Appendix J – Traffic Impact Assessment

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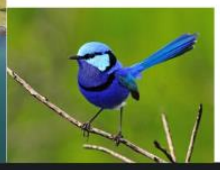

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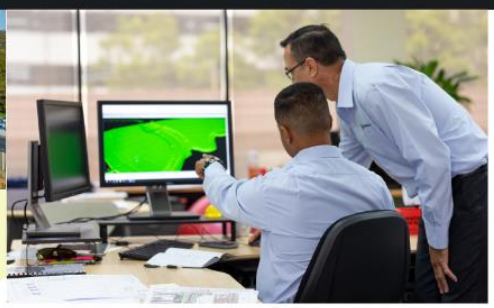

Tweed Sand Plant, Altona Road, Cudgen

Traffic Impact Assessment

Client: Hanson Construction Materials Pty Ltd
Project No: BE190043

Document No: BE190043-RP-TIA-06

February 2021

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Executive Summary

Burchills Engineering Solutions has been commissioned by Hanson Construction Materials Pty Ltd (Hanson) to prepare a Traffic Impact Assessment (TIA) report to support a Development Application (DA) for the expansion of the existing Tweed Sand Plant (TSP) located at Altona Road, Cudgen. The development is located within Tweed Shire Council Local Authority.

The current approved sand extraction sites include Lot Plans: 22 on DP1082435, 23 on DP1077509 and 494 on DP720450. The proposed expansion site includes the current site plus Lot Plans; 1 on DP1250570, 2 on DP1192506, 3 on DP1243752, 50 on DP1056966 and 51 on DP1166990. The total area for the future Tweed Sand Plant site would be approximately 236ha and result in an increase in the sand production rate from the current limit of 500,000 tonnes per annum (tpa) to 950,000 tpa. The applicant proposes to gain access from Tweed Valley Way off-ramp to the west of the site at the Pacific Motorway Interchange, contrary to the current arrangements utilising the local street network involving Altona Road, Crescent Street and Tweed Coast Road.

Pacific Motorway (M1) is a declared Freeway and Transport for New South Wales (TfNSW) is the Roads Authority for Freeways in accordance with Section 7 of the Roads Act 1993. Tweed Valley Way (679) is a classified (Regional) Road and a declared Controlled Access Road (CAR) in the subject area. Tweed Shire Council is the Roads Authority for all public roads in the local government area, including Tweed Valley Way. However, TfNSW can exercise Roads Authority powers in relation to classified roads and provides consent to any new connection with a Freeway or CAR in accordance with the Roads Act. Developer works are subject to the terms of a Works Authorisation Deed (WAD).

Email correspondence of 22 August 2019 forwarded to TfNSW requested comments in relation to the proposed expansion of the abovementioned development and the outcomes of a subsequent pre-lodgement meeting held between the applicant and TfNSW on 23 September 2019. Several options for connection to Tweed Valley Way were submitted to TfNSW for preliminary assessment.

TfNSW requested a Traffic Impact Assessment (TIA) be prepared by suitably qualified person/s in accordance with the Austroads *Guide to Traffic Management* Part 12, the complementary Roads and Maritime Supplement and RTA *Guide to Traffic Generating Developments*. The report builds on the preferred option as provided in the initial submission to TfNSW.

The report describes the site location and the existing road network in the vicinity of the site. Existing traffic surveys are available on the site and Tweed Shire Council Transport reporting on future traffic volume forecasts were also adopted in the analysis. In addition, specific targeted traffic survey volumes, vehicle classification and speed surveys in addition to peak hour intersection surveys were carried out to compliment and update the available information. All new surveys were completed in early March 2020 pre COVID -19 and represent the normal situation. The speed surveys identified that the advisory speed of 75km/hr is exceeded by speeds of 87km/hr recorded as the 85th percentile speed.

The current daily heavy vehicle percentage of 9.5% on the Tweed Valley Way off-ramp is expected to increase marginally in 2041 considering the growth in background traffic and the future Tweed Valley Way 2041 volumes including growth in current heavy vehicle and light vehicle trips. Traffic

growths at the rate of 1.6% per annum as agreed with Tweed Shire Council were adopted for the analysis of the intersection at the Australian Bay Lobster Producers Limited (ABLP) property. The growth rate is consistent with the medium growth scenario adopted for Tweed Shire Transport planning.

The report describes the other Committed Developments in the vicinity of the site. The report outlines the preferred site access strategy, including a description of the types of vehicles to be used for transportation of sand products by the proposed development, and an explanation of assumptions and justification of adopted parameters informing the TIA. Assessment of existing road safety and consideration for any increased risk arising from trips generated by the proposed development, particularly at affected intersections including available sight distances is also included. Safety and efficiency on the surrounding road network identified that no accidents have been recorded between 2013 and 2019 at the existing ABLP intersection with Tweed Valley Way.

The design vehicle for the TSP is 25m B-Double truck. The preferred site access strategy is contained in the Appendix A; SK101 and SK102. Egress from the site involves an acceleration lane and merge onto the Tweed Valley Way off-ramp. Ingress to the site involves use of the existing ABLP priority intersection including a new left turn auxiliary lane. Right turn out and right turn in will be banned for the TSP trucks at the ABLP intersection.

For future access onto the Tweed Valley Way off-ramp, trucks are required to accelerate from 40km/hr to 67km/hr at 0.4% grade over an available distance of 618m along the internal haul road to the end of acceleration lane merge taper at the Tweed Valley Way off-ramp. 540 metres is the required acceleration distance based on the higher simulated grade of 1.0% hence the acceleration lane length provided is conservative and above the absolute requirement. An additional merge distance of 90 metres is provided. The merge between the outbound haul route and Tweed Valley Way occurs before the start of the increase in the vertical gradient up to the M1 overpass level and before the 75km/hr advisory speed sign and within the 80km/hr speed zone. A run-out area is available at the end of the merge before the start of the left turn auxiliary lane into the ABLP / TSP Intersection. Actual recorded speeds are higher as per the traffic survey data and have been considered in the calculations. The deceleration lane length of 100 metres including merge is provided for the auxiliary left turn lane into the ABLP 'T' intersection. TSP destinations involve 95% delivery trips travelling north and 5% south.

The SIDRA software capacity analysis identified an excessive Level of Service (LOS) for vehicles travelling from the south in the future that will not be able to turn right into the ABLP access and instead as part of the Code of Conduct are required to continue along the M1 to the Tweed Coast Road interchange further north for a U turn to approach the intersection from the north using the left turn auxiliary lane provided in the Tweed Valley Way. Similarly, any TSP vehicles leaving, use the Service Centre roundabout for a U turn to access the M1 southbound on-ramp.

Tweed Valley Way / Caltex Service Station roundabout is designed to cater for 25m B-Double heavy vehicles. However, swept path analysis of the U-turn movement at this roundabout identified that modifications to the roundabout island are required. To ensure road safety, it is proposed to provide additional signage with advisory safe turning speed for trucks manoeuvring the roundabout as part of an upgrade that marginally widens the pavement to the circulating lane on the southeast side.

Assessment of the impact on public transport (public and school bus routes) and consideration for alternative transport modes such as walking and cycling, recommended access from the existing Tweed Coast Road as part of the Tweed Shire Council bus services and active transport infrastructure.

Functional layout plans of the proposed intersection improvements and internal haulage roads are included in Appendix A.

Hanson will retain ownership of the site following completion of sand extraction and any proposed subsequent use of the site will be decided via the appropriate consultative, application and regulation processes in place at that time.

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1. Introduction

1.1 Background

Burchills Engineering Solutions has been commissioned by Hanson Construction Materials Pty Ltd (Hanson) to prepare a Traffic Impact Assessment (TIA) report to support a Development Application (DA) for the expansion of the existing Tweed Sand Plant located at Altona Road, Cudgen. The development is located within Tweed Shire Council Local Authority.

The current approved sand extraction sites include Lot Plans: 22DP1082435, 23DP1077509 and 494DP720450. The proposed expansion site includes the current site plus Lot Plans; 1 on DP1250570, 2 on DP1192506, 3 on DP1243752, 50 on DP1056966 and 51 on DP1166990. The total area for the future Tweed Sand Plant (TSP) site would be approximately 236ha and results in an increase in the sand production rate from the current approved limit of 500,000 tonnes per annum (tpa) to 950,000 tpa. The applicant proposes to gain access from Tweed Valley Way to the west of the site at the Pacific Motorway Interchange, contrary to the current arrangements utilising the local street network involving Altona Road, Crescent Street and Tweed Coast Road.

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Email correspondence of 22 August 2019 forwarded to Transport for New South Wales (TfNSW) requested comments in relation to the proposed expansion of the abovementioned development and the outcomes of a subsequent pre-lodgment meeting held between the applicant and TfNSW on 23 September 2019 included the following.

TfNSW requested a Traffic Impact Assessment (TIA) be prepared by suitably qualified person/s in accordance with the Austroads *Guide to Traffic Management* Part 12, the complementary Roads and Maritime Supplement and RTA Guide to Traffic Generating Developments.

The primary objective of the Traffic Impact Assessment report (TIA) is to consider the safety, efficiency and ongoing operation of the classified road and demonstrate compliance with all relevant standards, guidelines and codes.

This report considers the transportation aspects of the development proposal, in particular safety, site access and traffic generation. It concludes that the proposed site access arrangements are adequate to service the site and that there will be no material impacts associated with the development of the site onto the local and state-controlled road network.

1.2 Scope

This Traffic Impact Assessment report has been prepared to the following scope:

Section 2 Describes the site location and the existing road network in the vicinity of the site.

Section 3 Describes the existing and forecast traffic data in the vicinity of the site.

Section 4 Outlines Committed Developments in the vicinity of the site.

Section 5 Outlines the relevant characteristics of the proposed development including site access strategy, including a description of the types of vehicles likely to be used for transportation of sand products by the proposed development, and an explanation of assumptions and justification of adopted parameters informing the TIA. Assessment of existing road safety and consideration for any increased risk arising from trips generated by the proposed development, particularly at affected intersection including available sight distances.

Assessment and Impact on public transport (public and school bus routes) and consideration for alternative transport modes such as walking and cycling.

Section 6 Estimates the increase in traffic generated by the proposed development including; existing traffic volumes and background traffic growth expected on the surrounding road network and along proposed haulage route/s using actual traffic counts, daily and peak hourly volume distribution of traffic generated by the proposed development, identification of existing and proposed turn treatments warrants at affected intersections.

Section 7 Assess the operation of key intersections in the vicinity of the site by demonstrating the total impact of existing and proposed development on the road network with consideration for 10 year horizons over the life of the proposed operation by modeling of intersection capacity using SIDRA analysis to identify Level of Service (LOS) at affected intersections along the proposed haulage route/s.

Section 8 Assess any proposed mitigation requirements on safety and efficiency on the surrounding road network, swept path analysis; demonstrate accessibility for relevant design vehicles. Functional layout plans of the proposed intersection improvements and internal haulage roads.

Section 9 Presents a summary of the report and identifies the main conclusions that can be drawn from the Traffic Impact Assessment Report.

2. Existing Conditions

Section 2 of this report details the baseline conditions in the vicinity of the site, including the existing development site, the local road infrastructure and existing traffic volumes.

2.1 Existing Tweed Sand Plant

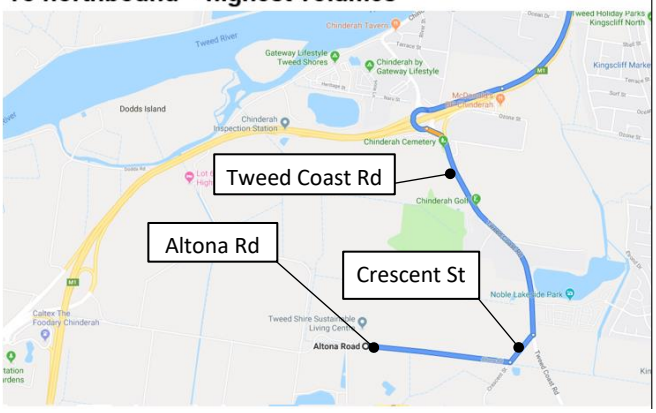
The current Tweed Sand Plant site shown in Figure 2.1 consists of three lots (Lot 22 on DP1082435, Lot 23 on DP1077509, Lot 494 on DP720450) on Altona Road, Cudgen.

Figure 2.1 Current Approval Sites

The current approval relates to Phases 3 and 4 only, across Lot Plans 22DP1082435, 23DP1077509 and 494DP720450) with approval to produce and transport a maximum of 500,000 tonnes of sand products from the site in any financial year.

Access to and egress from the existing site is obtained via Altona Road, Crescent Street, and Tweed Coast Road as shown in Figure 2.2 below.

To northbound – highest volumes



From northbound – highest volumes

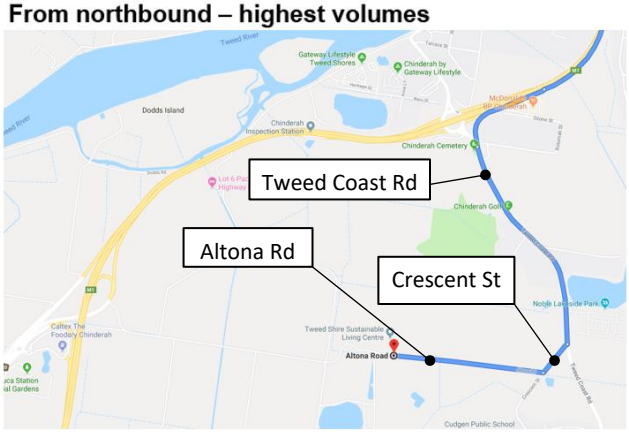


Figure 2.2 Existing Tweed Sand Plant Truck Routes

2.1.1 Existing Tweed Sand Plant Traffic Generation (2017-2018)

Sand Extraction (up to 150,000m³) Prior to modification (The Development Consent DA152-6-2005)

The annual and daily heavy vehicle movements for the existing site were extracted from the following reports:

- *"Traffic Impact Assessment for Tweed Sand Plant Lot 22 (DP1082435), Lot 23 (DP1077509) and Lot 494 (DP7240450) Crescent Street Cudgen"* report prepared by Bitzios; and
- *"Annual Environmental Management Report Tweed Sand Plant Cudgen, NSW July 2017 to June 2018"* report prepared by +Gilbert Southerland.

Between July 2017 and June 2018, the total annual extraction of sand was approximately 214,000 tonnes,. Heavy vehicle movements recorded for the same period are summarised in Table 2.1 below.

Table 2.1 2017-2018 Recorded Heavy Vehicle Movement Volumes

Extraction	2-way Vehicle Movement volumes	Period
214,000 tonnes	126	Maximum daily recorded
	20	Max peak volumes recorded (typically occurring between 12:00-14:00)
	13,958	Annual recorded vehicle movements

Further to the above, Schedule 2, Condition 9 of the TSP Development Consent restricted heavy vehicle movements as follows:

- 200 per day (max 2-way);
- 80 per day (rolling quarterly average 2-way); and
- 20 per hour (max peak 2-way).

It is worth noting that the peak period for heavy vehicle movements occurs typically between 12:00 and 14:00, which is outside of typical road network AM Peak hour (08:00-09:00) and PM Peak hour (15:30-16:30).

Truck volumes at Tweed Sand Plant road network during peak hours were recorded in a traffic survey on 15th December 2016. Survey data extracted from Bitzios Traffic Impact Assessment report is summarised in Table 2.2 below:

Table 2.2 Surveyed AM and PM Peak Tweed Sand Plant Traffic Volumes (214,000t June 2018)

Extraction	AM Peak (08:00-09:00)			PM Peak (15:00-16:00)		
	In	Out	Two-way	In	Out	Two-way
214,000 tonnes	2	7	9	5	4	9
In/Out % Split	22%	87%	100%	56%	44%	100%

As shown in Figure 2.2 above, during a typical morning and evening peak hours, TSP generated significantly lower truck volumes (9) than the maximum two-way volumes (20) conditioned via Schedule 2, Condition 9 of the TSP Development Consent.

Approved Sand Extraction up to a maximum 500,000 tonnes per annum

In 2018, a Notice of Modification to the Development Consent (DA152-6-2005) for the Tweed Sand Plant was granted by the Minister for Planning. The modification to the approval increased the sand extraction limit to 500,000 tonnes per annum. In addition, the following has been conditioned:

- *The Applicant must not dispatch more than 10 laden trucks from the site in any hour until the agreement required by condition 23 of Schedule 3 for the upgrade and maintenance of Altona Road has been entered into and the upgrade of Altona Road under that agreement has been completed.*

  Following the upgrade of Altona Road, the Applicant must not dispatch more than 18 laden trucks from the site in any hour (Schedule 2, Condition 9).

Based on the above development condition, the Tweed Sand Plant is forecast to generate the following heavy vehicles movements based on the sand extraction limit of 500,000 tonnes per annum:

Table 2.3 Forecast AM and PM Peak Tweed Sand Plant Traffic Volumes 500,000 tonnes extraction limit)

Extraction	AM Peak (08:00-09:00)			PM Peak (15:00-16:00)		
	In	Out	Two-way	In	Out	Two-way
500,000 tonnes	18	18	36	18	18	36

The above Table 2.3 represents worst-case scenario as the maximum 36 two-way volumes are unlikely to occur during AM and PM road network peak hours as discussed previously due to the misalignment between the TSP peak hour delivery times and the typical road network peak hour times.

2.1.2 Current Operating Hours

Current operating hours of the TSP are shown in Figure 2.3 below.

Activity	*Permissible Hours*
Quarrying operations (excluding loading and dispatch of trucks)	• 7 am to 5 pm Monday to Friday • 7 am to 4 pm Saturday • At no time on Sundays or public holidays
Loading and dispatch of trucks	• 7 am to 5 pm Monday to Friday • 7 am to 12 pm Saturday • At no time on Sundays or public holidays
Maintenance	• May be conducted at any time, provided that these activities are not audible at any privately-owned residence

Figure 2.3 TSP Operating Hours

Currently the Plant operates within normal business hours.

2.2 Surrounding Road Network

The surrounding road network in the vicinity of the proposed redevelopment site includes the Pacific Motorway M1, Tweed Valley Way, Altona Road, Crescent Street and Tweed Coast Road (Refer Figure 2.4).

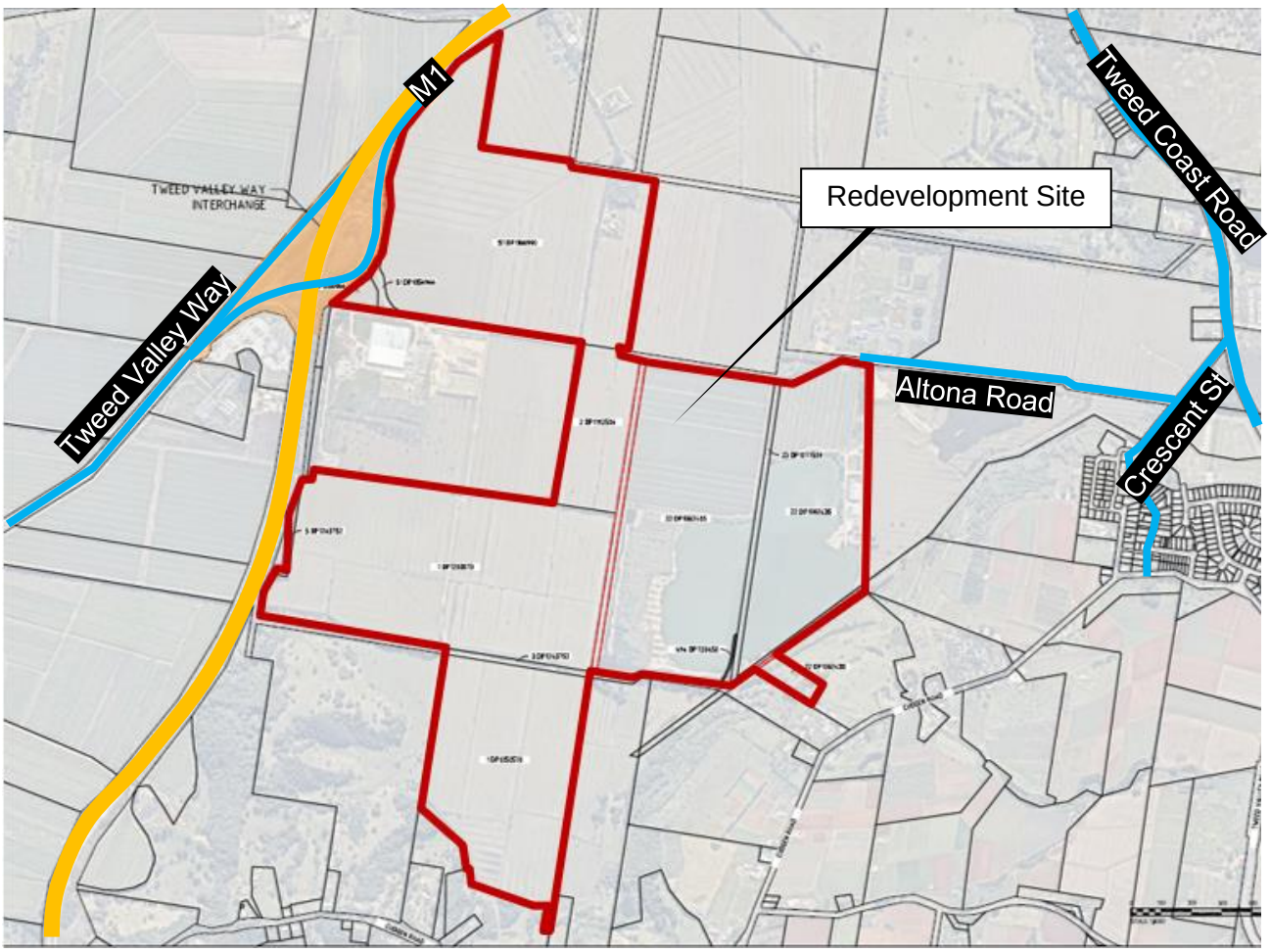


Figure 2.4 Proposed Redevelopment Site. Location Surrounding Roads

2.2.1 Tweed Valley Way

A photograph of Tweed Valley Way off ramp approaching the ABLP property access from the north is presented in Figure 2.5 below.

Figure 2.5 Tweed Valley Way Northern Approach to ABLP Property Access

The following Figure 2.6 shows the general speed environment.

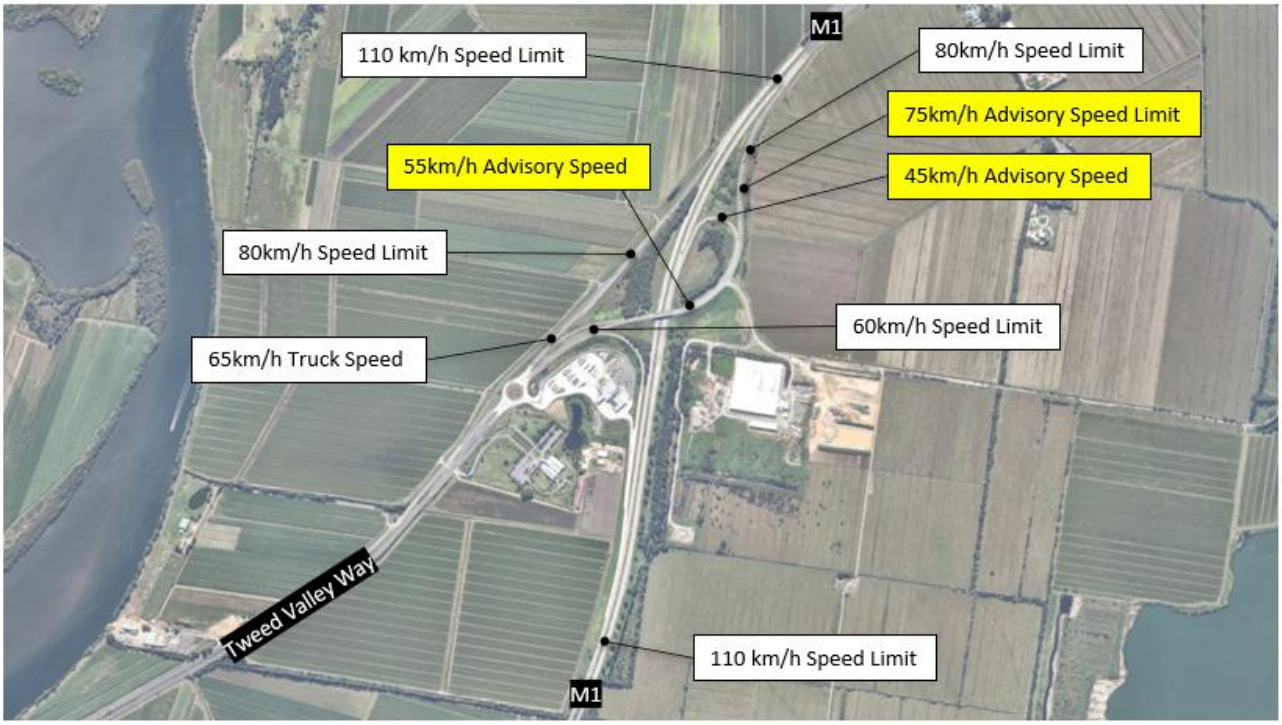


Figure 2.6 Speed Limit along Tweed Valley Way

The speed limit along Tweed Valley Way off-ramp decreases from 110km/hr to 80km/hr before the ABLP Property access. As shown in Figure 2.6, there is a 75km/h advisory speed limit at the northern approach to the ABLP property intersection and 55km/h at the southern approach.

2.2.2 Altona Road

A photograph of Altona Road approaching Crescent Street is presented in Figure 2.7.

Source: Nearmap.com

Figure 2.7 Altona Road Approach to Intersection with Crescent Street

Altona Road is a low order standard road with narrow pavement and formation width (One lane past the TSP access). Passing bays are also provided.

2.2.3 Crescent Street

A photograph of recently upgraded Crescent Street / Tweed Coast Road priority T-intersection is presented in Figure 2.8. The priority intersection benefits from a left turn slip lane from Crescent Street into Tweed Coast Road including a dedicated 200m long acceleration lane.

Figure 2.8 Crescent Street / Tweed Coast Road Intersection

Crescent Street connects Altona Road to Tweed Coast Road.

2.2.4 Tweed Coast Road

A photograph of Tweed Coast Road approaching the Tweed Coast Road / Crescent Street priority T-intersection is presented in Figure 2.9.

Figure 2.9 Tweed Coast Road Cross-section

Tweed Coast Road (679) is a classified (Regional) Road and a declared Controlled Access Road (CAR) in the subject area. Tweed Shire Council is the Roads Authority for the Tweed Coast Road. The road connects Crescent Street to the Tweed Coast Road interchange at the M1 and represents the current haulage route onto the Pacific Motorway.

2.2.5 Pacific Motorway

Pacific Motorway (M1) is a declared Freeway and TfNSW is the Roads Authority for Freeways in accordance with Section 7 of the Roads Act 1993. The Pacific Motorway provides a significant contribution to the east coast of Australia road transport by facilitating the north-south coastal route between Queensland including the Brisbane CBD and Sydney NSW. Locally, the last section in Northern NSW through the Tweed Shire, provides local access for the surrounding towns and suburbs and provides accessibility for Queensland residents travelling to Northern NSW, including tourist destinations such as Byron Bay as well as access for residents in northern NSW commuters to work and shopping in southern Gold Coast. The following Figure 2.10 shows the road classifications and declarations at the Tweed Valley Way / Pacific Motorway Interchange.

Figure 2.10 Road Classifications and Declarations Tweed Valley Way / Pacific Motorway Interchange

2.3 Existing Road Safety Assessment

Assessment of existing road safety and consideration for any increased risk arising from trips generated by the proposed development, particularly at affected intersections includes:

- Available sight distances identified and addressed by the assessment; and
- Identification of existing and proposed turn treatments at affected intersections along the proposed haulage route/s, having reference to warrants provided in Austroads Guide to Traffic Management Part 6 and treatments identified in Austroads Guide to Road Design Part 4A.

2.3.1 Crash data

Crash data at the Tweed Valley Way / Pacific Motorway M1 interchange has been obtained from the NSW database between 2013 and 2019 and reproduced in the following Figure 2.11.

ID	Year	Crash Severity	Crash Description
1	2013	Non-casualty	Off road left, hit object
2	2013	Fatal	Head on
3	2013	Non-casualty	Off road left, hit object
4	2013	Non-casualty	Off road left/right bend, hit object
5	2013	Non-casualty	Off right/right bend
6	2014	Non-casualty	Off road to right
7	2014	Non-casualty	Off road left, hit object
8	2014	Non-casualty	Off road left, left bend, hit object
9	2015	Non-casualty	Off road right, hit object
10	2015	Minor injury	Off road right, hit object
11	2016	Non-casualty	Off road to left
12	2016	Fatal	Head on
13	2016	Non-casualty	Off road left, hit object
14	2017	Serious injury	Off road left, hit object
15	2017	Serious injury	Off road left/right bend
16	2017	Non-casualty	Rear end
17	2017	Serious injury	Head on
18	2017	Serious injury	Off road right, hit object

Figure 2.11 Existing Crash Records Tweed Valley Way Interchange

Two fatal accidents were recorded along the M1 as shown by the red colour. Accidents recorded on the Tweed Valley Way that impact on the safety of the existing and proposed operations occurred at the east of the M1 overpass bridge and the two recorded at the Service Centre roundabout. No accidents were recorded at the ABLP property intersection with the Tweed Valley Way off-ramp.

2.3.2 Intersection Sight Distance

The existing ABLP property intersection sight visibility is shown in the following Figure 2.12. Due to the overpass bridge balustrade, there is restricted visibility for vehicles travelling north along Tweed Valley Way to gain access onto the southbound on-ramp onto the Pacific Motorway. The subsequent

analysis of the right turn at the ABLP property intersection, resulted in the recommendation that Tweed Sand Plant vehicles returning from deliveries south of the interchange, should proceed north to the Tweed Coast Road / Pacific Motorway interchange and do a U turn back along the M1 to approach the ABLP property intersection from the north via the Tweed Valley Way off ramp. Hence no worsening or increase in vehicles using the right turn at the ABLP property intersection occurs as a result of the increased activities proposed for Tweed Sand Plant.

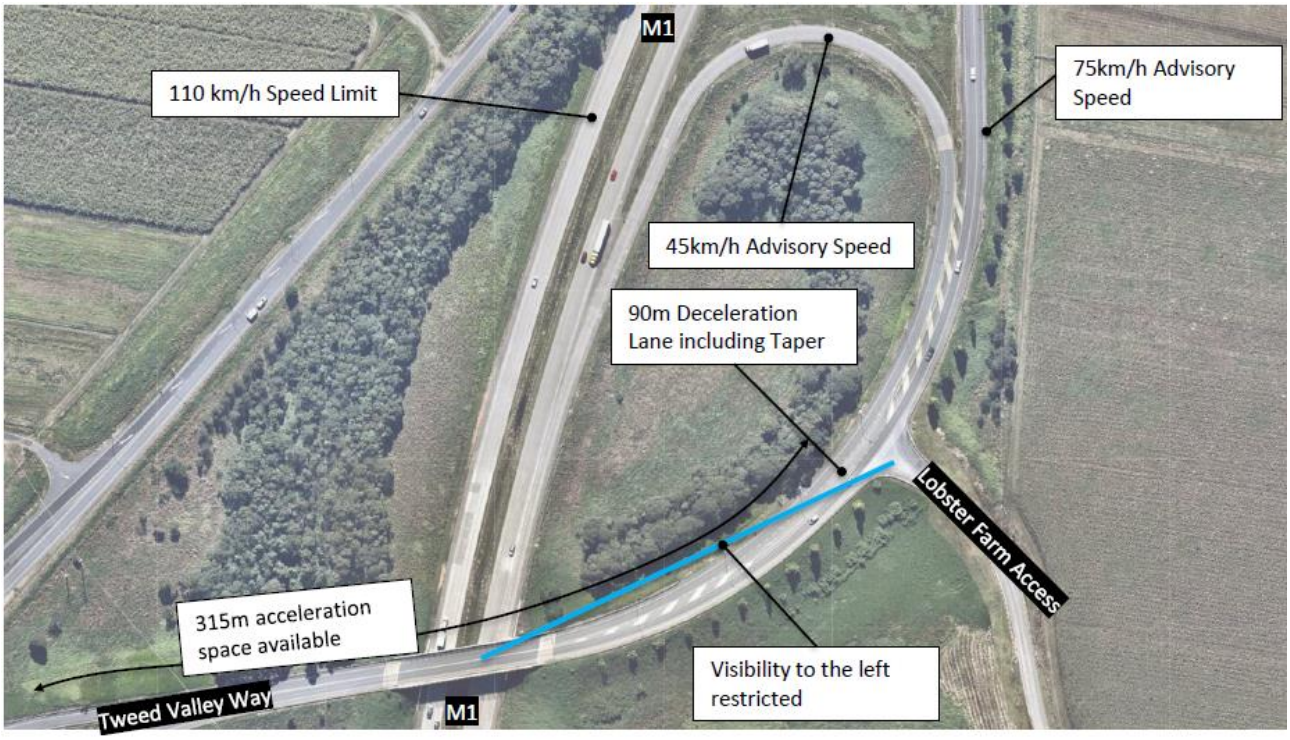


Figure 2.12 Existing ABLP Property Intersection Sight Visibility

2.3.3 Recorded Speeds

At the location of the 75 km /hr advisory speed sign in Tweed Valley Way off-ramp, the recorded 85th percentile speed is as follows:

- 7-day 85th percentile speed in southbound direction of travel was 86.4km/h;
- 7-day 85th percentile speed in northbound direction of travel was 64.9km/h; and
- Bidirectional 85th percentile speed is 84.4km/h.

The 85th percentile speed in the southbound direction is in excess of the 75km/hr advisory speed sign. Based on the above, for the analysis of acceleration of the Tweed Sand Plant haulage vehicles and the merge with the Tweed Valley Way traffic, the 85th percentile values of 87km/hr has been adopted.

2.4 Drivers Code of Conduct

In consideration for Clause 16(1) of the Mining SEPP including consideration of impacts on school zones and residential areas, a Drivers Code of Conduct for haulage operators, and assessment of

road safety along the proposed haulage route/s is currently in place. Generally, a Driver Code of Conduct could include, but not be limited to:

- A map of the primary haulage route/s highlighting critical locations;
- Safety initiatives for haulage through residential areas and/or school zones;
- An induction process for vehicle operators and regular toolbox meetings;
- A complaint resolution and disciplinary procedure; and
- Any community consultation measures proposed for peak haulage periods.

A copy of the current Drivers Code of Conduct (CoC) for Tweed Sand Plant and the Operational Traffic Management Plan referred to in the CoC are included in Appendix D. The updated version of the CoC with respect to the current Application will form part of the standard operating procedures and induction process for all ongoing operations at the Tweed Sand Plant.

Where road safety concerns are identified at a specific location along the identified haulage route/s, TfNSW recommend that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons. No road safety concerns have been identified outside the Tweed Valley Way interchange as the destinations are similar with existing deliveries. However, should operations identify concerns, then it is recommended the safety issues be documented and the CoC modified accordingly.

3. Traffic Data

3.1 Reference Documentation

The traffic volume, speed and vehicle classification survey locations were adopted for the TIA to describe and justify the approach taken for data collection. The most recent update to the Tweed Road Development Strategy (TRDS 2017) as prepared by TSC in consultation with RMS and is considered to be the relevant source reference for forecasting future traffic conditions.

3.1.1 Previous Traffic Reports

Previous relevant traffic reports include the following:

1. Traffic Impact Study Proposed Aquaculture (ABLP Property) Development September 2004;
2. Proposed modification to existing Aquaculture (ABLP Property) Rytenskild February 2019;
3. TTM Chinderah Service Centre Development 1st December 2014;
4. Bitzios Report response to RMS comments 2nd November 2017;
5. Tweed Sand Plant Response to DPE and Gailes Submission Correspondence 15th February 2018; and
6. Tweed Shire Council – Tweed Road Development Strategy, Bitzios Consulting, November 2018.

3.1.2 Traffic Volume Survey Data Available

Existing traffic volumes and background traffic growth is available on the surrounding road network and along the proposed haulage routes. The following sources of traffic data and new actual traffic counts obtained to inform the base case were obtained from the following sources;

a) Existing sources of traffic volume data:
   - NSW Government Traffic Census Data;
   - Tweed Shire Council Traffic Count Database;
   - Tweed Shire Council traffic studies and forecast traffic volumes; and
   - Previous traffic studies at the Tweed Valley Way / Pacific Motorway interchange as listed in 3.1.1 previous traffic reports above.

Pacific Motorway M1 traffic volumes are recorded in the annual traffic census data. The following Figure 3.1 shows the M1 traffic volumes.

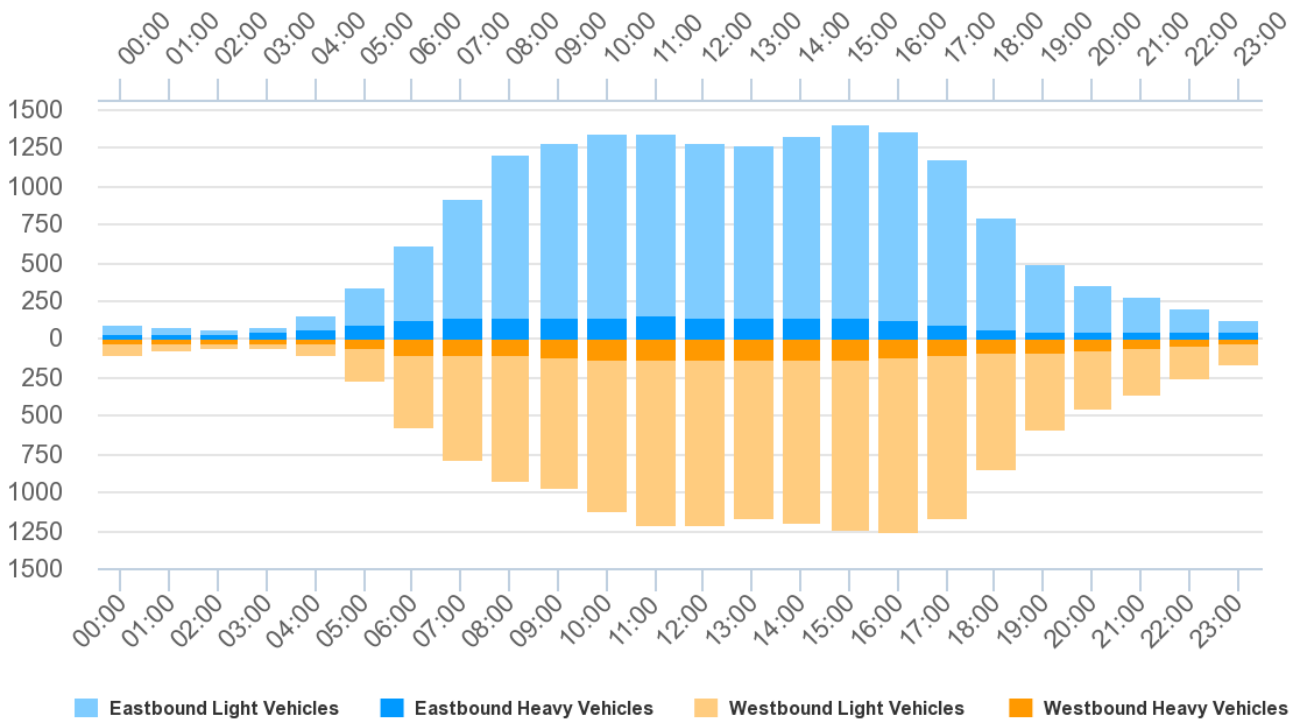


Figure 3.1 Pacific Motorway M1 Traffic Volumes

The graph shows the daily profile for all census data recorded from 21/11/2008 – 28/06/2019 for all days from 0.00 to 24.00 for all vehicles separately in each direction.

3.2 New Traffic Count Surveys

For the purposes of the assessment of development traffic impact onto the local road network, surveys were undertaken of the roads in the vicinity of the proposed new western access with Tweed Valley Way. New Traffic volume surveys were undertaken at the Tweed Valley Way / Pacific Motorway Interchange and Tweed Valley Way west of the interchange from 4th to 10th March 2020 at the following locations:

1. Tweed Valley Way southbound off-ramp. 7 x 24 hr day tube counters located between the start of the Tweed Valley Way southbound off-ramp and the existing ABLP property access 'T' intersection;
2. The start of the merge with the northbound off-ramp on the western side and Tweed Valley Way; and
3. Tweed Valley Way (M.R.679) - at No 232 IGA west of the interchange.

Data collected includes vehicle by type, volumes and travel speed.

Fully classified turning count surveys were undertaken for the 07.00 to 19.00 periods on a Thursday and for the 10.00 to 15.00 period on a Saturday, including peak hour turning volumes at the following intersections:

- The Service Station / Tweed Valley Way roundabout; and
- The existing ABLP property access / Tweed Valley Way off-ramp priority 'T' intersection.

All surveys avoided school and public holiday periods. Figure 3.2 shows the survey locations.

Figure 3.2 Location of Traffic Surveys

Reference Figure 3.2, details of the traffic surveys at each location are as follows:

- 7 day x 24 hr day Tube counters located as follows:
  - Location 1 Tweed Valley Way southbound off-ramp. 7 x 24 hr day tube counters located between the start of the Tweed Valley Way southbound off-ramp and the existing ABLP property access 'T' intersection (two way);
  - Location 2 Existing ABLP property access (two way);
  - Location 3 Tweed Valley Way southbound off-ramp. 7 x 24 hr day tube counters located west of the Pacific Highway overpass bridge (two way);
  - Location 4 The start of the merge with the northbound on-ramp on the western side and Tweed Valley Way (one way); and
  - Tweed Valley Way (M.R.679) - at No 232 IGA west of the interchange, located at start of merge. (Two way). Not shown on diagram below.

Data collected includes vehicle by type, volumes and travel speed.

Locations nominated by red circle in Figure 3.2 data collected included:

- AM and PM Peak hour turning volumes at the following intersections:
  - The Service Station / Tweed Valley Way roundabout; and
  - The existing 'T' intersection at the ABLP property access / Tweed Valley Way southbound off-ramp.

Weekday intersection surveys recorded from 6.00 am until 9.00 am and 3.00 pm until 6.00 pm.

3.2.1 Survey Results Tweed Valley Way

Location 1 near proposed merge. Bio directional Peak Hours summary as follows:

- Weekday peak hour. AM 529vph from 8.00am to 9.00am; PM 596vph from 16.00pm to 17.00pm;
- Saturday peak hour. AM 571vph from 11.00am to 12.00pm; PM 610vph from 13.00pm to 14.00pm; and
- Sunday peak hour. AM 747vph from 8.00am to 9.00am; PM 533vph from 12.00pm to 13.00pm.

The following Figure 3.3 shows the weekly volume traffic flows.

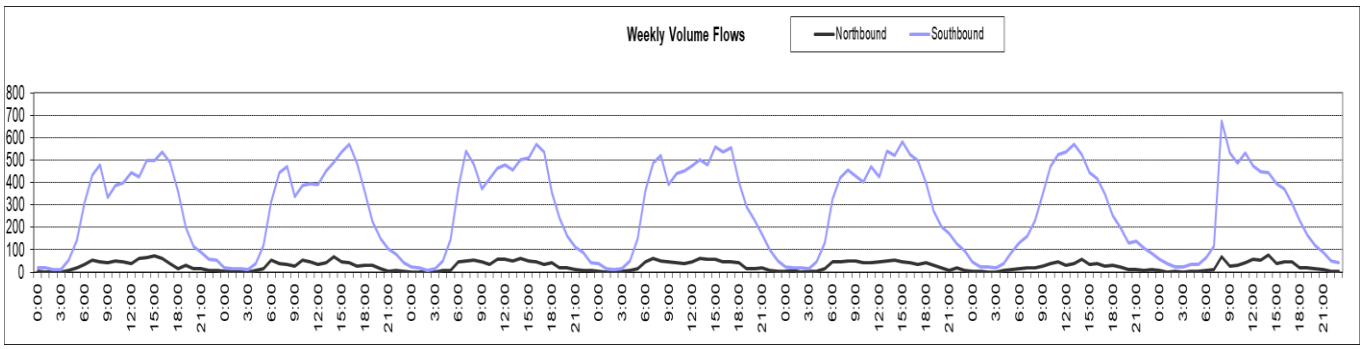


Figure 3.3 Location 1 Bio Directional Weekly Volume Flows Tweed Valley Way Site 1.

The highest weekly peak traffic volume occurred on the Sunday, followed by the Saturday, then the average weekday. During the week the highest AM peak hour 591vph occurred on the Wednesday. The highest PM peak hour 630vph occurred on the Friday. This higher result is consistent with the evening commuter traffic combining with the start of weekend holiday traffic.

Location 1 Tweed Valley Way speed distribution Northbound (towards Tweed Heads then southbound on-ramp) summary as follows

- Weekday average speed 54.2km/hr, 85th percentile speed 65.1km/hr;
- Saturday mean speed 57.0km/hr, 85th percentile 65km/hr; and
- Sunday mean speed 55.8km/hr, 85th percentile 64km/hr.

The following Figure 3.4 shows the Speed Distribution Northbound towards the southbound on-ramp.

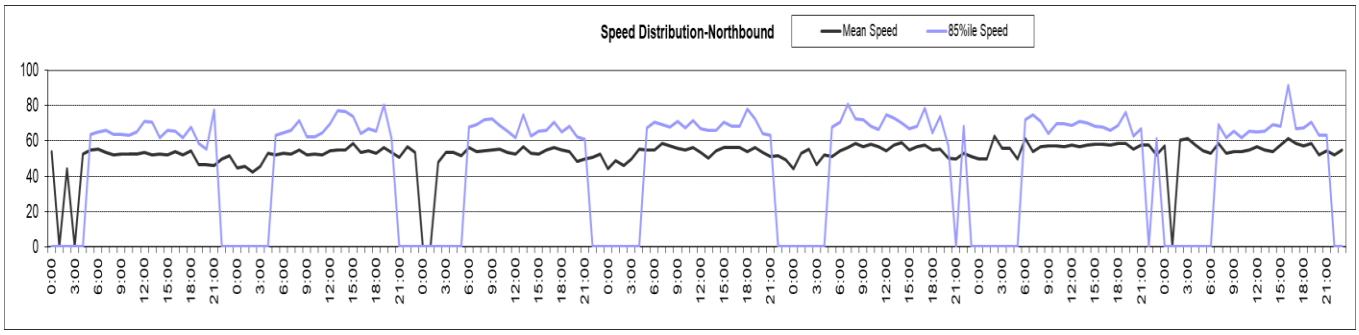


Figure 3.4 Location 1 Speed Distribution Northbound (towards M1 Southbound On-Ramp)

- Tweed Valley Way speed distribution Southbound away from Tweed Heads.
- Weekday Southbound 75.1km/hr; 85th percentile 86.3km/hr.
- Saturday Southbound 74.0km/hr; 85th percentile 87km/hr.
- Sunday Southbound 74.0km/hr; 85th percentile 86km/hr.

The following Figure 3.5 shows the Speed Distribution Southbound away from Tweed Heads.

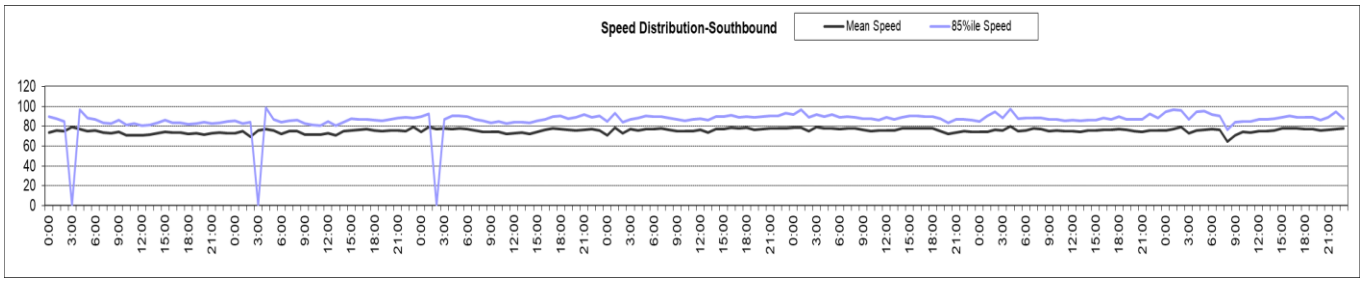


Figure 3.5 Location 1 Speed Distribution Southbound Tweed Valley Way

The higher speeds recorded on the southbound off-ramp compared with the lower speeds northbound towards the M1 southbound on-ramp are consistent with the speed environment expected in each case. Vehicles travelling towards the bend in the southbound on-ramp are slowing due to the 45km/hr advisory speed sign ahead compared to the 75km/hr advisory speed sign on the off-ramp.

87km/hr has been adopted for the 85th percentile speed for the merge from the TSP haul road onto the southbound off-ramp. Weekday traffic volumes have been adopted for the intersection capacity analysis as the distribution loads from the TSP are higher for the weekdays compared to the weekends.

Heavy Vehicles Proportions to M1 Southbound on-ramp are shown in Figure 3.6.

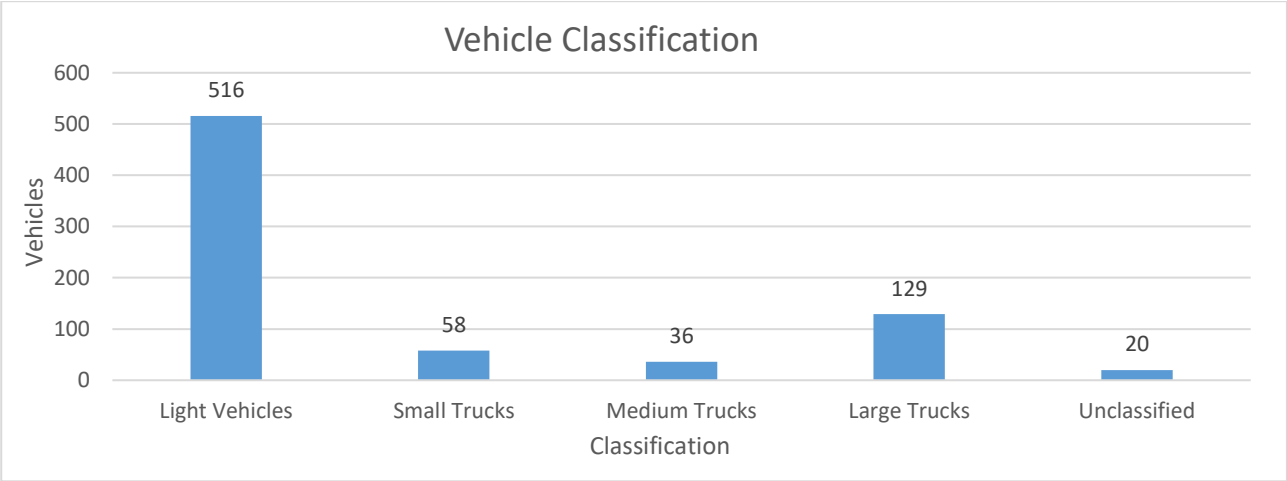


Figure 3.6 Location 1 Heavy Vehicle Proportions Travelling Northbound

The following Table 3.1 shows the volumes for each vehicle class.

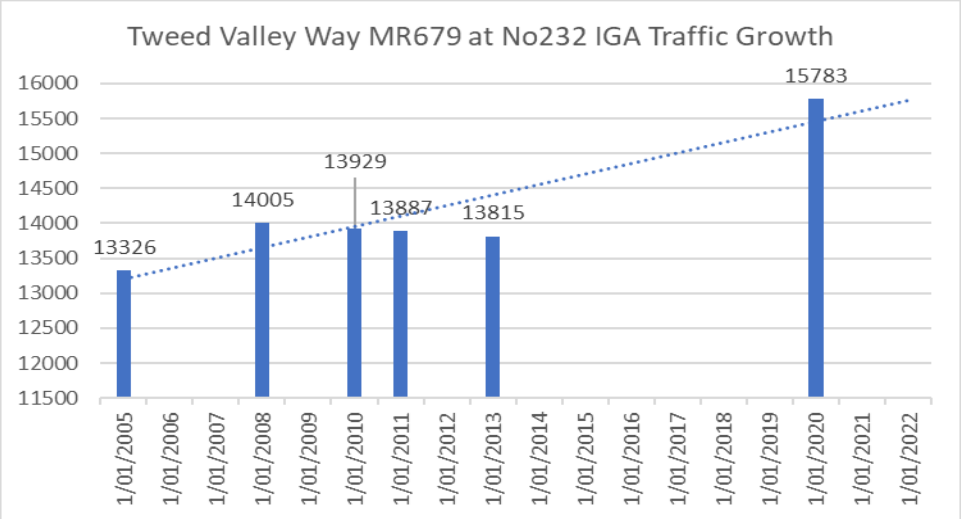
Table 3.1 Location 1 - 5-day Average Volumes

Vehicle Class	Northbound		Southbound	
	Volume Data	Percentage	Volume Data	Percentage
Light Vehicles – Classes 1 to 2	508	70.3%	6,198	70.4%
Small Trucks – Class 3	50	7.0%	305	6.9%
Medium Trucks – Classes 4 to 5	44	6.1%	120	6.1%
Large Trucks – Classes 6 to 12	107	14.8%	220	14.8%
Unclassified – Class 13	13	1.9%	1	1.8%
Total Class 3-13	214	29.6%	646	9.4%
Total	722	100%	6,844	100%

Overall, there is a 29.6% proportion of heavy vehicles currently using the Tweed Valley Way on-ramp northbound and 9.4% southbound. Note that the high value is a result of heavy vehicles from the M1 accessing the heavy vehicle Service Centre. A further 4 heavy vehicle trips in a peak hour will occur in the future from the Tweed Sand Plant vehicles travelling south. Based on future Tweed Valley Way 2041 volumes and growth in current heavy vehicle and light vehicle trips, the heavy vehicle trips with the development trips superimposed is expected to increase to 30%.

3.2.2 Historical Traffic Growth

Several sources were investigated regarding the growth factor for traffic specifically along Tweed Valley Way. The following Figure 3.7 shows the calculation for the historical traffic growth along Tweed Valley Way.



TVW Growth calculation	
2020	15500
2010	13900
Growth	11.51%
Growth p.a.	**1.15%**

Figure 3.7 Traffic Survey Site Tweed Valley Way (TVW) Mr679 at No 232 LGA Historic Growth Calculation

Based on the above the historical growth along Tweed Valley Way is 1.15% per annum linear growth.

3.2.3 Traffic Growth Projection

An assessment of the growth future forecast was determined by comparing the 2020 pre COVID 19 survey in Tweed Valley Way with the Tweed Shire Council – Tweed Road Development Strategy TRDS, November 2018 output results for the medium yield 2041 base year. The following Figure 3.8 shows the reference material and calculation.

TRDS Report 2041 medium yield TVW 10,530vpd northbound + 10,440vpd southbound. ADT 20,970 vehs per day.
2020 Traffic Survey Tweed Valley Way ADT two way 15,783 vehs per day.
Growth 2020 to 2041; 5,187 vehs. per day.
Growth 32.87% or 0.0156 (1.56)% per annum. ADOPT 1.6% pa compound growth.
Note % growth adopted generally in accordance with Tweed Shire Council TRDS Report Medium Scenario, 1.54% pa. compound growth.

Figure 3.8 Traffic Survey Site Tweed Valley Way (TVW) Mr679 At No 232 IGA Future Growth Calculation

The Tweed Valley Way annual growth rate of 1.6% was confirmed with Tweed Shire Council and a copy of the confirmation email forwarded to Tweed Shire Council is contained in Appendix F.

4. Committed Development

Before considering the implications of the proposed development it is considered appropriate to summarise the changes in traffic flows likely to be associated with Australian Bay Lobster Producers Limited (ABLP) committed development, as part of the construction requirement for their site as detailed in their recent (2019) application to Tweed Shire Council.

The ABLP committed development site is identified as Lot 1 on DP1192506 and has an area of approximately 45 hectares as shown on Figure 4.1 below.

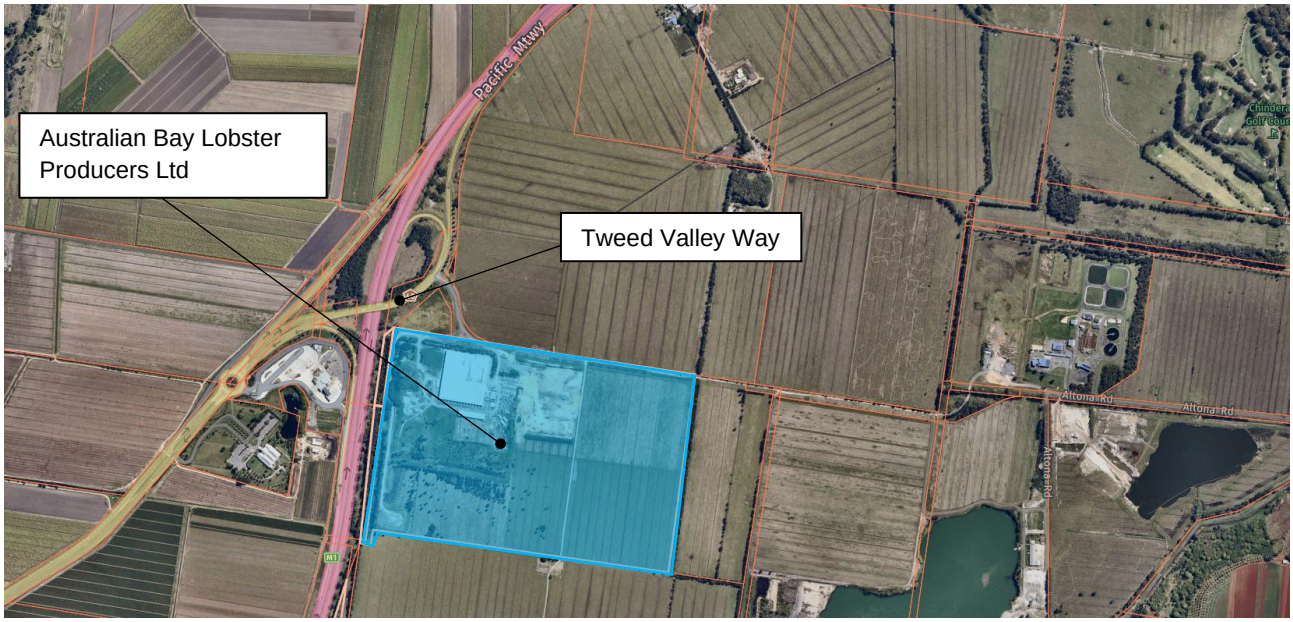


Figure 4.1 Committed Developments

The existing access to the ABLP site is gained via a T-priority intersection with the M1 southbound on and off-ramps at the M1 / Tweed Valley Way Interchange. The speed limit in the vicinity of the intersection is 80km/h. Due to the road geometry, a 75km/h advisory speed is present at the northern approach to the intersection and 55km/h at the southern approach to the intersection.

As part of the construction requirement for their site, ABLP are required to modify the ground level to ensure that the site would be immune to a 1 in 100-year flood event.

It is anticipated that 500,000m³ of material will be hauled to the site annually over four years up to 2025. Details of the forecast haulage volumes are presented below:

- Maximum haulage per day - 1,922m^3, or 2,500 tonnes.
- Average pay load per vehicles - 45 tonnes
- Max number of loaded vehicles per day - 56 loaded vehicles
- Max number of heavy vehicle trips per day - 112 trips (56 to and 56 from the site)

The proposed committed development layout plan shown in Figure 4.2 below was sourced from the Traffic Impact Assessment for the Proposed Modification of Existing Aquaculture (ABLP Property) prepared by the Rytenskild Traffic Engineering (Doc Reference 18394, Feb 2019).

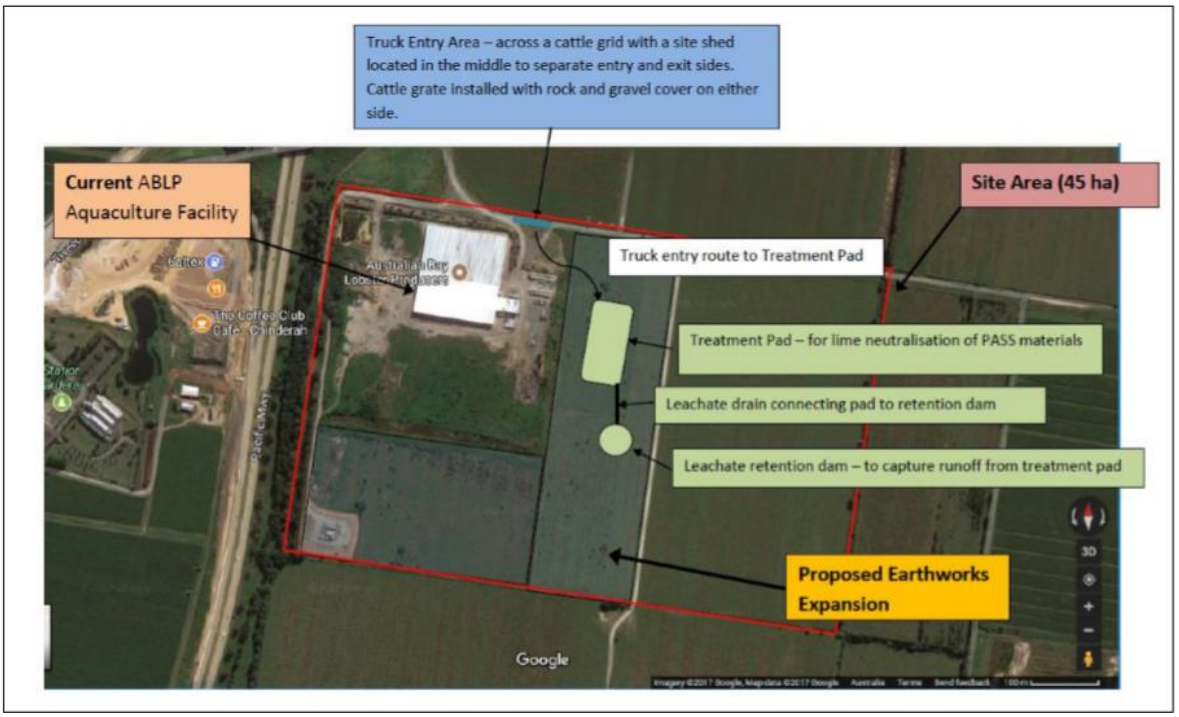


Figure 4.2 The Proposed Modification of Existing Aquaculture

It has been estimated that the proposed works will generate 14 heavy vehicles movements (7 to and 7 from the site) per hour. The committed development traffic flows shown in Figure 4.3 have been extracted from the Traffic Impact Assessment report prepared for the site by Rytenskild Traffic Engineering.

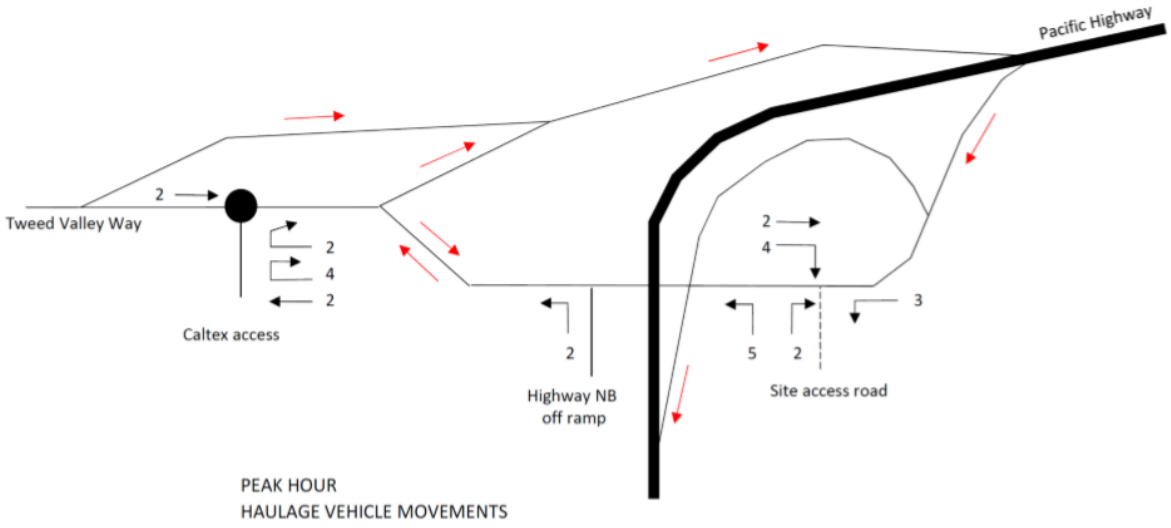


Figure 4.3 Australian Bay Lobster Producers Limited Committed Development

5. Proposed Development

5.1 Development Details

The proposed development with Street address as Altona Road, Cudgen comprises the following land parcels:

- Lot 22, DP 1082435; Lot 23 DP1077509; Lot 494 DP720450; Lot 1 DP1250570; Lot 2 DP1192506; Lot 3 DP1243752; Lot 51 DP1166990; and Lot 50 DP1056966.

The proposed development seeks to:

- Increase the sand production rate from the current limit of 500,000 tonnes per annum (tpa) of sand products from site up to 950,000 tpa. The annual extraction and sales rate would be market driven, up to the proposed maximum 950,000 tpa;
- Increase the extraction area yielding a total Tweed Sand Plant re-development site area of 236ha compared to the current 77ha site, of which 46ha is currently approved for extraction;
- All extraction would be via a dredge unit (i.e. wet excavation), piped to an onshore wash plant. The dredge and wash plant would have a larger capacity and footprint compared to the current operation, albeit noise output, air emissions etc would likely be lower due to improvements in technology;
- Consistent with existing operations, loading of the product would be via a front-end loader(s) into standard highway trucks (i.e. truck and dog, and articulated heavy vehicles);
- Operating hours would be as follows:
    - Sand dredging & processing, 24 hours/day, 7 days/week;
    - Haulage, 24 hours/day, 7 days/week; and
    - Maintenance, 24 hours/day, 7 days/week.
- Site personnel would remain at a similar number to present (currently three full-time employees), however the increase in extraction and sales rate requires an increase in truck drivers to transport the material;
- A ‘ramp-up’ phase may be adopted during the initial phase (first five years) of the expansion, depending upon market conditions, plus ongoing availability of suitable fine sand from alternate sources;
- Transporting material off-site by public roads. The intention is to access TSP via a left turn from the southbound Tweed Valley Way off-ramp at the ABLP property access. Egress is proposed via a new acceleration lane commencing within the site onto the southbound Tweed Valley Way off-ramp; and
- Progressive rehabilitation of the site.

Hanson will retain ownership of the site following completion of sand extraction and any proposed subsequent use of the site will be decided via the appropriate consultative, application and regulation processes in place at that time.

The proposed redevelopment site is shown in Figure 5.1 below.

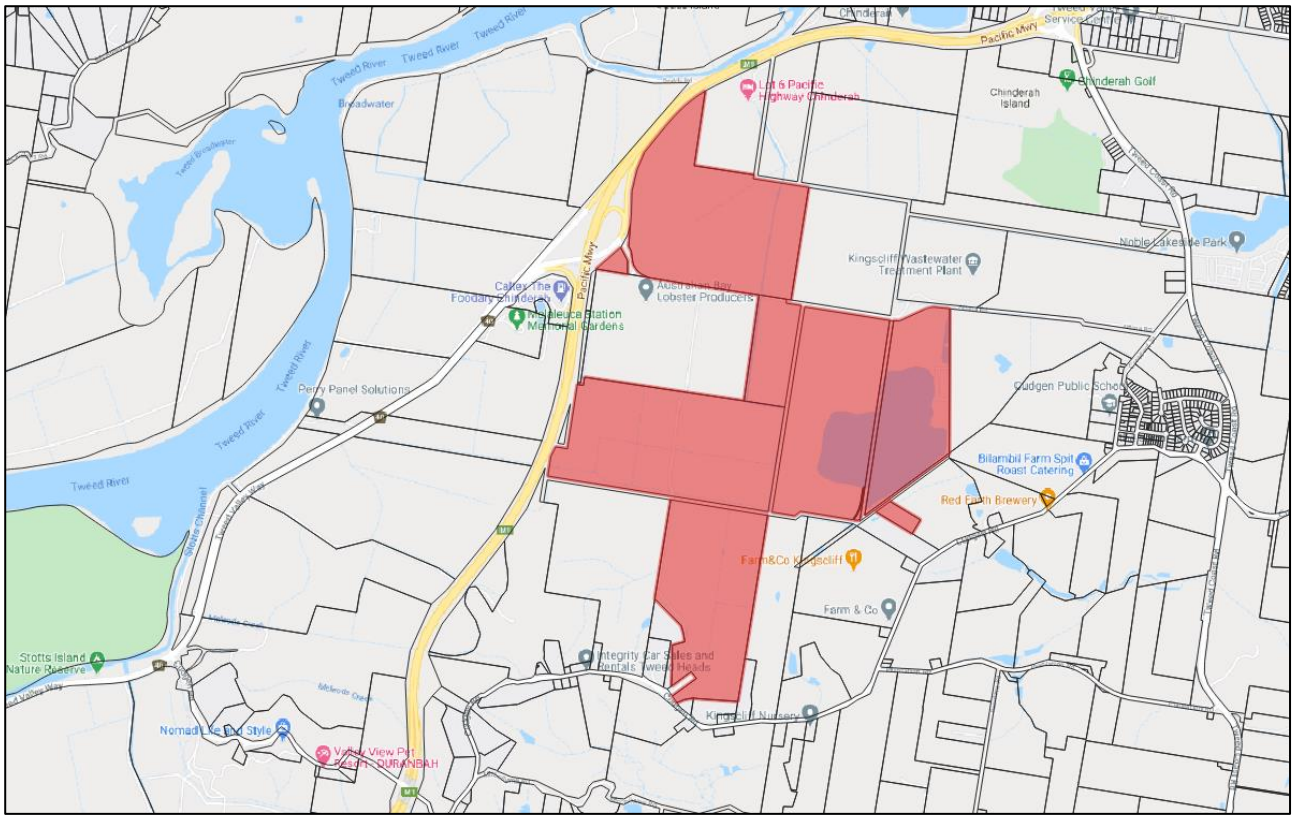


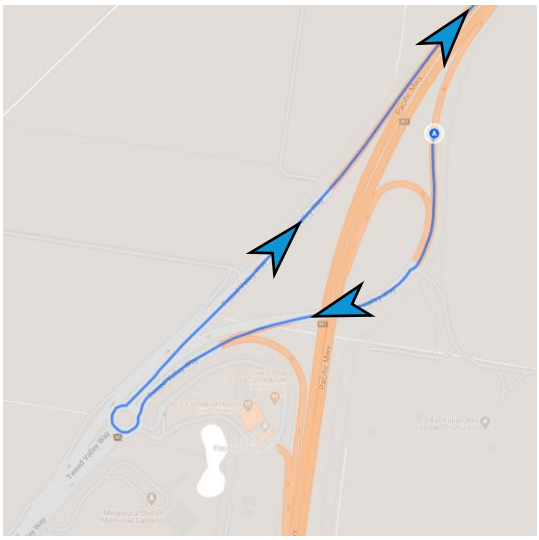
Figure 5.1 Locality Plan of the Proposed Redevelopment Site (Base from Google maps)

5.2 Site Access Arrangements Investigated

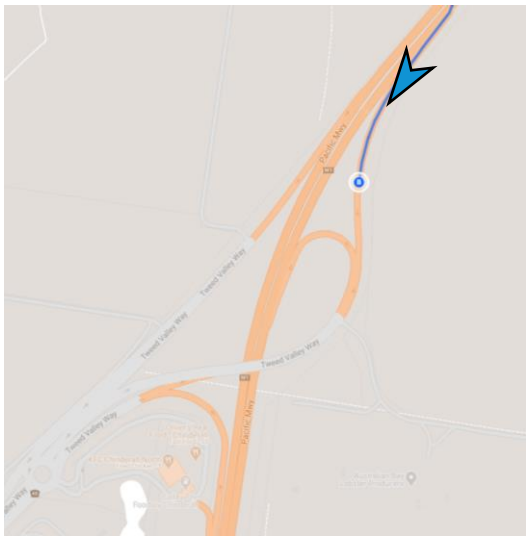
To avoid heavy vehicles travelling along local streets, the applicant proposes to gain access from Tweed Valley Way to the west of the site at the Pacific Motorway Interchange, including all site and ancillary vehicles. No vehicular access will occur via Altona Road, Crescent Street and Tweed Coast Road to the east.

5.2.1 Traffic Distribution

The analysis of published annual operations from the existing Tweed Sand Plant site shows the destinations of the deliveries. The following Figure 5.4 shows the proposed haulage route to / from northbound destinations based on SIDRA assessment recommendations (Refer Section 7).



To north

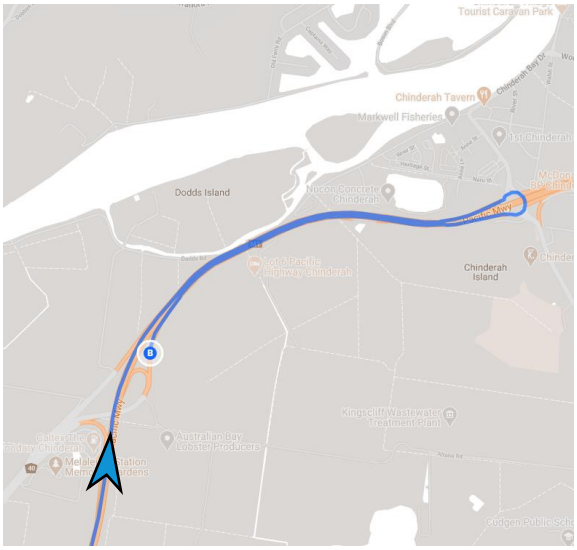


From north

Figure 5.2 Tweed Sand Plant Haulage Route Northbound

The following Figure 5.5 shows the haulage route to / from southbound destinations.

To south



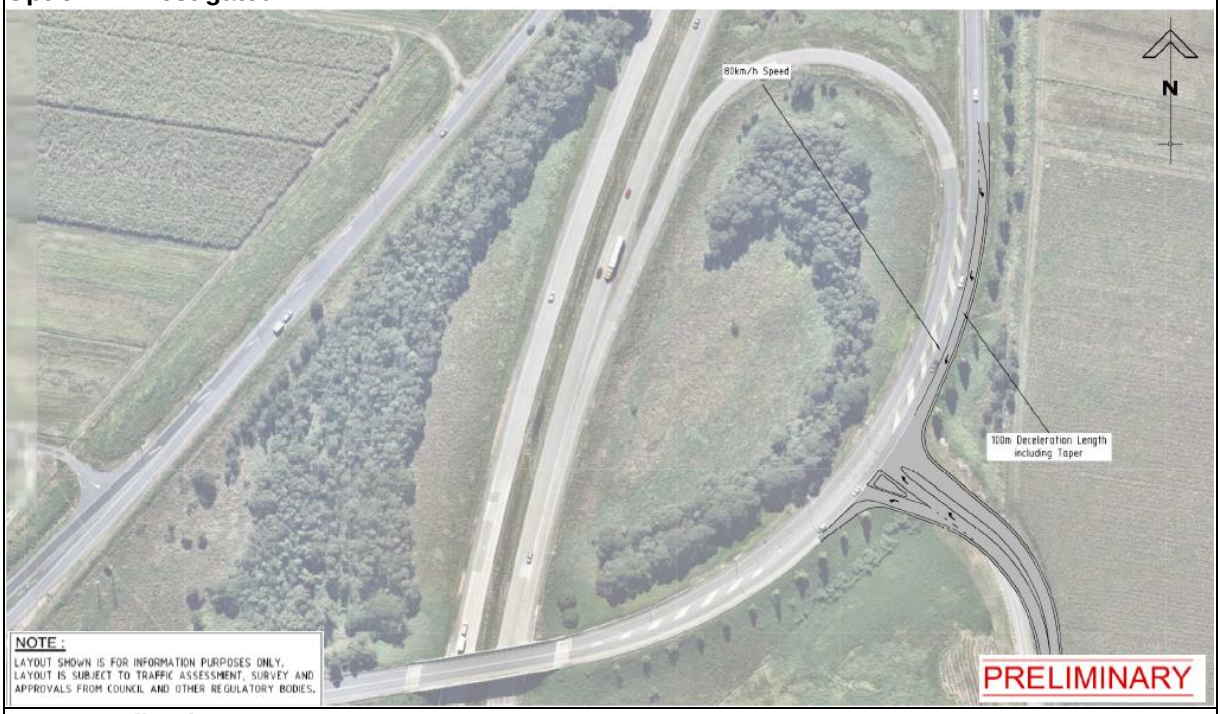
From south

Figure 5.3 Tweed Sand Plant Haulage Route Southbound Destinations

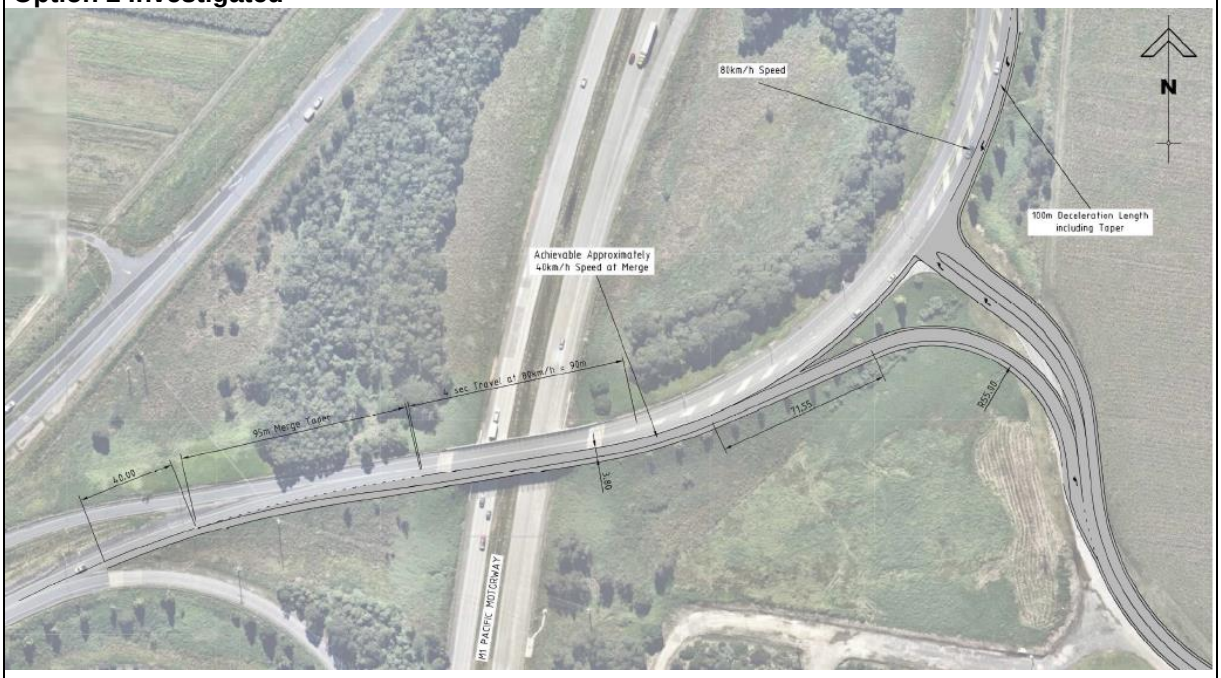
Any TSP vehicle travelling south will exit the site onto the southbound Tweed Valley Way off-ramp and use the existing service centre roundabout for a U-turn to access the M1 southbound on-ramp. Vehicles returning from the south continue north on the M1 to the Roundabout at the Tweed Coast Road interchange and use the roundabout for a U-turn back to the southbound Tweed Valley Way off-ramp to turn left into the ABLP property intersection to return to the TSP.

5.2.2 Tweed Valley Way off-ramp Access Options

As part of initial investigations for access onto the southbound Tweed Valley Way off-ramp at the M1 interchange, 4 options were investigated and forwarded to the TfNSW for initial discussion and comment. Options 1 to 3 (not preferred) are included in the following Figure 5.2 for background information together with corresponding comments from TfNSW.

Discussion of Access Options RMS Feedback
Option 1 Investigated

RMS Feedback
• *It is understood under this option that heavy vehicles will be proposed to egress left out.* • *The AUL and CHR deceleration lanes will need to meet Austroads requirements for the posted speed limit, grade, and geometry for the target design vehicle/s.* • *Modelling will need to demonstrate adequate storage for vehicles turning right into the development under future conditions; demand management under a TMP & DCoC may be required to manage arrivals and mitigate any potential for queuing of right turning vehicles.* • *Vehicles entering TVW need to meet speed differential for through traffic under posted speed limit.* • *Discussion highlighted that this option is likely to have an unacceptable impact on safety and efficiency of the interchange under peak conditions due to entry speed of laden vehicles merging onto TVW.*

Option 2 Investigated



RMS Feedback

- *It is understood under this option that heavy vehicles will be proposed to egress left out.*
- *The AUL and CHR deceleration lanes will need to meet Austroads requirements for the posted speed limit, grade, and geometry for the target design vehicle/s.*
- *Modelling will need to demonstrate adequate storage for vehicles turning right into the development under future conditions; demand management under a TMP & DCoC may be required to manage arrivals and mitigate any potential for queuing of right turning vehicles.*
- *Vehicles entering TVW need to meet speed differential for through traffic under posted speed limit.*
- *The CHL acceleration lane necessitates a significant investment in bridge duplication with potential for impacts on the M1 during construction.*
- *Discussion highlighted that the level of investment required for this option may not provide a significant improvement in entry speed of laden vehicles merging onto TVW, and that similar to Option 1, this option is also likely to have an unacceptable impact on safety and efficiency of the interchange.*

Option 3 Investigated

RMS Feedback

- *Proposed roundabout treatment necessitates a lower speed environment with subsequent impacts on the efficiency of the interchange and the potential for queuing on the southbound on-ramp and TVW overbridge.*
- *This option lowers the speed of all vehicles to accommodate entry speed of trucks.*
- *Meeting discussed merit of dual circulating lanes and dedicated turn lanes to accommodate development traffic.*
- *Option was not supported by RMS during discussions due to impacts on safety and efficiency of the interchange.*

Figure 5.2 Investigated Site Access Options 1 – 3 (Not Recommended)

5.3 Preferred Site Access Arrangement

Option 4, the preferred option, proposes vehicle entry to the subject site via the existing ABLP property / Tweed Valley Way access priority intersection. Vehicles leaving TSP will use a new internal haul road before joining a new acceleration lane to merge onto the southbound Tweed Valley Way off-ramp. The preferred option is shown in the following Figure 5.3 together TfNSW comments.

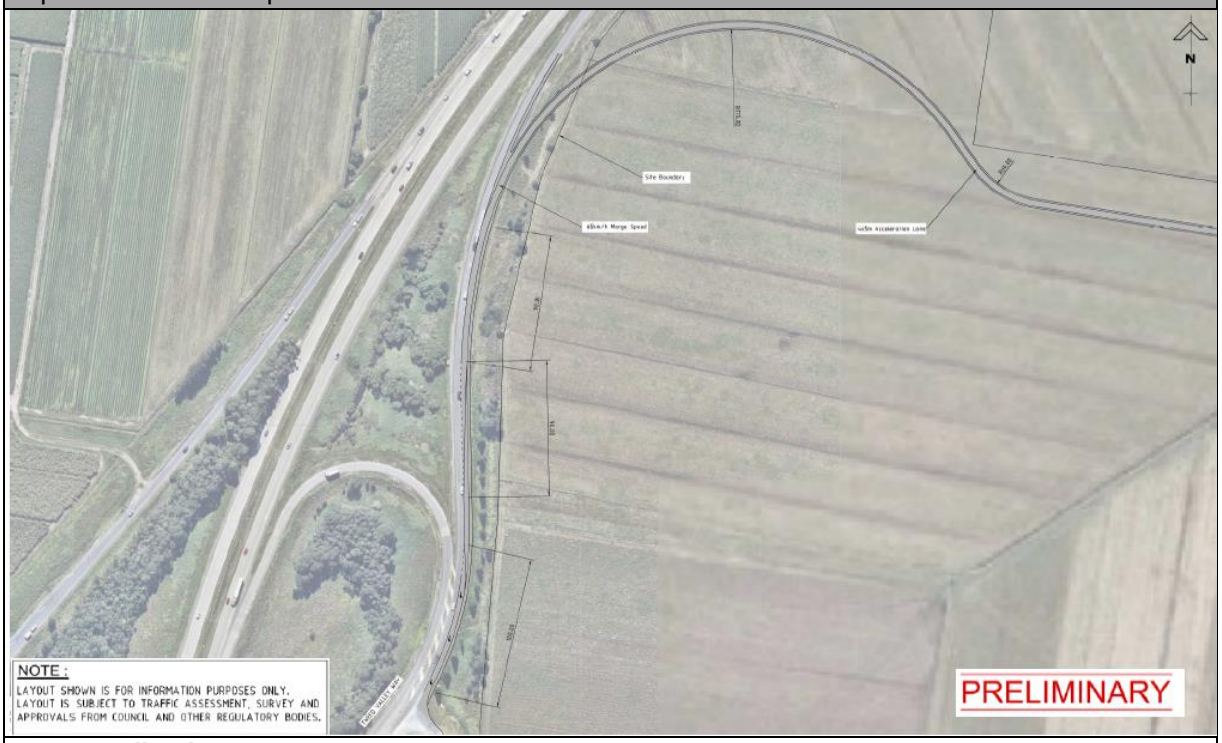
Discussion of Access Options RMS Feedback Preferred Option arrangement
Option 4 Preferred Option

RMS Feedback
• *It is understood under this option that heavy vehicles will be proposed to egress left out.* • *The AUL and CHR deceleration lanes will need to meet Austroads requirements for the posted speed limit, grade, and geometry for the target design vehicle/s.* • *Modelling will need to demonstrate adequate storage for vehicles turning right into the development under future conditions; demand management under a TMP & DCoC may be required to manage arrivals and mitigate any potential for queuing of right turning vehicles.* • *Option has merit as enables laden vehicles to achieve a greater entry speed when merging onto TVW.* • *Further design and analysis will be required to demonstrate the option can function acceptably.* • *The weaving between trucks leaving and entering the site will need to be further considered.*

Figure 5.3 Proposed Site Access Strategy (Vehicles Leaving) Preferred Option

As per the TfNSW commentary, further development of the preferred option has included the recommendations involving targeted traffic counts, vehicle classification and speed recording surveys, detailed traffic capacity and intersection performance modelling, merge and acceleration studies associated with vehicle entering the existing ABLP property intersection, combined with trucks merging into the through lane along Tweed Valley Way.

5.4 Description of the Types of Vehicles

A description of the types of vehicles to be used for transportation of sand products from the proposed development are shown in the following Table 5.1.

Table 5.1 Description of the Types of Vehicles to be used for Transportation of Sand Products

Vehicle Description	PBS Vehicle configuration	Maximum length	GCM	Engine Horsepower	Transmission Model/Rear Axle Ratio
	Three Axle prime mover and three axle semi- trailer	20.0m	44 Tonnes	435	mDrive / 3.42
	Three Axle truck and Three Axle dog trailer	20.0m	49.5 Tonnes	500	mDrive / 3.42
	Three Axle Truck and Four Axle dog trailer	20.0m	57.5 Tonnes	535	mDrive / 3.42

Fully laden at maximum GCM 57.5 tonnes (PBS truck & quad trailer) represents the worst case with respect to truck acceleration.

Also to provide for larger vehicles if required for future use along dedicated freight haulage routes, provision for haulage by 25 metre B-Doubles has been allowed and swept paths within the Tweed Valley Way / Pacific Motorway Interchange have been checked with the design vehicles plus the 25 metre B-Double vehicles. The 25 metre B-Double, 9 axle with GCM 68 Tonnes has also been checked with respect to acceleration and merge distance requirements onto the Tweed Valley Way off-ramp.

5.5 Adopted Option Truck Acceleration Distance and Merge Assessment

In accordance with Austroads, the length of the acceleration lane for heavy vehicles should be sufficient to accelerate to a speed no less than 20km/hr below the mean free speed. In this case the average 85th percentile recorded speed of 87km/hr from surveys, has been adopted as the mean free speed. If the speed of trucks nearing the end of an acceleration lane is too low, it can be very difficult for drivers on the through road to determine whether to brake and follow a merging truck or accelerate and move ahead of the truck. For this reason, the average 85th percentile speed less the 20km/hr (i.e.67km/hr) has been adopted for the minimum speed achieved at which heavy vehicles will merge. The length of the acceleration lane had been designed accordingly, including the horizontal and vertical geometry within the site. Also a minimum 20 metre run-out area between the end of the acceleration lane taper and start of the deceleration lane has been provided.

Truck acceleration distances and speeds are based on the truck manufacturer's simulation software (as calculated by the supplier). The information was used to determine acceleration distances / speed relationships for the proposed acceleration lane.

Analysis identifies that truck speeds at the merge point to accelerate to a speed no less than 20 km/h below the mean free speed of Tweed Valley Way (85th percentile), are achieved. The long acceleration distance required to achieve the speed differential at the point of merging between Tweed Valley Way and the haulage vehicles is achieved from the length of the internal haul road available within the project site.

Figure 5.4 shows acceptable acceleration requirements and speed parameters derived from the software output on the internal haul road for the fully laden Hanson truck, occurs before the Tweed Valley Way merge for road grades between 0% and 1% grade. The diagrams are based on computer simulation for the worst-case Tipper with Quad Dog as per the previous Table 5.1.

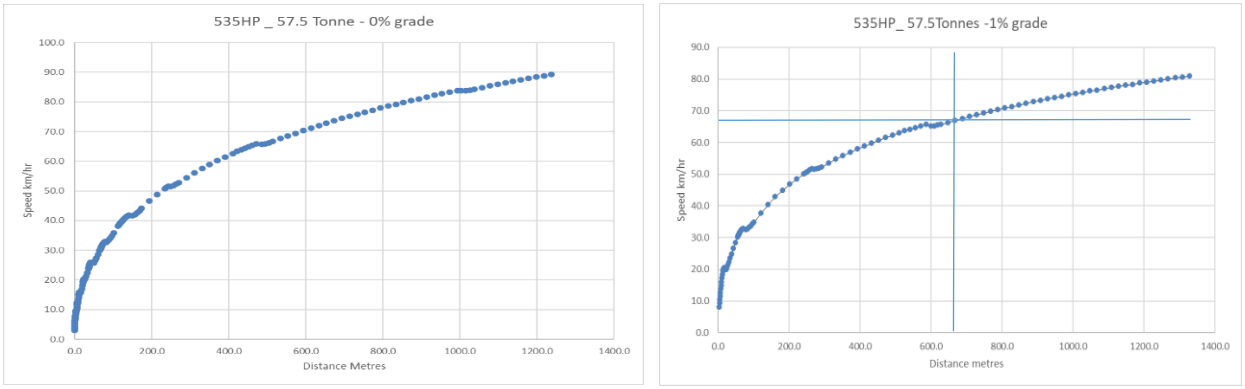


Figure 5.4 Vehicle Acceleration Results from Tipper with Quad Dog Simulation 535HP, GCM 57.5 Tonne 0% and 1% Grade

Figure 5.5 shows achievable acceleration characteristics and speeds based on Tweed Valley Way Road grades at 2 % and 5 % grade.

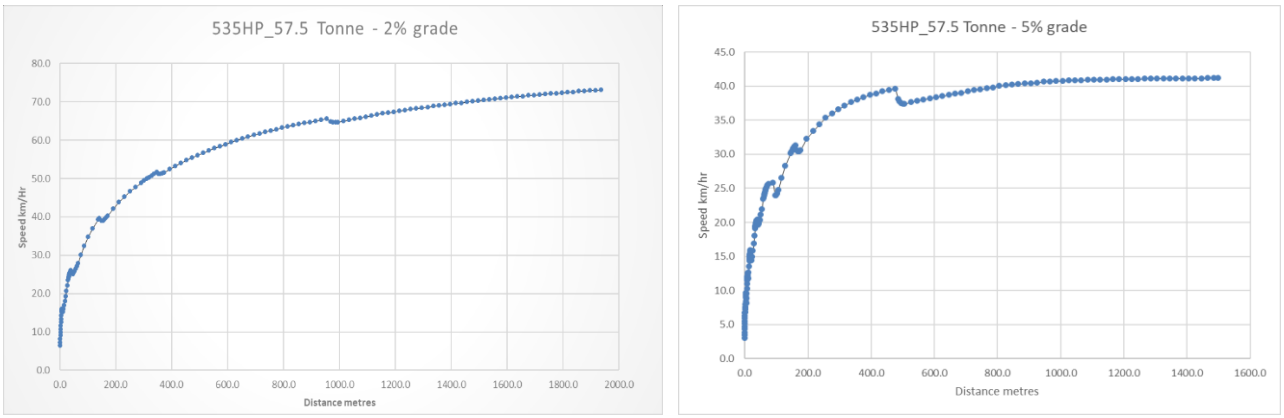


Figure 5.5 Vehicle Acceleration Results from Tipper with Quad Dog Simulation 535HP, GCM 57.5 Tonne 2% and 5% Grade

To allow for larger vehicles if required for future use along dedicated freight haulage routes, the 25 metre B-Double, 9 axle with GCM 68 Tonnes has also been checked with respect to acceleration and merge distance requirements. Figure 5.6 shows achievable acceleration characteristics and speeds based on Tweed Valley Way / internal haul road grades at 0 % and 1 % grade.

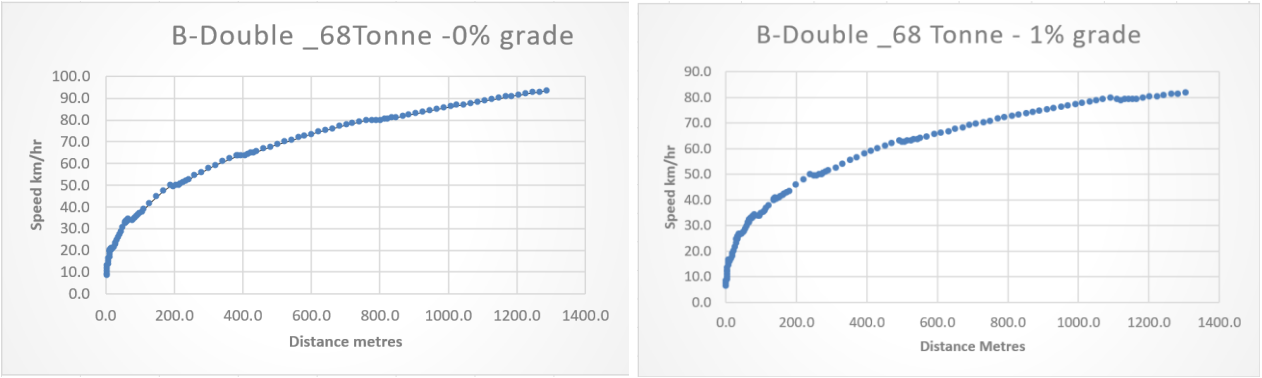


Figure 5.6 Vehicle Acceleration Results from B-Double Simulation 685HP, GCM 68 Tonne 0% and 1% Grade

The acceleration curve results for the B-Double show slightly higher performance compared to the Tipper with Quad Dog combination in Figure 5.6. Hence the Tipper with Quad Dog acceleration has been adopted for the calculations.

The longitudinal section of the exit haul road is shown in Appendix A, graded at zero to 0.4%. Traffic speed at survey location 1, representing the acceleration lane position was recorded at 87km/h (recorded 85th percentile speeds) during the average weekday. The position of the tube speed recorder was after the 80km/hr speed zone and at the start of the 75km/hr advisory speed sign.

Considering the recorded Tweed Valley Way speed environment at the merge location, the road grade and the location of the merge, the achievable truck speed of 67km/hr at the merge has been adopted for the design, being 20km/hr less than the 85th percentile speed recorded. This option also allows to provide appropriate length for the Auxiliary Left Turn Lane (AUL) into the existing site access at the ABLP property intersection.

Adopting the acceleration curves for the Tipper with Quad Dog, from a starting truck speed of 40km/hr, the following Figure 5.7 shows the required length to accelerate from 40km/hr to 67km/hr, is a distance of 540 metres conservatively based on a 1% gradient. Note that the gradient of the haul approaching the Tweed Valley Way off-ramp at the merge location is average 0.4% which requires less acceleration lane length. Hence the calculation is conservative.

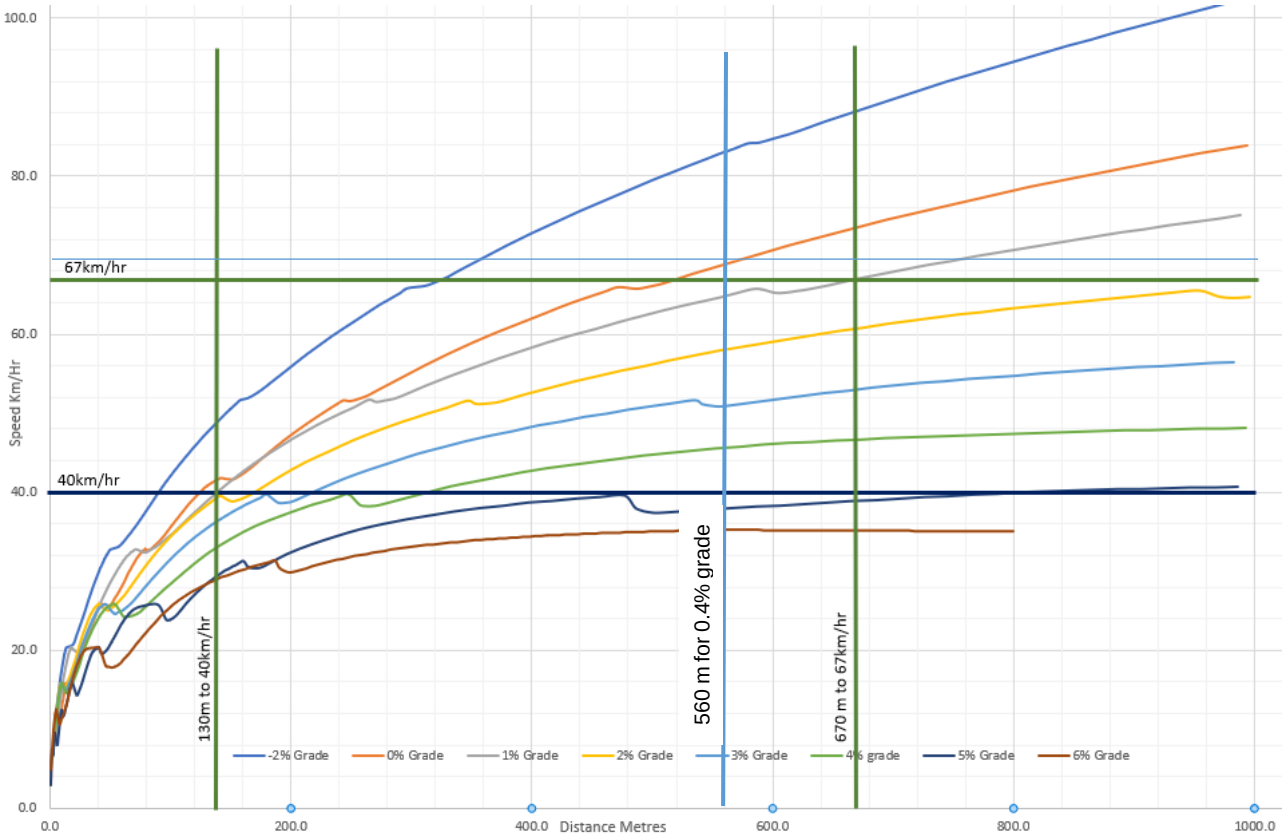


Figure 5.7 Vehicle Acceleration Results from Simulation 535HP, GCM 57.5 Tonne. 1 % Grade

Considering the road grade and the location of the merge on the existing Tweed Valley Way off-ramp, the following Figure 5.8 shows the truck speed at the merge of 67km/h is achieved with traffic travelling at 87km/h (recorded 85th percentile speed) along Tweed Valley Way. To accelerate from 40km/hr to 67km/hr at 1% vertical grade, the required distance is 540 metres which corresponds with the available distance to the end of the acceleration lane. Along the internal haul road within private property, total 618m Acceleration Lane length is available from the midpoint point of the preceding 60 metre radius curve to the end of the 90 metres taper.

Note the acceleration distance is based on a 1% grade however as shown in Appendix A, the grade of the haul road up to the Tweed Valley Way is less than this at 0.4%. As labelled in Figure 5.7 acceleration from 40km/hr to 67km/hr along a 0.4% slope requires a distance 430 metres. Hence the 618metre acceleration lane length provided is conservative and provides a longer acceleration distance compared to the absolute minimum requirement.

In line with Austroads Guide to Road Design *Unsignalised and Signalised Intersections* Table 5.5, 90m Merge Taper has been provided for 90km/h Design Speed and 100m 4 sec travel distance.

This option also provides an appropriate length for the Auxiliary Left Turn Lane (AUL) into the existing site access at the ABLP property intersection. A lane length of 110 metres is provided. The above is in line with Austroads Guide to Road Design *Unsignalised and Signalised Intersections* Table 5.2 deceleration distance required from 90km/hr Design Speed to Exit Curve design speed of 30km/h at a comfortable 2.5m/s^2 deceleration rate. The above is based on a flat level grade whereas in fact the

deceleration lane is located on the uphill section of the Tweed Valley Way off ramp that climbs to the overpass level across the M1. Hence the truck deceleration is assisted by the uphill gradient compensating for the increased deceleration distance required for trucks and reducing the requirement for trucks to slow in the through lane before entering the left turn auxiliary lane.

5.6 Site Access Strategy Overview

The following Table 5.2 shows the components of the acceleration lane / deceleration lane geometry commencing within the site up to the Auxiliary left turn at the ABLP Property / TSP intersection.

Table 5.2 Description of Acceleration and AUL Lane at Tweed Valley Way and ABLP Property / TSP Ingress / Egress

Chainage	Description
102	Chainage 102 commences at the tangent point to the left turn auxiliary lane (AUL) at the ABLP property / TSP access.
212	The deceleration lane (AUL) into the ABLP property / TSP access is 110 metres long commencing at Chainage 212 finishing at Chainage 96
232	The end of the merge taper from the acceleration lane finishes at chainage 232 providing a minimum 20 metre run-out area between the end of the acceleration lane taper and start of the deceleration lane.
322	Start of 90 metre merge taper for acceleration lane.
422	Start of 100 metres section of acceleration lane running parallel with Tweed Valley Way.
850	Start of acceleration lane from 40km/hr to 67km/hr truck speed. Corresponds with the midpoint onto the 60 metre radius horizontal curve within the property.

The following Figure 5.8 shows the site access overview for all vehicles leaving TSP.

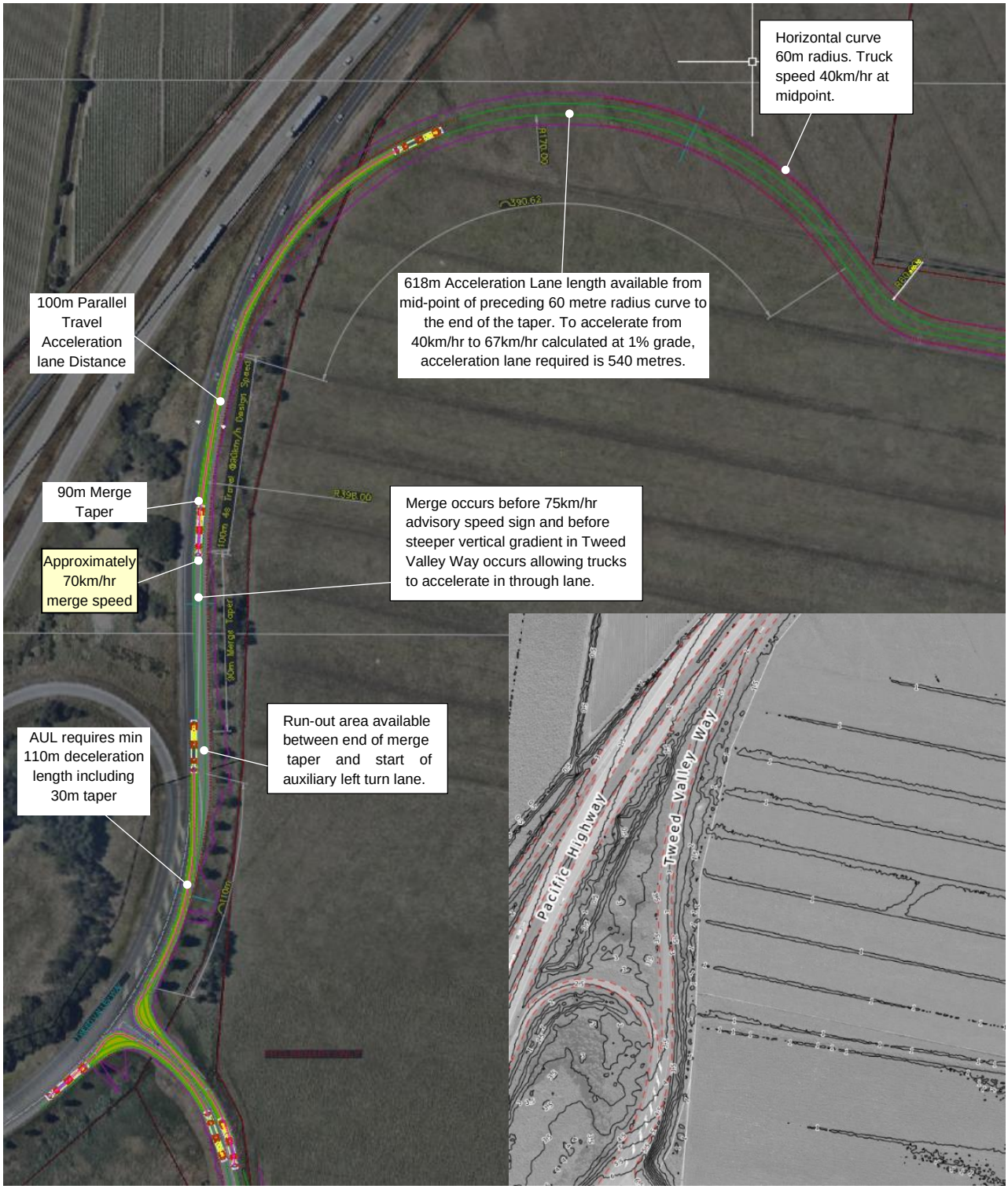


Figure 5.8 Summary Vehicle Acceleration Calculations Access onto Tweed Valley Way and Contours on Tweed Valley Way off ramp

In summary, at the midpoint of the haul road horizontal curve of 60m radius within the project site, the truck speed is 40km/hr. Following negotiation of the horizontal curve, a minimum acceleration

length of 540m is required to accelerate from 40km/hr to 67km/hr at 1% grade. The available distance is 618m to the end of acceleration lane at the Tweed Valley Way off-ramp including the taper. A run-out area is available at the end of the merge before the start of the left turn auxiliary lane into the ABLP Property / TSP Intersection.

As shown by the insert with half metre contours in Figure 5.8, the merge taper between the outbound haul road and Tweed Valley Way occurs before the start of the increase in vertical gradient up to the M1 overpass level, before the 75km/hr advisory speed sign and after the 80km/hr speed limit sign. Actual recorded speeds are higher as per the traffic survey data and have been considered in the calculations.

5.7 Public and Active Transport

This section investigates the impact on public transport (public and school bus routes) and consideration for alternative transport modes such as walking and cycling as part of the DA application within the life of the project. All site, ancillary and haulage vehicles will access the Tweed Sand Plant site via from Tweed Valley Way to the west. No vehicular access is proposed via Altona Road, Crescent Street and Tweed Coast Road to the east. The operations associated with the dredging, stockpiling and loading of the product on site do not require extensive personnel and there is minimal parking of haulage vehicles on site over night at the end of shifts. There are no public and active transport opportunities associated with the proposed access arrangements at the western side of the development and Tweed Valley Way. If fact, pedestrian or cyclist activities in proximity to the interchange are not contemplated or currently exist.

6. Traffic Demands

In order to assess the relative impact of the proposal on the surrounding road network, it is necessary to define the existing traffic demands on the road network and estimate future traffic demands on key intersections.

This section of the report details the existing traffic demands as defined in traffic surveys and forecasts these to the future assessment years. These volumes represent the “Pre-Development” scenario.

The traffic generated by the proposed development is estimated, along with its distribution across the surrounding road network. These volumes are added to the “Pre-Development” scenario to provide the “Post Development” traffic scenario.

6.1 Pre-Development Traffic

A traffic survey data and background growth rates have been used to establish background traffic demands. As mentioned in Section 3 of this report, traffic surveys have been undertaken at the following intersections:

- Tweed Valley Way / ABLP Property Site Access priority T-intersection; and
- Tweed Valley Way / Service Station Access Roundabout.

Traffic counts used for analysis have been provided in Appendix B. Figure 6.1 below shows a summary of surveyed AM and PM weekday Peak Hour traffic volumes (March 2020).

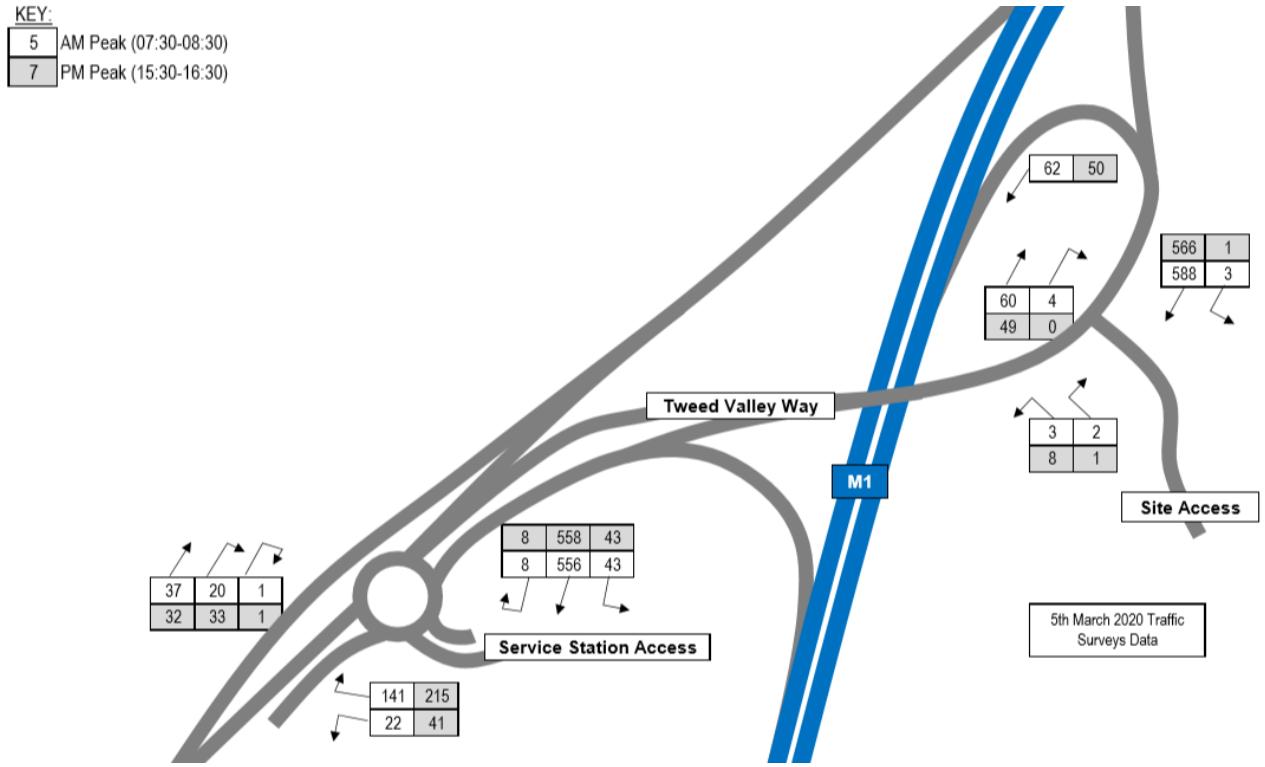


Figure 6.1 2020 Base Traffic Flows Peak Hours.

6.1.1 Background Traffic Growth Rates

The 1.6% compound traffic growth rate for Tweed Valley Way has been used in the assessment in line with the Tweed Shire Council recommendations. The development is expected to be operational by 2022 and the 10-year design horizon in accordance with TfNSW recommendations, is therefore 2032. For a robust assessment, a 20-year horizon out to 2042 has also been adopted.

The project life would be up to approximately 30 years, accessing an available resource of approximately 30-35 million tonnes. The traffic forecast above 30 years is not recommended due to uncertainty of the traffic forecast over the extended time period.

Table 6.1 below summarises the compound growth rates used in the traffic impact assessment.

Table 6.1 Traffic Growth Factors

Growth Period	2020 to 2022	2020 to 2032	2020 to 2042
Traffic Growth Factor	1.032	1.210	1.418

6.1.2 Future Year Traffic Volumes

Growth factors summarised in Table 6.1 have been applied to the 2020 surveyed traffic flows (Refer Figure 6.1) to identify future traffic flows in 2022, 2032 and 2042. The resultant future traffic for the year of 2022, 2032 and 2042 AM and PM peak hours is shown in the Figure 6.2, Figure 6.3 and Figure 6.4 respectively.

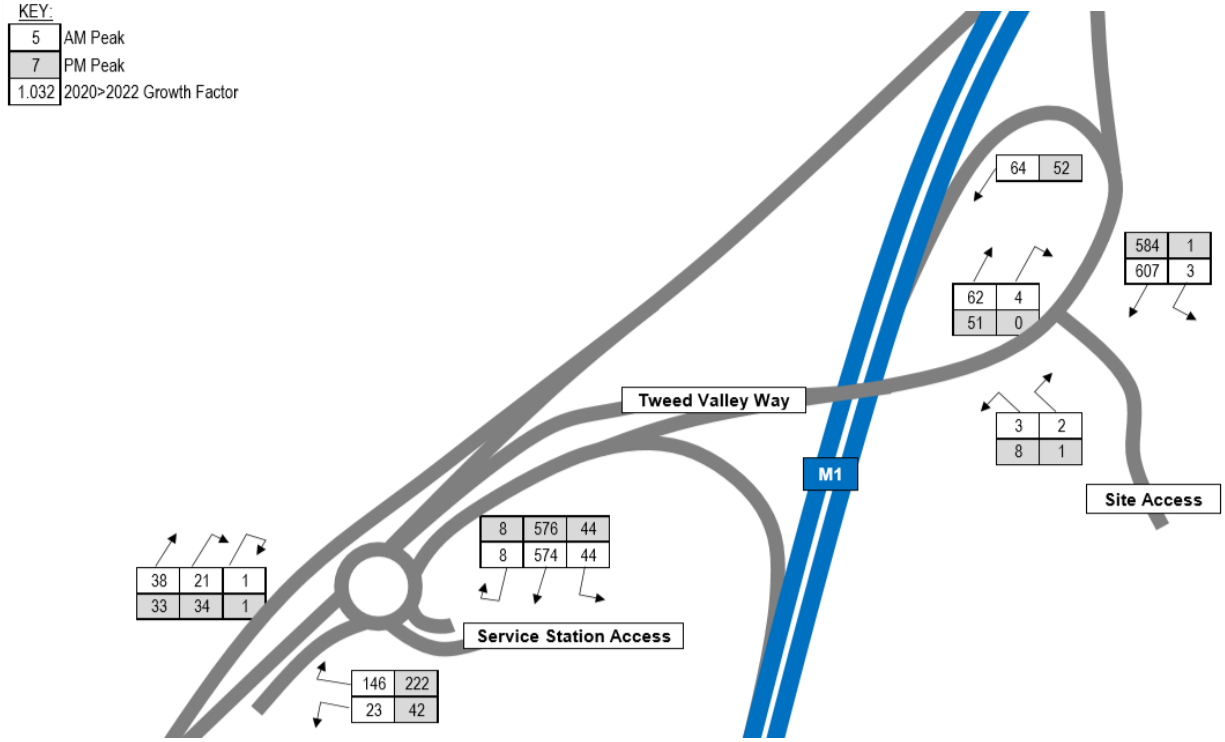


Figure 6.2 2022 Background Traffic Flows Peak Hours

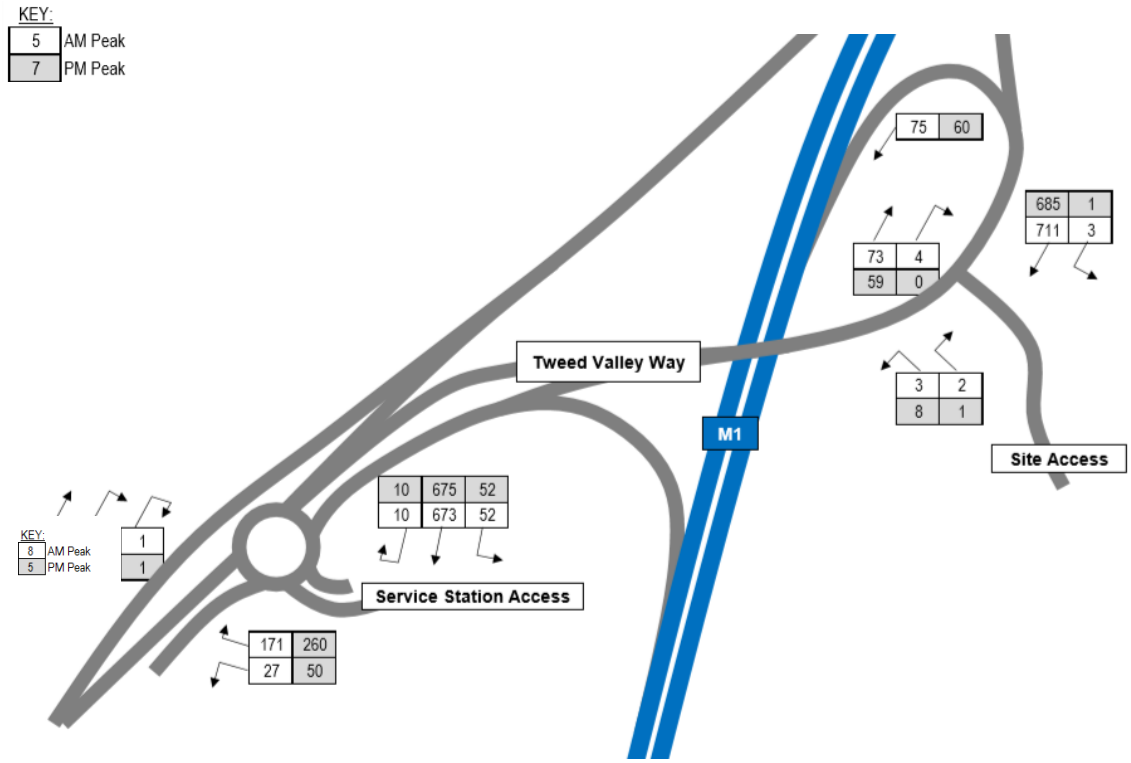


Figure 6.3 2032 'Pre-development' Traffic Flows Peak Hours

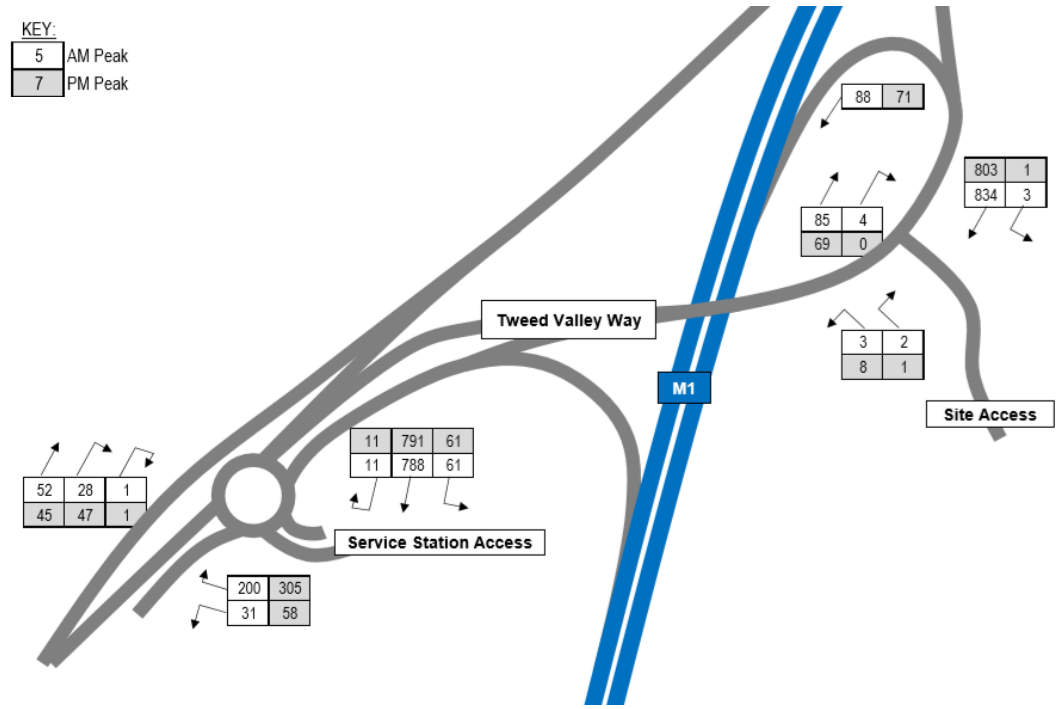


Figure 6.4 2042 'Pre-development' Traffic Flows Peak Hours

6.1.3 Future Year Traffic Volumes with Committed Development

As mentioned earlier, it is anticipated that 500,000 cu.m of material will be hauled to the Australian Bay Lobster Producers committed development site annually over four years up to 2025. Consequently, the committed development traffic volumes have been combined with the 2022 assessment year (previous Figure 6.2)

Figure 6.5 shows 'Pre-development' Traffic Flows for the 2022 assessment year with the flows representing the reference case against which the implications of the proposed development can be assessed.

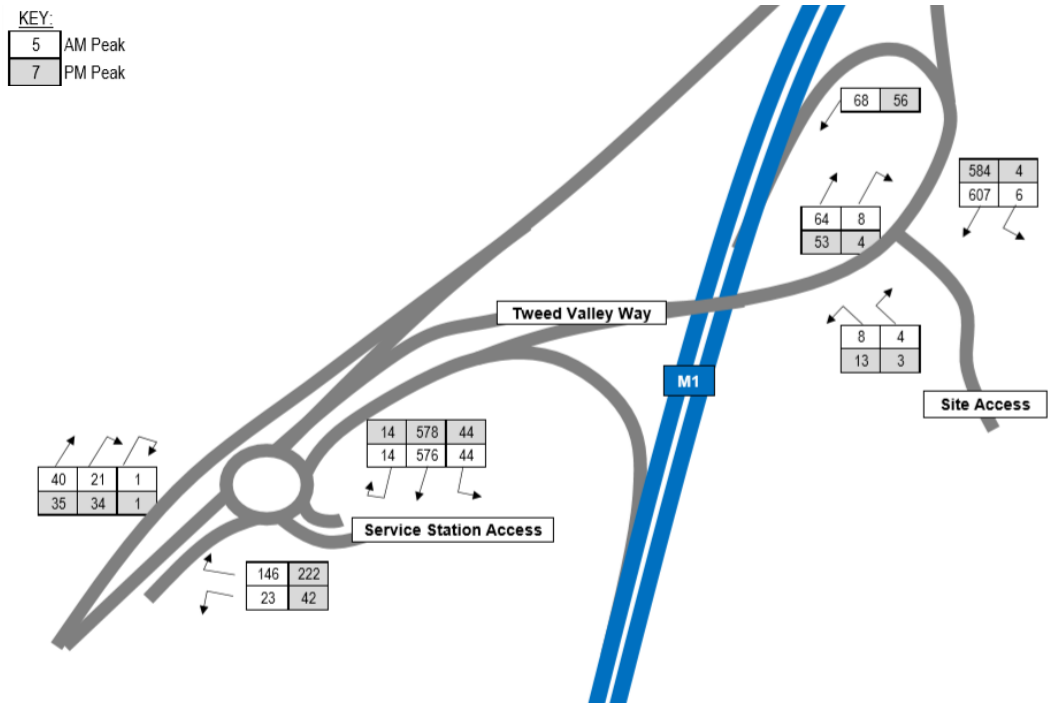


Figure 6.5 2022 Base with ABLP Property Committed Development

6.2 Development Traffic

6.2.1 Trip Generation

TSP trip generation for the site based on the current maximum 500,000 tpa was previously shown in Table 2.3. In addition, TSP must not dispatch more than 18 laden trucks from the site in any hour following the upgrade of Altona Road and the Crescent Street/Tweed Coast Road intersection.

It is important to note that the existing site truck movements to and from the development are restricted between 7:00am to 5:00pm Monday to Friday and 7:00am to 12pm on Saturday with no operation on Sundays and public holidays.

The additional traffic generated by the proposed redevelopment is calculated pro-rata on the basis of the anticipated increase in haulage trucks compared to the existing traffic volumes generated by the site.

As TSP is proposing to increase to 24 hours operation, it is considered appropriate to use Hanson's Lytton Sand Plant heavy vehicle movement data which benefits from 24hr operation and similar sand extraction per annum (up to 450,000 tpa).

It is proposed to increase the truck movement period to 24 hours as part of the redevelopment proposal. This reduces the peak hour truck movements as truck volumes are spread over the longer period. For comparison purposes and to forecast future demand, 2018/2019 data for Hanson's Lytton Sand Plant, which extracts up to 450,000 tpa of sand has been used. Figure 6.6 below shows the typical daily trip generation for the Lytton Sand Plant.

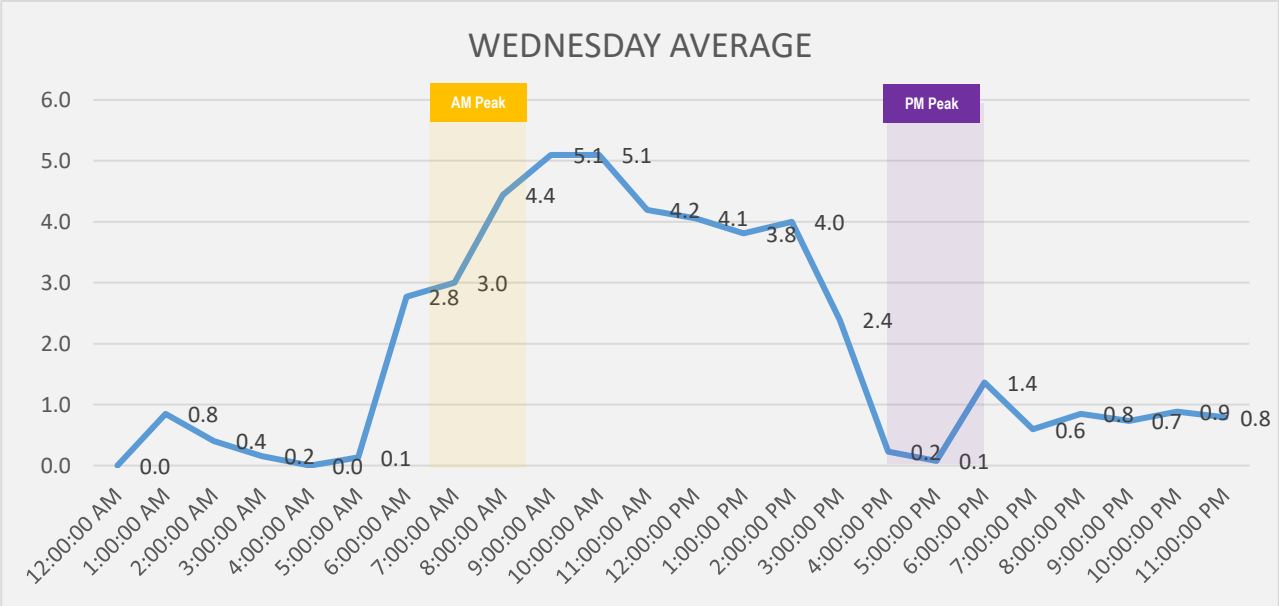


Figure 6.6 Recorded Lytton Sand Plant Wednesday Average Traffic Volumes (Arrivals Only)

As can be seen in the above figure, the highest trip generation occurs between 09:00 and 11:00AM, which is outside the typical network morning peak period (07:00-09:00). However, for robust assessment, the highest recorded trip generation from the site in a year (13 laden trucks dispatched from the site) has been used for the assessment. Table 6.2 below shows the highest recorded trip generation at Lytton Sand Plant.

Table 6.2 Recorded Lytton Sand Plant Truck Movements

Extraction (tonnes)	Plant	In	Out	Two-way
424,025	Highest recorded Lytton Sand Plant Truck Movements (2018 data)	13	13	26
450,000	Pro-rata to 450,000 tonnes	14	14	28

It is worth to note that the highest recorded trips for the 424,025 tonnes have been adopted to pro rata the equivalent number of trips applicable to 450,000 tonnes.

The proposed Tweed Sand Plant redevelopment trip generation was calculated by adding the existing TSP trips (approved 500,000 tonnes) and Lytton Sand Plant traffic volumes (450,000 tonnes) as summarised in Table 6.3 below.

Table 6.3 Forecast Tweed Sand Plant Redevelopment Truck Movements

Extraction	Plant	In	Out	Two-way
500,000	TSP Approved truck movements	18	18	36
450,000	Lytton Sand Plant truck movements	14	14	28
950,000	**Forecast Tweed Sand Plant Redevelopment**	**32**	**32**	**64**

As show in Table 6.3 above, the proposed TSP redevelopment is forecast to generate 64 two-way truck movements per hour. In reality this is likely to be a worst-case value as the highest trip generation occurs outside the traditional road network peak hours as presented in the previous Figure 6.6.

Annual trip generation is based on the Tweed Sand Plant trip generation pro-rata to account for the increased extraction from the TSP. Table 6.4 shows the pro-rata calculations of the existing annual trip generation.

Table 6.4 Forecast Tweed Sand Plant Redevelopment Truck Movements

Extraction	Plant	Departures (Annually)	Two-way (Annually)	Max Daily (two-way)	Per day (rolling quarterly average
214,000	Recorded Tweed Sand Plant Truck Movements (2018 data)	6,979*	13,958*	126*	80**
950,000	**Forecast Tweed Sand Plant Redevelopment Truck Movements**	**30,982**	**61,963**	**559**	**267**

**Source: "Annual Environmental Management Report Tweed Sand Plant Cudgen, NSW July 2017 To June 2018"*

*** 80 per day based on the 285,000 tonnes sand extraction limit*

The Equivalent Standard Axle has been estimated based on the surveys undertaken at Altona Road extracted from Bitzios Traffic Impact Assessment report prepared for the site. Table 6.5 below shows the recorded TSP truck volumes based on the earlier 150,000m³ extraction of processed material per annum.

Table 6.5 Surveyed Existing TSP Truck Volumes Generated by Type (2016 Data)

Movement	TSP Truck and Dog (TD) 6 Axles	TSP Truck and Dog (TD) 7 Axles	TSP Articulated Vehicle (AV) 6 Axles	Total
AM Peak				
In	1	1	-	2
Out	5	-	2	7
Total	6	1	2	9
PM Peak				
In	-	1	4	5
Out	-	1	3	4
Total	-	2	7	9

Table 6.6 below shows the percentages adopted for calculations based on the recorded Truck types.

Table 6.6 Surveyed Existing TSP Truck Volumes by Type (%) (2016 Data)

Movement	TSP Truck and Dog (TD) 6 Axles	TSP Truck and Dog (TD) 7 Axles	TSP Articulated Vehicle (AV) 6 Axles	Total
AM Peak				
In	50%	50%	-	100%
Out	71%	-	29%	100%

PM Peak				
In	-	20%	80%	100%
Out	-	25%	75%	100%

Using the above surveyed truck percentage split, the forecast trip generation by the Truck Type has been calculated as shown in Table 6.7.

Table 6.7 Forecast Development Truck Volumes by Vehicle Type

Movement	TSP Truck and Dog (TD) 6 Axles	TSP Truck and Dog (TD) 7 Axles	TSP Articulated Vehicle (AV) 6 Axles	Total
AM Peak				
In	16	16	0	32
Out	23	0	9	32
Total	39	16	9	64
PM Peak				
In	0	8	24	32
Out	0	0	0	32
Total	0	8	24	64

6.2.2 Trip Distribution

Trip distribution for the proposed TSP redevelopment is based on the combined Lytton Sand Plant and the existing Tweed Sand Plant key destinations.

It is considered that the geographical spread of the key destinations for delivery are unlikely to be significantly different from those of the existing two plants so for simplicity this existing distribution information was used to determine the distribution of the new truck trips associated with the site redevelopment.

The distribution of trips to the local road network has been undertaken using Google Maps, assigning the trip to the most logical / shortest route available as shown in Table 6.8.

Table 6.8 Combined Lytton Sand Plant and Tweed Sand Plant Key Destinations

Plant	Trucks	Destination based on 2018 data	Northbound	Southbound
Lytton Sand Plant	1	*CLOSED NOOSA HEADS CONCRETE	1	
	1	{CREEK RD}		1
	192	CABOOLTURE CONCRETE {ROSEBY ROAD}	192	
	267	CALOUNDRA CONCRETE	267	
	871	COOPERS PLAINS CONCRETE {NORBURY ST	871	
	13	FERNY GROVE QUARRY	13	
	3	GLASSHOUSE MOUNTAINS QUARRY	3	
	23	HANSON LABRADOR CONCRETE	23	
	574	HYMIX SPRINGWOOD	574	
	557	HYMIX WACOL	557	
	20	HYMIX BURLEIGH HEADS {WILLIAM BANKS	20	
	393	HYMIX CLEVELAND	393	
	735	HYMIX NARANGBA	735	
	827	HYMIX PARK RIDGE {MT LINDESAY HWY}	827	
	21	HYMIX SOUTHPORT	21	
	710	HYMIX WINDSOR	710	
	427	IPSWICH CONCRETE {BRIGGS RD}	427	
	954	JINDALEE CONCRETE {SINNAMON RD}	954	
	736	LYTTON CONCRETE {ANTON RD}	736	
	588	MAROOCHYDORE CONCRETE	588	
	513	NORTHGATE CONCRETE {NUDGEE RD}	513	
	203	EXTERNAL VARIOUS*	203	
	567	SPRINGWOOD CONCRETE {HANSON}	567	
	36	STAPYLTON CONCRETE {ELLIOT DR}	36	
	690	STRATHPINE CONCRETE {DUNTROON ST}	690	
	2,539	WEST END CONCRETE {NOTT ST}	2,539	
	1	ZONE 1 GATE 56 EASTBOUND {LOGAN MWY	1	
Tweed Sand Plant	360	BALLINA CONCRETE		360
	669	BURLEIGH CONCRETE (HANSON)	669	
	135	BYRON BAY CONCRETE		135
	20	COOPERS PLAINS CONCRETE {NORBURY ST	20	
	285	EXBIN TWEED - BENOWA {BORAL BENOWA}	285	
	165	EXBIN TWEED - CHINDERAH {BORAL CHIN	165	
	558	EXBIN TWEED SANDS - Q CRETE BURLEIGH	558	
	542	HANSON LABRADOR CONCRETE	542	
	522	HYMIX BURLEIGH HEADS {WILLIAM BANKS	522	
	809	HYMIX CHINDERAH	809	
	577	HYMIX SOUTHPORT	577	
	9	JINDALEE CONCRETE {SINNAMON RD}	9	
	168	LISMORE CONCRETE		168
	18	LYTTON CONCRETE {ANTON RD}	18	
	506	NERANG QUARRY	506	
	127	Q EXBIN TWEED - WEST BURLEIGH QUARRY	127	
	1	Q WESTFIELD {FOXWELL RD}	1	
	679	STAPYLTON CONCRETE {ELLIOT DR}	679	
%			96.4%	3.6%

The adopted distribution is summarised as follows:

- Northbound 95%
- Southbound 5%

The above trip generation and trip distribution data has then been combined to represent the likely distribution and volume of highway peak hour trips associated with the proposed TSP redevelopment. The assignment of the development trips onto the local road network is shown in Figure 6.7 below.

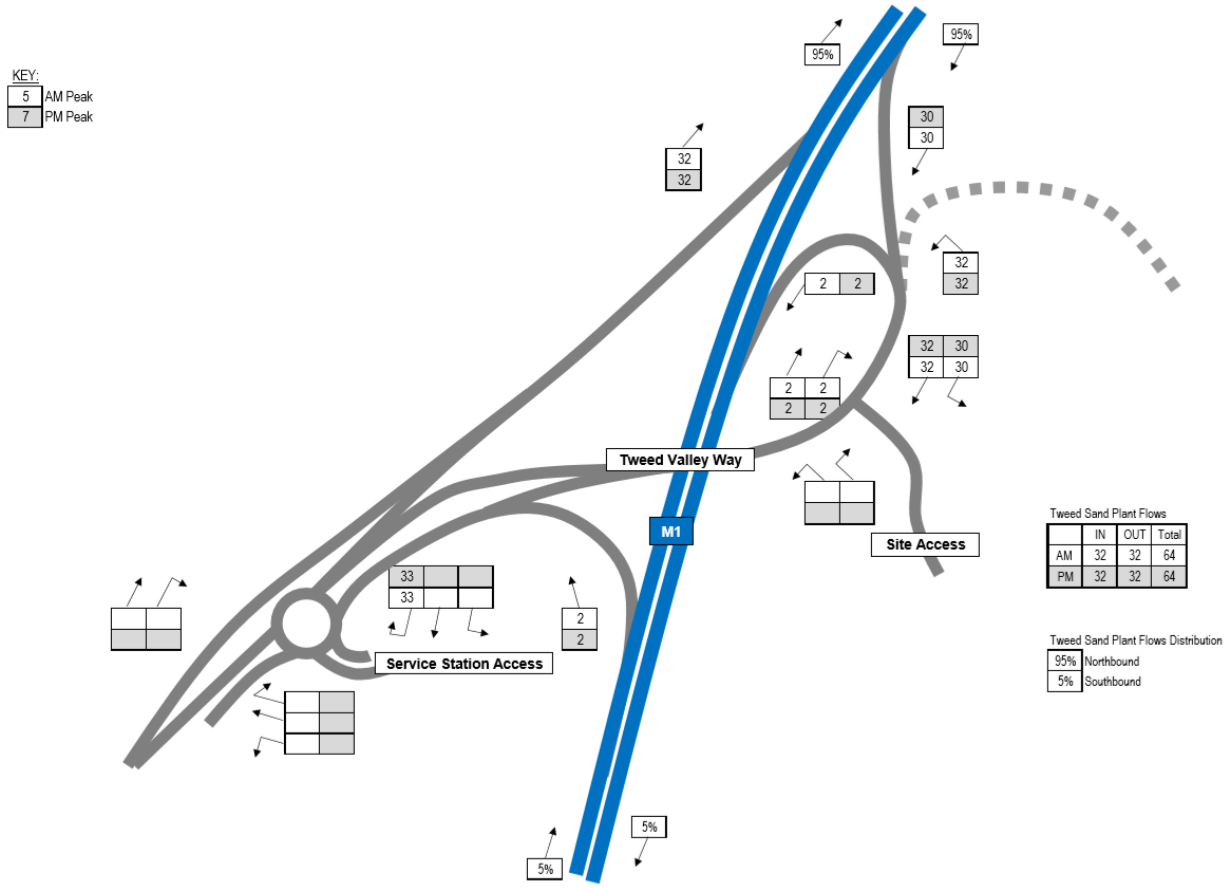


Figure 6.7 Development Trips Assignment

As per TfNSW request, sensitivity Testing was undertaken to ensure a robust assessment.

The adopted development trip distribution for sensitivity testing is summarised as follows:

- Northbound (Sensitivity Testing) 80%
- Southbound (Sensitivity Testing) 20%

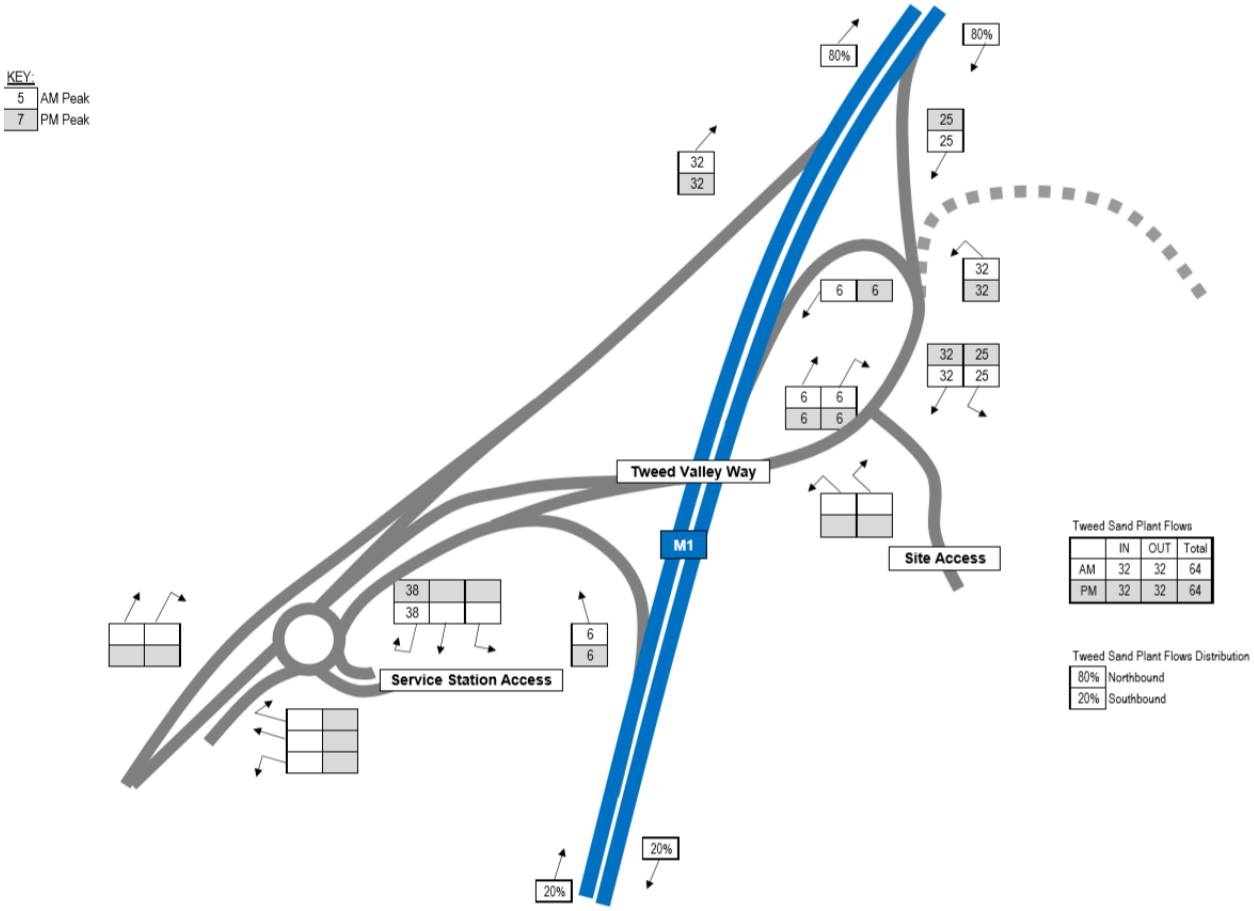


Figure 6.8 Development Trips Assignment (Sensitivity Testing)

6.3 Post Development Traffic

The development traffic (Figure 6.7) has been added to the Pre-Development traffic demands (Figure 6.3, Figure 6.4 and Figure 6.5) to provide the Post Development traffic scenarios. The Post Development traffic demands for the 2022, 2032 and 2042 design years are shown in Figure 6.9, Figure 6.10 and Figure 6.11 respectively with all traffic flow diagrams provided in Appendix C.

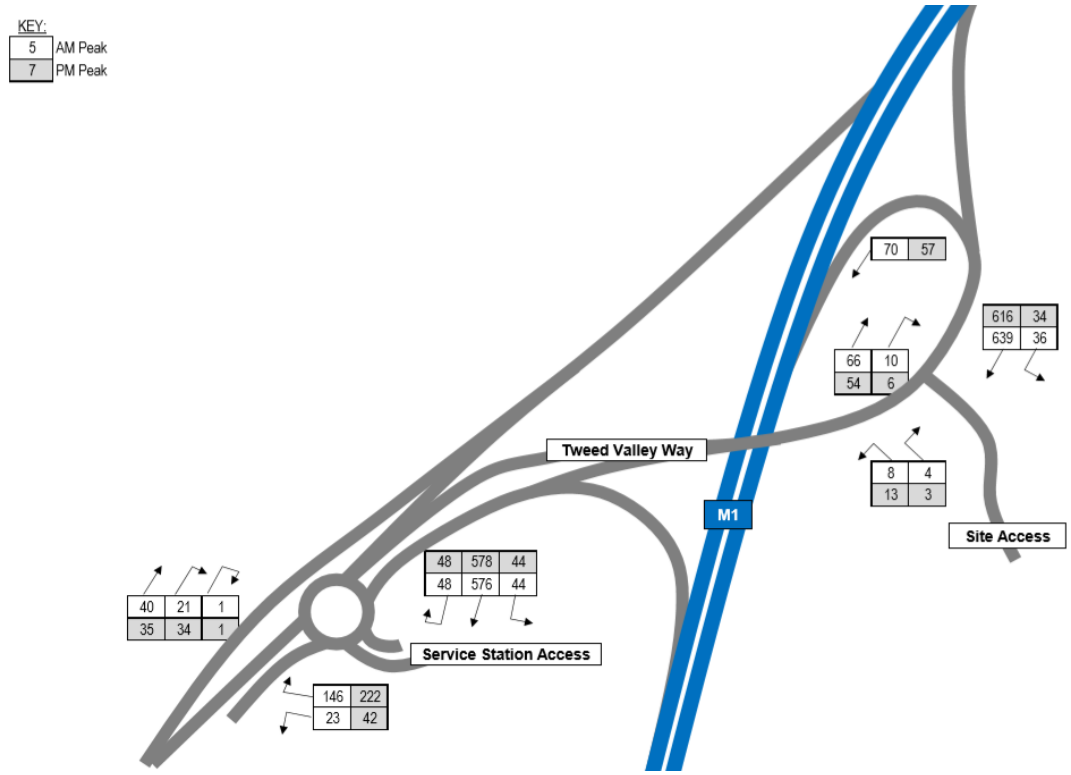


Figure 6.9 2022 'Post-development' Traffic Flows Peak Hours

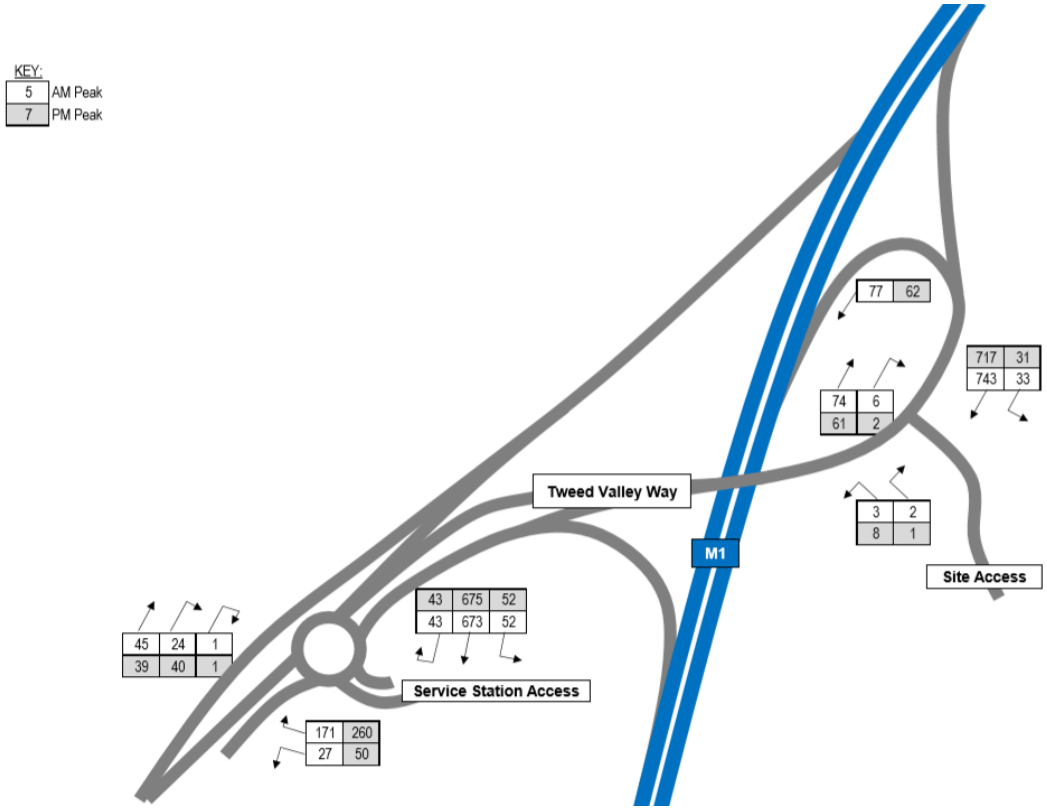


Figure 6.10 2032 'Post-development' Traffic Flows Peak Hours

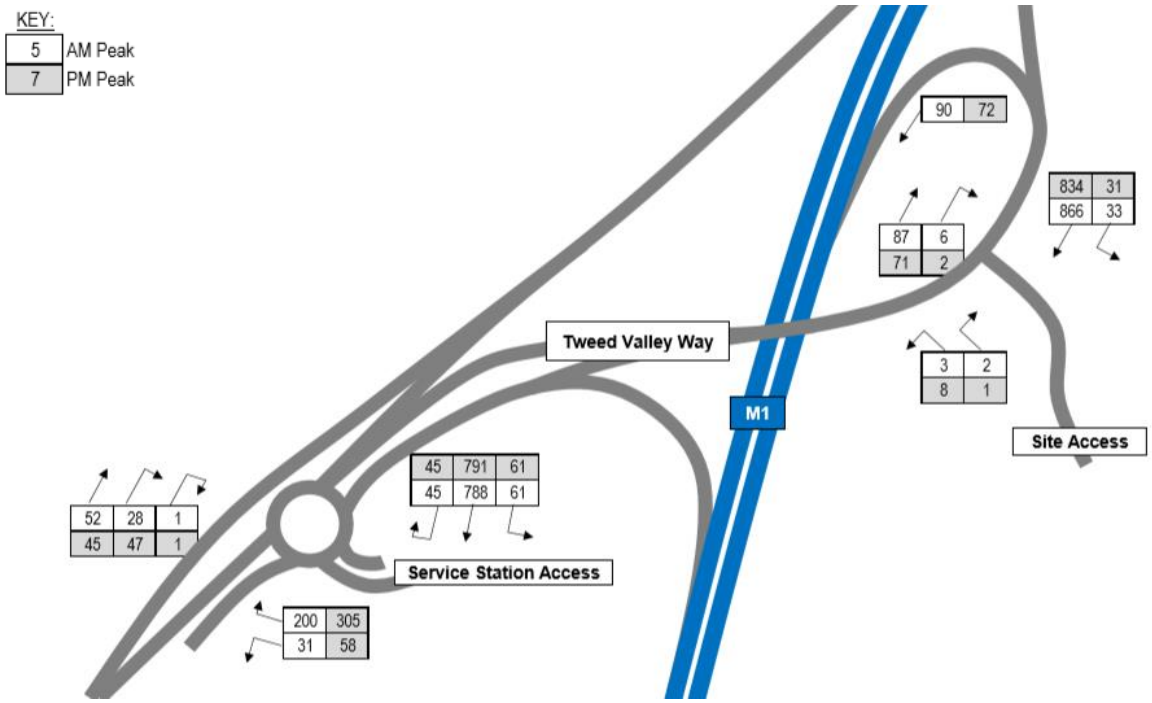


Figure 6.11 2042 'Post-development' Traffic Flows Peak Hours

The development traffic with higher southbound truck trip distribution (Figure 6.8) has been added to the Pre-Development traffic demands in 2042 assessment year (Figure 6.4) to provide the Post Development traffic scenarios for sensitivity testing. The Sensitivity Testing Post Development traffic demands for the 2042 design years are shown in Figure 6.12.

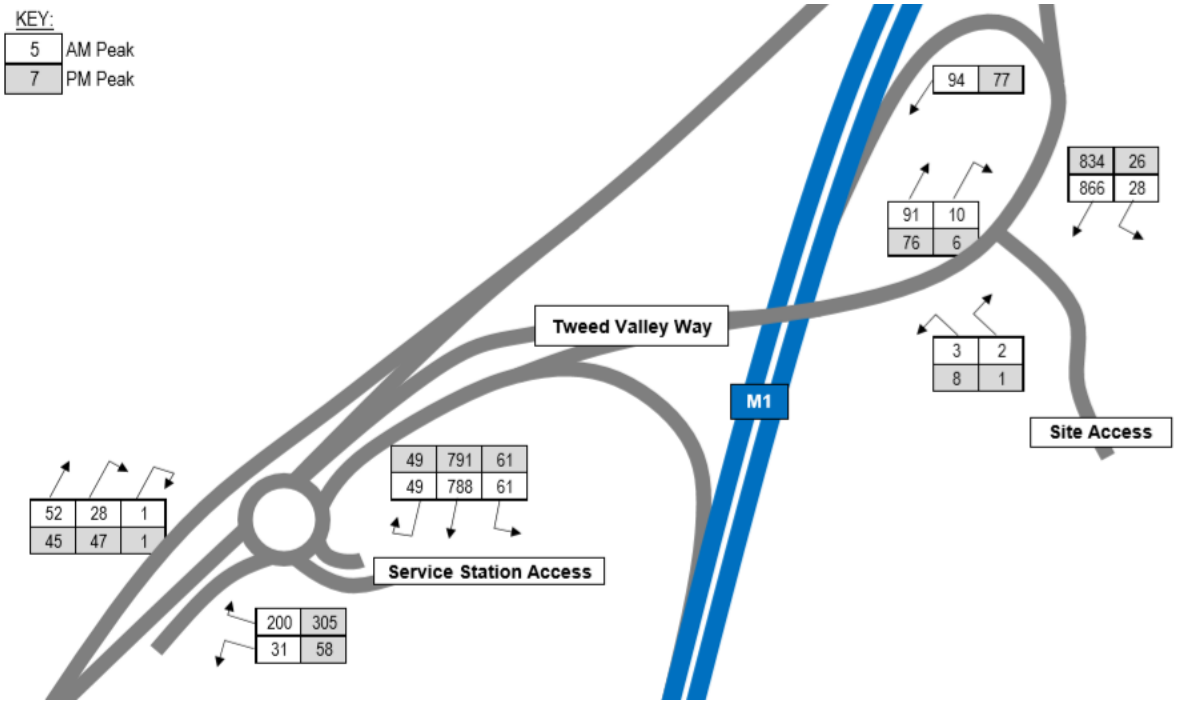


Figure 6.12 2042 'Post-development' Traffic Flows (Sensitivity Testing) Peak Hours.

7. Operational Assessment

The following assessment scenarios have been undertaken at the Tweed Valley Way / ABLP Property Site Access priority T-intersection and the Tweed Valley Way / Service Station Access roundabout:

- 2020 – existing situation – Figure 6.1
- 2022 – pre-development scenario (year of opening) – Figure 6.5
- 2022 – post -development scenario (year of opening) – Figure 6.9
- 2032 – pre-development scenario (10-year design horizon) – Figure 6.3
- 2032 – post-development scenario (10-year design horizon) – Figure 6.10
- 2042 – pre-development scenario (20-year design horizon) – Figure 6.4
- 2042 – post-development scenario (20-year design horizon) – Figure 6.11
- 2042 – post-development sensitivity scenario (20-year design horizon) – Figure 6.12

7.1 Turn Warrant Assessment

Turn warrants have been developed in relation to safety. The warrants have been developed around the relationship between traffic volumes, speed environments and accident statistics, employing a Benefit Cost Ratio (BCR) across an assumed design life.

The warrants are based on the construction of intersections on new roads, ie “greenfield” sites. For existing intersections, they provide a reference point, but are not strictly applied as the BCRs in established locations often do not support upgrades, due to the existing physical constraints (eg. services, road reserve, drainage structures, etc). A brief summary of turn treatments is provided in Table 7.1 below. Assessment of turn warrants has been carried out using Figure 7.1 and Figure 7.2 extracted from Austroads.

Table 7.1 Turn Lane Descriptions

Turn Treatment	Description
BAL	Basic Left Turn Lane
CHL	Channelised Left Turn Lane
AUL (s)	Shortened Auxiliary Left Turn Lane
AUL	Full Length Auxiliary Left Turn Lane
BAR	Basic Right Turn Lane
CHR (s)	Shortened Channelised Right Turn Lane
CHR	Channelised Right Turn Lane

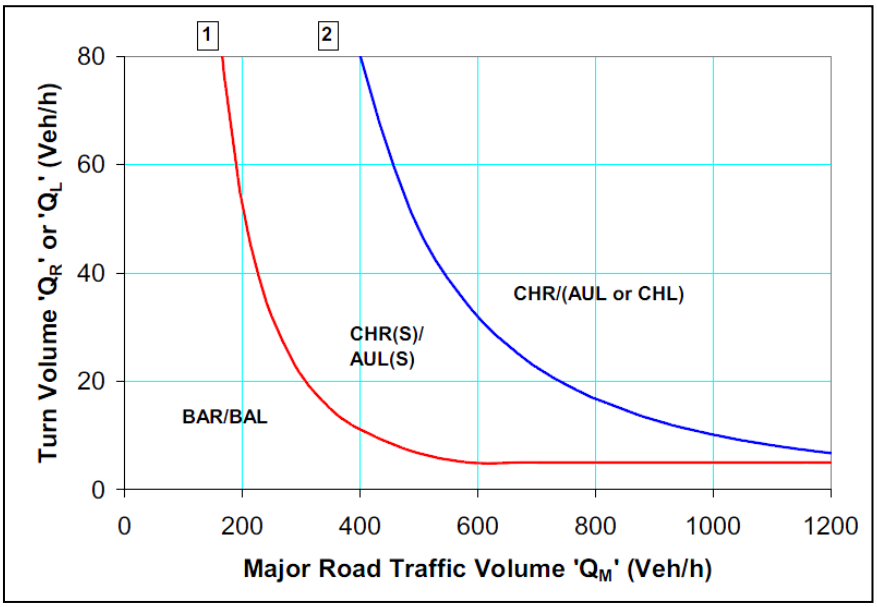
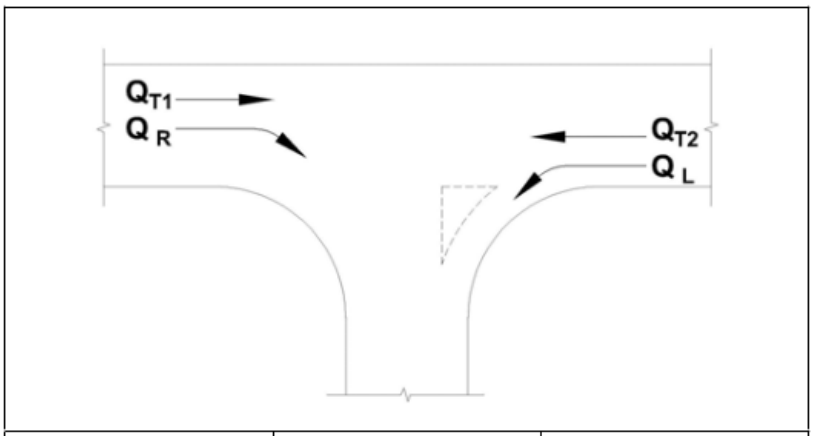


Figure 7.1 Warrants for Turn Treatments for Roads with a Design Speed < 100 kph

Calculation of the values of Q_m, Q_r and Q_l for use with Figure 7.2 is in accordance with Austroads.



Turn type	Splitter island	Q_M (veh/h)
Right	No	= Q_{T1} + Q_{T2} + Q_L
Right	Yes	= Q_{T1} + Q_{T2}
Left	No/Yes	= Q_{T2}

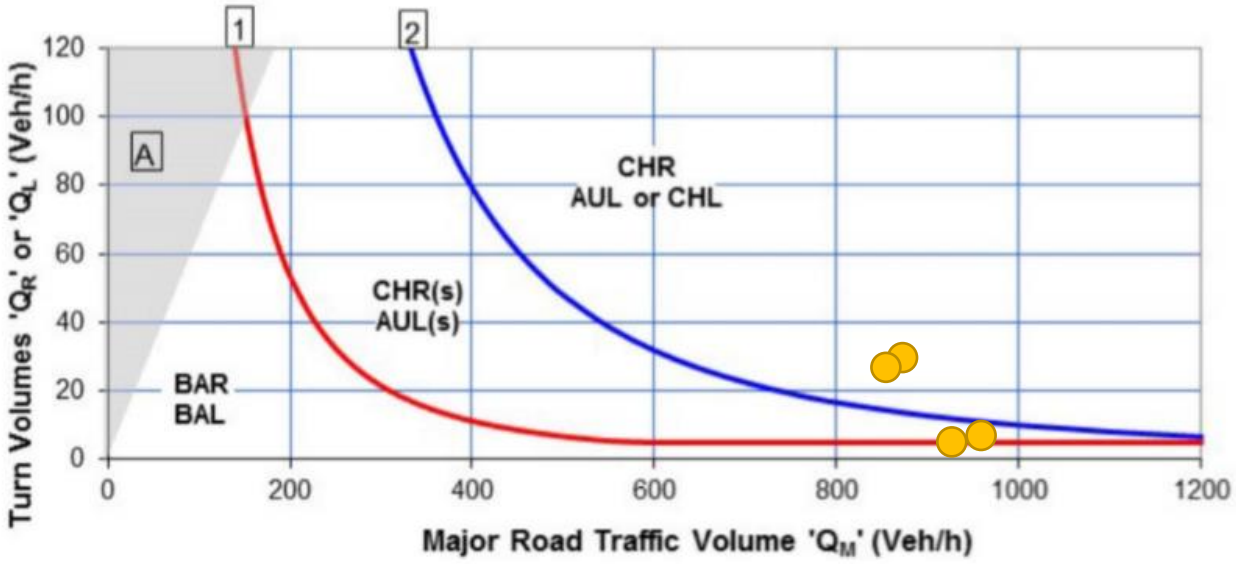
Figure 7.2 Calculation of the Major Road Traffic Volume Parameter 'Q_m'

The Tweed Valley Way / Site Access intersection is a priority controlled "T" intersection where Tweed Valley Way is the major road. The calculated Major Road Traffic Volumes Parameter Q_M for the 2042 Post Development Scenario are summarised in Table 7.2 below.

Table 7.2 Assessment of Turn Warrants for Tweed Valley Way/ Site Access Intersection

Scenario	Right Turn						Left Turn		
	Q_{T1}	Q_{T2}	Q_L	Q_R	Q_M	Treatment	Q_L	Q_M	Treatment
2042 Post Development AM	87	866	33	6	985	CHR(s)	33	866	AUL
2042 Post Development PM	71	834	31	2	937	CHR(s)	31	834	AUL

As demonstrated, due to the addition of development trips, a CHR (s) and AUL turning treatment is warranted at the Tweed Valley Way / Site Access intersection. Turn Warrant Assessment was undertaken based on the *Austroads Guide to Traffic Management Part 6 Intersections Interchanges and Crossings* for roads with design speeds between 70km/h to 100 km/h as shown in Figure 7.3 below.



(b) 70 km/h < Design Speed < 100 km/h

Figure 7.3 Turn Warrant Assessment

Based on the above Turn Warrant Assessment, the SIDRA analysis for the Post Development Scenarios includes an Auxiliary Left Turn Lane at Tweed Valley Way in addition to the existing right turn (CHR).

7.2 Intersection Capacity Analysis

Capacity analysis of the surrounding intersections has been carried out utilising SIDRA INTERSECTION 9 traffic modelling software. This is an advanced micro-analytical traffic evaluation tool that employs lane-by-lane and vehicle drive models and can assess intersections within a network.

The key performance criteria considered are Degree of Saturation (DOS), Delays and Queuing. For a priority-controlled intersection, a DOS in excess of 80% is considered over capacity, 85% for roundabouts and 90% for signalised intersections. A DOS of 90% is the recommended upper limit

as above this value performance quickly deteriorates. For priority-controlled intersections, a delay up to 42 seconds is considered satisfactory and a delay greater than 56 seconds is considered over capacity (*Guide to Traffic Generating Developments*, Roads and Traffic Authority, 2002, Tab. 4.2). Acceptable queue lengths are determined on a site by site basis, considering available storage and interaction with other intersections. To ensure detailed assessment, SIDRA analysis includes the number of total vehicles, percentage Large Trucks and Heavy Vehicles.

7.3 Tweed Valley Way / ABLP Property Site Access Priority T-intersection

The diagrammatic layout of the intersection as well as aerial photo of the intersection layout, are shown in the following Figure 7.4.

Figure 7.4 Tweed Valley Way / ABLP Property Site Access Intersection (Existing Layout)

Figure 7.5 below shows the proposed Tweed Valley Way / ABLP Property Site Access Intersection layout, which includes an AUL lane at Tweed Valley Way as per the Turn Warrant Assessment findings.

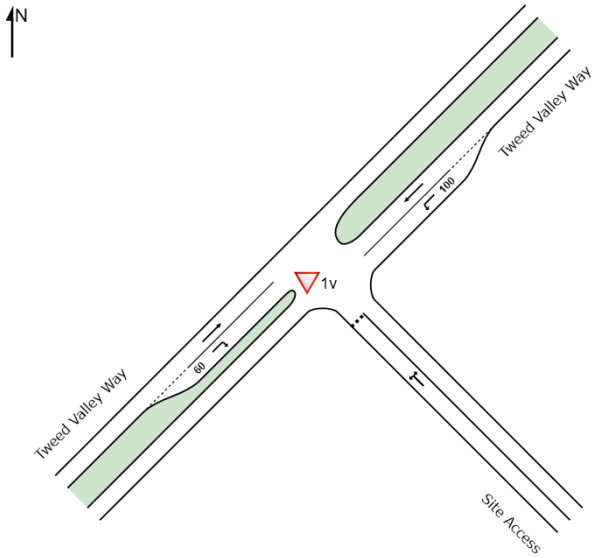


Figure 7.5 Tweed Valley Way / ABLP Property Site Access Intersection (Proposed Layout)

Table 7.3 shows the intersection performance indicators for the Tweed Valley Way / ABLP Property Site intersection for the surveyed 2020 year.

Table 7.3 Tweed Valley Way / ABLP Property Site Access Intersection SIDRA Results – Year 2020

Peak Hour	Approach / Movement	Year 2020 without development		
		DOS	Delay (seconds)	Queue (metres)
AM	Site Access	0.017	15.7	0.6
	Tweed Valley Way (North East)	0.331	0.1	0.0
	Tweed Valley Way (South West)	0.037	0.7	0.3
	Intersection overall	0.331	0.3	0.6
PM	Site Access	0.015	9.9	0.5
	Tweed Valley Way (North East)	0.318	0.1	0.0
	Tweed Valley Way (South West)	0.030	0.2	0.0
	Intersection overall	0.318	0.3	0.5

SIDRA intersection capacity analysis has demonstrated that the existing Tweed Valley Way / ABLP property intersection currently works below its theoretical operational capacity of 80%. The junction is operating within a satisfactory Level of Service. The Degree of Saturation during PM Peak hour reached a maximum Degree of Saturation (DoS) of 33.1%. Level of Service D and 24.6 seconds average delay is achieved for the right turn movement from Tweed Valley Road into the ABLP site access road.

Table 7.4 below shows the SIDRA results for the Tweed Valley Way / ABLP property intersection for the 2022 Pre and Post Development Scenarios. It is important to note that 2022 Pre and Post development scenarios includes committed development traffic associated with the ABLP property redevelopment.

Table 7.4 Tweed Valley Way / ABLP Property Site Access Intersection SIDRA Results – Year 2022

Peak Hour	Approach / Movement	Year 2022 without development			Year 2022 with development		
		DOS	Delay (seconds)	Queue (metres)	DOS	Delay (seconds)	Queue (metres)
AM	Site Access	0.049	19.0	2.1	0.077	26.8	2.9
	Tweed Valley Way (NE)	0.345	0.2	0.0	0.384	0.5	0.0
	Tweed Valley Way (SW)	0.040	1.7	1.1	0.050	3.0	2.3
	Intersection overall	0.345	0.7	2.1	0.384	1.2	2.9
PM	Site Access	0.053	16.3	2.4	0.064	17.9	2.2
	Tweed Valley Way (NE)	0.331	0.2	0.0	0.371	0.5	0.0
	Tweed Valley Way (SW)	0.032	1.0	0.5	0.037	2.7	1.9
	Intersection overall	0.331	0.6	2.4	0.371	1.1	2.2

SIDRA analysis indicated that with the anticipated background traffic growth for 2022 and additional committed ABLP property development traffic, the intersection is expected to operate within its theoretical operational capacity with DoS reaching 34.5% in the AM Peak. Superimposing the development traffic results in increased DoS marginally to 38.4%. SIDRA analysis confirmed that the Tweed Valley Way / ABLP property intersection performs satisfactorily with development traffic superimposed.

Table 7.5 below shows a SIDRA results for Tweed Valley Way / ABLP property intersection for the 2032 Pre and Post Development Scenarios.

Table 7.5 Tweed Valley Way / ABLP property Site Access Intersection SIDRA Results – Year 2032

Peak Hour	Approach / Movement	Year 2032 without development			Year 2032 with development		
		DOS	Delay (s)	Queue (m)	DOS	Delay (s)	Queue (m)
AM	Site Access	0.024	21.2	0.8	0.045	34.5	1.4
	Tweed Valley Way (NE)	0.399	0.2	0.0	0.442	0.5	0.0
	Tweed Valley Way (SW)	0.045	0.7	0.3	0.047	2.2	1.8
	Intersection overall	0.399	0.3	0.8	0.442	0.8	1.8
PM	Site Access	0.019	11.7	0.6	0.031	15.7	0.1
	Tweed Valley Way (NE)	0.381	0.1	0.0	0.428	0.5	0.0
	Tweed Valley Way (SW)	0.036	0.2	0.0	0.039	1.9	0.1
	Intersection overall	0.384	0.3	0.6	0.428	0.7	0.1

In the 2032 without the development scenario, the Tweed Valley Way / ABLP property Site continues to operate well above its theoretical operational capacity in all peak hours. The maximum DoS value becomes 0.339 during AM Peak hour. Under the 2032 with the proposed development scenario, the maximum DoS value marginally increases to 0.442 with the maximum queue length also increasing slightly again in the weekday AM peak hour.

Table 7.6 below shows a SIDRA results for the Tweed Valley Way / ABLP Property intersection for the 2042 Pre and Post Development Scenarios.

Table 7.6 Tweed Valley Way / ABLP property Site Access Intersection SIDRA Results – Year 2042

Peak Hour	Approach / Movement	Year 2042 without development			Year 2042 with development		
		DOS	Delay (seconds)	Queue (metres)	DOS	Delay (seconds)	Queue (metres)
AM	Site Access	0.038	30.2	1.2	0.075	54.4	2.2
	Tweed Valley Way (NE)	0.468	0.2	0.0	0.511	0.5	0.0
	Tweed Valley Way (SW)	0.052	0.7	0.4	0.064	2.7	2.7
	Intersection overall	0.468	0.4	1.2	0.511	1.0	2.7
PM	Site Access	0.025	14.2	0.8	0.043	20.4	1.2
	Tweed Valley Way (NE)	0.450	0.2	0.0	0.494	0.5	0.0
	Tweed Valley Way (SW)	0.042	0.2	0.0	0.057	2.7	3.5
	Intersection overall	0.450	0.3	0.8	0.494	0.8	3.5

In summary the analysis of the Tweed Valley Way / ABLP Property Site intersection showed an increase in the delay and queue length at the Tweed Valley Way north east approach with the development traffic superimposed in the morning peak hour. However the right movement out of the Site Access road experiences long delays (105.5 seconds) resulting in LoS F for this movement during the AM Peak hour. Additionally, the right turn movement from Tweed Valley Way also results in long delays in the range of 42 seconds and 99 seconds for the AM and PM Peak respectively.

7.3.1 Sensitivity Testing

Sensitivity testing based on the 80%/20% northbound/southbound distribution has been undertaken. Table 7.7 below shows sensitivity testing SIDRA results.

Table 7.7 Tweed Valley Way / ABLP Property Site Access Intersection– Sensitivity Testing

Peak Hour	Approach / Movement	Year 2042 with development			
		DOS	Delay (seconds)	Queue (metres)	LOS
AM	Site Access	0.088	62.4	2.6	F
	Tweed Valley Way (NE)	0.511	0.5	0.0	A
	Tweed Valley Way (SW)	0.449	20.6	25.7	A/F*
	Intersection overall	0.511	2.8	25.7	
PM	Site Access	0.043	20.5	1.2	C
	Tweed Valley Way (NE)	0.494	0.4	0.0	A
	Tweed Valley Way (SW)	0.192	8.8	12.1	A/F*
	Intersection overall	0.494	1.4	12.1	

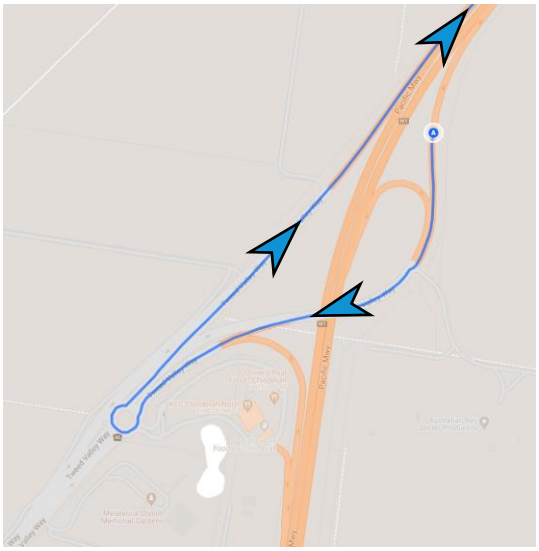
**LOS F for the right turn movement*

As can be seen in the above table, with higher demand for the right turn movement at Tweed Valley Way, Level of Service F is achieved with delays reaching 192.5 seconds in the AM Peak and 104.4 seconds in the PM Peak.

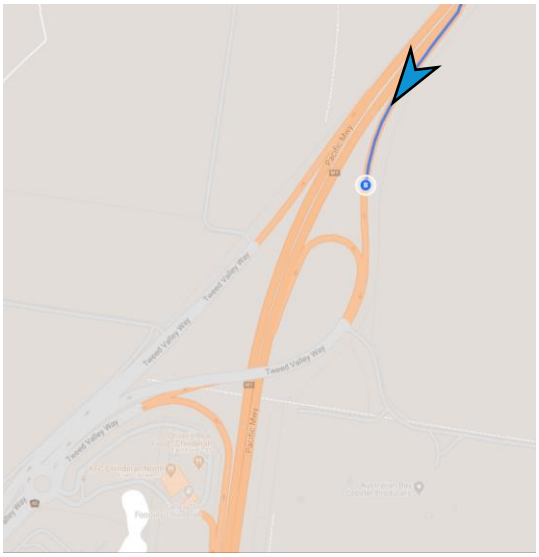
In addition, the right turn out from the Site Access Road becomes difficult due to the high volumes along Tweed Valley Way forecast for 2042 assessment year. In the morning peak, LOS F is achieved with associated 124.2 second delay.

Based on the SIDRA assessment analysis the following are recommended:

- ABLP Property priority intersection to be used as left in access only for the TSP traffic;
- Exit only access obtained via the Tweed Valley Way off-ramp including the new acceleration lane (Refer Site Access Strategy Overview in Section 5.6)
- Truck Haulage Route as follows:
    - To and from the north



To north



From north

    - To and from the south

To south

From south

Figure 7.6 TSP Truck Haulage Routes Northbound and Southbound

TSP vehicles return from southern destinations by continuing along the M1 onto Tweed Coast Road Roundabout at the M1 interchange further north, then U turn back to the southbound Tweed Valley Way off-ramp to enter the site via the existing priority intersection at the ABLP Property.

7.4 Tweed Valley Way / Service Station Access roundabout

The schematic layout used for the 2022, 2032 and 2042 intersection analysis is shown in the following Figure 7.7.

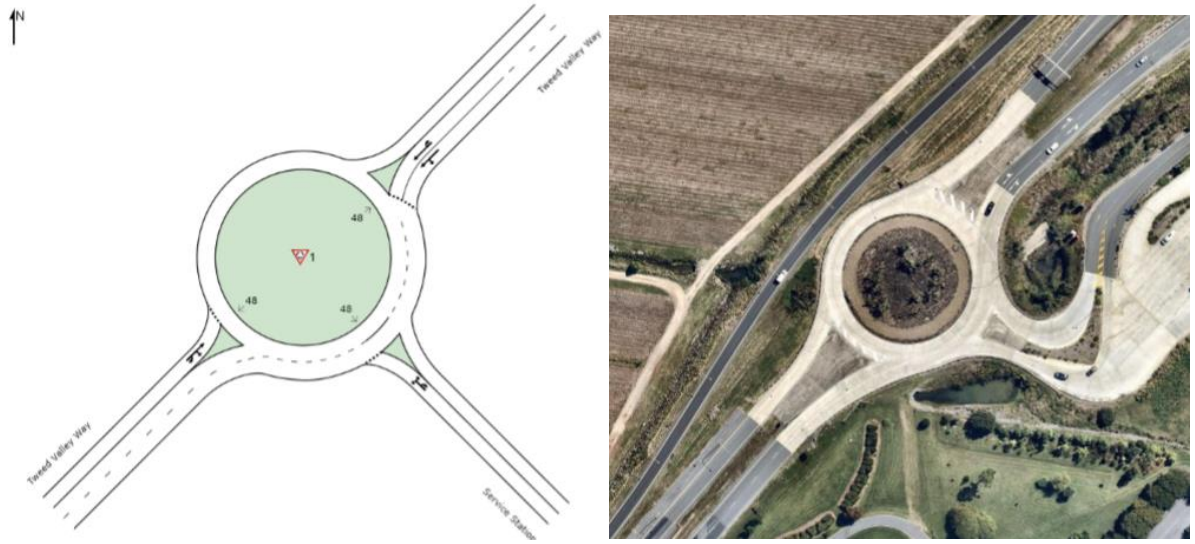


Figure 7.7 Napper Road / Allied Drive Intersection (Existing Layout)

A SIDRA summary of the operation of the existing signals is presented in Table 7.8 with the full output in Appendix D.

Table 7.8 Tweed Valley Way / Service Station Roundabout SIDRA Results – Year 2020

Peak Hour	Approach / Movement	Year 2020 without development		
		DOS	Delay (seconds)	Queue (metres)
AM	Service Station	0.192	11.0	6.2
	Tweed Valley Way (North East)	0.189	2.6	8.4
	Tweed Valley Way (South West)	0.047	5.5	2.0
	Intersection overall	0.192	4.4	8.4
PM	Service Station	0.285	10.7	9.3
	Tweed Valley Way (North East)	0.194	2.6	8.9
	Tweed Valley Way (South West)	0.055	7.0	2.3
	Intersection overall	0.285	5.2	9.3

The existing roundabout operates within its theoretical capacity during AM and PM peak hours. The maximum DoS value of 0.285 and an associated average queue length of approximately 1.2 vehicles is reached in 2020 assessment year during AM Peak hour. The intersection currently operates with LOS A during AM Peak and PM Peak hours.

A Network SIDRA outputs for the 2022 assessment year scenario are summarised in Table 7.9 below.

Table 7.9 Tweed Valley Way / Service Station Roundabout SIDRA Results – Year 2022

Peak Hour	Approach / Movement	Year 2022 without development			Year 2022 with development		
		DOS	Delay (seconds)	Queue (metres)	DOS	Delay (seconds)	Queue (metres)
AM	Service Station	0.201	11.1	6.5	0.208	11.3	6.8
	Tweed Valley Way (NE)	0.199	2.7	9.0	0.226	3.3	13.0
	Tweed Valley Way (SW)	0.052	5.5	2.2	0.055	5.9	2.3
	Intersection overall	0.201	45	9.0	0.226	5.0	13.0
PM	Service Station	0.297	10.8	9.8	0.308	11.1	10.2
	Tweed Valley Way (NE)	0.204	2.7	9.5	0.231	3.3	13.6
	Tweed Valley Way (SW)	0.060	6.9	2.6	0.064	7.3	2.8
	Intersection overall	0.297	5.3	9.8	0.308	5.7	13.6

As can be seen in Table 7.9, the intersection operation in the 2022 without the proposed development scenario is expected to operate well within its theoretical operational capacity. With proposed development traffic superimposed, the roundabout is still expected to operate well within its theoretical capacity both during AM and PM Peak hours.

SIDRA outputs for the 2032 assessment year scenario are summarised in Table 7.10 below.

Table 7.10 Tweed Valley Way / Service Station Roundabout SIDRA Results – Year 2032

Peak Hour	Approach / Movement	Year 2032 without development			Year 2032 with development		
		DOS	Delay (seconds)	Queue (metres)	DOS	Delay (seconds)	Queue (metres)
AM	Service Station	0.244	11.4	8.1	0.252	11.6	8.5
	Tweed Valley Way (NE)	0.230	2.6	10.8	0.256	3.1	14.7
	Tweed Valley Way (SW)	0.059	5.6	2.6	0.062	6.0	2.7
	Intersection overall	0.244	4.6	10.8	0.256	4.6	14.7
PM	Service Station	0.364	11.3	12.7	0.376	11.6	13.5
	Tweed Valley Way (NE)	0.237	2.7	11.6	0.263	3.2	15.3
	Tweed Valley Way (SW)	0.070	7.2	3.1	0.075	7.6	3.3
	Intersection overall	0.364	5.4	12.7	0.376	5.7	15.3

As shown in Table 7.10 above, the Tweed Valley Way / Service Station Roundabout is forecast to operate within its theoretical capacity in 2032 assessment year.

Table 7.11 below shows a SIDRA summary of the Tweed Valley Way / Service Station Roundabout for the 2042 assessment year. As can be seen, the roundabout is expected to operate well within its theoretical capacity in 2042 assessment years with development traffic superimposed.

Table 7.11 Tweed Valley Way / Service Station Roundabout SIDRA Results – Year 2042

Peak Hour	Approach / Movement	Year 2042 without development			Year 2042 with development		
		DOS	Delay (seconds)	Queue (metres)	DOS	Delay (seconds)	Queue (metres)
AM	Service Station	0.298	11.8	10.3	0.307	12.1	10.7
	Tweed Valley Way (NE)	0.270	2.6	13.4	0.297	3.1	17.7
	Tweed Valley Way (SW)	0.070	5.8	3.1	0.074	6.2	3.3
	Intersection overall	0.298	4.7	13.4	0.307	5.0	17.7
PM	Service Station	0.447	12.2	17.9	0.462	12.6	19.0
	Tweed Valley Way (NE)	0.279	2.7	14.5	0.308	3.2	18.7
	Tweed Valley Way (SW)	0.085	7.4	3.9	0.091	7.9	4.2
	Intersection overall	0.447	5.7	17.9	0.462	6.0	19.0

Overall in summary as can be seen in the above table, the Tweed Valley Way / Service Station roundabout is expected to operate well within its theoretical operational capacity with the proposed development traffic superimposed.

7.4.1 Sensitivity Testing

Sensitivity testing based on the 80%/20% northbound/southbound distribution has been undertaken. Table 7.12 below shows sensitivity testing SIDRA results.

Table 7.12 Tweed Valley Way / Service Station Rdb SIDRA Results – Sensitivity Testing

Peak Hour	Approach / Movement	Year 2042 without development			
		DOS	Delay (seconds)	Queue (metres)	LOS
AM	Service Station	0.310	12.1	10.8	B
	Tweed Valley Way (NE)	0.302	3.1	18.3	A
	Tweed Valley Way (SW)	0.075	6.3	3.3	A
	Intersection overall	0.310	5.1	18.3	A
PM	Service Station	0.465	12.7	19.2	B
	Tweed Valley Way (NE)	0.312	3.2	19.5	A
	Tweed Valley Way (SW)	0.092	8.0	4.3	A
	Intersection overall	0.465	6.1	19.5	A

As can be seen in the above table, the Tweed Valley Way / Service Station roundabout is expected to operate well within its theoretical operational capacity with proposed development traffic superimposed. Level of Service A is achieved both in the AM and PM Peak hours.

8. Proposed Mitigation Works

8.1 Overall Site Access Strategy

An overview of the site access strategy is shown in the following Figure 8.1.

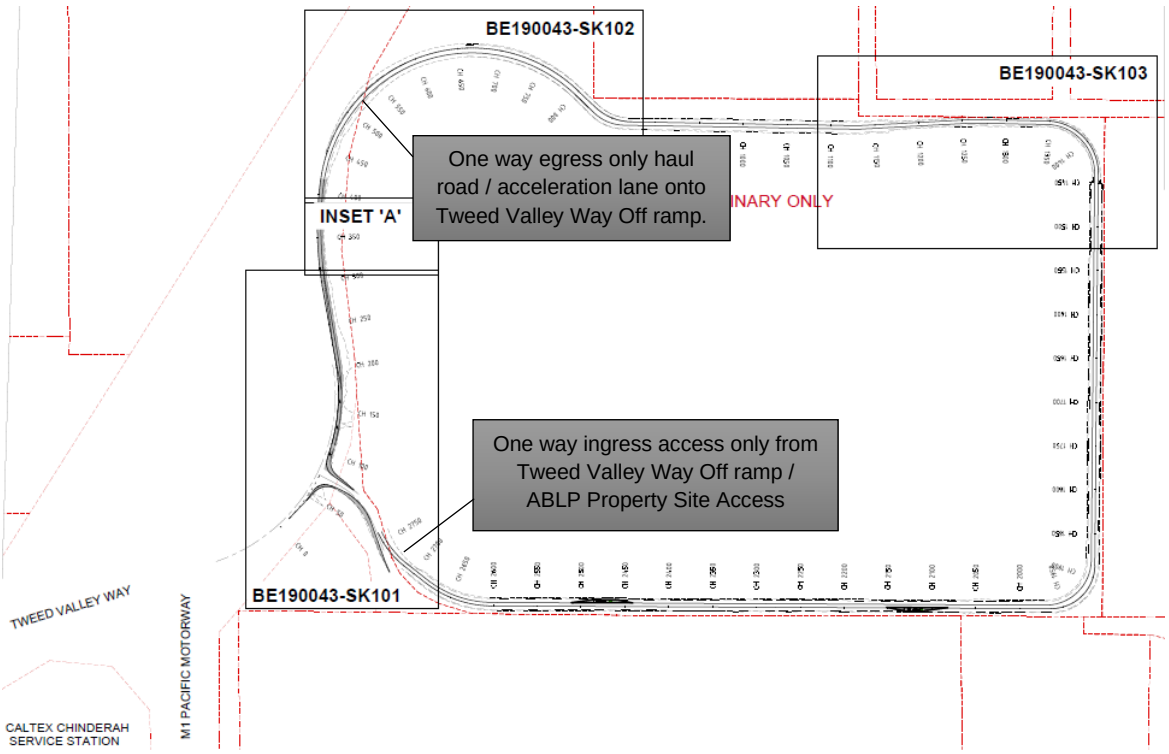


Figure 8.1 Site Access Strategy Overview

Appendix A shows the following drawings detailing the site access strategy. The relevant detail drawings showing the intersections and road gradings are as follows:

Drawing BE190043-SK100 Rev C - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Layout Plan.
Drawing BE190043-SK101 Rev D - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Proposed Roadworks – Sheet 1 of 3 (B-Double).
Drawing BE190043-SK102 Rev D - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Proposed Roadworks – Sheet 2 of 3 (B-Double).
Drawing BE190043-SK103 Rev D - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Proposed Roadworks – Sheet 3 of 3 (B-Double).
Drawing BE190043-SK105 Rev B - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Road Longitudinal Section – Sheet 1 of 10.
Drawing BE190043-SK106 Rev A - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Road Longitudinal Section – Sheet 2 of 10.
Drawing BE190043-SK107 Rev A - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Road Longitudinal Section – Sheet 3 of 10.
Drawing BE190043-SK108 Rev A - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Road Longitudinal Section – Sheet 4 of 10.

Drawing BE190043-SK109 Rev A - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Road Longitudinal Section – Sheet 5 of 10.
Drawing BE190043-SK120 Rev B - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Typical Sections – Sheet 1 of 3.
Drawing BE190043-SK121 Rev B - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Typical Sections – Sheet 2 of 3.
Drawing BE190043-SK122 Rev B - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Typical Sections – Sheet 3 of 3.

8.2 Access to the Tweed Valley Way Off-Ramp

Proposed access to the Tweed Valley Way off-ramp including an acceleration lane located within the site boundary is shown in Figure 8.2 below with the Tweed Valley Way / acceleration lane longitudinal section shown in Figure 8.3.

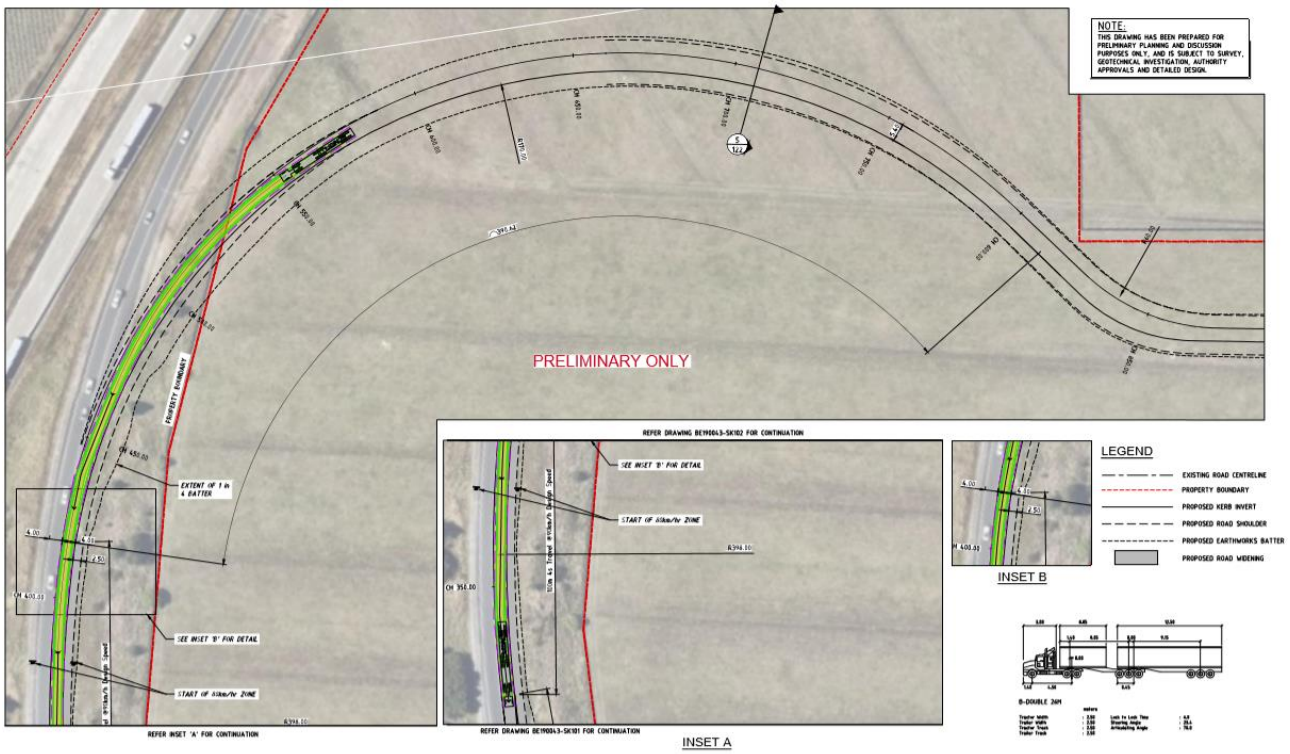


Figure 8.2 Proposed Access to the Tweed Valley Way Off-Ramp

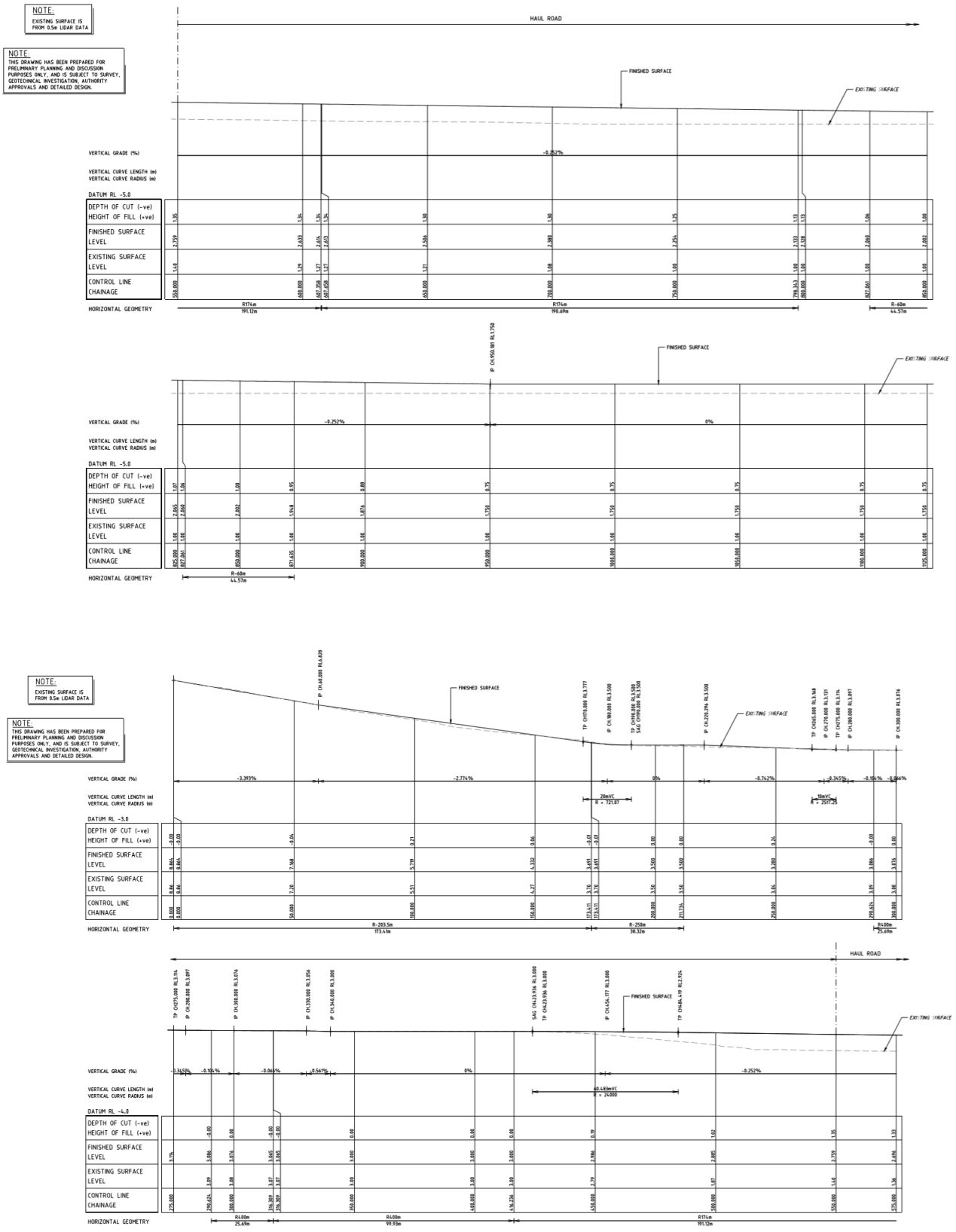


Figure 8.3 Tweed Valley Way / Acceleration Lane Long-section

8.3 Tweed Valley Way / Site Access Intersection.

The results of SIDRA assessments of the Tweed Valley Way Site Access intersection (also used to access the ABLP site) identified that it would fail to operate satisfactorily in the future due to the right turn movements. As proposed, all TSP vehicles will leave site via the internal haul road and acceleration lane to merge onto the Tweed Valley Way off-ramp. To avoid the right turn from Tweed Valley Way, vehicles returning from southern destinations continue north to the M1 / Tweed Coast Road roundabout, perform a U turn, then enter the site at the ABLP intersection via a left turn off the southbound Tweed Valley Way off-ramp. The proposed upgrades at the Tweed Valley Way / Site Access intersection are shown in Figure 8.4 below.

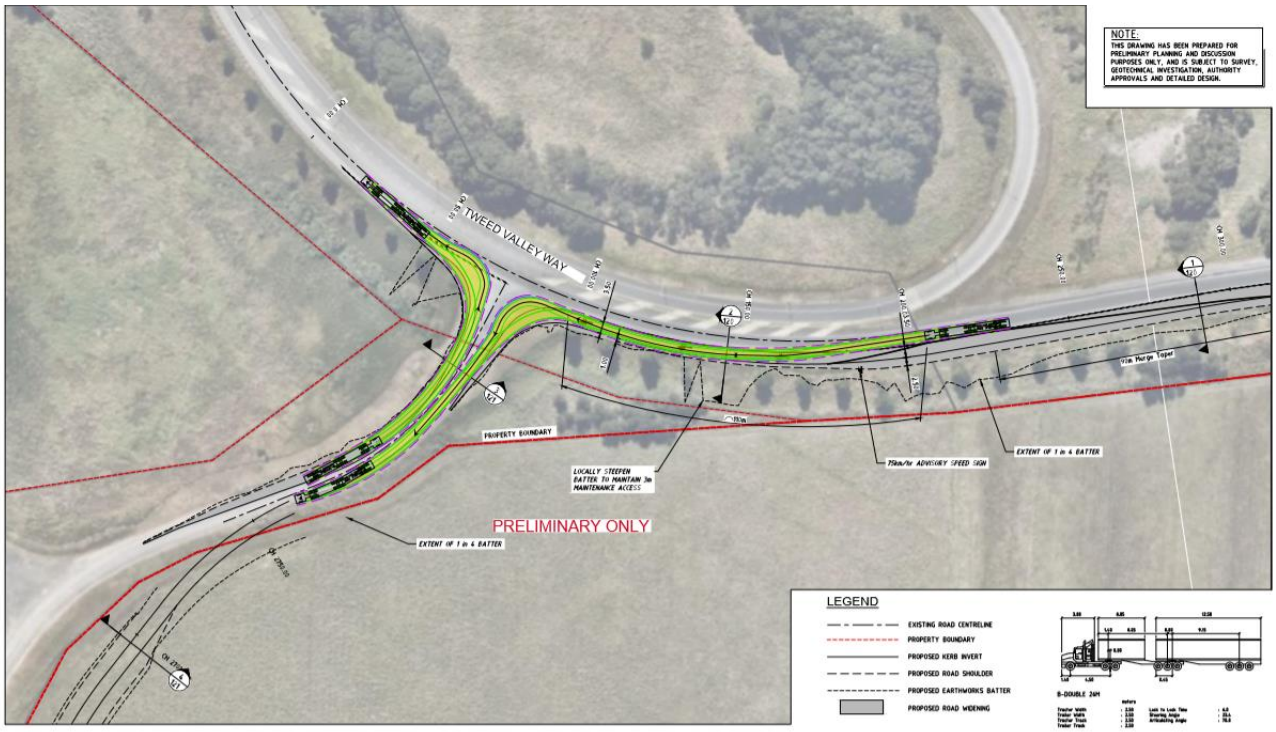


Figure 8.4 Proposed Upgrades to Tweed Valley Way / Site Ingress Intersection

Upgrades include an Auxiliary Left Turn lane on Tweed Valley Way and widening of the site access approach road plus shoulder.

8.4 Tweed Valley Way / Service Station Roundabout

The Tweed Valley Way / Service Station Roundabout is required to be upgraded following development of the site to accommodate additional Heavy Vehicles utilising the roundabout and undertaking a U-turn. The proposed layout for the upgraded Tweed Valley Way / Service Station Roundabout is shown in Figure 8.5 below.

The hatched area shows the proposed modification to the roundabout centre island. Currently vehicles either turn into the Service Centre or continue onto Tweed Valley Way. The above effectively represents a U turn from the M1.

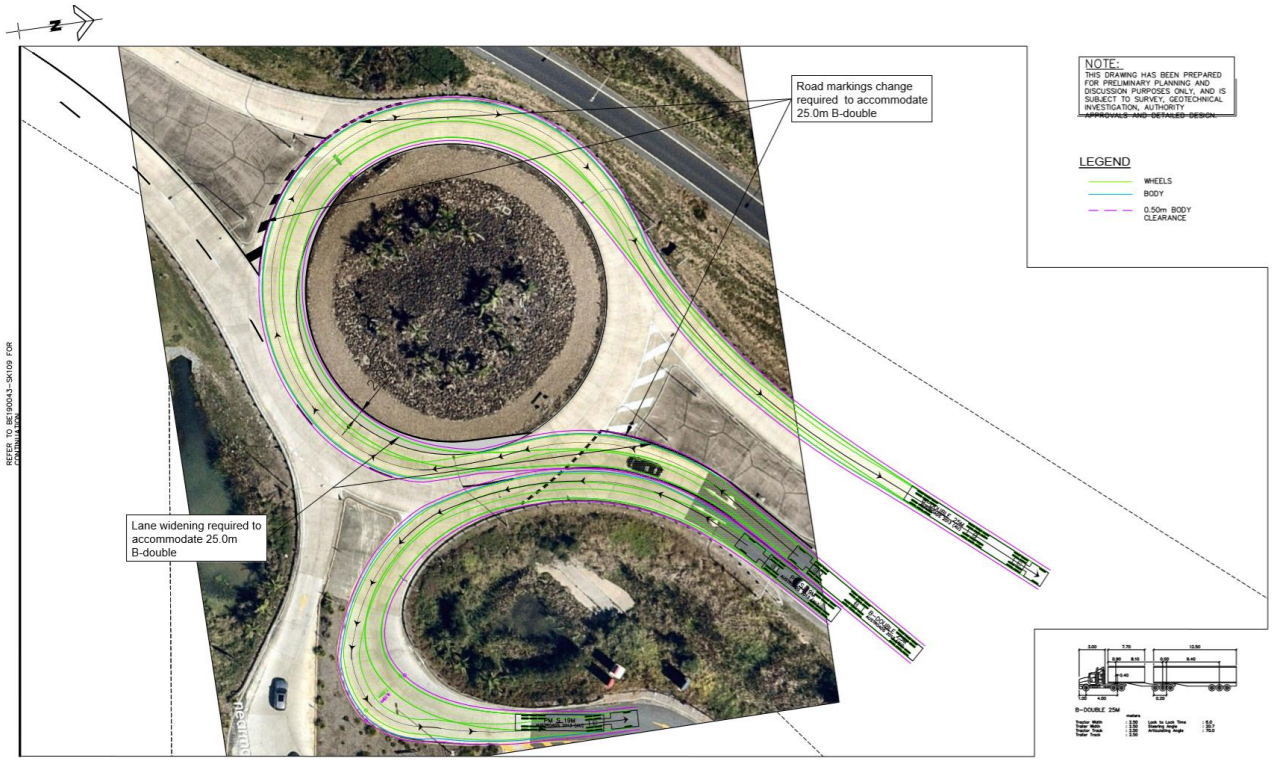


Figure 8.5 Proposed Upgrades to Tweed Valley Way / Service Station Roundabout

The swept paths for the two B-Double vehicles shows the extent of the lane widening required to the southern side of the roundabout to accommodate the two heavy vehicles passing. Refer Appendix A Drawing BE190043-SK131 Rev B - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Swept path Analysis – 25m B-Double.

8.5 Swept Paths Analysis

Swept paths analysis has been undertaken for the intersection which demonstrate appropriate clearances are achieved with the pavement widths proposed. The following Drawings In Appendix A show the swept paths adopted.

Drawing BE190043-SK307 Rev B - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Swept Path Analysis – B- Double.
Drawing BE190043-SK308 Rev B - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Swept Path Analysis – B- Double.
Drawing BE190043-SK309 Rev B - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Swept Path Analysis – Semi Trailer.
Drawing BE190043-SK310 Rev B - Tweed Valley Way and Australian Bay Lobster Producers Access _ Widening Works; Swept Path Analysis – Semi Trailer..

8.6 Project Phasing Concept Plan.

The concept phasing plan is shown in the following Figure 8.6 below.

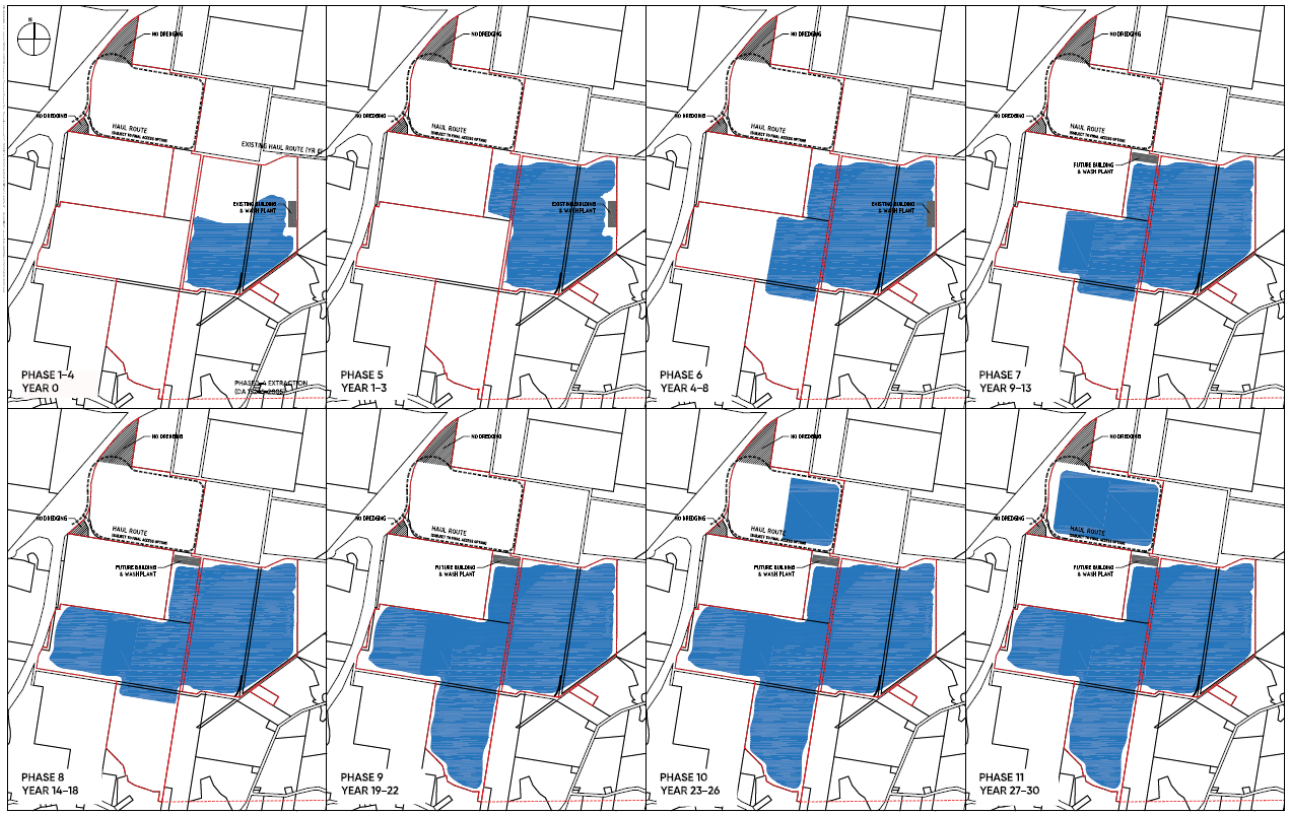


Figure 8.6 Project Phasing Concept Plan

The concept plan shows proposed 11 phases and western migration of the work area, consistent with the vehicle access objectives adopting and maintaining the Tweed Valley Way as the point of access to the external road network. The access onto Tweed Valley Way is proposed with Phase 1. The access arrangements proposed do not change throughout the life of the project.

Refer Appendix A for a copy of the Concept Development Phasing Drawing Z19163-104 Sheet 01 of 01.

9. Tweed Shire Council Draft Comments

Following submission of a draft Traffic Impact Report to Tweed Shire Council, the following relevant engineering minutes with respect to Traffic Impact assessment are extracted from Minutes of Assessment Panel held 2 December 2020 as follows (in italics) with response :

- *The development site has no existing right of access to the Pacific Highway – Tweed Valley Way interchange. The public road reserve (Altona Road) terminates part way across the frontage of Lot 2 DP 1192506. In order to achieve road access the proponents will need to negotiate the appropriate licenses (for the life of the sand quarry) or easements with the adjoining property owner(s) and Roads and Maritime Services. The access road would need to be sealed to address ongoing management of dust, erosion and sediment export onto the Highway.*

RESPONSE

The appropriate licences with the adjoining property owners have been obtained by Hanson, plus relevant applications to RMS for access approval form part of the development application. Within the state controlled road reserve, the pavement for the acceleration / deceleration lane, merge lanes and widening are to be in accordance with RMS requirements and standards and subject to detailed design and approval. The internal haul roads are to be sealed.

- *The proposal will require a traffic impact analysis to ensure that the road access for the site (subject to negotiations above) is capable of catering for the forecast truck movements, up to b-double configuration. This assessment will need to include adequacy of the existing intersection with the highway off ramp, and the new roundabout intersection on Tweed Valley Way and merge which would be utilised for each north bound load.*

RESPONSE

The merge onto the Tweed Valley Way is adopted for northbound and southbound trips. Southbound trips use the service centre roundabout for a U turn back to the Pacific Motorway southbound on-ramp. The swept path analysis as contained in the text and acceleration calculations include provisions for B-Double Trucks. Refer preceding sections. Items raised are included in this TIA.

- *A draft Traffic Impact Assessment was submitted for discussion at the meeting. This report proposes a graded acceleration lane to reduce risk at the merge point on the southbound highway off ramp, as the preferred option from previous consultation with RMS/TfNSW. As this presents a significant conflict point for vehicle safety, further review of the TIA is required in consultation with TfNSW.*

RESPONSE

Initially a number of access options were submitted to RMS and the preceding sections of this TIA addresses the comments as received in the subsequent feedback from both RMS and TSC.

- *The proposal places a high reliance on turning movements at the Tweed Valley Way / Service Centre roundabout, and will significantly increase heavy vehicle movements (up to b-doubles) impacting on the operation and pavement life of the roundabout, which is a Council asset. A review of the design of the roundabout is warranted and should be added to the TIA with any upgrades proposed. Changes to the roundabout centre island have been identified. It is questioned how this can be achieved under live traffic and to a suitably resilient design.*

RESPONSE

As shown in Figure 8.4, there are two circulating lanes on the southern side of the roundabout that follow the alignment of the Tweed Valley Way. Traffic Management proposed for the construction of the lane widening and changes to the roundabout centre island, involves the closure of the inside lane of the two lane section of the roundabout plus utilising the existing additional lane width available in the chevron marked area of the east and west sides of the roundabout. One circulating lane remains open at all times. At the eastern approach to the roundabout, lane designation signs close the inside (RHS) lane creating a single approach lane. The pavement construction is subject to detail investigation and design and further submission to TSC and RMS for construction approval. A key goal of the design to achieve a resilient outcome will involve designing uniform surface levels consistent with the existing crossfall, that can be maintained throughout the life of the roundabout similar to concrete pavement widening construction methods.

- *The road design does not appear to cater for potential traffic demands from other users along Altona Road to the east. Clarification is sought as to intended tenure and ability for this infrastructure to service a larger area.*

RESPONSE

Altona Road reserve is not currently continuous to the west and is not being extended or connected to the Tweed Valley Way off ramp. All heavy vehicle haulage and traffic will use the Tweed Valley Way without any connection to Altona Road. The existing connection between the site / Altona Road to Tweed Coast Road for haulage vehicles will not be retained. The use of the existing intersection by ABLP onto Tweed Valley Way is to be maintained in its current form and the calculations submitted allow for the anticipated traffic volumes forecast and Altona Road traffic will not have access to the Pacific Motorway to the west.

- *The application should address geotechnical properties of the quarry site, including consideration of long term stability of the excavation batters, to ensure that they are designed and constructed to prevent slumping and instability on adjoining land in perpetuity.*

RESPONSE

A geotechnical investigation has been commissioned to investigate bank stability of the dredged submerged batters adjacent to the Tweed Valley Way off-ramp.

- *Section 94 Plan No. 4 (TRCP) Contributions would be applicable. Any variation to the standard rate would require the submission of a traffic analysis.*

A traffic analysis will be separately submitted regarding any variation to the standard rate.

RESPONSE

- *Analysis will be required to determine the required amount of car parking and to assist Council in determining the applicable parking provision under the relevant DCP.*

Hanson will retain ownership of the site following completion of and extraction and any proposed subsequent use of the site will be decided via the appropriate consultative, application and regulation processes in place at that time. The report gives a general outline of Public and active infrastructure currently available.

10. Public Access Strategy End Use Development

Hanson will retain ownership of the site following completion of sand extraction and any proposed subsequent use of the site will be decided via the appropriate consultative, application and regulation processes in place at that time.

10.1.1 Vehicular Access

Vehicular access to the end use completed development of the TSP land by the public will be provided via Crescent Street / Tweed Coast Road priority intersection, Crescent Street and Tweed Coast Road as shown in Figure 10.1 below. Sight distance at the Crescent Street / Tweed Coast Road priority intersection accords with the minimum requirement of the Australian Standards for 90km/h Design Speed. The desirable visibility of 185m is achieved in both directions.

In summary, the means of ingress to or egress from the future end use site development are adequate and provide for safe and convenient movement to and from the site.

Figure 10.1 Existing Tweed Coast Road / Crescent Street Priority Intersection

It is recommended for a traffic impact assessment of the Crescent Street / Tweed Coast Road Intersection to be undertaken at the appropriate time in the future when the Crescent Street access is required as part of the end use.

10.1.2 Walking and Cycling Distances

The accessibility of the site by active and sustainable modes of transport in the future is important as it is likely to impact upon the number of private car trips made to and from the site and their localised impacts onto the local road network. Facilitating competitive, attractive and sustainable

travel mode choices through the provision of quality transport infrastructure and incentives / disincentives has a potential to reduce dependency on car use and car parking demand.

The location of the site with respect to the wider built-up area and active transport facilities is shown in Figure 10.2 below.

Figure 10.2 Existing Walking and Cycling Paths in the Vicinity of the TSP Site (Source Tweed Shire Council)

Comfortable cycling distance of 5km is achieved and covers Kingscliff, Casuarina, Chinderah and Dodds Island.

10.1.3 Public Transport

The existing public transport infrastructure in the vicinity of the site is shown in Figure 10.3 and Figure 10.4 below.

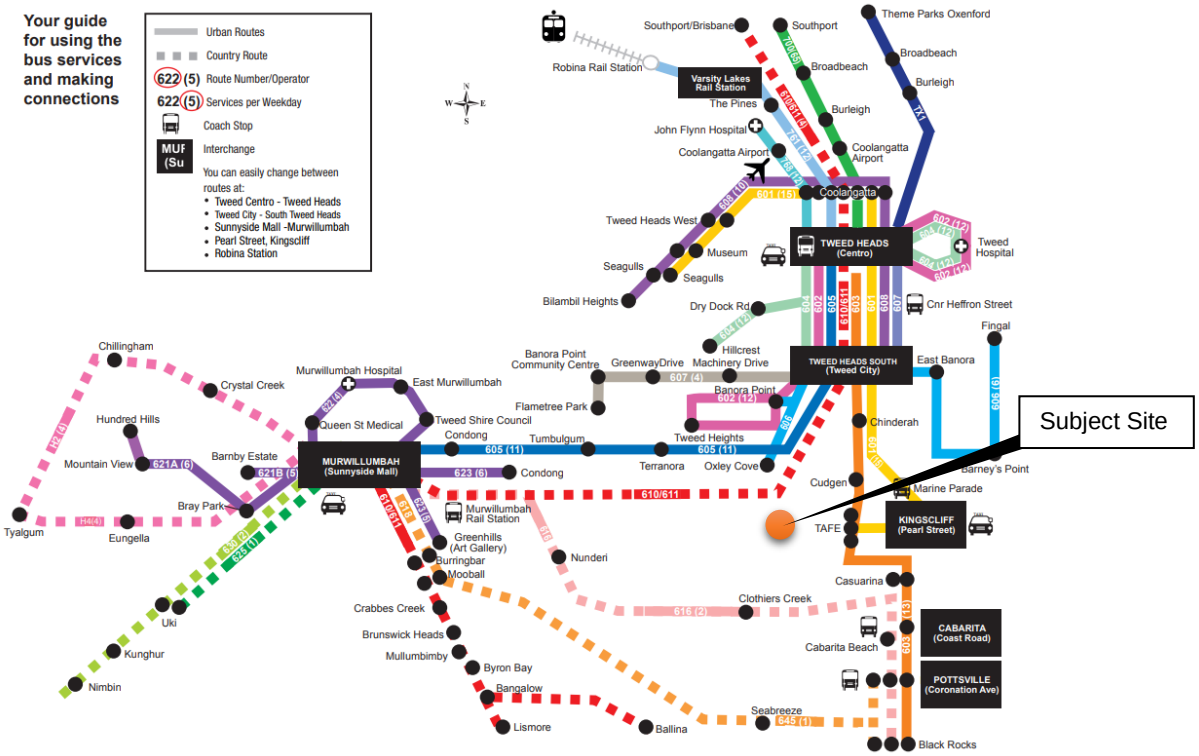


Figure 10.3 Public Transport Accessibility (Source Tweed Shire Council)

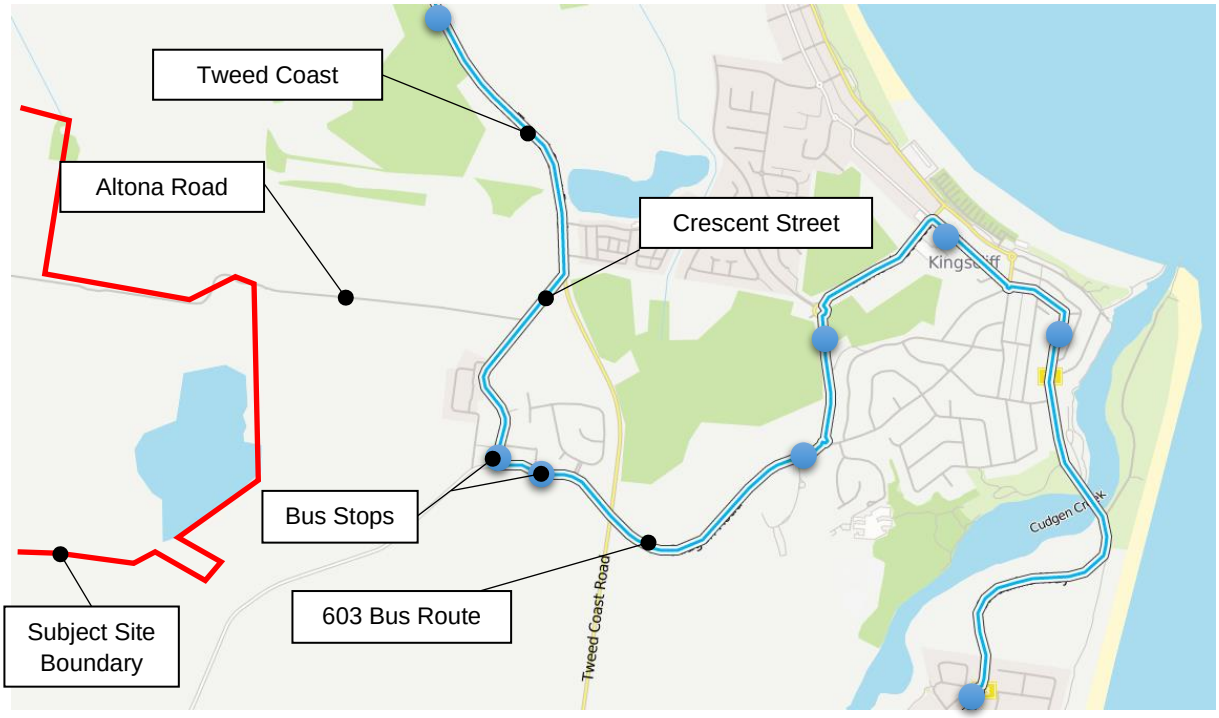


Figure 10.4 Bus 603 Route (Source Tweed Shire Council)

"Streets for People Compendium" document identifies recommended distances to bus stops within 400m from the site and tram stop or high-frequency bus stops within 800m from the site. The above distances could relate to walking journeys to and from the development.

There are bus stops along Crescent Street located outside comfortable walking distance from the site. Bus stops located along Crescent Street are accessible within 24-minute walk (1.9km).

The bus service operating at this stop is 603, which provides connection from Tweed Heads to Kingscliff and Pottsville with 60-minute frequency.

11. Conclusions and Recommendations

The report describes the site location and the existing road network in the vicinity of the site. Existing traffic surveys are available on the site and Tweed Shire Council Transport reporting on future traffic volume forecasts were also adopted in the analysis. In addition, specific targeted traffic survey volumes, vehicle classification and speed surveys in addition to peak hour intersection surveys were carried out to compliment and update the available information. All new surveys were completed in early March 2020 pre COVID -19 and represent the normal situation. The speed surveys identified that the advisory speed of 75km/hr is exceeded by average speeds of 87km/hr which considerably affects the acceleration length for the laden trucks.

The current daily heavy vehicle percentage of 9.5% on the Tweed Valley Way off-ramp is expected to increase marginally in 2041 considering the growth in background traffic and the future Tweed Valley Way 2041 volumes including growth in current heavy vehicle and light vehicle trips. Traffic growths at the rate of 1.6% per annum as agreed with Tweed Shire Council were adopted for the analysis of the intersection at the Australian Bay Lobster Producers Limited (ABLP) property. The growth rate is consistent with the medium growth scenario adopted for Tweed Shire Transport planning.

The report describes the other Committed Developments in the vicinity of the site. The report outlines the preferred site access strategy, including a description of the types of vehicles to be used for transportation of sand products by the proposed development, and an explanation of assumptions and justification of adopted parameters informing the TIA. Assessment of existing road safety and consideration for any increased risk arising from trips generated by the proposed development, particularly at affected intersections including available sight distances is also included. Safety and efficiency on the surrounding road network identified that no accidents have been recorded between 2013 and 2019 at the existing ABLP intersection with Tweed Valley Way.

The design vehicle for the TSP is 25m B-Double truck. The preferred site access strategy is contained in the Appendix A; SK101 and SK102. Egress from the site involves an acceleration lane and merge onto the Tweed Valley Way off-ramp. Ingress to the site involves use of the existing ABLP priority intersection including a new left turn auxiliary lane. Right turn out and right turn in will be banned for the TSP trucks at the ABLP intersection.

For future access onto the Tweed Valley Way off-ramp, trucks are required to accelerate from 40km/hr to 67km/hr at 0.4% grade over an available distance is 618m along the internal haul road to the end of acceleration lane at the Tweed Valley Way off-ramp. 540 metres is the required acceleration distance based on the higher simulated grade of 1.0% hence the acceleration lane length provided is conservative and above the absolute requirement. An additional merge distance of 90 metres is provided. The merge between the outbound haul route and Tweed Valley Way occurs before the start of the increase in the vertical gradient up to the M1 overpass level and before the 75km/hr advisory speed sign and within the 80km/hr speed zone. A run-out area is available at the end of the merge before the start of the left turn auxiliary lane into the ABLP / TSP Intersection. Actual recorded speeds are higher as per the traffic survey data and have been considered in the calculations. The deceleration lane length of 100 metres including merge is provided for the auxiliary

left turn lane into the ABLP 'T' intersection. TSP destinations involve 95% delivery trips travelling north and 5% south.

The SIDRA software capacity analysis identified an excessive Level of Service (LOS) for vehicles travelling from the south in the future that will not be able to turn right into the ABLP property access and instead as part of the Code of Conduct, are required to continue along the M1 to the Tweed Coast Road interchange further north for a U turn to approach the intersection from the north using the left turn auxiliary lane. Similarly, any TSP vehicles leaving use the Service Centre roundabout for a U turn to access the M1 northbound and southbound on-ramp.

Assessment of the impact on public transport (public and school bus routes) and consideration for alternative transport modes such as walking and cycling recommended access from the existing Tweed Coast Road as part of the Tweed Shire Council bus services and active transport infrastructure following the completion of the end use.

Tweed Valley Way / Caltex Service Station roundabout is designed to cater for a 25m B-Double heavy vehicles. However, swept path analysis of the U-turn movement at this roundabout identified that modifications to the roundabout island are required. To ensure road safety, it is proposed to provide additional signage with advisory safe turning speed for trucks manoeuvring roundabout in addition to a slight modification to the inside circulating lane.

Functional layout plans of the proposed intersection improvements and internal haulage roads are included in the appendices.

Hanson will retain ownership of the site following completion of sand extraction and any proposed subsequent use of the site will be decided via the appropriate consultative, application and regulation processes in place at that time.

12. References

Australian / New Zealand Standard 2004, Parking Facilities Part 1: Off-ramp-Street Car Parking, Standards Australia, Sydney

Roads and Traffic Authority 2002, Guide to Traffic Generating Developments, Roads and Traffic Authority, Sydney

Austroads Guide to Traffic Management Part 6

Austroads Guide to Road Design Part 4A

Austroads Guide to Traffic Management Part 12

Austroads Guide to Road Design

Tweed Shire Council Guidelines

Road Design Guide (RMS)

Appendix A – Site Layout and Swept Path Analysis

NOTE:
THIS DRAWING HAS BEEN PREPARED FOR PRELIMINARY PLANNING AND DISCUSSION PURPOSES ONLY, AND IS SUBJECT TO SURVEY, GEOTECHNICAL INVESTIGATION, AUTHORITY APPROVALS AND DETAILED DESIGN.

LEGEND

- EXISTING ROAD CENTRELINE
- PROPERTY BOUNDARY
- PROPOSED KERB INVERT
- PROPOSED ROAD SHOULDER
- PROPOSED EARTHWORKS BATTER
- PROPOSED ROAD WIDENING

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TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS

LAYOUT PLAN

SCALE 20 0 20 40 60 80 100 (metres)
1 : 2000 (FULL SIZE)

BE190043-SK100 Rev C

Designer : JUAN VELEZ

Date : 09/02/2021

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TWEED VALLEY WAY

CH 0.00
CH 50.00
CH 100.00
CH 150.00
CH 200.00
CH 250.00
CH 300.00
CH 2700
CH 2750.00

3.50
1.00
2.50

2/120
1/120
3/121
4/121

90m Merge Taper
110m

PROPERTY BOUNDARY

LOCALLY STEEPEN BATTER TO MAINTAIN 3m MAINTENANCE ACCESS

75km/hr ADVISORY SPEED SIGN

EXTENT OF 1 in 4 BATTER

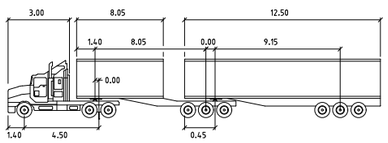
EXTENT OF 1 in 4 BATTER

PRELIMINARY ONLY

REFER DRAWING BE190043-SK102 FOR CONTINUATION

LEGEND

- EXISTING ROAD CENTRELINE
- PROPERTY BOUNDARY
- PROPOSED KERB INVERT
- PROPOSED ROAD SHOULDER
- PROPOSED EARTHWORKS BATTER
- PROPOSED ROAD WIDENING



B-DOUBLE 26M

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

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TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS

PROPOSED ROADWORKS - SHEET 1 OF 3 (B-DOUBLE)

Designer : JUAN VELEZ

Date : 09/02/2021

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)

BE190043-SK101 Rev D

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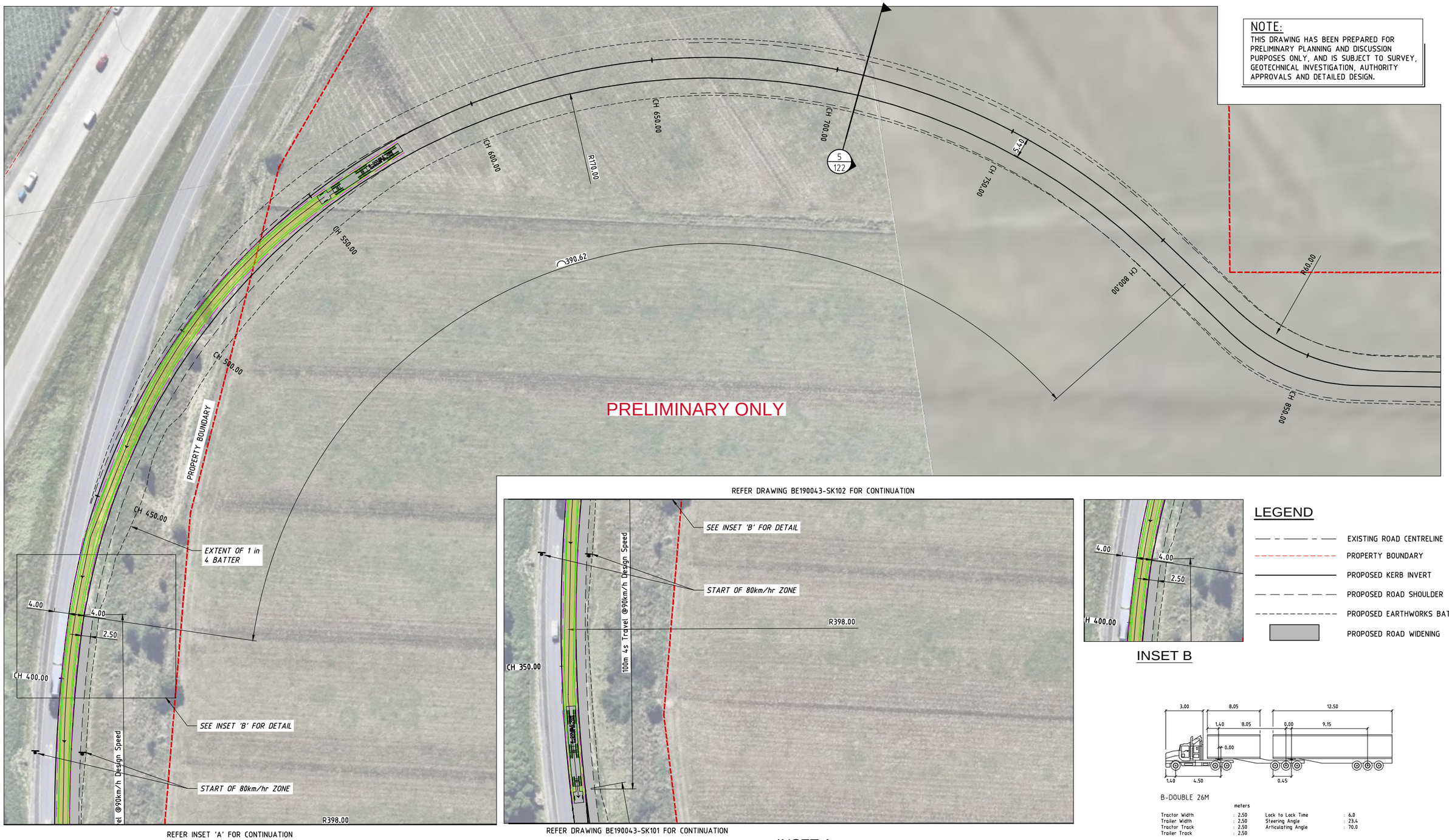

REFER INSET 'A' FOR CONTINUATION

REFER DRAWING BE190043-SK102 FOR CONTINUATION

REFER DRAWING BE190043-SK101 FOR CONTINUATION

INSET A

INSET B

LEGEND

- EXISTING ROAD CENTRELINE
- PROPERTY BOUNDARY
- PROPOSED KERB INVERT
- PROPOSED ROAD SHOULDER
- PROPOSED EARTHWORKS BATTER
- PROPOSED ROAD WIDENING

B-DOUBLE 26M

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

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TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS

PROPOSED ROADWORKS- SHEET 2 OF 3 (B-DOUBLE)

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)

BE190043-SK102 Rev D

Designer : JUAN VELEZ

Date : 09/02/2021

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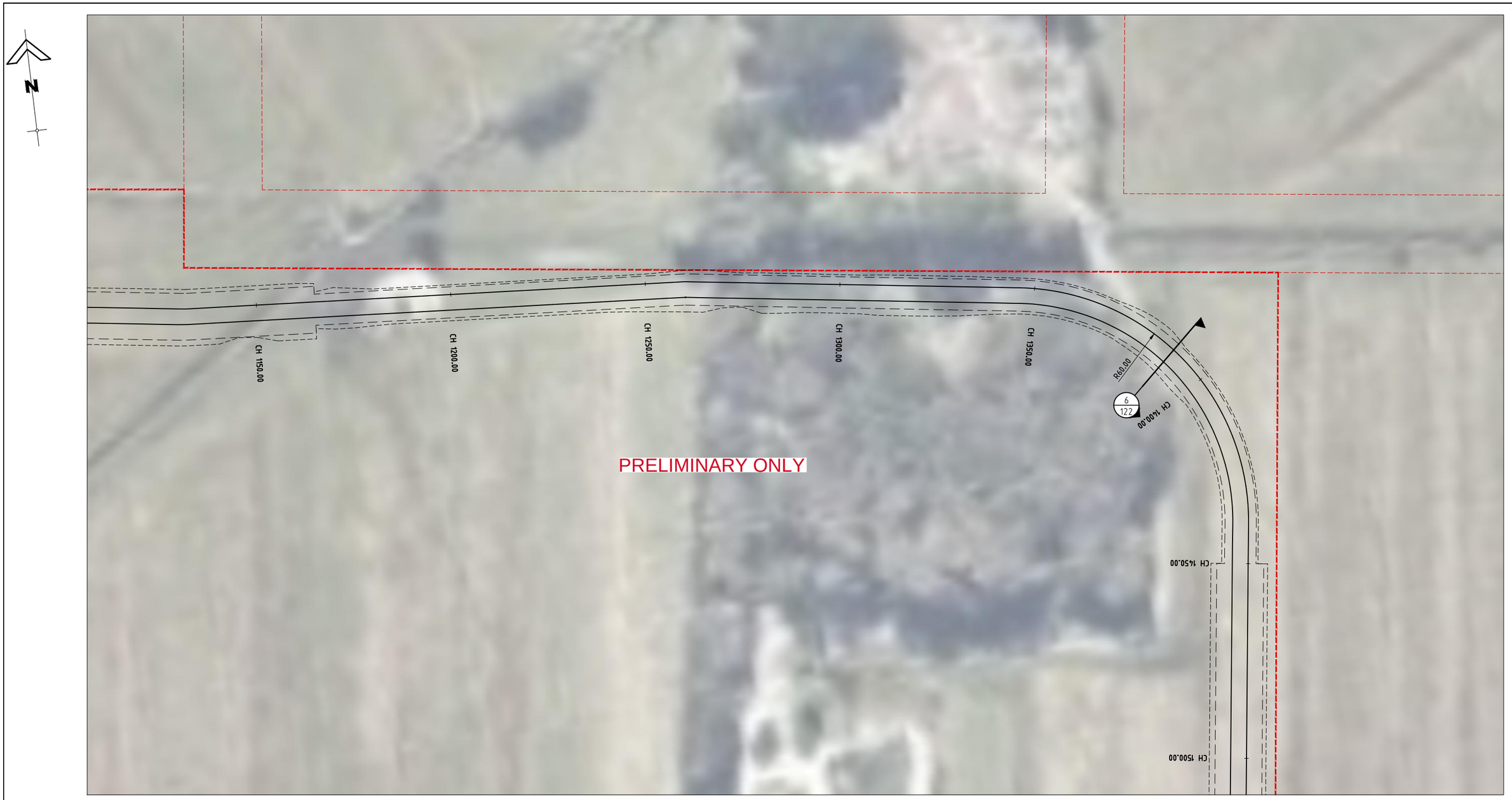

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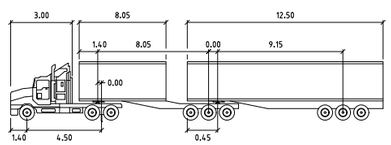
LEGEND

- EXISTING ROAD CENTRELINE
- PROPERTY BOUNDARY
- PROPOSED KERB INVERT
- PROPOSED ROAD SHOULDER
- PROPOSED EARTHWORKS BATTER
- PROPOSED ROAD WIDENING



B-DOUBLE 26M

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

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TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS

PROPOSED ROADWORKS- SHEET 3 OF 3 (B-DOUBLE)

SCALE 5 0 5 10 15 20 25 (metres)
1 : 500 (FULL SIZE)

BE190043-SK103 Rev B

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Date : 09/02/2021

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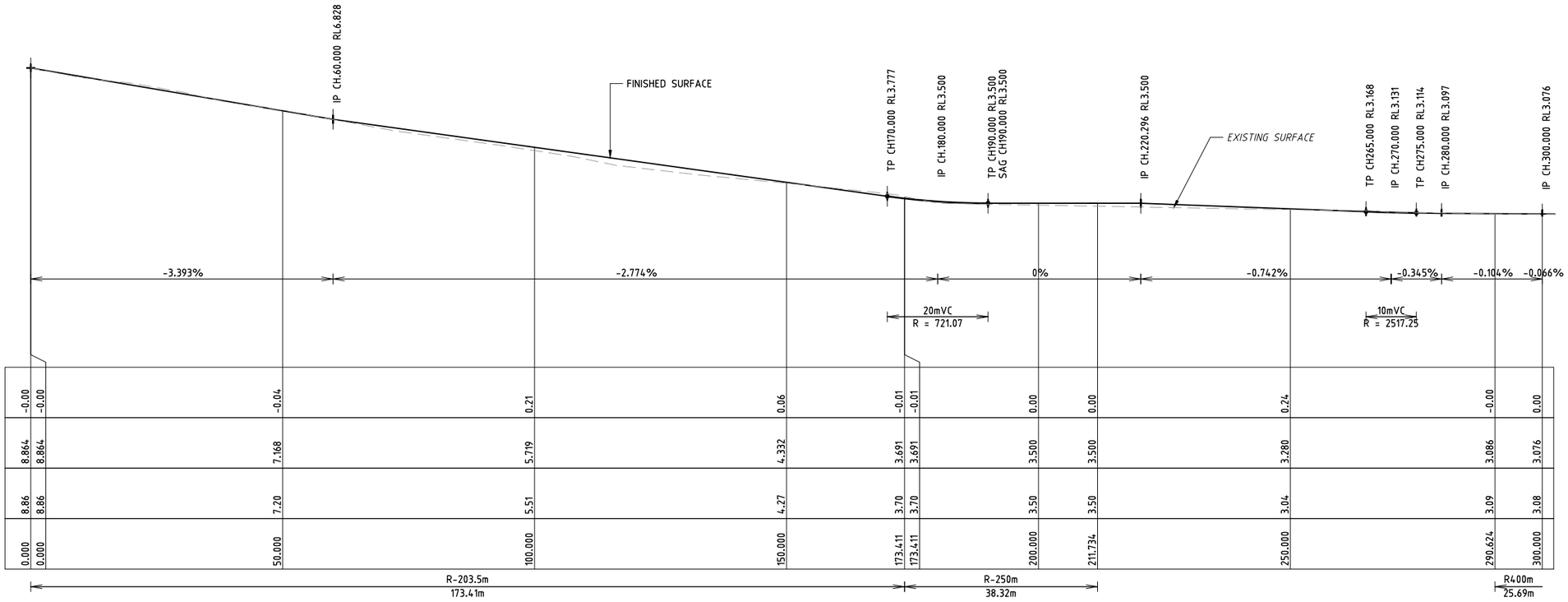

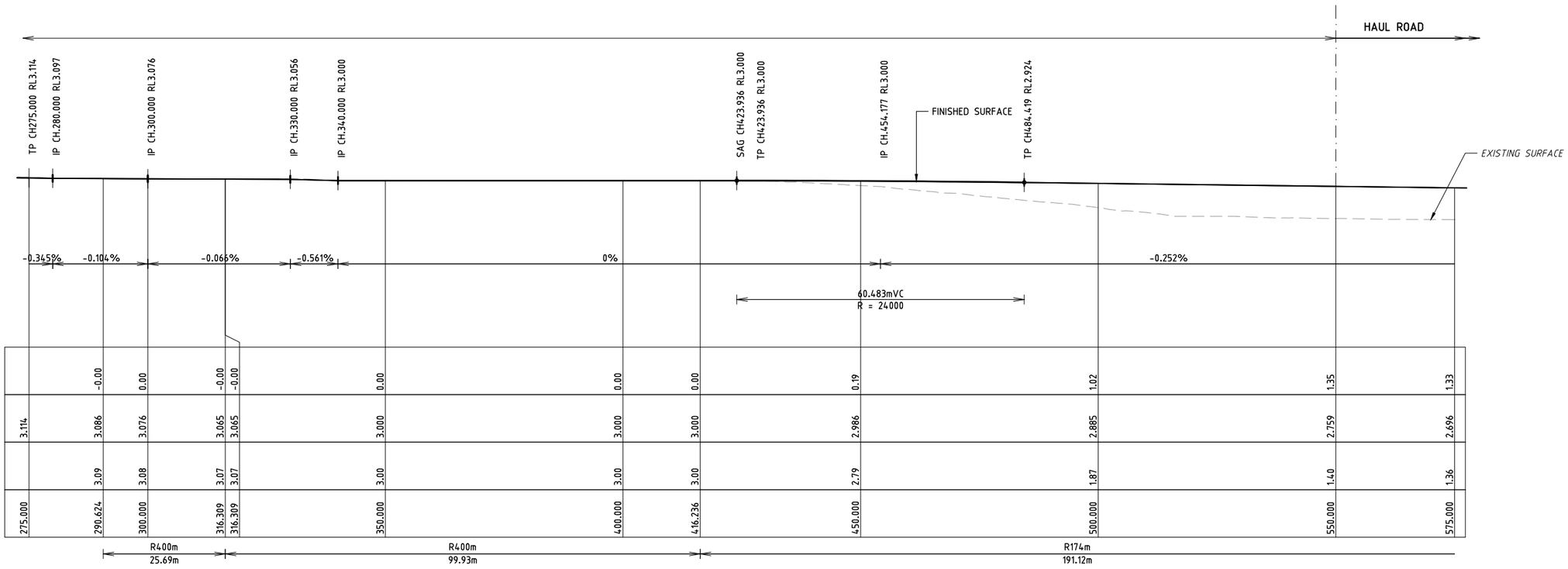

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TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS
ROAD LONGITUDINAL SECTION - SHEET 1 OF 10

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (meters)
HORIZONTAL SCALE 5 0 5 10 15 20 25 1:500 (meters)
(FULL SIZE)

Designer : JUAN VELEZ

Date : 09/02/2021

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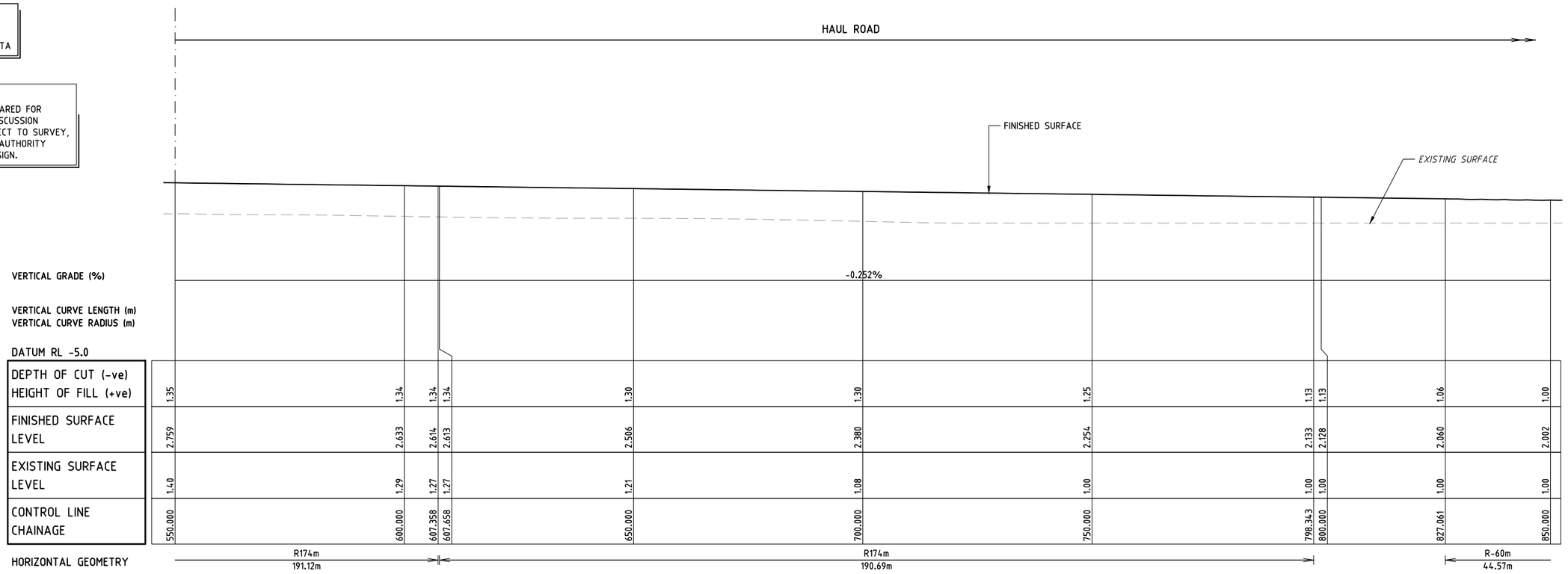

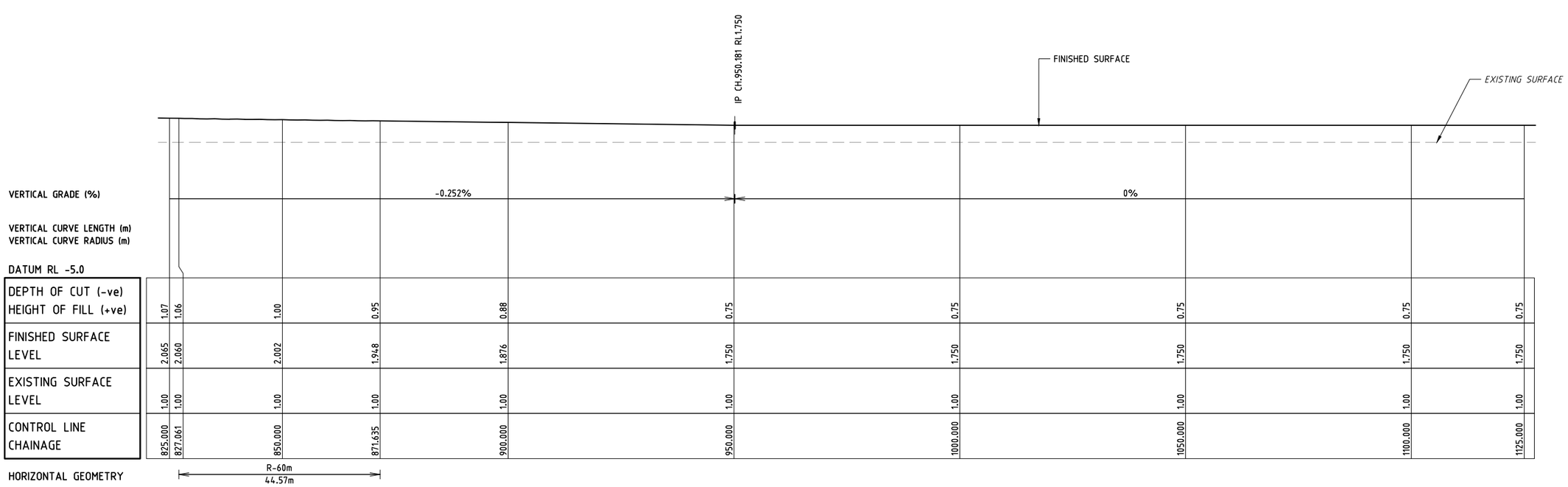

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TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS
ROAD LONGITUDINAL SECTION - SHEET 2 OF 10

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (meters)
HORIZONTAL SCALE 5 0 5 10 15 20 25 1:500 (meters)
(FULL SIZE)

Designer : JUAN VELEZ
Date : 09/02/2021

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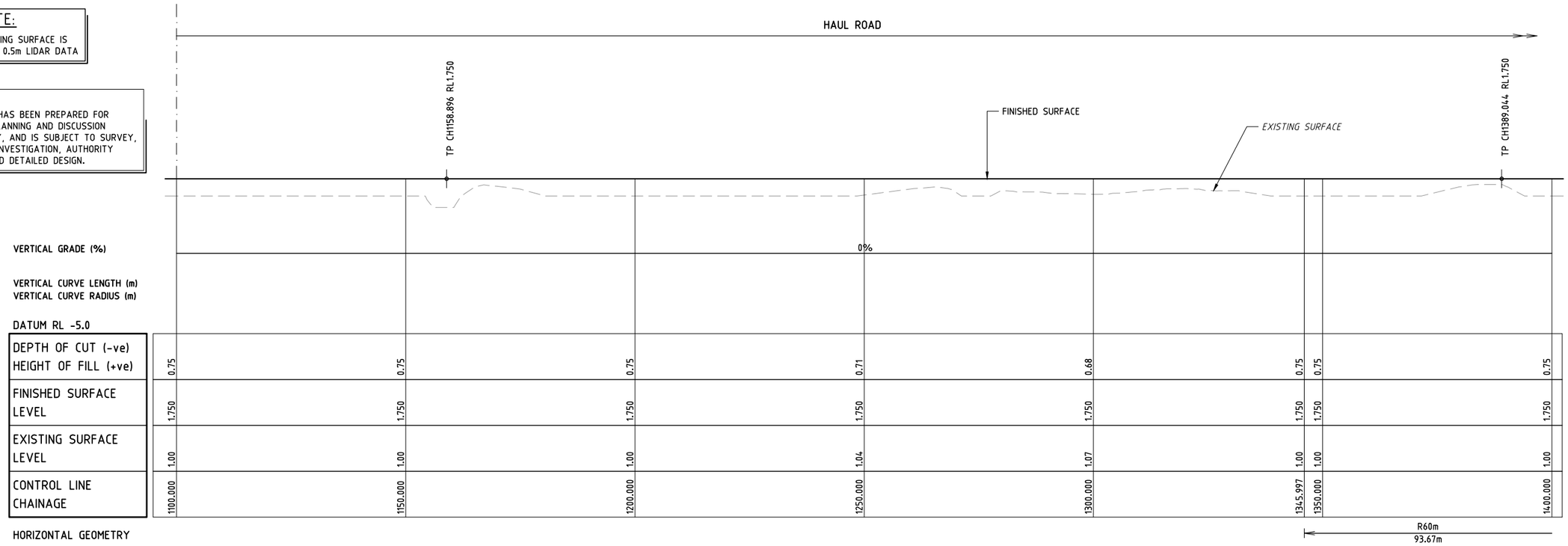

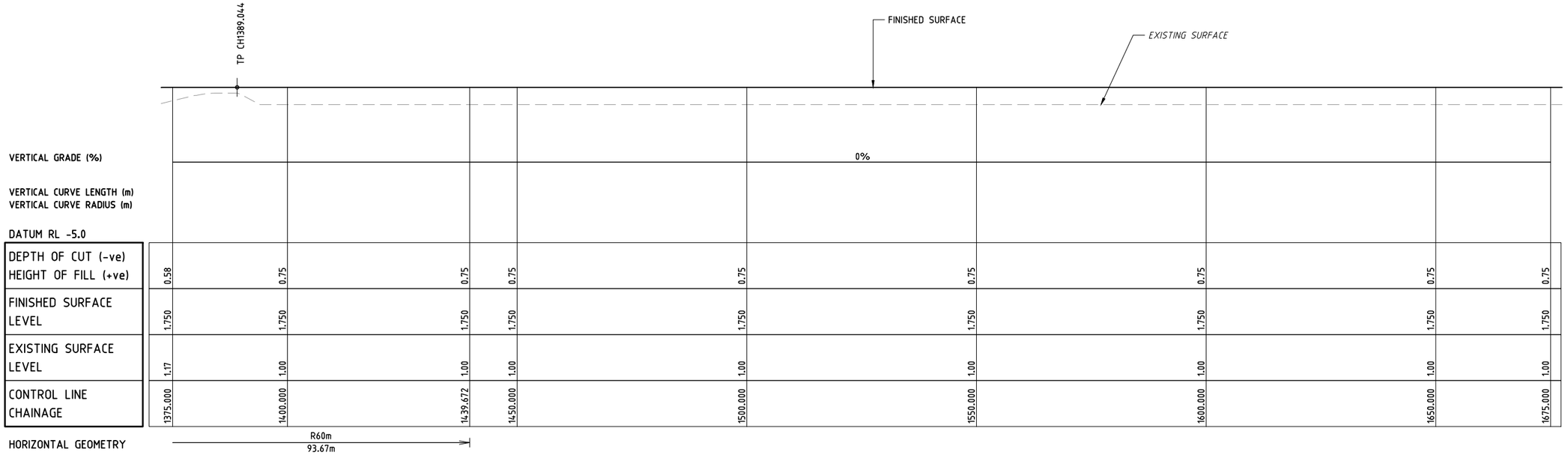

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TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS
ROAD LONGITUDINAL SECTION - SHEET 3 OF 10

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (meters)
HORIZONTAL SCALE 5 0 5 10 15 20 25 1:500 (meters)
(FULL SIZE)

Designer : JUAN VELEZ

Date : 09/02/2021

BE190043-SK107 Rev B

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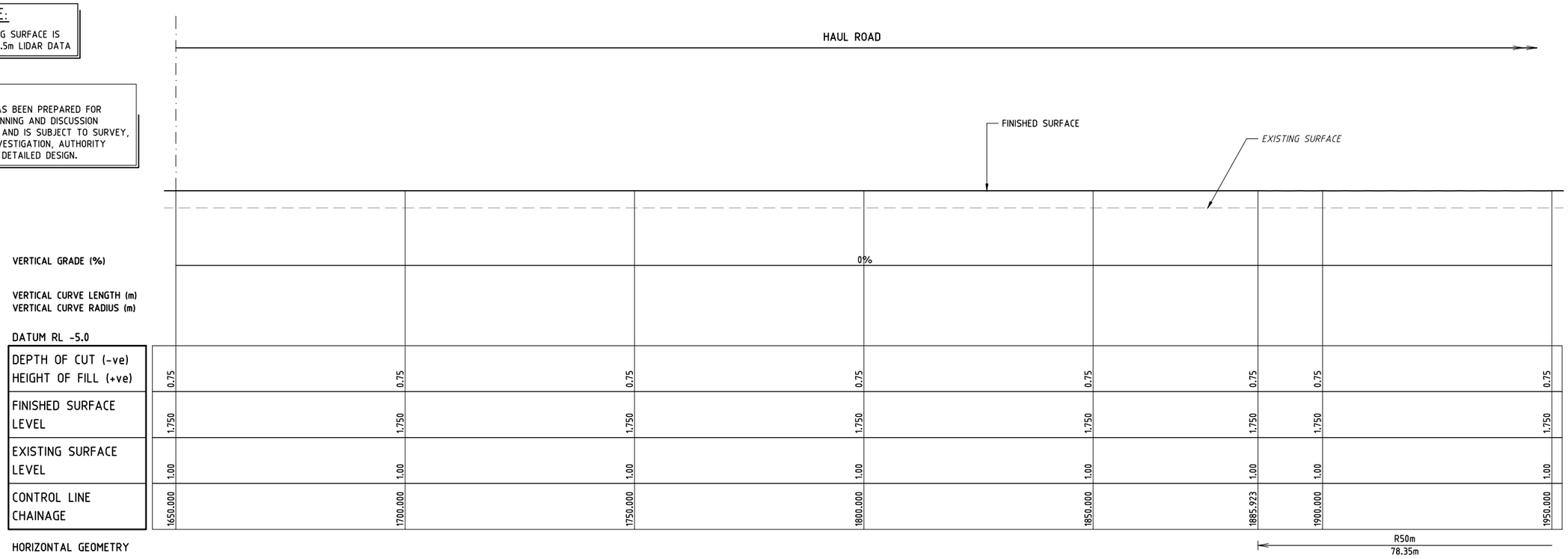

Prepared for : HANSON CONSTRUCTION MATERIALS PTY LTD

TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS
ROAD LONGITUDINAL SECTION - SHEET 4 OF 10

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (meters)
HORIZONTAL SCALE 5 0 5 10 15 20 25 1:500 (meters)
(FULL SIZE)

Designer : JUAN VELEZ
Date : 09/02/2021

BE190043-SK108 Rev B

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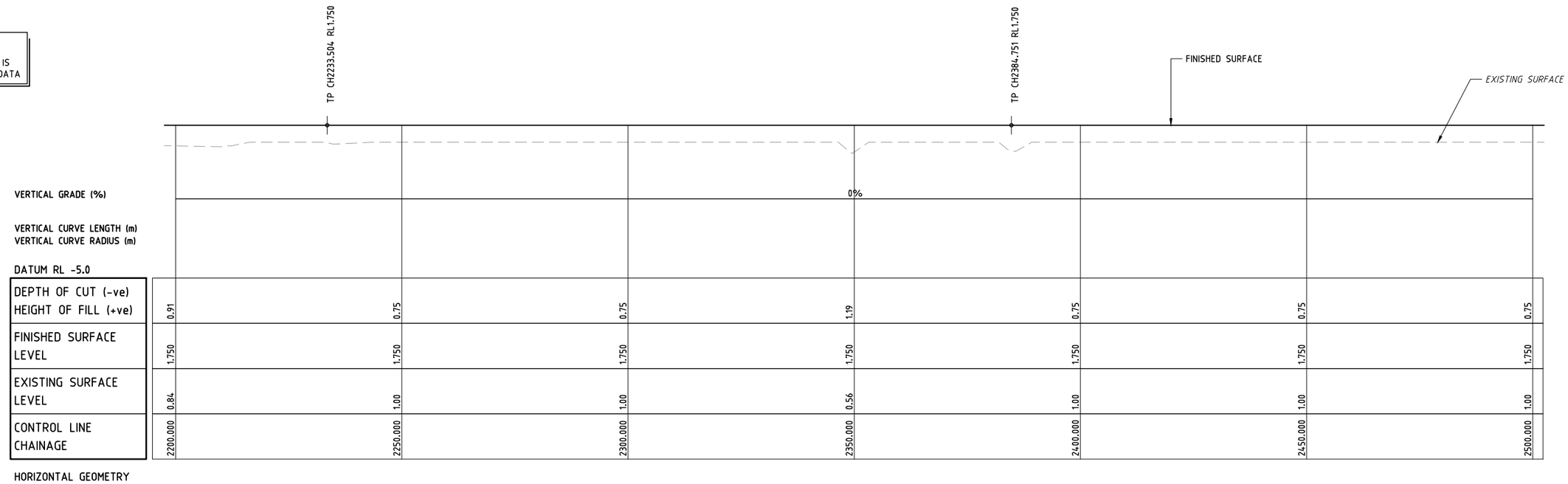
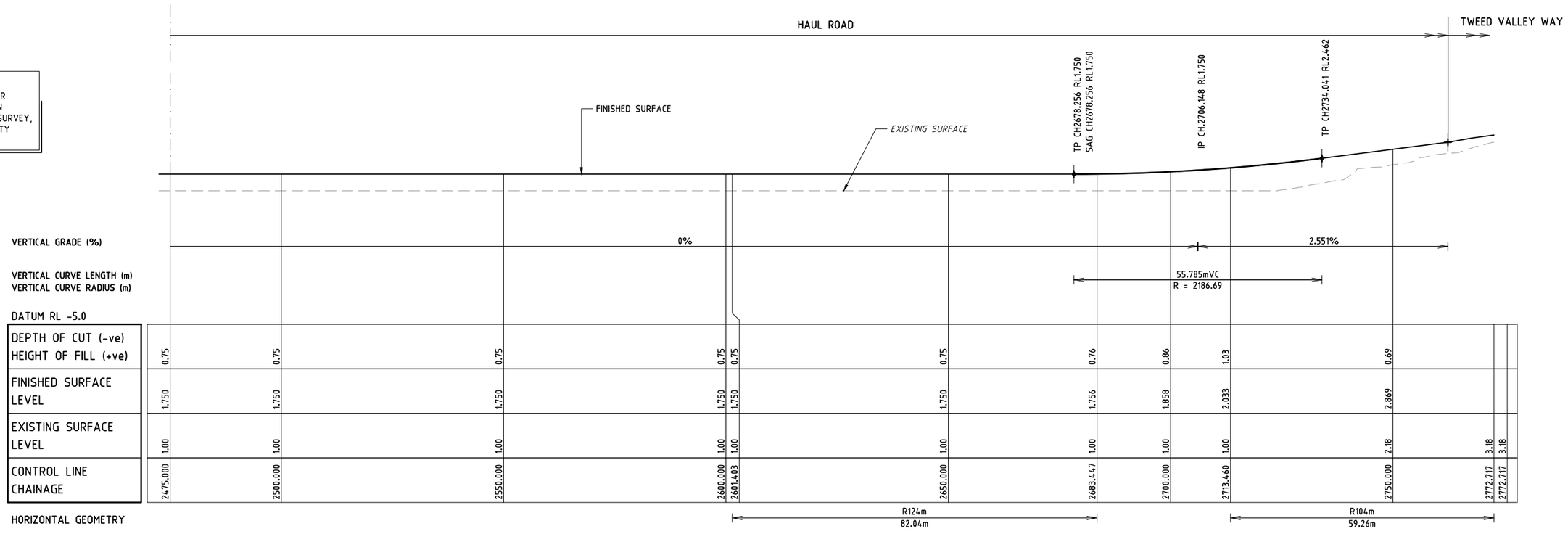
NOTE:
EXISTING SURFACE IS FROM 0.5m LIDAR DATA



NOTE:
THIS DRAWING HAS BEEN PREPARED FOR PRELIMINARY PLANNING AND DISCUSSION PURPOSES ONLY, AND IS SUBJECT TO SURVEY, GEOTECHNICAL INVESTIGATION, AUTHORITY APPROVALS AND DETAILED DESIGN.



Prepared for : HANSON CONSTRUCTION MATERIALS PTY LTD

TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS
ROAD LONGITUDINAL SECTION - SHEET 5 OF 10

VERTICAL SCALE 1 0 1 2 3 4 5 1:100 (meters)
HORIZONTAL SCALE 5 0 5 10 15 20 25 1:500 (meters)
(FULL SIZE)

BE190043-SK109 Rev B

Designer : JUAN VELEZ
Date : 09/02/2021

BURCHILLS ENGINEERING SOLUTIONS
Level 2, Connaught Centre
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Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: admin@burchills.com.au
Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

NOTE:
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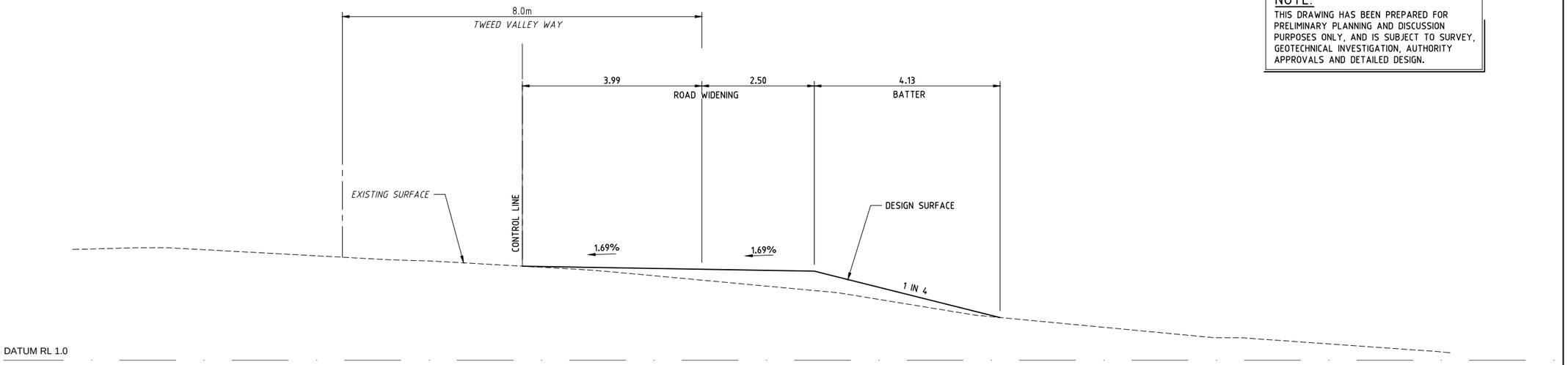
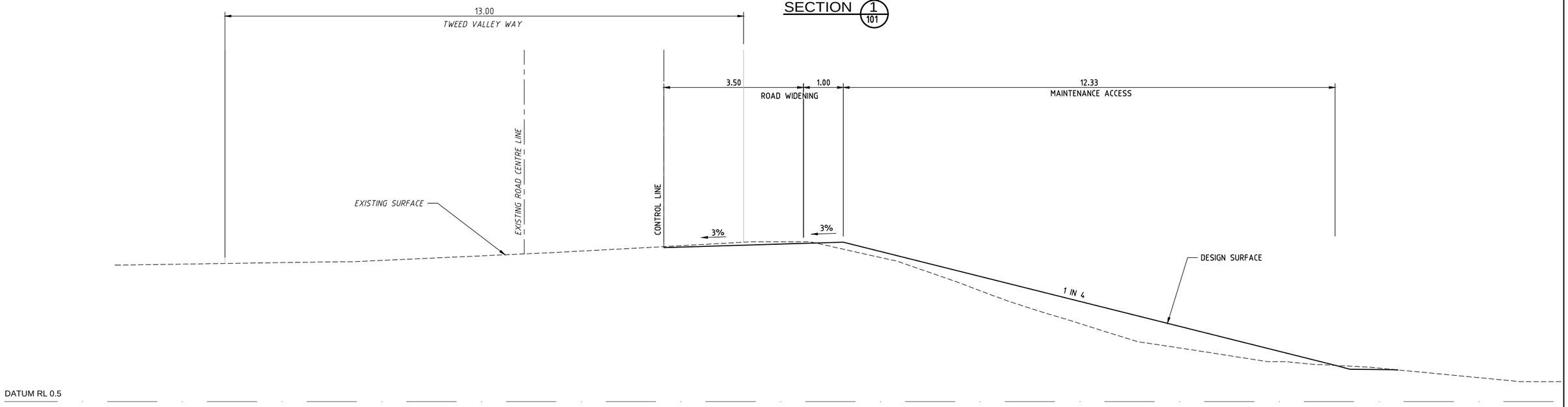


SECTION 1/101



SECTION 2/101

Prepared for : HANSON CONSTRUCTION MATERIALS PTY LTD

TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS
TYPICAL SECTIONS - SHEET 1 OF 3

Designer : JUAN VELEZ

Date : 09/02/2021

SCALE 1.0 0 1.0 2.0 (metres)
1 : 50 (FULL SIZE)

BE190043-SK120 Rev B

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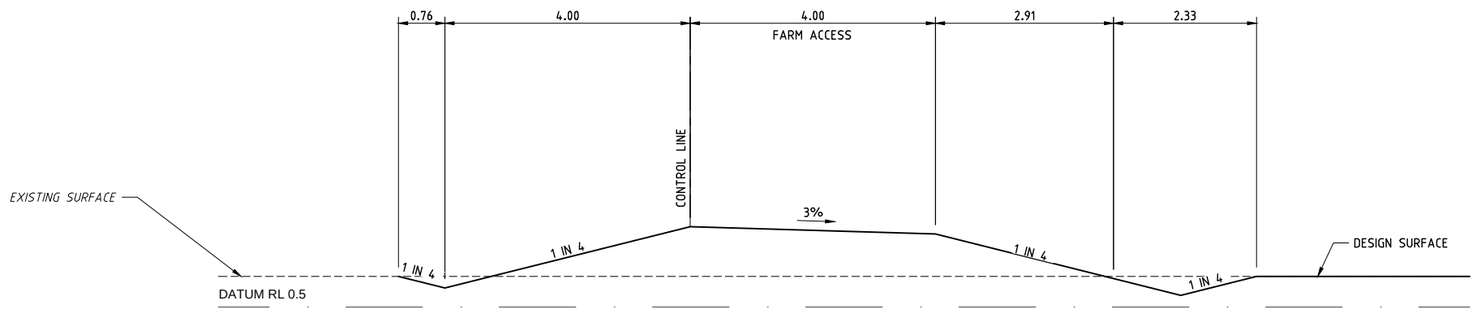
SECTION 3/101



SECTION 4/101

Prepared for : HANSON CONSTRUCTION MATERIALS PTY LTD

TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS
TYPICAL SECTIONS - SHEET 2 OF 3

Designer : JUAN VELEZ

Date : 09/02/2021

SCALE 1.0 0 1.0 2.0 (metres)
1 : 50 (FULL SIZE)

BE190043-SK121 Rev B

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Level 2, Connaught Centre
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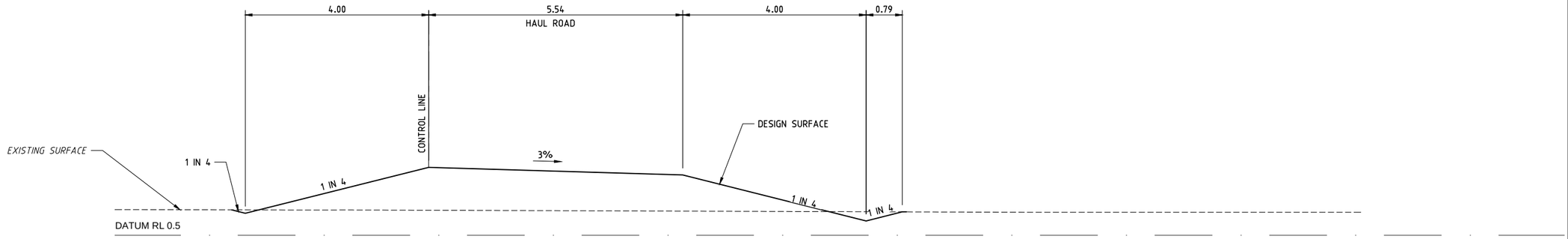
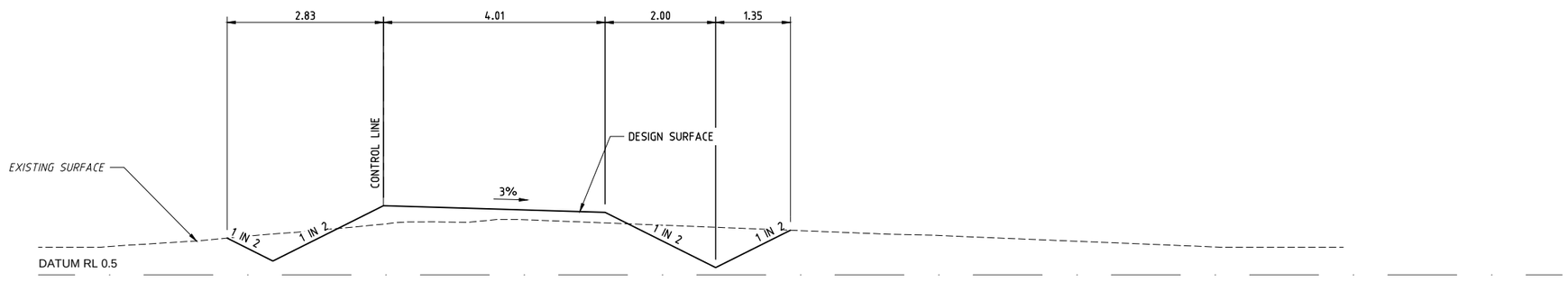


SECTION 5/102



SECTION 6/103

Prepared for : HANSON CONSTRUCTION MATERIALS PTY LTD

TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS
TYPICAL SECTIONS - SHEET 3 OF 3

Designer : JUAN VELEZ

Date : 09/02/2021

SCALE 1.0 0 1.0 2.0 (metres)
1 : 50 (FULL SIZE)

BE190043-SK122 Rev B

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ABN 76 166 942 365

N

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TWEED VALLEY WAY

90m Merge Taper

110m

REFER TO BE190043-SK308 FOR CONTINUATION

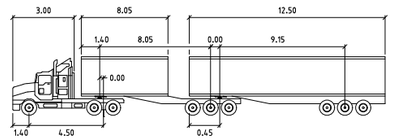
PRELIMINARY ONLY

LEGEND

WHEELS

BODY

0.50m BODY CLEARANCE



B-DOUBLE 26M

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

Prepared for : HANSON CONSTRUCTION MATERIALS PTY LTD

TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS

SWEPT PATH ANALYSIS - B-DOUBLE

Scale: 1:500

BE190043-SK307 Rev B

Designer : JUAN VELEZ

Date : 09/02/2021

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Coote Burchills Engineering Pty Ltd
ABN 76 166 942 365

N

REFER TO BE190043-SK307 FOR CONTINUATION

NOTE:
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LEGEND

- WHEELS
- BODY
- 0.50m BODY CLEARANCE

B-DOUBLE 26M

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

Prepared for : HANSON CONSTRUCTION MATERIALS PTY LTD

TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS

SWEPT PATH ANALYSIS - B-DOUBLE

Scale: 1:500

BE190043-SK308 Rev B

Designer : JUAN VELEZ

Date : 09/02/2021

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TWEED VALLEY WAY

90m Merge Taper

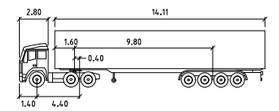
110m

REFER TO BE190043-SK310 FOR CONTINUATION

PRELIMINARY ONLY

LEGEND

- WHEELS
- BODY
- 0.50m BODY CLEARANCE



SEMI-TRAILER

	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 24.1
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

Prepared for : HANSON CONSTRUCTION MATERIALS PTY LTD

Designer : JUAN VELEZ

Date : 09/02/2021

TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS

SWEPT PATH ANALYSIS - SEMI-TRAILER

Scale: 1:500

BE190043-SK309 Rev B

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ABN 76 166 942 365

N

REFER TO BE190043-SK309 FOR CONTINUATION

NOTE:
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LEGEND

- WHEELS
- BODY
- 0.50m BODY CLEARANCE

SEMI-TRAILER

meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 24.1
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

Prepared for : HANSON CONSTRUCTION MATERIALS PTY LTD

TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS

SWEPT PATH ANALYSIS - SEMI TRAILER

Scale: 1:500

BE190043-SK310 Rev B

Designer : WELLINGTON JESUS

Date : 09/02/2021

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ABN 76 166 942 365

N

Road markings change required to accommodate 25.0m B-double

Lane widening required to accommodate 25.0m B-double

REFER TO BE190043-SK109 FOR CONTINUATION

NOTE:
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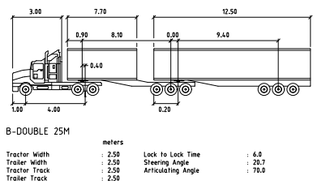
LEGEND

- WHEELS
- BODY
- 0.50m BODY CLEARANCE



B-DOUBLE 25M

meters			
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 28.7
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

Prepared for : HANSON CONSTRUCTION MATERIALS PTY LTD

Designer : WELLINGTON JESUS

Date : 09/02/2021

TWEED VALLEY WAY AND AUSTRALIAN BAY LOBSTER PRODUCERS ACCESS_WIDENING WORKS

SWEPT PATH ANALYSIS - 25.0m B-Double

Scale: 1:500

BE190043-SK311 Rev B

BURCHILLS ENGINEERING SOLUTIONS

Level 2, Connaught Centre
26 Marine Parade, Southport QLD 4215
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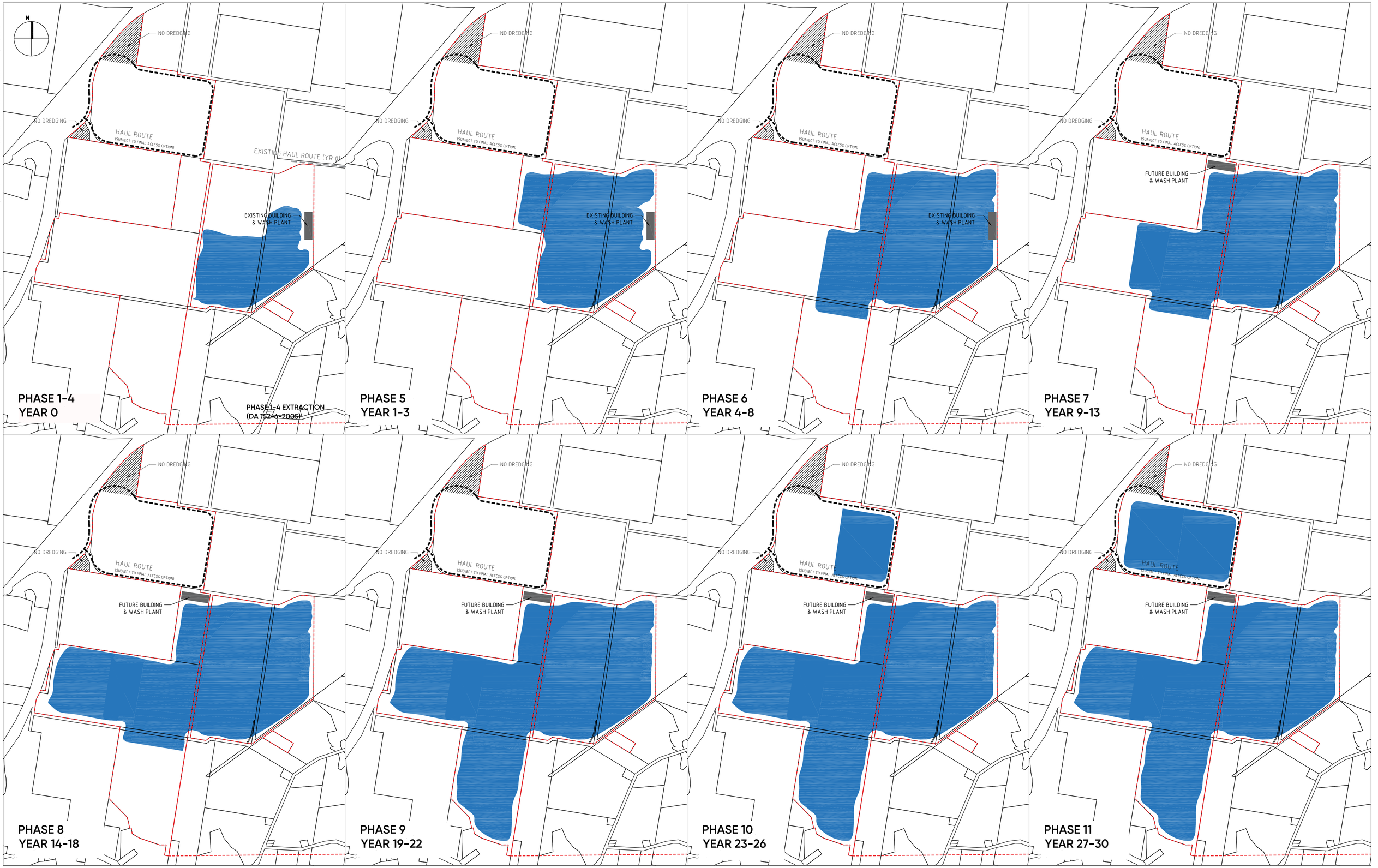

PROJECT TITLE

HANSON TWEED SAND PLANT

PHASE 5-11

DRAWING TITLE

CONCEPT DEVELOPMENT PHASING

REV	DESCRIPTION	DATE	DRAWN	DESIGN	CHECK	APPROVED
A	PASHING ARRANGEMENT CHANGES - REQ. PLANNER	25.01.2021	ZP	LN	LN	LN

ISSUE:	CLIENT:
PRELIMINARY	HANSON CONSTRUCTION MATERIALS PTY LTD
BASE PROVIDED BY:	**MANAGER:**
SIXMAPS DCDB	LANCE NEWLEY

ZONE PLANNING GROUP

GOLD COAST
1638 Tweed Street, Burleigh Heads QLD 4220
PO Box 3805, Burleigh Town QLD 4220

GLADSTONE
2/172 Goondoon St, Gladstone, QLD 4680
PO Box 5332, Gladstone QLD 4680

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JOB / DRAWING NO:
Z19163- 104

SHEET NO.
SHEET 01 OF 01

Appendix B – Traffic Surveys

Intersection Summary

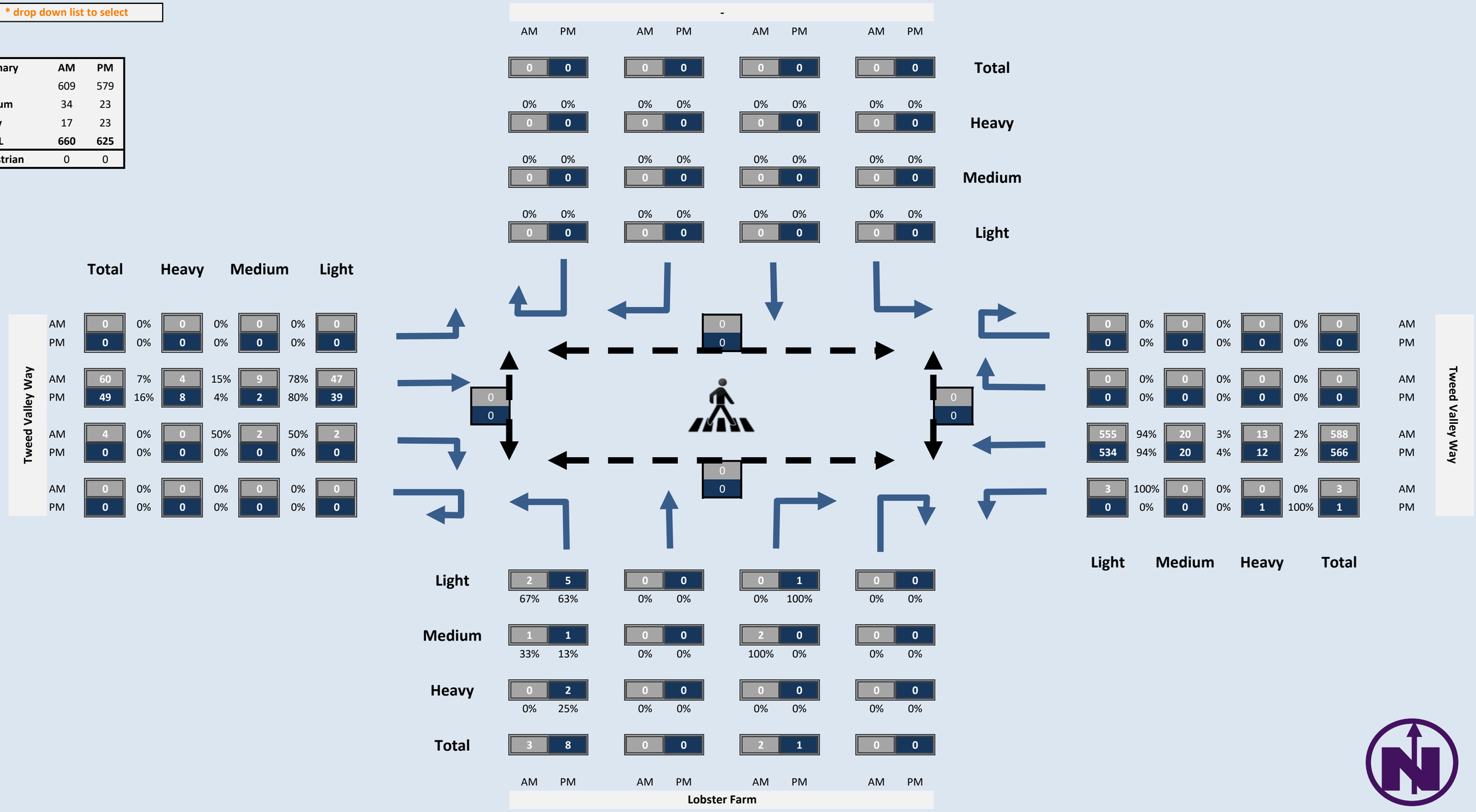
Location	Tweed Valley Way / Lobster Farm (THU)				2
Time Interval	7:30	to	8:30	AM	
Time Interval	15:30	to	16:30	PM	

Survey Day, Date	Thursday, 5 March 2020		
AM Peak Hour	7:30	to	8:30
PM Peak Hour	15:30	to	16:30
Weather	Fine		

Research Analytics
Transforming Data Into Insights
www.randagroup.com.au

* drop down list to select

Summary	AM	PM
Light	609	579
Medium	34	23
Heavy	17	23
TOTAL	660	625
Pedestrian	0	0



Intersection Summary

Location	Tweed Valley Way / Service Station (THU)			1
Time Interval	7:30	to	8:30	AM
Time Interval	15:15	to	16:15	PM

Survey Day, Date	Thursday, 5 March 2020		
AM Peak Hour	7:30	to	8:30
PM Peak Hour	15:15	to	16:15
Weather	Fine		

Research Analytics
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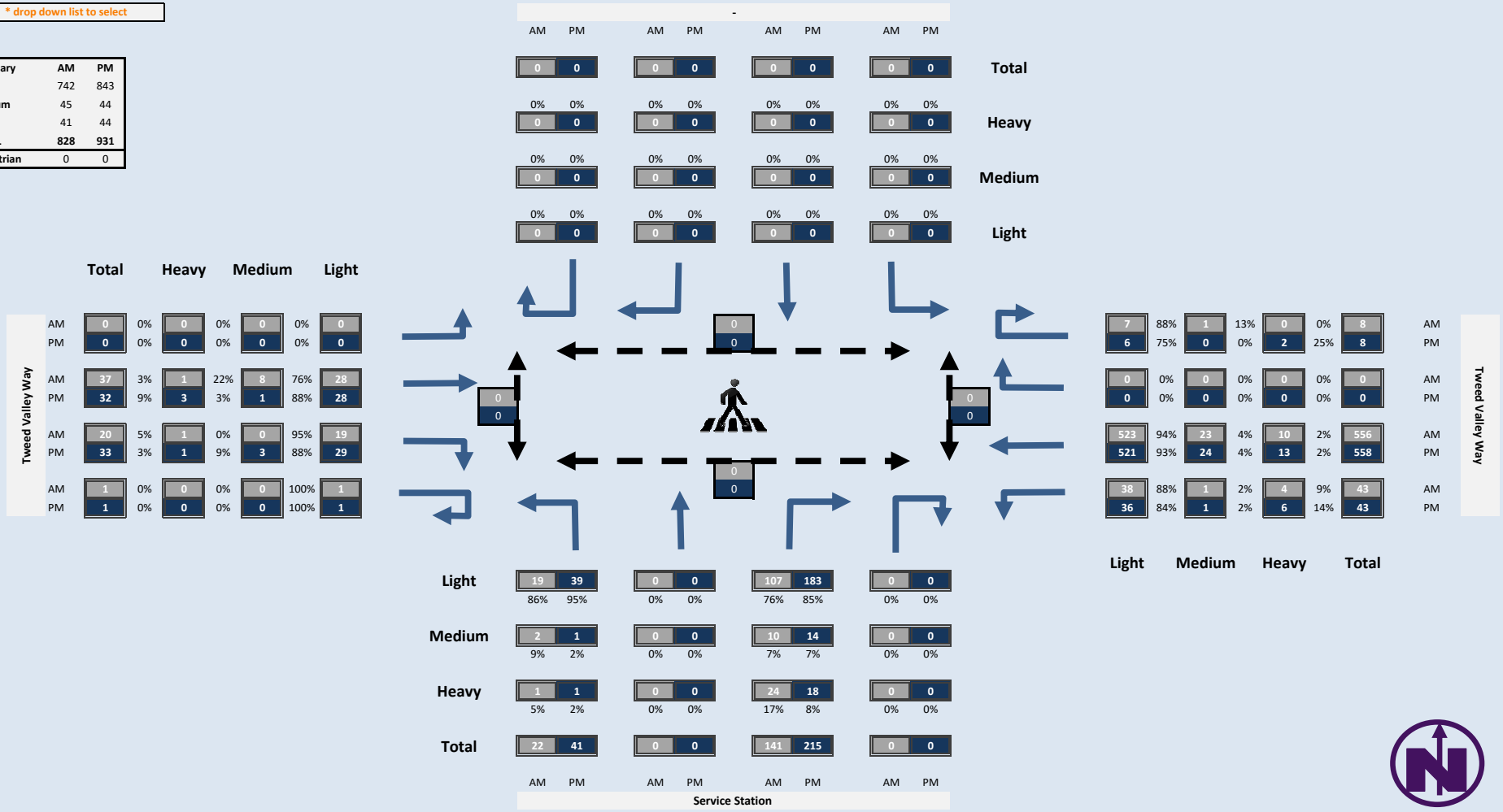
* drop down list to select

Summary	AM	PM
Light	742	843
Medium	45	44
Heavy	41	44
TOTAL	828	931
Pedestrian	0	0



One Page Summary

Back to Menu

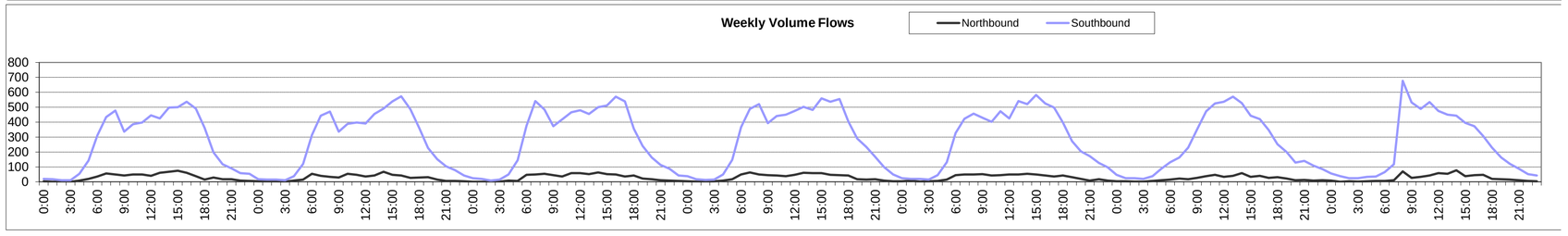
Street: Site 1, Tweed Valley Way
Suburb: Chinderah
Location: Site 1, Tweed Valley Way, to the electric light pole
Count No.: 1
Speed Limit: 80 km/h
Start Date: Wednesday, 4 March 2020

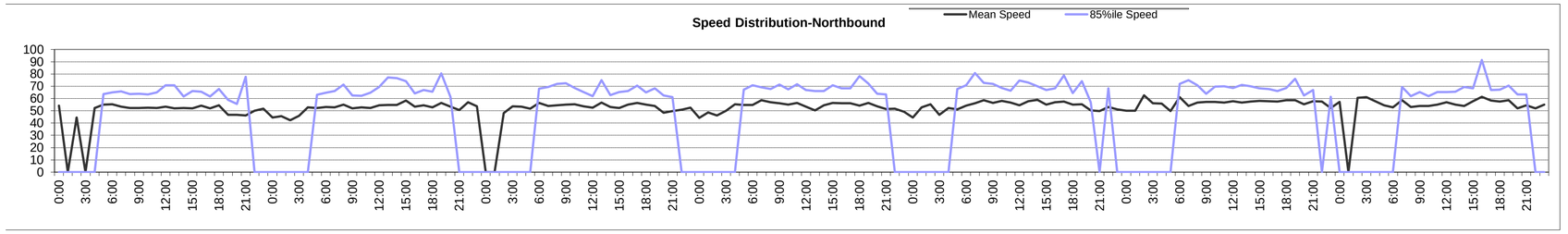
Research Analytics
Data Collection and Surveys
www.oneranda.com
contact@oneranda.com

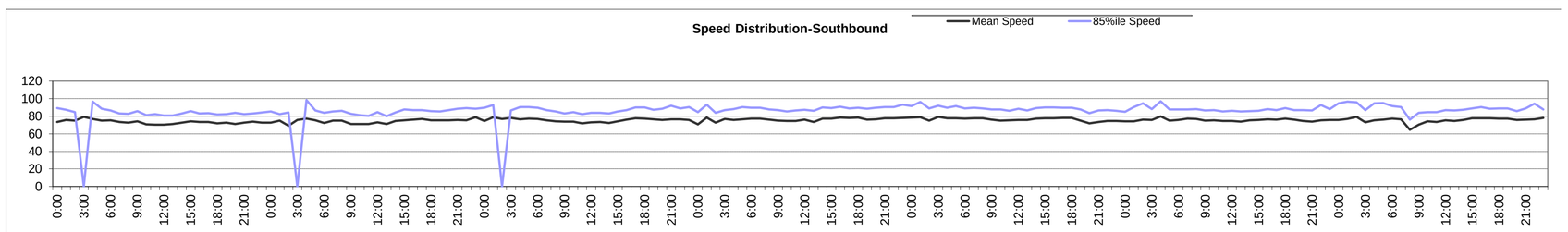
5-Day Speed & Volume Data				
		Travel Direction		
		Bidirectional	Northbound	Southbound
		7,566 vpd	722 vpd	6,844 vpd
Peak Hr AM	08:00	529 vpd	47 vpd	482 vpd
Peak Hr PM	16:00	596 vpd	48 vpd	548 vpd
Speeds	85th%	84.3 km/h	65.1 km/h	86.3 km/h
	Average	73.1 km/h	54.2 km/h	75.1 km/h
Commercial Vehicles %		11.2%	27.8%	9.4%

7-Day Speed & Volume Data				
		Travel Direction		
		Bidirectional	Northbound	Southbound
		7,226 vpd	676 vpd	6,549 vpd
Peak Hr AM	08:00	520 vpd	46 vpd	474 vpd
Peak Hr PM	14:00	560 vpd	65 vpd	505 vpd
Speeds	85th%	84.4 km/h	64.9 km/h	86.4 km/h
	Average	73.1 km/h	54.7 km/h	75.0 km/h
Commercial Vehicles %		9.5%	24.1%	8.0%

Data Record Inerval = 1-Hour	Monday, 09 Mar 20			Tuesday, 10 Mar 20			Wednesday, 04 Mar 20			Thursday, 05 Mar 20			Friday, 06 Mar 20			Saturday, 07 Mar 20			Sunday, 08 Mar 20		
	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional
Light Vehicle - Classes 1 to 2	516	5722	6238	465	5872	6337	510	6253	6763	510	6620	7130	537	6521	7058	458	5620	6078	518	5551	6069
Medium Vehicle - Classes 3 to 5	94	423	517	72	396	468	107	481	588	102	426	528	95	397	492	28	186	214	30	142	172
Long Vehicle - Classes 6 to 12	129	225	354	97	191	288	100	242	342	125	243	368	84	200	284	27	61	88	49	66	115
Volume 0700-1900	595	5287	5882	490	5331	5821	589	5696	6285	594	5805	6399	553	5669	6222	408	4836	5244	518	5021	5539
Volume 24-Hour	**739**	**6370**	**7109**	**634**	**6459**	**7093**	**717**	**6976**	**7693**	**737**	**7289**	**8026**	**716**	**7118**	**7834**	**513**	**5867**	**6380**	**597**	**5759**	**6356**
85%ile Speed	**63**	**83**	**81**	**65**	**85**	**83**	**64**	**86**	**84**	**66**	**89**	**86**	**67**	**89**	**87**	**65**	**87**	**85**	**64**	**86**	**84**
Mean Speed	**52.3**	**72.7**	**70.6**	**53.8**	**74.1**	**72.3**	**54.1**	**74.9**	**72.9**	**54.9**	**76.5**	**74.5**	**55.8**	**76.6**	**74.6**	**57.0**	**75.5**	**74.0**	**55.8**	**74.0**	**72.3**
AM Peak Hour Volume	55	478	526	53	471	504	57	542	591	62	521	571	51	473	517	46	525	571	70	677	747
AM Hour Factor	0.07	0.08	0.07	0.08	0.07	0.07	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.09	0.09	0.09	0.12	0.12	0.12
AM Peak 85%	66	97	88	71	98	85	72	93	93	72	93	88	81	96	89	75	97	91	69	97	97
AM Peak Time	7:00	8:00	8:00	9:00	8:00	8:00	11:00	7:00	7:00	7:00	8:00	8:00	9:00	11:00	11:00	11:00	11:00	11:00	10:00	9:00	8:00
PM Peak Hour Volume	74	536	596	68	572	614	63	571	619	61	559	618	54	582	630	57	570	610	77	474	533
PM Hour Factor	0.10	0.08	0.08	0.11	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.11	0.10	0.10	0.13	0.08	0.08
PM Peak 85%	78	86	83	81	89	87	75	92	89	78	93	89	79	90	89	76	93	87	91	94	91
PM Peak Time	15:00	16:00	13:00	14:00	16:00	16:00	14:00	14:00	16:00	13:00	15:00	15:00	14:00	15:00	15:00	14:00	13:00	13:00	14:00	14:00	12:00







Classification	Monday, 09 Mar 20			Tuesday, 10 Mar 20			Wednesday, 04 Mar 20			Thursday, 05 Mar 20			Friday, 06 Mar 20			Saturday, 07 Mar 20			Sunday, 08 Mar 20		
	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional	Northbound	Southbound	Bidirectional
Class 1 Car	495	5625	6120	447	5804	6251	477	6120	6597	487	6501	6988	510	6385	6895	430	5484	5914	492	5417	5909
Class 2 Car+Trailer	21	97	118	18	68	86	33	133	166	23	119	142	27	136	163	28	136	164	26	134	160
Class 3 2 axle Truck	58	297	355	37	296	333	45	332	377	47	297	344	64	301	365	23	165	188	23	124	147
Class 4 3 axle Truck	22	94	116	22	69	91	46	114	160	38	101	139	18	64	82	3	14	17	3	14	17
Class 5 4 axle Truck	14	32	46	13	31	44	16	35	51	17	28	45	13	32	45	2	7	9	4	4	8
Class 6 3 axle Semi	4	5	9	3	4	7	0	8	8	3	9	12	4	4	8	1	1	2	1	4	5
Class 7 4 axle Semi	5	8	13	6	14	20	5	9	14	4	9	13	8	11	19	1	3	4	1	2	3
Class 8 5 axle Semi	7	9	16	4	11	15	2	12	14	11	17	28	7	16	23	4	3	7	2	4	6
Class 9 6 axle Semi	55	105	160	40	98	138	55	134	189	62	123	185	35	110	145	11	32	43	24	26	50
Class 10 7/8 axle Truck	54	97	151	42	63	105	34	77	111	43	80	123	25	58	83	10	21	31	20	28	48
Class 11 B-Double	4	1	5	2	1	3	4	1	5	2	5	7	5	1	6	0	1	1	1	2	3
Class 12 Road Train	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Class 13 Unknown	20	3	23	11	1	12	13	0	13	13	0	13	10	2	12	5	0	5	10	1	11

Volume Summary

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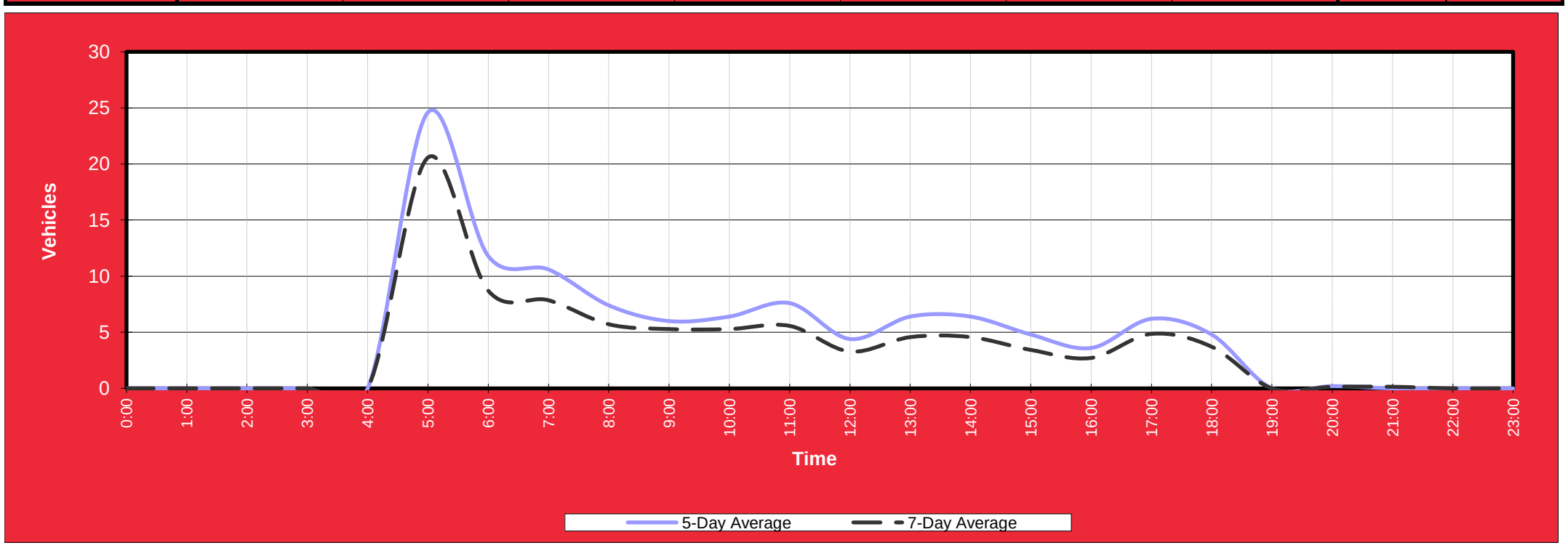
Street	Site 2, Tweed Valley Way				
Suburb	Chinderah				
Location	Site 2, Tweed Valley Way, to no through road sign board				
Count No.	2				
Start Date	Wednesday	04 Mar 2020	**Speed Limit**	20 km/h	
Direction	Eastbound				

5-Day Average	111
7-Day Average	86
5-Day Heavy (Classes 3 to 12)	7.2%
7-Day Heavy (Classes 3 to 12)	7.3%

Hour Starting	Day of Week - Classes 1 to 12							5-Day Average	7-Day Average
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	09/03/2020	10/03/2020	04/03/2020	05/03/2020	06/03/2020	07/03/2020	08/03/2020		
AM Peak	27	26	22	26	22	12	9		
PM Peak	10	7	9	6	8	2	2		
0:00	0	0	0	0	0	0	0	0	0
1:00	0	0	0	0	0	0	0	0	0
2:00	0	0	0	0	0	0	0	0	0
3:00	0	0	0	0	0	0	0	0	0
4:00	0	0	0	0	0	0	0	0	0
5:00	27	26	22	26	22	12	9	25	21
6:00	10	13	14	12	10	2	0	12	9
7:00	10	11	7	16	9	2	0	11	8
8:00	8	6	8	6	9	0	3	7	6
9:00	7	8	0	8	7	3	4	6	5
10:00	5	4	8	7	8	2	3	6	5
11:00	7	8	7	6	10	1	0	8	6
12:00	6	3	5	2	6	1	0	4	3
13:00	10	4	4	6	8	0	0	6	5
14:00	9	7	6	6	4	0	0	6	5
15:00	4	4	9	3	4	0	0	5	3
16:00	5	4	3	2	4	0	1	4	3
17:00	8	6	6	5	6	1	2	6	5
18:00	4	5	5	5	5	2	0	5	4
19:00	0	0	0	0	0	0	0	0	0
20:00	0	1	0	0	0	0	0	0	0
21:00	0	0	0	0	0	1	0	0	0
22:00	0	0	0	0	0	0	0	0	0
23:00	0	0	0	0	0	0	0	0	0
Total	**120**	**110**	**104**	**110**	**112**	**27**	**22**	**111**	**86**
Heavy %	4.2%	7.3%	7.7%	10.0%	7.1%	11.1%	4.5%	7.2%	7.3%



Hourly Classification Data

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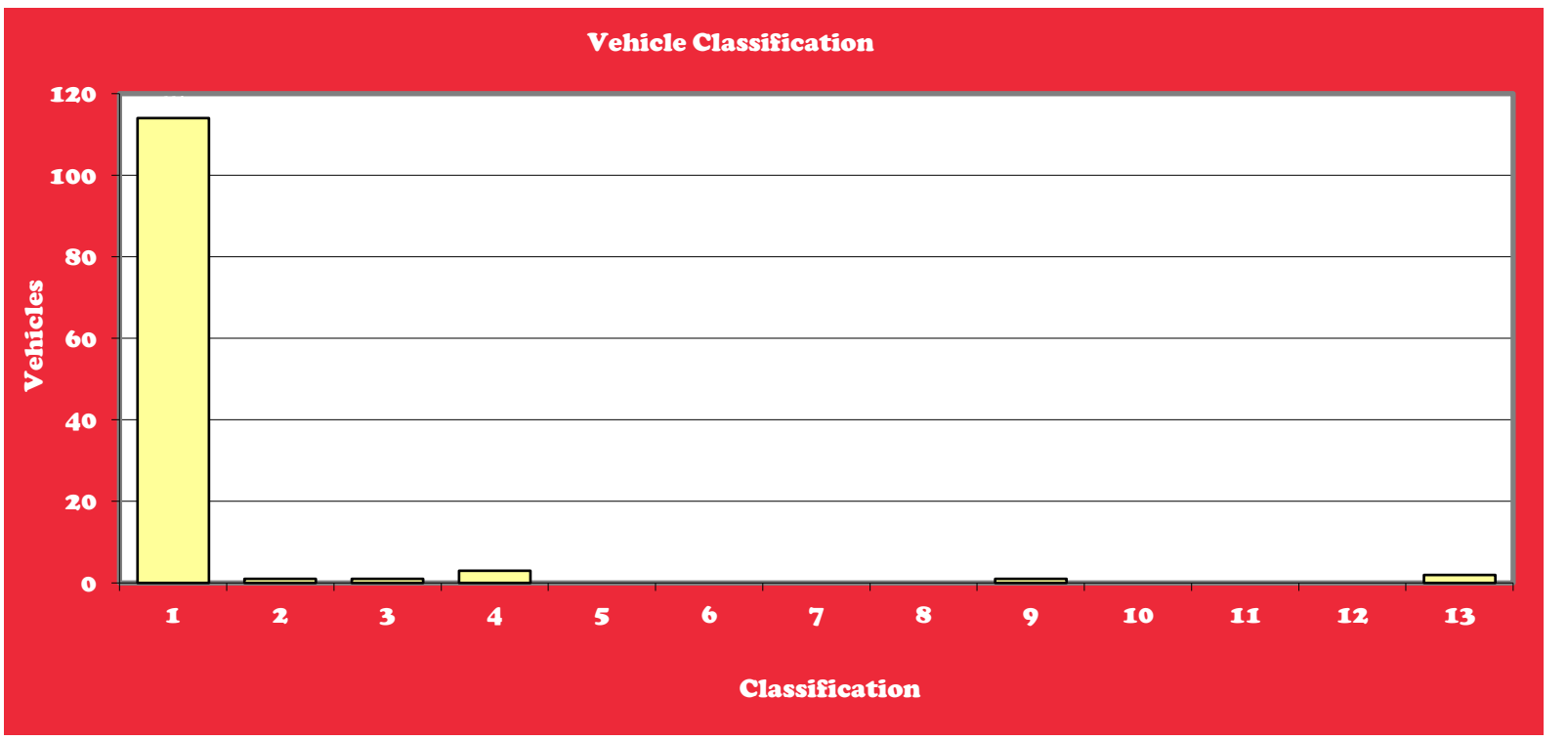
Street	Site 2, Tweed Valley Way			**AADT**	122
Suburb	Chinderah			**Average Speed**	32.5
Location	Site 2, Tweed Valley Way, to no through road sign board			**85th Percentile**	10
Direction	Eastbound			**Heavy Percentage**	4.1%
Day	Monday	**Count No.**	2	**AM Peak**	5:00 27 vph
Date	09 Mar 2020	**Speed Limit**	20 km/h	**PM Peak**	13:00 10 vph
Start Date	Wednesday 04 Mar 2020				

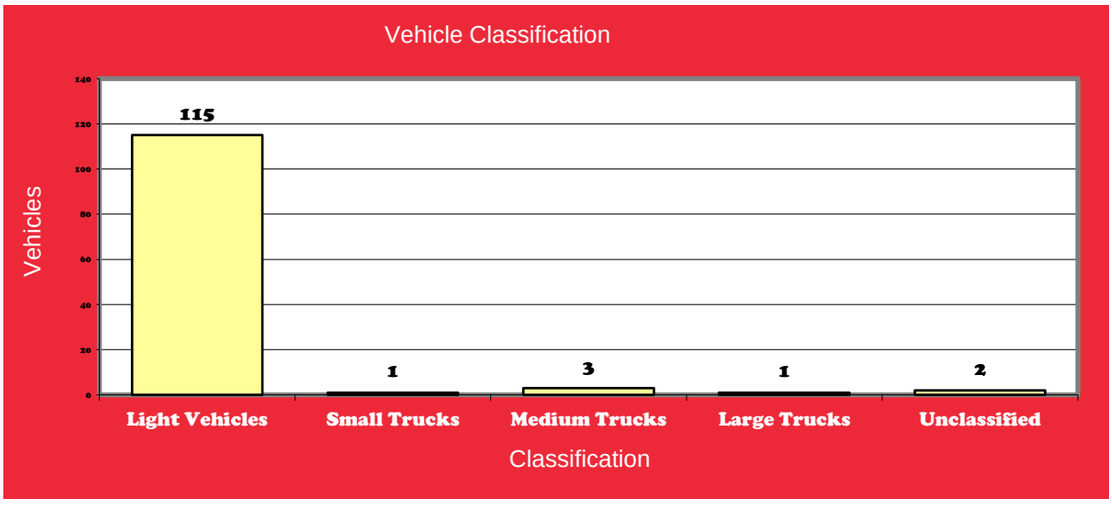
Hour Starting	Vehicle Classification														Speed	
	1	2	3	4	5	6	7	8	9	10	11	12	13	Total	Average	85%ile
0:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
1:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
2:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
3:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
5:00	27	0	0	0	0	0	0	0	0	0	0	0	0	27	32.8	44
6:00	10	0	0	0	0	0	0	0	0	0	0	0	0	10	35.2	0
7:00	9	0	0	1	0	0	0	0	0	0	0	0	0	10	38.3	0
8:00	7	1	0	0	0	0	0	0	0	0	0	0	1	9	32.7	0
9:00	6	0	0	1	0	0	0	0	0	0	0	0	0	7	27.0	0
10:00	4	0	0	0	0	0	0	0	1	0	0	0	0	5	29.6	0
11:00	7	0	0	0	0	0	0	0	0	0	0	0	0	7	28.2	0
12:00	6	0	0	0	0	0	0	0	0	0	0	0	0	6	29.8	0
13:00	8	0	1	1	0	0	0	0	0	0	0	0	0	10	30.8	0
14:00	9	0	0	0	0	0	0	0	0	0	0	0	0	9	31.9	0
15:00	4	0	0	0	0	0	0	0	0	0	0	0	0	4	28.2	0
16:00	5	0	0	0	0	0	0	0	0	0	0	0	0	5	37.5	0
17:00	8	0	0	0	0	0	0	0	0	0	0	0	1	9	34.6	0
18:00	4	0	0	0	0	0	0	0	0	0	0	0	0	4	32.5	0
19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total	114	1	1	3	0	0	0	0	1	0	0	0	2	122	32.5	10
Class %	93	1	1	2	0	0	0	0	1	0	0	0	2			



Class Data Summary

Street	Site 2, Tweed Valley Way		**Light Vehicles**	94.3%
Location	Chinderah		**Small Trucks**	0.8%
Count No.	Site 2, Tweed Valley Way, to no through road sign board		**Medium Trucks**	2.5%
Direction	Eastbound		**Large Trucks**	0.8%
Day	Monday		**Unclassified**	1.6%
Start Date	Wednesday	**AM Peak**	5:00	27 vph
Date	09 Mar 2020	**PM Peak**	13:00	10 vph

Hour Starting	Vehicle Classification					
	Light Vehicles	Small Trucks	Medium Trucks	Large Trucks	Unclassified	Total
0:00	0	0	0	0	0	0
1:00	0	0	0	0	0	0
2:00	0	0	0	0	0	0
3:00	0	0	0	0	0	0
4:00	0	0	0	0	0	0
5:00	27	0	0	0	0	27
6:00	10	0	0	0	0	10
7:00	9	0	1	0	0	10
8:00	8	0	0	0	1	9
9:00	6	0	1	0	0	7
10:00	4	0	0	1	0	5
11:00	7	0	0	0	0	7
12:00	6	0	0	0	0	6
13:00	8	1	1	0	0	10
14:00	9	0	0	0	0	9
15:00	4	0	0	0	0	4
16:00	5	0	0	0	0	5
17:00	8	0	0	0	1	9
18:00	4	0	0	0	0	4
19:00	0	0	0	0	0	0
20:00	0	0	0	0	0	0
21:00	0	0	0	0	0	0
22:00	0	0	0	0	0	0
23:00	0	0	0	0	0	0
Total	**115**	**1**	**3**	**1**	**2**	**122**



Light Vehicles – Classes 1 to 2

Small Trucks – Class 3

Medium Trucks – Classes 4 to 5

Large Trucks – Classes 6 to 12

Unclassified – Class 13

One Page Summary

Back to Menu

Street: Site 3, Tweed Valley Way
Suburb: Chinderah
Location: Site 1, Tweed Valley Way
Count No.: 3
Speed Limit: 80 km/h
Start Date: Thursday, 12 March 2020

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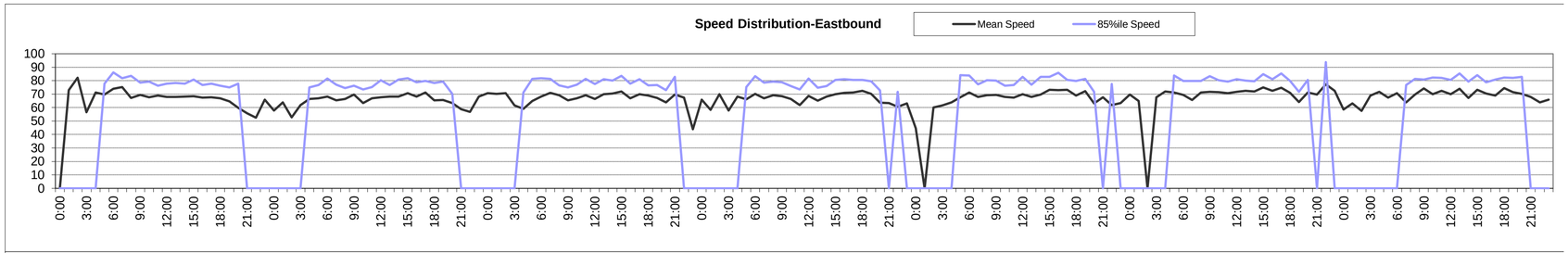
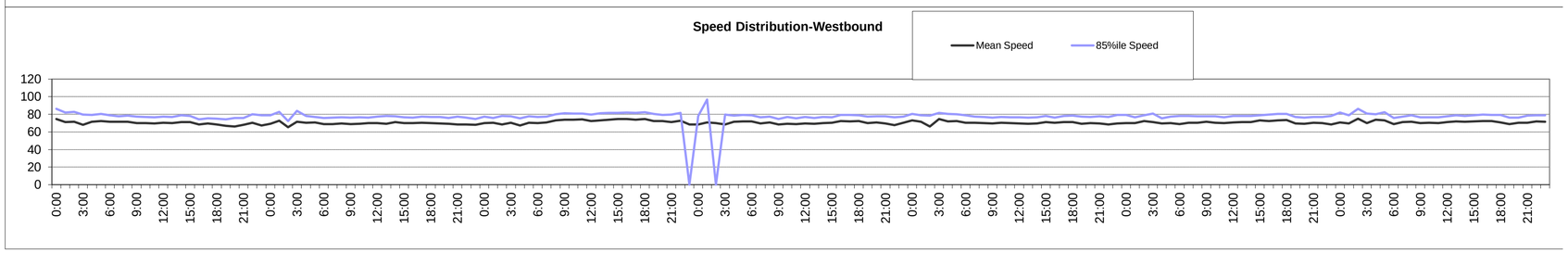
5-Day Speed & Volume Data		Travel Direction		
		Bidirectional	Eastbound	Westbound
		6,938 vpd	708 vpd	6,230 vpd
Peak Hr AM	07:00	497 vpd	52 vpd	445 vpd
Peak Hr PM	15:00	557 vpd	57 vpd	500 vpd
Speeds	85th%	77.5 km/h	75.9 km/h	77.7 km/h
	Average	70.4 km/h	68.2 km/h	70.6 km/h
Commercial Vehicles %		12.6%	32.4%	10.4%

7-Day Speed & Volume Data		Travel Direction		
		Bidirectional	Eastbound	Westbound
		6,380 vpd	631 vpd	5,749 vpd
Peak Hr AM	11:00	457 vpd	44 vpd	413 vpd
Peak Hr PM	15:00	507 vpd	52 vpd	455 vpd
Speeds	85th%	77.6 km/h	75.7 km/h	77.8 km/h
	Average	70.5 km/h	68.7 km/h	70.7 km/h
Commercial Vehicles %		11.0%	30.4%	8.9%

Data Record Inerval = 1-Hour	Monday, 16 Mar 20			Tuesday, 17 Mar 20			Wednesday, 18 Mar 20			Thursday, 12 Mar 20			Friday, 13 Mar 20			Saturday, 14 Mar 20			Sunday, 15 Mar 20		
	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional
Light Vehicle - Classes 1 to 2	485	5427	5912	505	5387	5892	418	5043	5461	493	5896	6389	478	6160	6638	354	4751	5105	327	3992	4319
Medium Vehicle - Classes 3 to 5	127	382	509	119	383	502	111	613	724	118	410	528	113	372	485	62	117	179	46	105	151
Long Vehicle - Classes 6 to 12	90	233	323	117	204	321	106	226	332	145	222	367	102	191	293	38	72	110	50	53	103
Volume 0700-1900	563	5119	5682	582	4981	5563	487	4884	5371	597	5352	5949	528	5566	6094	356	4110	4466	348	3517	3865
Volume 24-Hour	**702**	**6042**	**6744**	**741**	**5974**	**6715**	**635**	**5882**	**6517**	**756**	**6528**	**7284**	**693**	**6723**	**7416**	**454**	**4940**	**5394**	**423**	**4150**	**4573**
85%ile Speed	**76**	**77**	**77**	**74**	**77**	**77**	**77**	**80**	**80**	**75**	**77**	**77**	**77**	**77**	**77**	**76**	**78**	**78**	**74**	**78**	**78**
Mean Speed	**68.3**	**70.0**	**69.9**	**67.1**	**69.7**	**69.4**	**68.4**	**73.1**	**72.6**	**67.7**	**70.3**	**70.0**	**69.4**	**70.2**	**70.1**	**71.4**	**71.1**	**71.1**	**70.5**	**71.0**	**71.0**
AM Peak Hour Volume	56	421	452	59	444	503	51	466	517	68	445	513	62	451	513	41	446	487	36	412	448
AM Hour Factor	0.08	0.07	0.07	0.08	0.07	0.07	0.08	0.08	0.08	0.09	0.07	0.07	0.09	0.07	0.07	0.09	0.09	0.09	0.09	0.10	0.10
AM Peak 85%	86	86	86	82	84	77	82	81	81	83	97	90	84	82	81	84	81	79	82	86	79
AM Peak Time	6:00	7:00	7:00	9:00	7:00	7:00	7:00	7:00	7:00	11:00	11:00	11:00	7:00	7:00	7:00	11:00	11:00	11:00	10:00	9:00	11:00
PM Peak Hour Volume	68	546	613	61	491	537	46	508	552	64	500	551	57	564	614	51	492	528	47	403	437
PM Hour Factor	0.10	0.09	0.09	0.08	0.08	0.08	0.07	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.11	0.10	0.10	0.11	0.10	0.10
PM Peak 85%	81	80	79	82	78	78	84	82	82	82	79	79	86	79	79	94	80	81	85	80	79
PM Peak Time	15:00	16:00	13:00	13:00	17:00	9:00	12:00	14:00	15:00	14:00	16:00	15:00	15:00	14:00	15:00	14:00	13:00	13:00	15:00	14:00	12:00





Classification	Monday, 16 Mar 2020			Tuesday, 17 Mar 2020			Wednesday, 18 Mar 2020			Thursday, 12 Mar 2020			Friday, 13 Mar 2020			Saturday, 14 Mar 2020			Sunday, 15 Mar 2020		
	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional	Eastbound	Westbound	Bidirectional
Class 1 Car	458	5274	5732	488	5235	5723	406	4915	5321	473	5744	6217	457	5995	6452	337	4598	4935	307	3850	4157
Class 2 Car+Trailer	27	153	180	17	152	169	12	128	140	20	152	172	21	165	186	17	153	170	20	142	162
Class 3 2 axle Truck	108	264	372	92	269	361	81	499	580	79	291	370	78	269	347	56	102	158	45	89	134
Class 4 3 axle Truck	13	82	95	18	75	93	16	87	103	26	86	112	20	71	91	4	9	13	1	8	9
Class 5 4 axle Truck	6	36	42	9	39	48	14	27	41	13	33	46	15	32	47	2	6	8	0	8	8
Class 6 3 axle Semi	4	7	11	3	5	8	3	8	11	4	2	6	5	3	8	1	5	6	3	4	7
Class 7 4 axle Semi	8	10	18	5	9	14	6	20	26	9	12	21	8	8	16	5	4	9	5	2	7
Class 8 5 axle Semi	5	10	15	3	11	14	5	16	21	5	13	18	3	13	16	1	5	6	1	1	2
Class 9 6 axle Semi	20	110	130	38	102	140	39	103	142	49	108	157	34	95	129	23	42	65	21	29	50
Class 10 7/8 axle Truck	53	96	149	61	76	137	50	77	127	67	86	153	47	70	117	7	16	23	19	17	36
Class 11 B-Double	0	0	0	7	1	8	3	2	5	11	1	12	5	2	7	1	0	1	1	0	1
Class 12 Road Train	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Class 13 Unknown	3	0	3	1	0	1	6	1	7	1	0	1	2	0	2	0	0	0	2	0	2

Volume Summary

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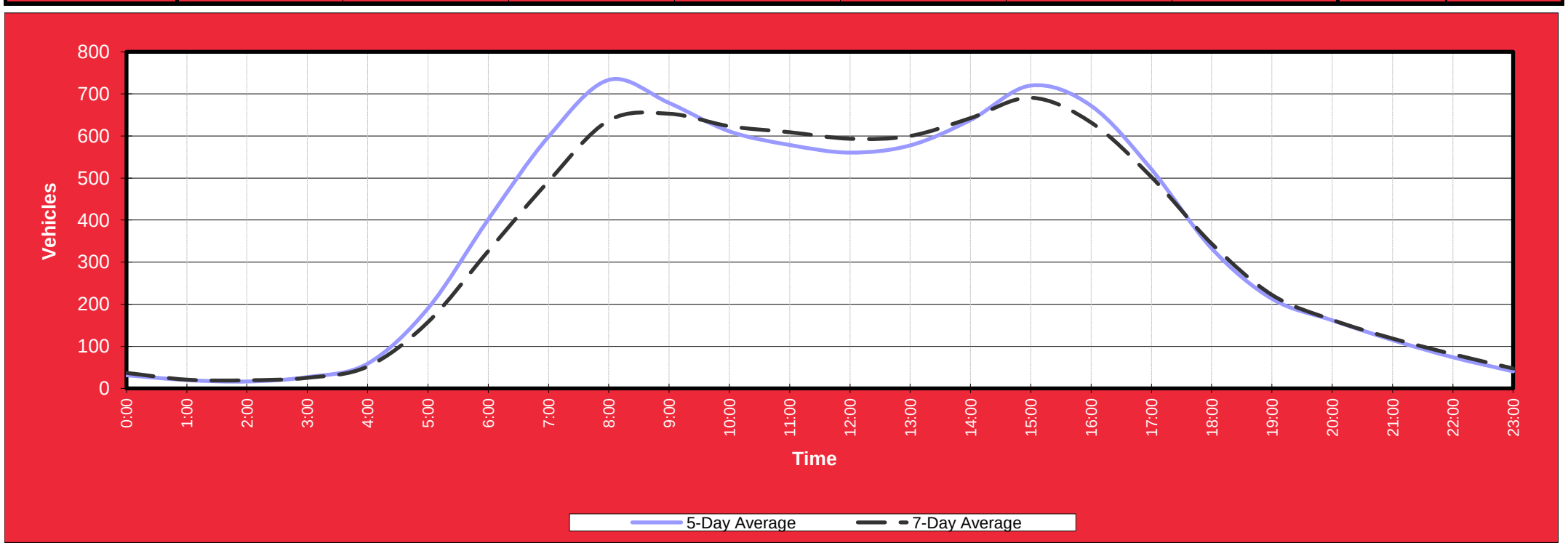
Street	Site 4, Tweed Valley Way				
Suburb	Chinderah			**5-Day Average**	8,569
Location	Site 4, Tweed Valley Way			**7-Day Average**	8,289
Count No.	4			**5-Day Heavy (Classes 3 to 12)**	20.9%
Start Date	Wednesday	04 Mar 2020	**Speed Limit** 60 km/h	**7-Day Heavy (Classes 3 to 12)**	19.1%
Direction	Northbound				

Hour Starting	Day of Week - Classes 1 to 12							5-Day Average	7-Day Average
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	09/03/2020	10/03/2020	04/03/2020	05/03/2020	06/03/2020	07/03/2020	08/03/2020		
AM Peak	769	731	721	792	709	707	662		
PM Peak	647	680	744	778	750	642	730		
0:00	27	37	31	33	28	43	59	31	37
1:00	24	16	20	21	18	25	21	20	21
2:00	19	19	14	16	14	31	22	16	19
3:00	18	23	35	35	23	28	14	27	25
4:00	52	46	72	65	59	38	32	59	52
5:00	186	202	201	174	187	88	64	190	157
6:00	396	373	431	431	376	156	121	401	326
7:00	578	591	644	604	574	280	174	598	492
8:00	769	731	674	792	700	440	351	733	637
9:00	635	635	721	692	709	658	520	678	653
10:00	635	548	627	604	641	693	614	611	623
11:00	559	528	602	595	609	707	662	579	609
12:00	499	577	524	578	624	631	721	560	593
13:00	559	510	599	595	625	642	670	578	600
14:00	617	536	664	654	718	578	730	638	642
15:00	647	680	744	778	750	584	653	720	691
16:00	584	676	672	745	682	503	562	672	632
17:00	435	469	488	614	599	453	460	521	503
18:00	255	303	308	352	446	388	356	333	344
19:00	171	169	198	245	282	217	274	213	222
20:00	130	164	155	165	195	148	183	162	163
21:00	101	93	127	108	145	142	114	115	119
22:00	73	67	54	86	90	125	74	74	81
23:00	40	28	33	46	55	83	47	40	47
Total	**8,009**	**8,021**	**8,638**	**9,028**	**9,149**	**7,681**	**7,498**	**8,569**	**8,289**
Heavy %	22.2%	22.3%	20.7%	20.5%	19.1%	14.2%	14.0%	20.9%	19.1%



Hourly Classification Data

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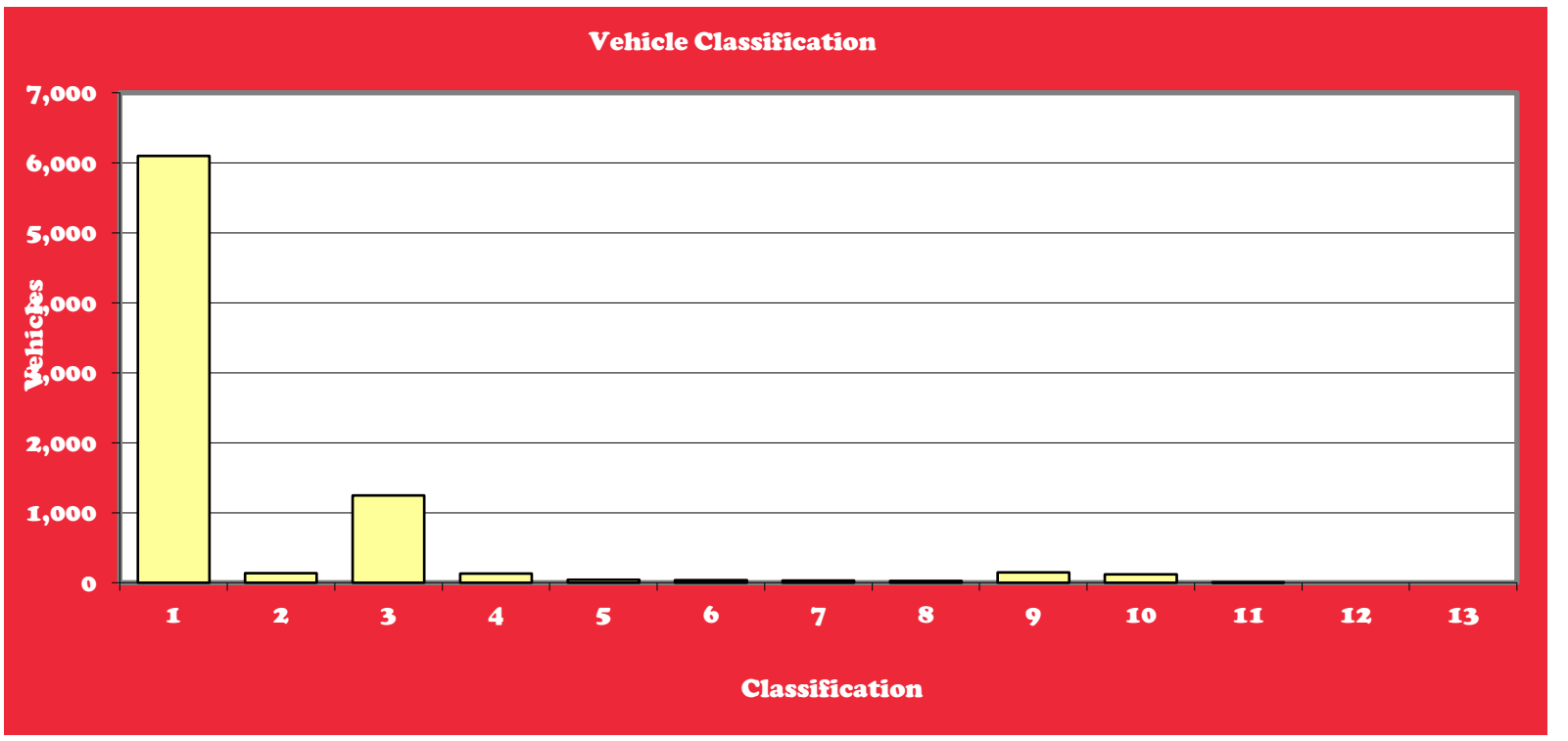
Street	Site 4, Tweed Valley Way		**AADT**	8,009	
Suburb	Chinderah		**Average Speed**	87.5	
Location	Site 4, Tweed Valley Way		**85th Percentile**	103	
Direction	Northbound		**Heavy Percentage**	22.2%	
Day	Monday	**Count No.** 4	**AM Peak**	8:00	769 vph
Date	09 Mar 2020	**Speed Limit** 60 km/h	**PM Peak**	15:00	647 vph
Start Date	Wednesday 04 Mar 2020				

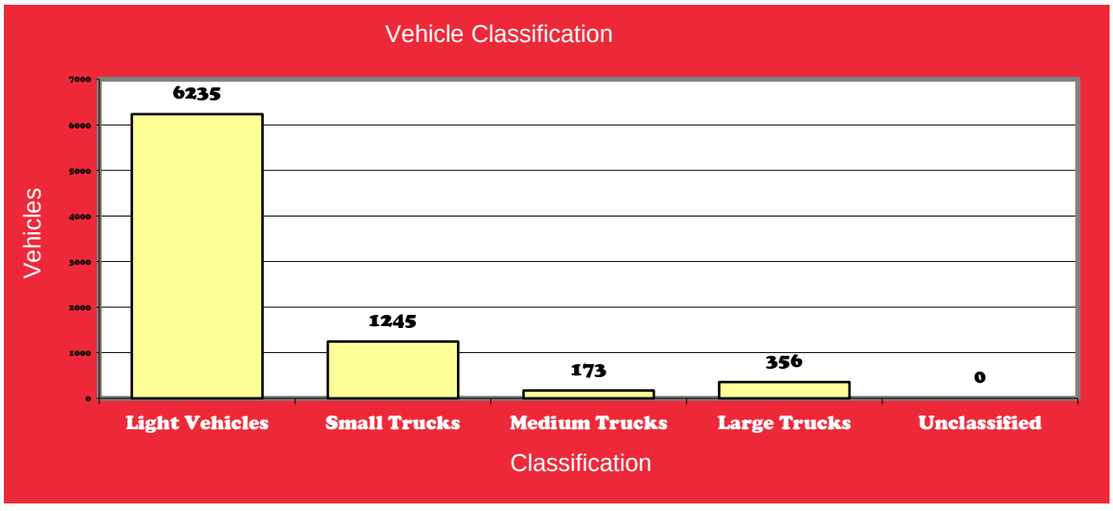
Hour Starting	Vehicle Classification														Speed	
	1	2	3	4	5	6	7	8	9	10	11	12	13	Total	Average	85%ile
0:00	15	0	4	0	0	0	0	1	6	1	0	0	0	27	90.7	108
1:00	15	1	5	0	0	0	0	0	0	3	0	0	0	24	83.0	112
2:00	8	0	2	0	0	0	0	0	4	5	0	0	0	19	88.6	127
3:00	11	0	5	0	0	0	0	0	1	1	0	0	0	18	94.0	119
4:00	27	1	16	1	1	0	0	0	3	3	0	0	0	52	92.3	114
5:00	125	4	39	4	5	1	0	0	2	6	0	0	0	186	94.4	110
6:00	282	6	77	3	6	2	2	2	9	7	0	0	0	396	92.5	110
7:00	435	8	95	10	4	1	3	3	11	8	0	0	0	578	88.2	104
8:00	612	5	109	21	5	5	1	1	8	2	0	0	0	769	87.2	101
9:00	506	6	79	20	1	3	1	2	12	5	0	0	0	635	87.5	102
10:00	469	14	102	24	0	3	3	1	9	10	0	0	0	635	84.9	100
11:00	391	21	100	11	4	6	3	1	14	8	0	0	0	559	84.6	98
12:00	368	19	85	6	2	3	3	1	6	6	0	0	0	499	85.9	103
13:00	409	16	97	12	2	3	4	1	9	6	0	0	0	559	84.4	98
14:00	466	14	100	7	6	1	3	2	8	9	1	0	0	617	87.9	103
15:00	497	9	116	6	1	0	2	0	11	5	0	0	0	647	89.9	104
16:00	484	2	79	3	2	4	0	2	6	2	0	0	0	584	89.1	102
17:00	365	5	51	2	0	1	1	0	7	3	0	0	0	435	88.5	105
18:00	213	1	36	1	0	1	0	1	1	1	0	0	0	255	87.8	101
19:00	144	0	15	0	0	0	0	1	4	7	0	0	0	171	86.2	100
20:00	107	3	9	0	0	0	1	2	5	3	0	0	0	130	84.4	103
21:00	72	0	16	1	1	1	0	1	2	7	0	0	0	101	87.4	106
22:00	50	1	6	1	0	1	1	1	7	5	0	0	0	73	83.9	106
23:00	28	0	2	0	0	0	1	0	4	5	0	0	0	40	86.0	120
Total	6,099	136	1,245	133	40	36	29	23	149	118	1	0	0	8,009	87.5	103
Class %	76	2	16	2	0	0	0	0	2	1	0	0	0			



Class Data Summary

Street	Site 4, Tweed Valley Way		**Light Vehicles**	77.8%
Location	Chinderah		**Small Trucks**	15.5%
Count No.	Site 4, Tweed Valley Way		**Medium Trucks**	2.2%
Direction	Northbound		**Large Trucks**	4.4%
Day	Monday		**Unclassified**	0.0%
Start Date	Wednesday	**AM Peak**	8:00	769 vph
Date	09 Mar 2020	**PM Peak**	15:00	647 vph

Hour Starting	Vehicle Classification					
	Light Vehicles	Small Trucks	Medium Trucks	Large Trucks	Unclassified	Total
0:00	15	4	0	8	0	27
1:00	16	5	0	3	0	24
2:00	8	2	0	9	0	19
3:00	11	5	0	2	0	18
4:00	28	16	2	6	0	52
5:00	129	39	9	9	0	186
6:00	288	77	9	22	0	396
7:00	443	95	14	26	0	578
8:00	617	109	26	17	0	769
9:00	512	79	21	23	0	635
10:00	483	102	24	26	0	635
11:00	412	100	15	32	0	559
12:00	387	85	8	19	0	499
13:00	425	97	14	23	0	559
14:00	480	100	13	24	0	617
15:00	506	116	7	18	0	647
16:00	486	79	5	14	0	584
17:00	370	51	2	12	0	435
18:00	214	36	1	4	0	255
19:00	144	15	0	12	0	171
20:00	110	9	0	11	0	130
21:00	72	16	2	11	0	101
22:00	51	6	1	15	0	73
23:00	28	2	0	10	0	40
Total	**6235**	**1245**	**173**	**356**	**0**	**8009**



Light Vehicles – Classes 1 to 2

Small Trucks – Class 3

Medium Trucks – Classes 4 to 5

Large Trucks – Classes 6 to 12

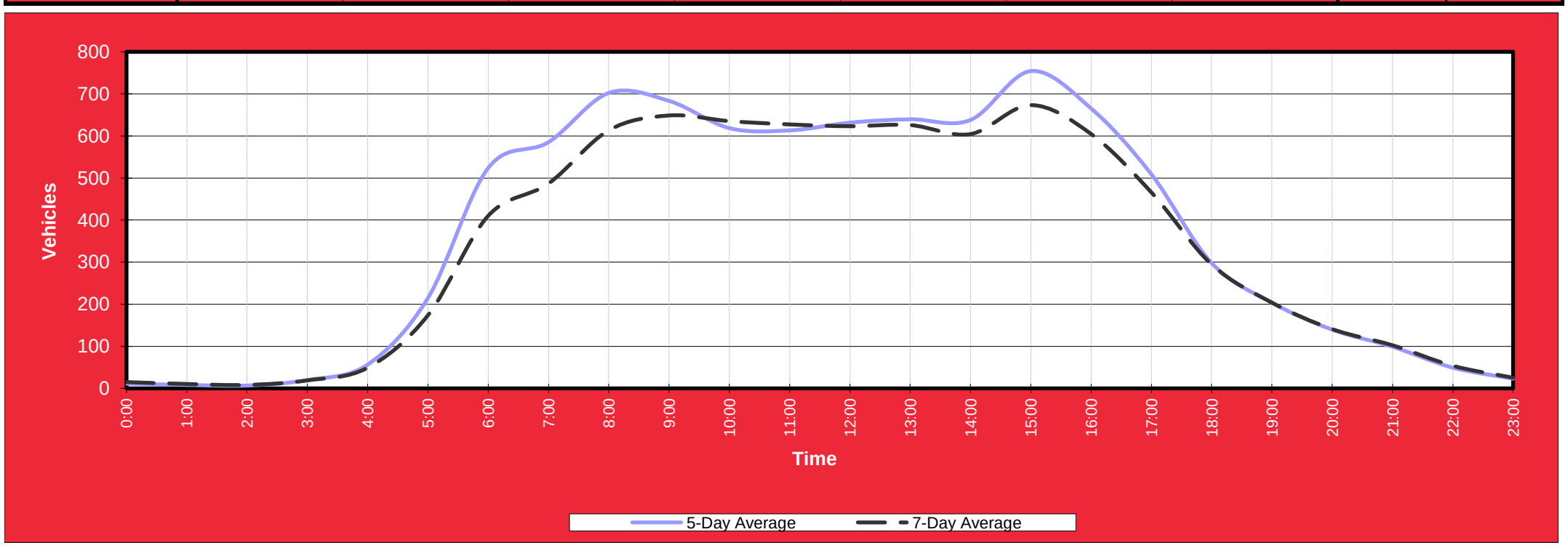
Unclassified – Class 13

Volume Summary

Research Analytics
Data Collection and Surveys
www.oneranda.com

Street	Site 5, Tweed vallay Way				
Suburb	Murwillubah			**5-Day Average**	8,694
Location	Site 5, Murwillubah, Tweed vallay Way			**7-Day Average**	8,115
Count No.	5			**5-Day Heavy (Classes 3 to 12)**	6.1%
Start Date	Wednesday	04 Mar 2020	**Speed Limit** 60 km/h	**7-Day Heavy (Classes 3 to 12)**	5.2%
Direction	Northbound				

Hour Starting	Day of Week - Classes 1 to 12							5-Day Average	7-Day Average
	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
	09/03/2020	10/03/2020	04/03/2020	05/03/2020	06/03/2020	07/03/2020	08/03/2020		
AM Peak	707	703	719	754	676	707	666		
PM Peak	711	693	783	823	761	611	617		
0:00	10	7	15	13	12	22	26	11	15
1:00	6	9	9	6	11	18	14	8	10
2:00	6	4	6	8	10	15	9	7	8
3:00	19	13	24	21	22	24	10	20	19
4:00	56	47	56	68	55	27	35	56	49
5:00	205	220	223	222	203	94	49	215	174
6:00	486	499	576	587	471	157	95	524	410
7:00	573	576	607	611	559	284	198	585	487
8:00	707	703	692	754	655	426	357	702	613
9:00	647	680	719	695	676	625	499	683	649
10:00	630	572	620	632	639	688	666	619	635
11:00	557	617	658	597	637	707	619	613	627
12:00	641	611	652	618	636	611	593	632	623
13:00	578	601	669	663	687	566	617	640	626
14:00	549	595	696	660	690	487	554	638	604
15:00	711	693	783	823	761	445	497	754	673
16:00	600	642	661	753	671	441	465	665	605
17:00	454	502	493	566	530	386	330	509	466
18:00	213	290	300	344	343	308	264	298	295
19:00	154	181	214	235	234	193	216	204	204
20:00	107	130	150	160	151	168	120	140	141
21:00	55	100	117	89	134	143	79	99	102
22:00	39	38	38	48	83	92	38	49	54
23:00	24	19	17	10	45	48	14	23	25
Total	**8,027**	**8,349**	**8,995**	**9,183**	**8,915**	**6,975**	**6,364**	**8,694**	**8,115**
Heavy %	6.0%	6.0%	6.1%	6.5%	5.7%	3.0%	2.2%	6.1%	5.2%

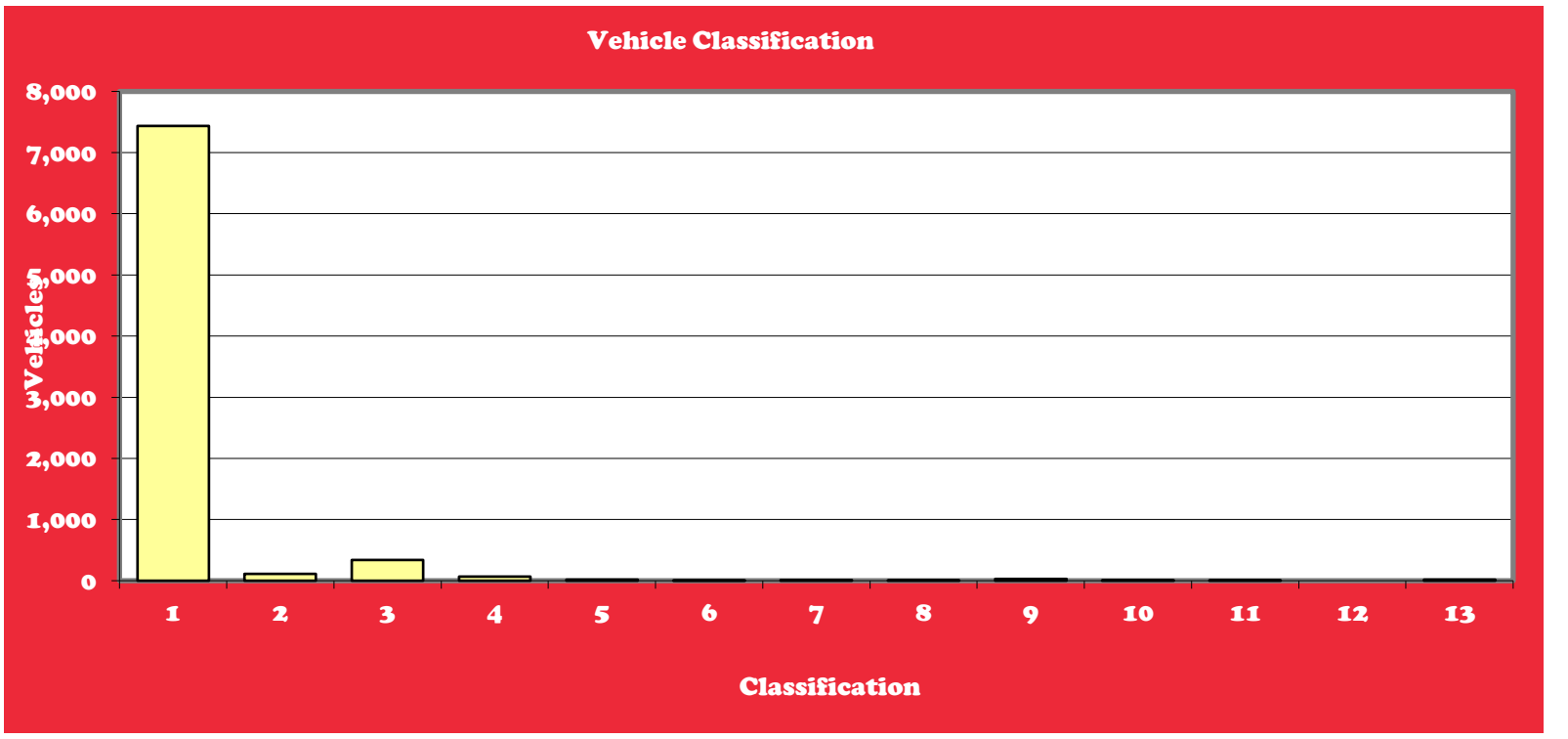


Hourly Classification Data

Research Analytics
Data Collection and Surveys

Street	Site 5, Tweed vallay Way			**AADT**	8,041
Suburb	Murwillubah			**Average Speed**	53.5
Location	Site 5, Murwillubah, Tweed vallay Way			**85th Percentile**	62
Direction	Northbound			**Heavy Percentage**	5.9%
Day	Monday	**Count No.** 5		**AM Peak**	8:00 708 vph
Date	09 Mar 2020	**Speed Limit** 60 km/h		**PM Peak**	15:00 712 vph
Start Date	Wednesday 04 Mar 2020				

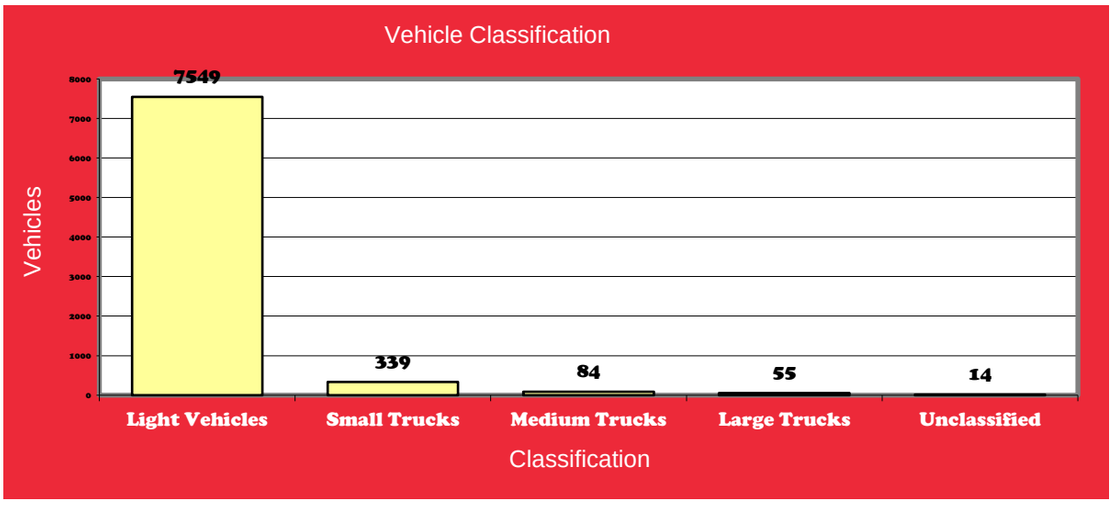
Hour Starting	Vehicle Classification														Speed	
	1	2	3	4	5	6	7	8	9	10	11	12	13	Total	Average	85%ile
0:00	8	0	1	0	0	0	0	0	1	0	0	0	0	10	57.0	0
1:00	5	0	0	0	0	0	0	0	1	0	0	0	0	6	49.0	0
2:00	4	0	2	0	0	0	0	0	0	0	0	0	0	6	66.1	0
3:00	19	0	0	0	0	0	0	0	0	0	0	0	0	19	64.9	82
4:00	51	1	3	1	0	0	0	0	0	0	0	0	0	56	58.5	72
5:00	195	2	6	2	0	0	0	0	0	0	0	0	0	205	59.2	70
6:00	455	8	21	1	1	0	0	0	0	0	0	0	0	486	55.0	64
7:00	511	13	32	8	1	1	3	1	3	0	0	0	0	573	54.2	63
8:00	653	9	33	7	1	0	0	0	4	0	0	0	1	708	53.5	62
9:00	602	10	25	5	2	1	0	1	1	0	0	0	0	647	52.8	61
10:00	584	10	26	5	0	0	1	1	2	1	0	0	3	633	52.6	61
11:00	504	9	30	9	1	1	1	0	1	0	1	0	1	558	52.8	61
12:00	598	7	24	4	4	0	2	0	2	0	0	0	2	643	52.1	61
13:00	528	11	29	6	0	1	1	0	2	0	0	0	2	580	53.2	63
14:00	493	4	33	9	1	2	2	0	5	0	0	0	2	551	53.5	62
15:00	663	10	31	3	2	1	1	0	0	0	0	0	1	712	52.9	61
16:00	568	8	17	3	1	0	2	0	1	0	0	0	0	600	53.2	62
17:00	435	6	8	4	0	0	0	0	1	0	0	0	1	455	54.1	63
18:00	208	1	4	0	0	0	0	0	0	0	0	0	0	213	53.3	64
19:00	146	1	4	1	0	0	0	0	2	0	0	0	1	155	53.3	63
20:00	102	1	3	1	0	0	0	0	0	0	0	0	0	107	52.7	65
21:00	49	1	2	1	0	0	0	0	2	0	0	0	0	55	54.3	67
22:00	33	0	5	0	0	0	0	0	1	0	0	0	0	39	57.3	70
23:00	22	1	0	0	0	0	0	0	1	0	0	0	0	24	62.4	103
Total	7,436	113	339	70	14	7	13	3	30	1	1	0	14	8,041	53.5	62
Class %	92	1	4	1	0	0	0	0	0	0	0	0	0			



Class Data Summary

Street	Site 5, Tweed vallay Way			**Light Vehicles**	93.9%
Location	Murwillubah			**Small Trucks**	4.2%
Count No.	Site 5, Murwillubah, Tweed vallay Way			**Medium Trucks**	1.0%
Direction	Northbound			**Large Trucks**	0.7%
Day	Monday			**Unclassified**	0.2%
Start Date	Wednesday	**AM Peak**	8:00		708 vph
Date	09 Mar 2020	**PM Peak**	15:00		712 vph

Hour Starting	Vehicle Classification					
	Light Vehicles	Small Trucks	Medium Trucks	Large Trucks	Unclassified	Total
0:00	8	1	0	1	0	10
1:00	5	0	0	1	0	6
2:00	4	2	0	0	0	6
3:00	19	0	0	0	0	19
4:00	52	3	1	0	0	56
5:00	197	6	2	0	0	205
6:00	463	21	2	0	0	486
7:00	524	32	9	8	0	573
8:00	662	33	8	4	1	708
9:00	612	25	7	3	0	647
10:00	594	26	5	5	3	633
11:00	513	30	10	4	1	558
12:00	605	24	8	4	2	643
13:00	539	29	6	4	2	580
14:00	497	33	10	9	2	551
15:00	673	31	5	2	1	712
16:00	576	17	4	3	0	600
17:00	441	8	4	1	1	455
18:00	209	4	0	0	0	213
19:00	147	4	1	2	1	155
20:00	103	3	1	0	0	107
21:00	50	2	1	2	0	55
22:00	33	5	0	1	0	39
23:00	23	0	0	1	0	24
Total	**7549**	**339**	**84**	**55**	**14**	**8041**



Light Vehicles – Classes 1 to 2

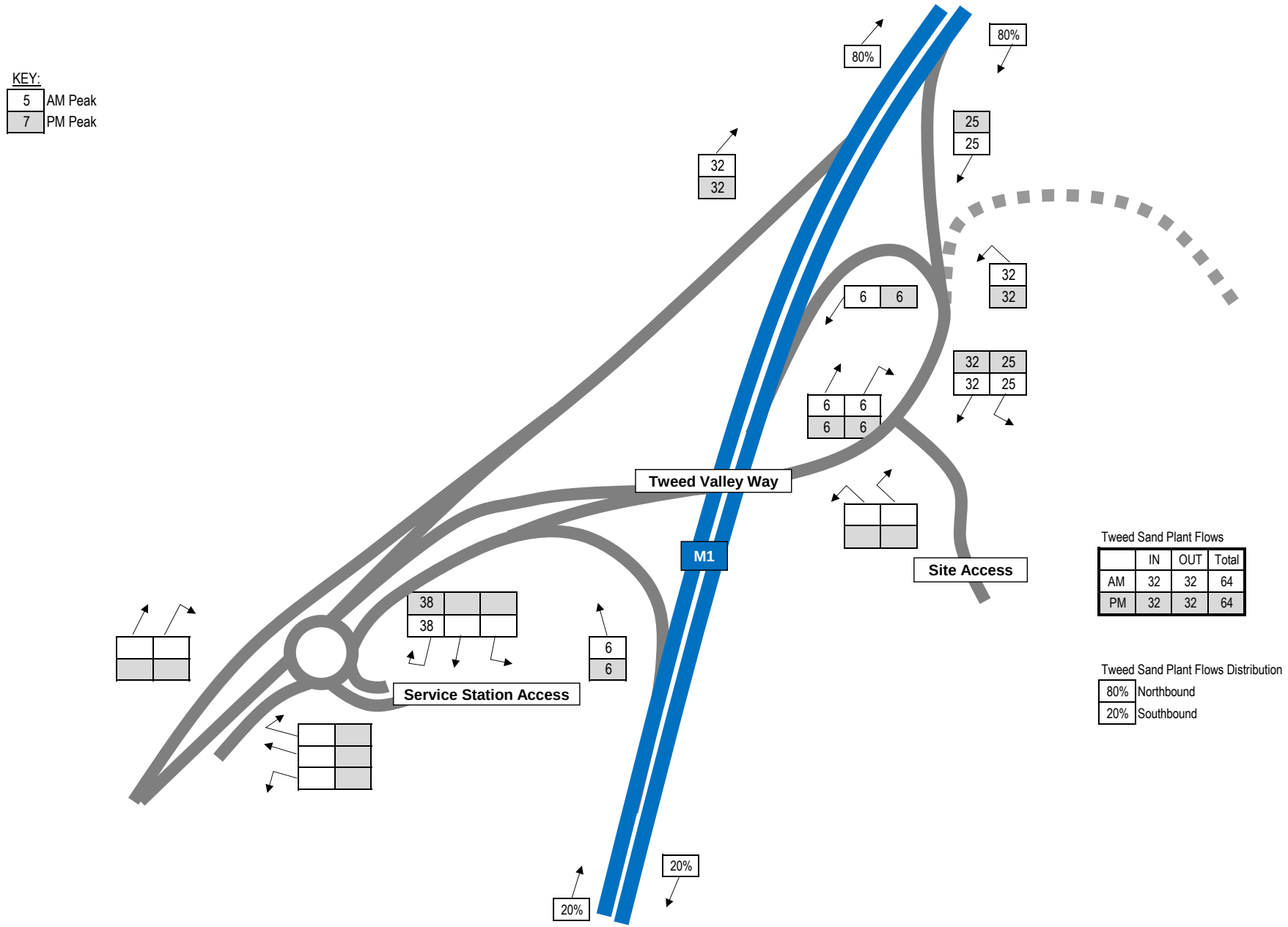
Small Trucks – Class 3

Medium Trucks – Classes 4 to 5

Large Trucks – Classes 6 to 12

Unclassified – Class 13

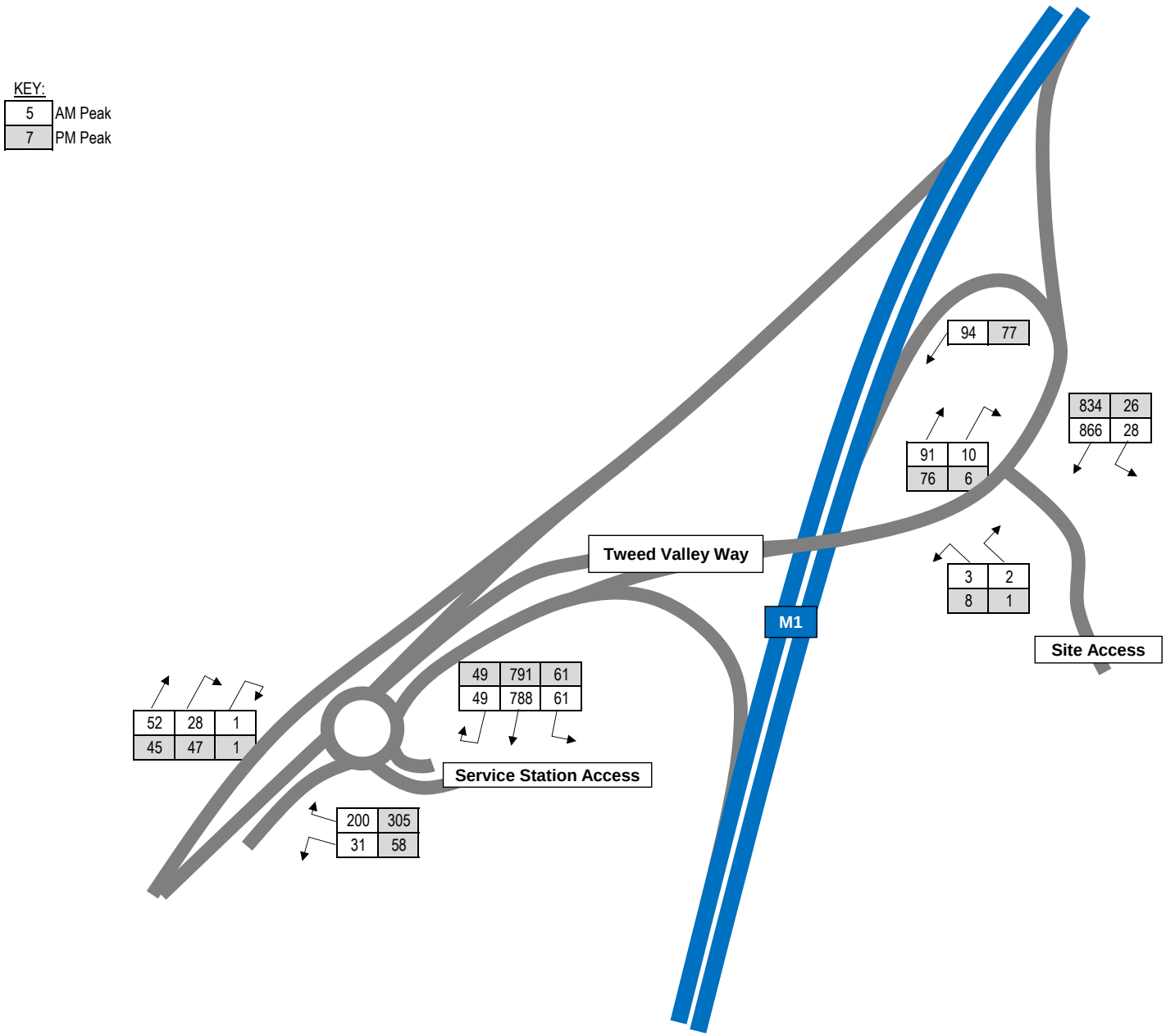
Appendix C – Trip Distribution Diagrams



BE190043_Tweed Sand Plant

Figure 11 - Tweed Sand Plan Traffic Flows (Sensitivity Testing)

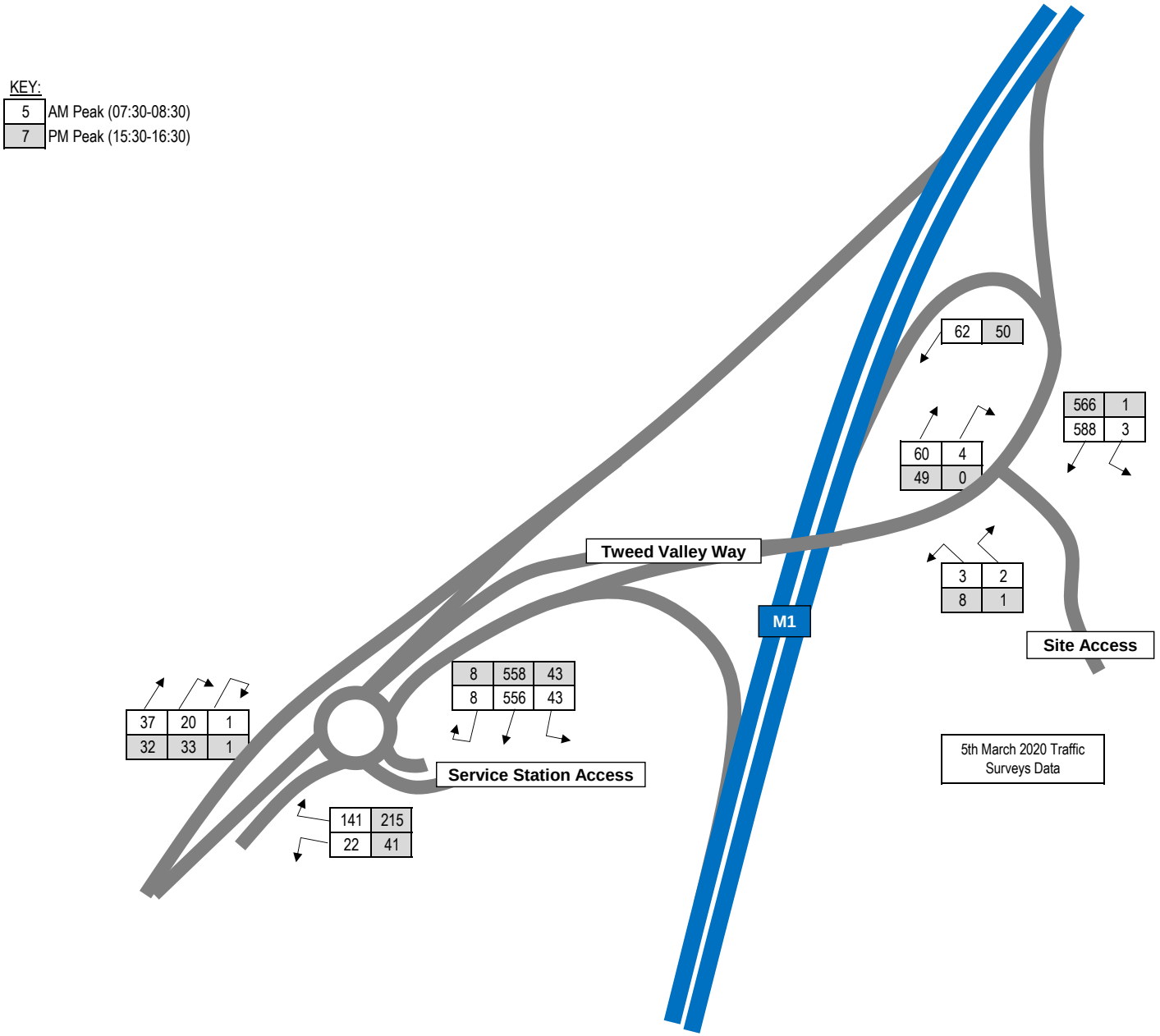
BURCHILLS ENGINEERING SOLUTIONS



BE190043_Tweed Sand Plant

Figure 12 - 2042 Base with Proposed Development Traffic Flows (Sensitivity Testing)

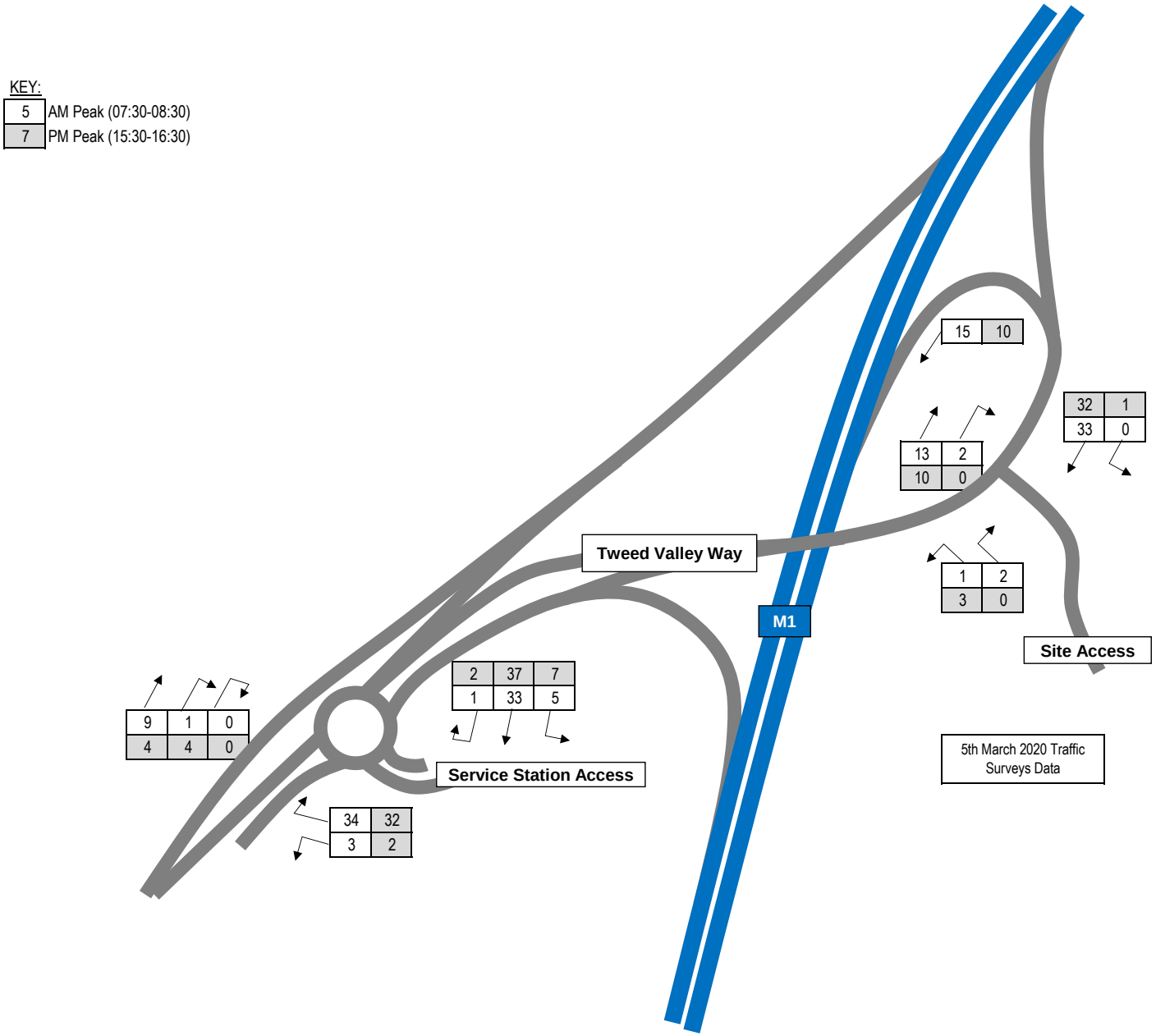
BURCHILLS ENGINEERING SOLUTIONS



BE190043_Tweed Sand Plant

Figure 1a - 2020 Traffic Survey AM and PM Peak Summary

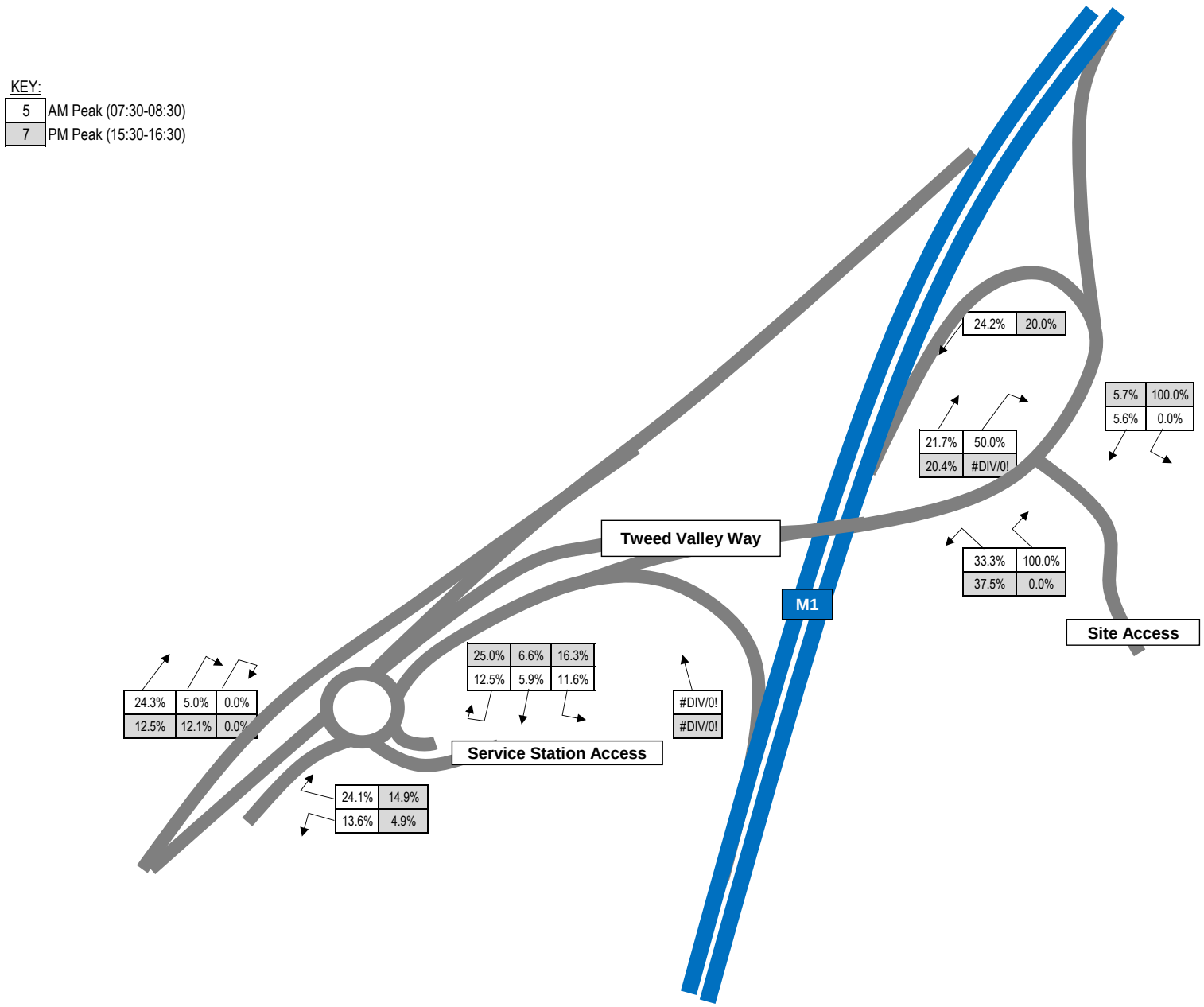
BURCHILLS ENGINEERING SOLUTIONS



BE190043_Tweed Sand Plant

Figure 1b - 2020 Traffic Survey AM and PM Peak Summary (Heavy Vehicles)

BURCHILLS ENGINEERING SOLUTIONS



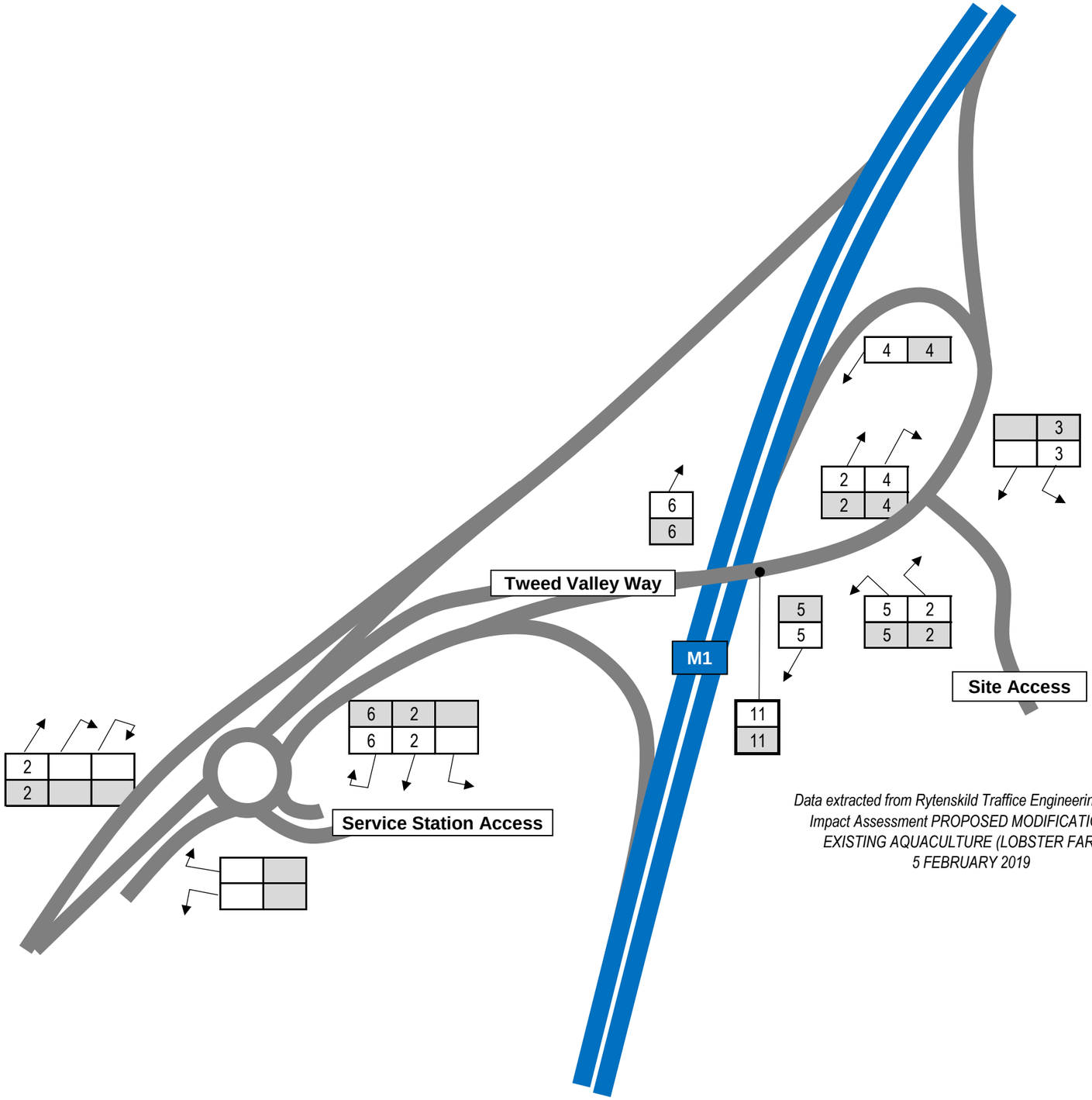
BE190043_Tweed Sand Plant

Figure 1c - 2020 Traffic Survey AM and PM Peak Summary (Heavy Vehicles %)

BURCHILLS ENGINEERING SOLUTIONS

KEY:

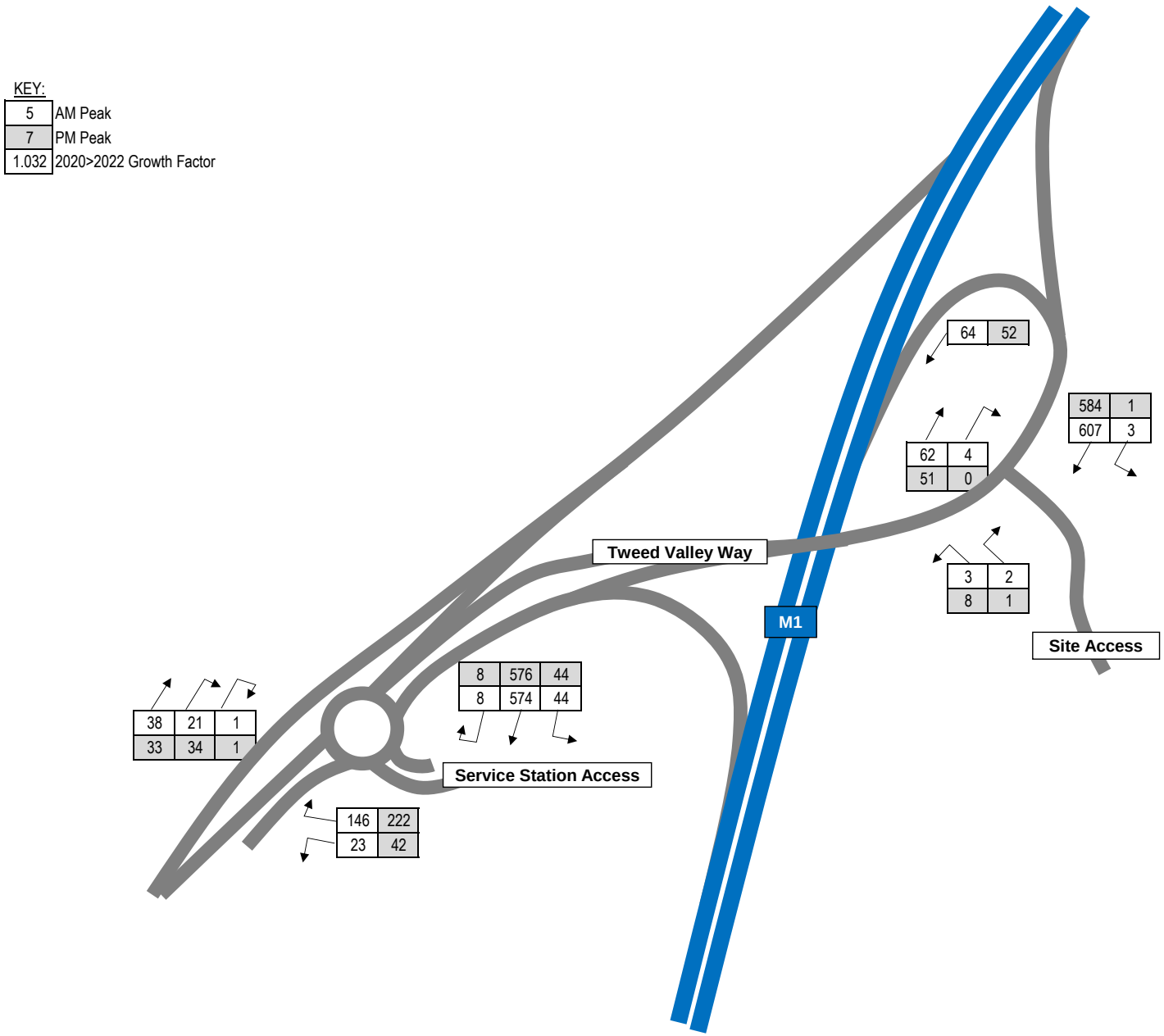
5	AM Peak
7	PM Peak



Data extracted from Rytenskild Traffice Engineering "Traffic Impact Assessment PROPOSED MODIFICATION OF EXISTING AQUACULTURE (LOBSTER FARM)", 5 FEBRUARY 2019

Figure 2 - Australian Bay Lobster Producers Limited (ABLP) Committed Development Traffic

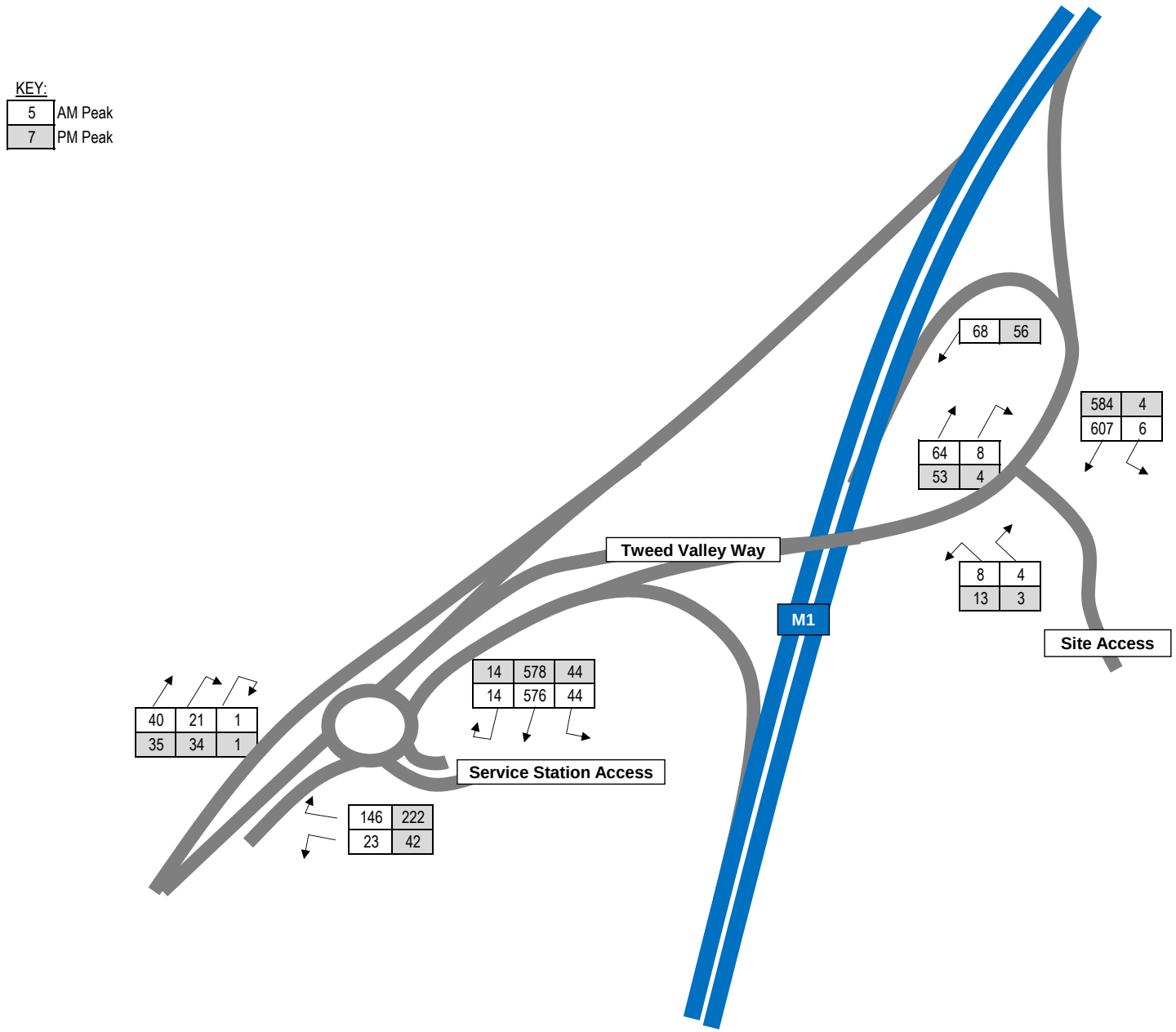
BURCHILLS ENGINEERING SOLUTIONS



BE190043_Tweed Sand Plant

Figure 3 - 2022 Base Traffic Flows

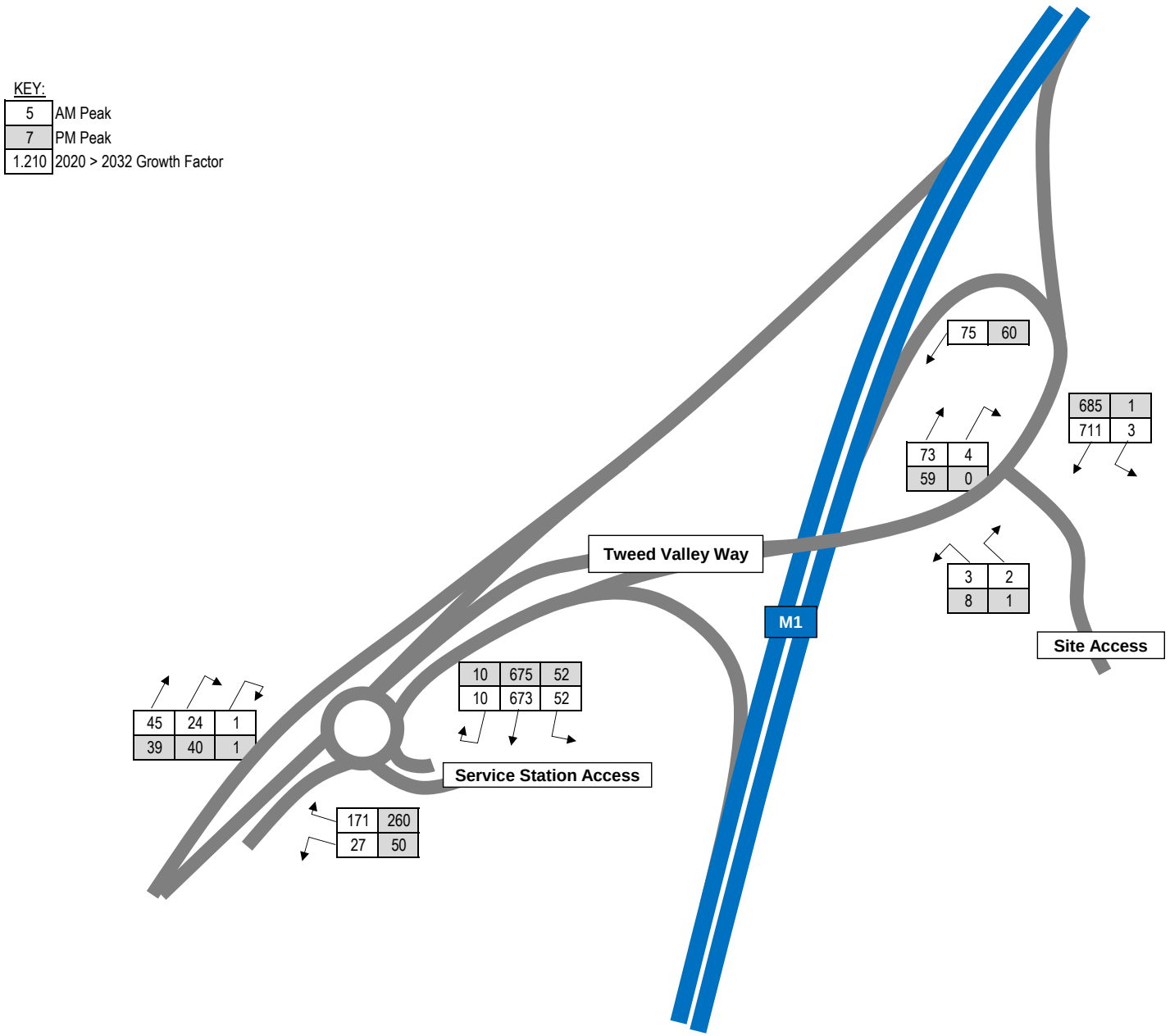
BURCHILLS ENGINEERING SOLUTIONS



BE190043_Tweed Sand Plant

Figure 4 - 2022 Base with Committed Traffic Flows

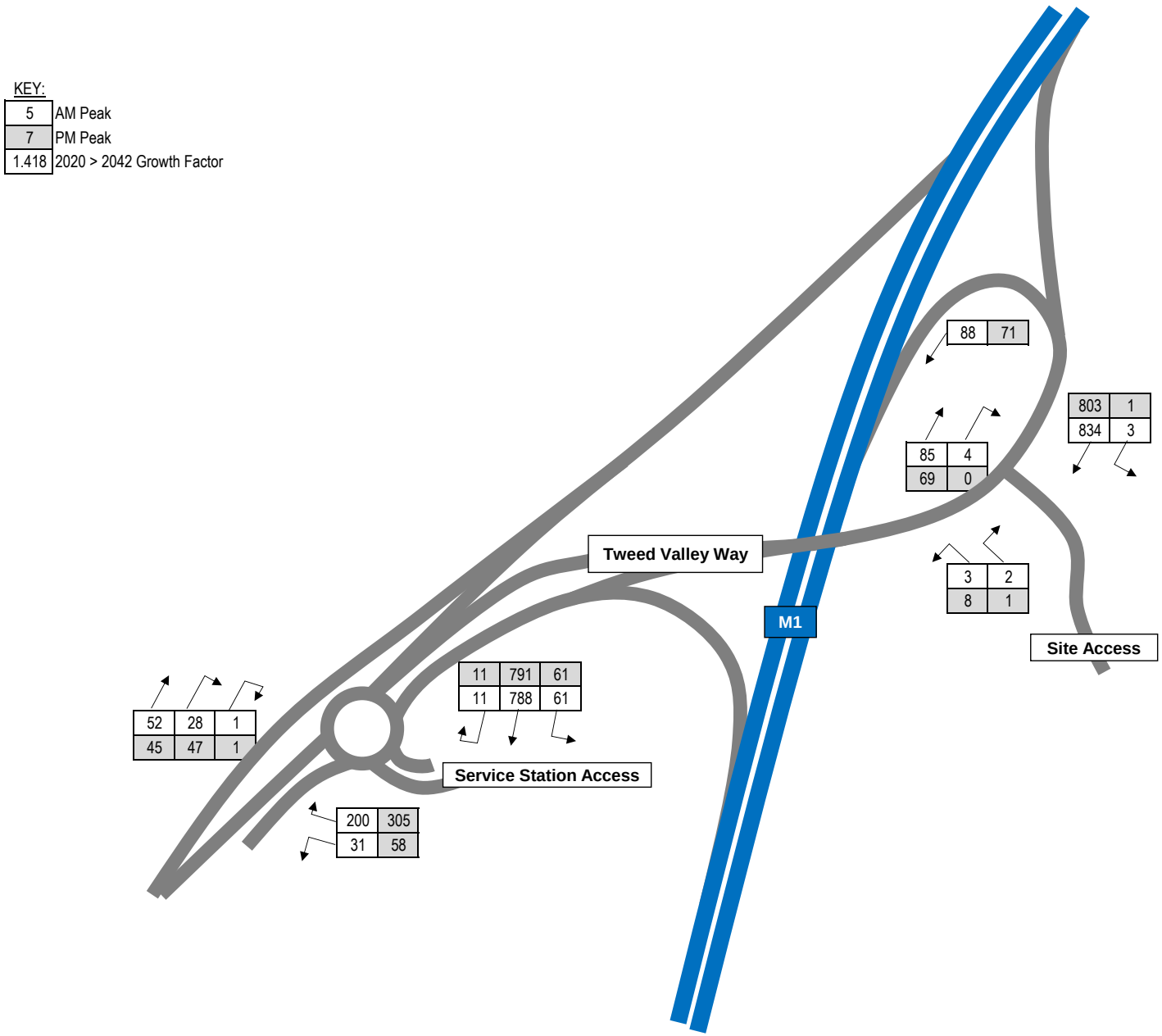
BURCHILLS ENGINEERING SOLUTIONS



BE190043_Tweed Sand Plant

Figure 5 - 2032 Base Traffic Flows

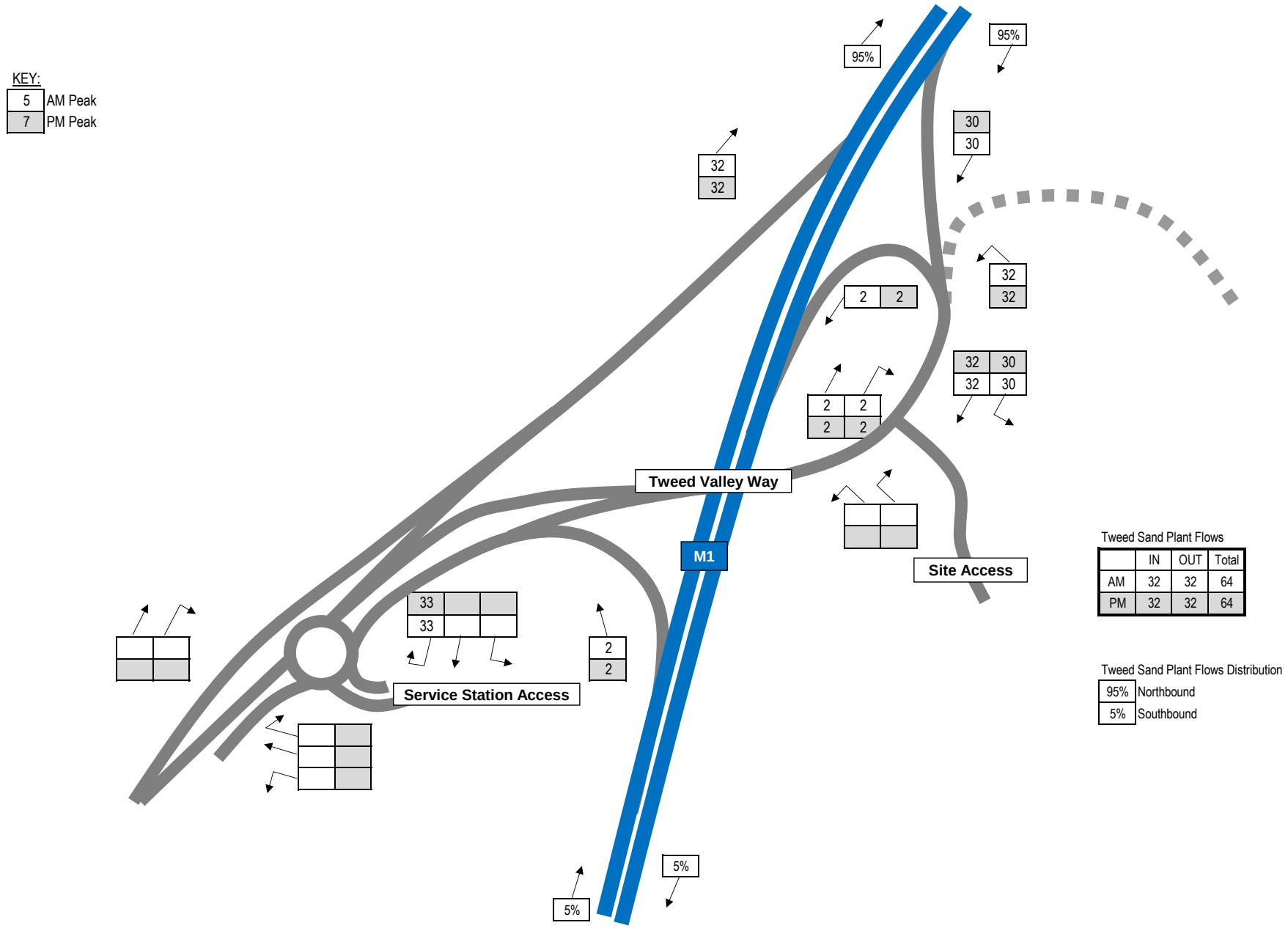
BURCHILLS ENGINEERING SOLUTIONS



BE190043_Tweed Sand Plant

Figure 6 - 2042 Base Traffic Flows

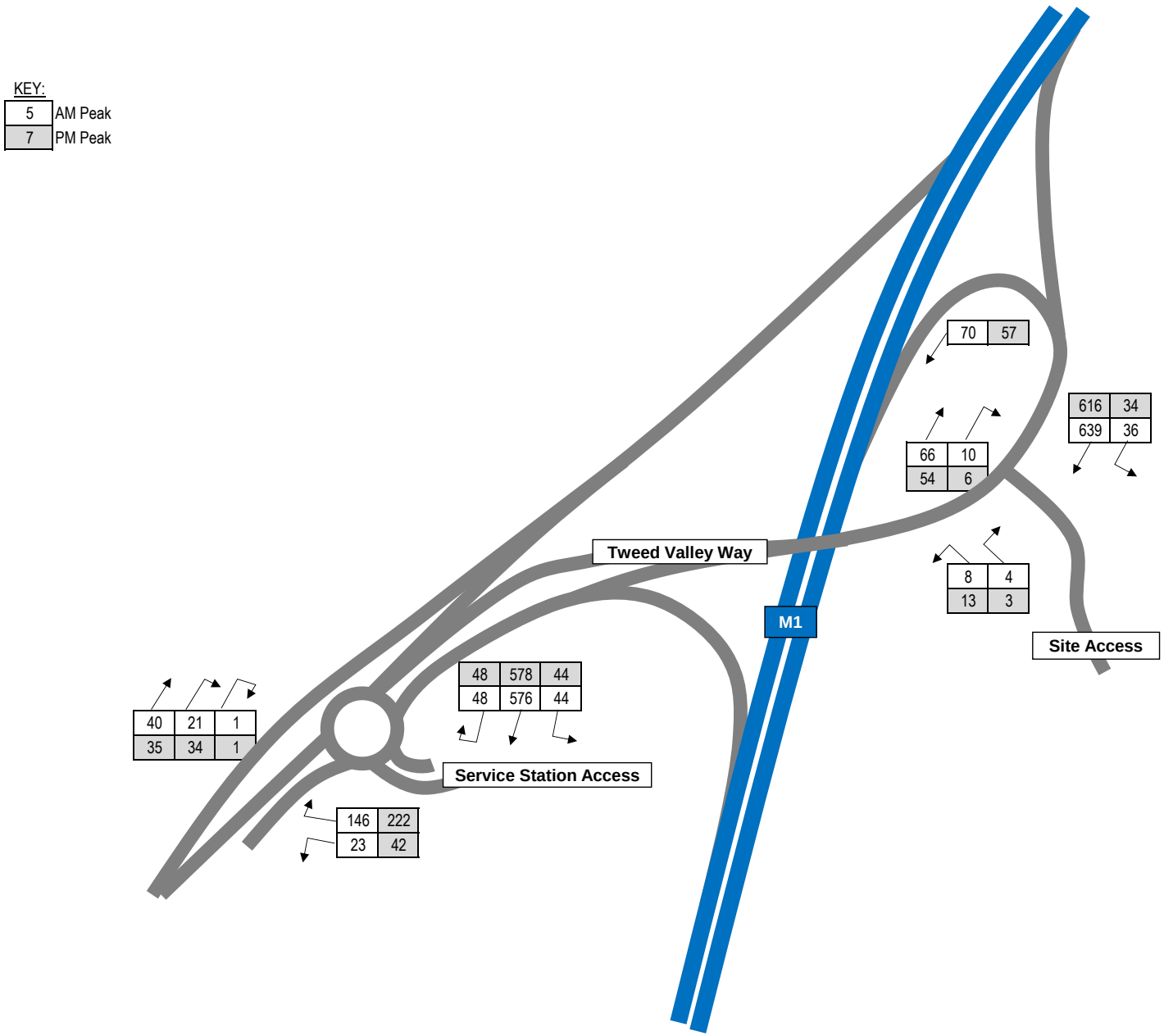
BURCHILLS ENGINEERING SOLUTIONS



BE190043_Tweed Sand Plant

Figure 7 - Tweed Sand Plan Development Traffic Flows

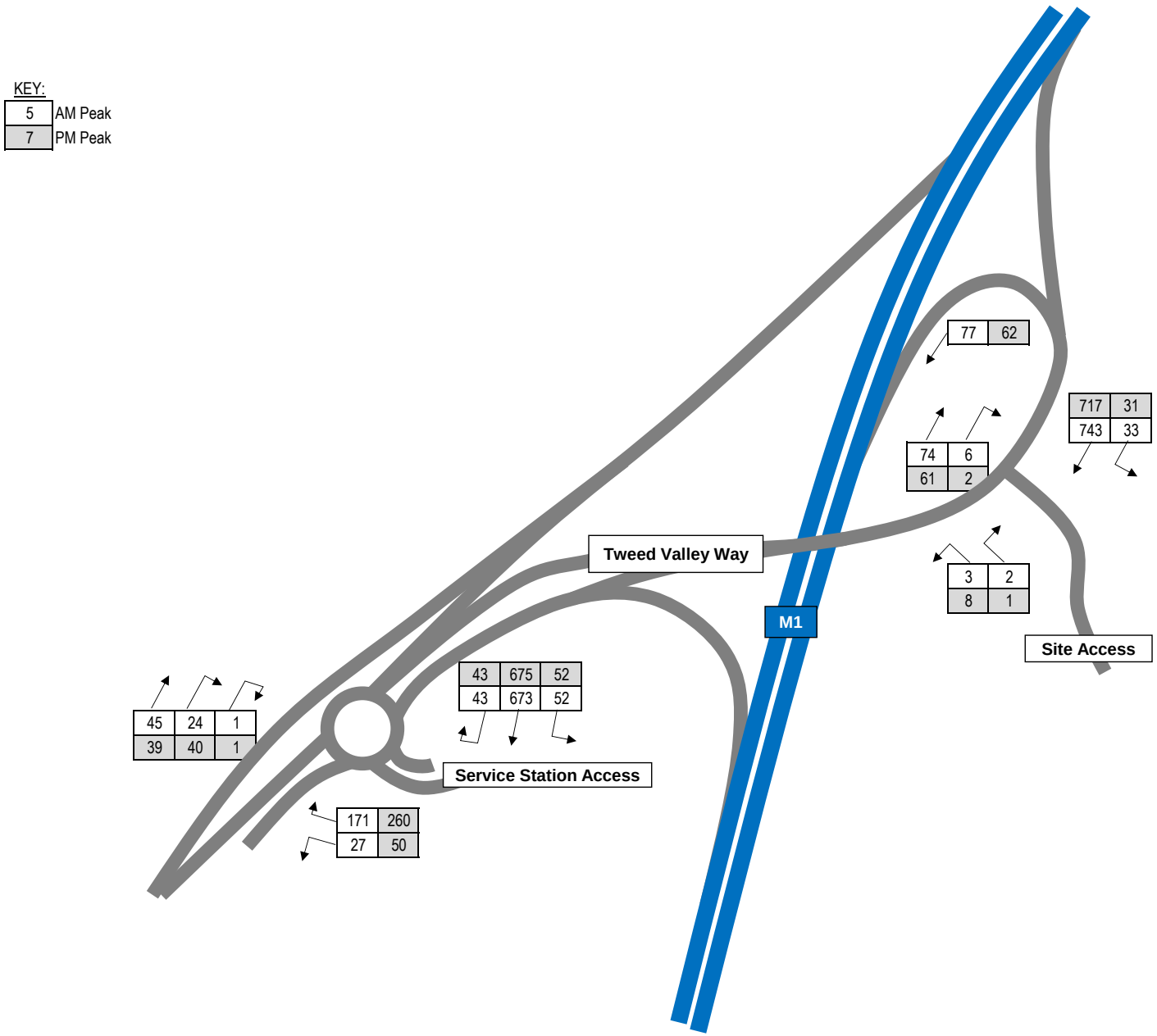
BURCHILLS ENGINEERING SOLUTIONS



BE190043_Tweed Sand Plant

Figure 8 - 2022 with Committed and Proposed Development Traffic Flows

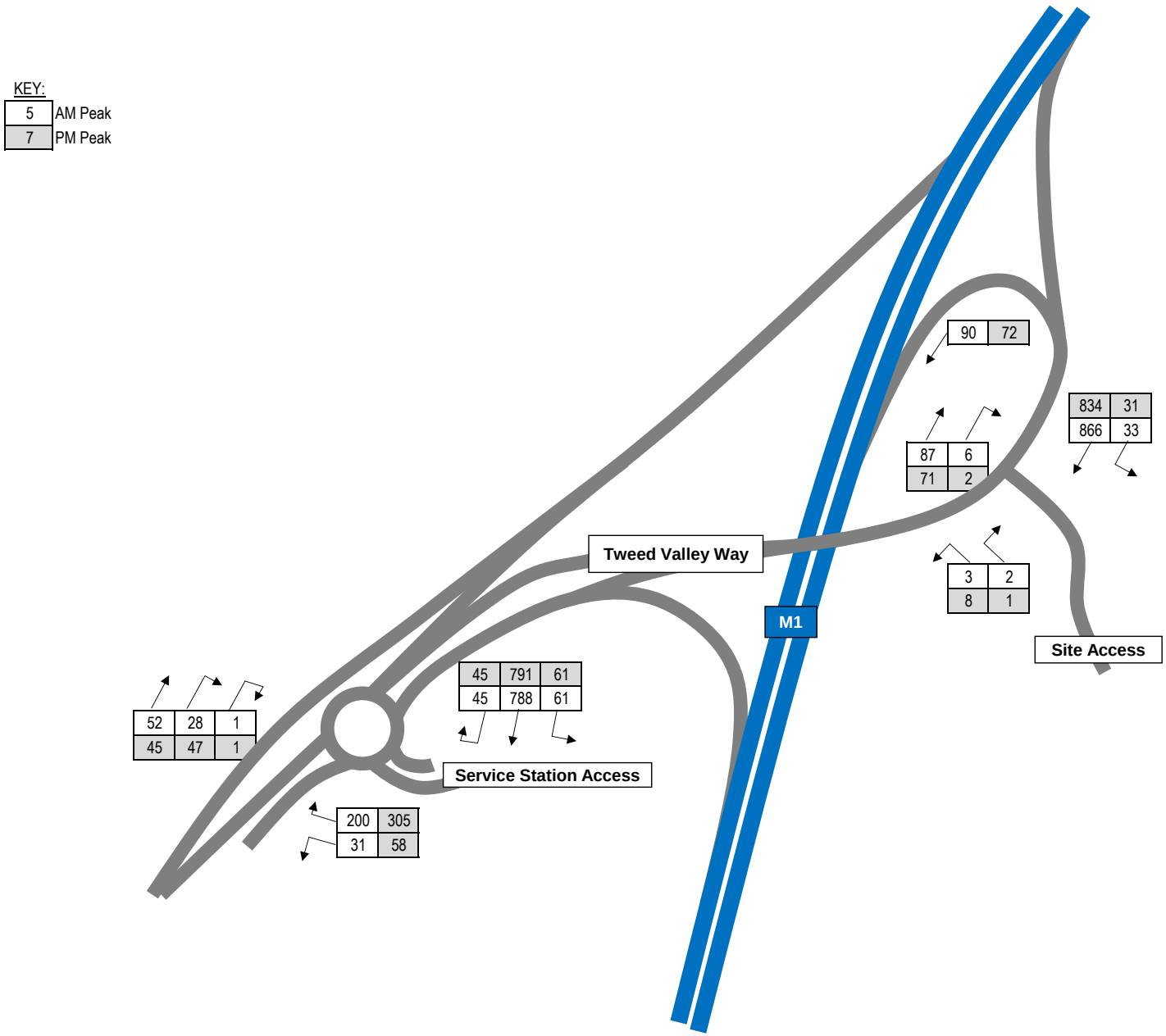
BURCHILLS ENGINEERING SOLUTIONS



BE190043_Tweed Sand Plant

Figure 9 - 2032 Base with Proposed Development Traffic Flows

BURCHILLS ENGINEERING SOLUTIONS



BE190043_Tweed Sand Plant

Figure 10 - 2042 Base with Proposed Development Traffic Flows

BURCHILLS ENGINEERING SOLUTIONS

Appendix D – MOD1 Operational Traffic Management Plan and Drivers Code of Conduct

TWEED SAND PLANT

MOD1 Operational Traffic Management Plan

Prepared for:

Hanson Construction Materials C/- Tweed Sand Plant
PO Box 2010
Kingscliff NSW 2487

SLR Ref: 620.12479-R02
Version No: v1.3
March 2019

PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Hanson Construction Materials C/- Tweed Sand Plant (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
620.12479-R02-v0.4	Draft for Road Authority Review	1 November 2018	Chris Lawlor (Associate – Transport Advisory)	Jeffrey Baczynski (Principal – Transport Advisory)	Jeffrey Baczynski (Principal – Transport Advisory)
620.12479-R02-v1.2	Final	20 November 2018	Chris Lawlor (Associate – Transport Advisory)	Jeffrey Baczynski (Principal – Transport Advisory)	Jeffrey Baczynski (Principal – Transport Advisory)
620.12479-R02-v1.3	Revised Final based on DPE Feedback	7 March 2019	Chris Lawlor (Associate – Transport Advisory)	Jeffrey Baczynski (Principal – Transport Advisory)	Jeffrey Baczynski (Principal – Transport Advisory)

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DOCUMENT REFERENCES

TABLES

FIGURES

APPENDICES

1 Operational Traffic Management Plan Context

1.1 Background

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Hanson Construction Materials Pty Ltd (Hanson) to prepare an Operational Traffic Management Plan (Operational TMP) for Hanson's Tweed Sand Plant (TSP) operation in Cudgen, NSW.

The Operational TMP is required to satisfy Schedule 3 (*Specific Environmental Conditions*), Condition 25 (*Transport Management Plan*) of the Notice of Modification for Development Consent DA 152-6-2005 issued by the New South Wales (NSW) Department of Planning and Environment (DPE) on 20 August 2018. The notice was issued following an application lodged by Hanson on 7 February 2017 to change the site's condition from an annual extraction limit of 150,000 m^3 to transporting no more than 500,000 tonnes of product (sand) from the site per financial year. This modification will potentially result in increased haulage from the site, and therefore an Operational TMP is required to manage the potential traffic impacts associated with this change.

The Notice of Modification constitutes a revision of the Notice of Modification conditions issued in July 2006 for Phases 3 and 4 of TSP and requires the preparation and update of various management plans to guide management of the site.

1.2 Operational TMP Requirements

This Operational TMP has been prepared to satisfy the requirements of Schedule 3, Condition 25 of the Notice of Modification and in turn minimise the impact of site traffic on the safety and efficiency of the road network.

The specific requirements of the condition to prepare an Operational TMP are reproduced in Table 1. In addition, Table 1 details which section of this Operational TMP addresses each of the individual components identified within Condition 25, in order to validate that all components of the condition are addressed by this Operational TMP.

Further to this, Schedule 5 (*Environmental Management, Reporting and Auditing*), Condition 2 (*Management Plan Requirements*) of the Notice of Modification stipulates further generic requirements in relation to the preparation of management plans. The requirements of this condition are reproduced in Table 2 along with references to the sections of the Operational TMP that address each individual component.

This document has been prepared under the supervision of Jeffrey Baczynski, whom DPE has approved as 'a suitably qualified and experienced person'. A copy of this approval is included at Appendix A.

It is noted that the Operational TMP is not intended to replace the need to prepare Construction Traffic Management Plans to support the road upgrade works imposed under various conditions within the Notice of Modification. The required Construction Traffic Management Plans will be prepared at the time the upgrade work designs are prepared, which is appropriate given that the upgrade works are not required until certain triggers are met, which may mean that the works do not commence for potentially several years depending on commercial conditions. Nevertheless, a high level overview of the mitigation strategies potentially implemented as part of future Construction Traffic Management Plans is detailed herein.

Table 1 Operational TMP Requirements: Schedule 3, Condition 25

Item	Condition Requirement	TMP Section
25	*The Applicant must prepare a Traffic Management Plan for the development to the satisfaction of the Secretary. This plan must:*	
(a)	*be prepared by suitably qualified and experienced person/s whose appointment has been endorsed by the Secretary;*	Section 1.2 Appendix A
(b)	*be prepared in consultation with RMS and Council, and in accordance with the RTA – Traffic Control at Worksites Manual;*	Section 2
(c)	*describe the processes in place for the management of truck movements entering and exiting the site;*	Section 4
(d)	*prohibit trucks departing the site from turning right from Crescent Street to Tweed Coast Road;*	Section 4.3
(e)	*include a Drivers' Code of Conduct that includes:* • *details of the safe and quiet driving practices that must be used by drivers travelling to and from the quarry;* • *a map of the primary haulage route;* • *safety initiatives for haulage through residential areas, school zones and along school bus routes;* • *an induction process for vehicle operators and regular toolbox meetings;* • *complaints resolution and disciplinary procedures; and* • *details of community consultation measures for peak haulage periods.*	Section 4 Appendix C
(f)	*describe the measures to be put in place to ensure compliance with the Drivers' Code of Conduct;*	Section 5 & 6
(g)	*include details of the measures to be implemented to minimise traffic safety issues and disruption to local road users during road upgrade works; and*	Section 4.5
(h)	*propose measures to minimise the transmission of dust and tracking of material onto the surface of public roads from vehicles leaving the quarry.*	Section 4.4.3
-	*The Applicant must not commence operations under Modification 1 until the Traffic Management Plan is approved by the Secretary.*	
	The Applicant must implement the approved Traffic Management Plan as approved from time to time by the Secretary.	

Table 2 Generic Management Plan Requirements: Schedule 5, Condition 2

Item	Requirement	TMP Section
2	*The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:*	
(a)	*a summary of relevant background or baseline data;*	Section 3.1
(b)	*a description of:* • *the relevant statutory requirements (including any relevant approval, licence or lease conditions);* • *any relevant limits or performance measures/criteria; and* • *the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;*	Section 1.2, 3.2 & 3.3
(c)	*a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;*	Section 4
(d)	*a program to monitor and report on the:* • *impacts and environmental performance of the development; and* • *effectiveness of any management measures (see (c) above);*	Section 6 & 7
(e)	*a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible.*	Section 6
(f)	*a program to investigate and implement ways to improve the environmental performance of the development over time;*	Section 7
(g)	*a protocol for managing and reporting any:* • *incidents;* • *complaints; and* • *non-compliances with statutory requirements;*	Section 5, 6, 7 & 8
(h)	*a protocol for periodic review of the plan; and*	Section 7
(i)	*a document control table that includes version numbers, dates when the management plan was prepared and reviewed, names and positions of the person/s who prepared and reviewed the management plan, a description of any revisions made and the date of the Secretary's approval.*	Document Control Table
	Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.	-

2 Road Authority Consultation

2.1 Consultation Requirements

Schedule 5, Condition 6 (*Evidence of Consultation*) of the Notice of Modification states the following with regard to consultation for management plans:

"Where the conditions of this consent require consultation with an identified party, the Applicant must:

(a) consult with the relevant party prior to submitting the subject document to the Secretary for approval; and

(b) provide details of the consultation undertaken, including:

- ***the outcome of that consultation, matters resolved and unresolved;***
- ***and details of any disagreement remaining between the party consulted and the Applicant and how the Applicant has addressed any unresolved matters."***

Schedule 3, Condition 25 of the Notice of Modification requires that the Operational TMP ***"be prepared in consultation with RMS and Council",*** and therefore the Road and Maritime Services (RMS) and Tweed Shire Council (TSC) were contacted by SLR.

2.2 TSC Consultation

2.2.1 Initial Consultation

A representative of TSC (Colleen Forbes – Team Leader Development Assessment) responded to a SLR/Hanson consultation request by email on 2 October 2018, stating:

"With reference to the Traffic Management Plan for the Tweed Sand Quarry, Council's Traffic Engineer has reviewed Schedule 3 Condition 25 and Schedule 5 Condition 2 of DA152-6-2005 MOD1. Please be advised that TSC considers that the information required appears to be sufficient in breadth and scope. Accordingly, no additional traffic considerations are requested by TSC.

Please also be advised that TSC would like to receive a copy of the draft Plan for review / feedback prior to its submission to the Department."

A copy of this response from TSC is included at Appendix B. SLR provided a draft of this Operational TMP to TSC for review prior to submission with DPE.

2.2.2 Review of Draft Operational TMP

A representative of TSC (Colleen Forbes – Team Leader Development Assessment) confirmed the following review of the Operational TMP:

"Council's Traffic Engineer has briefly reviewed the draft TMP. No concerns / objections are raised from Council's perspective."

A copy of this response from TSC is included at Appendix B.

2.3 RMS Consultation

2.3.1 Initial Consultation

A representative of the RMS (Greg Sciffer – Development Assessment Officer – Northern Region) provided comments in response to a SLR/Hanson consultation request during a phone conversation with Glyn Cowie (SLR) on 27 September 2018. RMS's verbal advice is summarised in Table 3, followed by a response to each comment as to how these have been incorporated into the drafting of the Operational TMP.

Table 3 RMS Initial Consultation Summary

RMS Advice	SLR Response
RMS identified that the term 'Traffic Management Plan' is a term that is typically used when referring to managing the traffic associated with road construction activities rather than operational activities, and hence RMS would prefer that the document is instead referred to as an 'Operational Traffic Management Plan' or similar.	SLR agrees with the RMS's assertion that a condition to prepare a 'Traffic Management Plan' in isolation of greater details of the required content could potentially be confused with a requirement to prepare a plan that relates to managing traffic associated with road construction activities. This confusion could also be potentially exacerbated by Schedule 3, Condition 25(b) of the Notice of Modification, which includes a generic requirement for the TMP to be prepared "*in accordance with the RTA – Traffic Control at Worksites Manual*". Due to this potential for confusion, SLR has previously advocated the use of alternative terms such as "*Road Use Management Plan"* to identify where a TMP relates to the management of operational activities. In this instance, the naming of this TMP is, however, largely semantics as Schedule 3, Condition 25 of the Notice of Modification specifically stipulates the requirements of the plan and clearly articulates that these requirements relate to the operational activities associated with the site itself and not remote road construction activities, hence the generic reference to the worksite manual for example is not overly confusing in this instance. In response to this specific input received from RMS, this document has been referred to as *Tweed Sand Plant: MOD 1 Operational Traffic Management Plan (Operational TMP)* to minimise the potential for confusion.

RMS Advice	SLR Response
RMS provided a copy of a sample Operational Traffic Management Plan that has recently been prepared for another extractive industry project. The sample document provides guidance as to the style of TMP that RMS would prefer is prepared for TSP.	SLR appreciates RMS seeking to assist by providing a sample Operational Traffic Management Plan prepared for another project. The content of the *Tweed Sand Plant Operational TMP* is however dictated by the requirements of Schedule 3, Condition 25 of the Notice of Modification. It would therefore not necessarily be appropriate to replicate the structure of a plan prepared for another facility that responds to a different set of conditions and circumstances. In drafting the *Tweed Sand Plant Operational TMP,* SLR has specifically sought to ensure that the structure of the reporting and the aspects considered herein directly respond to the conditioned requirements (i.e. to aid verification that the conditioned requirements have been fully addressed). As a result, SLR has not directly replicated the structure of the sample reporting provided by RMS.
RMS offered to review the TMP prior to formal lodgement of the draft to DPE.	SLR has provided a draft of this Operational TMP to RMS for review prior to submission with DPE.

2.3.2 Review of Draft Operational TMP

A representative of the RMS (Greg Sciffer – Development Assessment Officer – Northern Region) provided the comments detailed in Table 4 on the 6 November 2018 following review of the Draft Operational TMP. Table 4 also provides a response as to how this feedback has been incorporated into the drafting of the final Operational TMP.

Table 4 RMS Draft Operational TMP Summary

RMS Advice	SLR Response
The Drivers Code of Conduct should include: • Safety initiatives for haulage through residential areas, school zones and along school bus routes. • Regular toolbox meetings • Details of community consultation measures for peak haulage periods	During the current and historic planning application process the minimisation of impacts on residential areas and school zones has been considered and hence the adopted safety initiative was that the defined haulage route would exclude access through Cudgen Village except for local deliveries for example. Additional commentary has been added to Section 4.3 (Haulage Route) to reflect this safety initiative in response to the feedback provided. In relation to toolbox meetings no trucks are based at TSP so it is not possible to hold toolbox meetings involving drivers. TSP does however hold regular toolbox meetings, but the only attendees are site personnel. No change has been made in relation to community consultation measures as this is already considered to be sufficiently dealt with within Section 8.1 that details the Community Consultative Committee arrangements for the site.
Details of measures to be implemented to minimise traffic safety issues and disruption to local road users during road upgrade works.	The Operational TMP is not intended to replace the future need to prepare Construction Traffic Management Plans associated with any external road works delivered by Hanson. In response to the feedback provided by RMS this limitation of the Operational TMP has been clarified by additional commentary being added to Section 1.2. It is however premature to include the Construction Traffic Management Plan considerations within this Operational TMP as the design of the upgrade works to which the Construction Traffic Management Plans relate have not been prepared and are not required to be prepared until certain output thresholds are met as detailed in Section 3.2. It is not possible for example to prepare Traffic Control Plans (TCPs) that are a component of the Construction Traffic Management Plans in the absence of at least conceptual design drawings. This approach is appropriate in this instance as the external works are not required to be completed prior to commencement of use, but rather once certain output thresholds are exceeded, which may not occur for several years depending on commercial conditions. Nevertheless, a high level overview of the mitigation strategies potentially implemented as part of future Construction Traffic Management Plans is provided in Section 4.5 of this document.
Measures to minimise tracking of materials onto the surface of public roads.	In response to this feedback additional commentary has been added to Section 4.2 to identify that a shaker grid is provided on exit to minimise the tracking of materials onto the surface of public roads.

3 Project Overview

3.1 Site Details

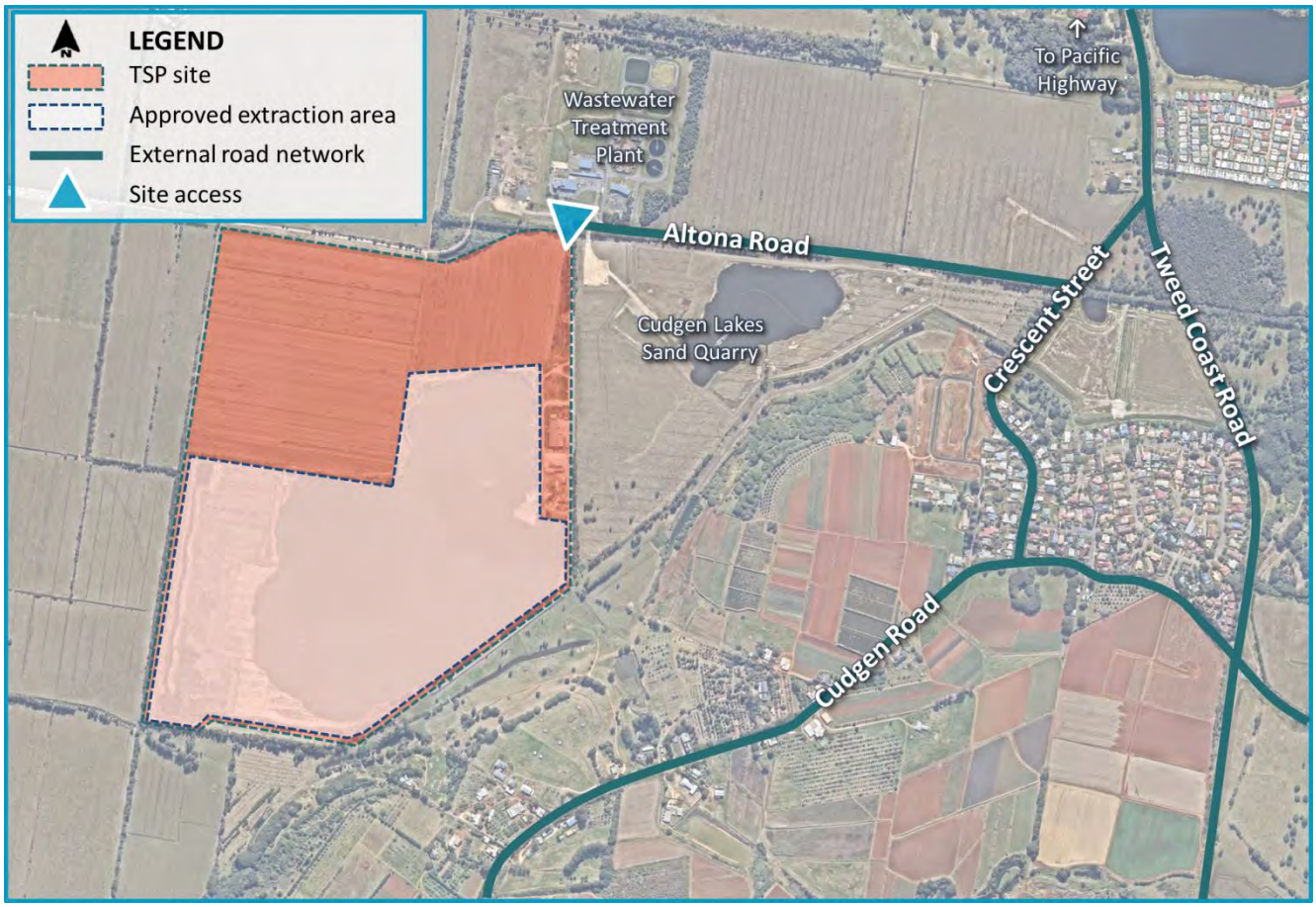
TSP is located off Altona Road in Cudgen, Northern NSW. The site is formally described as Lot Plans 22DP1082435, 23DP1077509 and 494DP720450, with a total area of approximately 77 hectares (ha), of which 46 hectares (ha) form the approved extraction area. An overview of TSP and the surrounding area is presented on Figure 1.

Sand extraction has been undertaken on the site since 1983, with Hanson taking over operation of the existing site in 2005. TSP operates a single dredge unit which is linked to an onshore wash plant via a floating flow line. Sand product is processed through the wash plant, stock piled and loaded via a front end loader into standard highway trucks. Loaded trucks pass across the site weighbridge (logging product weight and truck departure date/time), exit the site, and then follow the standard haul route of Altona Road, Crescent Street, Tweed Coast Road, and the Pacific Highway to their ultimate destination.

TSP is located within the Tweed Valley flood plain and is surrounded by the following land uses/receptors:

- **North**: Tweed Shire Council's wastewater treatment facility, the proposed Carbrook Sands Quarry isolated residential receptors; agricultural land (cane, grazing), Pacific Motorway and township of Chinderah in the distance (approximately 2 km);
- **East**: Cudgen Lake Sand Quarry (Cudgen Lakes), township of Cudgen (approximately 1 km), Township of Kingscliff in the distance (approximately 3 km);
- **South**: Residential receptors located along Cudgen Road ridge;
- **West**: Australian Bay Lobster Producers Pty Ltd, Melaleuca Station Memorial Gardens and Crematorium, Pacific Motorway, agricultural land (cane, grazing).

Figure 1 TSP and Surrounding Area



Source: Nearmap. Note: Site bounds indicative only.

3.2 Road Use Conditions

Schedule 3, Condition 20 of the Notice of Modification requires that the ***"Applicant must ensure that all heavy vehicle access to and from the site is via the Tweed Coast Road/Crescent Road (sic)/Altona Road route. Heavy vehicles must not travel via Crescent Street through Cudgen Village, except for local deliveries to Cudgen Village."*** Furthermore, Schedule 3, Condition 25 (d) of the Notice of Modification requires that the Operational TMP ***"prohibits trucks departing the site from turning right from Crescent Street to Tweed Coast Road".***

Schedule 2, Condition 9 also requires certain upgrades, which are discussed subsequently herein, to be completed before the applicant can dispatch more than 10 laden trucks from the site in any hour. Following completion of these upgrades and the relevant notification requirements as outlined in Schedule 2, Condition 22 the applicant may dispatch up to 18 laden trucks from TSP in any given hour.

Schedule 2, Condition 16 and Schedule 3, Condition 22 impose obligations on the applicant to contribute towards road maintenance activities relating specifically to Altona Road and also the broader local road network.

Schedule 2, Condition 10 details the permissible hours of operation as detailed in Section 3.5 of the Operational TMP.

3.3 Operating Conditions

Relevant to the Operational TMP Schedule 3, Condition 24 requires that:

"The Applicant must:

(a) provide sufficient parking on the site for all project-related traffic and visitors, in accordance with any applicable Council parking code and ensure that no on street parking is undertaken;

(b) ensure that on-site parking and pedestrian facilities are adequately signposted;

(c) ensure that all laden trucks entering or exiting the site have their loads covered;

(d) ensure that all laden trucks exiting the site are cleaned of material that may fall from vehicles, before leaving the site;

(e) use its best endeavours to ensure that appropriate signage is displayed on all trucks used to transport quarry products from the development so they can be easily identified by road users; and

(f) keep accurate records of all laden truck movements to and from the site and publish a summary of these records on its website every month."

3.4 Surrounding Road Network

3.4.1 Altona Road

Altona Road extends approximately 1km from the TSP access to Crescent Street, and incorporates a rural formation with varying seal width. The western section of Altona Road, extending for approximately 400m from the TSP access east towards Crescent Street, incorporates approximately a 6.0m-6.5m wide seal. The remaining approximately 600m long section of Altona Road that ultimately intersects with Crescent Street incorporates approximately a 3.5m wide seal and three passing bays located on the northern (outbound) side of the seal.

Signage is installed on Altona Road near its intersection with Crescent Street and 150m east of the TSP access advising drivers of the presence of soft road edges, the presence of three passing bays and requiring that vehicles give-way to trucks. Additional signage is also currently installed advising that no sand trucks are permitted on Altona Road before 7am (NSW time). The current posted speed limit on Altona Road is 40km/h.

Schedule 3, Condition 21 and 22 of the Notice of Modification also impose obligations on the applicant to contribute towards providing two additional passing bays along Altona Road and contribute towards the maintenance of Altona Road.

3.4.2 Crescent Street

Crescent Street extends approximately 900m from Tweed Coast Road to Cudgen Road. The northern section of Crescent Street extending approximately 250m between the Tweed Coast Road intersection and the Altona Road intersection incorporates a rural formation with approximately an 8m wide seal. The southern section of Crescent Street which extends for approximately 650m between the Altona Road intersection and the Cudgen Road intersection has a varying width and formation with a Gross Load Limit of 14.5t also applicable to this southern section.

Schedule 3, Condition 20 of the Notice of Modification requires that heavy vehicles must not travel via Crescent Street through Cudgen Village, except for local deliveries to Cudgen Village.

3.4.3 Tweed Coast Road

Tweed Coast Road extends approximately 1.5km from Crescent Street to the Pacific Motorway. Tweed Coast Road also extends much further south to Wooyung. The section of Tweed Coast Road between Crescent Street and the Pacific Motorway incorporates approximately a 7.5m wide seal, centre and edge line markings.

Schedule 3, Condition 25 (d) prohibits trucks departing TSP from turning right from Crescent Street into Tweed Coast Road (i.e. southbound). Furthermore, Schedule 3, Condition 23 (d) of the Notice of Modification also imposes obligations on the applicant to contribute towards upgrading of the existing Tweed Coast Road/Crescent Street intersection to include an acceleration lane for vehicles turning left out of the western Crescent Street approach to Tweed Coast Road (northbound), and right from the northern Tweed Coast Road (i.e. southbound) approach into Crescent Street (westbound).

3.5 Permissible Hours of Operation

Schedule 2, Condition 10 of the Notice of Modification states the hours within which TSP may operate. These are reproduced in Table 5.

Table 5 Schedule 2 Condition 10 – Hours of Operation

Activity	Permissible Hours[1]
Quarrying operations (excluding loading and dispatch of trucks)	• 7 am to 5 pm Monday to Friday; • 7 am to 4 pm Saturday; and • At no time on Sundays or public holidays
Loading and dispatch of trucks	• 7 am to 5 pm Monday to Friday; • 7 am to 12 pm Saturday; and • At no time on Sundays or public holidays
Maintenance	• May be conducted at any time, provided that these activities are not audible at any privately-owned residence

Note 1: These hours of operation relate to a NSW operating site which will be one hour ahead of Queensland during daylight saving periods (relevant to interstate truck movements).

In addition to the Hours of Operation stated in Table 5 above, Schedule 2 Condition 11 of the Notice of Modification states:

"The following activities may be carried out outside the hours specified in [Table 5] ***above:***

(a) delivery or dispatch of materials as requested by Police or other public authorities; and

(b) emergency work to avoid the loss of lives, property or to prevent environmental harm.

In such circumstances, the Applicant must notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter."

4 Heavy Vehicle Management

This Operational TMP provides additional details to supplement the Hanson *Tweed Sand Plant: Drivers' Code of Conduct* document, which is included at Appendix C. As part of the mandatory site induction required for drivers entering TSP, all drivers are required to read the *Tweed Sand Plant: Drivers' Code of Conduct* and this Operational TMP. Drivers are to complete and sign the *Confirmation of Understanding* provided within the *Tweed Sand Plant: Drivers' Code of Conduct*, and return to an authorised TSP staff member for secure storage onsite.

4.1 General Requirements

All heavy vehicle drivers hauling sand products from TSP must abide by the following:

- Undertake a site induction carried out by an authorised TSP staff member or suitably qualified person under the direction of the site manager;
- All drivers must hold a valid driver's licence which is appropriate for the class of vehicle under their operation;
- All drivers must comply with Chain of Responsibility legislation;
- All drivers are required to operate vehicles in a safe and courteous manner, within and external to TSP;
- All drivers are to comply with the instructions of authorised site personnel when within TSP;
- Any accidents, incidents, complaints, hazards, spillages or near misses must be reported immediately to the site manager. This includes incidents along the designated haulage route on the external road network; and
- Appropriate signage is to be displayed on all trucks used to transport product from TSP so that they can be readily identified by road users.

4.2 Site Management

The following procedures are to be observed by all heavy vehicle drivers accessing TSP:

- Haulage heavy vehicle access to TSP is to be restricted to the following hours (noting that these hours are more restrictive than the permissible hours detailed in Section 3.5 to minimise the potential for non-compliance with the permissible hours):
    - 7:15AM – 4:45PM Monday to Friday (NSW time);
    - 7:15AM – 11:45AM Saturday (NSW time).
- Hanson has a drug and alcohol policy which includes random testing;
- Drivers are to obey all site signage and the directions of TSP staff;
- All site mobile equipment has right of way at all times;
- Vehicles entering TSP are to be registered, roadworthy, and of sound mechanical condition. Hanson may request to inspect any vehicle or request maintenance records for any vehicle. Hanson reserves the right to prohibit any vehicle from TSP should there be any indication that the vehicle is not roadworthy or safe to operate;
- Upon entry to TSP, drivers are required to communicate with the loader operator on UHF channel 19 prior to entering the stockpile area;

- Drivers are to remain within the truck cabin unless instructed by a loader driver;
- Prior to leaving TSP, vehicles are to be weighed using the on-site weighbridge. Vehicles are required to be within the legal Gross Vehicle Mass (GVM) limit before being permitted to leave TSP;
- A shaker grid is installed at the site entry/exit such that all vehicles, including loaded trucks, must pass over the grid prior to leaving site, to minimise the tracking of materials onto the surface of public roads. The layout and fencing of the site is such that the shaker grid cannot be bypassed.

4.3 Haulage Route

To minimise the safety impact on residential areas and school zones the designated haulage route for heavy vehicles for TSP is Altona Road, Crescent Street, Tweed Coast Road and the Pacific Highway. This haulage route is mapped on Figure 2.

Figure 2 TSP Standard Haulage Route

Source: Nearmap. Note: Site bounds indicative only.

Drivers are to abide by the following instructions at each of the specific locations identified:

1. **Altona Road:**
   - Altona Road is not to be accessed by trucks prior to 7:00AM (NSW time) on any day;

- Heavy vehicles travelling outbound from TSP along Altona Road (eastbound) are to give way using the provided passing bays. Heavy vehicle drivers travelling inbound to TSP along Altona Road (westbound) are to centre vehicles on the carriageway to avoid the soft shoulders on either side, and are to provide adequate passing clearance to any vehicles propped in the passing bays; and
- All vehicles must observe the posted speed limit on Altona Road (40km/h).

2. **Crescent Street/Altona Road intersection:**
   - All trucks must STOP at the corner of Altona Road and Crescent Street after exiting TSP;
   - Heavy vehicles leaving TSP are not permitted to turn right from Altona Road onto Crescent Street (with the exception of making local deliveries to Cudgen Village); and
   - Any vehicle turning right from Altona Road onto Crescent Street to access Cudgen Village must also observe the sign posted load limit (Gross Load Limit 14.5t).
3. **Crescent Street/Tweed Coast Road:** Heavy vehicles leaving TSP are not permitted to turn right from Crescent Street onto Tweed Coast Road.

Through minimising haulage along roads in the vicinity of the site that include either school zones or that facilitate lower speed residential property access, the designated haulage route minimises the safety impacts on residential areas and school zones through limiting the potential for haulage vehicles to interact with the following:

- Students walking or cycling to school, or boarding/alighting buses;
- Pedestrians and children around residential properties;
- Vehicles or cyclists entering or leaving residential property accesses.

The typical framework applied to risk management seeks to (1) Avoid; (2) Manage, and (3) Mitigate risks (in order of preference). By avoiding residential areas and school zones, the proposed haulage route is consistent with this framework.

As noted, haulage vehicles may be required on occasion to make local deliveries to residential areas or travel past school zones. Safety impacts on residential areas and school zones in these instances will be managed through the driving standards detailed in Section 4.4, and through the *Tweed Sand Plant: Drivers' Code of Conduct*, which is included at Appendix C.

4.4 Driving Standards

4.4.1 Speed Management

Posted speed limits along the haulage route indicated on Figure 2 are as follows:

- Within the subject site: 30km/h;
- Altona Road: 40km/h;
- Crescent Street: 80km/h; and
- Tweed Coast Road: 80km/h / 60km/h.

Drivers are to observe posted speed limits at all times, and vehicle speeds should be adjusted in consideration of the road environment (e.g. geometry and traffic conditions) and prevailing weather conditions (e.g. rain and fog).

4.4.2 Heavy Vehicle Noise Management

To limit heavy vehicle noise associated with TSP haulage activities, drivers are to abide by the following requirements:

- Vehicle access to TSP is to be via the designated haulage route of Altona Road - Crescent Street - Tweed Coast Road - Pacific Motorway;
- Trucks slowing to use the Altona Road/Crescent Street and Crescent Street/Tweed Coast Road intersections are not to use engine or compression braking systems (when accessed from either direction) except where required for safety reasons;
- Posted speed limits on the external road network are to be observed, and vehicle speeds are to be restricted to 30km/h within TSP site;
- TSP is not to be accessed by heavy vehicles outside of the site operating hours (loading and dispatch of trucks) as follows:
    - 7:15AM – 4:45PM Monday to Friday (NSW time);
    - 7:15AM – 11:45AM Saturday (NSW time).
- Vehicles are to be turned off when not in use.

4.4.3 Heavy Vehicle Load Restraint and Dust Suppression

To minimise the potential for load spillages and dust production, drivers are required to act in accordance with the following measures:

- Drivers are to ensure their load is legal, secure and side bars, draw bar and tailgate are clear of material;
- Drivers are to ensure that vehicle tailgates are locked following any tipping activities;
- Drivers are to ensure that all loads are tarped prior to leaving TSP. The tarp must cover the whole body without air gaps;
- Haul road watering will be conducted within TSP site on a regular basis to supress dust as per Schedule 3, Condition 5 (*Operating* Conditions) of the Notice of Modification:

  "The Applicant must:

  (a) Implement best management practise to minimise the dust emissions of the development, including routinely watering haul roads being used by heavy vehicles and equipment".

- Drivers are to report excessive haul road dust (i.e. internal to TSP) to the site manager.

4.5 Construction Traffic Management Plans for Road Upgrade Works

Conditions 21, 22, and 23 of Schedule 3 of the Notice of Modification require that road upgrade works and/or maintenance works be undertaken at a future stage should certain output thresholds be exceeded, as detailed in Section 3.2 of this document. Should these works be triggered at a future stage, Construction Traffic Management Plans and associated Traffic Control Plans would be required to manage any operational or safety impacts of construction activities associated with the works.

Given that the upgrade works are not yet required, conceptual designs of the upgrade works have not been prepared, and hence no detailed assessment of the likely requirements can be undertaken at this stage. Nevertheless, a high level overview of the mitigation strategies that could potentially be implemented as part of future Construction Traffic Management Plans or Traffic Control Plans, which may be required to support future upgrade works, are discussed below.

4.5.1 Altona Road Upgrade and Maintenance Works

Schedule 3, Condition 21 and 22 of the Notice of Modification impose obligations on the applicant to contribute towards providing two additional passing bays along Altona Road and contribute towards the maintenance of Altona Road.

At a high level, upgrade or maintenance works on Altona Road have the potential to impact users of Altona Road and potentially also Crescent Street. To manage any safety impacts during future road upgrade works, and also to minimise the disruption to local road users, the future Construction Traffic Management Plans associated with the upgrade works may therefore need to consider the following:

- Conceptual design of the proposed upgrade works;
- Traffic demand profiles and speed environment of Altona Road and Crescent Street;
- Consultation with Tweed Shire Council and local Stakeholders (i.e. landowners of adjacent properties accessed off Altona Road) so that construction works can be scheduled to occur at times which minimise inconvenience and disturbance for local road users and landholders;
- Traffic Control Plans that are prepared by a suitably qualified person in accordance with the following relevant references:
    - *Traffic control at work sites: Technical Manual* (RMS, 2018);
    - *Australian Standard 1742.3, Manual of uniform traffic control devices - Traffic control for works on roads.*

4.5.2 Tweed Coast Road/Crescent Street Intersection Upgrade Works

Schedule 3, Condition 23 of the Notice of Modification also imposes obligations on the applicant to upgrade the existing Tweed Coast Road/Crescent Street intersection to include an acceleration lane for vehicles turning left out of the western Crescent Street approach to Tweed Coast Road (northbound), and right from the northern Tweed Coast Road (i.e. southbound) approach into Crescent Street (westbound). Should these works be triggered at a future stage, Construction Traffic Management Plans and associated Traffic Control Plans would be required to manage any operational or safety impacts associated with the works.

At a high level, upgrade works at the Tweed Coast Road/Crescent Street intersection have the potential to impact users of Tweed Coast Road and Crescent Street. To manage any safety impacts during potential future road upgrade works, and also to minimise the disruption to local road users, the future Construction Traffic Management Plans associated with the upgrade works may therefore need to consider the following:

- Conceptual design of the proposed upgrade works;
- Traffic demand profiles and speed environment of Tweed Coast Road and Crescent Street;
- Consultation with road authorities to ensure that construction works are scheduled to occur at times which minimises inconvenience and disturbance for local road users and landholders;
- Consideration of the need for the temporary installation of Variable Messaging Signage (VMS) in appropriate locations in the vicinity of the Tweed Coast Road/Crescent Street intersection for a period prior to the construction works occurring to alert motorists to the timing of the upgrade works, and that delays could be expected. This would enable motorists to allow for delays (i.e. start journey earlier), travel outside construction periods, or select an alternate travel route;
- Traffic Control Plans that are prepared by a suitably qualified person in accordance with the following relevant references:
    - *Traffic control at work sites: Technical Manual* (RMS, 2018);
    - *Australian Standard 1742.3, Manual of uniform traffic control devices - Traffic control for works on roads.*

5 Incident Reporting

5.1 Relevant Conditions

Schedule 5, Conditions 9 to 11 of the Notice of Modification requires the following:

9. ***"The Department must be notified in writing to compliance@planning.nsw.gov.au immediately after the Applicant becomes aware of an incident.***

10. ***Within 7 days of the date of the incident, the Applicant must provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested. This report must include the time and date of the incident, details of the incident, measures implemented to prevent re-occurrence and must identify any non-compliance with this consent.***

11. ***Any written requirements of the Secretary or relevant public authority (as determined by the Secretary) which may be given at any point in time, to address the cause or impact of an incident must be complied with and within any timeframe specified by the Secretary or relevant public authority."***

In accordance with the Definition section of the Notice of Modification, an 'Incident' is defined as:

"A set of circumstances that:

i. causes or threatens to cause material harm to the environment; or

ii. results in non-compliance with this consent."

For the purposes of this Operational TMP, it is foreseen that the most likely cause for a potential 'incident' will be due to a non-compliance with the hourly truck dispatch limit criteria detailed in Section 3.2, use of sections of the road network not approved for haulage as also detailed in Section 3.2 or alternatively haulage that occurs outside the permissible hours identified in Section 3.5.

6 Protocol for Managing Complaints and/or Non-Compliances

6.1 Managing Complaints

All complaints received regarding traffic movements associated with TSP will be responded to within three dispatch days following receipt of the complaint. Dispatch days are taken to be those days during which loading and dispatch of trucks is approved to occur as detailed in Section 3.5.

TSP will keep a record of any complaint made to the site or to any employee or to agent/contractor of TSP in relation to traffic associated with TSP. Records will include:

- Date and time of the complaint;
- Method by which the complaint was made;
- Personal details of the complainant (if provided);
- Nature of the complaint and location;
- The driver/heavy vehicle details;
- Action taken by TSP and any follow up actions;
- If no action was taken, the reason why no action was taken; and
- A copy of the reply made to the complainant.

The Hanson website will include Contact Details and a Complaints Register, in accordance with Schedule 5, Condition 16 of the Notice of Modification.

6.2 Compliance Monitoring and Non-Compliance Response Procedure

Compliance of this Operational TMP with the Notice of Modification conditions will be measured according to the following performance indicators:

- Compliance with the hourly traffic volume dispatch criterion detailed in Section 3.2;
- An authorised TSP staff member or suitably qualified person under the direction of the site manager will undertake formal observations of compliance at yearly intervals;
- Contractor and employee awareness of this Operational TMP; and
- The frequency and nature of complaints reported to TSP in relation to traffic associated with TSP.

Incident reporting is to be undertaken as per the requirements in Section 5.1. In the event of non-compliance, the following actions will be undertaken:

- Establish the details in relation to the incident (location, vehicle, driver etc.);
- Confirm that the reported incident is therefore actually related to a vehicle associated with TSP;
- Conduct an investigation into why the incident occurred and evaluate the effectiveness of the current mitigation strategy; and
- Report details of any non-compliance to DPE in accordance with Section 5.1.

Should any driver be found to have acted in breach of the *Tweed Sand Plant: Drivers' Code of Conduct*, through either the formal complaint process detailed above, or through observations by authorised TSP personnel, disciplinary action will be taken, which could include the following:

- Verbal notification (if possible) and written confirmation to the driver of non-compliance with the *Tweed Sand Plant: Drivers' Code of Conduct*;
- Refusal to load affected trucks and direction to the driver to leave the site;
- Implementation of a temporary ban of the affected vehicle or driver until such time as sufficient evidence has been provided to authorised TSP staff that the breach has been rectified and/or will not occur again;
- In the case of a serious breach or repeated non-compliance with the *Tweed Sand Plant: Drivers' Code of Conduct,* a permanent site ban of the affected vehicle or driver will be considered.

7 Periodic Review

This Operational TMP shall be reviewed and revised and/or updated, in accordance with Schedule 5, Condition 4 of the Notice of Modification, within three (3) months of any of the following:

- The submission of an incident report under Schedule 5, Condition 10;
- The submission of an Annual Review under Schedule 5, Condition 13;
- The submission of an Audit report under Schedule 5, Condition 14; or
- The approval of any modification to the conditions of the Notice of Modification.

Where a review results in revisions to the Operational TMP, within six weeks of the review the revised Operational TMP will be submitted for DPE approval.

Review of this Operational TMP will also take place if monitoring records indicate that it is warranted, or in the event of any significant change to the form of the external road network from that contemplated herein.

8 Community Consultation and Performance Monitoring

8.1 Community Consultative Committee

Schedule 5, Condition 8 of the Notice of Modification states that TSP must operate a Community Consultative Committee (CCC) for the site. The CCC must be operated in general accordance with DPE's *Community Consultative Committee Guidelines: State Significant Projects* (2016), for the duration of TSP operations and for at least 6 months following the completion of TSP operations. TSP already has an existing CCC in place that meets biannually.

The CCC is to facilitate communication, consultation and information sharing between TSP and the local community.

8.2 Public Performance Reporting

Schedule 3, Condition 24 (f) of the Notice of Modification requires that TSP keep accurate records of all laden truck movements to and from the site and publish a summary of these records on its website every month.

APPENDIX A

DPE Approval of Expert

NSW GOVERNMENT | Planning & Environment

Planning Services
Resource Assessments
Contact: Genevieve Seed
Phone: (02) 9274 6489
Email: genevieve.seed@planning.nsw.gov.au

Mr Murray Graham
Development Manager
Hanson Construction Materials Pty Ltd
PO Box 1636
Toombul QLD 4012

Dear Mr Graham,

Tweed Sand Quarry (DA 152-6-2005)
Approval of Experts

I refer to your email dated 19 September 2018, seeking the approval of various experts to prepare management plans for the Tweed Sand Quarry, including:

- Adam McArthur, Phoebe Chapman and Nicole Davis from JWA Ecological, to prepare the Rehabilitation Management Plan; and
- Jeff Baczynski of SLR, to prepare the Transport Management Plan.

The Secretary has approved the appointment of these experts.

Should you have any enquiries in relation to this matter, please contact Genevieve Seed.

Yours sincerely,

20/9/18

Megan Dawson
A/Director
Resource Assessments
as nominee of the Secretary

APPENDIX B

Evidence of Consultation

Jeffrey Baczynski

From: Colleen Forbes <CForbes@tweed.nsw.gov.au>
Sent: Wednesday, 7 November 2018 3:49 PM
To: Glyn Cowie
Cc: Jeffrey Baczynski; Graham, Murray (Skygate) AUS; Erin Holton (holton.el@access.gs); Chris Lawlor
Subject: RE: 620.12479 - Tweed Sand Plant MOD1 - Traffic Management Plan Stakeholder Consultation

Hi Glyn,

Council's Traffic Engineer has briefly reviewed the draft TMP. No concerns / objections are raised from Council's perspective.

Regards,
Colleen

Colleen Forbes
Team Leader Development Assessment

TWEED SHIRE COUNCIL

p (02) 6670 2596

contact us | **website** | **your say tweed** | **our values**

From: Glyn Cowie [mailto:gcowie@slrconsulting.com]
Sent: Friday, 2 November 2018 2:03 PM
To: Colleen Forbes
Cc: Jeffrey Baczynski; Graham, Murray (Skygate) AUS; Erin Holton (holton.el@access.gs); Chris Lawlor
Subject: RE: 620.12479 - Tweed Sand Plant MOD1 - Traffic Management Plan Stakeholder Consultation

Hi Colleen,

Thank you for your below response.

Further to your request, please see attached the draft Traffic Management Plan for TSP. We would appreciate your review and any feedback you have so this can be considered prior to Hanson's submission to DPE.

Please note that due to the current time critical nature of the TMP, we would appreciate your feedback no later than COB Friday 9 November 2018.

Should you have any questions that you'd wish to discuss over the phone, please don't hesitate to contact either Jeff Baczynski (07 3858 4800) or myself (0438 763 516).

Kind regards,
Glyn

From: Colleen Forbes <CForbes@tweed.nsw.gov.au>
Sent: Tuesday, 2 October 2018 12:14 PM
To: Glyn Cowie <gcowie@slrconsulting.com>
Cc: Jeffrey Baczynski <jbaczynski@slrconsulting.com>; Graham, Murray (Skygate) AUS <Murray.Graham@hanson.com.au>
Subject: RE: 620.12479 - Tweed Sand Plant MOD1 - Traffic Management Plan Stakeholder Consultation

Dear Glyn,

With reference to the Traffic Management Plan for the Tweed Sand Quarry, Council's Traffic Engineer has reviewed **Schedule 3 Condition 25** and **Schedule 5 Condition 2 of DA152-6-2005 MOD1**. Please be advised that TSC considers that the information required appears to be sufficient in breadth and scope. Accordingly, no additional traffic considerations are requested by TSC.

Please also be advised that TSC would like to receive a copy of the draft Plan for review / feedback prior to its submission to the Department.

Regards,
Colleen

Colleen Forbes
Team Leader Development Assessment

TWEED SHIRE COUNCIL

p (02) 6670 2596

contact us | **website** | **your say tweed** | **our values**

From: Glyn Cowie [mailto:gcowie@slrconsulting.com]
Sent: Monday, 24 September 2018 4:15 PM
To: Colleen Forbes
Cc: Jeffrey Baczynski; Graham, Murray (Skygate) AUS
Subject: 620.12479 - Tweed Sand Plant MOD1 - Traffic Management Plan Stakeholder Consultation

Hi Colleen,

You would be aware of the recently approved Tweed Sand Plant (TSP) MOD1 approval relating to an increase in extraction limit and associated heavy vehicle numbers. In accordance with the approved MOD1 *Notice for Modification Development Consent* (DA 152-6-2005 dated 20 August 2018, 'the Consent'), a traffic management plan is required to be prepared for the development to the satisfaction of the Secretary (DPE). SLR Consulting has been engaged by Hanson Construction Materials (HCM, the operator of TSP) to prepare a traffic management plan in accordance with the Consent.

The specific requirements for the traffic management plan are detailed in Schedule 3 Condition 25 of the Consent, which are copied below.

Transport Management Plan

25. The Applicant must prepare a Traffic Management Plan for the development to the satisfactio Secretary. This plan must:
    (a) be prepared by suitably qualified and experienced person/s whose appointment has been e by the Secretary;
    (b) be prepared in consultation with RMS and Council, and in accordance with the *RTA – Traffi at Worksites Manual*;
    (c) describe the processes in place for the management of truck movements entering and e site;
    (d) prohibit trucks departing the site from turning right from Crescent Street to Tweed Coast R
    (e) include a Drivers' Code of Conduct that includes:
        - details of the safe and quiet driving practices that must be used by drivers travelling to the quarry;
        - a map of the primary haulage route;
        - safety initiatives for haulage through residential areas, school zones and along sc routes;
        - an induction process for vehicle operators and regular toolbox meetings;
        - complaints resolution and disciplinary procedures; and
        - details of community consultation measures for peak haulage periods.
    (f) describe the measures to be put in place to ensure compliance with the Drivers' Code of C
    (g) include details of the measures to be implemented to minimise traffic safety issues and disr local road users during road upgrade works; and
    (h) propose measures to minimise the transmission of dust and tracking of material onto the s public roads from vehicles leaving the quarry.

In addition to Schedule 3 Condition 25, Schedule 5 Condition 2 details the broader requirements for management plans supporting this MOD1. These are copied below.

Management Plan Requirements

2. The Applicant must ensure that the management plans required under this consent are pre accordance with any relevant guidelines, and include:
   (a) a summary of relevant background or baseline data;
   (b) a description of:
      - the relevant statutory requirements (including any relevant approval, licence or lease cc
      - any relevant limits or performance measures/criteria; and
      - the specific performance indicators that are proposed to be used to judge the performa guide the implementation of, the development or any management measures;
   (c) a description of the measures to be implemented to comply with the relevant statutory requ limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
      - impacts and environmental performance of the development; and
      - effectiveness of any management measures (see (c) above);
   (e) a contingency plan to manage any unpredicted impacts and their consequences and to er ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as
   (f) a program to investigate and implement ways to improve the environmental performan development over time;
   (g) a protocol for managing and reporting any:
      - incidents;
      - complaints; and
      - non-compliances with statutory requirements;
   (h) a protocol for periodic review of the plan; and
   (i) a document control table that includes version numbers, dates when the management prepared and reviewed, names and positions of the person/s who prepared and revi management plan, a description of any revisions made and the date of the Secretary's ap

Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted fo management plans.

With regard to specific traffic management plan requirements, it is stated that the plan must be prepared in consultation with Council. To satisfy this requirement, this email serves to commence that consultation. We kindly request a response to the following two (2) points:

1. Could you please confirm whether you require any additional considerations into developing the traffic management plan above those specifically stated in the Consent and copied into this email? If you do, could you please state your considerations.
2. Do you request a copy of the draft plan for review/feedback prior to HCM's submission to DPE for ultimate approval?

I appreciate your response on this matter. Please note that in accordance with the Consent, HCM must not commence operations under the Consent until a traffic management plan has been approved by DPE. The Stakeholder consultation process will need to be completed prior to HCM submitting the traffic management plan for approval. As the traffic management plan is considered critical path, I would appreciate your response as soon as practical.

Please do not hesitate to contact me should you wish to discuss further.

Kind regards,
Glyn

We work flexibly. If you have received an email from me outside of normal business hours, I'm sending it at a time that suits me. Unless it's flagged as urgent, I'm not expecting you to read or reply until normal business hours.

All official correspondence requiring a formal written response should be addressed to the General Manager, PO Box 816, Murwillumbah, 2484; or emailed to tsc@tweed.nsw.gov.au; or faxed to 02 6670 2429.

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www.tweed.nsw.gov.au

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Jeffrey Baczynski

From: Glyn Cowie
Sent: Tuesday, 6 November 2018 11:44 AM
To: SCIFFER Greg
Cc: Development Northern; Gen Seed; Jeffrey Baczynski; Graham, Murray (Skygate) AUS; Erin Holton (holton.el@access.gs)
Subject: RE: 620.12479 - Tweed Sand Plant MOD1 - Traffic Management Plan Stakeholder Consultation

Thank you Greg for your prompt feedback.

Our Principal Transport Consultant, Jeff Baczynski, will review your below points and be in touch should he wish to discuss further.

Kind regards,
Glyn

Glyn Cowie
Associate - Acoustics & Vibration

d 20819
m +61 438 763 516
o +61 7 3858 4800
e gcowie@slrconsulting.com

SLR Consulting Australia Pty Ltd
Ground Floor, 194 Varsity Parade, Varsity Lakes, QLD, 4227

From: SCIFFER Greg <Greg.SCIFFER@rms.nsw.gov.au>
Sent: Tuesday, 6 November 2018 11:24 AM
To: Glyn Cowie <gcowie@slrconsulting.com>
Cc: Development Northern <development.northern@rms.nsw.gov.au>; Gen Seed <genevieve.seed@planning.nsw.gov.au>
Subject: RE: 620.12479 - Tweed Sand Plant MOD1 - Traffic Management Plan Stakeholder Consultation

Glyn

Thank s for the opportunity to comment on the Draft OTMP for Tweed Sand Plant. Generally the Draft OTMP has addressed most of requirements of Schedule 3, Condition 25. The following comments are provided for your consideration:

1. The Drivers Code of Conduct should include:
   - Safety initiatives for haulage through residential areas, school zones and along school bus routes.
   - Regular toolbox meetings
   - Details of community consultation measures for peak haulage periods

2. Details of measures to be implemented to minimise traffic safety issues and disruption to local road users during road upgrade works.

3. Measures to minimise tracking of materials onto the surface of public roads.

Regards
Greg Sciffer
Development Assessment Officer
Northern Region

From: Glyn Cowie [mailto:gcowie@slrconsulting.com]
Sent: Friday, 2 November 2018 2:08 PM
To: SCIFFER Greg
Cc: Jeffrey Baczynski; Chris Lawlor; Graham, Murray (Skygate) AUS; Erin Holton (holton.el@access.gs)
Subject: RE: 620.12479 - Tweed Sand Plant MOD1 - Traffic Management Plan Stakeholder Consultation

Hi Greg,

Further to the below email, and your verbal request, please see attached the draft Operational Traffic Management Plan for TSP. We would appreciate your review and any feedback you have so this can be considered prior to Hanson's submission to DPE.

Please note that due to the current time critical nature of the TMP, we would appreciate your feedback no later than COB Friday 9 November 2018.

We also note the example OTMP that you provided following our discussion. Please note that this OTMP has been drafted to specifically address the relevant conditions of the TSP Notice of Modification. Those specific conditions are referenced in Section 1.2 of the attached.

Should you have any questions that you'd wish to discuss over the phone, please don't hesitate to contact either Jeff Baczynski (07 3858 4800) or myself (0438 763 516).

Kind regards,
Glyn

From: SCIFFER Greg <Greg.SCIFFER@rms.nsw.gov.au>
Sent: Thursday, 27 September 2018 9:31 AM
To: Glyn Cowie <gcowie@slrconsulting.com>
Subject: RE: 620.12479 - Tweed Sand Plant MOD1 - Traffic Management Plan Stakeholder Consultation

Glyn

I have been reviewing, preparing advice and liaising with DEP for RMS regarding Tweed Sand Quarry. Could you ring me on 02 6604 9328 to discuss your email before RMS formally replies.

Thanks
Greg Sciffer
Development Assessment Officer
Northern Region

From: Glyn Cowie [mailto:gcowie@slrconsulting.com]
Sent: Monday, 24 September 2018 4:17 PM
To: Development Northern
Cc: Jeffrey Baczynski; Graham, Murray (Skygate) AUS
Subject: 620.12479 - Tweed Sand Plant MOD1 - Traffic Management Plan Stakeholder Consultation

Attn: Liz Smith/John Perkins.

Hi Liz/John,

You may be aware of the recently approved Tweed Sand Plant (TSP) MOD1 approval relating to an increase in extraction limit and associated heavy vehicle numbers. In accordance with the approved MOD1 *Notice for Modification Development Consent* (DA 152-6-2005 dated 20 August 2018, 'the Consent'), a traffic management plan is required to be prepared for the development to the satisfaction of the Secretary (DPE). SLR Consulting has

been engaged by Hanson Construction Materials (HCM, the operator of TSP) to prepare a traffic management plan in accordance with the Consent.

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    (b) be prepared in consultation with RMS and Council, and in accordance with the *RTA – Traffi at Worksites Manual*;
    (c) describe the processes in place for the management of truck movements entering and e site;
    (d) prohibit trucks departing the site from turning right from Crescent Street to Tweed Coast R
    (e) include a Drivers' Code of Conduct that includes:
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        - a map of the primary haulage route;
        - safety initiatives for haulage through residential areas, school zones and along sc routes;
        - an induction process for vehicle operators and regular toolbox meetings;
        - complaints resolution and disciplinary procedures; and
        - details of community consultation measures for peak haulage periods.
    (f) describe the measures to be put in place to ensure compliance with the Drivers' Code of C
    (g) include details of the measures to be implemented to minimise traffic safety issues and disr local road users during road upgrade works; and
    (h) propose measures to minimise the transmission of dust and tracking of material onto the s public roads from vehicles leaving the quarry.

In addition to Schedule 3 Condition 25, Schedule 5 Condition 2 details the broader requirements for management plans supporting this MOD1. These are copied below.

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   (c) a description of the measures to be implemented to comply with the relevant statutory requ limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
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   - effectiveness of any management measures (see (c) above);

   (e) a contingency plan to manage any unpredicted impacts and their consequences and to er ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as
   (f) a program to investigate and implement ways to improve the environmental performan development over time;
   (g) a protocol for managing and reporting any:
   - incidents;
   - complaints; and
   - non-compliances with statutory requirements;

   (h) a protocol for periodic review of the plan; and
   (i) a document control table that includes version numbers, dates when the management prepared and reviewed, names and positions of the person/s who prepared and revi management plan, a description of any revisions made and the date of the Secretary's ap

Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted fo management plans.

With regard to specific traffic management plan requirements, it is stated that the plan must be prepared in consultation with RMS. To satisfy this requirement, this email serves to commence that consultation. We kindly request a response to the following two (2) points:

1. Could you please confirm whether you require any additional considerations into developing the traffic management plan above those specifically stated in the Consent and copied into this email? If you do, could you please state your considerations.
2. Do you request a copy of the draft plan for review/feedback prior to HCM's submission to DPE for ultimate approval?

I appreciate your response on this matter. Please note that in accordance with the Consent, HCM must not commence operations under the Consent until a traffic management plan has been approved by DPE. The Stakeholder consultation process will need to be completed prior to HCM submitting the traffic management plan for approval. As the traffic management plan is considered critical path, I would appreciate your response as soon as practical.

Please do not hesitate to contact me should you wish to discuss further.

Kind regards,
Glyn

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APPENDIX C

Tweed Sand Plant: Drivers' Code of Conduct

Site Specific Requirements:

- All trucks must only access site via Tweed Coast Rd/Crescent St/Altona Rd (see map below).
- No trucks are permitted on Altona Road before **7:00am** NSW time.
- Trucks are not permitted to turn right from Crescent Street onto Tweed Coast Road.
- **UHF 19** must be used to communicate with sales loader.
- Operating Hours for sales:
  Mon – Fri = 7:15am to 4:45pm NSW time
  Saturday = 7:15am to 11:45am NSW time
- Maximum speed limits:
  Altona Road = ***40kmh***
  Sand Plant site = ***30kmh***
- Tweed Sand Plant is a 'No Smoking' site.
- In addition to this Drivers' Code, drivers are required to read the *Tweed Sand Plant: MOD1 Operational Traffic Management Plan* prepared by SLR. A copy will be kept onsite and made available to drivers as part of the site induction.

Note: Non-compliance with any directive included in this Drivers' Code, either on or off site, may lead to refusal to load truck and/or further disciplinary action against the driver.

Site Contact Details:

Manager: John McQueen, ph. 0407 180 038

Hanson
HEIDELBERGCEMENT Group

Hanson Construction Materials Pty Ltd

Tweed Sand Plant

Drivers' Code of Conduct

Updated: March 2019

Tweed Sand Plant – Drivers' Code of Conduct

Transport routes may require travel through, or in close proximity to residential areas. Hanson has made a commitment to local authorities and the local community to undertake all activities including delivery of product in a manner which protects the environment and amenity of the local community.

It must be remembered that your driving behaviour is the Company image that the general public see and if tarnished, can severely impact our reputation with the local community.

All heavy vehicle drivers are required to be responsible, professional and drive in accordance with this Drivers' Code.

Hanson will enforce this code and follow up on any complaints. Breaches or blatant disregard of the Drivers' Code of Conduct may lead to exclusion from site and/or further disciplinary action.

This Drivers' Code of Conduct is required to be read and completed by all drivers; signed confirmation will be held on site.

- *Professional road courtesy must be displayed at all times towards other road users. Drivers must obey all signage, given directions and instructions.*
- *The use of engine brakes is prohibited in residential areas in close proximity to all Hanson sites.*
- *All loads with material <150mm must be tarped prior to exiting site. The tarp must cover the total surface of the truck and trailer body.*
- *All loads must be secure, with drawbars, tailgates and side combings cleaned down prior to leaving site.*
- *All drivers must comply with current Chain of Responsibility legislation.*
- *All site mobile equipment (FEL, dump truck, water truck, etc) has right of way at all times.*
- ***POSITIVE COMMUNICATION MUST** be established when approaching any site vehicle, mobile equipment or machine and/or before entering the site vehicle's work area.*
- *All trucks entering site must be fully maintained and roadworthy.*
- *No truck will be allowed to leave site if weight is in excess of the Registered Gross Mass of the vehicle.*
- *You must remain in the truck cabin whilst being loaded unless directed otherwise by the loader driver. Apply park brake if leaving vehicle.*
- *No children are allowed on site, including in truck cabins. Any vehicle containing children will not be loaded (organised school visits and apprentices under 18 are excluded).*
- *Inappropriate or unnecessary use of UHF radios is not permitted, so as to allow clear and concise communications on site.*
- *Steel cap boots and high visibility clothing must be worn on site at all times. Hard hats must be worn if exiting truck.*
- *Hanson has a Drug and Alcohol Policy which includes random testing. If you refuse to be tested you will not be loaded.*
- *No soil, fill or other materials are to be brought onto site without the Site Manager's prior approval. All trucks must be free of soil build-up prior to entering site.*
- *All trucks must drive through the wheel wash and/or across the shaker grid when exiting any site where installed, to remove loose material from tyres and truck body.*
- *No truck maintenance or repairs are to be performed on site without Site Manager's approval.*
- *Any litter must be placed in litter bins on site.*
- *Any accidents, incidents, complaints, hazards, spillages or near misses that occur on or off site, must be reported to the Site Manager as soon as possible after the occurrence.*

Hanson Construction Materials Pty Ltd

Tweed Sand Plant

Drivers' Code of Conduct

Confirmation of Understanding

I, _____ *(print)*

of _____ *(company)*

have read/had explained to me, the Tweed Sand Plant Drivers' Code of Conduct and understand my obligations with regard to its content.

I further confirm I will comply with all requirements of the Tweed Sand Plant Drivers' Code of Conduct.

Signed: _____

Date: _____

Endorsed By: _____
(Hanson Representative)

Please detach and retain in site files

ASIA PACIFIC OFFICES

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NEW PLYMOUTH
Level 2, 10 Devon Street East
New Plymouth 4310
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T: +64 0800 757 695

Site Specific Requirements:

- All trucks must only access site via Tweed Coast Rd/Crescent St/Altona Rd (see map below).
- No trucks are permitted on Altona Road before **7:00am** NSW time.
- Trucks are not permitted to turn right from Crescent Street onto Tweed Coast Road.
- **UHF 19** must be used to communicate with sales loader.
- Operating Hours for sales:
  Mon – Fri = 7:15am to 4:45pm NSW time
  Saturday = 7:15am to 11:45am NSW time
- Maximum speed limits:
  *Altona Road = **40kmh***
  *Sand Plant site = **30kmh***
- Tweed Sand Plant is a 'No Smoking' site.
- In addition to this Drivers' Code, drivers are required to read the *Tweed Sand Plant: MOD1 Operational Traffic Management Plan* prepared by SLR. A copy will be kept onsite and made available to drivers as part of the site induction.

<u>Note</u>: Non-compliance with any directive included in this Drivers' Code, either on or off site, may lead to refusal to load truck and/or further disciplinary action against the driver.

Site Contact Details:

Manager: John McQueen, ph. 0407 180 038

Hanson
HEIDELBERGCEMENT Group

Hanson Construction Materials Pty Ltd

Tweed Sand Plant

Drivers' Code of Conduct

Updated: April 2019

Tweed Sand Plant – Drivers' Code of Conduct

Transport routes may require travel through, or in close proximity to residential areas. Hanson has made a commitment to local authorities and the local community to undertake all activities including delivery of product in a manner which protects the environment and amenity of the local community.

It must be remembered that your driving behaviour is the Company image that the general public see and if tarnished, can severely impact our reputation with the local community.

All heavy vehicle drivers are required to be responsible, professional and drive in accordance with this Drivers' Code.

Hanson will enforce this code and follow up on any complaints. Breaches or blatant disregard of the Drivers' Code of Conduct may lead to exclusion from site and/or further disciplinary action.

This Drivers' Code of Conduct is required to be read and completed by all drivers; signed confirmation will be held on site.

- *Professional road courtesy must be displayed at all times towards other road users. Drivers must obey all signage, given directions and instructions.*
- *The use of engine brakes is prohibited in residential areas in close proximity to all Hanson sites.*
- *All loads with material <150mm must be tarped prior to exiting site. The tarp must cover the total surface of the truck and trailer body.*
- *All loads must be secure, with drawbars, tailgates and side combings cleaned down prior to leaving site.*
- *All drivers must comply with current Chain of Responsibility legislation.*
- *All site mobile equipment (FEL, dump truck, water truck, etc) has right of way at all times.*
- ***POSITIVE COMMUNICATION MUST** be established when approaching any site vehicle, mobile equipment or machine and/or before entering the site vehicle's work area.*
- *All trucks entering site must be fully maintained and roadworthy.*
- *Hanson reserves the right to request all maintenance records of trucks entering site.*
- *No truck will be allowed to leave site if weight is in excess of the Registered Gross Mass of the vehicle.*
- *You must remain in the truck cabin whilst being loaded unless directed otherwise by the loader driver. Apply park brake if leaving vehicle.*
- *No children are allowed on site, including in truck cabins. Any vehicle containing children will not be loaded (organised school visits and apprentices under 18 are excluded).*
- *Inappropriate or unnecessary use of UHF radios is not permitted, so as to allow clear and concise communications on site.*
- *Steel cap boots and high visibility clothing must be worn on site at all times. Hard hats must be worn if exiting truck.*
- *Hanson has a Drug and Alcohol Policy which includes random testing. If you refuse to be tested you will not be loaded.*
- *No soil, fill or other materials are to be brought onto site without the Site Manager's prior approval. All trucks must be free of soil build-up prior to entering site.*
- *All trucks must drive through the wheel wash and/or across the shaker grid when exiting any site where installed, to remove loose material from tyres and truck body.*
- *No truck maintenance or repairs are to be performed on site without Site Manager's approval.*
- *Any litter must be placed in litter bins on site.*
- *Any accidents, incidents, complaints, hazards, spillages or near misses that occur on or off site, must be reported to the Site Manager as soon as possible after the occurrence.*

Hanson Construction Materials Pty Ltd

Tweed Sand Plant

Drivers' Code of Conduct

Confirmation of Understanding

I, _____ *(print)*

of _____ *(company)*

have read/had explained to me, the Tweed Sand Plant Drivers' Code of Conduct. I understand my obligations with regard to its content and confirm I will comply with all requirements.

I further confirm I understand and acknowledge that on entering the Quarry:

- I have entered a Mine Site.
- I am fit for duty, am not fatigued and will comply with all applicable work and rest requirements.
- The vehicle I am driving must be in a sound condition and fit for purpose.
- The vehicle I am driving must be loaded legally to within the design criteria, and in line with national and local laws.
- I must comply with all applicable permit and route requirements.
- I will be re-inducted following significant changes to site traffic management or site specific requirements.

Signed: _____

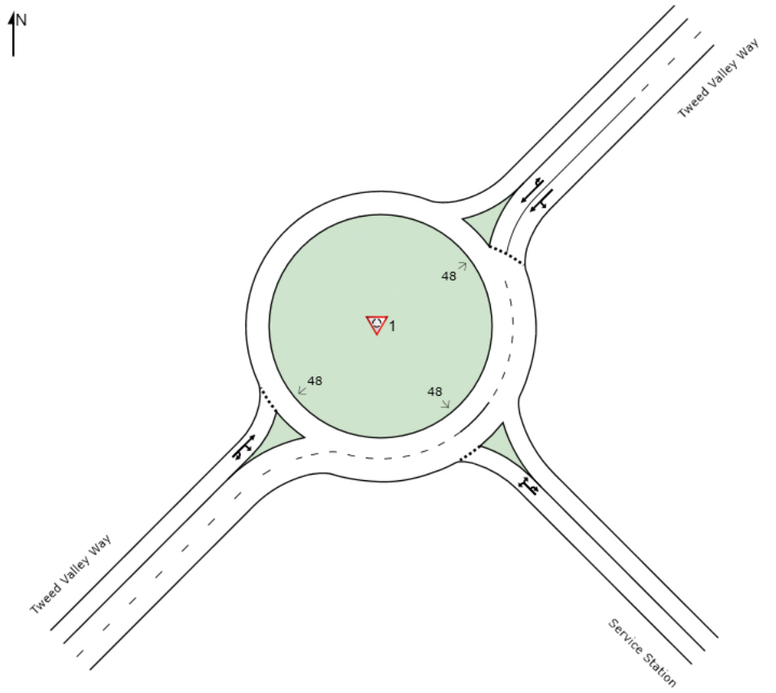
Date: _____

Endorsed By: _____
(Hanson Representative)

Please detach and retain in site files

Appendix E – Intersection Performance Summaries

Tweed Valley Way / Service Station Roundabout – 2020 Surveyed Base



MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2020 AM (Site Folder: General)]

Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	22	13.6	23	13.6	0.192	4.7	LOS A	0.7	6.2	0.50	0.75	0.50	51.8
6	R2	141	24.1	148	24.1	0.192	11.9	LOS B	0.7	6.2	0.50	0.75	0.50	54.2
6u	U	1	0.0	1	0.0	0.192	13.9	LOS B	0.7	6.2	0.50	0.75	0.50	56.8
Approach		164	22.5	173	22.5	0.192	11.0	LOS B	0.7	6.2	0.50	0.75	0.50	53.9
NorthEast: Tweed Valley Way														
7	L2	43	11.6	45	11.6	0.189	3.1	LOS A	1.1	8.4	0.11	0.25	0.11	57.4
8	T1	556	5.9	585	5.9	0.189	2.4	LOS A	1.1	8.4	0.12	0.26	0.12	60.1
9u	U	8	12.5	8	12.5	0.189	12.4	LOS B	1.1	8.2	0.12	0.26	0.12	63.5
Approach		607	6.4	639	6.4	0.189	2.6	LOS A	1.1	8.4	0.12	0.26	0.12	59.9
SouthWest: Tweed Valley Way														
2	T1	37	24.3	39	24.3	0.047	2.8	LOS A	0.3	2.0	0.34	0.43	0.34	56.7
3	R2	20	5.0	21	5.0	0.047	10.2	LOS B	0.3	2.0	0.34	0.43	0.34	57.8
3u	U	1	0.0	1	0.0	0.047	12.8	LOS B	0.3	2.0	0.34	0.43	0.34	60.4
Approach		58	17.2	61	17.2	0.047	5.5	LOS A	0.3	2.0	0.34	0.43	0.34	57.1
All Vehicles		829	10.3	873	10.3	0.192	4.4	LOS A	1.1	8.4	0.21	0.37	0.21	58.4

MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2020 PM (Site Folder: General)]

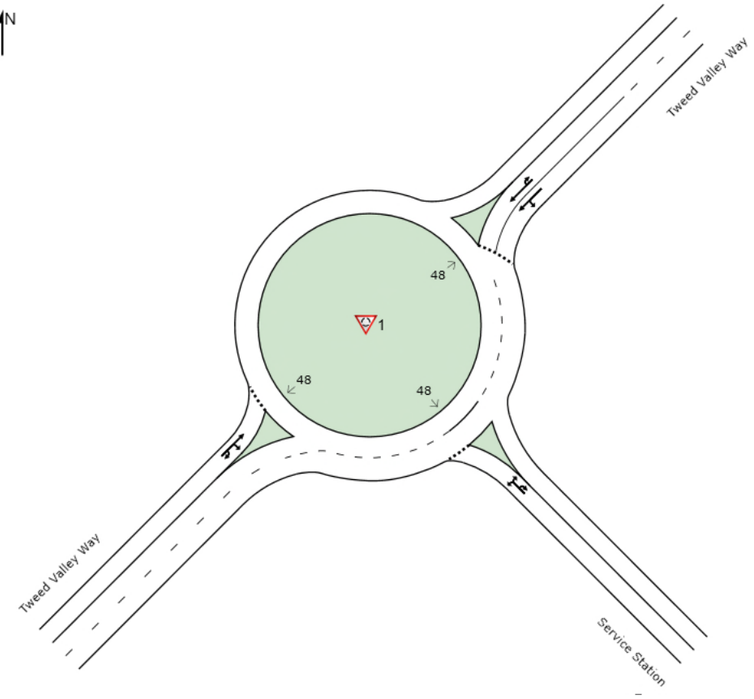
Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	41	4.9	43	4.9	0.285	4.7	LOS A	1.2	9.3	0.53	0.77	0.53	51.9
6	R2	215	14.9	226	14.9	0.285	11.8	LOS B	1.2	9.3	0.53	0.77	0.53	54.5
6u	U	1	0.0	1	0.0	0.285	14.1	LOS B	1.2	9.3	0.53	0.77	0.53	56.9
Approach		257	13.2	271	13.2	0.285	10.7	LOS B	1.2	9.3	0.53	0.77	0.53	54.1
NorthEast: Tweed Valley Way														
7	L2	43	16.3	45	16.3	0.194	3.2	LOS A	1.2	8.9	0.15	0.26	0.15	57.1
8	T1	558	6.6	587	6.6	0.194	2.5	LOS A	1.2	8.9	0.16	0.27	0.16	59.8
9u	U	8	25.0	8	25.0	0.194	12.6	LOS B	1.2	8.7	0.17	0.27	0.17	62.7
Approach		609	7.5	641	7.5	0.194	2.6	LOS A	1.2	8.9	0.16	0.27	0.16	59.6
SouthWest: Tweed Valley Way														
2	T1	32	12.5	34	12.5	0.055	3.0	LOS A	0.3	2.3	0.41	0.50	0.41	55.9
3	R2	33	12.1	35	12.1	0.055	10.6	LOS B	0.3	2.3	0.41	0.50	0.41	56.7
3u	U	1	0.0	1	0.0	0.055	13.0	LOS B	0.3	2.3	0.41	0.50	0.41	59.4
Approach		66	12.1	69	12.1	0.055	7.0	LOS A	0.3	2.3	0.41	0.50	0.41	56.4
All Vehicles		932	9.4	981	9.4	0.285	5.2	LOS A	1.2	9.3	0.28	0.42	0.28	57.7

Tweed Valley Way / Service Station Roundabout – 2022 Base with Committed Development



MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2022 AM (Site Folder: General)]

Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	23	13.6	24	13.6	0.201	4.8	LOS A	0.8	6.5	0.51	0.76	0.51	51.7
6	R2	146	24.1	154	24.1	0.201	12.0	LOS B	0.8	6.5	0.51	0.76	0.51	54.2
6u	U	1	0.0	1	0.0	0.201	14.0	LOS B	0.8	6.5	0.51	0.76	0.51	56.8
Approach		170	22.5	179	22.5	0.201	11.1	LOS B	0.8	6.5	0.51	0.76	0.51	53.8
NorthEast: Tweed Valley Way														
7	L2	44	11.6	46	11.6	0.199	3.1	LOS A	1.2	9.0	0.12	0.25	0.12	57.4
8	T1	576	6.1	606	6.1	0.199	2.4	LOS A	1.2	9.0	0.12	0.26	0.12	60.1
9u	U	14	49.4	15	49.4	0.199	12.8	LOS B	1.2	8.9	0.13	0.27	0.13	62.0
Approach		634	7.4	667	7.4	0.199	2.7	LOS A	1.2	9.0	0.12	0.26	0.12	59.9
SouthWest: Tweed Valley Way														
2	T1	40	27.0	42	27.0	0.052	2.9	LOS A	0.3	2.2	0.36	0.44	0.36	56.6
3	R2	21	5.0	22	5.0	0.052	10.2	LOS B	0.3	2.2	0.36	0.44	0.36	57.7
3u	U	1	0.0	1	0.0	0.052	12.8	LOS B	0.3	2.2	0.36	0.44	0.36	60.3
Approach		62	19.1	65	19.1	0.052	5.5	LOS A	0.3	2.2	0.36	0.44	0.36	57.0
All Vehicles		866	11.2	912	11.2	0.201	4.5	LOS A	1.2	9.0	0.21	0.37	0.21	58.4

MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2022 PM (Site Folder: General)]

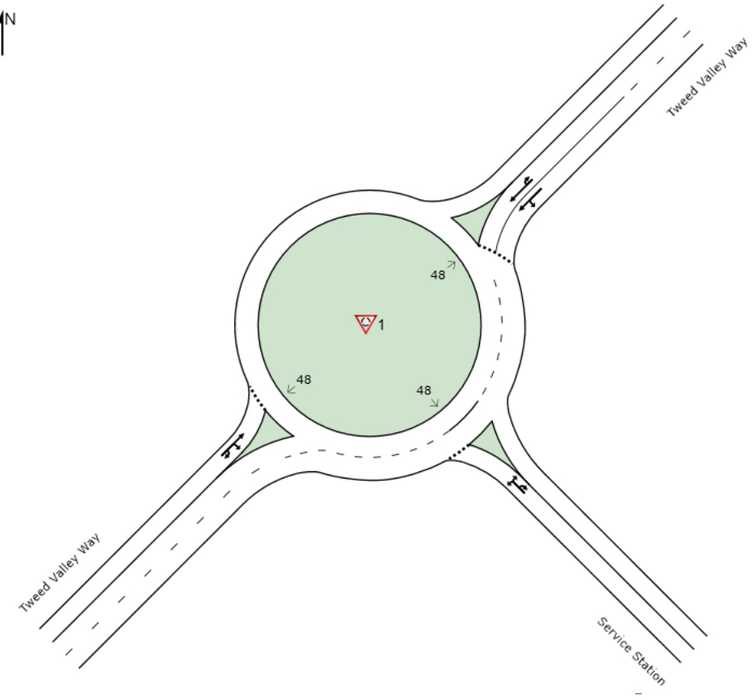
Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	42	4.9	44	4.9	0.297	4.8	LOS A	1.3	9.8	0.54	0.78	0.54	51.8
6	R2	222	14.9	234	14.9	0.297	12.0	LOS B	1.3	9.8	0.54	0.78	0.54	54.4
6u	U	1	0.0	1	0.0	0.297	14.2	LOS B	1.3	9.8	0.54	0.78	0.54	56.8
Approach		265	13.3	279	13.3	0.297	10.8	LOS B	1.3	9.8	0.54	0.78	0.54	54.0
NorthEast: Tweed Valley Way														
7	L2	44	16.3	46	16.3	0.204	3.2	LOS A	1.3	9.5	0.16	0.26	0.16	57.1
8	T1	578	6.7	608	6.7	0.204	2.5	LOS A	1.3	9.5	0.17	0.27	0.17	59.8
9u	U	14	56.1	15	56.1	0.204	13.0	LOS B	1.2	9.4	0.17	0.28	0.17	61.4
Approach		636	8.5	669	8.5	0.204	2.7	LOS A	1.3	9.5	0.16	0.27	0.16	59.6
SouthWest: Tweed Valley Way														
2	T1	35	17.0	37	17.0	0.060	3.1	LOS A	0.3	2.6	0.43	0.50	0.43	55.9
3	R2	34	12.1	36	12.1	0.060	10.7	LOS B	0.3	2.6	0.43	0.50	0.43	56.7
3u	U	1	0.0	1	0.0	0.060	13.1	LOS B	0.3	2.6	0.43	0.50	0.43	59.4
Approach		70	14.4	74	14.4	0.060	6.9	LOS A	0.3	2.6	0.43	0.50	0.43	56.3
All Vehicles		971	10.2	1022	10.2	0.297	5.3	LOS A	1.3	9.8	0.29	0.43	0.29	57.7

Tweed Valley Way / Service Station Roundabout – 2022 Base with Committed and Proposed Development



MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2022WD AM (Site Folder: General)]

Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	23	3	24	13.0	0.208	5.1	LOS A	0.8	6.8	0.53	0.79	0.53	51.6
6	R2	146	35	154	24.0	0.208	12.3	LOS B	0.8	6.8	0.53	0.79	0.53	54.1
6u	U	1	0	1	0.0	0.208	14.2	LOS B	0.8	6.8	0.53	0.79	0.53	56.7
Approach		170	38	179	22.4	0.208	11.3	LOS B	0.8	6.8	0.53	0.79	0.53	53.7
NorthEast: Tweed Valley Way														
7	L2	44	5	46	11.4	0.226	3.1	LOS A	1.4	10.7	0.12	0.25	0.12	57.4
8	T1	576	36	606	6.2	0.226	2.4	LOS A	1.4	10.7	0.13	0.28	0.13	60.0
9u	U	49	42	52	85.7	0.226	13.5	LOS B	1.3	13.0	0.14	0.32	0.14	59.7
Approach		669	83	704	12.4	0.226	3.3	LOS A	1.4	13.0	0.13	0.28	0.13	59.8
SouthWest: Tweed Valley Way														
2	T1	40	11	42	27.5	0.055	3.3	LOS A	0.3	2.3	0.42	0.47	0.42	56.3
3	R2	21	1	22	4.8	0.055	10.6	LOS B	0.3	2.3	0.42	0.47	0.42	57.4
3u	U	1	0	1	0.0	0.055	13.2	LOS B	0.3	2.3	0.42	0.47	0.42	59.9
Approach		62	12	65	19.4	0.055	5.9	LOS A	0.3	2.3	0.42	0.47	0.42	56.7
All Vehicles		901	133	948	14.8	0.226	5.0	LOS A	1.4	13.0	0.22	0.39	0.22	58.3

MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2022WD PM (Site Folder: General)]

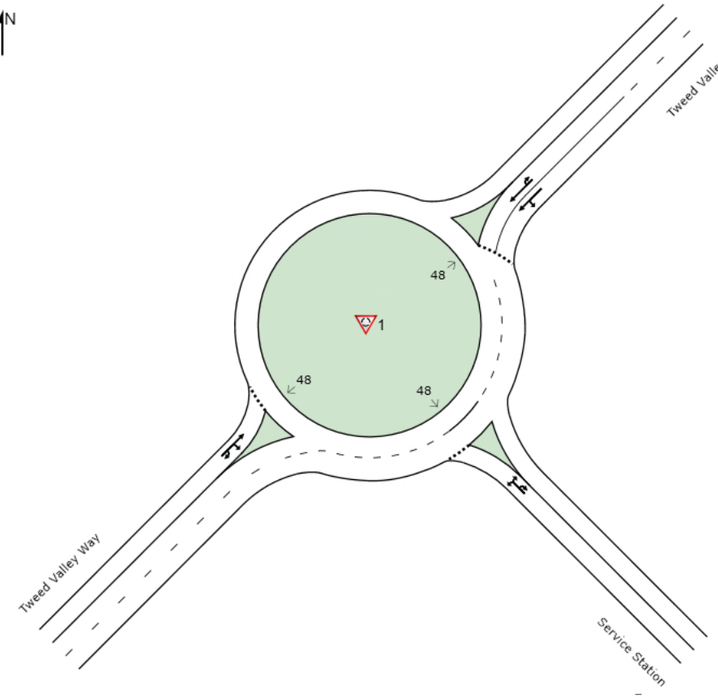
Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	42	2	44	4.8	0.308	5.0	LOS A	1.3	10.2	0.57	0.80	0.57	51.8
6	R2	222	33	234	14.9	0.308	12.2	LOS B	1.3	10.2	0.57	0.80	0.57	54.3
6u	U	1	0	1	0.0	0.308	14.4	LOS B	1.3	10.2	0.57	0.80	0.57	56.7
Approach		265	35	279	13.2	0.308	11.1	LOS B	1.3	10.2	0.57	0.80	0.57	53.9
NorthEast: Tweed Valley Way														
7	L2	44	7	46	15.9	0.231	3.2	LOS A	1.5	11.4	0.17	0.26	0.17	57.0
8	T1	578	40	608	6.9	0.231	2.5	LOS A	1.5	11.4	0.17	0.29	0.17	59.7
9u	U	49	43	52	87.8	0.231	13.8	LOS B	1.4	13.6	0.19	0.33	0.19	59.3
Approach		671	90	706	13.4	0.231	3.3	LOS A	1.5	13.6	0.17	0.29	0.17	59.5
SouthWest: Tweed Valley Way														
2	T1	35	6	37	17.1	0.064	3.6	LOS A	0.4	2.8	0.49	0.53	0.49	55.6
3	R2	34	4	36	11.8	0.064	11.1	LOS B	0.4	2.8	0.49	0.53	0.49	56.4
3u	U	1	0	1	0.0	0.064	13.5	LOS B	0.4	2.8	0.49	0.53	0.49	59.1
Approach		70	10	74	14.3	0.064	7.3	LOS A	0.4	2.8	0.49	0.53	0.49	56.1
All Vehicles		1006	135	1059	13.4	0.308	5.7	LOS A	1.5	13.6	0.30	0.44	0.30	57.6

Tweed Valley Way / Service Station Roundabout – 2032 Base



MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2032 AM (Site Folder: General)]

Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	27	13.6	28	13.6	0.244	5.2	LOS A	1.0	8.1	0.55	0.80	0.55	51.6
6	R2	171	24.1	180	24.1	0.244	12.4	LOS B	1.0	8.1	0.55	0.80	0.55	54.0
6u	U	1	0.0	1	0.0	0.244	14.3	LOS B	1.0	8.1	0.55	0.80	0.55	56.7
Approach		199	22.6	209	22.6	0.244	11.4	LOS B	1.0	8.1	0.55	0.80	0.55	53.7
NorthEast: Tweed Valley Way														
7	L2	52	11.6	55	11.6	0.230	3.1	LOS A	1.5	10.8	0.13	0.26	0.13	57.3
8	T1	673	5.9	708	5.9	0.230	2.4	LOS A	1.5	10.8	0.14	0.26	0.14	60.0
9u	U	10	12.5	11	12.5	0.230	12.4	LOS B	1.4	10.6	0.14	0.26	0.14	63.3
Approach		735	6.4	774	6.4	0.230	2.6	LOS A	1.5	10.8	0.13	0.26	0.13	59.8
SouthWest: Tweed Valley Way														
2	T1	45	24.3	47	24.3	0.059	3.0	LOS A	0.3	2.6	0.38	0.45	0.38	56.6
3	R2	24	5.0	25	5.0	0.059	10.3	LOS B	0.3	2.6	0.38	0.45	0.38	57.7
3u	U	1	0.0	1	0.0	0.059	12.9	LOS B	0.3	2.6	0.38	0.45	0.38	60.2
Approach		70	17.3	74	17.3	0.059	5.6	LOS A	0.3	2.6	0.38	0.45	0.38	57.0
All Vehicles		1004	10.4	1057	10.4	0.244	4.6	LOS A	1.5	10.8	0.23	0.38	0.23	58.3

MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2032 PM (Site Folder: General)]

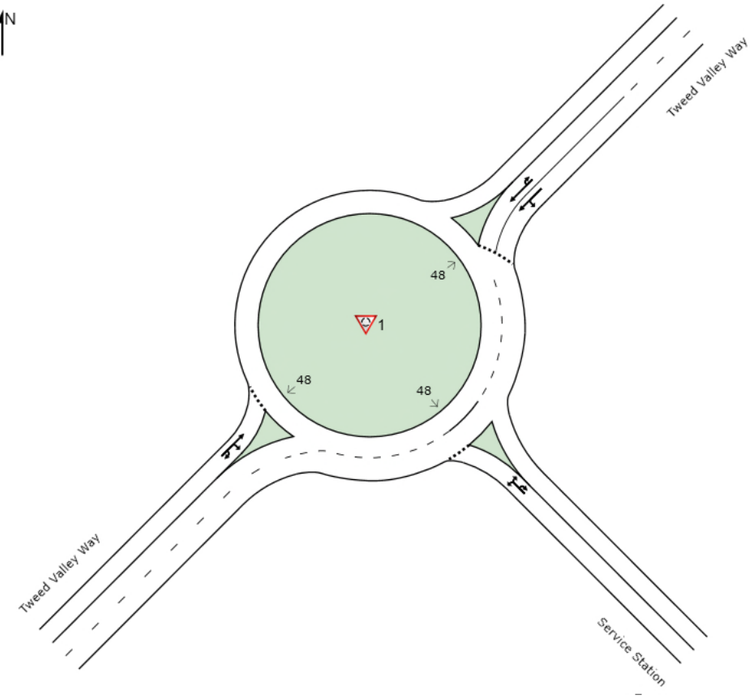
Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	50	4.9	53	4.9	0.364	5.2	LOS A	1.6	12.7	0.59	0.82	0.60	51.7
6	R2	260	14.9	274	14.9	0.364	12.4	LOS B	1.6	12.7	0.59	0.82	0.60	54.3
6u	U	1	0.0	1	0.0	0.364	14.6	LOS B	1.6	12.7	0.59	0.82	0.60	56.6
Approach		311	13.2	327	13.2	0.364	11.3	LOS B	1.6	12.7	0.59	0.82	0.60	53.8
NorthEast: Tweed Valley Way														
7	L2	52	16.3	55	16.3	0.237	3.2	LOS A	1.6	11.6	0.18	0.27	0.18	56.9
8	T1	675	6.6	711	6.6	0.237	2.5	LOS A	1.6	11.6	0.19	0.27	0.19	59.6
9u	U	10	25.0	11	25.0	0.237	12.7	LOS B	1.5	11.2	0.20	0.28	0.20	62.4
Approach		737	7.5	776	7.5	0.237	2.7	LOS A	1.6	11.6	0.19	0.27	0.19	59.5
SouthWest: Tweed Valley Way														
2	T1	39	12.5	41	12.5	0.070	3.3	LOS A	0.4	3.1	0.46	0.52	0.46	55.7
3	R2	40	12.1	42	12.1	0.070	10.8	LOS B	0.4	3.1	0.46	0.52	0.46	56.5
3u	U	1	0.0	1	0.0	0.070	13.3	LOS B	0.4	3.1	0.46	0.52	0.46	59.2
Approach		80	12.1	84	12.1	0.070	7.2	LOS A	0.4	3.1	0.46	0.52	0.46	56.2
All Vehicles		1128	9.4	1187	9.4	0.364	5.4	LOS A	1.6	12.7	0.32	0.44	0.32	57.5

Tweed Valley Way / Service Station Roundabout – 2032 Base with Proposed Development



MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2032WD AM (Site Folder: General)]

Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	27	4	28	14.8	0.252	5.4	LOS A	1.0	8.5	0.57	0.82	0.57	51.5
6	R2	171	41	180	24.0	0.252	12.6	LOS B	1.0	8.5	0.57	0.82	0.57	53.9
6u	U	1	0	1	0.0	0.252	14.5	LOS B	1.0	8.5	0.57	0.82	0.57	56.5
Approach		199	45	209	22.6	0.252	11.6	LOS B	1.0	8.5	0.57	0.82	0.57	53.6
NorthEast: Tweed Valley Way														
7	L2	52	6	55	11.5	0.256	3.1	LOS A	1.7	12.7	0.14	0.26	0.14	57.3
8	T1	673	40	708	5.9	0.256	2.4	LOS A	1.7	12.7	0.14	0.28	0.14	59.9
9u	U	44	36	46	81.8	0.256	13.6	LOS B	1.6	14.7	0.15	0.31	0.15	59.8
Approach		769	82	809	10.7	0.256	3.1	LOS A	1.7	14.7	0.14	0.28	0.14	59.7
SouthWest: Tweed Valley Way														
2	T1	45	11	47	24.4	0.062	3.4	LOS A	0.3	2.7	0.44	0.48	0.44	56.2
3	R2	24	1	25	4.2	0.062	10.7	LOS B	0.3	2.7	0.44	0.48	0.44	57.4
3u	U	1	0	1	0.0	0.062	13.2	LOS B	0.3	2.7	0.44	0.48	0.44	59.9
Approach		70	12	74	17.1	0.062	6.0	LOS A	0.3	2.7	0.44	0.48	0.44	56.7
All Vehicles		1038	139	1093	13.4	0.256	4.9	LOS A	1.7	14.7	0.24	0.39	0.24	58.2

MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2032WD PM (Site Folder: General)]

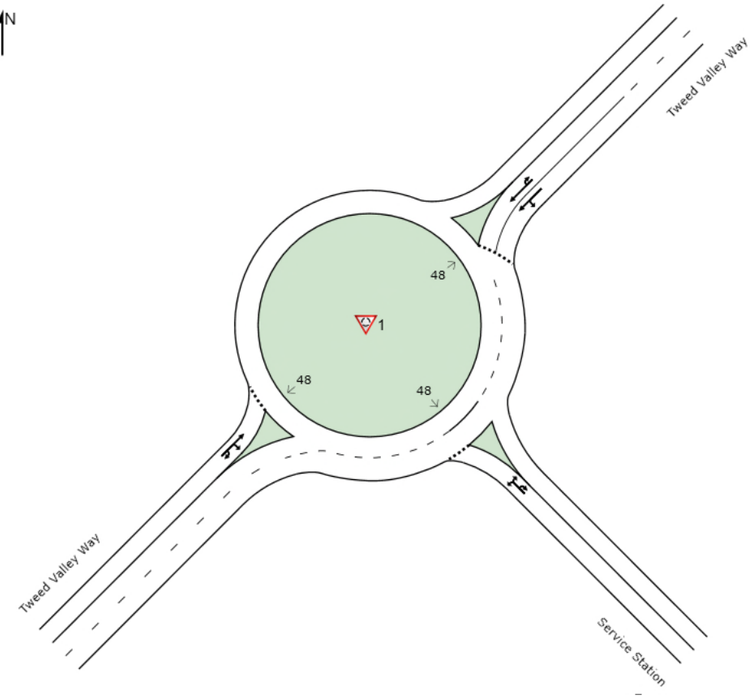
Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	50	2	53	4.0	0.376	5.5	LOS A	1.7	13.5	0.62	0.85	0.65	51.6
6	R2	260	39	274	15.0	0.376	12.8	LOS B	1.7	13.5	0.62	0.85	0.65	54.2
6u	U	1	0	1	0.0	0.376	14.9	LOS B	1.7	13.5	0.62	0.85	0.65	56.5
Approach		311	41	327	13.2	0.376	11.6	LOS B	1.7	13.5	0.62	0.85	0.65	53.7
NorthEast: Tweed Valley Way														
7	L2	52	6	55	11.5	0.263	3.2	LOS A	1.8	13.4	0.19	0.27	0.19	57.0
8	T1	675	40	711	5.9	0.263	2.5	LOS A	1.8	13.4	0.20	0.29	0.20	59.6
9u	U	44	36	46	81.8	0.263	13.9	LOS B	1.6	15.3	0.21	0.32	0.21	59.4
Approach		771	82	812	10.6	0.263	3.2	LOS A	1.8	15.3	0.20	0.29	0.20	59.4
SouthWest: Tweed Valley Way														
2	T1	39	5	41	12.8	0.075	3.7	LOS A	0.4	3.3	0.52	0.55	0.52	55.5
3	R2	40	5	42	12.5	0.075	11.2	LOS B	0.4	3.3	0.52	0.55	0.52	56.3
3u	U	1	0	1	0.0	0.075	13.6	LOS B	0.4	3.3	0.52	0.55	0.52	59.0
Approach		80	10	84	12.5	0.075	7.6	LOS A	0.4	3.3	0.52	0.55	0.52	55.9
All Vehicles		1162	133	1223	11.4	0.376	5.7	LOS A	1.8	15.3	0.33	0.46	0.34	57.5

Tweed Valley Way / Service Station Roundabout – 2042 Base



MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2042 AM (Site Folder: General)]

Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	31	13.6	33	13.6	0.298	5.6	LOS A	1.2	10.3	0.59	0.83	0.59	51.4
6	R2	200	24.1	211	24.1	0.298	12.8	LOS B	1.2	10.3	0.59	0.83	0.59	53.8
6u	U	1	0.0	1	0.0	0.298	14.6	LOS B	1.2	10.3	0.59	0.83	0.59	56.4
Approach		232	22.6	244	22.6	0.298	11.8	LOS B	1.2	10.3	0.59	0.83	0.59	53.5
NorthEast: Tweed Valley Way														
7	L2	61	11.6	64	11.6	0.270	3.1	LOS A	1.8	13.4	0.15	0.26	0.15	57.2
8	T1	788	5.9	829	5.9	0.270	2.4	LOS A	1.8	13.4	0.16	0.26	0.16	59.8
9u	U	11	12.5	12	12.5	0.270	12.5	LOS B	1.8	13.1	0.16	0.27	0.16	63.2
Approach		860	6.4	905	6.4	0.270	2.6	LOS A	1.8	13.4	0.15	0.26	0.15	59.7
SouthWest: Tweed Valley Way														
2	T1	52	24.3	55	24.3	0.070	3.1	LOS A	0.4	3.1	0.42	0.46	0.42	56.4
3	R2	28	5.0	29	5.0	0.070	10.5	LOS B	0.4	3.1	0.42	0.46	0.42	57.5
3u	U	1	0.0	1	0.0	0.070	13.0	LOS B	0.4	3.1	0.42	0.46	0.42	60.0
Approach		81	17.3	85	17.3	0.070	5.8	LOS A	0.4	3.1	0.42	0.46	0.42	56.8
All Vehicles		1173	10.3	1235	10.3	0.298	4.7	LOS A	1.8	13.4	0.26	0.39	0.26	58.1

MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2042 PM (Site Folder: General)]

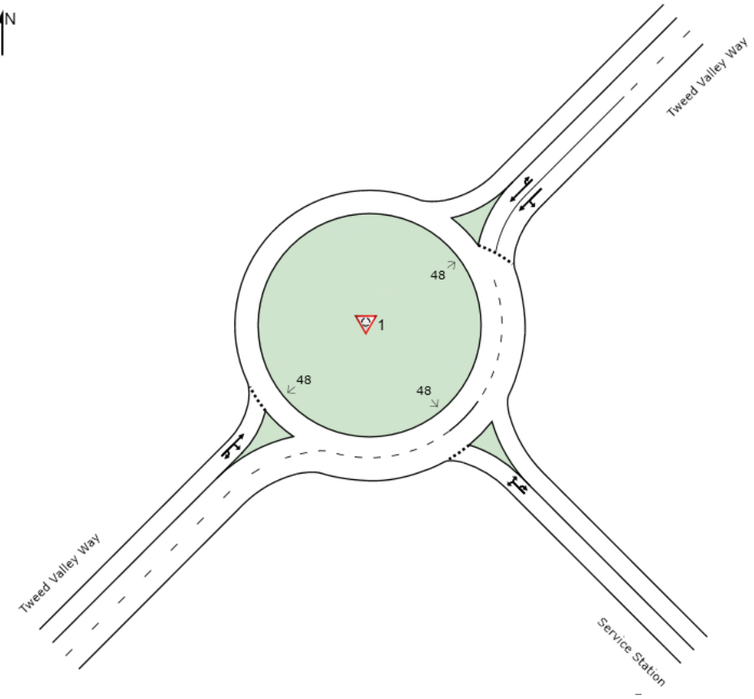
Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	58	4.9	61	4.9	0.447	6.1	LOS A	2.3	17.9	0.65	0.89	0.75	51.2
6	R2	305	14.9	321	14.9	0.447	13.4	LOS B	2.3	17.9	0.65	0.89	0.75	53.7
6u	U	1	0.0	1	0.0	0.447	15.5	LOS B	2.3	17.9	0.65	0.89	0.75	56.1
Approach		364	13.3	383	13.3	0.447	12.2	LOS B	2.3	17.9	0.65	0.89	0.75	53.3
NorthEast: Tweed Valley Way														
7	L2	61	16.3	64	16.3	0.279	3.2	LOS A	1.9	14.5	0.21	0.27	0.21	56.8
8	T1	791	6.6	833	6.6	0.279	2.5	LOS A	1.9	14.5	0.22	0.28	0.22	59.4
9u	U	11	25.0	12	25.0	0.279	12.7	LOS B	1.9	14.0	0.23	0.28	0.23	62.2
Approach		863	7.5	908	7.5	0.279	2.7	LOS A	1.9	14.5	0.22	0.28	0.22	59.3
SouthWest: Tweed Valley Way														
2	T1	45	12.5	47	12.5	0.085	3.5	LOS A	0.5	3.9	0.51	0.54	0.51	55.5
3	R2	47	12.1	49	12.1	0.085	11.1	LOS B	0.5	3.9	0.51	0.54	0.51	56.3
3u	U	1	0.0	1	0.0	0.085	13.5	LOS B	0.5	3.9	0.51	0.54	0.51	59.0
Approach		93	12.2	98	12.2	0.085	7.4	LOS A	0.5	3.9	0.51	0.54	0.51	56.0
All Vehicles		1320	9.4	1389	9.4	0.447	5.7	LOS A	2.3	17.9	0.36	0.46	0.38	57.2

Tweed Valley Way / Service Station Roundabout – 2042 Base with Proposed Development



MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2042WD AM (Site Folder: General)]

Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	31	4	33	12.9	0.307	5.8	LOS A	1.3	10.7	0.61	0.84	0.61	51.3
6	R2	200	48	211	24.0	0.307	13.1	LOS B	1.3	10.7	0.61	0.84	0.61	53.7
6u	U	1	0	1	0.0	0.307	14.8	LOS B	1.3	10.7	0.61	0.84	0.61	56.2
Approach		232	52	244	22.4	0.307	12.1	LOS B	1.3	10.7	0.61	0.84	0.61	53.3
NorthEast: Tweed Valley Way														
7	L2	61	7	64	11.5	0.297	3.1	LOS A	2.1	15.5	0.15	0.26	0.15	57.2
8	T1	788	47	829	6.0	0.297	2.5	LOS A	2.1	15.5	0.16	0.28	0.16	59.8
9u	U	46	36	48	78.3	0.297	13.6	LOS B	2.0	17.7	0.17	0.31	0.17	59.8
Approach		895	90	942	10.1	0.297	3.1	LOS A	2.1	17.7	0.16	0.28	0.16	59.6
SouthWest: Tweed Valley Way														
2	T1	52	13	55	25.0	0.074	3.6	LOS A	0.4	3.3	0.48	0.49	0.48	56.1
3	R2	28	1	29	3.6	0.074	10.8	LOS B	0.4	3.3	0.48	0.49	0.48	57.2
3u	U	1	0	1	0.0	0.074	13.4	LOS B	0.4	3.3	0.48	0.49	0.48	59.6
Approach		81	14	85	17.3	0.074	6.2	LOS A	0.4	3.3	0.48	0.49	0.48	56.5
All Vehicles		1208	156	1272	12.9	0.307	5.0	LOS A	2.1	17.7	0.27	0.40	0.27	58.0

MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2042WD PM (Site Folder: General)]

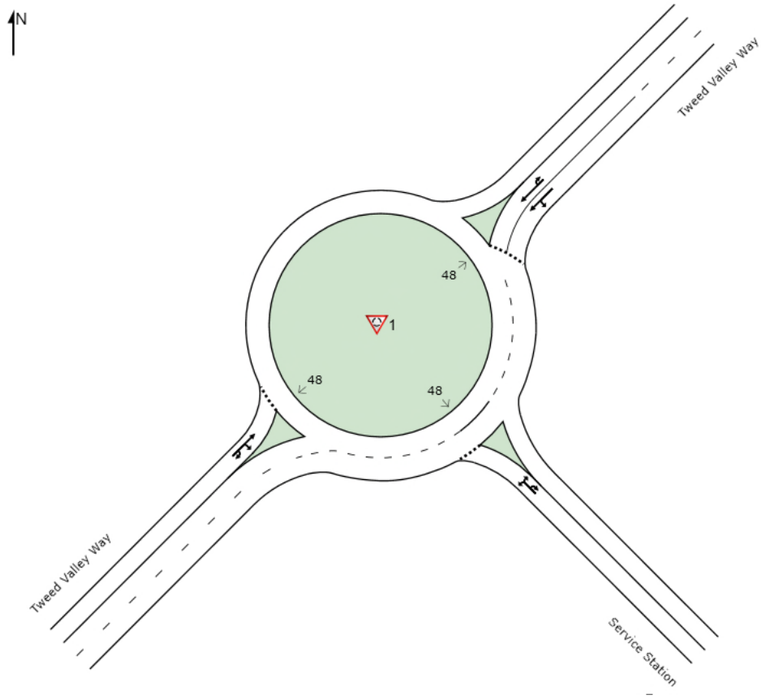
Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	58	3	61	5.2	0.462	6.6	LOS A	2.4	19.0	0.68	0.91	0.80	50.9
6	R2	305	45	321	14.8	0.462	13.8	LOS B	2.4	19.0	0.68	0.91	0.80	53.4
6u	U	1	0	1	0.0	0.462	15.8	LOS B	2.4	19.0	0.68	0.91	0.80	55.7
Approach		364	48	383	13.2	0.462	12.6	LOS B	2.4	19.0	0.68	0.91	0.80	53.0
NorthEast: Tweed Valley Way														
7	L2	61	10	64	16.4	0.308	3.2	LOS A	2.2	16.8	0.22	0.27	0.22	56.7
8	T1	791	52	833	6.6	0.308	2.6	LOS A	2.2	16.8	0.23	0.29	0.23	59.3
9u	U	46	36	48	78.3	0.308	14.0	LOS B	2.1	18.7	0.24	0.32	0.24	59.3
Approach		898	98	945	10.9	0.308	3.2	LOS A	2.2	18.7	0.23	0.29	0.23	59.1
SouthWest: Tweed Valley Way														
2	T1	45	6	47	13.3	0.091	4.0	LOS A	0.5	4.2	0.57	0.57	0.57	55.3
3	R2	47	6	49	12.8	0.091	11.5	LOS B	0.5	4.2	0.57	0.57	0.57	56.0
3u	U	1	0	1	0.0	0.091	13.9	LOS B	0.5	4.2	0.57	0.57	0.57	58.7
Approach		93	12	98	12.9	0.091	7.9	LOS A	0.5	4.2	0.57	0.57	0.57	55.7
All Vehicles		1355	158	1426	11.7	0.462	6.0	LOS A	2.4	19.0	0.37	0.48	0.41	57.1

Tweed Valley Way / Service Station Roundabout – 2042 Base with Proposed Development (Sensitivity Testing)



MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2042WD AM - Sensitivity (Site Folder: General)]

Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	31	4	33	12.9	0.310	5.8	LOS A	1.3	10.8	0.62	0.84	0.62	51.2
6	R2	200	48	211	24.0	0.310	13.1	LOS B	1.3	10.8	0.62	0.84	0.62	53.6
6u	U	1	0	1	0.0	0.310	14.9	LOS B	1.3	10.8	0.62	0.84	0.62	56.2
Approach		232	52	244	22.4	0.310	12.1	LOS B	1.3	10.8	0.62	0.84	0.62	53.3
NorthEast: Tweed Valley Way														
7	L2	61	7	64	11.5	0.302	3.1	LOS A	2.1	15.9	0.16	0.26	0.16	57.2
8	T1	788	47	829	6.0	0.302	2.5	LOS A	2.1	15.9	0.16	0.28	0.16	59.8
9u	U	51	41	54	80.4	0.302	13.6	LOS B	2.0	18.3	0.18	0.31	0.18	59.6
Approach		900	95	947	10.6	0.302	3.1	LOS A	2.1	18.3	0.16	0.28	0.16	59.6
SouthWest: Tweed Valley Way														
2	T1	52	13	55	25.0	0.075	3.6	LOS A	0.4	3.3	0.49	0.50	0.49	56.0
3	R2	28	1	29	3.6	0.075	10.9	LOS B	0.4	3.3	0.49	0.50	0.49	57.1
3u	U	1	0	1	0.0	0.075	13.5	LOS B	0.4	3.3	0.49	0.50	0.49	59.6
Approach		81	14	85	17.3	0.075	6.3	LOS A	0.4	3.3	0.49	0.50	0.49	56.4
All Vehicles		1213	161	1277	13.3	0.310	5.1	LOS A	2.1	18.3	0.27	0.40	0.27	58.0

MOVEMENT SUMMARY

Site: 1 [Tweed Valley Way / Service Station 2042WD PM - Sensitivity (Site Folder: General)]

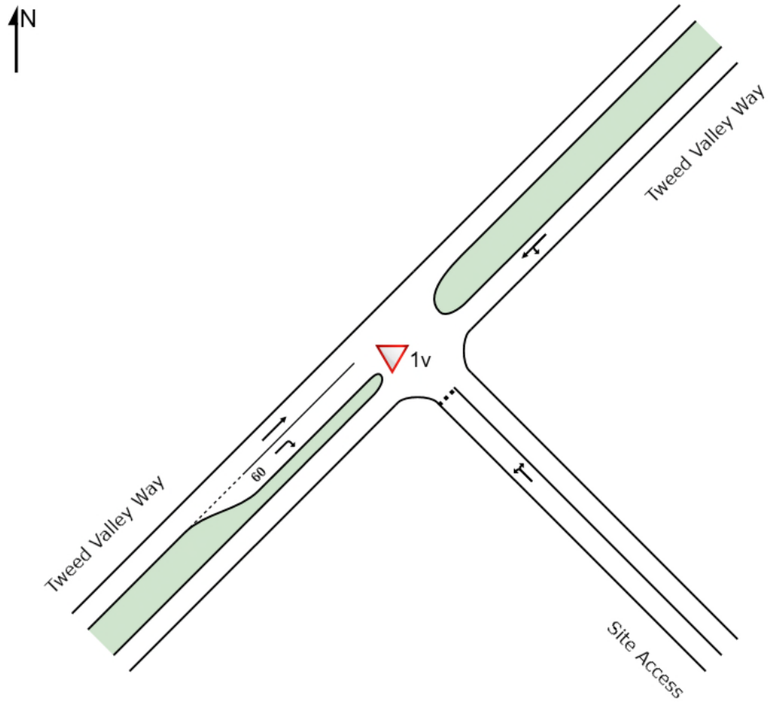
Tweed Valley Way / Service Station

Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Service Station														
4	L2	58	3	61	5.2	0.465	6.6	LOS A	2.5	19.2	0.68	0.92	0.81	50.9
6	R2	305	45	321	14.8	0.465	13.8	LOS B	2.5	19.2	0.68	0.92	0.81	53.4
6u	U	1	0	1	0.0	0.465	15.9	LOS B	2.5	19.2	0.68	0.92	0.81	55.7
Approach		364	48	383	13.2	0.465	12.7	LOS B	2.5	19.2	0.68	0.92	0.81	53.0
NorthEast: Tweed Valley Way														
7	L2	61	10	64	16.4	0.312	3.2	LOS A	2.3	17.1	0.22	0.27	0.22	56.7
8	T1	791	52	833	6.6	0.312	2.6	LOS A	2.3	17.1	0.23	0.29	0.23	59.3
9u	U	51	43	54	84.3	0.312	14.0	LOS B	2.1	19.5	0.25	0.33	0.25	59.1
Approach		903	105	951	11.6	0.312	3.2	LOS A	2.3	19.5	0.23	0.29	0.23	59.1
SouthWest: Tweed Valley Way														
2	T1	45	6	47	13.3	0.092	4.0	LOS A	0.5	4.3	0.57	0.58	0.57	55.2
3	R2	47	6	49	12.8	0.092	11.6	LOS B	0.5	4.3	0.57	0.58	0.57	56.0
3u	U	1	0	1	0.0	0.092	14.0	LOS B	0.5	4.3	0.57	0.58	0.57	58.6
Approach		93	12	98	12.9	0.092	8.0	LOS A	0.5	4.3	0.57	0.58	0.57	55.6
All Vehicles		1360	165	1432	12.1	0.465	6.1	LOS A	2.5	19.5	0.37	0.48	0.41	57.1

Tweed Valley Way / Australian Bay Lobster Producers Access – 2020 Base



MOVEMENT SUMMARY

Site: 1v [Tweed Valley Way / Site Access 2020 AM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	3	33.3	3	33.3	0.017	9.8	LOS A	0.1	0.6	0.69	0.79	0.69	45.6
2	R2	2	100.0	2	100.0	0.017	24.6	LOS C	0.1	0.6	0.69	0.79	0.69	43.1
Approach		5	60.0	5	60.0	0.017	15.7	LOS C	0.1	0.6	0.69	0.79	0.69	44.6
NorthEast: Tweed Valley Way														
3	L2	3	0.0	3	0.0	0.331	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.2
4	T1	588	5.6	619	5.6	0.331	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		591	5.6	622	5.6	0.331	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
SouthWest: Tweed Valley Way														
5	T1	60	21.7	63	21.7	0.037	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	4	50.0	4	50.0	0.007	10.7	LOS B	0.0	0.3	0.60	0.69	0.60	47.9
Approach		64	23.5	67	23.5	0.037	0.7	NA	0.0	0.3	0.04	0.04	0.04	59.0
All Vehicles		660	7.7	695	7.7	0.331	0.3	NA	0.1	0.6	0.01	0.01	0.01	59.5

MOVEMENT SUMMARY

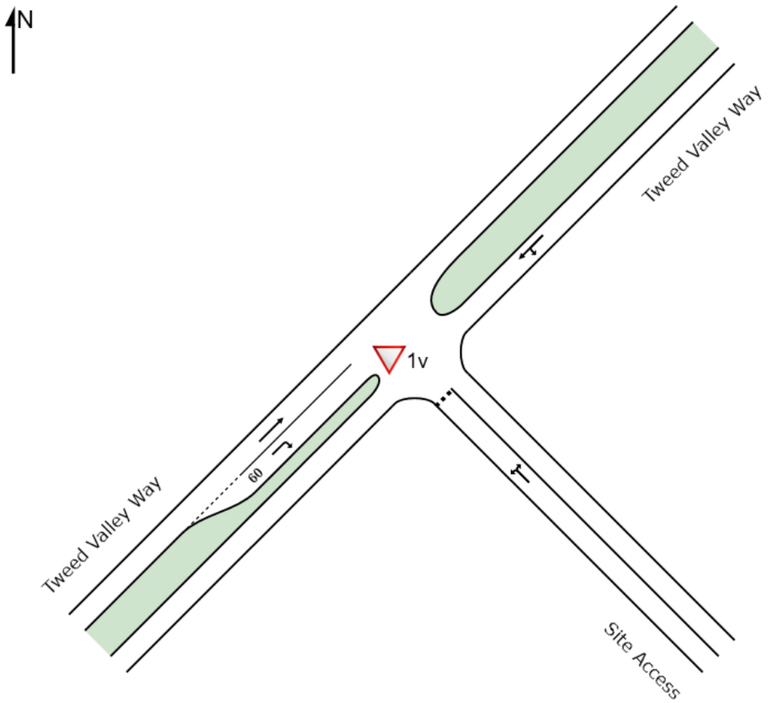
Site: 1v [Tweed Valley Way / Site Access 2020 PM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	8	37.5	8	37.5	0.015	9.8	LOS A	0.1	0.5	0.56	0.70	0.56	49.3
2	R2	1	0.0	1	0.0	0.015	10.9	LOS B	0.1	0.5	0.56	0.70	0.56	50.2
Approach		9	33.3	9	33.3	0.015	9.9	LOS A	0.1	0.5	0.56	0.70	0.56	49.4
NorthEast: Tweed Valley Way														
3	L2	1	100.0	1	100.0	0.318	6.8	LOS A	0.0	0.0	0.00	0.00	0.00	53.5
4	T1	566	5.7	596	5.7	0.318	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		567	5.9	597	5.9	0.318	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
SouthWest: Tweed Valley Way														
5	T1	49	20.4	52	20.4	0.030	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	1	0.0	1	0.0	0.001	7.8	LOS A	0.0	0.0	0.54	0.58	0.54	51.3
Approach		50	20.0	53	20.0	0.030	0.2	NA	0.0	0.0	0.01	0.01	0.01	59.8
All Vehicles		626	7.4	659	7.4	0.318	0.3	NA	0.1	0.5	0.01	0.01	0.01	59.6

Tweed Valley Way / Australian Bay Lobster Producers Access – 2022 Base with Committed Development



MOVEMENT SUMMARY

Site: 1v [Tweed Valley Way / Site Access 2022 with Com Dev AM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	8	100.0	8	100.0	0.049	14.8	LOS B	0.2	2.1	0.74	0.88	0.74	42.0
2	R2	4	100.0	4	100.0	0.049	27.2	LOS D	0.2	2.1	0.74	0.88	0.74	41.4
Approach		12	100.0	13	100.0	0.049	19.0	LOS C	0.2	2.1	0.74	0.88	0.74	41.8
NorthEast: Tweed Valley Way														
3	L2	6	100.0	6	100.0	0.345	6.8	LOS A	0.0	0.0	0.00	0.01	0.00	53.5
4	T1	607	5.6	639	5.6	0.345	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
Approach		613	6.5	645	6.5	0.345	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
SouthWest: Tweed Valley Way														
5	T1	64	21.7	67	21.7	0.040	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	8	100.0	8	100.0	0.022	14.9	LOS B	0.1	1.1	0.69	0.80	0.69	43.4
Approach		72	30.4	76	30.4	0.040	1.7	NA	0.1	1.1	0.08	0.09	0.08	57.5
All Vehicles		697	10.6	734	10.6	0.345	0.7	NA	0.2	2.1	0.02	0.03	0.02	59.0

MOVEMENT SUMMARY

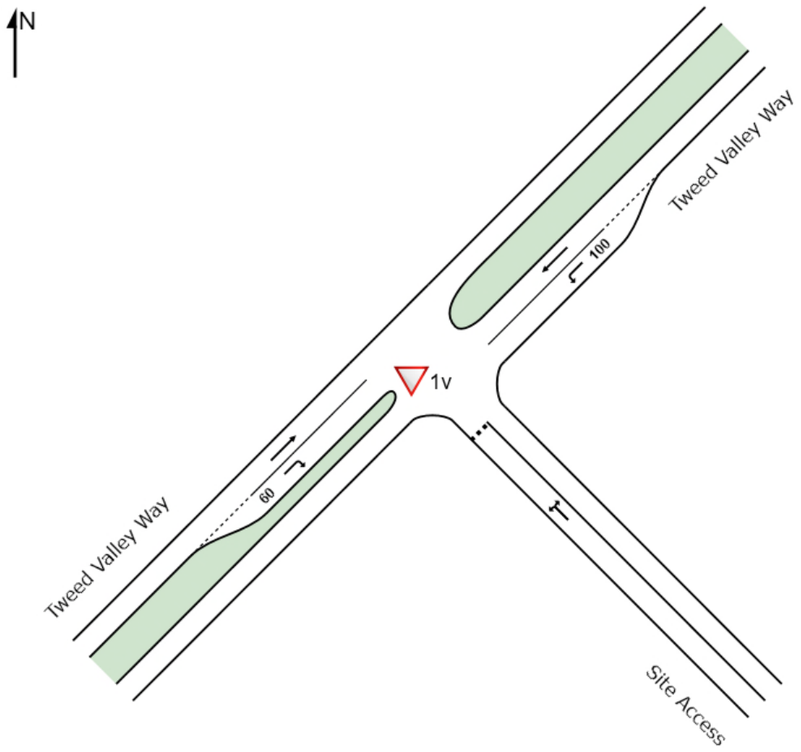
Site: 1v [Tweed Valley Way / Site Access 2022 with Com Dev PM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	13	100.0	14	100.0	0.053	14.3	LOS B	0.2	2.4	0.69	0.85	0.69	43.3
2	R2	3	100.0	3	100.0	0.053	24.8	LOS C	0.2	2.4	0.69	0.85	0.69	42.8
Approach		16	100.0	17	100.0	0.053	16.3	LOS C	0.2	2.4	0.69	0.85	0.69	43.2
NorthEast: Tweed Valley Way														
3	L2	4	100.0	4	100.0	0.331	6.8	LOS A	0.0	0.0	0.00	0.00	0.00	53.5
4	T1	584	5.7	615	5.7	0.331	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		588	6.3	619	6.3	0.331	0.2	NA	0.0	0.0	0.00	0.00	0.00	59.7
SouthWest: Tweed Valley Way														
5	T1	53	20.4	56	20.4	0.032	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	4	100.0	4	100.0	0.010	14.1	LOS B	0.0	0.5	0.66	0.74	0.66	43.8
Approach		57	26.0	60	26.0	0.032	1.0	NA	0.0	0.5	0.05	0.05	0.05	58.5
All Vehicles		661	10.3	696	10.3	0.331	0.6	NA	0.2	2.4	0.02	0.03	0.02	59.0

Tweed Valley Way / Australian Bay Lobster Producers Access – 2022 Base with Committed and Proposed Development



MOVEMENT SUMMARY

Site: 1v [Tweed Valley Way / Site Access 2022WD AM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	8	6	8	75.0	0.077	17.5	LOS C	0.2	2.9	0.82	0.92	0.82	39.1
2	R2	4	4	4	100.0	0.077	45.4	LOS E	0.2	2.9	0.82	0.92	0.82	38.4
Approach		12	10	13	83.3	0.077	26.8	LOS D	0.2	2.9	0.82	0.92	0.82	38.9
NorthEast: Tweed Valley Way														
3	L2	37	34	39	91.9	0.050	7.0	LOS A	0.0	0.0	0.00	0.57	0.00	48.6
4	T1	640	67	674	10.5	0.384	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		677	101	713	14.9	0.384	0.5	NA	0.0	0.0	0.00	0.03	0.00	59.0
SouthWest: Tweed Valley Way														
5	T1	66	17	69	25.8	0.043	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	10	8	11	80.0	0.050	22.5	LOS C	0.2	2.3	0.79	0.92	0.79	40.4
Approach		76	25	80	32.9	0.050	3.0	NA	0.2	2.3	0.10	0.12	0.10	56.4
All Vehicles		765	136	805	17.8	0.384	1.2	NA	0.2	2.9	0.02	0.05	0.02	58.2

MOVEMENT SUMMARY

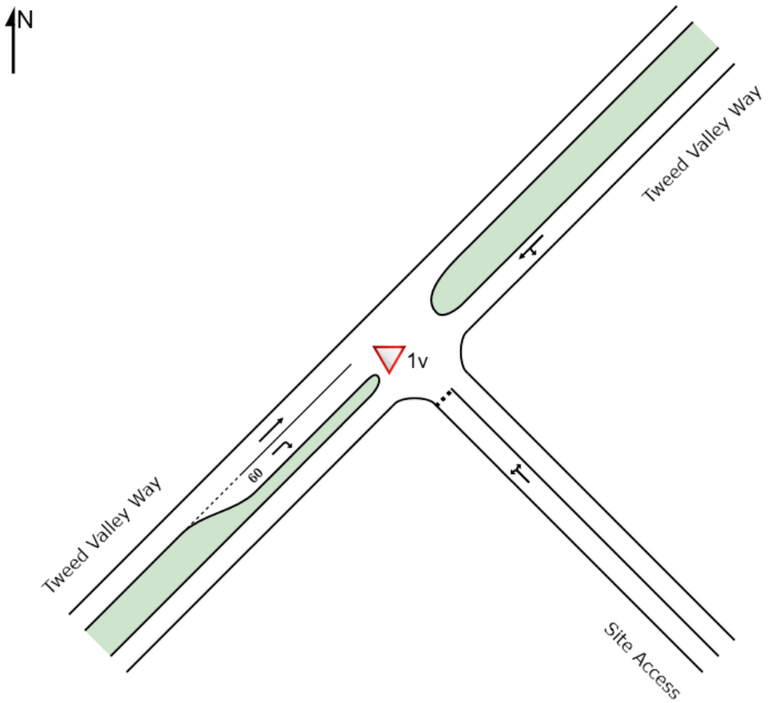
Site: 1v [Tweed Valley Way / Site Access 2022WD PM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	13	8	14	61.5	0.064	15.3	LOS C	0.2	2.2	0.74	0.89	0.74	43.9
2	R2	3	2	3	66.7	0.064	29.5	LOS D	0.2	2.2	0.74	0.89	0.74	43.6
Approach		16	10	17	62.5	0.064	17.9	LOS C	0.2	2.2	0.74	0.89	0.74	43.9
NorthEast: Tweed Valley Way														
3	L2	35	35	37	100.0	0.049	7.1	LOS A	0.0	0.0	0.00	0.57	0.00	47.3
4	T1	617	66	649	10.7	0.371	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		652	101	686	15.5	0.371	0.5	NA	0.0	0.0	0.00	0.03	0.00	58.9
SouthWest: Tweed Valley Way														
5	T1	54	14	57	25.9	0.035	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	6	6	6	100.0	0.037	26.7	LOS D	0.1	1.9	0.81	0.93	0.81	37.5
Approach		60	20	63	33.3	0.037	2.7	NA	0.1	1.9	0.08	0.09	0.08	56.6
All Vehicles		728	131	766	18.0	0.371	1.1	NA	0.2	2.2	0.02	0.05	0.02	58.3

Tweed Valley Way / Australian Bay Lobster Producers Access – 2032 Base



MOVEMENT SUMMARY

Site: 1v [Tweed Valley Way / Site Access 2032 AM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	3	33.3	3	33.3	0.024	11.5	LOS B	0.1	0.8	0.79	0.88	0.79	42.7
2	R2	2	100.0	2	100.0	0.024	35.8	LOS E	0.1	0.8	0.79	0.88	0.79	40.4
Approach		5	60.0	5	60.0	0.024	21.2	LOS C	0.1	0.8	0.79	0.88	0.79	41.8
NorthEast: Tweed Valley Way														
3	L2	3	0.0	3	0.0	0.399	5.7	LOS A	0.0	0.0	0.00	0.00	0.00	58.1
4	T1	711	5.6	748	5.6	0.399	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		714	5.6	752	5.6	0.399	0.2	NA	0.0	0.0	0.00	0.00	0.00	59.7
SouthWest: Tweed Valley Way														
5	T1	73	21.7	77	21.7	0.045	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	4	50.0	4	50.0	0.009	12.8	LOS B	0.0	0.3	0.69	0.75	0.69	46.5
Approach		77	23.2	81	23.2	0.045	0.7	NA	0.0	0.3	0.04	0.04	0.04	59.1
All Vehicles		796	7.6	838	7.6	0.399	0.3	NA	0.1	0.8	0.01	0.01	0.01	59.5

MOVEMENT SUMMARY

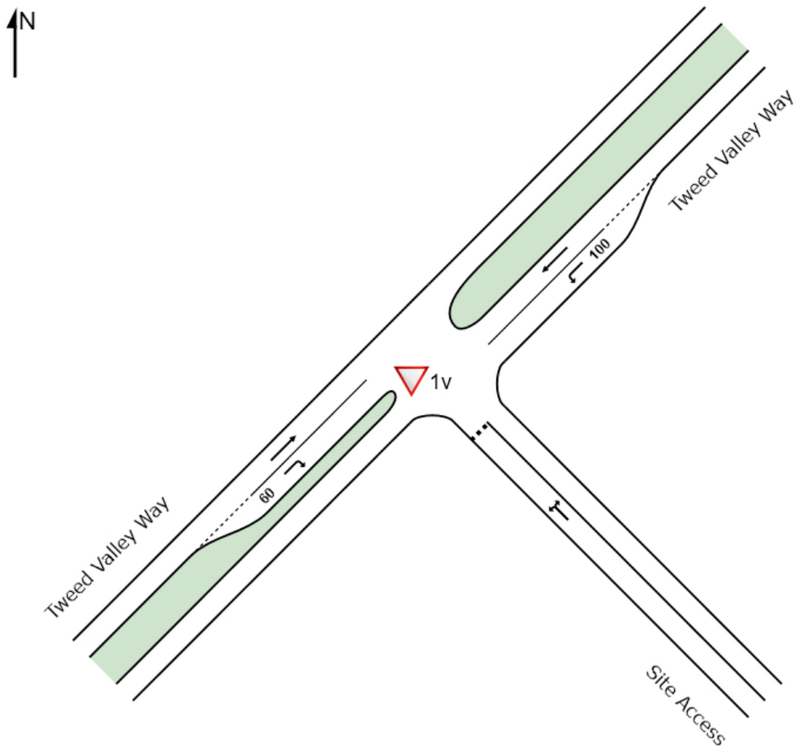
Site: 1v [Tweed Valley Way / Site Access 2032 PM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	8	37.5	8	37.5	0.019	11.5	LOS B	0.1	0.6	0.64	0.77	0.64	48.1
2	R2	1	0.0	1	0.0	0.019	13.3	LOS B	0.1	0.6	0.64	0.77	0.64	49.0
Approach		9	33.3	9	33.3	0.019	11.7	LOS B	0.1	0.6	0.64	0.77	0.64	48.2
NorthEast: Tweed Valley Way														
3	L2	1	100.0	1	100.0	0.384	6.8	LOS A	0.0	0.0	0.00	0.00	0.00	53.5
4	T1	685	5.7	721	5.7	0.384	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		686	5.8	722	5.8	0.384	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.7
SouthWest: Tweed Valley Way														
5	T1	59	20.4	62	20.4	0.036	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	1	0.0	1	0.0	0.001	8.8	LOS A	0.0	0.0	0.59	0.61	0.59	50.7
Approach		60	20.1	63	20.1	0.036	0.2	NA	0.0	0.0	0.01	0.01	0.01	59.8
All Vehicles		755	7.3	795	7.3	0.384	0.3	NA	0.1	0.6	0.01	0.01	0.01	59.6

Tweed Valley Way / Australian Bay Lobster Producers Access – 2032 Base with Proposed Development



MOVEMENT SUMMARY

Site: 1v [Tweed Valley Way / Site Access 2032WD AM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	3	1	3	33.3	0.045	15.5	LOS C	0.1	1.4	0.87	0.94	0.87	37.0
2	R2	2	2	2	100.0	0.045	63.0	LOS F	0.1	1.4	0.87	0.94	0.87	35.5
Approach		5	3	5	60.0	0.045	34.5	LOS D	0.1	1.4	0.87	0.94	0.87	36.4
NorthEast: Tweed Valley Way														
3	L2	34	31	36	91.2	0.047	7.0	LOS A	0.0	0.0	0.00	0.57	0.00	48.6
4	T1	744	73	783	9.8	0.442	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach		778	104	819	13.4	0.442	0.5	NA	0.0	0.0	0.00	0.02	0.00	59.1
SouthWest: Tweed Valley Way														
5	T1	74	18	78	24.3	0.047	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	6	4	6	66.7	0.041	28.8	LOS D	0.1	1.8	0.85	0.94	0.85	37.9
Approach		80	22	84	27.5	0.047	2.2	NA	0.1	1.8	0.06	0.07	0.06	57.5
All Vehicles		863	129	908	14.9	0.442	0.8	NA	0.1	1.8	0.01	0.03	0.01	58.7

MOVEMENT SUMMARY

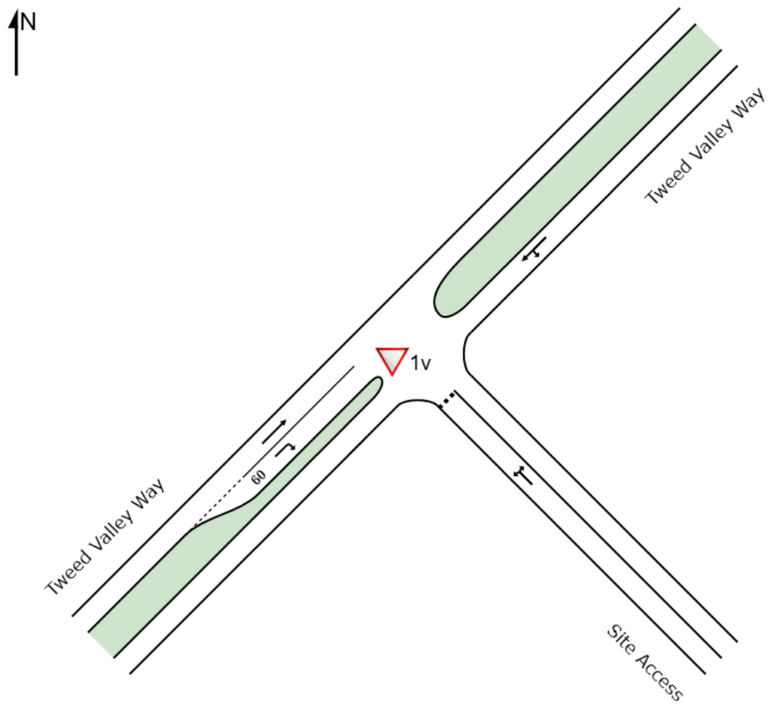
Site: 1v [Tweed Valley Way / Site Access 2032WD PM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	8	3	8	37.5	0.031	15.3	LOS C	0.1	0.9	0.73	0.89	0.73	45.7
2	R2	1	0	1	0.0	0.031	18.7	LOS C	0.1	0.9	0.73	0.89	0.73	46.7
Approach		9	3	9	33.3	0.031	15.7	LOS C	0.1	0.9	0.73	0.89	0.73	45.8
NorthEast: Tweed Valley Way														
3	L2	32	32	34	100.0	0.047	7.1	LOS A	0.0	0.0	0.00	0.57	0.00	47.2
4	T1	718	72	756	10.0	0.428	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		750	104	789	13.9	0.428	0.5	NA	0.0	0.0	0.00	0.02	0.00	59.0
SouthWest: Tweed Valley Way														
5	T1	61	14	64	23.0	0.039	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	2	2	2	100.0	0.032	59.8	LOS F	0.1	2.1	0.91	0.97	0.91	27.7
Approach		63	16	66	25.4	0.039	1.9	NA	0.1	2.1	0.03	0.03	0.03	57.8
All Vehicles		822	123	865	15.0	0.428	0.7	NA	0.1	2.1	0.01	0.03	0.01	58.7

Tweed Valley Way / Australian Bay Lobster Producers Access – 2042 Base



MOVEMENT SUMMARY

Site: 1v [Tweed Valley Way / Site Access 2042 AM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	3	33.3	3	33.3	0.038	14.1	LOS B	0.1	1.2	0.86	0.94	0.86	38.6
2	R2	2	100.0	2	100.0	0.038	54.5	LOS F	0.1	1.2	0.86	0.94	0.86	36.8
Approach		5	60.0	5	60.0	0.038	30.2	LOS D	0.1	1.2	0.86	0.94	0.86	37.9
NorthEast: Tweed Valley Way														
3	L2	3	0.0	3	0.0	0.468	5.7	LOS A	0.0	0.0	0.00	0.00	0.00	58.0
4	T1	834	5.6	878	5.6	0.468	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach		837	5.6	881	5.6	0.468	0.2	NA	0.0	0.0	0.00	0.00	0.00	59.6
SouthWest: Tweed Valley Way														
5	T1	85	21.7	89	21.7	0.052	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	4	50.0	4	50.0	0.013	16.0	LOS C	0.0	0.4	0.77	0.83	0.77	44.7
Approach		89	23.0	94	23.0	0.052	0.7	NA	0.0	0.4	0.03	0.04	0.03	59.1
All Vehicles		931	7.5	980	7.5	0.468	0.4	NA	0.1	1.2	0.01	0.01	0.01	59.4

MOVEMENT SUMMARY

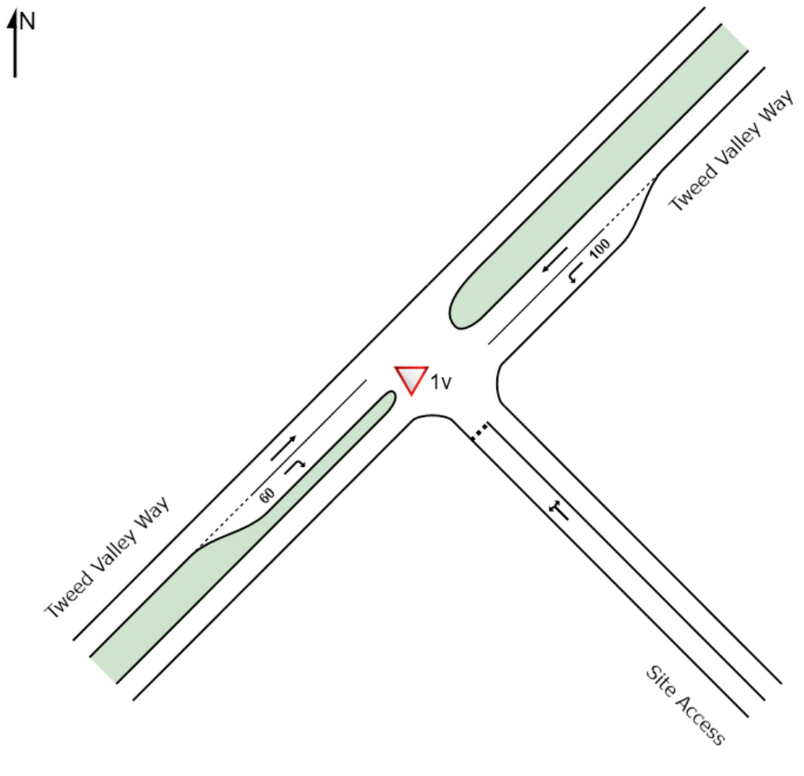
Site: 1v [Tweed Valley Way / Site Access 2042 PM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	8	37.5	8	37.5	0.025	13.8	LOS B	0.1	0.8	0.73	0.86	0.73	46.6
2	R2	1	0.0	1	0.0	0.025	16.7	LOS C	0.1	0.8	0.73	0.86	0.73	47.4
Approach		9	33.3	9	33.3	0.025	14.2	LOS B	0.1	0.8	0.73	0.86	0.73	46.7
NorthEast: Tweed Valley Way														
3	L2	1	100.0	1	100.0	0.450	6.8	LOS A	0.0	0.0	0.00	0.00	0.00	53.5
4	T1	803	5.7	845	5.7	0.450	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach		804	5.8	846	5.8	0.450	0.2	NA	0.0	0.0	0.00	0.00	0.00	59.6
SouthWest: Tweed Valley Way														
5	T1	69	20.4	73	20.4	0.042	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	1	0.0	1	0.0	0.002	10.1	LOS B	0.0	0.0	0.66	0.66	0.66	49.8
Approach		70	20.1	74	20.1	0.042	0.2	NA	0.0	0.0	0.01	0.01	0.01	59.8
All Vehicles		883	7.2	929	7.2	0.450	0.3	NA	0.1	0.8	0.01	0.01	0.01	59.5

Tweed Valley Way / Australian Bay Lobster Producers Access – 2042 Base with Proposed Development



MOVEMENT SUMMARY

Site: 1v [Tweed Valley Way / Site Access 2042WD AM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	3	1	3	33.3	0.075	20.4	LOS C	0.2	2.2	0.92	0.97	0.92	30.8
2	R2	2	2	2	100.0	0.075	105.5	LOS F	0.2	2.2	0.92	0.97	0.92	29.7
Approach		5	3	5	60.0	0.075	54.4	LOS F	0.2	2.2	0.92	0.97	0.92	30.3
NorthEast: Tweed Valley Way														
3	L2	34	31	36	91.2	0.047	7.0	LOS A	0.0	0.0	0.00	0.57	0.00	48.6
4	T1	867	80	913	9.2	0.511	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.5
Approach		901	111	948	12.3	0.511	0.5	NA	0.0	0.0	0.00	0.02	0.00	59.0
SouthWest: Tweed Valley Way														
5	T1	87	20	92	23.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	6	4	6	66.7	0.064	41.8	LOS E	0.2	2.7	0.90	0.96	0.90	33.4
Approach		93	24	98	25.8	0.064	2.7	NA	0.2	2.7	0.06	0.06	0.06	57.0
All Vehicles		999	138	1052	13.8	0.511	1.0	NA	0.2	2.7	0.01	0.03	0.01	58.6

MOVEMENT SUMMARY

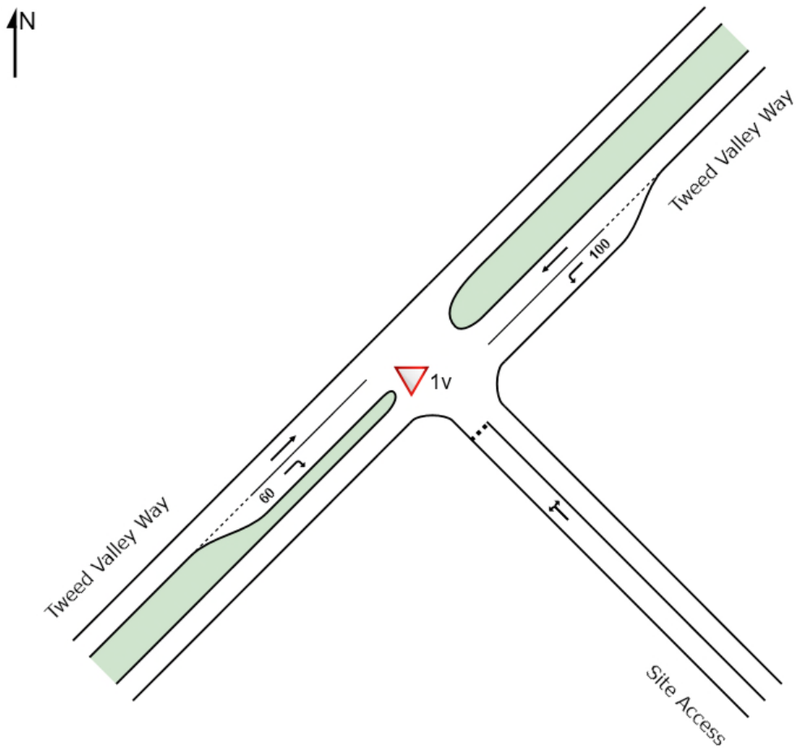
Site: 1v [Tweed Valley Way / Site Access 2042WD PM (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	8	3	8	37.5	0.043	19.8	LOS C	0.1	1.2	0.81	0.92	0.81	43.2
2	R2	1	0	1	0.0	0.043	24.7	LOS C	0.1	1.2	0.81	0.92	0.81	44.1
Approach		9	3	9	33.3	0.043	20.4	LOS C	0.1	1.2	0.81	0.92	0.81	43.3
NorthEast: Tweed Valley Way														
3	L2	32	32	34	100.0	0.047	7.1	LOS A	0.0	0.0	0.00	0.57	0.00	47.2
4	T1	836	78	880	9.3	0.494	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach		868	110	914	12.7	0.494	0.5	NA	0.0	0.0	0.00	0.02	0.00	59.0
SouthWest: Tweed Valley Way														
5	T1	71	16	75	22.5	0.045	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	2	2	2	100.0	0.057	98.6	LOS F	0.2	3.5	0.95	0.98	0.95	21.4
Approach		73	18	77	24.7	0.057	2.7	NA	0.2	3.5	0.03	0.03	0.03	57.2
All Vehicles		950	131	1000	13.8	0.494	0.8	NA	0.2	3.5	0.01	0.03	0.01	58.6

Tweed Valley Way / Australian Bay Lobster Producers Access – 2042 Base with Proposed Development (Sensitivity Testing)



MOVEMENT SUMMARY

Site: 1v [Tweed Valley Way / Site Access 2042WD AM - Sensitivity Testing (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	3	1	3	33.3	0.088	21.2	LOS C	0.2	2.6	0.94	0.97	0.94	28.8
2	R2	2	2	2	100.0	0.088	124.2	LOS F	0.2	2.6	0.94	0.97	0.94	27.9
Approach		5	3	5	60.0	0.088	62.4	LOS F	0.2	2.6	0.94	0.97	0.94	28.5
NorthEast: Tweed Valley Way														
3	L2	29	26	31	89.7	0.040	7.0	LOS A	0.0	0.0	0.00	0.57	0.00	48.6
4	T1	867	80	913	9.2	0.511	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.5
Approach		896	106	943	11.8	0.511	0.5	NA	0.0	0.0	0.00	0.02	0.00	59.1
SouthWest: Tweed Valley Way														
5	T1	92	25	97	27.2	0.062	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	11	9	12	81.8	0.449	192.5	LOS F	1.3	25.7	0.98	1.04	1.13	13.9
Approach		103	34	108	33.0	0.449	20.6	NA	1.3	25.7	0.10	0.11	0.12	44.3
All Vehicles		1004	143	1057	14.2	0.511	2.8	NA	1.3	25.7	0.02	0.03	0.02	56.9

MOVEMENT SUMMARY

Site: 1v [Tweed Valley Way / Site Access 2042WD PM - Sensitivity Testing (Site Folder: General)]

Three-way intersection with 3-lane major road (Stop control)
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Site Access														
1	L2	8	3	8	37.5	0.043	19.8	LOS C	0.1	1.2	0.81	0.92	0.81	43.1
2	R2	1	0	1	0.0	0.043	25.5	LOS D	0.1	1.2	0.81	0.92	0.81	44.0
Approach		9	3	9	33.3	0.043	20.5	LOS C	0.1	1.2	0.81	0.92	0.81	43.2
NorthEast: Tweed Valley Way														
3	L2	27	27	28	100.0	0.039	7.1	LOS A	0.0	0.0	0.00	0.57	0.00	47.2
4	T1	836	78	880	9.3	0.494	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach		863	105	908	12.2	0.494	0.4	NA	0.0	0.0	0.00	0.02	0.00	59.1
SouthWest: Tweed Valley Way														
5	T1	76	21	80	27.6	0.052	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	7	7	7	100.0	0.192	104.4	LOS F	0.5	12.1	0.96	0.99	0.99	20.7
Approach		83	28	87	33.7	0.192	8.8	NA	0.5	12.1	0.08	0.08	0.08	51.7
All Vehicles		955	136	1005	14.2	0.494	1.4	NA	0.5	12.1	0.01	0.03	0.01	58.2

Appendix F – Email to TSC on Traffic Factor

Nicky Jackett

From: Dale Kleimeyer
Sent: Friday, 13 November 2020 2:31 PM
To: Ray Clark
Subject: Tweed Sand Plant, Altona Road, Cudgen.

Hi Ray
We refer to our telephone discussion of the 15 October 2020 regarding forecast traffic growth rates in the Tweed Shire Council generally and specifically along Tweed Valley Way at the Tweed Valley Way / Pacific Motorway interchange. Burchill's are preparing a Traffic Impact Study for an application to TfNSW and Tweed Shire Council on behalf of Tweed Sand Plant for future access onto Tweed Valley Way.

As discussed based on recent traffic surveys conducted from 4th to 10th March 2020 and forecast traffic volumes from the 2017 Tweed Road Development Strategy Report for 2041, we have adopted a linear growth of 1.6% per annum.

We confirm council's acceptance of the growth rate of 1.6% per annum as this corresponds with the growth rate adopted for the Medium Scenario in accordance with the recommendations in the Tweed Road Development Strategy.

Kind Regards
Dale Kleimeyer