Appendix J Traffic and transport assessment

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Memorandum

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From:	**Christophe Steinbach (Senior Associate – Transport Planning)**
Date:	**03/08/2018**
No. Pages:	**8**

Subject: Traffic impact assessment – Eurobodalla Southern Water Supply Storage

Methodology

The traffic and transport impact assessment was undertaken with reference to the principles of the Roads and Maritime Services [formerly the NSW Roads and Traffic Authority] (RMS) (2002) Guide to Traffic Generating Developments, Sydney, NSW. The following information was reviewed as part of the traffic and transport impact assessment for the proposal:

- road network
- existing traffic
- crash data
- construction vehicles data including haulage volumes
- haulage routes
- traffic volume data (where available).

The assessment of construction traffic impacts has involved a review of the types of construction activities proposed, staging of work, construction traffic generation and working hours. Mitigation and management measures have been described to minimise impacts where possible.

Proposed construction traffic management

Maintaining traffic flow of the existing road network including Eurobodalla Road during construction is a key consideration for construction traffic planning for the proposal. Construction vehicles would generally use Eurobodalla Road to haul materials for short distances. Haulage would also be required on local roads that form part of the proposed upgrade but only for relatively short distances. The average number of construction vehicle movements (one way) is expected to peak at about 175 per day (over a six day working week) though at times, depending on the nature of construction activities, this could be higher.

Materials for construction of the proposal would be sourced from within the quarry areas and would also be imported to the storage area. Imported construction materials would likely be sourced from either Eurobodalla Quarry or Springwater Quarry. The haulage routes from these quarries are summarised below:

- Eurobodalla Quarry at Elizabeth Farm via Nerrigundah Mountain Road then to Eurobodalla Road (five kilometre haulage route)
- Springwater Quarry at Mogo via Princes Highway and Eurobodalla Road (42 kilometre haulage route).

Haulage to the proposal during construction would be along the proposed storage access road. Where possible, construction would be programmed to minimise impact on traffic using the local and regional road network. Standard traffic management measures would be used to minimise short-term traffic impacts during construction and ensure that traffic flow along Eurobodalla Road is maintained throughout construction.

Access would be maintained to all private properties during construction. In the event that construction activities would affect a permanent access, alternative access would be provided in consultation with the affected property owner or resident. As far as practicable, this would be of a standard equivalent to the permanent access. At the end of construction, the permanent access would be reinstated should this be the preference of the property owner, subject to the final layout of completed works.

Construction truck movements

Quarry rock removal and construction material deliveries would generate about 175 heavy vehicle movements per day during peak periods of construction. An estimate of truck movements for the proposal is provided in Table 1 and would be further refined during detailed design.

Table 1: Construction vehicle movements

Activity	Daily one-way	Daily two-way	Peak hour (two-way)	Peak hour Comment
Light vehicles	50-75	100-150	50-75	Light vehicle peaks are expected for commencement of day (7am) and end of day (5pm), for construction staff
Heavy vehicles	175	350	40	300 of the total peak daily two-way haulage is attributable to fill haulage, of which up to 200 movements per day may be attributable to short hauls from the Eurobodalla Quarry
Total	225 – 250	450 – 500	90 – 115	

Traffic management plan

Construction activities would be guided by a construction environmental management plan (CEMP) to ensure work is carried out in accordance with the Secretary's conditions of approval, and to Council's specifications. A component of the CEMP would be a construction traffic management plan. Further details on construction traffic are detailed Chapter 12.

Traffic management measures to be implemented during construction would be determined during the detailed design. Local residents, schools and business owners would be notified of traffic management procedures, and ongoing consultation would be carried out to provide landowners with information on planned construction activities and changes to any access arrangements.

Existing environment

Road network

The proposal would be accessed from the Princes Highway via Eurobodalla Road. It is anticipated that delivery of all major plant and equipment would be from the Princes Highway and then along

Eurobodalla Road to the construction site. This route is also expected to be used by the construction workforce. Haulage of imported fill materials would occur along the Princes Highway, Nerrigundah Mountain Road and Eurobodalla Road. Waincourt Road would be used occasionally during construction of the proposal for delivery of oversized plant.

The existing conditions of each key road in the study area is summarised below:

- Princes Highway serves as the major arterial (State) road connecting Bodalla with Sydney and south to Victoria. Between the towns of Moga and Bodalla, the Princes Highway generally has one lane in each direction with overtaking permitted through some sections. The posted speed limit along the Princes Highway varies between 80 to 100 kilometres per hour through rural areas, and down to 50 kilometres per hour within townships
- Eurobodalla Road is a local road which operates as a two-lane sealed carriageway connecting to the Princes Highway at Bodalla. The posted speed limit along Eurobodalla Road is generally 80 kilometres per hour. Through the township of Bodalla, the posted speed of Eurobodalla Road is 50 kilometres per hour. The road is typically seven metres wide (3.5 metre travel lanes), with no sealed shoulders, typical of rural roads
- Nerrigundah Mountain Road is a two-lane, sealed local public road which links Eurobodalla Quarry with Eurobodalla Road. The road narrows to one lane across the bridges for the Tuross River and various creek crossings. The speed limit along Nerrigundah Mountain Road is 80 kilometres per hour
- Waincourt Road is a local public road which connects Eurobodalla Road with Bullockys Hut Road and operates as a two-lane sealed carriageway, typically six metres in width.
- Bullockys Hut Road is a State Forest road linking Eurobodalla Road to the proposed storage facility. The road currently operates as a one to two lane unsealed road and links through a private property to Eurobodalla Road. Bullockys Hut Road is currently accessed by Waincourt Road.

The existing conditions of each key road intersection in the study area is summarised below:

- Princes Highway forms a T-intersection with Eurobodalla Road, with widened shoulders provided for turning vehicles.
- Eurobodalla Road forms a T-intersection with Nerrigundah Mountain Road, with turning vehicles along Eurobodalla Road required to store in the travel lane before turning into Nerrigundah Mountain Road.

Existing traffic

Traffic along the existing road network within the study area comprises of:

- local residential traffic
- local farm traffic, including trucks servicing local dairy farms
- trucks transporting materials from the nearby Rewlee soil extraction operation, the Cadgee Quarry and other extractive operations in the area
- trucks transporting forestry timber
- a school bus route operates on both Eurobodalla Road and Nerrigundah Mountain Road
- light and heavy vehicle traffic associated with the Eurobodalla Quarry operations.

Traffic counts were previously undertaken in 2006 (Masson Wilson Twiney, 2006). These included counts east and west of the Tyrone Bridge (Nerrigundah Mountain Road) intersection. Traffic counts were also sourced for the Princes Highway south of Bodalla (sourced from NSW Roads and Maritime permanent count station).

To provide the most recent analysis of traffic in the study area, additional traffic count information has been sourced, and where traffic counts have been unavailable, informed assumptions have been made, to bring traffic counts to a 2017 basis, as shown in Table 2.

Table 2: Traffic counts in the study area

Count Road	Location	Count type	2006	2017
Princes Highway	South of Bodalla	Average annual daily traffic	3,672	5,191 (10.8% heavy vehicles)
Eurobodalla Road	East of Nerrigundah Road	Manual daily count	328 (17% HV)	464 [1] (17%) [2]
Eurobodalla Road	West of Nerrigundah Road	Automatic daily count	142	214 [3] (17%) [5]
Nerrigundah Road	North of Eurobodalla Road	Average annual daily traffic	-	250 [4] (17%) [5]

Notes:

[1] – Traffic volumes have been escalated based on the adopted growth rate from the Princes Highway (which has grown at a rate of four per cent annual south of Bodalla)
[2] – Heavy vehicle percentage has been assumed to remain the same as that identified from 2006 counts.
[3] – Counts west of the Nerrigundah Mountain Road have been assumed as the difference from the assumed counts east of Nerrigundah Road, and those collected at the Tyrone Bridge (assume all traffic on the bridge head east towards Bodalla)
[4] – counts at Nerrigundah Road have been provided by NSW Public Works from the adjacent Tyrone Bridge replacement (on Nerrigundah Road)
[5] – assume the same proportion of heavy vehicles as per Eurobodalla Road (east of Nerrigundah Mountain Road)

The majority of heavy vehicles on Eurobodalla Road and Nerrigundah Mountain Road relate to the operation of the existing Eurobodalla Quarry. The Eurobodalla Quarry recently received project approval for the expansion of existing quarrying operations, which sought to increase the maximum annual extraction from 100,000 tonnes to 175,000 tonnes. The future (approved) average heavy vehicle movement associated with the quarry haulage increased from 23 movements per day (two-way), to peak demand of 94 movements per day (two-way).

Crash history

The five-year crash history (April 2012 to March 2017) for roads associated with access and haulage routes in the study area were sourced from NSW Roads and Maritime. Crash statistics included:

- Princes Highway (in vicinity of the Eurobodalla Road intersection): There were two crashes reported in the vicinity of Eurobodalla Road intersection, including a vehicle entering the highway from a driveway (non-casualty), and a loss of control (serious injury) crash
- Eurobodalla Road: There were two crashes (both casualty) involving a vehicle leaving the road, being one loss of control and one hit object
- Waincourt Road: no reported crashes along the length of the road
- Nerrigundah Mountain Road: no reported crashes along the length of the road
- Bullockys Hut Road: no reported crashes along the length of the road.

There were two left-road crashes reported on Eurobodalla Road. The locations of the reported run-off road crashes are included within the scope of works for a proposed upgrade of Eurobodalla Road, funded under the Federal Government's Blackspot program, where the road will be upgraded by 2018 to provide sealed shoulders, and protection (or removal) of roadside hazards.

Potential impacts

Construction

Construction vehicles would generally access the proposal from the Princes Highway and then to Eurobodalla Road, and Nerrigundah Mountain Road from Eurobodalla Quarry, resulting in a temporary increase in construction movements along these routes during the construction phase. Construction traffic would include light and heavy vehicles (including for fill material haulage), concrete trucks and over-dimension vehicles. Construction traffic would be greatest during the main

earthworks and civil construction, and would comprise vehicles transporting equipment, materials and construction workers to the site.

Most of the imported material required for the construction of the storage would potentially be sourced from nearby quarries, with 177,000 cubic metres to be sourced from the Eurobodalla Quarry (located about five kilometres from the proposal site), and 24,500 cubic metres sourced from the Springwater Quarry (located about 42 kilometres north from the proposal).

The haulage of materials is anticipated to be over a 12-month duration. Eurobodalla Quarry is located close to the proposal site, requiring a reduced heavy vehicle fleet to undertake the bulk of the fill material haul. The peak haulage (delivery) rate is expected to be 10 vehicles per hour from Eurobodalla Quarry, and five vehicles per hour from Springwater Quarry.

Eurobodalla Quarry

The haulage route from Eurobodalla Quarry towards the proposal would be along Nerrigundah Mountain Road and Eurobodalla Road. These roads are considered adequate to provide for the additional haulage traffic in terms of traffic efficiency and safety.

The intersection of Eurobodalla Road and Nerrigundah Mountain Road is controlled by a give-way arrangement, with priority provided to Eurobodalla Road traffic.

Springwater Quarry

The haulage route from Springwater Quarry at Mogo would be along Princes Highway and then along Eurobodalla Road. These roads are considered adequate to provide for the additional haulage traffic in terms of traffic efficiency and safety.

The intersection of Eurobodalla Road and Princes Highway is a T intersection with priority to traffic on Princes Highway and give way on Eurobodalla Road, which is considered an appropriate means of control for the additional haulage traffic volumes.

Other construction traffic

During peak construction phases the site is expected to receive two to three oversized vehicle loads per day. This would be for delivery of plant. Delivery of other materials to site, such as pipes, concrete (via agitator trucks) and fencing materials are expected to be up to 20 one-way vehicle movements per day during peak periods.

A workforce program was prepared for each of the proposal's main activities. Two-way light vehicle traffic volumes would be 1.2 employees per arriving vehicle to site. Up to 200 daily heavy vehicle traffic movements would be attributable to the haulage of materials from the Eurobodalla Quarry to the proposal site, a haul distance of about five kilometres, along Nerrigundah Mountain Road and west along Eurobodalla Road. These peak haulages would only be expected to occur over an 18 month duration.

An estimate of the additional traffic associated with the proposal on roads in the study area is shown in Table 3, with a figure of current and project light and heavy vehicle movements shown in Figure 1.

Table 3 Total two-way traffic volumes, proposal traffic peaks and total traffic peaks

Road	AM/PM	Current (2017)		Peak proposal traffic		Total future peak traffic (% increase on current)	
		Total	HVs	Total	HVs	Total	HVs
Princes Highway (north of Bodalla Road)	Daily	5,191	560	240	140	5,431 (5%)	700 (25%)
	Peak	357	39	65	15	422 (18%)	54 (38%)
Princes Highway (south of Bodalla Road)	Daily	5,191	560	60	10	5,251 (1%)	570 (2%)
	Peak	357	39	30	5	387 (8%)	44 (13%)
Eurobodalla Road (east of Bullockys Road)	Daily	464	78	300	150	764 (65%)	228 (192%)
	Peak	65	11	95	20	160 (146%)	31 (182%)
Eurobodalla Road (west of Nerrigundah Mountain Road)	Daily	280	53	200	200	480 (71%)	253 (376%)
	Peak	30	5	20	20	50 (67%)	25 (400%)
Nerrigundah Mountain Road	Daily	257	80	200	200	457 (78%)	280 (251%)
	Peak	20	5	20	20	40 (100%)	25 (400%)

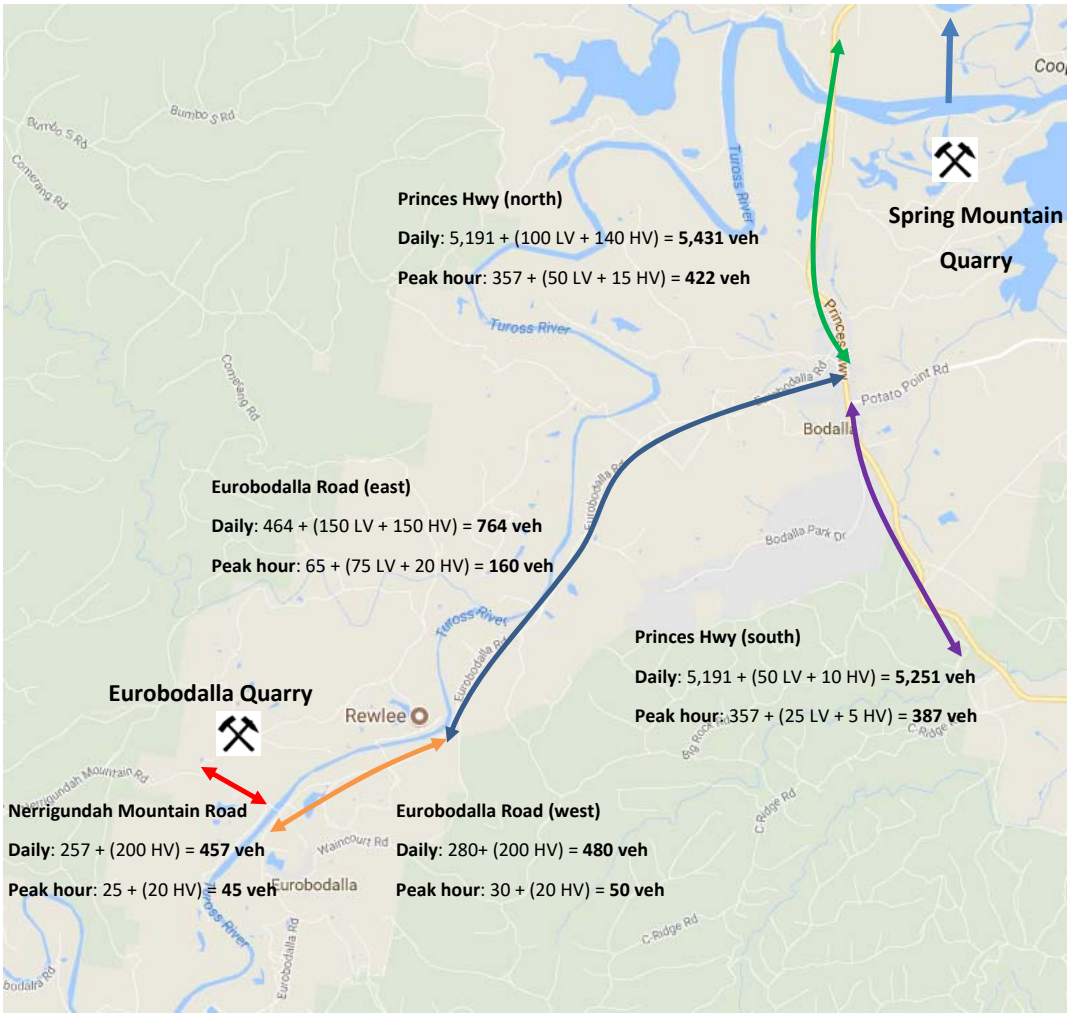

Figure 1: Current and future estimated daily and peak hour traffic (additional construction traffic (in brackets))

Traffic volumes increases (both total and heavy vehicles) vary across the local and state road network, with large increases (overall and as a percentage) anticipated on Eurobodalla Road and Nerrigundah Mountain Road. These traffic volume increases (particularly heavy vehicles) are associated with the peak haulage of fill materials from Eurobodalla Quarry and Springwater Quarry. Despite the large increases in current traffic levels, the total peak projected traffic volumes, particularly on local roads remain relatively low, with no expected impacts on existing travel times or safety of the existing network. The standard of local roads would continue to be of a suitable standard for the increase in traffic associated with the proposal, and is typical of local road standards in Eurobodalla Shire.

Where construction traffic turns to access the site, or at the intersection of Nerrigundah Mountain Road and Eurobodalla Road, there would be minor traffic flow impacts relating to turning construction vehicles, which may cause minor delays to existing road users.

The impact on the Princes Highway is less pronounced (due to the higher current traffic volumes including heavy vehicles). However, deliveries to site (including plant and materials) and the employment workforce are expected to travel along the Princes Highway to the site.

The increased number of vehicles (principally heavy vehicles) associated with construction of the proposal could have adverse impacts on road pavements on access routes. The magnitude and nature of these impacts would be influenced by the existing condition and standard of the road (including pavement design).

Construction compounds would be accessed by heavy vehicles, including oversized vehicles transporting plant and other large items. These movements would be conducted in a controlled manner with all necessary safety and traffic management measures in place. Planning for these movements would include consultation with Roads and Maritime and Council (as the respective road authorities) and preparation of a Construction Traffic Management Plan.

Local roads and access

Maintaining traffic flow during construction is a key consideration for construction traffic planning for the proposal. Through traffic on the Princes Highway, Eurobodalla Road and all other local roads in the vicinity of the proposal would continue to operate.

No changes to access arrangements on local roads, or most private properties would be required. Minor changes to a private property access near the construction site may be required, particularly along Bullockys Hut Road, however it is anticipated that this property would be partially purchased by Council. Construction vehicles would be parked within the construction footprint in designated areas that would be determined by the contractor.

Operation

Once operational, the proposal would be managed from the Council Depot in Moruya. Council staff would travel to the proposal area periodically to undertake routine maintenance. There are no proposed changes to the road network as a result of the operational phase of the proposal.

As previously discussed the proposal would not be used for recreational purposes and there would be no public access to the proposal area. Therefore any additional traffic movement generation from visitors would be negligible. Operational vehicles would be parked in designated areas within the operational boundary of the proposed water storage facility.

Safeguards and mitigation measures

The safeguards and management measures for traffic and transport are detailed below.

Table 4: Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Construction traffic impacts	A Construction Traffic Management Plan (TMP) would be prepared prior to construction and would be included in the CEMP. The TMP would: • identify the traffic management requirements during construction • describe the general approach and procedures to be adopted when producing specific traffic control plan • identify designated parking areas for construction workforce. • determine temporary speed restrictions to ensure safe driving environment around work zones, including on unsealed roads, and at major intersections (e.g. Nerrigundah Mountain Road and Eurobodalla Road) • identify any high-risk periods (such as during school bus operations), and whether delivery to site, and material haulage can be undertaken outside of these hours • identify opportunities to stagger heavy vehicle arrivals to site (e.g. use of minimum headways between arriving haul trucks), to avoid the potential for heavy vehicle convoys arriving on site • identify and provide temporary works, such as for site access, turn-around bays, parking areas for heavy vehicle dwelling, and minor site distance clearing around local road intersection sites (e.g. at the access points to the construction site) • provide temporary warning and advisory signposting, such as during periods of material haulage, and at major intersections (e.g. Nerrigundah Mountain Road and Eurobodalla Road), where there will be increased traffic activity • where practical, program deliveries of construction plant and materials (such as over-mass and over-dimension vehicles) outside peak traffic periods • identify steps to minimise construction traffic, such as car-pooling by construction staff to site • regularly review and modify the TMP (such as at changes of construction stages), to ensure the TMP remains valid and appropriate • document communication protocols amongst heavy vehicle operators, such as when approaching higher risk areas. This could be through the establishment of a call point system, whereby call point signage is erected on the approach to higher risk areas, such as the intersection of Nerrigundah Mountain Road and Eurobodalla Road, or the single lane Tuross River (Tyrone) bridge, and access points to the construction site	Construction contractor	Detailed design Pre-construction During construction

Impact	Environmental safeguards	Responsibility	Timing
	• maintain access to private properties (and liaise with property owners), particularly that off Bullockys Hut Road, which may be used as a site access • identify a contact person (and phone number) for liaison and complaints, by project stakeholders and the community. Consultation with various stakeholders will also be undertaken in the development and periodic review of the Construction TMP, including: • ensuring all relevant requirements from emergency service providers are included, including from NSW Rural Fire Service, NSW Ambulance Service and NSW Police • consultation with the respective road authorities including Roads and Maritime Services and Eurobodalla Shire Council • consultation with other relevant parties including school bus operators • periodic notification of construction activities and changes in traffic control arrangements would be publicly notified, including through local newspapers, community noticeboards, and through a letter box drop off for residents in proximity to the construction site as appropriate. Detailed traffic control plans would be developed for each construction phase. These would include: • provision for emergency services passage through construction zones. Only accredited traffic controllers would be permitted to prepare and implement traffic control plans.		
Impacts to local roads during construction	Council will undertake a photographic inspection of local roads, and undertake a pre-dilapidation survey of local road pavements before construction commences, in order to document the state and condition of local roads. Periodic surveys will be undertaken during construction activities to identify any road damage, with road damage to local roads being repaired by Council as soon as practical. The construction contractor will also monitor the incidence of mud tracking off the construction site and onto local roads, and will sweep or clean local roads to minimise mud tracking. The contractor will preferably install controls to minimise the incidence of mud-tracking in the first instance, such as by use of grids at site access points. Construction personnel will also be encouraged to report road hazards and road damage	Council	Pre-construction, during construction
Impacts to local roads during operation	Council will develop a traffic plan to show the new storage access road for maintenance purposes which will be provided to the rural fire service.	Council	Operation