



Tweed Heads Boat Maintenance Facility

Review of Environmental Factors

Transport for NSW

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Approval and authorisation

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1 Introduction

1.1 Overview

This document comprises a Review of Environmental Factors (REF) for the proposed upgrade of an existing boat maintenance facility at Tweed Heads (Southern Boatharbour within Terranora Creek) by decommissioning the existing slipway facility and installation of a new travel lift facility. This REF has been prepared by Royal HaskoningDHV (RHDHV) for Transport for NSW (TfNSW) to assess the potential environmental impacts of the works and propose methods of mitigating or ameliorating any adverse effects.

1.2 Background

The existing boat maintenance (slipway) facility has reached the end of its working life with significant deterioration of the slipway cradle having reduced its lifting capacity to less than 50 tonnes, which is below the load rating required for servicing of the local trawler fleet that is moored close by within the Southern Boatharbour. The slipway rails are also considered to be at the end of their life, with previous repairs required to prevent lateral movement and 'steps' in the rails increasing the difficulty of cradle movement up the ramp. In addition, the functioning of the wastewater collection system is compromised by the positioning of the slipway ramp surface drainage grate/pit below the high water mark. This has resulted in ineffective capture of washdown water and an elevated concentration of contaminants within the seabed sediments in the vicinity of the slipway ramp.

The project proposal (refer **Section 3**) comprises two separate stages of works. Stage 1 involves removal of the slipway and upgrading of the existing boat maintenance facility to a travel lift with the capacity to lift 75 tonne displacement vessels. This will involve demolition of above-ground infrastructure including the upper portion of the slipway rails, slipway winch and cradle, office building/workshop/storage container, and the concrete hardstand. The proposed future operation of a 75 tonne travel lift will require the site to be made level, including filling over the existing slipway ramp, construction of a rock revetment to protect the filled area, installation of a new pavement surface, construction of an overwater travel lift support structure, comprising concrete runway beams supported on piles, and installation of service pontoons and access gangways.

Stage 2 involves additional works to extend the footprint of the travel lift facility including:

- extension of the footprint of the proposed travel lift facility further to the east across the existing road entry, existing storage yard and adjacent grassed area;
- relocation of the road entry point;
- relocation of the storage yard;
- provision of an amenities block; and,
- installation of fencing.

A location plan of the site is included as **Figure 1**. A site plan of the existing boat slipway site which is situated on Lot 717 DP 729484 is included below in **Figure 2**. A General Arrangement plan of the proposed Stage 1 facility is included in **Appendix A**. A General Arrangement plan of the proposed Stage 2 extension works is included in **Appendix B**.

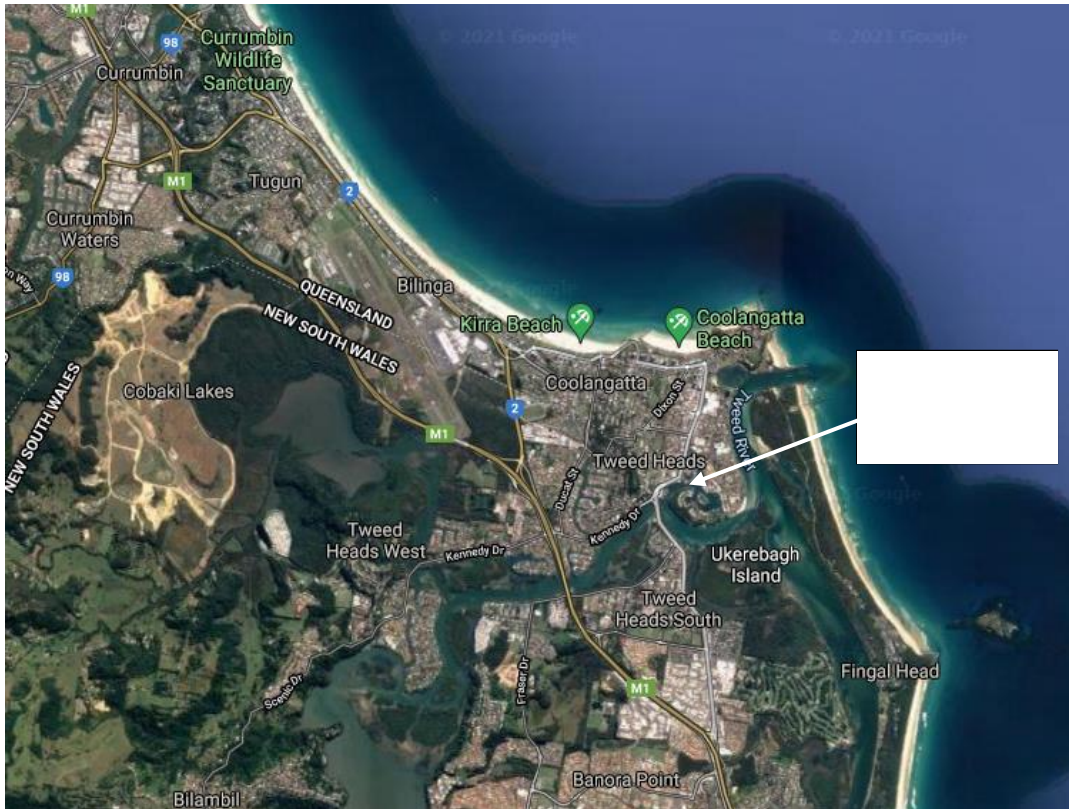


Figure 1: Location of the proposed Tweed Heads Boat Maintenance Facility



Figure 2: Location of the existing Tweed Heads slipway at Lot 717 DP 729484

1.3 Structure of this Document

This REF has been prepared to examine the likely environmental impacts from undertaking the proposed works and provide measures to mitigate the adverse effects to the surrounding environment. For the purposes of these works, TfNSW is the proponent and is also the determining authority under Part 5 of the *Environmental Planning & Assessment Act, 1979* (EP&A Act).

The description of the proposed work and assessment of associated environmental impacts have been undertaken in the context of:

- Clause 228 of the *Environmental Planning and Assessment Regulation 2000*;
- Factors in *Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979* (DUAP, 1995/1996);
- *Marinas and Related Facilities EIS Guideline* (DUAP, 1996);
- *Biodiversity Conservation Act 2016* (BC Act);
- *Fisheries Management Act 1994* (FM Act); and
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In doing so, the REF helps to fulfil the requirements of Section 5.5 of the EP&A Act including that TfNSW examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

This REF has been prepared having regard to, and drawing on, background information included in a preliminary REF document developed by Hydrosphere Consulting on behalf of the Department of Planning, Industry and Environment (DPIE) in 2019 for a previous, now superseded, concept design.

In summary, this REF document details:

- The introduction and background to the project (**Section 1**);
- The need for the proposal and options considered (**Section 2**);
- A description of the project proposal (**Section 3**);
- A review of the environmental planning framework (**Section 4**);
- Stakeholder and community consultation (**Section 5**);
- An assessment of the site conditions for each of the sensitive receptors and the potential environmental impacts (**Section 6**);
- Identification of the proposed mitigation and control measures (**Section 7**);
- Environmental factors considered under state and federal legislation (**Section 8**); and,
- A summary of the REF and its findings (**Section 9**).

1.4 Abbreviations

Following abbreviations and terms are used in this document.

Table 1: Abbreviations and Definitions

Term/ Acronym	Description
AHD	Australian Height Datum
AS	Australian Standard
BC Act	<i>Biodiversity Conservation Act 2016 (NSW).</i>
CEMP	Construction environmental management plan
CM SEPP	State Environmental Planning Policy (Coastal Management) 2018
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW).</i> Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).</i> Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
Fetch	
FM Act	<i>Fisheries Management Act 1994 (NSW)</i>
Heritage Act	<i>Heritage Act 1977 (NSW)</i>
ISEPP	State Environmental Planning Policy (Infrastructure) 2007
Jetty	A structure extending into the harbour generally perpendicular to the shore
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
MHWM	Mean high water mark
MNES	Matters of national environmental significance under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999.</i>
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>

Term/ Acronym	Description
Piles	Foundations used to support marine structures and offshore platforms
Pontoon	A floating structure serving as a dock
Silt curtain	A temporary sediment barrier installed parallel to the bank of a waterway used to contain sediment produced by construction operations
Slipway	A slope built leading down into water, used for launching and landing boats and ships or for building and repairing them
TMP	
TfNSW	Transport for NSW
Travel Lift	A specialised type of crane used for lifting boats out of the water
REF	Review of Environmental Factors
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
TSC Act	<i>Threatened Species Conservation Act 1995 (NSW)</i> (repealed)
Wharf	A landing place where vessels may tie up and load or unload, typically aligned parallel to shore.

2 Need and Options Considered

This section describes the strategic need and justification for the project and identifies the options considered.

2.1 Operational Needs

Infrastructure at the Tweed Heads Slipway is ageing, and some parts require significant maintenance or replacement. The slipway rails and joins are corroded, the fall of the rails is uneven along the length of the rails, the sleepers are uneven in size with some broken, and areas of concrete support are crumbling. In addition, environmental controls at the current slipway are poor and the site is contributing to contamination of surrounding estuarine sediments (refer **Section 6.2**). The upgrade is required in order to include environmental controls to minimise contamination of the river and sediments.

The current slipway has restricted capacity and is only able to service a relatively small number and range of vessels. Consultation with the local boating community indicates that there are a considerable number of non-seagoing vessels including house boats, charter boats, recreational boats and fishing boats that are based on the Tweed waterways that require a boat maintenance facility.

2.2 Strategic Needs

This project forms part of the NSW Government's commitment to providing maritime infrastructure along the NSW coast and aligns with outcomes in the *NSW Maritime Infrastructure Plan 2019-2024*. The plan identifies the Tweed River as a key investment location for maritime infrastructure. Priority infrastructure outcomes for the Tweed River include the provision of vessel maintenance and repair facilities that meet the needs of key user groups, in particular larger commercial fishing and tourism vessels. The proposed works directly address this priority outcome for the Tweed River.

Further, the Draft Tweed River Estuary Coastal Management Program (2019) identifies "*Restricted levels of boating infrastructure and facilities or reduced navigability*" as a threat to the estuary. A priority action within the plan is to, "*Maintain and improve boating infrastructure, access and ancillary facilities for boaters*". The proposed works align with this the priority action.

2.3 Proposal Objectives and development Criteria

The main objectives of the project are summarised as follows:

- decommissioning of the existing slipway facility;
- upgrade existing boat maintenance facility to cater for operation of a 75-tonne travel lift;
- upgrading of services (electrical, water, fire) to meet current codes and regulations;
- stormwater and wastewater drainage and water treatment provisions to meet current guidelines and Council trade waste requirements;
- improving the aesthetics, general organisation and tidiness of the facility; and,
- providing a facility to meet private commercial operational requirements.

2.4 Alternatives considered

2.4.1 Option 1 - Do nothing

The do nothing approach will lead to further degradation of slipway infrastructure including additional downrating of capacity, ongoing degraded environmental controls and pollution of the adjacent waterway, and will not address the service requirements of local vessels. Accordingly, a do nothing option would not achieve the project objectives.

2.4.2 Option 2 – Maintain existing facility

Significant works would be required to maintain the existing infrastructure, but this would only maintain the status quo regarding the capacity of the facility. This option would not satisfy the requirements to cater for larger vessels, would not address environmental controls, and therefore is not supported.

2.4.3 Option 3 – Marine travel lift

The preferred option is to convert and upgrade the facility with the installation of a marine travel lift. The travel lift with an expanded hardstand area offers value for money and achieves the needs of the local users by allowing additional local vessels to be serviced by the site to meet demand.

This option was considered to be the most suitable option to maximize the commercial viability of the site, improve environmental outcomes, satisfy the repair and maintenance needs of the Tweed based vessels, and increase safety for vessel owners. The key project objectives would be achieved with this option.

The proposed incorporation of the additional Stage 2 works associated with the travel lift upgrade is consistent with the operational and strategic need for the overall project.

The additional works are required to allow increased work area for the facility and provide permanent amenities for the wider Fishermen's Co-Op jetty area.

3 Project Proposal

3.1 Description of Stage 1 Preferred Concept

The preferred Stage 1 concept plan is included in **Appendix A**. The package of concept drawings includes:

- PA2481-RHD-01-DR-W-CP01 GENERAL ARRANGEMENT
- PA2481-RHD-01-DR-W-CP02 SECTIONS SHEET 1
- PA2481-RHD-01-DR-W-CP03 SECTIONS SHEET 2
- PA2481-RHD-01-DR-W-CP04 DEMOLITION PLAN

The Stage 1 General Arrangement plan has been included as **Figure 3** below. The preferred concept for the boat maintenance facility includes:

- runway beams to support a 75 tonne capacity travel lift, comprising concrete beams supported on piles;
- one fender/guide pile seaward of each runway beam;
- service pontoons running adjacent to each runway beam, linked to shore with gangways, and fitted with service pedestals, fire fighting provisions and lighting;
- slipway ramp filling and extension of the existing rock revetment;
- hardstand pavement with surface drainage provisions;
- trade waste rain sentry device and treatment system;
- office building and storage container;
- 2.4m high palisade perimeter fencing;
- hardstand service pedestals with power outlets, potable water and lighting;
- pole-mounted outdoor lighting and CCTV system; and
- lead-in services (power, potable water, fire water, telecommunications).

The existing office building, shipping container, slipway winch and cradle, upper portion of slipway rails, perimeter fencing, existing pavement, drainage provisions and services would be demolished and removed to facilitate the proposed works.

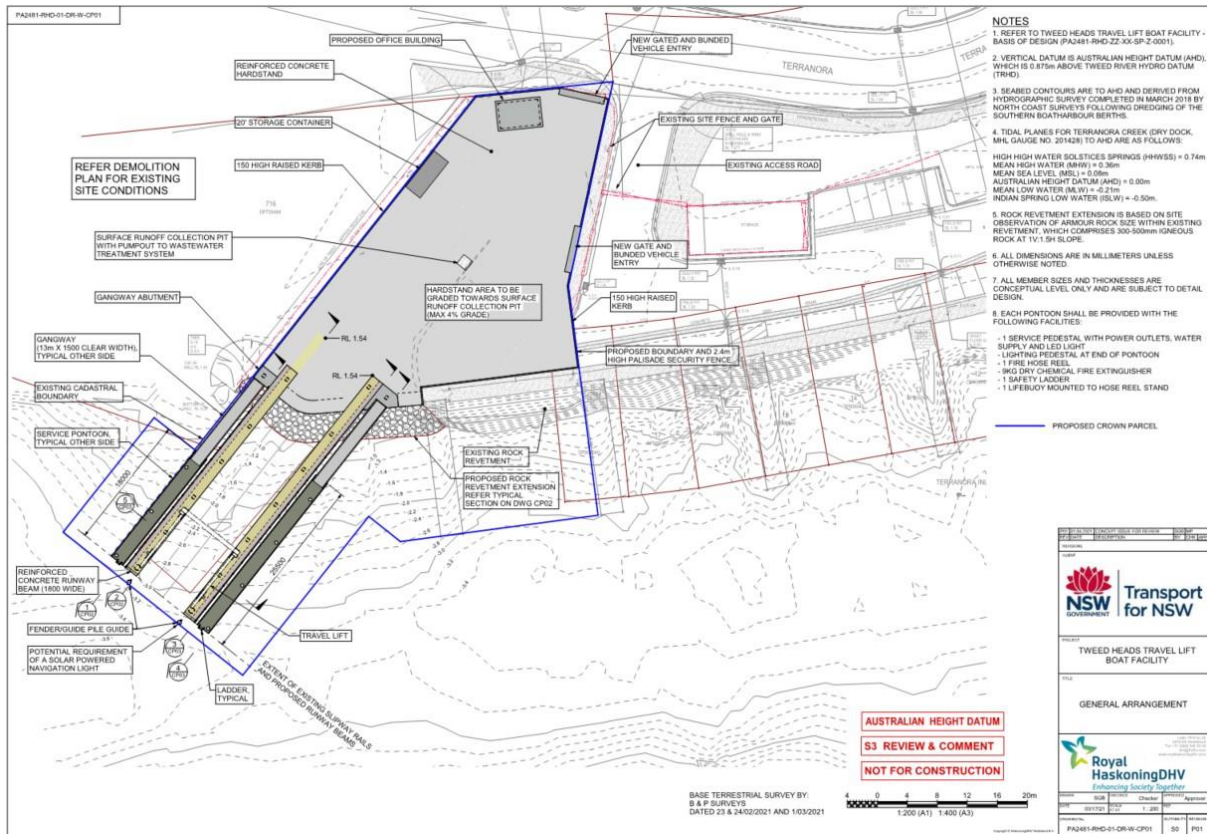


Figure 3: Stage 1 General Arrangement plan

3.1.1 Electrical Services

3.1.1.1 Review of Existing Services

3.1.1.1.1 Electrical

The existing site is currently fed by 100A three phase service from the Essential Energy street network. Service cables are overhead from Terranora Terrace opposite the site and attach to a consumer pole located within the site boundary. From the consumer pole the consumer mains reticulate down the pole and underground to the Main Switchboard. The Main Switchboard (MSB) is located on the external wall of the existing office building.

The existing MSB is in relatively fair condition with considerable spot rusting to the exterior. Within the MSB resides the retail meter, service fuses and Main Switch Isolator.

From the MSB, a sub main cable (not visible from inspection) appears to reticulate to the existing Distribution Board (DB) located within the existing office building. The DB is relatively old with obsolete switchgear. It appears from inspection that the MSB and DB are located back-to-back.

In the existing DB resides power chassis and circuit breakers. All sub circuits for the site electrical field equipment reticulate from this board.

Reticulation around the existing hardstand appears to be underground within conduits. Radially these would connect to the existing electrical equipment. The cable cover below the existing MSB indicates that most of the conduits are behind this cover.

It has been determined that all of the existing electrical field elements inclusive of MSB, DB, socket outlets lighting, switches and the like would not be suitable for reuse and would be demolished and removed from site.

It is proposed at this stage subject to inquiry to retain / reuse the existing service aerials and consumer pole. The existing metering would most likely be transferred over to the new MSB.

3.1.1.1.2 Communications

The existing communications service lead-in appears to be located on the existing consumer pole where a carrier termination point is located approximately 3.5m from ground. From the carrier termination point the comms reticulate underground to the existing office building to a phone point outlet on the wall adjacent the existing DB.

It is proposed to remove the existing carrier service and apply for a new NBN service with new lead-in to the site boundary.

3.1.1.1 Proposed Services at New Facility

3.1.1.1.1 Electrical

It is proposed to investigate and reuse the existing street service to the existing consumer pole. From the consumer pole point of attachment (the top connection with service cables), a new consumer mains service would reticulate underground to the new office building where the new MSB would reside.

The MSB proposed would be free standing and bolted to the new office building for stability. Within the new MSB would be service / metering, surge protection, power meter (demand monitoring) and circuit breaker distribution. At the current stage of design and on review of concentration of outlets it is not considered that an additional pontoon DB would be required.

For reticulation out from the MSB, all the subcircuits to the hardstand and service pontoons would be by a pit and pipe system. Conduits would turn-up from underground to the electrical field equipment, such as service pedestals, light poles or service isolators.

For the reticulation within the office building it is proposed that cables are installed in cavity or ceiling space. Chasing in walls would be the preferred method, rather than exposed conduits and mounting blocks.

Area lighting proposed would be performance fitting with a distribution pattern to limit the number of fittings required to light up the area and also to minimise light spill from the site boundary to neighbouring properties.

3.1.1.1.2 Communications

It is proposed to have a new NBN lead-in conduit from the Terranora Terrace boundary to a Premise Connection Device (PCD) located on the new office building. NBN is the default service provider in the area.

The actual service provider is unknown at this stage of the design. Further consultation with TfNSW is required to confirm who the service provider would be, which may change the lead-in design.

A small communications rack is proposed (15RU) and this would house the retail service provider equipment, client active equipment, CCTV head-end equipment and pathing of cabling.

The CCTV design proposed is to use the area lighting poles as the points where CCTV may be installed. CCTV coverage and final layout would be determined in consultation with TfNSW.

3.1.2 Hydraulic Services

3.1.2.1 Review of Existing Services

Water supply to the site originates at the Tweed Shire Council Water main on the southern side of Terranora Terrace. The main is nominated on Council drawings as being PVC-U-S2 100mm diameter.

Water supply into the site is delivered via an existing 25mm water meter located on the Terranora Terrace boundary in the north-west corner of the site. The meter designation is 02X026397. The assembly contains an existing reduced pressure zone backflow prevention device.

The water supply system supplies the internal water services to the existing building, washdown hose taps and two fire hose reels. The fire hose reels are not covered and are deteriorating.

The existing liquid waste treatment system is also connected to a water supply branch from the water supply system via a control panel, solenoid valve and backflow prevention device.

Hot water to the existing building is supplied via an ageing 125 litre electric Hot Water Unit with a date of manufacture of September 1992.

There are currently no onsite fire hydrants for the facility.

The site is currently reliant on the attending fire brigade connecting to an existing street hydrant located approximately 47 metres west of the north-east property boundary.

The site sanitary drainage connection is via an on-site sewer wet well. Discussions with Tweed Shire Council has confirmed that the site has a license to operate and to their knowledge, there are no current problems with the system function.

The site has a liquid trade waste treatment system that is marked as being from Fox Environmental Systems and includes a sump pump and a Kwikflo Coalescing Plate Separator (manufactured in 2006). Tweed Shire Council has confirmed that a license to operate this system is currently in place.

3.1.2.2 Proposed Services at New Facility

Tweed Shire Council have confirmed that they would be responsible for all disconnections and new connections required to the street water main. They have also confirmed that they would supply and install valve assemblies for both fire and domestic water services, including the property backflow prevention valves. This also includes any meter assemblies required.

A new 100mm connection to the water supply main would be required to supply the proposed fire main.

Tweed Shire Council may elect to retain the existing 25mm water supply to the north-west corner of the site and the existing water meter assembly. Alternatively, they may decide to remove the existing 25mm service entirely and cap it at the water main. Should this be the case, the Council would then branch from the new 100mm incoming service to the site water meter. This would be determined during their hydraulic drawing review. The system would be documented as being all new with the existing service being disconnected.

The service from the site water meter would supply the fire hose reels, external hose taps, the new office building and any water supply requirements for the liquid trade waste treatment plant.

The 100mm boundary valve assembly would supply the two fire hydrant locations nominated.

Backflow prevention devices would be designed in accordance with Australian Standards for any equipment within the site that poses a water supply cross contamination risk.

Hot water is to be supplied to the new office building via a new hot water unit.

Due to there being no noted problems with the existing sewer wet well system, it is not proposed to replace this item at this time unless a change in site levels or locations of new buildings dictate that this is necessary.

The existing liquid trade waste treatment plant is of doubtful integrity due to its age and exposure to the elements. Discussions with Tweed Shire Council Trade Waste officers have confirmed that they have worked successfully with Fox Environmental Systems on a number of previous projects in the area and are comfortable with their system methodology and function. Therefore, Fox Environmental Systems have been requested to provide details on appropriate replacement plant for the site.

3.2 Stage 1 Construction Aspects

3.2.1 General

Construction aspects of the boat maintenance facility upgrade are outlined in this section under a number of main headings. It is possible that some adjustments to the construction methodology may occur following appointment of a contractor. However, these adjustments are unlikely to be material and would affect the outcome of this environmental assessment.

3.2.2 Outline Scope of Work

3.2.2.1 Demolition

The scope of demolition works comprises removal and disposal of:

- office building;
- slipway winch and cradle;
- upper portion of slipway rails;
- shipping container;
- perimeter fencing;
- blockwork and timber retaining walls on each side of slipway ramp;
- concrete pavement hardstand (approx. 180mm thick from geotechnical investigations);
- asphalt pavement and kerb/gutter at end of access road;
- unsuitable foundation material beneath the demolished hardstand;
- existing wastewater treatment system including pits and pipework; and,
- miscellaneous fixtures over the hardstand area.

3.2.2.2 Construction of New Facilities

- Site filling and revetment construction
 - Place geotextile fabric marker layer
 - Place rock bund comprised of underlayer sized rock across slipway ramp entrance
 - Place geotextile fabric filter layer over landward face of rock bund

- Excavate existing subgrade (gravelly/clayey sand fill) beneath the demolished hardstand area down to required levels for pavement installation.
- Place engineered fill in compacted layers behind rock bund to achieve site design levels
- Place rock armour over seaward face of rock bund
- Drainage provisions and hardstand pavement
 - Install drainage pits and pipes, including central sump for trade waste pumpout and connection to stormwater system
 - Install pipework and conduits for hardstand services and lead-in services for the service pontoons
 - Placement and compaction of pavement sub base
 - Prepare formwork, place steel reinforcement and pour concrete hardstand, including perimeter kerbing as required
- Runway beams
 - Installation of runway beam support piles, fender/guide piles and pontoon restraint piles
 - Prepare pile connections and formwork for runway beam installation
 - Lift precast concrete runway beams into position with crane and cast insitu concrete in place
 - Install access ladders and handrails
- Service Pontoons
 - Fabricate service pontoon units offsite, including fendering and mooring cleats and transport to site by truck
 - Install marina pontoons by crane and connect individual units
 - Supply and install services reticulation, service pedestals, fire hose reels, lighting pedestals, fire extinguishers, lifebuoys and safety ladders
- Gangways
 - Prepare abutment for gangway
 - Fabricate aluminium gangways offsite and transport to site by truck
 - Install gangways by crane
- Office Building and Shipping Container
 - Fabricate BCA compliant office building
 - Float office building/shipping container to site on trucks and lift into place with crane
- Hardstand Services and Fixtures
 - Connect services to office building
 - Installation of onsite trade waste treatment system and local sewerage system connection
 - Installation of main switchboard and distribution boards
 - Installation of service pedestals around perimeter of hardstand
 - Installation of pole-mounted outdoor lighting and CCTV system
 - Installation of perimeter fencing and vehicular access gates

3.2.3 Construction Hours and Duration

The proposed upgrade works would be constructed over a period of up to six months. It is assumed that the working hours during construction would be standard daytime construction hours of 7 am to 6 pm, Monday to Friday and 8 am to 1 pm Saturday in accordance with the

Noise Policy for Industry (EPA, 2017). No work would be undertaken on Sundays or Public Holidays.

Work outside standard hours may be advantageous at certain times to take advantage of particular tidal conditions. Should this be the case, approval would be sought from the relevant authority.

3.2.4 Site Establishment

Site establishment would involve the following main tasks:

- establishment of a site compound and ancillary facilities, including fencing and site office/amenities;
- establishment of a waterside construction area using buoys or the like to delineate the area;
- disconnection of existing services and connection of temporary services as required;
- establishment of environmental controls in accordance with the construction environmental management plan (CEMP), including erosion and sediment control measures and silt curtains; and,
- establishment of traffic control measures for vehicles, watercraft and pedestrians in accordance with a traffic management plan (TMP), including installation of appropriate way finding signage where necessary.

3.2.5 Slipway Ramp Rock Bund

A schematic diagram of the proposed works on the slipway ramp area is provided as **Figure 4**.

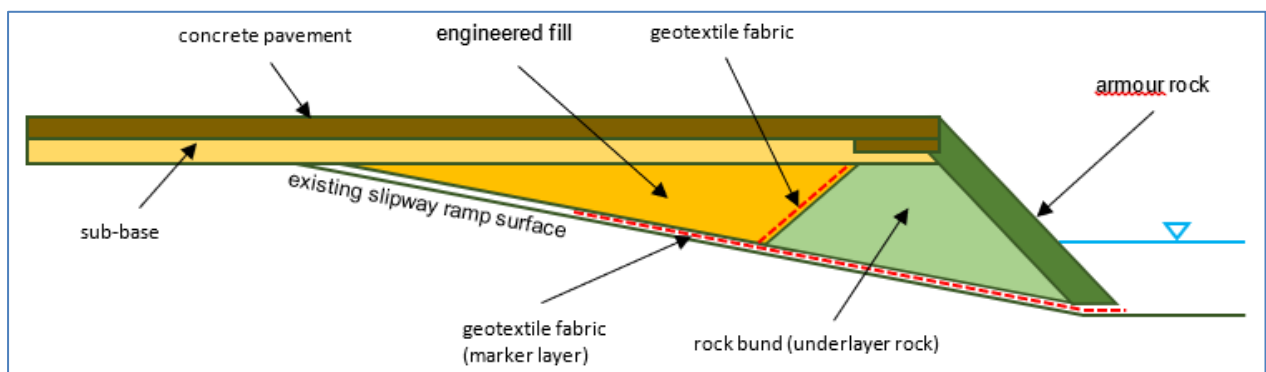


Figure 4: Schematic diagram of proposed works on slipway ramp

Site establishment activities would include the deployment of two floating silt curtains (a primary silt curtain and secondary back-up silt curtain) across the slipway ramp entrance. The silt curtains would later be extended further into the waterway to enclose the overwater work area required for pile driving.

A geotextile fabric marker layer would be placed (with ballasting as required) over the area of the slipway ramp surface that is covered with sediments. The marker layer would extend to the seaward limit of the land-based civil works, which would be defined by the toe of the proposed alongshore extension of the existing rock revetment located behind the fixed jetty berths to the east.

A rock bund would then be placed across the seaward end of the marker layer. This would be constructed from igneous rock of underlayer size (160-200mm dia.) that would form a face at a slope of 1V:1.5H for subsequent placement of igneous armour rock (300-500mm dia.). The seabed level at the toe of the proposed revetment extension is at approximately -1m AHD. The rock bund would have a crest level of around +0.9m AHD, which corresponds to the underside of the sub-base material beneath the thickened edge of concrete pavement. The rock would be carefully placed by excavators operating at low tide. A geotextile fabric would be placed on the landward face of the rock bund to retain the engineered fill.

The marker layer, engineered fill, and rock bund (including geotextile fabric) would act to both cap the contaminated sediments on the slipway ramp and provide an effective environmental control for containment of any sediment disturbance by land-based demolition activities and/or tidal water level variations at the site during construction.

3.2.6 Demolition of Existing Structures

Plant and equipment involved in the demolition and removal activities would include land based excavators, skip bins and trucks.

Existing services would be disconnected and where necessary, any fixtures, cabling, conduits or pipes would be removed.

Materials that could be reused or recycled would be separately identified, stockpiled, and transported by road to a recycling facility. Materials not suitable for recycling would be transported by road to a licensed waste facility.

Any excavated material removed as part of demolition activities (e.g. trenching) would be stockpiled onsite for testing to characterise the material and assess it for beneficial reuse onsite as fill, or for offsite disposal at a licensed waste facility.

3.2.7 Site Filling and Rock Revetment

The existing subgrade beneath the hardstand area would need to be excavated down to the required levels for pavement installation. This material would be stockpiled onsite for testing to characterise the material and assess it for beneficial reuse onsite as fill, or for offsite disposal at a licensed waste facility.

Filling of the slipway ramp area would take place with imported engineered fill or suitable excavated subgrade material from beneath the demolished hardstand. The imported engineered fill would comprise granular material with minimal fines content (0-5%). Fill would be placed and compacted in layers behind the rock bund up to the level required for subsequent placement of the pavement sub-base. This filling work would be undertaken with conventional earthmoving and compaction equipment (such as trucks, excavators, rollers, plate compactors etc.).

At this stage a working surface would exist for placement of rock armour over the seaward face of the rock bund with land-based excavators. Where necessary/appropriate, floating barges and barge mounted cranes may be utilised to transport and/or place the rock to form the revetment.

3.2.8 Drainage Provisions and Hardstand Pavement

Once the site has been filled to design levels, the remaining landside works would then be completed including installation of drainage provisions and in-ground services, pavement sub-base placement and compaction, concrete pavement construction and installation of

above-ground fixtures. This work would be undertaken with conventional earthmoving, compacting and concreting equipment, supplemented with manual labour as required.

3.2.9 Piling

The remaining waterside works would be completed primarily with floating plant and equipment, including pile driving, construction of concrete runway beams, and gangway/pontoon installation. It is noted that any runway beam support piles that are required to be located within the footprint of the rock bund would need to be driven prior to rock placement to ensure driveability; rock would then be subsequently placed around the piles. Alternatively, sleeves could be installed within the rock for piles to be subsequently driven through.

Piles would be installed using barge mounted plant or land based plant depending on location and access. Piles would be transported to site by truck and transferred to floating plant as required. Alternatively, piles could be delivered to site overwater by floating barge.

Vertical piles are required to support the runway beams (approx. 14 piles total) and to restrain the two service pontoons (approx. 7 piles total). These piles would comprise steel circular hollow sections with HDPE sleeving and would be approximately 500mm in diameter. A fender/guide pile would be installed in front of each runway beam (2 piles total) and would comprise 500mm diameter painted steel piles with anodic protection. Piles would be founded several metres into the very stiff to hard residual silty clay that exists below the overlying soft alluvial sediments (very loose to loose silty clayey sand, and medium dense to dense silty sand).

3.2.10 Installation of Runway Beams

The runway beams could be fabricated onsite as precast concrete elements or fabricated offsite in a precasting yard and delivered to the site by truck or floating barges. If delivered by truck, the beam segments would be transferred to floating barges by a land-based crane. The beam segments would be lowered in position over the pre-prepared pile connections by barge-mounted cranes or land based cranes, depending on the location and available access. The blockouts within the runway beams would then be concreted into place with insitu concrete pumped into temporary formwork constructed around each pile connection. This could be achieved from land by use of a truck mounted boom pump.

3.2.11 Installation of Pontoon Units

All pontoon units would be manufactured offsite. They would be transported to site by truck and launched by crane, or transported to a nearby wharf by truck, launched by crane, interconnected in lengths, and towed to site overwater. The pile guide frames would be installed onsite.

3.2.12 Installation of Gangway and Pontoon Services

The concrete abutment on the approach to the gangway would be constructed prior to installation of the gangway. Ferrules would be cast into the abutment or installed using chemical anchors for fixing the gangway hinge.

The gangway would be fabricated offsite and delivered to site by truck or overwater by floating barge and lifted into place by crane. The gangway would be fixed to the abutment onsite.

Installation of the services pedestals, fire fighting equipment, lighting pedestals, safety ladders and services cables and pipework are essentially a manual task.

3.2.13 Site Clean-up

Site clean-up would involve the following main tasks:

- removal of all environmental controls and temporary structures;
- assessment of the safety of the site to identify any risks and rectification of any safety hazards resulting from construction before handing over the site to the agencies; and,
- removal of hoarding, site office, signage and any excess or demolished materials.

3.3 Description of Stage 2 Preferred Concept

Transport for NSW (TfNSW) are proposing to extend the footprint of the proposed travel lift facility further to the east across the existing road entry, existing storage yard and adjacent grassed area. The expansion works will be completed as Stage 2 to the main upgrade works (Stage 1), and will include relocation of the road entry point, relocation of the storage yard, provision of a permanent amenities block for the wider Fishermen's Co-Op jetty area, and installation of fencing.

The proposed concept plan for the Stage 2 works is provided in **Figure 5** and **Appendix B**. The concept includes:

- removal of a section of the eastern boundary palisade fencing around the travel lift facility;
- removal of wire mesh fencing between the storage yard and equipment storage shed;
- demolition of existing kerb/gutter, asphalt pavement, concrete slab and storage yard;
- clearing, grubbing and regrading of grassed areas;
- extension of the travel lift hardstand area to the east, including perimeter bunding and surface drainage provisions;
- services pedestals with power outlets, potable water and lighting;
- installation of fire hose reel(s)
- pole-mounted outdoor lighting and CCTV system for extended hardstand area;
- installation of new palisade fencing around extended travel lift hardstand area, including vehicle access gate across existing road with bunded vehicle entry;
- installation of new wire mesh fencing along edge of footpath;
- construction of relocated storage yard, comprising a concrete ground slab, above ground oil storage tank with bunding and shelter, and perimeter wire mesh fencing with lockable gated access along the rear of the existing car parking spaces;
- installation of a permanent amenities block for the wider Fishermen's Co-Op jetty area, including a urinal, toilet pan, wash basin and shower;
- connection of services for hardstand extension fixtures and amenities block; and,
- construction of a new road entry from Terranora Terrace to the jetty access road, located to the east of the existing storage sheds and water supply distribution control valve.

- Clearing and grubbing of grassed areas
- Excavate existing subgrade beneath hardstand extension area down to required levels for pavement installation
- Drainage provisions and hardstand pavement
 - Install drainage pits and pipes, including connection to central sump for trade waste pumpout and connection to stormwater system
 - Install pipework and conduits for hardstand services
 - Placement and compaction of pavement sub base
 - Prepare formwork, place steel reinforcement and pour concrete hardstand, including perimeter kerbing as required
- Hardstand Services and Fixtures
 - Installation of services pedestals around perimeter of hardstand
 - Installation of fire hose reel
 - Installation of pole-mounted outdoor lighting and CCTV system
 - Connection of electrical services to main switchboard
 - Connection of potable water and fire water to main supply
 - Installation of perimeter fencing
- Relocated Storage Yard
 - Clearing and grubbing of grassed areas
 - Excavate existing subgrade down to required levels for concrete base slab installation
 - Prepare formwork, place steel reinforcement and pour concrete base slab
 - Install above ground oil storage tank with double bunded area
 - Install wire mesh fencing with lockable gated access along the rear of the existing car parking spaces
- Amenities block
 - Fabricate BCA compliant amenities block
 - Prepare concrete base slab and lead in services
 - Float amenities block to site on trucks and install
 - Connect services to amenities block
- New Road Entry
 - Clearing and grubbing of grassed areas
 - Excavate existing subgrade down to required levels for road pavement installation
 - Placement and compaction of pavement sub base and base course layers
 - Placement and compaction of asphalt wearing course
 - Installation of in situ concrete kerbing and tie into existing kerb/gutter

3.4.3 Construction Hours and Duration

The Stage 2 works would be constructed over a period of approximately three months. As funding is not yet available for the Stage 2 works, it will be undertaken separately from the Stage 1 works. The working hours during construction would be standard daytime construction hours of 7 am to 6 pm, Monday to Friday and 8 am to 1 pm Saturday in accordance with the Noise Policy for Industry (EPA, 2017). No work would be undertaken on Sundays or Public Holidays.

3.4.4 Site Establishment

Site establishment would involve the following main tasks:

- establishment of a site compound and ancillary facilities, including fencing and site office/amenities;
- disconnection of existing services and connection of temporary services as required;
- establishment of environmental controls in accordance with the construction environmental management plan (CEMP), including erosion and sediment control measures; and,
- establishment of traffic control measures for vehicles and pedestrians in accordance with a traffic management plan (TMP), including installation of appropriate way finding signage where necessary.

3.4.5 Demolition of Existing Structures

Plant and equipment involved in the demolition and removal activities would include land based excavators, skip bins and trucks.

Existing services would be disconnected and where necessary, any fixtures, cabling, conduits or pipes would be removed.

Fuel and oil storage tanks and infrastructure within the existing storage yard would be decommissioned and removed as required to accommodate the proposed hardstand extension. Solid and liquid waste would be disposed offsite at a licensed waste facility.

Materials that could be reused or recycled would be separately identified, stockpiled, and transported by road to a recycling facility. Materials not suitable for recycling would be transported by road to a licensed waste facility.

Any excavated material removed as part of demolition activities (e.g. trenching) would be stockpiled onsite for testing to characterise the material and assess it for beneficial reuse onsite as fill, or for offsite disposal at a licensed waste facility.

3.4.6 Site Earthworks

Following clearing and grubbing of grassed areas, the existing subgrade beneath the hardstand extension area would need to be excavated down to the required levels for pavement installation. This material would be stockpiled onsite for testing to characterise the material and assess it for beneficial reuse as fill onsite or offsite disposal at a licensed waste facility.

This work would be undertaken with conventional earthmoving and compaction equipment (such as trucks, excavators, rollers, plate compactors etc.).

3.4.7 Drainage Provisions and Hardstand Pavement

Once the site has been graded to design levels, the remaining civil works would then be completed including installation of drainage provisions and in-ground services, pavement sub-base placement and compaction, concrete pavement construction and installation of above-ground fixtures. This work would be undertaken with conventional earthmoving, compacting and concreting equipment, supplemented with manual labour as required.

3.4.8 Relocated Storage Yard

The construction of the relocated storage area would be completed in a similar manner to the hardstand extension works.

3.4.9 Amenities Block

It is anticipated that the amenities block would comprise a pre-fabricated modular structure that would be transported to site on trucks and installed on a concrete base slab with the assistance of small cranes and manual labour for fixing and connection of services.

3.4.10 New Road Entry

Clearing, grubbing, subgrade preparation, and placement and compaction of road base layers would be completed with conventional earthmoving equipment. Installation of the asphalt pavement would require asphalt mixing plant, paving machines, trucks and rollers. Installation of concrete kerb/gutter and pram ramps would be completed with in situ concreting. This would involve cement mixers, concrete kerbing machines, and would be supplemented with manual formwork and concreting as required.

3.4.11 Site Clean-up

Site clean-up would involve the following main tasks:

- removal of all environmental controls and temporary structures;
- assessment of the safety of the site to identify any risks and rectification of any safety hazards resulting from construction before handing over the site to the agencies; and,
- removal of hoarding, site office, signage and any excess or demolished materials.

4 Planning and Legislative Requirements

4.1 Land Use and Ownership

The proposed Stage 1 travel lift facility is situated on Lot 717 DP 729484 which is owned and managed by Crown Lands. The proposed Stage 2 works are situated on Lot 5 DP 1243139 which is owned and managed by Crown Lands. The site is zoned IN4 – Working Waterfront under the Tweed Local Environmental Plan (LEP) 2014. The proposed works also extend into the waterway onto land zoned W3 – Working Waterway (no lot or DP number) under the LEP (refer to **Figure 6**) also owned and managed by Crown Lands.

A search of the National Native Title Tribunal register of Native Title Claims did not indicate any determined native title claims at or near the Stage 1 site. A search for any Native Title Claims at or near the Stage 2 site is currently in progress. One active application by the Tweed River Bundjalung People is listed on the register and covers a large area from Burleigh Heads in Queensland to Brunswick Heads in NSW. This application is in its notification period until June 2021.

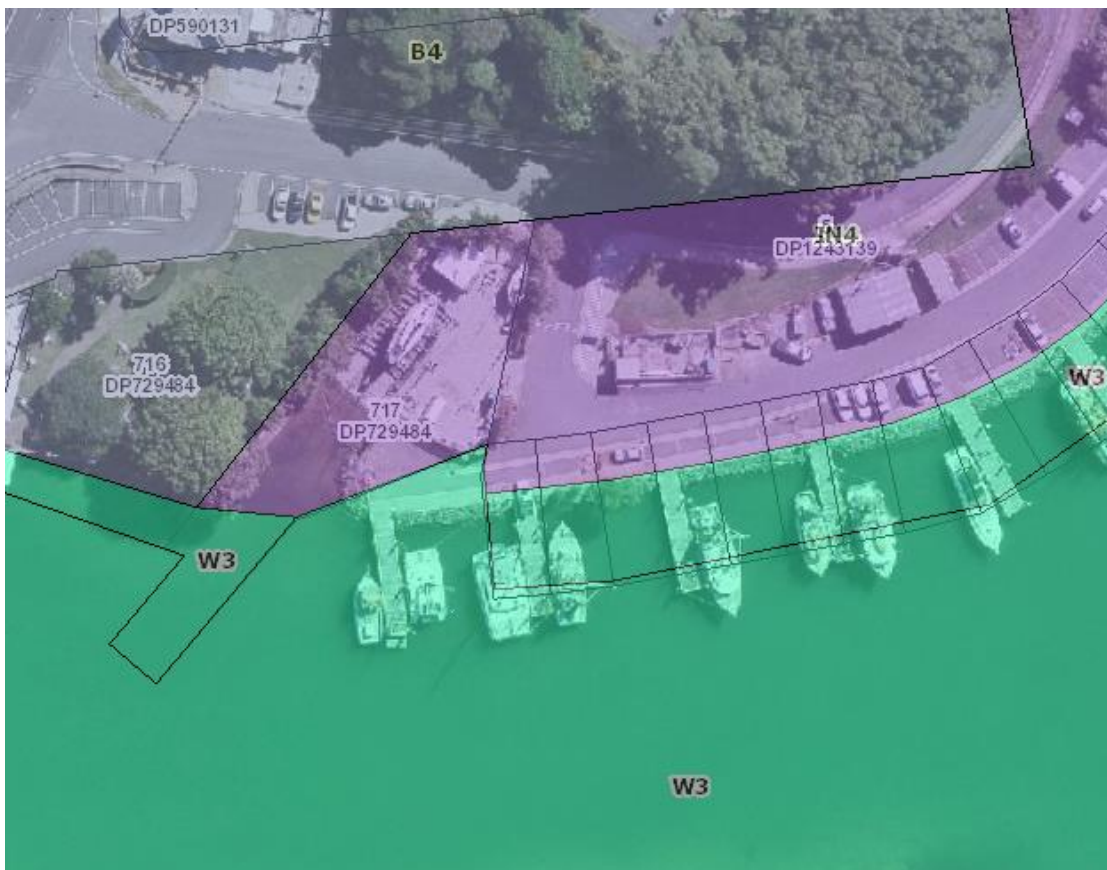


Figure 6: Tweed LEP 2014 Land Use Zoning Map for the Study Area

4.2 Approvals Pathway

Clause 68(4) of State Environmental Planning Policy (Infrastructure) 2007 permits development for the purpose of wharf or boating facilities to be carried out on any land by or on behalf of a public authority without consent. As the proposal is for the purpose of wharf or boating facilities and is to be carried out by TfNSW, it can be assessed under Division 5.1 of

the *Environmental Planning and Assessment Act 1979*. Development consent from Council is not required.

The Stage 2 works are considered ancillary to the main use (proposed Stage 1 boat maintenance facility upgrade) and therefore can also be carried out as development without consent i.e. assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979*.

A more detailed discussion and justification of this pathway is provided in the following sections.

4.3 NSW Planning and Approvals Process

The New South Wales (NSW) environmental planning legislative framework provides for the classification of developments, and the assessment of impacts from developments and activities. This framework comprises:

- Environmental Planning and Assessment Act (EP&A Act) 1979;
- Environmental Planning and Assessment Regulation (EP&A Regulation) 2000;
- Environmental Planning Instruments (EPIs) made under the EP&A Act (i.e. State Environmental Planning Policies (SEPPs), Regional Environmental Plans (REPs), and Local Environmental Plans (LEPs)); and
- Other planning codes, policies, guidelines and strategies that relate to any proposed development of a particular site including Development Control Plans (DCPs) and Council codes and policies.

The statutory basis for planning and environmental assessment in NSW is set out in the EP&A Act 1979 and the EP&A Regulations 2000.

Part 4 of the EP&A Act sets out the development assessment requirements for those developments that require consent. Part 5 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by or on behalf of public authorities that are permissible without development consent.

Part 3, Division 13 Clause 68 of the State Environmental Planning Policy (Infrastructure) 2007 states “Development for the purpose of wharf or boating facilities may be carried out by or on behalf of a public authority without consent on any land”. As the proposed Tweed Heads Travel Lift works are characterised as ‘development for the purpose of wharf or boating facilities’, and are to be carried out by TfNSW on Crown Lands, the construction works do not require development consent under Part 4 of the EP&A Act and fall under Part 5 of the EP&A Act.

4.4 Tweed Local Environmental Plan 2014 and Tweed City Centre Local Environmental Plan 2012

The Tweed LEP 2014 is the primary statutory plan for the majority of the Tweed Shire and is based on the requirements of the Standard Instrument (Local Environmental Plans) Order 2006. As noted in **Section 4.1**, the site of the proposed travel lift boat facility is zoned W3 – Working Waterway and IN4 – Working Waterfront (refer to **Figure 6**).

Land Zone W3 for Working Waterways has the following objectives:

- To enable the efficient movement and operation of commercial shipping, water-based transport and maritime industries;

- To promote the equitable use of waterways, including appropriate recreational uses;
- To minimise impacts on ecological values arising from the active use of waterways; and,
- To provide for sustainable fishing industries.

Land Zone IN4 for Working Waterfront has the following objectives:

- To retain and encourage waterfront industrial and maritime activities;
- To identify sites for maritime purposes and for activities that require direct waterfront access;
- To ensure that development does not have an adverse impact on the environmental and visual qualities of the foreshore;
- To encourage employment opportunities; and,
- To minimise any adverse effect of development on land uses in other zones.

The proposed works meet the objectives of the zones and would be permissible with consent.

4.5 State Environmental Planning Policies

4.5.1 State Environmental Planning Policy (Infrastructure) 2007

SEPP (Infrastructure) 2007 aims to facilitate the effective delivery of infrastructure within NSW by public authorities. It does this by prescribing the infrastructure related works that may be undertaken without development consent, although the public authority may still be required to obtain an approval, licence or permit under another Act, such as the Fisheries Management Act 1994.

Part 3 Division 13, Clause 68 of State Environmental Planning Policy (Infrastructure) 2007 states that “Development for the purpose of wharf or boating facilities may be carried out by or on behalf of a public authority without consent on any land. ‘Wharf or boating facilities’ are defined as:

... a wharf or any of the following facilities associated with a wharf or boating that are not port facilities—

- (a) facilities for the embarkation or disembarkation of passengers onto or from any vessels, including public ferry wharves,
- (b) facilities for the loading or unloading of freight onto or from vessels and associated receipt, land transport and storage facilities,
- (c) wharves for commercial fishing operations,
- (d) refuelling, launching, berthing, mooring, storage or maintenance facilities for any vessel,
- (e) sea walls or training walls,
- (f) administration buildings, communication, security and power supply facilities, roads, rail lines, pipelines, fencing, lighting or car parks.

The travel lift facility is classified as a maritime facility.

SEPP (Infrastructure) 2007 prevails over other environmental planning instruments with the exception of clauses 10, 11 and 19 of State Environmental Planning Policy (Coastal Management) 2018, which are discussed below.

4.5.2 State Environmental Planning Policy (Coastal Management) 2018

SEPP (Coastal Management) 2018 updates and consolidates into one integrated policy SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection), including clause 5.5. of the Standard Instrument – Principal Local Environmental Plan. These policies are now repealed.

The SEPP (Coastal Management) gives effect to the objectives of the *Coastal Management Act 2016* from a land use planning perspective, by specifying how development proposals are to be assessed if they fall within the coastal zone.

Need for Development Consent under SEPP Coastal Management

Under Clause 10 of SEPP (Coastal Management) development on land identified as coastal wetlands and littoral rainforests requires development consent. Under Clause 19 of SEPP (Coastal Management) 2018, certain coastal protection require development consent.

As the proposed works are not coastal protection works and do not fall within wetland or littoral rainforest areas, development consent for the works is not required under SEPP (Coastal Management).

The works are located within a coastal wetlands proximity area. Under clause 11 SEPP (Coastal Management), development consent must not be granted to development on land identified as “proximity area for coastal wetlands” unless the consent authority is satisfied that the proposed development will not significantly impact on:

- (a) the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or
- (b) the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest.

The proposed works fall within a coastal proximity area (refer **Figure 7**) but are not expected to significantly impact either of the above.

As clauses 10, 11 and 19 of State Environmental Planning Policy (Coastal Management) 2018, are not triggered by the works, SEPP (Infrastructure) 2007 prevails and development consent is not required.



Figure 7: Coastal Wetland Proximity Area (blue hatching)

Coastal Management Areas and Objectives

The *Coastal Management Act 2016* defines the coastal zone as comprising four coastal management areas. SEPP (Coastal Management) 2018 gives effect to the objectives of the Act from a land use planning perspective, by specifying how development proposals are to be assessed if they fall within the coastal zone. The four coastal management areas are:

- Coastal Wetlands and Littoral Rainforests Area — areas which display the characteristics of coastal wetlands or littoral rainforests that were previously protected by SEPP 14 and SEPP 26
- Coastal Vulnerability Area — areas subject to coastal hazards such as coastal erosion and tidal inundation
- Coastal Environment Area — areas that are characterised by natural coastal features such as beaches, rock platforms, coastal lakes and lagoons and undeveloped headlands. Marine and estuarine waters are also included
- Coastal Use Area — land adjacent to coastal waters, estuaries and coastal lakes and lagoons.

The proposed works fall within a Coastal Environment Area and Coastal Use Area as shown below in **Figure 8**.

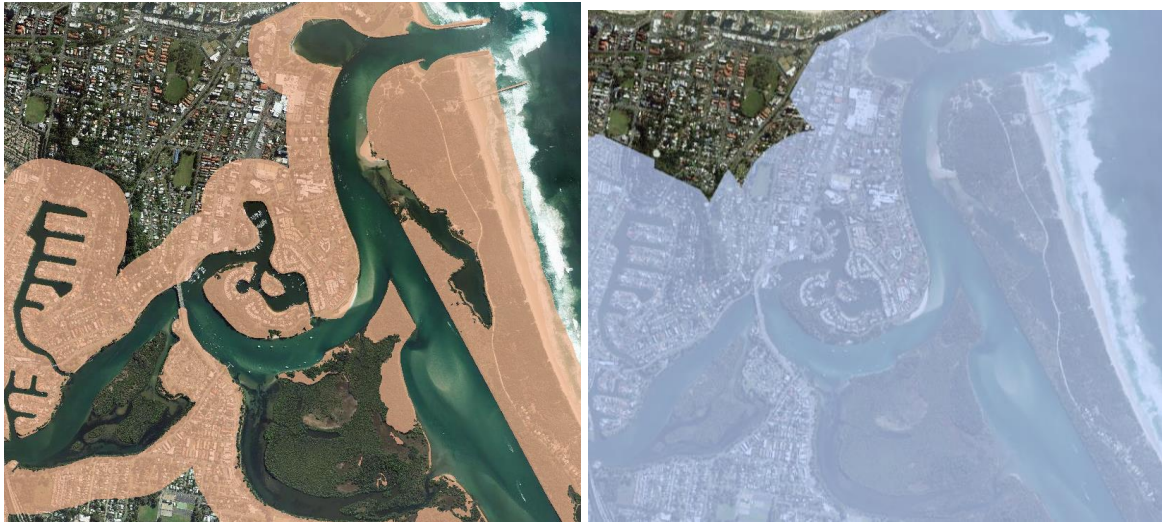


Figure 8: Coastal Management Designations for Study Area (orange shaded area shows coastal use area and grey shading shows coastal use area)
https://webmap.environment.nsw.gov.au/PlanningHtml5Viewer/?viewer=SEPP_CoastalManagement

Development controls for the coastal environmental area aim to protect the processes and values of coastal waters, estuaries, coastal lakes and lagoons and the natural features on the adjoining land, including beaches, dunes, foreshores, headlands and rock platforms. Controls identify the need to minimise impacts on the environment, and TfNSW must be satisfied that the proposed development avoids, minimises or manages impacts on:

- The integrity and resilience of the biophysical, hydrological and ecological environment;
- Coastal environmental values and natural coastal processes;
- The water quality of the marine estate, and has particular regard to cumulative impacts on sensitive coastal lakes;
- Marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms;
- Existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including people with a disability;
- Aboriginal cultural heritage, practices and places, and
- The use of the surf zone.

All of the above sensitivities and impacts are discussed in detail in **Section 6**.

The objectives of the Coastal Environment Area zone are identified below in **Table 2**. The proposed works either meets these objectives or in no way is contrary to them.

Table 2: Objectives of Coastal Environment Areas (Coastal Management SEPP)

Objective No.	Objective Description	Works Compliance?
1	To protect and enhance the coastal environmental values and natural processes of coastal waters, estuaries, coastal lakes and coastal lagoons. <i>The work will continue to protect existing built and environmental assets, and the overall form of the shoreline in this area.</i>	✓
2	Enhance natural character, scenic value, biological diversity and ecosystem integrity <i>The works are not contrary to the maritime characteristics of the area. The works will not impact on biological diversity or ecosystem integrity.</i>	✓
3	To reduce threats to, and improve the resilience of, coastal waters, estuaries, coastal lakes and coastal lagoons, including in response to climate change <i>The works will improve the resilience of this stretch of shoreline..</i>	✓
4	To maintain and improve water quality and estuary health <i>The works will improve the water quality and estuary health.</i>	✓
5	To support the social and cultural values of coastal waters, estuaries, coastal lakes and coastal lagoons <i>The works will not impact on or alter social and cultural values of the area.</i>	✓
6	To maintain the presence of beaches, dunes and the natural features of foreshores, taking into account the beach system <i>The works will maintain the presence of the shoreline in this area.</i>	✓
7	To maintain and, where practicable, improve public access, amenity and use of beaches, foreshores, headlands and rock platforms <i>The works will not alter public access in this area.</i>	✓

The coastal use area is land adjacent to coastal waters, estuaries, coastal lakes and lagoons, where development is or may be carried out and impacts of development on the scenic and cultural values and use and enjoyment of the beaches, foreshores, dunes, headlands, rock platforms, estuaries, lakes and the ocean need to be considered.

The coastal use area represents some of the most environmentally, economically and socially valuable land in NSW. Development in this area must maintain and improve the scenic, social and cultural values of the coast for the enjoyment of current and future generations. Development proposals must address public interest and built form criteria to avoid, minimise or mitigate impacts on:

- Existing safe access to and along a foreshore, beach, headland or rock platform, including access for people with a disability
- Overshadowing, wind funnelling and loss of views from public places to foreshores
- The visual amenity and scenic nature of the coast, including headlands
- Aboriginal cultural heritage, practices and places, and
- Cultural and built environment heritage.

Development proposals must also consider the type, bulk, scale and size of the proposed development in the context of the surrounding area. The coastal use area applies to land only. Development controls for coastal waters are in the coastal environment area. Foreshore development which straddles land and coastal waters (i.e. this particular development) is assessed against development controls for both the coastal use and coastal environment areas.

The objectives of the Coastal Use zone are identified below in **Table 3**. The proposed works either meets these objectives or in no way is contrary to them.

Table 3: Objectives of Coastal Use Areas (Coastal Management SEPP)

Objective No.	Objective Description	Works Compliance?
1	The type, bulk, scale and size of development is appropriate for the location and natural scenic quality of the coast <i>The facility will be appropriate for the maritime setting.</i>	✓
2	Adverse impacts on cultural and built environment heritage are avoided or mitigated <i>There is no known or anticipated cultural or environmental heritage at this location.</i>	✓
3	Urban design, including water sensitive urban design, is supported and incorporated into development activities <i>The works will not impact on water flow or drainage in any way.</i>	✓
4	Adequate public open space is provided, including for recreational activities and associated infrastructure <i>The work will not impact on access or the public space.</i>	✓
5	The use of the surf zone is considered <i>There will be no impact on the surf zone.</i>	✓

Most importantly, Section 15 of the Coastal Management SEPP states that “development consent must not be granted to development on land within the coastal zone unless the consent authority is satisfied that the proposed development is not likely to cause increased risk of coastal hazards on that land or other land”.

Furthermore, development consent must also not be granted to development on land that is within the coastal environment area unless the consent authority has considered whether the proposed development is likely to cause an adverse impact on the following:

1. The integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment, and
2. Coastal environmental values and natural coastal processes.

It is recognised that the design must best meet the objectives of the Coastal Management SEPP so as to not impact upon any element of the existing coastal system. Furthermore, these works will not be contrary to the above objectives of the Coastal Management SEPP.

4.6 Other Relevant Legislation

Relevant additional State Legislation that would potentially apply to the proposed works includes the following:

- Protection of the Environment Operations Act 1997 (POEO Act) – Activities should be carried out in a manner which does not result in the pollution of waters. An Environmental Protection Licence (EPL) for a premises for boat construction/maintenance (refer Clause 25, Schedule 1 of *POEO Act*) is required if the facility has the capacity to handle more than 5 vessels longer than 5 meters (excluding rowing boats, dinghies and other small craft) at any time. The preferred Stage 1 concept design as described in this REF is not expected to provide for capacity to handle more than 5 vessels longer than 5 m, and hence an EPL for the premises is not required for Stage 1. The expansion of the hardstand as described in this REF provides capacity to handle more than 5 vessels longer than 5 m, and hence an EPL for the premises will be required once the Stage 2 works are completed.
- Fisheries Management Act 1994 (FM Act) – Permits under Part 7 of the Act are required for dredging and reclamation, temporarily or permanently obstructing fish passage, and harming marine vegetation.
 - A Fisheries Part 7 permit may be required for dredging/reclamation due to disturbance of the seabed, placement of fill over portion of the slipway, and placement of rock. A permit is not required if the works will be licenced under a Crown Lands licence negating the need for a permit. However, Section 199 of the Fisheries Management Act requires that the public authority must, before it carries out or authorises the carrying out of dredging work, give the relevant Minister written notice of the proposed work, and consider any matters concerning the proposed work that are raised by the Minister within 21 days after the giving of the notice.
 - Any temporary or permanent structures (such as a weir, causeway, dam, coffer dam etc.) that may inhibit, obstruct or block the movement of fish within a waterway either temporarily or permanently require a permit. While floating plant and a silt curtain will be present in the waterway during the works, these will be adjacent to the shoreline and the remainder of the waterway will be available for the free passage of fish. A permit under Section 219 is therefore not required.
 - Permits are required for any damage to, or destruction of, saltmarsh, mangroves or seagrasses growing on public water land or the foreshore of

public water. As marine vegetation has not been recorded within the footprint of the works, a permit under Section 205 is not required.

- Permits under Part 7 are not required for the Stage 2 works.

- Crown Lands Management Act 2016 – To undertake activities and work on crown land, a licence is required from the Department of Planning, Industry and Environment (DPIE) – Lands (Crown Land). The proposed crown lands parcel for the Stage 1 facility is shown on the General Arrangement plan (**Appendix A** and **Figure 3**). If the work has been authorised under the *Crown Lands Act 1989*, it will negate the need for a Fisheries Permit for dredging/reclamation. The Stage 2 works will also require a licence from the Department of Planning, Industry and Environment (DPIE) – Lands (Crown Land).

- Biodiversity Conservation Act 2017 – The potential impact of the proposal on threatened species has been assessed. The assessment for this REF determined that there is not likely to be a significant effect on threatened species, populations and/or ecological communities listed in the NSW Fisheries Management Act or NSW Biodiversity Conservation Act, or their habitats from the proposed activities. Therefore, a species impact statement is not required.

- Water Management Act 2000 – Under the Water Act, approval is required to undertake controlled activities on waterfront land. However, the Water Management Regulation 2011 outlines a number of exemptions for controlled activities. Where a public authority is carrying out the controlled activity on or in waterfront land, approval from the Office of Water is not required.

- National Parks & Wildlife Act 1974 – Under s86, it is an offence to harm or desecrate an Aboriginal object or place. Assessment for this REF determined there are no known sites or places of Aboriginal significance nearby to the site. In addition, the project is not located on land reserved under the National Parks and Wildlife Act 1974.

- Native Title Act 1994 – No native title claims have been identified at or near the site.

- Heritage Act 1977 – No heritage sites, areas or items identified within vicinity of the proposed works area.

4.7 Commonwealth Legislation

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) requires that proposals for development or “actions” that have, will have, or are likely to have, a significant impact on any matter of national environmental significance are to be referred to the Commonwealth Environment Minister for consideration and approval.

The EPBC Act identifies the following matters of national environmental significance:

- World heritage;

- National heritage;
- Wetlands of international importance;
- Listed threatened species and communities;
- Listed migratory species;
- Protection of the environment from nuclear actions; and,
- Marine environment.

The proposed works would not have a significant impact on any of the above, therefore, referral to the Federal Minister for approval is not required.

4.8 Confirmation of Statutory Position

An assessment of the relevant statutory planning instruments has concluded that development consent is not required for the Stage 1 or Stage 2 works and the proposals can be assessed under Part 5 of the EP&A Act by TfNSW as a determining authority. The identified impacts in **Section 6** would not significantly affect the environment and therefore an EIS is not required and the environmental assessment for this project takes the form of this REF.

5 Stakeholder and Community Consultation

This section details the stakeholder and community consultation that will be undertaken for the project.

5.1 Transport for NSW Stakeholder Community Consultation

TfNSW will undertake all consultation with the community and stakeholders including public display of this REF. This will include but not be limited to:

- Tweed Byron Local Aboriginal Land Council;
- Commercial fishermen;
- Tweed Shire Council; and,
- Tweed Point Danger Marine Rescue.

5.2 SEPP (Infrastructure) Consultation Provisions

Part 2, Clauses 13 to 16 of SEPP (Infrastructure) contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Clauses 13 to 15 apply to consultation with Councils relating to development with significant impacts to Council related infrastructure, local heritage and flood liable land. These are largely not applicable to the works other than water connection requirements discussed in **Section 3.1.2**. As discussed in **Section 3.1.2**, Tweed Shire Council have confirmed that they would be responsible for all disconnections and new connections required to the street water main. They have also confirmed that they would supply and install valve assemblies for both fire and domestic water services, including the property backflow prevention valves.

Discussions with Tweed Shire Council Trade Waste officers have also been undertaken. It has been confirmed that the existing degraded Fox Environmental Systems trade waste system should be replaced, but Council considers the Fox Environmental Systems methodology and function suitable for re-introduction on site in an up-to-date form.

An assessment of Clause 16, relating to consultation with public authorities other than councils, is provided in **Table 4** below and demonstrates that statutory consultation is not required in accordance with Clause 16.

Table 4: Assessment of SEPP (Infrastructure) consultation requirements

Item	Requirement
a) development adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> or to land acquired under Part 11 of that Act—the Office of Environment and Heritage	The construction activities are not adjacent to a National Park.
b) development on land in Zone E1 National Parks and Nature Reserves or in a land use zone that is equivalent to that zone—the Office of Environment and Heritage	The construction activities are not on land in Zone E1 National Parks and Nature Reserves

Item	Requirement
c) development adjacent to an aquatic reserve or a marine park declared under the <i>Marine Estate Management Act 2014</i> —the Department of Industry	The construction activities are not adjacent to an aquatic reserve or a marine park
d) development in the foreshore area within the meaning of the <i>Sydney Harbour Foreshore Authority Act 1998</i> —the Sydney Harbour Foreshore Authority	The construction activities are not in the foreshore area within the meaning of the <i>Sydney Harbour Foreshore Authority Act 1998</i>
e) development comprising a fixed or floating structure in or over navigable waters—Roads and Maritime Services,	The construction activities do comprise a fixed or floating structure in or over navigable waters and Roads and Maritime Services (now TfNSW) is the proponent for the works
f) development for the purposes of a health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land (as defined by the Act)—the NSW Rural Fire Service	The proposal does not comprise development for the purposes of a health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land
g) development that may increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map—the Director of the Observatory	The construction activities do not comprise development that may increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map
h) development on defence communications facility buffer land within the meaning of clause 5.15 of the Standard Instrument—the Secretary of the Commonwealth Department of Defence	The construction activities do not comprise development on defence communications facility buffer land within the meaning of clause 5.15 of the Standard Instrument—the Secretary of the Commonwealth Department of Defence
i) development on land in a mine subsidence district within the meaning of the <i>Mine Subsidence Compensation Act 1961</i> —the Mine Subsidence Board	The construction activities do not comprise development on land in a mine subsidence district within the meaning of the <i>Mine Subsidence Compensation Act 1961</i>

5.3 Agency Consultation

In 2019, for a previous concept design for the boat maintenance facility upgrade, the following agencies were consulted:

- NSW EPA;
- Office of Environment and Heritage (now NSW Department of Planning, Industry and Environment (DPIE));

- DPI Fisheries; and,
- RMS (now TfNSW).

Key issues each agency raised in 2019 to be addressed by the REF are listed below and included in **Appendix D**. In addition, an update of the project concept proposal was forwarded to NSW EPA for comment. DPIE has also been consulted regarding Crown Lands lease/licencing requirements.

5.3.1 NSW EPA

In 2019, NSW EPA advised the following should be addressed:

- any potential water quality impacts from the proposal must be identified and managed. Of particular importance is the prevention of water quality impacts in relation to the:
 - Mobilised sediments from the marine excavation work.
 - Dewatering of marine sediments.
 - The management of stormwater on and around the hardstand, Mitigation options should consider minimising areas exposed, clean water diversions, preventing sediment laden runoff into harbour.
- The excavation and temporary stockpiling of sediment and soil should be managed to prevent the movement of any contaminants. The REF should consider contamination aspects.
- The potential risks to human health from exposure to airborne particulates (from uncontrolled dust emissions) must be assessed.
- All practical measures should be implemented to mitigate the impacts of noise on receivers.
- The REF must identify all wastes expected to be generated by the remediation works, with a lawful disposal option identified for each waste stream.

The above issues are covered in **Section 6.2, 6.3, 6.6, 6.9, 6.10 and 6.14** of this REF.

On the 18th of March 2021, RHDHV consulted with the NSW EPA in order to reach agreement in principle on the proposed construction approach for the upgrade works and the identification of the appropriate environmental mitigation measures.

Subsequently, on the 30th of March 2021 the NSW EPA agreed in principle on the proposed construction approach for the upgrade of the Tweed Heads boat travel lift facility, as described in this REF (refer **Appendix D**).

5.3.2 NSW Department of Planning, Industry and Environment

In 2019, DPIE (previously OEH) advised that the REF should include an assessment of the potential impacts on biodiversity, including threatened species, populations, ecological communities, or their habitats likely to occur on or near the subject site, as well as Aboriginal cultural heritage values and flooding.

The above issues are covered in **Section 6.8, 6.15 and 6.16** of this REF.

The proposed crown lands parcel for the facility is shown on the General Arrangement plan (**Appendix A and Figure 3**). DPIE has been consulted with regarding lease/license requirement for the construction works and operation of the facility on crown land.

5.3.3 DPI Fisheries

DPI Fisheries advised that the REF should consider whether the project involves dredging/reclamation or harm to marine vegetation activities that would require Fisheries approval.

The proposal should first aim to avoid impacts to fisheries resources, particularly key fish habitats. Where impacts to key fish habitats cannot be avoided, the preference is to impact less sensitive key fish habitats over more highly sensitive key fish habitats. These issues are discussed in **Section 6.8**.

6 Environmental Assessment

This section considers the existing site conditions and the potential impacts for those environmental sensitivities considered relevant at the site in the context of the Stage 1 and Stage 2 works. Mitigation and control measures are provided for both construction and operational phases in **Section 7** and **Table 11**.

6.1 Initial Overview of Site and Impacts

The site for the proposed Stage 1 works is localised to Lot 717 DP 729484 and a portion of the adjacent waterway. The works would comprise the demolition and removal of existing infrastructure and the construction of a replacement boat travel lift facility with a rock revetment structure and floating service pontoons. The proposed upgrade works would be constructed over a period of up to six months.

The site for the proposed Stage 2 works is localised to Lot 5 DP 1243139. The works would comprise the extension of the footprint of the proposed travel lift facility, relocation of the road entry point, relocation of the storage yard, provision of an amenities block and installation of fencing. The proposed Stage 2 works would be constructed over a period of up to three months.

The works would have discrete and localised environmental impacts, with potential effects on:

- a. Sediment Quality;
- b. Geology and Soils;
- c. Estuarine Processes;
- d. Services;
- e. Water Quality;
- f. Landscape and Visual Character;
- g. Ecology
- h. Air Quality;
- i. Noise and Vibration;
- j. Traffic and Parking;
- k. Navigation;
- l. Existing Users, Access and Safety;
- m. Waste Management;
- n. Aboriginal Heritage; and,
- o. Non-Aboriginal Heritage.

6.2 Sediment Quality

6.2.1 Site Conditions

The following sediment quality investigations have been undertaken at or near the site:

- GHD (2017), Tweed Heads Slipway Contamination Investigation, Report prepared on behalf of the Department of Industry – Lands, December 2017.
- Hydrosphere Consulting (2019), Sediment Investigation Report – Southern Boat Harbour, Tweed Heads Maintenance Dredging, Report prepared on behalf the Department of Industry – Lands, February 2019.

The contamination investigation undertaken by GHD (2017) comprised sediment sampling and testing to a maximum depth of 1.2 m at 9 locations (six within approximately 50 m of the slipway and three from the vicinity of the adjacent commercial fishing jetties/berths).

Testing was undertaken for the following contaminants of potential concern (COPC):

- Tributyltin (TBT);
- Metals (antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
- Polycyclic aromatic hydrocarbons (PAHs);
- Total recoverable hydrocarbons (TRH);
- Benzene, toluene, ethylbenzene and xylene (BTEX);
- Organochlorines (OC) and organophosphates (OP) pesticides;
- Polychlorinated biphenyls (PCBs); and,
- Phenols, and ammonia.

Laboratory analysis of selected samples for particle size distribution (PSD) and acid sulfate soils (ASS) was also undertaken.

The sediments encountered during the investigations comprised dark-grey/grey fine to medium grained sand with some shells.

Results of the geochemical testing were compared against the sediment quality guideline values (SQGVs) from ANZECC/ARMCANZ (2013). The low guideline value (SQGV-low) represents a low probability of environmental effects, while the upper guideline value (SQGV-high) represents a high probability of environmental effects. Results of the geochemical testing showed the following:

- TBT exceeded guideline concentrations at all locations for the majority of samples with exceedances of SQGV-high observed at the locations closest to the slipway;
- Copper, mercury, lead, nickel and zinc were all elevated with particularly high concentrations exceeding SQGV-high at the location closest to the slipway;
- Concentrations of TRH were below the laboratory limit of reporting (LOR), with the exception of the surface and near-surface samples closest to the slipway;
- Concentrations of PAH were low, either below the LOR or below the SQGV-low guideline; and,
- Concentrations of pesticides, BTEX, ammonia and phenols were all below the LOR.

The spatial distribution of contamination was as expected, with the highest concentrations observed in the surface samples and those samples nearest to the slipway. Elevated concentrations were also observed within the adjacent berths where vessels are understood to rest on the sediments at very low tides.

Acid sulfate soils testing indicated the sediments may be potential acid sulfate soils (PASS). Removal and subsequent oxidation of the sediments would require preparation of an acid sulfate soils Management Plan (ASSMP).

There have been no specific investigations completed to date to determine waterside subsurface conditions for engineering design purposes. However, environmental sampling in waterside areas adjacent to the slipway was completed by Hydrosphere in May 2018. The sampling comprised a series of vibrocores taken along the water frontage of the existing timber jetties to the east of the slipway site (refer **Figure 9**). The investigation determined that subsurface conditions typically comprised silty sand or silty clayey sand overlying

relatively clean sand layers. The closest investigation location to the slipway was BH1 (seabed surface -0.91 m TRHD (-1.79 m AHD)) and this contained the following subsurface conditions:

- Silty sand from the seabed surface down to -2.82 m TRHD (-3.70 m AHD);
- Sandy clay to -3.23 m TRHD (-4.11 m AHD); and,
- Sand to -4.28 m TRHD (-5.16 m AHD, end of vibrocore).

Sampling identified a vertical distribution of contaminants with elevated concentrations for both metals and TBT generally occurring in the top 1.5 m layer of sediment associated with the silty sand/silty clayey sand stratum. Elevated contaminant concentrations, most notably TBT and mercury, were also recorded within sediments in the jetty berths adjacent to the slipway. Contamination of the sediments was attributed to past use of the slipway facility and general vessel operations within the area and the accumulation of anthropogenic material on the bed over time.

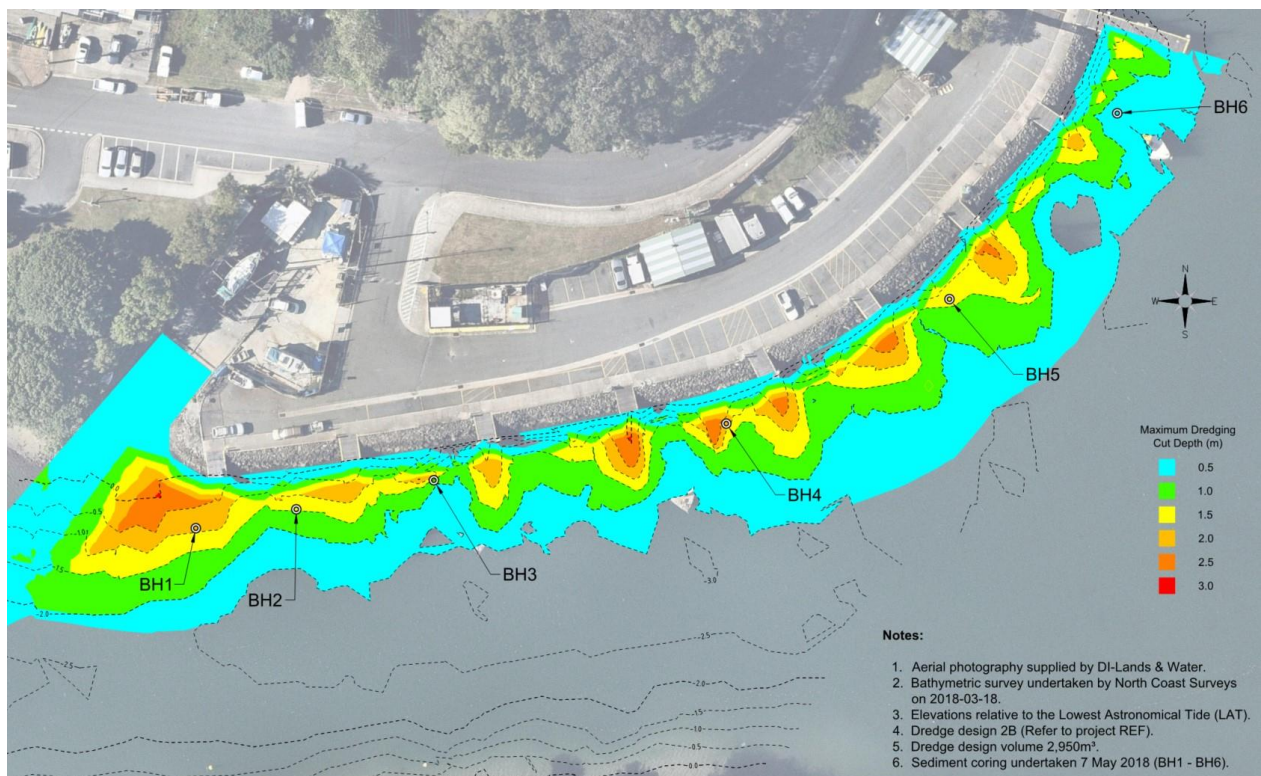


Figure 9: May 2018 Hydrosphere Environmental Sampling

6.2.2 Potential Impacts

The proposed Stage 1 construction methodology is described in **Section 3.2.5** and focuses on measures to control sediment disturbance and loss of sediment into the adjacent waterway during the works.

Site establishment activities would include the deployment of two floating silt curtains across the slipway ramp entrance. The silt curtains would later be extended further into the waterway to enclose the overwater work area required for pile driving.

A geotextile fabric marker layer extending to the seaward limit of the land-based civil works would be placed (with ballasting as required) over the area of the slipway ramp surface that

is covered with sediments. A rock bund would then be placed across the seaward end of the marker layer. The rock would be carefully placed by excavators operating at low tide, a geotextile fabric would be placed on the landward face of the rock bund.

The proposed marker layer and rock bund (including geotextile fabric) would act to both cap the contaminated sediments on the slipway ramp and provide an effective environmental control for containment of any sediment disturbance by land-based demolition activities and/or tidal water level variations at the site during construction.

Following construction of the rock bund, filling of the slipway ramp area would take place with engineered fill, thereby creating a working surface for placement of rock armour over the seaward face of the rock bund with land-based excavators and for completion of the remaining landside works i.e. installation of drainage provisions and in-ground services, pavement basecourse placement and compaction, concrete pavement construction and installation of above-ground fixtures. The remaining waterside works would be completed primarily with floating plant and equipment, including pile driving, construction of concrete runway beams, and gangway/pontoon installation.

The proposed approach has the following advantages:

- Minimal disturbance of the sediment with elevated concentrations of contaminants.
- Straightforward construction over the ramp i.e. no water based works for the capping activities thereby further reducing the potential for mobilisation of the sediments.
- Permanent capping of the sediments with the most elevated levels of contamination (i.e. closest to the slipway).

If the slipway was to continue operating without the capping of this area, contaminated sediments would be continually re-worked and mobilised through tidal movements, wind and boat wake wave action, and use of the slipway.

The proposed Stage 2 works would not have any impact on sediment quality.

Proposed mitigation measures are listed below and in **Section 7**.

6.2.3 Recommended control measures

The following mitigation measures should be implemented to manage and mitigate potential impacts of the Stage 1 works:

- Deployment of floating silt curtains (two) across the slipway ramp entrance. These silt curtains would later be extended further into the waterway to enclose the overwater work area required for pile driving. The silt curtains should be weighted and extend all the way to the seabed in all tidal conditions;
- Daily inspections for turbidity and effectiveness of the silt curtain;
- Adoption of marker layer and rock bund (including geotextile fabric) to cap the contaminated sediments on the slipway ramp and provide an effective environmental control for containment of any sediment disturbance by land-based demolition activities and/or tidal water level variations at the site during construction;
- Rock used in the works should be free of fines (washed); and
- If excavation of sediments is required, an ASS Management Plan should be prepared.

6.3 Geology and Soils

6.3.1 Site Conditions

Available landside geotechnical information comprises the results of an investigation completed by Soil Surveys Engineering in April 2019 and a subsequent interpretive report prepared by Advisian in May 2019. The interpretive report provides a summary of the soil landscape and geology. Reference to the Tweed Heads 1:100 000 scale quaternary geological map and 1:250 000 scale geological map indicates that the near surface geology of the site comprises Holocene aged marine sand, silt, clay and gravels. The site investigation also identified metasiltstone / phyllite bedrock underlying the marine sediments.

The landside site investigation locations are shown on **Figure 10** and comprised two (2) boreholes (BH) (with Standard Penetration Tests), three (3) Cone Penetrometer Tests (CPT), and laboratory testing for soil aggressivity.

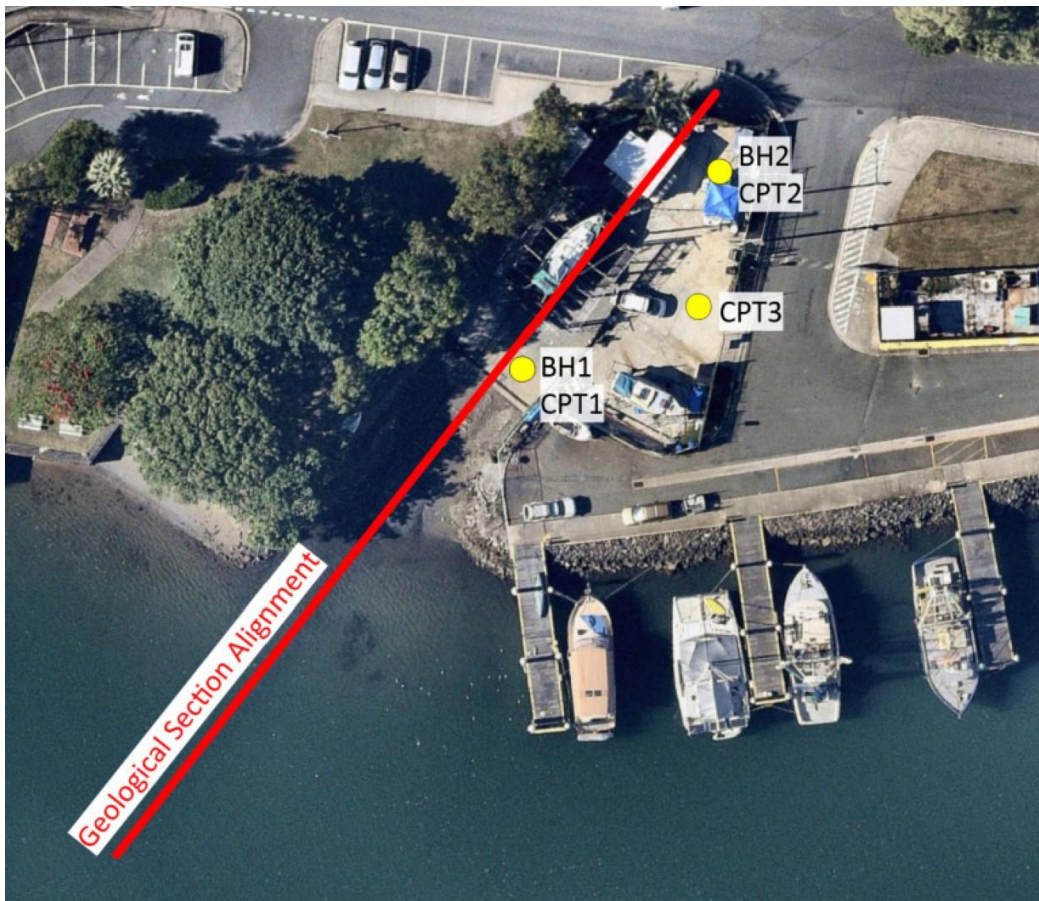


Figure 10: Landside geotechnical investigation points (Soil Surveys Engineering, 2019)

The results of the investigation determined that:

- At the rear of the slipway site subsurface conditions comprised the following (note XW means extremely weathered):
 - Unit 1: Gravelly / Clayey Sand, Medium Dense (Fill)
 - Unit 3: Silty Clay, Very Stiff to Hard (Residual Soil / XW Material)
 - Unit 4: Metasiltstone / Phyllite, Very Low to Medium Strength (Bedrock)

- At the seaward side of the slipway site subsurface conditions comprised:
 - Unit 2a: Silty / Clayey Sand, Very Loose to Loose (Marine sands)
 - Unit 2b: Silty Sand, Medium Dense to Dense (Marine sands)
 - Unit 3: Silty Clay, Very Stiff to Hard (Residual Soil / XW Material)
 - Unit 4: Metasiltstone / Phyllite, Very Low to Medium Strength (Bedrock)

The boreholes and CPTs indicated fill (gravelly/clayey medium dense sand) and marine sands (silty sand and silty/clayey sand) underlying the hardstand/paved area. No soil sampling and testing for soil contamination under the Stage 1 hardstand/paved area was undertaken. In addition, no boreholes or soil sampling was undertaken within the proposed Stage 2 hardstand extension area, proposed storage yard or new roadway entry.

6.3.2 Potential Impacts

The existing subgrade beneath the Stage 1 hardstand area would need to be excavated down to the required levels for pavement installation. This material would be stockpiled onsite for testing to characterise the material and assess it for beneficial reuse onsite as fill, or for offsite disposal at a licensed waste facility.

The existing subgrade beneath the Stage 2 hardstand extension area would need to be excavated down to required levels for pavement installation. Excavation of the existing subgrade will also be required at the proposed relocated storage yard down to required levels for concrete base slab installation and at the new road entry down to required levels for road pavement installation.

Proposed mitigation measures are listed below and in **Section 7**.

6.3.3 Recommended control measures

The following mitigation measures should be implemented to manage and mitigate potential impacts:

- Excavated existing subgrade beneath the hardstand should be stockpiled onsite for testing to characterise the material and assess it for beneficial reuse as fill onsite or for offsite disposal at a licensed waste facility;
- Operation of the Travel Lift Facility should be managed according to best management practice procedures including Environmental Action for Marinas, Boatsheds and Slipways (DECC, 2007); and,
- To prevent contaminated material being placed on the site, imported material should be either virgin excavated natural material as defined in the Protection of the Environment Operations Act or be excavated natural material that has been tested in accordance with the 'excavated natural material exemption 2014'.

6.4 Estuarine Process (Tides, Waves and Flooding)

6.4.1 Site Conditions

6.4.1.1 Tidal Water Levels

Water levels in Terranora Creek are influenced by tides and storms. Tidal planes obtained from OEH NSW Tidal Planes Analysis: 1990-2010 Harmonic Analysis (MHL, 2012) are summarised in **Table 5** for the gauge at Dry Dock. The Dry Dock gauge (MHL gauge No. 201428) is located within Terranora Creek, approximately 1km upstream of the Pacific Motorway bridge crossing.

Table 5: Tide Levels for Terranora Creek (Dry Dock)

Description	Water Level (m AHD)
High High Water Summer Solstice (HHWSS)	+0.74
Mean High Water (MHW)	+0.36
Mean Sea Level (MSL)	+0.08
0.0m Australian Height Datum (AHD)	0.00
Mean Low Water (MLW)	-0.21
Indian Spring Low Water (ISLW)	-0.50

6.4.1.2 Sea Level Rise

Sea level rise (SLR) of 0.5m has been allowed for over the 50 year design life of the facility. This allowance is consistent with the latest SLR estimates from IPCC documented within the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate – Chapter 4 Sea Level Rise and Implications for Low-lying Islands, Coasts and Communities (IPCC, 2019). Predictions for the upper bound of the likely range (i.e. 13th to 87th percentile) of sea level rise for the worst case RCP8.5 climate change scenario are approximately 0.5m over the next 50 year period.

6.4.1.3 Storm Surge

During extreme events, the water level can be elevated higher than the predicted tidal level due to low barometric pressure, wind setup and wave setup. This increase in water level due to reduced barometric pressure and wind setup is known as storm surge. Wave setup due to ocean storms would not be expected to influence extreme water levels at the subject site due to the open condition of the Tweed River entrance and the distance of the site from the entrance.

The 100 year ARI extreme water level due to tide and storm surge, from analysis of the Tweed River at Tweed Heads tide gauge data, is 1.4m AHD. This is based on an analysis completed by Watterson et al 2013 and documented in the paper Flooding Tailwater Levels for NSW Coastal Entrances.

6.4.1.4 Current Loads

Currents may be attributed to tidal flows, river flooding, wind shear, propeller wash and localised flows at stormwater outlets. Currents may also be generated by the passing nearby of other vessels.

Current from tidal flows and flood flows are expected to be minimal at the site due to its position within a sheltered inlet off the main Tweed River waterway. The Boating Map for the waterway adjacent to the project site indicates that a 4 knot zone and no wash zone applies, which would limit currents generated from vessel passing.

6.4.1.5 Flood Levels

Flood levels for the Tweed River floodplain were determined within the Tweed Valley Flood Study (BMT WBM, 2009) and are summarised in **Table 6**. Flood behaviour at the site is dominated by the downstream ocean boundary condition, which was set at 2.6m AHD for the baseline 100 year Average Recurrence Interval (ARI) flooding scenario. The “*ocean level boundary accounts for a tide surge interaction with the storm surge and wave setup superimposed upon normal variations in water level estimates*” and included a 0.3m low level allowance for the potential effects of climate change (BMT, 2009).

Table 6: Flood Levels at Dry Dock Gauge (BMT WBM, 2009)

Flooding Scenario	Flood Level (m AHD)
100 year ARI (baseline)	2.30
Medium Impact Climate Change Scenario	2.53
High Impact Climate Change Scenario	2.82

It is noted that the modelled climate change scenarios were as follows:

- Medium level impacts: A 20% increase in rainfall intensity and a 55 cm increase in sea level
- High level impacts: A 30% increase in rainfall intensity and a 91 cm increase in sea level

Review of Tweed Development Control Plan – Section A3 Development of Flood Liable Land (Version 1.5, 10 December 2019) and associated flood hazard mapping, indicates that the subject site is located within the Lower Tweed area within an area of flood liable land (inundated during the 100 year ARI flood event) and has a Design Flood Level (DFL) of 2.6m AHD. The Tweed Development Control Plan 2008 states the following with regard to development on flood liable land:

- Building Materials:
 - All materials used below Council's adopted design flood level must not be susceptible to water damage.
- Electrical Supply:
 - Subject to the requirements of Northern Rivers Electricity, all electrical wiring, power outlets, switches, etc., should, to the maximum extent possible, be

located above the design flood level. All electrical wiring installed below the design flood level should be suitably treated to withstand continuous submergence in water.

- Filling
 - All filling is to be graded so that it drains to the street or other approved permanent drainage system.
- Commercial and industrial development will be required to make adequate provision of flood free storage areas for stock and equipment susceptible to water damage.

6.4.1.6 Wave Loads

6.4.1.6.1 General

The wave loads can potentially be generated by one or more of the three components below:

- **Swell Waves:** residual longer period (e.g. 10 seconds plus) waves generated remotely and transmitted into the waterway. These are distributed by reflection, diffraction and refraction.
- **Wind Waves, or Seas:** waves being generated locally by wind shear across the surface of the waterway. Wave amplitude (H) and period (T) are functions primarily of wind speed and duration, fetch length and water depth.
- **Vessel Wash:** Waves generated by passage of vessels. Waves can be either bow waves or stern waves which can be of differing characteristics for the same vessel passage.

6.4.1.6.2 Swell Waves

Swell waves which propagate through the Tweed River entrance would not reach the project site at Terranora Inlet. As such, swell waves do not need to be considered in wave loading.

6.4.1.6.3 Wind Waves or Seas

The project site is located in a relatively sheltered area, being only exposed to significant wind fetches over Terranora Creek from the south west. The south-westerly wind fetch to the Minjungbal Drive road bridge is 400m. The bridge piers would act to disrupt propagation of wind waves from the upstream waterway area of Terranora Creek, which has a south-westerly wind fetch of 1800m to the Pacific Motorway bridge crossing. The estimated wind wave climate for the shorter fetch distance is summarised in **Table 7**.

Table 7: Wind Wave Climate

Wind Fetch	Wind Wave Conditions							
	1 year ARI		50 year ARI		100 year ARI		200 year ARI	
	Hs	Tp	Hs	Tp	Hs	Tp	Hs	Tp
400m SW fetch	0.29	1.71	0.57	2.29	0.64	2.41	0.70	2.52

6.4.1.6.4 Vessel Wash

As noted above, vessel speed and wake restrictions applied to the adjacent waterway areas would limit vessel wash to insignificant levels for design purposes.

6.4.2 Potential Impacts

The proposed travel lift boat facility includes the construction of a rock revetment along the foreshore of the project site to meet existing rock revetment structures on either side. The rock armour for the revetment matches existing rock sizes in the adjacent revetment structures and can satisfactorily withstand the local wave and current climate. Accordingly, the foreshore along the project site would not be at risk of erosion or instability.

The Basis of Design for the travel lift boat facility considers all the estuarine processes at the site and the facility would be designed in accordance with the relevant Australian Standards. Accordingly, the structures would be fit for purpose over their design life.

Sea level rise (SLR) and flooding can potentially impact the travel lift facility in the future by submerging any electrical wiring, power outlets or switches located below the design flood level. Any electrical wiring installed below the design flood level should be suitably treated to withstand submergence in water. In addition, debris may collect at the facility during a flooding event creating a potential safety hazard and should be removed following a flooding event when safe to do so. The structural condition of the facility is not expected to be impacted by sea level rise and flooding as these parameters have been taken into account during the design phase of the travel lift facility, as noted above.

The proposed travel lift boat facility would have no significant impact on estuarine processes at the site, as the redevelopment of the site does not involve any significant modification to the estuary. The infilling of the lower section of the slipway ramp would marginally reduce the local tidal prism (the volume of water between low water and high water), but this reduction would be negligible compared to the tidal prism of Terranora Creek and the wider Tweed River estuary. There would be some additional local reflection of waves at the site due to construction of the rock revetment which would replace the existing gently sloping slipway ramp, but this would be of a very minor scale and would not be an issue for the estuary or waterway users, as evidenced from the experience of the adjacent rock revetment structures.

Proposed mitigation measures are noted below and in **Section 7**.

6.4.3 Recommended control measures

To manage and mitigate potential impacts a construction and operational flood management plan should be prepared.

6.5 Services

6.5.1 Site Conditions

A survey identifying all services (water/ sewer/ stormwater mains), power lines and structures has been undertaken and is included in **Appendix E**.

6.5.2 Potential Impacts

Design and construction of the Stage 2 works would allow for preservation of all existing services at their existing locations. The services survey would be provided to the Contractor as site information. A service locator would be engaged by the Contractor to locate all services prior to construction works commencing to ensure the construction works do not adversely impact services.

Proposed mitigation measures are noted below and in **Section 7**.

6.5.3 Recommended control measures

A service locator should be engaged prior to construction works commencing to ensure the construction works do not adversely impact services.

6.6 Water Quality

6.6.1 Site Conditions

The following site conditions were described by Hydrosphere (2019) and are not considered to have altered significantly since that time.

The project site is located adjacent to Terranora Creek, within the lower Tweed River estuary and receives diurnal tidal flushing but is locally influenced by harbour operations. Water quality is expected to be generally consistent with a healthy estuarine environment although there is likely to be ongoing impacts associated with the existing facility associated with boat related resuspension of contaminated sediments as well as potential small scale hydrocarbon slicks, harbour debris, and the like.

GHD (2017) reported that runoff from the slipway ramp is directed into a narrow catch drain (at the southwestern end of the concrete ramp), flowing into a pit at the north-western of the drain, then pumped via an underground pipe into an oil-water separator (at the northern corner of the winch house), before being discharged into the Council sewerage system. However, the catch drain for the slipway works area is often inundated during high tides (GHD, 2017), as is the lower portion of the work area, resulting in the discharge of stormwater into the waterway.

6.6.2 Potential Impacts

6.6.2.1 Stage 1 Works

Construction Phase

Potential short-term construction phase water quality impacts include:

- Turbidity due to water based works disturbing bed sediments (rock placement, piling etc);
- Runoff from stockpiles;
- Mobilisation of sediment and contaminants;
- Disturbance and oxidation of PASS during piling;
- Spills at the works site (fuel, coolant, lubricants, hydraulic fluids); and

- Waste material from construction activities entering the surrounding marine waters (e.g. fuel and oil from construction machinery, garbage and waste materials from site).

Specifically, during construction, initial placement of engineered fill onto sediments in the lower section of the slipway ramp could potentially disturb and mobilise fine sediments generating turbidity within the vicinity of the works and release of contaminants from the site. The marker layer (geotextile fabric) proposed to be placed on the sediment prior to filling would avoid this situation.

The estuary bed at the base of the slipway may also be disturbed during the installation of new runway beams, support and guide piles, and the placement of armour rock during the construction of the new revetment structure. The installation of piles would involve pile driving from either a floating barge mounted plant or land-based plant depending on location and access, however no material would be removed from the bed. The proposed installation of two silt curtains would restrict the migration of any disturbed sediments. Adverse water quality impacts would not be expected.

There may potentially be disturbance of PASS material when installing the support and guide piles however any impact is expected to be minor, localised and buffered by the seawater. No PASS material would be removed from the seabed and transferred onshore to an oxic environment.

Both demolition and construction material would be stockpiled onsite where the existing parking space within the project boundary is located, distant as far as practicable from the water's edge.

Appropriate mitigation and control measures to avoid and ameliorate any impacts on water quality and to manage waste have been identified below and summarised in **Section 7**.

Operation Phase

The operation of boat repair and maintenance facilities has the potential to generate liquid waste from runoff from washdown, sanding, painting and maintenance areas. The proposed works include the construction of a bunded concrete washdown area with wastewater capture and treatment. The wastewater would then be discharged to the Council sewerage system as trade waste. This would be a significant improvement on the current runoff capture and treatment process at the site and would reduce wastewater discharge to the environment.

No long-term negative water quality impacts are expected from the proposed works. The works are expected to improve localised water quality in the long term by improving environmental controls, in particular site runoff management, thereby avoiding ongoing mobilisation of contaminated sediments and wastes to the adjacent waterway.

6.6.2.2 Stage 2 Works

Construction Phase

Potential short-term construction phase water quality impacts include:

- Runoff from stockpiles;
- Spills at the works site (fuel, coolant, lubricants, hydraulic fluids); and
- Waste material from construction activities entering the surrounding marine waters (e.g. fuel and oil from construction machinery, garbage and waste materials from site).

Both demolition and construction material would be stockpiled onsite, distant as far as practicable from the water's edge.

Appropriate mitigation and control measures to avoid and ameliorate any impacts on water quality and to manage waste have been identified below and summarised in **Section 7**.

Operation Phase

The proposed stage 2 hardstand extension would include the construction of a bunded concrete washdown area with wastewater capture and treatment. The wastewater would then be discharged to the Council sewerage system as trade waste.

The relocated storage yard would comprise a concrete ground slab with an above ground oil storage tank with bunding and shelter and would have appropriate drainage connected to the stormwater system.

The amenities building will be connected to Council's sewerage system.

No long-term negative water quality impacts are expected from the proposed Stage 2 works.

6.6.3 Recommended control measures

6.6.3.1 Stage 1 Works

The following mitigation measures should be implemented to manage and mitigate potential impacts of the Stage 1 works:

- Replacement of the trade waste system and approval from Tweed Shire Council for the discharge of trade waste to the sewerage system. The trade waste oil separator should be double bunded;
- Industry standards and pollution prevention regulations should be adhered to during refuelling, transfer, storage and handling of hazardous materials;
- Contractor should ensure that all plant is maintained in good working order with regular servicing.
- No major maintenance of equipment should be undertaken on-site;
- Weather and tide forecasts should be checked regularly during construction. Where flooding or inundation is forecast to the any work area, all equipment and materials to be removed from the landside construction zone or appropriately secured above expected flood levels in the area. These procedures should be documented in a Flood Management Plan;
- Stockpiles should be located on flat ground at least 5 metres away from areas subject to run-off and away from established flow paths (e.g. drains, gutters, etc.). The height of the stockpiles should not exceed 2 metres unless stockpiles are suitably protected from wind erosion. The Contractor should protect temporary stockpiles in accordance with 'Blue Book' requirements;
- Any machinery working on the waterway should carry a full spill containment kit including hydrocarbon booms to reduce the impact of any spill;
- Appropriate site and project inductions/training detailing potential water quality impacts and relevant construction measures and spill and emergency response procedures should be used;
- Daily inspections of plant, minimisation of fluids on site, and proper procedures for refuelling and maintenance need to be observed; and

- Preparation and implementation of a site Stormwater Management Plan for the operation of the site. The plan should consider stormwater runoff and flow from the site and potential contamination sources.

6.6.3.2 Stage 2 Works

The following mitigation measures should be implemented to manage and mitigate potential impacts of the Stage 2 works:

- Industry standards and pollution prevention regulations should be adhered to during refuelling, transfer, storage and handling of hazardous materials;
- Above ground oil storage tank should be double bunded;
- Contractor should ensure that all plant is maintained in good working order with regular servicing.
- No major maintenance of equipment should be undertaken on-site;
- Weather and tide forecasts should be checked regularly during construction. Where flooding or inundation is forecast to the any work area, all equipment and materials to be removed from the landside construction zone or appropriately secured above expected flood levels in the area. These procedures should be documented in a Flood Management Plan;
- Stockpiles should be located on flat ground at least 5 metres away from areas subject to run-off and away from established flow paths (e.g. drains, gutters, etc.). The height of the stockpiles should not exceed 2 metres unless stockpiles are suitably protected from wind erosion. The Contractor should protect temporary stockpiles in accordance with 'Blue Book' requirements;
- Appropriate site and project inductions/training detailing potential water quality impacts and relevant construction measures and spill and emergency response procedures should be used;
- Daily inspections of plant, minimisation of fluids on site, and proper procedures for refuelling and maintenance need to be observed; and
- Preparation and implementation of a site Stormwater Management Plan for the operation of the site. The plan should consider stormwater runoff and flow from the site and potential contamination sources.

6.7 Landscape and Visual Character

6.7.1 Site Conditions

The project area is located within the Southern Boat Harbour, off the Terranora Inlet, and comprises wharves, jetties, trawlers, yachts, and other marine vessels both upstream and downstream of the inlet. Within the site boundary is the existing boat slipway facility (**Figure 11**), ramp (**Figure 12**, **Figure 13** and **Figure 14**), maintenance shed, open space for material and equipment storage and car parking. An existing entry way, storage yard (**Figure 15**), grassed areas and carparking are located within the Stage 2 site boundary.

Numerous jetties with berths for commercial fishing boats are located along the foreshore of the site with a rock revetment to protect the embankment from erosion (**Figure 16**). The area opposite the site to the south is classified as an E2 Environmental Conversation area including mangroves and an elevated boardwalk (**Figure 17**). Located upstream of the site are the Ancora restaurant, and the Ivory Waterside Tavern and Marina (**Figure 18**).

Immediately to the west of the site is an open grassland area called Marina Park. Commercial buildings including the Tweed Holden Car Dealership are located approximately 100 m to the northwest. Residential buildings are located north of the project site but are visually screened by a natural vegetation barrier.



Figure 11: View of the existing boat slipway facility



Figure 12: Image facing downstream across the existing boat ramp and slipway facility



Figure 13: Image facing south down the existing boat ramp with the drainage grate/pit visible below the highwater mark



Figure 14: Existing boat ramp and slipway facility with the maintenance shed and car parking in the background



Figure 15: Existing entry way and storage yard



Figure 16: Existing rock revetment and berthing zone to the east of the proposed works



Figure 17: E2 Environmental Conservation area (LEP2014) south of the project area including mangroves and an elevated boardwalk



Figure 18: Image facing west (upstream) of the inlet from the project site

6.7.2 Potential Impacts

6.7.2.1 Stage 1 Works

Impacts to the landscape and visual character are expected during the construction phase with the presence of workers, plant and associated works infrastructure (as required). This is a time limited impact which would occur during the estimated six months of construction. Following the completion of construction activities, the site would be returned to pre-construction landscape conditions with the addition of the travel lift. The proposed travel lift facility is expected to look similar to that shown in **Figure 19**.



Figure 19: Example travel lift facility (Source: Waterline cover page 2020-2nd quarter, Marine Industries Association)

Due to the considerable size and length of the travel lift runways and associated structures, the facility would be visually prominent within the harbour landscape at a local level. The structures are either at ground level (runway beams) or are on the water (pontoons) which assists in mitigating their prominence.

A travel lift device itself is often associated with harbours and the presence of a travel lift at this location would be consistent with the existing visual maritime character of the area. In addition, when not in use, the travel lift would be parked on the hardstand and not on the runway beams over water, reducing visual impact. The presence of the travel lift at this location is not expected to significantly alter or negatively impact the visual amenity of the harbour. The operation of the travel lift can in fact create visual interest at the foreshore.

The travel lift structure would require safety navigation lighting at night, however due to the considerable ambient light levels and other light emission within the harbour (i.e. other vessels, navigation aids, marina lighting), impacts from lights are not expected to be significant. Lighting on the service pontoons, which would comprise downward facing bollard type lighting, could be arranged such that the lights are automatically turned off at a prescribed time at night. TfNSW would install and maintain navigation lighting mounted to the pontoon restraint piles or fender/guide piles if deemed necessary by TfNSW.

Appropriate mitigation and control measures to avoid and ameliorate any impacts have been identified below and summarised in **Section 7**.

6.7.2.1 Stage 2 Works

Impacts to the landscape and visual character are expected during the construction phase with the presence of workers, plant and associated works infrastructure (as required). This is

a time limited impact which would occur during the estimated three months of construction. Following the completion of construction activities, the Stage 2 site would largely be returned to pre-construction landscape conditions with the addition of the extended hardstand area, new storage yard with above ground oil storage yard, new fencing, new amenities building (4 x 6 m) and new entry location with curb and guttering. The grassed area adjacent to the footpath along Terranora Terrace will be lost due to the extended hardstand area but the new fencing will match the existing fencing and footpath alignments further along Terranora Terrace.

None of the features of the proposed works on the Stage 2 portion of the site are visually prominent nor are they a significant deviation from the features of the existing site. Stage 2 lighting is not expected to be significantly different from existing conditions and therefore unlikely to cause impacts on adjacent residences. The proposed works would create a more ordered and updated looking site. All fencing would be wire mesh fencing allowing views through the site.

Appropriate mitigation and control measures to avoid and ameliorate any impacts have been identified below and summarised in **Section 7**.

6.7.3 Recommended control measures

The following mitigation measures should be implemented to manage and mitigate potential impacts:

- Impacted areas (i.e. for access, storage and site works) should be returned to pre-construction conditions where possible; and,
- The construction site should be kept tidy and an in an orderly fashion at all times to minimise visual impacts to local residents.

6.8 Ecology

An assessment of ecology in the vicinity of the proposed works was undertaken by Hydrosphere (2019). The findings are largely reproduced below but with updated searches of databases and mapping.

6.8.1 Site Conditions

A search through the NSW BioNet Wildlife Atlas for threatened specials and the Federal Protected Matters Search Tool was undertaken on 21/04/2021 for the proposed works area. The search results are provided in **Appendix C**.

6.8.1.1 Estuarine Vegetation

DPI habitat mapping (2000) shows large areas of estuarine vegetation (seagrass, mangroves, saltmarsh) are located through the broader lower Terranora Inlet and Tweed River estuary (refer **Figure 20**). No seagrass, mangroves or saltmarsh are present within the proposed works areas. The nearest seagrass meadows shown on 2021 aerial photography are located approximately 40 m from the site (**Figure 21**). The seagrass is likely to be *Zostera capricorni* based on the DPI mapping. Mangroves are also located on the opposite foreshore approximately 50 m south of the works area.

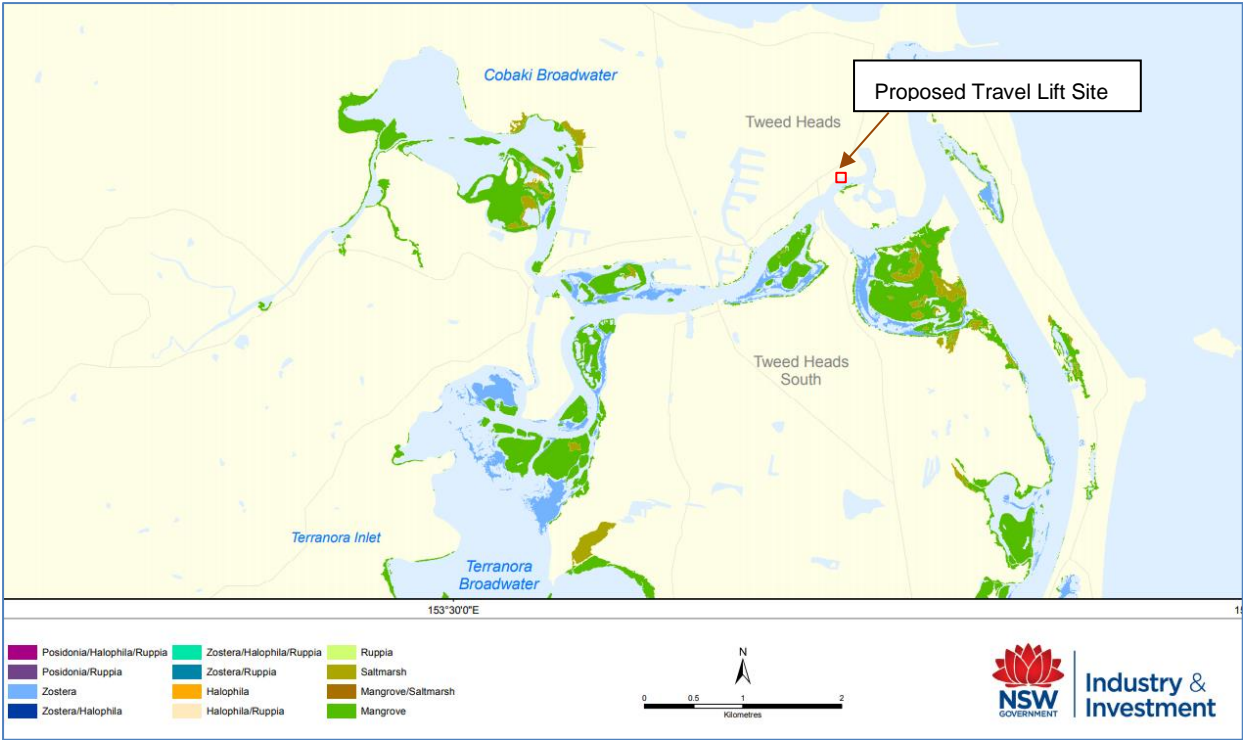


Figure 20: NSW DPI Estuarine Habitat Mapping 2000



Figure 21: Seagrass in vicinity of site

6.8.1.1 Birds

A large range of bird species utilise a variety of habitats throughout the broader lower estuary including threatened shorebird species. No threatened shorebird habitat is present within or in the vicinity of the proposed works area. The rock revetment bordering the harbour may provide potential foraging habitat for the Sooty Oystercatcher. This habitat is likely to be only intermittently used and is considered to be low value due to the high human disturbance in the harbour and large areas of more suitable habitat throughout the estuary.

Common coastal bird species such as Silver Gull, Pelican, Common Tern and various Cormorant species may utilise the jetties and rock revetment for roosting. These species may also use the waters within the harbour as foraging habitat. Common urban bird species such as the Australian Magpie, Torresian Crow, Laughing Kookaburra and Noisy Miner that commonly inhabit disturbed areas may intermittently utilise the slipway site.

6.8.1.2 Fish

The wider lower estuary contains a broad range of estuarine habitats including rocky habitat (natural and rock training walls), seagrass/seaweed, mangroves, saltmarsh, sand flats, mud flats and other soft bottom habitats. A range of fish species are likely to utilise the different habitats within the vicinity of the proposed works area. Recreationally and commercially important species, Yellow-fin Bream (*Acanthopagrus australis*), Whittings (mainly *Sillago ciliata*), Flatheads (mainly *Platycephalus fuscus*), Mulletts (mainly *Mugil cephalus* and *Myxus elongates*) and Trevally (*Caranx* spp.) are likely to utilise habitats within the proposed works area.

Bream, Luderick, Mangrove Jack (*Lutjanus argentimaculatus*) and Flathead are also likely to utilise the rocky habitats adjacent to the works area. Black Cod (*Epinephelus daemeli* – listed as vulnerable in NSW) may potentially utilise the rocky habitat (rock revetment) adjacent to the works area. This area of habitat is not particularly significant with larger areas of more suitable higher value habitat present throughout the estuary (i.e. training walls in lower estuary).

6.8.1.1 Terrestrial Vegetation

There is one small tree located within the footprint of the proposed Stage 2 works adjacent to the proposed new road entry (refer **Figure 22**). This tree will be retained.



Figure 22: Small tree to left of photo to be retained adjacent to the proposed new road entry

6.8.2 Potential Impacts

The proposed works are expected to cause limited to negligible impacts on coastal ecology.

A search of the 'NSW BioNet Atlas of NSW Wildlife' provided by the DPIE was undertaken. The search area, centred on the project site, comprised the minimum 10km x 10km. The search resulted in 53 threatened species records – 24 species of flora and 60 faunal species (refer **Appendix C**). A variety of terrestrial and marine-based species are identified. The nature of the project and the existing condition of the site in which the works are proposed to be undertaken makes many of the records irrelevant in terms of potential impact. For this reason, a closer examination of the records provided for the project site and surrounds was completed (refer **Figure 23**).

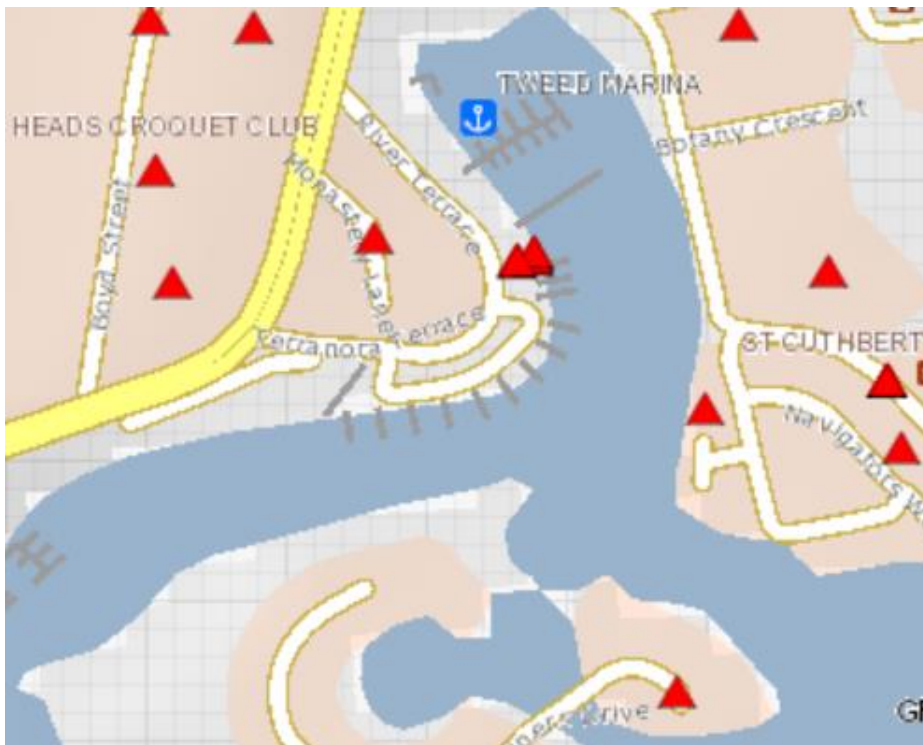


Figure 23: Locations of BioNet search results for the project site and close proximity.

The records contained at the project site and immediate vicinity are listed in **Table 8**.

Table 8: Species recorded on BioNet in close proximity to the project site

Species	Likelihood of Impact
Australian Wood Duck	low
Eastern Barn Owl	low
Australia Pelican	low
Eastern Water Dragon	low
Spotted Turtle-Dove	low

A search of the Commonwealth EPBC Act (matters of national environmental significance) determined that 71 listed threatened species, 66 migratory threatened species and 3 listed

threatened ecological community are either known, likely or have potential to occur in the search area. A full list of these 'Matters of National Environmental Significance' is provided in **Appendix C**. Of this large list, only a small number have potential to be at the site and all would have a low likelihood of impact due to the works.

While the adjacent channel would be regarded as key fish habitat, there is no indication that the site contains protected fauna or protected native plants pursuant to the *Fisheries Management Act 1994*. NSW Fisheries will need to be notified of the works (refer **Section 4.6**) as some portion of the of the works are below MHWL.

6.8.2.1 Estuarine Vegetation

No mangroves or saltmarsh are expected to be impacted by the proposed works. Seagrass has the potential to be impacted by the proposed works due to turbidity and site run off. Measures have been outlined in **Section 7** to minimise turbidity due to the construction works. With the implementation of these measures no turbidity related impacts on estuarine vegetation are considered likely.

6.8.2.2 Birds

Common bird species that utilise the work areas may be impacted during works. However, any impact is expected to be temporary and minor with the species expected to re-utilise those habitats post-construction.

6.8.2.3 Fish

The rock revetment works and installation of new travel lift runway beams would temporarily disturb fish species within the immediate vicinity of works. However, any impact is expected to be minor and temporary with species expected to recolonise the area after work ceases. The area within the slipway to be filled provides a level of fish habitat, however the habitat is marginal, insignificant within the broader estuary habitat and a relatively small area. Any impact is expected to be minor.

With regards to Black Cod (*E. daemellii*), works may temporarily disturb (via noise) any individuals utilising habitat within the vicinity of the operating works area. The works are not expected to significantly alter any *E. daemellii* habitat. Any disturbance is expected to be minor and temporary with no long-term impacts expected. The proposed works are not expected to fragment, isolate or impact *E. daemellii* habitat and therefore are not expected to affect the species. A test of significance is not considered necessary and has not been prepared.

Appropriate mitigation and control measures to avoid and ameliorate any impacts have been identified below and presented in **Section 7**.

6.8.3 Recommended control measures

The water and sediment quality protection measures outlined above should be undertaken for the protection of ecology. Appropriate fencing should be installed to protect the tree to be retained adjacent to the proposed new road entry during construction of the Stage 2 works. No additional specific measures are considered necessary.

6.9 Air Quality

6.9.1 Site Conditions

The existing air quality across Tweed Heads is primarily influenced by emissions from industrial and commercial operations, motor vehicles and residential activities. The air quality in Tweed Heads is also influenced by the prevailing weather and climatic conditions including bushfires and other natural factors such as pollen.

Existing air quality at the sites is presumed to have moderate levels of pollutants, such as particulate matter and oxides, owing to their locations near major roads, industrial and/or commercial areas.

6.9.2 Potential Impacts

During the construction, temporary impacts on air quality may arise from:

- Minor generation of particles and dust from demolition work;
- Minor emissions (primarily diesel exhaust) from plant and machinery and,
- Minor emissions from construction traffic and water vessels.

These impacts are expected to be short-term, low intensity and able to be managed through the identified mitigation measures described in **Section 7**.

Following construction, air quality is expected to return to preconstruction levels.

6.9.3 Recommended control measures

The following mitigation measures should be implemented to manage and mitigate potential impacts:

- Material and rock transported to and from the sites should be covered;
- Dust suppression measures should be employed by construction crews during dry and windy periods or when required. Water sprays for dust suppression will be minimised to practicable levels; and
- Operating air quality should be managed in accordance with industry best management practice including Environmental Action for Marinas, Boatsheds and Slipways (DECC, 2007).

6.10 Noise and Vibration

Noise sensitive receptors for the site have been identified. The TfNSW construction and maintenance noise estimator has been used to assign a noise category for the site to describe the background noise environment. The noise estimator was then used to determine the predicted noise level at the nearest sensitive receptors.

The noise and vibration impact assessment was prepared in accordance with the following guidelines:

- Interim Construction Noise Guideline (ICNG) (DECCW, 2009).
- Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime, 2016).

The following noise assessment was based on the assessment undertaken by Hydrosphere (2019) and has been augmented by adoption of the TfNSW construction and maintenance noise estimator.

6.10.1 Site Conditions

Due to the Tweed Boat Harbour being a working marina, the acoustic environment surrounding the site is heavily influenced by recreational and commercial vessels regularly moving in and out of the site and noise generated from industrial work. Road traffic from Wharf Street and Terranora Terrace is another source of noise in the project area. The closest sensitive receivers to the proposed works are the residences located approximately 40 m and 70 m to the north with other residential areas located directly across the waterway 200 m to the east and 70 m to the south. In addition, potential commercial sensitive receivers include the Ancora restaurant located 30 m west, the Ivory Waterside Tavern and Marina located approximately 250 m west and other commercial businesses located 100 m northwest of the project site.

The TfNSW construction and maintenance noise estimator has been used to assign a noise area category for the site (category R2¹) to describe the background noise environment. Noise levels within the residential areas would be approximately 45 dB(A), 40 dB(A) and 35 dB(A) for day, evening and night times respectively. These noise levels are considered to be reflective of those likely to be experienced at residential receptors and waterway based hospitality premises for this project.

The Interim Construction Noise Guideline (DECC, 2009) provides noise management levels for maintenance work. Noise management levels differ depending on the type of sensitive receiver that may be affected and the time of day that the work is being carried out. According to the ICNG, for residential receivers, construction noise levels should be managed with the aim of not exceeding the noise affected level, which is the Rating Background Level (RBL) plus 10dB(A) during standard working hours or the RBL plus 5dB(A) outside of standard working hours (refer to **Table 9**). Where construction noise is predicted to exceed the noise affected level, all reasonable and feasible mitigation measures should be applied. The highly noise affected level is 75 dB(A). Where construction noise is predicted to reach this level, respite periods for very noisy work may be required.

¹ Definitions as per TfNSW Construction Noise and Vibration Guideline (August 2016)

R1 - Rural/suburban - Areas with negligible transportation or very limited local traffic, typically light vehicles only. 100m or more from the road.

R2 - Suburban/urban - Areas with low density transportation. Typically local traffic, light vehicles, intermittent traffic flow.

R3 – Urban - Areas with medium density transportation or some commerce or industry. Typically traffic is moving from one area to another (light & heavy vehicles) with heavy peak hour traffic movement. May be on or close to bus route/ light rail.

R4 – Urban/Industrial - Areas with dense transportation with some commerce of industry. Typically on or near an arterial or sub arterial road OR near rail line; 24 hour traffic movement.

Table 9: Noise Management Levels at Residences

Time of Day	Noise Management Level (NML) L _{Aeq} (15 mins)
Recommended standard construction hours Monday – Friday: 7am to 6pm Saturday: 8am to 1pm	Noise affected RBL + 10 dB(A)
	Highly noise affected 75 dB(A)
No work on Sundays or Public holidays	
Outside of Recommended Standard Hours	Noise affected RBL + 5 dB(A)

The daytime noise management level for the residential receptors is calculated to be 55 dB(A). This is also considered to be a suitable construction noise management level for the nearby hospitality premises (Ancora restaurant). The highly noise affected level represents the point above which there may be strong community reaction to noise. The highly noise affected level for the project is 75 dB(A).

The underwater noise environment within the vicinity of the works is unknown. However, given the location of the site close to the slipway and commercial vessel jetties the underwater environment is likely to experience intermittent high noise levels due to commercial activities typical of most marinas and slipways, including vessel engine noise.

6.10.2 Potential Impacts

Construction activity on site would be undertaken during the following normal working hours, in accordance with the Noise Policy for Industry (EPA, 2017):

- Monday to Friday 7am to 6pm
- Saturday 8 am to 1 pm
- No work on Sundays or Public Holidays

Work outside standard hours may be advantageous at certain times to take advantage of particular tidal conditions during the Stage 1 works. Any variation to the above hours would require the approval of the relevant authority, which would need to consider any potential for noise impacts on the surrounding residential amenity.

The proposed construction activities would involve demolition of existing structures, filling of land, placement of rock and surfacing, concreting, and piling installation (Stage 1 only). The construction activity that is expected to generate the highest level of noise is the installation of the piles for the travel lift runway beams and service pontoons during the Stage 1 works. Typical noise levels generated from these main activities (SWL L_{Aeq} (dB(A))) are shown in **Table 10**. The TfNSW noise estimator was used to determine the predicted noise levels at the nearest sensitive receptors assuming a line of sight to the receiver. The results are summarised in **Table 10**.

Table 10: Predicted Noise Levels at Nearest sensitive receptors

Plant	SWL LAeq(dB(A))	SPL (dB(A))			
		Ancora (30m)	Residences (40m)	Residences (100m)	Residences (200m)
Piling Rig	116	77	74	66	57
Excavator	110	71	68	60	51
Concrete truck	109	70	67	59	50

The noise level estimates indicate that the construction activities are likely to impact surrounding sensitive receivers. Estimates indicate that piling during the Stage 1 works is likely to exceed the highly noise affected criteria at Ancora restaurant. The restaurant operators should be consulted with regarding predicted noise levels and potential impacts of customers. Noise mitigation measures have been identified in **Section 7** to minimise noise impacts however further measures may need to be negotiated with the operator of Ancora to minimise impacts on their patrons. Further measures may include alternative timing of noisy works such as no piling during their peak trade hours. Any noise impacts would be restricted to standard work hours and would be confined to the construction phase of the project.

Piling during the Stage 1 works is not expected to exceed the highly noise affected criteria at nearby residences, however noise levels are expected to exceed the daytime noise management level (55 dB(A)) for residences at 40 and 100 m.

Other proposed machinery for activities determined to be high noise emitters (excavating and concreting) are expected to exceed the daytime noise management level (55 dB(A)) for residences at 40 and 100 m.

Truck and machinery movements would increase noise at the immediate work site and transport route (Terranora Terrace and Wharf Street), however this impact is unlikely to significantly increase ambient noise levels.

Impacts from noise would be restricted to standard work hours for the duration of works. Mitigation measures are outlined below and in **Section 7**. With the application of these mitigation measures and the short duration of the works, any disruption or noise impact on the community is expected to be temporary.

Operational noise generated from the site in the long term is not expected to differ significantly from that of the current facility.

6.10.3 Recommended control measures

The following mitigation measures should be implemented to manage and mitigate potential impacts:

- All works should be undertaken in accordance with construction noise guidelines;
- Nearby sensitive receivers (residences and businesses within 200 m) should be notified prior to commencement of works regarding the timing and expected noise levels of the construction works and to be made aware of the details of the complaints handling system including site manager contact details;

- All works should be undertaken during the standard work hours. No works to be undertaken outside standard hours without consultation with TfNSW;
- Construction vehicles and equipment should be suitably serviced prior to and appropriately maintained during construction activities;
- Plant that is not being used should be turned off;
- Where feasible and reasonable, alternative work practices which minimise noise should be implemented;
- High vibration methods should be substituted with lower vibration methods where possible;
- The work site should be set up to minimise the requirement for movement alarms on vehicles and mobile plant;
- All employees and contractors should receive an environmental induction prior to commencement of works. The induction should include:
 - Relevant project specific and standard noise mitigation measures.
 - Permissible hours of work.
 - Location of nearest sensitive receivers.
- Further measures should be negotiated with the operator of Ancora, where required, to minimise impacts on their patrons. Such further measures may include alternative timing of noisy works such as no piling during peak trading hours.

6.11 Traffic and Parking

6.11.1 Site Conditions

Currently, land access to the Fishermen's Co-Op jetty area and the existing slipway is located off Terranora Terrace (refer **Figure 24**). This area is utilised by commercial fishermen and companies associated with servicing commercial vessels, and members of the public who purchase fish directly from the fishing vessels. Terranora Terrace in conjunction with River Terrace provides access to the Fishermen's Co-Op jetties, a number of residences, the Tweed Heads Southern Boat Harbour marina and the Marine Rescue facility.



Figure 24: Existing vehicle entry off Terranora Terrace

6.11.2 Potential Impacts

6.11.2.1 Stage 1 Works

Site entry and exit from land for the construction works would be via the existing vehicle entry point on the eastern side of the site. This can be accessed through the jetty access road extending from Terranora Terrace.

The proposed works would require the delivery of machinery and materials to the site. Capping works would require the importation of rock for filling of the slipway (rock bund) and the rock revetment, importation of engineered fill, and importation of sub base for surfacing of the hardstand area. Other materials would also be required for the concrete wash down pad and wastewater treatment facility. The delivery of materials to the site would require an increase in truck and other construction traffic related movements to the site and may cause temporary, minor and localised traffic disruptions. Any traffic associated impacts are expected to be minor and restricted to the construction phase of the works.

Following construction, traffic and parking are expected to return to pre-construction levels.

Appropriate mitigation and control measures to avoid and ameliorate any impacts have been identified below and summarised in **Section 7**.

6.11.2.1 Stage 2 Works

The current entry to the site falls within the footprint of the proposed Stage 2 extension to the hardstand. A new vehicle entry is therefore proposed to the east of the site to allow access to the jetties. A vehicle access point will be retained at the current entry to the site but this will be gated with a bunded vehicle entry to the extension to the hardstand.

The construction of the proposed new vehicle entry way and amenities block will result in the loss of approximately 7 car parking spaces. However, as shown on the Driveway, Access and Parking Plan (refer Appendix B) it is proposed that up to 6 spaces could be potentially recovered or gained from removal of obstructions and reconfiguration of parking arrangements. Over 40 parking spaces are retained on the site and this is considered sufficient for the current demand for parking.

The proposed works would require the delivery of machinery and materials to the site. The delivery of materials to the site would require an increase in truck and other construction traffic related movements to the site and may cause temporary, minor and localised traffic disruptions. Any traffic associated impacts are expected to be minor and restricted to the construction phase of the works.

Following construction, traffic and parking are expected to return to pre-construction levels.

Appropriate mitigation and control measures to avoid and ameliorate any impacts have been identified below and summarised in **Section 7**.

6.11.3 Recommended control measures

The following mitigation measures should be implemented to manage and mitigate potential impacts:

- Public and commercial access to the jetty access road and Terranora Terrace should be maintained. The Contractor may temporarily restrict access along the jetty access road and Terranora Terrace for public safety or operational reasons with the prior approval of the Superintendent and Tweed Shire Council, but such restrictions should all be kept to a minimum;
- The public and commercial operators should be notified of all changes and restrictions to access along the jetty access road and Terranora Terrace;
- To manage heavy vehicle movements during construction, a traffic management plan should be developed and implemented; and,
- All precautions should be taken to ensure that public roads, thoroughfares, accessways and haulage routes are not obstructed or damaged as a result of the construction Works or transport of equipment and materials. In the event of any damage, the Contractor should take all necessary and immediate steps to repair the damage.

6.12 Navigation

6.12.1 Site Conditions

The slipway rails are intermittently used for slipping activities. The adjacent navigation channel is used by all vessels as the entry and exit channel to the fishing vessel berths and marina. It is understood from records of previous correspondence with TfNSW-Maritime that:

- There is generally a good line of sight in both directions for vessels transiting the area;
- There is sufficient water space for vessels to stop or manoeuvre in the approaches to the site; and,
- It is a very sheltered waterway which is not generally affected by wind.

6.12.2 Potential Impacts

During construction of Stage 1 the installation of the travel lift runway beams and pontoons would at times restrict navigable areas of the waterway however navigation into the harbour would be maintained. This is to be managed with appropriate navigation aids including signage, markers, lighting and a vessel traffic management plan.

Following construction, the runway beams for the proposed travel lift would not extend beyond the existing slipway rail stop ends so as to maintain an equivalent navigable channel to existing. Previous correspondence has been undertaken with TfNSW-Maritime (Rod McDonagh) regarding the navigation requirements for the proposed facility (refer Section G of Advisory preliminary basis of design 2019). TfNSW navigation requirements for the proposed facility are summarised below and would be complied with:

- Due to the restricted area around the slipway and the proposed extremities of the site, it would be necessary to install strategically placed navigation aids in the channel;
- The navigational plan would be designed to indicate the centreline of the channel approximately 15m to the south of the upstream extremity of the planned travel lift structure;
- These would act as a pathway through the area for larger vessels;
- Two (2) starboard lit PVC pipe markers to be installed on the southern bank at the 2m AHD contour;
- 1 Port lit buoy to be installed on the downstream approach to the structure (near restaurant);
- These options may need to be modified after completion of the works;
- It is not envisaged these navigation aids would have any visual, navigational or environmental impact on the waterway; and
- TfNSW-Maritime would install and maintain navigation assets.

As such, it is considered that the only limitations for the travel lift operation would be related to the available water depth at the lifting location and the draft of vessels being lifted. Larger vessels with a deeper draft are likely to require use of tidal windows for lifting operations. The deepest draft vessel that may be accommodated at the facility has a 1.8m draft. The shallowest seabed level inside the runway beams is at around -2 m AHD which would provide the necessary minimum underkeel clearance of 0.3m at mean sea level (0.08m AHD) or above. As such, vessels with this draft would have approximately 50% operability with tides.

Appropriate mitigation and control measures to avoid and ameliorate any impacts have been identified below and summarised in **Section 7**.

6.12.3 Recommended control measures

The following mitigation measures should be implemented to manage and mitigate potential impacts of the Stage 1 works:

- Vessel traffic management plan should be prepared and implemented. The plan is to identify potential hazards to boating traffic and harbour users during the construction and operation of the travel lift and provide mitigation actions and controls;
- Any works impacting on navigation during the construction phase should seek TfNSW support 21 days prior to works commencing; and,
- Any vessels or obstructions located within the waterway should be moored securely, and marked appropriately (for both day and night) in accordance with the requirements of TfNSW to ensure that no problems are created to vessels navigating within the area.

6.13 Existing Users, Access and Safety

6.13.1 Site Conditions

The Stage 1 slipway site is currently used for the repair and maintenance of marine vessels. Public access through the site is not permissible. There is no public access to the land area of the slipway site from the waterway.

The Stage 2 site can be accessed from the water and the land. As noted in **Section 6.11**, land access to the Fishermen's Co-Op jetty area and the existing slipway is located off Terranora Terrace. This area is utilised by commercial fishermen and companies associated with servicing commercial vessels, and members of the public who purchase fish directly from the fishing vessels.

6.13.2 Potential Impacts

At different times during the various stages of the works, the foreshore would be transformed by the construction activity. The slipway would be unavailable for use during the majority of the Stage 1 construction works. Construction works may temporarily restrict access to the western jetty. Impact is expected to be minor and temporary with no socio-economic impacts expected.

Appropriate safety precautions would be taken during the construction activities, such as incorporation of security fencing and construction barrier fencing, to ensure public and worker safety. It would be a requirement of the construction contract that the Contractor employ persons to control vehicular movements to and from the access road to the site.

Once complete, the Stage 1 works would increase the capacity for use of the facility. The Stage 2 works would provide a new road entry point to the east of the site. There would be no change to water access via the jetties.

6.13.3 Recommended control measures

The following mitigation measures should be implemented to manage and mitigate potential impacts:

- Prior to commencement of works, boundaries of the construction and access areas should be marked with temporary barrier fencing. The fencing should be monitored daily by the site supervisor and immediately repaired or replaced if necessary and removed when construction is completed;
- Slipway users should be notified of works prior to commencement;
- Fishermen's Co-Op should be notified of works prior to commencement; and,
- Access to jetties and harbour operations should be maintained to the maximum extent possible.

6.14 Waste Management

6.14.1 Site Conditions

As noted previously, infrastructure at the Tweed Heads Slipway is ageing and some parts require significant maintenance or replacement. In particular, environmental controls at the

current slipway are poor and the site is contributing to contamination of surrounding sediments.

The Stage 2 footprint currently contains a storage yard, carparking spaces, grassed areas and fencing in various states of repair. The existing storage yard contains rubbish/debris and old infrastructure. This includes fuel and oil storage tanks and associated infrastructure.

6.14.2 Potential Impacts

The proposed construction works may generate the following waste materials:

- Excavated fill material unsuitable for reuse;
- General construction waste; and,
- Contaminated solid waste and liquid waste from decommissioning and removal of fuel and oil storage tanks and associated infrastructure.

Materials that could be reused or recycled would be separately identified, stockpiled, and transported by road to a recycling facility. Materials that are unsuitable for reuse would be tested, classified and transported offsite to a licensed waste facility.

The removal of general construction waste from site is a normal construction contract requirement, progressively and at completion. It is recommended that standard construction site good practice is adhered to, as detailed in **Section 7**.

Decommissioning and removal of fuel and oil storage tanks and associated infrastructure has the potential to cause site contamination and will likely generate contaminated solid and liquid waste to be transported offsite to a licenced waste facility.

Following completion of the works, the installation and operation of a concrete wash down pad and wastewater treatment system, with discharge into the Council sewerage system, would remove the risk of contaminated stormwater entering the waterway. These improvements and measures have been discussed in more detail in **Section 6.6** and included in **Section 7**.

6.14.3 Recommended control measures

The following mitigation measures should be implemented to manage and mitigate potential impacts:

- Decommissioning and removal of fuel and oil storage tanks and associated infrastructure should be undertaken in accordance with relevant guidelines and standards including:
 - Underground Petroleum Storage Systems Technical Note: Decommissioning, Abandonment and Removal of UPSS (DECCW, 2010);
 - AS4976-2008: Removal and disposal of underground petroleum storage tanks;
 - AS1940-2004: Storage and handling of flammable and combustible liquids; and,
 - SafeWork NSW WHS codes of practice.
- Contaminated solid and liquid waste generated from decommissioning and removal of fuel and oil storage tanks and associated infrastructure should be classified and disposed offsite at a licenced waste facility;

- The handling, transport and disposal of waste materials should be undertaken in accordance with relevant regulatory and statutory requirements;
- All litter and waste should be removed from site and disposed of at appropriate waste management facilities;
- Waste material (for example packaging, strapping, off-cuts) should be contained within the land-based site during construction and then be removed to an authorised waste disposal facility. No material should be placed in any location or in any manner that would allow it to enter the waterway or escape from the site;
- Waste materials from the project should be managed in accordance with the waste hierarchy outlined in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21. All waste/excess materials should be reused (preferable) or recycled and diverted from landfill where practicable. Where these materials cannot be effectively re-used onsite or by other operations the material should be classified, transported and recycled or disposed of in accordance with relevant waste guidelines; and
- Excess excavated materials should be disposed of to a licensed waste facility.

6.15 Aboriginal Heritage

6.15.1 Site Conditions

A search of the Aboriginal Heritage Information Management System (AHIMS) register was undertaken (refer **Appendix C**). No Aboriginal heritage sites were identified on or within the immediate vicinity of the proposed Stage 1 or Stage 2 works areas.

Database searches identified Ukerebagh Island as an Aboriginal Places listed under the National Parks and Wildlife Act. It is located approximately 1km from the proposed travel lift site. Ukerebagh Island is a former Aboriginal settlement and reserve. From the 1920s to the 1960s, Ukerebagh Island was home to Aboriginal people of the traditional Minjungbal Aboriginal Nation as well as other Aboriginal and Torres Strait Islander people who had come to work in the Tweed area. The settlement created a sense of community for all Aboriginal people and provided an isolated environment in which children could be taught about their culture.

6.15.2 Potential Impacts

No impacts are expected from the proposed works as there were no Aboriginal heritage sites identified on or within the immediate vicinity of the proposed Stage 1 or Stage 2 works areas. The site is a highly modified environment and as such Aboriginal objects are not expected to be encountered during the works. As detailed below and in **Section 7**, standard procedures would be followed in the event of any artifacts being uncovered during the works.

6.15.3 Recommended control measures

The following mitigation measures should be implemented to manage and mitigate potential impacts:

- All persons working on site should be made aware that it is an offence under Section 86 of the National Parks and Wildlife Act 1975 to harm or desecrate an Aboriginal object unless that harm or desecration is the subject of an approved Aboriginal Heritage Impact Permit (AHIP);

- If Aboriginal heritage items are uncovered during the work, all work in the vicinity of the find must cease and the TfNSW Aboriginal cultural heritage advisor and the senior regional environmental officer contacted immediately. Steps in the Roads and Maritime's *Standard Management Procedure: Unexpected Archaeological Find July 2012* must be followed; and
- In the unlikely event that an Aboriginal object is identified whilst carrying out works within the study area, all activities in the immediate vicinity of the identified Aboriginal object should cease and a suitably qualified archaeologist to be contacted to confirm the validity of the object. Should the object be confirmed to be of Aboriginal cultural origin, the contractor must notify DPIE and may need to apply for an AHIP prior to the recommencement of further ground disturbance works in proximity to the object.

6.16 Non-Aboriginal Heritage

6.16.1 Site Conditions

A search of the NSW State Heritage Register, Marine Heritage Register, Commonwealth Heritage List and Tweed Council LEP were undertaken. No non-Aboriginal heritage sites were identified at the site or within the vicinity of the proposed Stage 1 or Stage 2 works areas. The nearest items listed were local government listings and included:

- T S Vampire Dry Dock, Dry Dock Road, Tweed Heads South
- Terranora Cemetery and Memorial Stone, Philp Parade, Tweed Heads South
- Terranora Park - site of Cedar Getters Camp, Dry Dock Road, Tweed Heads South
- Tweed Heads Maritime Museum - Boyd Fishermens Shed 230 Kennedy Drive, Tweed Heads West
- Tweed Heads Maritime Museum – Deckhouse, 230 Kennedy Drive (Pioneer Park), Tweed Heads West
- Tweed Heads Maritime Museum - former Tweed Heads Court House, 230 Kennedy Drive (Pioneer Park), Tweed Heads West

6.16.2 Potential Impacts

No impacts are expected from the proposed works as there were no non-Aboriginal heritage sites identified in the vicinity of the Stage 1 or Stage 2 works areas.

6.16.3 Recommended control measures

The following mitigation measures should be implemented to manage and mitigate potential impacts:

- If unexpected archaeological remains are uncovered during the work, all work must cease in the vicinity of the material/find and the steps in TfNSW's *Standard Management Procedure: Unexpected Archaeological Finds July 2012* must be followed. TfNSW Senior Regional Environmental Officer must be contacted immediately;
- If any items defined as relics under the NSW *Heritage Act 1977* are uncovered during the works, all work must cease in the vicinity of the find and the TfNSW Senior Regional Environmental Officer contacted immediately; and

- If during the course of proposed works previously unknown historical archaeological material or heritage items are discovered, all work in the area of the item(s) should cease immediately. The Project Manager is to engage the Heritage Division, DPIE and a qualified heritage consultant, in accordance with Section 146 of the Heritage Act, to determine an appropriate course of action prior to the recommencement of work in the area of the item.

6.17 Cumulative Impacts

6.17.1 Existing Environment

The proposed Stage 1 travel lift facilities will be constructed on the site of an existing slipway. The proposed Stage 2 works would be constructed adjacent to the proposed Stage 1 travel lift facilities on the site of the existing entry way, storage yard, car parking spaces and grassed areas. The Stage 2 works allow a more efficient use of the space and upgrade to the site including the provision of an amenities building separate from the proposed travel lift facility.

As described by Hydrosphere (2019), in the Tweed River there is one other facility similar to the slipway located at Chinderah and similar slipway facilities are located at Gold Coast, Sunshine Coast, Brisbane, Iluka, Yamba, Ballina and Moreton Bay. There are no other marine travel lifts in the nearby region.

6.17.2 Potential Impact

Although the travel lift is a significant improvement in infrastructure, the overall type of use of the site (boat repair and maintenance) is not expected to significantly change. As described by Hydrosphere (2019), there is potential for increased boat movements into and out of the facility and that the number of boats able to be serviced will be increased. However, the net result will be improvement in environmental management of the facility and a reduction in the need for vessels to travel to (or be trucked to) other facilities to get the same work undertaken. The proposal is not anticipated to intensify or otherwise significantly modify long-term use of the harbour.

7 Environmental Management

7.1 Environmental Management Plan

A site-specific construction environmental management plan (CEMP) should be prepared by the Contractor and approved by TfNSW prior to commencement of construction. The Contractor would implement the CEMP during the works and would be responsible for selecting appropriate control measures for the potential impacts identified in this REF. The CEMP should be compliant with the Contract technical specifications.

The CEMP would ensure that:

- appropriate control measures for the potential impacts are implemented on the site;
- activities are carried out with due diligence; and
- all activities comply with relevant environmental legislation including conditions of approval, Acts and Regulations, and Standards and Best Management Practices.

With the implementation of the CEMP environmental controls there would not be expected to be significant environmental impacts during construction.

7.2 Summary of Environmental Control Measures

The following **Table 11** identifies the recommended mitigation and control measures that should be put in place to avoid or ameliorate the potential impacts of the works, as discussed in **Section 6**.

Table 11: Proposed Environmental Safeguards and Mitigation Measures

Environmental Safeguard and/or Mitigation Measure
Water and Sediment Quality (Stage 1 only)
1. Deployment of floating silt curtains (two) across the slipway ramp entrance. These silt curtains would later be extended further into the waterway to enclose the overwater work area required for pile driving. The silt curtains shall be weighted and extend all the way to the seabed in all tidal conditions.
2. Daily inspections for turbidity and effectiveness of the silt curtains.
3. Adoption of marker layer and rock bund (including geotextile fabric) to cap the contaminated sediments on the slipway ramp and provide an effective environmental control for containment of any sediment disturbance by land-based demolition activities and/or tidal water level variations at the site during construction.
4. Rock used in the works to be free of fines (washed).
5. If excavation of sediments is required, an ASS Management Plan is to be prepared.
Water and Sediment Quality (Stage 1 and Stage 2)
6. Replacement of the trade waste system and approval from Tweed Shire Council for the discharge of trade waste to the Council sewerage system. The trade waste oil separator should be double banded.

Environmental Safeguard and/or Mitigation Measure
7. Industry standards and pollution prevention regulations to be adhered to during refuelling, transfer, storage and handling of hazardous materials.
8. Contractor to ensure that all plant is maintained in good working order with regular servicing.
9. No major maintenance of equipment shall be undertaken on-site.
10. Weather and tide forecasts to be checked regularly during construction. Where flooding or inundation is forecast to the any work area, all equipment and materials to be removed from the landside construction zone or appropriately secured above expected flood levels in the area. These procedures should be documented in a Flood Management Plan.
11. Stockpiles shall be located on flat ground at least 5 metres away from areas subject to run-off and away from established flow paths (e.g. drains, gutters, etc.). The height of the stockpiles shall not exceed 2 metres unless stockpiles are suitably protected from wind erosion. The Contractor shall protect temporary stockpiles in accordance with 'Blue Book' requirements.
12. Any machinery working on the waterway is to carry a full spill containment kit including hydrocarbon booms to reduce the impact of any spill.
13. Appropriate site and project inductions/training detailing potential water quality impacts and relevant construction measures and spill and emergency response procedures to be used.
14. Daily inspections of plant, minimisation of fluids on site, and proper procedures for refuelling and maintenance need to be observed.
15. Preparation and implementation of a site Stormwater Management Plan for the operation of the site. The plan should consider stormwater runoff and flow from the site and potential contamination sources.
Water and Sediment Quality (Stage 2 only)
16. Above ground oil storage tank should be double banded.
Contaminated Land (Stage 1 and Stage 2)
17. Excavated existing subgrade beneath the hardstand to be stockpiled onsite for testing to characterise the material and assess it for beneficial reuse as fill onsite or for offsite disposal at a licensed waste facility.
18. Operation of the Travel Lift Facility is to be managed according to best management practice procedures including Environmental Action for Marinas, Boatsheds and Slipways (DECC, 2007).
19. To prevent contaminated material being placed on the site, imported material shall be either virgin excavated natural material as defined in the Protection of the Environment Operations Act or be excavated natural material that has been tested in accordance with the 'excavated natural material exemption 2014'.

Environmental Safeguard and/or Mitigation Measure
Estuarine Processes (Stage 1 and Stage 2)
20. Construction and operational flood management plans to be prepared.
Landscape and Visual (Stage 1 and Stage 2)
21. Impacted areas (i.e. for access, storage and site works) be returned to pre-construction conditions where possible.
22. The construction site to be kept tidy and an in an orderly fashion at all times to minimise visual impacts to local residents.
Ecology (Stage 1 and Stage 2)
23. The water and sediment quality protection measures outlined above to be installed for protection of ecology.
Ecology (Stage 2 only)
24. Appropriate fencing should be installed to protect the tree to be retained adjacent to the proposed new road entry during construction.
Air Quality (Stage 1 and Stage 2)
25. Material and rock transported to and from the sites to be covered.
26. Dust suppression measures to be employed by construction crews during dry and windy periods or when required. Water sprays for dust suppression will be minimised to practicable levels.
27. Operating air quality to be managed in accordance with industry best management practice including Environmental Action for Marinas, Boatsheds and Slipways (DECC, 2007).
Noise and Vibration (Stage 1 and Stage 2)
28. All works to be undertaken in accordance with construction noise guidelines.
29. Nearby sensitive receivers (residences and businesses within 200 m) to be notified prior to commencement of works regarding the timing and expected noise levels of the construction works and to be made aware of the details of the complaints handling system including site manager contact details.
30. All works to be undertaken during the standard work hours. No works to be undertaken outside standard hours without consultation with TfNSW.
31. Construction vehicles and equipment to be suitably serviced prior to and appropriately maintained during construction activities.
32. Plant that is not being used to be turned off.
33. Where feasible and reasonable, alternative work practices which minimise noise to be implemented.
34. High vibration methods to be substituted with lower vibration methods where possible.

Environmental Safeguard and/or Mitigation Measure

35. The work site to be set up to minimise the requirement for movement alarms on vehicles and mobile plant.

36. All employees and contractors to receive an environmental induction prior to commencement of works. The induction to include:

- Relevant project specific and standard noise mitigation measures.
- Permissible hours of work.
- Location of nearest sensitive receivers.

37. Further measures to be negotiated with the operator of Ancora, where required, to minimise impacts on their patrons. Such further measures may include alternative timing of noisy works such as no piling during peak trading hours.

Traffic Management (Stage 1 and Stage 2)

38. Public and commercial access to the jetty access road and Terranora Terrace to be maintained. The Contractor may temporarily restrict access along the jetty access road and Terranora Terrace for public safety or operational reasons with the prior approval of the Superintendent and Tweed Shire Council, but such restrictions shall be kept to a minimum.

39. The public and commercial operators to be notified of all changes and restrictions to access along the jetty access road and Terranora Terrace.

40. To manage heavy vehicle movements during construction, a traffic management plan to be developed and implemented.

41. All precautions to be taken to ensure that public roads, thoroughfares, accessways and haulage routes are not obstructed or damaged as a result of the construction Works or transport of equipment and materials. In the event of any damage, the Contractor shall take all necessary and immediate steps to repair the damage.

Navigation (Stage 1 only)

42. Vessel traffic management plan to be prepared and implemented. The plan is to identify potential hazards to boating traffic and harbour users during the construction and operation of the travel lift and provide mitigation actions and controls.

43. Any works impacting on navigation during the construction phase must seek TfNSW support 21 days prior to works commencing.

44. Any vessels or obstructions located within the waterway to be moored securely, and marked appropriately (for both day and night) in accordance with the requirements of TfNSW to ensure that no problems are created to vessels navigating within the area.

Existing Users, Access and Safety (Stage 1 and Stage 2)

45. Prior to commencement of works, boundaries of the construction and access areas to be marked with temporary barrier fencing. The fencing to be monitored daily by the site supervisor and immediately repaired or replaced if necessary and removed when construction is completed.

46. Slipway users to be notified of works prior to commencement.

Environmental Safeguard and/or Mitigation Measure

47. Fishermen's Co-Op should be notified of works prior to commencement.

48. Access to jetties and harbour operations to be maintained to the maximum extent possible.

Waste Management (Stage 1 and Stage 2)

49. The handling, transport and disposal of waste materials to be undertaken in accordance with relevant regulatory and statutory requirements.

50. All litter and waste to be removed from site and disposed of at appropriate waste management facilities.

51. Waste material (for example packaging, strapping, off-cuts) to be contained within the land-based site during construction and then be removed to an authorised waste disposal facility. No material to be placed in any location or in any manner that would allow it to enter the waterway or escape from the site.

52. Waste materials from the project to be managed in accordance with the waste hierarchy outlined in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21. All waste/excess materials to be reused (preferable) or recycled and diverted from landfill where practicable. Where these materials cannot be effectively re-used onsite or by other operations the material is to be classified, transported and recycled or disposed of in accordance with relevant waste guidelines.

53. Excess excavated materials to be disposed of to a licensed waste facility.

Waste Management (Stage 2 only)

54. Decommissioning and removal of fuel and oil storage tanks and associated infrastructure should be undertaken in accordance with relevant guidelines and standards including:

- Underground Petroleum Storage Systems Technical Note: Decommissioning, Abandonment and Removal of UPSS (DECCW, 2010);
- AS4976-2008: Removal and disposal of underground petroleum storage tanks;
- AS1940-2004: Storage and handling of flammable and combustible liquids; and,
- SafeWork NSW WHS codes of practice.

55. Contaminated solid and liquid waste generated from decommissioning and removal of fuel and oil storage tanks and associated infrastructure should be classified and disposed offsite at a licenced waste facility.

Aboriginal Heritage (Stage 1 and Stage 2)

56. All persons working on site to be made aware that it is an offence under Section 86 of the National Parks and Wildlife Act 1975 to harm or desecrate an Aboriginal object unless that harm or desecration is the subject of an approved Aboriginal Heritage Impact Permit (AHIP).

57. If Aboriginal heritage items are uncovered during the work, all work in the vicinity of the find must cease and the Roads and Maritime's Aboriginal cultural heritage advisor and the senior regional environmental officer contacted immediately. Steps in

Environmental Safeguard and/or Mitigation Measure

the TfNSW *Standard Management Procedure: Unexpected Archaeological Find July 2012* must be followed.

58. In the unlikely event that an Aboriginal object is identified whilst carrying out works within the study area, all activities in the immediate vicinity of the identified Aboriginal object to cease and a suitably qualified archaeologist to be contacted to confirm the validity of the object. Should the object be confirmed to be of Aboriginal cultural origin, the contractor must notify DPIE and may need to apply for an AHIP prior to the recommencement of further ground disturbance works in proximity to the object.

Non-Aboriginal Heritage (Stage 1 and Stage 2)

59. If unexpected archaeological remains are uncovered during the work, all work must cease in the vicinity of the material/find and the steps in TfNSW's Standard Management Procedure: Unexpected Archaeological Finds July 2012 must be followed. TfNSW Senior Regional Environmental Officer must be contacted immediately.

60. If any items defined as relics under the NSW Heritage Act 1977 are uncovered during the works, all work must cease in the vicinity of the find and the TfNSW Senior Regional Environmental Officer contacted immediately.

61. If during the course of proposed works previously unknown historical archaeological material or heritage items are discovered, all work in the area of the item(s) to cease immediately. The Project Manager is to engage the Heritage Division, DPIE and a qualified heritage consultant, in accordance with Section 146 of the Heritage Act, to determine an appropriate course of action prior to the recommencement of work in the area of the item.

7.3 Licencing and Approvals

The following licences are required to construct and operate the facility.

Instrument	Requirement	Timing
Fisheries Management Act 1994_(S199)	Written notice of the proposed work to the relevant Minister, and consider any matters concerning the proposed work that are raised by the Minister within 21 days after the giving of the notice	A minimum of 28 days prior to start of Stage 1 works.
Crown Land Management Act 2016 (Division 5.5 and 5.6)	Lease or Licence to occupy Crown Land	Prior to start of Stage 1 and Stage 2 works.

<p>Protection of the Environment Operations Act 1997 (POEO Act)</p>	<p>An Environment Protection Licence (EPL) for a premises for boat construction/maintenance (refer Clause 25, Schedule 1 of <i>POEO Act</i>) - facility has the capacity to handle more than 5 vessels longer than 5 meters (excluding rowing boats, dinghies and other small craft) at any time.</p>	<p>Prior to the completion of the Stage 2 works.</p>
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8 Environmental Factors Considered

8.1 Consideration of Factors in Clause 228 of the EP&A Regulation

Clause 228 of the *EP&A Regulation 2000* provides a list of factors that must be considered in determining the likely impacts of an activity on the natural and built environment and therefore the necessity for an EIS.

Following review of the Clause 228 factors outlined below, the proposed works are not considered to result in significant detrimental environmental impacts. Therefore, it is concluded that an EIS is not required and this REF is considered an appropriate environmental assessment.

Factor	Impact
<p>a. Any environmental impact on a community? No communities will be impacted.</p>	Nil
<p>b. Any transformation of a locality? Upgraded facilities will allow improved services and reduced environmental impact.</p>	Positive long term impact
<p>c. Any environmental impact on the ecosystems of the locality? Within the proposed silt curtains, water quality impacts may occur during construction of the Stage 1 works. Once operational the facility will have improved environmental controls.</p>	Minor short term water quality impacts during construction of the Stage 1 works. Long term positive impacts due to improved environmental controls for the overall Stage 1 and Stage 2 works.
<p>d. Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? Construction noise will impact on surrounding residences. Travel lift once operational will result in a visual change to the premises but in line with other maritime features of the area.</p>	Minor short term noise impacts during construction. Neutral long term visual impact of travel lift.
<p>e. Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? Nil effects.</p>	Nil
<p>f. Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)? Nil effects</p>	Nil
<p>g. Any endangering of any species of animal, plant or other form of life whether living on land, in water or in the air? Nil effects.</p>	Nil

Factor	Impact
<p>h. Any long term effects on the environment? Long term positive impacts due to improved environmental controls.</p>	<p>Long term positive impacts on water quality due to the overall Stage 1 and Stage 2 works.</p>
<p>i. Any degradation of the quality of the environment? Within the proposed silt curtains, water quality impacts may occur during construction of the Stage 1 works. Once operational the facility will have improved environmental controls.</p>	<p>Minor short term water quality impacts during construction of the Stage 1 works. Long term positive impacts due to improved environmental controls for the overall Stage 1 and Stage 2 works.</p>
<p>j. Any risk to the safety of the environment? Nil effects.</p>	<p>Nil</p>
<p>k. Any reduction in the range of beneficial uses of the environment? Upgraded facility and infrastructure at an existing site.</p>	<p>Positive long term benefit for boat users and other users in the area.</p>
<p>l. Any pollution of the environment? Within the proposed silt curtains, water quality impacts may occur during construction of the Stage 1 works. Once operational the facility will have improved environmental controls.</p>	<p>Minor short term water quality impacts during construction of the Stage 1 works. Long term positive impacts due to improved environmental controls for the overall Stage 1 and Stage 2 works.</p>
<p>m. Any environmental problems associated with the disposal of waste? Waste management has been addressed for the construction and operational phase of the works.</p>	<p>Nil</p>
<p>n. Any increased demands on resources (natural or otherwise) that are or are likely to become in short supply? No increase in demand of resources.</p>	<p>Nil</p>
<p>o. Any cumulative environmental effect with other existing or likely future activities? No cumulative environmental effects.</p>	<p>Nil</p>
<p>p. Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? No impacts identified.</p>	<p>Nil</p>

8.2 Consideration of Matters of National Environmental Significance

Matters of National Environmental Significance must be considered under the environmental assessment provisions of the EPBC Act. No matters of National Environmental Significance would be impacted by the proposed works, as set out below.

a. Any environmental impact on a world heritage property?	Nil
b. Any Environmental Impact on a National Heritage place?	Nil
c. Any Environmental Impact on Ramsar Wetlands of international importance?	Nil
d. Any environmental impact on Commonwealth listed threatened species and ecological communities?	Nil
e. Any environmental impact on Commonwealth listed migratory species?	Nil
f. Does any part of the project involve a nuclear action?	Nil
g. Any environmental impact on the Commonwealth marine environment?	Nil
h. Any impact on Commonwealth land?	Nil

9 Justification and Conclusion

9.1 Justification

Infrastructure at the Tweed Heads Slipway is ageing, and some parts require significant maintenance or replacement. The slipway rails and joins are corroded, the fall of the rails is uneven along the length of the rails, the sleepers are uneven in size with some broken, and areas of concrete support are crumbling. In addition, environmental controls at the current slipway are poor and the site is contributing to contamination of surrounding sediments. The upgrade is required to include environmental controls to minimise ongoing contamination of the river and sediments.

The current slipway has restricted capacity and is able to service only a relatively small number and range of vessels. Consultation with the local boating community indicates that there are a considerable number of non-seagoing vessels including house boats, charter boats, recreational boats and fishing boats that are based on the Tweed waterways that require a boat maintenance facility.

The proposed activity is permissible without consent under SEPP Infrastructure, 2007. An environmental assessment of the proposed activity has been carried out in accordance with s111 of the EP&A Act (1979) and Part 14 s228 of the EP&A Regulation (2000) and Clause 13 and 16, Division 1 of SEPP Infrastructure 2007.

The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity and has found the proposed activity would have minimal impacts on the surrounding environment. The identified impacts would not significantly affect the environment and therefore an EIS or a Species Impact Statement (SIS) or a 'major project' application under Part 3A of the Act is not required.

9.2 Conclusion and Recommendation

This REF is a written statement prepared for TfNSW that considers the impact of the proposed Stage 1 and Stage 2 works on the natural and built environment, and the proposed methods of mitigating or ameliorating any adverse effects.

The proposed Stage 1 and Stage 2 works are to be undertaken under Part 5 of the EP&A Act.

TfNSW is a determining authority for the works. Other approvals for the works include:

- Crown Lands Licence from DPIE for the works as they are on Crown Land (Stage 1 and Stage 2 works); and,
- EPL from NSW EPA for a premises for boat construction/maintenance that has the capacity to handle more than 5 vessels longer than 5 meters (Stage 2 works only).

Potential impacts primarily relate to water quality and noise during construction and have been addressed by this REF. In general, given the localised and temporary nature of the construction works, it is expected that the project would have few adverse impacts on the surrounding environment, typically of a low to negligible level. Where potential environmental impacts have been identified, control measures have been recommended.

Following completion of the Stage 1 and Stage 2 works, operational impacts on the marine environment would be reduced as a result of the removal of the slipway and the installation of improved stormwater management and trade waste systems.

10 Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Ali Watters

Principal Environmental Engineer

Royal HaskoningDHV

Date: 12th August 2021



I have examined this review of environmental factors and accept it on behalf of Transport for NSW.

Julian Burgess

Project Manager

Date: 12th August 2021

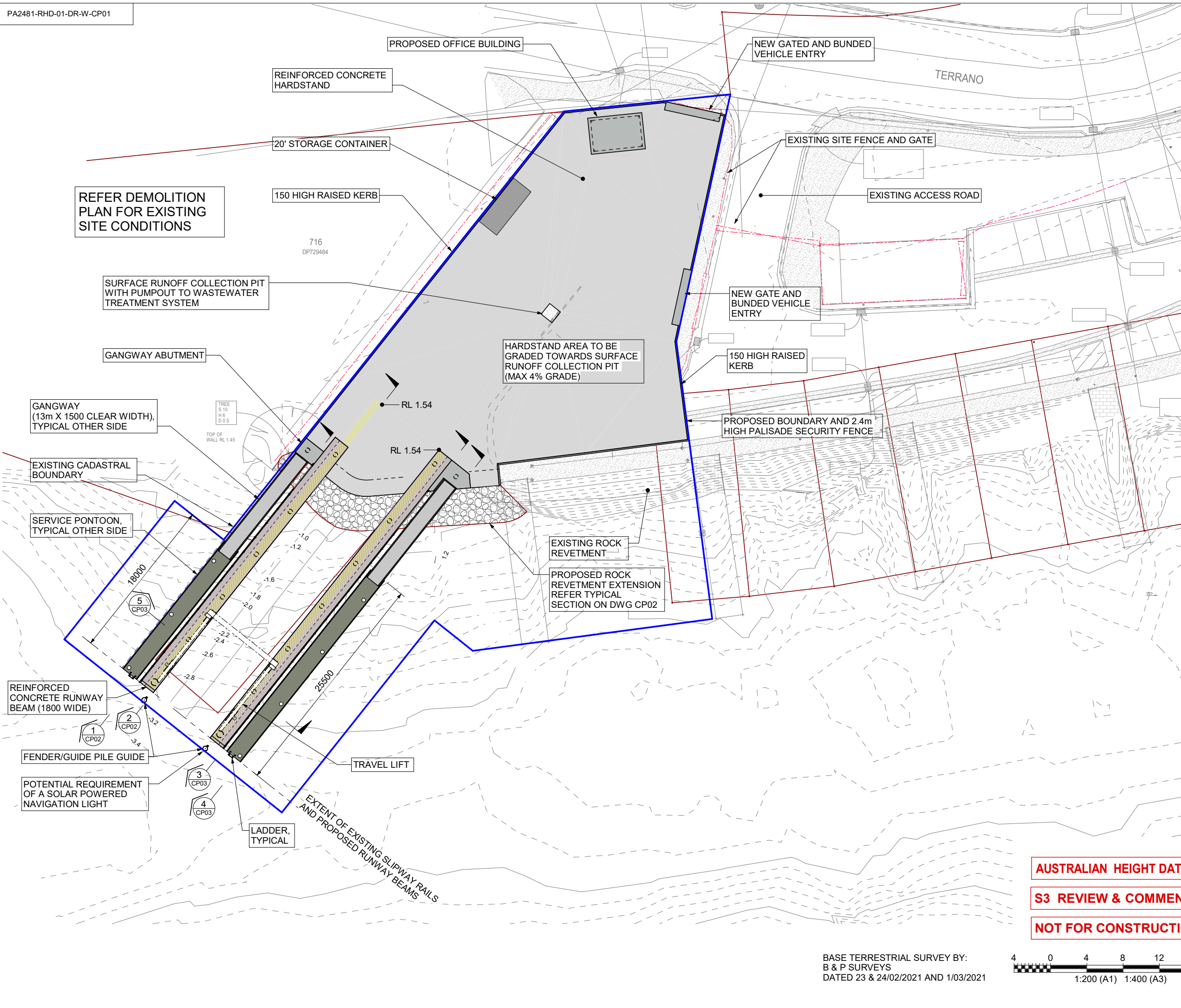
11 References

- Advisian (2019), *Tweed Heads Travel Lift – Geotechnical Interpretive Report*.
- Advisian (2019), *Tweed Heads Travel Lift Preliminary Design – Basis of Design*.
- BMT WBM (2009), *Tweed Valley Flood Study*. Prepared for Tweed Shire Council.
- Department of Environment & Climate Change (2009), *Interim Construction Noise Guidelines*
- GHD (2017), *Tweed Heads Slipway Contamination Investigation*. Report prepared on behalf the Department of Industry – Lands, December 2017.
- Hydrosphere Consulting (2019), *Tweed Heads Slipway Travel Lift REF*.
- Hydrosphere Consulting (2019), *Sediment Investigation Report - Southern Boat Harbour, Tweed Heads Maintenance Dredging*. Prepared for NSW Department of Industry – Lands and Water
- Intergovernmental Panel on Climate Change [IPCC] (2019), *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate – Chapter 4 Sea Level Rise and Implications for Low-lying Islands, Coasts and Communities*.
- Manly Hydraulics Laboratory [MHL] (2012), *OEH NSW Tidal Planes Analysis: 1990-2010 Harmonic Analysis*.
- NSW EPA (2015), *Draft Industrial Noise Guideline*.
- Roads and Maritime Services (2016), *Construction Noise and Vibration Guideline*.
- Tweed Shire Council (2016), *What's the cultural picture? A snapshot of the Tweed Shire*.
- Watterson et al (2013), *Flooding Tailwater Levels for NSW Coastal Entrances*.

Appendix A

Stage 1 Concept Drawings

- PA2481-RHD-01-DR-W-CP01 GENERAL ARRANGEMENT
- PA2481-RHD-01-DR-W-CP02 SECTIONS SHEET 1
- PA2481-RHD-01-DR-W-CP03 SECTIONS SHEET 2
- PA2481-RHD-01-DR-W-CP04 DEMOLITION PLAN



NOTES

1. REFER TO Tweed Heads Boat Maintenance Facility - BASIS OF DESIGN (PA2481-RHD-ZZ-XX-SP-Z-0001).
2. VERTICAL DATUM IS AUSTRALIAN HEIGHT DATUM (AHD), WHICH IS 0.875m ABOVE TWEED RIVER HYDRO DATUM (TRHD).
3. SEABED CONTOURS ARE TO AHD AND DERIVED FROM HYDROGRAPHIC SURVEY COMPLETED IN MARCH 2018 BY NORTH COAST SURVEYS FOLLOWING DREDGING OF THE SOUTHERN BOATHARBOUR BERTHS.
4. TIDAL PLANES FOR TERRANORA CREEK (DRY DOCK, MHL GAUGE NO. 201428) TO AHD ARE AS FOLLOWS:
 HIGH HIGH WATER SOLSTICES SPRINGS (HHWSS) = 0.74m
 MEAN HIGH WATER (MHW) = 0.36m
 MEAN SEA LEVEL (MSL) = 0.08m
 AUSTRALIAN HEIGHT DATUM (AHD) = 0.00m
 MEAN LOW WATER (MLW) = -0.21m
 INDIAN SPRING LOW WATER (ISLW) = -0.50m.
5. ROCK REVETMENT EXTENSION IS BASED ON SITE OBSERVATION OF ARMOUR ROCK SIZE WITHIN EXISTING REVETMENT, WHICH COMPRISES 300-500mm IGNEOUS ROCK AT 1V:1.5H SLOPE.
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED.
7. ALL MEMBER SIZES AND THICKNESSES ARE CONCEPTUAL LEVEL ONLY AND ARE SUBJECT TO DETAIL DESIGN.
8. EACH PONTOON SHALL BE PROVIDED WITH THE FOLLOWING FACILITIES:
 - 1 SERVICE PEDESTAL WITH POWER OUTLETS, WATER SUPPLY AND LED LIGHT
 - LIGHTING PEDESTAL AT END OF PONTOON
 - 1 FIRE HOSE REEL
 - 9KG DRY CHEMICAL FIRE EXTINGUISHER
 - 1 SAFETY LADDER
 - 1 LIFEBOUY MOUNTED TO HOSE REEL STAND

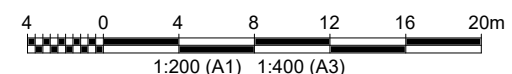
— PROPOSED CROWN PARCEL

AUSTRALIAN HEIGHT DATUM

S3 REVIEW & COMMENT

NOT FOR CONSTRUCTION

BASE TERRESTRIAL SURVEY BY:
 B & P SURVEYS
 DATED 23 & 24/02/2021 AND 1/03/2021



REV	DATE	DESCRIPTION	BY	CHK	APP
P01	01.04.2021	CONCEPT ISSUE FOR REVIEW	SGB	MP	

REVISIONS

CLIENT

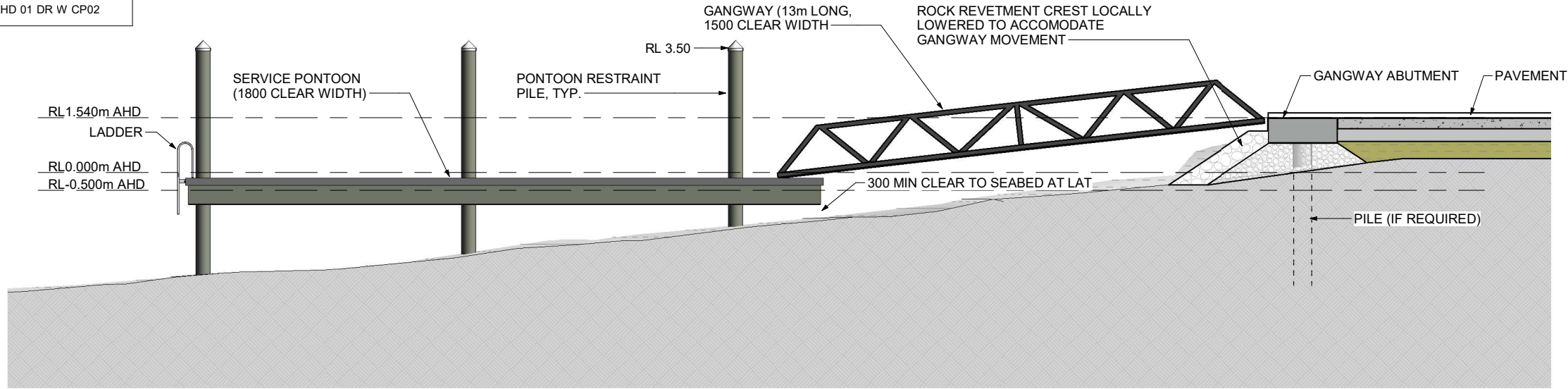


PROJECT
 Tweed Heads Boat Maintenance Facility

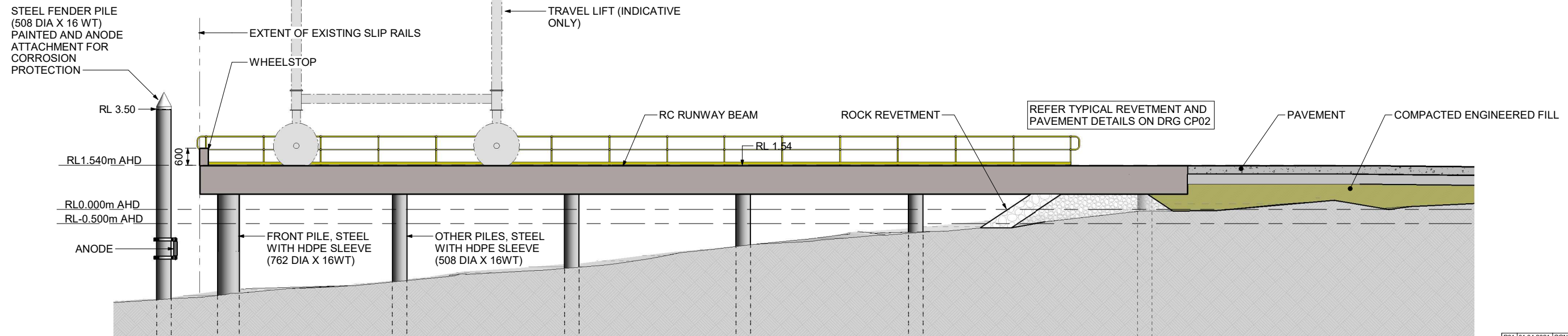
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 GENERAL ARRANGEMENT



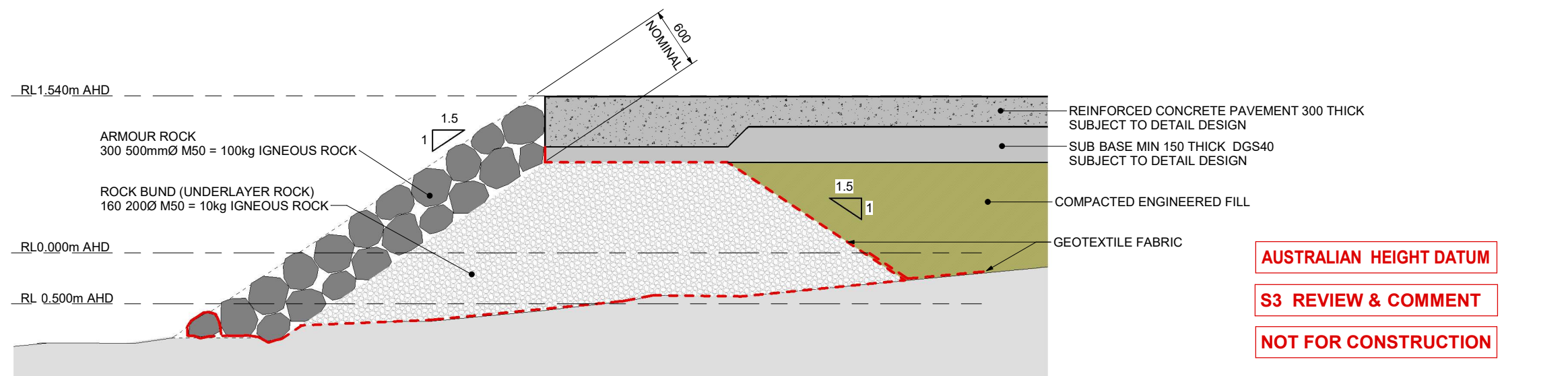
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DATE	03/17/21	SCALE	AT A1	REF.	1 : 200
DRAWING No.	PA2481-RHD-01-DR-W-CP01	SUITABILITY	S0	REVISION	P01



SECTION 1
1 : 75 (A1) CP01



SECTION 2
1 : 75 (A1) CP01

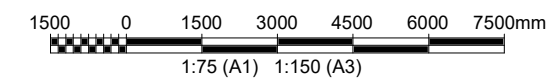


TYPICAL REVETMENT AND PAVEMENT DETAILS
1 : 25 (A1)

AUSTRALIAN HEIGHT DATUM

S3 REVIEW & COMMENT

NOT FOR CONSTRUCTION



REV	DATE	DESCRIPTION	BY	CHK	APP
P01	01.04.2021	CONCEPT ISSUE FOR REVIEW	SGB	MP	

REVISIONS

CLIENT

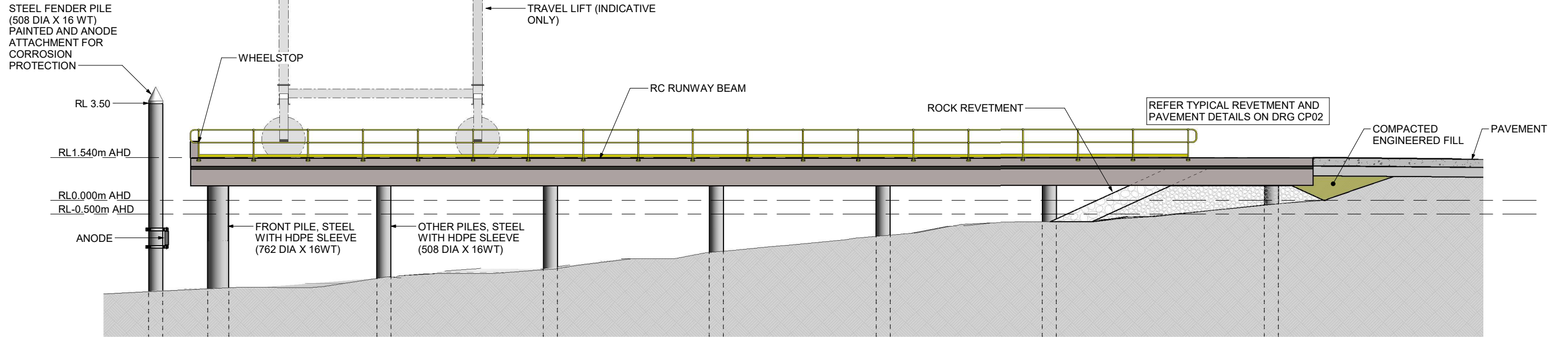


PROJECT
Tweed Heads Boat Maintenance Facility

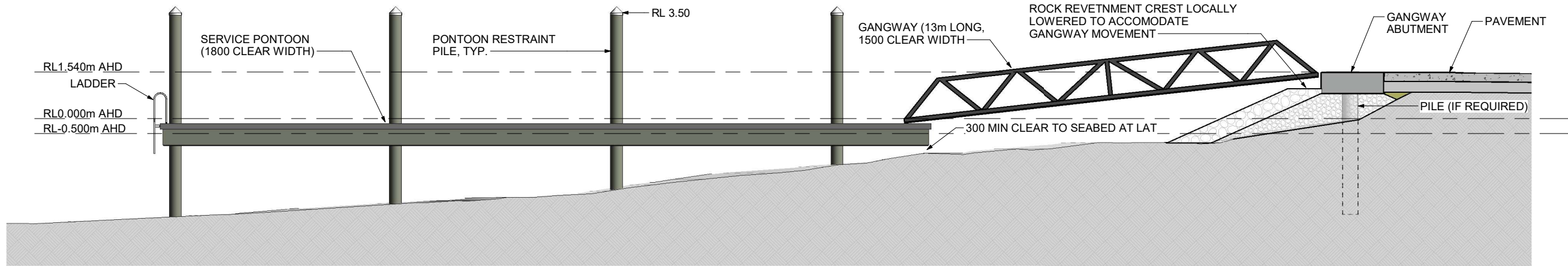
TITLE
SECTIONS SHEET 1



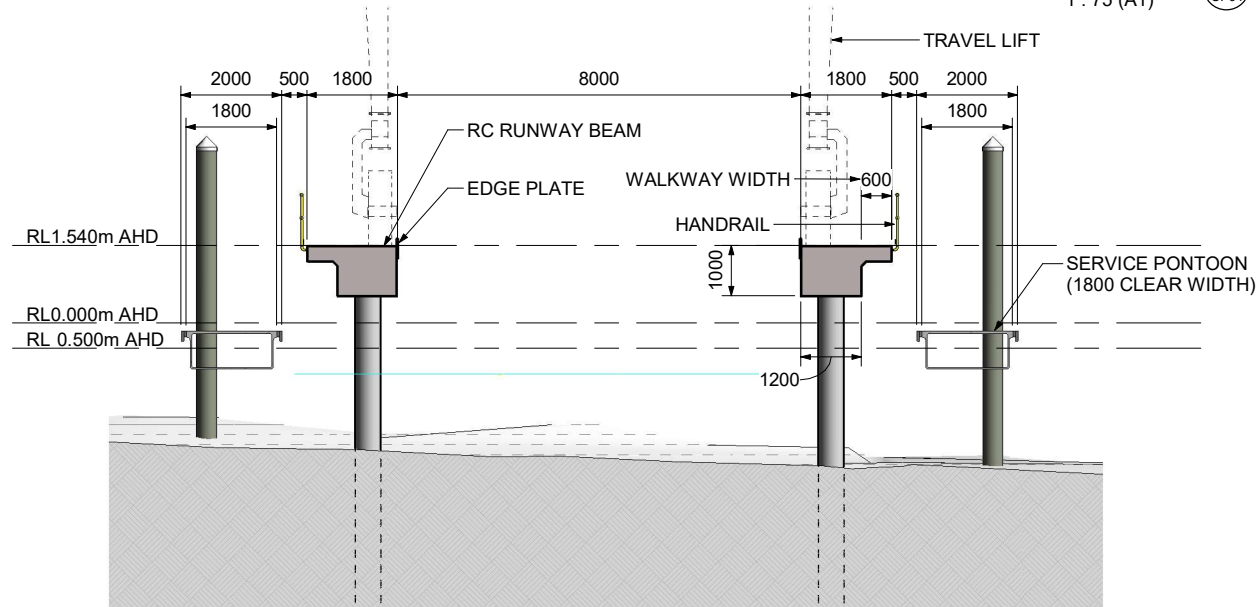
DRAWN	Author	CHECKED	Checker	APPROVED	Approver
DATE	03/27/21	SCALE	As indicated	REF.	
DRAWING No.	PA2481 RHD 01 DR W CP02	SUITABILITY	S0	REVISION	P01



SECTION 3
1 : 75 (A1) CP01



SECTION 4
1 : 75 (A1) CP01



SECTION 5
1 : 75 (A1) CP01

AUSTRALIAN HEIGHT DATUM

S3 REVIEW & COMMENT

NOT FOR CONSTRUCTION



REV	DATE	DESCRIPTION	BY	CHK	APP
REVISIONS					
CLIENT					

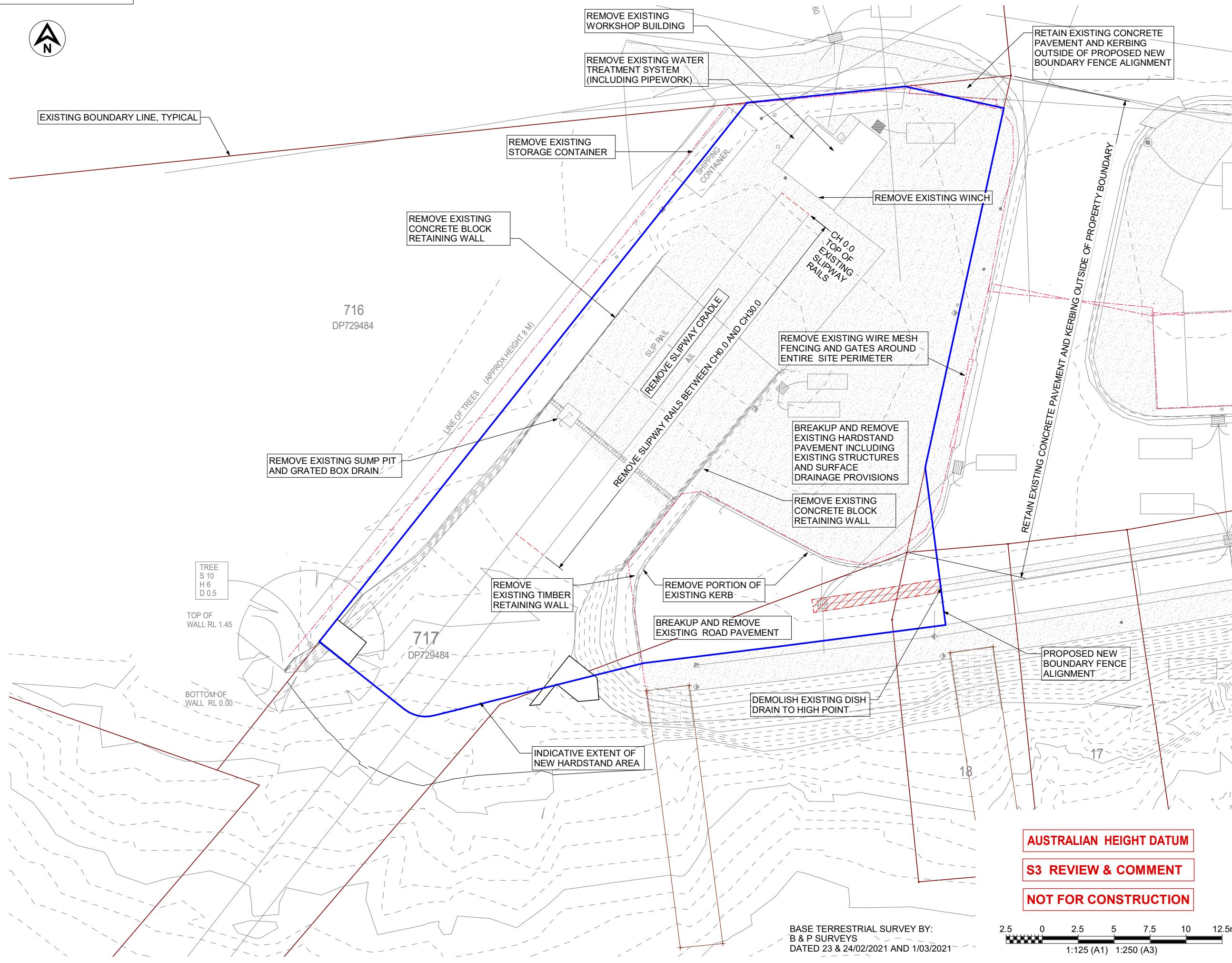


PROJECT
Tweed Heads Boat Maintenance Facility

TITLE
SECTIONS SHEET 2



DRAWN	CHECKED	APPROVED	DATE	SCALE	REF.
sgb	Checker	Approver	03/29/21	AT A1	1 : 75
DRAWING No.	SUITABILITY	REVISION			
PA2481 CP03	S0				



NOTES

1. REFER DRG CP01 FOR GENERAL NOTES
2. EXISTING SERVICES (POWER, WATER, SEWER, COMMUNICATIONS) SHALL BE DISCONNECTED AND WHERE NECESSARY, ANY FIXTURES, CABLING, CONDUITS OR PIPES SHALL BE REMOVED

TREE
S 10
H 6
D 0.5

TOP OF WALL RL 1.45

BOTTOM OF WALL RL 0.00

716
DP729484

717
DP729484

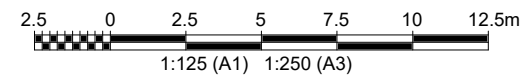
18

17

AUSTRALIAN HEIGHT DATUM

S3 REVIEW & COMMENT

NOT FOR CONSTRUCTION



BASE TERRESTRIAL SURVEY BY:
B & P SURVEYS
DATED 23 & 24/02/2021 AND 1/03/2021

REV	DATE	DESCRIPTION	BY	CHK	APP
P01	01.04.2021	CONCEPT ISSUE FOR REVIEW	SGB	MP	

REVISIONS

CLIENT



PROJECT
Tweed Heads Boat Maintenance Facility

TITLE
DEMOLITION PLAN

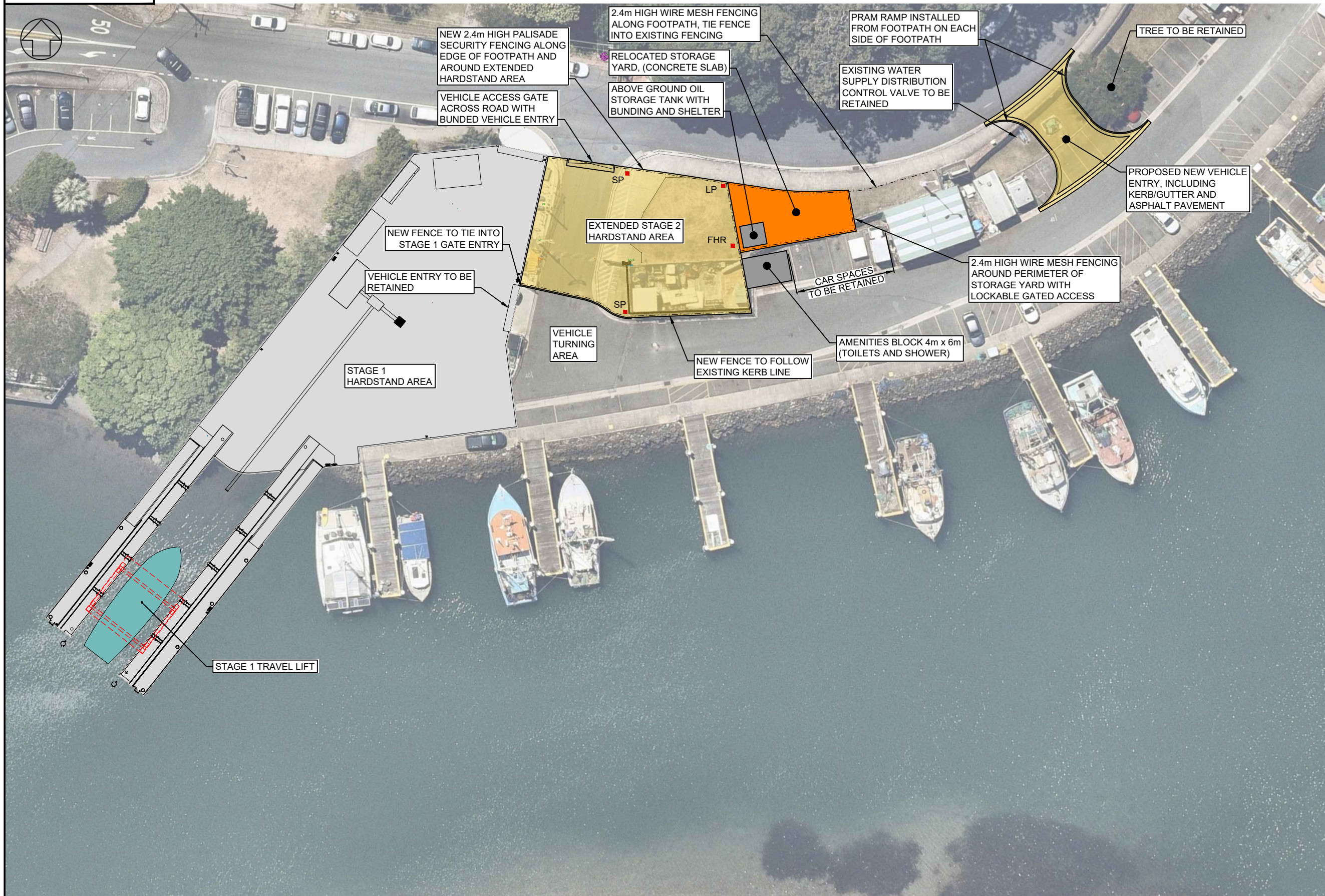


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DATE	03/09/21	SCALE	AT A1	1 : 125	REF.
DRAWING No.	PA2481-RHD-01-DRG-W-CP04	SUITABILITY	S0	REVISION	P01

Appendix B

Stage 2 Concept Drawings

- PA2481-RHD-03-DR-W-CP-0001 STAGE 2 CONCEPT PLAN
- PA2481-RHD-03-DR-W-CP-0002 DRIVEWAY, ACCESS AND PARKING PLAN



LEGEND

- SP ■ SERVICES PEDESTAL
- FHR ■ FIRE HOSE REEL
- LP ■ LIGHT POLE AND CCTV

REV	DATE	DESCRIPTION	BY	CHK	APP
P01.01	04.02.21	FOR REVIEW	SGB	MP	-

REVISIONS

CLIENT



PROJECT

Tweed Heads Boat Maintenance Facility

TITLE

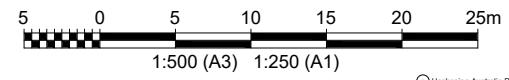
STAGE 2 CONCEPT PLAN

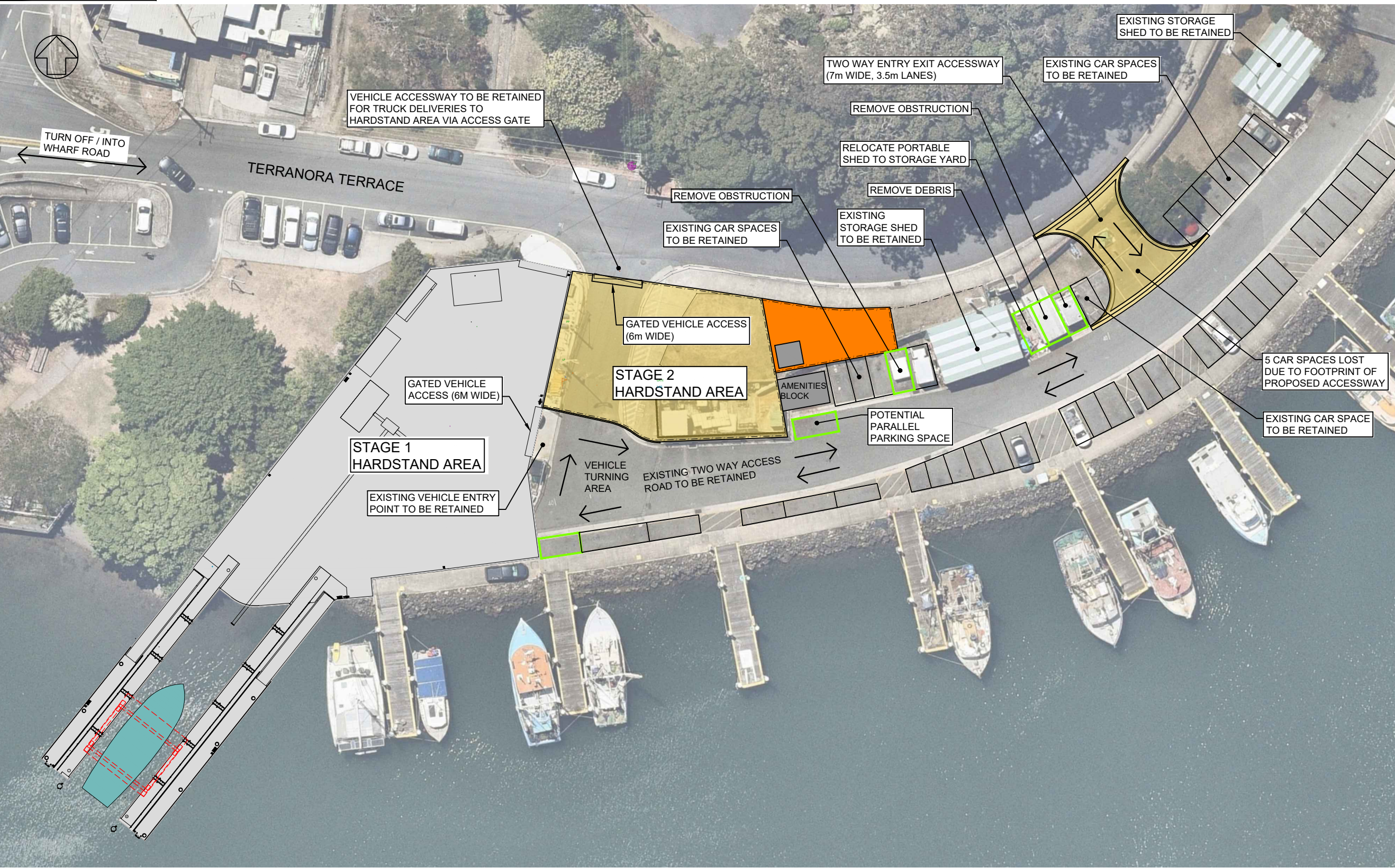
Level 55, 99 Mount Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 95290960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	COORD. SYSTEM	DATUM	DATE
PA2481-RHD-03-DR-W-STAGE 2	MGA 94 56	[ENTER HERE]	25.06.2021

DRAWING No.	REVISION
PA2481-RHD-03-W-CP-0001	P01.01

NOT FOR CONSTRUCTION **S0 WORK IN PROGRESS**





LEGEND

- RETAINED MARKED CAR SPACE
- RECOVERED/GAINED CAR SPACE
- ← TRAFFIC FLOW

REV	DATE	DESCRIPTION	BY	CHK	APP
A	27.07.2021	FOR REVIEW		SGB	MP

CLIENT

PROJECT
Tweed Heads Boat Maintenance Facility

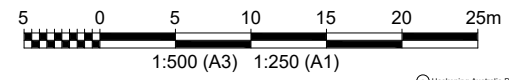
TITLE
DRIVEWAY, ACCESS AND PARKING PLAN

Royal HaskoningDHV
Enhancing Society Together

Level 55, 99 Mount Street
North Sydney NSW 2060
Australia
Tel +61 2 88545000
Fax +61 2 95290960
Email: project.admin.australia@rhdhv.com
Website: www.royalhaskoningdhv.com

DRAWN	COORD. SYSTEM	DATUM	DATE
PA2481-RHD-03-DR-W-STAGE 2	MGA 94 56	[ENTER HERE]	27.07.2021
DRAWING No.	REVISION		
PA2481-RHD-03-W-CP-0002	A		

NOT FOR CONSTRUCTION **S3 REVIEW & COMMENT**



Appendix C

Database Searches

- BioNet Atlas Results
- Federal Protection Matters search results
- AHIMS

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Copyright the State of NSW through the Department of Planning, Industry and Environment. Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) Entities in selected area [North: -28.13 West: 153.49 East: 153.59 South: -28.23] returned a total of 1,656
Report generated on 6/05/2021 12:14 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records
Animalia	Amphibia	Myobatrachidae	3137	<i>Crinia tinnula</i>		Wallum Froglet	V,P		141
Animalia	Amphibia	Hylidae	3169	<i>Litoria brevipalmata</i>		Green-thighed Frog	V,P		1
Animalia	Amphibia	Hylidae	3202	<i>Litoria olongburensis</i>		Olongburra Frog	V,P	V	47
Animalia	Reptilia	Cheloniidae	2004	<i>Caretta caretta</i>		Loggerhead Turtle	E1,P	E	13
Animalia	Reptilia	Cheloniidae	2007	<i>Chelonia mydas</i>		Green Turtle	V,P	V	8
Animalia	Aves	Anseranatidae	0199	<i>Anseranas semipalmata</i>		Magpie Goose	V,P		6
Animalia	Aves	Columbidae	0021	<i>Ptilinopus regina</i>		Rose-crowned Fruit-Dove	V,P		6
Animalia	Aves	Procellariidae	0072	<i>Ardeanna carneipes</i>		Flesh-footed Shearwater	V,P	J,K	1
Animalia	Aves	Ciconiidae	0183	<i>Ephippiorhynchus asiaticus</i>		Black-necked Stork	E1,P		30
Animalia	Aves	Ardeidae	0196	<i>Ixobrychus flavicollis</i>		Black Bittern	V,P		2
Animalia	Aves	Accipitridae	0226	<i>Haliaeetus leucogaster</i>		White-bellied Sea-Eagle	V,P		103
Animalia	Aves	Accipitridae	0225	<i>Hieraetus morphnoides</i>		Little Eagle	V,P		2
Animalia	Aves	Accipitridae	0230	^^ <i>Lophoictinia isura</i>		Square-tailed Kite	V,P,3		1
Animalia	Aves	Accipitridae	8739	^^ <i>Pandion cristatus</i>		Eastern Osprey	V,P,3		315
Animalia	Aves	Falconidae	0238	<i>Falco subniger</i>		Black Falcon	V,P		1
Animalia	Aves	Rallidae	0053	<i>Amaurornis moluccana</i>		Pale-vented Bush-hen	V,P		7
Animalia	Aves	Burhinidae	0174	<i>Burhinus grallarius</i>		Bush Stone-curlew	E1,P		9
Animalia	Aves	Burhinidae	0175	<i>Esacus magnirostris</i>		Beach Stone-curlew	E4A,P		9
Animalia	Aves	Haematopodidae	0131	<i>Haematopus fuliginosus</i>		Sooty Oystercatcher	V,P		49
Animalia	Aves	Haematopodidae	0130	<i>Haematopus longirostris</i>		Pied Oystercatcher	E1,P		187
Animalia	Aves	Charadriidae	0141	<i>Charadrius leschenaultii</i>		Greater Sand-plover	V,P	V,C,J,K	15
Animalia	Aves	Charadriidae	0139	<i>Charadrius mongolus</i>		Lesser Sand-plover	V,P	E,C,J,K	10
Animalia	Aves	Jacaniidae	0171	<i>Irediparra gallinacea</i>		Comb-crested Jacana	V,P		25
Animalia	Aves	Scolopacidae	0161	<i>Calidris ferruginea</i>		Curlew Sandpiper	E1,P	CE,C,J,K	45
Animalia	Aves	Scolopacidae	0165	<i>Calidris tenuirostris</i>		Great Knot	V,P	CE,C,J,K	4
Animalia	Aves	Scolopacidae	0152	<i>Limosa limosa</i>		Black-tailed Godwit	V,P	C,J,K	4
Animalia	Aves	Scolopacidae	0160	<i>Xenus cinereus</i>		Terek Sandpiper	V,P	C,J,K	30
Animalia	Aves	Laridae	0117	<i>Sternula albifrons</i>		Little Tern	E1,P	C,J,K	47
Animalia	Aves	Cacatuidae	0265	^ <i>Calyptorhynchus lathami</i>		Glossy Black-Cockatoo	V,P,2		1
Animalia	Aves	Psittacidae	0260	<i>Glossopsitta pusilla</i>		Little Lorikeet	V,P		2
Animalia	Aves	Strigidae	0246	^^ <i>Ninox connivens</i>		Barking Owl	V,P,3		2
Animalia	Aves	Strigidae	0248	^^ <i>Ninox strenua</i>		Powerful Owl	V,P,3		1
Animalia	Aves	Tytonidae	0252	^^ <i>Tyto longimembris</i>		Eastern Grass Owl	V,P,3		1
Animalia	Aves	Tytonidae	0250	^^ <i>Tyto novaehollandiae</i>		Masked Owl	V,P,3		2
Animalia	Aves	Alcedinidae	0327	<i>Todiramphus chloris</i>		Collared Kingfisher	V,P		55
Animalia	Aves	Meliphagidae	0610	<i>Lichenostomus fasciocularis</i>		Mangrove Honeyeater	V,P		22
Animalia	Aves	Neosittidae	0549	<i>Daphoenositta chrysoptera</i>		Varied Sittella	V,P		4
Animalia	Aves	Campephagidae	0428	<i>Coracina lineata</i>		Barred Cuckoo-shrike	V,P		2
Animalia	Aves	Monarchidae	0376	<i>Carterornis leucotis</i>		White-eared Monarch	V,P		1
Animalia	Mammalia	Dasyuridae	1045	<i>Planigale maculata</i>		Common Planigale	V,P		10
Animalia	Mammalia	Phascolarctidae	1162	<i>Phascolarctos cinereus</i>		Koala	V,P	V	79
Animalia	Mammalia	Phascolarctidae	1162	<i>Phascolarctos cinereus</i>		Koala population between the Tweed River and Brunswick River east of the Pacific Highway	E2,V,P	V	4
Animalia	Mammalia	Petauridae	1137	<i>Petaurus norfolcensis</i>		Squirrel Glider	V,P		3
Animalia	Mammalia	Potoroidae	1175	<i>Potorous tridactylus</i>		Long-nosed Potoroo	V,P	V	2
Animalia	Mammalia	Potoroidae	1175	<i>Potorous tridactylus</i>		Long-nosed Potoroo, Cobaki Lakes and Tweed Heads West	E2,V,P	V	1
Animalia	Mammalia	Pteropodidae	1290	<i>Nyctimene robinsoni</i>		Eastern Tube-nosed Bat	V,P		1
Animalia	Mammalia	Pteropodidae	1280	<i>Pteropus poliocephalus</i>		Grey-headed Flying-fox	V,P	V	35
Animalia	Mammalia	Pteropodidae	1294	<i>Syconycteris australis</i>		Common Blossom-bat	V,P		2
Animalia	Mammalia	Emballonuridae	1321	<i>Saccolaimus flaviventris</i>		Yellow-bellied Sheath-tail-bat	V,P		1
Animalia	Mammalia	Molossidae	1937	<i>Ozimops lumsdenae</i>		Northern Free-tailed Bat	V,P		16
Animalia	Mammalia	Vespertilionidae	1354	<i>Chalinolobus nigrogriseus</i>		Hoary Wattlebat	V,P		2
Animalia	Mammalia	Vespertilionidae	1357	<i>Myotis macropus</i>		Southern Myotis	V,P		5
Animalia	Mammalia	Vespertilionidae	1336	<i>Nyctophilus bifax</i>		Eastern Long-eared Bat	V,P		7
Animalia	Mammalia	Miniopteridae	1346	<i>Miniopterus australis</i>		Little Bent-winged Bat	V,P		52
Animalia	Mammalia	Miniopteridae	3330	<i>Miniopterus orianae oceanensis</i>		Large Bent-winged Bat	V,P		10
Animalia	Mammalia	Otariidae	1882	<i>Arctocephalus pusillus doriferus</i>		Australian Fur-seal	V,P		1
Animalia	Insecta	Noctuidae	1021	<i>Phyllodes imperialis southern subspecies</i>		Southern Pink Underwing Moth	E1	E	1
Animalia	Gastropoda	Camaenidae	1002	<i>Thersites mitchellae</i>		Mitchell's Rainforest Snail	E1	CE	2
Plantae	Flora	Apocynaceae	1176	<i>Ochrosia moorei</i>		Southern Ochrosia	E1	E	1
Plantae	Flora	Ebenaceae	14710	<i>Diospyros yandina</i>		Shiny-leaved Ebony	E1		2

Plantae	Flora	Fabaceae (Caesalpinioideae)	1892	<i>Cassia marksiana</i>		E1		12
Plantae	Flora	Fabaceae (Faboideae)	2833	<i>Desmodium acanthocladum</i>	Thorny Pea	V	V	1
Plantae	Flora	Fabaceae (Faboideae)	3032	<i>Sophora tomentosa</i>	Silverbush	E1		3
Plantae	Flora	Fabaceae (Mimosoideae)	3711	<i>Acacia bakeri</i>	Marblewood	V		9
Plantae	Flora	Fabaceae (Mimosoideae)	7757	<i>Archidendron hendersonii</i>	White Lace Flower	V		26
Plantae	Flora	Grammitidaceae	9471	^^ <i>Grammitis stenophylla</i>	Narrow-leaf Finger Fern	E1,3		1
Plantae	Flora	Lauraceae	3477	<i>Cryptocarya foetida</i>	Stinking Cryptocarya	V	V	51
Plantae	Flora	Lauraceae	3491	<i>Endiandra hayesii</i>	Rusty Rose Walnut	V	V	2
Plantae	Flora	Lauraceae	8480	<i>Endiandra muelleri subsp. bracteata</i>	Green-leaved Rose Walnut	E1		5
Plantae	Flora	Myrtaceae	4283	<i>Rhodamnia rubescens</i>	Scrub Turpentine	E4A		3
Plantae	Flora	Myrtaceae	4284	<i>Rhodomyrtus psidioides</i>	Native Guava	E4A		5
Plantae	Flora	Myrtaceae	4290	<i>Syzygium hodgkinsoniae</i>	Red Lilly Pilly	V	V	1
Plantae	Flora	Myrtaceae	4292	<i>Syzygium moorei</i>	Durobby	V	V	14
Plantae	Flora	Orchidaceae	6672	^ <i>Geodorum densiflorum</i>	Pink Nodding Orchid	E1,P,2		9
Plantae	Flora	Orchidaceae	4480	^ <i>Phaius australis</i>	Southern Swamp Orchid	E1,P,2	E	6
Plantae	Flora	Orchidaceae	4583	^ <i>Sarcophilus fitzgeraldii</i>	Ravine Orchid	V,P,2	V	1
Plantae	Flora	Orobanchaceae	7884	<i>Centranthera cochinchinensis</i>	Swamp Foxglove	E1		1
Plantae	Flora	Proteaceae	5372	<i>Grevillea hilliana</i>	White Yiel Yiel	E1		11
Plantae	Flora	Proteaceae	5446	<i>Macadamia tetraphylla</i>	Rough-shelled Bush Nut	V	V	6
Plantae	Flora	Rubiaceae	8297	<i>Randia moorei</i>	Spiny Gardenia	E1	E	16
Plantae	Flora	Rutaceae	6457	<i>Acronychia littoralis</i>	Scented Acronychia	E1	E	4
Plantae	Flora	Rutaceae	5765	<i>Bosistoa transversa</i>	Yellow Satinheart	V	V	2
Plantae	Flora	Sapindaceae	8291	<i>Lepiderema pulchella</i>	Fine-leaved Tuckeroo	V		18
Plantae	Flora	Sapotaceae	11957	<i>Niemeyera whitei</i>	Rusty Plum, Plum Boxwood	V		1



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

Report created: 21/04/21 09:57:54

[Summary](#)

[Details](#)

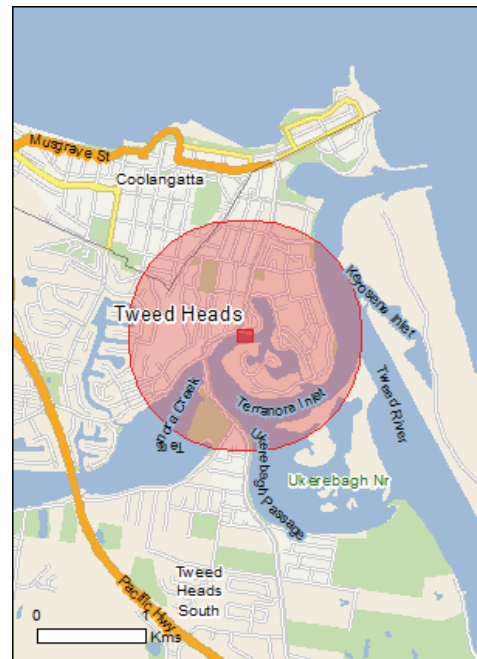
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

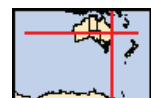
[Acknowledgements](#)



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2015

[Coordinates](#)

Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	71
Listed Migratory Species:	66

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	71
Whales and Other Cetaceans:	2
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	1
Invasive Species:	31
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [\[Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Coastal Swamp Oak (<i>Casuarina glauca</i>) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [\[Resource Information \]](#)

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area
Frogs		
Litoria olongburensis Wallum Sedge Frog [1821]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes fleayi Fleay's Frog [25960]	Endangered	Species or species habitat may occur within area
Insects		
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
Phyllodes imperialis smithersi Pink Underwing Moth [86084]	Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area
Other		
Thersites mitchellae Mitchell's Rainforest Snail [66774]	Critically Endangered	Species or species habitat may occur within area
Plants		
Acronychia littoralis Scented Acronychia [8582]	Endangered	Species or species

Name	Status	Type of Presence
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	habitat likely to occur within area Species or species habitat likely to occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat known to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Diploglottis campbellii Small-leaved Tamarind [21484]	Endangered	Species or species habitat may occur within area
Endiandra floydii Floyd's Walnut [52955]	Endangered	Species or species habitat may occur within area
Fontainea australis Southern Fontainea [24037]	Vulnerable	Species or species habitat may occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat likely to occur within area
Marsdenia longiloba Clear Milkvine [2794]	Vulnerable	Species or species habitat may occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
Randia moorei Spiny Gardenia [10577]	Endangered	Species or species habitat known to occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat likely to occur within area
Syzygium hodgkinsoniae Smooth-bark Rose Apple, Red Lilly Pilly [3539]	Vulnerable	Species or species habitat likely to occur within area
Syzygium moorei Rose Apple, Coolamon, Robby, Durobby, Watermelon Tree, Coolamon Rose Apple [12284]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Tylophora woolsii [20503]	Endangered	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or

Name	Status	Type of Presence
Chelonia mydas Green Turtle [1765]	Vulnerable	related behaviour known to occur within area Foraging, feeding or related behaviour known to occur within area
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Sharks

Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area
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Listed Migratory Species

[[Resource Information](#)]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Sternula albifrons Little Tern [82849]		Breeding may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat likely to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area

Name	Threatened	Type of Presence
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa incana Wandering Tattler [831]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land

[[Resource Information](#)]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name

Commonwealth Land -
Commonwealth Land - Australian Telecommunications Commission

Listed Marine Species

[[Resource Information](#)]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat known to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Heteroscelus incanus Wandering Tattler [59547]		Roosting known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Flesh-footed Shearwater [1043]		Species or species habitat likely to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat may occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Breeding may occur within area

Name	Threatened	Type of Presence
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area

Extra Information

State and Territory Reserves [\[Resource Information \]](#)

Name	State
Ukerebagh	NSW

Regional Forest Agreements [\[Resource Information \]](#)

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species [\[Resource Information \]](#)

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name	Status	Type of Presence
Birds		
<i>Acridotheres tristis</i> Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
<i>Anas platyrhynchos</i> Mallard [974]		Species or species habitat likely to occur within area
<i>Carduelis carduelis</i> European Goldfinch [403]		Species or species habitat likely to occur within area
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
<i>Lonchura punctulata</i> Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
<i>Passer domesticus</i> House Sparrow [405]		Species or species habitat likely to occur within area
<i>Streptopelia chinensis</i> Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
<i>Sturnus vulgaris</i> Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
<i>Rhinella marina</i> Cane Toad [83218]		Species or species

Name	Status	Type of Presence
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus africanus Climbing Asparagus, Climbing Asparagus Fern [66907]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area

Name	Status	Type of Presence
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area

Nationally Important Wetlands		[Resource Information]
Name		State
Ukerebagh Island Nature Reserve		NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-28.18041 153.54033,-28.18041 153.54158,-28.1813 153.54158,-28.1813 153.54033,-28.18041 153.54033

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence
Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

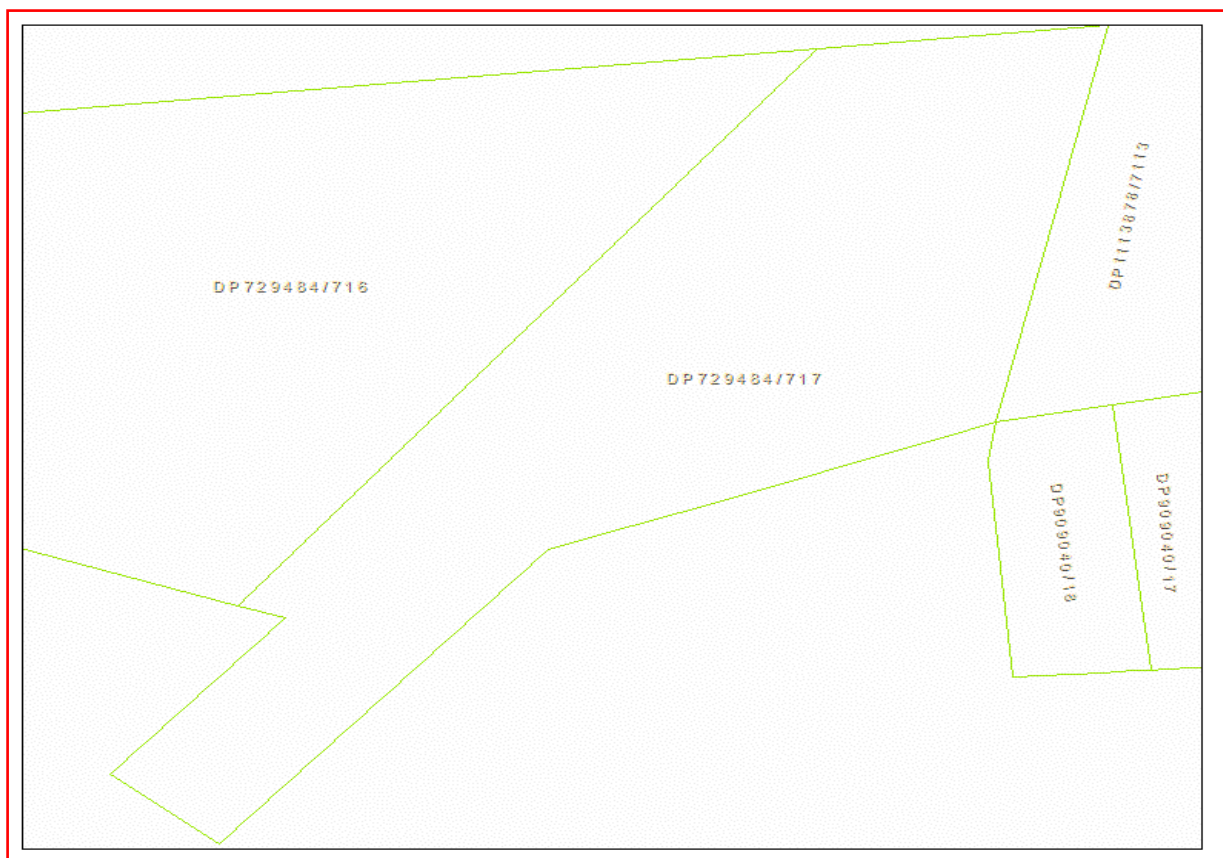
Haskoning Australia
Berry Street
North Sydney New South Wales 2060
Attention: Ali Watters
Email: ali.watters@rhdhv.com

Date: 06 May 2021

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 717, DP:DP729484 with a Buffer of 0 meters, conducted by Ali Watters on 06 May 2021.

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 the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the [NSW Government Gazette \(http://www.nsw.gov.au/gazette\)](http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not to be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Appendix D

Consultation

From: Stan Viney <Stan.Viney@epa.nsw.gov.au>

Sent: Tuesday, March 30, 2021 10:33 AM

To: Ali Watters <ali.watters@rhdhv.com>

Subject: RE: Tweed Heads Boat Maintenance Facility

This message was sent from an **e-mail domain unknown to Royal HaskoningDHV**. Please be cautious.

Hi Ali,

My apologies! I have read the letter and have no major concerns regarding the proposed works. The capping of the contaminated material at the site is a good solution. The proposed environmental mitigation measures appear adequate. My only suggestion is the use of a second silt curtain particularly during the land based works. The second curtain acts as a back-up should the first curtain fail in any way. I've seen this used successfully on other projects.

I can confirm the EPA agrees in principle on the project proposal.

I'm happy for you to arrange a meeting – at this stage my calendar is relatively free.

Kind regards

Stan

Stan Viney

Operations Officer – Regulatory Operations

NSW Environment Protection Authority

M: 0429 215 388 Ph: +61 2 6640 2512

stan.viney@epa.nsw.gov.au www.epa.nsw.gov.au [@EPA_NSW](#) [EPA YouTube](#)

Report pollution and environmental incidents 131 555 (NSW only) or +61 2 9995 5555

NSW EPA logo



We acknowledge the traditional custodians of the land on which we work and gather. We celebrate the diversity of Aboriginal Peoples, their ongoing culture and connection to land and waters.

From: Ali Watters <ali.watters@rhdhv.com>
Sent: Tuesday, 30 March 2021 10:13 AM
To: Stan Viney <Stan.Viney@epa.nsw.gov.au>
Subject: RE: Tweed Heads Boat Maintenance Facility

Hi Stan

Just wondering if you have had a chance to review the letter describing the proposed works for the Tweed Heads Boat Maintenance Facility? Would it be possible to arrange a meeting to discuss the project?

Thanks

Ali

From: Ali Watters
Sent: Monday, March 22, 2021 12:09 PM
To: stan.viney@epa.nsw.gov.au
Cc: Matt Potter <matt.potter@rhdhv.com>; Julian Burgess <Julian.BURGESS2@transport.nsw.gov.au>; David Doyle <David.Doyle@transport.nsw.gov.au>; Greg Britton <greg.britton@rhdhv.com>
Subject: Tweed Heads Boat Maintenance Facility

Hi Stan

As discussed this morning, please find attached a letter describing the proposed upgrade to the existing boat maintenance facility at Tweed Heads. We would like to reach agreement in principle on the proposed construction approach for the upgrade works and the identification of appropriate environmental mitigation measures.

Please let me know if you require any further information or have any queries.

Regards

Ali

Ali Watters
Principal Environmental Engineer
Maritime & Aviation, Sydney, Australia

T +61 2 8854 5001 | **M** +61 422 763 386 | **E** ali.watters@rhdhv.com | **W**

Mr Stan Viney
Operations Officer
NSW Environment Protection Authority (Grafton)
PO Box 498
Grafton NSW

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project.admin.australia@rhdhv.com **E**
royalhaskoningdhv.com **W**

Date:	18 March 2021	Contact name:	Ali Watters
Your reference:		Telephone:	0422 763 386
Our reference:	PA2481-RHD-ZZ-XX-CO-Z-0001	Email:	Ali.watters@rhdhv.com
Classification:	Project related		

Dear Stan,

RE: Tweed Heads Boat Maintenance Facility

We are currently working with Transport for NSW (TfNSW) to design a proposed upgrade to the existing boat maintenance facility within Terranora Inlet at Tweed Heads. At this early concept design stage, we would like to engage with NSW EPA in order to reach agreement in principle on the proposed construction approach for the upgrade works and the identification of appropriate environmental mitigation measures.

1 Introduction

The existing boat maintenance (slipway) facility has reached the end of its working life with significant deterioration of the slipway cradle having reduced its lifting capacity to less than 50 tonnes, which is below the load rating required for servicing of the local trawler fleet that is moored close by within the Southern Boatharbour. The slipway rails are also considered to be at the end of their life, with previous repairs required to prevent lateral movement and 'steps' in the rails increasing the difficulty of cradle movement up the ramp. In addition, the functioning of the wastewater collection system is compromised by the positioning of the slipway ramp surface drainage grate/pit below the high water mark. This has resulted in ineffective capture of washdown water and an elevated concentration of contaminants within the seabed sediments in the vicinity of the slipway ramp.

The project proposal involves removal of the slipway and upgrading of the boat maintenance facility to a travel lift with the capacity to lift 75t displacement vessels. This will involve demolition of above-ground infrastructure including the upper portion of the slipway rails, slipway winch and cradle, office building/workshop/storage container, and the concrete hardstand. The proposed future operation of a 75t travel lift will require the site to be made level, including filling over the existing slipway ramp, installation of a new pavement surface and construction of an overwater travel lift support structure, comprising concrete runway beams supported on piles. A preliminary layout of the proposed facility is included as **Attachment A**.

The following sections provide an appraisal of the available sediment quality data and an outline of the proposed construction methodology for consideration by NSW EPA and further discussion as required.

2 Available Sediment Quality Data

The following sediment quality investigations have been undertaken at or near the site:

- GHD (2017), *Tweed Heads Slipway Contamination Investigation*, Report prepared on behalf of the Department of Industry – Lands, December 2017.
- Hydrosphere Consulting (2019), *Sediment Investigation Report – Southern Boat Harbour, Tweed Heads Maintenance Dredging*, Report prepared on behalf the Department of Industry – Lands, February 2019.

The contamination investigation undertaken by GHD (2017) comprised sediment sampling and testing to a maximum depth of 1.2 m at 9 locations (six within approximately 50 m of the slipway and three from the vicinity of the adjacent commercial fishing wharf/berths).

Testing was undertaken for the following contaminants of potential concern (COPC):

- tributyltin (TBT);
- metals (antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
- polycyclic aromatic hydrocarbons (PAHs);
- total recoverable hydrocarbons (TRH);
- benzene, toluene, ethylbenzene and xylene (BTEX);
- organochlorines (OC) and organophosphates (OP) pesticides;
- polychlorinated biphenyls (PCBs);
- phenols, and ammonia.

Laboratory analysis of selected samples for particle size distribution (PSD) and acid sulfate soils (ASS) was also undertaken.

The sediments encountered during the investigations comprised dark-grey/grey fine to medium grained sand with some shells.

Results of the geochemical testing were compared against the sediment quality guideline values (SQGVs) from ANZECC/ARMCANZ (2013). The low guideline value (SQGV-low) represents a low probability of effects, while the upper guideline value (SQGV-high) represents a high probability of effects. Results of the geochemical testing showed the following:

- TBT exceeded guideline concentrations at all locations for the majority of samples with exceedances of SQGV-high observed at the locations closest to the slipway;
- Copper, mercury, lead, nickel and zinc were all elevated with particularly high concentrations exceeding SQGV-high at the location closest to the slipway;
- Concentrations of TRH were below the laboratory limit of reporting (LOR), with the exception of the surface and near-surface samples closest to the slipway;
- Concentrations of PAH were low, either below the LOR or below the SQGV-low guideline; and,
- Concentrations of pesticides, BTEX, ammonia and phenols were all below the LOR.

The spatial distribution of contamination was as expected, with the highest concentrations observed in the surface samples and those samples nearest to the slipway. Elevated concentrations were also observed within the adjacent berths where vessels are understood to rest on the sediments at very low tides.

Acid sulfate soils testing indicated the sediments may be potential acid sulfate soils (PASS). Removal and subsequent oxidation of the sediments would require preparation of an acid sulfate soils Management Plan (ASSMP).

The investigations undertaken by Hydroshpere (2019) showed the sediments at the adjacent berths typically consisted of silty sand or silty clayey sand overlying relatively clean sand layers. Sampling identified a vertical distribution of contaminants with elevated concentrations for both metals and TBT generally occurring in the top 1.5 m layer of sediment associated with the silty sand/silty clayey sand stratum. Elevated contaminant concentrations, most notably TBT and mercury, were also recorded within sediments in the wharf berths adjacent to the slipway. Contamination of the sediments was attributed to past use of the slipway facility and general vessel operations within the area and the accumulation of anthropogenic material on the bed over time.

3 Proposed Construction Methodology

The proposed construction methodology outlined here focuses on the slipway ramp area and the measures proposed to control sediment disturbance and loss of sediment into the adjacent waterway during the works. The proposed capping of contaminated sediments within the footprint of the land-based civil works is also discussed. A schematic diagram of the proposed works on the slipway ramp area is provided as **Figure 1**.

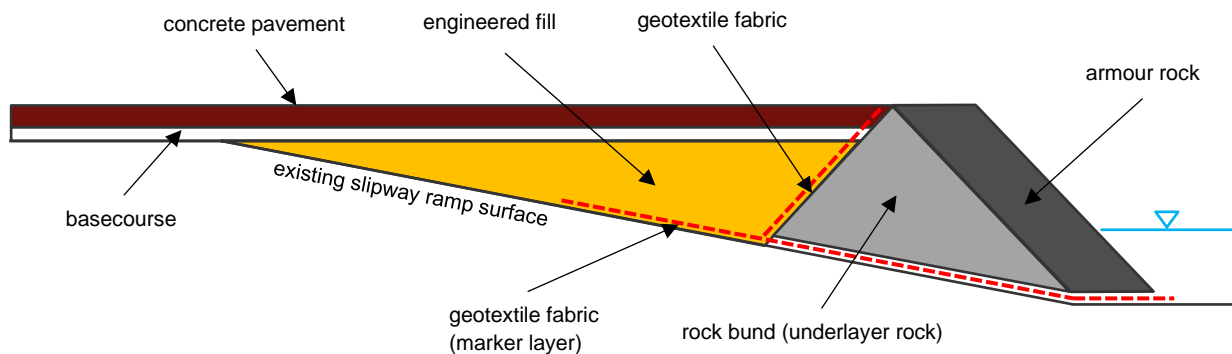


Figure 1: Schematic diagram of proposed works on slipway ramp

Site establishment activities would include the deployment of a floating silt curtain across the slipway ramp entrance. This silt curtain would later be extended further into the waterway to enclose the overwater work area required for pile driving.

A geotextile fabric marker layer would be placed (with ballasting as required) over the area of the slipway ramp surface that is covered with sediments. The marker layer would extend to the seaward limit of the land-based civil works, which would be defined by the toe of the proposed extension of the existing rock revetment located behind the fixed jetty berths to the east.

A rock bund would then be placed across the seaward end of the marker layer. This would be constructed from igneous underlayer sized rock (160-200mm dia.) that would form a face at a slope of 1V:1.5H for placement of igneous armour rock (300-500mm dia.). The seabed level at the toe of the proposed revetment extension is at approximately -1m AHD. The rock bund would have a crest level of around +1.5m AHD, which corresponds to the proposed finished level of the hardstand area. The rock would be carefully placed by excavators operating at low tide. A geotextile fabric would be placed on the landward face of the rock bund.

The marker layer and rock bund (including geotextile fabric) would act to both cap the contaminated sediments on the slipway ramp and provide an effective environmental control for containment of any sediment disturbance by land-based demolition activities and/or tidal water level variations at the site during construction.

Following construction of the rock bund, filling of the slipway ramp area would take place with engineered fill. The engineered fill would comprise granular material with minimal fines content (0-5%) and be placed and compacted in layers behind the rock bund up to the level required for subsequent placement of the pavement basecourse. At this stage a working surface would exist for placement of rock armour over the seaward face of the rock bund with land-based excavators.

The remaining landside works would then be completed, including installation of drainage provisions and in-ground services, pavement basecourse placement and compaction, concrete pavement construction and installation of above-ground fixtures. The remaining waterside works would be completed primarily with floating plant and equipment, including pile driving, construction of concrete runway beams, and gangway/pontoon installation. It is noted that any runway piles that are required to be located within the footprint of the rock bund would need to be driven prior to rock placement, to allow the rock to be subsequently placed around the piles, or otherwise for sleeves to be installed within the rock for piles to be subsequently driven through..

The proposed approach has the following advantages:

- Minimal disturbance of the sediment with elevated concentrations of contaminants.
- Straightforward construction from the ramp i.e. no water based works for the capping activities thereby further reducing the potential for mobilisation of the sediments.
- Permanent capping of the sediments with the most elevated levels of contamination (i.e. closest to the slipway).

If the slipway was to continue operating without the capping of this area, contaminated sediments would be continually re-worked and mobilised through tidal movements, wind and boat wake wave action, and use of the slipway.

We trust that the above information provides a suitable basis for your consideration of the proposed approach of effectively capping the existing contaminated sediments with engineered fill material placed over the existing slipway ramp. Your comments on the proposed construction methodology and associated environmental mitigation measures would also be appreciated.

We look forward to reaching agreement in principle on the project proposal, which we believe represents a significant improvement over the existing poor condition, operational capacity limitations and environmental compliance of the current slipway facility. Please do not hesitate to contact me for further discussion and clarification.

Yours Sincerely,



Ali Watters

Principal Environmental Engineer
Water

Attachment A – Preliminary Travel Lift Facility Layout



HARDSTAND
AREA = 1270m²

REV	DATE	DESCRIPTION	BY	CHK	APP
P01.01	04.02.21	FOR REVIEW		SGB	MP

REVISIONS

CLIENT



PROJECT
Tweed Heads Boat Maintenance Facility

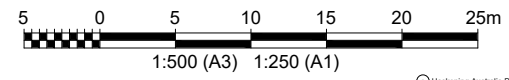
TITLE
SITE CONCEPT PLAN
OPTION 1



DRAWN	COORD. SYSTEM	DATUM	DATE
PA2481-RHD-00-DR-W-OP1	MGA 94 56	[ENTER HERE]	02.02.2021

DRAWING No.	REVISION
PA2481-RHD-00-DR-W-OP1	P01.0

NOT FOR CONSTRUCTION **S0 WORK IN PROGRESS**





Our Reference: EF19/3635 SF19/16795 DOC19/136149-1
Contact: Geff Cramb
Date: 12 March 2019

Mick Howland
Managing Director
Hydrosphere Consulting
PO Box 7059
BALLINA NSW 2478

Dear Mick

Re: Marine Travel Lift Conversion – Southern Tweed Heads Boat Harbour

I refer to your correspondence dated 19 February 2019 titled Marine Travel Lift Conversion - Southern Tweed Heads Boat Harbour (MTLC). Hydrosphere Consulting (HC) on behalf of NSW Department of Industry – Lands and Water (DoI), have requested from the Environment Protection Authority (EPA) any relevant matters or requirements that should be taken into consideration in preparing a Review of Environmental Factors (REF) for the MTLC project. The MTLC project is for conversion of the existing slipway to a marine travel lift within the Southern Boat Harbour, off Terranora Inlet, Tweed Heads NSW.

It is important that a Construction Environmental Management Plan (CEMP) be prepared by Department of Industry, Crown Lands (DoL) / HC for this proposal.

In summary, key information requirements for the proposal include an adequate assessment of: Air quality impacts; Noise impacts; Soil and water management; and, Waste.

- **Water Quality:** Lands must ensure that any potential water quality impacts from the proposal are identified and managed. Of particular importance is the prevention of water quality impacts in relation to the:
 - Mobilised sediments from marine excavation work;
 - dewatering of marine sediments; and,
 - the management of stormwater on and around the hardstand. Mitigation options should consider minimising areas exposed, clean water diversions, preventing sediment-laden run off to the harbour.
- **Soil and Sediment Management:** The excavation and temporary stockpiling of sediment and soil should be managed to prevent the movement of any contaminants. The REF should consider contamination aspects.
- **Air Quality:** The potential risks to human health from exposure to airborne particulates (from uncontrolled dust emissions) must be assessed. This is of particular importance given the proximity of the site to high public use areas. Dust control measures must be detailed, with the aim to prevent any movement of dust off-site.

- **Noise:** All practical measures should be implemented to mitigate the impacts of noise on receivers. This includes taking into account the following recommended standard hours of operation:
 - Monday to Friday – 7:00am to 6:00pm
 - Saturday – 8:00am to 1pm; and
 - No work on Sundays or Public Holidays.
- **Waste Management:** The REF must identify all wastes expected to be generated by the remediation works, with a lawful disposal option identified for each waste stream.

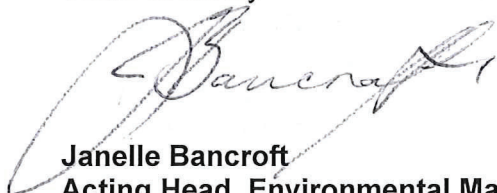
The EPA requests DoL / HC provide the EPA with a copy of the:

- Draft REF; and,
- Draft CEMP.

for our further specific advice and comment.

Should you require any further information, please contact Geff Cramb on 66402510.

Yours sincerely



Janelle Bancroft
Acting Head, Environmental Management Unit – North Coast
Environment Protection Authority

cc. Andy Hartley
Department of Industry, Crown Lands
18A River Street
MACLEAN, NSW 2463



OUR REF: C19/97

4 March 2019

Mr Peter Challenger
Hydrosphere Consulting Pty Ltd
PO Box 7059
BALLINA NSW 2478
Via email: peter.challenger@hydrosphere.com.au

Dear Mr Challenger

Re: Environmental study requirements for the proposed conversion of an existing slipway to a marine travel lift, Southern Boat Harbour, off Terranora Inlet, Tweed Heads

I refer to your letter of 19 February 2019 seeking comment from DPI Fisheries on the preparation of an REF for the conversion of an existing slipway to a marine travel lift within the Southern Boat Harbour, off Terranora Inlet, Tweed Heads. The above mentioned proposal appears likely to have direct impact on key fish habitats. Cognisant of this, I have outlined below the environmental study requirements necessary to facilitate appropriate assessment of the above mentioned proposal.

DPI Fisheries is responsible for ensuring that fish stocks are conserved and that there is “no net loss” of key fish habitats upon which they depend. To achieve this, the Aquatic Ecosystems Unit assesses activities under Part 4 and Part 5 of the *Environmental Planning and Assessment Act 1979* in accordance with the objectives of the FM Act, the aquatic habitat protection and threatened species conservation provisions in Parts 7 and 7A of the FM Act, and the associated *Policy and Guidelines for Fish Habitat Conservation and Management (2013 Update)* (DPI Fisheries P&G). This document is available online at: <https://www.dpi.nsw.gov.au/fishing/habitat/protecting-habitats/toolkit>. In addition, DPI Fisheries is responsible for ensuring the sustainable management of viable commercial fishing and aquaculture; quality recreational fishing; and to promote the continuation of Aboriginal cultural fishing within NSW.

Part 7 Fisheries Management Act 1994 Approvals

The table below outlines actions that trigger sections of the *Fisheries Management Act 1994*. Please consider whether components of the project involve these works.

Sections	Description of action	Legislative trigger
198-202	Dredge (digging) and / or reclamation (filling) of land permanently or periodically inundated by water (including wetlands).	Digging and / or filling below the Highest Astronomical Tide (~1m AHD) in estuaries. Digging and / or filling within the high bed of 3 rd order watercourses (based on 1:25,000 scale maps). Draining water from land for its reclamation. Activities described in cl 263 <i>Fisheries Management (General) Regulation 2010</i>
205	Harming marine vegetation (seagrass, mangroves and kelp)	Gather, cut, pull up, destroy, poison, dig up, remove, injure or otherwise harm marine vegetation or any part of it. Activities described in cls 260-262 <i>Fisheries</i>

		<i>Management (General) Regulation 2010</i>
218-220	Obstructing free passage of fish, in waterways	Construction or alteration of a dam, floodgate, causeways or weir or otherwise creation of an obstruction

Avoiding impacts to fisheries resources

The subject site contains key fish habitat. Key fish habitats are defined within the policy and guidelines and are graded by 'type' on the basis of their sensitivity, or their importance to the survival of fish (refer to section 3.2 of the policy and guidelines for further information). The proposal should first aim to avoid impacts to fisheries resources, particularly key fish habitats. Where impacts to key fish habitats cannot be avoided, the preference is to impact less sensitive key fish habitats over more highly sensitive key fish habitats.

Offsetting unavoidable impacts to fisheries resources

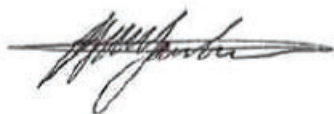
It is highlighted that in the DPI Fisheries P&G, SEPP Coastal Wetlands, saltmarsh and seagrass are considered TYPE 1 *Highly Sensitive Key Fish Habitat* while mangroves (when outside of mapped SEPP 14 Coastal Wetlands) are considered TYPE 2 *Moderately Sensitive Key Fish Habitat*. Section 3.3.3.2 of the DPI Fisheries P&G notes that DPI Fisheries enforces a 'no net loss' habitat policy as a condition of consent perhaps requiring proponents to conduct habitat rehabilitation and/or provide environmental compensation for all unavoidable impacts to marine vegetation.

Other information requirements

DPI Fisheries' standard minimum information requirements for environmental assessment are clearly detailed in section 3.3 of the DPI Fisheries P&G. Please ensure that the proponent addresses these requirements in their environmental studies. This will facilitate effective assessment of the proposal and reduce delays.

If you have any queries, please contact me on 02 6626 1375 or jonathan.yantsch@dpi.nsw.gov.au.

Yours sincerely



Jonathan Yantsch
Senior Fisheries Manager - Coastal Systems (North Coast)



6 March 2019

Mr Peter Challenger
Senior Consultant
Hydrosphere Consulting Pty Ltd
Suite 6, 26-54 River Street
(PO Box 7059)
Ballina NSW 2478

Sent via email: peter.challenger@hydrosphere.com.au

Dear Mr Challenger

TWEED HEADS TRAVEL LIFT PROPOSAL – STAKEHOLDER CONSULTATION

Thank you for your letter of 19 February 2019 requesting comment on the proposal for the conversion of the existing slipway to a marine travel lift within the Southern Boat Harbour, off Terranora Inlet, Tweed Heads NSW

RMS requests consideration is given to the following when preparing the REF:

1. Any works impacting on navigation during the construction phase must seek Roads and Maritime support 21 days prior to works commencing. A full scope of works including dates is to be provided to NavigationAdviceNorth@rms.nsw.gov.au.
2. The location (footprint) of the proposed facility may impact the navigable channel and create a navigational hazard to vessels.
3. Drawings supplied by Hydrosphere indicate the travel lift facility will extend midway across the navigable channel however RMS acknowledges this may be reduced when plans are finalised.
4. Depending on weather conditions, navigation may be problematic.
5. The Southern Boat Harbour is home to a marina which provides berthing for houseboat (up to 16 metres in length) hire operations and numerous other commercial and recreational vessels. In addition the harbour is home to a commercial fishing fleet (trawlers) with a draft up to 2.8 metres. In addition one of the charter vessels (Tweed River Princess) is approximately 22 metres in length.
6. In order to access the Southern Boat Harbour all vessels are required to transit the navigable channel where the proposed travel lift facility will be located.
7. RMS understands a hydrographic has been undertaken to assess remaining available water depth.
8. Dredging operations may be required to ensure a navigable channel is maintained.
9. When plans are finalised RMS request to be consulted to determine appropriate lighting of the structure.

Roads and Maritime Services requests consultation at the detailed design stage of the project to provide comment on the level of impact the proposed works will have on the safety of navigation.

For more information, please contact me on navigationadvicenorth@rms.nsw.gov.au or the Senior Boating Safety Officer, Wayne Langshaw on 0419 751 858.

Yours sincerely

Lynda Hourigan
Project Officer North
Operations and Compliance | Maritime



Our Ref: DOC19/154941
Your Ref: Letter dated 19/02/2019

Hydrosphere Consulting
PO Box 7059
Ballina NSW 2478

Attention: Mr Pater Challenger

Dear Mr Challenger

Re: Request for OEH Environmental Assessment Requirements – Conversion of the slipway at Southern Boat Harbour, near Terranora Inlet, Tweed Heads

Thank you for your letter dated 19 February 2019 seeking Environmental Assessment Requirements (EARs) from the Office of Environment and Heritage (OEH) for the preparation of a Review of Environmental Factors for the proposed conversion of the existing slipway to a marine travel lift at Southern Boat Harbour. I appreciate the opportunity to provide input.

We note that the project will be assessed in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Review of Environmental Factors (REF) EARs provided by the OEH are limited to Aboriginal cultural heritage, biodiversity, OEH estate, historic heritage, acid sulphate soils, flooding, stormwater and coastal erosion.

The proponent should ensure that the REF will be sufficiently comprehensive to enable unambiguous assessment of all direct and indirect impacts of the proposal.

The REF should include an assessment of the potential impacts on biodiversity, including threatened species, populations, ecological communities, or their habitats likely to occur on or near the subject site, as well as Aboriginal cultural heritage values and flooding. We consider that this information is necessary for a comprehensive REF for the proposal.

The full list of our requirements that may need to be addressed in the REF is provided in **Attachment 1**. In preparing the REF, the proponent should refer to the relevant guidance material listed in **Attachment 2**.

If you have any further questions about this issue, Ms Nicky Owner, Conservation Planning Officer, Regional Operations, OEH, can be contacted on 66598254 or at nicky.owner@environment.nsw.gov.au.

Yours sincerely

 28 March 2019

DIMITRI YOUNG
Senior Team Leader Planning, North East Branch
Regional Operations

Contact officer: Nicky Owner 6659 8254

Enclosures:

Attachment 1 OEH's Recommended Environmental Assessment Requirements (EARs)

Attachment 2 REF Guidance Material

Attachment 1

OEH's Recommended Environmental Assessment Requirements (EARs)

Review of Environmental Factors

Conversion of slipway at Southern Boat Harbour, Terranora Inlet, Tweed Heads

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A. The Proposal

The Review of Environmental Factors (REF) should clearly describe the proposal and identify its environmental objectives. These environmental objectives will guide decisions on environmental controls and management throughout the life of the proposal.

The objectives of the proposal should be clearly stated and refer to:

1. the size and type of the proposal and its operation;
2. all anticipated environment impacts, both direct and indirect, including level of vegetation / habitat clearing
3. the anticipated level of performance in meeting required environmental standards;
4. threatened species, populations, ecological communities and their habitats impacted upon;
5. the staging and timing of the proposal; and
6. the proposal's relationship to any other proposal.

The REF should fully identify all the processes and activities intended for the site and during the life of the proposal, including details of:

7. the location of the proposal and details of the surrounding environment;
8. the proposed layout of the site;
9. appropriate land use zoning;
10. ownership details of any residence and/or land likely to be affected by the proposal;
11. maps/diagrams showing the location of residences and properties likely to be affected and other industrial developments, conservation areas, wetlands, etc. in the locality that may be affected by the proposal;
12. all equipment proposed for use at the site;
13. chemicals, including fuel, used on the site and proposed methods for the transportation, storage, use and emergency management;
14. waste generation, storage and disposal;
15. a plan showing the distribution of any threatened flora or fauna species and the vegetation communities on or adjacent to the subject site, and the extent of vegetation proposed to be cleared should be provided; and
16. methods to mitigate any expected environmental impacts of the proposal.

B. Environmental Impacts of the Proposal

Impacts related to the following environmental issues need to be assessed, quantified and reported:

- Aboriginal cultural heritage
- Biodiversity
- OEH Estate (land reserved or acquired under the *National Parks and Wildlife Act 1974*)
- Historic heritage
- Acid Sulfate Soils
- Flooding, Stormwater and Coastal Erosion
- Cumulative Impacts

The REF should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned. A full list of guidelines is at **Attachment 2**.

C. Aboriginal Cultural Heritage

The REF should contain:

1. A description of the Aboriginal objects and declared Aboriginal places located within the area of the proposal.
2. A description of the cultural heritage values, including the significance of the Aboriginal objects and declared Aboriginal places, that exist across the whole area that will be affected by the proposal, and the significance of these values for the Aboriginal people who have a cultural association with the land.
3. A description of any consultation with Aboriginal people regarding the proposal and the significance of any Aboriginal cultural heritage values identified through that consultation. The OEH advises that the proponent may utilise the OEH's *Aboriginal Consultation Requirements for Proponents 2010* as best practice guidelines for such consultation (these OEH requirements for consultation must be followed if the proposal requires an Aboriginal Heritage Impact Permit or the Aboriginal heritage assessment requires archaeological testing).
4. The views of those Aboriginal people regarding the likely impact of the proposal on their cultural heritage. If any submissions have been received as a part of the consultation requirements, then the report must include a copy of each submission and your response.
5. A description of the actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the proposal, with reference to the cultural heritage values identified.
6. A description of any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places.
7. A description of any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm or, if this is not possible, to manage (minimise) harm.

In addressing these requirements, the proponent may refer to the following documents:

- a) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (OEH, 2010) - www.environment.nsw.gov.au/resources/cultureheritage/ddcop/10798ddcop.pdf. These guidelines identify a process that could be used to prepare Aboriginal cultural heritage assessments for activities assessed under Part 5 of the *Environmental Planning and Assessment Act 1979*.
- b) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (OEH, 2010) - www.environment.nsw.gov.au/licences/consultation.htm. This document further explains the consultation requirements that are set out in clause 80C of the National Parks and Wildlife Regulation 2009. The process set out in this document must be followed and documented in the REF if the proposal requires an Aboriginal Heritage Impact Permit or the Aboriginal heritage assessment requires archaeological testing.
- c) *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH, 2010) - www.environment.nsw.gov.au/licences/archinvestigations.htm. The process

described in this Code should be followed and documented where the assessment of Aboriginal cultural heritage requires a archaeological testing to be undertaken.

Notes:

- An Aboriginal Site Impact Recording Form (<http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm>) must be completed and submitted to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site that is harmed through archaeological investigations required or permitted through these environmental assessment requirements.
- Under section 89A of the *National Parks and Wildlife Act 1974*, it is an offence for a person not to notify OEH of the location of any Aboriginal object the person becomes aware of, not already recorded on the Aboriginal Heritage Information Management System (AHIMS). An AHIMS Site Recording Form should be completed and submitted to the AHIMS Registrar (<http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm>), for each Aboriginal site found during investigations.

D. Biodiversity

The REF should include a detailed biodiversity assessment, including assessment of impacts on threatened biodiversity, native vegetation and habitat. This assessment should address the matters below.

1. A field survey of the site should be conducted and documented in accordance with relevant guidelines, including:
 - a. the *Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna -Amphibians* (DECC, 2009)
<http://www.environment.nsw.gov.au/resources/threatenedspecies/09213amphibia ns.pdf>
 - b. *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft* (DEC, 2004),
<http://www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf>
 - c. Field survey methods and assessment information on the OEH website:
<http://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/about-threatened-species/surveys-and-assessments>

If a proposed survey methodology is likely to vary significantly from the above methods, the proponent should discuss the proposed methodology with the OEH prior to undertaking the REF, to determine whether the OEH considers that it is appropriate.

Recent (less than five years old) surveys and assessments may be used. However, previous surveys should not be used if they have:

- been undertaken in seasons, weather conditions or following extensive disturbance events when the subject species are unlikely to be detected or present, or
- utilised methodologies, survey sampling intensities, timeframes or baits that are not the most appropriate for detecting the target subject species, unless these differences can be clearly demonstrated to have had an insignificant impact upon the outcomes of the surveys.

If a previous survey is used, surveys for any additional entities listed under the *Biodiversity Conservation Act 2016* since the previous survey took place, must be undertaken and documented.

The list of potential threatened species, populations, ecological communities, or their habitats for the site should be determined in accordance with:

- the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft* (DEC, 2004), and
- The OEH Threatened Species website
<http://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species> ,and
- the *Bionet Atlas of NSW*
<http://www.environment.nsw.gov.au/wildlifeatlas/about.htm> , and
- the Vegetation Information System (BioNet Vegetation Classification)
<http://www.environment.nsw.gov.au/research/Visclassification.htm> , and

- Other data sources (e.g. PlantNET, Online Zoological Collections of Australian Museums (<http://www.ozcam.org/>), previous or nearby surveys etc.) may also be used to compile the list.
2. The REF should contain the following information as a minimum:
 - a. Description and geo-referenced mapping of the study area (and spatial data files), e.g. overlays on topographic maps, satellite images and /or aerial photos, including details of map datum, projection and zone, all survey locations, vegetation communities (including classification and methodology used to classify), key habitat features and reported locations of threatened species, populations and ecological communities present in the subject site and study area.
 - b. Description of survey methodologies used, including timing, location and weather conditions.
 - c. Details, including qualifications and experience of all staff undertaking the surveys, mapping and assessment of impacts.
 - d. Identification of national and state listed threatened biota known or likely to occur in the study area and their conservation status.
 - e. Description of the likely impacts of the proposal on biodiversity and wildlife corridors, including direct and indirect and construction and operation impacts. Wherever possible, quantify these impacts such as the amount of each vegetation community or species habitat to be cleared or impacted, or any fragmentation of a wildlife corridor.
 - f. Identification of the avoidance, mitigation and management measures that will be put in place as part of the proposal to avoid or minimise impacts, including details about alternative options considered and how long term management arrangements will be guaranteed.
 - g. Description of the residual impacts of the proposal. If the proposal cannot adequately avoid or mitigate impacts on biodiversity, then a biodiversity offset package is expected (see the requirements for this at point 4 below).
 3. An assessment of the direct and indirect impacts of the proposal on threatened biodiversity known or considered likely to occur in the study area, based on the presence of suitable habitat, must be undertaken in accordance with Part 7 of the *Biodiversity Conservation Act 2016* and the guidance provided by the *Threatened Species Assessment Guideline – The Assessment of Significance* (DECC, 2007) which is available at:
<http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf>
 4. The proposal must be designed to avoid and minimise impacts on biodiversity to the fullest extent possible and offset remaining direct and indirect biodiversity impacts. In determining an appropriate offset package, it is recommended that the REF should:
 - a. Accord with the 13 OEH offsetting principles available at <http://www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm>.
 - b. Use the Biodiversity Assessment Method to determine the type and quantum of offsets required to compensate for those remaining biodiversity impacts.
 - c. Identify the conservation mechanisms to be used to ensure the in-perpetuity protection and management of proposed offset sites.

- d. Include a specific Statement of Commitments for the proposed offset package which is informed by a., b. and c. above and by any consultation with OEH.

Note:

For the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*, the REF should identify any relevant Matters of National Environmental Significance and whether the proposal has been referred to the Commonwealth or already determined to be a controlled action.

E. OEH Estate

The REF should address the following with respect to land reserved under the *National Parks and Wildlife Act 1974*.

1. Where appropriate, likely impacts (both direct and indirect) on any adjoining and/or nearby OEH estate reserved under the *National Parks and Wildlife Act 1974* should be considered. Refer to the *Guidelines for developments adjoining land managed by the Office of Environment and Heritage* (OEH, 2013). The guideline is available at:

<http://www.environment.nsw.gov.au/resources/protectedareas/development-land-adjoining-130122.pdf>

2. The OEH has clear guidelines for assessing the environmental impact of developments and activities proposed within OEH managed lands. These include guidelines for the preparation of an REF for activities proposed on land reserved under the *National Parks and Wildlife Act 1974*, including national parks and nature reserves. The *Guidelines for preparing a Review of Environmental Factors* provides information on how to determine whether certain activities are permissible, as well as specific information on matters for consideration during the preparation of an REF. The guidelines can be found at

<http://www.environment.nsw.gov.au/research-and-publications/publications-search/guidelines-for-preparing-a-review-of-environmental-factors>

3. For those proposals within OEH managed areas that seek a lease or licence under Section 151 of the *National Parks and Wildlife Act 1974*, in addition to an REF, applications must also be accompanied by a sustainability assessment. The assessment must address the criteria adopted by the Chief Executive of the OEH. Templates for completing a Sustainability Assessment can be found at:

<http://www.environment.nsw.gov.au/protectedareas/sustainabilityassessments.htm>

Note: Proposals which may impact marine protected areas should be referred to the Department of Primary Industries to determine the assessment and approval requirements.

F. Historic Heritage

The REF should address the following:

1. The heritage significance of the site and any impacts the proposal may have upon this significance should be assessed. This assessment should include natural areas and places of Aboriginal, historic or archaeological significance. It should also include a consideration of wider heritage impacts in the area surrounding the site.
2. The Heritage Council maintains the State Heritage Inventory which lists some items protected under the *Heritage Act 1977* and other statutory instruments. This register can be accessed through the OEH Heritage webpage (<http://www.environment.nsw.gov.au/topics/heritage>). In addition, lists maintained by the National Trust, any heritage listed under the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* and the local council should be consulted to identify any known items of heritage significance in the area affected by the proposal. These lists are constantly evolving and items with potential heritage significance may not yet be listed
3. Non-Aboriginal heritage items within the area affected by the proposal should be identified by field survey. This should include any buildings, works, relics (including relics underwater), gardens, landscapes, views, trees or places of non-Aboriginal heritage significance. A statement of significance and an assessment of the impact of the proposal on the heritage significance of these items should be undertaken. Any policies/measures to conserve their heritage significance should be identified. This assessment should be undertaken in accordance with the guidelines in the NSW Heritage Manual. The field survey and assessment should be undertaken by a qualified practitioner/consultant with historic sites experience.

The Manager, OEH Heritage Division Conservation Team, can be contacted on telephone (02) 9873 8599 for a list of suitable consultants.

G. Acid Sulfate Soils

The REF should address the following:

1. The potential impacts of the proposal on acid sulfate soils must be assessed in accordance with the relevant guidelines in the *Acid Sulphate Soils Manual* (Stone et al. 1998) and the *Acid Sulphate Soils Laboratory Methods Guidelines* (Ahern et al. 2004).
2. Describe mitigation and management options that will be used to prevent, control, abate or minimise potential impacts from the disturbance of acid sulfate soils associated with the proposal, and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

H. Flooding, Stormwater and Coastal Erosion

The REF should include an assessment of the following referring to the relevant guidelines in Attachment 2:

1. The potential effect of coastal processes and coastal hazards including potential impacts of sea level rise:
 - a. on the proposal; and
 - b. arising from the proposal.
2. Whether the proposal is consistent with any coastal zone management plans.
3. Whether the proposal is consistent with any floodplain risk management plans.
4. Whether the proposal is compatible with the flood hazard of the land.
5. Whether the proposal will significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties.
6. Whether the proposal will significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
7. Whether the proposal incorporates appropriate measures to manage risk to life from flood.
8. Whether the proposal is likely to result in unsustainable social and economic costs to the community as a consequence of flooding.
9. The implications of flooding over the full range of potential flooding, including the probable maximum flood, should be considered as set out in the NSW Government Floodplain Development Manual. This should include the provision of:
 - a. Full details of the flood assessment and modelling undertaken in determining any design flood levels (if applicable), including the 1 in 100 year flood levels.
 - b. A sensitivity assessment of the potential impacts of an increase in rainfall intensity and runoff (10%, 20% and 30%) and sea level rise on the flood behaviour for the 1 in 100 year design flood if applicable.
10. All site drainage, stormwater quality devices and erosion / sedimentation control measures should be identified and the onsite treatment of stormwater and effluent runoff and predicted stormwater discharge quality from the proposal should be detailed.

I. Cumulative Impacts

The REF should include an assessment of the following:

1. The cumulative impacts, including both construction and operational impacts, from all clearing activities and operations, associated edge effects and other indirect impacts on cultural heritage, biodiversity and OEH Estate in accordance with the *Environmental Planning and Assessment Act 1979*.
2. The cumulative impacts, including both construction and operational impacts, of the proponent's existing and proposed development and associated infrastructure (such as access tracks etc.) as well as the cumulative impact of the development in the context of other developments located in the vicinity.

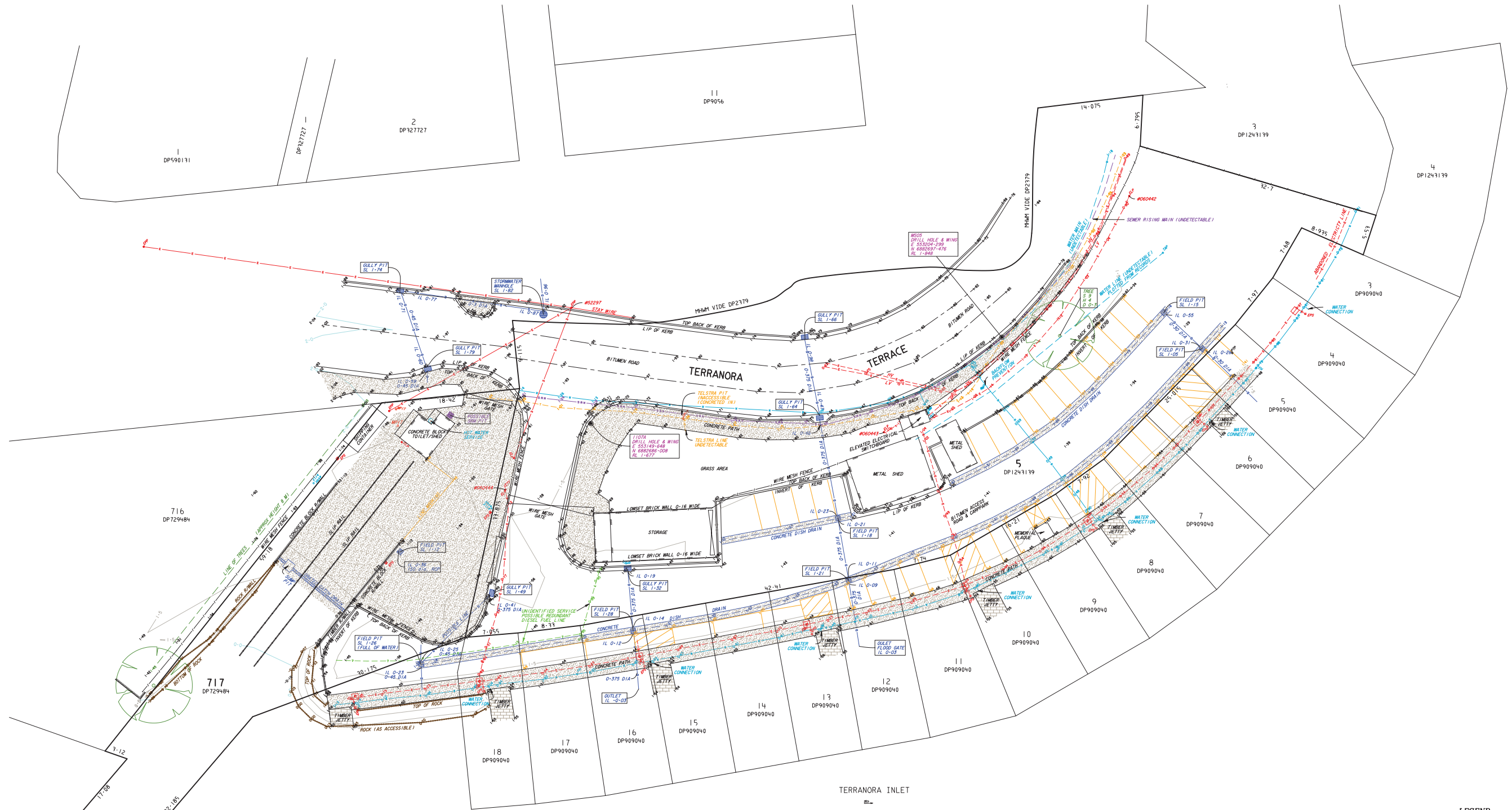
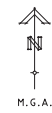
Appendix E

Site Survey

COORDINATE BASE NOTES:
 A MGA (1000M) COORDINATE WAS CALCULATED FOR STATION 11074 FROM PNA2018 & PNA2019. SEE MGA COORDINATE SCHEDULE BELOW.
 B MGA (1000M) GROUND BASED COORDINATE SYSTEM WAS ADOPTED USING STATION 11074 AS THE ORIGIN.

WYS	Height	Class	Order	MGA Easting	MGA Northing	Class	Order	CSF
PM 42316	4.50	LB	-	553071746	6862112-837	B	2	0-999629
PM 42329	3.00	LB	-	553075-681	6862112-837	B	2	0-999629

DATE: 1/03/2021



LEGEND

- ... COMMUNICATIONS PIT
- ... STOP VALVE
- ... WATER TAP
- ... FIRE HYDRANT
- ... ELECTRICITY LIGHT POLE
- ... ELECTRICITY POLE
- ... ELECTRICITY PILLAR
- ... ELECTRICITY MANHOLE
- ... ELECTRICITY POWER SOURCE
- ... STORMWATER LINE
- ... OVERHEAD ELECTRICITY LINES
- ... UNDERGROUND ELECTRICITY LINES
- ... SECURITY CAMERAS
- ... UNIDENTIFIED PIT
- ... MONITORING WELL

- ... ELECTRICITY SERVICE CONDUIT (POSITION & DEPTH) BY OTHERS USING ELECTRONIC SERVICE LOCATION METHODS
- ... WATER LINE (POSITION & DEPTH) BY OTHERS USING ELECTRONIC SERVICE LOCATION METHODS
- ... TELSTRA SERVICE CONDUIT (POSITION & DEPTH) BY OTHERS USING ELECTRONIC SERVICE LOCATION METHODS
- ... SEWER RISING MAIN (POSITION & DEPTH) BY OTHERS USING ELECTRONIC SERVICE LOCATION METHODS



<p>Important Notes: (THIS NOTE IS AN INTEGRAL PART OF THIS PLAN) DATE OF SURVEY: 23 & 24/02, 1/03 & 9/7/21 CONTOUR INTERVAL - 0.5m LEVEL DATUM: VSE PM 42329 RL 3.001 AHD CONTOURS ARE DERIVED FROM FIELD OBSERVATIONS AND ARE ACCURATE TO WITHIN HALF THE CONTOUR INTERVAL ONLY VISIBLE SURFACE FEATURES OF UNDERGROUND SERVICES HAVE BEEN SHOWN TO THE SITE NO REPORT IS MADE ON ANY UNDERGROUND SERVICES OR OF ADJACENT TO THE SITE PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON THE SITE, THE RELEVANT AUTHORITIES SHOULD BE CONTACTED FOR THE POSSIBLE LOCATION OF FURTHER UNDERGROUND SERVICES AND DETAILED LOCATION OF ALL SERVICES. THE TITLE BOUNDARIES AS SHOWN HEREON WERE NOT MARKED AT THE TIME OF SURVEY AND HAVE BEEN DETERMINED BY PLAN DIMENSIONS ONLY & NOT BY FIELD SURVEY.</p>		<p>LEVEL & DETAIL SURVEY LOT 717 IN DP729484 & LOT 5 IN DP1243139 TERRANORA TERRACE TWEED HEADS</p>		<p>B & P SURVEYS CONSULTING SURVEYORS 30 Berry Street Tweed Heads NSW 2485, Australia Telephone: (07) 5536 3611 Email: enq@bpcsurveys.com.au Website: www.bpcsurveys.com.au</p>	
<p>Client: TRANSPORT FOR NSW</p>		<p>Parish of TERRANORA County of ROUS T:\16800\16835\Topo\210223\24151B-B.pro</p>		<p>Office: Ales A1 Date: 1.03.2021 Drawing No./Rev: 24151 B</p>	
<p>Scale: 1 : 200@A0 Level Datum: AHD Unit: L/L Size: 296 x 296</p>		<p>Sheet: 1 of 1</p>		<p>Rev. No.: 1</p>	