

# REVIEW OF ENVIRONMENTAL FACTORS (REF) PROPOSED CULVERT REPLACEMENT AND ASSOCIATED WORKS WORROWING WATERWAY THE WOOL ROAD OLD EROWAL BAY AND WORROWING HEIGHTS



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#### Document control

Item	Details
Project	Proposed Culvert Replacement – Worrowing Waterway - The Wool Road, Old Erowal Bay and Worrowing Heights
Client/Proponent	Technical Services Department - City Services - Shoalhaven City Council
Prepared By	Technical Services Department - City Services - Shoalhaven City Council

#### **Document status**

Version	Author / Reviewer*	Name	Signed	Date
V1.0	Author	Geoff Young	ally	25/11/2024
	Review	Jeff Bryant	J.O.J.	26/11/2024

#### \*Review and endorsement statement:

"I certify that I have reviewed and endorsed the contents of this REF document and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under clause 170 of the EP&A Regulation, and the information it contains is neither false nor misleading".

#### Assessment and approvals overview

Item	Details
Assessment type	Division 5.1 (EP&A Act) - Review of Environmental Factors (REF)
Proponent	Shoalhaven City Council – City Services
Determining authority / authorities	Shoalhaven City Council – City Services
Required approvals (consents, licences and permits)	Nil
Required publication	Yes – The determining authority considers that the publishing of this REF is in the public interest (Section 171(4)(c) of the NSW <i>Environmental Planning</i> <i>and Assessment Regulation 2021).</i>



### 1. BACKGROUND AND PURPOSE

#### 1.10verview

The activity is the replacement of the Worrowing Waterway culvert crossing under The Wool Road at Worrowing Heights and Old Erowal Bay (Figure 1 and Figure 2 below).

The proposed activity would comprise the following works (refer to Figure 3 below and Appendix A for detailed plans):

#### Stage 1 – Initial Work

To establish traffic diversion (1 lane) track during the construction period:

- Temporary downstream extension of the existing culverts utilising 4 x 900mm diameter pipes. These pipes would be extended to the box culverts under the pedestrian walkway (approximately 10 metres).
- Fill over these pipes between existing wingwalls with Densely Graded Base Course 20 mm (DGB20) to match existing road levels.
- Protection of the watermain to Shoalhaven Water requirements.
- Establishment of sediment controls.
- Removal of existing 'W' Beam guardrail on the eastern / downstream side of the road and provision of water barriers to guide traffic to the diversion access track.

#### Stage 2 - Partial Demolition - western side of road

- Vegetation removal to allow access. This may include the removal of up to four small trees.
- Demolish 7.2 metres of the existing culverts from the western / upstream side of the road. This would include the associated road pavement and seal.
- Removal of existing 'W' Beam guardrail on the western / upstream side of the road and provision of water barriers to guide traffic to the diversion access track.
- Protection of the watermain to Shoalhaven Water requirements.

#### Stage 3 - Partial Construction - western side of road

- Install first three box culvert cells (3300mm wide x 2100mm high) on new concrete slab with concrete wingwalls.
- Trim back existing 750mm RCP and tie in with new wingwall.
- Provision of new pavement over the new culverts.
- Provision of temporary concrete headwall fixed to top of culvert.
- Box out and extend shoulders as shown in plans.
- Provision of new 'W' Beam Barriers with SKT terminals.
- Provision of water barriers to guide traffic to the diversion access track.



#### Stage 4 – Remaining Demolition – eastern side of road

- Divert traffic onto the completed western side of the road utilising traffic control and water barriers.
- Demolish the remaining existing culverts.
- Demolish temporary side access track and removal of the associated DGB20 and temporary pipes.

#### Stage 5 – Remaining culvert construction – eastern side of road

- Extension of Stage 3 construction works with two new 3-cell 3300mm wide x 2100mm high box culverts on new base concrete slab.
- Removal of temporary concrete headwall.
- Provision of new downstream cast in-situ headwall.
- Construction of new sandstone wingwalls on reinforced concrete footings.
- Provision of new pavement and reinstatement of line-marking.
- Installation of new W-Beam barriers.

Works would also involve the implementation of safeguards and mitigation measures prescribed in Section 7 of this Review of Environmental Factors (REF).

Shoalhaven City Council (SCC) is the proponent and the determining authority under Part 5 of the EP&A Act. The environmental assessment of the proposed activity and associated environmental impacts has been undertaken in the context of Clause 171 of the *Environmental Planning and Assessment Regulation 2021*. In doing so, this REF helps to fulfil the requirements of Section 5.5 of the Act that SCC examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

#### 1.2 Purpose of the Activity

The Wool Road between Macgibbon Parade and Birriga Avenue, Old Erowal Bay / Worrowing Heights was severely damaged following an extreme weather event declared a natural disaster on 6 June 2024. The road sustained significant damage after a culvert within the Worrowing Waterway failed causing a sinkhole to form (refer to Photos 1 and 2 in Section 2.4 of this REF). The road was closed for almost a month; reopening on 1 July 2004 following temporary remedial works including:

- removal of the existing, failed steel arch culvert and installation of temporary pipes,
- backfilling of temporary pipes to provide support to the existing concrete beams, and
- reinstatement of road pavement to open the road to traffic.

Being a major collector road with little capacity for detours, the closure of the road at Worrowing Waterway created enormous disruption amongst the local Jervis Bay and St Georges Basin villages community. This level of disruption has led to the decision to avoid wherever possible



closing the road again during the construction of the replacement culvert. Instead, a temporary single-lane bypass is proposed on the eastern, downstream side of the culvert as shown in the plans (Figure 3 and Appendix A).

#### 1.3 Location

The proposed activity would be undertaken predominantly within The Wool Road road reserve. Minor components of the proposed activity would also extend into adjoining lands shown in Figure 2 and described in Table 1 below.

Land details	Components of activity	Pertinent land information
The Wool Road	As described in Section 1.1 above	<ul> <li>SCC is the roads authority under the NSW <i>Roads Act 1993.</i></li> <li>The road is listed within the heritage schedules of the <i>Shoalhaven Local Environmental</i> <i>Plan 2014.</i></li> </ul>
Lot 28 Sec A DP12958 The Wool Road, Old Erowal Bay	Provision of temporary access track and associated works.	<ul> <li>Owned by SCC in freehold title.</li> <li>Categorised as Community Land – Natural Area – Bushland under the NSW Local Government Act 1993.</li> </ul>
Lot 7301 DP1163797 The Bindaree, Worrowing Heights	Provision of temporary access track and associated works.	<ul> <li>Crown Reserve R580085.</li> <li>SCC has responsibility and control of the reserve through Section 48 of the NSW <i>Local Government Act 1993.</i></li> <li>Subject of an undetermined Aboriginal Land Rights Claim.</li> </ul>

#### Table 1: Lands affected by the proposed activity



Figure 1 Location of the proposed activity





#### Figure 2 Location of the proposed activity



Review of Environmental Factors Worrowing Waterway Culvert replacement The Wool Road, Old Erowal Bay / Worrowing Heights D24/505655

























## 2. Site Description

The proposed activity would predominantly be within the existing culvert footprint. Works may encroach into forest vegetation to the west / upstream of the culvert to allow access for construction plant, equipment and personnel.

Photos of the site are provided in Section 2.4 below.

#### 2.1 Terrestrial Habitat and Features

NSW Plant Community Type (PCT) vegetation mapped as occurring in proximity to the site of the proposed activity includes (Figure 4 below):

- PCT 4019 Coastal Alluvial Bangalay Forest
- PCT 3654 Shoalhaven Lowland Bloodwood Shrub Forest
- PCT 4049 South Coast Floodplain Grassy Swamp Forest

PCT 4019 *Coastal Alluvial Bangalay Forest* is associated with the threatened ecological community (TEC) *Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner* (hereafter referred to as Swamp Sclerophyll Forest TEC).

Only the western most part of the proposed activity would encroach into native vegetation. This vegetation comprises Spotted Gum *Corymbia maculata*, Bangalay *Eucalyptus botryoides*, and the occasional Turpentine *Syncarpia glomulifera* forming the canopy. Midstorey and groundcover species include Spiky-headed Mat-rush *Lomandra longifolia*, Blue Flax Lily *Dianella caerulea*, Tall Saw-sedge *Gahnia clarkei*, Black Wattle *Acacia mearnsii*, Myrtle Wattle *A. myrtifolia*, Blueberry Ash *Elaeocarpus reticulatus*, Common Silkpod *Parsonia straminea*, Snake Vine *Stephania japonica var.discolor*, , Blady Grass *Imperata cylindrica*, Sweet Pittosporum *Pittosporum undulatum*, Swamp Paperbark *Melaleuca ericifolia*, Black Sheoak *Allocasuarina littoralis*, Swamp Sheoak *Casuarina glauca*, Bracken *Pteridium esculatum*, Wonga Wonga Vine *Pandorea pandorana*, Lilly Pilly *Syzygium smithii*, Crimson Bottlebrush *Callistemon salignus*, Native Sarsaparilla *Smilax glyciphylla*, Blueberry Ash *Elaeocarpus reticulatus*, and Black Wattle *Callicoma serratifolia*. Many of these species are characteristic of the Swamp Sclerophyll Forest TEC.

The area also contains non-native and weedy species such as Arum Lily *Zantedeschia aethiopica*, Fireweed *Senecio madagascariensis*, Quaking Grass *Briza maxima*, Sowthistle *Sonchus oleraceus*, and Cobbler's Pegs *Bidens pilosa*.

Habitat assessments for threatened fauna species and cryptic threatened flora, and targeted surveys for non-cryptic threatened species were conducted on 01 November 2024. The assessment / survey indicated that, in the area of the proposed activity:

- Biconvex Paperbark, *Meleleuca biconvexa*, Magenta Lilly Pilly *Syzygium paniculatum*, and Scrub Turpentine *Rhodamnia rubescens* is not present,
- there are no hollow-bearing trees,



- there are no trees displaying glider incision scars, and
- there is no evidence of feeding by Glossy Black Cockatoos (*i.e.* chewed Allocasuarina cones).

Due to the level of disturbance and modification of groundcover through the footprint of the site, no suitable habitat for threatened terrestrial orchids (including *Rhizanthella slateri, Prasophyllum affine, Cryptostylis hunteriana, Genoplesium baueri, Calochilus pulchellus* and *Pterostylis vernalis*) was considered to occur. Targeted survey for locally occurring threatened orchids was therefore not warranted.

#### Figure 4 Plant Community Type



#### 2.2 Worrowing Waterway

At the time of environmental assessment, the waterway was not flowing and stagnant ponds were extant upstream and downstream of the culvert. The base of the existing culvert was predominantly dry with no waterflow.

At the site of the proposed activity, the waterway has been assessed as a 2<sup>nd</sup> order stream under the Strahler ordering system. Under the NSW Department of Primary Industries – Fisheries' policy document for fish habitat conservation and management (DoPI 2013), the waterway at the site of the proposed activity would be considered "*Class 3 Minimal Key Fish Habitat*".



The waterway downstream of the proposed activity is mapped as "key fish habitat" for the purposes of the NSW *Fisheries Management Act 1994* (Figure 5 below). The proposed activity would not be undertaken within this area. NSW Department of Primary Industries – Fisheries also considers this not to be Key Fish Habitat (refer to Section 5.2 of this REF).

The site of the proposed activity is flood liable (Figure 6 p.17). Refer to Section 3.6 for assessment of potential impact.







#### Figure 6 Flooding extent



#### 2.3 Geology and Geomorphology

The site of the proposed activity is comprised of alluvial valley deposits of silt, clay, fluvially deposited lithic to quartz-lithic sand, and gravels over Wandrawandian Formation (most likely siltstone). Acid Sulfate Soils and Potential Acid Sulfate Soils are unlikely.



#### 2.4 Photos



Photo 1: The sinkhole just after forming





Photo 2: The area between the pedestrian walkway and the road to be filled for the purposes of temporary access track





Photo 3: Site of the proposed activity looking from north to south





Photo 4: Western side of the culvert crossing where works may encroach into native forest vegetation.





Photo 5: Western side of the culvert crossing where works may encroach into native forest vegetation.





Photo 6: Worrowing Waterway upstream of the proposed activity





Photo 7: Worrowing Waterway downstream of the proposed activity



### 3. ASSESSMENT OF LIKELY IMPACTS ON THE ENVIRONMENT

#### 3.1 Impacts associated with the proposed activity

The proposal would involve the following disturbances and direct impacts:

- Impact (including removal) to approximately 160m<sup>2</sup> of predominantly native vegetation including up to four small trees within a riparian area and within a threatened ecological community.
- Installation of structures within a flood liable waterway.
- Impact to the flow of traffic and delays.

Other impacts on the environment, including indirect impacts have been considered, including:

- indigenous heritage
- threatened species

Each is discussed below.

#### 3.2Vegetation Removal

The proposed activity would involve the removal of approximately 160m<sup>2</sup> of native vegetation (Figure 7 below). A description of the vegetation is provided in Section 2.1 of this REF.

The removal of the vegetation is not considered a significant impact for the following reasons:

- The species to be impacted are common and are not on the threatened species schedules of the NSW *Biodiversity Conservation Act 2016* or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*
- The trees do not contain hollows which could provide breeding or roosting habitat.
- The trees do not provide significant fauna habitat or food or breeding resources, particularly for threatened fauna.
- The vegetation is unlikely to have a significant impact on Threatened Ecological Communities. Refer to Section 3.3.2 of this REF for details.

Environmental impact mitigation measures and safeguards listed in Section 7 of this REF do, however, apply to limit clearing and off-site impacts.



#### Figure 7 Extent of probable vegetation impact



#### 3.3 Threatened species impact assessment (NSW)

Section 1.7 of the EP&A Act 1979 applies the provisions of Part 7 of the NSW *Biodiversity Conservation Act 2016* and Part 7A of the *NSW Fisheries Management Act 1994* that relate to the operation of the Act in connection with the terrestrial and aquatic environment. Each are addressed below.

#### 3.3.1 Part 7A Fisheries Management Act 1994

Part 7A relates to threatened species conservation.

There are no threatened species listed under the Act which are mapped as occurring in proximity to the site, or likely to occur in proximity to the site.

The proposal would have minimal impact on any aquatic habitat and is unlikely to result in indirect impacts which would affect threatened aquatic species or their habitats.

The proposal does not constitute, is not part of, and would not increase the impact of a relevant key threatening process, including the degradation of native riparian vegetation along NSW water courses.

Further consideration of the threatened species assessment criteria is not warranted.



#### 3.3.2 Part 7 Biodiversity Conservation Act 2016

Section 7.3 of the Act provides a 'five-part' test to determine whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. Each Part is addressed below.

# Part A - In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be place at risk of extinction.

An assessment of the potential for NSW threatened flora and fauna species occurring on-site or otherwise being impacted by the proposal was undertaken (refer Appendix B: NSW Threatened Species Likelihood of Occurrence Table). It was determined that the site is unlikely to support a population of, or habitat, for threatened species. No further consideration is necessary.

# Part B - In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

- (i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

The proposed activity is likely to encroach into a vegetation community that is likely to comprise the endangered ecological community *Swamp Sclerophyll Forest on coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* (hereafter referred to as 'Swamp Sclerophyll Forest'). Refer to Section 2.1 of this REF for details.

Swamp Sclerophyll Forest is the name given to the ecological community associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. The structure of the community is typically open forest containing species listed in the NSW Scientific Committee's (as amended in 2011) determination.

Swamp Sclerophyll Forests have been extensively cleared and modified. Large areas that formerly supported this community are occupied by exotic pastures grazed by cattle and cropping enterprises. Other threats include continual fragmentation and degradation, flood mitigation and drainage works, landfilling and earthworks associated with urban and industrial development, pollution from urban and agricultural runoff, weed invasion, overgrazing, trampling and other soil disturbance by domestic livestock and feral animals including pigs, activation of 'acid sulfate soils', removal of dead wood and rubbish dumping (NSW Scientific Committee 2011).

The proposed activity may impact up to 160m<sup>2</sup> of this community on the western side of the culvert crossing (Figure 7 above). This is necessary to allow access, reinstate the swale drain and construct apron slab and headwalls.

The local extent of the EEC extends west and east of the culvert crossing (Figure 8 below). The probable vegetation impact would occur along the existing disturbed road-side edge and be insignificant in area (less than 0.1%) in comparison to the local extent of the EEC (Figure 8 below).



The proposed would not result in sediment movement, changes to soil characteristics or hydrology, nor the introduction of invasive species or edge effects that might impact indirectly on the TEC.

The proposal would therefore not involve a significant removal of the TEC and would not exacerbate the fragmentation or isolation, nor adversely affect the extent or composition of the TEC such that a local occurrence of the TEC would be placed at risk of extinction.





Part C - In relation to the habitat of a threatened species or ecological community:

- (i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity
- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
- (iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.

No important habitat for threatened species would be removed or otherwise significantly impacted (see Part A).

No TEC would be fragmented or isolated, nor removed or modified to an extent that would affect the long-term survival of the TEC occurring in the locality (refer to Part B).



The proposal will therefore not affect the long-term survival of any threatened species or endangered ecological community in the locality.

# Part D – Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

No "areas of outstanding biodiversity values" have been declared in the City of Shoalhaven.

# Part E – Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Key threatening processes listed in the NSW *Biodiversity Conservation Act 2016* considered relevant to the proposed activity include:

• Clearing native vegetation

Clearing of native vegetation is listed as a key threatening process, defined by the Scientific Committee's determination (OEH 2021) as:

the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of a stand or stands.

Clearing of native vegetation has been shown to:

- cause widespread fragmentation of ecological communities;
- reduce the viability of ecological communities by disrupting ecological functions;
- result in the destruction of habitat and loss of biological diversity;
- lead to soil and bank erosion, increased salinity and loss of productive land.

The proposed activity may involve the clearing of approximately 160 m<sup>2</sup> (canopy extent) native vegetation including approximately.

All vegetation removal would occur along a linear, existing disturbed roadside edge and would not result in increased fragmentation.

The impact of the proposal with regard to clearing of native vegetation, is not considered to be significant as it is unlikely to lead to:

- destruction of habitat causing a loss of biological diversity and extinction of species or loss or local genotypes.
- fragmentation of populations resulting in limited gene flow between small, isolated populations, reduced potential to adapt to environmental change and loss or severe modification of the interactions between species.
- riparian zone degradation such as bank erosion leading to sedimentation that affects aquatic communities the riparian corridor would be stabilised as a result of the works.
- disturbance of habitat which may permit the establishment and spread of exotic species which may displace native species.
- loss of leaf litter, removing habitat for a wide variety of vertebrates and invertebrates.
- significant reduction of habitat for threatened species or ecological communities.



#### 3.4 Indigenous heritage

Under Section 86 of the NSW National Parks and Wildlife Act 1974 (NPW Act) it is an offence to disturb, damage, or destroy any Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP). The Act, however, provides that if a person who exercises 'due diligence' in determining that their actions will not harm Aboriginal objects has a defence against prosecution if they later unknowingly harm an object without an AHIP (Section 87(2) of the Act). To effect this, the NSW Department of Environment, Climate Change and Water have prepared the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (hereafter referred to as the 'Due Diligence Code') (DECCW 2010) to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for an AHIP.

A search on the Aboriginal Heritage Information Management System (AHIMS) on 30 October 2024 indicated that there are no recorded Aboriginal sites or places in the vicinity of the proposal (refer to AHIMS report below in Figure 9 below).

The site of the proposed activity is within a landscape feature listed in the Due Diligence Code that has a higher propensity for Aboriginal objects *i.e.* within 200 metres of waters. However, the area could also be described as 'disturbed land' as defined by the Due Diligence Code), i.e.:

Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable. Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as stormwater drainage and other similar infrastructure) and construction of earthworks."

The proposed activity is within disturbed land as the lands have been subjected to the continued disturbance of human activity and development being cleared and developed for residential development, road construction and maintenance, culvert installation, and the installation of underground utilities (stormwater, telecommunications, and water supply).

An AHIP is not required, and the activity can proceed without an AHIP.



#### Figure 9 Results of AHIMS Aboriginal heritage search



AHIMS Web Services (AWS) Search Result

Your Ref/PO Number : worrowing culvert Client Service ID : 945138

Date: 30 October 2024

Shoalhaven City Council - Nowra PO Box 42 Bridge Rd Nowra New South Wales 2541 Attention: Geoffrey Young

Email: geoff.young@shoalhaven.nsw.gov.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA. Zone : 56, Eastings : 285548.0 -285751.0. Northings : 6115265.0 - 6115428.0 with a Buffer of 0 meters, conducted by Geoffrey Young on 30 October 2024.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:



### 3.5 Non-indigenous heritage

The Wool Road is listed on the Environmental Heritage schedules of the *Shoalhaven Local Environmental Plan 2014* as "Colonial Road – Remnants (Former Wool Rd)". This listing includes the road reserve from the former South Huskisson Wharf and Holden Street Vincentia, to Beulee Gap (near Endrick River). It was an important route explored by Charles Throsby in 1821. The need for a route from Braidwood to the coast for wool was instrumental in its adoption and clearing by convicts in 1841 under Dr Wilson, founder of Braidwood, and Colonel Mackenzie, grazier of Nerriga. It was the first public road in the Shoalhaven district of which sections remain.



The heritage significance relates more to the preserved original route of the road, rather than tangible relics of the old road which are limited to old cuttings, pavement and World War II-era engravings on sandstone near Beulee Gap and sandstone blocks of the wharf off Holden Street, Vincentia. These, and other tangible relics of the colonial road, would not be impacted by the proposed activity and no further consideration is required.

#### 3.6Flooding

The site of the proposed activity is flood liable (Figure 6 p.17).

The proposed activity would replace the dual steel arch culverts (3 m diameter) in place prior to the storm damage with three cell 3.3 m (wide) x 2.1 m (high) set of culverts to match the culverts downstream above the pedestrian walkway.

The flood study conducted for the proposed activity (Rhelm 2024) assessed that this change in size would lower the predicted overtopping frequency from 0.3 m in the 2050 5% AEP to being flood free in the 5% AEP with minimal impacts on flood behaviour.

Rhelm (2024) also found that increasing the size of the culverts to 3.6 metres wide would not necessarily make the crossing flood free at 2050 1%AEP without significantly raising the road level greater than 0.3 metres. As this would require the raising the road approaches across the affected flood liable land, it was not considered achievable.

Consultation with SCC's Flood Engineers and NSW State Emergency Services has been undertaken in accordance with the *State Environmental Planning Policy (Transport and Infrastructure) 2021.* Details are provided in Section 5.1 of this REF.

#### 3.7 Traffic impact

Being a major collector road with little capacity for detours, the closure of the road at Worrowing Waterway created enormous disruption amongst the local Jervis Bay and St Georges Basin villages community. Closure of the road at the culvert would result in approximate 25 minute / 25 kilometre diversion through the small village of Tomerong *i.e.* if travelling from Old Erowal Bay to Vincentia schools and shops. This level of disruption has led to the decision to avoid wherever possible closing the road again during the construction of the replacement culvert. Instead, a temporary, single-lane access bypass would be provided on the eastern, downstream side of the culvert as shown in the plans (Figure 2 and Appendix A). Being only a single-lane, slow-speed detour, traffic delays and disruption will, however, be inevitable and this will need to be managed through a carefully considered traffic management plan and monitoring.

Community engagement would also need to provide regular updates on the progress of the works to assure commuters of the temporary nature of the traffic disruption.

#### 3.8EP&A Regulation – Section 171 matters of consideration

Section 171(2) of the *Environmental Planning and Assessment Regulation 2021* lists the factors to be taken into account when consideration is being given to the likely impact of an activity on the



environment under Part 5 of the EP&A Act. The following assessment in Table 2 below deals with each of the factors in relation to the proposed activity.

Does the proposal:	Assessment	Reason
a) Have any environmental impact on a community?	Positive – long term Short term – medium adverse	The proposed activity is likely to cause substantial traffic delays and congestion. The proposed activity would improve the resilience of the
		waterway crossing and improve flood immunity at this location.
		community services and infrastructure such as power, waste water, stormwater, waste management, educational, medical or social services.
b) Cause any transformation of a locality?	Negligible	The locality would remain as culvert waterway crossing of The Wool Road.
c) Have any environmental impact on the ecosystem of the	Low adverse	An assessment provided in Section 3 of this REF concludes that the proposed activity would not have a significant impact upon threatened species or endangered ecological communities.
locality?		No significant habitat features would be removed or otherwise impacted. No food resources critical to the survival of a particular species would be removed.
		Aquatic ecosystems are not likely to be significantly affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem.
		The proposed activity would be conducted within a highly modified environment.
		Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.
d) Cause a diminution of the	Low adverse / positive	In the context of the locality the visual impact of the activity would be minimal.
aesthetic, recreational, scientific or other environmental quality or value of a locality?		The site has minimal aesthetic, recreational, scientific or other environmental qualities or values. Negligible impact would occur in this regard.
e) Have any effect on a locality, place or building having	Negligible	The proposal would occur in a previously disturbed and modified area.

#### Table 2: Section 171(2) Factors



Does the proposal:	Assessment	Reason
aesthetic, anthropological, archaeological, architectural, cultural, historical,		The proposed activity would not affect a site listed on the State Heritage List or a site listed in the heritage schedules of the SLEP 2014 (refer to Section 3.5 of this REF). Underground 'relics' (as defined in the NSW Heritage Act) are also not anticipated.
scientific, or social significance or other special		The site is not within an Aboriginal Place declared under the National Parks and Wildlife Act 1974.
value for present or future generations?		In accordance with the NSW Department of Environment, Climate Change and Water's Due Diligence Code of Practice, the proposed activity does not require an Aboriginal Heritage Impact Permit as the activity is unlikely to harm an Aboriginal artefact (refer to Section 3.4).
f) Have any impact on the habitat of protected fauna	Low adverse	No protected fauna habitat will be removed by the activity. No important habitat will be removed or otherwise impacted. The potential impact is therefore considered to be insignificant or inconsequential.
(within the meaning of the		The proposed activity would not have a significant impact upon threatened fauna (refer to Section 3.3 of this REF).
Conservation Act 2016)?		The specified environmental mitigation measures (Section 7) would mitigate indirect impacts to fauna and habitat.
g) Cause any endangering of any species of	Negligible	There are no species likely to rely on the site of the proposed works to the extent that modification would put them further in danger.
animal, plant or other form of life, whether living on land, in water or in the air?		The prescribed environmental safeguards and mitigation measures (Section 7 of this REF) would minimise the risk of impact on resident fauna, fish, and flora.
h) Have any long- term effects on the	Negligible	Works would be relatively short term and the noise generated will occur during normal working hours.
environment?		The proposed activity would not use hazardous substances or use or generate chemicals which may build up residues in the environment.
		The possible impacts have been discussed in detail under Section 3. Refer also to the conclusions and recommendations in Section 7.
i) Cause any degradation of the quality of the environment?	Low-adverse	Aquatic ecosystems are not likely to be significantly affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem.
		The proposal would not intentionally introduce noxious weeds, vermin, or feral animals into the area or contaminate the soil.



Does the proposal:	Assessment	Reason
		Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.
j) Cause any risk to the safety of the	Negligible	The proposed activity would not involve hazardous wastes and would not lead to increased bushfire or landslip risks.
environment?		The activity is not anticipated to adversely affect flood behaviour or exacerbate flooding risks.
k) Cause any reduction in the range of beneficial uses of the environment?	Positive	The site and local environment will remain relatively unchanged. The proposal is consistent with the existing land use. The proposal is not anticipated to result in further degradation of the site or surrounding land.
I) Cause any pollution of the environment?	Low adverse	The proposal would involve a temporary and local increase in noise during the construction phase due to the use of machinery. However, this will not affect any sensitive receivers such as schools, childcare centres and hospitals.
		Sediment and erosion control in accordance with the Blue Book will be implemented to minimise movement of sediment into waterways.
		It is unlikely that the activity (including the environmental impact mitigation measures) would result in water or air pollution, spillages, dust, odours, vibration or radiation.
		The proposal does not involve the use, storage or transportation of hazardous substances or the generation of chemicals which may build up residues in the environment.
m) Have any environmental problems associated with	Negligible	The waste that would be disposed off-site can be recycled or re-used in accordance with resource recovery exemptions or taken to a licensed waste facility.
the disposal of waste?		liquid waste, or restricted solid waste as described in the NSW <i>Protection of the Environment Operations Act 1997</i> .
n) Cause any increased demands on resources (natural or otherwise) which are, or are likely to become, in short supply?	Negligible	The amount of resources that would be used are not considered significant and would not increase demands on current resources such that they would become in short supply.
<ul> <li>o) Have any</li> <li>cumulative</li> <li>environmental</li> <li>effect with other</li> </ul>	Negligible	The assessed low adverse or negligible impacts of the proposal are not likely to interact. Mitigation measures (Section 7) shall be implemented to minimise the risk of cumulative environmental effects.



Does the proposal:	Assessment	Reason
existing or likely future activities?		The current proposal would not significantly affect habitat connectivity or reduce any significant vegetation. No further construction activities are planned for this location.
<ul> <li>p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions</li> </ul>	Negligible	The proposed activity would have no effect on coastal processes including those projected under climate change conditions. The site of the proposed activity is not in a coastal hazard zone.
<ul> <li>q) applicable local strategic planning statements, regional strategic plans or district plans made under the Act, Division 3.1</li> </ul>	Positive	The proposed activity is consistent with the <i>Shoalhaven</i> 2040 Strategic Land-use Planning Statement, including Planning Priority 2 <i>Delivering infrastructure</i> <u>https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record</u> =D20/437277. The activity is not inconsistent with the Illawarra Shoalhaven Regional Plan 2041 <u>https://www.planning.nsw.gov.au/-/media/Files/DPE/Plans-and-policies/Plans-for-your-area/Regional-plans/Illawarra-Shoalhaven-Regional-Plan-05-21.pdf</u> and does not impact any areas mapped in the Planning Statement as "high environmental value" or "habitat corridor".
r) other relevant environmental factors	n/a	Environmental factors have been addressed in Section 3 of this REF.
# 4. PERMISSIBILITY AND APPROVALS

#### 4.1 NSW Environmental Planning & Assessment Act 1979

Section 4.1 (Development that does not need consent) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) states that:

*"If an environmental planning instrument provides that specified development may be carried out without the need for development consent, a person may carry the development out, in accordance with the instrument, on land to which the provision applies."* 

In this regard, Section 2.109(1) of the NSW State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) states that "Development for the purpose of a road or road infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land" (<u>https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0732#sec.2.109</u>). As the proposed activity would for the purposes of a road (The Wool Road) by a public authority, *i.e.* SCC, Section 2.109(1) of the T&I SEPP applies, and the proposed activity does not require development consent.

As the proposed activity does not require development consent, and as it constitutes an 'activity' for the purposes of Part 5 of the EP&A Act, being carried out by (or on behalf of) a public authority, environmental assessment under Part 5 of the EP&A Act is required. This REF provides this assessment.

#### 4.2 NSW Roads Act 1993

SCC is the roads authority for The Wool Road.

Under Section 71 of the Act, a roads authority may carry out road work on any public road for which it is the roads authority.

Under Section 88, a roads authority may, despite any other Act or law to the contrary, remove or lop any tree or other vegetation that is on or overhanging a public road if, in its opinion, it is necessary to do so for the purpose of carrying out road work or removing a traffic hazard.

Section 175 provides that for the purpose of carrying out roadwork on a road, the roads authority may use and occupy, for as long as may reasonably be necessary, any land along or near the line of the road.

### 4.3 NSW Local Government Act 1993

Part of the proposed activity (temporary bypass access track) would occur on "Community Land" categorised as "natural area - bushland" in the context of the *Local Government Act 1993* (LG Act).

Under Section 35 of LG Act, community land is required to be used and managed in accordance with the plan of management (PoM) applying to the land. The PoM applying to the land is the *Generic Community Land Plan of Management – Natural Areas* 



<u>https://doc.shoalhaven.nsw.gov.au/LinkGeneratorAPI/record/4408560/preview\_latest\_final\_versio</u> <u>n\_pdf</u>. The PoM does not address nor preclude the proposed activity in this highly developed part of the reserve. Indeed, the powers of roads authority to take possession of land to provide a temporary access road whilst carrying out road work (refer to Section 4.2 p.37) is likely to prevail over the PoM.

#### 4.40ther

A summary of other relevant legislation and permissibility is provided in Table 3 below.

#### Table 3: Summary of other relevant legislation and permissibility

Environmental Planning and Assessment Act 1979 (EP&A Act)
Permissible $$ Not permissible
Justification:
The T&I SEPP provides for the proposed works to be undertaken without development consent (refer above). In circumstances where development consent is not required, the environmental assessment provisions outlined in Part 5 of the Act are required to be complied with. This REF fulfils this requirement.
State Environmental Planning Policy (Hazards and Resilience) 2021
Permissible $$ Not permissible
Justification:
The proposed activity is not mapped as comprising coastal wetlands or littoral rainforest for the purpose of this SEPP. Other considerations of the SEPP are not applicable to the proposed activity.
Protection of the Environment Operations Act 1997
Permissible $$ Not permissible
Justification: The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.
Justification: The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence. Fisheries Management Act 1994
Justification: The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.         Fisheries Management Act 1994         Permissible √       Not permissible
Justification: The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.         Fisheries Management Act 1994         Permissible √       Not permissible         Justification:
Justification: The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.         Fisheries Management Act 1994         Permissible √       Not permissible         Justification:         The proposed activity would not be undertaken within Key Fish Habitat (KFH) and:
Justification: The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.         Fisheries Management Act 1994         Permissible √ Not permissible □         Justification:         The proposed activity would not be undertaken within Key Fish Habitat (KFH) and:         • would not affect declared aquatic reserves (Part 7, Division 2 of the Act)
Justification: The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.         Fisheries Management Act 1994         Permissible √ Not permissible □         Justification:         The proposed activity would not be undertaken within Key Fish Habitat (KFH) and:         • would not affect declared aquatic reserves (Part 7, Division 2 of the Act)         • would not involve dredging and reclamation within Key Fish Habitat (Part 7 Division 3)
Justification:       The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.         Fisheries Management Act 1994         Permissible √       Not permissible         Justification:         The proposed activity would not be undertaken within Key Fish Habitat (KFH) and:         •       would not affect declared aquatic reserves (Part 7, Division 2 of the Act)         •       would not involve dredging and reclamation within Key Fish Habitat (Part 7 Division 3)         •       would not involve blocking the passage of fish within KFH (s.219)
Justification: The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence. <b>Fisheries Management Act 1994</b> Permissible √ Not permissible □  Justification: The proposed activity would not be undertaken within Key Fish Habitat (KFH) and:  • would not affect declared aquatic reserves (Part 7, Division 2 of the Act)  • would not involve dredging and reclamation within Key Fish Habitat (Part 7 Division 3)  • would not involve blocking the passage of fish within KEH (s 219)



<b>7</b> City Council	
<ul> <li>would not involve disturbance to gravel beds wh Act)</li> <li>does not involve the release of live fish (Part 7, does not involve the construction of dams and w</li> <li>would not use explosives in a watercourse (Clau Management (General) Regulation 2019).</li> </ul>	here salmon or trout spawn (s.208 of the Division 7) veirs (s.218) uses 70 and 71 of the <i>Fisheries</i>
Local Land Services Act 2013	
Permissible $$ Not permissible	
Justification:	
Any clearing of vegetation would be of a kind authoris Land Services Act 2016 ("an activity carried out by a de Part 5 of the Act after compliance with that Part."). No required.	sed under Section 60O(b)(ii) of the Local etermining authority within the meaning of o separate authorisation under the Act is
National Parks and Wildlife Act 1974 (NP&W Act)	
Permissible $$ Not permissible	
<ul> <li>The proposed activity would not encroach into N</li> <li>The Act provides the basis for the legal protection NSW. Under Sections 86 and 90 of the Act it is or knowingly destroy or damage, or cause the object or place, except in accordance with a per the Act.</li> <li>As there are no recorded sites or visible objects not in a landscape that would have a higher poliligence Guidelines (DECCW 2010) requires r to conclude that there is a low probability of object activity and an AHIP is not required. Refer to Section 2010.</li> </ul>	National Park estate. on and management of Aboriginal sites in an offence to disturb an Aboriginal object destruction or damage to, an Aboriginal mit of consent under section 87 and 90 of and as the site is on 'disturbed land' and propensity for heritage objects, the Due to further assessment as it is reasonable ects occurring in the area of the proposed ction 3.2 of this REF for more information.
Biodiversity Conservation Act 2016	
Permissible $$ Not permissible	
<ul> <li>Justification:</li> <li>The proposed activity is unlikely to have a signif listed in the schedules of the Act (refer to Section)</li> <li>The proposed development is not within an biodiversity value" as defined in the Act.</li> <li>The design and mitigation measures (Section <i>irreversible impacts on biodiversity values</i> (as d the proposed activity.</li> </ul>	icant impact on species and communities on 3.3.2 of this REF). In area declared to be of "outstanding In 7) would ensure that no <i>serious and</i> efined by the BC Act) occur at the site of



The proposed activity therefore is not deemed to be *likely to significantly affect threatened species* and an environmental impact statement (EIS) or a Biodiversity Development Assessment Report (BDAR) is not required.

It is also a defence to a prosecution for an offence under Part 2 of the Act (harming animals, picking plants, damaging the habitat of threatened species or ecological communities *etc*) if the work was essential for the carrying out of an activity by a determining authority within the meaning of Part 5 of the *Environmental Planning and Assessment Act 1979* after compliance with that Part. The activity will not remove vegetation that is listed under Schedule 1 Threatened Species, Schedule 2 Threatened ecological communities and Schedule 6 Protected Plants. Therefore the activity is considered permissible as this REF has been prepared and determined in accordance with the EP&A Act.

#### Aboriginal Land Rights Act 1983

Permissible v	Not permissible
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Justification:

Crown Reserve R580085 (Lot 7301 DP 1163797) is subject to the 2017 blanket and multiple Aboriginal Land Rights claim. The proposed activity, however, would be undertaken entirely within an area lawfully occupied and used prior to 2017, *i.e.*, pedestrian path, powerlines, road verge, and culvert). The area of the proposed activity is therefore unlikely to be claimable land as defined in Section 4 of the Act <u>https://legislation.nsw.gov.au/view/html/inforce/current/act-1983-042#sec.4</u>. No consultation with claimants is considered necessary.

Water Management Act 2000

Permissible $$	Not permissible
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Justification:

- Local councils are exempt from s.91E(1) of the Act in relation to all controlled activities that they carry out in, on or under waterfront land by virtue of clause 41 of the *Water Management (General) Regulation 2018.*
- The proposal would not interfere with the aquifer and therefore an interference licence is not required (s.91F).

#### COMMONWEALTH LEGISLATION

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EP&BC Act)

Permissible  $\sqrt{N}$ 

Not permissible

Justification:

The proposed activity would not be undertaken on Commonwealth land and no matters of National Environmental Significance are likely to be significantly impacted by the proposed activity. The proposed activity is therefore not a controlled action and does not require Commonwealth referral.



#### Commonwealth Native Title Act 1993

Permissible  $\sqrt{}$ 

Not permissible

#### Justification:

The proposed activity would be undertaken predominantly on a road reserve and freehold land (Lot 28 Sec A DP12958). Native Title can reasonable be assumed to have previously been extinguished over these lands.

Part of the proposed activity would however be undertaken in Crown Reserve R580085 (Lot 7301 DP 1163797). Native title has already been impacted and/or extinguished in the area of this reserve where the proposed activity would occur through construction of the existing culvert, installation of electricity powerpoles, installation of underground water mains, maintenance of road verge, and the construction of a shared path (see below). The proposed activity would not exacerbate or go beyond that area of native title impact/extinguishment. No further consideration or action is necessary.





# 5. CONSULTATION WITH GOVERNMENT AGENCIES

#### 5.1 Transport and Infrastructure SEPP 2021 requirements

#### <u>Section 2.10 – Consultation with councils - development with impacts on council-related</u> infrastructure or services

The proposed activity involves stormwater management within a road reserve which would lead to a disruption to pedestrian and vehicle traffic. The proposed activity however would be undertaken by the staff managing roads and stormwater (City Services). No consultation is therefore required.

The proposed activity would

With regard to the other consultation triggers in Section 2.10 of the SEPP, the proposed activity would:

- (a) unlikely generate traffic to an extent that it would strain the capacity of the road system
- (b) not involve connection to, or have a substantial impact on the capacity of the sewerage system
- (c) not involve connection to, and use of a substantial volume of water from the water supply system
- (d) not involve the excavation of, or a footpath adjacent to, a road for which the proponent is not responsible for the maintenance of the road or footpath.

No consultation is therefore required.

#### Section 2.11 - Consultation with councils - development with impacts on local heritage

There would be no heritage objects or places affected by the proposed activity (refer to Section 3.5 of this REF for more information).

#### Section 2.12 - Consultation with councils - development with impacts on flood liable land

The proposed activity would be undertaken on flood liable land. In accordance with Section 2.13 of the SEPP a notice of intention was submitted to SCC's Flood Engineers on 15 October 2024 (D24/443782 - notice of intention - SCC Flood Engineers - clause 2.12 of the Transport and Infrastructure SEPP - proposed culvert replacement - The Wool Road within the Worrowing Waterway - Old Erowal Bay - City of Shoalhaven).

A response was received on 25 October 2024 (<u>D24/480159 - response - notice of intention - SCC</u> <u>Flood - clause 2.12 of the Transport and Infrastructure SEPP - proposed culvert replacement - The</u> <u>Wool Road within the Worrowing Waterway - Old Erowal Bay - City of Shoalhaven</u>). The response read "*FYI we have no comments or concerns regarding this culvert replacement design. The proposed replacement culverts are consistent with the recommendations from the flood investigations completed.*" No further consultation is required.



<u>Section 2.13 – Consultation with State Emergency Service (SES) - development with impacts on</u> <u>flood liable land</u>

The proposed activity would be undertaken on flood liable land. In accordance with Section 2.13 of the SEPP a notice of intention was submitted to SES on 15 October 2024 (<u>D24/443541 - notice of intention - SES - clause 2.13 of the Transport and Infrastructure SEPP - proposed culvert replacement - The Wool Road within the Worrowing Waterway, Old Erowal Bay, City of Shoalhaven</u>).

A response was received on 5 November 2024 (<u>D24/479854 - Response - notice of intention -</u> <u>SES - clause 2.13 of the Transport and Infrastructure SEPP - proposed culvert replacement - The</u> <u>Wool Road within the Worrowing Waterway, Old Erowal Bay, City of Shoalhaven</u>). Based on their review, SES:

- "Recommend considering the impact of flooding on the infrastructure and on the people using the road up to and including the Probable Maximum Flood (PMF), along with the impact of climate change on the flood risks.
- Support any improvements to flood resilience that can be made to reduce flood risk, as it will benefit the community
- Ensure workers and people using the road during and after the upgrades are aware of the flood risk, for example through site inductions, by using signage and other flood information tools.
- Consider closing the worksite and securing all materials and equipment prior to the start of the working day if there is a risk of local flooding, on receipt of advice from the Bureau of meteorology (BOM), or when other evidence leads to an expectation of flooding. During site works, check the BOM website prior to start of the workday for any Severe Weather Warnings.
- In addition, if the construction phase of the upgrades causes disruption to the operation of local roads, this may impact the ability for emergency vehicles to use these routes. The NSW SES requests that notification be provided where there are likely to be significant delays in the operation of the roads affected by the upgrades."

In response:

- SCC has considered the impact of flooding on infrastructure and people using the road up to PMF through;
  - Development controls (*e.g.* Shoalhaven Local Environmental Plan 2014 and Development Control Plan Chapter G9 – Development on Flood Prone Land)
  - Flood emergency management plans (as part of the Local Emergency Management Committee).
  - Flood studies (*e.g.* Rhelm 2024 and Stantec 2022).
- The proposed activity would improve flood immunity at this crossing (Rhelm 2024, refer to Section 3.6 of this REF).



• Construction management contingencies shall be in place to ensure flood situational awareness (*e.g.* emergency response plan) and inform emergency services of traffic restrictions and delays. Refer to Section 7 of this REF).

No further consultation with SES is therefore required.

# <u>Section 2.14 – Consultation with councils - development with impacts on certain land within the coastal zone</u>

The proposal would not occur within a coastal vulnerability area. Consultation is therefore not required.

#### Section 2.15 - Consultation with public authorities other than councils

In consideration of the other consultation requirements specified under Section 2.15 of the Transport and Infrastructure SEPP, the proposed activity:

- would not be undertaken adjacent to land reserved under the National Parks and Wildlife Act 1974 or land acquired under that Act
- would not be undertaken on land in Zone E1 National Parks and Nature Reserves on in an equivalent land use zone.
- does not comprise a fixed or floating structure in or over navigable waters
- would not increase the amount of artificial light in the night sky and located on land within the dark sky region as identified on the dark sky region map
- would not be undertaken within Defence communications facility buffer (only relevant to the defence communications facility near Morundah)
- would not be undertaken on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*
- would not have an impact on the Willandra Lakes Region World Heritage Property
- would not occur in a Western City operational area specified in the Western Parkland City Authority Act 2018.

These prescribed consultation requirements therefore do not apply.

#### Section 2.16 – Consideration of Planning for Bush Fire Protection (PBP)

The proposed activity would not be undertaken on Bushfire Prone Land and is not a development prescribed in this section (health services facilities, correctional centres, residential accommodation). Consideration of PBP is therefore not required.



#### 5.2 NSW Department of Primary Industries - Fisheries

Multiple enquiries were made with NSW Fisheries to determine whether a Fisheries Permit (Part 7 of the NSW *Fisheries Management Act 1994*) was required for the proposed activity.

NSW Fisheries latest response reconfirmed that no Permit is required as "*The stream is a 2<sup>nd</sup>* order and is above the tidal range" (D24/443528 - reconfirmation regarding no need for Fisheries <u>Permit - Wool Road Culvert Upgrade</u>). Regardless, a notice of commencement will be sent to NSW Fisheries prior to works.

# 6. COMMUNITY ENGAGEMENT

The community has been engaged through social media platforms and SCC's website <u>https://www.shoalhaven.nsw.gov.au/Council/Projects-and-works/Road-works/The-Wool-Road-Old-Erowal-Bay-Road-Failure</u> with regular updates. This level of engagement shall continue and closer to commencement the community shall be informed of commencement and anticipated finishing dates and traffic arrangements.

The proposed activity would be considered "Local Area / High Impact" under SCC's Community Engagement Policy (POL/28). In accordance with the Policy, the following additional information actions are recommended:

- Fact sheets and newsletters mailed to residents and owners.
- Media releases.
- Notices within library and community notice boards.

Information to be conveyed should be name of the company undertaking the works, what is proposed, the commencement and anticipated finishing dates, and traffic arrangements.

Variable Message Boards (VMS) shall also be in place either side of the culvert location at least two weeks prior to the commencement of works to inform commuters / users of the road of the works, period of works and of potential traffic delays.



# 7. ENVIRONMENTAL SAFEGUARDS AND MEASURES TO MINIMISE IMPACTS

#### Note that safeguards / measures are prescribed unless otherwise stated.

Saf	eguard / Measure	Responsibility
Wo	rks planning, approvals, consultation and notification	
1.	This REF shall be published on the NSW Planning Portal.	SCC EOO
2.	The NSW Department of Primary Industries – Fisheries (Huskisson office) shall be notified of the anticipated commencement of instream works.	SCC Project Manager (PM), SCC Environmental Operations Officer (EOO), and Construction Contractor
3.	As the compound and depot and works would be within flood liable land, the Construction Contractor shall develop a flood management plan to prescribe actions to monitor weather situations and their response should a flood event be predicted, <i>e.g.</i> moving plant and equipment, stockpiles, fuels, toilets, site sheds onto higher ground.	Construction Contractor
4.	A traffic management plan shall be prepared and submitted to SCC's Project Manager and Traffic Engineer for review.	Construction Contractor
5.	<ul><li>Community engagement of the proposed activity shall continue and be extend to:</li><li>fact sheets and newsletters mailed to residents and owners.</li></ul>	SCC Project Manager
	• media releases.	
	<ul> <li>notices within library and community notice boards.</li> </ul>	
Info cor cor arra	ormation to be conveyed shall include the name of the npany undertaking the works, what is proposed, the nmencement and anticipated finishing dates, and traffic angements.	
6.	Variable Message Boards (VMS) shall also be in place either side of the culvert location at least two weeks prior to the commencement of works to inform commuters / users of the road of the works, period ow works and of potential traffic delays.	
7.	Emergency services (State Emergency Service, Ambulance, Rural Fire Service, and Police), through the Local Emergency Management Committee, shall be	SCC Project Manager and SCC representative on the



Sat	ieguard / Measure	Responsibility
	notified of the works and potential congestion and delays at the site.	Local Emergency Management Committee
Site	e establishment	
8.	Any machinery, vehicles and stockpiles utilised during construction shall be stored and / or operated within the project footprint and existing cleared areas only. Works, machinery and vehicles shall not encroach into the canopies of trees that are to be retained and protected.	Construction Contractor
9.	A Construction Environmental Management Plan (CEMP) for the proposed activity shall be prepared / amended to address the prescribed safeguards and measures within this REF.	Construction Contractor
10.	Erosion and sediment controls in accordance with the 'Blue Book' (Landcom 2004) shall be installed and maintained to prevent the entry of sediment into waterways i.e. water diversion, minimising disturbance, erosion control, sediment capture and rapid re- establishment.	Construction Contractor
11.	In the event that any wildlife be significantly disturbed or injured during works, Council's Environmental Officers are to be contacted or if unavailable, Wildlife Rescue – South Coast should be contacted on 0418 427 214, to rescue and relocate the animal(s).	Construction Contractor
Со	nstruction works	
12.	Vegetation removal shall be undertaken only to the extent required to carry out the works.	Construction Contractor
13.	The approved Traffic Management Plan and Flood Plan shall be implemented.	Construction Contractor
14.	An emergency spill kit shall be always kept on-site with procedures to contain and collect any leakage or spillage of fuels, oils, greases, <i>etc</i> .	Construction Contractor
15.	No major equipment maintenance works shall be undertaken on-site.	Construction Contractor
16.	To avoid the risk of pollution from machinery, refuelling shall generally be done off site, however if refuelling on site is required, due care shall be taken to avoid spilling fuel and a tray shall be used to catch any accidentally spilt fuel.	Construction Contractor
17.	Stockpiles of any excavated earthen material shall be in existing cleared areas and more than 10 metres from the waterway and any trees that are to be retained.	Construction Contractor



Safeguard / Measure	Responsibility
18. Any waste shall be managed, transported, stored, collected and disposed of in an environmentally satisfactory manner pursuant to NSW <i>Protection of the Environment Operations Act 1997</i> , and that all reasonable measures regarding the control and prevention of pollution and waste from being introduced into the estuary are implemented.	Construction Contractor
<ol> <li>Upon completion of works, disturbed land shall be stabilised with jute mush, turf, hydromulch, seeding or similar.</li> </ol>	Construction Contractor
20. All parties shall comply with any direction given by authorised officers of the Transport for NSW, Department of Primary Industries, and NSW Environment Protection Authority with regard to the prevention of pollution.	Construction Contractor and Project Manager.
21. Any woody debris extant outside the works area shall be left in-situ.	Construction Contractor
Post construction	
22. An asset form shall be trimmed to file 44574E on commissioning of the new culverts in accordance with POL15/8 Asset Accounting Policy section 3.1.4 and POL16/79 Asset Management Policy section 3.3.	SCC Project Manager

noalhaven Citv Council

## 8. SIGNIFICANCE EVALUATION & DECISION STATEMENT

This Review of Environmental Factors has assessed the likely environmental impacts, in the context of Part 5 of the *Environmental Planning and Assessment Act 1979*, of a proposal by Shoalhaven City Council for the replacement of the Worrowing Waterway Culvert Crossing under The Wool Road at Worrowing Heights and Old Erowal Bay

In consideration of the proposal as described in Section 1, and assuming the implementation of all proposed safeguards and mitigation measures (Section 7), it is determined that:

- 1. It is unlikely that there will be any significant environmental impact as a result of the proposed work and an Environmental Impact Statement is not required for the proposed works.
- 2. The proposed activity will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats and a Species Impact Statement / BDAR is not required.
- 3. No additional statutory approvals, licences, permits and external government consultations are required.
- 4. The proposed activity may proceed.

In accepting and adopting this REF, Shoalhaven City Council commits to ensuring the implementation of the proposed safeguards and mitigation measures identified in this report (Section 7) to minimise and/or prevent detrimental environmental impacts.

#### **Determined by:**

Craig Exton Manager – Technical Services Shoalhaven City Council

Date: 5/2/2025



## 9. REFERENCES

- DECCW (Department of Environment, Climate Change and Water, NSW) 2010 Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. Available at: <u>https://www.environment.nsw.gov.au/research-and-publications/publications-search/due-</u> <u>diligence-code-of-practice-for-the-protection-of-aboriginal-objects-in-new-south-wales</u>
- DoPI (Department of Primary Industries, NSW) 2013 Policy and Guidelines for Fish Habitat Conservation and Management. Available at: <u>https://www.dpi.nsw.gov.au/\_\_data/assets/pdf\_file/0005/634694/Policy-and-guidelines-for-fish-habitat.pdf</u>
- Landcom 2004 Managing Urban Stormwater: Soils and Construction Volume 1. Published by Landcom ISBN 0-97520-3037 <u>https://www.environment.nsw.gov.au/research-and-</u> <u>publications/publications-search/managing-urban-stormwater-soils-and-construction-</u> <u>volume-1-4th-editon</u>
- NSW Scientific Committee 2011 Final Determination swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions endangered ecological listing. <u>https://www2.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/nsw-threatened-species-scientific-committee/determinations/final-determinations/2004-2007/swamp-sclerophyll-forest-coastal-floodplains-endangered-ecological-listing</u>
- Rhelm 2024 The Wool Road Culvert Flood Assessment. Unpublished report for Shoalhaven City Council D24/443124 - Flood Study - The Wool Road Culvert Assessment - Rhelm
- Stantec 2002 St Georges Basin Flood Study. Unpublished report for SCC https://doc.shoalhaven.nsw.gov.au/LinkGeneratorAPI/record/8188022/preview\_latest\_final\_ version\_pdf



APPENDIX A – THE PROPOSED ACTIVITY D24/505161 - The Wool Rd Culvert Ch10300 - Detailed Design - IFT





THIS DRAWING AND THE CONCEPTS CONTAINED | REV. | AMENDMENTS APPROVED DATE THEREIN ARE THE PROPERTY OF WESTLAKE P.LITTLE 09.08.2024 ISSUED DETAILED DESIGN FOR COMMENT PUNNETT & ASSOCIATES PTY LTD. NO P.LITTLE 09.10.2024 ISSUED DETAILED DESIGN FOR COMMENT UNAUTHORISED COPYING IS PERMITTED. ALL P.LITTLE ISSUED FOR DETAILED DESIGN REVIEW DIMENSIONS SHALL BE VERIFIED ON SITE. DO P.LITTLE 31.10.2024 ISSUED FOR TENDER NOT SCALE - NO RESPONSIBILITY WILL BE TAKEN BY WESTLAKE PUNNETT & ASSOCIATES PTY LTD FOR ANY DISCREPANCIES CAUSED BY THE SCALING OF THESE DRAWINGS.





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COVER SHEET AN

**CLIENT:** SHOALHAVEN CITY **PROJECT:** CULVERT REPLACEM ADDRESS: THE WOOL ROAD, (

DRAWING SCHEDULE						
PLAN No. DRAWING TITLE						
C01	COVER SHEET AND LOCALITY PLAN	4				
C02	GENERAL NOTES	4				
C03 STAGE 1 – INITIAL WORKS 4						
C04 STAGE 2 - PARTIAL DEMOLITION						
C05 STAGE 3 – PARTIAL CULVERT CONSTRUCTION 4						
CO6 STAGE 4 - REMAINING DEMOLITION 4						
C07 STAGE 5 - REMAINING CULVERT CONSTRUCTION						
C08 ALIGNMENTS AND LONG SECTIONS 4						
C09	STRUCTURAL PLAN AND DETAILS	4				
C10	STRUCTURAL DETAILS	4				
C11	WING WALL DETAILS	4				
C12	SEDIMENT AND EROSION CONTROL PLAN	4				
C13	SEDIMENT AND EROSION CONTROL DETAILS	4				

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### GENERAL NOTES

- THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO COUNCIL'S REPRESENTATIVE BEFORE PROCEEDING WITH THE WORK.
- 2. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE FOLLOWING REPORTS: 2.1 GEOTECHNICAL INVESTIGATION REPORT PREPARED BY TERRA INSIGHT REF. NO. TERRA24-734.REP1.REV2 DATED 18 AUGUST 2024. 2.2 CULVERT ASSESSMENT REPORT BY RHELM REF. NO. RL-01-1955-00 DATED 2 AUGUST
- 2024. 2.3 WHS SAFETY IN DESIGN REPORT BY WESTLAKE PUNNETT & ASSOCIATES PTY LTD REF. NO. 24253.R01.
- 2.4 DESIGN REPORT BY WESTLAKE PUNNETT & ASSOCIATES PTY LTD REF. NO. 24253.R02. 3. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT AUSTRALIAN STANDARDS AND WITH THE BY-LAWS AND ORDINANCES OF THE
- RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION. 4. ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE CONSTRUCTOR ON SITE. ENGINEERS' DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.
- . DURING CONSTRUCTION EXISTING STRUCTURES SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE 6. ALL DISTURBED AREAS ARE TO BE TRIMMED, LEVELED, TURFED & FERTILISED CONSTRUCTOR TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.
- 6. THE CONSTRUCTOR SHALL GIVE 48 HOURS NOTICE FOR ALL ENGINEERING INSPECTIONS. 7. SLABS BEAMS AND WALLS SHALL BE POURED ON THE DAY OF APPROVAL UNLESS PERMISSION IS GIVEN OTHERWISE.
- 8. UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.
- 9. ALL SERVICE LOCATIONS ON PLANS ARE SCHEMATIC ONLY.
- 10. CONSTRUCTOR TO DETERMINE AND/OR CONFIRM LOCATION AND DEPTH OF ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK. ENGINEER TO BE NOTIFIED.
- 11. PROPRIETARY PRODUCTS MAY BE REPLACED WITH EQUIVALENT PRODUCTS, ONLY FOLLOWING REVIEW AND WRITTEN APPROVAL BY COUNCIL'S REPRESENTATIVE. CONSTRUCTOR TO PROVIDE SUPPORTING DOCUMENTATION INDICATING EQUIVALENT PROPERTIES FOR COUNCIL'S REVIEW.
- 12. REFERENCES TO SUPERINTENDENT OR PRINCIPAL SHALL BE TAKEN AS COUNCIL'S REPRESENTATIVE.
- 13. CONSTRUCTOR OR CONTRACTOR IS RESPONSIBLE FOR ENSURING BUILDING WORKS ARE UNDERTAKEN IN ACCORDANCE WITH THE RELEVANT STANDARDS, PROPRIETARY ITEMS ARE INSTALLED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS AND ALL STRUCTURES ARE SEALED TO PREVENT THE INGRESS OF RAIN DURING STORM EVENTS
- 14. REFERENCES TO CONSTRUCTOR, SUPPLIER OR OTHER PARTIES INVOLVED IN CONSTRUCTION SHALL HAVE THE SAME MEANING AS CONTRACTOR.
- 15. THE CONTRACTOR IS RESPONSIBLE FOR ALL TESTING AS SPECIFIED IN THE CONTRACT DOCUMENTS TO DEMONSTRATE COMPLIANCE. THE CONTRACTOR SHALL BEAR ALL COSTS ASSOCIATED WITH COMPLIANCE TESTING.
- 16. A SECTION 138 APPLICATION AND APPROVAL IS REQUIRED PRIOR TO ANY OCCUPATION OF COUNCIL'S ROAD OR FOOTPATH. THIS IS THE RESPONSIBILITY OF THE CONSTRUCTING AGENT. 17. A TRANSPORT FOR NSW ROAD OCCUPANCY LICENCE APPLICATION AND APPROVAL IS
- REQUIRED TO BE OBTAINED BY THE CONSTRUCTOR PRIOR TO ANY OCCUPATION OF STATE ROADS OR PROPERTY.
- 18. ALL WORKS SHALL BE SUPERVISED BY PERSONS EXPERIENCED AND QUALIFIED IN THE TYPE OF WORK BEING CARRIED OUT.

### SAFETY NOTES

- 1. THE CONSTRUCTOR IS REQUIRED TO PREPARE A SAFETY MANAGMENT PLAN FOR THE WORK SITE. THE SAFETY MANAGEMENT PLAN IS TO BE SUBMITTED TO COUNCIL'S REPRESENTATIVE PRIOR TO COMMENCEMENT OF ANY WORKS ON SITE
- 2. CONTRACTOR TO ERECT SIGNAGE ADVISING OF CONSTRUCTION ACTIVITIES PRIOR TO COMMENCEMENT OF WORKS ON SITE. SIGNAGE SHALL BE PLACED AS NECESSARY TO ENSURE 20. ANY EXCAVATION WORK ADJACENT TO ADJOINING PROPERTIES OR THE PUBLIC CLEAR VISIBILITY TO SIGNAGE FROM ANY ROUTE BY WHICH MOTORISTS, CYCLISTS, OR PEDESTRIANS MAY APPROACH THE WORK SITE.
- THE CONTRACTOR IS TO CLEARLY DISPLAY THE NOMINATED CONSTRUCTION MANAGERS' CONTACT DETAILS ON THE SITE ACCESS SIGNAGE.
- THE CONSTRUCTOR IS TO COMPLY WITH ALL WH&S REQUIREMENTS IN ACCORDANCE WITH THE 'WORK HEALTH AND SAFETY ACT 2011' AND RELEVANT ACCOMPANYING REGULATIONS. SAFETY SYSTEMS AND DOCUMENTATION SHALL BE THE RESPONSIBILITY OF THE CONSTRUCTOR AND SHALL COMPLY WITH SPECIFIC REQUIREMENTS AS DETAILED IN RELEVANT PROJECT DOCUMENTATION.
- 5. THE CONTRACTOR SHALL ADHERE TO SAFEWORK NSW CODES OF PRACTICE FOR ALL RELEVANT CONSTRUCTION ACTIVITIES.
- 6. SITE FACILITIES AND ACCESS TO BE MAINTAINED IN A NEAT AND TIDY CONDITION AT ALL TIMES.
- 7. THE CONSTRUCTOR SHALL OBTAIN AND KEEP ON SITE ALL RELEVANT MATERIAL SAFETY DATA SHEETS (MSDS) FOR ANY MATERIALS THAT ARE USED IN THE WORKS. ALL TRANSPORTATION, STORAGE AND USE OF THESE MATERIALS SHALL BE IN ACCORDANCE WITH MSDS.
- 8. THE CONSTRUCTOR IS TO PREPARE A SITE SPECIFIC RISK MANAGEMENT PLAN TAKING INTO ACCOUNT ALL FORSEEABLE RISKS INCLUDING MANAGEMENT OF ALL RESIDUAL RISKS IDENTIFIED IN THE SAFETY IN DESIGN REPORT.
- 9. THE CONSTRUCTOR IS RESPONSIBLE FOR ALL TEMPORARY SHORING OR BENCHING OF EXCAVATIONS. THE CONSTRUCTOR IS TO PROVIDE DESIGN AND CERTIFICATION OF ALL TEMPORARY SHORING SYSTEMS FOR APPROVAL BY COUNCIL'S REPRESENTATIVE.
- 10. TRAFFIC MANAGEMENT MEASURES ARE REQUIRED TO BE IMPLEMENTED AND MAINTAINED DURING CONSTRUCTION IN ACCORDANCE WITH 'TENSW. TRAFFIC CONTROL AT WORK SITES' TECHNICAL DIRECTION AND AS 1742 'MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES'. A TRAFFIC MANAGEMENT PLAN IS TO BE PREPARED BY THE CONTRACTOR AND SUBMITTED TO COUNCIL'S REPRESENTATIVE FOR APPROVAL.
- 11. PEDESTRIAN CONTROL MEASURES ARE REQUIRED TO BE IMPLEMENTED AND MAINTAINED DURING CONSTRUCTION IN ACCORDANCE WITH AS 1742 'MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.'

ENVIRONMENTAL CONTROLS

- 1. EROSION & SEDIMENT CONTROLS TO BE INSTALLED IN ACCORDANCE WITH COUL SPECIFICATION & THE NSW DEPARTMENT OF HOUSING "BLUE BOOK" - SOILS CONSTRUCTION - MANAGING URBAN STORMWATER, 2004. REFER TO THE BLUE STANDARD DRAWINGS "SD".
- 2. SEDIMENT & EROSION CONTROLS MUST BE IN PLACE PRIOR TO THE COMMENCE EARTHWORKS OR DEMOLITION ACTIVITY. THE LOCATION OF SUCH DEVICES IS AND FINAL POSITION SHOULD BE DETERMINED ON SITE.
- 3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL MEASU TAKEN DURING THE COURSE OF CONSTRUCTION TO PREVENT SEDIMENT EROSION POLLUTION OF THE DOWNSTREAM SYSTEM, SUPERVISING ENGINEER SHOULD BE IN DOUBT. ALL SEDIMENT CONTROL STRUCTURES TO BE INSPECTED AFTER EAC EVENT FOR STRUCTURAL DAMAGE AND ALL TRAPPED SEDIMENT TO BE REMOV NOMINATED SOIL STOCKPILE SITE.
- RETAIN ALL EXISTING GRASS COVER WHEREVER POSSIBLE. TOPSOIL FROM ALL WILL BE DISTURBED TO BE STRIPPED AND STOCKPILED AT THE NOMINATED S SEDIMENT FENCE TO BE PLACED DOWNHILL OF STOCKPILE.
- AREAS OF SITE REGRADING ARE TO BE COMPLETED PROGRESSIVELY DURING STABILISED AS EARLY AS POSSIBLE. COUNCIL'S REPRESENTATIVE MAY DIRECT CONTRACTOR TO HAVE AREAS OF DISTURBANCE COMPLETED AND STABILISED COURSE OF THE WORKS.
- DAYS OF EXPOSURE.
- 7. ALL EXISTING TREES TO BE RETAINED UNLESS SHOWN OTHERWISE ON APPROV TREES RETAINED ARE TO BE PROTECTED WITH A HIGH VISIBILITY FENCE, PLUS INDIVIDUAL TREES AS NECESSARY.
- 8. INSTALL TEMPORARY SEDIMENT BARRIERS TO ALL INLET PITS LIKELY TO COLL LADEN WATER, UNTIL SURROUNDING AREAS ARE PAVED OR REGRASSED. GRAV GEOTEXTILE INLET FILTERS TO SD6-11 & SD6-12.
- 9. ALL SILT FENCES & BARRIERS ARE TO BE MAINTAINED IN GOOD ORDER & REC DESILTED DURING THE CONSTRUCTION PERIOD. SILT FENCES TO SD6-8 OR SD6-
- 10. STOCKPILES OF LOOSE MATERIALS SUCH AS SAND, SOIL, GRAVEL MUST BE C GEOTEXTILE SILT FENCE MATERIAL. PLASTIC SHEETING OR MEMBRANE MUST N SAFETY BARRICADING SHOULD BE USED TO ISOLATE STOCKPILES OF SOLID MA AS STEEL REINFORCING, FORMWORK AND SCAFFOLDING.
- 11. WASTE MATERIALS ARE TO BE STOCKPILED OR LOADED INTO SKIP-BINS LOCAT
- 12. NO MORE THAN 150 m OF TRENCHING TO BE OPEN AT ANY ONE TIME. IMMEDIA TRENCH BACKFILLING, PROVIDE SANDBAGS OR SAUSAGE FILTERS ACROSS EACH MAXIMUM 20 m SPACINGS. FILTERS TO REMAIN IN PLACE UNTIL REVEGETATION OCCURRED.
- 13. ALL VEHICLES LEAVING THE SITE MUST PASS OVER A STABILISED SITE ACCES AREA (SIMILAR TO SD6-14) TO SHAKE OFF SITE CLAY AND SOIL. IF NECESSAR AND AXLES ARE TO BE HOSED DOWN. BALLAST IS TO BE MAINTAINED & REP NECESSARY DURING THE CONSTRUCTION PERIOD.
- 14. THE HEAD CONTRACTOR IS TO INFORM ALL SITE STAFF AND SUB-CONTRACTOR OBLIGATIONS UNDER THE EROSION AND SEDIMENT CONTROL PLAN.
- 15. ANY SEDIMENT DEPOSITED ON THE PUBLIC WAY, INCLUDING FOOTPATH RESERV SURFACE, IS TO BE REMOVED IMMEDIATELY.
- 16. PROVIDE BARRIERS AROUND ALL CONSTRUCTION WORKS WITHIN THE FOOTPAT PROVIDE SAFE ACCESS FOR PEDESTRIANS.
- 17. CONCRETE PUMPS AND CRANES ARE TO OPERATE FROM WITHIN THE BALLAST DRIVEWAY AREA AND ARE NOT TO OPERATE FROM THE PUBLIC ROADWAY UN COUNCIL PERMISSION IS OBTAINED.
- 18. DELIVERY VEHICLES MUST NOT STAND WITHIN THE PUBLIC ROADWAY FOR MOI MINUTES AT A TIME.
- 19. TRUCKS REMOVING EXCAVATED / DEMOLISHED MATERIAL SHOULD TRAVEL ON CONSTRUCTION PATHS. MATERIAL TO BE TAKEN TO THE TRUCK TO REDUCE T MOVEMENT ON SITE. TRUCKS TO BE LIMITED TO SINGLE UNIT HEAVY RIGID VEH SEMITRAILERS).
- NOT TO BE COMMENCED UNTIL THE STRUCTURAL ENGINEER IS CONSULTED AND INSTRUCTIONS RECEIVED FROM COUNCIL'S REPRESENTATIVE.
- 21. SITE COMPOUND SHALL PROVIDE FOR ADMINISTRATION FACILITIES, TOILETS AND AREAS SUFFICIENT FOR THE PROPOSED CONSTRUCTION OPERATION. THE COMPO FENCED AND SECURE.
- 22. TOILET FACILITIES MUST BE EITHER A FLUSHING TYPE OR APPROVED PORTAB CLOSET. CHEMICAL CLOSETS ARE TO BE MAINTAINED & SERVICED ON A REGUL THAT OFFENSIVE ODOUR IS NOT EMITTED.
- 23. DURING TRENCH EXCAVATION ALL SPOIL SHALL BE MOUNDED ON THE UPHILL TRENCHES AND PLACEMENT IS TO COMPLY WITH COUNCIL'S REPRESENTATIVES
- 24. DIVERSION BANKS SHOULD BE CONSTRUCTED BY MOUNDING STRIPPED TOPSOIL 600 mm) WHERE DIRECTED. MATERIAL TO BE RE-SPREAD ON FOOTWAYS AFTER TRIMMING
- 25. THE SITE MANAGEMENT PLAN IS INDICATIVE ONLY BASED ON PRELIMINARY INF FINAL SITE MANAGEMENT PLAN IS TO BE PREPARED BY THE CONTRACTOR AN TO COUNCIL'S REPRESENTATIVE FOR APPROVAL PRIOR TO UNDERTAKING ANY

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	1	ISSUED DETAILED DESIGN FOR COMMENT	P.LITTLE	09.08.2
	2	ISSUED DETAILED DESIGN FOR COMMENT	P.LITTLE	09.10.2
	3	ISSUED FOR DETAILED DESIGN REVIEW	P.LITTLE	11.10.2
	4	ISSUED FOR TENDER	P.LITTLE	31.10.2
TAKEN BY WESTLAKE PUNNETT & ASSOCIATES				
PTY LTD FOR ANY DISCREPANCIES CAUSED BY				
THE SCALING OF THESE DRAWINGS.				

	DE	MOLITION	RO	AD PAVEME
NCIL'S AND	1.	THE CONTRACTOR IS TO CARRY OUT ALL DEMOLITION WORK IN ACCORDANCE WITH AS2601 AND THE SAFE WORK NSW CODE OF PRACTICE FOR DEMOLITION WORK.	1.	ALL ROAD PAN CONSTRUCTION
BUUK FUR	2.	PRIOR TO REMOVAL OF ANY STRUCTURAL SUPPORT: - PROVIDE TEMPORARY SUPPORT FOR ALL STRUCTURES WHICH ARE TO BE ALTERED AND	2.	ALL ROAD PAN MAXIMUM DRY
INDICATIVE ONLY		WHICH NORMALLY RELY FOR SUPPORT ON WORK TO BE DEMOLISHED. - SUPPORT EXCAVATIONS FOR DEMOLITION OF UNDERGROUND STRUCTURES. - PROVIDE SUPPORT TO ADJACENT STRUCTURES WHERE NECESSARY, SUFFICIENT TO	3.	REMOVE ANY S PROOF ROLLING
URES ARE )N AND F CONTACTED IF		PREVENT DAMAGE RESULTING FROM THE WORKS. - LATERAL SUPPORTS: PROVIDE LATERAL SUPPORT AT LEAST THAT GIVEN BY THE		EXCEEDING 200 WRITTEN APPR
CH RAINFALL VED TO A		STRUCTURE TO BE DEMOLISHED, USING SHORING. - VERTICAL SUPPORTS: PROVIDE SUPPORT WHERE NECESSARY USING PILING OR, UNDERPINNING OR BOTH.	4.	ANY FILL REQUE FORMATION TO EXCEEDING 200
L AREAS THAT SITE. A	3. 4.	THE CONTRACTOR IS NOT PERMITTED TO USE EXPLOSIVES. THE CONTRACTOR SHALL GIVE NOTICE IMMEDIATELY IF UNKNOWN HAZARDOUS MATERIALS OR	5.	IMPORTED FILL REQUIREMENTS
THE WORKS AND T THE DURING THE		- ASBESTOS OR MATERIAL CONTAINING ASBESTOS. - FLAMMABLE OR EXPLOSIVE LIQUIDS OR GASES.	6.	BACKFILLING FO WELL-GRADED COMPACTED AS
WITHIN 14		<ul> <li>TOXIC, INFECTIVE OR CONTAMINATED MATERIALS.</li> <li>RADIATION OR RADIOACTIVE MATERIALS.</li> </ul>	7.	DO NOT PROCE WITHOUT PRIOF
VED DRAWINGS.		<ul> <li>NOXIOUS OR EXPLOSIVE CHEMICALS.</li> <li>TANKS OR OTHER CONTAINERS WHICH HAVE BEEN USED FOR STORAGE OF EXPLOSIVE,</li> </ul>		APPROVED UNL FROM ENGINEEF
S FLAGGING TO	5.	TOXIC, INFECTIVE OR CONTAMINATED SUBSTANCES. IT IS THE RESPONSIBILITY OF THE BUILDER TO REMOVE FROM SITE AND DISPOSE OF ALL	8.	PAVEMENT DET C.B.R. OF 5%.
VEL OR	6.	ALL ASBESTOS MATERIALS TO BE REMOVED IN LINE WITH WORK COVER CODES OF PRACTICE. PROVIDE RECORDS OF DISPOSAL. PROVIDE AIR MONITORING DURING REMOVAL & CLEARANCE	9.	CONTRACTOR. BASE AND SUE
OVERED WITH	<b>F</b> 4	CERTIFICATION ON COMPLETION & PRIOR TO OCCUPATION.		DENSITY AS A SOAKED C.B.R.
NOT BE USED. ATERIALS SUCH	ЕА 1.	RIHWURKS PROVIDE PROTECTION BARRIERS TO PROTECTED/SENSITIVE AREAS PRIOR TO ANY BULK EXCAVATION.	<b>CO</b> 1.	NCRETE ALL WORKMANS
ATED ON SITE. ATELY AFTER	2.	THE CONTRACTOR IS TO CLEAR AND GRUB OVER THE FULL EXTENTS OF EARTHWORKS. CLEARING AND GRUBBING SHOULD GENERALLY BE UNDERTAKEN IN ACCORDANCE WITH COUNCILS CONSTRUCTION SPECIFICATION C212.	2.	CONCRETE QUAL
N HAS	3.	THE CONTRACTOR IS TO STRIP TOPSOIL, CUT TO FILL OVER THE SITE TO SUBGRADE LEVEL AND STOCKPILE ANY SURPLUS MATERIAL ON SITE. EARTHWORKS SHALL BE UNDERTAKEN IN	3.	CLEAR CONCRET OTHERWISE:
RY WHEELS PLACED AS	4.	PRIOR TO PLACEMENT OF ANY FILL, THE CONTRACTOR IS TO PROOF ROLL THE EXPOSED FILL AREA SURFACE WITH A ROLLER OF MINIMUM WEIGHT OF 5 TONNES WITH A MINIMUM OF 10		
ORS OF THEIR	5.	PASSES. ALL ORGANIC, SATURATED, YIELDING OR OTHERWISE UNSUITABLE MATERIAL SHALL BE		ELEMENT
VE AND ROAD		IS TO BE REPLACED WITH APPROVED FILL AND COMPACTED IN LAYERS. THE WHOLE OF THE EXPOSED SUBGRADE AND FILL SHALL BE COMPACTED TO 98% STANDARD MAXIMUM DRY	B	ASE SLAB AND FOOTINGS
TH AREA TO		DENSITY AT OPTIMUM MOISTURE CONTENT $\pm$ 2%. COUNCIL'S REPRESENTATIVE IS TO BE NOTIFIED PRIOR TO UNDERTAKING OF FINAL PROOF ROLLING. THIS CONSTITUTES A MANDATORY HOLD POINT.	P	RECAST TEMP
NLESS SPECIFIC	6.	FOR ALL FILL AREAS, THE CONTRACTOR SHALL TAKE LEVELS OF EXISTING SURFACE AFTER STRIPPING OF TOPSOIL AND PRIOR TO COMMENCING FILL OPERATIONS.		HEADWALL
ORE THAN 20	7.	WHERE ROCK IS EXPOSED IN THE EXCAVATED SUB-GRADE, THE CONTRACTOR IS TO NOTIFY COUNCIL'S REPRESENTATIVE AND A DECISION MADE ON THE LEVEL TO WHICH EXCAVATION IS TAKEN. EXCAVATION IN ROCK IS NOT TO BE UNDERTAKEN PRIOR TO THE RECEIPT OF	4.	PROJECT CONTR THE CONTRACTO PROPERTIES, ST
EHICLES. (NO	8.	ROCK IS DEFINED AS MATERIAL THAT CANNOT BE RIPPED BY A 30 TONNE EXCAVATOR WITH		DELIVERY. DOCK
C ROADWAY IS D SPECIFIC		SMALLER THAN 1.5 m <sup>3</sup> IN VOLUME DO NOT CONSTITUTE EXCAVATION IN ROCK. THE PRESENCE OF ISOLATED BOULDERS OR ROCK FRAGMENTS LARGER THAN 1.5 m <sup>3</sup> IN VOLUME DOES NOT WARRANT THE CHANGE IN CLASSIFICATION OF THE SURROUNDING MATERIAL.		PAIRS OF STAN THE CONTRACTO TEST RESULTS
ND STORAGE OUND SHALL BE	9.	ALL FILL IS TO BE PLACED IN MAXIMUM 200 mm (LOOSE THICKNESS) LAYERS TO SUBGRADE LEVEL USING SUITABLE MATERIAL AND COMPACTED TO 98% STANDARD MAXIMUM DRY	5.	DAYS OF COMPL CONCRETE SHAL
BLE CHEMICAL LAR BASIS SO		DENSITY AT OPTIMUM MOISTURE CONTENT $\pm$ 2%. SHOULD THERE BE INSUFFICIENT SUITABLE MATERIAL FROM SITE WON EXCAVATIONS, IMPORT SUITABLE MATERIAL AS NECESSARY TO ACHIEVE SUBGRADE LEVELS. THE CONTRACTOR IS TO PROVIDE TEST RESULTS FOR ALL IMPORTED MATERIAL FOR APPROVAL BY THE CONTRACTOR'S REPRESENTATIVE.		DAYS IN ACCOR OUT FOR EACH O CONCRETE COMP
SIDE OF 5 REQUIREMENT.	10.	FILLING SHALL CONSIST OF SUITABLE SELECTED FILL MATERIAL THAT MEETS THE REQUIREMENTS OF COUNCILS CONSTRUCTION FARTHWORKS SPECIFICATION (213.	6.	DETAILS OF THE
L (MIN HEIGHT ER FINAL	11.	SHOULD FILLING BELOW PAVEMENTS OCCURS OVER NATURAL GRANULAR SUBGRADE, INSTALL	7.	NO ADMIXTURES
FORMATION. THE	12.	COMPACTION TESTING SHALL BE CARRIED OUT AT THE RATE OF 2 TESTS PER 1000SQ METRES PER LAYER BY A REGISTERED NATA LABORATORY. THE COSTS OF TESTING AND	8.	FOR CHAMFERS, LOCATIONS.
WORKS.	13.	RE-TESTING ARE TO BE ALLOWED FOR BY THE CONTRACTOR. BATTER SLOPES TO BE AS SHOWN, OR MAXIMUM 1 VERT : 4 HORIZ. ALL CONDUITS AND	9.	NO HOLES, CHAS THE STRUCTURA
	14.	SERVICES SHALL BE LAID PRIOR TO LAYING OF FINAL PAVEMENT. ALL BATTERS AND FOOTPATHS ADJACENT TO ROADS SHALL BE TOP SOILED WITH 150 mm	10.	
	15.	THICK LAYER OF APPROVED LOAM AND SEEDED UNLESS OTHERWISE SPECIFIED. THE ADEQUACY OF THE SUBGRADE SHALL BE DETERMINED ON SITE BY COUNCIL'S REPRESENTATIVE.	11.	THE FINISHED CO MASS, COMPLET
	PA	VEMENT – FLEXIBLE		COMPACTED WIT
	1.	ASSUMED DESIGN CBR 10% TO BE CONFIRMED ONSITE DURING CONSTRUCTION PRIOR TO PLACEMENT OF PAVEMENT MATERIALS. THE CONTRACTOR IS TO UNDERTAKE SUFFICIENT CBR TESTING TO CONFIRM THE ASSUMED VALUE. WHERE A LESSER VALUE HAS BEEN DETERMINED, COUNCIL'S	12.	CURING SHALL O SURFACE HAS B EXCEPT WHERE
	2.	REPRESENTATIVE IS TO BE NOTIFIED TO DETERMINE A REVISED PAVEMENT DESIGN. ADOPTED DESIGN TRAFFIC LOADING IS OUTLINED IN THE GEOTECHNICAL REPORT.		OF MOISTURE FO
	3.	PAVEMENT TO BE CONSTRUCTED AS FOLLOWS: SURFACE COURSE – DENSE GRADED ASPHALT. AC14 TO 40mm THICKNESS.		TRAFFIC. APPRO ARE PROPOSED.
		PRIMERSEAL – EMULSION BASED HOT BITUMEN BASE COURSE – DGB 20	13.	REPAIRS TO CON
	I.	SUB BASE - DGS 40	14.	
	4. 5.	SUBGRADE SHALL DE LUMPALIED IU 100% STANDARD MAXIMUM DRY DENSITY RATIO AT OPTIMUM MOISTURE CONTENT ±2%. IN ACCORDANCE WITH CURRENT AUSTRALIAN STANDARDS. Min CBR = 10% SUBBASE COURSE SHALL BE COMPACTED TO 98% MODIFIED MAXIMUM DRY DENSITY. 150mm THICKNESS		WALLS ARE TO
	6.	BASECOURSE SHALL BE COMPACTED TO 98% MODIFIED MAXIMUM DRY DENSITY. 320mm THICKNESS.	15.	CAST-IN FIXING

- 7. PRIOR TO THE PLACEMENT OF THE PRIMERSEAL AND AFTER THE REQUIRED DENSITY IS ACHIEVED, THE PAVEMENT IS TO BE ALLOWED TO DRY BACK TO APPROXIMATELY 60% TO 70% OPTIMUM MOISTURE CONTENT.
- 8. ALL SUBGRADES TO BE PROOF ROLLED & APPROVED BY SUPERVISING ENGINEER. 9. COMPACTION TESTS ARE TO BE UNDERTAKEN FOR ALL PAVEMENT LAYERS INCLUDING SUBGRADE AT A RATE TO BE DETERMINED BY COUNCIL'S REPRESENTATIVE & THE RESULTS TO BE SUPPLIED TO THE ENGINEER PRIOR TO PLACEMENT OF THE NEXT PAVEMENT LAYER.

R0.	AD PAVEME	INTS							ST	ORMWATER DRAINAGE			
1.	ALL ROAD PAY	EMENT WOR SPECIFICATI	KS ARE TO ON.	BE CONS	TRUCTED IN A	ACCORDANCE	E WITH CO	JNCIL'S	1.	STORMWATER DRAINAGE SHALL BE GENERALLY IN ACCORDANCE WITH CURRENT AUSTRALIAN STANDARDS AND COUNCIL'S SPECIFICATION.			
2.	ALL ROAD PAN MAXIMUM DRY ALTERNATIVE	/EMENT SUB DENSITY, (A INSTRUCTION	GRADE IS TO AS1289E1.1), A I IS TO BE C	) be comi at a moi: )btained	PACTED TO A STURE CONTE FROM A GEO	CHIEVE 100 NT WITHIN TECHNICAL	% STAND 2% OF O ENGINEER.	ARD PTIMUM, OR	<ol> <li>THE CONTRACTOR/BUILDER SHALL MAINTAIN EXISTING STORMWATER FLOWS THROUGH THE WORKS AREA AND MAKE DUE ALLOWANCE FOR SEVERE WEATHER EVENTS.</li> <li>THE CONSTRUCTOR SHALL ENSURE THAT ALL WORKS ARE SECURED FOR WET WEATHER AN</li> </ol>				
3. REMOVE ANY SOFT, HEAVING, WET OR UNSTABLE SUBGRADE MATERIAL IDENTIFIED DURING PROOF ROLLING AND REPLACE USING SELECT IMPORTED FILL COMPACTED IN LAYERS NOT EXCEEDING 200 mm MEASURED LOOSE TO ACHIEVE 100% STANDARD COMPACTION. OBTAIN WRITTEN APPROVAL FROM CLIENT PRIOR TO PROCEEDING WITH THE ABOVE WORK.									<ul> <li>THAT THE WORKS ARE ADEQUATELY PROTECTED AND DRAINED SO AS TO MINIMISE ANY ADVERSE EFFECTS OF STORMWATER RUNOFF.</li> <li>4. WHERE THE BUILDER PROPOSES TO TRAVEL CONSTRUCTION PLANT IN EXCESS OF 5 TON GROSS MASS OVER INSTALLED PIPES OR CULVERTS, THE BUILDER SHALL DESIGN AND</li> </ul>				
4.	ANY FILL REQU FORMATION TO EXCEEDING 200	JIRED TO RA BE APPRON MM MEASU	NSE LEVELS /ED SELECTE RED LOOSE	TO UNDE D GRANUI TO ACHIE\	RSIDE OF PRO AR MATERIA /E A MINIMUM	DPOSED SLA L COMPACT I 98% STA	AB OR PAN ED IN LAY NDARD MA	5.	<ul><li>IMPLEMENT ADEQUATE PROTECTIVE MEASURES FOR THE CROSSING AND SHALL SUBMIT PROPOSALS TO THE SUPERINTENDENT FOR APPROVAL.</li><li>5. PIPES UNDER 225mm DIA. SHALL BE UPVC.</li></ul>				
5.	<ol> <li>IMPORTED FILL IS TO CONSIST OF IMPORTED WELL-GRADED MATERIAL THAT MEETS THE REQUIREMENTS OF COUNCIL'S CONSTRUCTION SPECIFICATION</li> </ol>									RUBBER RING JOINTED U.N.O.			
6.	REQUIREMENTS BACKFILLING FO WELL-GRADED	OF COUNCIL OR SERVICE GRANULAR 5 SPECIFIED	'S CONSTRU TRENCHES U MATERIAL. E ABOVE.	CTION SPE INDER SLA ITHER SEI	CIFICATION. ABS AND PAA LECTED INSIT	/EMENTS SH J OR IMPOR	HALL BE A TED FILL	7. 8.	ALL FRC OR RCP STORMWATER PIPES WITHIN ROAD RESERVE AREAS TO BE CLASS 4 U.N.O. PIPES SHALL BE INSTALLED WITHIN 10mm OF THE GRADE LINE AND WITHIN 10mm OF THE HORIZONTAL ALIGNMENT SHOWN ON THE DRAWINGS. THE BUILDER MAY BE REQUIRED TO RELAY ANY PIPES WHICH FALL OUTSIDE THESE TOLERANCES AT THE DISCRETION OF THE				
7.	DO NOT PROCE WITHOUT PRIOF APPROVED UNI FROM ENGINEEF	ED WITH AN R APPROVAL LESS FORMA R.	IY EARTHWO FROM CLIEN L INSTRUCTI	RKS WHIC NT. VARIA ON, INCLU	H WILL BE S TIONS FOR E DING VARIAT	UBJECT TO ARTHWORKS ON VOLUME	A VARIA1 S WILL NO S, IS OBT	<ul> <li>SUPERINTENDENT.</li> <li>9. BEDDING AND BACKFILL SUPPORT TO BE TYPE 'HS3' U.N.O</li> <li>10. MINIMUM COVER TO PIPES 300mm DIA. AND OVER GENERALLY SHALL BE 600mm IN CARPARK &amp; ROADWAY AREAS U.N.O.</li> </ul>					
8.	PAVEMENT DET C.B.R. OF 5%. COSTS ASSOCI CONTRACTOR.	TAILS HAVE CBR. SUBGI ATED WITH	BEEN DESIGI RADE CBR IS TESTING ANI	NED ASSU TO BE V D RETEST	MING A SUBO ERIFIED BY O NG ARE TO I	iRADE WITH iEOTECHNICA 3E BOURNE	I A MINIMU AL TESTIN BY THE	M SOAKED 5. ALL	11. 12. 13.	PIPES UP TO 150mm DIA SHALL BE LAID AT 1.0% MIN. GRADE U.N.O PIPES 225mm DIA AND OVER SHALL BE LAID AT 0.5% MIN. GRADE U.N.O. ANY PIPES OVER 16% GRADE SHALL HAVE CONCRETE BULKHEADS AT ALL JOINTS.			
9.	BASE AND SUE DENSITY AS A SOAKED C.B.R.	B-BASE COU MOISTURE OF 80% &	RSES SHALL CONTENT WI 30% RESPE	BE COMP THIN 2% ECTIVELY	ACTED TO 98 OF STANDAR UNO.	8% MODIFIE D OPTIMUM	D MAXIMUI AND WITH	1 DRY Minimum	14. 15.	LIFTING HOLES SHALL BE SEALED WITH A MORTAR OF 3:1 SAND:CEMENT BEFORE COMMENCEMENT OF BACKFILLING. PIPES SHALL BE LAID WITH THE SOCKET END PLACED UPSTREAM. PIPES WHICH HAVE MARKINGS INDICATING THE CROWN OR INVERT OF THE PIPE SHALL BE LAID STRICTLY IN			
COI	NCRETE									ACCORDANCE WITH THE MARKINGS. UNLESS SPECIFIED NO INDIVIDUAL LENGTH OF PIPE SHALL BE SHORTER THAN 1.2m.			
1. 2.	ALL WORKMANS CURRENT EDITIC CONCRETE QUAI	SHIP AND MA ONS WITH AM _ITY	TERIALS SHA ENDMENTS, E	LL BE IN A XCEPT WH	CCORDANCE V IERE VARIED E	VITH AS 360 3Y THE CON <sup>-</sup>	0 AND AS 1 TRACT DOC	3610 UMENTS.	16. 17.	UNLESS NOTED OTHERWISE ALL PIPES ARE TO BE RUBBER RING JOINTED USING SYNTHETIC RUBBER RINGS COMPLYING WITH AS1646 BEFORE MAKING THE JOINT, THE SPIGOT AND SOCKET SHALL BE CLEAN AND DRY EXCEPT			
З.	ALL CEMENT TO CLEAR CONCRET OTHERWISE:	BE TYPE GP E COVER TO	, GENERAL PU ALL REINFOR	JRPOSE CE CEMENT S	MENT IN ACCO HALL BE AS F	ORDANCE WI	TH AS3972 LESS SHOV	/N	18. 19	FUR ANT LUBRICANTS RELUMMENDED BY THE MANUFACTURER. ALL PIPES ARE TO BE INSTALLED IN STRICT ADHERENCE TO THE MANUFACTURERS INSTALLATION SPECIFICATIONS. FLUSH OR BUTT JOINTS SHALL NOT BE USED			
			CONCRETE	SCHEDUL	.E				20.	BACKFILL TRENCHES WITH APPROVED FILL COMPACTED IN 200mm LAYERS TO 98% OF			
	ELEMENT	EXPOSURE CLASS	STRENGTH GRADE	SLUMP	MAX. AGGREGATE SIZE	CO AGAINST GROUND	VER AGAINST FORMS	-	21.	STANDARD DENSITY. WHERE EXCAVATED MATERIAL IS TO BE USED FOR FILLING, THE MATERIAL SHALL BE INSPECTED AND APPROVED BY THE SUPERINTENDENT.			
BA	SE SLAB AND FOOTINGS HEADWALL	B2 B2	40	100	20	65	65	_	23.	THE CONTRACTOR/BUILDER SHALL MAKE ALLOWANCE FOR DE-WATERING OF ALL EXCAVATIONS THROUGHOUT THE PERIOD OF WORKS. ALL COSTS FOR RECTIFICATION OF WORKS OR MATERIAL DAMAGED BY WATER WILL BE BOURNE BY THE CONTRACTOR/BUILDER.			
P	RECAST TEMP	B2	40	100	20	65	65	_	24.	INDICATED. ALL PITS DEEPER THAN 1200 mm TO BE FITTED WITH STEP IRONS.			
	HEADWALL		+0						25.	PROVIDE A 3.0 m LENGTH OF $\varnothing$ 100 SUBSUIL DRAINAGE INTO THE OPSTREAM FACE OF ALL PITS.			
<ul> <li>4. PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 3600. THE CONTRACTOR SHALL FORWARD TO COUNCIL DELIVERY DOCKETS IDENTIFYING CONCRETE PROPERTIES, STRENGTH GRADE AND COMPLIANCE WITH AS 3792 FOR EACH CONCRETE TRUCK DELIVERY TO SITE. CONCRETE SLUMP TEST SHALL BE CARRIED OUT ON EACH CONCRETE TRUCK DELIVERY. DOCKETS AND TEST RESULTS SHALL BE PROVIDED BY THE CONTRACTOR TO COUNCIL WITHIN ONE WORKING DAY OF THE RESPECTIVE TRUCK DELIVERY.</li> <li>PAIRS OF STANDARD CONCRETE CYLINDERS SHALL BE TAKEN AND TESTED (AT 7 AND 28 DAYS) BY THE CONTRACTOR FOR EACH CONCRETE PLACEMENT UNLESS OTHERWISE DIRECTED BY COUNCIL. TEST RESULTS SHALL BE PROVIDED BY THE CONTRACTOR FOR EACH CONCRETE PLACEMENT UNLESS OTHERWISE DIRECTED BY COUNCIL. TEST RESULTS SHALL BE PROVIDED BY THE CONTRACTOR TO COUNCIL WITHIN THREE WORKING DAYS OF COMPLETING THE TESTING OF PAIRED CYLINDERS.</li> <li>5. CONCRETE SHALL BE PROPORTIONED TO LIMIT DRYING SHRINKAGE TO 600 MICROSTRAIN AT 56 DAYS IN ACCORDANCE WITH AS 1012.13. WHEN REQUESTED BY COUNCIL, TESTING SHALL BE CARRIED</li> </ul>								RETE RUCK TRUCK COUNCIL 8 DAYS) BY OUNCIL. ORKING AT 56 BE CARRIED OR EACH	27. 28. 29.	HAND-EXCAVATE STORMWATER PIPES IN VICINITY OF TREE ROOTS. WHERE DIRECTED BY THE SUPERINTENDENT THE BOTTOM OF TRENCHES OR EXCAVATIONS SHALL BE COMPACTED PRIOR TO PLACEMENT OF ANY BEDDING OR CONCRETE MATERIALS. SHOULD, IN THE OPINION OF THE SUPERINTENDENT, THE MATERIAL BE UNSATISFACTORY, IT SHALL BE REMOVED AND REPLACED WITH APPROPRIATE MATERIAL NATURAL MATERIAL WON FROM EXCAVATION MAY BE USED AS REQUIRED FOR BACKFILL SUBJECT TO SUBJECT TO GEOTECHNICAL TESTING AND CERTIFICATION AS WELL AS ANY SPECIFIC REQUIREMENTS STIPULATED IN THE DESIGN OR ACCOMPANYING PROJECT DOCUMENTS.			
6.	RESULTS ARE T	O BE FORWA	RDED TO COU MIX TO BE SU	JE AND TE INCIL. JBMITTED	& APPROVAL	OBTAINED P	RIOR TO PO	URING ANY					
7.	CONCRETE.	S SHALL BE U	JSED IN CONC	RETE UNLE	SS APPROVE	D IN WRITING	<b>5</b> .						
8.	FOR CHAMFERS,	DRIP GROOV	ES, REGLETS	, ETC. MAI	NTAIN COVER	TO REINFOR	RCEMENT A	T THESE					
9.	NO HOLES, CHAS THE STRUCTUR/ WRITTEN APPRO	SES, BLOCKO AL DRAWING OVAL OF COU	UTS, DUCTS ( S SHALL BE N NCIL'S REPRE	DR EMBEDN 1ADE IN CO ESENTATIN	1ENT OF PIPES INCRETE MEME 1'E.	S OTHER THA	AN THOSE : JT THE PRI	SHOWN ON OR					
10.		JOINTS WHEF /E.	RE NOT SHOW	'N SHALL I	BE LOCATED T	O THE APPF	ROVAL OF (	OUNCIL'S					
11.	REPRESENTATIVE. 1. THE FINISHED CONCRETE SHALL BE MECHANICALLY VIBRATED TO ACHIEVE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED WITH MECHANICAL VIBRATORS												
12.	<ul> <li>COMPACTED WITH MECHANICAL VIBRATORS.</li> <li>2. CURING SHALL COMMENCE AS SOON AS PRACTICABLE AFTER THE FINISHING OF ANY UNFORMED SURFACE HAS BEEN COMPLETED. CONCRETE CURING SHALL COMPLY WITH AS 3600, SECTION 17 EXCEPT WHERE VARIED BY THE DRAWINGS. CURING OF ALL CONCRETE IS TO BE ACHIEVED BY KEEPING SURFACES CONTINUOUSLY WET FOR A PERIOD OF 7 DAYS, AND THE PREVENTION OF LOSS OF MOISTURE FOR A TOTAL OF 14 DAYS, FOLLOWED BY A GRADUAL DRYING OUT. POLYTHENE SHEETING OR WET HESSIAN SHALL BE USED TO PROVIDE ADEQUATE PROTECTION FROM WIND AND TRAFFIC. APPROVED SPRAYED ON CURING COMPOUNDS MAY BE USED WHERE NO FLOOR FINISHES ARE PROPOSED.</li> </ul>												
13.	REPAIRS TO CON	NCRETE SHAL	L NOT BE AT	TEMPTED	WITHOUT THE	PERMISSION	N OF COUNC	IL'S					
14.	CONSTRUCTION OVERSTRESSING WALLS ARE TO HAS BEEN REMO WALL.	SUPPORT PR 5 THE STRUC BE CONSTRU IVED AND TH	OPPING IS TO TURE DUE TO CTED ON SUS E SLAB PRE-	) BE LEFT CONSTRU PENDED L LOADED W	IN PLACE WHE CTION LOADIN EVELS UNTIL VITH THE BRIC	RE NEEDED G, NO BRICK SEVEN DAYS <s or="" td="" units<=""><td>TO AVOID WORK OR F S AFTER PI S TO BE US</td><td>PARTITION ROPPING ED IN THE</td><td></td><td></td></s>	TO AVOID WORK OR F S AFTER PI S TO BE US	PARTITION ROPPING ED IN THE					
15.	CAST-IN FIXING	S, BOLTS ET	C. SHALL NOT	BE ALTE	RED WITHOUT	THE PERMIS	SION OF CO	UNCIL'S					
16.	THE CONCRETE S	SHALL BE PL		H A MANNE			N OR LOSS	OF					
	HATERIALS. MA		UNCKEI	_ <i>≕</i> ושעכו ד	nn or use enl	ιΗυ	ilo uk SIM	ILAN.					





# GENER

CLIENT: SHOALHAVEN CITY **PROJECT:** CULVERT REPLACEM ADDRESS: THE WOOL ROAD,

	N	IOT FO	DR (	10	NSTRL	ICTION	
AL NOTES	APPROVED	VED Designed: P.LITTLE					
		Drawn: P.LITTLE					
		Checked: N.GUNDLACH					
CUUNCIL		Datum	Size		Scale	Date	
1ENT		GDA2020	A1		N/A	31.10.2024	
DLD EROWAL BAY	P.LITTLE	Project No 2425	i3	Drav	wing No. C02	Rev. 4	



ADDRESS: THE WOOL ROAD, (

LEGEND	
7.00	EXISTING MAJOR CONTOURS (1m)
	EXISTING MINOR CONTOURS (0.2m)
——————————————————————————————————————	EXISTING ELECTRICAL (OVERHEAD)
W	EXISTING WATER MAIN
T	EXISTING TELECOMMUNICATIONS
S	EXISTING SEWER
	PROPOSED GRAVEL FILL
	PROPOSED TEMPORARY ROAD
/	EXISTING FENCE
	EXISTING PROPERTY BOUNDARY
	EXISTING ROAD PAVEMENT
	EXISTING CONCRETE FOOTPATH
EL	INDICATES LINEMARKING IN ACCORDANCE WITH AUSTROADS REPORT AP-R578-18
0 1 2	4 6 8 10m

		NOT FO	JR (	[0]	ISTRU	JCTION
INITIAL WORKS	APPROVED Designed: P.LITTLE					
		Drawn: P.LITTLE				
COUNCIL		Checked: N.GUNDLACH				
		Datum	Size		Scale	Date
1ENT		GDA2020	A1		1:100	31.10.2024
DLD EROWAL BAY	P.LITTLE	Project No 2425	i3	Drav	wing No. C03	Rev. 4



ADDRESS: THE WOOL ROAD, C

LEGEND	
7.00	EXISTING MAJOR CONTOURS (1m)
	EXISTING MINOR CONTOURS (0.2m)
——————————————————————————————————————	EXISTING ELECTRICAL (OVERHEAD)
W	EXISTING WATER MAIN
T	EXISTING TELECOMMUNICATIONS
S	EXISTING SEWER
	INDICATES ELEMENTS TO BE DEMOLISHED
/	EXISTING FENCE
	EXISTING PROPERTY BOUNDARY
	EXISTING ROAD PAVEMENT
	EXISTING CONCRETE FOOTPATH
0 1 2	4 6 8 10m
SCALE 1:100 (A1), 1:2	200 (A3)

	1	NOT FO	OR (	ONST	RUCTION		
RTIAL DEMOLITION	APPROVED	Designed: P.LITTLE					
		Drawn: P.LITTLE					
		Checked: N.GUNDLACH					
COUNCIL 1FNT		Datum GDA2020	Size A1	Scale 1:10(	Date 31.10.2024		
DLD EROWAL BAY	P.LITTLE	Project No 2425	53	Drawing No C04	. Rev. 4		



					NUI FUK	CONSTRU	JUTION
E	WEETLAKE BUNNETT & ABERBLATER BTY LTD		STAGE 3 - PARTIAL CULVERT CONSTRUCTION	APPROVED	Designed: P.LITTL	Ē	
2024		ABN 38 120 322 536			Drawn: P.LITTL	Ē	
2024					Checked: N.GUND	_ACH	
024		EMAIL office@westlakepunnett.com.au	LIENI: STUALTAVEN LITT LUUNLIL		Datum Size	Scale	Date
	WEETLAKE DUNNETT	PHONE 02 4423 5533 ADDRESS PO Box 1573 NOWPA NSW 25/1	PROJECT: CULVERT REPLACEMENT		GDA2020 A	1:100	31.10.2024
	WEBSITE www.westla	WEBSITE www.westlakepunnett.com.au	ADDRESS: THE WOOL ROAD, OLD EROWAL BAY	P.LITTLE	Project No. 24253	Drawing No. C05	Rev. 4
			1	·	<u> </u>		



1:100 31.10.2024 P.LITTLE 24253 C06 4

ADDRESS: THE WOOL ROAD, OLD EROWAL BAY

LEGEND	
7.00	— EXISTING MAJOR CONTOURS (1m)
	— EXISTING MINOR CONTOURS (0.2m)
——————————————————————————————————————	— EXISTING ELECTRICAL (OVERHEAD)
W	- EXISTING WATER MAIN
T	- EXISTING TELECOMMUNICATIONS
S	- EXISTING SEWER
	- INDICATES ELEMENTS TO BE DEMOLISHED
	PROPOSED NEW ROAD PAVEMENT. REFER
	PROPOSED CONCRETE WORKS
/	- EXISTING FENCE
	— EXISTING PROPERTY BOUNDARY
	EXISTING ROAD PAVEMENT
	EXISTING CONCRETE FOOTPATH
EL	INDICATES LINEMARKING IN ACCORDANCE WITH AUSTROADS REPORT AP-R578-18
0 1 2	4 6 8 10m
SCALE 1:100 (A1), 2	1:200 (A3)
	NOT FOR CONSTRUCTION
APPROV	/ED Designed: P.LITTLE
	Drawn: P.LITTLE
	Checked: N.GUNDLACH
	Datum Size Scale Date

		REINSTATE LINEMARKING USING THERMOPLASTIC.	EL BL2	EXTEND STAGE 3 TWO NEW 3-CELL ON NEW BASE SLA
	THE W	OOL ROAD	BOX OUT AND EXTEND SHOULDER FO APPROX. EXTENT SHOWN. LAP SEAL EXISTING. REFER TO TYPICAL DETAIL	RWITH
W     W       W <th>W W T T T E(0/H)</th> <th>Р</th> <th>PROVIDE FLARED TERMINAL WITH 600mm RA OFFSET SOUTH EASTERN SIDE OF CULVERT.</th> <th>REINSTATE LOG BARF T FOLLOWING COMPLET CONSTRUCT NEW SA WINGWALLS ON REIN FOOTINGS. REFER TO TIE INTO EXISTING R</th>	W W T T T E(0/H)	Р	PROVIDE FLARED TERMINAL WITH 600mm RA OFFSET SOUTH EASTERN SIDE OF CULVERT.	REINSTATE LOG BARF T FOLLOWING COMPLET CONSTRUCT NEW SA WINGWALLS ON REIN FOOTINGS. REFER TO TIE INTO EXISTING R
	S S S			L M L
		//		
THIS DRAWING AND THE CONCEPTS CONTAINED THEREIN ARE THE PROPERTY OF WESTLAKE PUNNETT & ASSOCIATES PTY LTD. NO UNAUTHORISED COPYING IS PERMITTED. ALL DIMENSIONS SHALL BE VERIFIED ON SITE. DO NOT SCALE – NO RESPONSIBILITY WILL BE TAKEN BY WESTLAKE PUNNETT & ASSOCIATES PTY LTD FOR ANY DISCREPANCIES CAUSED BY THE SCALING OF THESE DRAWINGS	REV.       AMENDMENTS         1       ISSUED DETAILED DESIGN F         2       ISSUED DETAILED DESIGN F         3       ISSUED FOR DETAILED DESI         4       ISSUED FOR TENDER	OR COMMENT OR COMMENT GN REVIEW		APPROVED         DAT           P.LITTLE         09.08.2           P.LITTLE         09.10.2           P.LITTLE         11.10.2           P.LITTLE         31.10.2           Image: Comparison of the second



STAGE 5 GENERAL ARRANGEMENT PLAN SCALE: 1:100





WESTLAKE PUNNETT & ASSOCIATES PTY LTD ABN 38 120 322 536

STAGE 5 – REMAINING

CLIENT: SHOALHAVEN CITY PROJECT: CULVERT REPLACEME ADDRESS: THE WOOL ROAD, C



SCALE 1:100 (A1), 1:200 (A3)

	Ν	NOT FO	OR (	[0]	NSTRU	JCTION	
CULVERT CONSTRUCTION	APPROVED						
		Drawn: P.LITTLE					
		Checked: N.GUNDLACH					
COUNCIL		Datum	Size		Scale	Date	
IFNT		GDA2020	2020 A1		1:100	31.10.2024	
DLD EROWAL BAY	P.LITTLE	Project No 2425	i3	Drawing No. 3 C07		Rev. 4	



						CIION	
D LONG SECTIONS	APPROVED	APPROVED Designed: P.LITTLE					
		Drawn: P.LITTLE					
		Checked: N.GUNDLACH					
COUNCIL		Datum	Size		Scale	Date	
ENT		GDA2020	A1		1:100	31.10.2024	
		Project No		Dra	wing No.	Rev.	
LD EROWAL BAY	P.LITTLE	2425	3		C08	4	





ATE ).2024 .2024		WESTLAKE PUNNETT & ASSOCIATES PTY LTD ABN 38 120 322 536		STRUCTURAL PL
).2024		EMAIL office@westlakepunnett.com.au	CLIENT:	SHOALHAVEN CITY C
	WESTLAKE PUNNETT	PHONE 02 4423 5533 ADDRESS PO Box 1573 NOWRA, NSW 2541	PR0JECT:	CULVERT REPLACEME
		WEBSITE www.westlakepunnett.com.au	ADDRESS:	THE WOOL ROAD, OL



	ABN 38 120	322 536		
	FMAII	office@westlakenunnett.com.au	CLIENT:	SHOA
TLAKE PUNNETT	PHONE	02 4423 5533 P0 Box 1573 NOWRA, NSW 2541	PROJECT:	CULV
	WEBSITE	www.westlakepunnett.com.au	ADDRESS:	THE

## SANDSTONE LOG WALL NOTES:

#### 1. NORMAL LOADING

#### THE NORMAL LOADING CONDITION ASSUMES THAT:

- THE WATER TABLE IS BELOW THE BASE OF THE WALL. - BACKFILL MATERIALS ARE ESSENTIALLY GRANULAR MATERIAL OF AT LEAST A LOOSE TO MEDIUM DENSITY.

- THE RETRAINED SURFACE IS HORIZONTAL.

2. SURFACE SLOPE WHERE THE SURFACE SLOPE OF THE RETRAINED MATERIAL IS BETWEEN 10:1 AND 4:1, THE WALL BASE DIMENSION IS TO BE INCREASED BY 0.5m.

3. SURCHARGE LOADING

WHERE THE NATURAL SURFACE BEHIND THE WALL IS TO CARRY SURCHARGE LOADING THE WALL GEOMETRY SHALL BE AMENDED TO ALLOW FOR AN EQUIVALENT WALL HEIGHT EQUAL TO THE TRUE HEIGHT PLUS 0.5m FOR EACH 5kPa OF SURCHARGE.

4. NATURE OF FOUNDATION

CONCRETE FOOTING BASE IS TO BE FOUNDED ON WEATHERED ROCK LAYER AS SHOWN IN THE DETAILS. 5. MATERIALS

MATERIALS USED FOR CONSTRUCTION OF THE WALL SHALL BE COMPETENT 2000 LONGx500x500 SANDSTONE LOGS.

6. FOUNDATION PREPARATION – ROCK

WHERE THE WALL IS FOUNDED ON BEDROCK THE PREPARATION OF THE FOUNDATION SHALL INCLUDE THE REMOVAL OF ALL LOOSE ROCK AND SOIL. ANY IRREGULARITIES IN THE LEVEL OF THE BEDROCK SHALL BE FILLED WITH MASS CONCRETE OR RIPPED ROCK COMPACTED TO A MINIMUM DRY DENSITY OF 98% STANDARD.

### 7. PLACEMENT OF ROCK

ROCK IS TO BE PLACED TO ENSURE THAT INDIVIDUAL BLOCKS ARE INTERLOCKING. TO ACHIEVE THIS, BLOCKS SHOULD BE LAID ROUGHLY COURSED AND BEDDED ON THEIR BROADEST BASES. ALL VERTICAL JOINTS BETWEEN BLOCKS SHALL BE BROKEN.

#### 8. BACKFILL – MATERIALS

MATERIAL USED FOR BACKFILLING BEHIND THE WALL SHALL BE ESSENTIALLY GRANULAR CONSISTING OF SAND, CLAYEY SAND, RIPPED SANDSTONE OR GRAVELLY MATERIAL.

9. BACKFILL – COMPACTION ANY COMPACTION OF FILL PLACED BEHIND THE WALL SHALL BE CAREFULLY CARRIED OUT TO MINIMISE THE INDUCED LATERAL STRESS AGAINST THE WALL. ALL FILL SHOULD BE PLACED IN LAYERS WITH A MAXIMUM LOOSE THICKNESS OF 250mm AND COMPACTED TO A DRY DENSITY RATIO OF NOT LESS THAN 95% BASED ON STANDARD COMPACTION. WHERE PAVEMENT CONSTRUCTION IS TO TAKE PLACE USING THE BACKFILL AS SUBGRADE MATERIAL, NEAR SURFACE COMPACTION OF THE BACKFILL SHALL BE CARRIED OUT IN ACCORDANCE WITH PAVEMENT COMPACTION REQUIREMENTS.

10. DRAINAGE

WHERE THE POTENTIAL EXISTS FOR SIGNIFICANT SURFACE RUNOFF OR SUBSURFACE GROUNDWATER FLOW OR WHERE A FREE DRAINING BACKFILL IS NOT USED, SUFFICIENT DRAINAGE MEASURES SHALL BE INCORPORATED TO ENSURE THAT WATER PRESSURE DOES NOT DEVELOP IN THE MATERIAL RETAINED BY THE WALL.

11. SLOPE STABILITY

WHERE REQUIRED THE OVERALL STABILITY OF THE SLOPE AND ROCK WALL SHALL BE EVALUATED. SUCH AN EVALUATION SHALL BE CARRIED OUT BY A SUITABILITY QUALIFIED OR EXPERIENCED GEOTECHNICAL ENGINEER PRIOR TO COMMENCING PLACEMENT OF THE WALL ROCK.

12. APPURTENANT STRUCTURE

WHERE PIPES ARE TO PASS THROUGH OR BENEATH THE ROCK WALL THEY SHALL BE ENCASED IN CONCRETE TO ENSURE THAT THE BASE OF THE WALL IS FOUNDED IN COMPETENT MATERIAL.

SLAB USING CHEMSET 801.

COMPACT IN ACCORDANCE WITH

THIS DRAWING AND THE CONCEPTS CONTAINED	REV.	AMENDMENTS	APPROVE
THEREIN ARE THE PROPERTY OF WESTLAKE	1	ISSUED DETAILED DESIGN FOR COMMENT	P.LITTLE
PUNNETT & ASSOCIATES PTY LTD. NU	2	ISSUED FOR DETAILED DESIGN REVIEW	P.LITTLE
DIMENSIONS SHALL BE VERIFIED ON SITE. DO			
NOT SCALE - NO RESPONSIBILITY WILL BE	4	ISSUED FOR TENDER	P.LITTLE
TAKEN BY WESTLAKE PUNNETT & ASSOCIATES			
PTY LTD FOR ANY DISCREPANCIES CAUSED BY			
THE SCALING OF THESE DRAWINGS.			



SCALE: 1:20



SCAL	_E 1:20 (A1), 1:40 (A3)					
	١	NOT F	OR (	[0]	NSTRU	ICTION
ALL DETAILS	APPROVED	Designed: f	P.LITTLE			
		Drawn: f	P.LITTLE			
		Checked: N.GUNDLACH				
CUUNCIL		Datum GDA2020	Size A1		Scale 1:20	Date 31.10.2024
OLD EROWAL BAY	P.LITTLE	Project No 2425		Dra	wing No. C11	Rev. 4

1.5



<u>LEGEND</u>	
7.00	EXISTING MAJOR CONTOURS (1m)
	EXISTING MINOR CONTOURS (0.2m)
———— E(O/H) ————	EXISTING ELECTRICAL (OVERHEAD)
w	EXISTING WATER MAIN
T	EXISTING TELECOMMUNICATIONS
S	EXISTING SEWER
	PROPOSED NEW ROAD PAVEMENT
	PROPOSED CONCRETE WORKS
/	EXISTING FENCE
	EXISTING PROPERTY BOUNDARY
	EXISTING ROAD PAVEMENT
	EXISTING CONCRETE FOOTPATH
	PROPOSED SILT CURTAIN
SF	PROPOSED SEDIMENT FENCE (SD 6-8)
0 1 2	4 6 8 10m
SCALE 1:100 (A1), 1:20	)0 (A3)
	NOT FOR CONSTRUCTION
APPROVED	Designed: N.GUNDLACH
	Drawn: N.GUNDLACH
	Checked: P.LITTLE
	N/A A1 Scale Date 31.10.2024
	Project No. Drawing No. Rev.

STABILISE STOCKPIL SURFACE EARTH BANK FLOW FLOW CONSTRUCTION NOTES 1. PLACE STOCKPILES MORE VEGETATION, CONCENTRAT 2. CONSTRUCT ON THE CONTO	E SEDIMENT FENCE SEDIMENT FENCE MAX SPILES (SD 4-1) NTS THAN 2 (PREFERABLY 5) METRES FROM THAN 3 (PREFERABLY 5) ME	0.1 M EXISTING RD AREAS. NDS. BE LECS	GF DR 5m MIN. E	ADIENT OF AIN 1% TO 5% ARTH BA ONSTRUCTION NOT BUILD WITH GRAD DUILD WITH GRAD NOT REMOVING ENSURE THE STF IRREGULARITIES	CAN BE CONSTR OR WITHOUT CH 2.0m MIN <u>NK (LOW</u> NTS SOIENTS BETWEEN TREES AND SHR RUCTURES ARE FR THAT COULD IMP	RUCTED WITH IANNEL	ALL BATTER 2(H):1(V) MAX (SD 5- (SD 5-))))))))))))))))))))))))))))))))))))	
<ul> <li>3. WHERE THERE IS SUFFICIENTHAN 2 METRES IN HEIGH</li> <li>4. WHERE THEY ARE TO BEFOLLOWING THE APPROVELESS THAN 0.10.</li> <li>5. CONSTRUCT EARTH BANKSTO DIVERT WATER AROUNDRAWING 6-8) 1 TO 2 METOR</li> </ul>	NT AREA, TOPSOIL STOCKPILES SHALL T. IN PLACE FOR MORE THAN 10 DAYS, S D ESCP OR SWMP TO REDUCE THE C- (STANDARD DRAWING 5-5) ON THE C ID STOCKPILES AND SEDIMENT FENCES TRES DOWNSLOPE.	- BE LESS STABILISE FACTOR TO JPSLOPE SIDE (STANDARD - JO A 15	4 5 6 9 11N SECTIONS OF SUPPORT POST 0mm OVERLAP.	IRREGULARITIES BUILD THE DRAIN SECTIONS, NOT Y ENSURE THE BAN COMPLETE PERM/ CONSTRUCTION. FABRIC AT WITH A	THAT COULD IMP IS WITH CIRCULA V-SHAPED IKS ARE PROPER ANENT OR TEMPO	EDE WATER F R, PARABOLIG LY COMPACTE RARY STABIL	ELOW. OR TRAPEZOI	D.
DRAINAGE ARI MAXIMUM 1:2 WIRE OR S DISTURE DISTURE 0.6m MAX. 0.2m	EA MAXIMUM 0.6HA SLOPE GRADIENT SLOPE LENGTH MAXIMUM 60m	OF OVERLAP. UNDISTURBED AREA	V POSTS DRIV ENSURE ALL ARE FITTED	<ul> <li>FIX SELF-SUPPO UP SLOPE SIDE GOES TO THE B THE GEOTEXTILE RECOMMENDED B USE GEOTEXTILE FOR SEDIMENT F CLOTH FOR THIS SATISFACTORY.</li> <li>VEN 0.6m INTO GRO POSTS/STAR PIO WITH SAFETY CA</li> </ul>	URTING GEOTEXTIL OF THE POSTS E ASE OF THE TRE WITH WIRE TIES Y THE MANUFAC SPECIFICALLY P ENCING. THE USE PURPOSE IS NO	.E TO THE NSURING IT NCH. FIX 5 OR AS TURER. ONLY RODUCED OF SHADE T		
CUT A 200mm DEEP TRENCH ALONG THE UP SLOPE OF THE FENCE FOR T BOTTOM OF THE FABRIC TO BE ENTRENCHED. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC ANI COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.	THE <u>SEDIMENT FENCE</u>	E DETAIL (SD	<u>6-8)</u>					
THIS DRAWING AND THE CONCEPTS CONTAINED	REV. AMENDMENTS					APPROVED	DATE	
THEREIN ARE THE PROPERTY OF WESTLAKE PUNNETT & ASSOCIATES PTY LTD. NO UNAUTHORISED COPYING IS PERMITTED. ALL DIMENSIONS SHALL BE VERIFIED ON SITE. DO NOT SCALE – NO RESPONSIBILITY WILL BE TAKEN BY WESTLAKE PUNNETT & ASSOCIATES	1     ISSUED FOR DETAILED DESIGN       4     ISSUED FOR TENDER	N REVIEW				P.LITTLE P.LITTLE	11.10.2024 31.10.2024	
PTY LTD FOR ANY DISCREPANCIES CAUSED BY THE SCALING OF THESE DRAWINGS.								

ALL BATTER GRADES



5 PERCENT. - WORK AROUND THEM. IONS OR OTHER

TRAPEZOIDAL CROSS

TO PREVENT FAILURE. TION WITHIN 10 DAYS OF





WESTLAKE PUNNETT & ASSOCIATES PTY LTD ABN 38 120 322 536

office@westlakepunnett.com.au

02 4423 5533

# SEDIMENT AND EROS

**CLIENT**: SHOALHAVEN CITY **PROJECT:** CULVERT REPLACEM ADDRESS: THE WOOL ROAD, OLD EROWAL BAY

# STANDARD SCHEDULE OF EROSION & SEDIMENT CONTROL MEASURES TO BE IMPLEMENTED DURING CONSTRUCTION.

- 1. ALL EROSION SEDIMENT AND POLLUTION CONTROLS ARE TO BE IN ACCORDANCE WITH "SOILS AND CONSTRUCTION - MANAGING URBAN STORMWATER", 4th EDITION, LANDCOM, MARCH 2004 (THE BLUE BOOK). 2. CONSTRUCTION SHALL BE PHASED SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE. THIS WILL LIMIT THE DURATION DISTURBED AREAS ARE TO BE EXPOSED TO EROSION.
- PERIMETER/DIVERSION BANKS ARE TO BE STABILISED IMMEDIATELY AFTER THEY ARE CONSTRUCTED. 3. THE CONTRACTOR IS TO MONITOR WEATHER FORECASTS DAILY AND PLAN WORK STAGING TO MINIMISE THE RISK OF EXPOSURE DURING SIGNIFICANT WEATHER EVENTS.
- 4. TOPSOIL STOCKPILES ARE TO BE LOCATED AS DIRECTED BY SUPERVISING ENGINEER OR SURVEYOR. STOCKPILES ARE TO BE IMMEDIATELY VEGETATED BY SEED AND FERTILIZER APPLICATION FOLLOWING FINAL PLACEMENT AND WATERING TO PROMOTE REVEGETATION. HAYBALES OR SEDIMENT FILTER FENCES ARE TO BE PLACED AROUND THE PERIMETER OF THE STOCKPILES TO ACT AS EROSION AND SEDIMENT CONTROLS.
- 5. SEDIMENT AND DEBRIS SHALL BE REMOVED FROM DETENTION BASINS WHEN THEY ARE 60% FULL. ALL SEDIMENT REMOVED SHALL BE DISPOSED OF AS DIRECTED BY COUNCIL OR COUNCILS REPRESENTATIVE. 6. ALL CUT AND FILL BATTERS SHALL HAVE A GRADE OF 4H:1V OR AS SHOWN. ANY WITH A SLOPE LENGTH
- IN EXCESS OF 7 METRES SHALL HAVE A 1.5m WIDE BERM CONSTRUCTED INTO THE TOE OR THE TOP OF THE BATTER AND TEMPORARY BARRIERS OF HAY BALES SHALL BE CONSTRUCTED TO DIVERT THE WATER EITHER DOWN HALF ROUND PIPES AND INTO DRAINAGE STRUCTURES OR ALONG DIVERSION DRAINS. UPON COMPLETION OF SHAPING, BATTERS AND DISTRUBED AREAS SHALL BE TOPSOILED TO A MINIMUM DEPTH OF 150mm AND SEEDED WITH ANNUAL GRASSES. ANY DISTURBED AREAS WHICH ARE SEEDED AND ARE ANTICIPATED TO BE EXPOSED TO FLOODWATERS SHALL UTILISE OPEN WEAVE BIODEGRADABLE JUTE MATTING.
- 7. TEMPORARY EROSION AND SEDIMENT CONTROLS ARE TO BE INSTALLED DURING CONSTRUCTION. THESE CONTROLS ARE TO INCLUDE -
- 7.1. ALL WEATHER ACCESS ROAD NOMINALLY CRUSHED ROCK ON GEOTEXTILE FABRIC TO SUIT CONSTRUCTION VEHICLES.
- 7.2. ESTABLISHMENT OF STOCKPILE LOCATIONS WITH EARTHEN BUND TO THE UPSLOPE SIDE AND SEDIMENT FENCE TO THE DOWNSLOPE SIDE.
- 7.3. HIGH VISIBILITY SILT CURTAIN TO THE WATER SIDE OF LEVEE REPAIRS.
- 7.4. SEDIMENT FENCING TO WORKS PERIMETER ON THE LAND SIDE OF WORKS.
- 8. ANY CONSTRUCTION EXITS SHALL BE CONSTRUCTED USING SHAKER GRID. 9. ALL SEDIMENT CONTROL DEVICES SHALL BE RETAINED WHILE ANY DISTURBED AREAS REMAIN OR ARE CONTRIBUTING SEDIMENT TO A STORMWATER SYSTEM. NO DEVICES SHALL BE REMOVED UNTIL APPROVED
- BY THE PRINCIPAL. 10. ADDITIONAL SEDIMENT & EROSION CONTROL MEASURES TO BE PROVIDED AS PER THE PRINCIPALS REQUIREMENTS.

# AIR & NOISE POLLUTION CONTROL

- 1. SUPPRESS DUST BY THE FOLLOWING METHODS WHERE APPLICABLE:
- 1.1. STAGE WORKS TO LIMIT THE EXTENT OF EXPOSED AND UNPROTECTED AREAS. 1.2. CONDUCT REGULAR SPRAYING OF WATER.
- 1.3. COVER AND SECURE VEHICULAR LOADS ENTERING/EXITING THE SITE.
- 1.4. USE AN ENVIRONMENTALLY FRIENDLY CHEMICAL SPRAY TO BIND SOIL TOGETHER THUS STABILISING
- UNUSED SOIL. 1.5. RESTRICT SPEED OF VEHICLES ONSITE.
- 1.6. COVER STOCKPILES TO PROTECT THEM FROM WIND.
- 1.7. PROVIDE 1.8m HIGH DUST SCREENS; SHADE CLOTH, PVC BANNER OR POLYESTER MESH; SECURELY FIXED TO PERIMETER FENCE. 2. IMPLEMENT MEASURES TO LIMIT AIR POLLUTION BY VEHICLES AND PLANT WORKING ON OR PASSING THROUGH THE SITE.
- 3. MAINTAIN POLLUTION CONTROL MEASURES DURING CONSTRUCTION AND UNTIL FULL STABILISATION. ROUTINELY INSPECT EACH WEEK AND AFTER SIGNIFICANT RAINFALL EVENTS. REPAIR AND REINSTATE WORKS AS NEEDED TO MAINTAIN PROTECTION. RECORD MAINTENANCE ACTIVITIES AND DETAILS AND PROVIDE TO EPA FOR INSPECTION WHEN REQUESTED.
- 4. ENSURE ALL CONSTRUCTION WORK THAT GENERATES NOISE TAKES PLACE ONLY WITHIN THE PRE-APPROVED OPERATING HOURS FOR THE PROJECT: MONDAY TO FRIDAY, BETWEEN 7A.M. & 6P.M.
  - SATURDAY, BETWEEN 8A.M & 3P.M.

	I		JN (	_ UI	1 J I CU	CTUN
SION CONTROL DETAILS	APPROVED	Designed: N	I.GUNDL	ACH		
		Drawn: N	I.GUNDL	ACH		
		Checked: P	P.LITTLE			
CUUNCIL		Datum	Size		Scale	Date
1ENT		GDA2020	A1		NTS	31.10.2024
		Project No.	•	Dra	wing No.	Rev.
DLD EROWAL BAY	P.LITTLE	2425	3		C13	4

# NOT FOR CONSTRUCTION



# APPENDIX B – NSW THREATENED SPECIES LIKELIHOOD OF OCCURRENCE TABLE

The table of likelihood of occurrence (below) evaluates the likelihood of threatened species to occur on the subject site. This list is derived from previously recorded species within a 5 km radius (taken from Office of Environment and Heritage (OEH) Wildlife Atlas) around the subject site (search undertaken on 11 October 2024). Ecology information has been obtained from the Threatened Species Profiles on the NSW OEH website (www.threatenedspecies.environment.nsw.gov.au).

#### Likelihood of occurrence in study area

- Unlikely Species, population or ecological community is not likely to occur. Lack of previous recent (<25 years) records and suitable potential habitat limited or not available in the study area.
- Likely Species, population or ecological community could occur and study area is likely to provide suitable habitat. Previous records in the locality and/or suitable potential habitat in the study area.
- 3. Present Species, population or ecological community was recorded during the field investigations.

#### **Possibility of impact**

- 1. Unlikely The proposal would be unlikely to impact this species or its habitats. No EP&A Act 5-Part Test or EPBC Act significance assessment is necessary for this species.
- Likely The proposal could impact this species, population or ecological community or its habitats. An EP&A Act 5-Part Test and/or EPBC Act significance assessment is required for this species, population or ecological community.



Endangered Ecological Community name	Status	Likelihood of presence within areas impacted by the activity
Bangalay Sand Forest of the Sydney Basin and South East Corner Bioregions	Endangered - NSW BC Act	Mapped as occurring approximately 450m from the site, but site surveys confirmed that this EEC does not occur in close proximity such that it is at risk of being impacted by the proposal. No vegetation removal will occur in proximity to this EEC. No indirect impacts including erosion and sediment movement will affect this EEC.
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions	Endangered - <i>NSW</i> BC <i>Act</i> Vulnerable - Commonwealth <i>EPBC Act</i>	Does not occur on-site and is not mapped as occurring in close proximity to the site
Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	Endangered - <i>NSW</i> BC <i>Act</i>	Does not occur on-site and is not mapped as occurring in close proximity to the site.
Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion	Endangered - <i>NSW</i> BC <i>Act</i> Critically Endangered - Commonwealth <i>EPBC Act</i>	Does not occur on-site and is not mapped as occurring in close proximity to the site.



Littoral Rainforest in the New S Coast, Sydney Basin and Sout Bioregions	South Wales North th East Corner	Endangered - NSW BC Act Critically Endangered - Commonwealth EPBC Act	Does not occur on-site and is not site.	mapped as occurring in close proximity to the
Swamp oak floodplain forest o Coast, Sydney Basin and Sout bioregions	f the NSW North th East Corner	Endangered - <i>NSW</i> BC <i>Act</i> Endangered - Commonwealth <i>EPBC Act</i>	Mapped as occurring approximate confirmed that this EEC does not being impacted by the proposal. N this EEC. No indirect impacts inclu this EEC.	ely 280m from the site, but site surveys occur in close proximity such that it is at risk of lo vegetation removal will occur in proximity to uding erosion and sediment movement will affect
Swamp sclerophyll forest on co the NSW North Coast, Sydney East Corner bioregions	pastal floodplains of Basin and South	Endangered - NSW BC Act	Mapped as occurring in proximity investigations. Further assessmer	to the site and confirmed as occurring during nt undertaken in section 3.3.2 of this REF.
Species name	Status	Habitat requirements (w	ww.environment.nsw.gov.au)	Likelihood of presence within areas impacted by the activity
FLORA				
Narrow-leafed Wilsonia Wilsonia backhousei	Vulnerable NSW BC Ad	ct This is a species of the marg	ins of salt marshes and lakes.	No – no habitat present.



Ettrema Mallee Eucalyptus sturgissiana	Vulnerable NSW BC Act	The Ettrema Mallee is mostly restricted to the Northern Budawang Range in Morton National Park, with a few occurrences on the nearby coastal plain. Usually grows as an emergent in low shrub-heath. Grows on sandy, swampy soils.	No – no habitat present. Conspicuous species not observed on site.
Biconvex Paperbark <i>Melaleuca biconvexa</i>	Vulnerable BC Act and EPBC Act	Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	No – Conspicuous species not observed on site.
Scrub Turpentine <i>Rhodamnia rubescens</i>	Critically Endangered NSW BC Act	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	No - Conspicuous species not observed on site.
Magenta Lilly Pilly Syzygium paniculatum	Endangered BC Act Vulnerable EPBC Act	Occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral rainforest.	No – no habitat present. Conspicuous species not observed on site.
Thick Lip Spider Orchid Caladenia tessellata	Vulnerable BC Act Vulnerable EPBC Act	Generally found in grassy sclerophyll woodland on clay loam or sandy soils.	No – no habitat present.
Pretty Beard Orchid Calochilus pulchellus	Endangered BC Act Endangered EPBC Act	At Vincentia the species grows in low Scribbly Gum dominated woodland with a low wet heath understorey. The soil is a sandy loam overlying sandstone. In Booderee National Park it grows in a tall heathy association. In Morton National Park on the Little Forest Plateau it occurs in low heath among scattered clumps of emergent eucalypts and Banksia in shallow coarse white sand over sandstone, in a near-escarpment area subject to strong orographic precipitation.	No – no habitat present.
Leafless Tongue Orchid Cryptostylis hunteriana	Vulnerable BC Act Vulnerable EPBC Act	The larger populations typically occur in woodland dominated by Scribbly Gum ( <i>Eucalyptus sclerophylla</i> ), Silvertop Ash ( <i>E. sieberi</i> ), Red Bloodwood ( <i>Corymbia gummifera</i> ) and Black	No – no habitat present.



		Sheoak (Allocasuarina littoralis); appears to prefer open areas	
		in the understorey of this community and is often found in	
		association with the Large Tongue Orchid (C. subulata) and	
		the Tartan Tongue Orchid (C. erecta).	
Bauer's Midge Orchid	Endangered BC Act	Grows in dry sclerophyll forest and moss gardens over	No – no habitat present.
Genoplesium baueri	Endangered EPBC Act	sandstone.	
Jervis Bay Leek Orchid	Endangered BC Act	Jervis Bay Leek Orchid is currently known from three areas	No – no habitat present.
Prasophyllum affine	Endangered EPBC Act	south-east of Nowra on South Coast. These are Kinghorne	
		Point, Wowly Gully near the town of Callala Bay, and near the	
		township of Vincentia.	
		Grows on poorly drained grey clay soils that support low	
		heathland and sedgeland communities.	
Pterostylis ventricosa	Endangered BC Act	Predominantly in more open areas of tall coastal eucalypt	Unlikely to occur due to history of physical
		forest often dominated by one or more of the following tree	ground disturbance and likely importation of fill
		species:- Turpentine, Spotted Gum, Grey Ironbark, Blackbutt,	material for the bridge approaches.
		White Stringybark, Scribbly Gum and Sydney Peppermint.	
		Often favours more open areas such as along powerline	
		easements and on road verges where the tree overstorey has	
		been removed or thinned.	
		Grows in a range of groundcover types, including moderately	
		dense low heath, open sedges and grasses, leaf litter, and	
		mosses on outcropping rock. Small moss gardens are a	
		commonly associated micro-habitat feature in most habitats.	
		Soil type ranges from moisture-retentive grey silty loams to	
		grey sandy loams.	
		Sometimes found in skeletal soils on sandstone rock shelves.	
AMPHIBIANS			
Green and Golden Bell Frog	Endangered BC Act	Inhabits marshes, dams and stream-sides, particularly those	No – no habitat present.
Litoria aurea	Vulnerable EPBC Act	containing bullrushes (Typha spp.) or spikerushes (Eleocharis	
		spp.).	



Giant Burrowing Frog Heleioporus australiacus	Vulnerable BC Act Vulnerable EPBC Act	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Breeding habitat is generally soaks or pools within first or second order streams. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites.	No - No important habitat will be removed or otherwise affected.
Green Turtle Chelonia mydas	Vulnerable BC Act Vulnerable EPBC Act	Ocean-dwelling species spending most of its life at sea.	No – no habitat present.
Hawksbill Turtle Eretmochelys imbricata	Vulnerable EPBC Act	Ocean-dwelling species spending most of its life at sea.	No – no habitat present.
MICRO-CHIROPTERAN BA	TS		
BIRDS			
White-throated Needletail <i>Hirundapus caudacutus</i>	Vulnerable BC Act Vulnerable EPBC Act	In Australia, the White-throated Needletail is mostly aerial. Although the species appears to primarily roost aerially, it	Possibly occurring transiently within / over the site. No important habitat will be removed or
		woodlands. Does not breed in Australia	otherwise affected.
Black Bittern <i>Ixobrychus</i> flavicollis	Vulnerable BC Act	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	No – no habitat present.
White-bellied Sea-Eagle Haliaeetus leucogaster	Vulnerable BC Act	<ul> <li>Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea.</li> <li>Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent</li> </ul>	Possibly occurring transiently within the site. Highly mobile species. No important habitat will be removed or otherwise affected.



		eucalypts and often have emergent dead branches or large	
		dead trees nearby which are used as 'guard roosts'. Nests	
		are large structures built from sticks and lined with leaves or	
		grass.	
Square-Tailed Kite	Vulnerable NSW BC	Summer breeding migrant to the south-east, including the	Possibly occurring transiently over or within
Lophoictinia isura	Act	NSW south coast, arriving in September and leaving by	the site. Highly mobile species. No important
		March. Found in a variety of timbered habitats including dry	habitat will be removed or otherwise affected.
		woodlands and open forests. Shows a particular preference	
		for timbered watercourses large hunting ranges of more than	
		100km <sup>2</sup> Nest within large hollow bearing trees generally	
		within 200m of riparian areas.	
Eastern Osprey Pandion	Vulnerable BC Act	Favour coastal areas, especially the mouths of large rivers,	Possibly occurring transiently over or within the
cristatus		lagoons and lakes.	site. Highly mobile species. No important
		Feed on fish over clear, open water.	habitat will be removed or otherwise affected.
		Nests are made high up in dead trees or in dead crowns of live	
		trees, usually within one kilometre of the sea.	
Sooty Oystercatcher	Vulnerable	Shore bird – breeds in sand or coral scrapes on offshore	No - No suitable habitat occurs on site. No
Sooty Oystercatcher Haematopus fuliginosus	Vulnerable NSW BC Act	Shore bird – breeds in sand or coral scrapes on offshore islands	No - No suitable habitat occurs on site. No important habitat will be removed or otherwise
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Sooty Oystercatcher Haematopus fuliginosus Pied Oystercatcher	Vulnerable NSW BC Act Endangered BC Act	Shore bird – breeds in sand or coral scrapes on offshore islands Favours intertidal flats of inlets and bays, open beaches and	No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected. No - No suitable habitat occurs on site. No
Sooty Oystercatcher Haematopus fuliginosus Pied Oystercatcher Haemotopus longirostris	Vulnerable NSW BC Act Endangered BC Act	Shore bird – breeds in sand or coral scrapes on offshore islands Favours intertidal flats of inlets and bays, open beaches and sandbanks.	No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected. No - No suitable habitat occurs on site. No important habitat will be removed or otherwise
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Sooty Oystercatcher Haematopus fuliginosus Pied Oystercatcher Haemotopus longirostris	Vulnerable NSW BC Act Endangered BC Act	Shore bird – breeds in sand or coral scrapes on offshore islands Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is	No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected. No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
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Sooty Oystercatcher Haematopus fuliginosus Pied Oystercatcher Haemotopus longirostris	Vulnerable NSW BC Act Endangered BC Act	Shore bird – breeds in sand or coral scrapes on offshore islands Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish. Nests mostly on coastal or estuarine beaches although	No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected. No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
Sooty Oystercatcher Haematopus fuliginosus Pied Oystercatcher Haemotopus longirostris	Vulnerable NSW BC Act Endangered BC Act	Shore bird – breeds in sand or coral scrapes on offshore islands Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are	No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected. No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
Sooty Oystercatcher Haematopus fuliginosus Pied Oystercatcher Haemotopus longirostris	Vulnerable NSW BC Act Endangered BC Act	Shore bird – breeds in sand or coral scrapes on offshore islands Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often	No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected. No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
Sooty Oystercatcher Haematopus fuliginosus Pied Oystercatcher Haemotopus longirostris	Vulnerable NSW BC Act Endangered BC Act	Shore bird – breeds in sand or coral scrapes on offshore islands Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones.	No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected. No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
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		vegetation (e.g. swamps, flooded grasslands or heathlands,	
		around bogs and other water bodies). However, they can also	
		occur in habitats with saline or brackish water, in modified or	
		artificial habitats, and in habitats located close to humans or	
		humn activity.	
Eastern Curlew Numenius	Critically Endangered	It generally occupies coastal lakes, inlets, bays and estuarine	No - No suitable habitat occurs on site. No
madagascariensis	EPBC Act	habitats, and in New South Wales is mainly found in intertidal	important habitat will be removed or otherwise
-		mudflats and sometimes saltmarsh of sheltered coasts.	affected.
		Occasionally, the species occurs on ocean beaches (often	
		near estuaries), and coral reefs, rock platforms, or rocky islets	
		It forages in or at the edge of shallow water, occasionally on	
		exposed algal mats or waterweed, or on banks of beach-cast	
		seagrass or seaweed.	
		It roosts on sandy spits and islets, especially on dry beach	
		sand near the high-water mark, and among coastal vegetation	
		including low saltmarsh or mangroves. May also roost on	
		wooden oyster leases or other similar structures	
Sooty Tern Onychoprion	Vulnerable NSW BC Act	The Sooty Tern is found over tropical and sub-tropical seas	No - No suitable habitat occurs on site. No
fuscata		and on associated islands and cays around Northern Australia.	important habitat will be removed or otherwise
		In NSW only known to breed at Lord Howe Island.	affected.
		Occasionally seen along coastal NSW, especially after	
		cyclones.	
Gang-gang Cockatoo	Vulnerable NSW BC	Tall mountain forests and woodlands, particularly in heavily	Possibly occurring transiently within the site.
Callocephalon fimbriatum	Act	timbered and mature wet sclerophyll forests. In winter, may	Highly mobile species. No important habitat
		occur at lower altitudes in drier more open eucalypt forests	will be removed or otherwise affected.
		and woodlands, and often found in urban areas. preferring	
		more open eucalypt forests and woodlands, particularly in	
		box-ironbark assemblages, or in dry forest in coastal areas.	
		Favours old growth attributes for nesting and roosting	



South-eastern Glossy Black-Cockatoo Calyptorhynchus lathami lathami	Vulnerable BC Act Vulnerable EPBC Act	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (Allocasuarina littoralis) and Forest Sheoak (A. torulosa) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, Allocasuaraina diminuta, and A. gymnathera. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in	Possibly occurring transiently over or within the site. Highly mobile species. No important habitat will be removed or otherwise affected. No sign of feeding from Black Sheoaks in the vicinity of the proposed activity.
		open woodlands dominated by Belah (Casuarina cristata).	
		Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species), shredding	
Little Lorikoot	Vulnarabla NSW/DC	Ine cones with the massive bill.	Describly accurring transiently within the cite
Little Lorikeet Glossopsitta pusilla	Vulnerable NSW BC ACT	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species Roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts. Entrance is small (3 cm) and usually high above the ground (2–15 m). These nest sites are often used repeatedly for decades, suggesting that preferred sites are limited. Riparian trees often chosen, including species like Allocasuarina	Possibly occurring transiently within the site. Highly mobile species. No important habitat will be removed or otherwise affected.



Swift ParrotEndangered EPBC ActMigrates to the Australian south-east mainland between MarchPossibly occurring transiently over or withinLathamus discolourEndangered NSWBCand October. On the mainland they occur in areas wheresite. Highly mobile species. No importantActeucalypts are flowering profusely or where there are abundanthabitat will be removed or otherwise affected	the
Lathamus discolourEndangered NSW BC Actand October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundantsite. Highly mobile species. No important habitat will be removed or otherwise affected	
Act eucalypts are flowering profusely or where there are abundant habitat will be removed or otherwise affected	
	d.
lerp (from sap-sucking bugs) infestations. Favoured feed trees	
include winter flowering species such as Swamp Mahogany	
(Eucalyptus robusta), Spotted Gum (Corymbia maculata), Red	
Bloodwood (C. gummifera), Mugga Ironbark (E. sideroxylon),	
and White Box (E. albens). Commonly used lerp infested trees	
include Inland Grey Box E. microcarpa, Grey Box E.	
moluccana and Blackbutt E. pilularis. Return to some foraging	
sites on a cyclic basis depending on food availability. Following	
winter they return to Tasmania where they breed from	
September to January, nesting in old trees with hollows and	
feeding in forests dominated by Tasmanian Blue Gum	
Eucalyptus globulus.	
Eastern Ground Parrot Vulnerable BC Act The Ground Parrot occurs in high rainfall coastal and near No - No suitable habitat occurs on site. No	
Pezoporus wallicus wallicus coastal low heathlands and sedgelands, generally below one important habitat will be removed or otherw	ise
metre in height and very dense (up to 90% projected foliage affected.	
cover). These habitats provide a high abundance and diversity	
of food, adequate cover and suitable roosting and nesting	
opportunities for the Ground Parrot, which spends most of its	
time on or near the ground. When flushed, birds fly strongly	
and rapidly for up to several hundred metres, at a metre or less	
above the ground.	
Powerful Owl Vulnerable NSW BC Coastal Woodland, Dry Sclerophyll Forest, wet sclerophyll Possibly occurring transiently over or within	
Ninox strenua Act forest and rainforest- Can occur in fragmented landscapes the site outside of construction hours. Highl	v
Roosts in dense vegetation comprising species such as mobile species. No important habitat will be	
Turpentine Syncarpia glomulifera. Black She-oak	
Allocasuarina littoralis. Blackwood Acacia melanoxylon.	
Rough-barked Apple Angophora floribunda. Cherry Ballart	
Exocarpus cupressiformis and a number of eucalypt	
species requires old growth elements-hollow bearing tree	



		hollows in large eucalypts that are at least 150yrs old. Often in riparian areas, Large home range	
Masked Owl – Tyto	Vulnerable NSW BC	Dry eucalypt forests and woodlands from sea level to 1100	Possibly occurring transiently over or within
novaehollandiae	Act	m. Inhabits forest but often hunts along the edges of forests,	the site outside of construction hours. Highly
		including roadsides. The typical diet consists of tree-dwelling	mobile species. No important habitat will be
		and ground mammals, especially rats.	removed or otherwise affected.
		Pairs have a large home-range of 500 to 1000 hectares.	
		Roosts and breeds in moist eucalypt forested gullies, using	
		large tree hollows or sometimes caves for nesting. Requires	
		old growth elements-hollow bearing tree resources for	
		nesting and prey source.	
Sooty Owl	Vulnerable	Occurs in rainforest, including dry rainforest, subtropical and	Possibly occurring transiently over or within the
l yto tenebricosa	NSW BC Act	warm temperate rainforest, as well as moist eucalypt forests	site outside of construction hours. Highly
			mobile species. No important nabitat will be
Fastern Bristlahird Desugratio	Endongorod NSW/ DC	Habitat for control and couthern populations is characterized	removed of otherwise affected.
brachypterus	Act and EPBC Act	hy dense, low vegetation including heath and open woodland	important babitat will be removed or otherwise
brachypierus		with a heathy understorey. In porthern NSW the habitat occurs	affected
		in open forest with dense tussocky grass understorey and	anected.
		sparse mid-storey pear rainforest ecotope: all of these	
		vegetation types are fire prone.	
Regent Honeyeater	Endangered BC Act	The species inhabits dry open forest and woodland, particularly	No - No suitable habitat occurs on site. No
Anthochaera Phrygia	Critically Endangered	Box-Ironbark woodland, and riparian forests of River Sheoak.	important habitat will be removed or otherwise
	EPBC Act	Regent Honeyeaters inhabit woodlands that support a	affected.
		significantly high abundance and species richness of bird	
		species. These woodlands have significantly large numbers of	
		mature trees, high canopy cover and abundance of mistletoes.	
		Every few years non-breeding flocks are seen foraging in	
		flowering coastal Swamp Mahogany and Spotted Gum forests,	
		particularly on the central coast and occasionally on the upper	
		north coast. Birds are occasionally seen on the south coast.	



Varied Sittella	Vulnerable	Inhabits eucalypt forests and woodlands, especially those	Possibly occurring transiently within the site.
Daphoenositta chrvsoptera	NSW BC Act	containing rough-barked species and mature smooth-barked	Highly mobile species. No important habitat
		gums with dead branches, mallee and Acacia woodland	will be removed or otherwise affected
Dusky Woodswallow	Vulnerable	Primarily inhabit dry, open eucalypt forests and woodlands,	Possibly occurring transiently within the site.
Artamus cyanopterus	NSW BC Act	including mallee associations, with an open or sparse	Highly mobile species. No important habitat
cyanopterus		understorey of eucalypt saplings, acacias and other shrubs,	will be removed or otherwise affected.
		and ground-cover of grasses or sedges and fallen woody	
		debris. It has also been recorded in shrublands, heathlands	
		and very occasionally in moist forest or rainforest. Also found	
		in farmland, usually at the edges of forest or woodland.	
MAMMALS			
Spotted-tailed Quoll	Endangered	Recorded across a range of habitat types, including rainforest,	No - No suitable habitat occurs on site. No
Dasyurus maculatus	EPBC Act	open forest, woodland, coastal heath and inland riparian forest,	important habitat will be removed or otherwise
-	Vulnerable	from the sub-alpine zone to the coastline. Individual animals	affected.
	NSW BC Act	use hollow-bearing trees, fallen logs, small caves, rock	
		outcrops and rocky-cliff faces as den sites. Mostly nocturnal,	
		although will hunt during the day; spends most of the time on	
		the ground, although also an excellent climber and will hunt	
		possums and gliders in tree hollows and prey on roosting birds.	
		Use communal 'latrine sites', often on flat rocks among boulder	
		fields, rocky cliff-faces or along rocky stream beds or banks.	
		Such sites may be visited by multiple individuals and can be	
		recognised by the accumulation of the sometimes	
		characteristic 'twisty-shaped' faeces deposited by animals.	
		Females occupy home ranges up to about 750 hectares and	
		males up to 3500 hectares. Are known to traverse their home	
		ranges along densely vegetated creeklines.	



White-footed Dunnart Sminthospsis leucopus	Vulnerable NSW BC Act	Dry sclerophyll forests, sedgeland or heathland- coastal dune vegetation, coastal forest, tussock grassland and woodland and forest post disturbance – open understorey layer. They shelter in bark nests in hollows under standing or fallen timber, burrows in the ground, piles of logging debris, large grass clumps such as provided by Grass Trees <i>Xanthorrhoea</i> spp.and Cycads <i>Macrozamia</i> spp. and rock crevices	No - No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
Southern Brown Bandicoot	Endangered EPBC ACt	Southern Brown Bandicoots are largely crepuscular (active	Unlikely to occur. No suitable nabitat occurs on
(eastern) Isoodon obesulus obesulus	Act	found in heath or open forest with a heathy understorey on sandy or friable soils. They feed on a variety of ground- dwelling invertebrates and the fruit-bodies of hypogeous (underground-fruiting) fungi. Their searches for food often create distinctive conical holes in the soil. Males have a home range of approximately 5-20 hectares whilst females forage over smaller areas of about 2-3 hectares. Nest during the day in a shallow depression in the ground covered by leaf litter, grass or other plant material. Nests may be located under Grass trees Xanthorrhoea spp., blackberry bushes and other shrubs, or in rabbit burrows. The upper surface of the nest may be mixed with earth to waterproof the inside of the nest.	otherwise affected.
Koala Phascolarctos cinereus	Vulnerable NSW BC Act	Eucalypt woodland and forest Home range sizes vary with quality of habitat ranging from less than two ha to several hundred ha. Preferred tree species on the south coast are <i>Eucalyptus amplifolia, E. viminalis, &amp; E .tereticornis</i> but	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.
		numerous other species also known food trees.	
Eastern Pygmy-possum Cercatetus nanus	Vulnerable NSW BC Act	Rainforest, sclerophyll forest & woodland to heath – but heath & woodland preferred. Forages on banksias, eucalypts & bottlebrushes.	Unlikely to occur. No suitable habitat occurs on site. No important habitat will be removed or otherwise affected.



Southern Greater Glider Petauroides Volans	Vulnerable EPBC Act	Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelter during the day in tree hollows and will use up	Unlikely to occur. No important habitat will be removed or otherwise affected.
		to 18 hollows in their home range. Occupy a relatively small	
		home range with an average size of 1 to 3 ha. Give birth to a	
		single young in late autumn or early winter which remains in	
		the pouch for approximately 4 months and is independent at 9	
		months of age. Usually solitary, though mated pairs and	
		offspring will share a den during the breeding season and until	
		the young are independent. Can glide up to a horizontal	
		distance of 100m including changes of direction of as much as	
		90 degrees. Very loyal to their territory.	
Grey-headed Flying-fox	Vulnerable EPBC Act	Occur in subtropical and temperate rainforests, tall sclerophyll	Possibly occurring transiently over or within the
Pteropus poliocephalus	Vulnerable NSW BC Act	forests and woodlands, heaths and swamps as well as urban	site. Highly mobile species. No important
		gardens and cultivated fruit crops. Roosting camps are	habitat will be removed or otherwise affected.
		generally located within 20km of a regular food source and are	
		commonly found in gullies, close to water, in vegetation with a	
		dense canopy.	
Yellow-bellied Sheathtail-bat	Vulnerable BC Act	Roosts singly or in groups of up to six, in tree hollows and	Possibly occurring transiently within the site
Saccolaimus flaviventris		buildings; in treeless areas they are known to utilise mammal	outside of construction hours. No important
		burrows.	habitat will be removed or otherwise affected.
		When foraging for insects, flies high and fast over the forest	
		canopy, but lower in more open country.	
		Forages in most habitats across its very wide range, with and	
		without trees; appears to defend an aerial territory.	
Eastern Coastal Freetail-Bat	Vulnerable NSW BC	Small tree hollows/fissures in bark for roosting in dry	Possibly occurring transiently within the site
Micronomus norfolkensis	Act	sclerophyll forest, woodland, swamp forests and mangrove	outside of construction hours. No important
		forests east of the Great Dividing Range.	habitat will be removed or otherwise affected.
Eastern False Pipistrelle	Vulnerable NSW BC	Prefers moist habitat that contains trees greater than 20 m high	Possibly occurring transiently within the site
Falsistrellus tasmaniensis	Act	with a dense undertstorey. They are fast flyers.	outside of construction hours. No important
		Roosts in hollow trunks of eucalyptus trees, in colonies of 3 –	habitat will be removed or otherwise affected.
		80. Also may roost in caves and old wooden buildings. This	



		species changes roost every night. Roosts on consecutive nights are usually less than 750 m apart. This species has a home range of up to 136 ha (Churchill, S 2008, Australian Bats, Jacana Books, Crows Nest, NSW). Although they prefer habitat with a dense understorey, they prefer to forage along flyways to avoid the thick understorey. They prefer continuous forest and avoid remnant vegetation. However, they have been recorded in open forests (Churchill, S 2008, Australian Bats, Jacana Books, Crows Nest, NSW).	
Southern Myotis (Large- footed Myotis) <i>Myotis macropus</i>	Vulnerable <i>NSW</i> BC <i>Act</i>	This species is predominantly roosts in caves, however, is known to roost in trees and man- made structures close to water. Roosts are generally located close to water, where the bats forage in small groups of three or four. They have a strong association with streams and permanent waterways in areas that are vegetated rather than cleared (Churchill, S 2008, Australian Bats, Jacana Books, Crows Nest, NSW They feed on small fish, prawns and aquatic macroinvertebrates. They have a preference towards large still pools, rather than flowing streams. They will also forage an aerial insects flying over water. They use their large feet to capture prey items (Churchill 2008).	Possibly occurring transiently within the site outside of construction hours. No important habitat will be removed or otherwise affected.
Greater Broad-nosed Bat Scoteanaux ruepelli	Vulnerable <i>NSW</i> BC <i>Act</i>	<ul> <li>Found mainly in gullies and river systems that drain the Great Dividing Range, it utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, below 500m, though it is most commonly found in tall wet forest.</li> <li>Although this species usually roosts in tree hollows, it has also been found in buildings.</li> <li>Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m</li> </ul>	Possibly occurring transiently within the site outside of construction hours. No important habitat will be removed or otherwise affected.



Insects			
Giant Dragonfly Petalura	Endangered NSW BC	Live in permanent swamps and bogs with some free water	Unlikely to occur. No important habitat will be
gigantea	Act	and open vegetation.	removed or otherwise affected.

