A	11.7 / 9.5	2.1 / 1.5
Overall	A / A	6.6 / 6.8	20.4 / 22.0

Note- results for the AM / PM peak periods



Figure 4-6 Layout of roundabout intersection of Nelson Bay Road (east-west) and Port Stephens Drive/Jessie Road

The operation of this roundabout including development flows has been assessed with SIDRA and the results of the analysis are presented below in Table 4-2.

Table 4-2 – Sidra results, 2026 + development Nelson Bay Road and Port Stephens Drive

Approach	Level of Service	Delay (seconds)	Queue (metres)
Nelson Bay Road (Nelson Bay)	A / A	6.7 / 7.1	20.6 / 21.2
Port Stephens Drive	A / A	10.4 / 10.7	13.1 / 18.7
Nelson Bay Road (Newcastle)	A / A	4.7 / 4.6	17.5 / 22.5
Jessie Road	A / A	11.8 / 9.6	2.1 / 1.5
Overall	A / A	6.7 / 6.9	20.6 / 22.5

Note- results for the AM / PM peak periods

The above analysis shows that the roundabout is operating well with minimal delays and congestion for all road users. The additional traffic movements associated with the development shall increase traffic demands by some 10 vehicles per hour being outbound laden trucks. It is considered that this will have a negligible impact upon the operation of the roundabout, based upon site observations and the SIDRA analysis above for the peak period. Outside of the peaks, the traffic movements are much lower with the roundabout operating with less delays.

For the access route through to Newcastle / Raymond Terrace and Maitland, all of the major intersections are controlled by traffic signals or roundabouts and operate well with minimal delays and congestion. It is considered that the additional 20 trucks movements per hour maximum would have an acceptable impact upon these intersections.

4.3.3 Background traffic and other developments

A review of growth in this location indicates that this has been very low, being on average 0.8% per annum. Allowing for the above SIDRA results the impact of 10% background growth over a 10 year timeframe is considered to be acceptable with this roundabout and the road network in the locality of the subject site continuing to operate to a high level with minimal delays and congestion.

The impact of this quarry operation downstream shall be negligible as this quarry will come online at the same time as the proponent's Cabbage Tree Road operation will be at the end of its operational life. The trucks associated with the subject site will replace those currently operating from the Cabbage Tree Road sand quarry with no permanent increase in traffic demands. Even if both operated concurrently these roads operate well with the key intersection of Tomago Road and the Pacific Highway subject to significant changes in association with the M1 Motorway extension and able to accommodate the impact of 8 additional truck movements each way per hour.

Other sand quarries operating along the Nelson Bay Road corridor and other operations in the area, including the industrial developments adjacent to the Williamstown Airport, have been considered in their development planning with roads found to be adequate and intersections upgraded where necessary.

4.3.3.1 Cumulative Impacts

A review of the DPE Major Projects portal indicates a number of sand quarries subject to review by the Department of Planning and Environment.

Table 4-3 Summary of major Sand Quarry projects (February 2026)

Cabbage Tree Road (proponent's current site at 398 Cabbage Tree Road which will wind up just prior to Bobs Farm commencing)
• Cabbage Tree Road mod for lateral extension (under assessment / not approved yet)
Boral quarry at Fullerton Cove (plus mods to original consent)
Holcim at Salt Ash (under assessment / not approved yet)
Redisand at Salt Ash (7 Janet Pde)
• Redisand at Salt Ash (7 Janet Pde) mod 6 application for lateral expansion (under assessment / not approved yet)

Of these most are extensions to existing operations with these quarry vehicles forming part of the existing road operations. Holcim at Salt Ash is proposing an increase in capacity which will see additional trucks along Nelson Bay Road and Cabbage Tree Road. This increase in truck movements is quantified in the report prepared by *Transport & Urban Planning Pty Ltd (October 2021)* as being up to 111 vehicles per day (111 inbound/111 outbound) with the report concluding that the cumulative impact for the future 2031 year on the principal intersections and the quarry access intersections will be satisfactory with all intersections operating at a Level of Service A, B or C operation.

This and future growth in development along this corridor has been considered by the road authority in the upgrading of Nelson Bay Road in recent years which is reflected in the capacity analysis showing spare capacity

along this route. The upgrade of the M1 Pacific Motorway and its bypassing of Heatherbrae will also reduce traffic demands in the Tomago area which has been a pinch point, with regional and interstate traffic removed, increasing capacity through this section of the road network. Trucks with a destination to the south will be able to access the M1 Motorway north of the Hunter River at the Old Punt Road interchange and exit as required at the various interchanges along the length of the motorway. Similarly, the duplication of the Hexham Straight has provided additional capacity for traffic using this east-west corridor between Newcastle and Thornton. Therefore, it is concluded that background growth along with the traffic (up to 16 truck movements per hour) associated with the development will be able to be accommodated on these major freight corridors.

4.3.4 Impact of Construction Traffic

Construction activity on site is primarily the washing facility with associated infrastructure including an office. The major impact during the establishment of the site will be during the construction of the new access off Nelson Bay Road. This will require work on the site as well as work adjacent to the existing road carriageway.

As part of the construction work a Traffic Management Plan will need to be developed and implemented. This will be submitted to TfNSW and Council for approval prior to any works commencing on site. A Works Authorisation Deed (WAD) will also be established with TfNSW to ensure the site access is designed and constructed in accordance with the road authority requirements.

Vehicle movements associated with the construction are expected to be much less than those associated with the operation of the quarry.

4.4 Impact on Road Safety

The additional traffic flows associated with the development of the subject site will have a relatively low impact upon traffic safety. The site access located on Nelson Bay Road with a left turn deceleration lane and acceleration lane will be provided in accordance with Austroads and TfNSW design requirements to ensure trucks can safely enter and exit the site. The trucks exiting the site will have a long, separated acceleration lane and suitable merge designed to allow trucks to enter the traffic stream on Nelson Bay Road. These trucks will then complete a U-turn at the roundabout of Nelson Bay Road and Port Stephens Drive, which ensures road safety is maintained for all users. This U-turn will form part of the Operational Plan of Management and Drivers Code of Conduct which will detail the turn requirements as well as noting that all drivers must follow road rules and regulations.

The Port Stephens Drive roundabout has been designed to accommodate large truck movements and is an approved B-Double route.

The main haulage routes for the transportation of sand will be on state and regional roads which have been designed to accommodate heavy vehicle movements. No road safety audit has been considered necessary given the site is to connect directly to Nelson Bay Road, a recently upgraded road built to current road safety standards.

Overall, it is considered that the proposed development will have a negligible impact upon road safety in the general locality of the subject site and to the broader road network.

4.5 Parking Analysis

The parking for the proposed development can all be accommodated on site. There will be an area set aside beside the office which will accommodate the staff (up to 15) located on site. Note that the trucks will not be parked on site and as such do not need to be provided for nor parking for the truck drivers private vehicles.

4.6 Public Transport

4.6.1 Options for improving services

It can be seen that the site is not well serviced by public transport and the nature of the development does not support public transport use. No improvements to public transport are considered necessary for the project.

5 Improvement Analysis

5.1 Improvements to Accommodate Existing and Background Traffic

The existing road network in the immediate vicinity of the subject site is well developed having been duplicated over recent years. Current road upgrades associated with the extension of the M1 Pacific Motorway and the Hexham Straight duplication will increase road capacity and allow for background growth, including the safe movement of heavy vehicles. No further road upgrades are required to accommodate traffic movements throughout this area.

5.2 Additional Improvements to Accommodate Development Traffic

Based upon the Sidra analysis, it is considered that no road upgrade works are required to accommodate the traffic movement's associated with the subject development site. Trucks will turn left from the site and travel along Nelson Bay Road to then complete a U-turn at the roundabout controlled intersection at Port Stephens Drive. This will ensure that there are no delays for traffic and ensures that there will be no impact upon road safety at the site access.

A new access shall be developed in conjunction with Transport for NSW to provide for left in left out movements at the site entry.

U-turns at the roundabout intersection of Nelson Bay Road and Port Stephens Drive shall be documented in the quarry's Operational Management Plan and Drivers Code of Conduct.

5.3 Alternative Improvements

No alternative improvements are put forward for the project.

6 Summary and Recommendations

6.1 Summary

The following conclusions are drawn from the investigations into the proposed sand quarry at Bobs Farm off Nelson Bay Road:

1. Newcastle Sand intends to relocate sand quarry operations from its Cabbage Tree Road Williamtown site to the subject site to allow for the ongoing supply of sand given the limited life remaining of the proponent's Cabbage Tree Road site.
2. The proposal allows for a sand quarry with all heavy vehicle access via a new access point off Nelson Bay Road. Light vehicle access will be retained from an existing access to the west.
3. The site is located within the locality of Bobs Farm with frontage to Nelson Bay Road only. The major access route for outbound material will be to the west of the site along Nelson Bay Road to centres such as Taree, Maitland, Singleton, Newcastle, Lake Macquarie, Central Coast and Sydney. The end market and haulage routes will be consistent with the Cabbage Tree Road operations.
4. All trucks will enter the site directly off Nelson Bay Road via a new access which will allow left in left out movements. This access will be designed and constructed in accordance with TfNSW and Council requirements. Outbound trucks will proceed to the roundabout intersection of Nelson Bay Road and Port Stephens Drive to undertake a U-turn to travel west along Nelson Bay Road.
5. The trucks will then continue along Nelson Bay Road and use Richardson Road to head towards Raymond Terrace and the Pacific Highway, or Cabbage Tree Road to head towards the New England Highway and Maitland or continue along Nelson Bay Road towards Newcastle. Both Nelson Bay Road and Cabbage Tree Road are approved routes suitable for heavy haulage including B-Double vehicles.
6. These routes are consistent with the existing routes used by the Cabbage Tree Road quarry and so the impact on these routes will be minimal given that the existing quarry will be winding down as this quarry at Bobs Farm shall be ramping up.
7. Light vehicles will enter and exit the site and shall be able to use the existing access from the electricity easement. A carpark is proposed adjacent to the site office.
8. The site access point has been reviewed on site and allows for safe vehicle movements, with adequate sight lines to allow for the access design.
9. All parking can be accommodated on site. The haulage trucks will not be parked on site over-night with only the equipment associated with excavation and transfer to the wash area kept on site.

The overall conclusion from the investigations is that traffic and access arrangements for the development proposal are satisfactory and that there is no traffic or access impediments to the development. The trucks access routes have been reviewed based upon impacts for other road users and road safety and the proposed access routes can operate in a safe and efficient manner with minimal delays for other road users.

The cumulative impacts will be negligible with this quarry designed to replace the existing Cabbage Tree Road quarry which is reaching the end of its life with the truck movements of one replacing those of the other.

The new access point on Nelson Bay Road will be designed and constructed in accordance with TfNSW and Council requirements to ensure that vehicles, including trucks can safely enter and exit the site.

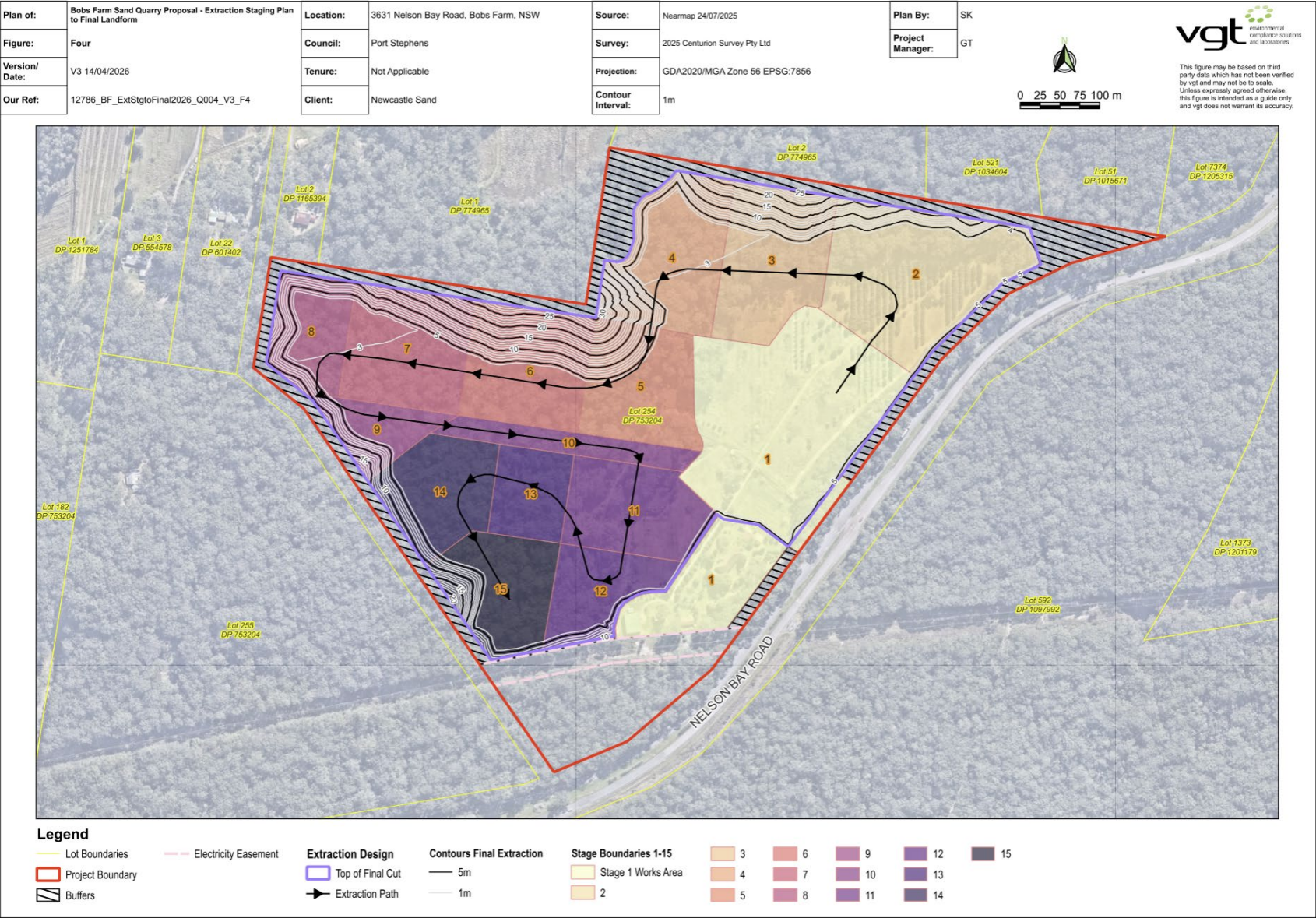
The access to the dwelling on site shall remain, providing access to the Manager's residence both now and in the future, as well as providing light vehicle access for workers. This can also provide an emergency access if required.

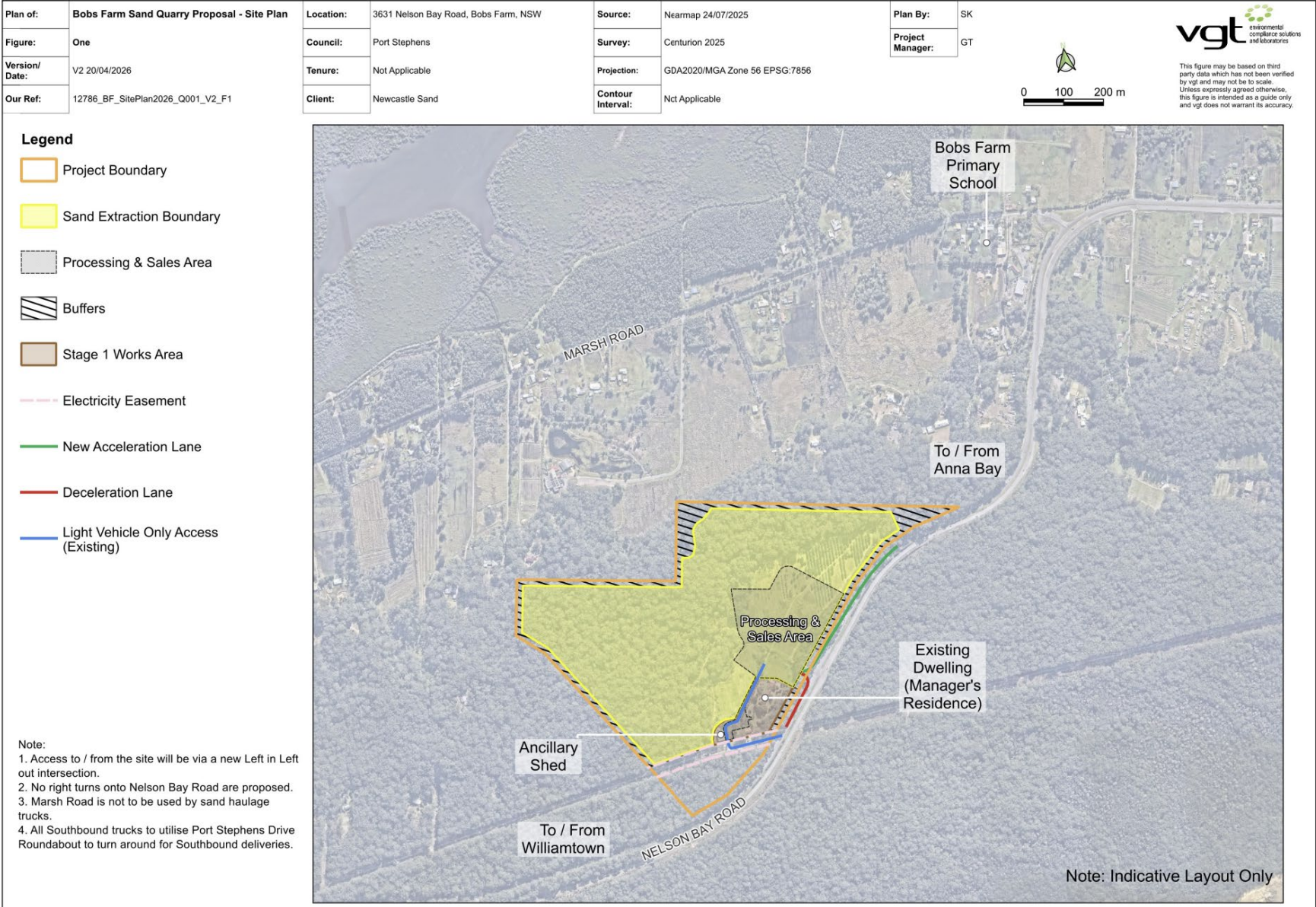
Plan of:	Bobs Farm Sand Quarry Proposal - Processing and Sales Area Plan	Location:	3631 Nelson Bay Road, Bobs Farm, NSW	Source:	Nearmap 24/07/2025	Plan By:	SK	This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.
Figure:	Two	Council:	Port Stephens	Survey:	Newcastle Sands 2026	Project Manager:	GT	
Version/Date:	V0 04/03/2026	Tenure:	Not Applicable	Projection:	Not Applicable			
Our Ref:	12786_BF_ProcessingSales2026_Q002_V0_F2	Client:	Newcastle Sand	Contour Interval:	2m			

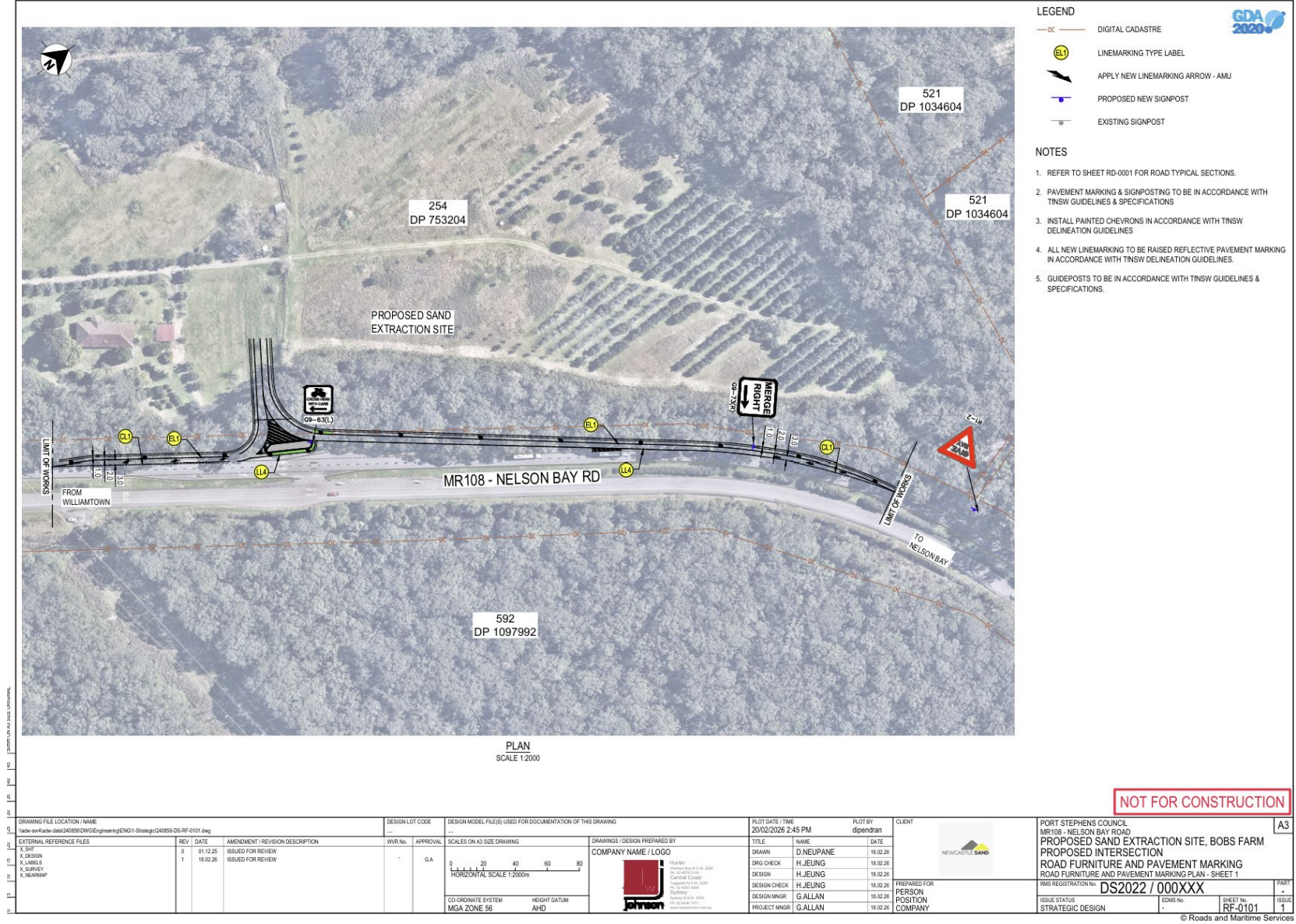
Note:

1. Access to / from the site will be via a new Left in Left out intersection.
2. No right turns onto Nelson Bay Road are proposed.
3. Marsh Road is not to be used by sand haulage trucks.
4. All Southbound trucks to utilise Port Stephens Drive Roundabout to turn around for Southbound deliveries.

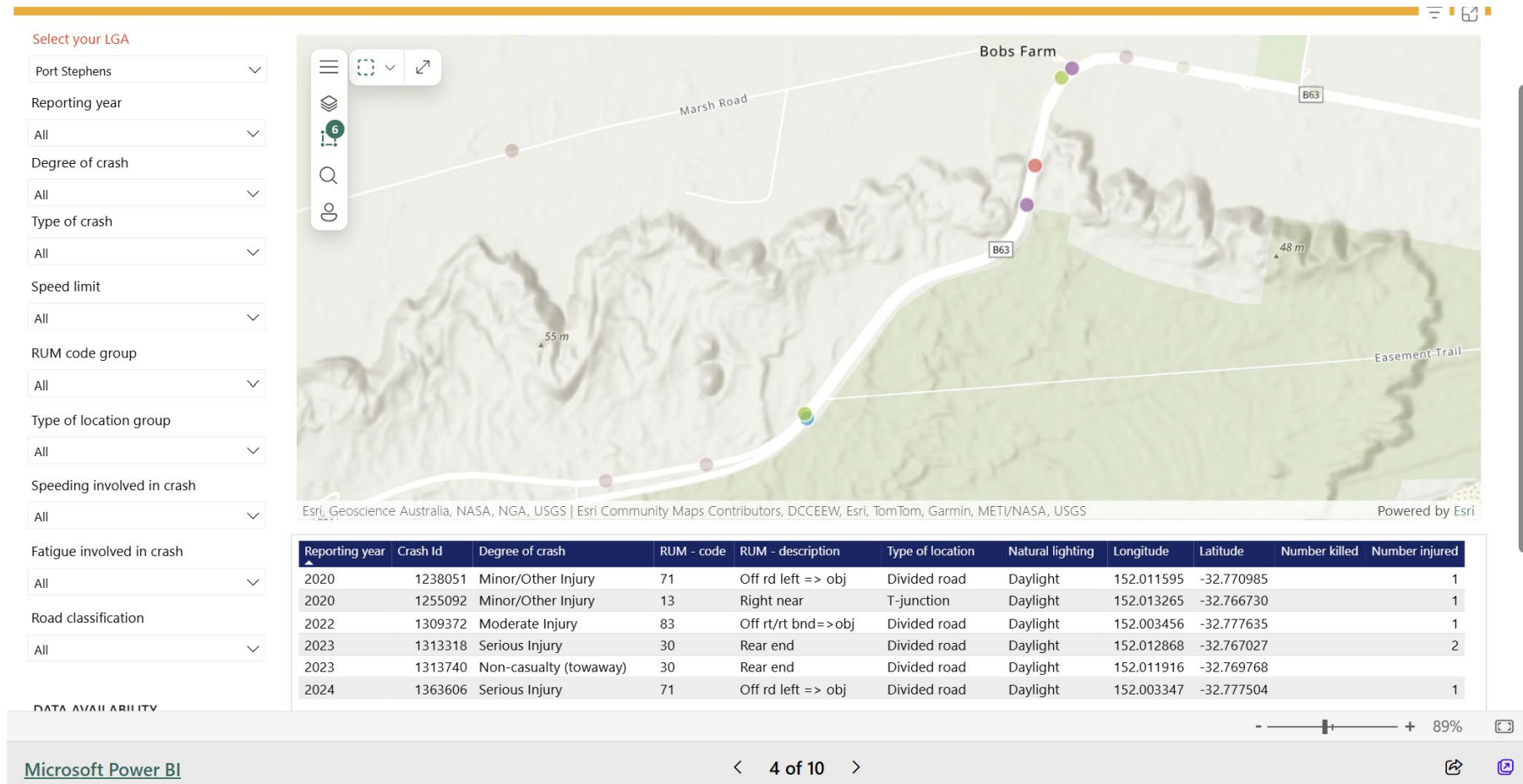
Note: Indicative Layout Only



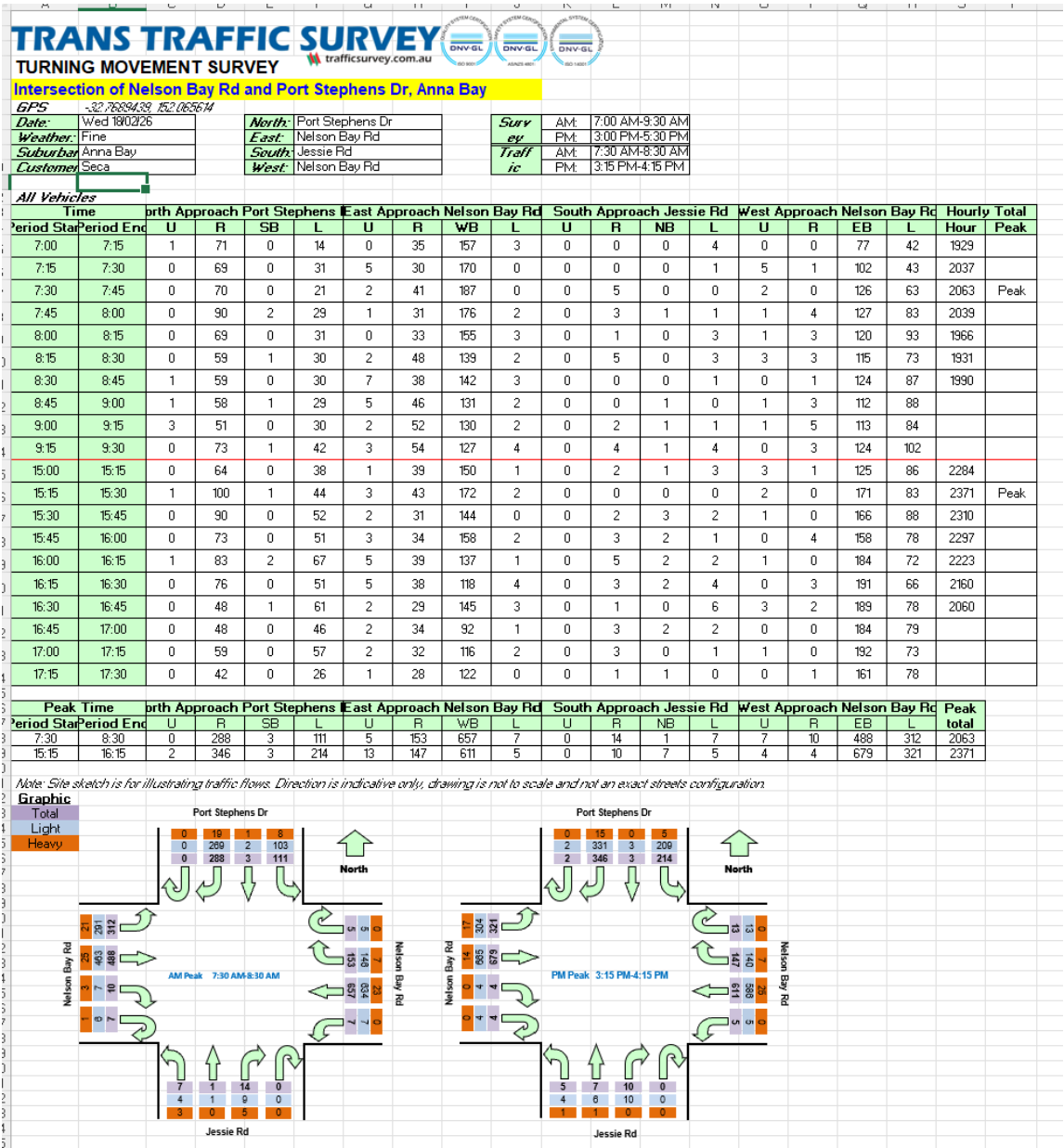




Appendix B Accident Data



Appendix C Traffic Surveys Nelson Bay Rd / Port Stephens Dr



P3289 3631 Nelson Bay Road Sand Quarry Traffic Impact Assessment VerA.02

Appendix D Sidra Results

Criteria for interpreting results of SIDRA

1-Level of Service (LoS)

LoS	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Good	Good
B	Good, with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but requires accident study
D	Operating near capacity	Near capacity and requires accident study
E	At capacity, excessive delay: roundabout requires other control method	At capacity, requires other control mode
F	Unsatisfactory, requires other control mode or additional capacity	Unsatisfactory, requires other control mode

2-Average Vehicle Delay (AVD)

The AVD is a measure of operational performance of an intersection relating to its LoS. The average delay should be taken as a guide only for an average intersection. Longer delays may be tolerated at some intersections where delays are expected by motorists (e.g. those in inner city areas or major arterial roads).

LoS	Average Delay / Vehicle (secs)	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and	Acceptable delays and spare
C	28 to 42	Satisfactory	Satisfactory but accident study required
D	42 to 56	Operating near capacity	Near capacity, accident study required
E	56 to 70	At capacity, excessive delays: roundabout requires other control mode	At capacity; requires other control mode
F	Exceeding 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode

3-Degree of Saturation (D/S)

The D/S of an intersection is usually taken as the highest ratio of traffic volumes on an approach to an intersection compared with the theoretical capacity, and is a measure of the utilisation of available green time. For intersections controlled by traffic signals, both queues and delays increase rapidly as DS approaches 1.0. An intersection operates satisfactorily when its D/S is kept below 0.75. When D/S exceeds 0.9, queues are expected.

SITE LAYOUT

 Site: [1] Nelson Bay Road - Port Stephens Drive - AM - Existing (Folder1)

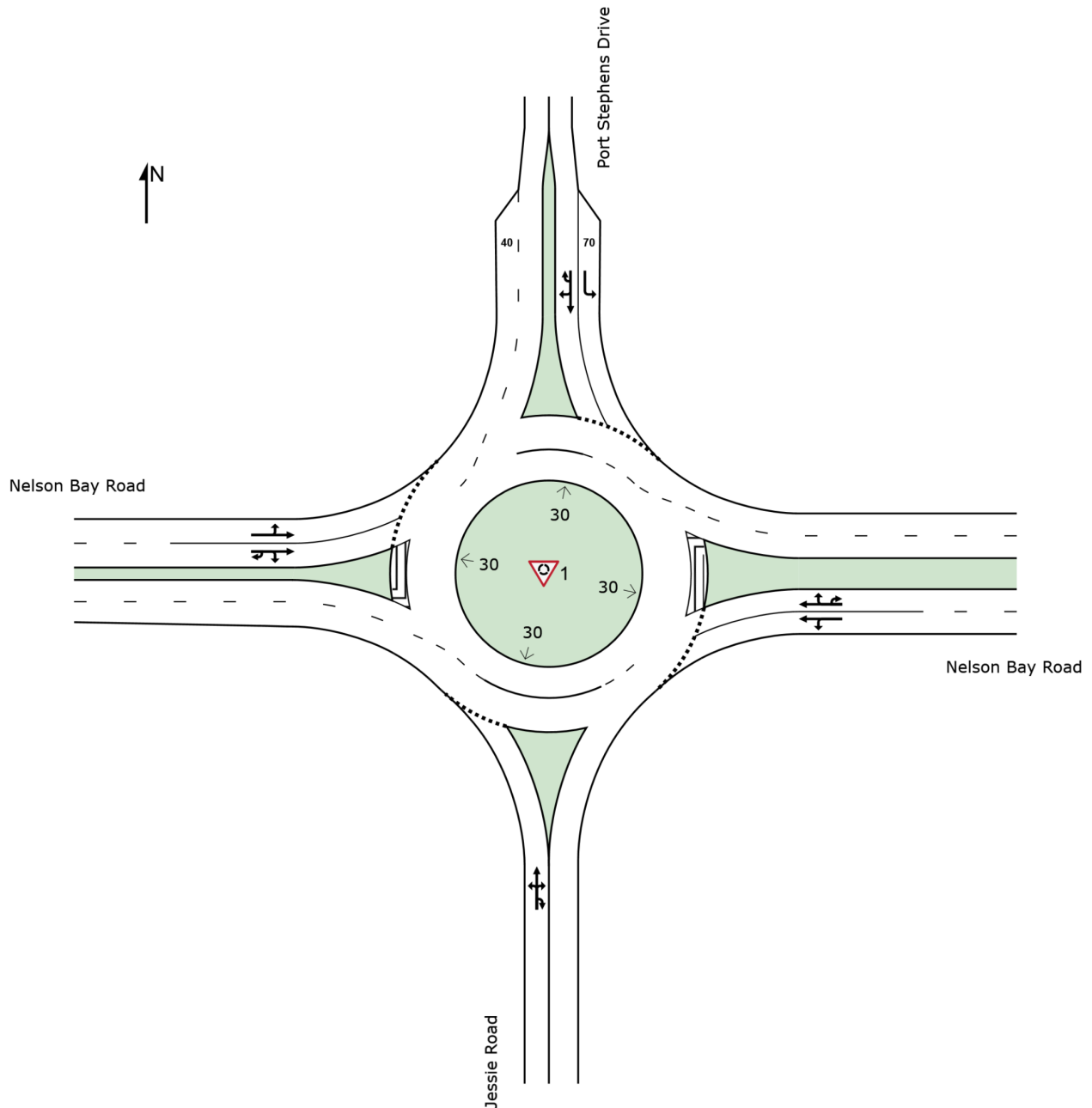
NA

Site Category: (None)

Roundabout

Site Scenario: 1 | Local Volumes

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

 **Site: [1] Nelson Bay Road - Port Stephens Drive - AM - Existing (Folder1)**

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

NA

Site Category: (None)

Roundabout

Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles	Number of Cycles	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]				[Veh.	Dist]		Rate to Depart		km/h
			veh/h	%	veh/h	%	v/c	sec		veh	m				
South: Jessie Road															
1	L2	All MCs	7	42.9	7	42.9	0.060	8.5	LOS A	0.2	2.1	0.68	0.86	0.68	49.3
2	T1	All MCs	1	0.0	1	0.0	0.060	6.5	LOS A	0.2	2.1	0.68	0.86	0.68	50.4
3	R2	All MCs	14	38.5	14	38.5	0.060	13.7	LOS A	0.2	2.1	0.68	0.86	0.68	46.5
3u	U	All MCs	1	0.0	1	0.0	0.060	13.9	LOS A	0.2	2.1	0.68	0.86	0.68	22.8
Approach			23	36.4	23	36.4	0.060	11.7	LOS A	0.2	2.1	0.68	0.86	0.68	47.4
East: Nelson Bay Road															
4	L2	All MCs	7	0.0	7	0.0	0.366	5.3	LOS A	2.8	20.4	0.62	0.52	0.62	51.5
5	T1	All MCs	692	3.5	692	3.5	0.366	5.4	LOS A	2.8	20.4	0.62	0.55	0.62	55.5
6	R2	All MCs	161	4.6	161	4.6	0.366	11.5	LOS A	2.7	19.3	0.64	0.60	0.64	54.3
6u	U	All MCs	5	0.0	5	0.0	0.366	13.6	LOS A	2.7	19.3	0.64	0.60	0.64	53.8
Approach			865	3.6	865	3.6	0.366	6.6	LOS A	2.8	20.4	0.63	0.56	0.63	55.2
North: Port Stephens Drive															
7	L2	All MCs	117	7.2	117	7.2	0.179	7.1	LOS A	0.8	6.0	0.60	0.67	0.60	55.6
8	T1	All MCs	3	33.3	3	33.3	0.327	6.9	LOS A	1.7	12.9	0.62	0.73	0.62	50.2
9	R2	All MCs	302	6.6	302	6.6	0.327	11.7	LOS A	1.7	12.9	0.62	0.73	0.62	53.7
9u	U	All MCs	1	0.0	1	0.0	0.327	13.8	LOS A	1.7	12.9	0.62	0.73	0.62	53.9
Approach			423	7.0	423	7.0	0.327	10.4	LOS A	1.7	12.9	0.61	0.71	0.61	54.2
West: Nelson Bay Road															
10	L2	All MCs	328	6.7	328	6.7	0.323	4.5	LOS A	2.3	17.0	0.44	0.46	0.44	56.6
11	T1	All MCs	514	5.1	514	5.1	0.323	4.4	LOS A	2.3	17.0	0.46	0.45	0.46	56.4
12	R2	All MCs	11	30.0	11	30.0	0.323	10.8	LOS A	2.2	16.4	0.47	0.45	0.47	53.1
12u	U	All MCs	7	14.3	7	14.3	0.323	12.8	LOS A	2.2	16.4	0.47	0.45	0.47	55.8
Approach			860	6.1	860	6.1	0.323	4.5	LOS A	2.3	17.0	0.45	0.46	0.45	56.4
All Vehicles			2172	5.6	2172	5.6	0.366	6.6	LOS A	2.8	20.4	0.56	0.55	0.56	55.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

 **Site: [1 (3)] Nelson Bay Road - Port Stephens Drive - AM - With Development (Folder1)**

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

NA

Site Category: (None)

Roundabout

Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]				[Veh. veh	Dist] m				km/h
			veh/h	%	veh/h	%	v/c	sec							
South: Jessie Road															
1	L2	All MCs	7	42.9	7	42.9	0.061	8.6	LOS A	0.2	2.1	0.69	0.86	0.69	49.2
2	T1	All MCs	1	0.0	1	0.0	0.061	6.6	LOS A	0.2	2.1	0.69	0.86	0.69	50.3
3	R2	All MCs	14	38.5	14	38.5	0.061	13.8	LOS A	0.2	2.1	0.69	0.86	0.69	46.4
3u	U	All MCs	1	0.0	1	0.0	0.061	14.0	LOS A	0.2	2.1	0.69	0.86	0.69	22.6
Approach			23	36.4	23	36.4	0.061	11.8	LOS A	0.2	2.1	0.69	0.86	0.69	47.3
East: Nelson Bay Road															
4	L2	All MCs	7	0.0	7	0.0	0.371	5.4	LOS A	2.9	20.6	0.63	0.53	0.63	51.4
5	T1	All MCs	692	3.5	692	3.5	0.371	5.5	LOS A	2.9	20.6	0.63	0.55	0.63	55.5
6	R2	All MCs	161	4.6	161	4.6	0.371	11.6	LOS A	2.7	19.5	0.65	0.61	0.65	54.3
6u	U	All MCs	5	0.0	5	0.0	0.371	13.7	LOS A	2.7	19.5	0.65	0.61	0.65	53.8
Approach			865	3.6	865	3.6	0.371	6.7	LOS A	2.9	20.6	0.64	0.56	0.64	55.2
North: Port Stephens Drive															
7	L2	All MCs	117	7.2	117	7.2	0.181	7.2	LOS A	0.8	6.0	0.60	0.67	0.60	55.6
8	T1	All MCs	3	33.3	3	33.3	0.330	7.0	LOS A	1.8	13.1	0.63	0.73	0.63	50.2
9	R2	All MCs	302	6.6	302	6.6	0.330	11.7	LOS A	1.8	13.1	0.63	0.73	0.63	53.7
9u	U	All MCs	1	0.0	1	0.0	0.330	13.9	LOS A	1.8	13.1	0.63	0.73	0.63	53.9
Approach			423	7.0	423	7.0	0.330	10.4	LOS A	1.8	13.1	0.62	0.71	0.62	54.2
West: Nelson Bay Road															
10	L2	All MCs	328	6.7	328	6.7	0.330	4.5	LOS A	2.4	17.5	0.45	0.46	0.45	56.6
11	T1	All MCs	514	5.1	514	5.1	0.330	4.4	LOS A	2.4	17.5	0.46	0.46	0.46	56.3
12	R2	All MCs	11	30.0	11	30.0	0.330	10.8	LOS A	2.3	17.1	0.47	0.46	0.47	53.1
12u	U	All MCs	18	64.7	18	64.7	0.330	14.0	LOS A	2.3	17.1	0.47	0.46	0.47	54.8
Approach			871	7.3	871	7.3	0.330	4.7	LOS A	2.4	17.5	0.46	0.46	0.46	56.4
All Vehicles			2182	6.1	2182	6.1	0.371	6.7	LOS A	2.9	20.6	0.56	0.55	0.56	55.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

 **Site: [1 (2)] Nelson Bay Road - Port Stephens Drive - PM - Existing (Folder1)**

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

NA

Site Category: (None)

Roundabout

Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles	Number of Cycles	Aver. Speed
			[Total HV]		[Total HV]					[Veh.	Dist]		Rate to Depart		km/h
			veh/h	%	veh/h	%	v/c	sec		veh	m				
South: Jessie Road															
1	L2	All MCs	5	20.0	5	20.0	0.048	7.5	LOS A	0.2	1.5	0.68	0.82	0.68	51.0
2	T1	All MCs	7	14.3	7	14.3	0.048	7.4	LOS A	0.2	1.5	0.68	0.82	0.68	51.5
3	R2	All MCs	9	0.0	9	0.0	0.048	11.8	LOS A	0.2	1.5	0.68	0.82	0.68	49.2
3u	U	All MCs	1	0.0	1	0.0	0.048	14.1	LOS A	0.2	1.5	0.68	0.82	0.68	24.9
Approach			23	9.1	23	9.1	0.048	9.5	LOS A	0.2	1.5	0.68	0.82	0.68	50.2
East: Nelson Bay Road															
4	L2	All MCs	5	0.0	5	0.0	0.366	5.5	LOS A	2.9	21.0	0.67	0.54	0.67	51.2
5	T1	All MCs	643	4.1	643	4.1	0.366	5.7	LOS A	2.9	21.0	0.67	0.57	0.67	55.3
6	R2	All MCs	155	4.8	155	4.8	0.366	11.8	LOS A	2.7	19.6	0.69	0.63	0.69	54.1
6u	U	All MCs	14	0.0	14	0.0	0.366	13.9	LOS A	2.7	19.6	0.69	0.63	0.69	53.6
Approach			817	4.1	817	4.1	0.366	7.0	LOS A	2.9	21.0	0.68	0.58	0.68	55.0
North: Port Stephens Drive															
7	L2	All MCs	225	2.3	225	2.3	0.321	7.3	LOS A	1.6	11.4	0.68	0.72	0.68	55.6
8	T1	All MCs	3	0.0	3	0.0	0.428	6.9	LOS A	2.5	18.5	0.71	0.80	0.77	49.8
9	R2	All MCs	364	4.3	364	4.3	0.428	12.7	LOS A	2.5	18.5	0.71	0.80	0.77	53.5
9u	U	All MCs	2	0.0	2	0.0	0.428	14.9	LOS B	2.5	18.5	0.71	0.80	0.77	53.6
Approach			595	3.5	595	3.5	0.428	10.7	LOS A	2.5	18.5	0.70	0.77	0.74	54.2
West: Nelson Bay Road															
10	L2	All MCs	338	5.3	338	5.3	0.392	4.5	LOS A	3.0	22.0	0.48	0.46	0.48	56.5
11	T1	All MCs	715	2.1	715	2.1	0.392	4.4	LOS A	3.0	22.0	0.49	0.46	0.49	56.3
12	R2	All MCs	4	0.0	4	0.0	0.392	10.3	LOS A	2.9	20.9	0.50	0.45	0.50	53.2
12u	U	All MCs	4	0.0	4	0.0	0.392	12.6	LOS A	2.9	20.9	0.50	0.45	0.50	56.0
Approach			1061	3.1	1061	3.1	0.392	4.5	LOS A	3.0	22.0	0.49	0.46	0.49	56.4
All Vehicles			2496	3.6	2496	3.6	0.428	6.8	LOS A	3.0	22.0	0.60	0.58	0.61	55.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

 **Site: [1 (4)] Nelson Bay Road - Port Stephens Drive - PM - With Development (Folder1)**

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

NA

Site Category: (None)

Roundabout

Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles	Number of Depart	Aver. Speed
			[Total HV]		[Total HV]					[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Jessie Road															
1	L2	All MCs	5	20.0	5	20.0	0.049	7.6	LOS A	0.2	1.5	0.69	0.82	0.69	51.0
2	T1	All MCs	7	14.3	7	14.3	0.049	7.5	LOS A	0.2	1.5	0.69	0.82	0.69	51.5
3	R2	All MCs	9	0.0	9	0.0	0.049	11.9	LOS A	0.2	1.5	0.69	0.82	0.69	49.1
3u	U	All MCs	1	0.0	1	0.0	0.049	14.2	LOS A	0.2	1.5	0.69	0.82	0.69	24.7
Approach			23	9.1	23	9.1	0.049	9.6	LOS A	0.2	1.5	0.69	0.82	0.69	50.1
East: Nelson Bay Road															
4	L2	All MCs	5	0.0	5	0.0	0.370	5.6	LOS A	2.9	21.2	0.68	0.55	0.68	51.2
5	T1	All MCs	643	4.1	643	4.1	0.370	5.8	LOS A	2.9	21.2	0.68	0.58	0.68	55.3
6	R2	All MCs	155	4.8	155	4.8	0.370	11.9	LOS A	2.7	19.8	0.70	0.64	0.70	54.1
6u	U	All MCs	14	0.0	14	0.0	0.370	14.0	LOS A	2.7	19.8	0.70	0.64	0.70	53.6
Approach			817	4.1	817	4.1	0.370	7.1	LOS A	2.9	21.2	0.69	0.59	0.69	55.0
North: Port Stephens Drive															
7	L2	All MCs	225	2.3	225	2.3	0.325	7.4	LOS A	1.6	11.6	0.69	0.73	0.69	55.5
8	T1	All MCs	3	0.0	3	0.0	0.432	7.0	LOS A	2.6	18.7	0.72	0.81	0.78	49.8
9	R2	All MCs	364	4.3	364	4.3	0.432	12.8	LOS A	2.6	18.7	0.72	0.81	0.78	53.5
9u	U	All MCs	2	0.0	2	0.0	0.432	15.0	LOS B	2.6	18.7	0.72	0.81	0.78	53.5
Approach			595	3.5	595	3.5	0.432	10.7	LOS A	2.6	18.7	0.71	0.78	0.75	54.1
West: Nelson Bay Road															
10	L2	All MCs	338	5.3	338	5.3	0.399	4.5	LOS A	3.1	22.5	0.48	0.46	0.48	56.5
11	T1	All MCs	715	2.1	715	2.1	0.399	4.4	LOS A	3.1	22.5	0.50	0.46	0.50	56.3
12	R2	All MCs	4	0.0	4	0.0	0.399	10.3	LOS A	3.0	21.7	0.51	0.46	0.51	53.2
12u	U	All MCs	15	71.4	15	71.4	0.399	14.3	LOS A	3.0	21.7	0.51	0.46	0.51	54.6
Approach			1072	4.0	1072	4.0	0.399	4.6	LOS A	3.1	22.5	0.49	0.46	0.49	56.3
All Vehicles			2506	4.0	2506	4.0	0.432	6.9	LOS A	3.1	22.5	0.61	0.58	0.62	55.3

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

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Roundabout Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

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Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.