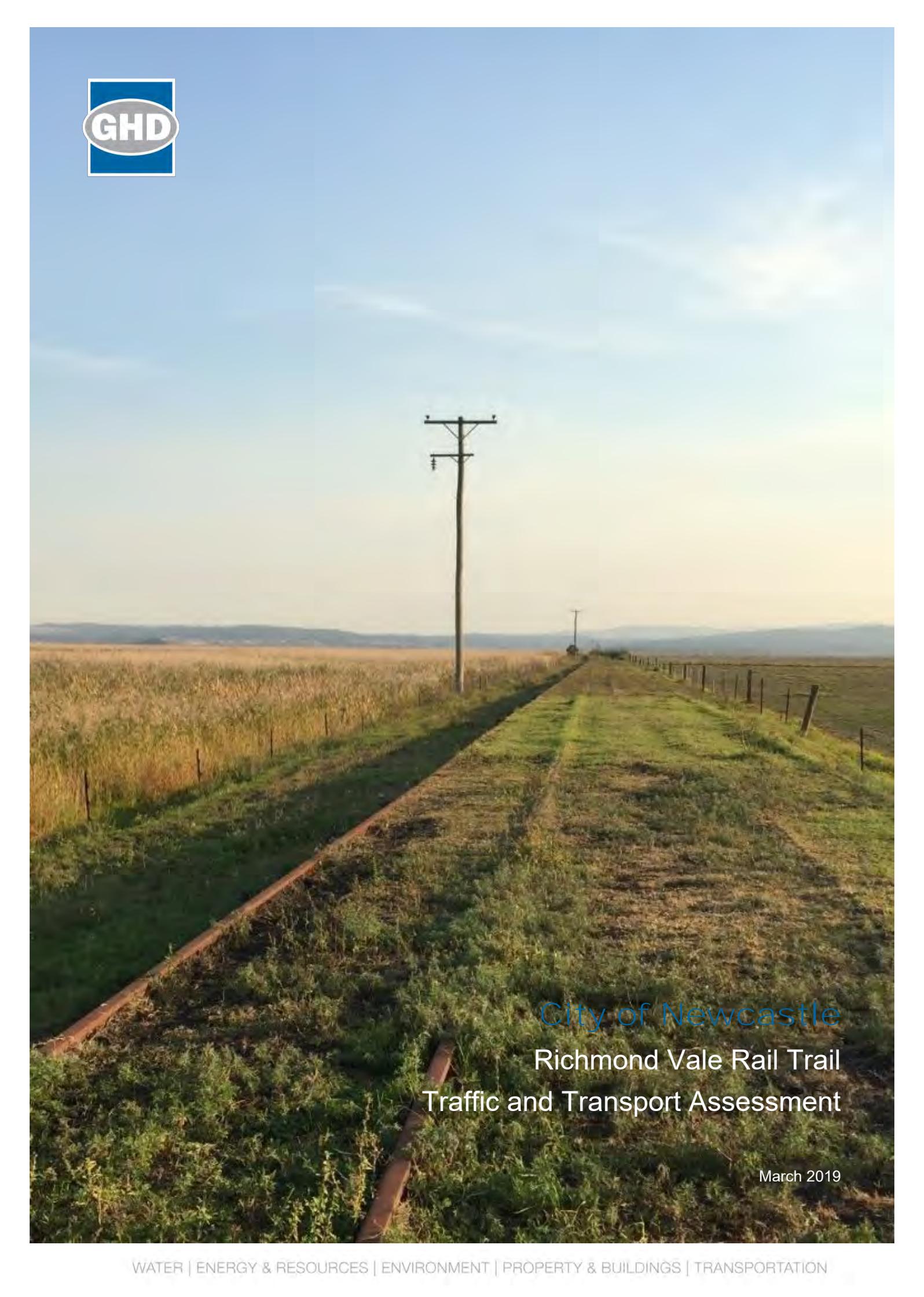


Appendix E – Traffic and Transport Assessment

The background of the entire page is a photograph of a rural landscape. A dirt path or rail trail runs from the bottom center towards the horizon. To the left of the path is a field of tall, golden-brown grasses. To the right is a green field with a wooden fence. In the distance, there are rolling hills under a clear blue sky with a few wispy clouds. A tall utility pole stands on the left side of the path, and another smaller one is visible further down the path.

City of Newcastle
Richmond Vale Rail Trail
Traffic and Transport Assessment

March 2019

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The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

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Appendices

Appendix A – Intersection configuration descriptions (typical)

1. Introduction

1.1 Background

The Richmond Vale Railway is a former rail line that runs from Hexham to Pelaw Main in the Lower Hunter region of NSW. The first section of the railway was opened in 1857 and originally ran from Hexham to Minmi. In 1905 the line was extended from Minmi to the Richmond Main and Pelaw Main Collieries, near Kurri Kurri. A number of small branch lines were also established from the 1920s to the 1950s to service collieries in the Stockrington area to the east of Pelaw Main. Industrial operation of the railway ceased in 1987 following the closure of the collieries in the region. In 1991, a direct passenger line was re-opened along a section of railway from the former Richmond Main Colliery to the former Pelaw Main Colliery. This passenger line continues to operate as a tourism facility managed by the Richmond Vale Railway Museum. The balance of the line has remained closed since 1987 (Richmond Vale Railway Museum, 2016).

An opportunity now exists to utilise the disused sections of the former rail line, along with a disused section of the former Chichester to Newcastle water main corridor, to establish a multi-use recreational trail for non-motorised travel. Once constructed, the trail would extend for 32 kilometres, from Shortland in the east, to Kurri Kurri in the west. There would also be a number of branch lines from the main trail alignment that would provide connections to the suburbs of Tarro, Fletcher and Minmi. The trail would be located within the Newcastle, Cessnock and Lake Macquarie local government areas (LGAs).

The proposed Richmond Vale Rail Trail (RVRT) will provide a safe cycling and walking experience between Cessnock and Newcastle without the use of current road networks and will also attract both local and regional users to enjoy the environmental and heritage attractions along the route. The RVRT provides an opportunity for the Lower Hunter region communities to develop key growth areas of transport, tourism, recreation, heritage, and economic and social by connecting into the proposed trail users. These opportunities were identified in the feasibility study undertaken by Mike Halliburton Associates, 2014 which recommended the construction of the trail based on the constructability, value, community benefit and tourism potential of the trail. This has been further expanded in the concept design and socio-economic study undertaken as part of the development of the project.

1.2 Scope of this report

The purpose of this report is to undertake an assessment of the potential traffic and transport impacts of the proposal. The scope of work for this report is as follows:

- Provide description of development.
- Address all of the Secretary's environmental assessment requirements (SEARs).
- Determine traffic generation and distribution as a result of the proposal.
- Describe access arrangements and any road crossings and confirm that the relevant standards and council requirements are met.
- Describe parking arrangements and confirm that the relevant standards and council requirements are met.

1.3 Proposal site

The proposed trail follows a former railway formation between Shortland and Kurri Kurri, with connections to Tarro, Fletcher, and Minmi. The proposal site and surrounds are shown in Figure 1-1.

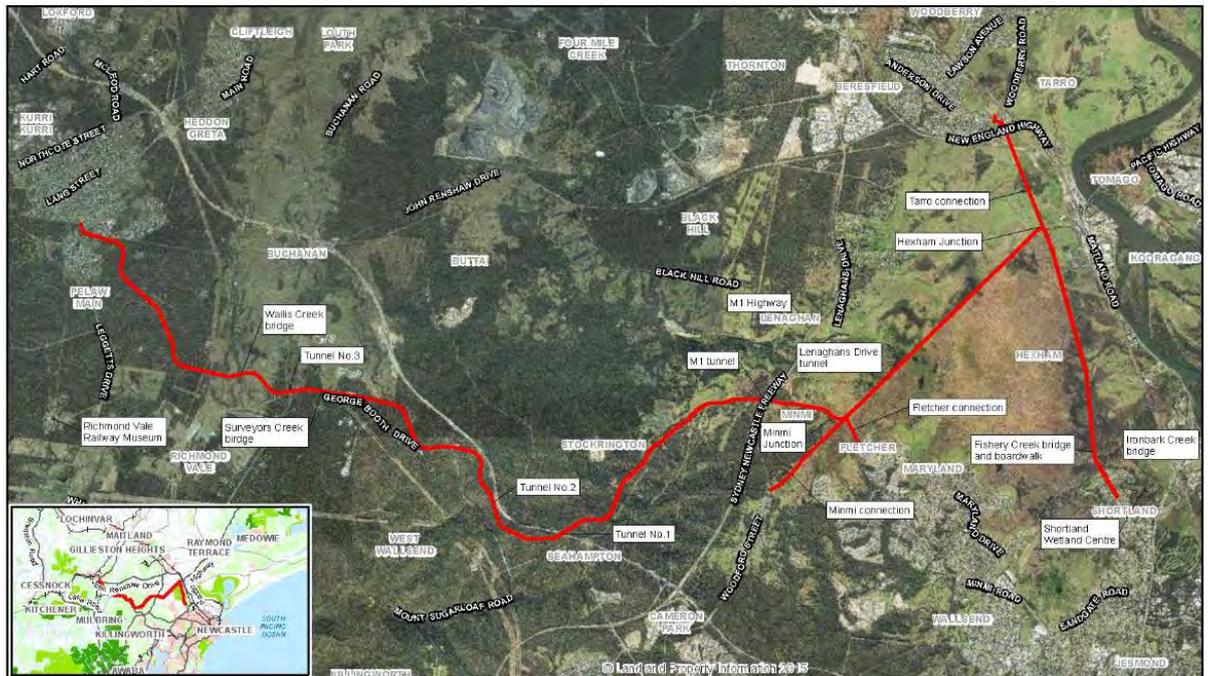


Figure 1-1 Proposed trail commencing at Shortland, and ending at Kurri Kurri

1.4 Secretary's environmental assessment requirements

The NSW government have outlined a number of SEARs to be addressed as part of this proposal. They can be summarised in Table 1-1.

Table 1-1 Summary of SEARs

Description	Where addressed in this report
Details of roads, cycle and pedestrian transport routes and access arrangements to and from the site during construction and operation.	Section 2.1, 2.3, 2.4, 3.2, 3.3
Road traffic predictions for the development during construction.	Section 3.4.1
Assessment of any potential impacts to the Lower Hunter Freight Corridor.	Section 2.2.1
Consultation with any relevant councils or transport departments.	Section 1.5
Identify any impacts the construction and operation of the shared pathway may have on the classified road network and any road underpasses or structures proposed to be utilised for the facility.	Refer separate structural assessment
Address vehicular access arrangements to and from the shared pathway during the construction phase of the project and for ongoing maintenance of the facility.	Section 3.3, 3.5
Provide details of any measures proposed to manage or mitigate impacts of the proposal identified, including ongoing maintenance of the road underpasses or structures.	Refer separate structural assessment
The Tarro side trail bisects the horizontal alignment of Roads and Maritime's preferred option for the proposed upgrading of the M1 to Raymond Terrace.	Section 2.2.2

Description	Where addressed in this report
Transport for NSW highlighted the need to give consideration to the Lower Hunter Freight Corridor and the M1 upgrade to Raymond Terrace.	Section 2.2
Assessment of traffic impacts of the shared path	Section 4

1.5 Authority consultation

The project will be located within the Newcastle, Cessnock and Lake Macquarie LGAs, and each of these Councils has been consulted during the development of this concept. Comments from technical officers from each Council on the draft report have been incorporated into the current version of this report.

2. Existing conditions

2.1 Road network

Much of the proposed rail trail route is remote from the road network. Locations where the rail trail interacts with the road network are described in the following sections.

2.1.1 Shortland

The proposed rail trail commences at King Street, Shortland, with an additional connection to the Hunter Wetlands Centre, as shown in Figure 2-1.

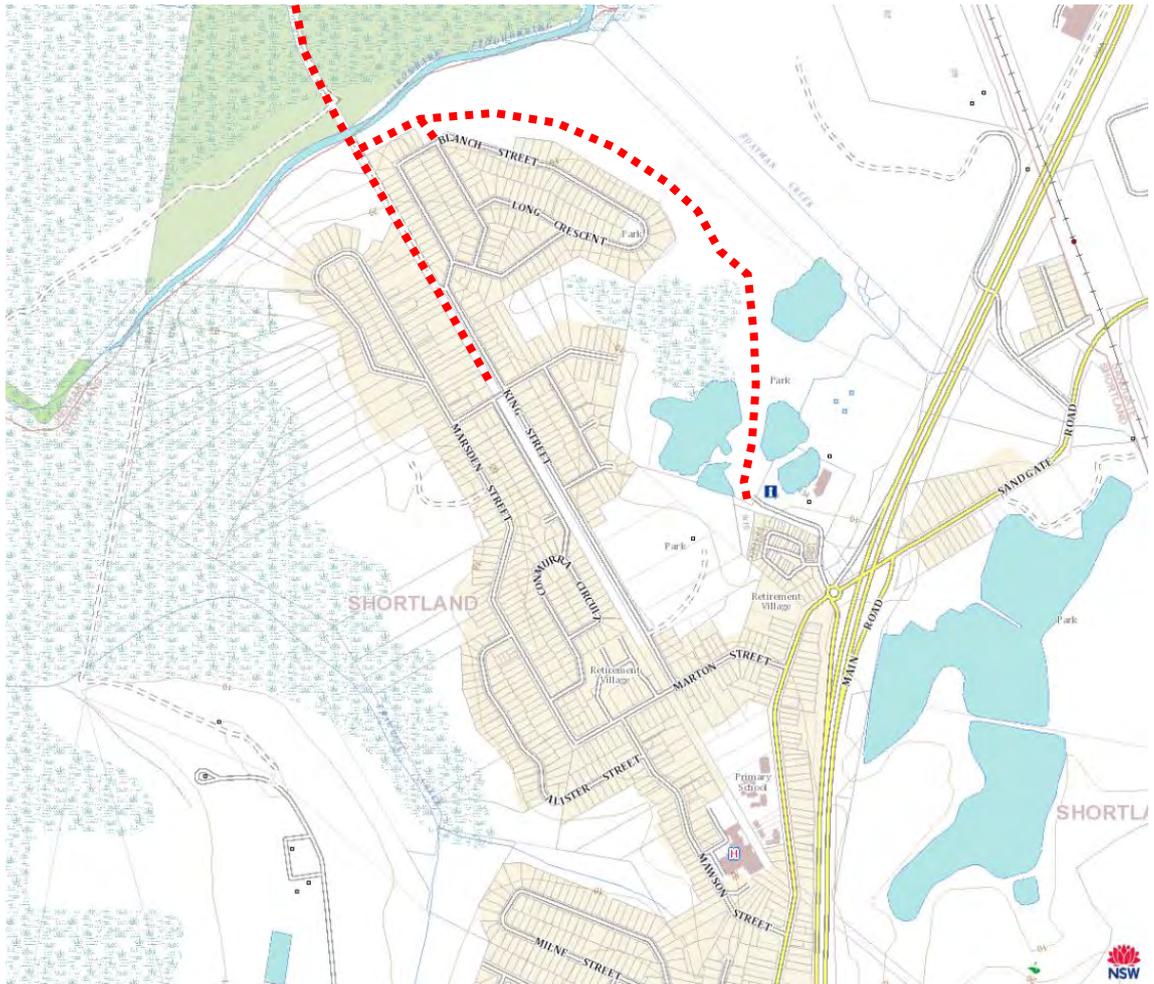


Figure 2-1 Local road network – Shortland

Base image source: NSW Spatial Services maps.six.nsw.gov.au

King Street is a local residential collector street that runs parallel to the beginning of the trail. Access to the arterial road network is via Marton Street, another residential collector road, to Sandgate Road. The intersection of Marton Street and Sandgate Road is give-way controlled.

Blanch Street is a local residential street connecting to the northern end of King Street.

Sandgate Road is a sub-arterial road connecting between the Pacific Highway/Maitland Road and a grade-separated interchange at the Newcastle Inner City Bypass. It has a single lane in each direction, and a 50 km/hr speed limit.

2.1.2 Tarro

The proposed rail trail would terminate south of the New England Highway, with a future potential connection to Anderson Drive, as shown in Figure 2-2.

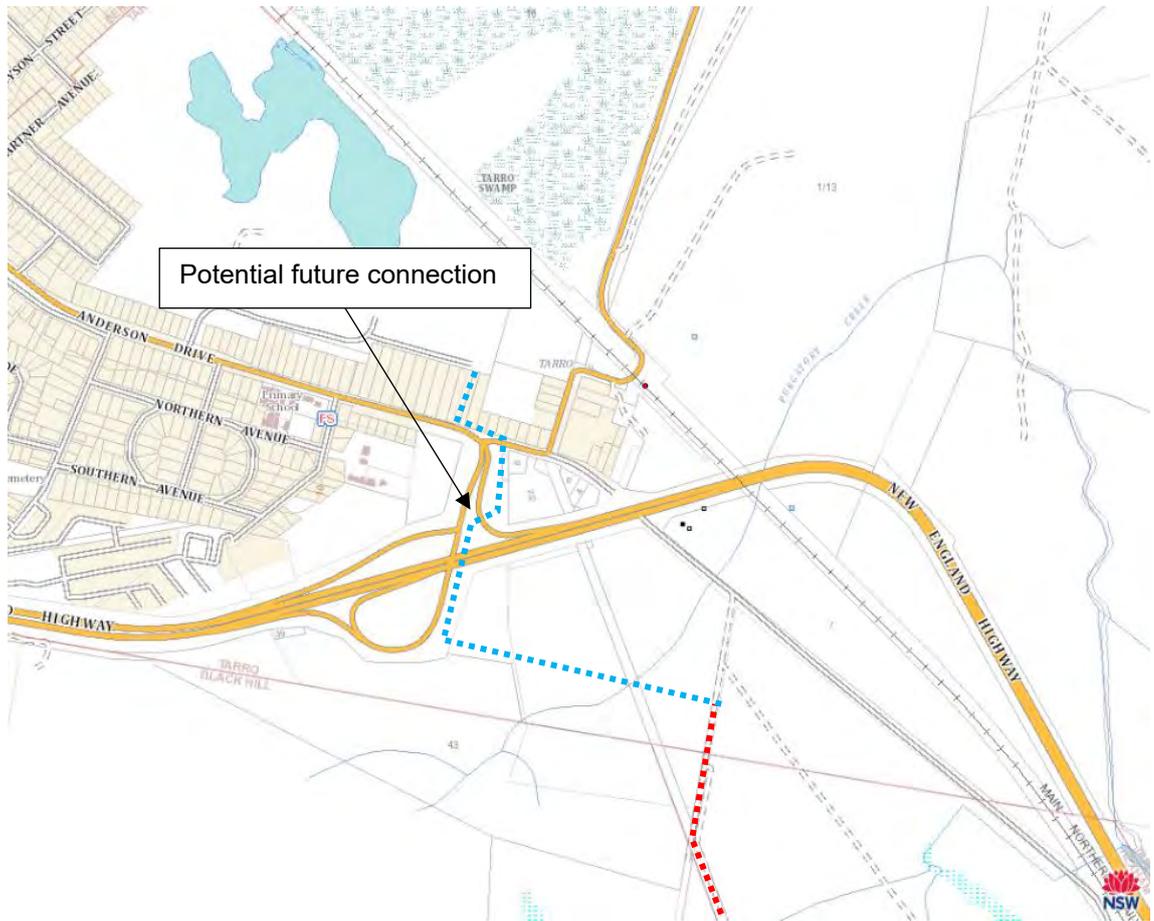


Figure 2-2 Local road network - Tarro

Base image source: NSW Spatial Services maps.six.nsw.gov.au

The New England Highway connects Newcastle with the Upper Hunter Valley, and ultimately Brisbane via Tamworth and Armidale. The section of the highway at Tarro connects the northern end of the Pacific Motorway with the Pacific Highway at Hexham. Through Tarro the highway is a limited access dual-carriageway with two lanes in each direction. There is an 80 km/hr speed limit on the eastbound carriageway, with a 90 km/hr speed limit westbound. A grade separated interchange provides access to Anderson Drive in Tarro.

Anderson Drive is a collector road, with a single lane in each direction. The speed limit is generally 50 km/hr, although school zone speed limits apply to various sections.

2.1.3 Fletcher

A connection to the trail is proposed from Kural Crescent, Fletcher.



Figure 2-3 Local road network - Fletcher

Base image source: NSW Spatial Services maps.six.nsw.gov.au

Relevant local roads within Fletcher include Kural Crescent and Mitti Street. Connections to the wider road network include via Kurraka Drive or Awabakal Drive to Minmi Road. Local and collector roads in Fletcher have a 50 km/hr speed limit. Minmi Road has a 60 km/hr speed limit, with signalised intersections and roundabouts providing connections into residential subdivisions.

2.1.4 Minmi

The trail is also planned to connect to an access road just off Woodford Street, Minmi, opposite the Minmi Rural Fire Station. Through Minmi, Woodford Street has a posted speed limit of 50 km/hr, with a single lane of traffic in each direction.

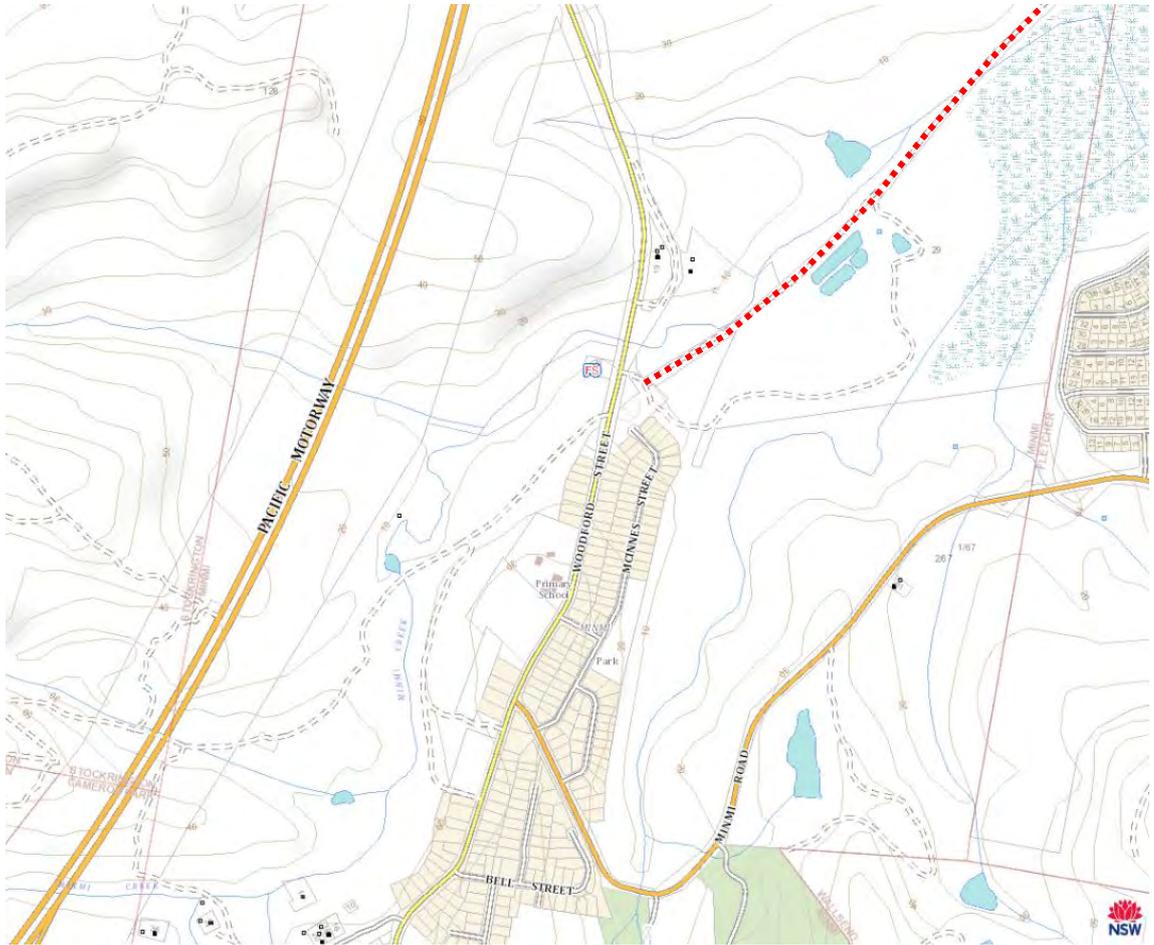


Figure 2-4 Local road network – Minmi

Base image source: NSW Spatial Services maps.six.nsw.gov.au

North of Minmi, Woodford Street becomes Lenaghans Drive, a sub-arterial road running parallel to the Pacific Motorway, with a single lane in each direction and an 80 km/hr speed limit.

2.1.5 Stockrington

The proposed trail crosses Dog Hole Road at Stockrington.



Figure 2-5 Local road network – Stockrington

Base image source: NSW Spatial Services maps.six.nsw.gov.au

Dog Hole Road is the continuation of Stockrington Road, which connects to Lenaghans Drive at an unsignalised T-junction with channelised right turn treatment. Dog Hole Road and Stockrington Road have a single lane in each direction and a 60 km/hr speed limit. In the vicinity of the proposed trail crossing, Dog Hole Road is a single-lane sealed roadway.

Seahampton Road runs between Dog Hole Road and George Booth Drive, passing under the Hunter Expressway. It is a private rural road, currently gated to prevent vehicular access. It has a narrow carriageway and few accesses along its length.

2.1.6 George Booth Drive

The trail is planned to run parallel to George Booth Drive for approximately 4.5 km. George Booth Drive is a rural road connecting the Pacific Motorway at Seahampton with Kurri Kurri, a function that has now largely been superseded by the Hunter Expressway. It has a single lane of traffic in each direction, with a posted speed limit of 80 km/hr.

Roads branch off George Booth Drive to give access to adjacent land uses, including a privately-owned quarry, and former Hunter Expressway construction compounds.

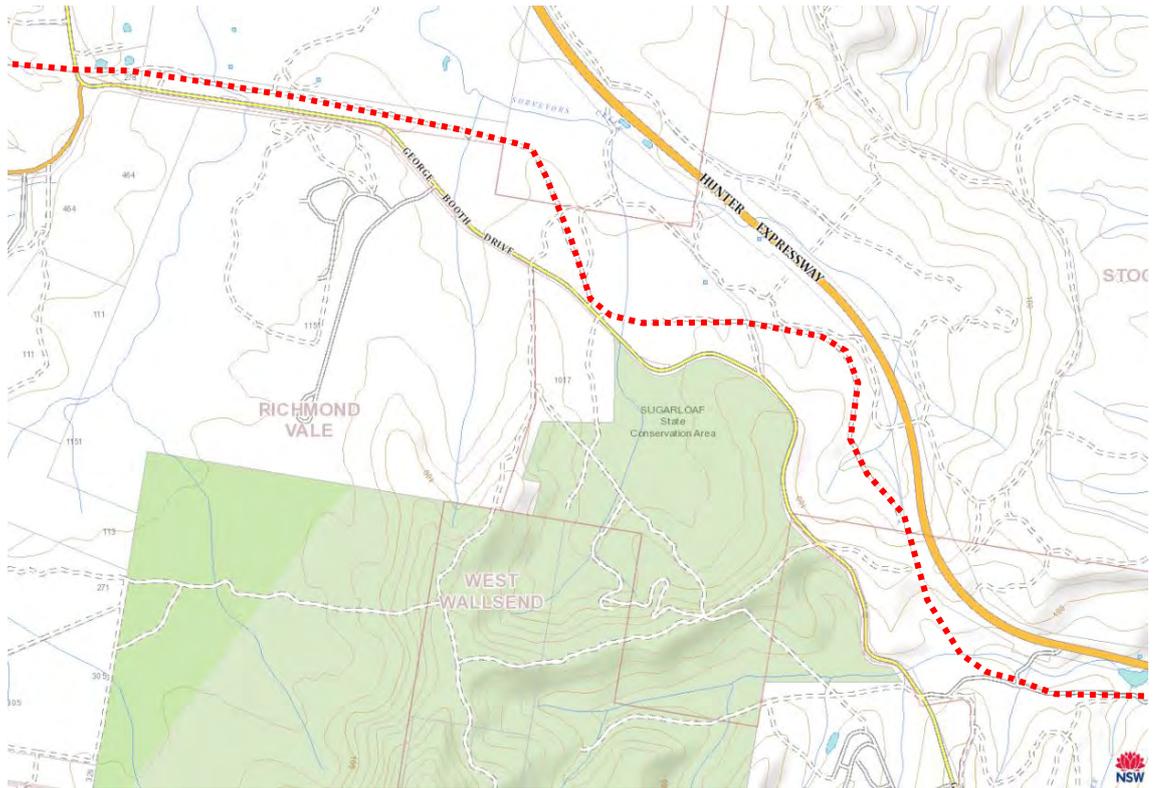


Figure 2-6 Local road network – George Booth Drive area

Base image source: [NSW Spatial Services maps.six.nsw.gov.au](https://maps.six.nsw.gov.au)

2.1.7 Kurri Kurri

The rail trail concludes at Kurri Kurri and crosses both Pokolbin Street and Stanford Street. Pokolbin Street is a suburban residential street with a posted speed limit of 50 km/hr. Stanford Street is a collector road between Leggetts Drive and Railway Street and has a posted speed limit of 50 km/hr.



Figure 2-7 Local road network - Kurri Kurri

Base image source: NSW Spatial Services maps.six.nsw.gov.au

2.1.8 Arterial road network

The arterial road network in the vicinity of the proposed rail trail includes the New England Highway (A1), John Renshaw Drive (B6), Pacific Motorway (M1), Newcastle Link Road (A15) and Hunter Expressway (M15).

John Renshaw Drive connects Tarro and Kurri Kurri and has a posted speed limit of 100 km/hr. John Renshaw Drive in 2010 had a westbound AADT of 16,093 west of Tarro. Eastbound volumes were not available.

The Pacific Motorway commences at John Renshaw Drive, Tarro and heads south, with major interchanges at the Hunter Expressway and George Booth Drive, before continuing towards the Central Coast and Sydney. Traffic volumes from 2016 indicate a two-way AADT of 32,314 south of Tarro. The Pacific Motorway has a posted speed limit of 110 km/hr.

Newcastle Link Road is a major arterial road connecting Newcastle and the Hunter Expressway, with a posted speed limit of 90 km/hr. Traffic volumes from 2010 showed an AADT of 27,098.

Hunter Expressway connects to Newcastle Link Road and runs past Kurri Kurri heading north with a posted speed limit of 110 km/hr. Traffic volumes from 2016 showed an AADT of 26,772 south of the John Renshaw Drive interchange.

2.2 Future transport upgrades

2.2.1 Lower Hunter Freight Corridor

The Lower Hunter Freight Corridor is a proposed rail corridor connecting the Main North Railway Line at Fassifern and the Hunter Valley Rail corridor at Hexham. Transport for NSW are currently investigating options for a dedicated freight link connecting the two lines. Depending on the selected corridor location the freight rail may impact on the proposed rail trail.

2.2.2 M1 to Raymond Terrace upgrade

Roads and Maritime Services are currently planning the extension of the M1 to Raymond Terrace. The current proposal includes the Pacific Motorway (M1) diverting from its current route south of John Renshaw Drive, and heading east to Tarro. The new route would include an interchange with the New England Highway at Tarro before heading east over the New England Highway, Main Northern Rail Line and the Hunter river. The new route would meet the existing Pacific Highway alignment at Tomago, with a diversion to the east of the Heatherbrae industrial area. The proposed route is shown in Figure 2-8. This proposal will impact the proposed rail trail at Tarro, with the rail trail needing to pass either over or under the new route as well as the existing New England Highway.

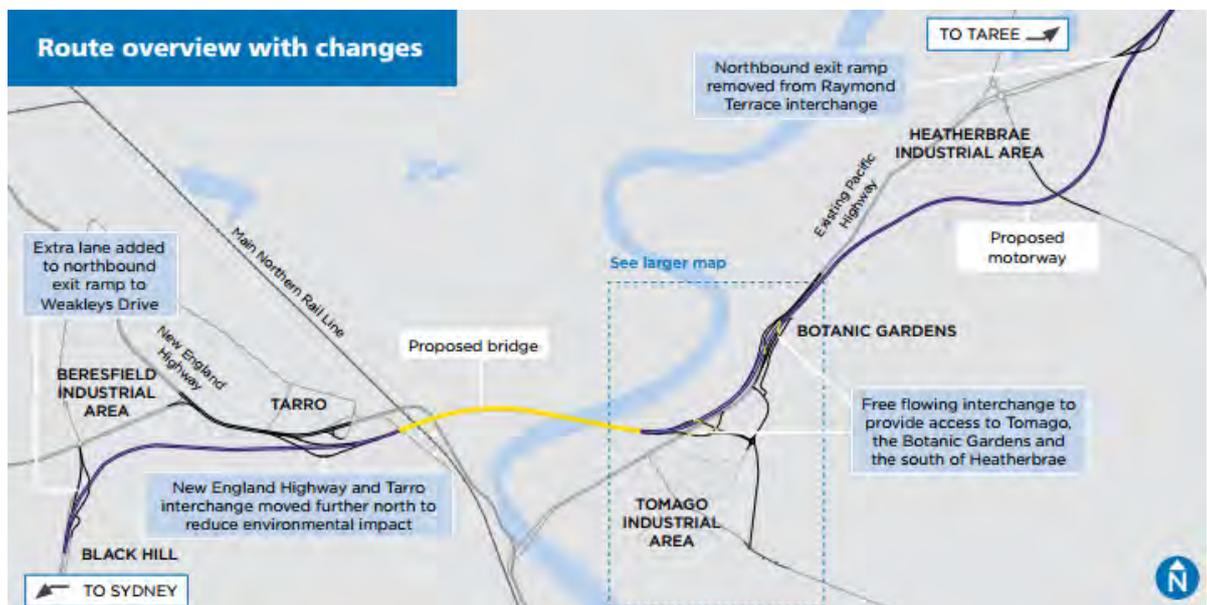


Figure 2-8 M1 to Raymond Terrace upgrade concept alignment

Source: Roads and Maritime Services

In the case of both the Lower Hunter Freight Corridor and the M1 to Raymond Terrace Upgrade, incorporation of the rail trail via either an overpass or underpass will be required. The rail trail is not likely to pose a significant constraint on the design of either project. Similarly, the construction of either project is not expected to impact the long term viability of the rail trail as a whole, with any impacts contained in a localised area.

2.3 Public transport

2.3.1 Shortland

Bus services at Shortland are operated by Newcastle Transport. Route 47 travels along King Street, linking Jesmond with Newcastle Marketown. Services are approximately every 60 minutes throughout the week (daytime only).

2.3.2 Tarro

Bus services at Tarro are operated by Hunter Valley Buses. Route 181 loops through Tarro via Christie Road, Burgess Parade, Southern Avenue, Eastern Avenue and Anderson Drive, and operates approximately hourly on weekdays and Saturdays, with less frequent services on Sundays. Tarro Train station is located in the local road network at the end of Woodberry Road. The rail service is run by NSW Trains between Scone, Dungog or Telarah, and Newcastle Interchange. Trains run approximately hourly every day.

2.3.3 Fletcher

Bus services at Fletcher are operated by Hunter Valley Buses. Route 261 travels via Kuraka Drive, Tibin Drive and Awabakal Drive during weekday peak periods only. Otherwise services travel via Minmi Road.

2.3.4 Minmi

Bus services at Minmi are operated by Hunter Valley Buses and stop at Woodford Street near Minmi Road. Only some services on Route 260 continue to the Minmi terminus, with most services terminating at Fletcher.

2.3.5 George Booth Drive and Dog Hole Road

Neither George Booth Drive (adjacent to the proposed route) or Dog Hole Road are serviced by regular public transport. The nearest public transport to Dog Hole Road is at Minmi, some 3.5 km away.

Public transport services George Booth Drive to the north of the study area at Buchanan, and to the south at Cameron Park.

2.3.6 Kurri Kurri

Public transport in Kurri Kurri is operated by Rover Coaches, with services between Cessnock, Kurri Kurri and Maitland. Route 166 travels closest to the proposed rail trail, via Pokolbin Street and Stanford Street. Other routes service central Kurri Kurri. Details of bus routes in Kurri Kurri are provided in Table 2-1.

Table 2-1 Kurri Kurri bus services

Bus Route	Description	Average time between services (minutes) Peak/Off Peak/Evening		
		Week Days	Saturdays	Sundays and Public Holidays
160	Cessnock to Newcastle	25/120/NA	Irregular	NA
163	Cessnock to Morisset Via Kurri Kurri	Irregular	Irregular	Irregular
164	Cessnock to Maitland Via Kurri Kurri	Irregular	Irregular	Irregular
166	Kurri Kurri to Maitland	120/120/NA	NA	NA
171	Kurri Kurri to Weston	Irregular/2/NA	NA	NA
172	Deakin Street to Kurri Kurri Rotary Park	Irregular	NA	NA

2.4 Local bike routes

There are many local bike tracks in the areas surrounding the proposed rail trail ranging from off road gravel tracks to sealed bike/pedestrian tracks which follow local road alignments. The northern end of the old rail line track has been used for a bike track commencing at Pokoblin Street, heading south and connecting to Leggetts Drive and then heading north returning to Kurri Kurri.

2.4.1 Newcastle Cycling Strategy and Action Plan

The Newcastle Cycling Strategy and Action Plan (2012) outlines a vision for cycling activity in Newcastle, including improvements to cycling infrastructure. The strategy outlines a number of proposed routes that align with parts of this current proposal, or would connect to it, including:

- R8 – Birmingham Gardens to Tarro via Hexham Swamp
- R9 – Minmi to Hexham
- L1 – Lenaghans Drive to Maryland
- R11 – Minmi to Beresfield
- L33 – Minmi to Maryland Drive West
- R2 – Newcastle to Maitland

2.4.2 Cessnock Cycling Strategy

The Cessnock Cycling Strategy was completed in mid-2016. The Strategy recognises the potential for the Richmond Vale Rail Trail, and supports its implementation: “The Rail Trail would provide cyclists in the region with a high quality cycleway that will make cycling more attractive and encourage people to get on their bikes and participate in cycling”.

The Strategy also identifies potential improved infrastructure connecting to the proposed trail, including within Kurri Kurri.

2.5 Crash history

The crash history from 2011-2015 was sourced from the NSW Centre for Road Safety for the road network surrounding the proposed trail and is summarised below.

2.5.1 Shortland

There were two crashes recorded in King Street, Shortland, both resulting in moderate injury. Both crashes involved a vehicle out of control, one leaving the road to the left and hitting an object.

2.5.2 Tarro

At Tarro, there were three crashes recorded at the top of the eastbound off-ramp from the New England Highway, including two single-vehicle run-off-road crashes. There were a further three crashes in Anderson Drive, near the New England Highway interchange.

2.5.3 Minmi

There were no crashes recorded in the vicinity of the proposed route at Minmi.

2.5.4 Fletcher

There were no crashes recorded in the vicinity of the proposed route at Fletcher.

2.5.5 George Booth Drive

There were no crashes recorded on George Booth Drive in the immediate vicinity of the Private Quarry Access Road intersection. However, there were a number of crashes on nearby sections of the road, particularly to the south where the alignment is winding. Off-road crashes were the most common types in this area.

There were no crashes recorded in the vicinity of the Expressway construction access road intersection.

2.5.6 Kurri Kurri

There was one crash recorded on Stanford Street in the vicinity of the proposed route. It was a head-on crash resulting in moderate injury.

Three crashes were recorded at the intersection of Stanford Street/Mulbring Street/Railway Street, with one resulting in minor injury.

There was also one crash in Mulbring Street opposite the trail terminus, resulting in serious injury.

Overall, the crash history surrounding the proposal is not indicative of any particular trends that may be exacerbated by the proposal.

3. Proposed development

3.1 Description

The path will typically be a 3.0 metre wide sealed pavement along flat and straight alignments in accordance with shared path standards. It is proposed to widen the path to 4.0 metres where it is expected that there will be a higher number of cyclist and pedestrians interacting, such as the connection between Shortland and Tarro (Hexham Wetlands).

The longitudinal grades of the trail are highly desirable for walking and cycling being less than 2%.

The path will include a dashed centre line to encourage separation of the two directions of flow. Behavioural signage will be provided along the route to encourage trail users to keep left, warn when approaching, move off the path when stopped, and to control dogs on the path.

3.1.1 Proposed route

The proposed trail commences at King Street, Shortland before heading north towards Tarro. A junction is proposed at Hexham from where the trail will head south-west to a second junction which will connect Minmi and Fletcher. From the second junction the trail will head west past Stockrington and parallel to George Booth Drive, ending at Mulbring Street, Kurri Kurri.

The trail will interact with public roads in the following locations:

- King Street, Shortland
- Blanch Street, Shortland
- Mitti Street, Fletcher
- Woodford Street, Minmi
- Dog Hole Road, Stockrington
- Seahampton Road, Stockrington
- Private Quarry Access Road, Richmond Vale
- Hunter Expressway construction yard off George Booth Drive, Richmond Vale
- George Booth Drive, Richmond Vale
- Pokolbin Street, Kurri Kurri

The trail would pass over or under the following roads:

- Pacific Motorway at Stockrington
- Hunter Expressway at Seahampton
- George Booth Drive, Buchanan
- Stanford Street, Kurri Kurri

3.2 Trail access points and parking areas

Locations where the trail can be accessed from the external road network are proposed at various locations along the route, as described below. Car parking provision has been based on similar trails and constraints at each site. It is noted that some of the proposal affects land managed by National Parks and Wildlife Service (NPWS). Appropriate approval will be sought from NPWS for all works on NPWS estate, including for parking and other facilities, and for work outside of/ adjacent to NPWS estate, works will be coordinated with NPWS as required.

Parking spaces were calculated based on the space available and similar parking facilities in proximity. There is the opportunity to provide additional parking if demand requires in some areas. Future upgrades to deal with increasing use could be undertaken at the following locations:

- King Street – additional parallel on-street parking available.
- Blanch Street – additional parallel on-street parking available.
- Minmi – future extensions would require significant earthworks.
- Dog Hole Road – additional parking available along the rail easement.
- George Booth Drive – future extensions would require significant civil works.
- Kurri Kurri – additional parallel on-street parking available.

3.2.1 Shortland

The trail would commence in the pipeline reserve adjacent to King Street at Mort Lane. Parallel parking on the existing grassed verge area of King Street would be formalised and sealed, providing up to 30 spaces on the trail side of King Street. On-street parking would also be retained on the opposite side of King Street.

A potential new off-street car park could be provided at Tuxford Park, at the southern end of King Street (not part of current proposal).

A connection is also proposed between the trail in the pipeline reserve, and the Hunter Wetlands Centre, with access to Blanch Street.

3.2.2 Tarro

In the future, access to the trail from Tarro would commence at the playing fields to the north of Anderson Drive. There are approximately 50 angle parking spaces at the eastern end of the playing field access road, with total capacity for over 100 spaces in the immediate vicinity.

3.2.3 Fletcher

The rail trail will connect to an existing shared pathway at Kural Crescent, Fletcher. No dedicated parking is proposed.

3.2.4 Minmi

Access to the trail at Minmi is off an existing access road that connects to Woodford Street opposite the Rural Fire Station. A parking area with capacity for approximately 12 vehicles is proposed.

Access to and from Leneghans Drive at Minmi was considered. However due to the limited sight lines along the road, which has an 80 km/hr posted speed, and its high elevation above the trail (3-4 m), this access was not included in the design. Access was provided at Dog Hole Road instead, which is only 2-3 km away and bale to be more cost efficiently and safely installed.

3.2.5 Dog Hole Road

A parking area with capacity for approximately 7 vehicles is proposed where the trail crosses Dog Hole Road and runs along Seahampton Road. This car park provides access to Pambalong Nature Reserve, which is about 1.5 km away.

3.2.6 George Booth Drive access between tunnel 1 and 2

New car parking and amenities are proposed using a former Hunter Expressway construction access road. A parking area with capacity for approximately 12 vehicles is proposed at this location.

3.2.7 George Booth Drive access near Surveyors Creek

New car parking and amenities are proposed using a former Hunter Expressway construction access road. A parking area with capacity for approximately 12 vehicles is proposed.

3.2.8 Kurri Kurri

Existing facilities at the Log of Knowledge Park will be upgraded, including formalising existing car parking areas. The existing off-street parking area has a capacity of approximately 30 vehicles. Additional parking is also available on Mulbring Street and surrounding streets.

3.3 Construction access

Many of the locations where access to the trail will be available during operation will also be used for construction access. These locations, along with additional locations that will be used only during construction, are described in Table 3-1.

Table 3-1 Construction access routes

Location of works	Access routes
Shortland to Fishery Creek	King Street and Hunter Water Corporation (HWC) easement Hunter Wetland Centre (light vehicles only)
Ironbark Creek Bridge Fishery Creek bridge and boardwalk	Ausgrid access track from Minmi Road, Maryland Drive and Archer Crescent for access to western side King Street and HWC easement for access to eastern side
Fishery Creek to Hexham Junction	Aurizon access road from New England Highway
Hexham Junction to Tarro	Aurizon access road from New England Highway
Hexham Junction to Minmi Junction	Aurizon access road from New England Highway Woodford Street at Minmi Rural Fire Station
Minmi Junction to Minmi	Woodford Street at Minmi Rural Fire Station
Minmi Junction to Fletcher	Woodford Street at Minmi Rural Fire Station Kural Cres
Minmi Junction to Dog Hole Road	Dog Hole Road from Leneghans Drive Woodford Street at Minmi Rural Fire Station
Dog Hole Road to Quarry Access Road	Dog Hole Road Quarry access road from George Booth Drive
Quarry Access Road to Surveyors Creek	Quarry access road from George Booth Drive Former Hunter Expressway compound access road from George Booth Drive
Surveyors Creek to Wallis Creek	Former Hunter Expressway compound access road from George Booth Drive Private driveway from George Booth Drive

Location of works	Access routes
Wallis Creek to Kurri Kurri	Fire trails from Leggetts Drive Pokolbin Street Mulbring Street

3.4 Traffic generation

3.4.1 During construction

Construction works are expected to occur in five stages:

1. Shortland to Tarro
2. Hexham to Minmi including up to Pambalong
3. Pambalong to Surveyors Creek
4. Surveyors Creek to Kurri Kurri
5. Fletcher to Minmi Junction

Construction is expected to occur over the standard working hours of 7:00 am to 6:00 pm Monday to Friday, and 8:00 am to 1:00 pm Saturday. However, night works will be required for the construction of the overpass structures at the New England Highway at Tarro.

The volume of traffic associated with construction will vary from location to location, and across the duration of the works. Details of traffic generating activities will be finalised as the design detail is completed, and the construction methodology is refined.

Equipment required to construct the rail trail will include:

- Concrete pump trucks
- Excavators
- Loaders
- Cranes
- Haul Trucks
- Asphalt Pavers
- Graders
- Watercarts
- Compaction equipment

Much of this equipment will be brought to each site once, where it will remain until the task is finished and then moved to the next work area. Other equipment will involve regular deliveries of materials to each site, such as gravel, asphalt and concrete.

Any over-dimension loads that may be required would be subject to specific planning for access route and timing.

3.4.2 During operation

It is likely that the majority of users of the rail trail will be recreational users, as opposed to commuters. This is due to the distances involved, and the indirect nature of much of the route for connecting trip origins and destinations. The distance from Kurri Kurri to the University of Newcastle at Callaghan, for instance, is over 30 km via the rail trail. The distance to the Newcastle CBD is over 40 km. There may be some commuter use of the section between Tarro and Shortland, as this offers a more direct connection than other sections of the trail.

It is expected, therefore, that traffic movements to and from the rail trail during the network peak periods will be minimal. The peak traffic activity associated with the proposal is expected on weekends, and during holiday periods, when background traffic volumes are generally lower and there is spare capacity on the road network.

The nature of the proposal is that some users will wish to travel the full length of the trail, while others will wish to travel only part. Therefore, the total use of the trail will be spread across the various trail heads.

There will be direct access to the rail trail from several local residential areas, including Shortland, Tarro, Fletcher, Minmi and Kurri Kurri. It is likely that most trail users who reside in these areas will access the trail directly by bicycle or on foot.

Many users of the rail trail will arrive as part of a group, and therefore the average vehicle occupancy for trips to the trail head locations is expected to be relatively high.

The expected traffic activity at each trail head is reflected in the number of parking spaces provided. Parking supply at each location is summarised in Table 3-2.

Table 3-2 Proposed parking supply

Location	Approximate parking supply
Shortland (King Street)	9
Shortland (Blanch Street)	3 (accessible parking only)
Hunter Wetland Centre	40 (shared with Wetland Centre)
Tarro (future)	100 (shared with adjacent playing fields)
Fletcher	0
Minmi	11
Dog Hole Road	7
Between Tunnels 1 and 2	12
Surveyors Creek	12
Kurri Kurri	30

It can be seen that apart from at Tarro, where the parking is shared with adjacent playing fields, the number of spaces at each location is relatively small. The largest parking areas are at either end of the rail trail.

It is unlikely that all parking spaces will be filled within a short period of time. However even if they did, the volume of traffic involved is small in comparison with the volume of traffic already on the network.

3.5 Maintenance

Maintenance of the trail will be required at regular intervals. Most maintenance activities will involve only a single light vehicle, with access via one of the trail heads and either an existing access track where available, or along the trail itself as required.

Maintenance activities for the larger infrastructure elements of the project, such as tunnels and bridges, may require more intense activity, which would be subject to more specific planning. In most cases the access routes used for construction would remain available to support maintenance activities.

4. Impact assessment

4.1 Traffic efficiency

The proposed trail heads are all located away from the arterial or sub-arterial road network, reducing the potential impact of vehicles parking, bikes being loaded/unloaded and the movement of bicycles and pedestrians on the efficiency of traffic flow.

Key intersections used to access the trail during construction and/or operation are assessed in Table 4-1.

Table 4-1 Traffic impacts from access

Access route	Construction Assessment	Operation Assessment
King Street, Shortland	Established access route from Sandgate Road Traffic management may be required for specific high-intensity trucking activities	No significant impacts expected
Hunter Wetland Centre	Traffic management required to minimise impacts on the Wetland Centre Access for light vehicles only	No significant impacts expected
Ausgrid Access Road, from Maryland	Existing Ausgrid maintenance route Potential short-term impacts in Archer Crescent from through movement of trucks and materials during bridge construction works	May only be used for occasional maintenance No significant impacts expected
Aurizon Access Road, from Tarro	Existing access route Low volume existing activity Access to New England Highway interchange at Tarro Localised traffic management required to support construction of trail connection over New England Highway No significant impacts expected	May only be used for occasional maintenance No significant impacts expected
Woodford Street at Minmi Rural Fire Station	Localised traffic management will be required to minimise impacts of turning traffic on through traffic on Woodford Street	Upgrade of intersection to BAL/BAR type (refer to Appendix A) could be considered as part of civil works upgrades to be undertaken by Council, to minimise impacts of turning traffic on through traffic on Woodford Street
Kural Crescent, Fletcher	Minimal vehicular access expected during construction Localised traffic management may be required	No significant impacts expected
Dog Hole Road, Stockrington	Existing connection to Leneghans Drive of a high standard No significant impacts expected	No significant impacts expected

Access route	Construction Assessment	Operation Assessment
Seahampton Road, Stockrington	Road currently closed to public traffic Access via Dog Hole Road No significant impacts expected	Proposed trail to use existing road pavement No significant impacts expected
Former Hunter Expressway Construction Access off George Booth Drive (Blue Gum Creek)	Existing intersection at George Booth Drive is left-in only (no right turn when approaching from the south) due to narrow alignment of George Booth Drive Construction access routes will reflect these restrictions	Intersection footprint designed for large truck access – potential for reconfiguration around smaller design vehicle to facilitate right turns, subject to further investigation
Private Quarry Access Road	Existing intersection with George Booth Drive has BAR/AUL configuration (refer to Appendix A) with all movements allowed	Existing intersection with George Booth Drive has BAR/AUL configuration (refer to Appendix A) with all movements allowed Mixing of quarry traffic and vehicles accessing the rail trail on access road Localised vegetation clearance required to maintain forward sight lines on access road Truck warning signage may be required on the access road once the trail is operational
Former Hunter Expressway Construction Access off George Booth Drive (Surveyors Creek)	Existing intersection with George Booth Drive has CHR/AUL configuration (refer to Appendix A) with all movements allowed Localised traffic management required during construction where traffic would divert from access road	Existing intersection with George Booth Drive has CHR/AUL configuration (refer to Appendix A) with all movements allowed No significant impacts expected
Private access to Wallis Creek	Rural residential access driveway Localised traffic management may be required if used for high-volume vehicle movements	No access
Local access roads from Leggetts Drive	Various fire trails and access roads from Leggetts Drive to be used for construction access only No turn facilities provided along Leggetts Drive Impacts on Leggetts Drive will depend on timing and intensity of construction traffic activity at each location (to be determined as construction planning proceeds)	No access
Pokolbin Street	No existing access to rail trail Localised traffic management and potentially minor works required to facilitate construction access and works No significant impacts expected	Rail trail to cross road at grade No significant impacts expected
Mulbring Street	Access to established parking area off Mulbring Street and Stanford Street No significant impacts expected	Access to established parking area off Mulbring Street and Stanford Street No significant impacts expected

4.2 Road crossings

The rail trail would pass under a number of roads, including:

- Pacific Motorway
- Cedar Hill Drive
- Leneghans Drive
- New England Highway (overpass)
- Hunter Expressway
- George Booth Drive
- Stanford Street

At these locations limited impacts to traffic are expected as a result of construction or operation of the proposal, with most crossings making use of existing infrastructure. Some night works may be required at Tarro to facilitate the construction of the new connection across the New England Highway.

At other locations, the rail trail will cross existing roads at grade:

- Dog Hole Road
- Private Quarry Access Road
- Former Hunter Expressway Construction Access off George Booth Drive (Surveyors Creek)
- Pokolbin Street
- Aurizon Access Road
- Anderson Drive

At each of these locations, a path termination treatment would be provided in accordance with City of Newcastle standards. These treatments provide a physical device which encourages cyclists to slow down on approach to the roadway, as well as preventing unauthorised vehicular access. Cyclists must give way to road traffic before crossing.

All locations where at-grade crossings are proposed are low-volume local roads, and the potential for significant delays to cyclists is expected to be very low. Warning signage will be placed on each road approaching the crossing point, to warn drivers of the potential for cyclists and pedestrians.

Specific treatment will be required at the Private Quarry Access Road in particular, to ensure that truck speeds are reduced and that there is adequate sight distance for all road users.

4.3 Public transport

The proposed trail is not expected to have any impact on public transport services. It is noted that bikes cannot be carried on buses in the study area, and so the potential for trail users to travel by public transport is limited to pedestrians, or cyclists arriving by train at Tarro.

Buses do not travel on any of the roads that would be crossed by the proposal at-grade.

4.4 Road safety

No adverse impacts on road safety are expected as a result of the rail trail, subject to confirmation of design features of the proposal. This is based on the following:

- The crash history is not indicative of any existing trends that might be exacerbated by the proposal.
- Traffic activity associated with trips to and from the rail trail will be dispersed along the route, so that there will be minimal concentration of activity in any one location.
- Trips to and from the rail trail will generally occur on weekends and during holiday periods, when traffic volumes across the network are generally lower than during weekday peak periods.

5. Recommendations

5.1 Interaction with future transport projects

The proposed rail trail route potentially conflicts with the M1 to Raymond Terrace road project, and the Lower Hunter Freight Corridor. Planning for both is ongoing. Maintaining a connection across each project for the rail trail, where required, is encouraged. The presence of the rail trail is not expected to impact on the feasibility of either project.

5.2 Construction traffic management

A Construction Traffic Management Plan (CTMP) should be prepared to guide construction activities that impact on roads, including haulage and transport of materials to and from each work site, and works that directly impact on roads such as those locations where the trail crosses an existing road.

The CTMP should include such information as designated access routes, times of operation, and any temporary works or signage that is required to manage traffic associated with construction works.

The CTMP should be prepared by the construction contractor in liaison with the relevant local council, Roads and Maritime Services and other relevant stakeholders.

Specific temporary traffic management measures will be required to support construction activities at some locations:

- King Street, Shortland
- Hunter Wetlands Centre
- Ausgrid Access Road, Maryland
- New England Highway interchange, Tarro
- Woodford Street, Minmi
- Kural Crescent, Fletcher
- Former Hunter Expressway construction access roads at Blue Gum Creek and Surveyors Creek
- Private Quarry Access Road
- Private access to Wallis Creek
- Leggetts Drive
- Pokolbin Street

All access points are required to be constructed to a standard that ensures safe access in all conditions, particularly for emergency vehicles. Measures will need to be in place to prevent the tracking of mud and debris onto the existing road network.

5.2.1 Intersection upgrades

It is recommended that upgrades to intersections be investigated at Woodford Street opposite Minmi Rural Fire Station, and at the George Booth Drive access to Blue Gum Creek.

At Woodford Street, localised widening to provide a BAR treatment could be investigated as part of the civil works at this location.

At the George Booth Drive access to Blue Gum Creek, reconfiguration of this intersection to allow right turns off George Booth Drive could be investigated. If this is not feasible this will not have a significant impact, with other trail head locations available and alternative routes to Blue Gum Creek also available using other intersection on George Booth Drive to turn around.

5.3 Trail and supporting infrastructure

The proposed general path construction of 3.0 metres sealed pavement is considered satisfactory for the expected use of the trail.

The proposed approach to linemarking and behavioural signage is also supported.

5.3.1 Road crossings

Additional signage is required at locations where the trail interacts with a road at grade. At these locations, there should be clear delineation between the trail and the roadway, such that priority arrangements are clear. At road crossings, trail users should be warned of the road when approaching, via “Road Ahead” signage (see Figure 5-1), with “give way” signage at the road edge. Similarly, road users should be warned of the potential presence of trail users when approaching the crossing location, using the combination of signs illustrated in Figure 5-2.



Figure 5-1 W6-8 Road Ahead signage



Figure 5-2 W6-9/W8-23 user warning signage

5.3.2 Private quarry access road

The Private Quarry Access Road will continue to provide access for quarry trucks as well as providing access to a trail head and parking/amenity area. In order to manage the potential conflict between light and heavy vehicle traffic, the following measures are recommended:

- Provision of truck warning signage on the access road, as shown in Figure 5-3.
- Management of roadside vegetation to maintain forward sight lines for traffic moving along the access road.



Figure 5-3 W5-22 truck warning signage

6. Conclusion

The proposed Richmond Vale Rail Trail would provide a 32 km connection between Shortland and Kurri Kurri, largely following the alignment of a disused rail line. The proposal includes connections to Tarro, Fletcher and Minmi from the main alignment. The path would be 3.0 metres wide in most locations, widening to 4.0 metres in some locations. The proposal is consistent with the cycling strategies of both the City of Newcastle and Cessnock.

A number of locations are proposed where users will be able to access the trail from the surrounding road network. Parking and other amenities will be provided at seven locations. Most of these locations would be used for access during construction, as well as once the trail is operational. Additional construction access points are proposed.

Traffic generation for the proposed route is currently unknown, but it is anticipated that most use of the trail will occur on weekends and in holiday periods when there is generally capacity in the surrounding road network. Vehicular activity will be dispersed along the route, minimising any potential impacts on a single location.

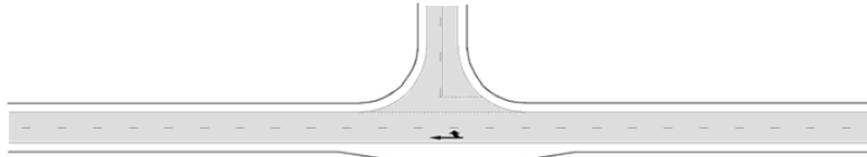
Construction activities will be similarly dispersed along the route. Construction may involve some intense periods of vehicular activity in some situations, which may require specific localised traffic management. A Construction Traffic Management Plan is recommended to guide construction activities that will impact on roads and road users.

It is recommended that upgrades be investigated for the intersection of Woodford Street, Minmi and the trail access road, to minimise delays to through traffic both during construction and operation of the trail. It may also be feasible, subject to further investigation, to upgrade the intersection of George Booth Drive with the former Hunter Expressway Construction Access Road at Blue Gum Creek to allow right turns off George Booth Drive.

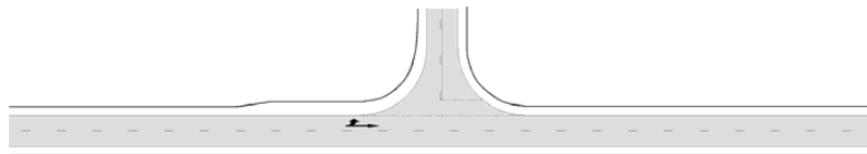
The trail includes grade-separated crossings of major roads including the Pacific Motorway, Hunter Expressway and New England Highway. Some at-grade crossings are proposed at local roads. Path terminal treatments will be provided at these crossings to indicate that cyclists and pedestrians should give way to traffic. It is recommended that warning signage be provided for both trail users and road users in these locations.

Appendix A – Intersection configuration descriptions (typical)

Basic Turn Treatment (BAL / BAR)

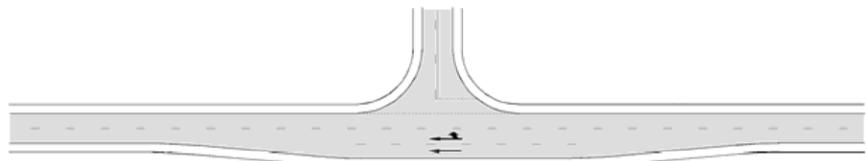


Basic Right Turn (BAR)
on the Major Road (Two-Lane, Two-Way Road)



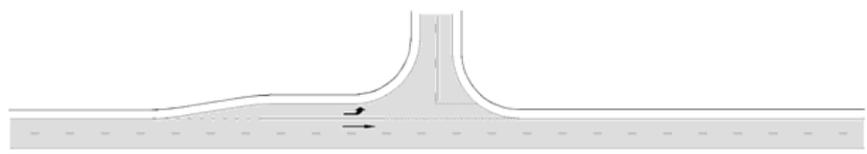
Basic Left Turn (BAL)
on the Major Road

Auxiliary Turn Treatment (AUL / AUR)



Auxiliary Right Turn (AUR)
on the Major Road (Two-Lane, Two-Way Road)

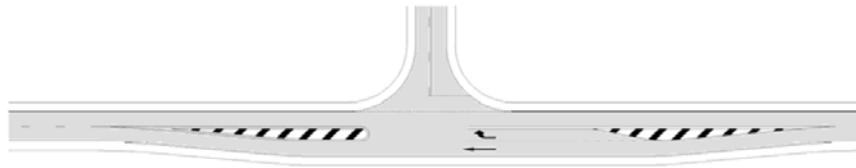
This turn type not as safe as a channelised treatment at unsignalised intersections



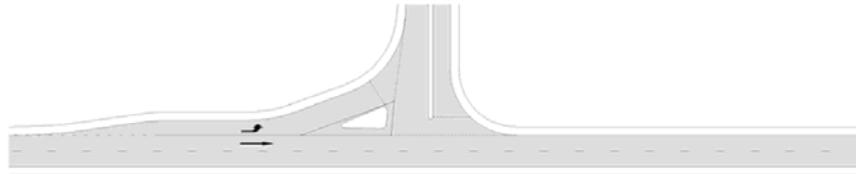
Auxiliary Left Turn (AUL)
on the Major Road

CHL treatment is preferred at unsignalised intersections to ensure a clear line of sight for vehicles turning from the minor road.

Channelised Turn Treatment (CHL / CHR)



**Channelised Right Turn (CHR)
on the Major Road**



**Channelised Left Turn (CHL)
on the Major Road**

Source: *Austrroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections, 2010*

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