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Riverstone Waste Water Treatment Plant / Rouse Hill Water Treatment Plant Growth Package / Sludge Transfer System

TRAFFIC AND TRANSPORT TECHNICAL REPORT

Document verification

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			Prepared by	*Checked by*	*Approved by*
		Name	Clarence Li	Sam Oswald	Sam Oswald
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		Description	Final		
			Prepared by	*Checked by*	*Approved by*
		Name	Clarence Li	Sam Oswald	Sam Oswald

Table of Contents

Content and chapter structure

The chapter structure and associated content is outlined in Table 1.

Table 1: Content and chapter structure

Chapter	Content
1. Introduction	Outlines the project description, purpose of this document and relevant legislation and policy.
2. Methodology	Sets out the methodology used to assess the transport impacts of the project on the surrounding environment during construction and operation.
3. Existing environment	Details the existing transport and traffic environment surrounding the project. This chapter also highlights any future infrastructure schemes that need to be considered as part of this study.
4. Transport impact assessment	The impact assessment uses the methodology outlined in Chapter 2 to assess any impacts of the project during construction and operation. This chapter assesses the impacts upon all modes, including private vehicles, public transport, cycling and walking. Key impacts are defined at the end of this chapter.
5. Proposed mitigation measures	Following the identification of any key issues, mitigation measures during construction and operation are presented. These mitigation measures are proposed to reduce the impacts of the construction and operational phases on the surrounding transport network.

Glossary of terms and abbreviations

Term	Meaning
CTMP	Construction Traffic Management Plan
DCP	Development Control Plan
DPE	Department of Planning and Environment
EPL	Environment Protection Licence
HV	Heavy Vehicle
LGA	Local Government Area
LV	Light Vehicle
NHVR	National Heavy Vehicle Regulator
NSW	New South Wales
NWGC	North West Growth Centre
NWTH	North West Treatment Hub
NWURC	North West Urban Renewal Corridor
REF	Review of Environmental Factors
RMS	Roads and Maritime Services
ROL	Road Occupancy Licence
RTA	Roads & Traffic Authority
SCATS	Sydney Coordinated Adaptive Traffic System
SSCTMP	Site Specific Construction Traffic Management Plan
STS	Sludge Transfer System
TfNSW	Transport for New South Wales
The project	Riverstone Waste Water Treatment Plant, Rouse Hill Water Recycling Plant (Growth Package) and Sludge Transfer System Upgrade
WRP	Water Recycling Plant
WWTP	Waste Water Treatment Plant

1 Introduction

1.1 Project description

Sydney Water's North West Treatment Hub (NWTH) comprises of the Castle Hill Water Recycling Plant (WRP), Rouse Hill WRP and Riverstone Wastewater Treatment Plant (WWTP). The NWTH provides wastewater servicing to Sydney's north west including the North West Growth Centre (NWGC) and North West Urban Renewal Corridor (NWURC) along the new Metro North West Line.

Sydney Water is undertaking staged upgrades to NWTH to support growth in Sydney's north west and to maintain waterway health in the Hawksbury Nepean catchments by complying to new Environment Protection Licence (EPL) limits which will come into effect from 1 July 2024.

Castle Hill and Rouse Hill WRP are currently non-compliant to the respective EPLs and some upgrade work is being accelerated because of this. A separate Review of Environmental Factors was prepared for the compliance upgrades in August 2021 (Sydney Water, 2021).

This proposal involves upgrades to the North West Treatment Hub (NWTH) and a new sludge transfer main for consolidated biosolids handling at Riverstone WWTP. The proposal will enable Sydney Water to provide wastewater servicing to a growing population in Sydney's north west to support priority growth areas, improve treatment processes to meet future regulatory requirements and provide a solution that minimises impacts to the community and the environment.

In summary the proposal involves:

- Upgrade Rouse Hill WRP to 40 ML/d AWDF (additional 14 ML/d) capacity including liquid amplification with increased recycling water capacity and improved treated water quality.
- Upgrade Riverstone WWTP to 30 ML/d AWDF (additional 10 ML/d) capacity including liquid amplification, new anaerobic digestion, energy recovery facility and flexibility for future food waste co-digestion. The upgrade will be sized to receive sludge from Castle Hill, Rouse Hill and Riverstone wastewater catchments for centralised biosolids treatment and outloading.
  - Removal of a stockpile from Riverstone WWTP of up to 35,000 m^3. Removal is expected to occur in 2025 for approximately 3.5 months.
- A new sludge transfer system (STS) including:
  - 6.3 km of pipeline (approximately 315 mm diameter) between Rouse Hill WRP and Riverstone WWTP dedicated for sludge transfer.
  - 10.2 km pipeline (approximately 200 mm diameter) between Castle Hill WRP and Rouse Hill WRP dedicated for sludge transfer.
  - A sludge pumping station (SP1224) and associated facilities at Castle Hill WRP.
  - A sludge pumping station (SP1223) and associated facilities at Rouse Hill WRP.

The sludge transfer pipeline will traverse land owned by Sydney Water, private property and Council and Crown owned land and will combine open excavation and trenchless methods during construction. Castle Hill WRP, Rouse Hill WRP and Riverstone WWTP are located in Sydney Water land.

1.2 Document purpose

This report is one of a number of technical reports that have been developed to support the Review of Environmental Factors (REF) for the project. This report outlines the traffic and transport impacts associated with the project and any mitigation measures to be implemented during construction and operation to address the impacts identified.

1.3 Legislative and Policy context

The legislation and policy included in Table 2 has been considered as part of this Traffic and Transport technical report:

Table 2: Legislation and policy

Legislation and policy relevant to the Traffic and Transport technical report		
Legislation/Policy	**Description**	**Relevance**
Guide to Traffic Generating Development (Roads & Traffic Authority, 2002) (RTA)	The Guide examines how to assess traffic generating developments and identify impacts upon the wider transport network. The level of assessment can vary depending on the type of development.	This project will generate traffic relating to construction and operation works. Therefore, this Guide has been used as it provides the appropriate methodology for assessing all types of traffic generating developments.
Guide to Traffic Management Part 12: Traffic Impacts of Developments (Austroads, 2009)	The document guides planners and engineers who design, develop and manage a variety of land use developments in identifying and managing the impacts on the transport network arising from these developments.	This project is a traffic generating development. Therefore, this Guide has been used as it provides the appropriate methodology for assessing all types of traffic generating developments.

2 Methodology

2.1 Methodology structure

To assess the impact of the project on the transport and traffic network, the following methodology has been used:

- Review available data and documentation to understand the transport requirements of the project in construction and operation.
- Review other infrastructure schemes that overlap with the programme for the project and their likely cumulative impact on the surrounding road network.
- Liaise with the Sydney Water project team to derive robust assumptions for the traffic generation of the project in construction and operation.
- Identify key routes to be used by construction and operational vehicles and assess the potential traffic impacts.
- Identify any impacts to public transport, walking and cycling.
- Classify the significance of all identified impacts.
- Develop mitigation measures to manage the identified impacts.

2.2 Project location

The Riverstone WWTP is located at 108 Bandon Road, Vineyard. The Rouse Hill WRP is located on Mile End Road, Rouse Hill. The STS alignment runs between Riverstone WWTP and Castle Hill WRP via Rouse Hill WRP through Vineyard, Box Hill, Rouse Hill, North Kellyville, Kellyville and Castle Hill.

The site locations and surrounding land use are shown in Figure 1 to Figure 3.

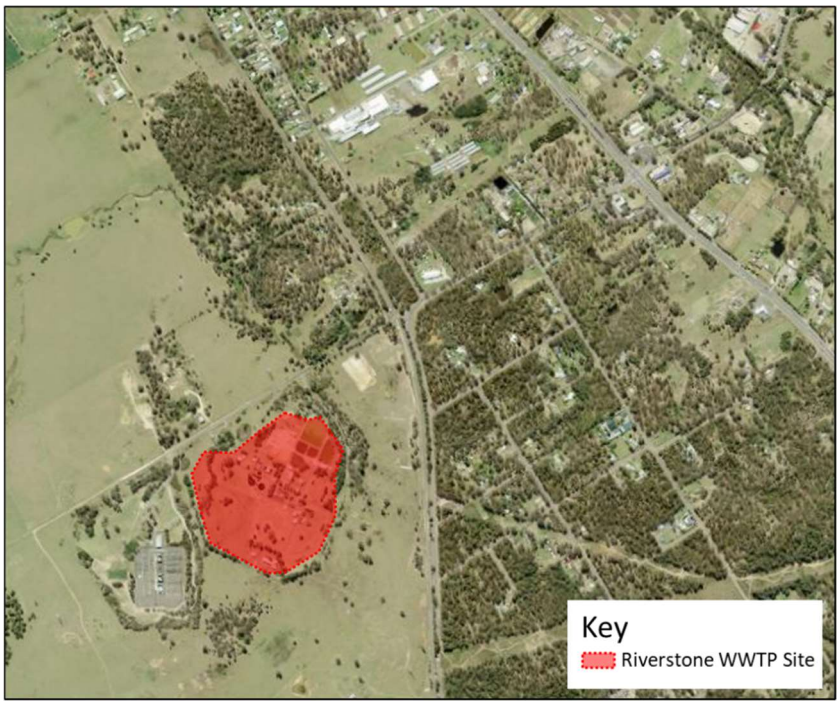


Figure 1 Project location – Riverstone WWTP

Source: SIX Maps (2021)

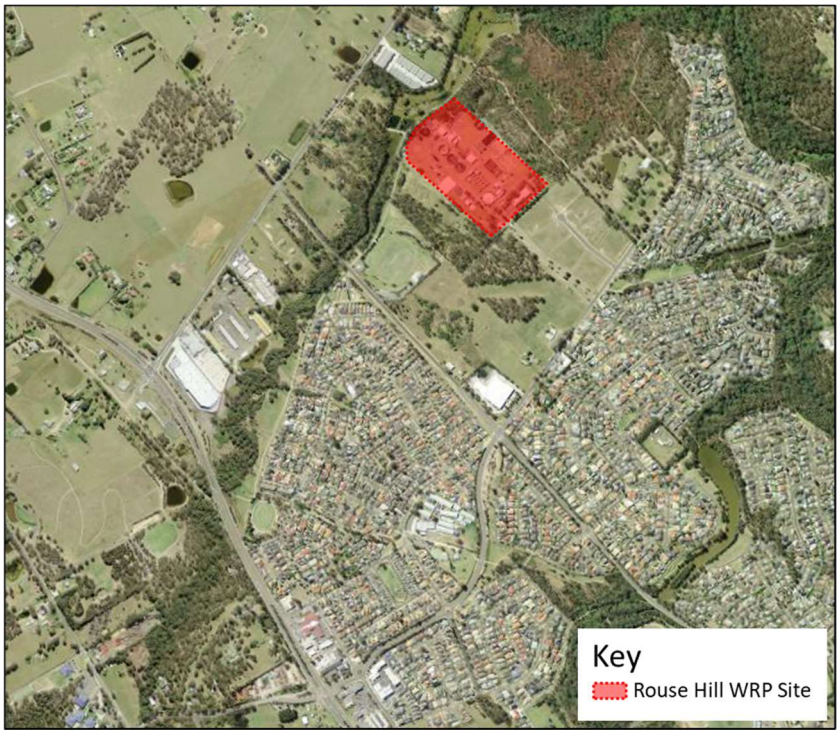


Figure 2 Project location – Rouse Hill WRP

Source: SIX Maps (2021)

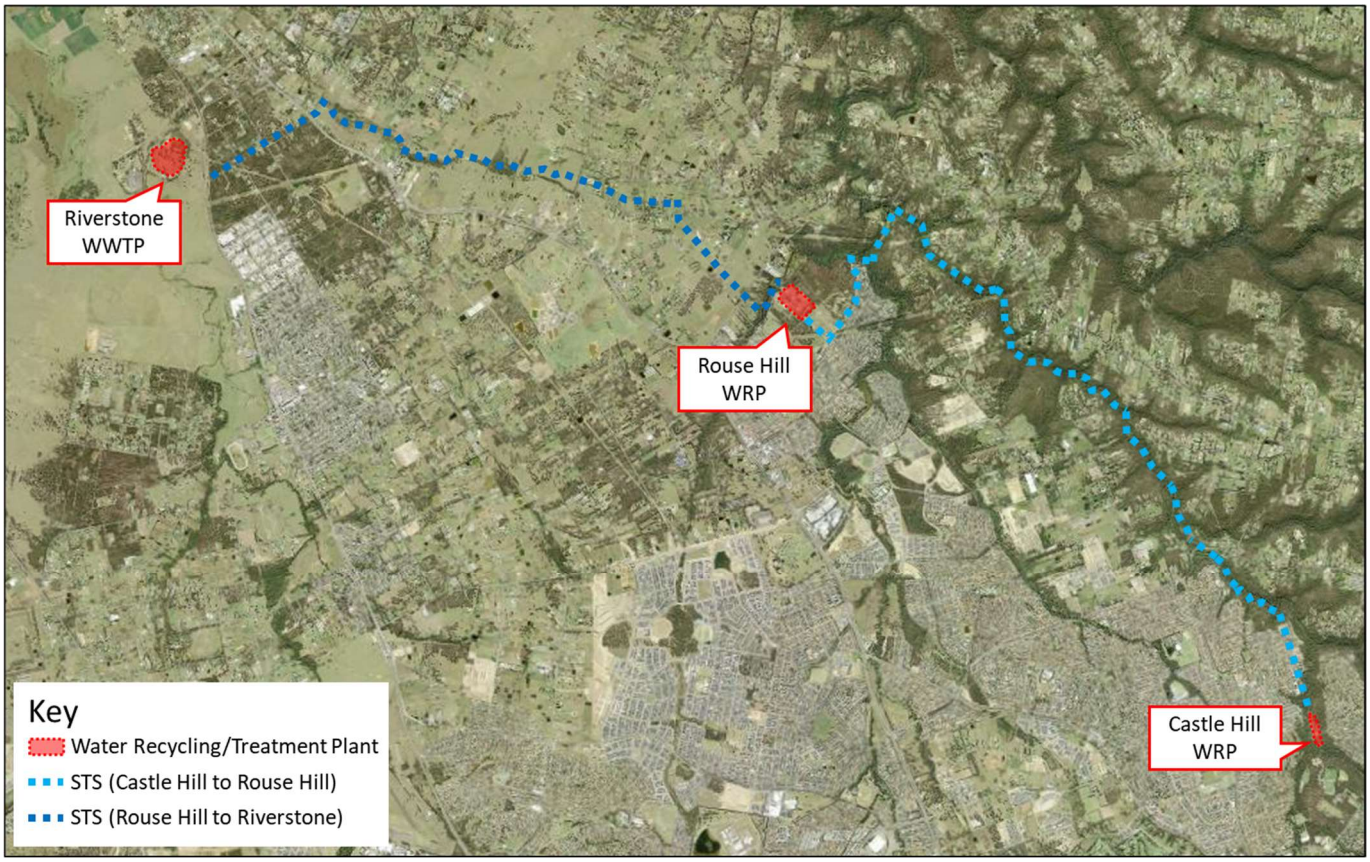


Figure 3 Project location – STS alignment

Source: SIX Maps (2021)

3 Existing environment

3.1 Riverstone Waste Water Treatment Plant

3.1.1 Existing road network

The Riverstone WWTP is connected to the wider road network via a primary and secondary access road from Bandon Road (shown in Figure 4). The primary access road links to the southern section of the Riverstone WWTP and the secondary access road connects to the northern section.

The access roads are shown in Photograph 1 and Photograph 2.

Figure 4 Local access road to the Riverstone WWTP

Source: SIX Maps (2021)

Photograph 1 Riverstone WWTP primary access road intersection with Bandon Road

Source: Site visit (July 2021)

Photograph 2 Riverstone WWTP primary access road

Source: Site visit (July 2021)

Bandon Road is a sub-arterial road that links Windsor Road with Vineyard Station and nearby low-density and undeveloped land uses. Unrestricted 90-degree parking is provided on Bandon Road near Vineyard train station.

The wider road network surrounding the Riverstone WWTP is shown in Figure 5.

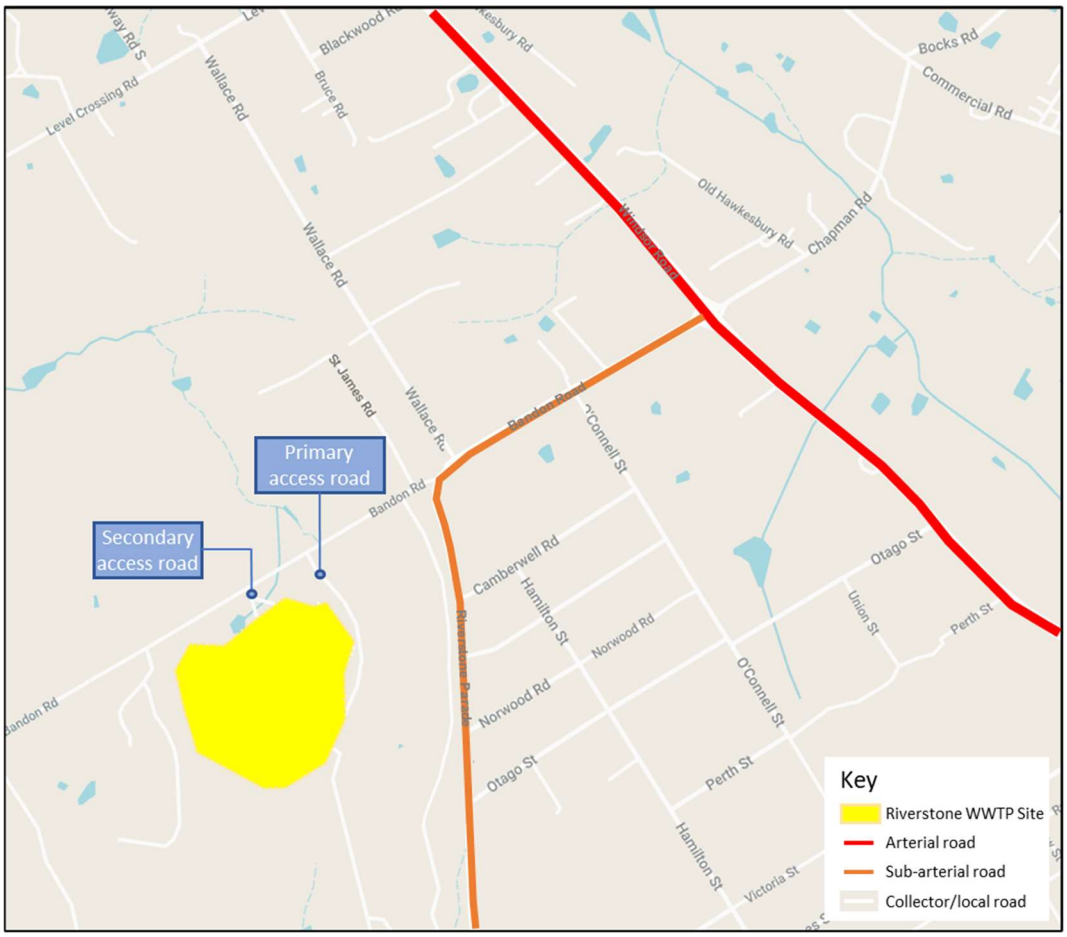


Figure 5 Road network surrounding the Riverstone WWTP

3.1.2 Public transport

Vineyard train station is located approximately 500 metres east of the Riverstone WWTP and is served by T1 North Shore & Western Line and T5 Cumberland Line services. The T1 North Shore & Western Line runs at a frequency of up to two services per hour at peak times and provides direct connections to Richmond, Blacktown, Parramatta and the Sydney CBD. The T5 Cumberland Line runs at a frequency of up to two services per hour at peak times and provides direct connections to Richmond, Blacktown, Parramatta, Liverpool and Leppington.

Bus stops are located near Vineyard Station on Wallace Road (approximately 600 metres east of the site) and Windsor Road (approximately 1.3 kilometres east of the site). These bus stops service seven bus routes and a summary of these routes is shown in Table 3.

The public transport network surrounding the Riverstone WWTP is shown graphically in Figure 6.

Table 3: Bus routes near Riverstone WWTP

Route number	Route name	Nearest bus stop	Peak hour frequency (buses/hour)
608	Windsor to Rouse Hill	Windsor Road at Bandon Road	1
671	Riverstone to Windsor via McGraths Hill & Vineyard	Wallace Road at Bandon Road	1
741	Oakville to Riverstone via Maraylya & Box Hill	Windsor Road at Bandon Road	2

Source: Transport for NSW (2021)

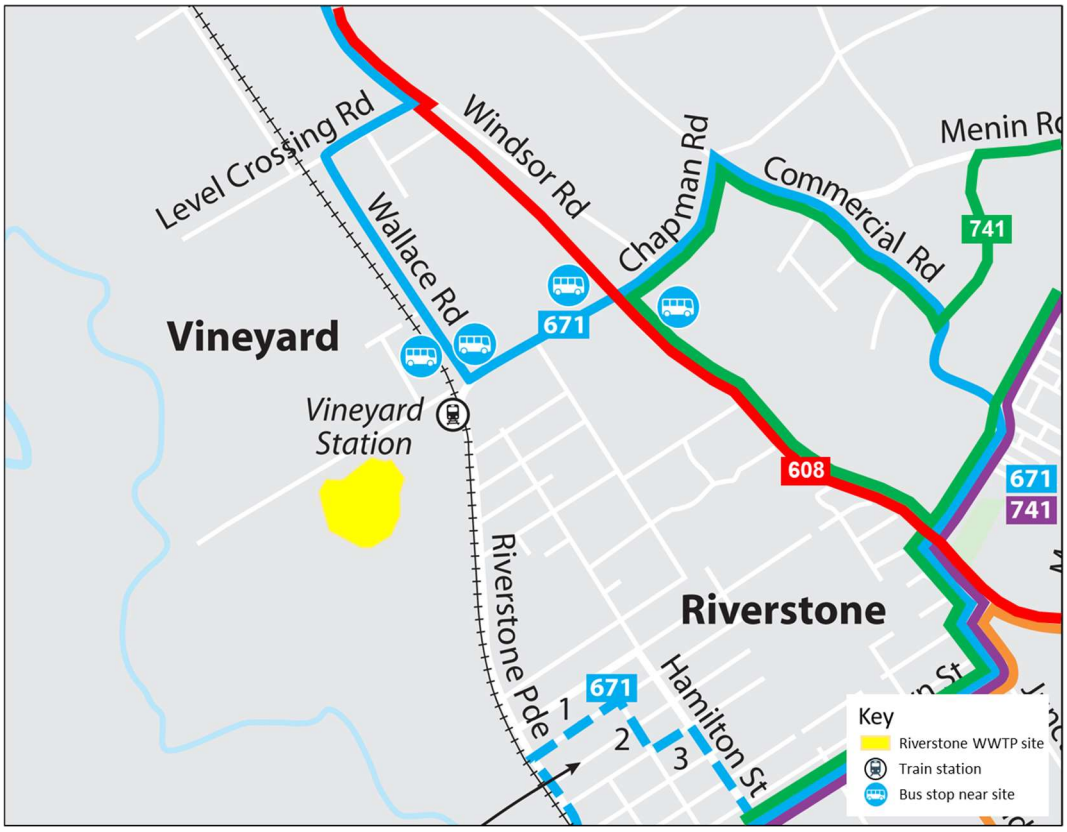


Figure 6 Public transport network surrounding Riverstone WWTP

Source: Transport for NSW (2021)

3.1.3 Active transport

Given the low-density and undeveloped land uses surrounding the site, pedestrian volumes are generally very low on surrounding streets. Footpaths are not provided near the site with the exception of the southern side of Bandon Road east of Wallace Road. As a result, pedestrians are required to walk on the carriageway or road shoulders.

The lack of footpaths on Bandon Road near Riverstone WWTP is shown in Photograph 3.

Photograph 3 No footpaths provided on Bandon Road near Riverstone WWTP

Source: Site visit (July 2021)

The cycling network surrounding the site is shown in Figure 7. An off-road shared path is provided on Windsor Road to the east of the site, which links to the wider regional cycling network.

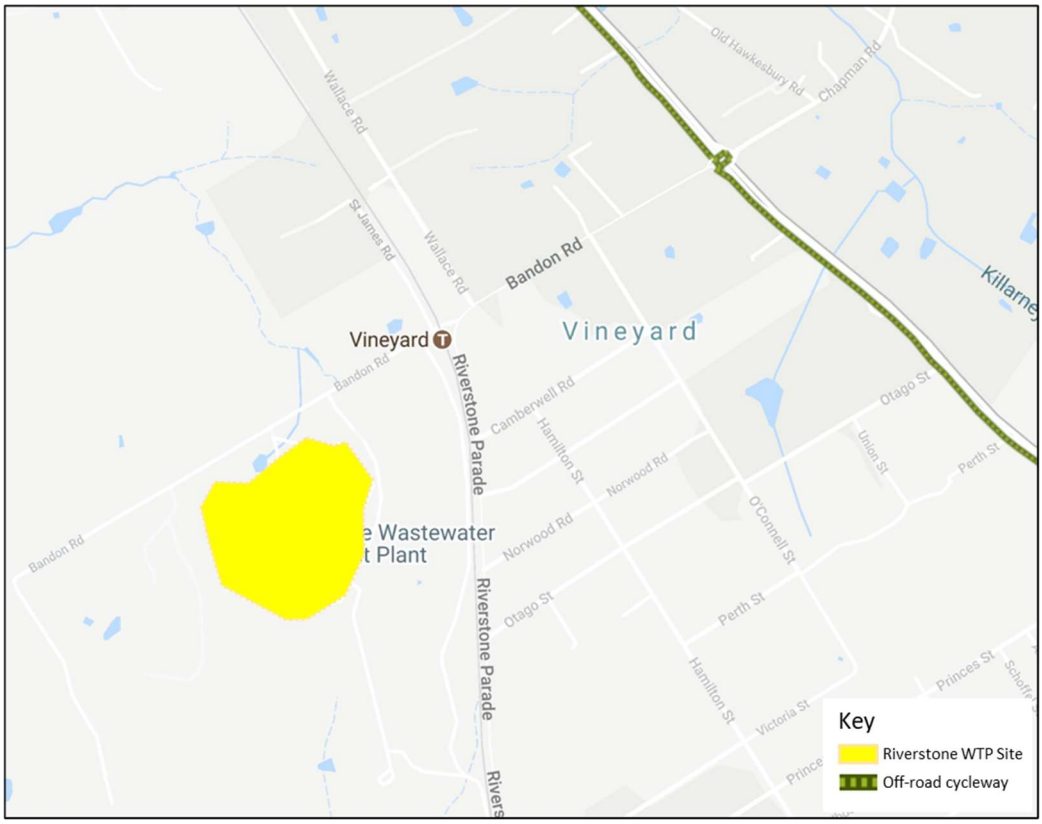


Figure 7 Cycling network around the Riverstone WWTP

Source: Cycleway Finder (Transport for NSW, 2021)

3.2 Rouse Hill Water Recycling Plant

3.2.1 Existing road network

All operational vehicles and staff currently access the Rouse Hill WRP using Mile End Road. The primary access road provides a link from Mile End Road to the south east corner of the site (shown in Figure 8). A secondary access road for construction vehicles runs adjacent to Second Ponds Creek and connects to Withers Road. This is an unsealed road with varying widths that narrows along certain sections, meaning large vehicles travelling in opposing directions may struggle to pass safely (shown in Photograph 4). Sight distances for vehicles exiting onto Withers Road are reduced due to the gradient of Withers Road and vegetation bordering the road (shown in Photograph 5).

Figure 8 Local access roads to the Rouse Hill WRP

Source: SIX Maps (2021)

Photograph 4 Unsealed secondary access road

Source: Site visit (July 2021)

Photograph 5 Reduced sight line for vehicles exiting the secondary access road onto Withers Road

Source: Site visit (July 2021)

Mile End Road is a connector road that links to residential land uses and the wider arterial road network via Windsor Road at its south western end. Withers Road is also a connector road that provides access to a range of uses between North Kellyville and Rouse Hill.

The wider road network surrounding the Rouse Hill WRP is shown in Figure 9.

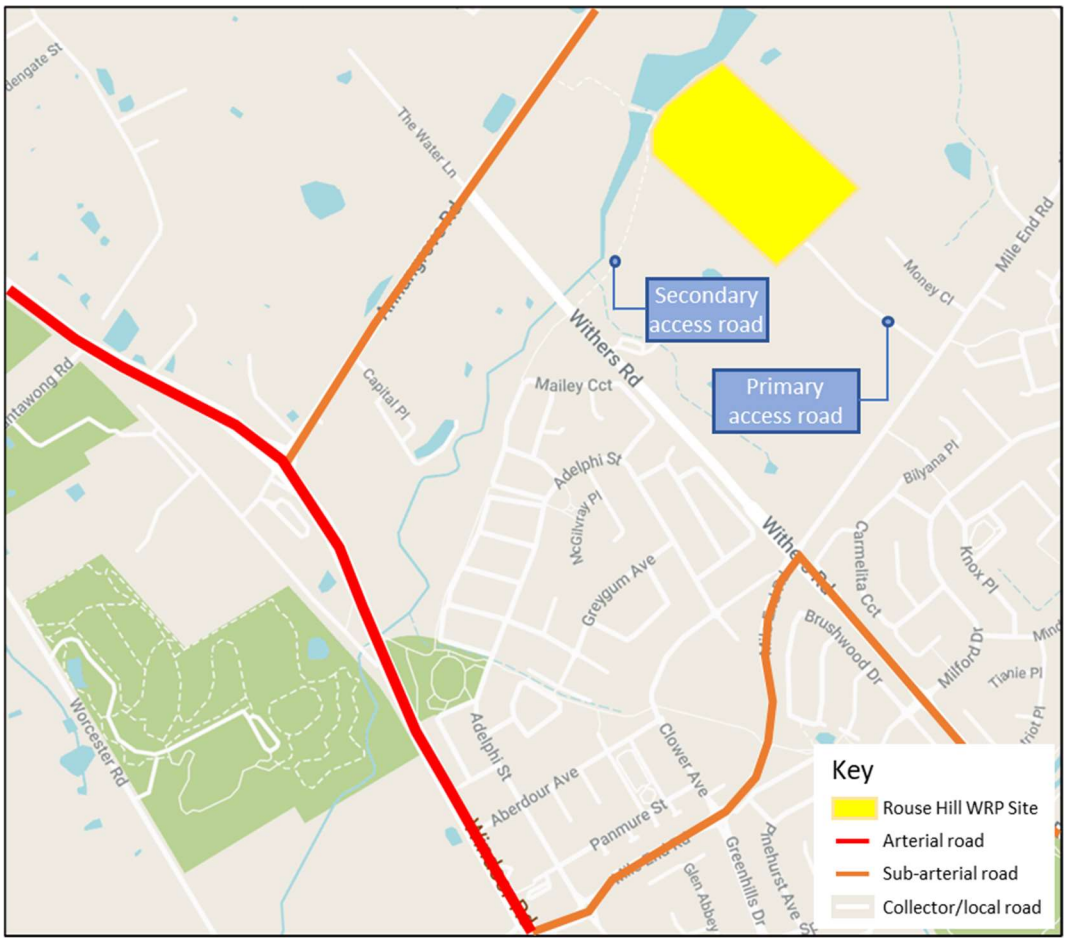


Figure 9 Road network surrounding the Rouse Hill WRP

3.2.2 Public transport

The Rouse Hill metro station is located approximately 2.5 kilometres south of the Rouse Hill WRP and is served by the Metro North West Line. Several bus stops are located near the Rouse Hill WRP on Mile End Road (approximately 400 metres east) and Milford Drive (approximately 600 metres east). These bus stops service four bus routes and a summary of these routes and frequencies is shown in Table 4.

The public transport network surrounding the Rouse Hill WRP is shown graphically in Figure 10.

Table 4: Bus routes near Rouse Hill WRP

Route number	Route name	Nearest bus stop	Peak hour frequency (buses/hour)
617	Rouse Hill to Kellyville Station	Mile End Road near Money Close	2
633	Rouse Hill to Pennant Hills via Kellyville & Castle Hill	Mile End Road near Money Close	2
735	Rouse Hill Station to Blacktown	Milford Drive near Mile End Road	2
746	Riverstone to Rouse Hill	Milford Drive near Mile End Road	2

Source: Transport for NSW (2021)

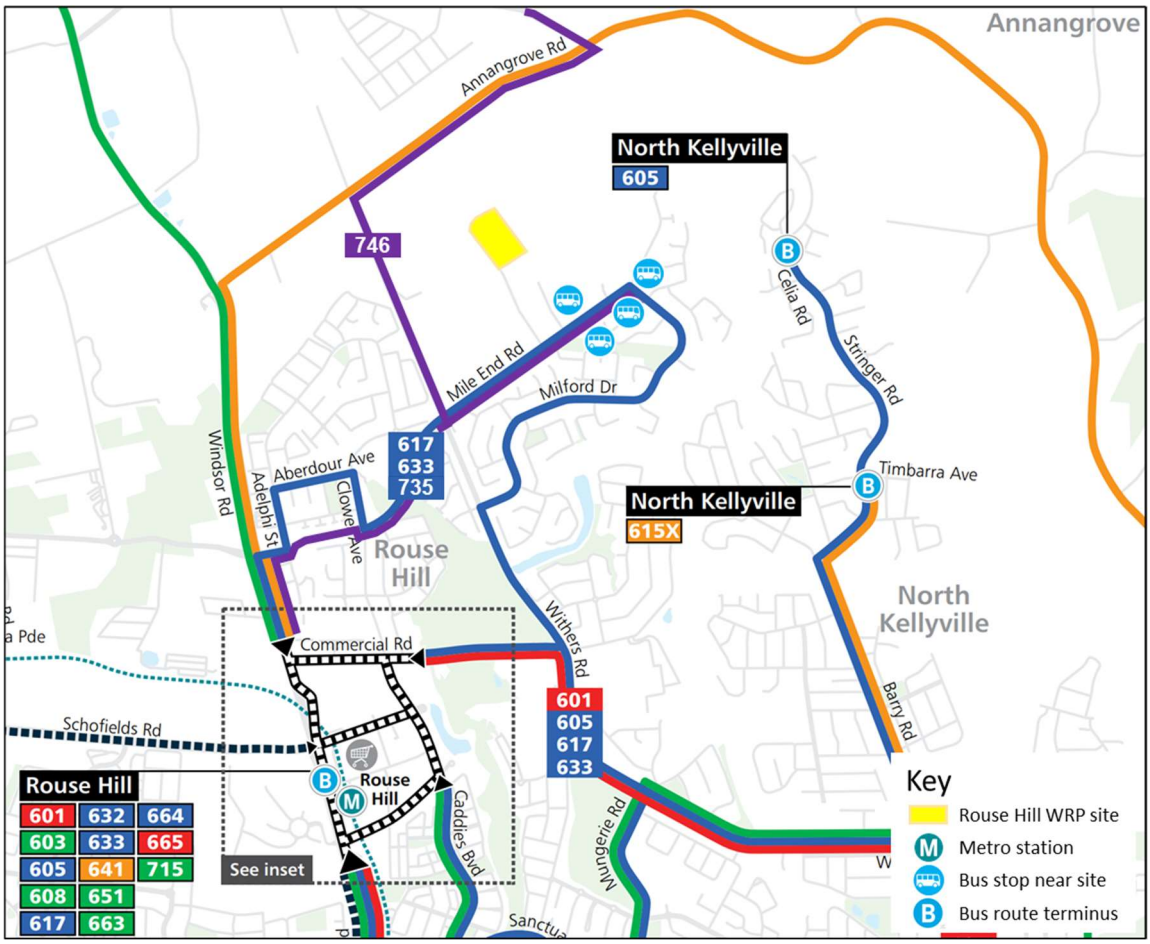


Figure 10 Public transport network surrounding Rouse Hill WRP

Source: Transport for NSW (2021)

3.2.3 Active transport

Pedestrian activity around the Rouse Hill WRP is low given the site is predominately bordered by open space with an industrial estate on its south eastern side. Footpaths are provided on one or both sides of Mile End Road but not on either side of Withers Road. It was observed on site that pedestrians occasionally walk using the secondary access road as it is directly adjacent to Russell Reserve. Furthermore, members of the Walking Volunteers community group use the secondary access road.

The cycling network is shown in Figure 11 and several off-road shared paths are located around the Rouse Hill WRP. A shared path is provided on the western side of Mile End Road, north of the Rouse Hill WRP primary access road. A shared path is also provided along the eastern side of Second Ponds Creek south of Withers Road, which connects to the wider regional cycling network via Windsor Road (shown in Photograph 6).

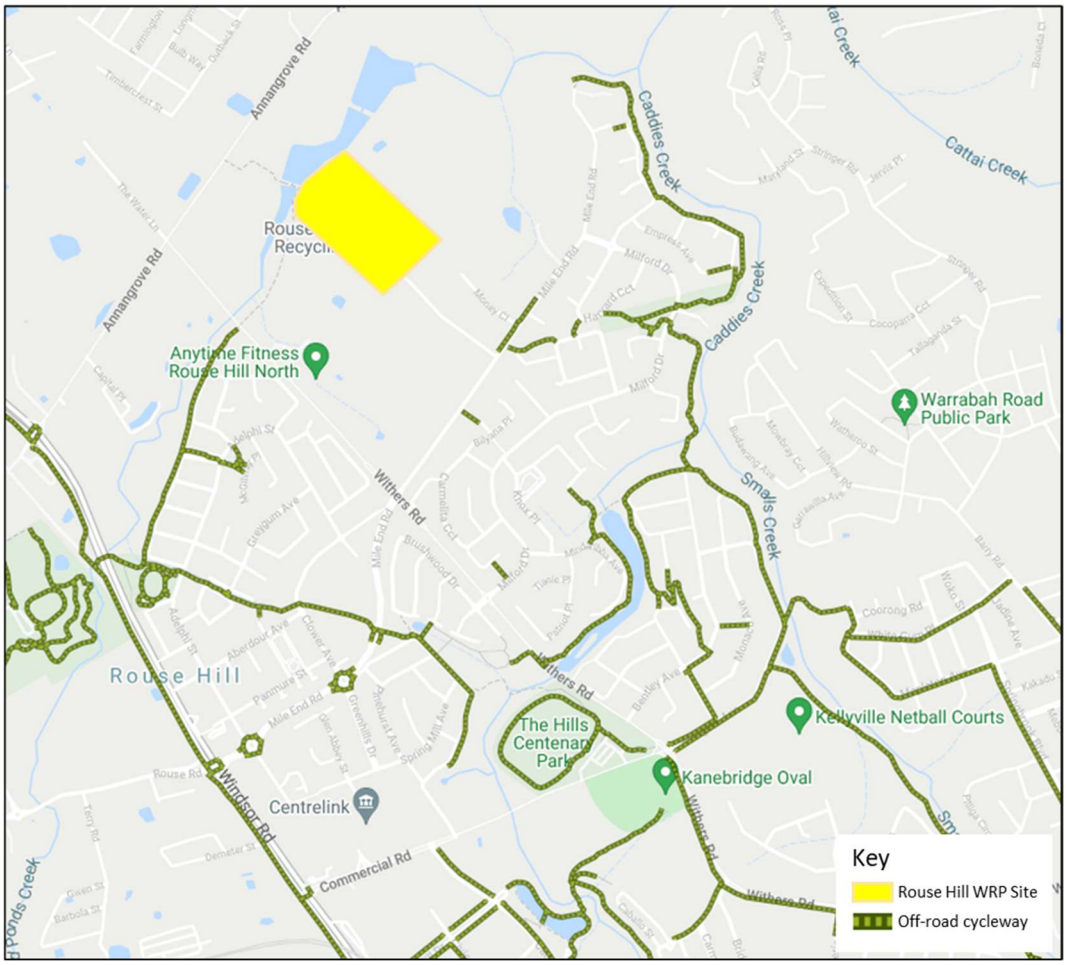


Figure 11 Cycling network around the Rouse Hill WRP

Source: Cycleway Finder (Transport for NSW, 2021)

Photograph 6 Shared path south of Withers Road

Source: Site visit (July 2021)

3.3 Sludge Transfer System (Castle Hill to Rouse Hill)

3.3.1 Existing road network

Vehicles are likely to access the STS alignment via several proposed access paths, including:

- AP1 – Cattai Creek Drive, Kellyville
- AP2 – Braekell Place, Kellyville
- AP3 – Deua Way, Kellyville
- AP4 – Whitsunday Circuit, North Kellyville
- AP5 – Stringer Road, North Kellyville
- AP6 – Jervis Place, North Kellyville
- AP7 – Ross Place, North Kellyville
- AP8 – Mile End Road, Rouse Hill

The proposed access paths are shown in Figure 12 to Figure 17 and Table 5. The proposed access paths consist of sealed or unsealed roads which are accessible from the wider road network via local and connector roads near residential land uses.

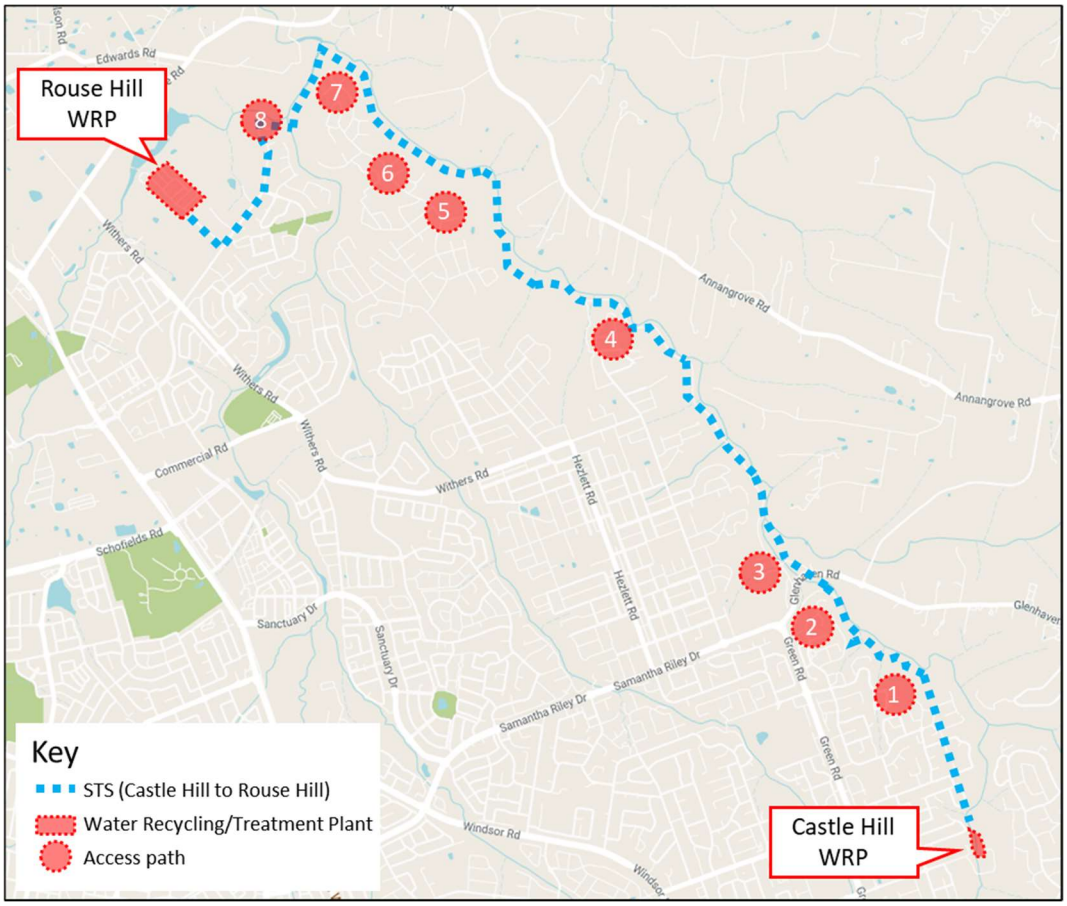


Figure 12 Road network surrounding STS (Castle Hill to Rouse Hill)

Figure 13 Road network surrounding AP1

Source: Sydney Water (2021)

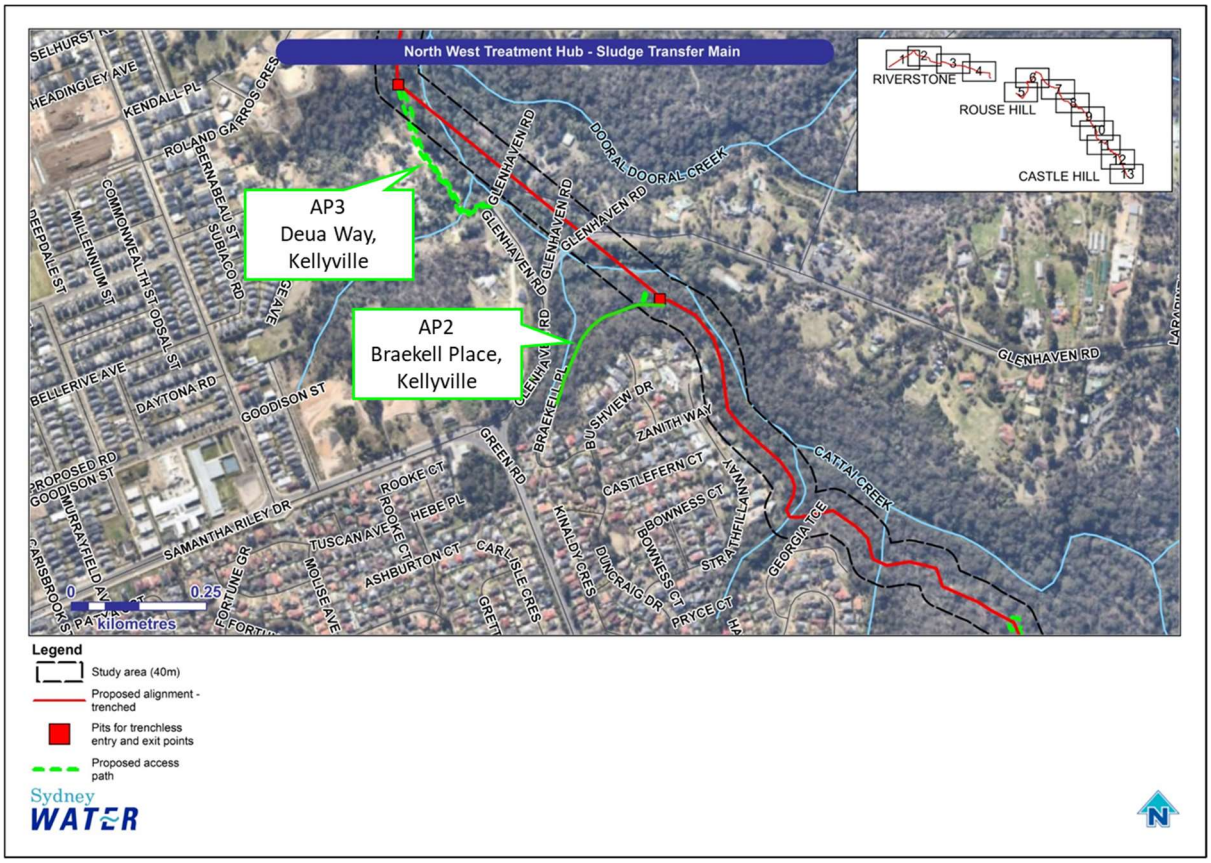


Figure 14 Road network surrounding AP2 and AP3

Source: Sydney Water (2021)

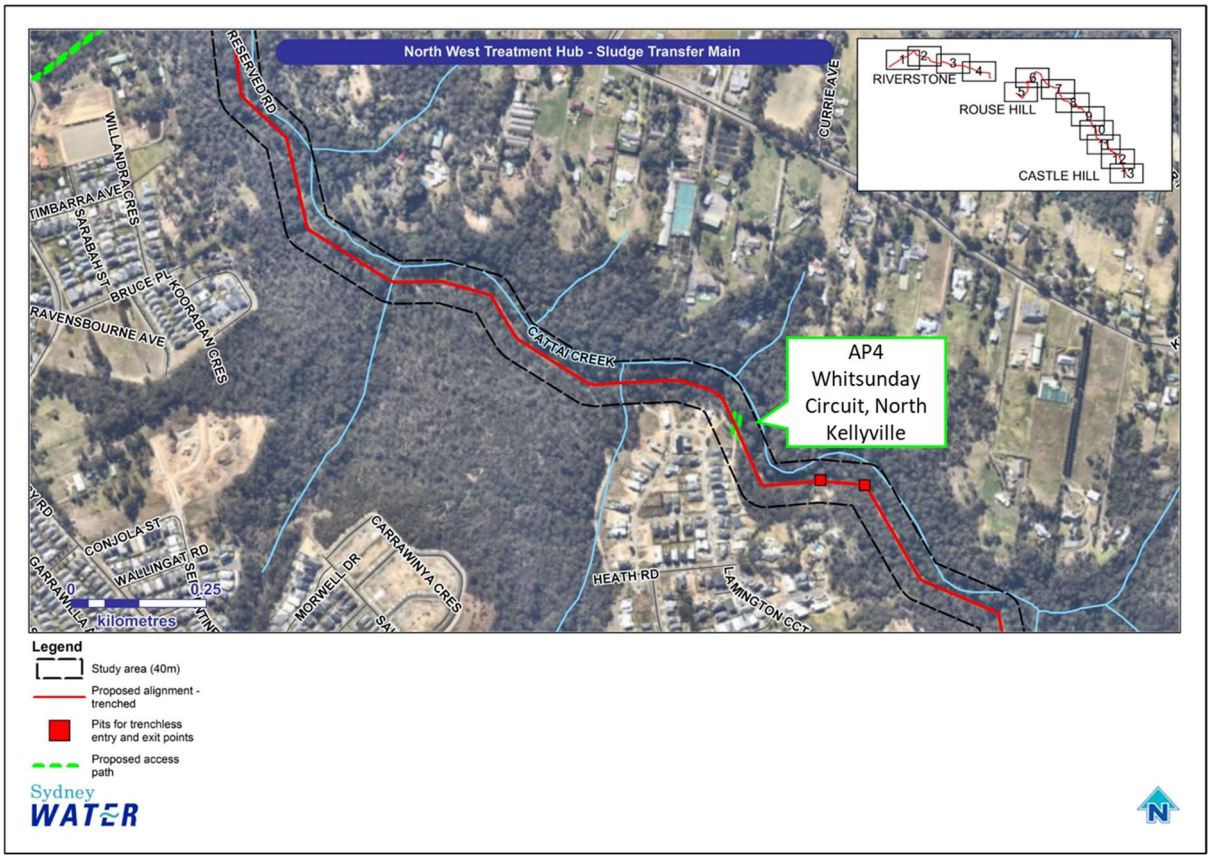


Figure 15 Road network surrounding AP4

Source: Sydney Water (2021)

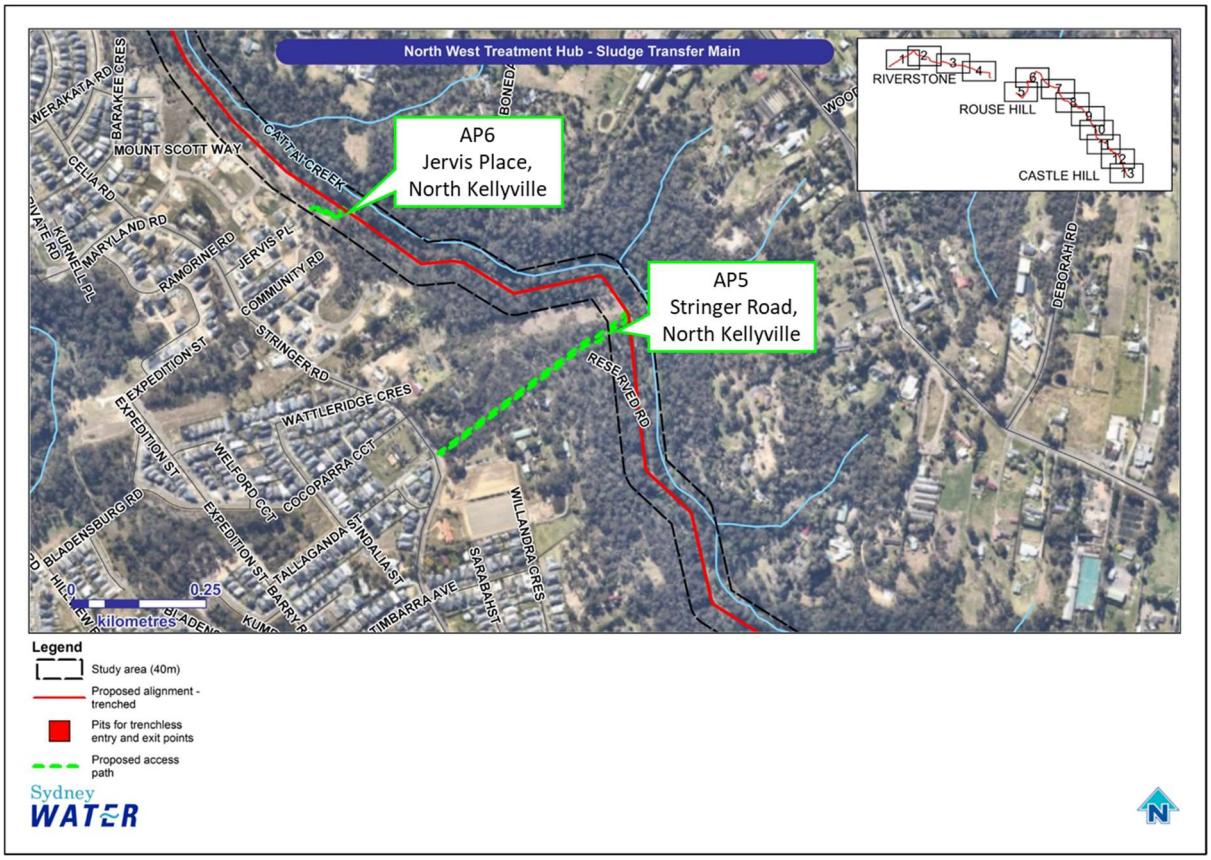


Figure 16 Road network surrounding AP5 and AP6

Source: Sydney Water (2021)

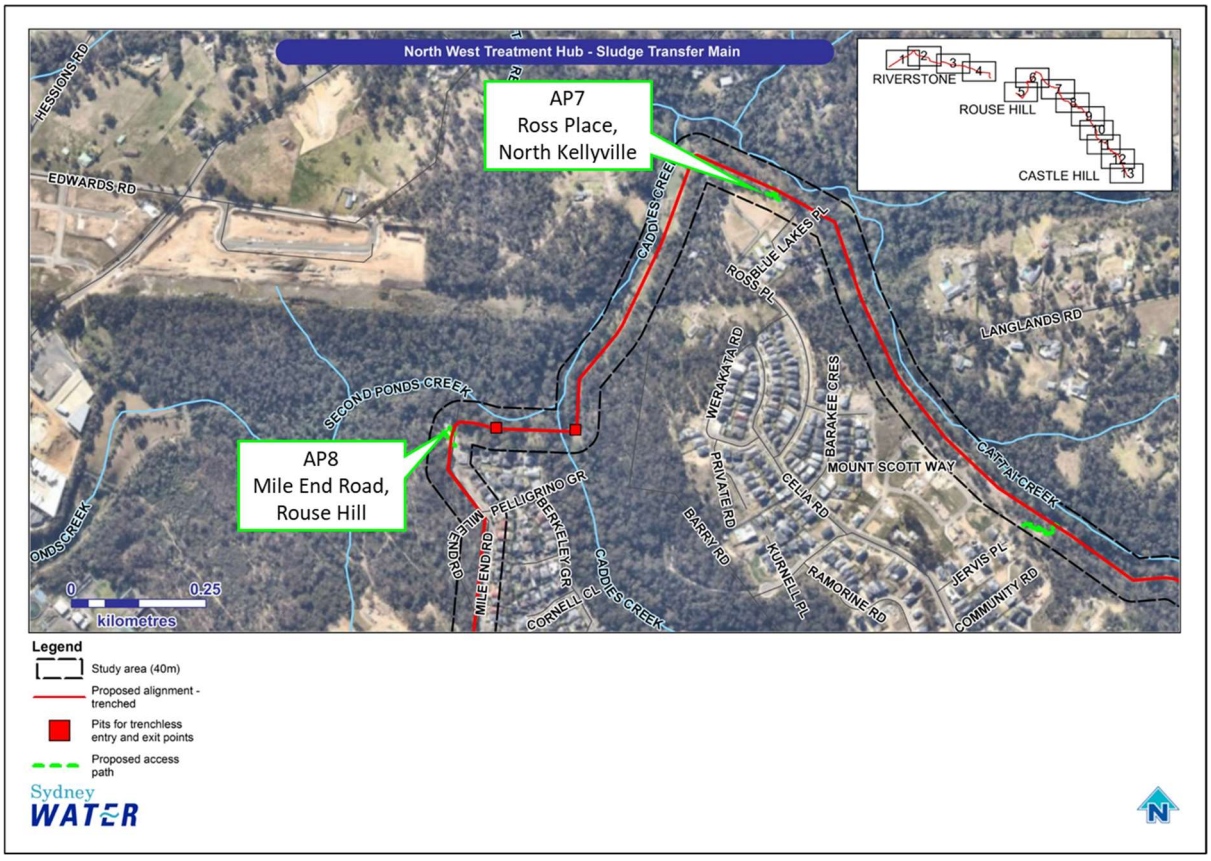
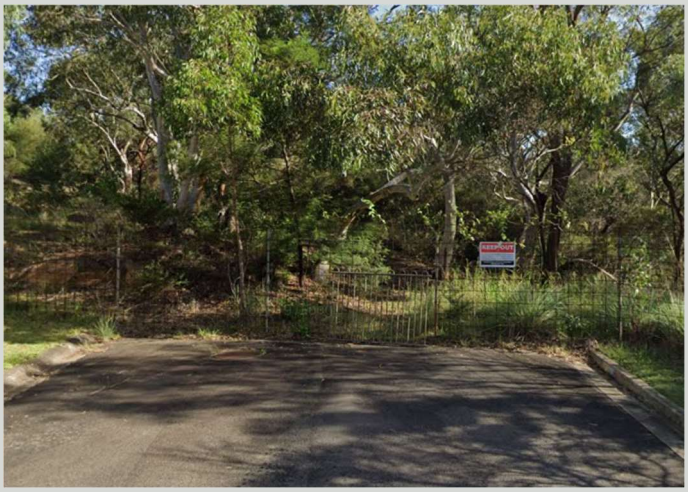
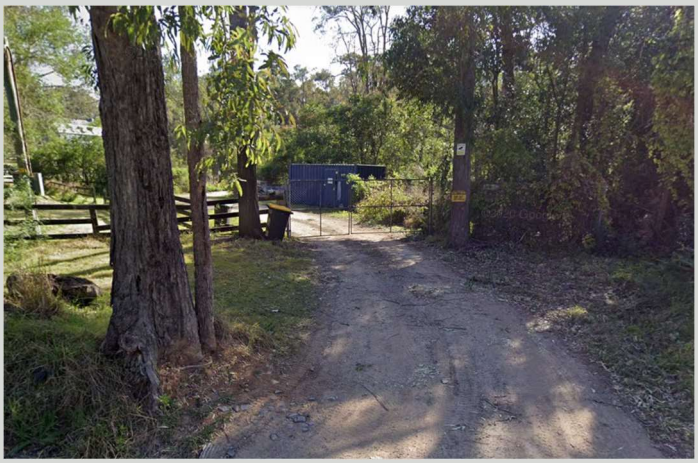


Figure 17 Road network surrounding AP7 and AP8

Source: Sydney Water (2021)

Table 5 STS (Castle Hill to Rouse Hill) proposed access paths

Access path	Description and photo
AP1 – Cattai Creek Drive, Kellyville	Unsealed track 
AP2 – Braekell Place, Kellyville	Sealed road 
AP3 – Deua Way, Kellyville	Unsealed track 
AP4 – Whitsunday Circuit, North Kellyville	Sealed road
AP5 – Stringer Road, North Kellyville	Unsealed track

	
AP6 – Jervis Place, North Kellyville	Sealed road
AP7 – Ross Place, North Kellyville	Sealed road
AP8 – Mile End Road, Rouse Hill	Unsealed track 

Source: Google Street View (2021)

3.3.2 Public and active transport

Bus stops are provided near all proposed access paths and service several bus routes which provide connections to Rouse Hill, Castle Hill and Kellyville. The public transport network surrounding the proposed access paths is shown graphically in Figure 18.

Pedestrian volumes near the proposed access paths are generally low given the surrounding low-density and undeveloped land uses. Footpaths are generally provided near the proposed access paths, with the exception of AP2 (Braekell Place, Kellyville), AP3 (Deua Way, Kellyville) and AP4 (Whitsunday Circuit, North Kellyville). Shared paths are also provided near some proposed access paths, which connect to wider cycling network via Windsor Road. The cycling network surrounding the proposed access paths is shown in Figure 19.

A summary of public and active transport infrastructure near the proposed access paths is shown in Table 6.

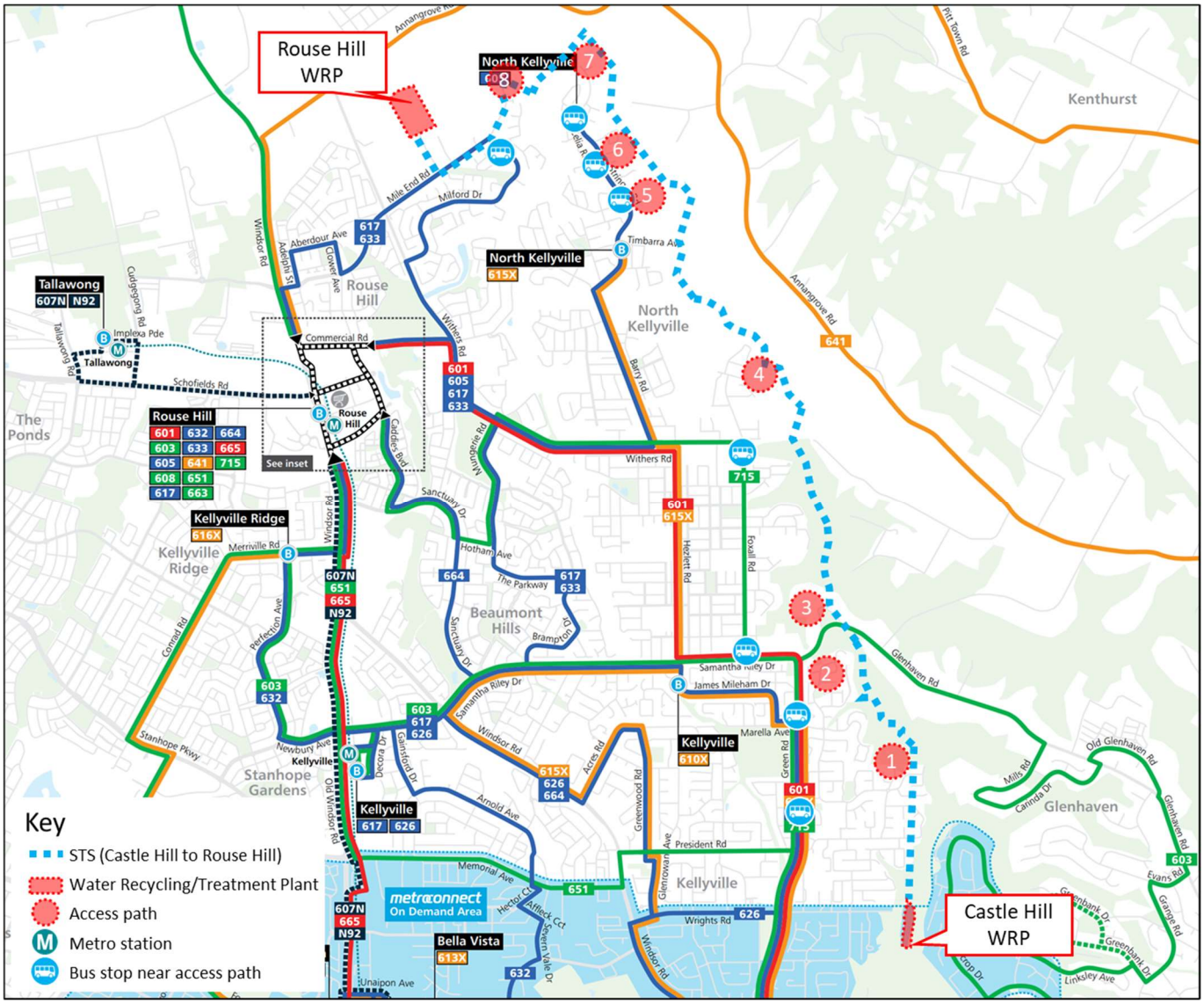


Figure 18 Public transport network surrounding the STS (Castle Hill to Rouse Hill)

Source: Transport for NSW (2021)

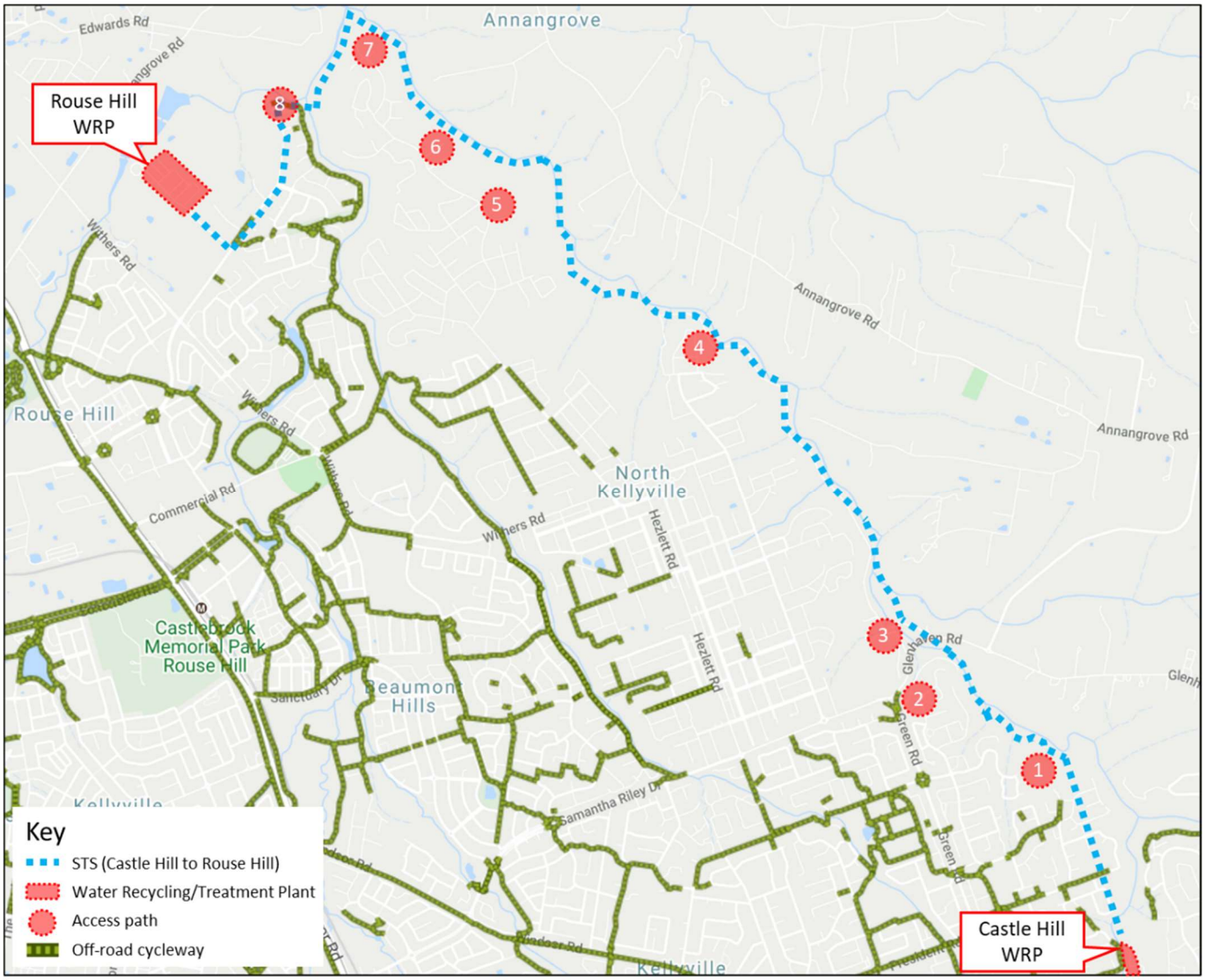


Figure 19 Cycling network around the STS (Castle Hill to Rouse Hill)

Source: Cycleway Finder (Transport for NSW, 2021)

Table 6 STS (Castle Hill to Rouse Hill) public and active transport

Access path	Nearest public transport service	Active transport infrastructure
AP1 – Cattai Creek Drive, Kellyville	Bus stops at Green Road near Ted Pike Reserve, which service routes 601, 610X, 633 and 715	Footpaths provided on Cattai Creek Drive Shared paths provided nearby on Cattai Creek Drive
AP2 – Braekell Place, Kellyville	Bus stops at Green Road and Marella Avenue, which service routes 601, 610X, 633 and 715	Footpaths not provided on Braekell Place or Duncraig Drive Shared paths provided nearby on Marella Avenue
AP3 – Deua Way, Kellyville	Bus stops at Samantha Riley Drive and Foxall Road, which service routes 601, 603, 615X and 715	Footpaths not provided on Glenhaven Road Shared paths not provided nearby
AP4 – Whitsunday Circuit, North Kellyville	Bus stops at Foxall Road near Aztec Street, which service route 715	Footpaths not provided on Whitsunday Circuit but provided further south at Heath Road and Foxall Road Shared paths not provided nearby

AP5 – Stringer Road, North Kellyville	Bus stops on Stringer Road near Cocoparra Circuit, which service route 605	Footpaths provided on Stringer Road Shared paths not provided nearby
AP6 – Jervis Place, North Kellyville	Bus stops on Stringer Road near Wattleridge Crescent, which service route 605	Footpaths provided on Stringer Road Shared paths not provided nearby
AP7 – Ross Place, North Kellyville	Bus stops on Stringer Road near Ross Place, which service route 605	Footpaths provided on Stringer Road Shared paths not provided nearby
AP8 – Mile End Road, Rouse Hill	Bus stops on Milford Drive near Mile End Road, which service route 617 and 633	Shared path provided nearby on Berkeley Grove

3.4 Sludge Transfer System (Rouse Hill to Riverstone)

3.4.1 Existing road network

Vehicles are likely to access the STS alignment via several proposed access paths, including:

- AP9 – Terry Road, Box Hill
- AP10 – Mount Carmel Drive, Box Hill
- AP11 – Boundary Road, Vineyard
- AP12 – Windsor Road, Vineyard

The proposed access paths are shown in Figure 20 to Figure 22 and Table 7. The proposed access paths consist of sealed or unsealed roads which are generally accessible from the wider road network via arterial or connector roads.

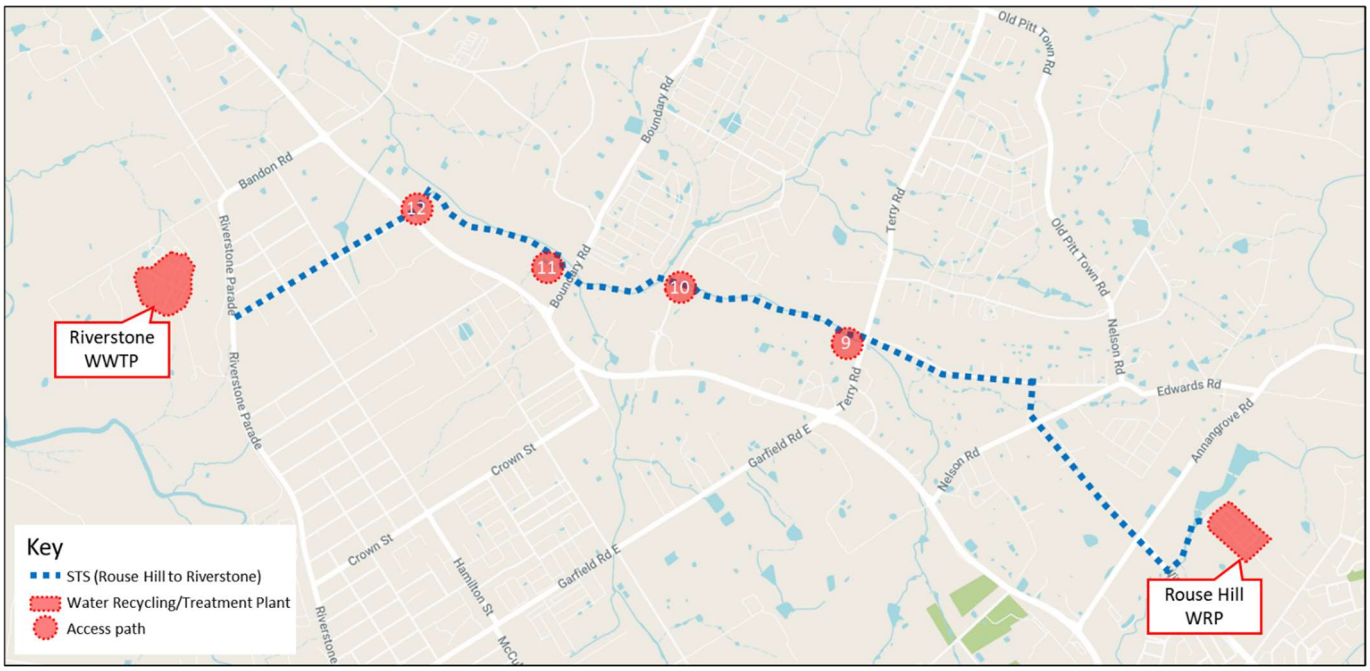


Figure 20 Road network surrounding STS (Rouse Hill to Riverstone)

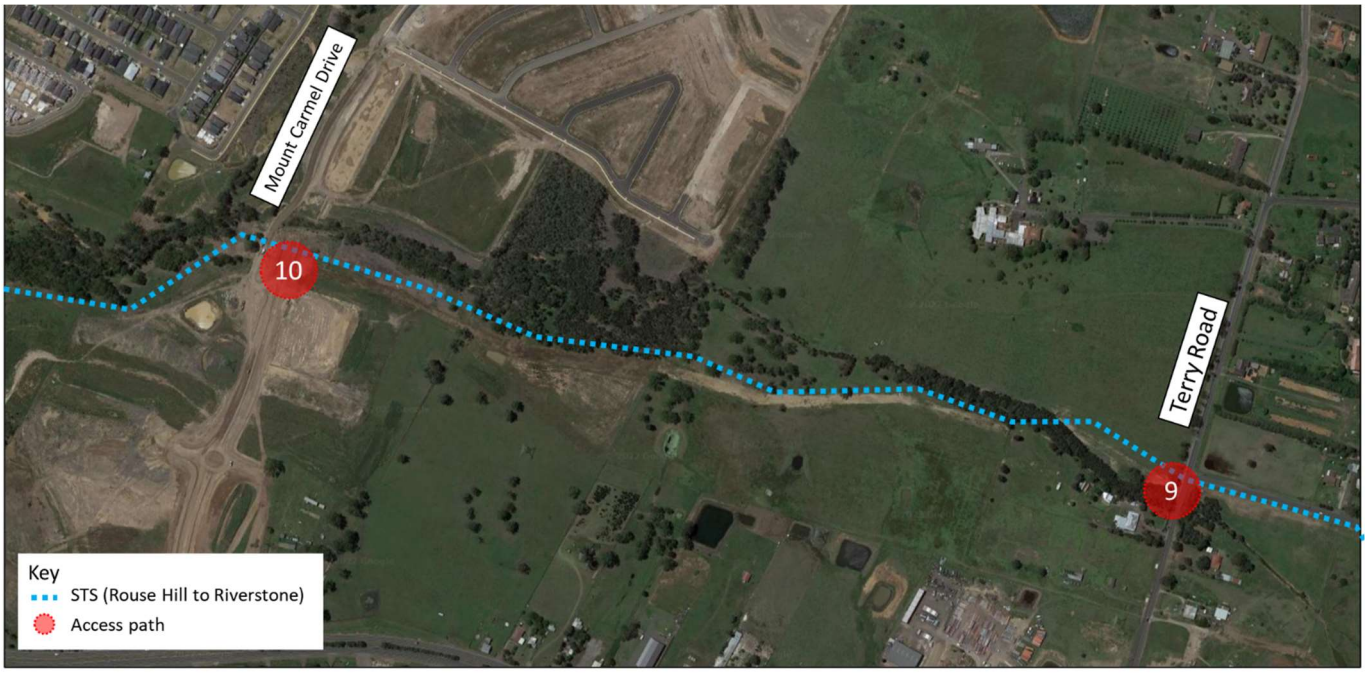


Figure 21 Road network surrounding AP9 and AP10

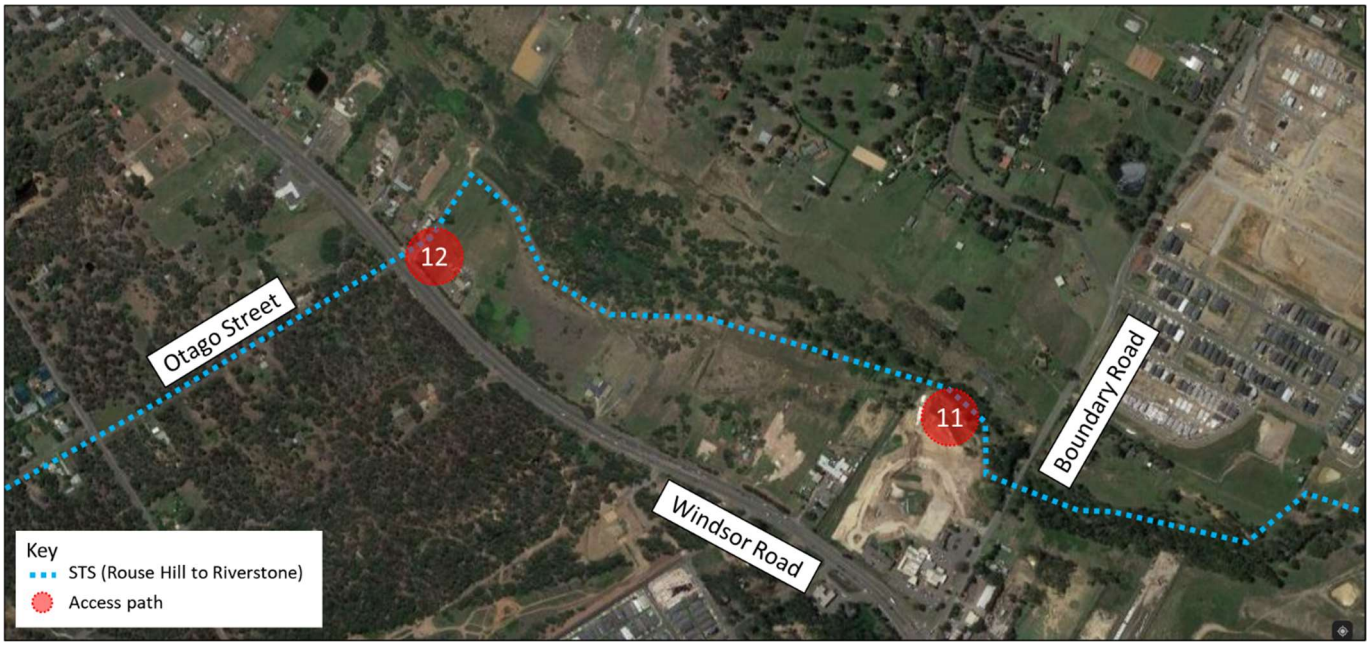
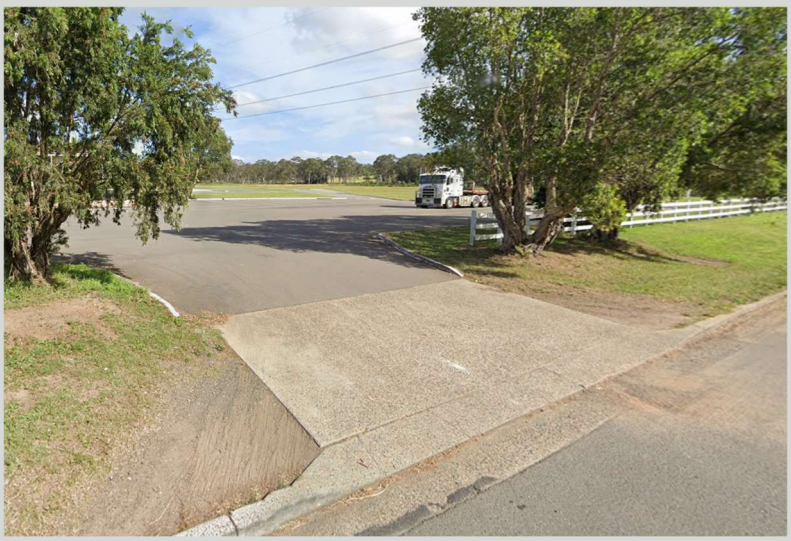


Figure 22 Road network surrounding AP11 and AP12

Table 7 STS (Rouse Hill to Riverstone) proposed access paths

Access path	Description and photo
AP9 – Terry Road, Box Hill	Unsealed track 
AP10 – Mount Carmel Drive, Box Hill	Sealed road 
AP11 – Boundary Road, Vineyard	Unsealed track 
AP12 – Windsor Road, Vineyard	Sealed road

Source: Google Street View (2021)

3.4.2 Public and active transport

Bus stops are provided near all proposed access paths and service several bus routes which provide connections to Rouse Hill, Riverstone, Vineyard and Windsor. The public transport network surrounding the proposed access paths is shown graphically in Figure 23.

Pedestrian volumes near the proposed access paths are generally low given the surrounding low-density and undeveloped land uses. Footpaths are not provided near the proposed access paths, with the exception of AP10 (Mount Carmel Drive, Box Hill). Shared paths are also provided near some proposed access paths, which connect to wider cycling network via Windsor Road. The cycling network surrounding the proposed access paths is shown in Figure 24.

A summary of public and active transport infrastructure near the proposed access paths is shown in Table 8.

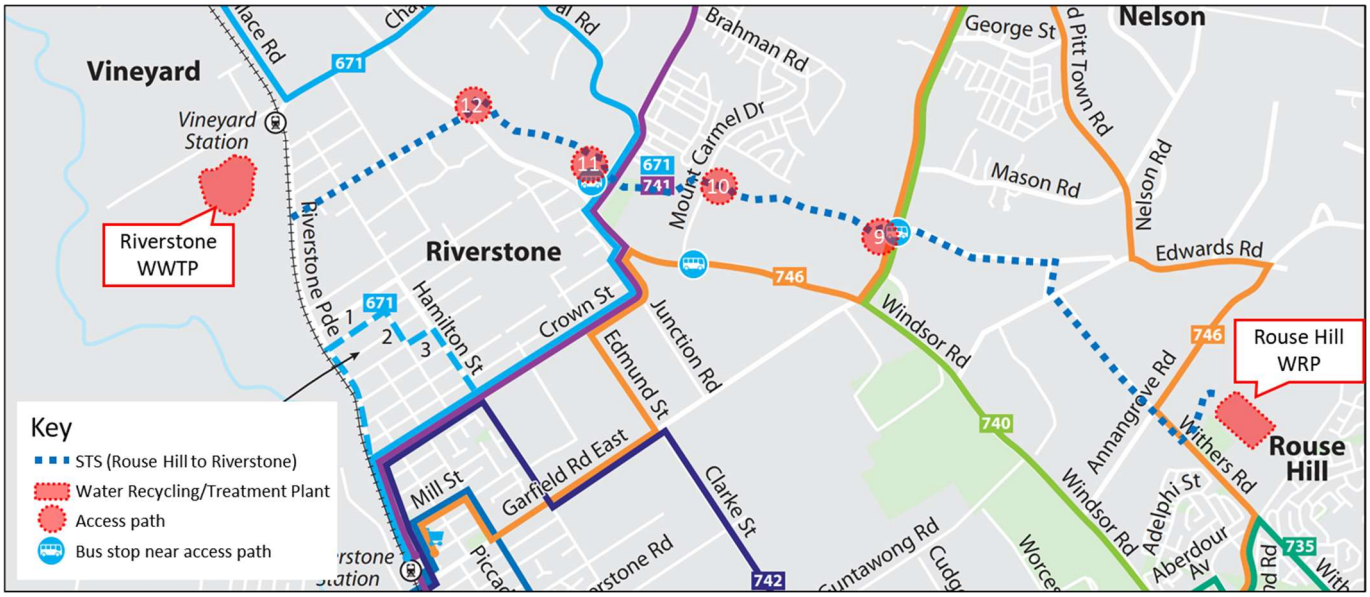


Figure 23 Public transport network surrounding the STS (Rouse Hill to Riverstone)

Source: Transport for NSW (2021)

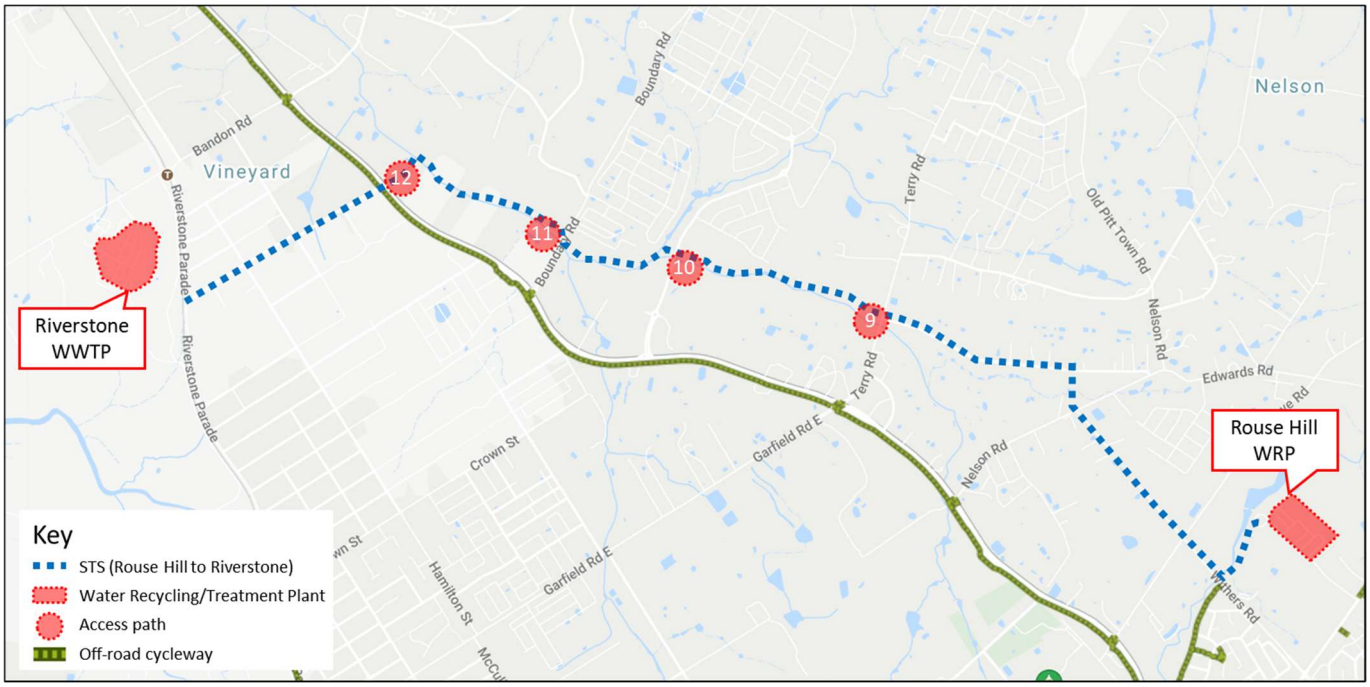


Figure 24 Cycling network around the STS (Rouse Hill to Riverstone)

Source: Cycleway Finder (Transport for NSW, 2021)

Table 8 STS (Rouse Hill to Riverstone) public and active transport

Access path	Nearest public transport service	Active transport infrastructure
AP9 – Terry Road, Box Hill	Bus stops on Terry Road near Hynds Road, which service routes 740 and 746	Footpaths not provided on Terry Road or Hynds Road Shared paths provided nearby on Windsor Road
AP10 – Mount Carmel Drive, Box Hill	Bus stop on Windsor Road near Mount Carmel Drive, which services route 746	Footpaths provided on Mount Carmel Drive Shared paths provided nearby on Windsor Road
AP11 – Boundary Road, Vineyard	Bus stops on Boundary Road/Windsor Road, which service routes 671 and 741	Footpaths not provided on Boundary Road Shared paths provided nearby on Windsor Road
AP12 – Windsor Road, Vineyard	No nearby bus stops	Shared paths provided on Windsor Road

3.5 Other infrastructure schemes

Several infrastructure schemes are planned or ongoing in the vicinity of the sites. Where publicly available information was available on the expected transport impact of these schemes they have been considered within this assessment.

3.5.1 Riverstone Waste Water Treatment Plant

The following schemes are located near the Riverstone WWTP:

- Bandon Road corridor
- Riverstone Resource Recycling Facility

The location of these schemes is shown in Figure 25.

Figure 25 Other infrastructure schemes near Riverstone WWTP

3.5.1.1 Bandon Road corridor

Transport for NSW is currently planning an extension of the Bandon Road corridor to link Richmond Road, Marsden Park and Windsor Road, Vineyard as part of the North West Growth Centre Road Network Strategy. The Bandon Road corridor would deliver an additional road connection between Richmond Road and Windsor Road, providing an alternative access across the North West Growth Area and reducing traffic within Riverstone.

Near Vineyard train station, Bandon Road would be realigned slightly north of the existing Bandon Road and then travel southwest to intersect with Richmond Road. Access to the Riverstone WWTP would be maintained via the existing Bandon Road.

As of July 2019, the corridor alignment has been finalised. As no information on construction traffic associated with the scheme is publicly available, this project has not been considered within this assessment.

3.5.1.2 Riverstone Resource Recovery Facility

The Riverstone Resource Recovery Facility is a state significant development that involves the expansion of a resource recovery facility. The Riverstone Resource Recovery Facility project is located approximately 1.4 kilometres southeast of the Riverstone WWTP. The Riverstone Resource Recovery Facility is currently in the Environmental Impact Statement preparation stage. As no information on construction traffic associated with the scheme is publicly available, this project has not been considered within this assessment.

No other infrastructure schemes were identified that would impact the transport network surrounding the Riverstone WWTP during construction.

3.5.2 Rouse Hill Water Recycling Plant

Compliance upgrades at the Rouse Hill WRP are expected to overlap with the construction phases of the Metro Northwest Growth Corridor at the Rouse Hill WRP. Construction vehicles relating to these developments could use routes similar to the project.

The following additional scheme is located near the Rouse Hill WRP:

- 332-334 Annangrove Road

The location of this scheme is shown in Figure 26.

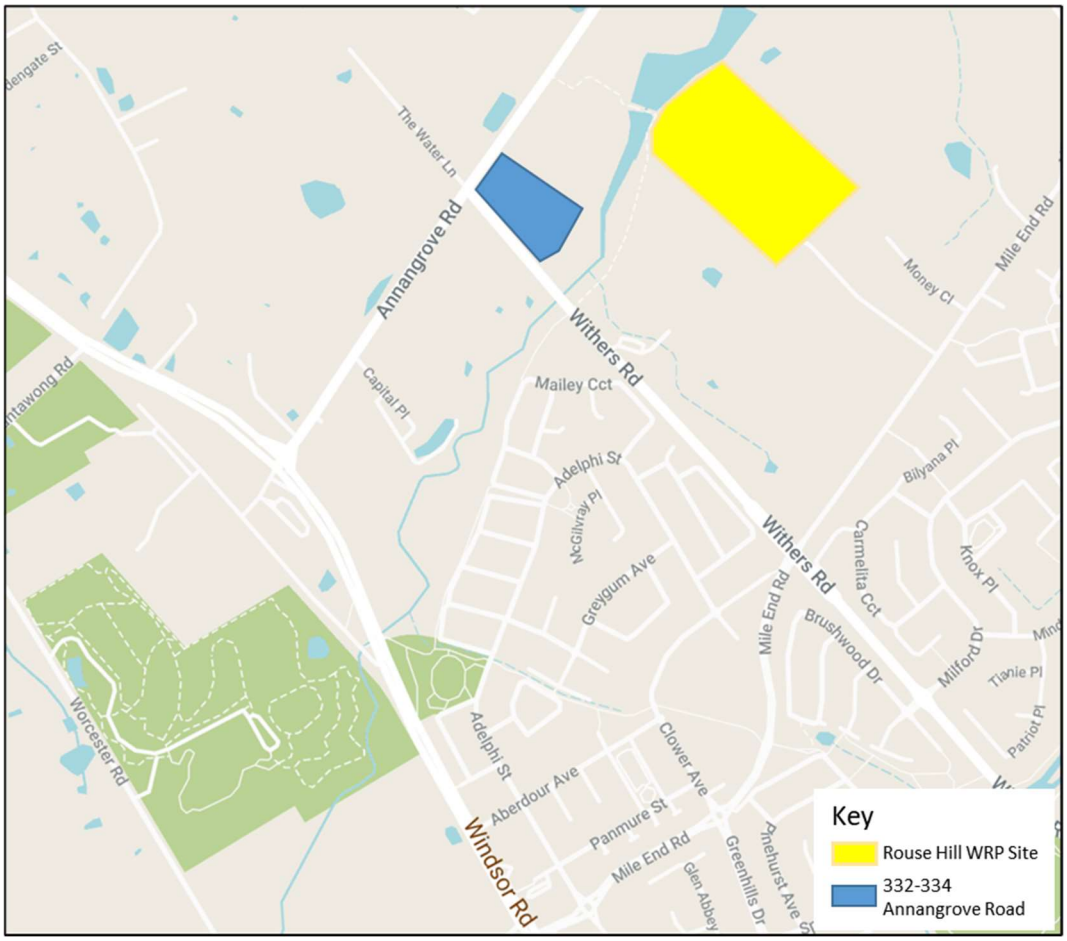


Figure 26 Other infrastructure schemes near Rouse Hill WRP

A mixed-use development at 332-334 Annangrove Road, approximately 500 metres southwest of the site, has been approved. The development comprises of a mixed-use building with 18,060m^2 of gross floor area including bulky good premises, food and drink premises, childcare centre, neighbourhood shops, offices, gym and play centre. Primary access to the site would be left-in left-out via Withers Road. The Traffic Impact Assessment for the development identified that operation of the development will not have a significant impact on the road network assuming signalisation of the Annangrove Road/Withers Road/The Water Lane intersection. Information on construction traffic associated with the scheme is not publicly available.

Any overlap in construction planning for this proposal will be coordinated with adjoining developer works.

3.5.2.1 Sydney Water Compliance Upgrades

The Sydney Water Compliance Upgrades includes upgrades to ensure licence conditions are met at the Rouse Hill WRP, including conditions for wet weather overflows. The need to upgrade treatment processes at Castle Hill WRP and Rouse Hill WRP is on the critical path with completion to meet compliance requirements set for 2024. Construction traffic is expected to use Mile End Road and access the Rouse Hill WRP via the secondary access from Withers Road.

A separate REF was undertaken to assess the traffic associated with the compliance upgrades, which identified that peak construction periods would generate 50 inbound light vehicle movements and 20 heavy vehicle movements in the AM peak hour. Impacts to the surrounding road network were expected to be minimal.

3.5.3 Sludge Transfer System

As identified in the *Box Hill Precinct Contributions Plan No. 15* (The Hills Shire Council, 2016), Terry Road (between Windsor Road and Mason Road) and The Water Lane (between Nelson Road and Annangrove Road) are proposed to be upgraded to provide a four lane sub-arterial road to support the development of the Box Hill Precinct. These roads align with or intersect with the STS (Rouse Hill to Riverstone). As no information on construction timing associated with the scheme is publicly available, this project has not been considered within this assessment.

Otherwise, no nearby infrastructure schemes were identified that would impact the transport network surrounding the STS during construction.

4 Transport impact assessment

Construction and operational impacts on road network performance, parking and access, public transport and active transport are detailed below. All impacts have been classified as outlined in Table 9.

Table 9 Impact classifications

Impact classification	Description
Low	Minimal impact with low frequency
Medium/moderate	Likely impacts to the transport network; however, generally more localised. Recommended that these impacts be monitored prior to the implementation of mitigation measures
High	Frequent impacts which may cover larger areas of the transport network. Will require further mitigation measures

4.1 Construction hours

Construction activities would be undertaken during the following hours:

- Monday to Friday: 7 am to 6 pm
- Saturday: 8 am to 1 pm
- No work on Sundays or public holidays

Some out of hours works would also be proposed. However, these works are not expected to generate traffic in the surrounding road network.

4.2 Indicative construction vehicle access routes

For both sites we have developed potential routes for construction traffic from the nearest arterial route. This exercise considered the vehicle types, suitability of surrounding roads and access points to each site.

4.2.1 Riverstone Waste Water Recycling Plant

From the arterial road network, vehicles accessing the Riverstone WWTP would travel via Windsor Road and Bandon Road to the secondary access road. The secondary access road will be primarily used by construction vehicles to access the main construction compound. During busy construction periods (such as large concrete pours), traffic control would be in operation to manage heavy vehicle movements in and out of the Riverstone WWTP. The primary access road may also be occasionally used by vehicles during busy construction periods.

Vehicles travelling to and from the Riverstone WWTP for stockpile removal are expected to travel to licensed landfill locations, which may include Eastern Creek, Kemps Creek and Wetherill Park. These vehicles would also travel via Windsor Road (to the south) and Bandon Road to the secondary access road.

The proposed construction vehicle route to and from the Riverstone WWTP is shown in Figure 27. The proposed access route would travel near Vineyard Public School, which is located on Bandon Road.

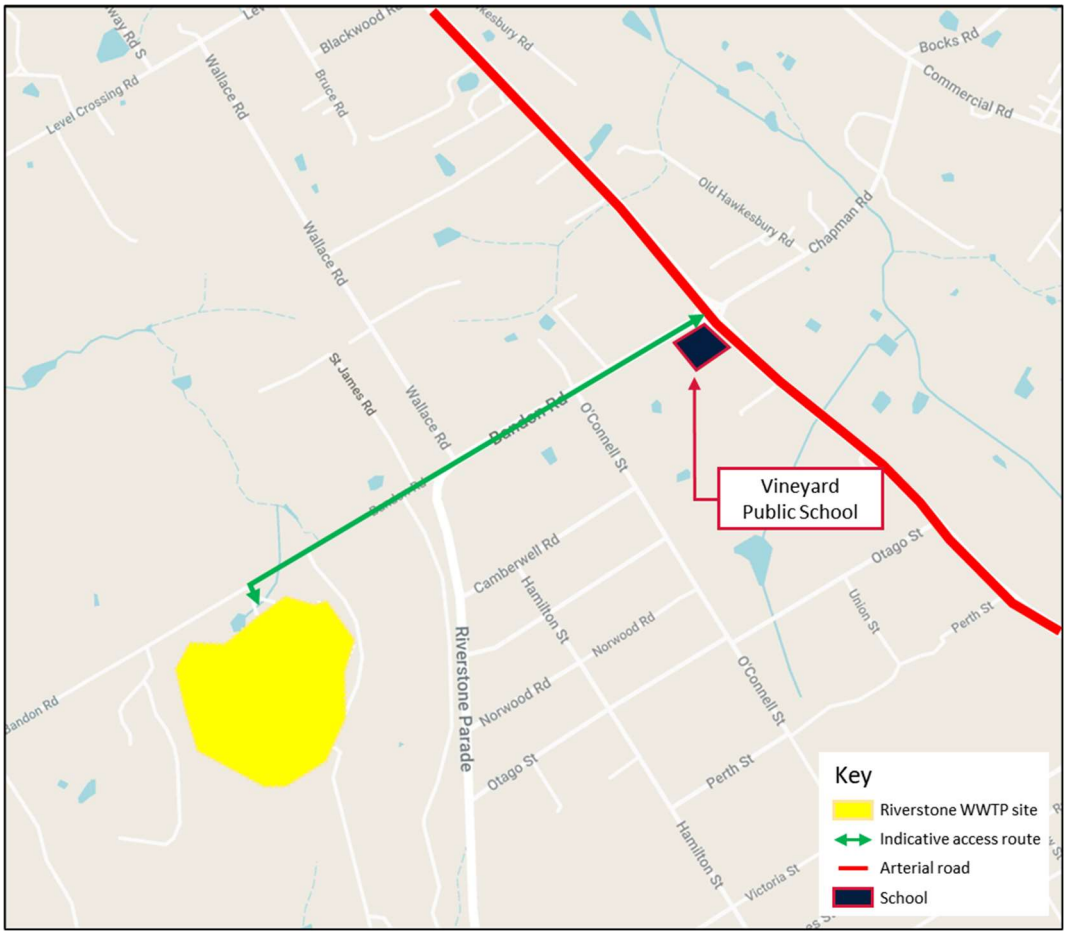


Figure 27 Indicative construction vehicle routes to and from the Riverstone WWTP

4.2.2 Rouse Hill Water Recycling Plant

From the arterial road network, vehicles accessing the Rouse Hill WRP would travel via Windsor Road and Mile End Road to the secondary access road on Withers Road (directly west of the Rouse Hill Rural Fire Brigade). Due to the poor sight distances for vehicles exiting the secondary access road onto Withers Road, it is recommended that vehicles only turn left onto Withers Road to reduce the safety risk. Consideration may also be given to left-in only access via Annangrove Road for vehicles entering the Rouse Hill WRP via the secondary access road.

The primary access road on Mile End Road may also be occasionally used by vehicles. However, use of the primary access would be discouraged during construction to minimise impacts to existing operation of the Rouse Hill WRP.

The proposed construction vehicle route to and from the Rouse Hill WRP is shown in Figure 28. The proposed access route would travel near Rouse Hill Public School, which is located on Mile End Road.

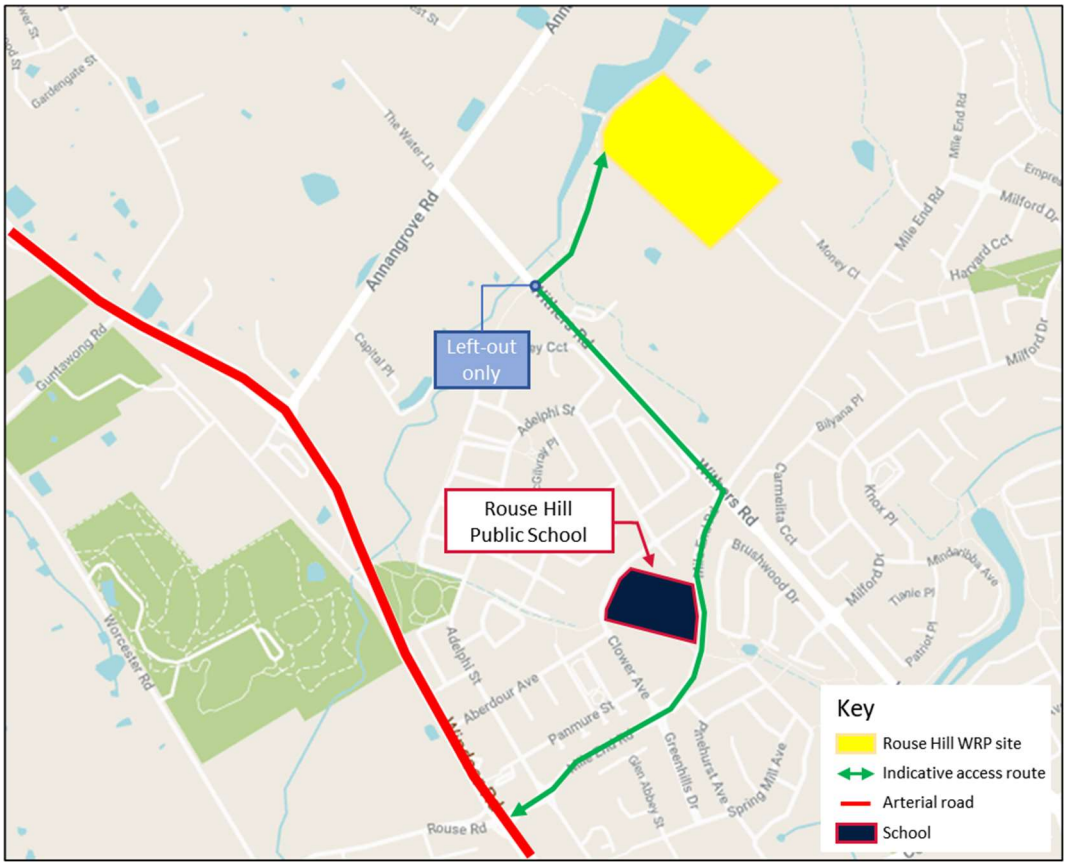


Figure 28 Indicative construction vehicle routes to and from the Rouse Hill WRP

4.2.3 Sludge Transfer System (Castle Hill to Rouse Hill)

Indicative construction vehicle access routes for vehicles travelling to and from the proposed access paths to STS (Castle Hill to Rouse Hill) are shown in Figure 29, Figure 30 and Table 10. Construction vehicles would also be able to travel along the STS alignment to travel between accesses or construction compounds, if required. The proposed access routes would travel near several schools.

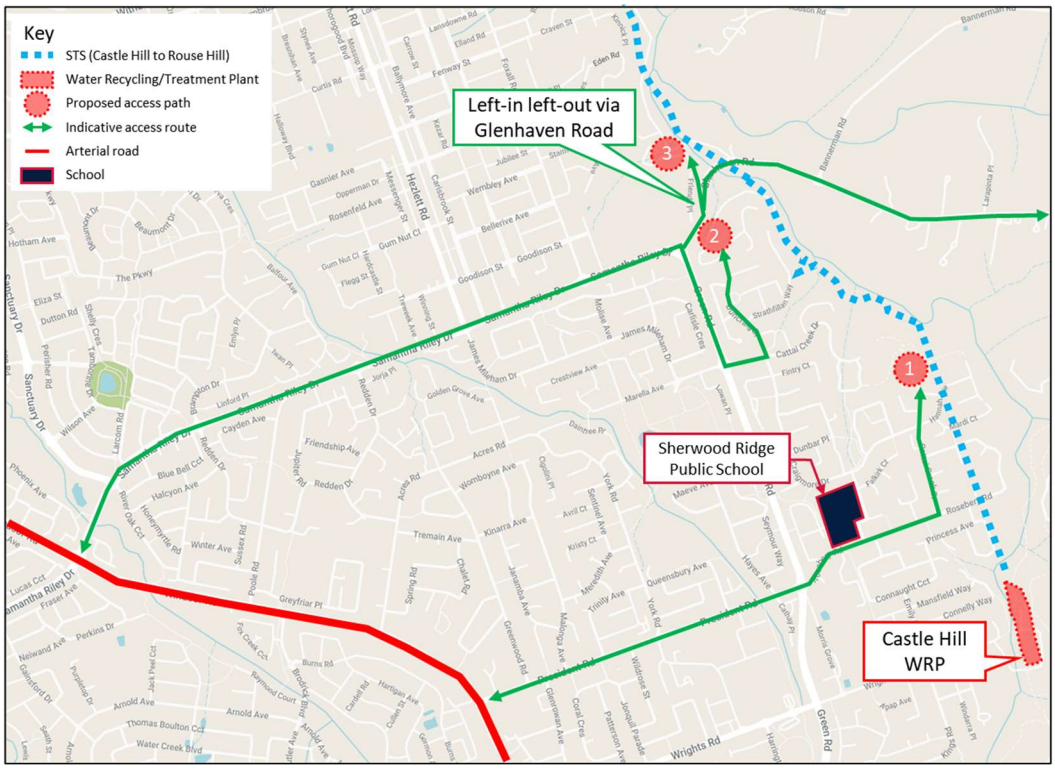


Figure 29 Indicative construction vehicle routes to and from AP1, AP2 and AP3

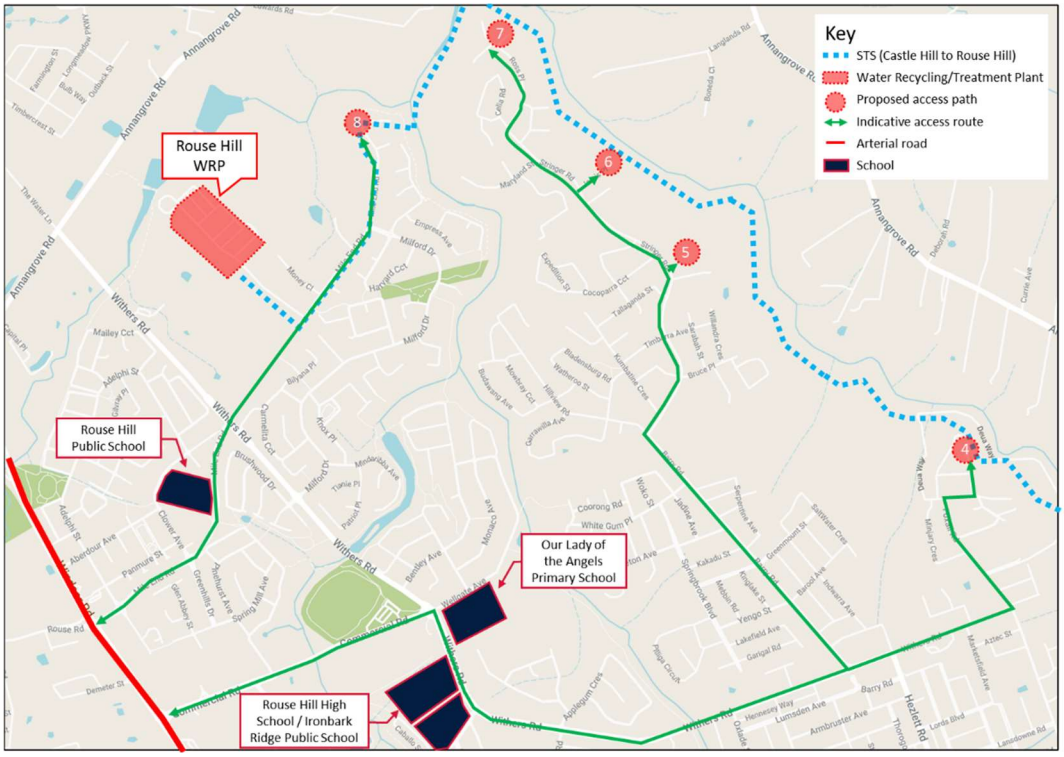


Figure 30 Indicative construction vehicle routes to and from AP4, AP5, AP6, AP7 and AP8

Table 10 Indicative construction vehicle access routes to and from STS (Castle Hill to Rouse Hill)

Access path	Route
AP1 – Cattai Creek Drive, Kellyville	Windsor Road, President Road, Rosebery Road and Cattai Creek Drive
AP2 – Braekell Place, Kellyville	Windsor Road, Samantha Riley Drive, Green Road, Cattai Creek Drive, Duncraig Drive and Braekell Place
AP3 – Deua Way, Kellyville	Inbound: Windsor Road, Samantha Riley Drive, Glenhaven Road and Deua Way Outbound: Glenhaven Road
AP4 – Whitsunday Circuit, North Kellyville	Windsor Road, Commercial Road, Withers Road, Foxall Road, Heath Road and Whitsunday Circuit
AP5 – Stringer Road, North Kellyville	Windsor Road, Commercial Road, Withers Road, Barry Road and Stringer Road
AP6 – Jervis Place, North Kellyville	Windsor Road, Commercial Road, Withers Road, Barry Road, Stringer Road and Jervis Place
AP7 – Ross Place, North Kellyville	Windsor Road, Commercial Road, Withers Road, Barry Road, Stringer Road and Ross Place
AP8 – Mile End Road, Rouse Hill	Windsor Road and Mile End Road

4.2.4 Sludge Transfer System (Rouse Hill to Riverstone)

Indicative construction vehicle access routes for vehicles travelling to and from the proposed access paths to STS (Rouse Hill to Riverstone) are shown in Figure 31 and Table 11. Construction vehicles would also be able to travel along the STS alignment to travel between accesses or construction compounds, if required.

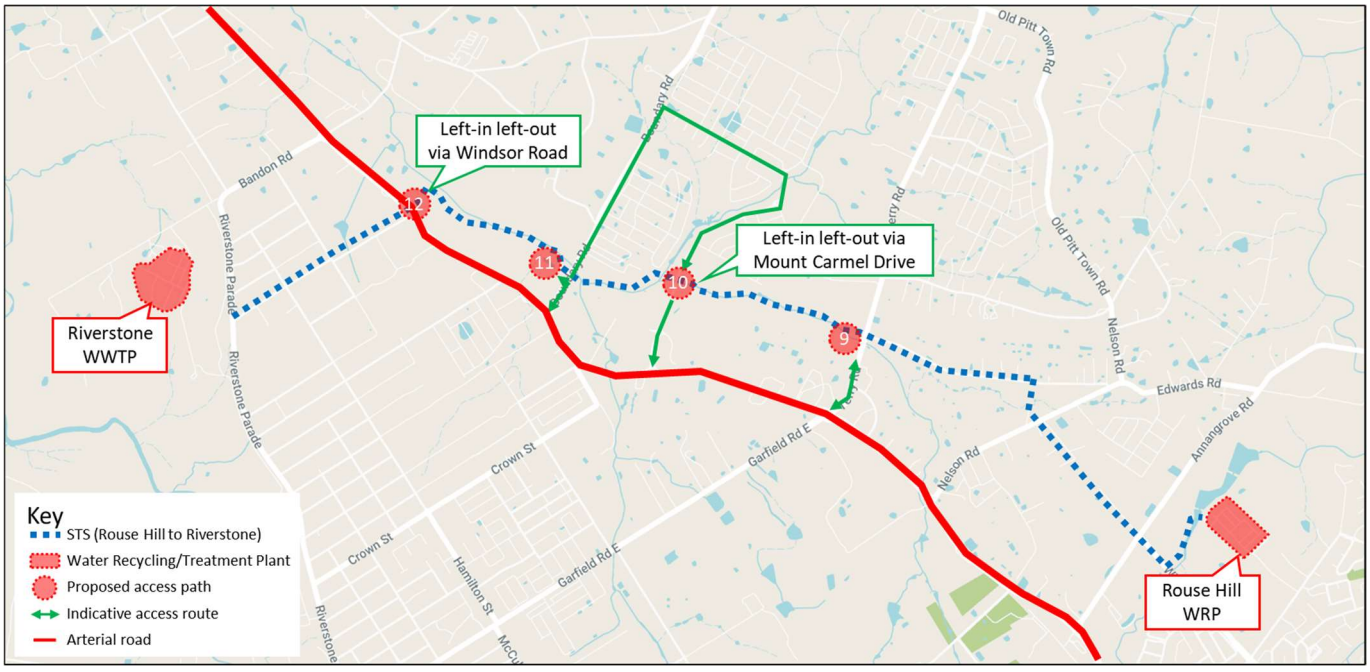


Figure 31 Indicative construction vehicle routes to and from AP9, AP10, AP11 and AP12

Table 11 Indicative construction vehicle access routes to and from STS (Castle Hill to Rouse Hill)

Access path	Route
AP9 – Terry Road, Box Hill	Windsor Road and Terry Road
AP10 – Mount Carmel Drive, Box Hill	Inbound: Windsor Road, Boundary Road, Brahman Road and Mount Carmel Drive Outbound: Mount Carmel Drive and Windsor Road
AP11 – Boundary Road, Vineyard	Windsor Road and Boundary Road
AP12 – Windsor Road, Vineyard	Windsor Road (left-in, left-out only)

4.3 Construction workers and vehicles

4.3.1 Vehicle types

A range of construction vehicle types are expected to be used throughout the construction phase and the vehicles to be used by the Contractor are not limited to those listed in this section:

- Light vehicles and utility vehicles
- Truck and Dog
- Concrete trucks
- Excavators
- Small rigid vehicles
- Heavy rigid vehicles

4.3.2 Traffic generation

4.3.2.1 Riverstone Waste Water Treatment Plant

4.3.2.1.1 Riverstone Waste Water Treatment Plant Upgrade

Typical construction would involve up to 40 workers. This may increase to up to 50 workers during peak construction periods.

The forecast number of peak construction movements at each site during construction is summarised in Table 12. The peak period of construction traffic will occur in the AM peak hour between light and heavy vehicle movements. It should be noted these are peak values and vehicle movements are expected to be lower than these values for the large periods of the construction phase. Light vehicle movements are predominately driven by the number of workers on site.

Table 12: Summary of peak construction traffic generation – Riverstone WWTP

Vehicle type		Time period	Peak hour movements (inbound and outbound)[1]
Light vehicle	AM peak	6:45 am to 7:45 am (one hour)	50 movements per hour (inbound only)
	PM peak	4:30 pm to 6:30 pm (two hours)	25 movements per hour (outbound only)
Heavy vehicle	AM peak	7 am to 12 pm	20 movements per hour (total inbound and outbound)

[1]Inbound movements correspond to vehicles entering the site. Outbound movements correspond to vehicles leaving the site.

4.3.2.1.2 Stockpile removal

Stockpile removal in 2025 is expected to generate approximately five heavy vehicles per hour to transport stockpile over an eight-hour period each day, which equates to ten heavy vehicle movements per hour (total inbound and outbound).

In addition, plant may also be transported to the site for stockpile removal. Vehicle movements to transport plant are expected to be low and would be undertaken outside of peak periods.

4.3.2.2 Rouse Hill Water Recycling Plant

Typical construction would involve up 25 workers.

The forecast number of peak construction movements at each site during construction is summarised in Table 12. The peak period of construction traffic will occur in the AM peak hour between light and heavy vehicle movements. It should be noted these are peak values and vehicle movements are expected to be lower than these values for the large periods of the construction phase. Light vehicle movements are predominately driven by the number of workers on site.

Table 13: Summary of peak construction traffic generation – Rouse Hill WRP

Vehicle type		Peak hour movements (inbound and outbound)[1]
Light vehicle	AM peak	30 movements per hour (inbound only)
	PM peak	25 movements per hour (outbound only)
Heavy vehicle	AM peak	Four movements per hour (total inbound and outbound)

[1]Inbound movements correspond to vehicles entering the site. Outbound movements correspond to vehicles leaving the site.

4.3.2.3 Sludge Transfer System

Construction works relating to the STS are expected to be staged for construction along the alignment. Therefore, traffic at all accesses or construction compounds is not expected to be generated concurrently.

Construction would involve up to 15 workers at each staged section of the alignment. For the entire length of pipeline, approximately 1,000 trucks would be generated to transport 23kT to 30kT of excavated spoil across the two-year construction period. As construction works are expected to be staged, these trucks would be distributed across the entire duration of construction. This equates to approximately 2 trucks or 4 total inbound and outbound movements per day.

An underboring machine would also be used to tunnel at the following locations:

- Between Castle Hill WRP and Cattai Creek Drive (AP1)
- Between Braekell Place (AP2) and Deua Way (AP3)
- East of Whitsunday Circuit (AP4)
- East of Mile End Road (AP8)

4.4 Construction worker parking

4.4.1 Riverstone Waste Water Treatment Plant

Within the Riverstone WWTP, all construction worker parking and stockpile removal vehicle parking would be accommodated on-site, minimising impacts to surrounding local streets.

4.4.2 Rouse Hill Water Recycling Plant

Within the Rouse Hill WRP, all construction worker parking would be accommodated on-site, minimising impacts to surrounding local streets.

4.4.3 Sludge Transfer System

Along the STS, construction worker parking would be accommodated within the 15-metre-wide corridor of the alignment in cleared areas and/or designated off-street compound areas, minimising impacts to surrounding local streets.

4.5 Riverstone Waste Water Treatment Plant construction impact assessment

4.5.1 Impacts on road network performance

For the Riverstone Waste Water Treatment Plant Upgrade, as discussed in Section 4.3.2, the peak period of construction traffic will occur in the AM peak hour. Peak construction periods are expected to generate 50 inbound light vehicle movements and 20 heavy vehicle movements in the AM peak hour.

For the stockpile removal, approximately ten heavy vehicle movements (total inbound and outbound) are expected to be generated per hour. Loaded trucks would be covered to minimise dust impacts on local roads and nearby properties.

Given the low existing traffic volumes on Bandon Road, construction traffic generation is expected to have a negligible impact on the road network performance. Windsor Road would also be used, which is an arterial road that carries high volumes of traffic. Hence, the relatively small increase in construction traffic is not expected to detrimentally impact Windsor Road.

Therefore, impacts on the surrounding road network relating to construction traffic are expected to be minimal.

4.5.2 Impacts on parking and access

As discussed in Section 4.4, all construction worker parking and stockpile removal vehicle parking at the Riverstone WWTP would be accommodated on-site. Therefore, no impacts to parking on surrounding roads are expected.

4.5.3 Impacts on the public transport network

Windsor Road and Bandon Road are used by buses and also form part of the proposed construction vehicle route. Minimal impacts on bus services are expected given the low volumes of traffic being generated. No impacts are anticipated on the operation of bus stops.

4.5.4 Impacts on the active transport network

No impacts to pedestrians or cyclists are expected given that no footpath or cycleway closures are proposed during construction or stockpile removal. However, heavy vehicle movements would be generated during the morning school drop-off period between 8 am and 9:30 am. These vehicles are proposed to travel near Vineyard Public School, which is located on Bandon Road.

4.6 Rouse Hill Water Recycling Plant construction impact assessment

4.6.1 Impacts on road network performance

As discussed in Section 4.3.2, the peak period of construction traffic will occur in the AM peak hour. Peak construction periods are expected to generate 30 inbound light vehicle movements and four heavy vehicle movements in the AM peak hour. As discussed in Section 3.5.2, traffic generated by nearby infrastructure schemes is expected to be relatively minor.

Impacts to roads that form part of the proposed construction vehicle route are expected to be minimal. Windsor Road is an arterial road that is suited to carrying high volumes of traffic and heavy vehicles. Therefore, the relatively small increase in construction traffic is not expected to significantly increase traffic volumes on Windsor Road. Furthermore, given the low existing traffic volumes on Withers Road and Mile End Road, construction traffic generation is not expected to have a detrimental impact.

4.6.1.1 Impacts on safety

Poor sight distances for vehicles exiting the secondary access road onto Withers Road poses a safety risk, particularly for heavy vehicles with slower acceleration speeds.

4.6.2 Impacts on parking and access

As discussed in Section 4.4, all construction worker parking at the Rouse Hill WRP would be accommodated on-site. Therefore, no impacts to parking on surrounding roads are expected.

4.6.3 Impacts on the public transport network

Windsor Road, Withers Road and Mile End Road are used by buses and also form part of the proposed construction vehicle route. Minimal impacts on bus services are expected given the low volumes of traffic being generated. No impacts are anticipated on the operation of bus stops.

4.6.4 Impacts on the active transport network

It was observed on site that pedestrians occasionally walk using the secondary access road as it is directly adjacent to Russell Reserve. Furthermore, members of the Walking Volunteers community group use the secondary access road. Therefore, additional construction vehicles may conflict with pedestrians wanting to use the secondary access road. Given low existing pedestrian volumes on this walking track, impacts are expected to be moderate.

Furthermore, heavy vehicle movements would be generated during the morning school drop-off period between 8 am and 9:30 am. These vehicles are proposed to travel near Rouse Hill Public School, which is located on Mile End Road.

4.7 Sludge Transfer System

4.7.1 Impacts on road network performance

As construction works will be staged, the approximately 2 trucks or 4 total inbound and outbound movements per day are expected to be generated during construction of the STS. Given the low number of traffic generation, minimal impacts on road network performance are expected.

Trenching on Mile End Road and Otago Street, Hynds Road and The Water Lane would require the closure of one traffic lane. To maintain two-way traffic operation, temporary traffic control would be required during construction. Due to low traffic volumes on these roads, the impact of a closure of one lane is expected to be minor. Coordination with adjacent properties would be undertaken to maintain driveway access and to minimise impacts where possible.

As discussed in Section 4.3.2.3, an underboring machine would be used at AP1 (Cattai Creek Drive), AP2 (Braekell Place), AP3 (Deua Way), AP4 (Whitsunday Circuit) and AP8 (Mile End Road). Trucks carrying spoil would be generated from the location where boring commences. Boring at AP4 and AP8 would generate trucks from the same access path regardless of where boring commences. However, at AP1, AP2 and AP3, trucks may carry spoil from either end of the boring alignment. Therefore, to minimise the impact the road network, consider commencing boring from the following locations:

- Between Castle Hill WRP and Cattai Creek Drive (AP1) – consider commencing boring from Cattai Creek Drive (AP1) as the Windsor Road/President Road intersection is signal-controlled and would better accommodate heavy vehicle access.
- Between Braekell Place (AP2) and Deua Way (AP3) – consider commencing boring from Deua Way (AP3) to minimise vehicles travelling on the local road network.

4.7.1.1 Impacts on safety

AP9 is located within 50 metres of the Hynds Road/Terry Road intersection. Due to its proximity to the existing intersection, AP9 has a potential safety risk of rear-end crashes as vehicles may not be aware of heavy vehicles slowing down to enter AP9.

AP11 is located on Boundary Road, which is a collector road with a speed limit of 80 km/h. AP11 has a potential safety risk of rear-end crashes as heavy vehicles accelerate slowly, which may increase the risk of a high-speed vehicle crashing from behind.

AP12 is located on Windsor Road, which is an arterial road with a speed limit of 80 km/h. AP12 has a potential safety risk of rear-end crashes as heavy vehicles accelerate slowly, which may increase the risk of a high-speed vehicle crashing from behind.

4.7.2 Impacts on parking and access

As discussed in Section 4.4, all construction worker parking along the STS would be accommodated on-site. Therefore, no impacts to parking on surrounding roads are expected.

4.7.3 Impacts on the public transport network

The following roads are used by buses and also form part of the proposed construction vehicle route:

- Windsor Road
- Green Road (Access to AP2)

- Glenhaven Road (Access to AP3)
- Commercial Road and Withers Road (Access to AP4, AP5, AP6 and AP7)
- Barry Road and Stinger Road (Access to AP5, AP6 and AP7)
- Mile End Road (Access to AP8)
- Terry Road (Access to AP9)
- Boundary Road (Access to AP11)

As construction works will be staged and truck traffic generation would be distributed across the two-year duration of construction, minimal impacts on bus services are expected.

No impacts are anticipated on the operation of bus stops. The exception is on the western footpath of Mile End Road and the southern footpath of Hynds Road as trenching would require the closure of these footpaths. Consultation with TfNSW would be undertaken to coordinate temporary bus stop locations during construction works. Impacts are expected to be minor as bus services would continue to be served by temporary bus stop operations during construction.

4.7.4 Impacts on the active transport network

Trenching on Mile End Road would require the closure of the western footpath. The footpath on the eastern side of Mile End Road would remain operational during construction. Due to low pedestrian volumes on Mile End Road, the impact of a closure of the western footpath is expected to be minor.

Furthermore, heavy vehicle movements would be generated during the morning school drop-off period between 8 am and 9:30 am. These vehicles are proposed to travel near the following schools:

- Sherwood Ridge Public School, which is located on Rosebery Road on the route to and from AP1 (Cattai Creek Drive, Kellyville).
- Our Lady of the Angels Primary School, which is located on Withers Road on the route to and from AP4 (Whitsunday Circuit, North Kellyville), AP5 (Stringer Road, North Kellyville), AP6 (Jervis Place, North Kellyville) and AP7 (Ross Place, North Kellyville).
- Rouse Hill High School and Ironbark Ridge Public School, which are located on Withers Road on the route to and from AP4, AP5, AP6 and AP7.
- Rouse Hill Public School, which is located on Mile End Road on the route to and from AP8 (Mile End Road).

4.7.4.1 Impacts on walking trails

The STS alignment between Castle Hill and Rouse Hill coincides with several walking tracks at the following locations (shown in Figure 32 to Figure 35).

- Castle Hill WRP
- AP1 (Cattai Creek Drive, Kellyville)
- AP3 (Deua Way, Kellyville) and AP4 (Whitsunday Circuit, North Kellyville)
- AP8 (Mile End Road, Rouse Hill)

Near the Castle Hill WRP, the walking track on the northern end of the Castle Hill WRP may be potentially closed to facilitate construction of the STS. Pedestrians would be able to use an alternative track along the southern side of the Castle Hill WRP.

Near AP1, the walking track to the north of Cattai Creek Drive may be potentially closed to facilitate construction of the STS. Pedestrians walking on the west of the STS alignment would be able to use an alternative track along the west. However, pedestrians walking on Jack McNamee Place would need to be diverted around construction works or a full closure of Jack McNamee Place would be required.

Near AP3 and AP4, the walking track along Deua Way may be potentially closed to facilitate construction of the STS. Pedestrians walking on this track would need to be diverted around construction works or a full closure of the walking track would be required.

Near AP8, the walking track to the northeast of Mile End Road may be potentially closed to facilitate construction of the STS. Pedestrians walking on this track would need to be diverted around construction works or a full closure of the walking track would be required.

Given the potential for walking track closures, the above impacts are expected to be moderate.

Figure 32 Walking tracks near Castle Hill WRP

Figure 33 Walking tracks near AP1 (Cattai Creek Drive, Kellyville)

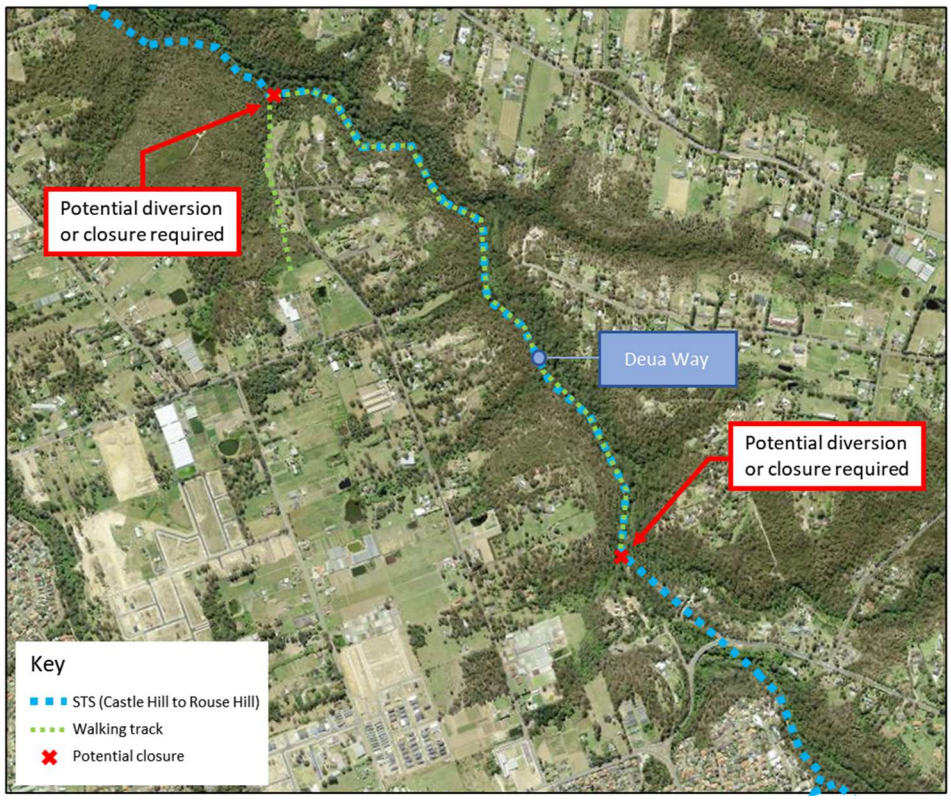


Figure 34 Walking tracks near AP3 and AP4 (Deua Way, Kellyville)

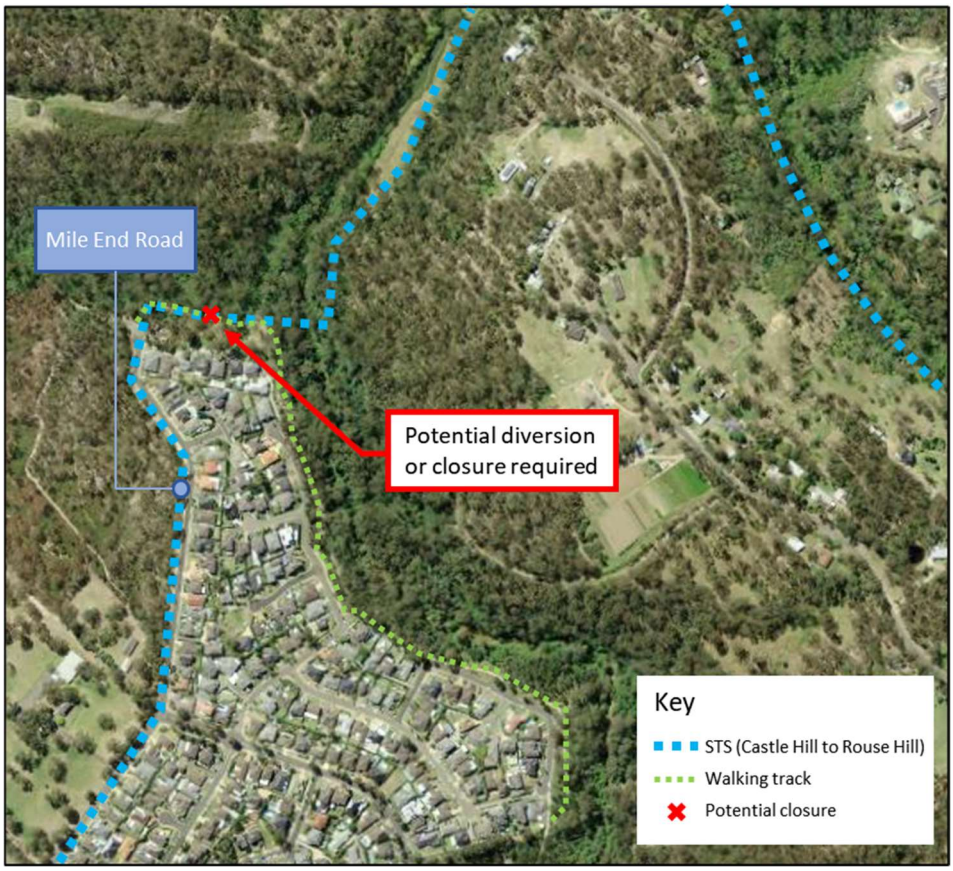


Figure 35 Walking tracks near AP8 (Mile End Road, Rouse Hill)

4.8 Operational impacts

During operation, traffic generation at the Riverstone WWTP, Rouse Hill WRP and STS is shown in Table 14. Operational vehicles would use the vehicle access routes described in Section 4.2.

Table 14: Summary of peak operation traffic generation

Site	Light vehicle peak hour movements (inbound and outbound)[1]	Heavy vehicle peak hour movements (inbound and outbound)
Riverstone WWTP	Up to four movements per hour (inbound and outbound)	Typically up to four movements per hour (inbound and outbound)
Rouse Hill WRP	15 movements per hour (inbound)	Two movements per hour (inbound and outbound)
Sludge Transfer System	Up to one movement per hour (inbound)	N/A

[1]Inbound movements correspond to vehicles entering the site. Outbound movements correspond to vehicles leaving the site.

At the Riverstone WWTP, operational traffic generation is expected to increase slightly above existing operational traffic volumes with approximately six heavy vehicle movements per week for biosolids outloading, two heavy vehicle movements per fortnight for screening and two heavy vehicle movements per fortnight for grit disposal.

At the Rouse Hill WRP, operational traffic generation is expected to be similar to the existing volumes of traffic generated. The STS is also not expected to typically generate traffic and would be limited to infrequent light vehicle access for maintenance.

Therefore, in operation the upgraded plants and STS are expected have a negligible impact on surrounding road network performance. Similarly, impacts on public transport and active transport are expected to be negligible during operation. No changes to parking or access are expected during operation as parking would be accommodated on-site.

5 Proposed mitigation measures

This section outlines potential mitigation measures required to minimise the impacts of the project throughout the construction and operational phases. All proposed mitigation measures should be developed further by the appointed contractor as part of their detailed Construction Management Plan.

5.1 Riverstone Waste Water Treatment Plant

The impacts and proposed mitigation measures relating to the Riverstone WWTP are summarised in Table 15.

Table 15: Mitigation and effectiveness – Riverstone WWTP

Project specific mitigation measures – construction and operation			
Potential impact	**Impact**	**Mitigation measure**	**Impact following mitigation**
Impacts of construction vehicles on surrounding road network performance, particularly Windsor Road	Low	Prepare and implement Traffic and Pedestrian Management Plan prior to construction. Construction traffic movements scheduled outside of peak periods where possible.	Low
Impacts of dust from stockpile removal trucks on local roads and nearby properties	Medium	Cover loaded trucks.	Low
Potential conflict between heavy vehicles and schoolchildren on Bandon Road	Medium	Prepare and implement Traffic and Pedestrian Management Plan prior to construction, noting schools near vehicle access routes. Minimise construction traffic movements through school zones during pick up and drop off times.	Low

5.2 Rouse Hill Water Recycling Plant

The impacts and proposed mitigation measures relating to the Rouse Hill WRP are summarised in Table 16.

Table 16: Mitigation and effectiveness – Rouse Hill WRP

Project specific mitigation measures – construction and operation			
Potential impact	**Impact**	**Mitigation measure**	**Impact following mitigation**
Impacts of construction vehicles on surrounding road network performance, particularly Windsor Road	Low	Prepare and implement Traffic and Pedestrian Management Plan prior to construction. Construction traffic movements scheduled outside of peak periods where possible. Discourage construction use of the primary access from Mile End	Low

		Road to minimise impacts to existing operation.	
Impacts to safety due to poor sight distance for vehicles exiting the secondary access road onto Withers Road	Medium	Left-out only for vehicles leaving the Rouse Hill WRP via the secondary access road. Use signage to alert vehicles on Withers Road of the informal access. Consider left-in only access for vehicles entering the Rouse Hill WRP via the secondary access road.	Low
Potential conflict between heavy vehicles and pedestrians on secondary access road to Rouse Hill WRP	Medium	Use signage to alert pedestrians of heavy vehicle access. Manage secondary access road to permit shared vehicle and pedestrian movements or provide alternative connection. This would form part of a Traffic and Pedestrian Management Plan.	Low
Potential conflict between heavy vehicles and schoolchildren on Mile End Road	Medium	Prepare and implement Traffic and Pedestrian Management Plan prior to construction, noting schools near vehicle access routes. Minimise construction traffic movements through school zones during pick up and drop off times.	Low

5.3 Sludge Transfer System

The impacts and proposed mitigation measures relating to the STS are summarised in Table 17.

Table 17: Mitigation and effectiveness – STS

Project specific mitigation measures – construction and operation			
Potential impact	**Impact**	**Mitigation measure**	**Impact following mitigation**
Impacts of construction vehicles on surrounding road network performance, particularly Windsor Road	Low	Prepare and implement Traffic and Pedestrian Management Plan prior to construction. Construction traffic movements scheduled outside of peak periods where possible. Commence underboring from Cattai Creek Drive (AP1) and Deua Way (AP3). Stage construction works to distribute truck traffic generation across the duration of works.	Low
Impacts of lane closures on Mile End Road, Otago Street, Hynds Road and The Water Lane	Medium	Implement temporary traffic control to maintain two-way traffic operation.	Low

		Consult with TfNSW to coordinate temporary bus stop locations during construction works. Coordinate with adjacent properties to maintain driveway access and to minimise impacts where possible.	
Potential safety risk due to proximity of AP9 (Terry Road) to the Hynds Road/Terry Road intersection	Medium	Use signage to alert traffic of heavy vehicle access. Minimise heavy vehicle movements during peak hours.	Low
Potential safety risk due to AP11 (Boundary Road) being located on the high-speed Boundary Road	Medium	Relocate access points to local roads if possible. Use signage to alert traffic of heavy vehicle access. Minimise heavy vehicle movements during peak hours.	Low
Potential safety risk due to AP12 (Windsor Road) being located on the high-speed Windsor Road	Medium	Relocate access points to local roads if possible. Use signage to alert traffic of heavy vehicle access. Minimise heavy vehicle movements during peak hours.	Low
Potential conflict between heavy vehicles and schoolchildren on Rosebery Road, Withers Road and Mile End Road.	Medium	Prepare and implement Traffic and Pedestrian Management Plan prior to construction, noting schools near vehicle access routes. Minimise construction traffic movements through school zones during pick up and drop off times.	Low
Impacts of walking trail closures near Castle Hill WRP, AP1 (Cattai Creek Drive, Kellyville), AP3 (Deua Way, Kellyville), AP4 (Whitsunday Circuit, North Kellyville) and AP8 (Mile End Road, Rouse Hill).	Medium	Prior to closure, construction contractor to determine if diversions around construction areas are feasible. Use signage and notifications to alert pedestrians of the diversion / closure. During closure, use wayfinding to alert pedestrians of diversion / closure.	Low