TRAFFIC & CIVIL SERVICES

# 25M/2009 QUARRY EXPANSION
# GRAVEL PIT ROAD
# NOOK

# TRAFFIC IMPACT ASSESSMENT
# MAY 2021

# 25M/2009 Quarry Expansion
# Gravel Pit Road
# Nook

## TRAFFIC IMPACT ASSESSMENT

- Draft Report
- May 2021

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# 1. Introduction

## 1.1 Background

A pavement gravel quarry expansion is proposed at 25M/2009 Gravel Pit Road, Nook.

This report has been prepared to assess the traffic impact of the proposal based on Department of State Growth (DSG) guidelines and responds to the Kentish Interim Planning Scheme 2013 Parking and Sustainable Transport Code E9.

## 1.2 Objectives

A Traffic Impact Assessment is a means for assisting in the planning and design of sustainable development that considers:

- Safety and capacity
- Equity and social justice
- Economic efficiency
- The environment and future development.

This TIA considers the impact of the proposal on projected traffic volumes expected by 2031.

## 1.3 Scope of Traffic Impact Assessment (TIA)

This TIA considers in detail the impact of the proposal on Gravel Pit Road and Nook Road that access 25M / 2009.

## 1.4 References

- RTA Guide to Traffic Generating Development 2002
- Kentish Interim Planning Scheme 2013
- Austroads Guide Road Design Part 4A: Unsignalised & Signalised Intersections 2021
- Guide to Traffic Management Part 6: Intersections, Interchanges & Crossings 2020.
- LGAT Standard Drawings

## 1.5 Statement of Qualifications and Experience

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

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

Richard Burk

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

Director Traffic and Civil Services Pty Ltd

## 1.6 Glossary of Terms

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

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

## 1.7 Site Specific Glossary of Terms

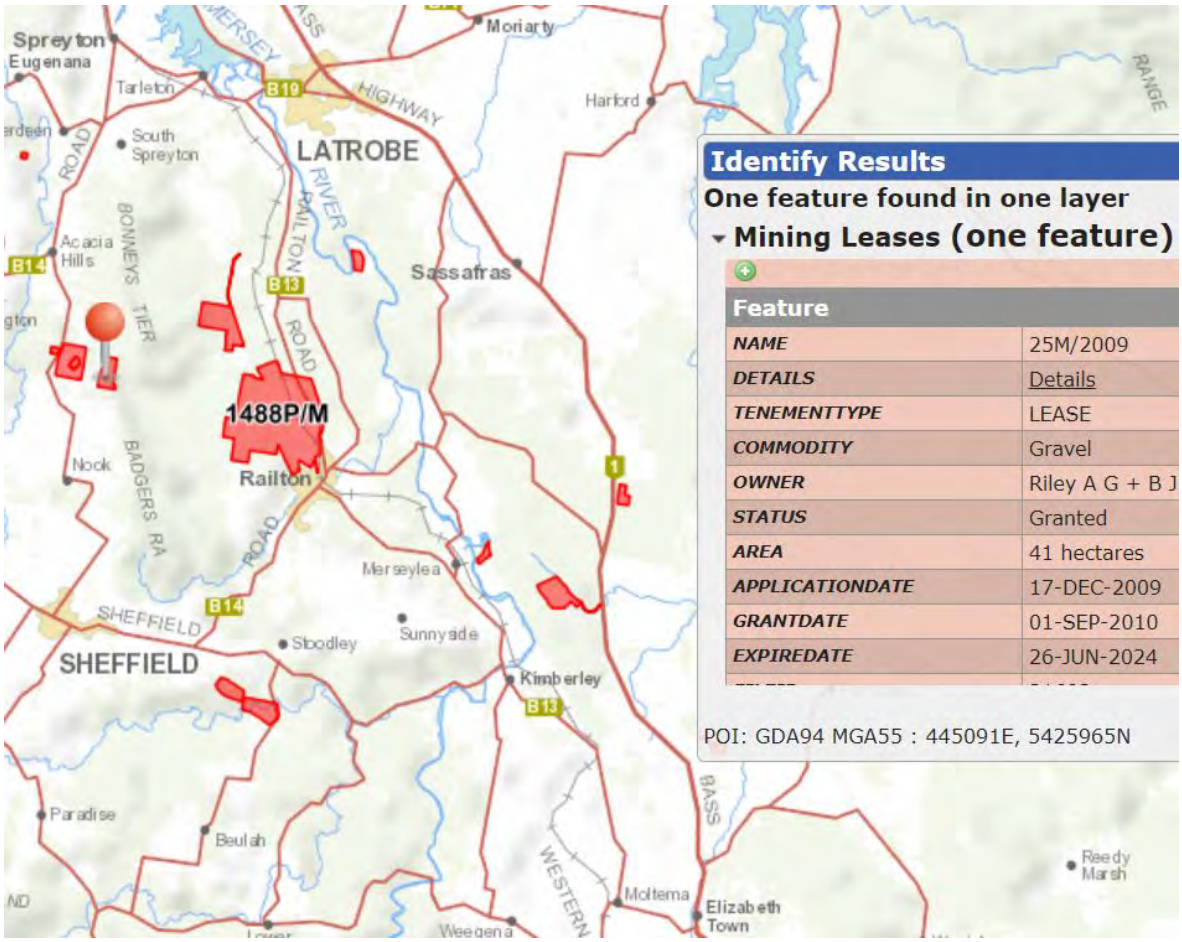
| | |
|---|---|
| SSA | Safe System Assessment |
| KC | Kentish Council |

# 2. Site Description

Figure 1 shows the development location for the Nook quarry lease 25M / 2009. The relevant state and council roads are shown in figures 2-4.

Nook Road and Gravel Pit Road provide access to Rural Resource land, see figure 6.

**Figure 1 – Quarry 25M/2009 location**




Source: *The List, DPIPWE*

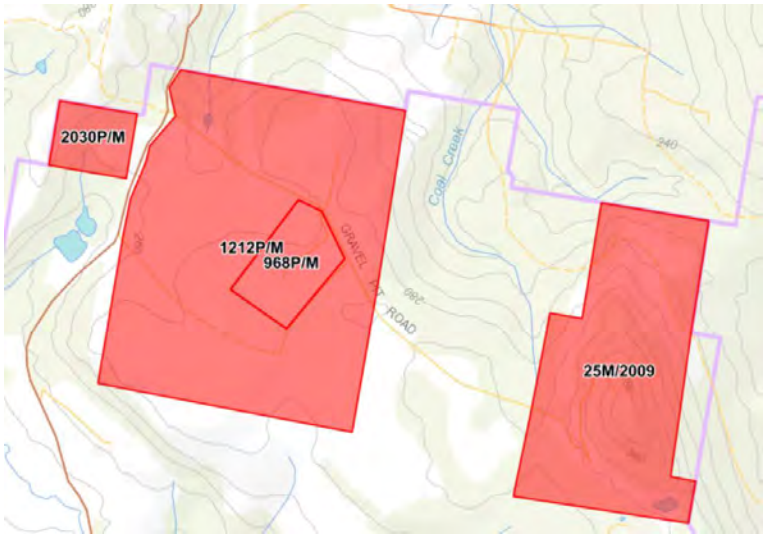
**Figure 2 – Local road network between Acacia Hills and Nook**

Source: *The List, DPIPWE*

**Figure 3 – Local road network between Nook and Sheffield**

Source: *The List, DPIPWE*

**Figure 4 – Gravel Pit Road access to 25M/2009**




Source: *The List, DPIPWE*

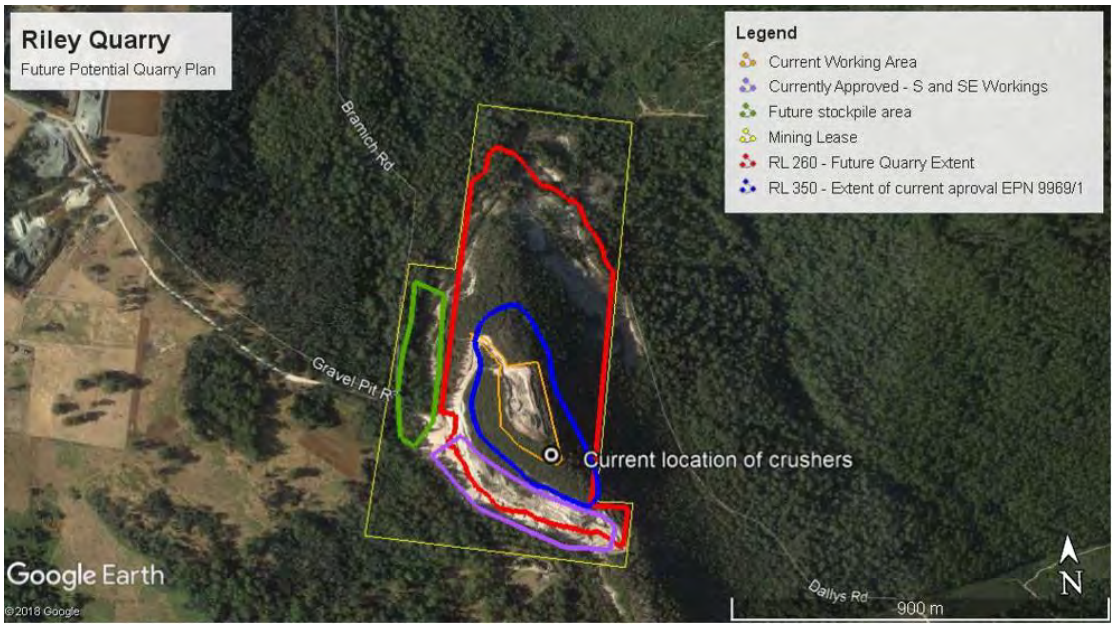
# 3. Proposal, Planning Scheme and Road Owner objectives

## 3.1 Description of Proposed Development

The proposal is to expand production at the 25M/2009 quarry from 50,000 to 150,000m3 pa. The quarry site is 41Ha in area with access via Gravel Pit Road which is a Council Road. The proposal is to deliver product to market with 10 Yard and 19m truck and trailer combinations with 12 to 30 tonne payloads respectively. Figure 5 and 6 and Appendix H show proposed site management plans and access arrangements.

**Figure 5 – Aerial view of quarry site**

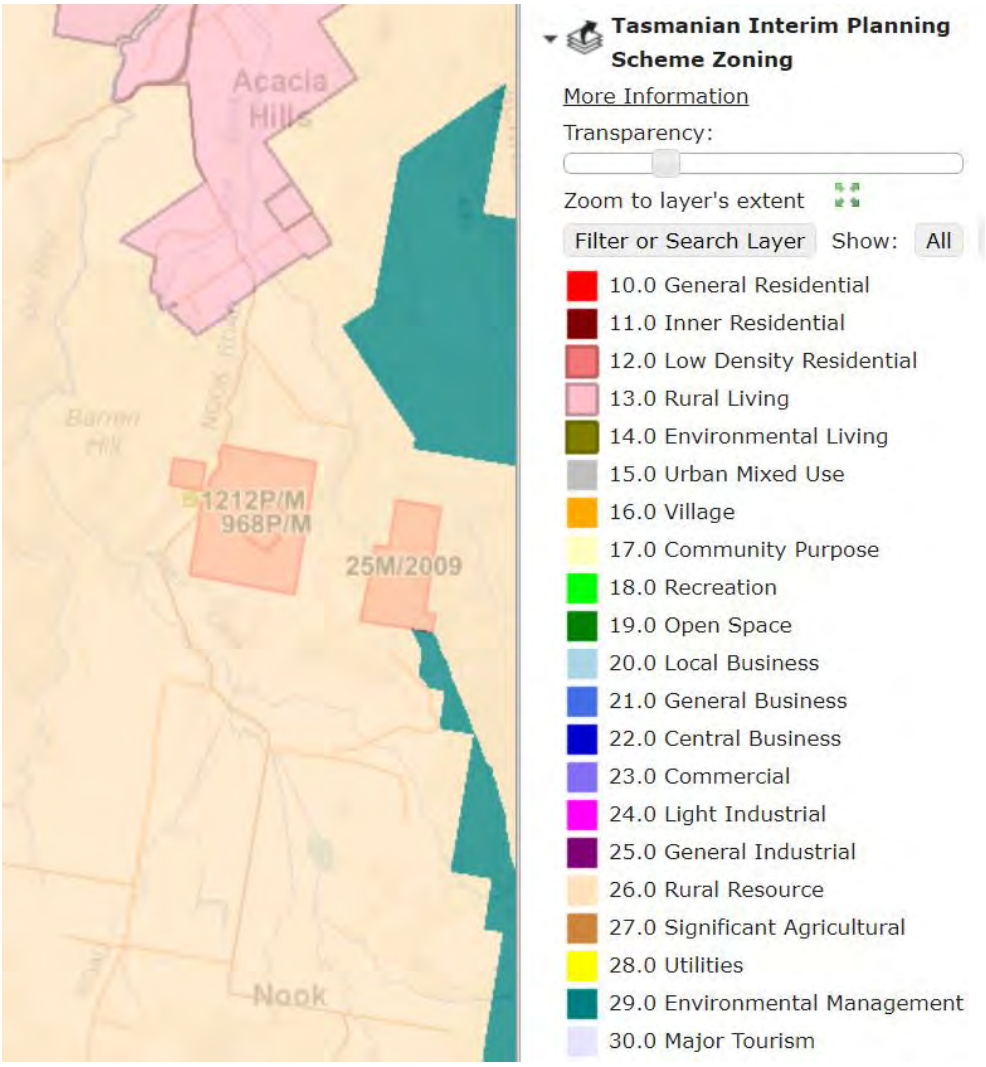
**Figure 6 – Proposed quarry site development**



### 3.2 Kentish Interim Planning Scheme 2013

The proposed development involves land currently zoned Rural Resource in accordance with the Kentish Interim Planning Scheme 2013 shown in Figure 7.

**Figure 7 – Quarry 25M/2009 is within the Rural Resource zone**




*Source: The List, DPIPWE*

### 3.3 Local Road Network Objectives

KC is the authority responsible for the Council road network impacted by the proposal. KC objectives are to maintain traffic safety and capacity for relevant road users.

### 3.4 State Road Network Objectives

DSG is the authority responsible for the State road network impacted by the proposal. DSG objectives are to maintain traffic safety and transport efficiency for relevant road users.

# 4. Existing Conditions

## 4.1 Transport Network

The transport system surrounding the 25M /2009 quarry lease consists of Sheffield Main which is a state road and Nook Road and Gravel Pit Road which are council roads.

## 4.2 Sheffield Main Road

Sheffield Main Road is a Category 4 Feeder Road in the State Road Hierarchy, see link maps in Appendix C, with an AADT of some 2,687 vpd (2018) at Acacia Hills and 2,583 vpd (2018) at Sheffield. Sheffield Main Road is part of the Tasmanian 26m B Double Network, see Appendix D.

The General Rural Default Speed Limit of 100km/h applies. Appendix B shows relevant traffic data. Sheffield Main Road is a two-way two-lane road with an 8.6m seal width including 3.3m traffic lanes and 1 m sealed shoulders.

### 4.2.1 Sheffield Main Road / Nook Road junction

This junction has a fully channelised layout and in excellent condition. Figure 8-10 show various features of the junction layout.

**Figure 8 – Sheffield Main Road / Nook Road junction**

*Source: The List, DPIPWE*

**Figure 9 – Looking right along Sheffield MR from Nook Road**

- Sight distance right is 250m.
- The approach speed environment is estimated at 95km/hr.

**Figure 10 – Looking left along Sheffield MR from Nook Road**

- Sight distance left is 151m.
- The approach speed environment is estimated at 70km/hr.

### 4.2.2 Sheffield Main Road / High Street intersection, Sheffield

The southern end of Nook Road becomes High Street at Sheffield. The Sheffield Main Road / High Street junction layout is shown in Figures 11-15.

**Figure 11 – Sheffield Main Road / High Street junction**

*Source: The List, DPIPWE*

**Figure 12 – Looking right along Sheffield MR from High Street, North**

Sight distance left is 170m.

**Figure 13 – Looking left along Sheffield MR from High Street, North**

Sight distance right is 100m.

Figure 14 – Sheffield Road Eastern approach to High Street

Figure 15 – Sheffield Road Western approach to High Street

### 4.3 Nook Road

Nook Road has a rural access function. The General Rural Default Speed Limit of 100km/h applies. Nook Road is not part of the Tasmanian 26m B Double Network, see Appendix D.

Appendix A shows relevant traffic data. Nook Road is a two-way two-lane road with a 6m sealed width and 0.5m unsealed shoulders with minimum verge.

### 4.3.1 Nook Road bend South of Little Nook Road junction

Figure 16 shows the 90-degree bend in Nook Roads South of Little Nook Road.

**Figure 16– Nook Road bend South of Little Nook Road**

*Source: The List, DPIPWE*

### 4.3.2 Bridge South of Nook Road / West Nook Road junction

Figure 17 shows narrow bridge South of West Nook Road junction.

**Figure 17–Looking South along Nook Rd at narrow bridge South of Little Nook Rd**

Road width at bridge:

- Kerb to kerb 5.4m
- Seal width 4.2m

### 4.3.3 Bridge South of Nook Road / Marshall Road junction

Figure 18 shows narrow bridge South of Marshall Road junction

**Figure 18– Looking North along Nook Rd at narrow bridge South of Marshall Road**

Road width at bridge:
- Kerb to kerb 5.1m
- Seal width 4.1m

### 4.3.4 Bridge West of Nook Road / Jarman Road junction

Figure 19 shows narrow bridge West of Jarman Road junction.

**Figure 19– Looking East along Nook Rd towards narrow bridge and Jarman Road**

Road width at bridge:
- Kerb to kerb 5.0m
- Seal width 4.2m

### 4.3.5 Nook Road / Jarman Road junction

The Y junction with Jarman Road is shown in Figure 20.

**Figure 20 – Nook Road / Jarman Road junction**

*Source: The List, DPIPWE*

### 4.3.6 Nook Road / Randwick Road junction

The 90-degree bend at the Randwick Road junction is shown in Figure 21.

**Figure 21 – Nook Road / Randwick Road junction**

*Source: The List, DPIPWE*

### 4.3.7 Nook Road bend North of Badgers Road junction

The 90-degree bend North of the Badgers Road junction is shown in Figure 22.

**Figure 22 – Nook Road bend North of Badgers Road junction**

*Source: The List, DPIPWE*

### 4.3.8 Nook Road / Gravel Pit Road junction

Features of the Nook Road / Gravel Pit Road junction are shown in Figures 23-31.

**Figure 23 – Nook Road / Gravel Pit Road junction**

*Source: The List, DPIPWE*

**Figure 24 – Elevation view of Nook Road / Gravel Pit Road junction**

Very faded Barrier Line

**Figure 25– Looking right along Nook Road from Gravel Pit Road**

- Sight distance right is 110m.
- The approach speed environment is estimated at 55km/hr.

Very faded Barrier Line

**Figure 26 – Looking left along Nook Road from Gravel Pit Road**

- Sight distance left is 150m.
- The approach speed environment is estimated at 65km/hr.

Very faded Barrier Line

**Figure 27 – Nook Road Southern approach to Gravel Pit Road junction**

Very faded Barrier Line

**Figure 28 – Nook Road Southern approach to Gravel Pit Road junction**

Very faded Barrier Line

**Figure 29 – Nook Road Southern approach at the Gravel Pit Road junction**

Forward sight distance 120m.

Very faded Barrier Line

**Figure 30 – Nook Road Southern approach at the Gravel Pit Road junction**

**Figure 31 – Nook Road Northern approach to Gravel Pit Road junction**

Very faded Barrier Line

### 4.4 Gravel Pit Road access to 25M/2009 Quarry

Gravel Pit Road is 1.5km in length to the boundary of the quarry lease and has a 40km/h speed limit.

The first 60m from Nook Road end is sealed to 7m wide. Thereafter the unsealed pavement width is 6.5m.

Figures 32-34 show the nature of the road.

**Figure 32 – Looking East along Gravel Pit Road from Nook Road**

**Figure 33 – Looking East along Gravel Pit Road towards the 25M/2009 Quarry.**

**Figure 34 – Looking East along Gravel Pit Road at the 25M/2009 Quarry gate.**

Quarry gate
4.5m wide.

## 4.5 Traffic Activity

### Sheffield Main Road( Acacia Hills)

- AADT: 2,687 vpd (2018)
- Compound Annual Growth 0.5%
- Estimated AADT: 2,867 vpd (2031)
- 8% trucks

### Sheffield Main Road( Sheffield)

- AADT: 2,583 vpd (2018)
- Compound Annual Growth 0.5%
- Estimated AADT: 2,756 vpd (2031)
- 10% trucks

### Nook Road ( Acacia Hills)

- Estimated AADT: 1,050 vpd (2021)
- Compound Annual Growth 0.5%
- Estimated AADT: 1,105 vpd (2031)
- 5% trucks

### High Street ( Sheffield)

- Estimated AADT: 1,360 vpd (2021)
- Compound Annual Growth 0.5%
- Estimated AADT: 1,430 vpd (2031)
- 2% trucks

### Nook Road ( Nook)

- Estimated AADT: 600 vpd (2021)
- Compound Annual Growth 0.5%
- Estimated AADT: 631 vpd (2031)
- 20% trucks

### Gravel Pit Road

- Estimated AADT: 130 vpd (2021)
- 90% trucks

## 4.6 Crash History

The Department of State Growth is supplied with reported crashes by Tasmania Police. The Department maintains a crash database from the crash reports which is used to monitor road safety, identify problem areas and develop improvement schemes.

The 5-year reported crash history on the Nook Road approaches to the Gravel Pit Road junction is summarised in Figures 35-36.

**Figure 35 – 5 Year crash history on Nook Road approaches to Gravel Pit Road**

| Crash Id | Description | Date | Time | Severity | Light | Speed | Location | Units |
|---|---|---|---|---|---|---|---|---|
| 1694519 | 189 - Other curve | 28-Apr-2016 | 07:28 | Fatal | Day | 100 | Nook Road, Nook | MC |
| 1905460 | 182 - Off carriageway left bend | 17-Sep-2016 | 01:40 | PDO | Night | 100 | Nook Road, Acacia Hills | LV |
| 49122108 | 181 - Off right bend into obj./prkd veh. | 14-Feb-2018 | 08:05 | Minor | Day | 100 | Nook Road, Acacia Hills | LV |
| 50201663 | 189 - Other curve | 14-Aug-2019 | 14:27 | PDO | Day | 080 | Nook Road, Acacia Hills | LV |
| 50280849 | 167 - Animal (not ridden) | 03-Oct-2019 | 22:18 | PDO | Night | 100 | Nook Road, Acacia Hills | LV |
| 50302488 | 189 - Other curve | 26-Oct-2019 | 08:50 | Minor | Day | 080 | Nook Road, Nook | LV |
| 50360915 | 183 - Off left bend into obj./prkd veh. | 01-Dec-2019 | 11:30 | PDO | Day | 100 | Nook Road, Nook | LV |
| 50602250 | 183 - Off left bend into obj./prkd veh. | 05-Mar-2020 | 12:20 | Minor | Day | 100 | Nook Road, Acacia Hills | LV |
| 50715987 | 189 - Other curve | 18-Jul-2020 | 08:40 | First Aid | Day | 080 | Nook Road, Nook | LV |
| 50734537 | 189 - Other curve | 02-Aug-2020 | 10:11 | PDO | Day | 080 | Nook Road, Acacia Hills | LV |
| 50841977 | 189 - Other curve | 17-Oct-2020 | 15:35 | Not known | Day | 060 | Nook Road, Acacia Hills | LV |
| 50955589 | 189 - Other curve | 29-Jan-2021 | 20:35 | PDO | Dusk | 080 | Nook Road, Acacia Hills | LV |
| 51017914 | n/a | 25-Mar-2021 | 16:15 | Minor | Day | 080 | Nook Road, Nook | LV |

| | |
|---|---|
| MC | Motor Cycle |
| LV | Light Vehicle |
| PDO | Propoerty Damage Only |

The crash history provides evidence of a generic *single vehicle leaving the road on curve* crash propensity with 11 of the 13 recorded crashes at a curve in the road.

The Fatal crash in 2016 involved a motorcyclist leaving the road on a bend as shown in Figure 36.

There is no evidence of a junction related or heavy vehicle related crash propensity in the vicinity of the Nork Road / Gravel Pit Road junction.

Improved delineation is a cost-effective mass action countermeasure for *the leaving the road* crash propensity.

**Figure 36 – 5 Year crash history on Nook Road approaches to Gravel Pit Road**

## 4.7 Road Safety Review

### 4.7.1 Sheffield Main Road / Nook Road Junction

No issues

### 4.7.2 Sheffield Main Road / High Street junction, Sheffield

No issues

### 4.7.3 Nook Road

Poor standard of delineation along Nook Road due to the badly faded barrier lines throughout. See Figures 24-31.

### 4.7.4 Nook Road / Gravel Pit Road junction.

Lack of *Trucks Entering* warning signs on the approaches to the Gravel Pit Road junction with Nook Road.

### 4.7.5 Gravel Pit Road

No issues

## 4.8 Safe System Assessment.

Sheffield Main Road, Nook Road and Gravel Pit Road were assessed in accordance with the Austroads Safe System assessment framework.

This framework involves consideration of exposure, likelihood and severity to yield a risk framework score. High risk crash types and vulnerable road user crash types are assessed for each site and aggregated to provide an overall crash risk. Crash risk is considered in terms of three components:

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

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

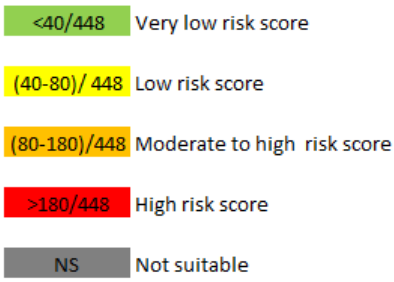
The crash risk score is an indicator of how well the road satisfies the *safe system objective which is for a forgiving road system where crashes do not result in death or serious injury.*

Calculated crash risk scores are summarised as follows:

- Sheffield Main Road 38/448
- Nook Road (North of Gravel Pit Road) 60/448
- Nook Road (South of Gravel Pit Road) 63/448
- Gravel Pit Road 42/448

Figure 37 indicates the crash risk. The calculated crash risk scores indicate a low crash risk and good alignment with the Safe Systems Objective, see Appendix E for assessment details.

**Figure 37 – SSA score relationship with crash risk**




## 4.9 Services

No services observed during the site inspection would be adversely impacted by the proposal.

# 5. Traffic Generation and Assignment

This section of the report estimates how traffic generated by the proposal is distributed within the adjacent road network now and ten years future.

## 5.1 Traffic Growth

See section 4.5 for traffic activity and historical traffic generation rates.

## 5.2 Trip Generation

### Existing 25M/2009 Operation (50,000m3 pa):

Quarry generates 8vph during peak operation (4 loaded & 4 return trips per hr), see Figure 38.

**Figure 38 – Existing Traffic Generation at 25M/2009 between 2018-2020**

| Period | Movement per 13 hours | Movements per hour |
|---|---|---|
| Busy – generally November – March | 110 | 8.47 |
| March - October | 25 | 1.93 |

### Proposed 25M/2009 Operation (150,000m3 pa):

By interpolation the proposed operation is estimated to generate 24vph at peak operation i.e. 12 deliveries and 12 return trips per hour.

### 19m Truck and Trailer (30t payload) & 10 Yard Trucks (12t payload) operation

Assuming average payload of 21 tonnes equates to 150,000 *1.7/21 i.e 12,150 loads pa.

Assuming peak transport operation over 20 weeks suggests 606 loads /week equates to 101 loads delivered per day for a 6-day week. Estimated delivery rate is on average 8 loads / hr ie. 16 vph which indicates peak operation at 24vph is feasible.

It is assumed the nearby Boral Quarry will operate at up to 8 vph throughout 2021-2031.

## 5.3 Trip Assignment

Trip assignment is based on assumed peak operations with:

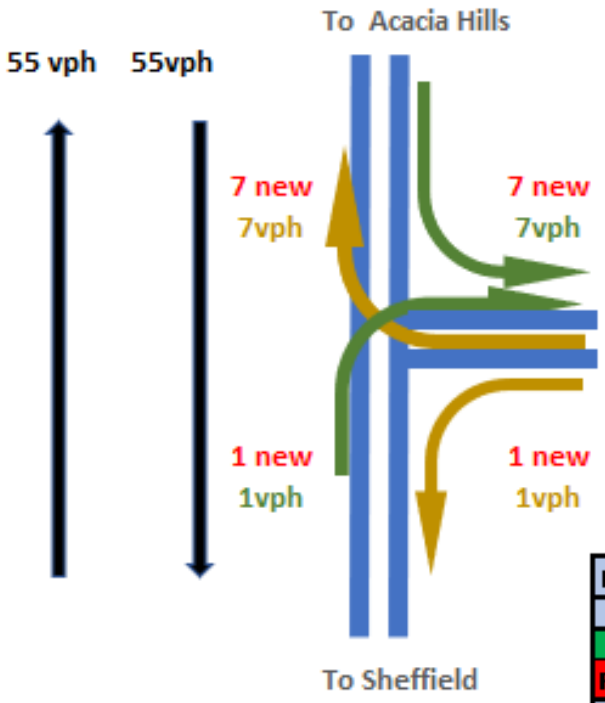
- 25M/2009 operating at 24vph
- Boral quarry operating at 8vph.

It is assumed 90% of loads will travel towards the Bass Highway from both quarries. Figure 39-40 show the assigned traffic on the local road junctions impacted in 2031.

**Figure 39 – Nook Road / Gravel Pit Road junction 2031**

**Figures in red due to the proposal.**

AM Peak - 2031 With Development




| Peak Hour Movement Summary (vph) | | |
|---|---|---|
| AM | Turns | Total Effected Flow |
| Left In | 14 | 55 |
| Right In | 2 | 124 |
| PM | Turns | Total Effected Flow |
| Left In | 14 | 55 |
| Right In | 2 | 124 |

PM Peak - 2031 With Development

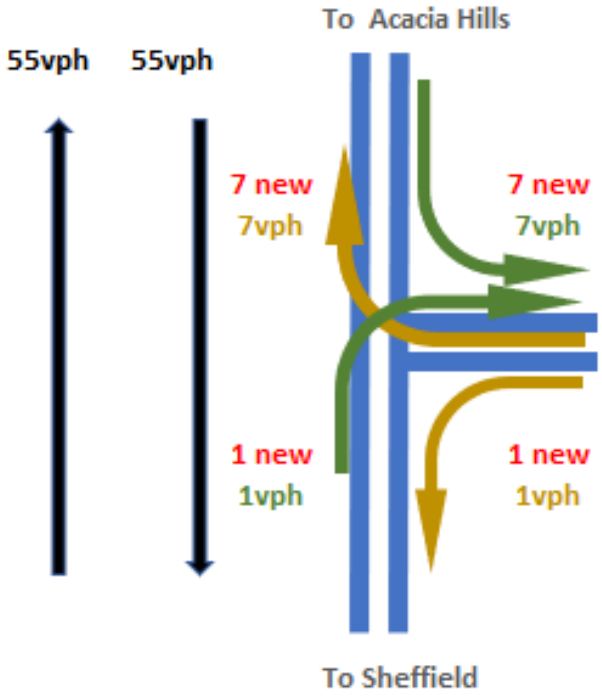
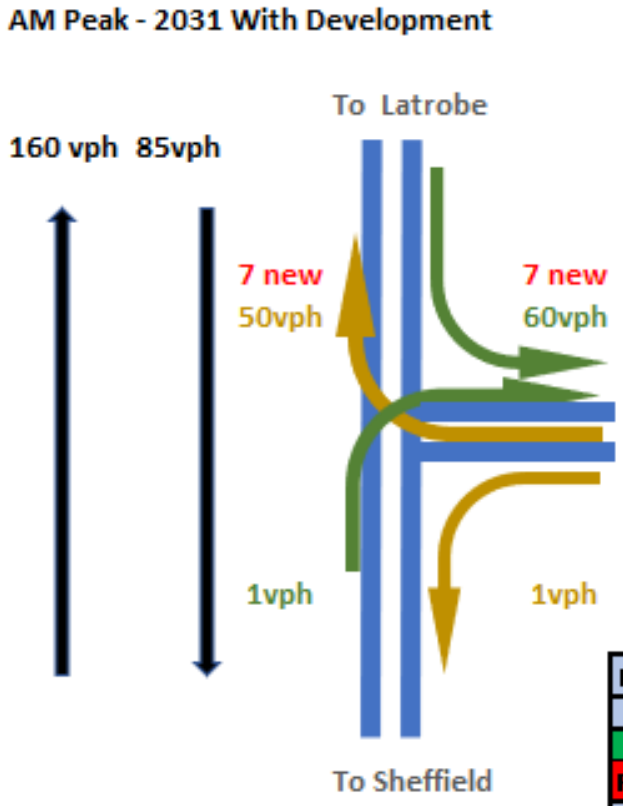
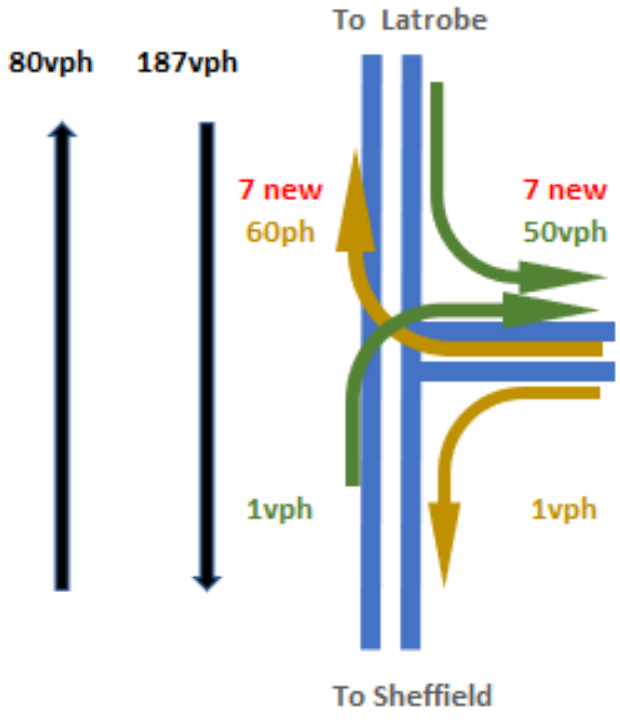


**Figure 40 – Sheffield Main Road / Nook Road junction 2031**

**Figures in red due to the proposal.**




| Peak Hour Movement Summary (vph) | | |
|---|---|---|
| AM | Turns | Total Effected Flow |
| Left In | 67 | 85 |
| Right In | 1 | 312 |
| PM | Turns | Total Effected Flow |
| Left In | 57 | 187 |
| Right In | 1 | 324 |



# 6. Impact on Road Network

## 6.1 Impact of traffic generated by the proposal.

Detailed intersection analysis is not required for the junctions impacted by the proposal as the traffic volumes are at the low end of the scale where the junction operation is at LOS A which is the highest LOS, see Appendix F for Level of Service (LOS) descriptions.

### 6.1.1 Sheffield Main Road / Nook Road junction

As shown in Figure 40, the proposal will increase turning movements at this junction by some 14vph which is insignificant in terms of the junction capacity and the current activity level of some 112vph. The junction also has a high standard junction layout. The proposal is assessed as having a very minor impact on the junction which should continue to operate at estimated LOS A.

### 6.1.2 Nook Road / Gravel Pit Road junction

As shown in Figure 39, the proposal will increase peak season turning movements at this junction by some 16vph to 32vph. While this increase doubles activity, the activity levels are very low and the impact on junction capacity is very low. The junction also has an adequate layout for the proposed operation. The proposal is assessed as having a minor impact on the junction which should continue to operate at estimated LOS A.

### 6.1.3 Sheffield Main Road / High Street intersection.

The proposal will increase turning movements at this junction by some 2vph .The High Street northern leg of the intersection operates at some 140vph as of 2021.

From site observations articulated trucks are able to turn left from Sheffield Main Road onto High Street bound for Gravel Pit Road without any issues.

Accordingly, the intersection is estimated to be negligibly impacted by the proposal.

### 6.1.4 Nook Road

#### South of Gravel Pit Road

The proposal is estimated to direct an additional 2 vph to Nook Road South of the Gravel Pit Road junction. This section of road has a poor geometric alignment due to many 90-degree bends and various narrow bridges with trafficable width of some 4m. The minor increase in use of Nook Road south of the Gravel Pit Road is considered acceptable at 2 vph.

### North of Gravel Pit Road

The proposal is estimated to direct an additional 14 vph to Nook Road North of the Gravel Pit Road junction. This section of road has a reasonable geometric alignment without any sharp bends however is currently very poorly delineated as the barrier line along the road is badly faded. With remarking of the barrier lines the road is considered adequate for the proposed use.

### 6.1.5 Gravel Pit Road

The proposal will increase peak hour traffic activity from some 16 to 32 vph which is well within the capacity of gravel haulage roads . The road is considered fit for purpose and the proposed increase in use.

## 6.2 Sight Distance

Austroads sight distance requirements are summarised in see Figure 41.

**Figure 41 – Available sight distance summary**

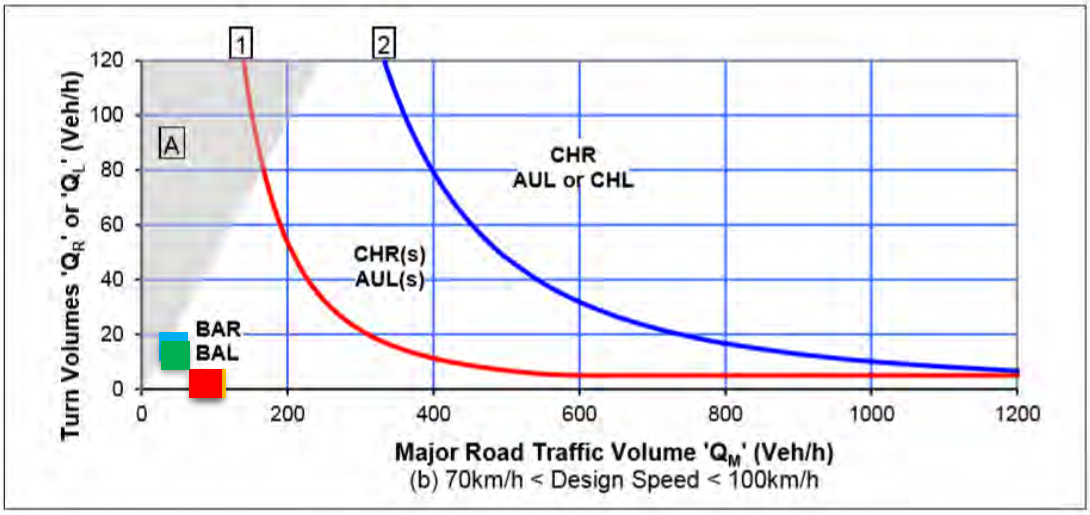
| Junction | Speed | Speed | Road frontage sight distance | | |
|---|---|---|---|---|---|
| Major Rd - Minor Rd | Limit | Environment | Austroads | Available | |
| | (km/h) | (km/h) | SISD (m) | Left(m) | Right(m) |
| Sheffield - Nook, Acacia Hills | 100 | 95 | 231 | | 250 |
| | | 70 | 151 | 151 | |
| Nook - Gravel Pit, Nook | 80 | 55 | 110 | | 110 |
| | | 65 | 137 | 150 | |
| High - Sheffield, Sheffield | 50 SZ | 48 | 93 | 93 | 93 |

Austroads Compliant

## 6.3 Junction warrants

The standard of junction required is based on Austroads Guidelines which take into account the standard of the road, speed limit and through & side road traffic i,e Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings – 2020. Figures 42 & 43 show the forecast traffic activity levels for the Nook / Gravel Pit Road and Nook / Sheffield Road junctions in 2031.

**Figure 42 – Peak turning activity at the Nook Rd / Gravel Pit Road junction 2031**




**AM Peak Left In**

**AM Peak Right In**

**PM Peak Left In**

**PM Peak Right In**

**Figure 42 demonstrates that Simple Right and Left junction layout is adequate which matches the existing layout.**

**Figure 43 – Peak turning activity at the Sheffield MR / Nook Rd junction 2031**

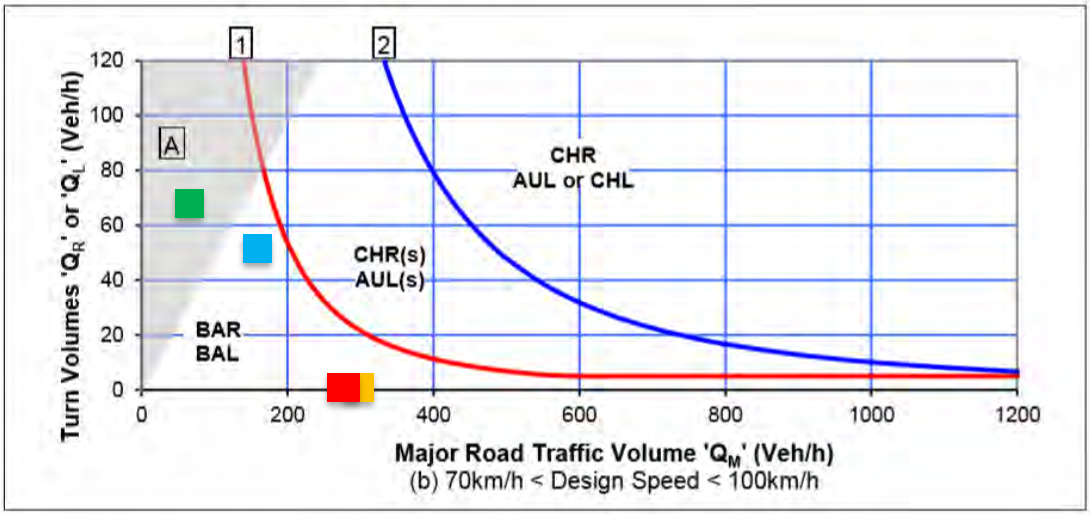



**Figure 43 demonstrates that a BAL junction layout is required. The current junction has a CHL layout.**

## 6.4 Impacts on road users.

**Public Transport** – Minimal impact.

**Delivery Vehicles** – Minimal impact.

**Pedestrians and Cyclists** - Minimal impact.

**Motorcyclists** – Minimal impact.

## 6.5 Other impacts

### 6.5.1 Environmental

Potential environmental impact considerations:

- Noise, vibration or visual impact. Increased quarrying and transport operations will increase noise levels and will be assessed separately.
- Community severance and pedestrian amenity are not applicable.
- Hazardous loads, air pollution or ecological impacts. The proposal will increase dust but as the site is remote from residences this may not be an issue.
- Heritage and Conservation would be assessed separately.

### 6.5.2 Street Lighting and Furniture

No additional streetlighting or roadside furniture is necessary.

## 6.6 Council Access Standard

Truck accesses to rural property accesses should comply with LGAT Standard Drawings TSD-R04-v1 and TSD-R05-v1 which are available online at :

Tasmanian-Municipal-Standards-Drawings-v3-December-20202.pdf (lgat.tas.gov.au)

The proposal has adequate existing access so there are no requirements in this case.

## 6.7 Kentish Interim Planning Scheme 2013

### Traffic Generation Use and Parking Code E9

*Section E9.5.1 – Provision for Parking*

***Acceptable Solution A1:*** *Provision for parking must be –*

*(a) The minimum number of on-site vehicle parking spaces must be in accordance with the applicable standard for the use class as shown in the Table to this Code.*

From Table E9.1:

**Extractive Industry**

- No minimum parking space requirement
- Spaces must be provided to service the likely workforce and attendance on the land.

**Manufacturing and Processing**

- 1 parking space / 75m2 manufacturing and processing workshop GFA
- 1 parking space / 40m2 Office GFA

**Resource Development**

- No minimum parking space requirement
- Spaces must be provided to service the likely workforce and attendance on the land.

**Resource Processing**

- 1 parking space / 75m2 manufacturing and processing workshop GFA
- 1 parking space / 40m2 Office GFA

**Assuming the proposed quarrying operations are considered a hybrid of all of the above then require:**

- 1 parking space / 75m2 manufacturing and processing workshop GFA
- 1 parking space / 40m2 Office GFA

The proposal involves the following facilities shown in Figure 44:

- no buildings and the current 20ft site container catering for 3 to 5 staff.
- car parking spaces (5) are provided beside the 20ft site container.

A1 is satisfied.

**Figure 44 – Quarry site container, parking and loading areas.**

Source: *The List, DPIPWE*

*Section E9.5.2 – Provision for Loading and Unloading Vehicles*

***Acceptable Solution A1: There must be provision for-***

***(a) On site loading area in accordance with the requirement in the Table to this Code; and***

***(b) Passenger vehicle pick up and set down facilities for business, commercial, educational and retail use at the rate of 1 space for every 50 parking spaces.***

From Table E9.1:

**Extractive Industry**

- Minimum loading area of 1 articulated truck space.

**Manufacturing and Processing**

- Minimum loading area of 1 large truck space / 800m2 of GFA.

**Resource Development**

- No minimum loading area requirement.

**Resource Processing**

- Minimum loading area of 1 articulated truck space / 800m2 of GFA.

**Assuming the proposed quarrying operations are considered a hybrid of all of the above then require:**

- Loading area for an articulated truck space & articulated truck space / 800m2 GFA.

The proposal involves the following facilities shown in Figure 44:

- no buildings and the current 20ft site container.
- Articulated truck parking space for loading all quarry products.

A1 is satisfied.

# 7. Recommendations and Conclusions

This traffic impact assessment has been prepared to assess the proposed 25M/2009 Nook Quarry expansion from 50,000m3 to 150,000m3 pa.

Gravel Pit Road has an estimated AADT of 100vpd (2021).

It is estimated the proposal would introduce 16 vph to Gravel Pit Road in the form of 10 Yard Trucks and 19m truck and trailer combinations. Accordingly, peak hour traffic activity is estimated at 32 vph plus 5-10 staff movements per day with light vehicles.

90% of transport operations are estimated to travel between Gravel Pit Road and the Bass Highway via Nook Road and Sheffield Road.

10% of transport operations are estimated to travel between Gravel Pit Road and Sheffield via Nook Road and High Street.

The proposal has been assessed in terms of :

- Traffic capacity on the state and council road network most impacted.
- Traffic safety from safety review of existing road conditions, 5 year reported crash history and Austroads Safe System Assessment.
- Austroads junction warrants
- Kentish Interim Planning Scheme 2013

## 7.1 Traffic Capacity

### Sheffield Main Road / Nook Road junction

This State Road junction is fully channelised with the priority road ( Sheffield Main Road being part of the Tasmanian 26m B Double Network.

The proposal will increase turning movements at this junction by some 14vph which is insignificant in terms of the junction capacity and the current activity level of some 112vph. The proposal is assessed as having a very minor impact on the junction which should continue to operate at estimated LOS A.

### Sheffield Main Road / High Street intersection

The proposal will increase turning movements at this junction by some 2vph .The High Street northern leg of the intersection operates at some 140vph as of 2021.
From site observations articulated trucks are able to turn left from Sheffield Main Road onto High Street bound for Gravel Pit Road without any issues.

Accordingly, the intersection is estimated to be negligibly impacted by the proposal.

### Nook Road / Gravel Pit Road junction

The proposal will increase peak hour turning movements at this junction from 16 to 32vph. While this increase almost doubles activity, the activity levels are very low and the impact on junction capacity is very low. The junction also has an adequate layout for the proposed operation. The proposal is assessed as having a minor impact on the junction which should continue to operate at estimated LOS A.

### Nook Road South of Gravel Pit Road

The proposal is estimated to direct an additional 2 vph to Nook Road South of the Gravel Pit Road junction. This section of road has a poor geometric alignment due to many 90-degree bends and various narrow bridges with trafficable width of some 4m. The minor increase in use of Nook Road south of the Gravel Pit Road is considered acceptable at 2 vph.

### Nook Road North of Gravel Pit Road

The proposal is estimated to direct an additional 14 vph to Nook Road North of the Gravel Pit Road junction. This section of road has a reasonable geometric alignment without any sharp bends however is currently very poorly delineated as the barrier line along the road is badly faded. With remarking of the barrier line marking the road is considered adequate for the proposed use.

### Gravel Pit Road

The proposal will increase peak hour traffic activity from some 16 to 32 vph which is well within the capacity of gravel haulage roads i.e from an AADT of 130vpd to 230 vpd. The road is considered fit for purpose and the proposed increase in use but will likely require more frequent grading and gravelling to maintain the road condition.

## 7.2 Traffic Safety

### Road Safety Review of existing road conditions

The following road safety issues were identified:

- Poor standard of delineation along Nook Road due to the badly faded barrier lines throughout. See Figures 24-31.
- Lack of Trucks Entering warning signs on the approaches to the Gravel Pit Road junction with Nook Road.

### 5 Year Reported Crash History

The 5-year reported crash history on the Nook Road approaches to the Gravel Pit Road junction provides evidence of *leaving the road on a curve* crash propensity. There is no evidence of a crash propensity in the vicinity of the Nook Road / Gravel Pit Road junction.

### Austroad Safe System Assessment

Safe System Assessment of roads used to access the quarry indicate low crash risks indicating compliance with the safe system objective for *a forgiving road system where crashes do not result in death or serious injury:*

- Sheffield Main Road 38/448
- Nook Road (North of Gravel Pit Road) 60/448
- Nook Road (South of Gravel Pit Road) 63/448
- Gravel Pit Road 42/448

### Austroads junction warrants

Existing junction layouts are adequate at the Nook Road / Gravel Pit Road and Sheffield Main Road / Nook Road junctions.

## 7.3 Kentish Interim Planning Scheme 2013.

Evidence is provided to demonstrate that requirements of the Traffic Generation Use and Parking Code E9 are satisfied.

## 7.4 Recommendations:

### *Gravel Pit Road*

- *KC increase grading and gravelling of Gravel Pit Road to maintain trafficable condition.*

### *Nook Road / Gravel Pit Road junction*

- *Developer install Trucks Entering (W5-22B) warning sign, see Appendix G , on both Nook Road approaches to Gravel Pit Road , 150m in advance of the junction.*

### *Nook Road*

- *KC request DSG re line mark the Barrier Lines on Nook Road as soon as possible.*

Overall, it has been concluded that the proposed development should operate safely and efficiently on Nook Road and Gravel Pit Road subject to implementation of the recommendations above. Based on the findings of this report the proposed development is supported on traffic grounds.

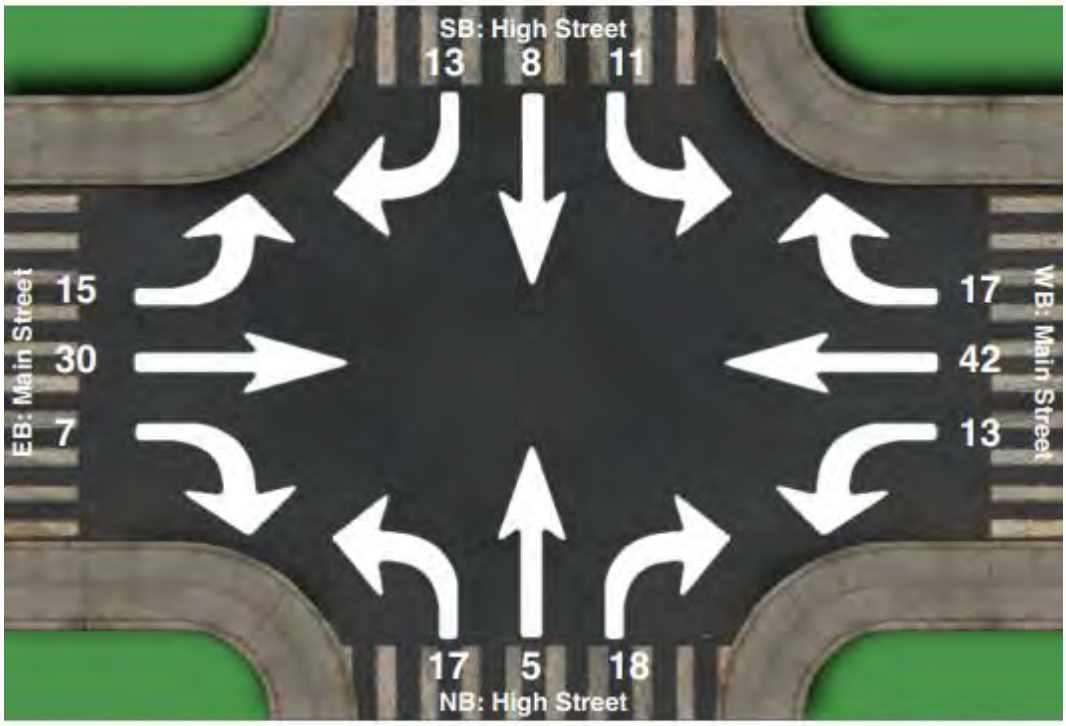
# Appendices

# Appendix A – TCS Traffic Counts

## Sheffield Rd / High St Intersection, Sheffield

### Intersection Count Summary

**Location:** High Street at Main Street, Latrobe
**GPS Coordinates:** Lat=-41.458495, Lon=147.200749
**Date:** 2021-05-04
**Day of week:** Tuesday
**Weather:** Sheffield
**Analyst:** Richard Burk




### Intersection Count Summary

11:05 - 11:35

| | SouthBound | | | Westbound | | | Northbound | | | Eastbound | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| Vehicle Total | 11 | 8 | 13 | 13 | 42 | 17 | 17 | 5 | 18 | 15 | 30 | 7 | 196 |

# Intersection Count Summary

## 11:05 - 11:35

| | SouthBound | | | Westbound | | | Northbound | | | Eastbound | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| Vehicle Total | 11 | 8 | 13 | 13 | 42 | 17 | 17 | 5 | 18 | 15 | 30 | 7 | 196 |

## Vehicle Summary

| Vehicle | SouthBound | | | Westbound | | | Northbound | | | Eastbound | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| Car | 11 | 8 | 13 | 13 | 42 | 16 | 17 | 4 | 17 | 14 | 30 | 7 | 192 |
| Truck | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 4 |
| Bicycle | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

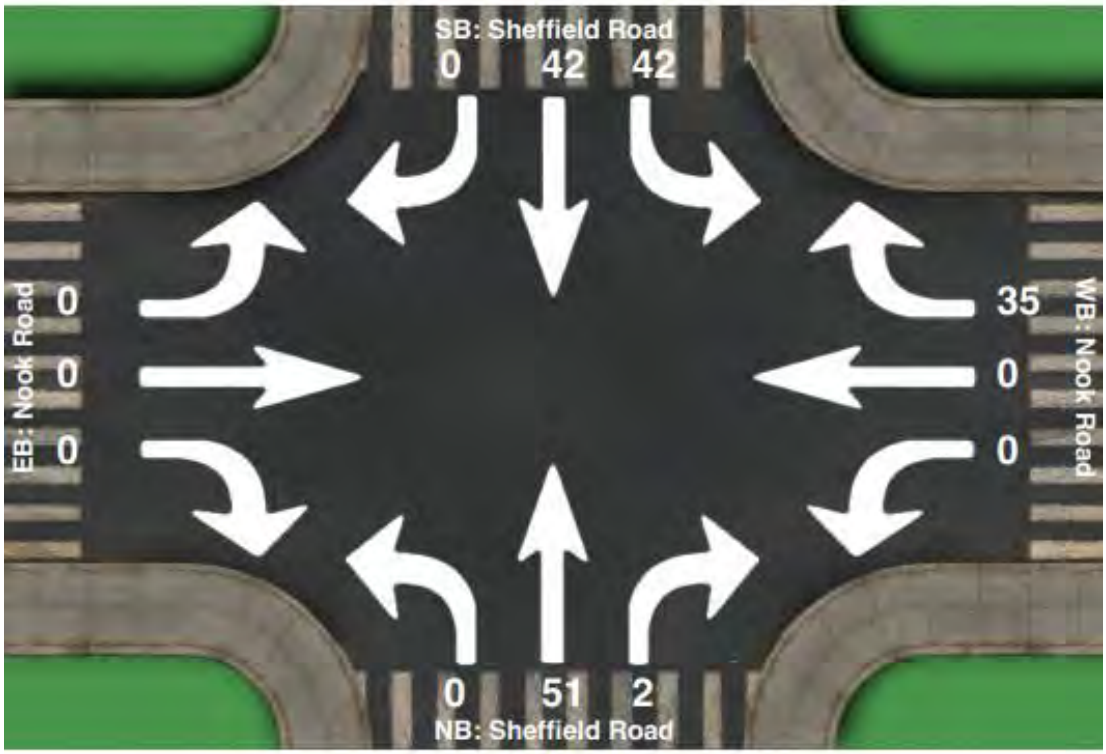
## Pedestrians Summary

| | NE | | | NW | | | SW | | | SE | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Right | Total | Left | Right | Total | Left | Right | Total | Left | Right | Total | |
| Pedestrians | 7 | 14 | 21 | 22 | 1 | 23 | 5 | 6 | 11 | 14 | 3 | 17 | 72 |

# Sheffield Rd / Nook Rd Junction, Acacia Hills

## Intersection Count Summary

**Location:** Sheffield Road at Nook Road, Nook
**GPS Coordinates:** Lat=-41.458495, Lon=147.200749
**Date:** 2021-05-04
**Day of week:** Tuesday
**Weather:** Sunny
**Analyst:** Richard Burk




## Intersection Count Summary

13:15 - 14:00

| | SouthBound | | | Westbound | | | Northbound | | | Eastbound | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| Vehicle Total | 42 | 42 | 0 | 0 | 0 | 35 | 0 | 51 | 2 | 0 | 0 | 0 | 172 |

# Intersection Count Summary

## 13:15 - 14:00

| | SouthBound | | | Westbound | | | Northbound | | | Eastbound | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| Vehicle Total | 42 | 42 | 0 | 0 | 0 | 35 | 0 | 51 | 2 | 0 | 0 | 0 | 172 |

## Vehicle Summary

| Vehicle | SouthBound | | | Westbound | | | Northbound | | | Eastbound | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| Car | 41 | 41 | 0 | 0 | 0 | 32 | 0 | 49 | 1 | 0 | 0 | 0 | 164 |
| Truck | 1 | 1 | 0 | 0 | 0 | 3 | 0 | 2 | 1 | 0 | 0 | 0 | 8 |
| Bicycle | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Pedestrians Summary

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

# Nook Rd / Gravel Pit Rd Junction, Nook

## Intersection Peak Hour

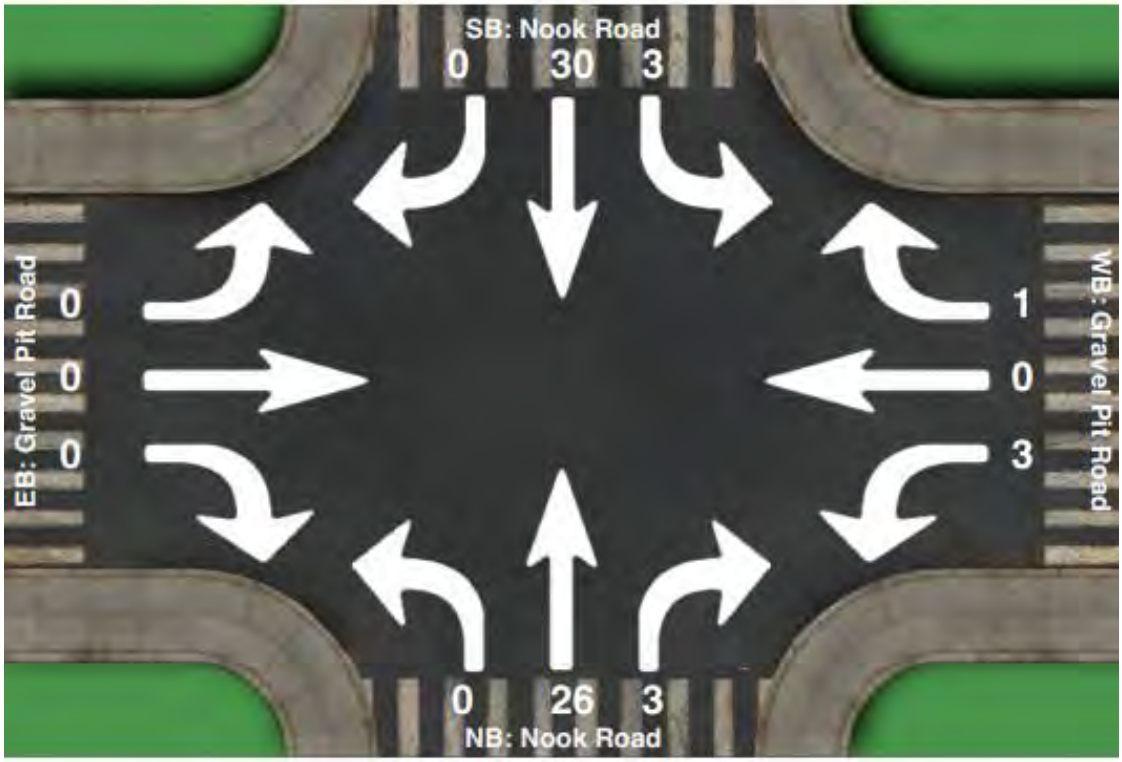
**Location:** Nook Road at Gravel Pit Road, Nook
**GPS Coordinates:** Lat=-41.458495, Lon=147.200749
**Date:** 2021-05-04
**Day of week:** Tuesday
**Weather:** Sunny
**Analyst:** Richard Burk

**Gravel Pit Road**
**Traffic Activity 2021:**

- **Off season - 10 vph**
- **Peak season -16 vph (Est.)**

**Estimated AADT:**

- **130 vpd**




## Intersection Peak Hour

12:05 - 13:05

| | SouthBound | | | Westbound | | | Northbound | | | Eastbound | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| Vehicle Total | 3 | 30 | 0 | 3 | 0 | 1 | 0 | 26 | 3 | 0 | 0 | 0 | 66 |
| Factor | 0.25 | 0.50 | 0.00 | 0.25 | 0.00 | 0.08 | 0.00 | 0.27 | 0.25 | 0.00 | 0.00 | 0.00 | 0.46 |
| Approach Factor | 0.46 | | | 0.33 | | | 0.30 | | | 0.00 | | | |

# Intersection Peak Hour

## 12:05 - 13:05

| | SouthBound | | | Westbound | | | Northbound | | | Eastbound | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| Vehicle Total | 3 | 30 | 0 | 3 | 0 | 1 | 0 | 26 | 3 | 0 | 0 | 0 | 66 |
| Factor | 0.25 | 0.50 | 0.00 | 0.25 | 0.00 | 0.08 | 0.00 | 0.27 | 0.25 | 0.00 | 0.00 | 0.00 | 0.46 |
| Approach Factor | 0.46 | | | 0.33 | | | 0.30 | | | 0.00 | | | |

## Peak Hour Vehicle Summary

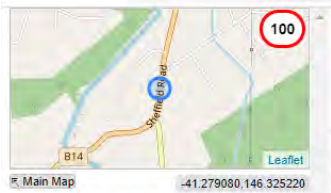
| Vehicle | SouthBound | | | Westbound | | | Northbound | | | Eastbound | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | Left | Thru | Right | |
| Car | 1 | 30 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 55 |
| Truck | 2 | 0 | 0 | 3 | 0 | 1 | 0 | 2 | 3 | 0 | 0 | 0 | 11 |
| Bicycle | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## Peak Hour Pedestrians

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

# Appendix B – DSG Traffic Counts

## Sheffield Main Road, 200m Nth of Nook Road




STATION

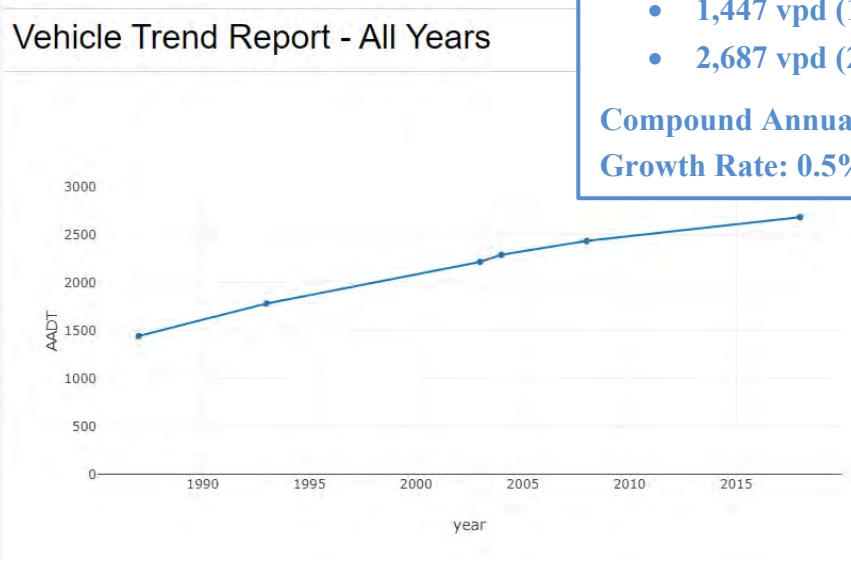
**A1031120**

a short term classified counter located at a two way road [S/N] in **Acacia Hills**, **Kentish** on **A1031**, 221m N Of Nook Rd [UTS L94 2.03 - 6.51]

Reports Spanning All Available Years

| Report Fragments | | |
|---|---|---|
| XAxis | Value | Series |
| Vehicle Trend Report | | |
| Change in AADT over time | | |
| HV pct Report | | |

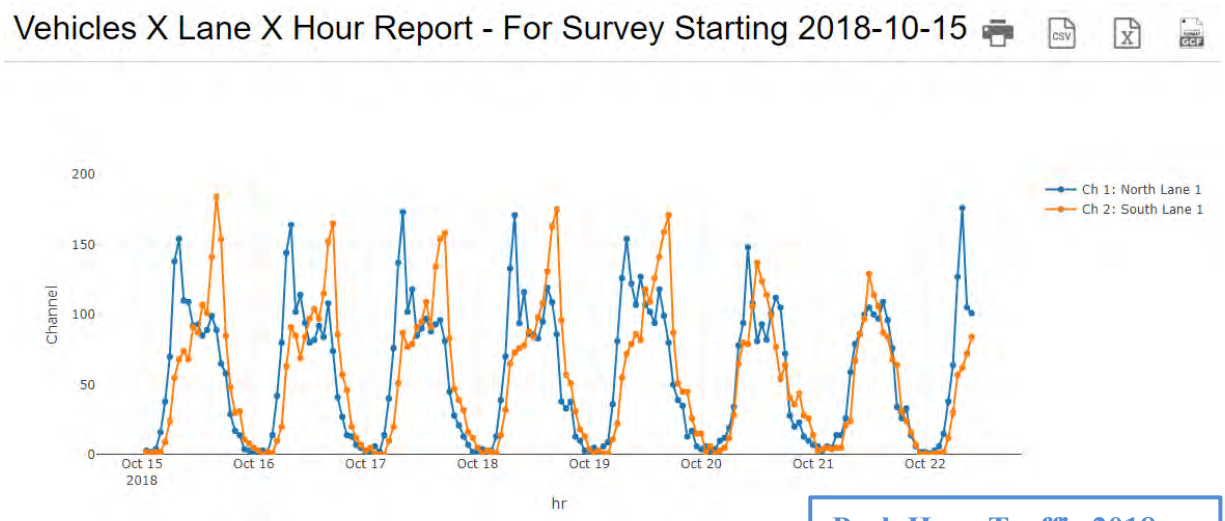
ALL YEARS | 2018




**Sheffield Main Road (200m Nth of Nook Rd) AADT:**

- **1,447 vpd (1987)**
- **2,687 vpd (2018)**

**Compound Annual Growth Rate: 0.5%**




**Peak Hour Traffic 2018**

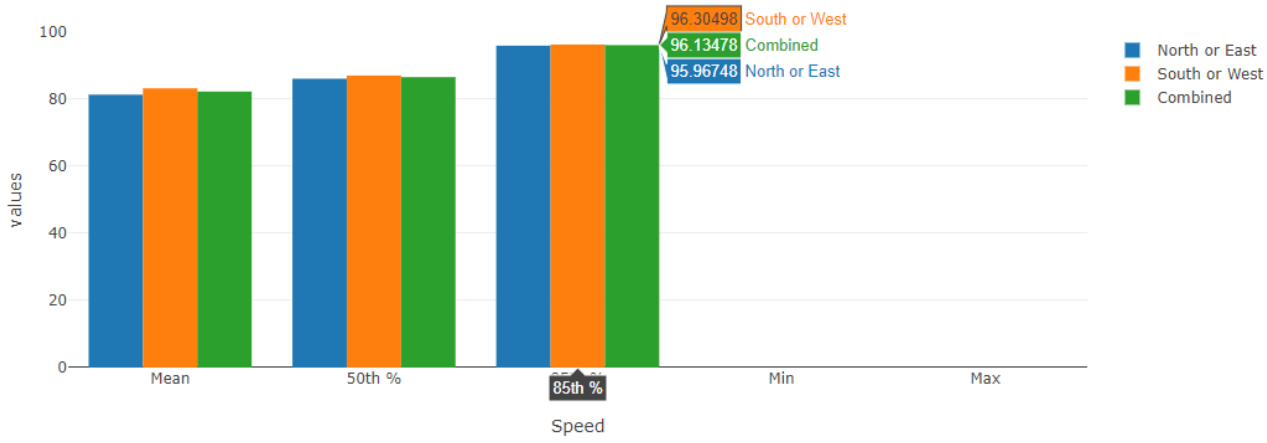
**AM Peak**

- **Nth Bnd: 150vph**
- **Sth Bnd: 80vph**

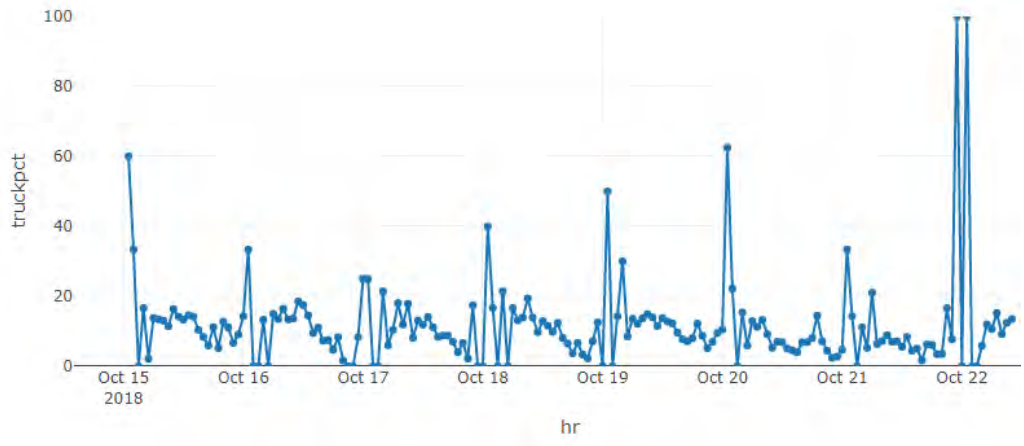
**PM Peak**

- **Nth Bnd:80vph**
- **Sth Bnd: 175vph**

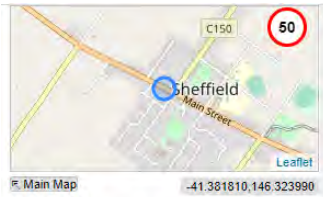
## Speed Stats X Direction - For Survey Starting 2018-10-15




## HV Pct Report - For Survey Starting 2018-10-15



# Sheffield MR, 75m West of High St, Sheffield




Main Map -41.381810,146.323990

STATION

**A1031185**

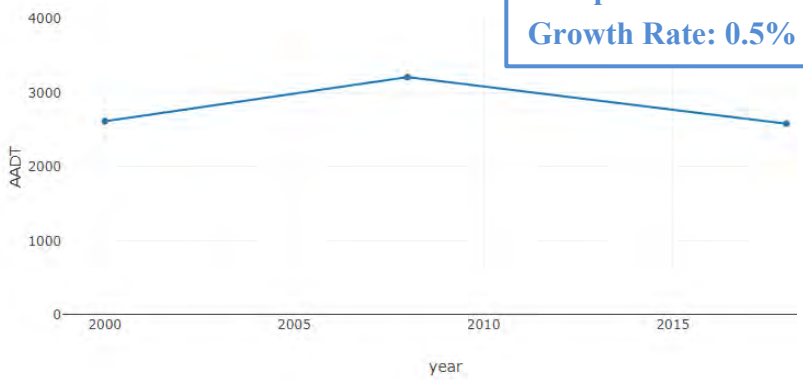
a short term classified counter located at a two way road [E/W] in **Sheffield**, **Kentish** on **A1031**, 75m W Of High St [ [UTS L30/4.26 - 5.10]

Reports Spanning All Available Years

| Report Fragments | | |
|---|---|---|
| XAxis | Value | Series |
| Vehicle Trend Report | | |
| Change in AADT over time | | |
| HV pct Report | | |

ALL YEARS | 2018

Vehicle Trend Report - All Years

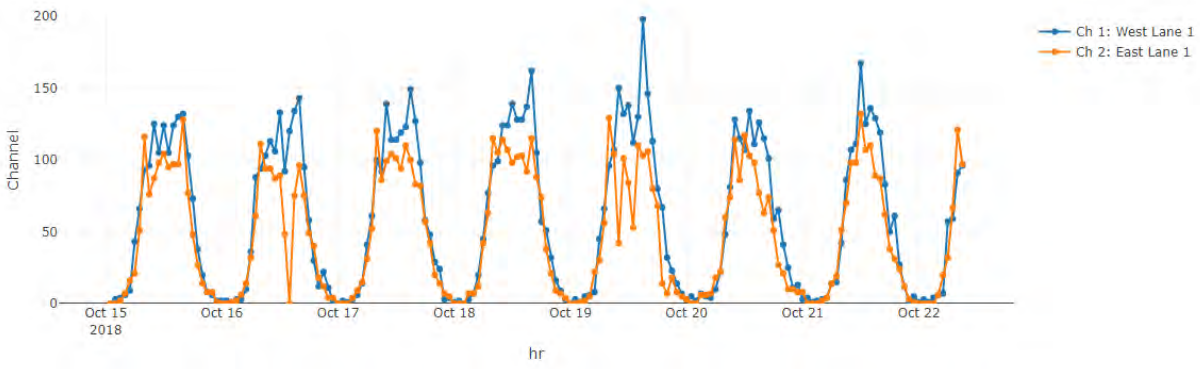



**Sheffield Main Road (75m West of Nook Rd) AADT:**

- **2,616 vpd (2000)**
- **2,583 vpd (2018)**

**Compound Annual Growth Rate: 0.5%**

Vehicles X Lane X Hour Report - For Survey Starting 2018-10-15




**Peak Hour Traffic 2018**

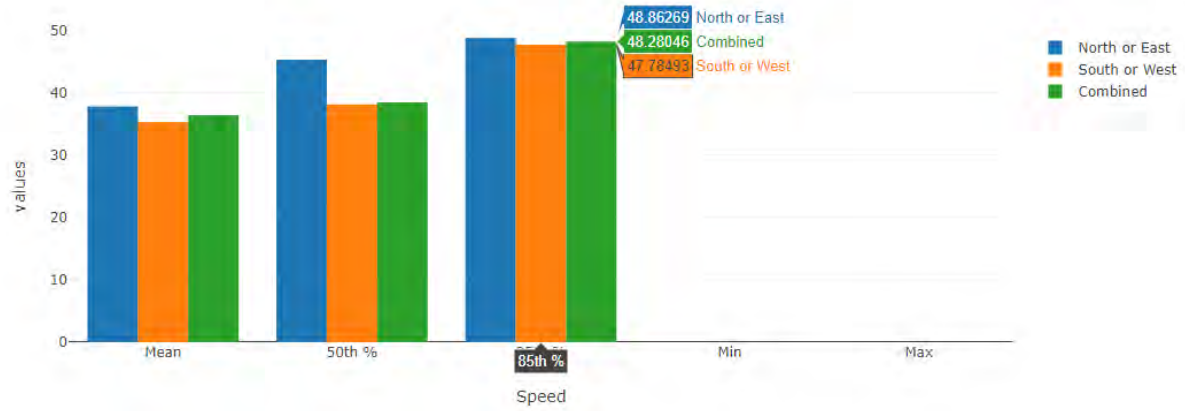
**AM Peak**

- **W Bnd: 125vph**
- **E Bnd: 120vph**

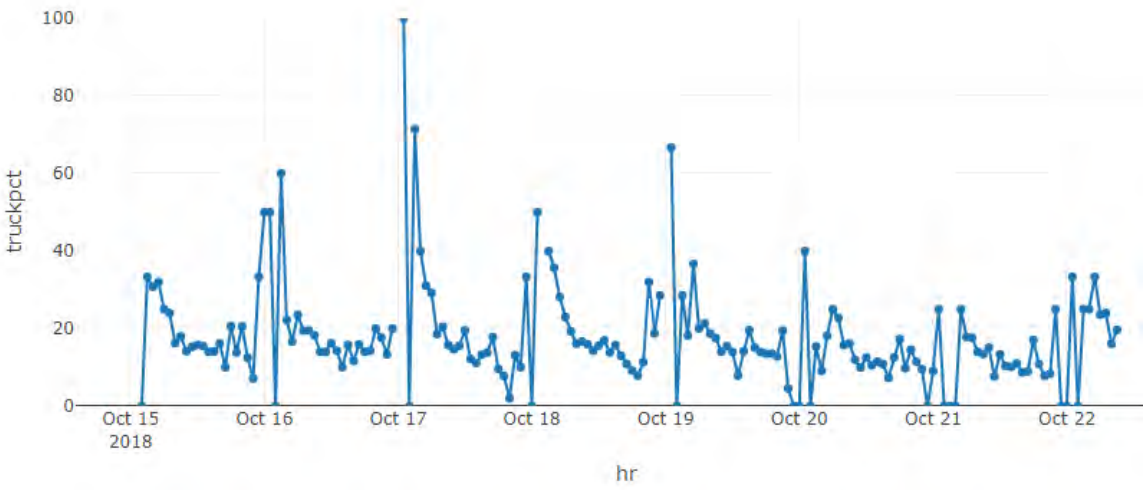
**PM Peak**

- **W Bnd:140vph**
- **E Bnd: 100vph**

## Speed Stats X Direction - For Survey Starting 2018-10-15

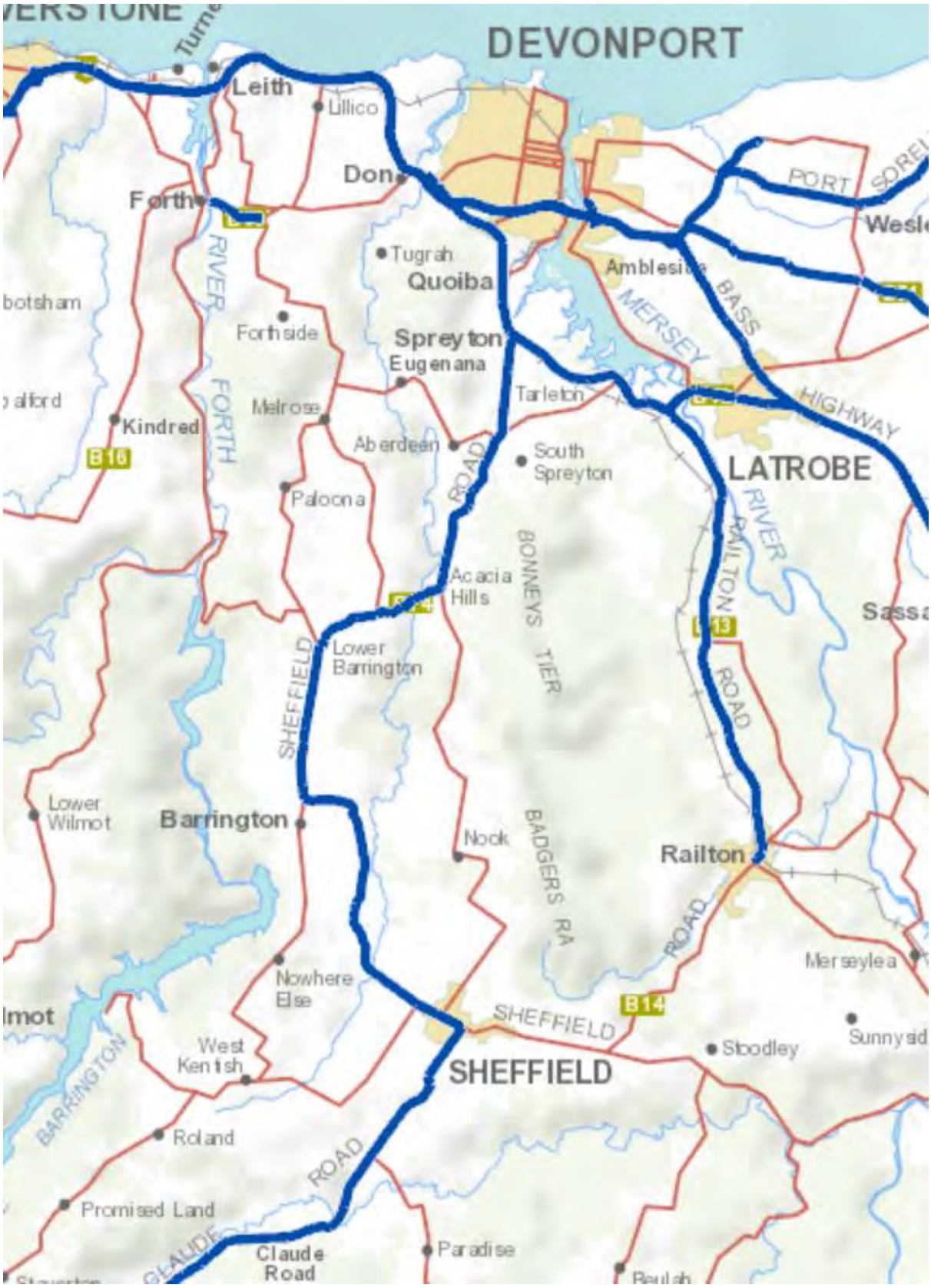


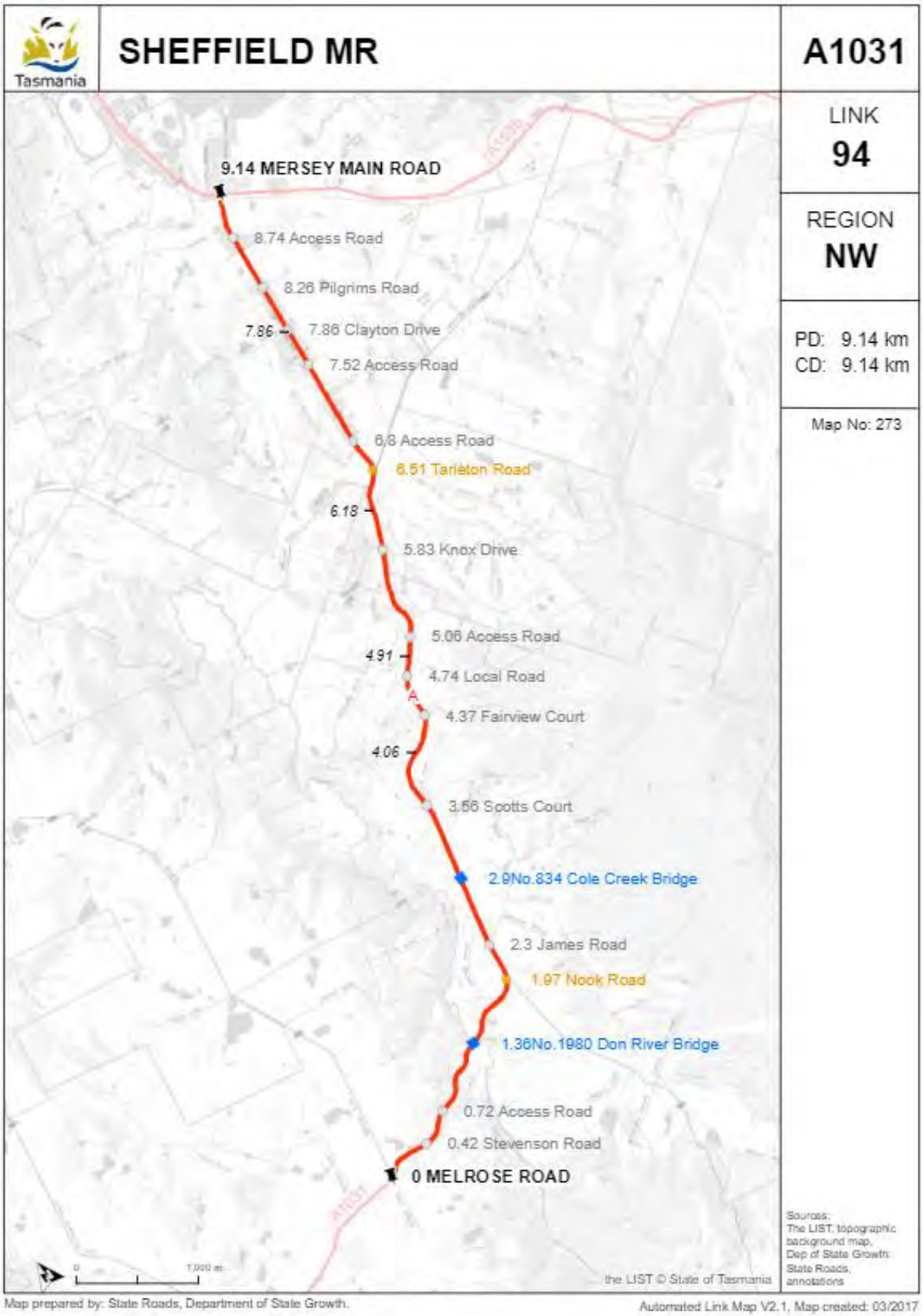

## HV Pct Report - For Survey Starting 2018-10-15




*GeoCounts State Growth Tas*

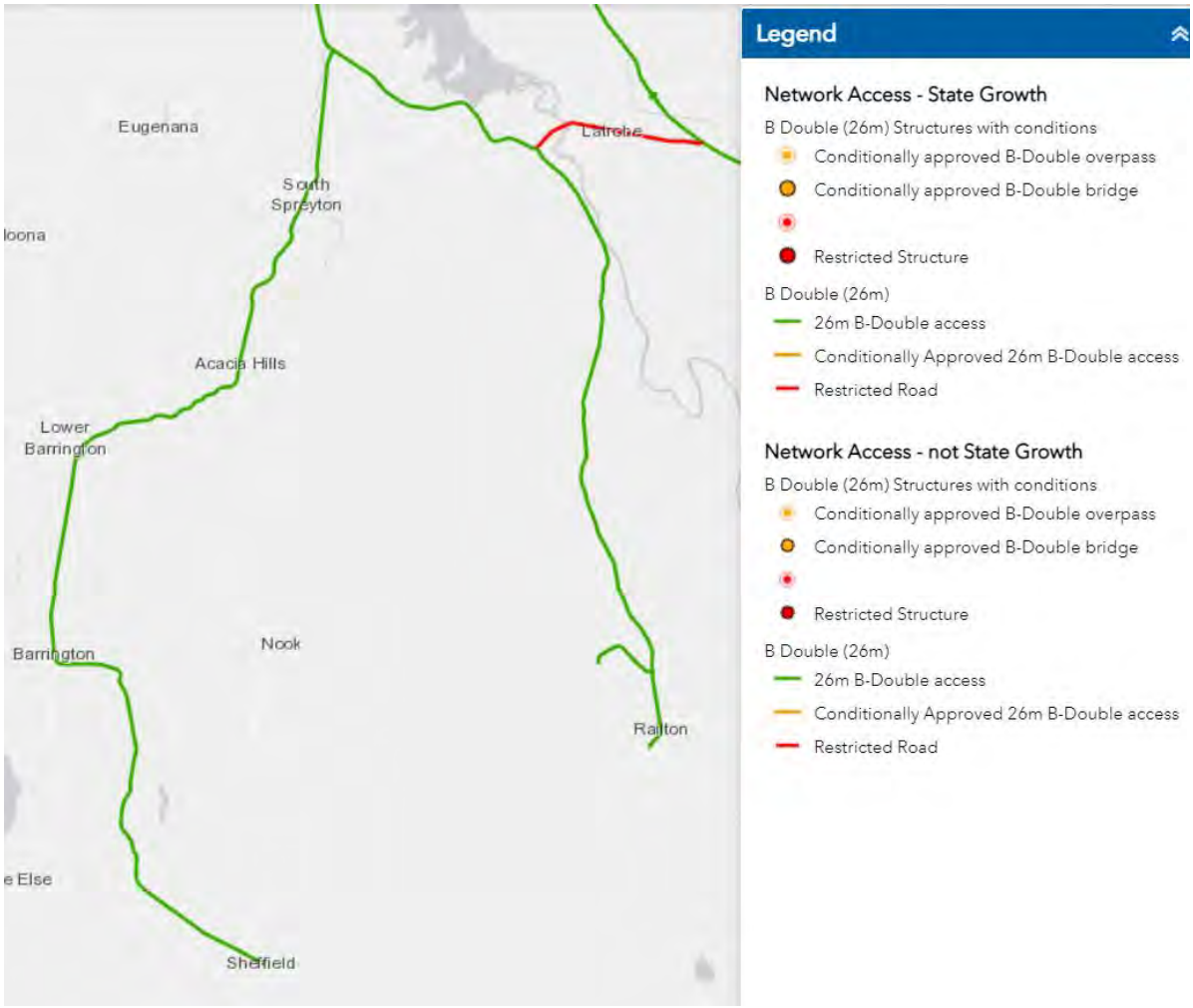
# Appendix C – DSG Link Maps




Tasmania
SHEFFIELD MR
A1031
LINK
94
REGION
NW
PD: 9.14 km
CD: 9.14 km
Map No: 273
9.14 MERSEY MAIN ROAD
8.74 Access Road
8.26 Pilgrims Road
7.86
7.86 Clayton Drive
7.52 Access Road
6.8 Access Road
6.51 Tarleton Road
6.18
5.83 Knox Drive
5.06 Access Road
4.91
4.74 Local Road
4.37 Fairview Court
4.06
3.66 Scotts Court
2.9No.834 Cole Creek Bridge
2.3 James Road
1.97 Nook Road
1.36No.1980 Don River Bridge
0.72 Access Road
0.42 Stevenson Road
0 MELROSE ROAD
A1031
0
1,000 m
the LIST © State of Tasmania
Sources:
The LIST, topographic background map, Dep of State Growth; State Roads, annotations
Map prepared by: State Roads, Department of State Growth.
Automated Link Map V2.1, Map created: 03/2017

SHEFFIELD MR
A1031
LINK
30
REGION
NW
PD: 8.82 km
CD: 8.82 km
Map No: 271
8.82 BARRINGTON ROAD (SOUTH)
8.61No.259 Whitehawk Creek Bridge
8.21
7.71 Hamptons Road
7.05 N0. 258
6.22 Access Road
5.62
5.6 West Kentish Road
4.26
4.26 Main Street
A
3.83 Access Road
3.43 Access Road
2.46 Access Road
1.72
0.77 Access Road
0.6 Brown Hill Road
0 PARADISE ROAD
Sources:
The LIST topographic background map, Dep of State Growth State Roads, annotations
the LIST © State of Tasmania
Map prepared by: State Roads, Department of State Growth.
Automated Link Map V2.1, Map created: 03/2017

# Appendix D – Tas. 26m B Double Network



# Appendix E – Safe System Assessments

**Safe System Assessment** — **Sheffield Road approaches to Nook Road junction 2021**

| | | Run-off-road | Head-on | Intersection | Other | Pedestrian | Cyclist | Motorcyclist | |
|---|---|---|---|---|---|---|---|---|---|
| **Exposure** | **Justification (AADT 2,700vpd)** | Low traffic volume, no crash propensity | Low traffic volume, no crash propensity | Nook Road 1,050 vpd, no crash propensity | 26m B Double Route | Negligible pedestrian activity | Low cyclist volumes | Low volumes | |
| | **Score /4** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| **Likelihood** | **Justification** | Horizontal curves on both approaches , 3.3m lanes and 1m sealed shoulders, excellent delineation and road condition , no significant roadside hazards | Horizontal curves on both approaches , 3.3m lanes and 1m sealed shoulders, excellent delineation and road condition , no significant roadside hazards | Fully channlised junction. | 26m B Double compliant road cross section. | Rural setting with pedestrian friendly verges | 1m sealed shoulders | Horizontal curves on both approaches , 3.3m lanes and 1m sealed shoulders, excellent delineation and road condition , no significant roadside hazards | |
| | **Score /4** | 2 | 2 | 1 | 1 | 2 | 1 | 2 | |
| **Severity** | **Justification (100km/h speed limit)** | Speed envrionments of 70km/h to the South and 95km/h to the North. | Speed envrionments of 70km/h to the South and 95km/h to the North. | Speed envrionments of 70km/h to the South and 95km/h to the North. | Speed envrionments of 70km/h to the South and 95km/h to the North. | high speed for pedestrians | high speed for cyclists | high speed for motor cyclists | |
| | **Score /4** | 3 | 3 | 3 | 3 | 4 | 4 | 4 | **Total /448** |
| **Product** | **Total Score /64** | **6** | **6** | **3** | **3** | **8** | **4** | **8** | **38** |

**Safe System Assessment** **Nook Road North of Gravel Pit Road junction 2021**

| | | Run-off-road | Head-on | Intersection | Other | Pedestrian | Cyclist | Motorcyclist | |
|---|---|---|---|---|---|---|---|---|---|
| **Exposure** | **Justification (AADT 600 - 1,050vpd)** | Low traffic volume, no crash propensity | Low traffic volume, no crash propensity | Gravel Pit Road (AADT 210 vpd), no crash propensity. | Rural access road and truck route | Negligible pedestrian activity | Low cyclist volumes | Low volumes | |
| | **Score / 4** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| **Likelihood** | **Justification** | Narrow winding alignment with tight horizontal curves , 3.m lanes and minimal shoulders, poor delineation and average road condition , barrier fences | Narrow winding alignment with tight horizontal curves , 3.m lanes and minimal shoulders, poor delineation and average road condition , barrier fences | Simple Right and Left turn junction layout, adequate sight distance. Poor delineation. | Narrow winding alignment with tight horizontal curves , 3.m lanes and minimal shoulders, poor delineation and average road condition , barrier fences | Rural setting with pedestrian unfriendly verges | Negligible shoulders | Narrow winding alignment with tight horizontal curves , 3.m lanes and minimal shoulders, poor delineation and average road condition , barrier fences | |
| | **Score / 4** | 3 | 3 | 3 | 3 | 4 | 4 | 4 | |
| **Severity** | **Justification (80km/h speed limit)** | Speed environment of 60km/h | Speed environment of 60km/h | Speed environment of 60km/h | Speed environment of 60km/h | high speed for pedestrians | high speed for cyclists | high speed for motor cyclists | |
| | **Score / 4** | 1 | 1 | 1 | 1 | 4 | 4 | 4 | **Total /448** |
| **Product** | **Total Score /64** | **3** | **3** | **3** | **3** | **16** | **16** | **16** | **60** |

## Safe System Assessment — Nook Road South of Gravel Pit Road junction 2021

| | | Run-off-road | Head-on | Intersection | Other | Pedestrian | Cyclist | Motorcyclist | |
|---|---|---|---|---|---|---|---|---|---|
| Exposure | Justification (AADT 600 - 1,360vpd) | Low traffic volume, no crash propensity | Low traffic volume, no crash propensity | Gravel Pit Road (AADT 210 vpd), no crash propensity. | Rural access road and truck route | Negligible pedestrian activity | Low cyclist volumes | Low volumes | |
| | Score / 4 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Likelihood | Justification | Narrow winding alignment with tight horizontal curves , 3.m lanes and minimal shoulders, poor delineation and average road condition , barrier fences | Narrow winding alignment with tight horizontal curves , 3.m lanes and minimal shoulders, poor delineation and average road condition , barrier fences | Simple Right and Left turn junction layout, adequate sight distance. Poor delineation. | Narrow winding alignment with tight horizontal curves , 3.m lanes and minimal shoulders, poor delineation and average road condition , narrow bridges | Rural setting with pedestrian unfriendly verges | Negligible shoulders | Narrow winding alignment with tight horizontal curves , 3.m lanes and minimal shoulders, poor delineation and average road condition , barrier fences | |
| | Score / 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | |
| Severity | Justification (80km/h speed limit) | Speed environment of 60km/h | Speed environment of 60km/h | Speed environment of 60km/h | Speed environment of 60km/h | high speed for pedestrians | high speed for cyclists | high speed for motor cyclists | |
| | Score / 4 | 1 | 1 | 1 | 1 | 4 | 4 | 4 | Total /448 |
| Product | Total Score /64 | **4** | **4** | **3** | **4** | **16** | **16** | **16** | **63** |

**Safe System Assessment** **Gravel Pit Road 2021**

| | | Run-off-road | Head-on | Intersection | Other | Pedestrian | Cyclist | Motorcyclist | |
|---|---|---|---|---|---|---|---|---|---|
| **Exposure** | **Justification (AADT 210vpd)** | Low traffic volume, no crash propensity | Low traffic volume, no crash propensity | Nook Road (AADT 600 vpd), no crash propensity. | Trucks using quarry access road | Negligible pedestrian activity | Low cyclist volumes | Low volumes | |
| | **Score / 4** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| **Likelihood** | **Justification** | Straight 6.5m trafficable width gravel road with guidepost delineation , good condition | Straight 6.5m trafficable width gravel road with guidepost delineation , good condition | Simple Right and Left turn junction layout, adequate sight distance. Poor delineation. | Straight 6.5m trafficable width gravel road with guidepost delineation , good condition | Rural setting with pedestrian unfriendly verges | Negligible shoulders | Straight 6.5m trafficable width gravel road with guidepost delineation , good condition | |
| | **Score / 4** | 2 | 2 | 3 | 2 | 3 | 4 | 4 | |
| **Severity** | **Justification (40km/h speed limit)** | Speed environment of 50km/h | Speed environment of 50km/h | Speed environment of 50km/h | Speed environment of 50km/h | Speed environment of 50km/h | Speed environment of 50km/h | Speed environment of 50km/h | |
| | **Score / 4** | 1 | 1 | 1 | 1 | 3 | 3 | 3 | **Total /448** |
| **Product** | **Total Score /64** | **2** | **2** | **3** | **2** | **9** | **12** | **12** | **42** |

# Appendix F – Austroads Level of Service descriptions

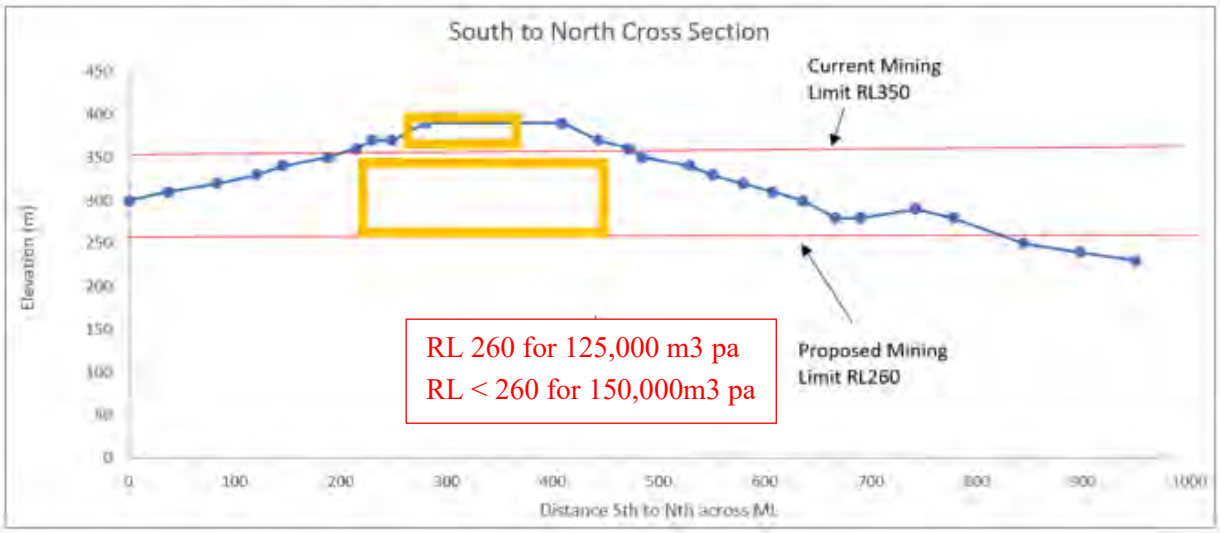
| | |
|---|---|
| **Level of service A** | A condition of free-flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent. |
| **Level of service B** | In the zone of stable flow where drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is a little less than with level of service A. |
| **Level of service C** | Also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level. |
| **Level of service D** | Close to the limit of stable flow and approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems. |
| **Level of service E** | Traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause breakdown. |
| **Level of service F** | In the zone of forced flow, where the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow breakdown occurs, and queuing and delays result. |

# Appendix G – Trucks Entering Warning Sign

## Australian Standard Trucks Entering warning sign W5-22B.

# Appendix H – Proposed expansion

Figure 3: Schematic Cross Section of Current and Future Quarry Operations






External traffic movements can also vary depending on the construction industry work load and market demand. Based on recent experience at the quarry, 60 movements would represent a busy day, with the average movements approximately 30, based on a review of 2018/2019 FY data. A movement could be from a small 6t truck up to a semi tipper. No public sales are undertaken at the quarry.

All quarry traffic uses Gravel Pit Road to enter/exit the quarry and the intersection with Nook Road (1.5km single trip). Gravel Pit Road is approximately 8 m wide with slight undulations and is also used by Boral for their quarry. A call sign protocol is used on Gravel Pit Road. The road allows for truck and trailer to safely pass each other.

Nook Road is a Kentish Council maintained road and provides commuter access between Sheffield and Acacia Hills and is primarily servicing significant volumes of through traffic in addition to rural property access.

The Nook Road – Gravel Pit Road intersection is a sealed intersection with a signed 80 km speed limit, with sight distance 175m to the north and 185m to the south. This is deemed adequate for large trucks to safely merge from Gravel Pit Road.

Once inside the quarry, all traffic follows signage which has been designed to provide adequate turning area for the larger trucks, loading area and no traffic pathway cross over. The exit is adjacent to the entry and provides suitable visibility to approaching traffic on Gravel Pit Road.

## 7.5 Hours of Operation

The proposed hours of operation are as per the existing EPN 9969/1, Condition N1

Extraction/Crushing/Screening:

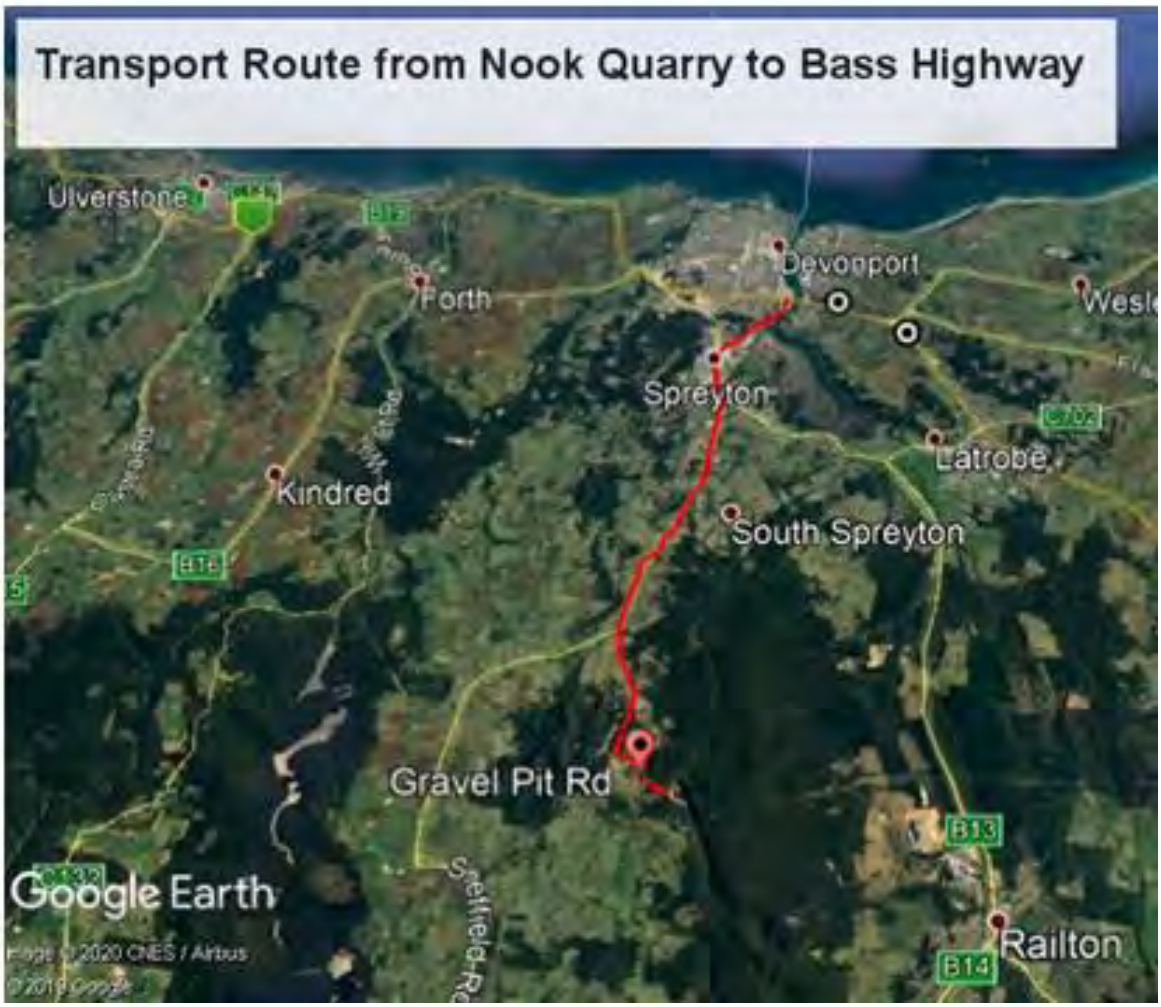
- 0700-1700 – Monday to Friday
- 0800-1600 – Saturday

Loading and Transport:

- 0600-1900 – Monday to Friday
- 0800-1600 – Saturdays

No works on Statewide Public Holidays

**Current Operation:**

| Period | Movement per 13 hours | Movements per hour |
|---|---|---|
| Busy – generally November – March | 110 | 8.47 |
| March - October | 25 | 1.93 |

The transport route taken by 90% of transport movements from the quarry