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# Addendum to Review of Environmental Factors

## Amendments to Existing Recycled Water Treatment Plant, Catherine Hill Bay

**Property:** Lot 1120 DP1219395

For: Coastal Hamlets Pty Ltd

> Date: November 2019



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## **Document Control Sheet**

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#### Limitations Statement

This report has been prepared in accordance with and for the purposes outlined in the scope of services agreed between ADW Johnson Pty Ltd and the Client. It has been prepared based on the information supplied by the Client, as well as investigation undertaken by ADW Johnson and the sub-consultants engaged by the Client for the project.

Unless otherwise specified in this report, information and advice received from external parties during the course of this project was not independently verified. However, any such information was, in our opinion, deemed to be current and relevant prior to its use. Whilst all reasonable skill, diligence and care have been taken to provide accurate information and appropriate recommendations, it is not warranted or guaranteed and no responsibility or liability for any information, opinion or commentary contained herein or for any consequences of its use will be accepted by ADW Johnson or by any person involved in the preparation of this assessment and report.

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## **Executive Summary**

Coastal Hamlets Pty Ltd have commissioned ADW Johnson ("ADWJ") to undertake this Addendum Review of Environmental Factors ("REF") to investigate any potential environmental impacts associated with the modifications to the existing approved recycled water treatment plant ("RWTP") located at the Beaches subdivision in Catherine Hill Bay. This report should be read in conjunction with the original REF prepared for the RWTP.

The Beaches subdivision was approved by the New South Wales Planning Assessment Commission (PAC) under Project Approval MP10\_0204 on 13<sup>th</sup> May 2011. The approval (as modified on 6<sup>th</sup> April 2018) included 540 residential lots; a retail lot; and seven (7) public reserves to be delivered over seven (7) stages. To date, Stages 1, 2, 4 and 5 have been delivered, with Stages 3, 6 and 7 remaining.

The current RWTP is located over Lot 1120 DP 1219395, and is approved to provide drinking water, sewerage and recycled water services to a maximum of 470 lots within the Beaches development. Whilst the current RWTP has the treatment capacity for the full development (approx. 550 lots), it has restricted ability to use/dispose of the surplus recycled water. The subject modification is therefore required to increase the recycled water disposal capacity in order to service the remaining 80 lots.

The recycled water generated by the RWTP is used within households for toilet flushing; landscaping and laundry. As a general rule, 75% of the recycled water generated by the RWTP is used during summer; and 20% is used during winter. The remaining water is classified as surplus recycled water (SRW) and under the existing Water Industry Competition Act (WICA) Licence, is approved to be temporarily irrigated over Stages 6 and 7 of the Beaches development.

A number of different options were explored to modify the RWTP to accommodate the remaining lots. One of these was to dispose of the SRW to adjoining waters, however following consultation with various government bodies, this was deemed to be unacceptable. Under the original REF, an offsite discharge system was always contemplated and was referred to as Stage 3 of the scheme.

Since this time, negotiations have occurred with Central Coast Council (CCC) who have agreed to receive the SRW to their Gwandalan Sewage Treatment Plant (STP). To facilitate this, approximately 8km length of surplus recycled water transfer main (SRWTM) would be constructed from the RWTP to the Gwandalan Sewerage Treatment Plant. 3.3kms of this has been assessed under a Development Application (DA) with CCC and 4.6kms has been assessed under a REF with National Parks and Wildlife Services (NPWS).

The remaining aspects of the modified RWTP are relatively minor and are the subject of this Addendum REF (detailed in full within **Section 3** of this report). The key modifications proposed include the ability to remove the reverse osmosis (RO) ponds and the irrigation area over Stages 6 and 7. In this regard, removal of the RO reject ponds would have particular environmental benefits through the removal of a concentrated saline water body adjacent to sensitive downstream wetlands which eliminates a potential hazard in this regard. Similarly, the removal of the irrigation area also avoids an environmental hazard and hence reduces risks associated with this process.



As the existing and proposed amended infrastructure is owned and operated by Catherine Hill Bay Water Utility Pty Ltd (CHBWU) under a WICA licence, the subject modifications represent "development permitted without consent" pursuant to Clause 106 of State Environmental Planning Policy (Infrastructure) 2007. In accordance with Sections 5.5 and 5.7 of the Environmental Planning Assessment Act 1979 ("EP&A Act"), CHBWU, is required to fully consider the potential impacts of the proposed amended infrastructure. This Addendum REF has been prepared to fulfill this requirement.

Having assessed the full suite of environmental issues that may be impacted by the infrastructure, key environmental risks are generally construction based impacts such as noise and dust creation, soil and water degradation. With regards to the operation of the RWTP, a significant environmental benefit has been created through the ability to remove the RO reject ponds and irrigation area.

Throughout the assessment, where potential environmental impacts have been identified, mitigation measures have been developed to minimise or remove the extent of impact.

As this Addendum REF has been prepared at the detailed design stage, mitigation measures have been identified for implementation during both the construction and operational stage. These mitigation measures would be further detailed within various management plans. Methods for implementing and monitoring these measures would be included in these plans.

Subject to the implementation of identified mitigation measures, it is considered that the construction and operation of the proposed amended infrastructure works are unlikely to significantly impact on the environment. With this in mind, an Environmental Impact Statement ("EIS") is not required and this Addendum REF is an adequate level of impact assessment for the proposed RWTP modifications.



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## 1.0 Introduction

## 1.1 PURPOSE OF THE REPORT

This Addendum REF has been prepared by ADW Johnson for Coastal Hamlets Pty Ltd on behalf of CHBWU, to act as a supporting document to the original REF. For the purposes of this report, CHBWU is the proponent and the Minister administering the Independent Pricing and Regulatory Tribunal (IPART) is the determining authority under Part 5 of the EP&A Act.

The purpose of the Addendum REF is to describe the proposed modifications to the RWTP, to document the likely impacts of the proposal on the environment, and to detail protective measures to be implemented. In this regard, this report is only scoping the minor adjustments to the site required from removal of the RO ponds.

The description of the proposed works and associated environmental impacts have been undertaken in context of Clause 228 of the EP&A Regs, the Biodiversity Conservation Act 2016 (BC Act), the Fisheries Management Act 1994 (FM Act), and the Australian Government's Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). In doing so, the Addendum and original REF helps to fulfil the requirements of Section 5.5 of the EP&A Act to ensure that the Minister administering IPART examines and takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the Addendum REF will consider:

- Whether the amended RWTP is likely to have a significant impact on the environment and therefore necessitate an EIS to be prepared and approval to be sought from the Minister for Planning and Public Spaces under Part 5 of the EP&A Act;
- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, in Section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement ("SIS"); and
- The potential for the amended RWTP to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of Sustainability, Environment, Water, Population and Communities for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

The overall objective of this report is to provide the determining authority (Minister administering the Independent Pricing and Regulatory Tribunal - IPART) with information to the fullest extent possible of all matters affecting or likely to affect the environment through the construction of the amended RWTP to allow for the disposal of SRW to Gwandalan STP.

The Addendum REF should be read in conjunction with the original REF as the following sections provide an assessment with regards to the modified aspects of the RWTP only. A copy of the original REF (minus appendices) can be found within **Appendix 7**. A complete copy of the REF including all appendices has been provided separately as part of the application.



#### 1.2 **PROPOSAL IDENTIFICATION**

The NSW PAC approved a seven (7) stage 550 residential lot subdivision at Catherine Hill Bay in 2010 (known as "the Beaches" and since modified). In March 2016, CHBWU was granted a licence under the Water Industry Competition Act 2016 (WICA Act) to provide a wastewater service to 470 lots within this development (refer to Appendix 2).

The WICA licence approval was for a RWTP which included use of treated recycled water by residents and irrigation of SRW over Stages 6 and 7 of the Beaches development. In order to facilitate the removal of the irrigation area, the subject proposal would connect the RWTP to Gwandalan via an approximately 8km length of SRWTM (approved separately) to receive the SRW.

The following Addendum REF will detail the works required to alter the RWTP to dispose the SRW into Gwandalan STP. It will then explore all potential environmental impacts and necessary safeguards as a consequence of these works.

The major elements of the amended RWTP infrastructure works include:

- Remove existing RO ponds through bulk earthworks and stabilise the area. Swale drain included to ensure site falls to the street drainage network;
- Installation of an isolation value to connect RWTP to SRWTM through existing 125m main; and
- A 15m length of transfer main connecting the existing main in Montefiore Parkway to the SRWTM assessed under the NPWS REF.

Plans detailing the above works are provided within **Appendix 1** and a plan detailing the existing area of operation compared to the proposed extension to Gwandalan is provided within **Appendix 9**.



## 2.0 Site & Surrounds

## 2.1 **PROPERTY DESCRIPTION**

#### 2.1.1 RWTP Allotment

The RWTP site as approved was located within the western extent of Lot 101 DP 1129872. Since the WICA licence was granted, the Beaches subdivision has proceeded, with new lots created, and as such, the RWTP site is now located on Lot 1120 DP 1219395 (see **Figure 1**).

Lot 1120 DP 1219395 is made up of two (2) part lots, the northern portion contains the majority of the RWTP infrastructure and the southern portion is approved to contain the RO reject ponds.



Figure 1: RWTP Site

#### 2.1.2 Irrigation Area & Location

The SRW irrigation area as approved was located on Lot 106 DP 1129872 and Lot 100 DP 1129872, occupying land identified as Stages 6 and 7 of the Beaches development. Since the WICA licence was granted, the Beaches subdivision has proceeded with new lots created and as such, the irrigation site is now approved to be located on Lot 1116 DP 1219395 (see **Figure 2**).





Figure 2: SRW Irrigation Site (Stages 6 & 7 of Beaches Development)

## 2.1.3 Transfer Main Connection

A 15m length of transfer main and air valve is proposed to connect the existing main in Montefiore Parkway to the SRWTM assessed under the NPWS REF (see **Figure 3**). These works will occur within the Montefiore Parkway Road Reserve which is under the care and control of Lake Macquarie City Council (LMCC).



Figure 3: Transfer Main Connection



### 2.2 LOCATION & CONTEXT

The location and context of the proposed RWTP amendments remains as addressed under the original REF.

#### 2.3 EXISTING APPROVALS

#### 2.3.1 WICA Licence

In March 2016, CHBWU was granted a licence under the WICA Act (refer to **Appendix 2**). This WICA licence provides for the establishment and operation of a utility for water supply, sewage treatment and water recycling, for the Beaches subdivision.

The REF for the WICA licence proposed RO to reduce the total dissolved solids (TDS) of the recycled water to an appropriate level for household use. It also proposed that Stages 6 and 7 (residentially zoned land) to act as an irrigation area for disposal of SRW.

The subject Addendum REF has been prepared to assess the modifications required to the RWTP to remove the need for RO and the irrigation area by disposing SRW directly to Gwandalan STP.

#### 2.3.2 Project Approval MP10\_0204

The Beaches subdivision was approved by the New South Wales Planning Assessment Commission (PAC) under Project Approval MP10\_0204 on 13<sup>th</sup> May 2011. Since the WICA licence was granted, the approval has been modified multiple times. The most recent modification approval was dated 8<sup>th</sup> April 2018 and included 540 residential lots; a retail lot; and seven (7) public reserves, to be delivered over seven (7) stages. A copy of the latest approval and approved plan is provided within **Appendix 4**.

To date, approximately 400 lots have been constructed, and the majority of the Beaches development footprint has been cleared.

#### 2.3.3 EPBC Act Approval

The proposed RWTP modifications have no impact on the existing EPBC Act Approval as addressed under the original REF.

## 2.4 EXISTING IMPROVEMENTS

#### 2.4.1 Recycled Water Treatment Plant

Since the issue of the WICA licence, the RWTP site including bulk earthworks for the RO reject ponds have been constructed and 190 houses connected.

Existing sewer mains have been constructed to accommodate the approved stages, including a 125 HDPE irrigation main along Montefiore Parkway ("existing mains").



**Figure 4** details the location of the current RWTP as well as the current approved SRW disposal area (being Stages 6 and 7 of the Beaches development). It is noted that the irrigation area has not been used since the issue of the WICA licence due to unforeseen delays in bulk earthwork in the area of Stages 6 and 7 that were required to be completed before irrigation could commence.



Figure 4: Key Infrastructure within the Beaches Development

Figure 5 below details the current key infrastructure within the RWTP which includes:

- RWTP Building;
- 1 x 1ML recycled water tanks;
- 2 x 1ML MBR permeate tank;
- 1 x 1ML potable water tank; and
- 2 x RO Reject Evaporation Ponds (Note: Only bulk earthworks have been undertaken in this regard).





Figure 5: Key Infrastructure within the RWTP

## 2.4.2 Surplus Recycled Water Transfer Mains

To connect the RWTP to Gwandalan STP, a 7,925m length of SRWTM has also been proposed (not yet constructed) to transport SRW from the RWTP to Gwandalan STP. These are assessed separately to the subject Addendum REF (discussed below). A

15m length of transfer main is proposed under this Addendum REF to connect the existing main to the 7,925m length of SRWTM (see **Figure 6**).

The following sections provide further details on two (2) approval processes for the proposed SRWTMs.





Figure 6: Existing/Separately Proposed Infrastructure

## 2.4.2.1 Central Coast Council SRWTM

As discussed previously, 3.3km of the SRWTM has been assessed under a DA (DA Reference: 1385/2018) with CCC as this portion runs along CCC controlled road reserves and within the CCC owned Gwandalan STP. Approval from CCC is imminent and the mitigation measures included within **Section 9** require compliance with this consent once received.

## 2.4.2.2 National Parks & Wildlife Services SRWTM

As discussed previously, 4.6kms of the SRWTM has been assessed under a REF with NPWS, as this section runs through NPWS controlled lands. Approval from NPWS is imminent and the mitigation measures included within **Section 9** require compliance with this approval once received.

## 2.5 ROADS AND ACCESS

Since the issue of the WICA licence, access to the site has been constructed from the Pacific Highway via Montefiore Street, to Rockpool Road (see **Figure 7**). An internal driveway has been constructed adjacent to the RO reject ponds to access the northern portion Lot 1120 DP 1219395.





Figure 7: Existing Access to RWTP site

#### 2.6 STATUTORY ZONING

The zoning of the proposed RWTP amendments remains as addressed under the original REF (SP2 Infrastructure).

#### 2.7 ENVIRONMENTAL CONSIDERATIONS

#### 2.7.1 Topography

The topography of the proposed RWTP amendments remains as addressed under the original REF.

#### 2.7.2 Bushfire Prone Land

The bushfire characteristics of the proposed RWTP amendments remains as addressed under the original REF.

#### 2.7.3 Flooding

The flooding characteristics of the proposed RWTP amendments remains as addressed under the original REF.

#### 2.7.4 Sensitive Receivers (Noise & Odour)

Since the issue of the WICA licence, dwellings have been constructed within the Beaches development, with the nearest being 20m from the boundary of the RO reject ponds (see **Figure 8**). This is relevant only for construction purposes, as operational noise and odour impacts have been previously assessed and through their removal will only be reduced in impact.





Figure 8: Location of Sensitive Receivers

## 2.7.5 Heritage Items

Whilst portions of the RWTP and ancillary infrastructure were located within the bounds of the Catherine Hill Bay Cultural Heritage Precinct under the original REF, none of the modified element as assessed under this Addendum REF are.

## 2.7.6 Biodiversity

The biodiversity characteristics of the proposed RWTP amendments remains as addressed under the original REF. Since this time however, vegetation across the site has been removed.





## 3.0 Description of the Proposal

## 3.1 GENERAL SUMMARY

#### 3.1.1 Original Proposal

The general summary provided within original REF continues to be relevant for the proposed RWTP amendments with the exception of Stage 3 which is now the subject of the Addendum REF.

The key aspects of the RWTP as described within the original REF included:

## Stage 1

- Recycled Water Treatment Plant Building and Office;
- Membrane Bioreactor and Associated Process Tanks;
- 2 X 1ML Wet Weather Storage tanks (now referred to as Permeate tanks);
- 1ML Recycled Water tank;
- 1ML Potable Water Storage tank;
- Permanent fence around perimeter with gate;
- All site hardstand including access and manoeuvring areas;
- Install all service ducting to accommodate final Stage 2 fitout;
- Install Stage 1 services; and
- Progressive installation of 4.5ha of irrigation area including vegetated buffers and perimeter fencing.

During Stage 1, only potable water was used to supply the non-potable water reticulation system until the Advanced Water Treatment Plant was constructed in Stage 2.

Stage 1 provided the full 550ET treatment capacity required by the Beaches subdivision, however only a maximum of 112ET would be connected.

## Stage 2

- Install Advanced Water Treatment Plant and associated process tanks;
- Reverse Osmosis Reject Evaporation Ponds;
- Install Stage 2 services; and
- Progressive installation of 4.0ha of irrigation area including vegetated buffers and perimeter fencing.

Stage 2 would be constructed once 112 lots within the subdivision were connected to the system and would service a maximum of 550ET.

## Stage 3

Stage 3 represents the ultimate scenario to service the full 550ET within approved Beaches development. Stage 3 required a form of offsite SRW discharge which was not assessed under the original REF and as such is the subject of this Addendum REF.





#### 3.1.2 Current RWTP Operations

All lots in the Beaches development are currently, and would continue to be, serviced by a pressure sewer collection system. The pressure sewer units (PSU) are owned by CHBWU and service up to four (4) lots. All PSU include duty/standby grinder pumps which macerate the sanitary wastewater and pump it directly into the pressure sewer network. The pressure sewer network then discharges to the RWTP.

All wastewater is treated at the RWTP via a membrane bioreactor (MBR) and is a modified activated sludge process with a number of treatment zones including primary treatment, inlet tank, anaerobic tank, anoxic tank, aeration tank and submerged membrane tank.

The MBR permeate is then treated further at the Advanced Water Treatment Plant (AWTP) which produces recycled water for supply to residents within the Beaches development.

Full details with regards to the current operations are provided within the WICA management plans including the Infrastructure Operating Plan (IOP), Sewage Management Plan (SMP) and Recycled Water Quality Management Plans (RWQMP). The current operations have been externally audited and approved for Commercial Operation under WIC Act as well as being externally audited and certified to ISO14001 and ISO9001.

The level of use of recycled water varies and as such, SRW is produced. At present, as only 190 households are connected, the SRW is transported offsite to an approved facility.

#### 3.1.3 Proposed RWTP Operations

Under the proposed RWTP operation, SRW would accumulate in the MBR Permeate Tank and then be transferred to Gwandalan STP via an onsite surplus recycled water pump and the SRWTM discussed above within **Section 2.4**. This is the same as the existing scenario, however the pump will pump to Gwandalan as opposed to the irrigation area.

A key change to the treatment process is the removal of RO capacity. RO extracts salts but produces a high salinity wastewater (RO reject). It was originally proposed for salinity control in the recycled water network, however is no longer necessary.

As discussed above, whilst the RO reject ponds were approved, only bulk earthworks were undertaken to create the pond. As part of this assessment, the proposal will include bulk earthworks to integrate these ponds back into the Beaches subdivision (refer to **Appendix 1**). Future use of this area would be subject to a separate approval process.

Removal of the RO enhances the sustainability of the plant and removes an environmental hazard by removing a high energy demand and high chemical consumption process as well as avoiding RO membrane and component waste. Removing this process also removes a concentrated saline water source in an area adjoining, and draining to conservation lands.

To ensure the recycled water used within households continues to have an appropriate TSD following the removal of RO, a Salinity Risk Assessment has been prepared which





concludes that increasing TDS from 600ppm to 750ppm will present low risk to residents (refer to **Appendix 6**). This is discussed in greater detail within **Section 7.13**.

Overall, the proposed amended RWTP treatment process represents a significant reduction in risk for the scheme when considering as a whole, given the benefits and reduced risk of the avoiding the hazard of the ponds as discussed above.

## 3.2 PLANT LAYOUT

The proposed layout of the plant for Stage 3 is shown in Figure 9.



Figure 9: Stage 3 Plant Layout

Plans of the amended RWTP and connection sewer main, as well as an amended process flow diagram and are included in **Appendix 1**.

#### 3.2.1 Construction

## **Existing Situation**

The current RWTP operations were constructed as detailed within the original REF for Stages 1 and 2 with the following exceptions:

- The irrigation system was not constructed due to delays in the bulk earthworks for Stages 6 and 7. This resulted in the need to temporarily truck SRW offsite;
- The RO unit was never installed as the quality of the recycled water following treatment met TDS standards appropriate for household use;
- The high density polyethylene lining within the RO reject ponds was not installed as RO was never employed; and
- Only bulk earthworks for the ponds were undertaken however the RO was not installed.

Further to the above, the two (2) wet weather storage balance tanks (now referred to as "permeate tanks") have been constructed as shown within Figure 5 and as such are





not subject to this REF.

Under the current IPART approval these are identified as wet weather irrigation storage, sized using the NSW EPA Effluent irrigation guideline. Full details with regards to this system are provided within the Original REF located within **Appendix 7** and with full appendices provided as part of the application. Under the new proposal these will be storage tanks to buffer out recycled water supply and demand and also for flow balancing and emergency storage in the surplus recycled water transfer system to Gwandalan.

## **Proposed Construction**

To facilitate the proposed RWTP operations, Stage 3 now requires the following physical works:

- Remove existing RO ponds through bulk earthworks and stabilise the area. Swale drain included to ensure site falls to the street drainage network;
- Installation of an isolation value to connect RWTP to SRWTM through existing 125mm main; and
- A 15m length of transfer main and associated air valve connecting the existing main in Montefiore Parkway to the SRWTM assessed under the NPWS REF.

Further to the above, the existing pump which was proposed to pump recycled water to Stages 6 and 7 of the Beaches development will now be used to pump recycled water to the Gwandalan WWTP. The suitability of the existing pump for this purpose is discussed in detail within the Designers Report.

## Bulk Earthworks

The main aspects of the proposed construction involve the filling of the RO ponds through bulk earthworks. These works include:

- The ponds currently have dimensions of approximately 50m(I) x 40m(w) x 3m(h). To fill this would involve the importing of 12,000 cubic metres of clean fill sourced from the existing adjoining development.
- The fill would be sourced from within Stages 3, 6 & 7 of the Beaches development which are yet to be constructed. This would involve construction movements within the development site only.
- Filling of the ponds would be expected to take approximately 4-5 weeks.

## 3.3 IRRIGATION

Since the issue of the WICA licence, CCC have confirm that SRW can now be transported to the Gwandalan STP and as such, irrigation over Stages 6 and 7 is no longer required. It is also noted, that irrigation for Stages 1 and 2 of the RWTP did not occur as SRW was tankered offsite.

## 3.4 OPERATIONAL DETAIL

#### 3.4.1 Plant Operation & Equipment

The plant operation and equipment would remain as assessed under the original REF with the following exceptions:

• The removal of the 8.5ha of irrigation land and replacement with transportation of





SRW to Gwandalan STP;

- Conversion of surplus recycled water irrigation pump and pipeline to a surplus recycled water transfer pump and pipeline; and
- Removal of RO.

#### 3.4.2 Work Force & Operation Times

The work force and operation times would remain as assessed under the original REF.

#### 3.4.3 Waste Management

The waste management procedures would remain as assessed under the original REF with the exception of the following improvements:

#### Reverse Osmosis Reject

The proposed modifications would remove the RO unit and RO reject ponds from the RWTP and subsequently remove the need to manage RO reject waste; RO chemicals; RO waste chemical container; RO membrane replacement; and reduced greenhouse gas waste from reduced energy consumption.

#### Irrigation Area Green Waste

As the proposed modifications to the RWTP remove the irrigation area, management of green waste from this land is no longer required.

#### General

Overall, reduction in environment impacts and risks through the removal of significant environment hazards from the above.

#### 3.4.4 Air Quality

#### Odour

The odours generated by the proposed RWTP would improve as a result of removing two (2) potential odour sources being the RO reject ponds and irrigation system.

#### Dust

The dust generated from the proposed RWTP amendments would remain as addressed under the original REF with the exception of any improvements as a result of removing the construction of the irrigation area and through stabilising the areas under the ponds to avoid dust.

#### 3.4.5 Stormwater Quality

The stormwater system for the entire Beaches development (including the subject site) was approved under Project Approval MP10\_0204. As part of this, the RWTP site was connected to the existing street stormwater system as part of Stage 5. No changes to this arrangement are proposed under the subject amendments.

The RO ponds, once filled, will also be captured by the existing street drainage network in Stage 5. It is proposed to install a turf lined swale to ensure stormwater is directed away from adjoining properties. The turf lined swale will act as a treatment measure for





this area, it will connect to the existing Stage 5 stormwater network which is further treated by a gross pollutant trap and a bioretention basin. These treatment measures have been approved under Project Approval MP10\_0204.

As no additional impervious surfaces are proposed as a result of filling in the ponds, and as stormwater continues to be directed to the street as approved, no modification to the approved Stormwater Management Plan is required from Council.

A copy of the approved stormwater plans for the RWTP site and RO ponds as well as the street network system are provided within **Appendix 10**.

#### 3.4.6 Noise and Vibrations

The noise and vibration generated by the proposed RWTP amendments would remain as addressed under the original REF with the exception of improvements as a result of removing the construction and operation of the irrigation area and use of RO ponds. Construction required as described under Section 3.2.1 will require management in accordance with the existing Construction and Environment Management Plan (CEMP) prepared by Planit Consulting. A copy of the CEMP is provided within **Appendix 8**. This will require updating to refer to the works described within Section 3.2.1.

#### 3.4.7 Traffic and Transport

The traffic generated by the proposed RWTP amendments would remain as addressed under the original REF with the exception of the following improvements:

- Reduced construction traffic as a result of removing the construction of the irrigation area;
- Reduced operational traffic from the removal of offsite tankering of RO reject waste and SRW;
- Removes need for RO construction vehicles;
- Removes need for RO pond pump out trucks;
- Removes need for RO chemical delivery trucks;
- Removes need for irrigation area landscape maintenance vehicles;
- Removes need for irrigation construction vehicles; and
- Removes need for irrigation soil import vehicles.

#### 3.4.8 Chemicals Management

The chemical management processes for the proposed RWTP amendments would remain as addressed under the original REF with the exception of the following improvements made through removing the requirement to use and store:

- Sodium metabisulphite for the dechlorination of RO feed water;
- RO antiscalant chemicals to prevent fouling of the RO Membrane Bioreactor; and
- RO pH correction chemicals.

## 3.5 UTILITIES

#### 3.5.1 Water

The water used within the proposed RWTP amendments would remain as addressed under the original REF. The Salinity Risk assessment has concluded that even if minimal





rain occurs over summer it is unlikely that shandying with potable water will be required to keep up with demand (refer to **Appendix 6**).

#### 3.5.2 Sewerage

The sewerage generated within the proposed RWTP amendments would remain as addressed under the original REF.

#### 3.5.3 Electricity

The electricity supplied within the proposed RWTP amendments would remain as addressed under the original REF with the exception of the following improvements:

• Reduced energy usage through the removal of the RO unit.

## 3.6 ENVIRONMENTAL MANAGEMENT PLANS

#### 3.6.1 Construction Environmental Management Plan

The approved Construction Environmental Management Plan (CEMP) prepared for the existing RWTP site from the plant build will be adopted for the proposed amendments and amended as necessary to include the subject scope of works described within Section 3.

#### 3.6.2 WICA Management Plans

The operation of the RWTP would continue to occur in accordance with the WICA management plans including the Infrastructure Operating Plan (IOP), Sewage Management Plan (SMP), Recycled Water Quality Management Plans (RWQMP) and Operational Environmental Management Plan (OEMP). The current operations have been externally audited and approved for Commercial Operation under WIC Act as well as being externally audited and certified to ISO14001 and ISO9001.

Once the proposed amendments are approved, these would be updated accordingly.

#### 3.6.3 Emergency Response Plans

The operation of the RWTP would continue to occur in accordance with the WICA management plans as per **Section 3.6.2**.

Once the proposed amendments are approved, these would be updated accordingly prior to commencing operation.

#### 3.7 ENVIRONMENTAL MONITORING, REPORTING AND COMPLAINTS CONTROL

Environmental monitoring, reporting and complaints control would be managed in accordance with the WICA management plans as per **Section 3.6.2**.

#### 3.8 **PROPOSED SCHEME ALTERATIONS**

Based on the above, RWTP operations and alterations, **Table 1** provides a summary of the changes proposed to the RWTP Scheme.





## Table 1: Summary of Changes to RWTP and Operations

Change	Justification
Delete SRW irrigation area	Allow completion of Stages 6 and 7 of the approved subdivision.
Dispose of SRW to Gwandalan STP	Provides a safe, reliable and sustainable alternative dispose of SRW.
Delete utility RO capacity	Reduce energy use of treatment plant and avoid RO waste storage, transport and disposal issues.
Remove RO waste ponds	Removes the risk of concentrated saline waters entering adjoining conservation lands as well as providing an area for passive open space.
Convert SRW irrigation pump station to transfer pump station	To accommodate changes.





## 4.0 Need and Options Considered

## 4.1 STRATEGIC NEED FOR THE PROPOSAL

### 4.1.1 SRW & Irrigation Area

Demand for recycled water within the Beaches development is estimated to vary by a factor of six (6) due to climatic conditions (i.e. seasonality of rainfall and evapotranspiration). This variability means recycled water is fully utilised during periods of high demand, but SRW occurs when demand is low.

Under the original REF, SRW was identified as being irrigated over Stages 6 and 7 of the Beaches development. This measure was a temporary solution and catered only for up to 470 lots. This measure has been unable to commence due to delays experiences within the Stage 6 and 7 bulk earthworks.

To overcome the above, the proposed modifications include removing irrigation and sending SRW to Gwandalan STP.

#### 4.1.2 Reverse Osmosis

The original RWTP included a RO unit for salinity control in the recycled water network. RO was required to treat a portion (<30%) of the recycled water going back to each house to reduce baseline TDS from an assumed baseline of 750mg/L down to around 600mg/L.

The RO process would produce a RO reject waste stream that required management through three (3) High Density Polyethylene lined and level monitored evaporation ponds with total surface area of 4,870m<sup>2</sup>.

Since RWTP operations have commenced, operational TDS data has become available which has indicated the baseline salinity of the recycled water prior to RO was compliant being generally around 550 to 600mg/L and as such, was already appropriate for use in households.

Despite the above, as there was a possibility that TDS could reach 750mg/L, a Salinity Risk Assessment has been prepared in accordance with the Australian Guidelines for Water Recycling (2006) in this regard. This assessment concludes that provided existing control measures are put in place, the risks associated with the higher level of TDS are minimal. This is discussed in greater detail within **Section 7.13** and with the report itself within **Appendix 6**.

#### 4.1.3 Current Operations

As discussed above, the irrigation area has not been used since the issue of the WICA licence due to unforeseen delays in bulk earthwork in the area of Stages 6 and 7 that were required to be completed before irrigation could commence. For this reason, since the commencement of RWTP, the SRW has instead been tankered offsite and the following aspects of the original REF have not progressed:

- Progressive installation of 8.5ha of irrigation area including vegetated buffers and perimeter fencing; and
- Installation of RO unit and RO reject evaporation ponds.





#### 4.2 OBJECTIVES OF THE PROPOSAL

The objectives behind the proposed amended RWTP remain as discussed within the original REF. The amendment is just concerned with the planned Stage 3 of the scheme, albeit has been brought forward. The following objectives behind this include:

- <u>Objective 1</u>: To provide best practice wastewater management for the locality which provides minimal risk to the environment and public health;
- <u>Objective 2</u>: Find an alternate method to dispose of SRW to reduce environmental risks associated with irrigation; and
- <u>Objective 3</u>: Minimise social and environmental impacts associated with providing cost effective waste water security.

#### 4.3 ALTERNATIVES AND OPTIONS CONSIDERED

Prior to reaching an agreement with CCC to transfer SRW to Gwandalan STP, the original proposed RWTP amendments included the consideration of nine (9) alternate options. These options were referred to the Environment Protection Agency (EPA) due to the potential for some of the options to require an Environment Protection Licence (EPL) under the Protection of the Environment Operations Act 1991, to dispose of waters into the environment. The EPA agreed to further consideration of the top three (3) ranked options and encouraged the maintaining of an irrigation area within the subdivision (refer to **Appendix 3**).

Accordingly, the following two (2) options were further considered as part of the proposed amendment to dispose of SRW:

- 1. Retain onsite irrigation area; and
- 2. Disposal to Gwandalan STP.

The relative merits of these two (2) options are compared in Table 2.





Comparison Criterion	1. Retain Irrigation Area	5. Preferred Option Disposal to Gwandalan STP
Economics / Establishment Cost	<b>2</b> Lowers subdivision yield and raises relative utility management costs and lowers economies of scale as well as irrigation pumping costs.	<b>1</b> Additional establishment costs, however no lost development yield.
Sustainability	<b>2</b> Low/moderate, as RO retained with RO waste disposal problem, minor impacts on receiving environment.	1 Additional pumping and maintenance costs, however it removes RO energy and waste disposal problems and will not impact on the receiving environment.
Manageability	2 SRW storage capacity issues during wet periods and potential for effect on downstream baseflows during otherwise dry periods.	<b>1</b> Lowest management effort required.
Environmental Impacts	2 The hydrology assessment indicates that capacity during wetter periods would likely be a problem, however irrigation wet weather storage mitigates this risk.	<b>1</b> Lowest impacts, as disposed of into existing licenced facility.
Risk	<b>2</b> RO waste management remains an issue however relatively low risk of impacts.	<b>1</b> Lowest risk as disposed of into existing licenced facility.
Score	10	5
	2nd	1st

#### Table 2: SRW Disposal Options Evaluation

#### 4.4 PREFERRED OPTION

Based on the options analysis undertaken above, the method to dispose of SRW to the Gwandalan STP represents the best option moving forward and consequently is the subject of the Addendum REF.





## 5.0 Statutory Framework

## 5.1 COMMONWEALTH LEGISLATION

The proposed RWTP modifications have no impact on the previous assessment against the EPBC Act as addressed under the original REF.

## 5.2 STATE LEGISLATION

#### 5.2.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

As discussed previously, the Addendum REF details the works required to provide for the amended RWTP infrastructure to service the Beaches development. It explores all potential environmental impacts and necessary safeguards as a consequence of these works.

The process of obtaining environmental planning approval is set out in the EP&A Act. The application of Clause 106 of State Environmental Planning Policy (Infrastructure) 2007 ("ISEPP") (discussed below) characterises the proposed amended infrastructure works as "development permitted without consent". This means that the project falls under Part 5 of the EP&A Act, rather than Part 4, as the works would be undertaken on behalf of CHBWU who have a network operator's licence under the Water Industry Competition Act 2006.

Part 5 of the EP&A Act establishes, under Section 5.5, a duty for determining authorities to "examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity" when determining if an activity should be undertaken.

#### 5.5 Duty to Consider Environmental Impact

(1) For the purpose of attaining the objects of this Act relating to the protection and enhancement of the environment, a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

This Addendum REF has been prepared to assess the potential environmental impact of the amended RWTP infrastructure for the purpose of satisfying CHBWU's duty under Section 5.5 of the EP&A Act and to provide IPART with all the information necessary to undertake their assessment in accordance with Section 5.5.

(3) Without limiting subsection (1), a determining authority shall consider the effect of an activity on any wilderness area (within the meaning of the <u>Wilderness Act 1987</u>) in the locality in which the activity is intended to be carried on.

The amended RWTP infrastructure site is not located within any wilderness area.

## 5.2.2 Environmental Planning and Assessment Regulations 2000 (EP&A Regs)

Clause 228 of the EP&A Regs details elements to be considered when assessing the potential impact of an activity on the environment. An assessment with regards to the amended RWTP infrastructure has been provided within **Appendix 5**.





#### 5.2.3 Protection of the Environment Operations Act 1997 (POEO Act)

The proposed RWTP modifications have no impact on the previous assessment against the POEO Act as addressed under the original REF whereby an Environment Protection Licence was not required.

#### 5.2.4 Coal Mines Subsidence Compensation Act 2017 (CMSC Act)

Since the issue of the WICA licence, the Mine Subsidence Compensation Act 1961 has been replaced with the CMSC Act. The proposed modified RWTP would require approval under Section 22 of the CMSC Act prior to works commencing.

#### 5.2.5 National Parks and Wildlife Act 1974 (NPW Act)

The proposed RWTP modifications have no impact on the previous assessment against the NPW Act as addressed under the original REF. As discussed above however, a portion of the SRWTM does traverse land controlled by NPWS, with this having been assessed separately.

#### 5.2.6 Heritage Act 1977

The proposed RWTP modifications do not fall within the State Heritage listed Catherine Hill Bay Cultural Heritage Precinct and as such, do not require an approval under Section 57(1) of the Heritage Act 1977.

#### 5.2.7 Roads Act 1993

Under the original REF, construction of the access to the RWTP required an approval under Section 138 of the Roads Act – this has since occurred. A Roads Opening Permit would however, be required to install the 15m of transfer main connection which occurs within the Montefiore Parkway road reserve.

#### 5.2.8 Biodiversity Conservation Act 2016 (BC Act)

Since the issue of the WICA licence, the Threatened Species Conservation Act 1995 has been replaced with the BC Act.

Section 7.8 of the BC Act states:

- 7.8 Biodiversity assessment for Part 5 activity
- (1) This section applies to environmental assessment under Part 5 of the Environmental Planning and Assessment Act 1979.
- (2) For the purposes of Part 5 of the <u>Environmental Planning and Assessment Act</u> <u>1979</u>, an activity is to be regarded as an activity likely to significantly affect the environment if it is likely to significantly affect threatened species.
- (3) In that case, the environmental impact statement under Part 5 of the <u>Environmental Planning and Assessment Act 1979</u> is to include or be accompanied by:
  - (a) a species impact statement, or
  - (b) if the proponent so elects—a biodiversity development assessment report.
- (4) If the likely significant effect on threatened species is the only likely significant effect on the environment, an environmental impact statement may be dispensed with and Part 5 of the Environmental Planning and Assessment Act





<u>1979</u> applies as if references to an environmental impact statement were references to a species impact statement or biodiversity development assessment report.

As the amended RWTP infrastructure would be undertaken over cleared and disturbed land, it is not likely to significantly affect threatened species under the BC Act.

#### 5.2.9 Water Management Act 2000 (WMA Act)

Under the original REF, construction of the irrigation system and catch and diversion drains occurred within waterfront land (i.e. 40m from a lake, estuary, river or shoreline) and as such, required a Controlled Activity Approval (CAA) pursuant to Section 91 of the WMA Act. As these are no longer required under the modified RWTP, A CAA is not required for these works.

#### 5.2.10 Noxious Weeds Act 1993

The proposed RWTP modifications have no impact on the previous assessment against the Noxious Weeds Act as addressed under the original REF with the exception of the removal of requirements surrounding the irrigation area which is no longer proposed.

#### 5.2.11 Rural Fires Act 1997

The proposed RWTP modifications have no impact on the previous assessment against the Rural Fires Act as addressed under the original REF with the exception of the removal of requirements surrounding the irrigation area which is no longer proposed.

## 5.2.12 Fisheries Management Act 1994

The original REF did not undertake an assessment against the requirements of the FM Act, however it is considered relevant with regards to the proposed modified RWTP.

#### Threatened Species & Endangered Ecological Communities

Schedules 4, 4A and 5 of the FM Act contain lists of fish and marine vegetation species, ecological communities and populations which have been determined by the NSW Fisheries Scientific Committee as being under threat of serious decline that could ultimately lead to extinction. Section 220ZZ of the FM Act provides assessment guidelines for the determination of whether an action is likely to significantly affect threatened species, populations or ecological communities, or their habitats.

As the amended RWTP infrastructure would only improve the surrounding aquatic habitats through the removal of the RO reject ponds and risk associated with storing concentrated saline waters, it is not likely to significantly affect threatened species under the FM Act.

#### Key Threatening Processes ("KTP")

Schedule 6 of the FM Act contains a list of KTPs, diseases and noxious fish and marine vegetation that have a negative impact on listed threatened species, populations and/ or communities.

No KTPs have the potential to affect the site as a consequence of the proposed amended RWTP.





Taking the above into consideration, it is concluded that the amended RWTP infrastructure would not significantly impact on threatened species, populations or ecological communities, or their habitats as listed under the FM Act.

#### 5.2.13 Waste Avoidance & Resource Recovery Act 2001 (WARR Act)

The original REF did not undertake an assessment against the requirements of the WARR Act, however it is considered relevant with regards to the proposed modified RWTP.

Waste disposal in NSW falls under the Waste Avoidance and Resource Recovery Act 2001. The relevant objectives of this Act to the amended RWTP infrastructure are:

- (a) to encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development,
- (b) to ensure that resource management options are considered against a hierarchy of the following order:
  - (i) avoidance of unnecessary resource consumption,
  - (ii) resource recovery (including reuse, reprocessing, recycling and energy recovery),
  - (iii) disposal,
- (c) to provide for the continual reduction in waste generation,
- (d) to minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste,
- (e) to ensure that industry shares with the community the responsibility for reducing and dealing with waste,
- (f) to ensure the efficient funding of waste and resource management planning, programs and service delivery,
- (g) to achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis,
- (h) to assist in the achievement of the objectives of the <u>Protection of the</u> <u>Environment Operations Act 1997</u>.

To meet these objectives the Act sets in place, a hierarchy of waste management of avoidance, recovery and disposal in descending order.

In this regard, the removal of RO only reduces waste produced by the RWTP including RO reject waste, RO chemicals; RO waste chemical container; RO membrane replacement; and reduced greenhouse gas waste from reduced energy consumption.

## 5.3 STATE ENVIRONMENTAL PLANNING POLICIES

# 5.3.1 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)

The proposed RWTP modifications have no impact on the previous assessment against SEPP 33 as addressed under the original REF.

#### 5.3.2 State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)

The proposed RWTP modifications have no impact on the previous assessment against SEPP 44 as addressed under the original REF.





#### 5.3.3 State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)

The proposed RWTP modifications have no impact on the previous assessment against SEPP 55 as addressed under the original REF with the exception of improvements resulting from the removal of the irrigation area. In this regard, removal of the irrigation area over land identified for residential development, would eliminate the need to remediate this land following its use for irrigation purposes.

#### 5.3.4 State Environmental Planning Policy (Coastal Management) 2018

Since the issue of the WICA licence, State Environmental Planning Policy No. 71 – Coastal Protection has been replaced with SEPP (Coastal Management) 2018. Under the original REF, SEPP 71 did not require consideration as Lake Macquarie Local Environmental Plan (LEP) 2004 stated it did not apply to the site. As the Coastal Management SEPP does not have the same exclusion under the LEP, it now requires consideration as part of the Addendum REF.

The Coastal Management SEPP aims to promote an integrated and coordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016. The SEPP applies to land within the coastal zone which includes coastal wetlands and littoral rainforests area, coastal vulnerability areas, coastal environment areas and coastal use areas. The location of the RWTP as amended does not fall within any of these areas (see **Figure 10**).

Further to the above, it is considered relevant to note that the proposed RWTP amendments, particularly the removal of the RO reject ponds, would remove a concentrated saline water source within close proximity to coastal wetlands. This is considered to have a significant risk upon the coastal environment.



Figure 10: Coastal Management SEPP Maps





#### 5.3.5 State Environmental Planning Policy (Infrastructure) 2007 (ISEPP)

The proposed RWTP modifications have no impact on the previous assessment against the ISEPP as addressed under the original REF. The RWTP continues to fall under the parameters of Clause 106, whereby CHBWU as a body licensed under WICA can develop a RWTP and sewerage reticulation mains without consent.

Clauses 13-16 of the ISEPP identify instances when the relevant Council or other authorities would be consulted as part of the infrastructure works. These are discussed within Section 6 of the Addendum REF.

# 5.3.6 State Environmental Planning Policy (State & Regional Development) 2011 (SEPP S&R)

The proposed RWTP modifications have no impact on the previous assessment against the SEPP State and Regional Development as addressed under the original REF.

#### 5.4 LAKE MACQUARIE LOCAL ENVIRONMENTAL PLAN 2004 (LM LEP)

The amended RWTP is located within SP2 Infrastructure Zone and the 15m of connection transfer main is located within the R2 Low Density Residential Zone under the LMLEP 2011 (see **Figure 11**). Regardless of this zone, permissibility in this regard is provided under the ISEPP.



Figure 11: Zoning Map (Source: LMLEP 2004)

The following table details how the amended RWTP achieves the controls/objectives of the LM LEP:





## Table 3: LMLEP Compliance Table

Clause	Compliance Amended RWTP
SP2 Infrastructure Zone Objectives (RWTP over Lot 1120 DP 1219395)	<b>Yes</b> : The amended RWTP continues to achieve the objectives of the SP2 Zone through the provision of sewerage related infrastructure.
R2 Low Density Residential Zone Objectives (Connection Main)	<b>Yes</b> : The connection main continues to achieve the objectives of the R2 Zone through the provision of infrastructure to support residential development.
144 Height of Building – 9m	<b>Yes</b> : The amended RWTP generally involves removing infrastructure and as such, continues to achieve the 9m height control. The only new infrastructure would be the installation of the connection main which is underground.
147 Development within the Coastal Zone	<b>N/A</b> : The subject amended RWTP components are not located within the coastal zone and would not dispose of waters into the coastal zone (see <b>Figure 10</b> ).
150 Heritage Conservation	N/A: The subject amended RWTP components are not located within the bounds of the State Heritage listed Catherine Hill Bay Cultural Heritage Precinct.

Taking the above into consideration, the proposed amended RWTP infrastructure works continue to adhere to the provisions of the LMLEP.

## 5.5 CATHERINE HILL BAY (SOUTH) DEVELOPMENT CONTROL PLAN (CHB SOUTH DCP)

The proposed RWTP modifications have no impact on the previous assessment against the CHB South DCP as addressed under the original REF with the exception of improvements resulting from the removal of the irrigation area and RO ponds.

#### 5.6 NSW AQUIFER INTERFERENCE POLICY

The proposed RWTP modifications have no impact on the previous assessment against the NSW Aquifer Interference Policy as addressed under the original REF with the exception of improvements made through the removal of RO and the irrigation area which would reduce the risk of groundwater contamination.

#### 5.7 WATER SHARING PLAN FOR THE HUNTER UNREGULATED AND ALLUVIAL WATER SOURCES 2009

The proposed RWTP modifications have no impact on the previous assessment against the Water Sharing Plan as addressed under the original REF with the exception of potential improvements resulting from the removal of the irrigation area and RO ponds.

#### 5.8 AUSTRALIAN GUIDELINES FOR WATER RECYCLING: MANAGING HEALTH & ENVIRONMENTAL RISKS 2006

The removal of the RO unit necessitates an amended assessment with regards to the recycled water supplied back to households. To ensure that recycled water continues to have an appropriate level of TDS, a Salinity Risk assessment has been prepared which concludes that provided control measures are implemented, there will be a low risk involved with increasing TDS from 600 ppm to 750 ppm.




# 5.9 CONFIRMATION OF STATUTORY POSITION

The confirmation of the statutory position presented within the original REF remains consistent with regards to the RWTP modifications with the exception of the removal of considerations concerning the irrigation area.





# 6.0 Stakeholder and Community Consultation

# 6.1 COMMUNITY CONSULTATION

Community consultation was undertaken as part of the WICA Licence for the RWTP and as part of the previously proposed discharge to adjoining waters as these had potential impacts to the surrounding community. As the proposed RWTP modification only reduces impacts through the removal of the irrigation area and RO, community consultation is not required. This point aside, as part of determining an appropriate solution, community consultation was undertaken in April 2018 whereby it was determined that disposing SRW into adjoining waters was not desired.

# 6.2 LOCAL ABORIGINAL COMMUNITIES

As the proposed RWTP modification only reduces impacts through the removal of the irrigation area and RO, consultation with the Aboriginal community is not required.

# 6.3 STATE ENVIRONMENTAL PLANNING POLICY (INFRASTRUCTURE) CONSULTATION

Whilst Clause 13-15 of the ISEPP apply only to public authorities (which CHBWU is not), consideration has nonetheless been afforded to the following ISEPP consultation requirements:

# Clause 13

This clause applies to development carried out by or on behalf of a public authority that this Policy provides may be carried out without consent if, in the opinion of the public authority, the development:

(a) will have a substantial impact on stormwater management services provided by a council, or

The proposed RWTP modification will result in minor changes to the management of stormwater on the site through the filling of the RO pond. This has been accounted for in the design through the stabilisation of the site to ensure that any runoff from this site is suitably managed in terms of water quality. Further, the RO pond site has been accommodated within the subdivision approval such that any runoff can be directed to the street network and away from adjoining properties. Given the minor nature of these works, it would not have a substantial impact on stormwater management services provided by a Council.

Runoff from the site is accommodated within the council drainage system and will be stabilised.

(b) is likely to generate traffic to an extent that will strain the capacity of the road system in a local government area, or

The proposed RWTP modification would have less impact on traffic through removing the construction of the RO ponds and irrigation area and ongoing traffic through removing landscape maintenance; the requirement to pump out the RO ponds and RO chemical delivery.

(c) involves connection to, and a substantial impact on the capacity of, any





# part of a sewerage system owned by a council, or

The proposed RWTP modification would connect to the Gwandalan STP. Consultation with CCC in this regard has been ongoing and agreement and conditions to accept SRW into this system has been provided in correspondence dated 31<sup>st</sup> August 2018 as well as through the future consent of the DA for the 3.3km portion of the. A requirement to comply with the future CCC consent has been added to the mitigation measures provided within Section 9 of the Addendum REF.

(d) involves connection to, and use of a substantial volume of water from, any part of a water supply system owned by a council, or

The RWTP is already connected to the CCC water supply system and the amendments proposed are within ultimate design capacity limits provided under the existing bulk water approval.

(e) involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council's management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential, or

The proposed RWTP modification would be undertaken within allotments which are in private ownership.

(f) involves excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the <u>Roads Act 1993</u> (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath).

The proposed RWTP modification would be undertaken within allotments which are in private ownership. Any works required as a result of the connection main would be minor an inconsequential only.

Clause 14 is not applicable as the proposed RWTP modification does not impact on items of local heritage significance.

Clause 15 is not applicable as the proposed RWTP modification would not change flood patterns within a flood liable area.

Clause 15AA is not applicable as the proposed RWTP modification is not located within flood liable land.

Clause 15A is not applicable as the proposed RWTP modification is not located within a coastal vulnerability area.

Clause 16 of the ISEPP identifies instances when public authorities other than the Council should be consulted as part of the infrastructure works, as follows:

- (1) A public authority, or a person acting on behalf of a public authority, must not carry out specified development that this Policy provides may be carried out without consent unless the authority or person has:
  - (a) given written notice of the intention to carry out the development (together with a scope of works) to the specified authority in relation to the development, and





- (b) taken into consideration any response to the notice that is received from that authority within 21 days after the notice is given.
- (2) For the purposes of subclause (1), the following development is **specified development** and the following authorities are **specified authorities** in relation to that development:
  - a. development adjacent to land reserved under the <u>National Parks and</u> <u>Wildlife Act 1974</u>—the Department of Environment and Climate Change,

The proposed RWTP modifications have no impact on the previous assessment provided in this regard with the exception of potential improvements resulting from the removal of the RO and irrigation area.

i. development on land in a mine subsidence district within the meaning of the <u>Mine Subsidence Compensation Act 1961</u>—the Mine Subsidence Board.

The proposed RWTP modification is located within the Swansea North Entrance Mine Subsidence Area. An approval under Section 22 of the CMSC Act would be required prior to works commencing for the proposed RWTP modification (i.e. installation of 15m of SRWTM connection and filling in of RO ponds).

# 6.4 GOVERNMENT AGENCY AND STAKEHOLDER INVOLVEMENT

The proposed modified RWTP would continue to require ongoing consultation and liaison with IPART as part of the WICA licence modification and with NSW Health as part of updating the Recycled Water Quality Management Plan.





# 7.0 Environmental Considerations & Impacts

This section of the Addendum REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the amended aspects of the RWTP only. Unless otherwise stated, the impacts assessed, and mitigation measures provided under the original REF continue to apply to RWTP.

It is a requirement under Section 5.5 of the EP&A Act that all matters likely to affect the environment by reason of the activity be taken into account to the fullest extent possible.

The potential environmental impacts of the proposed amended RWTP works have been generated based on the following:

- The infrastructure components proposed and the construction activities required to develop them, as discussed within **Section 3**;
- The legislative framework within which the works must comply, as discussed within **Section 5**;
- The input from relevant stakeholder and community consultation, as discussed within **Section 6**; and
- The environmental conditions, discussed below within **Section 7**.

In order to reduce any potential impacts derived from the above, where appropriate, mitigation methods would be implemented through construction and ongoing operation phase of the project.

To remove the need to refer to the original REF, a complete and amended list of mitigation methods as they apply to the amended RWTP proposal have been provided within **Section 9**.

# 7.1 SOILS

The soils assessment of the proposed RWTP modifications remain as addressed under the original REF with the exception of improvements as a result of removing the construction of the irrigation area and transferring SRW to Gwandalan RWTP. As a result of these modifications, impacts associated within the irrigation area are no longer applicable and as such, mitigation measures provided within the original REF under Sections 7.1 and 9.1.1 in this regard, are no longer required.

The design includes stabilising of this area to ensure that removal of the RO ponds through the proposed bulk earthworks do not result in erosion and sedimentation.

### 7.2 ODOUR

The odour assessment of the proposed RWTP modifications remain as addressed under the original REF, with the exception of reduced impacts regarding the removal of the irrigation area and RO ponds.

### 7.3 TRAFFIC

The traffic assessment of the proposed RWTP amendments remains as addressed under the original REF with the exception of the following improvements:



Addendum to Review of Environmental Factors – November 2019 Amendments to Recycled Water Treatment Plant, Catherine Hill Bay (Ref: 211688\211688)61))



- Reduced construction traffic as a result of removing the construction of the irrigation area;
- Reduced operational traffic from the removal of offsite tankering of RO reject waste and SRW; and
- Reduces operational traffic from the removal of RO in general (as discussed within **Section 3.4.7**).

Despite the above, the mitigation measures required under the original REF relating to construction traffic continue to apply.

# 7.4 NOISE

The noise and vibration assessment of the proposed RWTP amendments remains as addressed under the original REF with the exception of improvements as a result of removing the construction and operation of the RO and irrigation area. Specifically, the Noise Impact Assessment included under the original REF addressed any ongoing impacts from the use of the existing irrigation pumps. These pumps will now be used to for the transfer of SRW, with any noise generated to be as assessed under the original REF.

Construction required as described under Section 3.2.1 will require management in accordance with the existing CEMP which will be amended as necessary to address the scope of works described within Section 3.

# 7.5 GROUND WATER

Potential impacts upon groundwater have been significantly improved as a result of the proposed RWTP amendments, particularly through the removal of the irrigation area and RO reject ponds. For this reason, mitigation measures provided within the original REF under Sections 7.5 and 9.1.5 in this regard, are no longer required.

# 7.6 SURFACE WATER

The surface water assessment of the proposed RWTP modifications remain as addressed under the original REF with the exception of improvements as a result of removing the construction of the irrigation area and RO reject ponds. As a result of these modifications, impacts associated within the irrigation area and RO reject ponds are no longer applicable and as such, mitigation measures provided within the original REF under Sections 7.6 and 9.1.6 in this regard, are no longer required.

The design includes stabilising of this area, to ensure that removal of the RO ponds through the proposed bulk earthworks do not result in erosion and sedimentation. Stormwater from the RO pond site will be minimal given its small area and any runoff will be directed to the existing street drainage network via a swale.

# 7.7 FLORA AND FAUNA

The flora and fauna assessment of the proposed RWTP modifications remain as addressed under the original REF with the exception of improvements as a result of removing the construction of the irrigation area.

As a result of these modifications, impacts associated within the irrigation area are no longer applicable and as such, mitigation measures provided within the original REF under Sections 7.7 and 9.1.7 in this regard, are no longer required.





# 7.8 ABORIGINAL HERITAGE

The Aboriginal heritage assessment of the proposed RWTP modifications remain as addressed under the original REF.

# 7.9 VISUAL AMENITY

The visual amenity assessment of the proposed RWTP modifications remain as addressed under the original REF.

# 7.10 BUSHFIRE HAZARD

The bushfire hazard assessment of the proposed RWTP modifications remain as addressed under the original REF.

# 7.11 NON ABORIGINAL HERITAGE

The non-Aboriginal assessment of the proposed RWTP modifications remain as addressed under the original REF. In this regard, it is noted that works required for the proposed RWTP modifications are not located within the Catherine Hill Bay Cultural Heritage Precinct.

# 7.12 WASTE

Potential impacts upon waste production have been significantly improved as a result of the proposed RWTP amendments, particularly through the removal of the irrigation area and RO reject ponds whereby management of ongoing green waste and RO reject waste would no longer be required. Despite this, the general waste management mitigation measures detailed within the original REF would still apply.

# 7.13 TDS RISK ASSESSMENT

As the proposed RWTP modifications remove RO, a Salinity Risk Assessment has been undertaken to ensure that the recycled water to be used within households continues to achieve the require TDS level. In this regard, the assessment concludes that TDS levels can increase to 750ppm with minimal impact for the following reasons:

- Lawns used throughout the development (and those sold in the Sydney-Newcastle area) are typically tolerant of salt in both the irrigation water and soils;
- Garden plants used in the development are relatively tolerant of salinity; and
- Site soils and/or those typically sold by local suppliers are sandy and easy to leach salts through;
- The site is located on the coast and is already exposed to salt;
- Residents are instructed in the home owner's manual that:
  - o gypsum/lime additional may periodically be required;
  - o salt accumulation is more likely to occur in hot and dry conditions;
  - o salt accumulation is more likely with drip irrigation which is not recommended; and
  - drinking water should be used to irrigate salt sensitive plants and any plants suspected

of displaying signs of salt injury.

Taking the above into consideration, provided the above existing controls continue,





TDS levels can increase to 750ppm with minimal risk.

A copy of the Salinity Risk Assessment is provided within **Appendix 6**.

# 7.14 CUMULATIVE IMPACTS

The cumulative impacts assessment of the proposed RWTP modifications remain as addressed under the original REF with the exception of improvements as a result of removing the construction of the irrigation area and RO reject ponds.





# 8.0 Proposal Justification

# 8.1 **BIOPHYSICAL CONTEXT**

# 8.1.1 Beneficial Effects

Beyond the biophysical benefits of the RWTP, as provided within the original REF, the modified RWTP would have the following additional benefits:

- Removes the potential for water pollution from downstream degradation from wastewater irrigation and potential overflow or infiltration of concentrated saline waters from the RO reject ponds; and
- Reduced demand on energy through removing the RO process and subsequent reduction in greenhouse gases.

### 8.1.2 Adverse Effects

The modified RWTP would have no additional biophysical adverse effects beyond those assessed under the original REF. The modifications would however, remove the potential for water pollution as detailed above.

# 8.2 SOCIAL / COMMUNITY EFFECTS

### 8.2.1 Beneficial Effects

Beyond the social/community benefits of the RWTP, as provided within the original REF, the modified RWTP would have the following additional benefits:

- Potential reduction in odour impacts as a result of the removal of the irrigation area and RO reject ponds;
- Ability to deliver the full allotment yield as approved under the Beaches development;
- Allow more lots to connect to the scheme thus helping to reduce the servicing costs per lot for the local community; and
- Provides additional SRW capacity in the scheme so that the NSW government can connect the existing Catherine Hill Bay Village to avoid the existing environmental impacts of the existing onsite systems that currently impact the Intermittently Closed and Open Lagoons in the area.

### 8.2.2 Adverse Effects

The modified RWTP would have no additional social/community adverse effects beyond those assessed under the original REF. The modifications may however, reduce the potential for odour impacts as detailed above.

# 8.3 ECONOMIC CONTEXT

### 8.3.1 Beneficial Effects

Beyond the economic benefits of the RWTP as provided within the original REF, the modified RWTP would have the following additional benefits:

• Reduced construction cost through the removal of RO and irrigation;





- Reduced demand on energy through removing the RO process;
- Ability to deliver the full allotment yield as approved under the Beaches development; and
- Allow more lots to connect to the scheme thus helping to reduce the servicing costs per lot for the local community.

#### 8.3.2 Adverse Effects

The modified RWTP would have no additional economic impacts beyond those assessed under the original REF.

# 8.4 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The ecologically sustainable development assessment of the proposed RWTP modifications remain as addressed under the original REF with the exception of improvements as a result of removing the construction of the irrigation area and RO reject ponds. In terms of the hierarchy of risk controls, removing a potential hazard is the most effective way to minimise risk. In this regard, the following amended assessment against ESD principles is now relevant:

#### Precautionary Principle

The precautionary principle means "if there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation".

The potential for serious or irreversible environmental damage has been improved through the amended RWTP by removing risks associated with irrigation and RO reject storage.

### Intergenerational Equity

Intergenerational Equity means that the "present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for benefit of future generations".

The proposed method to treat recycled water and dispose of SRW under the amended RWTP arrangement provides a far superior means of disposal over the current approved irrigation methods. The ability to remove the need to store and dispose of RO reject waste, as well as the ability to transport SRW to Gwandalan STP, has significantly greater potential for maintenance and improvement of the surrounding environment.

### Conservation of Biological Diversity and Maintenance of Ecological Integrity

Biological diversity refers to the diversity of genes, species, populations, communities and ecosystems and the linkages between them.

The proposed amended RWTP arrangement has been designed specifically to protect the integrity of the local hydrology and ecology.





# Improved Valuation and Pricing of Environmental Resources

This principle is a component of "intergenerational equity" and establishes the need to determine economic values for services provided by the natural environment.

The assessment of environmental impacts has recognised the value of environmental resources and found to not only improve these under the proposed scheme but also provide an overall social and economic benefit.





# 9.0 Mitigation Methods

In order to prevent the potential environmental issues highlighted within Section 7 of the Addendum REF, the following mitigation methods are proposed:

# 9.1 SUMMARY OF COMMITMENTS AND MITIGATION MEASURES

### WICA Management Plans

Once the proposed amendments are approved, the following WICA Management Plans would be updated to include the requirements of the Surplus Recycled Water Transfer Main prior to commencement of operations:

- Infrastructure Operating Plan (IOP);
- Sewage Management Plan (SMP); and
- Recycled Water Quality Management Plans (RWQMP).

# Construction Environmental Management Plan (CEMP)

The Construction Environmental Management Plan prepared as part of the RWTP shall be amended to include reference to the proposed works and plans. A copy of the original CEMP is provided within **Appendix 8**.

Soils

Construction: To be undertaken in accordance with the existing "Erosion and Sediment Management" Mitigation Measures provided within the CEMP within **Appendix 8**.

Operational: No updates required.

### Dust & Odour

Construction: To be undertaken in accordance with the existing "Air Quality and Dust Management" Mitigation Measures provided within the CEMP within **Appendix 8**. Operational: No updates required.

Traffic

Construction: Construction: To be undertaken in accordance with the existing "Traffic Impacts" Mitigation Measures provided within the CEMP within **Appendix 8**. Operational: No updates required.

Noise & Vibration

Construction: To be undertaken in accordance with the existing "Noise Management" and "Vibration Management" Mitigation Measures provided within the CEMP within **Appendix 8** with the following exclusions which are no longer applicable either due to the fact that the works have since been undertaken or a no longer require as a result of the amended proposed works:

• Wherever practical, and where sensitive receivers may be affected, piling activities will be completed using bored piles. If driven piles are required they will only be installed where approved in a Construction Noise and Vibration Management Plan.

Operational: No updates required.

### **Ground Water**

Construction: To be undertaken in accordance with the existing CEMP.

Operational: No updates required.

# Surface Water

Construction: To be undertaken in accordance with the existing "Erosion and Sediment Management" and "Hazardous/Dangerous Material" Mitigation Measures provided within the CEMP within **Appendix 8**.

Operational: No updates required.





# Flora and Fauna

Construction: To be undertaken in accordance with the existing "Flora and Fauna Management" Mitigation Measures provided within the CEMP within **Appendix 8**. Operational: No updates required.

### Aboriginal Heritage

Construction: To be undertaken in accordance with the existing "Aboriginal Cultural Heritage" Mitigation Measures provided within the CEMP within **Appendix 8**.

Operational: No updates required.

### Visual Amenity

Construction: N/A

Operational: No updates required.

#### **Bushfire**

Construction: To be undertaken in accordance with the existing Bushfire Risk Management Plan referenced within the existing CEMP within **Appendix 8**.

Operational: No updates required.

### Non-Aboriginal Heritage

Construction: To be undertaken in accordance with the existing "European Cultural Heritage" Mitigation Measures provided within the CEMP within **Appendix 8**. Operational: No updates required.

#### Waste

Construction: To be undertaken in accordance with the existing "Waste Management" Mitigation Measures provided within the CEMP within **Appendix 8** with the following exclusions which are no longer applicable either due to the fact that the works have since been undertaken or a no longer require as a result of the amended proposed works:

- Removed native vegetation shall be separated from the general construction waste stream, mulched, and stockpiled for reuse.
- Trees defined as greater than 5m in height and 250mm in diameter shall be demolished, chipped and stockpiled on site for later reuse as mulch. Chipped pieces shall be no larger than 75 x 50 x 15mm.
- Trees will be mulched onsite and reused as mulch for construction and landscaping purposes.

Operational: No updates required.

### Public Health & Safety and Workplace Health & Safety

Construction: To be undertaken in accordance with the existing "Public Safety Management"; "Workplace Health & Safety" and "and "Hazardous/Dangerous Material" Mitigation Measures provided within the CEMP within **Appendix 8**.

Operational: No updates required.

# Central Coast Council Requirements

Adherence to Development Consent DA/1385/2018 for 3.3km length of SRWTM as shown in **Figure 6**.

# National Parks and Wildlife Requirements

Adherence to NPWS Part 5 Approval for 4.6km length of SRWTM as shown in **Figure 6**. **Total Dissolved Solids (TDS)** 

Construction: N/A

### Operation:

- Residents are instructed in the home owner's manual that:
  - o gypsum/lime additional may periodically be required;
    - o salt accumulation is more likely to occur in hot and dry conditions;
    - salt accumulation is more likely with drip irrigation which is not recommended; and
    - drinking water should be used to irrigate salt sensitive plants and any plants suspected of displaying signs of salt injury.





# 9.2 ENVIRONMENTAL MONITORING AND REPORTING

# WICA Management Plans

Once the proposed amendments are approved, the following documents would be updated accordingly:

- Infrastructure Operating Plan (IOP);
- Sewage Management Plan (SMP); and
- Recycled Water Quality Management Plans (RWQMP).

# 9.3 LICENSING AND APPROVALS

Requirement	Timing
Roads Opening Permit	A minimum of 10 days prior to the commencement of works (only required if works proposed within the road reserve).
Section 143 Notice under the Protection of the Environment Operations Act 1997	Prior to relocation of spoil if spoil is created by earth works to remove the Reverse Osmosis Reject Evaporation Ponds.
Approval to alter or erect improvements within a mine subsidence district under Section 22 of the Coal Mines Subsidence Compensation Act 2017	Prior to any works onsite.
Construction Certificate (or equivalent) if applicable.	Prior to any works onsite.
WICA Network Operator Licence Variation	Concurrent with determination of the Addendum REF.





# 10.0 Conclusion

# **10.1 SUMMARY OF BENEFICIAL EFFECTS**

The proposed amended RWTP is an integral component of the Beaches residential development. The modifications proposed will facilitate a waste disposal security for the full development yield whilst also reducing environmental, social and economic impacts associated with the currently approved irrigation area and RO systems. Furthermore, removing the RO and irrigation area, removes a potential hazard which is the most effective way to minimise risk to the scheme.

The nature of the works involved and the land upon which it is to be carried out is such that the environmental impacts are minimal given that the land is cleared and located within a residential subdivision. Accordingly, the amended RWTP represents a positive benefit, with minimal environmental impact.

# 10.2 SUMMARY OF ADVERSE EFFECTS

No additional adverse effects have been identified as a result of the amended RWTP proposal beyond those established under the original REF. The amended RWTP does however, remove a number of adverse impacts, particular surrounding potential risks associated with the irrigation areas and RO reject ponds. For this reason, the mitigation measures now proposed have been amended to account for the reduced impacts identified.

Taking the above into consideration, it has been concluded that there would be no additional physical, biophysical or social environmental impacts resulting from the proposed amended infrastructure.

# 10.3 OBJECTS OF THE EP&A ACT

Taking the above assessment undertaken for this Addendum REF into account, it is concluded that the objects of the EP&A Act under **Section 1.3** have been addressed as follows:

Object	Comment
(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,	The modifications proposed allow for the full development potential of the site whilst also reducing the existing approved environmental impacts through the removal of irrigation and RO.
(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision- making about environmental planning and assessment.	Ecologically sustainable development is considered in <b>Section 8.4</b> .
(c) to promote the orderly and economic use and development of land,	The proposed amended infrastructure is required to facilitate the orderly economic use and development of land in order to accommodate the full potential of an





(d) to promote the delivery and maintenance of affordable housing,	approved Major Project. This assists in using residentially zoned land to its full potential which consequently promotes the delivery of affordable housing.
(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,	The proposed modifications would only reduce potential impacts on threatened species, populations, ecological communities, or their habitats.
(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),	The proposed modifications would have no impacts beyond those assessed under the original REF.
(g) to promote good design and amenity of the built environment,	The proposed modifications would improve the amenity of the built environment through removal of the irrigation area and RO reject ponds, with these areas now able to be used for residential allotments and passive open space respectively.
(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,	N/A
(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,	N/A
(j) to provide increased opportunity for community participation in environmental planning and assessment.	Given that the proposed modifications only improve the existing RWTP, public participation within the design phase was not considered necessary.

# 10.4 CONCLUSION

The following conclusions have been derived from undertaking this Addendum REF:

- Having regard to the original and amended safeguard measures proposed, the amended RWTP will have only beneficial on the environment and therefore Section 5.5 of the EP&A Act provides that an EIS is not required;
- The proposed amended infrastructure would only result in improvements upon declared critical habitat; threatened species, populations or ecological communities or their habitats, and it is therefore considered that a SIS is not required;
- The proposed amended infrastructure would not affect any Commonwealth Lands and would not have any impacts on matters of NES;
- The proposed infrastructure is central to the Beaches development in order to provide waste security to the full approved allotment yield; and
- Overall, it is concluded that the modified RWTP will have an overall positive effect upon environmental, social and economic impacts.





Taking the above into consideration, the Addendum 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 proposed amended RWTP and has concluded that the proposal warrants IPART support.





# 11.0 Declaration

Signed:

This Addendum Review of Environmental Factors provides a true and fair review of the activity in relation to its likely impact on the environment. It addresses to the fullest extent possible, all of the factors listed in Clause 228 of the Environmental Planning and Assessment Regulations (as amended) and the Commonwealth Environmental Protection and Biodiversity Conservation Act (as amended).

Sm. VL

Name:Stephanie Van Dissel<br/>Bachelor of Urban and Regional Planning (Honours)Position:Senior Town PlannerDate:29th November 2019





# Appendix 1

PLANS





RWTP SITE BOUNDARY
LOT BOUNDARIES
MAJOR CONTOURS (NATURAL)
MINOR CONTOURS (NATURAL)



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LEGEND

NOTE: EARTHWORKS EXTENTS HAVE BEEN CALCULATED BASED ON EXISTING APPROVED DESIGN TO NEW DESIGN SURFACE

drawing title:

CUT/FILL PLAN

















# Appendix 2

WICA LICENCE



# **New South Wales**

# Water Industry Competition Act 2006 (NSW)

# Grant of network operator's licence Licence no. 16\_035

I, The Hon. Niall Blair MLC, Minister for Lands and Water, under section 10 of the Water Industry Competition Act 2006 (NSW), grant a network operator's licence to:

Catherine Hill Bay Water Utility Pty Ltd (ACN 163 381 922)

to construct, maintain and operate water industry infrastructure, subject to:

- (i) the conditions imposed by the Water Industry Competition Act 2006 (NSW);
- (ii) the conditions imposed by clause 9 and set out in Parts 1, 2 and 3 of Schedule 1 to the Water Industry Competition (General) Regulation 2008 (NSW);
- (iii) the conditions imposed by the Minister in the attached Schedule A, being special Ministerially-imposed licence conditions for Catherine Hill Bay Water Utility Pty Ltd's network operator's licence; and
- (iv) the conditions imposed by the Minister in the attached Schedule B, being standard Ministerially-imposed licence conditions for all licensed network operators.

Dated this 22 nd

Minister for Lands and Water day of March 2016



# NEW SOUTH WALES GOVERNMENT

# WATER INDUSTRY COMPETITION ACT 2006 (NSW)

# **NETWORK OPERATOR'S LICENCE**

# Catherine Hill Bay Water Utility Pty Ltd

(ACN 163 381 922)

# LICENCE SCOPE

# ACTIVITIES AUTHORISED UNDER THE LICENCE AND AREA OF OPERATIONS

#### S1 Activities authorised - non-potable water

- S1.1 This Licence authorises the Licensee and any authorised persons specified in Table 1.1 to construct, maintain and operate the water industry infrastructure which is specified in Table 1.2, and is substantially consistent with the water industry infrastructure described in the Review of Environmental Factors:
  - a) for one or more of the authorised purposes specified in Table 1.3; and
  - b) within the area of operations specified in Table 1.4,

subject to the conditions imposed by or under the Act, the Regulation and this Licence.

#### Table 1.1 Authorised persons

Solo Water Pty Ltd (ACN 160 013 614)

#### Table 1.2 Water industry infrastructure

- 1) A treatment plant for non-potable water and other water infrastructure used, or to be used, in connection with the treatment plant, where components of the treatment plant or the other water infrastructure may also be used for one or more of the following:
  - a) production of non-potable water;
  - b) treatment of non-potable water;
  - c) filtration of non-potable water;
  - d) storage of non-potable water; and
  - e) conveyance of non-potable water.
- 2) A reticulation network for non-potable water and other water infrastructure used, or to be used, in connection with the reticulation network, where components of the reticulation network or the other water infrastructure may also be used for one or more of the following:
  - a) storage of non-potable water;
  - b) conveyance of non-potable water; and
  - c) treatment of non-potable water.

### Table 1.3 Authorised purposes

Toilet flushing, laundry machine cold water connection, irrigation of private lots and footpaths, outdoor cleaning and washdown (including car and bin washing).

### Table 1.4 Area of operations

Lot 100 DP1129872, Lot 101 DP1129872, Lot 106 DP1129872, Lot 1 DP1141989, Lot 1 DP1129299, Lot 103 DP1194707, Lot 101 DP1194707, Lot 102 DP1194707, Lot 213 DP883941, Lot 1 Section I DP163, Lot 1 Section K DP163, Flowers Drive Road Reserve, and Montefiore Street Road Reserve, Catherine Hill Bay.

#### S2 Activities authorised – drinking water

- S2.1 This Licence authorises the Licensee and any authorised persons specified in Table 2.1 to construct, maintain and operate the water industry infrastructure which is specified in Table 2.2, and is substantially consistent with the water industry infrastructure described in the Review of Environmental Factors:
  - a) for the authorised purposes specified in Table 2.3; and
  - b) within the area of operations specified in Table 2.4,

subject to the conditions imposed by or under the Act, the Regulation and this Licence.

### Table 2.1 Authorised persons

Solo Water Pty Ltd (ACN 160 013 614)

### Table 2.2 Water industry infrastructure

A reticulation network for drinking water and other water infrastructure used, or to be used, in connection with the reticulation network, where components of the reticulation network or the other water infrastructure may also be used for one or more of the following:

- a) storage of drinking water;
- b) conveyance of drinking water; and
- c) treatment of drinking water.

### Table 2.3 Authorised purposes

Drinking water and fire water

### Table 2.4 Area of operations

- (a) The area of the transfer pump station on Lot 12 DP598580 and Lot 13 DP598580.
- (b) The area of the transfer pipeline on Lot 649 DP1027231, Lot 204 DP1164883, Lot 12 DP1180296, Lot 145 DP755266, Lot 105 DP1129872, Lot 100 DP1129872, Lot 101 DP1129872, Kanangra Drive, Pacific Highway Road Reserve, Montefiore Street Road Reserve, Catherine Hill Bay.
- (c) Lot 100 DP1129872, Lot101 DP1129872, Lot 106 DP1129872, Lot 1 DP1141989, Lot 1 DP1129299, Lot 103 DP1194707, Lot 101 DP1194707, Lot 102 DP1194707, Lot 213 DP883941, Lot 1 Section I DP163, Lot 1 Section K DP163, Flowers Drive Road Reserve, and Montefiore Street Road Reserve, Catherine Hill Bay.

#### S3 Activities authorised – sewerage services

- S3.1 This Licence authorises the Licensee and any authorised persons specified in Table 3.1 to construct, maintain and operate the water industry infrastructure which is specified in Table 3.2, and is substantially consistent with the water industry infrastructure described in the Review of Environmental Factors:
  - a) for one or more of the authorised purposes specified in Table 3.3; and
  - b) within the area of operations specified in Table 3.4,

subject to the conditions imposed by or under the Act, the Regulation and this Licence.

#### Table 3.1 Authorised persons

Solo Water Pty Ltd (ACN 160 013 614)

#### Table 3.2 Water industry infrastructure

- 1) A treatment plant for sewage and other sewerage infrastructure used, or to be used, in connection with the treatment plant, where components of the treatment plant or the other sewerage infrastructure may also be used for one or more of the following:
  - a) production of treated non-potable water from sewage;
  - b) treatment of sewage;
  - c) filtration of sewage;
  - d) storage of sewage; and
  - e) conveyance of sewage.
- 2) A reticulation network for sewage and other sewerage infrastructure used, or to be used, in connection with the reticulation network, where components of the reticulation network or the other sewerage infrastructure may also be used for one or more of the following:
  - a) storage of sewage; and
  - b) conveyance of sewage.

#### Table 3.3 Authorised purposes

Sewage collection, transport, treatment, effluent transfer to non-potable water system

#### Table 3.4 Area of operations

Lot 100 DP1129872, Lot 101 DP1129872, Lot 106 DP1129872, Lot 1 DP1141989, Lot 1 DP1129299, Lot 103 DP1194707, Lot 101 DP1194707, Lot 102 DP1194707, Lot 213 DP883941, Lot 1 Section I DP163, Lot 1 Section K DP 163, Flowers Drive Road Reserve, and Montefiore Street Road Reserve, Catherine Hill Bay.

### INTERPRETATION AND DEFINITIONS

### Interpretation

In this Licence, unless the context requires otherwise:

- (i) the singular includes the plural and vice versa;
- (ii) headings are used for convenience only and do not affect the interpretation of this Schedule A;
- (iii) a reference to a document includes the document as modified from time to time and any document replacing it;
- (iv) a reference to a person includes a natural person and any body or entity whether incorporated or not;
- (v) a reference to a clause is to a clause in this Schedule A;
- (vi) a reference to a schedule is to a schedule to this Licence;
- (vii) a reference to a law or statute includes regulations, rules, codes and other instruments under it, and consolidations, amendments, re-enactments or replacements of them; and
- (viii) explanatory notes do not form part of this Licence, but in the case of uncertainty may be relied on for interpretation purposes.

### Definitions

Expressions used in this Licence that are defined in the Act or the Regulation have the meanings set out in the Act or the Regulation.

In this Licence:

Act	means the Water Industry Competition Act 2006 (NSW).
Agreement	means any agreement or deed provided to IPART in connection with the Licensee's application for this Licence.
Appropriate Facilities	means a facility or facilities with the capacity to accept excess recycled water or excess sewage from the Water Industry Infrastructure specified in clause S1 and Table 1.2 and clause S3 and Table 3.2, including during wet weather periods.
Construction Environmental Management Plan ( <b>CEMP</b> )	means a site or project specific plan which, in relation to construction works:
	<ul> <li>(a) complies with the basic structure detailed in the "Guideline for the Preparation of Environmental Management Plans", Department of Infrastructure, Planning and Natural Resources (2004); and</li> <li>(b) identifies the environmental risks associated with the licensed activities and the mitigation measures to be implemented.</li> </ul>
IPART	means the Independent Pricing and Regulatory Tribunal of New South Wales established under the <i>Independent Pricing and Regulatory Tribunal Act 1992</i> (NSW).
Licence	means this network operator's licence granted under section 10 of the Act.

Licensee	means Catherine Hill Bay Water Utility Pty Ltd (ACN 163 38 922)
Minister	means the Minister responsible for Part 2 of the Act.
Operational Environmental Management Plan ( <b>OEMP</b> )	means a site or project specific plan which, in relation to the operational phase:
	<ul> <li>(a) complies with the basic structure detailed in the "Guideline for the Preparation of Environmental Managemer Plans", Department of Infrastructure, Planning and Natural Resources (2004); and</li> <li>(b) identifies the environmental risks associated with the licensed activities and the mitigation measures to be implemented.</li> </ul>
Review of Environmental Factors ( <b>REF</b> )	means the Review of Environmental Factors for the propose sewage treatment plant and sewage and recycled water reticulation systems (prepared for IPART by Planit Consultin Pty Ltd, August 2015).
Reporting Manual	means the document entitled "Network Operator's Reporting Manual" which is prepared by IPART and is available on IPART's website at <u>www.ipart.nsw.gov.au</u> .
Regulation	means the Water Industry Competition (General) Regulation 2008 (NSW).

# SCHEDULE A - SPECIAL MINISTERIALLY-IMPOSED LICENCE CONDITIONS FOR CATHERINE HILL BAY WATER UTILITY PTY LTD'S NETWORK OPERATOR'S LICENCE

This schedule sets out the conditions which the Minister imposes pursuant to section 13(1)(b) of the Act. In addition to these special Ministerially-imposed conditions, the Licence is subject to conditions imposed by the Act, the Regulation and the standard Ministerially-imposed licence conditions set out in Schedule B. The Minister may vary the conditions in this schedule or impose new conditions, provided there is no inconsistency with the conditions imposed by the Act or the Regulation.

- A1 If a party to an Agreement proposes to:
  - a) terminate the Agreement;
  - b) novate the Agreement;
  - c) assign or transfer any of its rights or obligations under the Agreement to any other person; or
  - d) alter the Agreement in any way that materially reduces the Licensee's technical, financial or organisational capacity to carry out the activities authorised by this Licence,

the Licensee must provide IPART with written notice as soon as practicable, but no later than 3 months, before the time when the proposed action is to occur. The written notice must include details of how the service provided under the Agreement will be provided subsequent to the proposed termination, novation, assignment, transfer or alteration.

- A2 The Licensee is to implement environmental mitigation measures substantially consistent with the environmental risk mitigation measures identified in:
  - a) the Review of Environmental Factors (**REF**) in carrying out any activities authorised under clause S1 and S3 of this Licence.
- A3 The Licensee must not commence, or authorise the commencement of, construction of any water industry infrastructure which is:
  - a) described in Clause S1 and Table 1.2; and
  - b) described in Clause S3 and Table 3.2.

#### (Relevant Recycling Infrastructure)

until after the Licensee has provided IPART with a Construction Environmental Management Plan (**CEMP**), and IPART has provided written approval of the CEMP to the Licensee.

- A4 In addition to any requirements imposed by or under the Act or the Regulation, the Licensee must not commence commercial operation of, or authorise commercial operation of, the Relevant Recycling Infrastructure until the Licensee has provided:
  - a) a report addressing how the environmental mitigation measures identified in the CEMP have been implemented during the design and construction of the Relevant Recycling Infrastructure (**Report**); and
  - b) an Operational Environmental Management Plan (OEMP),

to IPART, and IPART has provided written approval of the Report and the OEMP to the Licensee.

A5 The Licensee must operate and maintain the Relevant Recycling Infrastructure consistently with the OEMP.
- A6 If the Licensee proposes to vary its environmental mitigation measures referred to in clause A2, it must first notify IPART in accordance with the Reporting Manual. The Licensee must not vary its environmental mitigation measures without the prior written approval of IPART.
- A7 As at the date of this Licence, the Licensee must have an unconditional bank guarantee executed in its favour which is:
  - a) for a value of \$2.5 million (two million and five hundred thousand dollars); and
  - b) for a term of at least five years from the day of the grant of this Licence (and such further term as directed in writing by the Minister),

and provide a certified copy of the bank guarantee to the Minister or IPART on request.

- A8 The Licensee must not commence, or authorise the commencement of, construction of any water industry infrastructure described in clause S1.1 and Table 1.2 paragraph (1) until:
  - (a) the Licensee has provided IPART a report prepared by a suitably qualified environmental consultant on the Licensee's proposed strategy of tankering out excess non-potable water as set out in its REF. The report should include:
    - modelling of truck movements during significant wet weather events or periods in the 10 year period prior to the grant of this Licence at times when irrigation would not have been undertaken;
    - an estimation of the costs of trucking during those wet weather events or periods;
    - iii) identification of Appropriate Facilities that have the capacity to accept excess recycled water (including during wet weather periods);
    - iv) evidence of agreements with the Appropriate Facilities setting out the arrangements for accepting excess non-potable water; and
    - v) confirmation that the configuration and size of the non-potable water storage tanks (as described in the REF) is adequate for the activities authorised by the Licence or, if the configuration or size of the non-potable water storage tanks is not considered adequate, advice as to any changes required to the configuration or size of the non-potable water storage tanks; and
  - (b) IPART has provided written approval of the report.

A9 Before the Licensee brings the Water Industry Infrastructure described in Table 3.2 into commercial operation, the Licensee must provide written evidence of the following to IPART:

- a) details of Appropriate Facilities that have the capacity to accept excess sewage; and
- b) evidence of agreements with the Appropriate Facilities setting out the arrangements for accepting excess sewage,

and the Licensee must obtain IPART's written approval.

### SCHEDULE B - STANDARD MINISTERIALLY-IMPOSED LICENCE CONDITIONS FOR ALL LICENSED NETWORK OPERATORS UNDER THE ACT

This schedule sets out the standard conditions which the Minister imposes on the Licensee and all other licensed network operators pursuant to section 13(1)(b) of the Act. In addition to these standard Ministerially-imposed conditions, the Licensee is subject to obligations imposed by the Act, the Regulation and the special Ministerially-imposed licence conditions set out in Schedule A. The Minister may vary the conditions in this schedule or impose new conditions, provided there is no inconsistency with the conditions imposed on the Licensee by the Act or the Regulation.

### B1 Ongoing capacity to operate

B1.1 The Licensee must have the technical, financial and organisational capacity to carry out the activities authorised by this Licence. If the Licensee ceases to have this capacity, it must report this to IPART immediately in accordance with the Reporting Manual.

### B2 Obtaining appropriate insurance

- B2.1 Before commencing to commercially operate the Specified Water Industry Infrastructure under this Licence, the Licensee must:
  - a) obtain insurance that is appropriate for the size and nature of the activities authorised under this Licence;
  - b) provide a copy of each certificate of currency of the insurance obtained to IPART; and
  - c) demonstrate that the insurance obtained is appropriate for the size and nature of the activities authorised under this Licence by providing a report to IPART from an Insurance Expert that:
    - i) certifies that in the Insurance Expert's opinion, the type and level of the insurance obtained by the Licensee is appropriate for the size and nature of the activities authorised under the Licence; and
    - ii) is in the form prescribed by the Reporting Manual.

### B2.2 [Not applicable]

### B3 Maintaining appropriate insurance

- B3.1 The Licensee must maintain insurance that is appropriate for the size and nature of the activities authorised under this Licence.
- B3.2 The Licensee must provide a copy of each certificate of currency of the insurance maintained by the Licensee to IPART in accordance with the Reporting Manual.
- B3.3 If there is to be a change in:
  - a) the insurer or underwriting panel in respect of an insurance policy held by the Licensee; or
  - b) the type, scope or limit on the amount of insurance held by the Licensee,

in relation to the activities authorised under this Licence, the Licensee must provide a report to IPART in accordance with the Reporting Manual.

B3.4 From time to time when requested in writing by IPART, the Licensee must provide a report to IPART, in the manner, form and time specified by IPART, from an Insurance Expert certifying that in the Insurance Expert's opinion the type, scope or limit on the amount of the insurance held by the Licensee is appropriate for the size and nature of the activities authorised under this Licence.

[Note: The circumstances in which IPART may request a report under clause B3.4 include (but are not limited to) the following:

- where IPART has reason to believe that there may be a change in the type, scope or limit on the amount of insurance held by the Licensee in relation to activities authorised under this Licence;
- where there is a change in the type or extent of activities authorised under this Licence; or
- where IPART or an approved auditor has reason to believe that the type, scope or limit on the amount of insurance held by the Licensee may not be appropriate for the size and nature of the activities authorised under this Licence.]
- B3.5 The Licensee must maintain professional indemnity insurance during the Design Phase and for a minimum period of 6 years from the date of the completion of the Design Phase.

### B4 Complying with NSW Health requirements

- B4.1 The Licensee must carry out the activities authorised by this Licence in compliance with any requirements of NSW Health that:
  - a) IPART has agreed to; and
  - b) are notified from time to time to the Licensee by IPART in writing.

### **B5** Complying with Audit Guidelines from IPART

B5.1 The Licensee must comply with any Audit Guidelines issued by IPART.

### B6 Reporting in accordance with the Reporting Manual

B6.1 The Licensee must prepare and submit reports in accordance with the Reporting Manual.

### **B7** Reporting information in relation to the Register of Licences

- B7.1 Within 14 days of any change in relation to the following, the Licensee must notify IPART, and provide details, of the change in accordance with the Reporting Manual:
  - a) any source from which the water handled by the Specified Water Industry Infrastructure is derived;
  - b) the Authorised Purposes of the water handled by the Specified Water Industry Infrastructure;
  - c) the identity of each licensed retail supplier or public water utility that has access to the infrastructure services provided by the Specified Water Industry Infrastructure for the purpose of supplying water to its customers;
  - d) any other water infrastructure to which the Specified Water Industry Infrastructure is connected;
  - e) the identity of each licensed retail supplier or public water utility that has access to infrastructure services provided by the Specified Water Industry Infrastructure for the purpose of providing sewerage services to its customers;
  - f) any other sewerage infrastructure to which the Specified Water Industry Infrastructure is connected;
  - g) the arrangements for the disposal of waste from the Specified Water Industry Infrastructure.

### **B8** Monitoring

- B8.1 The Licensee must undertake any monitoring that is required for the purposes of this Licence, any Plan, the Act or the Regulation in accordance with this clause B8.
- B8.2 The Licensee must keep the following records of any samples taken for monitoring purposes specified in the Water Quality Plan:
  - a) the date on which the sample was taken;
  - b) the time at which the sample was collected;
  - c) the point or location at which the sample was taken; and
  - d) the chain of custody of the sample (if applicable).
- B8.3 The Licensee must ensure that analyses of all samples taken for the purposes of Verification Monitoring are carried out by a laboratory accredited for the specified tests by an independent body that is acceptable to NSW Health, such as the National Association of Testing Authorities or an equivalent body.

### **B9** Provision of copy of Plan

B9.1 Whenever the Licensee makes a significant amendment to a Plan, the Licensee must provide a copy of the amended Plan to IPART at the same time that it provides a copy to the approved auditor engaged to prepare a report as to the adequacy of the amended Plan, as required under the Regulation.

### **B10** Delineating responsibilities – interconnections

- B10.1 If a code of conduct has not been established under reg 25 of the Regulation, the Licensee must (by a date specified by IPART) establish a code of conduct (Licensee's Code of Conduct) in accordance with this clause B10.
- B10.2 The Licensee's Code of Conduct must set out the respective responsibilities of:
  - a) the Licensee; and
  - b) each licensed network operator, licensed retail supplier and/or public water utility that:
    - (i) supplies water or provides sewerage services by means of, or
    - (ii) constructs, maintains or operates any water industry infrastructure that is connected to the Specified Water Industry Infrastructure,

by, at a minimum, providing for:

- c) who is responsible for repairing, replacing or maintaining any pipes, pumps, valves, storages or other infrastructure connecting the Specified Water Industry Infrastructure to the other water industry infrastructure;
- d) who is responsible for water quality;
- e) who is liable in the event of the unavailability of water;
- f) who is liable in the event of failure of the Specified Water Industry Infrastructure;
- g) the fees and charges payable in respect of the use of the Specified Water Industry Infrastructure; and
- h) who is responsible for handling customer complaints.

- B10.3 Before the Licensee brings the Specified Water Industry Infrastructure into commercial operation or by a later date specified by IPART (if any), the Licensee's Code of Conduct must be agreed in writing between the Licensee and the other licensed network operators, licensed retail suppliers and/or public water utilities referred to in clause B10.2.
- B10.4 [Not applicable]
- B10.5 The Licensee must not contravene the Licensee's Code of Conduct to the extent that it makes the Licensee responsible or liable for the matters set out in it.

### B11 Notification of changes to end-use

B11.1 If the Licensee proposes to operate the Specified Water Industry Infrastructure to supply water for an end-use which is not set out in the most recent Water Quality Plan provided to IPART, the Licensee must notify IPART in writing at least 3 months before commencing such operation.

### B12 Notification of changes to Authorised Person

B12.1 If an Authorised Person ceases, proposes to cease, or receives notification to cease providing any of the services relating to the activities authorised by this Licence, the Licensee must provide IPART with written notice as soon as practicable but no later than 28 days before the date of cessation of the services. The written notice must include details of how the services previously undertaken by the Authorised Person will continue to be undertaken.

### B13 Notification of commercial operation

- B13.1 This clause B13 applies each time the Licensee has brought any of the Specified Water Industry Infrastructure into commercial operation.
- B13.2 The Licensee must:
  - a) notify IPART in accordance with the Reporting Manual that it has brought the relevant Specified Water Industry Infrastructure into commercial operation; and
  - b) provide such notification within 10 days after it has brought the relevant Specified Water Industry Infrastructure into commercial operation.

### INTERPRETATION AND DEFINITIONS

### Interpretation

In this Schedule B, unless the context requires otherwise:

- (i) the singular includes the plural and vice versa;
- (ii) headings are used for convenience only and do not affect the interpretation of this Schedule B;
- (iii) a reference to a document includes the document as modified from time to time and any document replacing it;
- (iv) a reference to a "person" includes a natural person and any body or entity whether incorporated or not;
- (v) a reference to a clause is to a clause in this Schedule B;
- (vi) a reference to a schedule is to a schedule to this Licence;

- (vii) a reference to a law or statute includes regulations, rules, codes and other instruments under it, and consolidations, amendments, re-enactments or replacements of them; and
- (viii) explanatory notes do not form part of this Licence, but in the case of uncertainty may be relied on for interpretation purposes.

### Definitions

Expressions used in this Schedule B that are defined in the Act or the Regulation have the meanings set out in the Act or the Regulation.

In this Schedule B:

Audit Guidelines	means the document entitled "Audit Guideline – Water Industry Competition Act 2006" which is prepared by IPART and is available on IPART's website at <u>www.ipart.nsw.gov.au</u> , and any other guidelines issued by IPART in relation to audits under the Act.
Authorised Person	<ul> <li>means the authorised persons specified in, as applicable:</li> <li>(i) Licence Scope, clause S1, Table 1.1;</li> <li>(ii) Licence Scope, clause S2, Table 2.1; and</li> <li>(iii) Licence Scope, clause S3, Table 3.1.</li> </ul>
Authorised Purposes	<ul> <li>means the authorised purposes specified in, as applicable:</li> <li>(i) Licence Scope, clause S1, Table 1.3;</li> <li>(ii) Licence Scope, clause S2, Table 2.3; and</li> <li>(iii) Licence Scope, clause S3, Table 3.3.</li> </ul>
Design Phase	means the period during which any design works are carried out in relation to the water industry infrastructure that the Licensee is authorised to construct, maintain and operate under this Licence.
Insurance Expert	means an insurance broker which holds an Australian financial services licence under Part 7.6 of the <i>Corporations Act 2001</i> (Cth) that authorises the broker to provide financial product advice for, and deal in, contracts of insurance within the meaning of Chapter 7 of that Act.
Licensee's Code of Conduct	has the meaning given in clause B10.1.
NSW Health	means the Water Unit of NSW Ministry of Health and any of the local health districts as defined by the NSW Ministry of Health.
Plan	means any infrastructure operating plan, water quality plan or sewage management plan that the Licensee is required to prepare under the Regulation.
Specified Area of Operations	<ul> <li>means the area of operations specified in, as applicable:</li> <li>(i) Licence Scope, clause S1, Table 1.4;</li> <li>(ii) Licence Scope, clause S2, Table 2.4; and</li> <li>(iii) Licence Scope, clause S3, Table 3.4.</li> </ul>
Specified Water Industry	means the water industry infrastructure specified in, as applicable: (i) Licence Scope, clause S1, Table 1.2;

Infrastructure	(ii) Licence Scope, clause S2, Table 2.2; and
	(iii) Licence Scope, clause S3, Table 3.2.
Verification	means verification monitoring as described in the document entitled
Monitoring	"Australian Drinking Water Guidelines" or the document entitled "Australian Guidelines for Water Recycling" as the case may be.
Water Quality Plan	means the water quality plan that the Licensee is required to prepare under the Regulation.





EPA CORRESPONDENCE





DOC16/318114, File No. SF16/24842

ADW Johnson Pty Limited 7/335 Hillsborough Road WARNERS BAY NSW 2282

Attention: Mr Ian McNicol

Dear Mr McNicol

#### COASTAL HAMLETS PTY LTD SURPLUS RECYCLING WATER DISPOSAL OPTIONS

I refer to discussions with ADW Johnson and the Environment Protection Authority (EPA) on 9 June 2016 regarding potential surplus effluent disposal options identified in the document titled "Surplus Recycling Water Disposal Options Catherine Hill Bay", dated June 2016, prepared by ADW Johnson ("scoping report").

The EPA understands the sewage treatment system serving the Catherine Hill Bay Subdivision is to be constructed, maintained and operated by Solo Water Pty Ltd. I also note that final effluent quality achieved at the Catherine Hill Bay Subdivision will meet domestic reuse quality standards and it is expected that surplus treated effluent generated will be disposed of off-site.

Nine options for disposal of surplus treated effluent have been identified. The preferred option identified in the scoping report is Option 6, being discharge to stormwater, via a series of bioretention basins. The bioretention basins discharge to the intermittently closed and open lagoon which flows to ocean via an open drainage channel on the southern end of Catherine Hill Bay Beach. Option 8, discharge to Catherine Hill Bay Creek, and Option 4, discharge via ocean outfall, were the second and third ranked options respectively.

The EPA supports further consideration of the top three ranked options but encourages ADW Johnson to consider maintaining an area of irrigation in community title, integrated into the scheme, or, providing a range of contingencies for on-site storage of surplus water. The EPA's preference is nil discharge to the environment, however the EPA will consider offsite disposal, provided it is demonstrated that all other feasible and reasonable options have been considered.

For the EPA to consider discharge to waters, the following must be included within the environmental assessment, but may not be limited to:

- Consideration of factors listed in section 45 of the Protection of the Environment Operations Act 1997.
- Consideration of the NSW Water Quality Objectives and environmental values of the area;
- Documentation of the expected surplus treated effluent quality to be discharged to the environment;
- An assessment of the practical measures that will be taken to avoid discharge to waters;
- An explanation of the wastewater treatment process, wastewater recycling reticulation network and options for disposal of surplus treated water, including the benefits and costs of each;

PO Box 488G Newcastle NSW 2300 117 Bull Street, Newcastle West NSW 2302 Tel: (02) 4908 6800 Fax: (02) 4908 6810 ABN 43 692 285 758 www.epa.nsw.gov.au ×

- Details of how the reverse osmosis waste is to be disposed of lawfully, including the likely volumes generated;
- If surplus treated effluent has been chlorinated following reverse osmosis for reticulation within the subdivision, detail how the water will be de-chlorinated before it is discharged to waters:
- The predicted volumes of surplus water to be discharged must be modelled in the range of hydrological conditions including worst case scenarios;
- Provision of mixing model results based on a range of volumes of recycled water, mixing with stormwater and/or receiving waters during a range of hyprological conditions to demonstrate mixing and identify the distance from discharge point at which amblent conditions are met;
- Assessment of the impact of hydrological changes on the intermittently closed and open lagoon and beach including potential impacts of coastal erosion, coastal recession and entrance instability and migration;
- Detail the ongoing maintenance arrangements and management of the discharge of surplus treated effluent; and
- Provide management and mitigation measures to reduce or prevent environmental impacts, particularly in relation to changes in hydrology and water quality.

If you require any further information regarding this matter please contact myself on (02) 4908 6830.

Yours sincerely

REBECCA SCRIVENER A/Head Regional Operations Unit - Hunter Environment Protection Authority

Contact officer: REBECCA SCRIVENER (02) 4908 6830 homer region (Japa now gov au



### Appendix 4

LATEST MODIFICATION APPROVAL DATED 8 APRIL 2018

### **Modification of Project Approval**

### Section 75W of the Environmental Planning & Assessment Act 1979

As delegate of the Minister for Planning, I modify the Project Approval referred to in Schedule 1, subject to the conditions in Schedule 2.

Ahlerd'

Anthony Witherdin Director Modification Assessments

Sydney 6 APRIL 2018

### SCHEDULE 1

Project Approval:	<b>MP 10_0204</b> granted by the Planning Assessment Commission on 13 May 2011
For the following:	<ul> <li>Residential subdivision at Catherine Hill Bay including:</li> <li>a 540 residential lots;</li> <li>a retail lot;</li> <li>7 public reserves;</li> <li>bulk earth works and associated infrastructure; and</li> <li>the creation of a heritage precinct around both Wallarah House and the Jetty Masters cottage.</li> </ul>
Proponent:	Coastal Hamlets Pty Ltd
Approval Authority:	Minister for Planning
The Land:	Lot 100, 101,102, 103 and 106 DP 112872, Lot 1 DP 1141989, Lot 1, DP 1129299 and Lot 1, DP 1151628.
Modification:	<b>MP 10_0204 MOD 6</b> for changes to the road layout in Stage 7

### SCHEDULE 2

The above approval is modified as follows:

(a) Schedule 2 Part A – Administrative Condition A2 is amended by the insertion of the <u>bold and underlined</u> words / numbers and deletion of the struck out words / numbers as follows:

### A2 Development in Accordance with Plans and Documentation

The development shall be in accordance with the following plans, documentation and recommendations made therein:

Environmental Assessment Report – Catherine Hill Bay - Bulk Earthworks, Infrastructure and Staged Subdivision for Residential Development, including Appendices A-O, prepared by ADW Johnson Pty Ltd and as amended by:

- Preferred Project Report MP 10/0204 prepared by ADJ Johnson Pty Ltd, including Appendices A-M;
- The Statement of Commitments;
- The conditions of this approval, and in particular condition A7 and the amended subdivision plan;
- The amended boundaries in the two plans titled "Plans of Stage 1 and 1b and Plan of Stage 2 Comparison of Revised Road Layout" in the report prepared by ADW Johnson Pty Ltd dated October 2012, accompanying the Mod 1 Application; and
- The revised subdivision plan titled 'Plan of Subdivision, Plans 1 to 13, prepared by ADW Johnson dated 16 June 2014, accompanying MOD 2 Application.
- The amended boundaries as shown in Comparison plans no. 11688-SUB-002-AW-C3D and the Staging and subdivision plan no. 1688-SUB-002-AW-C3D in the report prepared by ADW Johnson dated October 2014 accompanying the Mod 4 application.

 The revised subdivision, staging and comparison plans, all numbered 11688-SUB-002- BC-C3D dated 14/11/2017 in the Response to Submissions report prepared by ADW Johnson dated December 2017 accompanying the Mod 6 application.

(b) Schedule 2 Part B – Prior to Commencement of Works – Condition B8is amended by the insertion of the bold and underlined words / numbers and deletion of the struck out words / numbers as follows:

### *B8* Stormwater Management

- (1) The stormwater system for the subdivision is to be provided in accordance with Stormwater Management & Concept Engineering Report for Proposed Residential Subdivision at Montefiore Street, Catherine Hill Bay prepared by ADW Johnson December 2010 (Reference 11688SWV1). Design plans must be submitted to and approved by the Council prior to issue of a Construction Certificate.
- (2) If wetlands are to be constructed for stormwater management purposes, they shall be designed by an appropriately qualified person and generally in accordance with the Constructed Wetlands Manual (DLWC 1998).
- (3) A Wetland Management Plan must be submitted to the Council for approval prior to issue of the Construction Certificate for wetlands. Details to include operational, access and maintenance requirements and are to be included on the approved Construction Certificate plans.
- (4) A Stormwater Maintenance and Monitoring Strategy should be developed to demonstrate the effectiveness of the proposed stormwater treatments, particularly for those treatments which drain to the SEPP 14 wetland. This should include:
  - (a) Monitoring of water quality (total phosphorus, total nitrogen, total suspended solids and gross pollutants) downstream of the stormwater treatments during and after storm events; and
  - (b) A plan scheduling maintenance of stormwater infrastructure detailing required maintenance works and responsible parties for undertaken the maintenance works.
- (5) A consolidated Stormwater Management Strategy is to be prepared for all stages of the development and include drainage and detention requirements for all stages. The plan should include the addendum as provided as part of the MP10\_0204 MOD 4 request and clearly outline how stormwater is to be contained within the site prior to discharge and that any discharges will be in

accordance with OEH and Council treatment targets. <u>This includes discharges</u> from Stage 7 to the adjoining land owned by National Parks and Wildlife <u>Service</u>. This is to be provided to the Department following detailed design of all stages.

(c) Schedule 2 Part B – Prior to Commencement of Works – Condition B26 is amended by the insertion of the bold and underlined words / numbers and deletion of the struck out words / numbers as follows:

### B26 Retaining Wall

Retaining walls must be designed and certified by a qualified structural engineer in accordance with AS4678 Earth Retaining Structures prior to the issue of a Construction Certificate. The retaining walls must be located fully within the boundaries of the subject property.

Retaining walls in Stage 7 which are visible from public roads must be constructed of decorative masonry in a colour approved by Council prior to issue of the relevant Construction Certificate.

(d) Schedule 2 Part B – Prior to Commencement of Works – Condition B29 is amended by the insertion of the bold and underlined words / numbers and deletion of the struck out words / numbers as follows:

### B29 Bushfire

- (1) Having regard to the required subdivision amendments and inclusion of perimeter roads adjacent to conservation lands, documentation is to be submitted to the Director, Strategic Assessment to demonstrate that the NSW Rural Fire Service endorse the final proposed APZ depths and dwelling construction requirements for affected allotments in accordance with AS 3959-2009.
- (2) A bushfire risk management plan is to be prepared in consultation with the Rural Fire Services by a suitably qualified person. The plan is to be submitted and approved by the Certifying Authority.
- (3) Water supply for fire fighting purposes and water, electricity and gas are to comply with Planning for Bushfire Protection 2006.
- (4) Landscaping is to be in accordance with Planning for Bushfire Protection 2006.
- (5) <u>The perimeter road (being Raywood Circuit) in Stage 7 shall comply with</u> <u>section 4.1.3 (1) of Planning for Bushfire Protection 2006 and shall have a</u> <u>minimum carriageway width of 8 metres kerb to kerb.</u>

**End of Modification** 





















Ohnson pty. 1td.













**CLAUSE 228 - ENVIRONMENTAL FACTORS** 

### Assessment of Clause 228 of the Regulations

a) Any environmental impact on a community.

The proposed amended RWTP will have a beneficial impact on the community by providing a sewer service to future residents within the Beaches development. The amended proposal will also reduce construction and operation impacts through the removal of RO and irrigation.

b) Any transformation of a locality.

The proposed amended RWTP will improve the locality by being able to remove a large portion of land for irrigation purposes as well as using the existing RO reject ponds as passive open space.

c) Any environmental impact on the ecosystems of the locality.

The proposed amended RWTP will result in less environmental impacts as discussed throughout the Addendum REF.

d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality.

The proposed amended RWTP will result in improved aesthetic, recreational, scientific and environmental quality of the locality as discussed throughout the Addendum REF.

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.

The proposed amended RW TP will have only benefits upon the locality, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.

*f)* Any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974)

The proposed amended R WTP will only reduce impacts on the habitat of protected fauna.

g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air.

Discussed above.

h) Any long-term effects on the environment.

The proposed amended RWTP will not have any long term effects on the environment beyond what has been assessed under the original REF.

*i)* Any degradation of the quality of the environment.

Improvements only - Discussed above.

j) Any risk to the safety of the environment.

Improvements only - Discussed above.

k) Any reduction in the range of beneficial uses of the environment.

Improvements only - Discussed above.

I) Any pollution of the environment.

Improvements only - Discussed above.

m) Any environmental problems associated with the disposal of waste.

The proposed amended RWTP will have significant improvements in this regard through the removal of RO which generates a highly saline waste product.

n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply.

Improvements only - Discussed above.

o) Any cumulative environmental effect with other existing or likely future activities.

Improvements only - Discussed above.



### Appendix 6

**RISK ASSESSMENT FOR INCREASING TDS AUGUST 2019** 



# Risk assessment for increasing TDS limit in the recycled water at Catherine Hill Bay

August 2019





## Risk assessment for increasing TDS limit in the recycled water at Catherine Hill Bay

**Author:** Dr Mick Battam, Principal soil scientist AgEnviro Solutions. CPSS. CIAg CID **Reviewer:** Steve Garland, Principal horticulturalist. MLArch, Hort Cert, MAILDM.



### **Report Limitations**

This report was written in a certain way, with a certain budget, for a specific intention.

The material contained within this report is for use by Catherine Hill Bay Water Utility for the irrigation of recycled water in the Rose Group Development at Montefiore Street, Catherine Hill Bay NSW. Limitations apply and the material contained within the report (including technical information and formats) is not to be used by other persons, organisations other than within contexts of the irrigation of recycled water in the Rose Group Development at Montefiore Street, Catherine Hill Bay NSW.

### **AgEnviro Solutions**

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### **Executive summary**

A new subdivision (550 residential lots) is under construction around Montefiore Street at Catherine Hill Bay. Recycled water generated by the subdivision is treated by Catherine Hill Bay Water Utility and then reused by the residents for toilets, laundry, irrigation and outdoor cleaning.

At present the recycled water (RW) is treated using a using a membrane bioreactor along with UV exposure and chlorine dosing. Over the past 5 months the RW had an average TDS of 596 ppm, which is close to the 600-ppm average required. Given the water is being used to irrigate lawns and gardens in a subdivision subject to coastal spray, the Rose Group engaged Dr Mick Battam (AgEnviro Solutions) to perform a risk assessment on increasing the average TDS limit from 600 to 750 ppm. There would be no change to the maximum TDS level permissible in the RW, which remains at 1000 ppm.

### Impact of changes

Increasing the TDS levels in the recycled water from 600 to 750 ppm:

- will assist in maintaining a high soil infiltration rate;
- is of minimal concern for lawns, with those used throughout the development (and those sold in the Sydney-Newcastle area) typically tolerant of salt in both the irrigation water and soils;
- is of minimal concern for most of the garden plants used in the development which are relatively tolerant of salinity (Figure E.1); and
- the existing 600 ppm RW should not be used in a drip system due to the risk of salt accumulation along the edge of the wetted area beneath emitters. The soil at this site are poorly suited to drip irrigation as they are sands that are prone to becoming water repellent.



**Figure E.1:** Most plants are salt tolerant (not surprising in a coastal area)

RW containing 596 ppm (average) was used to irrigate lawns and gardens that survived a 32-day period over summer when minimal rain occurred (needed to leach salts), with no signs of salt stress reported. To apply the same quantity of salt with 750 ppm water requires 26 summer days with minimal rain, with water balance modelling suggesting shandying will be occurring at this point due to the scheme having inadequate RW to keep up with demand.

### **Recycled water irrigation management**

A risk assessment found the existing practices are adequate for managing the risks associated with increasing the TDS levels from 600 to 750 ppm, with key measures that are already in place including:

- site soils and/or those typically sold by local suppliers are sandy and easy to leach salts through;
- lawn species already planted and/or those sold by local suppliers are tolerant of salinity;
- most plants used in gardens are tolerant of salinity (not surprising given the coastal location);
- residents are instructed in the home owner's manual that:
  - gypsum/lime additional may periodically be required;
  - salt accumulation is more likely to occur in hot and dry conditions;
  - o salt accumulation is more likely with drip irrigation which is not recommended; and
  - drinking water should be used to irrigate salt sensitive plants and any plants suspected of displaying signs of salt injury.

It is not surprising that current practices are adequate as no reported signs of salinity occurred during the 32-day period (8<sup>th</sup> Jan to 8<sup>th</sup> Feb 2019) when minimal rain occurred. However, it is recommended that gardens and lawns be visually monitored for signs of salt injury in extended summer dry periods.
# Background

A new subdivision (550 residential lots) is under construction around Montefiore Street at Catherine Hill Bay (Figure 1.1). Recycled water generated by the subdivision is treated by Catherine Hill Bay Water Utility (CHBWU) and then reused by the residents for:

- toilets;
- laundry;
- irrigation; and
- other outdoor water uses e.g. cleaning and car washing.

It is expected that about 70% of the recycled water generated by the new subdivision will be reused onsite by the residents, with the excess wastewater to be conveyed to the sewer at Gwandalan once the 6 km connecting pipeline is installed (12 to 24 months).

At present the recycled water is treated using a membrane bioreactor along with UV exposure and chlorine dosing. Over the past 5 months the recycled water had an average TDS of 596 ppm, which is close to the 600-ppm average required. Given the water is being used to irrigate lawns and gardens in a subdivision subject to coastal spray, the Rose Group engaged AgEnviro Solutions Pty Ltd to perform a risk assessment on the impact of increasing the average TDS limit in the recycled water (RW) from 600 to 750 ppm. A summary of the risk assessment findings is presented in this report which was written by Dr Mick Battam (certified professional soil scientist).



Figure 1.1: Catherine Hill Bay development (Planit Consulting, 2014).

# 2 Recycled water

At the time of writing this report (July 2019) the development was generating about 100 kL/day of recycled water. Each week this is increasing by about 0.5 to 1 kL due to the connection of about 1 to 2 additional houses per week, with about 275 kL/day likely to be generated once construction of the 550 dwellings is complete. The recycled water is being treated using a using a membrane bioreactor along with UV exposure and chlorine dosing, with recycled water then reused by the residents.

# 2.1 Water quality

The scheme operates under a recycled water management plan based on the Australian guidelines for water recycling (NRMMC *et. al.*, 2006). Monitoring of the water quality found it operates within the management plan requirements, with the typical characteristics provided in Table 2.1. The sample tested on the 6<sup>th</sup> June 2019 and 18<sup>th</sup> July 2019 found the recycled water has and SAR level of 6.33 to 7.41, with the 6<sup>th</sup> June 2019 sampling finding;

- non-detectable levels of organochlorines and organophosphate pesticides; and
- low levels of metal were also observed which were all well below the ANZECC and ARMCANZ (2000) limits for sites receiving long-term irrigation.

It is not surprising to find low levels of contaminants given 99% of the sewage is generated by residents.

## 2.2 Proposed increase to TDS levels

Over the past 5 months the recycled water had an average TDS of 596 ppm, which is close to but slightly less than the 600-ppm limit. Given the water is being used to irrigate lawns and gardens in a subdivision subject to coastal spray, the Rose Group engaged AgEnviro Solutions Pty Ltd to perform a risk assessment on increasing the average TDS limit in the irrigation water from 600 to 750 ppm.

Parameter	Minimum	50-percentile	95-percentile	Maximum
BOD (mg/L)			5	10
Suspended solids (mg/L)			5	10
Ammonia (mg/L)			1	
Total nitrogen (mg/L)		10		20
Total phosphorus (mg/L)		0.3		2
pH	6.5			8.5
Turbidity (NTU)			0.5	
E.Coli (cfu/100 ml)			<1	
Total coliforms (cfu/100 ml)			<1	
TDS (mg/L)		600 <sup>1</sup>		1000
Bacteria LRV (log reduction)	5.3			
Protozoan LRV (log reduction)	5.1			
Virus LRV (log reduction)	6.5			
Chlorine residual (mg/L)	0.2		2	5

Table 2.1: Typical recycled water quality information provided by Solo Water to their customers.

1 Value refers to the average and not the median

# 3 Impact on soils

The impact of increasing TDS levels in the recycled water from 600 to 750 ppm is discussed below.

## 3.1 Capacity for leaching salts

Major earthworks have been performed on the development site that have resulted in a constructed soil profile that typically consists of (Aqueduct Consulting and AgEnviro Solutions, 2018):

- 50 to 200 mm of coarse sand to loamy sand, but contains some rocks; overlying
- 200 mm of gravelly loamy sand material; overlying
- orange light clay (dune sand subsoil) or pink/white heavy clay (conglomerate subsoil).

These soils have a low water holding capacity, with is demonstrated by some of the hardier plants struggling during the recent site inspection (Figure 3.2). Some residents have used imported topsoil, with this typically very sandy and consistent with material sold by the 3 major local soil suppliers.

The infiltration rate of the site and/or imported soil varied from moderate to very high (Aqueduct Consulting and AgEnviro Solutions, 2018). As such, the soils are relatively easy to leach salts through (a major reason why they are currently so low in nutrients), with the increase in TDS levels in the recycled water of minimal concern. This point is demonstrated by the absence of reported salinity problems in houses irrigated with RW during the extended dry period that occurred in early 2019.

## **3.2 Impact on infiltration rate**

Recent testing of the recycled water found it has an SAR level of 6.33 to 7.41. When combined with the current TDS level of 600 ppm ( $\neg$ 0.9 dS/m) there will possibly be a slight to moderate reduction in infiltration rate that will occur over time as a result of irrigating with RW (Figure 3.1). However, if the TDS level is increased to 750 ppm ( $\neg$ 1.2 dS/m) this problem is less likely to occur (Figure 3.1). As such, the increase in TDS levels will reduce the risk of a decline in infiltration rate.



**Figure 3.1:** Likely impact of irrigation water on the soil infiltration rate (FAO, 1994). Increasing to the TDS from 600 to 750 ppm will reduce the likelihood of infiltration problems developing.



**Figure 3.2:** Even hardy plants struggle in the dune soils (upper) and some of the imported soils (lower) throught the development as these have a small water holding capacity and are low in nutrients due to leaching. These soils (including the imported soils) should have been amended prior to planting or laying turf.

# 4 Impact on lawns

An inspection of subdivision in July 2019 found all of the lawn species planted are very tolerant of both saline irrigation water and salinity levels within the soil (Table 4.1). This is not surprising as almost all of the lawns sold by turf farms in the Newcastle-Sydney area are salt tolerant. As salts can be readily leached from the soils used in the development, increasing the TDS levels in the recycled water from 600 to 750 ppm is of minimal concern with regards to the performance of lawns.

**Table 4.1:** Lawn species (in order of occurrence) observed in Catherine Hill Bay development in July 2019 and their tolerance levels to salinity levels in the irrigation water and soil (adapted from Stevens *et. al.*, 2008).

Turf grass	Irrigation water spray (ppm)	Soil salinity EC <sub>e</sub> (ppm)
Soft leaf buffalo	1660	1920
Male sterile kikuyu	4420	3840 to 6400
Zoysia matrella 'Sir Grange'	2750	3200
Couch	2180	2560
Zoysia japonica 'Empire' <sup>2</sup>	>1350	>1540

1 Individual cultivars vary, with a conservative figure chosen that corresponds to a 20% reduction in growth 2 Conservatively estimated based on soft information available in the literature

# **5 Impact on gardens**

### 5.1 Salt sensitive plants

The current 600 ppm TDS levels within the recycled water and the coastal environment will have an adverse effect on salt sensitive plants that include (but are not limited to):

- some fruit and vegetables e.g. beans, carrots, tomato, potato and strawberries;
- some fruit trees e.g. citrus, stone fruit, mango, olive, apples, pear and grapes;
- orchids and some annual flowering plants e.g. pansies and cosmos;
- salt sensitive perennials e.g. azaleas, camelia japonica, roses and Japanese maples.

Many of these may struggle due to the salinity associated with salt spray from the ocean, but if residents choose to plant salt sensitive plants then these should be irrigated with potable or rain water. The following discussion is not about plants that are intolerant of 600 ppm TDS level, but focusses on the impact of increasing TDS levels in the recycled water from 600 to 750 ppm on other garden plants.

# 5.2 Plants used in the development

The houses within the subdivision are all located 0.3 to 1.6 km from the ocean and are thereby subject to sea spray. As such, it is not surprising to find almost all of the garden plants observed throughout the development are tolerant of (Table 5.1):

- spray from irrigation water containing salts; and
- soil salinity levels of more than 1300 ppm (saturated extract).

Relatively few salt intolerant garden plants were observed in the gardens, with the increase in TDS levels in the irrigation water likely to have minimal impact (Table 5.1). Those salt that were present were likely to struggle not only due to the coastal environment, but because they had often been planted in unsuitable locations such as <u>Acer palmatum</u> (Japanese maple) and <u>Colocasia</u> sp. (elephant ears) in full sun. Other poorly located plants were struggling such as <u>Zantedeschia aethiopica</u> (arum lilies) in full sun.

Saiantifia noma	Common	Tolerance to salt	Tolerance to	Tolerance to irrigation with:		
Scientific frame	name	in irrigation water	soil salinity	600 ppm	750 ppm	
Banksia integrifolia		Coastal plant	Coastal plant	Yes	Yes	
Cupaniopsis anacardioides	Tuckeroo	Coastal plant	Coastal plant	Yes	Yes	
Anigozanthos cvv.	Kangaroo paw	likely tolerant	Tolerant	Yes	Yes	
Poa labillardieri		Tolerant	Tolerant	Yes	Yes	
Lomandra 'Tanika'		Tolerant	Tolerant	Yes	Yes	
Westringia fructicosa	Seashore rosemary	Coastal plant	Coastal plant	Yes	Yes	
Strelitzia reginae	Bird of paradise	$1670^{2}$	$1280^{3}$	Yes	Yes	
Syzigum cvv.		2750 <sup>2</sup>	2560 <sup>3</sup>	Yes	Yes	
Carpobrotus glaucescens	Angular pigface	4420 <sup>2</sup>	5120 <sup>3</sup>	Yes	Yes	
Pennisetum alopecuroides		Tolerant	Tolerant	Yes	Yes	
Dianella cearulea		Tolerant	Moderate	Yes	Yes	
Philodendron 'Xanada'	Xanadu	Tolerant	Tolerant	Yes	Yes	
Festuca glauca		Tolerant	Tolerant	Yes	Yes	
Cycas revoluta	Cycas	Tolerant	Tolerant	Yes	Yes	

**Table 5.1a:** The <u>most common plants</u> observed in the residential gardens in July 2019 and their tolerance to salt in the irrigation water and soil<sup>1</sup>.

1 Based on information from various sources such as Berzona et al (2009), Greive et al (2012), NRMMC *et. al.*, 2006, Stevens et al (2008) and Tanji et al (2007). If information was lacking some additional advice on salt tolerance was obtained from former TAFE and University lecturer Mr Steve Garland who worked in leachate irrigation trials for the University of Sydney

2 units in ppm based on conversion from EC

 $3 \ \text{units}$  in ppm based on conversion from soil saturated extract EC

	Common	Tolerance to salt	Tolerance to	Tolerance to irrigation with:		
Scientific name	name	in irrigation water	soil salinity	600 ppm	750 ppm	
Acacia cognata				Yes	Yes	
Acer palmatum cv.	Weeping maple	830	<1280	Unlikely <sup>4</sup>	Unlikely <sup>4</sup>	
Adenanthos sericeus	Woolly Albany	Tolerant	Tolerant	Yes	Yes	
Agave		2750	2560	Yes	Yes	
Alpinia sp.	Ginger	Moderate	Moderate	Yes	Yes	
Bromeliads	0	Moderate	Moderate	Yes	Yes	
Casuarina cv.		Tolerant	Coastal plant	Yes	Yes	
Callistemon spp. & cvv.		Tolerant	Moderate	Yes	Yes	
Canna indica	Canna lilv	Moderate	Moderate	Yes	Yes	
Chrysocephalum apiculatum	Yellow buttons	tolerant	Tolerant	Yes	Yes	
Colocasia cv.	Elephant ear	Likely no	Some are	Unlikelv <sup>4</sup>	Unlikelv <sup>4</sup>	
Cordyline australis		Tolerant	Tolerant	Yes	Yes	
Dorvanthes excelsa	Gymea lily	Sensitive	Sensitive	Likely tolerant	Likely tolerant	
Dypsis lutescens	Golden cane	Tolerant	Tolerant	Yes	Yes	
Ficus benjamina	Weening fig	1670	1280	Yes	Yes	
Gardenia augusta cy	Gardenia	830 to 960	1280	Likely tolerant	Likely tolerant	
Grevillea cyv	Gurdenna	Some are	Some are	Many cultivars	Many cultivars	
Hardenbergia violacea	Native violet	highly tolerant	highly tolerant	Ves	Ves	
Hibiscus rosa-sinensis	Hibiscus	3840		Ves	Ves	
Hibisous tiliaceus	Native hibicous	Tolerant	Tolerant	Vac	Vac	
Juniner conforte	Share juniner	1670	1020	Vas	Vac	
Liriona mussori	Shore Jumper	Moderate	1920 Moderate	Yes	Vac	
Magnalia "Little Care"		1280	1280	I es	I es	
Magnolia "Liule Gem"		1280	1280	Likely tolerant	Likely tolerant	
Metrosideros exceisa	NZ Christmas bush	3840	3840	Yes	res	
Murraya paniculata	Murraya	Sensitive	Tolerant	Likely tolerant	Likely tolerant	
Myoporum parvitolium	Myoporum	Tolerant	Tolerant	Yes	Yes	
Nandina 'Gulf Stream'		Tolerant	Tolerant	Yes	Yes	
Ophiopogon japonicus	Mondo	1280	1670	Yes	Yes	
Pandanus tectorius	Pandanus	Coastal plant	Coastal plant	Yes	Yes	
Philodendron selloum		Moderate	Moderate	Yes	Yes	
Phormium cvv.	NZ Flax	2750	2560	Yes	Yes	
Photinia cv.	Photinia	830	830	Likely tolerant	Likely tolerant	
Pittosporum "green sheen"		>1280	1670	Likely tolerant	Likely tolerant	
Pittosporum "Miss Muffet"	Miss Muffet	>1280	1920	Yes	Yes	
Plumeria sp.	Frangipani	Tolerant	Tolerant	Yes	Yes	
Rhaphiolepsis 'Oriental pearl'	Indian hawthorn	2750	2560	Yes	Yes	
Rondeletia amoena		Tolerant	Tolerant	Yes	Yes	
Symphyotichum sp.	Aster daisy	Moderate	Moderate	Likely tolerant	Likely tolerant	
Tradescantia spathacea	Moses in the cradle	Tolerant	Tolerant	Yes	Yes	
Tulbaghia violacea	society garlic	Moderate	Moderate	Yes	Yes	
Viburnum odoratissimum	Sweet virburnum	Moderate	Moderate	Yes	Yes	
Xanthorrhoea sp.	Grass tree	Tolerant	Tolerant	Yes	Yes	
Zamia furfuracea	carboard palm	High tolerance	High tolerance	Yes	Yes	
Zantedeschia aethiopica	Arum lilies	Moderate	Moderate	Likely tolerant	Likely tolerant	

**Table 5.1b:** <u>Less common plants</u> observed in the residential gardens in July 2019 and their tolerance to salt in the irrigation water and soil<sup>1</sup>.

1 Based on information from various sources such as Berzona et al (2009), Greive et al (2012), NRMMC *et. al.*, 2006, Stevens et al (2008) and Tanji et al (2007). If information was lacking some additional advice on salt tolerance was obtained from former TAFE and University lecturer Mr Steve Garland who worked in leachate irrigation trials for the University of Sydney

2 units in ppm based on conversion from EC

3 units in ppm based on conversion from soil saturated extract  $\mathrm{EC}$ 

4 likely intolerant of 600 ppm

# 6 Localised areas where salts can accumulate

Unless a close emitter spacing is used, drip irrigation systems typically apply water to localised areas, with the surrounding soil remaining unirrigated. As a result, salt accumulation is possible around the edge of the wetted area (Hanson and May, 2011; Raine *et al*, 2005). If adequate rainfall occurs these salts can be leached, but salinity levels can become elevated in localised areas during extended dry periods (Figure 6.1). As such, drip irrigation is not recommended for use with the RW regardless of whether it has a TDS level of 600 or 750 ppm. In any event, the very sandy soils that are present throughout the development are poorly suited to drip irrigation because the soil:

- often has a very high infiltration rate (Aqueduct Consulting and AgEnviro Solutions, 2018), which would result in extremely narrow wetted areas so the water reaches the base of the rootzone in less than 5 minutes after starting a watering event (easy to waste water); and
- is highly prone to becoming water repellent so the water runs off the surface in an unpredictable manner until it finds an area where the soil is non-repellent.

As such, it is recommended that the home owners information pack for this development be modified to discourage residents from using drip irrigation, especially with RW.



**Figure 6.1:** Salt accumulation around the edge of the wetted area can occur when water containing salts is used in drip irrigation systems where the wetting patterns don't overlap (upper left). Drip irrigation is poorly suited to the very sandy soils (upper right) observed in the development which were constructed with site soil derived from a sand dune profile (lower).

# 7 Using potable water to leach salts

### 7.1 Recycled water supply versus summer demand

Water balance modelling was performed to determine whether there is likely to be adequate RW available for summer periods when minimal rain occurs for 26 days. The water balance model used 34 years of daily weather data and assumes:

- minimal laundry occurs on rainy days during the cooler months (May to September);
- minimal outdoor water use occurs during the cooler months (May to September);
- minimal irrigation occurs on days when more than 5 mm of rain occurs;
- the residents have an average peak water demand of 1.8 kL/day/house based on (WSAA, Sydney Water Edition 2014); and
- irrigation in the warmer months occurs in relation to pan evaporation rates up to a maximum of 10 mm pan evaporation, with a base level of irrigation assumed to occur on days where less than 5 mm of pan evaporation occurs. These figures were scaled until the model was able to demonstrate a long-term average reuse of 70% (WSAA, Sydney Water Edition 2014).

Once all of the 550 houses are connected, water balance modelling suggests if there is minimal rain over summer then the scheme will have inadequate RW to keep up with demand after 10 days (50 percentile) to 20 days (100 percentile). Therefore, if minimal rain occurs for a 20-day period over summer then based on this high-level water balance modelling it is likely that Solo Water will need to be shandying with potable to keep up with demand.

# 7.2 Past experience

The scheme has been delivering RW to the new subdivision since 18<sup>th</sup> December 2018. During this time the lawns and gardens survived a 32-day period (8<sup>th</sup> Jan to 8<sup>th</sup> Feb 2019) where inadequate rain occurred to assist in leaching of the salts applied via the irrigation with 600 ppm RW (Figures 7.1 & 7.2). If the same irrigation practices are used then to apply this quantity of salts with 750 ppm water would require a 26-day period over summer, with water balance modelling suggesting that Solo Water will already be shandying the RW by this time in order to keep up with demand (Section 7.1).

The lack of salinity symptoms observed in the dry period earlier this year suggest the gardens and lawns in the development could tolerant irrigation with 750 ppm RW for much more than 26 summer days with minimal rain. However, it is recommended that gardens and lawns be examined for signs of salt stress during extended dry summer periods, with the residents already warned about the increased risk in the homeowner's manual provided by Solo Water.



**Figure 7.1:** Most of the garden plants were relatively tolerant of salinity and survived the extended dry period that occurred in summer 2019. This is not surprising given the close proximity to the ocean.



**Figure 7.2:** Most of the garden plants were relatively tolerant of salinity which is not surprising given the close proximity to the ocean.

# 8 Risk assessment

A risk assessment was performed to identify those additional practices described in this report that should be implemented as a result of increasing the TDS levels in the RW from 600 to 750 ppm (Table 8.1). The risk assessment was performed in according to the "Australian Guidelines for Water Recycling: Managing Health and Environmental risks (Phase 1)", which involves ranking each potential hazard with regards to likelihood of occurrence and severity of outcome.

The existing practices are adequate for managing the risks associated with increasing the TDS levels from 600 to 750 ppm, with those key measures that are already in place including:

- the soils already on the site and/or those typically sold by local suppliers are sandy and therefore relatively easy to leach salts through;
- lawn species already planted and/or those sold by local suppliers are tolerant of salinity;
- most of the garden plants used by residents are tolerant of salinity which is not surprising given the coastal environment; and
- residents are instructed in the home owner's manual that:
  - o gypsum/lime additional may periodically be required;
  - o salt accumulation is more likely to occur in hot and dry conditions;
  - o salt accumulation is more likely with drip irrigation which is not recommended;
  - drinking water should be used to irrigate salt sensitive plants and any plants suspected of displaying signs of salt injury

These results are not surprising given no reported signs of salinity occurred during the 32-day period (8<sup>th</sup> Jan to 8<sup>th</sup> Feb 2019) where inadequate rain occurred to assist in leaching of the salts. However, it is recommended that gardens (and to a lesser extent lawns) be visually monitored for signs of salt injury during extended summer dry periods.

# Table 8.1: Risk assessment for the proposed increases in the TDS levels in the RW from 600 to 750 ppm.

Hazard	Use or exposure	Receptor	Environmental end point	Effect	Current control measures	Likelihood	Impact	Risk rating	Additional measures	Likelihood	Impact	Risk rating
Sodium	Soil	Soil	Soil and plant	Reduced infiltration rate	<ul> <li>SAR levels monitored at 6 monthly intervals</li> <li>RW with a SAR of 6.33 to 7.42 and TDS of 600 ppm is predicted to cause a slight to moderate reduction in the infiltration rate, with this less likely to occur if TDS is increased to 750 ppm (Figure 3.1)</li> <li>Home owner's manual says lawns &amp; gardens may periodically require lime/gypsum and residents should contact a nursery or landscaper regarding any specific soil amendments needed to grow plants</li> </ul>	Unlikely	Minor	Low		Unlikely	Minor	Low
Salt	Lawn	Lawn	Lawn	Foliar injury	• lawn species sold in the Sydney-Newcastle area (including all of those currently planted in the development) will tolerant irrigation with water containing a TDS of 750 ppm	Unlikely	Minor	Low		Unlikely	Minor	Low
Salt	Garden plants	Plants	Garden plants	Foliar injury	<ul> <li>Most of the plants in the gardens are tolerant of 750 ppm TDS which is not surprising given the coastal location</li> <li>Home owner's manual says that irrigation with drinking water should occur on all salt sensitive plants and any plant the is suspected of being impacted by salt.</li> </ul>	Unlikely	Minor	Low		Unlikely	Minor	Low
Salt	Soil	Lawn	Lawn	Toxicity	<ul> <li>soils in the suburb generally have a moderate to high infiltration rate so salts can be easily leached</li> <li>lawn species sold in the Sydney-Newcastle area (including all of those currently planted in the development) have a moderate to high salt tolerance</li> <li>lawns irrigated with RW that had a TDS of 600 ppm occurred for an extended dry period during early 2019 and survived for extended time when minimal rain occurred (Section 7.2)</li> <li>once 550 houses are connected the scheme is likely to have inadequate RW supply in peak periods, with potable water irrigation (supplied via the RW main) likely to occur if minimal rain occurs for an extended period of time over summer</li> <li>Home owner's manual tells residents that RW contains salts and that this is more likely to adversely affect plants in hot and dry conditions. The manual says irrigation with drinking water should occur on all salt sensitive plants and any plant the is suspected of being impacted by salt.</li> </ul>	Unlikely	Minor	Low		Unlikely	Minor	Low
Salt	Soil	Gardens	Gardens	Toxicity	<ul> <li>soils in the suburb generally have a moderate to high infiltration rate so salts can be easily leached</li> <li>Most of the plants in the gardens are tolerant of 750 ppm TDS which is not surprising given the coastal location</li> <li>lawn species sold in the Sydney-Newcastle area (including all of those currently planted in the development) have a moderate to high salt tolerance</li> <li>lawns irrigated with RW that had a TDS of 600 ppm occurred for an extended dry period during early 2019 and survived for extended time when minimal rain occurred (Section 7.2)</li> <li>once 550 houses are connected the scheme is likely to have inadequate RW supply in peak periods, with potable water irrigation (supplied via the RW main) likely to occur if minimal rain occurs for an extended period of time over summer</li> <li>Home owner's manual tells residents that RW contains salts and that this is more likely to adversely affect plants in hot and dry conditions. The manual says irrigation with drinking water should occur on all salt sensitive plants and any plant the is suspected of being impacted by salt.</li> <li>Home owner's manual tells residents that drip irrigation is not recommended for use with RW</li> </ul>	Unlikely	Minor	Low	• Visual monitoring of the gardens for signs of salt injury during extended hot and dry periods	Unlikely	Minor	Low

# 9 Conclusions

The report describes the impact of increasing TDS levels in the recycled water from 600 to 750 ppm, with the likely impact being:

- Soil infiltration rate: is less likely to decrease over time;
- Lawns: are tolerant of saline conditions and are of minimal concern;
- **Gardens:** there are plants that would not tolerate the current salt levels in the RW and these should be irrigated with potable water as recommended in the home owner's manual. The site assessment found most of the garden plants used in the development are relatively tolerant of salinity which is not surprising given the sites close proximity to the ocean (sea spray); and
- **Drip irrigation:** should not be used to apply recycled water (as recommended in the home owner's manual), with the soils at this site (sandy and prone to becoming water repellent) not suited to drip.

A risk assessment found the existing practices are adequate for managing the risks associated with increasing the TDS levels from 600 to 750 ppm. These results are not surprising given no reported signs of salinity occurred during the 32-day period (8<sup>th</sup> Jan to 8<sup>th</sup> Feb 2019) where minimal rain occurred.

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Appendix 7

**ORIGINAL REVIEW OF ENVIRONMENTAL FACTORS – REV E 29 JULY 2015** 

# **Review of Environmental Factors**

# Part 5 – EP&A Act, 1979

Sewage Treatment Plant & Sewage Reticulation Network Catherine Hill Bay Scheme Stages 1 & 2 Lot 100, 101 & 106 DP1129872, Lot 1 DP1141989, Lot 1 DP1129299, Lot 103 DP1194707, Lot 101 & 102 DP1194707, Lot 213 DP883941, Lot 1 Section I DP168, Lot 1 Section K DP163, Flowers Drive Road Reserve, Montefiore Street Road Reserve

> No. 85 & 95 Flowers Drive, 6 Keene Street & 12 Montefiore Street Catherine Hill Bay



CONSULTING



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#### Review and Amendments Schedule – PLANIT CONSULTING PTY LTD

		Date
Authors	LN	July 2014
Reviewer	AS	July 2014

Revision
Rev A – 22/01/14
Rev B – 02/07/14
Rev C – 15/10/14
Rev D – 11/06/15
Rev E – 29/07/15

The content of this report was prepared for the exclusive use of the proponent for the purposes of undertaking an activity (Sewage Treatment Plant and Sewage Reticulation Network) which does not require development consent but requires assessment under Part 5 of the E nvironmental Planning and Assessment Act 1979 and is not to be us ed for any other purpose or by any other person or corporation.

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Planit Consulting Pty Ltd declares that it does not have, nor expects to have, a beneficial interest in the subject proposal.

PLANIT CONSULTING PTY LTD<sup>©</sup> July 2014



# **Executive Summary**

#### The Proposal

Catherine Hill Bay Water Utility Pty Ltd proposes the construction and oper ation of a S ewage Treatment Plant and Sewage Reticulation Network to be located on land identified as Lot 100, 101 & 106 DP1129872, Lot 1 D P1141989, Lot 1 D P1129299, Lot 10 3 DP1194707, Lot 101 & 102 DP1194707, Lot 213 DP883941, Lot 1 Section I DP168, Lot 1 Section K DP163, Flowers Drive Road Reserve, Montefiore Street Road Reserve, Catherine Hill Bay.

The Sewerage Treatment Plant and Sewer Reticulation Network would be located within the Lake Macquarie City Council Local Government Area. The site is boarded by the Munmorah State Conservation Area to the south and west and by the Munmorah State Conservation Area and Pacific Ocean to the east. To the north lies the existing village of Catherine Hill Bay. The location and context of the site are further discussed under Section 2.

The proposal is to service a subdivision approved by the Planning Assessment Commission under Project Approval MP10\_0204 on the 13 May 2011 which includes 550 residential lots, 1 retail lot, 9 reserves and 2 heritage lots. This exiting approval has been subject to modification application identified as MP10\_0204 MOD 2, This modification consolidated a number of appr oved residential allotments to provide a dedicated allotment for the Sewage Treatment Plant. The Sewage Treatment Plant location, as it relates to the development approved under MP10\_0204 MOD 2 is further discussed under Section 2.

The proposed Sewage Treatment Plant would have the peak capacity to service 330kL per day and would be commissioned in three (3) stages. The subdivision the Sewage Treatment Plant is to service will require approximately 556ET treatment capacity. Ultimately the Sewage Treatment Plant would provide class A+ recycled water for domestic reuse on all allotments approved under MP10\_0204 as modified. Domestic reuse would be facilitated via 'third pipe' (purple pipe) reticulated network.

Stage 1 would provide the full 556ET treatment capacity required by the CHB subdivision using a Membrane Bioreactor and Ultraviolet Disinfection, however only a maximum of 112 ET would be connected at stage 1. Stage 1 would include onsite irrigation of treated wastewater. As an interim measure during stage 1 the recycled water network would be charged with potable water.

Stage 2 would see the installation of an Advanced Water Treatment Plant for the supply of class A+ recycled water through the 'third pipe' recycled water network for domestic re-use. Stage 2 would include a Reject Reverse Osmosis unit and would include three (3) Reverse Osmosis reject evaporation ponds; Stage 2 would be constructed once one hundred and twelve (112) lots within the subdivision are connected to the system and would service a maximum of 470ET. Stage 2 would include onsite irrigation of treated waste water.

Stage (3) represents an ultimate scenario to service the full 556ET required by the approved subdivision. Stage 3 would require a form of offsite discharge. Stage (3) of the proposal is not included or assessed as part of this Review of Environmental Factors and is mentioned for information purposes only. Stage 3 and the specific issues associated with it including using land which has been subject to recycled water irrigation for residential purposes will be subject to separate assessment and approval.



### Need for the Proposal

The proposal is needed to fac ilitate urban services for the subdivision approved under Project Approval MP10\_0204. The proposed Sewage Treatment Plant and Sewer Reticulation Network is a direct response to the need presented by this approved development

#### **Options Considered**

Five options have been identified for the proposal, these are:

- 1 Do Nothing;
- 2 Centralised connection to the Hunter Water Network;
- 3 Decentralised system with water recycling and irrigation of Membrane Bioreactor & Ultra Violet treated effluent on private land;
- 4 Decentralised system with water recycling and irrigation of Advanced Water Treatment Plant treated effluent on Council parks and verges;

The preferred option is option 3 and is that assessed within this Review of Environmental Factors, this option has been arrived at after considerable investigation into appropriate and economically feasible services provision and alternative measures to deal with wastewater.

A decentralised system licensed under the Water Industry Competition Act 2006 which maximises water recycling and irrigates Membrane Bioreactor treated effluent is the preferred option for the site.

#### Statutory and Planning Framework

The proposal has been as sessed as permissible without consent under the relevant environmental planning instruments. That position is established by reference to Clause 106 of the Infrastructure SEPP.

The proposal is within the definition of an 'activity' set by Section 110 of the Environmental Planning and Assessment Act 1979 and is being proposed by a person licensed under the Water Industry Competition Act 2006 (pending issue of license). Assessment under Part 5 of the Environmental Planning and Assessment Act 1979 is therefore required.

The matters prescribed by Clause 228 of the E nvironmental Planning and Assessment Regulation 2000, for consideration by assessments under Part 5, are reviewed at Appendix B.

No requirement for a referral under the Environment Protection Biodiversity Conservation Act 1999 has been identified.

The proposal includes irrigation of lands within Stages 6 and 7 of the s ubdivision approved under MP10\_0204. Legal advices have been sought on this issue and the irrigation is ancillary to Project Approval MP10\_0204. Refer Legal Advices under Appendix P.

#### Community and Stakeholder Consultation

Given the nature and scale of the proposal and that no private residences are directly affected, community involvement has been limited.

Consultation has been undertaken with Lake Macquarie City Council and Independent Pricing and Regulatory Tribunal. Ongoing consultation would be held with relevant authorities during implementation of the proposal would be had were required.



### **Environmental Impacts**

Environmental Impact as discussed in detail under Section 7.

#### Justification and Conclusion

The proposed Sewage Treatment Plant and Sewer Reticulation Network do not require development consent and is subject to assessment under Part 5 of the Environmental Planning and Assessment Act 1979. The Review of Environmental Factors has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposal. This has included consideration of critical habitat, impacts on thr eatened species, populations and ecological communities and their habitats and other protected fauna and native plants.

A number of potential environmental impacts from the proposal have been avoided or reduced during concept design development and options assessment. The proposal as described in the Review of Environmental Factors best meets the proposal objectives. Mitigation measures as detailed in this Review of Environmental Factors would ameliorate or minimise any expected impacts associated with the proposal. On balance the proposal is considered justified.

The environmental impacts of the proposal are not likely to be s ignificant and therefore it is not necessary for an environmental impact statement to be prepared or approval to be s ought for the proposal from the Mi nister for Planning under Part 5.1 of the Environmental Planning and Assessment Act 1979. The proposal is unlikely to affect threatened species, populations or ecological communities or their habitats, within the meaning of the *Threatened Species Conservation Act 1995* or *Fisheries Management Act 1994* and therefore a Species Impact Statement is not required. The proposal is also unlikely to affect Commonwealth land or have an impact on any matters of national environmental significance.

The subject site is considered able to suitably accommodate the proposed Sewage Treatment Plant & Sewer Reticulation Network.





#### 1.1 Brief & Purpose of the Report

This Review of Environmental Factors has been prepared by Planit Consulting Pty Ltd on behalf of Coastal Hamlets Pty Ltd. For the purposes of this Review of Environmental Factors, Solo Water Pty Ltd (Catherine Hill Bay Water Utility Pty Ltd) is the proponent and the Minister administering the Independent Pricing and R egulatory Tribunal is the det ermining authority under Part 5 of the *Environmental Planning and Assessment Act 1979*.

The purpose of the R eview of Environmental Factors is to describe the proposal, to document the likely impacts of the proposal on the env ironment, and to deta il protective measures to b e implemented.

The description of the pr oposal and associated environmental impacts have been und ertaken in context of C lause 228 of the *Environmental Planning and Assessment Regulation 2000*, the *Threatened Species Conservation Act 1995*, the Fisheries Management Act 1994, and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999*. In doing so, the REF helps to fulfill the requirements of Section 111 of the Environmental Planning & Assessment Act 1979, that the determining authority examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the proposal.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Infrastructure under Part 5.1 of the Environmental Planning and Assessment Act 1979.
- The significance of an y impact on threatened species as defined by the Threaten Species Conservation Act 1995 and/or Fisheries Management Act 1994, in Section 5A of the Environmental Planning and Assessment Act 1979 and therefore the requirement for a Species Impact Statement.
- The potential for the proposal to significantly impact a matter of national environmental significance or Commonwealth land and the ne ed to ma ke a r eferral to the A ustralian Government Department of Sustainability, Environment, Water, Population and Communities for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the Environment Protection and Biodiversity Conservation Act 1999.

#### 1.2 Proposal Identification

Catherine Hill Bay Water Utility Pty Ltd proposes the construction and operation of a S ewage Treatment Plant and Sewage Reticulation Network to be located on land identified as Lot 100, 101 & 106 DP1129872, Lot 1 D P1141989, Lot 1 D P1129299, Lot 10 3 DP1194707, Lot 101 & 102 DP1194707, Lot 213 DP883941, Lot 1 Section I DP168, Lot 1 Section K DP163, Flowers Drive Road Reserve, Montefiore Street Road Reserve, Catherine Hill Bay.

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The proposal is to service a subdivison approved by the Planning Assessment Commission under Project Approval MP10\_0204 on the 13 May 2011 which includes 550 residential lots, 1 retail lot, 9



reserves and 2 heritage lots. This exsting approval has been subject to modification application identified as MP10\_0204 MOD 2, This modification consolidated a number of approved residential allotments to provide a dedicated allotment for the Sewage Treatment Plant. The Sewage Treatment Plant location, as it relates to the development approved under MP10\_0204 MOD 2 is further discussed under Section 2.

The proposed Sewage Treatment Plant would have the peak capacity to service 330kL per day and would be commissioned in three (3) stages. The subdivision the Sewage Treatment Plant is to service will require approximately 556ET treatment capacity. Ultimately the Sewage Treatment Plant would provide class A+ recycled water for domestic reuse on all allotments approved under MP10\_0204 as modified. Domestic reuse would be facilitated via 'third pipe' (purple pipe) reticulated network.

Stage 1 would provide the full 556ET treatment capacity required by the CHB subdivision using a Membrane Bioreactor and Ultraviolet Disinfection, however only a maximum of 112 ET would be connected at stage 1. Stage 1 would include onsite irrigation of treated wastewater. As an interim measure during stage 1 the recycled water network would be charged with potable water.

Stage 2 would see the installation of an Advanced Water Treatment Plant for the supply of class A+ recycled water through the 'third pipe' recycled water network for domestic re-use. Stage 2 would include a Reject Reverse Osmosis unit and would include three (3) Reverse Osmosis reject evaporation ponds; Stage 2 would be constructed once one hundred and twelve (112) lots within the subdivision are connected to the s ystem and would service a maximum of 470ET. Stage 2 would include onsite irrigation of treated waste water.

Stage (3) represents an ultimate scenario to service the full 556ET required by the approved subdivision. Stage 3 would require a form of offsite discharge. Stage (3) of the proposal is not included or assessed as part of this Review of Environmental Factors and is mentioned for information purposes only. Stage 3 and the specific issues associated with it including using land which has been subject to recycled water irrigation for residential purposes will be subject to separate assessment and approval.



# 2 - Site & It's Surrounds

#### 2.1 Property Description

The site of the proposal is made up of a number of existing allotments. The legal property description and corresponding property address are identified in table 1. The site is located within the Lake Macquarie Council Local Government Area.

Table T. Leyal Description Summa	l y
Lot & Plan No.	Property Address
Lot 100 DP1129872	95 Flowers Drive, Catherine Hill Bay
Lot 101 DP1129872	95 Flowers Drive, Catherine Hill Bay
Lot 106 DP1129872	95 Flowers Drive, Catherine Hill Bay
Lot 1 DP1141989	95 Flowers Drive, Catherine Hill Bay
Lot 1 DP1129299	95 Flowers Drive, Catherine Hill Bay
Lot 103 DP1194707	95 Flowers Drive, Catherine Hill Bay
Lot 101 DP1194707	95 Flowers Drive, Catherine Hill Bay
Lot 102 DP1194707	95 Flowers Drive, Catherine Hill Bay
Lot 213 DP883941	85 Flowers Drive, Catherine Hill Bay
Lot 1 Section I DP163	6 Keene Street, Catherine Hill Bay
Lot 1 Section K DP163	12 Montefiore Street, Catherine Hill Bay
Flowers Drive Road Reserve	N/A
Montefiore Street Road Reserve	N/A

Table 1: Legal Description Summary

The site is boarded by the Munmorah State Conservation Area to the south and west and by the Munmorah State Conservation Area and Pacific Ocean to the east. The site is adjoined to the north by the existing village of C atherine Hill Bay. The following further comment is provided on the location of the three key elements of the Proposal:

#### 2.1.1 STP allotment

The Sewage Treatment Plant site would be located within and at the western extent of Lot 101 DP1129872. The proposal is to service a subdivision approved by the NSW Planning Assessment Commission under Project Approval MP10\_0204 on the 13 May 2011 which includes 550 residential lots, 1 retail lot, 9 reserves and 2 heritage lots.

This exsting approval has been modifed to consolidate a number of existing approved residential allotments to provide a dedicated lot for the Sewage Treatment Plant. The Sewage Treatment Plant would be located within this dedicated lot. This modification lodged with and approved by the NSW Department of Planning is identified as MP10\_0204 MOD 2.

The location of the Sewage Treatment Plant in relation to the amended subdivison layout under MP10\_0204 MOD 2 is identified in Figure 2.

#### 2.1.2 Irrigation Area & Location

A total of 8.5 ha of restricted access effluent irrigation area would be provided to service stage 1 and 2 (maximum of 470ET). The irrigation area would be staged in line with the rate of production of surplus recycled water from the subdivision however a total of 4.5 ha would be required for stage 1 and a further 4ha for stage 2. The irrigation system will be supplied from its own separate and independent irrigation network with its own irrigation pump.

The irrigation areas would be located on Lot 106 DP1129872 and Lot 100 DP1129872 and would occupy the land identified as subdivision stages 6 and 7 under MP10\_0204.



The irrigation areas would be cordoned off from public access via fencing. This fencing would take the form of 0.9m high chain wire fencing and would incorporate warning signs not to enter and to avoid contact with recycled water every 50m around the perimeter of the irrigation area.

An aerial image of the proposed irrigation area location is provided in Figure 1. The Irrigation areas are also identified within the Land Capability Assessment for Effluent Irrigation under Appendix K and the irrigation area and proposed exclusion fencing design is identified on drawing SW-56-C-SK50 under Appendix Q.



Figure 1 – Irrigation Area Location Source: Solo Water Integrated Water Management Plan Illustrative only. Not to scale

The proposed irrigation is ancillary to ancillary to Project Approval MP10\_0204. Refer legal advices under Appendix P.

#### 2.1.3 Reticulation Network

#### 2.1.3.1 Pressure Sewer and Recycled Water Network

A sewer reticulation network is approved as part of MP10\_0204. The reticulation network detail provided within the Review of Environmental Factors is provided to give a full picture of the overall system and its operation. The only items of the sewer reticulation network associated with the proposal which are not approved by and which will not be installed as part of construction works associated with delivering the ap proved subdivision under MP10\_0204 is the installation of the pressure sewer units and as sociated gravity sewer components within the bounds of the futur e residential allotments which will be created as part of MP10\_0204.

The reticulation network and the pressure sewer units and gravity sewer items which are separate to the sewer reticulation network approved as part of MP10\_0204 would be located within all allotments identified within the Review of Environmental Factors.



# Figure 2 – Amended Subdivision Layout Approved Under MP10\_0204 MOD 2 & STP Location





### 2.2 Location / Context

The proposal would be located on land to the east of the P acific Highway and the south and south west of the existing Catherine Hill Bay village (which includes approximately 90 dwellings and urban facilities). The proposed development site lies to the north of the Munmorah State Conservation Area.

The Catherine Hill Bay development site is located within the Lake Macquarie Council Local Government Area and is situated approximately 100 kilometers north of Sydney and 26 K ilometers south of Newcastle. The site is identified in Figure 3.



Figure 3 – Site Locality Source: Landscape & Visual Impact Assessment Illustrative only. Not to scale

An overview of the Catherine Hill Bay subdivision development site and the approximate location of the Sewage Treatment Plant site are provided below in Figure 4.





Figure 4: Site Location Source: Landscape & Visual Impact Assessment Illustrative only. Not to scale

## 2.3 Existing Approvals

#### 2.3.1 Project Approval MP10\_0204

Previous development approval has been granted by the NSW Planning Assessment Commission under Project Approval MP10\_0204 on the 13 M ay 2011 which includes 550 residential lots, 1 retail lot, 9 reserves and 2 heritage lots (as amended 27/05/2013). This exsting approval has been subject to a modification application indentified as MP10\_0204 MOPD 2. MP 10\_0204 MOD 2 included the consolidation of a number of exsting approved residential allotments to provide a dedicated lot for the Sewage Treatment Plant. The Sewage Treatment Plant would be located within this dedicated lot.

Importantly MP10\_0204 was subject to a detailed assessment including but not limited to matters of ecological significance, Aboriginal heritage, land contamination, access, etc. In light of this approval there are a significant number of synergies with regards to items that have already been assessed and approved and that which would potentially need to be as sessed as part of this Review of Environmental Factors. There are also a number of items that would normally be as sociated with such a proposal has already have approval.

To clarify Project Approval MP10\_0204 does not cover the following elements of this proposal:

- 1 The construction of the S ewage Treatment Plant Building and Facility including the Reverse Osmosis reject Evaporation ponds on the SP2 Zoned Land;
- 2 The general operation of the S ewage Treatment Plant (Note the irrigation is ancillary to the subdivision approved under MP10\_0204; and
- 3 The installation of the sewer pressure units and gravity connections within the bounds of the lots.
- 4 Forming of the catch and diversion drains within the irrigation area



Subject to completion of the w orks approved by MP10\_0204, the Sewage Treatment Plant and Irrigation site would be provided as a cleared, remediated site with formed access. Importantly for this assessment where an overlap exists with the requirements of the existing approval it has been recommended that the r equirements of the ex isting consent and other relevant approvals be completed prior to commencement of work on the Sewage Treatment Plant or associated items.

For reference a copy of the MP10\_0204 is included under Appendix G.

#### 2.3.2 EPBC Act Approval

As part of the assessment of MP10\_0204 an Environmental Protection and Biodiversity Conservation Act (EPBC) Act referral was required due to proposed vegetation clearing. Environment Protection Biodiversity Conservation Act referral 2012/6382 was approved on the 27 February 2009. Importantly MP10\_0204 has assessed all issues relating to flora and fauna associated with the clearing required by the subdivision. The Sewage Treatment Plant and Sewer Reticulation Network are located within the approved footprint under MP10\_0204 and do es not require or result in the need for clearing beyond that already approved.

For reference a copy of the Environment Protection Conservation Act Referral 2012/6382 approval is included under Appendix H.

#### 2.3 Existing Improvements

Subject to completion of that required by MP10\_0204, the Sewage Treatment Plant and irrigation site will be presented as a cleared, remediated site with access. As such for the purposes of this Review of Environmental Factors the site is considered to have no existing improvements.

#### 2.4 Roads and Access

The Sewage Treatment Plant site has road access from the Pacific Highway via Montefiore Street, approved road 28 and approved road 3, Refer Figure 2. Approved road 28 & 3 are to be constructed as per consent MP10\_0204; while as per the requirements of the voluntary planning agreement applying to MP10\_0204 the subdivision developer must enter into a road work agreement with the RTA (now RMS) for the upgrade of the Montefiore Street and Pacific Highway intersection prior to the release of subdivision certificate for the creation of the first urban lot.

The irrigation areas will be a ccessible from Montefiore Parkway. The location of this access is identified on drawing SW-56-C-SK50 under Appendix Q.

For the purposes of the R eview of Environmental Factors it has been assumed that ac cess as required to service the subdivision would be constructed and would be available for the Sewage Treatment Plant and irrigation site.

#### 2.5 Statutory Zoning

The site is subject to the provisions of the Lake Macquarie Local Environmental Plan 2004 and is subject to a number of land use zonings; these zones are identified as follows and are shown in Figure 5:

- SP2 Infrastructure
- R2 Low Density Residential
- E2 Environmental Conservation
- 2(1) Residential
- 7(1) Conservation (Primary); and
- 7(4) Environmental (Coastline)

The surrounding area includes a number of additional land uses and zonings. In the immediate vicinity the following land use zonings are present:



- E1 National Parks and Nature Reserves;
- E2 Environmental Conservation; and
- 8 National Park



Source: SEPP Major Developments 2005 Illustrative only. Not to scale

#### 2.6 Environmental Considerations

#### 2.6.1 Topography

The topography of the Catherine Hill Bay development area which includes the site is significantly altered terrain. The change to the topography has resulted from the former land use of coal mining access, storage, processing/washery and handling of coal exported from the jetty of Catherine Hill Bay.

Geotechnical testing undertaken in support of the pr oject approval MP10\_0204 indicates that the current topography has significant areas of cut to fill with benching of up to 10-15 metres from the existing natural surfaces. This was for the creation of flat pads associated with the coal handling land use. The change to topography commenced in the 1870's.

The Catherine Hill Bay subdivision will require bulk earth works to be under taken as part of the development. Topography of the Sewage Treatment Plant and Ir rigation site would not be a constraint to development.

#### 2.6.2 Bushfire Prone Land

The site is mapped as bushfire prone land.

#### 2.6.3 Flooding

The site is not mapped as flood prone land.

#### 2.6.4 Sensitive Receivers (Noise & Odour)



There is a small number of existing residence located approximately 800m radius from the Sewage Treatment Plant site. Future residence with stage 5 and 6 of the am ended subdivision as proposed under MP10\_0204 MOD 2 would be located within 500m radius of the Sewage Treatment Plant site. The location of the S ewage Treatment Plant and surrounding noise sensitive receivers is shown in Figure 6. It is noted that the r esidences with stage 6 would only be constructed pending separate approval of stage 3 of the Sewage Treatment Plant and Sewer Reticulation Network.



Figure 6: Location of Noise Sensitive Receivers Source: Noise Impact Assessment – Vipac Illustrative only. Not to scale

#### 2.6.5 Heritage Items

#### 2.6.5.1 Aboriginal Heritage Items

An Aboriginal cultural heritage management plan has been prepared in relation to project approval MP10\_0204. A copy of this management plan is included under Appendix M – Aboriginal Cultural Heritage Management Plan for reference. This assessment identified a single isolated stone artefact within the bounds of the Sewage Treatment Plant site, refer figure 7. No other archaeological sites or features where found within the subdivision development footprint approved under MP10\_0204.



Figure 7: Location of Isolated Stone Artefact Source: Aboriginal Cultural Heritage Management Plan for Project Approval, Catherine Hill Bay – Insite Heritage Pty Ltd Illustrative only. Not to scale



#### 2.6.5.2 Non Aboriginal Heritage Items

A number of the a llotments which form part of the site fall within the C atherine Hill Bay Cultural Heritage Precinct. The Catherine Hill Bay Cultural Heritage Precinct is listed on the New South Wales State Heritage Register. The area of the site located within the Catherine Hill Bay Cultural Heritage Precinct is identified in Figure 8.





The site also includes lots 101 and 102 D P1194707. Both are identified as heritage lots and are located within the Wallarah House Heritage Precinct under the Catherine Hill Bay (South) Development Control Plan 2012 adopted by the Department of Planning and Infrastructure on 18 July 2012.

Works within the Cultural heritage precinct and within Lots 101 & 102 DP1194707 do not relate to built structures upon these sites. Work would be limited to the installation of pressure sewer units and associated gravity sewer component of the sewer reticulation network.

#### 2.6.6 Biodiversity

In June 2012, the F ederal Department of Sustainability, Environment, Water, Populations and Communities (DSEWPC) approved an Environment Protection Biodiversity Conservation Act referral allowing the clearing of all vegetation within the subdivision footprint approved under MP10\_0204.

The proposed site of the Sewage Treatment Plant is located within the footprint of the approved subdivision and is to be created in accord with the existing approvals (MP10\_0204 as amended) and will be provided by Coastal Hamlets Pty Ltd to C atherine Hill Bay Water Utility Pty Ltd as a vacant clear site for construction of the Sewage Treatment Plant. The proposal would not require any clearing beyond that already approved in association with MP10\_0204.

It is also noted that at the time of preparation of this review of environmental factors the clearing permitted under MP10\_0204 and the E PBC Act approval has occurred and the s ite is clear of vegetation.



# 3 - Description of the Proposal

#### 3.1 General Summary

The proposed Sewage Treatment Plant would have the peak capacity to service 330kL per day and would be commissioned in three (3) stages. The subdivision the Sewage Treatment Plant is to service will require approximately 556ET treatment capacity. Ultimately the Sewage Treatment Plant would provide class A+ recycled water for domestic reuse on all allotments approved under MP10\_0204 as modified. Domestic reuse would be facilitated via 'third pipe' (purple pipe) reticulated network.

Stage 1 would provide the full 556ET treatment capacity required by the CHB subdivision using a MeMembrane Bioreactorane Bioreactor and Ultraviolet Disinfection, however only a maximum of 112ET would be connected at stage 1. Stage 1 would include onsite irrigation of treated wastewater. As an interim measure during stage 1 the r ecycled water network would be charged with potable water.

Stage 2 would see the installation of an Advanced Water Treatment Plant for the supply of class A+ recycled water through the 'third pipe' recycled water network for domestic re-use. Stage 2 would include a Reject Reverse Osmosis unit and would include three (3) Reverse Osmosis reject evaporation ponds; Stage 2 would be constructed once one hundred and twelve (112) lots within the subdivision are connected to the s ystem and would service a maximum of 470ET. Stage 2 would include onsite irrigation of treated waste water.

Stage (3) represents an ultimate scenario to service the full 556ET required by the approved subdivision. Stage 3 would require a form of offsite discharge. Stage (3) of the proposal is not included or assessed as part of this Review of Environmental Factors and is mentioned for information purposes only. Stage 3 and the specific issues associated with it including using land which has been subject to recycled water irrigation for residential purposes will be subject to separate assessment and approval.

#### 3.2 Plant Layout

The proposed layout of the plant is identified in Figure 9. This plan graphically depicts the ultimate layout of the Sewage Treatment Plant. It is noted no physical changes occur between stage 2 and 3 of the scheme. This plan is also contained within Appendix A.



# Figure 9 – Stage 2 Plant Layout


500



# 3.2.1 Construction

The proposal will see the construction of the following items independent of that approved as part of the subdivision under Project Approval MP10\_0204:

- Sewage Treatment Plant Facility including Reverse Osmosis Reject Evaporation Pond;
- Installation of the irrigation system and forming of the diversion and catch drains within the ancillary irrigation area; and
- Installation of pressure sewer units and gravity connections within the bounds of the lots.

#### Sewage Treatment Plant

Construction of the Sewage Treatment Plant is to be undertaken in two (2) stages. The following scope of works is identified for each stage of construction. The construction stages align with the two (2) commissioning stages assessed by this REF. Stage two (2) would commence upon connection of 112 lots to the Sewage Treatment Plant.

Stage 1

- Sewage Treatment Plant Building and Office
- Membrane Bioreactor & Associated Process Tanks;
- 2 X 1 ML Wet Weather Storage Tanks;
- 1ML Recycled Water Tank
- 1ML Potable Water Storage tank;
- Permanent fence around perimeter with gate;
- All site hardstand including access and manoeuvring areas;
- Install all service ducting to accommodate final Stage 2 fitout;
- Install stage 1 services;

#### Stage 2

- Install Advanced Water Treatment Plant and associated process tanks; and
- Reverse Osmosis Reject Evaporation Ponds
- Install stage 2 services;

The above two (2) stages are represented within the plans under Appendix A. F or process description associated with each stage refer to the Integr ated Water Management Plan under Appendix C.

#### Irrigation System

The irrigation system will be staged in line with waste water generation with total area for each stage of the sewage treatment plant system to be as follows

#### Stage 1

• Progressive installation of 4.5ha of i rrigation area including vegetated buffers and perimeter fencing

#### Stage 2

• Progressive installation of 4.0ha of i rrigation area including vegetated buffers and perimeter fencing

The above two (2) stages are represented within the plans under Appendix Q.



# 3.2.2 System Commissioning & Construction Quality

The proposal relies in low infiltration rates to ensure system inflows are not adversely impacted upon. To ensure low infiltration rates the construction of each element of the system is of importance but particularly so for the gravity sewer components of the proposal.

To ensure low infiltration rates the gravity collection will be constructed and tested in line with the Water Services Association of Australia Sewerage Code of Australia WSA02 and provided with a minimum grade of 1 in 60. The gravity component of the proposal uses 150 mm rubber ring PVC on the main line connecting to 100 mm solvent welded PVC house connection. The Standard Drawings of the gravity component and connection are represented within the plans under Appendix Q.

Solo Water has developed Inspection and Test Plans based on the Water Services Association of Australia Code for quality assurance of the gravity and pressure sewer systems. These inspections and tests are undertaken before accepting the sewer reticulation network components installed under Project Approval MP10\_0204. A copy of the In spection and Test Plan is provided under Appendix R.

# 3.3 Sewage Reticulation Network & 'Third Pipe' recycled water network layout.

As discussed under 2.3.1 Project Approval MP10\_0204 has approved a sewer reticulation network and this is to be construction as part of the works associated with MP10\_0204. The pressure sewer units and the gravity sewer component of the sewer reticulation system that will be installed as part of the works of this Review of Environmental Factors will located within the bounds of the residential allotments that will be created as part of MP10\_0204 will match the subdivision layout approved under MP10\_0204 as amended.

The overall sewer reticulation network would be built in seven (7) stages consistent with the staging approved under MP10\_0204 as amended. To provide an overview of the whole system the master plan of the network for stage 1 of the subdivision approved under MP10\_0204 are contained under Appendix Q.

It is noted stage 6 and 7 of the subdivision approved under MP10\_0204 would not proceed until approval is sought and granted for stage 3 of this proposal.

# 3.4 Irrigation

Recycled water irrigation would occur as part of stage 1 and 2. All waste water for irrigation would be Membrane Bioreactor and Ultra Violet treated. Irrigation is a ncillary to the r esidential use approved under MP10\_0204. Legal Advices has been sought on this and are provided under Appendix P.

A total of 8.5 ha of restricted access effluent irrigation area would be provided to service stage 1 and 2 of the proposal (maximum 470ET). The irrigation area would be staged in line with the rate of production of surplus recycled water from the subdivision however a total of 4.5ha would be required for stage 1 and a further 4ha for stage 2. The irrigation system will be supplied from its own separate and independent irrigation network with its own irrigation pump.

The irrigation system and diversion and catch drains would be formed as part of the works under this review of environmental factors.

The irrigation areas would be located on Lot 106 DP1129872 and Lot 100 DP1129872 and would occupy the land identified as subdivision stages 6 and 7 under MP10\_0204. An aerial image of the proposed irrigation area location is provided in Figure 1. The irrigation area will also be fully fenced with a 0.9m chain wire fence around the per imeter to pr event access. The fencing will include warning signs not to enter and to avoid contact with recycled water every 50m. The location of the fencing and signage is identified under Appendix Q.



In addition to fencing of the irrigation area and signage, information packs would be provided to all residents of the subdivision approved under MP10 0204 and the residents of the existing Catherine Hill Bay village. As standard these information packs cover homeowner obligations relating to pressure sewer, water usage, waste disposal, incident reporting and appropriate recycled water usage protocols. These information packs will also include information identifying the location of irrigation areas, identifying the risks of coming into contact with effluent, that people should not enter the nominated irrigation areas and provide actions to take should they come into contact with treated effluent (i.e wash, monitor health, seek medical assistance if required).

The onsite irrigation system including daily water and nutrient balance modelling is described within the Land Capability Assessment for Effluent Irrigation. This is included under Appendix K.

The vegetation with the irrigation area would be subject to ongoing monitoring and maintenance to ensure longer term health and function. The monitoring and maintenance measures are outlined within Section 9 of the Land Capability Assessment for Effluent Irrigation. These measures would be incorporated in the operational environmental management plan for the proposal.

#### **Operational Detail** 3.5

#### 3.5.1 Plant Operation & Equipment

To demonstrate how the plant will work an Integrated Water Management Plan, Land Capability Assessment for Effluent Irrigation and Preliminary Operating Plan has been prepared. These are included under Appendix C, Appendix K and Appendix N respectively. Table 2 summarises the main components of the system:

Scheme Component	General Description
Membrane Bioreactor + Ultraviolet disinfection	All wastewater is treated using Membrane Bioreactor + Ultra Violet disinfection to produce high quality effluent. Typical Membrane Bioreactor effluent quality: - BOD < 10 mg/L - SS < 5 mg/L - TN < 10 mg/L - TP < 0.3 mg/L - Faecal Coliform < 10 cfu/100 mL - Turbidity < 1 NTU The Membrane Bioreactor + Ultra Violet treatment plant has a peak design capacity of 3 30 kL/day and is sized to pr ovide treatment of average wastewater flows plus a 10% contingency allowance.
Advanced Water Treatment Plant – Constructed during Stage 2	Following construction of the Advanced Water Treatment Plant during Stage 2, Membrane Bioreactor treated effluent undergoes further treatment in the A dvanced Water Treatment Plant to produce "Class A+" recycled water suitable for supply to customers in the th ird pipe non-potable water reticulation network.
	The Advanced Water Treatment Plant uses a multiple barrier approach to ac hieve log reduction targets outlined in the Australian Guidelines for Water Recycling (2006) using Ultrafiltration Membrane Bioreactors, Ultraviolet disinfection and Chlorine contact tank and residual chlorination. All treatment processes in the Advanced Water Treatment Plant will be

#### Table 2. STP Component Summary

Offices also at Nobbies Beach and Darwin



	designed to appropriate United States Environmental Protection Agency standards using equipment accredited under United States Environmental Protection Agency guidelines.
	The Advanced Water Treatment Plant is sized with a nominal capacity of 300 kL/day of recycled water. The Advanced Water Treatment Plant will be operational once 112 lots are connected to the scheme.
Third pipe recycled water network	Compliant recycled water supplied through the ur ban non-potable water reticulation system is reused for the following uses:
	<ul> <li>Tollet flushing</li> <li>Laundry washing machine cold water (hard plumbed only)</li> <li>Outdoor cleaning and washdown (including bin and car washing)</li> <li>Unrestricted irrigation of private lots</li> </ul>
	The non-potable water reticulation system is supplied from a 1 ML recycled water storage tank using a variable speed drive booster pump set. Pressure in the non-potable water reticulation system is maintained below the pressure in the potable water network.
	An emergency potable water top-up (with air gap) is used to top-up the recycled water storage tank during consecutive peak day demands for recycled water.
	During Stage 1 only potable water is used to supply the non-potable water reticulation system until the Advanced Water Treatment Plant is constructed in Stage 2.
8.5ha land irrigation	Surplus Membrane Bioreactor treated effluent is managed by controlled irrigation of the tem porary irrigation areas to be constructed on the dev eloper's land inside the footpr int of the approved subdivision. A total of 8.5ha of r estricted access effluent irrigation area would be provided for the scheme servicing 470ET. S tage 1 w ill require 4.5ha and s tage 2 a further 4ha.
	All irrigation water is stored in 2 ML wet weather storages prior to supply via a separate independent irrigation supply network. The system is designed to prevent irrigation during or shortly after rainfall through the use of weather station override on the main irrigation supply pump.
	Automated irrigation controllers are used to s chedule effluent irrigation events on the restricted access open space areas in a controlled manner using spray drift controls and v egetated buffers to minimise environmental and public health risks.
	The effluent irrigation area would provide the following buffers:
	<ul> <li>Minimum 30m to down gradient property boundary</li> <li>Minimum 40m to down gradient property boundary in steeper north east corner of the irrigation area</li> <li>20m buffer to up gradient property boundary</li> <li>No irrigation within the 40m w ide future waterway corridor approved under MP10_0204</li> <li>70m minimum buffer to nearest residential dwelling</li> </ul>



The irrigation area will also be fully fenced with a 0.9m c hain wire fence around the perimeter to prevent access. The fencing will include warning signs not to enter and to avoid contact with recycled water every 50m.

The vegetation with the irrigation area would be subject to ongoing monitoring and maintenance to ensure longer term health and function. The monitoring and maintenance measures are outlined within Section 9 of the Land Capability Assessment for Effluent Irrigation. These measures would be incorporated in the operational environmental management plan for the proposal.

# 3.5.2 Work Force & Operation Times

The proposed sewage treatment plant will operate 365 d ays a year, 24 hour s a da y. Once constructed, the plant will be run by two (2) full time employees. Specialist maintenance contractors would be bought into the site as required to provide maintenance.

# 3.5.3 Waste Management

The proposed sewerage treatment plant would provide five (5) waste streams. In handling the waste the proposal would undertake the following

- A register will be maintained for all waste sampling and classification results for the life of the proposal in accordance with EPA's Classification Guidelines; and
- Detailed procedures for waste handling including storage and disposal procedures are be established and included within the Operation Environmental Management Plan.

The five (5) waste streams are identified as:

#### Membrane Bioreactor Screenings and Grit

All incoming wastewater passes through a fine screen before entering the membrane bioreactor treatment process. The screen used is a rotating drum screen with automatic bypass and high level monitoring and is located inside the Waste Water Treatment Plant building.

The screen includes an automatic dewatering and bagging unit to minimize Occupational Health & Safety issues associated with handling screenings. As each bag is filled, at approximately monthly intervals, the waste material would be taken off site for disposal at an approved land fill facility.

The amount of s creenings produced would be minimized through ongoing customer education designed to increase awareness of appropriate solid waste disposal practices.

#### Membrane Bioreactor Waste Activated Sludge

The membrane bioreactor is an activated sludge process that produces waste activated sludge at approximately 2% of the inflow rate. At ultimate development approximately 5 kL/day of waste activated sludge at s olids content of appr oximately 10,000 mg/ L will be gener ated from the membrane bioreactor. Waste sludge will be stored in a sealed tank until it is removed from the site at approximately weekly intervals by a licensed liquid waste transport contractor and disposed of to the nearest approved municipal wastewater treatment plant.

#### Reverse Osmosis Reject

The Sewage Treatment Plant includes a reverse osmosis units for salinity control in the recycled water network. The production of waste concentrate is proportional to flow through the Sewage Treatment Plant and feed water salinity. The Reverse Osmosis process would produce a Reverse Osmosis reject waste stream that requires management.



The Reverse Osmosis system is estimated to produce an average of 6.4kL/day of Reverse Osmosis reject with Total Dissolved Solids concentration of approximately 5000 mg/L. The reject Reverse Osmosis waste stream will be managed by:

- Three (3) High Density Polyethylene lined and level monitored evaporation ponds with total surface area of 4870m<sup>2</sup>; and
- Level sensors are used to detect breaks in the liner and to raise alarms before the ponds are full so the operator can take action by either turning off the R everse Osmosis units or road tanker pump out can be arranged.

The above Reverse Osmosis reject management system has been designed using daily water balance modeling. During prolong and extreme wet weather events when the evaporation ponds may fill, reject Reverse Osmosis would be trucked offsite to ensure there are no uncontrolled overflows to the environment.

Discussion of the Reverse Osmosis reject management system and water balance modeling is provided in Reverse Osmosis Reject Evaporation Pond Water Balance Report under Appendix I. It is noted in these reports the reverse osmosis reject ponds are modeled to overflow in 6% of years. This is a theoretical statistical result from the modeling, the reject ponds will be operated so as to never overflow.

In the 6 % of years when the ponds would be full, overflow will be avoided by undertaking the following

- Turning off the reverse osmosis unit; and/or
- Tanking off excess and disposing offsite at the nearest accepting licensed waste facility.

These procedures will occur as outlined within section 3.3 of the R everse Osmosis Reject Exportation Pond Water Balance Report under Appendix I.

#### Membrane Bioreactor Chemical Cleaning Wastewater

Chemical laden wastewater used in membrane bioreactor cleaning would contain high concentrations of chlorine, acid/or caustic. The exact constituents would vary depending on the cleaning regime being undertaken. All Membrane Bioreactor cleaning wastewater is temporarily stored in the Clean In Place waste tank and neutralized prior to return to the i nlet balance tank for treatment in the membrane bioreactor.

Return of neutralized water is 'trickled' back to the inlet balance tank in a controlled manner over a period of several days or weeks to ensure no impact on the biological process of the system. If process impacts are observed during operation this waste stream will be removed from the site and taken to the nearest approved facility by licensed liquid waste transport contractor.

#### General Waste

The site will generate a small amount of general waste including general waste from staff, landscaping waste from maintenance and general cleaning waste. This waste would be serviced by the local waste contractor.

#### Irrigation Area Green Waste

Irrigation as part of the proposal will generate a green waste stream. The irrigation areas are to be mowed and maintained to ensure ongoing plant growth and nutrient uptake. Biomass harvesting from the irrigation area will occur to export nutrients from the irrigation area. The green waste stream will be transported to nearest composting facility for disposal.



# 3.5.4 Air Quality

#### <u>Odour</u>

An Odour assessment has been undertaken for the facility. A copy of the odour impact assessment is provided under Appendix F. The odour assessment identified the STP and its operations would not result in odour concentrations exceeding the relevant criterion of 2 OU/m<sup>3</sup>. The odour modelling did not identify any specific mitigation measures as required.

#### Dust

All vehicle manoeuvring areas are to be fully sealed. Dust will not be generated onsite as part of operations. Refer plans under Appendix A.

To ensure no dust impacts during construction, measures to control and mitigate dust from the site would be prepared and integrated into the proposed Construction Environmental Management Plan.

# 3.5.5 Water Quality

#### Irrigation

The proposal would see 8.5ha of I and irrigated during stage 2 of the Sewage Treatment Plant and Sewer Reticulation scheme. The irrigation area would be staged in line with the rate of production of surplus recycled water from the subdivision however a total of 4.5ha would be required for stage 1 and a fur ther 4ha to s tage 4. The irrigation system will be supplied from its own separate and independent irrigation network with its own irrigation pump.

The irrigation areas would be located on Lot 106 DP1129872 and Lot 100 DP1129872 and would occupy the land identified as subdivision stages 6 and 7 under MP10\_0204. An aerial image of the proposed irrigation area location is provided in Figure 1.

All wastewater to be irrigated would be treated by a Membrane Bioreactor and Ultra Violet disinfection to produce very high quality water that is low in Biochemical Oxygen Demand, nutrients and faecal coliforms. The expected quality of irrigation water is outlined below in Table 3.

Parameter	Units	Minimum	Mean	95%ile	Maximum
Biochemical Oxygen	mg/L	-	-	10	20
Demand	-				
Suspended Solids	mg/L	-	-	5	10
Total Nitrogen	mg/L as N	-	10	-	20
Total Phosphorus	mg/L as P	-	0.3	-	2
pН	pН	6.5	-	-	8.5
Turbidity	NTU	-	-	1	2
UV Transmission	UVT%	60%			
Faecal Coliforms	cfu/100 mL	-	-	10	100
Total Dissolved Solids	mg/L	-	600	-	-

Table 3: Typical irrigation water quality following membrane bioreactor + ultra violet treatment.

Detail discussed of the modeling and water and nutrient balance results is included within the Land Capability Assessment for Effluent Irrigation. This is included under K.

#### Stormwater Management - Sewage Treatment Plant Site

Stormwater would be handled in accord with Councils requirement and relevant Australian Standards. A Stormwater Management Plan would be prepared for the Sewage Treatment Plant site. Is it noted at stormwater management has been approved for the subdivision approved as part of P roject Approval MP10\_0204. The stormwater management plan to be prepared for the site would detail connection of the Sewage Treatment Plant site to this approved system.



Stormwater Management - Irrigation Area

Stormwater within the irrigation area is to be hand led via diversion and catch drains. The diversion and catch drains are shown on drawing SW-56-C-SK50 under Appendix Q.

#### 3.5.6 Noise and Vibrations

A Noise Impact Assessment has been undertaken for the facility for both operation and construction. A copy of the no ise impact assessment is provided under Appendix E and Construction Noise Management Plan under Appendix O. The Noise Impact Assessment has identified no specific noise control measures during operation as being required.

The Construction Noise Management Plan has identified standard best practice measures to proactively control construction noise. These requirements would be included within the proposals Construction Noise Environmental Plan.

### 3.5.7 Traffic and Transport

The site will be a ccessed via internal roadway network from within the appr oved subdivision as amended. The proposal can facilitate onsite internal loading/unloading of Articulated Vehicles. As referenced on the currently approved subdivision plan for the Catherine Hill Bay development, access to and from the Pacific Highway would occur via Montefiore Street, Road 28 and Road 3. Refer Figure 2 for amended subdivision layout as sought by MP10\_0204 MOD 2 with STP overlay.

It is anticipated only two (2) truck movements per week would occur once the plant is constructed and operational. The proposal would not generate a significant increase in traffic during operation.

In regard to construction, the proposal would not result in a significant increase in construction traffic. As discussed the construction works not covered and being undertaken under MP10\_0204 is limited to the Sewage Treatment Plan building and facility located on the SP2 Zoned Lands; and the installation of the pressure sewer units and small runs of gravity sewer which will be located within the future private residential allotments created as part of MP10\_0204.

With regards to construction, a traffic management plan would be prepared and implemented as part of a Construction Environmental Management Plan for the proposal.

#### 3.5.8 Chemicals Management

The following water treatment chemicals would be used in the Catherine Hill Bay Water scheme:

- Aluminum Chlorohydrate for enhanced phosphorous removal;
- Acetic Acid as a supplementary carbon source for Mixed Liquor Suspended Solids control and denitrification;
- Hydrochloric acid for pH correction and Membrane Bioreactor cleaning;
- Sodium hydroxide for pH correction and Membrane Bioreactor cleaning;
- Sodium hypochlorite for chlorine dosing and Membrane Bioreactor cleaning;
- Sodium metabisulphite for dechlorination of Reverse Osmosis feed water; and
- RO antiscalant chemicals to prevent fouling of the Reverse Osmosis Membrane Bioreactor.

All chemicals used in the scheme would be managed based on best practice strategy outlined below:

- Online monitoring and control of chemical dosing to minimise chemical consumption;
- All chemicals delivered to the s ite by licensed chemical transport company in 200 litre or 1000 litre plastic containers to minimise transport risk;
- A dedicated chemical storage area at the Waste Water Treatment Plant site that:
  - Is located inside the Waste Water Treatment Plant building to avoid exposure to direct sunlight, wind etc;



- Is located in an appropriately lined and bunded area with adequate storage volume to contain all spills;
- Provides separation of non-compatible chemicals;
- Lifting gantry to allow safe unloading of chemical containers;
- Material Safety Data Sheets will be maintained onsite for all chemicals;
- Spill response kits will be maintained onsite for all chemicals;
- Procedures to control the acceptance of chemicals to the s ite to ensure only the correct chemicals are unloaded;
- Emergency response procedures for chemical spills;
- Staff training to ensure competency in chemical management processes and procedures.

# 3.6 Utilities

#### 3.6.1 Water

No water is used in the treatment process. Water usage would be limited to staff amenities, cleaning and landscaping maintenance. Water usage associated with the proposal will be minimal.

It is noted that in conjunction with the private Sewage Treatment Plant solution, Catherine Hill Bay Water Utility Pty Ltd will also be providing potable water services. The provision of the potable water service is not included within the scope of this Review of Environmental Factors. Emergency potable water backup would be provided for the recycled water reticulation system to ensure the continuity of supply.

#### 3.6.2 Sewerage

Sewage generated by the development would be treated onsite. Sewerage generated onsite would be minimal and would only be associated with staff located on the site at any one time.

### 3.6.3 Electricity

Electricity supply would be available with appropriate capacity installed as part of works to facilitate the Catherine Hill Bay subdivision approved under MP10\_0204.

# 3.7 Environmental Management Plans

Specific plans to manage the environmental impacts of construction and operation would be prepared as outlined within the Preliminary Infrastructure Operating Plan under Appendix N as part of the proposed Sewage Treatment Plant and Sewer Reticulation Network. The following plans would be prepared (among others):

- Construction Environmental Management Plan;
- Operation Environmental Management Plan;
- Emergency Response Plan;
- Recycled Water Management Plan

The Review of Environmental Factors recommends that certain mitigation measures be implemented as part of the proposal. These mitigative measures are listed in Section 9 and discussed in Section 7 and would be incorporated into these plans as outlined below.

### 3.7.1 Construction Environmental Management Plan

A Construction Environmental Management Plan would be prepared for the construction and commissioning phase of the proposed Sewage Treatment Plant and Sewer Reticulation Network. The proponent would be responsible for ensuring that the Construction Environmental Management



Plan adequately addresses environmental issues and the conditions of approval. The Construction Environmental Management Plan would include the following information and control plans:

Proposal Objectives and Scope – Once approval of the proposal has been obtained, the Proposal scope and objectives would be reassessed within the terms of any approval conditions.

Permits and Approvals – All permits and approvals required prior to and during the construction of the proposal would be identified in the Construction Environmental Management Plan. This would provide a checklist for construction contractors to ensure all permits and regulations are complied with and relevant approvals are obtained.

Consent Conditions – Consent conditions would be outlined within the Construction Environmental Management Plan with instructions on how to meet the conditions of approval. This would provide a checklist for construction contractors to ensure that consent conditions are met in the most effective manner.

Complaints Procedure – A procedure for managing complaints received during construction would be provided in the Construction Environmental Management Plan. The procedure would provide details on undertaking and monitoring actions following receipt of a complaint.

Construction Methods and Environmental Management Procedures – This section would provide an a ccurate description of the proposed construction activities. Location plans would be provided. Environmental considerations to be taken into account during all construction activities would be provided. Specific requirements relating noise, dust, traffic, etc would be outlined in other sections of the Construction Environmental Management Plan and would include timing details and who is responsible for their implementation.

Soil and Water Management – An erosion and sediment control plan would be prepared as part of the Construction Environmental Management Plan. The plan would detail the method's of erosion and sediment control, maintenance requirements, location requisites for effective operation of erosion and sediment control measures and related monitoring and reporting requirements.

Waste Management – This section would outline waste management procedures, including waste recycling and r euse measures, waste disposal measures (when reuse is not feasible), and the identification of the closest waste disposal areas. The waste management plan would be developed to minimise the generation of waste during construction and maximise reuse, recovery and recycling of waste products.

The Construction Environmental Management Plan would be reviewed on a regular basis and would incorporate the result of any monitoring undertaken in the previous period.

### 3.7.2 Operation Environmental Management Plan

An Operation Environmental Management Plan would be prepared for the operational phase of the proposed Sewage Treatment Plant and Sewer Reticulation Network. The proponent would be responsible for ensuring that the Operation Environmental Management Plan adequately addresses environmental issues and the conditions of any relevant approvals. The measures recommended to mitigate predicted environmental impacts during operation are discussed in Section 7.

Key environmental management issues that would be addressed include:

Consent conditions; Requirements for emissions to air; Effluent quality requirements; Overflow prevention procedures; Requirements for chemical handling; Odour management; Noise management; Waste management; Irrigation management and scheduling;



Weed management of irrigation areas; and Environmental Monitoring Monitoring and Maintenance as outlined in the Preliminary Infrastructure Operating Plan

# 3.7.3 Emergency Response Plans

Emergency Response Plans will be developed for all critical risks identified for the proposal. Contingency planning and the emergency response plans which would be developed as part of the proposal are identified within the Preliminary Infrastructure Operating Plan under Appendix N. Emergency response plans will be concise documents generally arranged in a flow chart type arrangement with relevant contact details etc. to ensure ease of use by operators.

The preliminary risk analysis undertaken in preparing the Preliminary Infrastructure Operating Plan identifies a broad range of eme rgency issues including communication and el ectrical failures, equipment failures, pump station failures and system pump out. Table 4 summarises the scheme component, the infrastructure risk, the c ontingency provided within the system and the det ailed emergency response plan to be developed during detailed design and prior to op erations commencing.

Schem	e Component	Infrastructure Risk	Contingency Planning	Emergency Response Plans (to be developed)^
Potable Water	Bulk water transfer system	Failure of bulk transfer system       24 hours storage in onsite potable water tank         Water cartage from Kanangra Drive reservoir         Electrical connection point for mobile generator provided on pump station electrical system		Emergency Response Plan for bulk water transfer system failure
	Potable water Scontamination or storage Contamination or vermin access		Chlorine tablets stored on site	Emergency Response Plan for storage contamination or vermin access
	Tank failure			Emergency Response Plan for tank failure
	Chlorine monitoring and dosing system	Chlorine system failure Inadequate chlorine dose	Duty and standby chlorine dosing pumps Chlorine tablets stored on site	Emergency Response Plan for chlorination system failure or low chlorine alarm
	Potable water supply booster pump station	Pump failure Power outage	Booster pump set designed so one pump can fail while still delivering peak flow and pressure to the reticulation network Emergency standby diesel pump with automatic changeover	Emergency Response Plan for booster pump station failure
	Potable water Cross connection reticulation		Water pressure control in potable and recycled water networks	Emergency Response plan for cross connections
Reticulation pipe break		Reticulation pipe break	Isolation valves designed into the network as per WSAA Code.	Emergency Response Plan for water main break including sterilisation

Table 4: Contingency Planning and Emergency Response Plans

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Schem	e Component	Infrastructure Risk	Contingency Planning	Emergency Response Plans (to be developed)^
Waste water	/aste water Pressure sewer pump stations Pump failure Power failure Control syste failure		Standard pumps with spare pumps and parts maintained on site Duty and standby pumps 24 hours storage in each pump station Fail safe for pump to operate during control system failure Road tanker pump-out from each pump station by licensed liquid waste contractor to nearest accepting licensed facility to avoid upcontrolled overflows	Emergency Response Plan for pressure sewer pump station failure or high level alarm Emergency Response Plan for scheme wide power outage
	Pressure sewer pipe lines	Pressure sewer main break	Isolation valves designed into the network as per WSAA Code.	Emergency Response Plan for pressure sewer main break including cleanup & disinfection procedures
	Membrane Bioreactor	Process failure Power outage Tank failure	Standard process pumps with spare pumps and parts maintained on site Electrical connection point for mobile generator provided on MBR electrical system Road tanker pump-out by licensed liquid waste contractor to nearest accepting licensed facility to avoid uncontrolled overflows	Emergency Response Plan for MBR process failure
	Wet weather storage	Algae growth	Potable water backup of recycled water tank if blue green algae outbreak occurs. Allowance to chlorinate effluent prior to entering the wet weather storage. Install aerator into pond if algae events are frequent.	Emergency Response Plan for algae growth in storage
		Structural integrity & leakage	Road tanker pump-out by licensed liquid waste contractor to nearest accepting licensed facility	Emergency Response Plan for pond leakage or wall failure
		High level overflow	Precautionary and emergency irrigation events to avoid uncontrolled storage overflows Road tanker pump-out by licensed liquid waste contractor to nearest accepting licensed facility to avoid uncontrolled overflows	Emergency Response Plan for high level in treated effluent wet weather storage.
Recycled Water	Advanced Water Treatment Plant	Process failure	Potable water back up of recycled water tank	Emergency Response Plan for AWTP failure
	Saline evaporation ponds	Structural integrity & leakage	Road tanker pump-out by licensed liquid waste contractor to nearest accepting licensed facility	Emergency Response Plan for pond leakage or wall failure
		High level overflow	0.5 metre freeboard Road tanker pump-out by licensed liquid waste contractor to nearest accepting licensed facility	Emergency Response Plan for saline evaporation pond high level
Recycled Water	Recycled Water Storages	Contamination or vermin access	Chlorine tablets stored on site	Emergency Response Plan for vermin access to storage
cont		Tank failure		Emergency Response Plan for tank failure

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Scheme Component		Infrastructure Risk	Contingency Planning	Emergency Response Plans (to be developed)^
	Chlorine monitoring and dosing system	Chlorine system failure Inadequate chlorine dose	Duty and standby chlorine dosing pumps Chlorine tablets stored on site	Emergency Response Plan for chlorination system failure or low chlorine alarm
	Recycled water supply booster pump station	Pump failure Power outage	Booster pump set designed so one pump can fail while still delivering peak flow and pressure to the reticulation network	Emergency Response Plan for booster pump station failure
			automatic changeover	
	Recycled water reticulation	Cross Connection	Water pressure control in potable and recycled water networks	Emergency Response Plan for cross connections
	network	Reticulation pipe break	Isolation valves designed into the network as per WSAA Code.	Emergency Response Plan for water main break including sterilisation
	Irrigation Systems	Irrigation pipe break	Isolation valves designed into the irrigation system for isolation of each irrigation zone	Emergency Response Plan for irrigation pipe break
Chemical	Chemicals management	Chemical spill	All chemicals storages located in a bunded & covered area	Emergency Response Plan for chemical spillage with cleanup procedures
Monitor- ing & control	Sensors and probes	Sensor failure	Control system allows manual override of faulty sensor until new sensor installed	Emergency Response Plan for faulty monitoring sensor
system Communication systems		Communication system failure	Multiple path radio system with backup from Telstra Next G mobile phone network	Emergency Response Plan for control system failure
			Fail safe to ensure pressure sewer units operate during control system failure	

As part of all emergency Response Plans, all incidents and "near misses" that occur in the Catherine Hill Bay Water scheme would be logged and reviewed to ensure continuous improvement. An incident reporting procedure would be developed that outlines the requirements of reporting of all incidents. Post incident reviews would be undertaken to i dentify appropriate preventative measures to be developed and implemented to prevent reoccurrence of similar events.

#### 3.7.3.1 Pump out Locations

The proposal includes a significant level of built in redundancy and ability to manage emergency issues onsite. However, as further redundancy the proposal includes the following pump out locations:

- 1. Pump out from the inlet tank within the sewerage treatment plant building using a vacuum sucker truck;
- 2. Pump out from the scour valves in the Pressure Sewer Network; and
- 3. Pump out from the wet well of each pressure sewer unit using a vacuum sucker truck.

#### 3.7.3.2 Discharge Points

The system is design to ensure that no ov erflows will occur as part of operations, however If an unmanaged failure was to occur, the system would potentially overflow form the following locations:

- 1. The Reverse Osmosis Reject Evaporation Ponds;
- 2. The wells of the sewer pressure units;
- 3. Wet Weather Storage (wet weather balance tanks)



It is noted that water balance modelling undertaken to demonstrate compliance with the permissible statistical overflow frequencies in the D epartment of Environment and C onservation Guidelines shows wet weather overflow of irrigation quality effluent would occur in 38% of years from the wet weather balance tanks when irrigation areas were not available due to wet weather. To ensure this does not occur as part of the proposals operations, the proposal has been designed to enable all surplus water to be tr ucked offsite to another approved facility. Within table 4 above this item is identified as 'high level overflow' and the relevant mitigation measure being truck offsite.

The emergency response plans and procedures outlined in Section 3.7.3 will ensure that no overflow will occur from these discharge points.

#### 3.8 Environmental Monitoring, Reporting and Complaints Control

Environmental monitoring and reporting would be undertaken during construction and operation of the Sewage Treatment Plant and Sewer Reticulation Network. Whilst a detailed monitoring and reporting program would be developed during the preparation of the Construction Environmental Management Plan and Operational Environmental Management Plan in accord with conditions of approval/license, an outline of proposed monitoring, parameters and location is provided in table 5, table 6 and table 7.

Darameter	Units	MBR Effluent Qua	Location	
	Units	Commissioning	Verification	LOCATION
BOD	mg/L		Monthly	MBR
Suspended Solids	mg/L	Freeword menitoring	Monthly	permeate
Ammonia as N	mg/L as N	during commissioning	Monthly	weather
TKN as N	mg/L as N	period to test the	Monthly	storage
Oxidised Nitrogen as N	mg/L as N	system under a	Monthly	
Total Nitrogen as N	mg/L as N	conditions	Monthly	
Total Phosphorus as P	mg/L as P		Monthly	
Faecal Coliforms	cfu/100 mL		Weekly	
Metals	Various	N/A	Annual	
Pesticides	Various	N/A	Annual	
Cations/Anions/SAR	Various	N/A	Annual	
All tank water levels	m	Continuous	Continuous	Online
All flows	L/s	Continuous	Continuous	
Dissolved Oxygen (CCP)	mg/L	Continuous	Continuous	
MLSS	mg/L	Continuous	Continuous	
Electrical Conductivity	dS/m	Continuous	Continuous	
рН	рН	Continuous	Continuous	
Transmembrane Pressure (CCP)	∆kPa	Continuous	Continuous	
Permeate Turbidity (CCP)	NTU	Continuous	Continuous	
UV Intensity (CCP)	mJ/cm <sup>2</sup>	Continuous	Continuous	
UVT% (CCP)	%	Continuous	Continuous	

#### Table 5 Membrane Bioreactor Effluent Quality and Operational Monitoring

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Table 6 Advance Water Treatment Plant Validation and Verification Recycled Water Quality Monitoring

Dellutent	Unite	Recycled Water Qu	Location	
Pollulant	Units	Validation	Verification	LUCALIUII
Biochemical Oxygen Demand	mg/L		Monthly	Recycled
Suspended Solids	mg/L		Monthly	Water
Ammonia as N	mg/L as N		Monthly	Slorage rank
TKN as N	mg/L as N		Monthly	
Oxidised Nitrogen as N	mg/L as N	Frequent	Monthly	
Total Nitrogen as N	mg/L as N	monitoring during	Monthly	
Total Phosphorus as P	mg/L as P	commissioning	Monthly	
Faecal Coliforms	cfu/100 mL	system under a	Weekly	
Free Residual Chlorine	mg/L	variety of operating	Weekly	
Sodium absorption ratio	ratio	conditions.	Annual	
Campylobacter (bacteria)	cfu/100 mL		Annual	
Cryptosporidium (protozoa)	cfu/100 mL		Annual	
Adenovirus (virus)	pfu/100 mL		Annual	
Rotavirus (virus)	pfu/100 mL		Annual	
Electrical Conductivity (CCP)	dS/m	Continuous	Continuous	Online
UF Permeate Flow (CCP)	L/s	Continuous	Continuous	
UF Permeate Turbidity (CCP)	NTU	Continuous	Continuous	
UF Transmembrane Pressure (CCP)	∆kPa	Continuous	Continuous	
UF Direct Integrity Testing (CCP)	$\Delta$ kPa/time	Continuous	Continuous	
UV Intensity (CCP)	mJ/cm <sup>2</sup>	Continuous	Continuous	
UVT% (CCP)	%	Continuous	Continuous	
pH (CCP)	рH	Continuous	Continuous	
Free Residual Chlorine (CCP)	mg/L	Continuous	Continuous	

Table 7 Environmental Monitoring of Effluent Irrigation Scheme

Туре	Parameter	Units	Туре	Location	Frequency
Turf and vegetation health	Visual inspection of plant health for signs or stress	General observations	Monitor for change	Irrigation area	Ongoing
	Laboratory biomass analysis of plant nutrients	mg/kg	Identify deficiencies	Irrigation area	If impacts observed
	Faecal Coliform	cfu/100 mL	_		
	BOD	mg/L	_	Downstream in Dam 1 and Dam 2 and upstream at SW U/S.	
Surface Water monitoring	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	Monitor for		Quarterly
	Total Phosphorus & Plant available phosphours	mg/L as P	and change		Quarterly
	рН	pH units	_		
	Electrical Conductivity	dS/m			
	рН	pH units		Downstream bores BH006 and BH009 and upstream bores	
Ground water	Cations	Mg/L	Monitor for		Quartarly
monitoring	Faecal Coliform	cfu/100 mL	and change		Quarterly
	Electrical conductivity	dS/m		BH004 and	

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Туре	Parameter	Units	Туре	Location	Frequency
	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N		BH008.	
	Total Phosphorus	mg/L as P	_		
	Plant available phosphorus	mg/L as P	_		
	Water level	m AHD			
	Total hydraulic and nutrient load onto each irrigation area	kL/year and kg/year			
	Electrical conductivity	dS/m	-		
	Available Phosphorus	mg/kg	_		
	Available Nitrogen	mg/kg	Select irri		
	Available Potassium	mg/kg		received the	Annual
	Chloride	meq/100g	Monitor for	highest hydraulic	
Soil monitoring	Exchangeable cations & CEC	meq/100g	and change.	Samples to be	
	Exchangeable Sodium %	%		taken from top	
	Sodium adsorption ratio	Ratio	_	soil and sub soil layers.	
	Total Organic Carbon	%	_		
	рН	pH units	_		
	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/kg	_		
	Total Phosphorus	mg/kg	-		
	Phosphorus Sorption Capacity	mg/kg	-		
	Heavy metals	mg/kg			
	Pesticides	mg/kg	_		

The monitoring methods, locations, frequency, criteria, reporting and responsibilities would be determined during preparation of the Operation Environmental Plan and would be consistent with any relevant licence conditions and with the Integrated Water Management Plan under Appendix C, the Land C apability Assessment for Effluent Irrigation under Appendix K and the pr elimary Infrastructure Operating Plan under Appendix N.

### 3.8.2 External Communications

#### **Operation**

All Solo Water schemes, including the Catherine Hill Bay Water scheme, use a centralised customer service call centre for receiving, logging and acting on customer questions, complaints, water outages and faults identified by the general public.

As required under the Independent Pricing and Regulatory Tribunal retail license the Catherine Hill Bay scheme will be supported by a customer call centre. In general the call centre will provide the following functions:

- Receive and log all customer complaints, queries and faults 24-hours a day, 7 days a week;
- Where appropriate call centre staff will escalate issues and provide work orders to Catherine Hill Bay operations staff to attend to complaints and faults etc.;
- Catherine Hill Bay operations staff are required to report back to the call centre when the fault
  has been acted upon and rectified, or to provide an update on progress. Open work orders are
  followed up by customer service call centre staff to ensure timely action;



• The customer service database records all complaints, issues, actions, response times etc. To enable extraction of Key Performance Indicators for reporting and continuous improvement;

#### **Construction**

A 24 hour contact number would be established and maintained for the duration of the construction period. The responsible person and entity will be identified in the Construction Environmental Management Plan for the proposal.



# 4 – Need and Options Considered

This section looks at other feasible alternatives to carrying out the development including the do nothing option. These are summarised below. It is concluded that the alternatives are not socially, economically or technically feasible or require further detailed assessment and that the proposal can occur with identified impacts being suitably mitigated and managed.

# 4.1 Strategic need for the Proposal

The proposal is needed to fac ilitate urban services for the subdivision approved under Project Approval MP10\_0204. The proposed Sewage Treatment Plant and Sewer Reticulation Network is a direct response to the need presented by this approved development

# 4.2 Objectives of the Proposal

The objectives of the proposal are:

- Provide financially feasibly services to the approved Catherine Hill Bay development;
- To provide best practice sewerage treatment and waste water minimisation for the locality;
- To ensure that activities have minimal environmental impacts upon the locality;
- To ensure noise, odour, visual and traffic impacts on surrounding land uses are at an acceptable level

# 4.3 Alternatives and Options Considered

### 4.3.1 Methodology for selection of preferred option

The preferred design option has been selected using a cost / benefit analysis. The preferred design option has been selected based upon the following criteria:

- Cost;
- Service provision;
- Constructability; and
- Potential Impacts
- Sustainability
- Low Energy usage
- Minimizing potable water use

# 4.3.2 Identified Options

Five options have been identified for the proposal, these are:

- 1 Do Nothing;
- 2 Centralised connection to the Hunter Water Network;
- 3 Decentralised system with water recycling and irrigation of Membrane Bioreactor & Ultra Violet treated effluent on private land;
- 4 Decentralised system with water recycling and i rrigation of A dvanced Water Treatment Plant treated effluent on council parks and verges;



The following assessment is provided for each, for options 2 through 4 the description and evaluation of this option is presented in Table 8.

#### Do nothing option

The 'do nothing' option is not an alternative if the Catherine Hill Bay subdivision is to be developed. This options was discounted

#### Options 2 through 4

### Table 8: Option 2 through 4 Analysis

0	ption	Description	Evaluation Summary
2 Cent Busin Usua conn Hunt netw	tralised ness As al nection to ter Water ork	<ul> <li>The business as usual connection to Hunter Water would involve construction and operation of:</li> <li>Gravity sewer networks, some of which would be at considerable depth and located below the water table;</li> <li>A number of smaller sub-catchment scale sewage pump stations;</li> <li>A number of large sewage transfer pump stations and approximately 10 km sewer rising mains with chemical injection for septicity control to connect to the existing network at Swansea;</li> <li>Upgrades to the existing network at Swansea;</li> <li>Treatment of all wastewater at Belmont Waste Water Treatment Plant to secondary treatment standards in a conventional activated sludge process;</li> <li>Discharge of all treated effluent to the ocean with no wastewater recycling.</li> </ul>	<ul> <li>The business as usual option is not the preferred option due to:</li> <li>No water recycling;</li> <li>100% of treated effluent discharged to the ocean;</li> <li>Potential for wet weather overflows from the gravity sewer network and pump stations;</li> <li>Environmental risk associated with failure of the 10 km sewer rising main;</li> <li>Issues of septicity due to long detention times in the transfer system, particularly during earlier stages of development;</li> <li>Belmont Waste Water Treatment Plant and broader catchment is already stressed during peak wet weather flow events;</li> <li>This option is subject to Hunter Water capital works program and is dependent on contributions from other developers, which is unlikely in the medium term.</li> </ul>
3 Onsi treat and of pr	te ment with irrigation ivate land	<ul> <li>This option involves the construction and operation of:</li> <li>Pressure sewer network within continuous online monitoring and alarms;</li> <li>Onsite Membrane Bioreactor to treat wastewater close to its source;</li> <li>Advanced Water Treatment Plant sized to treat approximately 60% of wastewater flow for recycling at each house;</li> <li>The 40% of surplus effluent managed by irrigation of private restricted access irrigation areas;</li> <li>8.5 ha irrigation area and 2 ML wet weather storage to manage all surplus water by irrigation with no discharges to waterways.</li> </ul>	<ul> <li>The original Solo Water proposal had the following advantages:</li> <li>60% of all wastewater generated is recycled back to each house;</li> <li>40% surplus effluent managed by sustainable irrigation;</li> <li>No discharges of surplus recycled water to waterways;</li> <li>No wet weather overflows from the pressure sewer network;</li> <li>Treat wastewater close to its source and avoid long sewage transfer systems;</li> <li>Relatively low energy option.</li> <li>Can deliver 470 E T capacity to allow initial stage of the subdivision approved under MP10_0204 to proceed</li> <li>This is the preferred option for stages 1 and 2 of the Sewage Treatment Plant and Sewer Reticulation Network scheme.</li> </ul>
4 Onsi with	te treatment water	The original Solo Water onsite wastewater proposal involved construction and operation	The original Solo Water proposal had the following advantages:

Offices also at Nobbies Beach and Darwin



Option	Description	Evaluation Summary
recycling and irrigation of public land	<ul> <li>of:</li> <li>Pressure sewer network within continuous online monitoring and alarms;</li> <li>Onsite Membrane Bioreactor to treat wastewater close to its source;</li> <li>Advanced Water Treatment Plant sized to treat approximately 60% of wastewater flow for recycling at each house;</li> <li>The 40% of surplus effluent managed by irrigation of public open space, parks and landscape buffers;</li> <li>10 ha irrigation area and 10 ML wet weather storage to manage all surplus water by irrigation with no discharges to waterways.</li> </ul>	<ul> <li>60% of all wastewater generated is recycled back to each house;</li> <li>40% surplus effluent managed by sustainable irrigation;</li> <li>No discharges of surplus recycled water to waterways;</li> <li>No wet weather overflows from the pressure sewer network;</li> <li>Treat wastewater close to its source and avoid long sewage transfer systems;</li> <li>Relatively low energy option.</li> <li>Can deliver 556 E T capacity to allow whole subdivision approved under MP10_0204 to proceed</li> <li>This was the preferred option but is not feasible because Lake Macquarie City Council as the ultimate owner of the parks, landscape buffers and public open space will not permit irrigation using recycled water.</li> </ul>

Stage 3 of the s cheme will require separate assessment of discharge options and will be subject to separate assessment and approval.

# 4.4 Preferred Option

The preferred option is option 3 and is that assessed within this Review of Environmental Factors, this option has been arrived at after considerable investigation into appropriate and economically feasible services provision and alternative measures to deal with wastewater.

A decentralised system licensed under the Water Industry Competition Act 2006 which maximises water recycling and irrigates membrane bioreactor and ultra violet treated wastewater is the preferred option for stage 1 and 2 of the Sewage Treatment Plant and Sewage Reticulation Network scheme.





# 5.1 Commonwealth Legislation

# 5.1.1 Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999)

Under the *Environment Protection and Biodiversity Conservation Act 1999* a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land. These are considered in Appendix B and Chapter 7 of the R EF. A copy of the E nvironment Protection Biodiversity Conservation Act Protected Matters Report is included under Appendix L.

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance. Accordingly, the proposal has not be en referred to the Australian Government Department of Sustainability, Environment, Water, Population and Communities.

As part of the assessment of MP10\_0204 an Environmental Protection and Biodiversity Conservation Act referral was required due to proposed vegetation clearing. Environmental Protection and Biodiversity Conservation Act referral 2012/6382 was approved on the 27 February 2009. Importantly MP10\_0204 has assessed all issues relating to flora and fauna associated with the clearing required by the subdivision. The Sewage Treatment Plant, Irrigation Area and Sewer Reticulation Network are located within the approved footprint under MP10\_0204 and does not require or result in the need for clearing beyond that already approved.

For reference a copy of the Environmental Protection and Biodiversity Conservation Act Referral 2012/6382 approval is included under Appendix H.

# 5.2 State Legislation

### 5.2.1 Environmental Planning and Assessment Act 1979 (EP&A Act 1979)

As provided by Clause 76, an environmental planning instruments being SEPP (Infrastructure) 2007 outlines the proposal is permissible without development consent. The Environmental Planning and Assessment Act 1979 outlines the definition of an activity as it relates to Part 5 of the EP& A Act 1979. The proposal is consistent with this definition and assessment is required in accord with the provisions of Part 5 of the Environmental Planning and Assessment Act 1979.

### 5.2.2 Environmental Planning & Assessment Regulation 2000 (EPAR 2000)

The matters prescribed by Clause 228 of the E nvironmental Planning and Assessment Regulation 2000, for consideration by assessments under Part 5, are reviewed at Appendix B.

# 5.2.3 Protection of the Environment Operations Act 1997

The Protection of Environmental Operations Act 1997, prohibits any person from causing pollution of waters or air, and provides penalties for pollution offences relating to water, air and noise. The Protection of Environments Operation Act 1997 provides a regulatory framework for the licensing of all activities listed in Schedule 1 to the Act that have the potential to impact on the environment.

The proposal falls within the Schedule 1 definition of 'Sewerage Treatment'. Pursuant to Clause 48 of the Protection of Environments Operation Act, an Environmental Protection License is required for all



scheduled activities and would be issued to a specific premises or activity. The proposal is not a scheduled activity as the Sewage Treatment Plant capacity does not ex ceed 2,500 equivalent persons or 750 kL/day. An Environmental Protection License is not required by the development.

Section 120 of the *Protection of the Environment Operations Act 1997* prohibits the pollution of waters. The proposal includes measures to address the risk of water pollution, see section 7.

The proposal will include earthworks to form the proposed storage ponds, If Virgin Excavated Natural Material is to be taken off the site, a Section 143 Notice under the Protection of Environments Operation Act will be required and if the site to receive the spoil requires a development application this will be in place as required by the Section 143 notice prior to the spoil being relocated.

### 5.2.4 Mines Subsidence Compensation Act 1961

In accord with Clause 15 of the M ines Subsidence Act 1961 the proposed site is located within the Swansea North Entrance Mine subsidence district. As per the requirements of Clause 15 (2A) an approval is required to alter or erect improvements within a mine subsidence district. This approval would have to be obtained prior to commencement of any works.

The issue of m ine subsidence has been considered as part of MP10\_0204. Condition D7 of MP10\_0204 requires that the pr inciple certifying authority for the subdivision works associated with MP10\_0204 be provided with evidence from a qu alified structural engineer that the land as subdivided under MP10\_0204 is able to meet the requirements of the Mine Subsidence Board and that stability, subsidence potential and load bearing capacity has been appropriately addressed.

This requirement applies to the Sewage Treatment Plant Site and this coupled with obtaining a Mine Subsidence Board approval for the proposed works as required by Clause 15 (2A) will full address the requirements of the Mine Subsidence Compensation Act 1961.

### 5.2.5 National Parks and Wildlife Act, 1974

The harming or desecrating of Aboriginal objects or places is an offence under section 86 of the *National Parks and Wildlife Act 1979.* Under section 90, an Aboriginal heritage impact permit may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or persons. Aboriginal objects or places are not likely to be affected by the proposal, refer Section 7.

All native birds, reptiles, amphibians and mammals, except the dingo, are protected in New South Wales under the National Parks and Wildlife Act. The harming of protected fauna is prohibited under the National Parks and Wildlife Act, but an exemption applies in relation to things that are essential to the carrying out of an activity to which Part 5 of the Environmental Planning and Assessment Act applies and where the determining authority has complied with the provisions of that part.

Potential impacts on flora and fauna are considered in Section 7. The proposal has been assessed as unlikely to impact upon flora or fauna.

### 5.2.6 Heritage Act, 1977

A number of the al lotments which form part of the s ite fall within the Catherine Hill Bay Cultural Heritage Precinct. The Catherine Hill Bay Cultural Heritage Precinct is listed on the N SW State Heritage Register. Clause 57 Effect of Interim Heritage orders and listing on State Heritage Register of the Heritage Act 1977 requires that:

(1) When an interim heritage order or listing on the State Heritage Register applies to a place, building, work, relic, moveable object, precinct, or land, a person must not do any of the following things except in pursuance of an approval granted by the approval body under Subdivision 1 of Division 3:

- (a) demolish the building or work,
- (b) damage or despoil the place, precinct or land, or any part of the place, precinct or land,
- (c) move, damage or destroy the relic or moveable object,
- (d) excavate any land for the purpose of exposing or moving the relic,



- (e) carry out any development in relation to the land on which the building, work or relic is situated, the land that comprises the place, or land within the precinct,
- (f) alter the building, work, relic or moveable object,
- (g) display any notice or advertisement on the place, building, work, relic, moveable object or land, or in the precinct,
- (h) damage or destroy any tree or other vegetation on or remove any tree or other vegetation from the place, precinct or land.

As such the proposal would require an approval in respect of doing or carrying out of an act, matter or thing required to in Clause 57(1) of the Heritage Act 1977. In this regard an approval is required prior to installing the pressure sewer unit and associated gravity sewer components.

# 5.2.7 Roads Act, 1993

The *Roads Act, 1993* sets out rights of members of the public to pass along public roads, establishes procedures for opening and closing a public road, and provides for the classification of roads. It also provides for the requirement for an approval to be issued for any structure or work to be carried out on or over a public road. The Sewerage Treatment Plant site access would include works within existing public road reserve. Approval under Section 138 of the R oad act will be required for these items.

# 5.2.8 Threatened Species Conservation Act, 1995

The Threaten Species Conservation Act 1995 is directed at conserving threatened species, populations and ecological communities of animals and plants. Certain species of animals or plants are identified as endangered species, populations or communities or vulnerable species under the Act. Areas of land comprising the habitats of listed endangered species may also be declared critical habitat under the Act.

By operation of as sociated Environmental Planning and Assessment Act 1979 provisions, activities that are likely to have a significant impact on listed threatened species, populations, endangered ecological communities or their habitats must be the s ubject of a s pecies impact statement and require the concurrence of the D irector-General of the Office of Environment & Heritage. Likely impacts on threatened species have been considered in Section 7. The assessment identifies the proposal is unlikely to threaten the viability of any local populations.

Section 91 of the Threaten Species Conservation Act 1995 provides for the granting of licenses for, amongst other things, to harm or pick threatened species, populations or ecological communities or damage habitat. The corresponding offence is outlined in section 118A of the N ational Parks and Wildlife Act. Importantly, several defenses are expressly recognised by the National Parks and Wildlife Act including where the action taken was essential to the carrying out of an ac tivity to which Part 5 of the E nvironmental Planning and Assessment Act 1979 applies and where the determining authority has complied with the provisions of that part. In this context it can be noted that full compliance with Part 5 of the Environmental Planning and Assessment Act 1979 is being pursued.

The proposed Sewage Treatment Plant and Sewer Reticulation Network do not r equire any vegetation removal beyond that approved under MP10\_0204.

### 5.2.9 Water Management Act 2000

The Water Management Act 2000 provides for the sustainable and integrated management of the State's water for the benefit of both present and future generations. The Act controls the extraction and use of water, the construction of water bodies such as weirs and dams and any activity that is in or near water sources in New South Wales.

The definition of a 'water source' is a broad term used to describe any or whole parts of a river, lake, estuary, New South Wales coastal waters or a place where water occurs naturally on or below the surface of the ground. The definition of a 'controlled activity' is the carrying out of work or any other activity that affects the quality or flow of water in a water source. The definition of 'waterfront land' is defined as land within 40 metres of a lake, estuary, river or shoreline.



The proposal does not r equire a controlled activity approval for the oper ation of the Sewage Treatment Plant and Sewer Reticulation Network as no water extraction would be required as part of the proposal. However any construction that is located within the 40m pr escribed distance of a waterway such as installation of the irrigation system and form of the catch and diversion drains will require a controlled activity approval. A controlled activity approval for any such construction would be required prior to commencement of works.

Refer Section 5.6 for comment against the NSW aquifer Interference Policy and the need for an aquifer interference license under the Water Management Act 2000.

# 5.2.10 Noxious Weeds Act 1993

The Noxious Weeds Act 1993 e stablishes a system for the identification and control of noxious weeds in New South Wales. Responsibility for the control of no xious weeds lies with the owner and/or occupier of private land and Crown land, local councils and other public authorities on land they occupy. Under the Noxious Weeds Act, the Minister for Primary Industries may declare a plant to be a noxious weed. Control notices can be issued by the Minister and local control authorities to ensure obligations are met.

Weed management measures undertaken as part of the works and operations would comply with the requirements of the Noxious Weeds Act 1993.

### 5.2.11 Rural Fires Act 1997

The Rural Fires Act 1997 includes the requirement for New South Wales Rural Fire Service approval of certain types of sensitive development, or special fire protection purposes under Section 100B of the Rural Fires Act 1997. The proposal is not listed as a special fire protection purpose and approval under Section 100B of the Rural Fires Act is not required.

The proposed Sewage Treatment Plant and as sociated structures is classified as a Class 10a structure pursuant to the Building Code of Australia. The Building Codes of Australia does not provide for any bushfire specific performance requirements and as such AS-3959-2009 does not apply as a set of 'deemed to satisfy' provisions.

The general fire safety construction provisions are taken as acceptable solutions, but the aims and objectives of Planning for Bushfire Protection 2006 apply in relation to other matters such as access, water and services, emergency planning and landscaping / vegetation management. A review of applicable requirements has been undertaken and is included within the Bushfire Management Plan under Appendix J.

# 5.3 State Environmental Planning Policies

We note that consideration of the State Environmental Planning policies is not a requirement of assessment under Part 5 of t he Environmental Planning and Assessment Act 1979. The State Environmental Planning Policies are to be as sessed when consent is required under Part 4 of t he Environmental Planning and Assessment Act 1979.

As a matter of good pr actice the provisions of the S tate Environmental Planning Policies are commented against where they could have been applied to the proposal had it required consent under Part 4 of the Environmental Planning and Assessment Act 1979

The following State Environmental Planning Policies have been considered as part of the Review of Environmental Factors.

- State Environmental Planning Policy No. 33 Hazardous and Offensive Development;
- State Environmental Planning Policy No. 44 Koala Habitat Protection;



- State Environmental Planning Policy No. 55 Remediation of Land;
- State Environmental Planning Policy No. 71 Coastal Protection
- State Environmental Planning Policy (Infrastructure) 2007;
- State Environmental Planning Policy (State & Regional Development) 2011

#### 5.3.1 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)

State Environmental Planning Policy 33 deals with the definition of and control of hazardous and offensive developments. State Environmental Planning Policy 33 provides definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry', 'offensive storage establishment', potentially hazardous industry and potentially offensive industry. The definitions apply to al I environmental planning instruments, existing and future.

The policy requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the p olicy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis.

In determining the app lication of State Environmental Planning Policy 33 to the proposal, consideration of the New South Wales Department of P lanning Hazardous and Offensive Development Application Guidelines – Applying SEPP 33 should be considered. Within this guideline it is stated:

'Consent authorities should firstly consider whether the proposed use falls within the definition of 'industry' adopted by the planning instrument which applies or whether it is a 'storage establishment'.

The planning instrument applying to the site is the Lake Macquarie Local Environmental Plan 2004, specifically the provisions of Part 11 South Wallarah Peninsula Site. Clause 133 Interpretation of Part 11 South Wallarah Peninsula Site refers works and expressions within the part as having the same meaning as it has in the standard instrument prescribed by the Standard Instrument (Local Environmental Plans) Order 2006.

Referring to the s tandard instrument definitions, the proposal would be defined as a sewerage system. It is noted a sewerage system is not defined or considered to be an Industry within the standard instrument definitions. As the proposal does not meet the definition of an Indus try the proposal would not be subject to the provisions of State Environmental Planning Policy 33.

It is noted that if State Environmental Planning Policy 33 app lied to the proposal and it was considered to be a 'potentially offensive industry' Clause 14 of State Environmental Planning Policy 33 would require the proposal to be notified as per the requirements for designated development. Clause 79 P ublic participation – designated development of the Environmental Planning and Assessment Act 1979 requires designated development to be publicly exhibited for a period of not less than 30 days.

As part of the Water Industry Competition Act License agreement the proposal including a copy of the Review of Environmental Factors documentation has been put on p ublic exhibition with the public invited to provide comment for a period of 30 days between 18<sup>th</sup> September 2014 and 18<sup>th</sup> October 2014. The public exhibition of the proposal which included the Review of Environmental Factors documentation has been under taken for a period consistent with that required by State Environmental Planning Policy 33.

If State Environmental Planning Policy 33 applied to the proposal the public notification of 30 days required by the policy would be complied with.



The operation of the S TP will use minimal chemical storages and is not consistent with any of the definitions contained within State Environmental Planning Policy 33. The proposal does not trigger the need for a preliminary hazard analysis.

# 5.3.2 State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)

As part of this assessment a review against State Environmental Planning Policy 44 has been undertaken, the following extract is provided:

This Policy 'aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.'

In association with development applications and in areas where the policy applies a number of criteria are to be addressed to determine levels of assessment and to govern management considerations. The steps are as follows:

1. Does the Policy Apply?

Is the land greater than 1ha in size and located within one of the Local Government areas listed within Schedule 1 of SEPP 44?

Yes. The land is >1HA in area and located within the Lake Macquarie Local Government area, and the Wyong Local Government Area.

2. Is the land potential koala habitat?

No the site is cleared of all vegetation

3. Is the land core koala habitat?

No the site is clear of all vegetation

4. Is there a requirement to prepare a Plan of Management for land containing core koala habitat?

No. It is considered that the site does not contain core Koala habitat as described.

As the site does not contain core koala habitat a koala management plan is not required. Again it is noted that all clearing of the site and surrounding subdivision footprint has been approved under MP10\_0204 and Environment Protection Biodiversity Conservation Act referral 2012/6382. At the time of preparing the review of environmental factors the site is clear of all vegetation.

# 5.3.3 State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55)

State Environmental Planning Policy 55 deals with the remediation of land, with the consent authority required to consider the items listed under Clause 7. As stated by Clause 7:

- (1) A consent authority must not consent to the carrying out of any development on land unless:
  - (a) It has considered whether the land is contaminated, and
  - (b) If the I and is contaminated, it is satisfied that the I and is suitable in its contaminated state (or will be suitable, after remediation) for the p urpose for which the development is proposed to be carried out, and
  - (c) If the land requires remediation to be made suitable for the purpose for which the development is proposed to be c arried out, it is satisfied that the I and will be remediated before the land is used for that purpose.



- (2) Before determining an application for consent to carry out development that would involve a change of use on any of the land specified in subclause (4), the consent authority must consider a report specifying the findings of a pr eliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines.
- (3) The applicant for development consent must carry out the investigation required by subclause (2) and must provide a report on it to the consent authority. The consent authority may require the applicant to carry out, and pr ovide a report on, a detai led investigation (as referred to in the contaminated land planning guidelines) if it considers that the findings of the preliminary investigation warrant such an investigation.
- (4) The land concerned is:
  - (a) Land that is within an investigation area,
  - (b) Land on w hich development for a pur pose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out,
  - (c) To the extent to which it is proposed to carry out development on it for residential, educational, recreational or child care purposes, or for the purposes of a hospital—land:
    - (i) in relation to which there is no knowledge (or incomplete knowledge) as to whether development for a pur pose referred to in Table 1 t o the contaminated land planning guidelines has been carried out, and
    - On which it would have been lawful to carry out such development during any period in respect of w hich there is no k nowledge (or incomplete knowledge).

The Sewage Treatment Plant and Sewer Reticulation Network will be located within the approved footprint of the C atherine Hill Bay subdivision under MP10\_0204. As part of the as sessment of MP10\_0204 the issue of site contamination was given significant consideration. As required by the conditions of approval for MP10\_0204 a R emediation Action Plan is to be pr epared for the entire Catherine Hill Bay development.

Approval MP10\_0204 requires that an accredited Environmental Protection Agency auditor certify that the Remediation Action Plan has been implemented and that the whole site is suitable for the proposed residential development prior to the issue of a subdivision certificate. As the Sewage Treatment Plant site is within the bounds of the approved Catherine Hill Bay subdivision the site will be subject to the w orks required by the R emediation Action Plan for the subdivision and upon completion will be suitable for the construction of the Sewage Treatment Plant.

# 5.3.4 State Environmental Planning Policy No. 71 – Coastal Protection

The site falls within the bounds of the New South Wales Coastal Zone and as such the provisions of State Environmental Planning Policy 71 would typically apply to the site. In this regard however we note the provisions of Clause 135(2) of the Lake Macquarie Local Environmental Plan which states as follows:

(2) The following State environmental planning policies (or provisions) do not apply to the South Wallarah Peninsula site:

State Environmental Planning Policy No 1—Development Standards State Environmental Planning Policy No 4—Development Without Consent and Miscellaneous Exempt and Complying Development (clause 6 and Parts 3 and 4) State Environmental Planning Policy No 60—Exempt and Complying Development State Environmental Planning Policy No 71—Coastal Protection



By virtue of Clause 135(2) of the Lake Macquarie Local Environmental Plan 2004 State Environmental Planning Policy 71 does not ap ply to the site. We note the Lake Macquarie Local Environmental Plan 2004 has specific provisions relating to development within the Coastal Zone and these are addressed under Section 5.4.

# 5.3.5 State Environmental Planning Policy (Infrastructure) 2007

*State Environmental Planning Policy (Infrastructure) 2007* aims to facilitate the effective delivery of infrastructure across the State.

Clause 106(1) of State Environmental Planning Policy (Infrastructure) permits development for the purposes of sewage treatment plants to be carried out by or on behalf of a public authority or any person licensed under the *Water Industry Competition Act 2006* without consent on land in a prescribed zone; while Clause 106(3) permits development for the purposes of sewerage reticulation system by or on behalf of a public authority or any person licensed under the *Water Industry Competition Act 2006* without consent on any land.

As the proposal is for a sewerage treatment plant and sewerage reticulation system and is to be carried out by Solo Water Pty Ltd (Catherine Hill Bay Water Utility Pty Ltd) which will be licensed under the W IC Act 2006, it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979*. Development consent under Part 4 of the EP&A Act 1979 is not required.

It is noted the Sewage Treatment Plant will be located on land zoned SP2 Infrastructure a prescribed zone for the purposes of Clause 106(1) of ISEPP.

The proposal is not located on land reserved under the National Parks and Wildlife Act 1974 and does not affect land or development regulated by State Environmental Planning Policy No. 14 - Coastal Wetlands, State Environmental Planning Policy No. 26 - Littoral Rainforests or State Environmental Planning Policy (Major Projects) 2005.

Part 2 of the State Environmental Planning Policy (Infrastructure) contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Consultation, including consultation as required by State Environmental Planning Policy (Infrastructure) (where applicable), is discussed in chapter 6 of this REF.

With regards to the irrigation, Irrigation is an approved ancillary component of MP10\_0204. Legal advices have been obtained on this issue and these are presented under Appendix P.

# 5.3.6 State Environmental Planning Policy (State & Regional Development) 2011

The provisions of State Environmental Planning Policy (State & Regional Development) 2011 provide for the nomination of development that is state significant development pursuant to Section 89C of the E nvironmental Planning & Assessment Act 1979. Specifically clause 8 Declaration of State Significant development: section 89 states:

#### 8 Declaration of State significant development: section 89C

- (1) Development is declared to be State significant development for the purposes of the Act if:
  - (a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and
  - (b) the development is specified in Schedule 1 or 2.

As part of the site is located on land on the State Heritage Register the proposal is listed within the Schedule of State Environmental Planning Policy (State & Regional Development) 2011. However by virtue of Clause 106 of State Environmental Planning Policy (Infrastructure) 2007 the proposal is permissible without development consent. C lause 106 of State Environmental Planning Policy (Infrastructure) 2007 does not include any exclusion for land located on the State Heritage Register.



As such the proposal does not meet the r equirement of C lause 8(1)(a) and as such is not state significant development.

# 5.4 Lake Macquarie Local Environmental Plan 2004

Permissibility is e stablished by State Environmental Planning Policy (Infrastructure) 2007 and is discussed under Section 5.3.5. The Lake Macquarie Local Environmental Plan 2004 also applies to the site, specifically Part 11 South Wallarah Peninsula Site. The proposal does not compromise the provisions contained within the LMLEP 2004. The following comment is provided against the relevant clauses:

#### Clause 144 – Height of Building

The site of the Sewage Treatment Plant is identified with a statutory height limit of 9m. The tallest structure associated with the Sewage Treatment Plant is the storage tanks. The tanks provide a height of 6m to top of tank (roof) and 6.9m to the top of open access platform which is required in accord with AS1657. The proposal is complaint with Clause 144. Refer Appendix A.

#### Clause 147 – Development within the coastal zone

The site is located within the N SW Coastal Zone. C lause 147 of the Lak e Macquarie Local Environmental Plan 2004 provides the following for development within the coastal zone.

- (2) Development consent must not be granted to development on land within the South Wallarah Peninsula site that is wholly or partly within the coastal zone unless the consent authority has considered:
  - (a) existing public access to and along the coastal foreshore for pedestrians (including persons with a disability) with a view to:
    - (i) maintaining existing public access and, where possible, improving that access, and
    - (ii) identifying opportunities for new public access, and

The proposed Sewage Treatment Plant and Sewer Reticulation network do not impact upon existing public foreshore access, new foreshore improvements and public open space to be provided as part of Project Approval MP10\_0204, nor does it due to its location provide further opportunity of new public foreshore access.

- (b) the suitability of the proposed development, its relationship with the surrounding area and its impact on the natural scenic quality, taking into account:
  - (i) the type of the proposed development and any associated land uses or activities (including compatibility of any land-based and water-based coastal activities), and
     (ii) the location, and
  - (iii) the bulk, scale, size and overall built form design of any building or work involved, and

The proposed Sewage Treatment Plant is located such that it will not be visible from foreshore areas and as such will not have an impact upon the scenic quality of the for eshore area. A Visual Impact Assessment has been prepared as part of this Review of Environmental Factors and mitigations measures proposed to ensure the proposal blends and is appropriately screened to prevent a visual impact in the wider locality. It is noted the structures proposed as part of the Sewage Treatment Plant comply with the statutory height limit of 9m prescribed for the site.

- (c) the impact of the proposed development on the amenity of the coastal foreshore, including:
  - (i) any significant overshadowing of the coastal foreshore, and
  - (ii) any loss of views from a public place to the coastal foreshore, and



The Sewage Treatment Plant has significant separation from the coastal foreshore area and will not overshadow the foreshore area. In terms of views the Sewage Treatment Plant is located such that it will not impede views from a public place to the coastal foreshore.

(d) how the visual amenity and scenic qualities of the coast, including coastal headlands, can be protected, and

The proposed Sewage Treatment Plant is located such that it will not be visible from foreshore areas and as such will not have an impact upon the scenic quality of the for eshore area. A Visual Impact Assessment has been prepared as part of this Review of Environmental Factors and mitigations measures proposed to ensure the proposal blends and is appropriately screened to prevent a visual impact in the wider locality. It is noted the structures proposed as part of the Sewage Treatment Plant comply with the statutory height limit of 9m prescribed for the site.

- (e) how biodiversity and ecosystems, including:
  - (i) native coastal vegetation and existing wildlife corridors, and
  - (ii) rock platforms, and
  - (iii) water quality of coastal waterbodies, and
  - (iv) native fauna and native flora, and their habitats, can be conserved, and

As discussed within this review of environmental factors the proposed sewage treatment plant and sewer reticulation network is located within the approved footprint of the Catherine Hill Bay subdivision approved under MP10\_0204. No further clearing is required to facilitate the proposal. Implementing the proposal has no direct impact upon native coastal vegetation, rock platforms, native fauna and flora and their habitats.

With regards to water quality assessment of the proposal, through the application of the proposed mitigations measures for the proposal it will not have a negative impact upon the surface or ground water quality of the locality.

We note this preferred option for the proposal was selected as it reduced the impact on surrounding biodiversity and ec osystems. P articularly Option 2 w hich was originally approved as part of MP10\_0204 would have required significant construction works and ongoing maintenance within lands dedicated as National Parks. The proposal as assessed in this review of environmental factors removes this impact.

- (f) the effect of coastal processes and coastal hazards and potential impacts, including sea level rise:
  - (i) on the proposed development, and
  - (ii) arising from the proposed development, and

The site is not affected by coastal process.

(g) the cumulative impacts of the proposed development and other development on the coastal catchment.

Cumulative impacts have the potential to arise from the interaction of individual elements within the proposal and the additive effects of the proposal with other external projects. Clause 228 (2) of the Environmental Planning and Assessment Act 1979 r equires that potential cumulative impacts as a result of the proposal be taken into account.

The Sewage Treatment Plant will be located within the bounds of an approved residential subdivision and as such cumulative impact associated with vegetation removal does not result as part of the proposal. The proposed works may produce greenhouse gas. Due to the small scope of the proposal, these impacts do not h ave the potential to have a significant cumulative environmental effect on existing or likely future activities. The potential impacts on the environment would be minimised with the implementation of the safeguards given in this Review of Environmental Factors.

With regard to traffic impacts the proposal will not generate significant traffic during either construction or operation.



The proposed works would not significantly increase demands on resources, which are, or are likely to become, in short supply. Relatively small amounts of materials would be required for the proposed works. The safeguards listed in this Review of Environmental Factors would be implemented to minimise any impacts.

It is also noted the proposal makes provisions for future connection of existing Catherine Hill Bay allotments into the system. This would allow the removal of existing and aging individual effluent disposal systems and allow this effluent to be treated to an appropriate standard within the proposed system. This would allow the future removal of an existing impact in the locality.

- (3) Development consent must not be granted to development on land within the South Wallarah Peninsula site that is wholly or partly within the coastal zone unless the consent authority is satisfied that:
  - (a) the proposed development will not impede or diminish, where practicable, the physical, land-based right of access of the public to or along the coastal foreshore, and

The proposed Sewage Treatment Plant and Sewer Reticulation network do not impact upon existing public foreshore access, new foreshore improvements and public open space to be provided as part of Project Approval MP10\_0204, nor does it due to its location provide further opportunity of new public foreshore access.

(b) if effluent from the development is disposed of by a non-reticulated system, it will not have a negative effect on the water quality of the sea, or any beach, estuary, coastal lake, coastal creek or other similar body of water, or a rock platform, and

The proposal is not a non-reticulated system; it is a private reticulation system which would be licensed under the Water Industry Competition Act. With regards to water quality assessment of the proposal, through the application of the proposed mitigations measures for the proposal it will not have a negative impact upon the surface or ground water quality of the locality.

(c) the proposed development will not discharge untreated stormwater into the sea, or any beach, estuary, coastal lake, coastal creek or other similar body of water, or a rock platform.

The proposal will not discharge untreated stormwater. The Sewage Treatment Plant site will be connected into the stormwater system of the approved Catherine Hill Bay subdivision approved under MP10\_0204. Stormwater management for the Sewage Treatment Plant would be prepared and would be in accord with Lake Macquarie Councils DCP No.1 Volume 2 Engineering Guidelines. No drainage is to be directed to the adjacent conservation lands.

#### Clause 150 – Heritage Conservation

The proposal does not include any of the items listed as requiring consent in relation to a h eritage item. The proposal will require an approval under Clause 57(1) of the H eritage Act 1977 prior to installation of the pressure unit and gravity sewer components of the sewer reticulation network within the area of the site listed on the State Heritage Register.

# 5.5 Catherine Hill Bay (South) Development Control Plan

The STP site will be located within the South Montefiore Street precinct. The intent of the precinct is for structures to correspond to the surrounding bushland with structures to be constructed of natural materials and neutral colours. Structures are to be I ow in scale to allow surrounding bush to be dominate feature of the locality.

The proposed STP structures would meet this intent with the tallest structure associated with the Sewage Treatment Plant being the storage tanks. The tanks provide a height of 6m to top of tank (roof) and 6.5m to the top of open access platform which is required in accord with AS1657, native



screen planting to be provided and were possible colours will be natural. The STP building would be clad with a natural colorbond colour such as Pale Eucalypt or similar. Refer Landscape and Visual Impact Assessment under Appendix D for assessment of the S ewage Treatment Plant visual impact upon the locality.

Stormwater management for the Sewage Treatment Plant would be prepared and would be in accord with Lake Macquarie Councils DCP No.1 Volume 2 Engineering Guidelines. No drainage is to be directed to the adjacent conservation lands.

# 5.6 NSW Aquifer Interference Policy

The purpose of the NSW Aquifer Interference Policy is stated as:

'The purpose of this Aquifer Interference Policy ("this Policy") is to explain the role and requirements of the Minister administering the Water Management Act 2000 ("the Minister") in the water licensing and assessment processes for aquifer interference activities under the Water Management Act 2000 and other relevant legislative frameworks.

The proposal does not meet the definition of an aquifer interference activity as defined under the Water Management Act 2000. An aquifer interference activity is defined as:

Aquifer interference activity means an activity involving any of the following:

- (a) the penetration of an aquifer,
- (b) the interference with water in an aquifer,
- (c) the obstruction of the flow of water in an aquifer,
- (d) the taking of water from an aquifer in the course of carrying out mining, or any other activity prescribed by the regulations,
- (e) the disposal of water taken from an aquifer as referred to in paragraph (d).

As outlined within this Review of Environmental Factors, the proposal does not undertaken an activity listed in points (a) through (e) of the definition of an aqu ifer interference activity and as such the proposal does not meet the d efinition of an aqu ifer interference activity and an aquifer interference license under the Water Management Act 2000 is not required. As an aquifer interference license is not required the NSW Aquifer Interference Policy is technically not applicable to the proposal.

It is also noted the NSW Aquifer Interference Policy States:

'an assessment of aquifer interference activities seeking approval under the Environmental Planning and Assessment Act 1979 will be made on a case by case basis for each particular project in accordance with this policy'

The proposal is subject to environmental assessment under Part 5 of the Environmental Planning and Assessment Act 1979. The proposal is not seeking consent under Part 4 or Part 5.1 of the Environmental Planning and Assessment Act 1979.

Although not applicable to the pr oposal a review of the N SW Aquifer Interference Policy has been undertaken and the proposal would be defined as a low impact activity, namely the 'construction and ongoing use of waste liquid/effluent storage and irrigation reuse schemes providing these are carried out in accordance with their planning and other approvals' as outlined within Section 3.3 of the policy

In addition to this the R EF demonstrates there is negligible potential for surface or groundwater contamination or water level/flow increases as a result of the scheme which meet the Minimal Impact Considerations within the Policy. These issues are discussed within Section 7.5 and 7.6 of this Review of Environmental Factors. The irrigation area is also located approximately 400m from nearest mapped ground water bore. This distance exceed the minimum setback required under the NSW EPA Effluent Irrigation Guidelines and the NSW Onsite Silver Book, this is discussed under Section 5.7.



Finally it is noted the NSW Office of Water have reviewed this review of environmental factors during its assessment and provided comments to the Independent Pricing and Regulatory Tribunal. The NSW Office of Water has raised no issues regarding the proposal either being an aquifer interference activity or requiring an aquifer interference license under the Water Management Act 2000.

# 5.7 Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009

The proposal is located in the area defined in the Water Sharing Plan Hunter Unregulated and Alluvial Water Sources 2009, in the L ake Macquarie Management Unit. The objectives of the pl an are identified as:

- (a) protect, preserve, maintain or enhance the important river flow dependent and high priority groundwater dependent ecosystems of these water sources,
- (b) protect, preserve, maintain or enhance the Aboriginal, cultural and heritage values of these water sources,
- (c) protect basic landholder rights,
- (d) manage these water sources to ensure equitable sharing between users,
- (e) provide opportunities for market based trading of access licences and water allocations within sustainability and system constraints,
- (f) provide recognition of the connectivity between surface water and groundwater,
- (g) provide sufficient flexibility in water account management to encourage responsible use of available water, and
- (h) adaptively manage these water sources.

A search of the NSW Groundwater Bores online system identifies fourteen (14) bores within the boundary of the subdivision approved under MP10\_0204 and one (1) within the existing Catherine Hill Bay Village. Figure 10 below is an extract of this mapped data.



Figure 10: Groundwater Works Location (Bores) Source: NSW Office of Water: Map of NSW Groundwater Bores Illustrative only. Not to scale

The fourteen (14) bores within the appr oved subdivision footprint of M P10\_0204 if not al ready decommissioned will be as part of going subdivision works approved under MP10\_0204.

The single bore within the existing Catherine Hill Bay village is located approximately 400m from the near point of the proposal irrigation areas. This exceeds the NSW EPA Effluent Irrigation Guidelines and the NSW Onsite Silver Book setback from of a minimum of 250m for domestic ground water bores.

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Further this Review of Environmental Factors demonstrates negligible potential for surface or groundwater contamination or water level/flow increases as a result of the proposal. Given this the potential for impacts on r iver flows, groundwater levels, existing water users and dependant ecosystems is negligible. The single bore identified within the existing Catherine Hill Bay Village will not be impacted upon by this proposal.

It is noted the existing bore within the existing Catherine Hill Bay Village is adjacent to existing properties which currently rely upon onsite effluent disposal the use of this bore is unlikely to be for potable purposes.

# 5.8 Confirmation of statutory position

The proposal has been as sessed as permissible without consent under the relevant environmental planning instruments. That position is established by reference to Clause 106 of State Environmental Planning Policy (Infrastructure) 2007.

The proposal is within the definition of an activity set by Section 110 of the Environmental Planning and Assessment Act 1979 and is being proposed by a person licensed under the Water Industry Competition Act 2006 (pending issue of license). Assessment under Part 5 of the Environmental Planning and Assessment Act is therefore required.

The matters prescribed by Clause 228 of the E nvironmental Planning and Assessment Regulation 2000, for consideration by assessments under Part 5, are reviewed at Appendix B.

No requirement for a referral under the Environment Protection Biodiversity Conservation Act has been identified.

With regards to the irrigation, Irrigation is an approved ancillary component of MP10\_0204. Legal advices have been obtained on this issue and these are presented under Appendix P.



# 6 – Stakeholder and community consultation

# 6.1 Community involvement

Community involvement of consultation has been limited on the proposed Sewage Treatment Plant and Sewage Reticulation Network. The proposal plant will not impact upon the existing Catherine Hill Bay village. The proposal is such that it will not have undue adverse impact on the residential allotments it will adjoin within the approved subdivision.

# 6.2 Aboriginal community involvement

Further consultation with the local Aboriginal community has not been undertaken as part of this Review of Environmental Factors. The proposed Sewage Treatment Plant & Sewage Reticulation Network is located within the existing approved footprint of the Catherine Hill Bay subdivision under MP10\_0204. In accord with the requirements of MP10\_0204 an Aboriginal Heritage Management Plan was prepared. This report included detail consultation with the Aboriginal Community and includes recommendation to address any Aboriginal heritage items onsite. The proposed Sewage Treatment Plant & Sewer Reticulation Network does not alter or expand the approved subdivision footprint and further consultation is not required in this instance.

# 6.3 State Environmental Planning Policy (Infrastructure) consultation

Part 2 of the State Environmental Planning Policy (Infrastructure) contains provisions for public authorities or persons acting on behalf of a public authority to consult with local councils and other public authorities prior to the commencement of certain types of development. In this regard the proponents are not a public authority nor are they acting on behalf of a public authority. As such the provisions of the clause are such that consultation is NOT strictly required.

In light of this the consultation requirements at clauses 13-16 of the Infrastructure SEPP have been reviewed and considered against the consultation undertaken as part of the project as a whole and the following is provided:

# Lake Macquarie City Council

In this regard to potential direct impact to public authority's assets, formal consultation with Lake Macquarie Council has occurred. Specifically, it is noted that excavation of council managed roads (or parts thereof) may be such that the work cannot reasonably be characterized as minor or inconsequential (see clause 13 of the State Environmental Planning Policy (Infrastructure)).

The consultation that has occurred with LMCC has taken the form of two (2) site meetings held with relevant Council officers on the 17/01/2013 and 07/03/2013. Given the proposal has minimal impact upon Council infrastructure it is considered to be sufficient for the purposes of proposal. The main feedback received centered around the location and use of irrigation.

As discussed within Section 4 opti ons consideration, it was this consultation that ultimately determined that irrigation of private owned restricted access open space was the preferred option and that option 4 was ruled out.

Ongoing consultation will be required with Lake Macquarie City Council and where required S138 approval will have to be issued by LMCC.

#### Office of Environment and Heritage (OEH) – National Parks & Wildlife

The office of Environment and Heritage were consulted during the assessment of MP10\_0204 MOD 2 which rezoned the site of the Sewerage Treatment Plant to SP2. The comments from the Office


and Environment and Heritage were received in writing on the 18 <sup>th</sup> Oct 2013. T hese comments centered on the potenti al for direct and indirect impacts upon the adj oining Munmorah State Conservation Area, including noise, odour, lighting, groundwater seepage and wet weather discharge. T hese issues have specifically been addressed within this Review of Environmental Factors and no impact is expected upon the Munmorah State Conservation Area.

#### Rural Fire Service

The Rural Fires Act 1997 includes the requirement for New South Wales Rural Fire Service approval of certain types of sensitive development, or special fire protection purposes under Section 100B of the Rural Fires Act 1997. The proposal is not listed as a special fire protection purpose and approval under Section 100B of the Rural Fires Act is not required as such specific consultation with the NSW Rural Fire Service is not required by the proposal.

#### 6.4 Government agency and stakeholder involvement

#### Independent Pricing and Regulatory Tribunal

Consolation with the Independent Pricing and R egulatory Tribunal has been ongoing, with the Independent Pricing and Regulatory Tribunal currently in receipt of a Network Operator and Retail Suppliers License Application under the Water Industry Competition Act 2006 for the proposal. The Independent Pricing and Regulatory Tribunal will be familiar with discussion had to date with regards to the proposal.

#### **NSW Health**

Ongoing consultation with NSW Health regarding the regulation, management and prevent of public health issues must occur following WIC Act License being granted. This proposal includes specific commitments to ongoi ng consultation with NSW Health as part of preparing a R ecycled Water Management Plan and Drinking Water Quality Management Plan.



# 7 – Environmental Considerations & Impacts

This section of the Review of Environmental Factors provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. T his includes consideration of the factors specified in the guidelines *Is an EIS required*? (DUAP 1999) as required under clause 228(1)(b) of the *Environmental Planning and Assessment Regulation 2000*. The factors specified in clause 228(2) of the *Environmental Planning and Assessment Regulation 2000* are also considered in Appendix B. Site-specific safeguards are provided to ameliorate the identified potential impacts.

# 7.1 Soils

# 7.1.1 Existing Environment

Geotechnical investigation of the site undertaken by Geotech Solutions Pty Ltd (2010) indicates the natural soils across the site consist of:

- Clean Aeolian quartz sand overlying silty and clayey quartz sand
- A mixture of sand, gravel, clay and silt overlying extremely to highly weathered rock
- Higher plasticity clays at depth near the interface of bedrock
- Triassic and late Permian age bedrock

Given the sites former use as a coal mine, topsoil conditions vary across the site based on the specific mining activities that have previously occurred, e.g. stockpiles, tailings dams, earthworks etc. Post development soil conditions will vary from what is currently on site due to the remediation works being undertaken by the coal mine and the bulk earth works that will occur as part of the residential subdivision approved under MP10\_0204.

As part of the assessment of M P10\_0204 the issue of site contamination was given significant consideration. As required by the conditions of approval for MP10\_0204 a Remediation Action Plan is to be prepared for the entire Catherine Hill Bay development.

Approval MP10\_0204 requires that an accredited Environmental Protection Agency auditor certify that the Remediation Action Plan has been implemented and that the whole site is suitable for the proposed residential development prior to the issue of subdivision certificate. A s the S ewage Treatment Plant site is within the bounds of the approved Catherine Hill Bay subdivision the site will be subject to the w orks required by the R emediation Action Plan for the subdivision and upon completion will be suitable for the construction of the Sewage Treatment Plant.

With regards to i rrigation detailed evaluation of s oil physical and chemical properties will be undertaken during each phase of the s ubdivision build out an d reassessed following bulk earthworks. Appropriate management measures will be incorporated in to t he Irrigation Management Plans.

Given the high sand content of the top soil layers where recycled water will be applied, issues associated with poor drainage, Sodicity, soil pH and soil salinity are not expected to be a significant constraint to effluent irrigation.

During establishment of the restricted access open space areas, a minimum of 100 mm of high quality sandy loam topsoil sourced from the site and other areas will be used to develop suitable soil conditions for plant growth in the irrigation areas.

# 7.1.2 Potential Impacts



Importantly, to address the potential impacts associated with the sites previous use and the potential to expose contaminated materials any work identified by the remediation action plan required for the CHB subdivision under MP10 0204 must be completed prior to commencement of works for the Sewage Treatment Plant and Sewer Reticulation Network on the subject site.

Upon completion of any works required to facilitate the subdivision under MP10\_0204. Impacts associated with the proposal would relate to construction activities and potential for increased erosion and sediment runoff.

#### 7.1.3 **Mitigation Measures**

- The preparation of the R emediation Action Plan as required under MP10\_0204 and any works • required by this plan must be completed prior to works on the Sewage Treatment Plant & Sewer Reticulation Network commencing.
- A Sediment and Erosion Control plan is to be prepared.
- Irrigation controls and m easures are to be in accord with that described within the Land Capability Assessment for Effluent Irrigation under Appendix K and as summarized in the table below. These are to be incorporated into an Operation Environmental Management Plan for plant operations.

Issue	Measures to be Incorporated into detailed Irrigation Management Plan
Preparation of irrigation areas	During development of each stage of the residential subdivision, a minimum of 100 mm of good quality sandy loam topsoil cover is to be provided in all new irrigation areas. Detailed soil testing will be undertaken following the bulk earthworks and land clearing activities. Soil testing will include assessment of top soil and sub soil physical and chemical properties as well as field
	permeability testing. If required soil amendments, e.g. organics, gypsum, lime etc will be incorporated into the soil profile prior to commencement of irrigation.
	Detailed landscape design, vegetation species selection and irrigation system design plans are to be prepared for each stage of the development prior to construction.
Pathogen	Restricted access irrigation area with minimum of 70 metre distance to the nearest dwelling.
exposure controls	Spray drift controls through the use of large droplet sprinklers and weather station assisted irrigation scheduling, i.e. avoid irrigation during high wind or rain.
	Warning/advisory signage around all irrigation areas.
	The irrigation area will be fenced with lockable access gates. Fencing will be 0.9 m open mesh fence with warning signage.
Cross	Separate pipe network and irrigation pump supplies water to irrigation areas.
connection	Lilac pipe with identification tape and signage.
Irrigation scheduling	Irrigation scheduling to be controlled by the central control system with adjustable settings to control the time of day, frequency and duration of irrigation events.
controls	Weather station sensor override on the irrigation supply pump to ensure irrigation does not occur during or shortly after rain or during high wind conditions.
	Soil moisture probes and an irrigation control system will be used to ensure over irrigation does not occur. When the storage is 100% full an emergency irrigation event will be scheduled automatically.
Overflow Management	During prolonged wet weather when the wet weather storage approaches full, water will be trucked to the nearest accepting licensed facility to ensure there is no potential for any offsite or downstream impacts.
Non-Irrigated	Minimum 30 metre buffer from irrigation area to down gradient property boundary.
Buffers	Minimum 40 metres buffer from irrigation areas to down gradient property boundary in the steeper NE corner of the irrigation area.
	20 metre buffer from irrigation area to up gradient property boundary.
	No irrigation within the 40 metre wide future waterway corridor.
	Minimum buffer to the nearest future residential dwelling is 70 metres.

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Issue	Measures to be Incorporated into detailed Irrigation Management Plan					
Monitoring	Continuous online monitoring, control and alarms on effluent turbidity, UVT%, UV intensity and other critical process parameters at the WWTP.					
	Monthly effluent quality compliance monitoring from the wet weather storage.					
	Detailed annual effluent quality monitoring for trace contaminants.					
	Annual soil monitoring.					
	Event based stormwater monitoring.					
	Quarterly groundwater monitoring.					
	Flow monitoring to each irrigation zone.					
	A detailed monitoring plan will be developed prior to commencement of operation.					
Maintenance of	Frequent mowing of irrigation area to keep grass in high growth state.					
irrigation areas	Harvesting lawn clippings to remove nutrients and other pollutants from the irrigation area. Collected lawn clippings are to composted onsite and/or disposed of via green waste recycling contractor.					
	Weekly inspection of the irrigation system for leaks, breakages of broken sprinkler heads.					
	Weekly inspection for evidence of runoff or surface ponding of water or boggy areas.					
	Weekly inspection of vegetation for signs of plant stress. If stress identified a specialist will be engaged and biomass analysis undertaken to identify the route cause.					
	Weekly inspection of fencing and signage to ensure access restrictions are maintained.					
	Weeding of the irrigation area and buffer zones and ensure crop does not spread offsite.					

## Environmental monitoring is to be under taken in accord with the Integr ated Water Management Plan under Appendix C and the table below. •

Туре	Parameter	Units	Туре	Location	Frequency
Turf and	Visual inspection of plant health for signs or stress	General observations	Monitor for change	Irrigation area	Ongoing
health	Laboratory biomass analysis of plant nutrients	mg/kg	ldentify deficiencies	Irrigation area	If impacts observed
	Faecal Coliform	cfu/100 mL	_		
	BOD	mg/L	_		
Surface Water	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	Monitor for	Downstream in Dam 1 and Dam	
monitoring	Total Phosphorus & Plant available phosphours	mg/L as P and change		2 and upstream at SW U/S.	Quartery
	рН	pH units	bH units		
	Electrical Conductivity	dS/m	_		
	рН	pH units	_		
	Cations	Mg/L		Downstream	
	Faecal Coliform	cfu/100 mL	_		
0	Electrical conductivity	dS/m	<ul> <li>Monitor for</li> </ul>	bores BH006	
Ground water monitoring	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	general trends and change	and BH009 and upstream bores BH004 and	Quarterly
	Total Phosphorus	mg/L as P		BH008.	
	Plant available phosphorus	mg/L as P	-		
	Water level	m AHD	_		
Soil monitoring	Total hydraulic and nutrient load onto each irrigation area	kL/year and kg/year	Monitor for general trends	Select irrigation zones that	Annual

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Parameter	Units	Туре	Location	Frequency
Electrical conductivity	dS/m	and change.	received the	
Available Phosphorus	mg/kg	-	load.	
Available Nitrogen	mg/kg	-	Samples to be	
Available Potassium	mg/kg	_	taken from top	
Chloride	meq/100g	-	layers.	
Exchangeable cations & CEC	meq/100g	-	·	
Exchangeable Sodium %	%	-		
Sodium adsorption ratio	Ratio	_		
Total Organic Carbon	%			
рН	pH units			
Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/kg			
Total Phosphorus	mg/kg			
Phosphorus Sorption Capacity	mg/kg	-		
Heavy metals	mg/kg	_		
Pesticides	mg/kg	-		

- Irrigation areas and irrigation implementation are to incorporate the following:
  - Diversion drains as shown on drawing SW-56-C-SK50 along uphill slope to divert upslope stormwater around the irrigation areas;
  - Catch drain/swale as shown on drawing SW-56-C-SK50 along the downhill boundary of irrigation areas;
  - Exclusion fencing and signage as shown on drawing SW-56-C-SK50
  - Dense deep rooted grass vegetation will be established, e.g. kikuyu pasture;
  - Low application rate sprinklers are to be used;
  - No irrigation during rainfall when there is increased potential for run off;
  - Contour mounds to be constructed at intervals of approximately 30-50 metres;
  - 30 metre down gradient buffer to the property boundary.
  - Minimum 40m to down gradient property boundary in steeper north east corner of the irrigation area
  - 20m buffer to up gradient property boundary
  - No irrigation within the 40m wide future waterway corridor approved under MP10\_0204
  - 70m minimum buffer to nearest residential dwelling
  - System and vegetation monitoring in accord with Section 9 of the Land Capability for Effluent Irrigation Report.

These measures are to be incorporated in the Operational Environmental Management Plan for plant operation

 If the irrigation area is proven to be not suitable, a portion or all of the surplus recycled water would be removed by road tanker to the near est licensed facility and stage 3 of the proposal would be implemented.



# 7.2 Odour

## 7.2.1 Existing Environment

There is a small number of existing residence located approximately 800m radius from the Sewage Treatment Plant site. Future residence with stage 5 and 6 of the am ended subdivision as proposed under MP10\_0204 MOD 2 would be located within 500m radius of the Sewage Treatment Plant site. It is noted stage 6 of the approved subdivision would not proceed until such time as the separate approvals for stage 3 of the S ewage Treatment Plant and Sewer Reticulation Network scheme are sought and received.

## 7.2.2 Assessment Criteria

The sense of smell is a subjective human response to the pr esence of a c hemical compound or "odour" in air. The sensitivity to a particular odour can vary from one individual to another by up to two (2) orders of magnitude. Differences in sensitivity to an odour are due to a v ariety of factors, including age, health, prior exposure to the odour and natural variation within the population.

The factors that are commonly recognised as influencing whether an odour will result in a complaint or not depend on a number of factors referred to as the FIDOL factors.

- Frequency how often the odour is detected,
- Intensity how strong the odour is,
- Duration how long the odour persists for,
- Offensiveness how the odour smells, and
- Location where the odour occurs

Dynamic olfactometry involves taking samples of a ir that contain an odourant and presenting the odour to a panel. The odour is diluted with "clean" air until 50% of the panel can detect the presence of the odour. This concentration is the threshold concentration and is deemed to be 1 odour unit (OU). The number of dilutions required to achieve this level determines the odour concentration of the original sample.

This science in conjunction with dispersion modelling has been shown to be the be st available method of predicting odour nuisance on a community over long periods. It is the accepted approach in most developed countries.

The current New South Wales odour policy presented in the *Approved Methods and Guidance – For the Modelling and Assessment of Air Pollutants in New South Wales, August 2001* is not a regulatory document. In this document a method is provided for determining an odour impact criterion based upon the number of people likely to be impacted by an operation, ranging from 2 OU/m<sup>3</sup> to 7 OU/m<sup>3</sup>

As per the Approved Methods and Guidance – For the Modelling and Assessment of Air Pollutants in New South Wales, August 2005 the nose response time average (i.e. on a 1 second average) which is the 99<sup>th</sup> percentile should be 2 OU/m<sup>3</sup> for a community with a population of 2000 or more people. This 1 second average criterion has been used within the Odour Assessment under Appendix F.

The maximum one second contour plots for the Sewage Treatment Plant are identified within the Odour Assessment under Appendix F.

The results show that the criterion of 2OU/m<sup>3</sup> will not be exceeded at any location and the highest concentration at the boundary of the proposed residential properties is significantly below the criterion, therefore odour nuisance from the Sewage Treatment Plant is not expected.

#### 7.2.3 Potential Impacts

Potential impacts associated with the proposal include loss of amenity for nearby sensitive receivers due to odour emissions.



# 7.2.4 Mitigation Measures

It is noted the odour assessment under Appendix F did not include the modeling of any additional mitigation measures. The measures to ensure odour is not an impact are inherent in the design of the Sewage Treatment Plant. However the proposal includes the following mitigations measures

- Ventilation stacks provided on all house connections to ensure gravity sewers are well ventilated;
- All gravity sewers designed to achieve self cleansing velocity to avoid accumulation and breakdown of solids in the network;
- Passively ventilated Mcberns activated carbon filters will be used on all air valves in the pressure sewer network;
- Actively ventilated Mcberns activated carbon filter on the Sewage Treatment Plant inlet balance tank;
- All Membrane Bioreactor biological tanks are fully enclosed and passively ventilated through McBerns activated carbon filters located on the roof of the Sewage Treatment Plant building;
- The Membrane Bioreactor room in the Sewage Treatment Plant building has automatic indoor air quality monitoring for temperature, oxygen, hydrogen sulphide and methane, with automatic operation of an evaporative air conditioning unit to maintain ventilation and air quality;
- Deodorizing sprays are included in the design of the Sewage Treatment Plant building to enable release of deodorizing sprays if required;
- Catherine Hill Bay has a 24 hour customer service call centre for fielding all odour and other complaints. All complaints are recorded, reviewed and acted upon as outlined in the Integrated Wastewater Management Plan under Appendix C.

# 7.3 Traffic

The proposal is to be I ocated within a residential area and will be access from the Pacific Highway via Montefiore Street, approved road 28 and appr oved road 3. The existing road and to be constructed road network has sufficient capacity to cater for the traffic generated by the development. The proposal can facilitate internal unloading/loading and onsite manoeuvring of vehicles up to and including articulated vehicles.

It is anticipated only two (2) truck movements per week will occur once the plant is constructed and operational.

In regard to construction the proposal would not result in a significant increase in construction traffic. As discussed the construction works not covered and being undertaken under MP10\_0204 is limited to the Sewage Treatment Plan building and facility located on the SP2 Zoned Lands; and the installation of the irrigation system and forming the catch and diversion drains within the irrigation area.

With regards to construction, a traffic management plan would be prepared and implemented as part of a Construction Environmental Management Plan for the proposal.

# 7.4 Noise

The site is located within proximity to a number of sensitive receivers and the potential for disruption due to excessive noise exists.

# 7.4.1 Existing Environment

The proposals acoustic consultants installed noise logging equipment in two locations to measure baseline environmental noise levels at a representative location in the vicinity of the proposed Sewage Treatment Plant. The location of the moni toring points is identified in the Noise Impact Assessment under Appendix E. Table 9 identifies current ambient noise levels as measured onsite.

Table 9 –	Onsite	Ambient	Noise I	evels
	Unsite	AIIIDICIII	1101361	-64613

Monitoring Location	Period	L <sub>Aeq</sub>	L <sub>A90</sub>	RBL
N1	Day	66	49	45
	Evening	65	43	41
	Night	60	40	38
N2	Day	63	49	47
	Evening	58	50	49
	Night	62	52	49

#### 7.4.2 Assessment Criteria

#### Operational

The EPA Industrial Noise Policy sets limits on the noise that may be generated by the Sewage Treatment Plant during the operational stage. These limits are dependent upon the existing noise levels at the site and are designed to en sure changes to the existing noise environment are minimised and deal with the intrusiveness of the noise and amenity environment. The most stringent of the limits is taken as the limiting criterion for the noise source.

The intrusiveness noise criterion requires that the LAeq, 15 minute for the noise source, measured at the most sensitive receiver under the worst-case conditions, should not exceed the rated background level (RBL) by more than 5dB, represented as follows:

LAeg, 15minute < RBL + 5dB.

The noise levels at near by noise sensitive receptors associated with the operation phase of the Sewage Treatment Plant should not exceed the noise levels identified in Table 10 below. The locations in Table 6 and 7 below are identified in the Noise Impact Assessment under Appendix E.

Location	Period	L <sub>Aeq</sub>	RBL	Recommended Acceptable L <sub>Aeq</sub>	Intrusiveness Criteria Level	Proposal Specific Noise Level
	Day	63	47	55	52	52
F1 & F2	Evening	58	49	45	54	45
	Night	62	49	40	54	40
	Day	66	45	55	50	50
F3	Evening	65	41	45	46	45
	Night	60	38	40	43	40

Table 10 – Proposal Specific Noise Levels at Noise Sensitive Receptors

Noise Prediction modelling has been carried out to a ssess the potential impact associated with the proposed Sewage Treatment Plant on the noise environment at the nearest noise sensitive receptors located in proximity to the site. The predicted noise levels of the operational phase of each stage is representative of the ultimate stage of the pr oposal for both neutral conditions and w orst-case conditions during day and night time, these are presented in Table 11 below

T-LL 11 D.	A D D D D D D D D D		- 1) Duraliata	- Malaa luu aat
ranie rr - Pr	nnnsen STP U	nerations (Niad	ie II – Predicie	a woise impact
		perutions (Stug	ic ij i i cuicic	u noise impuet

	Predicted Noise Levels dB(A)					
Location	Day time		Night time			
	Neutral	Worst	Neutral	Worst		
F1	29	30	29	30		
F2	38	39	38	39		
F3	21	21	21	21		

The predicted noise impact from the proposed sewage treatment plant on the no ise sensitive receivers ranged between 21 to 39dB(A), falling below the applicable criteria during day, evening and night time.

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# Construction

The New South Wales interim Construction Noise Guideline was developed by the New South Wales – Office of Environment and Heritage and contains detailed procedures for the as sessment and management of construction noise impacts. The proposed subdivision is to be constructed in stages with the houses in close proximity to the Sewage Treatment Plant being constructed in stage 5 and 6. Construction Noise impacts are not expected to present a significant impact. A construction noise management plan is include under Appendix O.

#### 7.4.3 Potential Impacts

Potential impacts associated with the proposal include loss of amenity for nearby sensitive receivers due to elevated noise levels.

#### 7.4.4 Mitigation Measures

#### **Operational**

It is noted the Noise Impact Assessment under Appendix E did not include the modeling of any additional mitigation measures. The measures to ensure noise is not an impact are inherent in the design of the Sewage Treatment Plant. However the proposal includes the following mitigations measures:

- All sewage pumps in the pressure sewer networks are submersible pumps located below ground level in an enclosed chamber;
- The Membrane Bioreactor and Advanced Water Treatment Plant are fully enclosed within the Sewage Treatment Plant building;
- Specific "noisy" equipment items like aeration blowers etc will be housed inside custom noise enclosures. E quipment specifications and design of c ustom noise enclosures will be undertaken to en sure compliance with the N ew South Wales Industrial Noise Policy of background noise plus 5 dBA at nearest residential dwelling;
- All planned construction and r outine maintenance works will be undertaken during standard permissible hours;
- All emergency works will be undertaken to minimise noise impacts on residents;
- Catherine Hill Bay has a 24 hour customer service call centre for fielding all noise and other complaints. All complaints are recorded, reviewed and acted upon as outlined in the Integrated Wastewater Management Plan under Appendix C.

#### **Construction**

• The measures recommended within the construction noise management plan prepared by Vipac Engineers and Scientists included under Appendix O are to be included within the Construction Environmental Management Plan to be prepared for the proposal.

# 7.5 Ground Water

#### 7.5.1 Existing Environment

A preliminary site & soil evaluation has been under taken to identify any significant constraints to irrigation, refer land capability assessment for effluent irrigation under Appendix C. As identified in this report a Geotechnical investigation undertaken by Geotech Solutions Pty Ltd (2010) indicated minimal groundwater was encountered in the upper soil profile or within 3 meters of effluent irrigation areas.

Some localised areas of the site were noted to be susceptible to water logging during extensive rain periods, particularly in areas of the site impacted by mining activities, e.g. where dams and ponds had been filled. No irrigation is proposed in low lying areas of the site or in the drainage reserves.



The land capability assessment for effluent irrigation also indicates a more detailed geotechnical and groundwater baseline investigation have been undertaken at the site during 2014/2015. These investigations have installed two (2) ground water monitoring bores located on the northern side (down slope side) of the irrigation areas. These bores are identified as BH006 and BH009. The location of these boreholes is identified on drawing No. SW-56-C-SK50 included under Appendix Q.

#### 7.5.1.1 Ground Water Depth

Irrigation of treated water will occur within the area of stage 6 and 7 of the appr oved subdivision under MP10\_0204. This land is located on the north facing side of a ridge with heights ranging from RL21m AHD up to RL44m AHD. Based on the data from boreholes BH006 and BH009 the depth between the irrigation area and groundwater varies from 3.3m to 33.4m. T he groundwater depth, irrigation land heights and depths to ground water are outlined in Table 12

#### Table 12: Ground Water and Depth to Groundwater

Irrigation Area	Ground water bore	Standing Water Levels Feb-15 (m AHD)	Irrigation Area Levels (m AHD)	Depth to Groundwater (m)
East	BH006	10.6	21 to 44	10 to 33.4
West	BH009	21.7	25 to 35	3.3 to 13.3

Under the Department of Environment and Conservation *Environmental Guidelines: Use of Effluent by Irrigation 2004* a depth to groundwater of greater than 3m is not a constraint to effluent irrigation.

Irrigation of restricted access privately owned open space will be with Membrane Bioreactor & Ultra Violet treated waste water. The proposal will utilise a low average irrigation rate of 1mm/day to ensure there is minimal potential for deep per colation of r ecycled water irrigation. F urther this irrigation will be scheduled using soil moisture probes, weather station and irrigation control system to ensure over irrigation or irrigation during high soil moisture conditions cannot occur.

The proposed irrigation scheme also includes a 2 ML wet weather storage to enable effluent to be stored during and following periods of heavy rainfall when localised saturated soil conditions may occur.

#### 7.5.1.2 Ground Water Quality

Background groundwater quality monitoring was also undertaken from boreholes BH006 and BH009, a summary of the results is presented in Table 13:

Groundwater	TDS	pН	Turbidity	Nitrates	Nitrites	Ammonia	Phosphorus
Monitoring Bore	(mg/L)		(NTU)	(mg/L)	(mg/L	(mg/L)	(mg/L)
BH006	890	4.5	16	0.015	<0.005	0.017	<0.05
BH009	590	6.7	49	0.67	0.027	0.15	< 0.05

#### Table 13: Ground Quality

It can be seen from the above table that the w ater in the aquifer is slightly brackish with Total Dissolved Solids ranging from 590 mg/L to 890mg/L. T he potential to contaminate the aquifer with salts due to irrigation activities is therefore negligible given the irrigated effluent will have a similar Total Dissolved Solids to the background groundwater conditions.

Some background nitrogen was also detected, particularly at B H009 that recorded total oxidised nitrogen of approximately 0.7 mg/L and an ammonia concentration of 0.15 mg/L. Irrigation activities are not expected to impact on nutrient concentrations in groundwater given the average irrigation rate of 1m m/day and plant uptake accounts for all nutrients applied. For reference the expected quality of irrigation wastewater is outlined below in table 14



Table 14: Typical irrigation water quality following Membrane Bioreactor + Ultra Violet treatment.

Parameter	Units	Minimum	Mean	95%ile	Maximum
Biochemical Oxygen	mg/L	-	-	10	20
Demand	-				
Suspended Solids	mg/L	-	-	5	10
Total Nitrogen	mg/L as N	-	10	-	20
Total Phosphorus	mg/L as P	-	0.3	-	2
рН	pН	6.5	-	-	8.5
Turbidity	NTU	-	-	1	2
UV Transmission	UVT%	60%			
Faecal Coliforms	cfu/100 mL	-	-	10	100
Total Dissolved Solids	mg/L	-	600	-	

MEDLI modelling undertaken as part of the Land Capability Assessment for Effluent Irrigation under Appendix K indicates all nutrients applied in irrigation are managed inside the bound ary of the irrigation area by plant uptake and s oil absorption, hence the potential for export of nutrients groundwater is considered low, provided irrigation scheduling controls are implemented.

## 7.5.2 Potential Impacts

#### Construction

Construction of the Sewage Treatment Plant is not expected to have any significant impact on groundwater in the vicinity of the site. There is a minor risk of groundwater contamination from chemical and fuel spills if appropriate control measures are not in place. Hazardous substances will be stored in accordance with their material safety data sheet and appropriate environmental controls will be established.

#### Operation

As with any such proposal, the storage of water has the potential for the deep percolation of reject RO storage to groundwater. Further, irrigation if undertaken in the absence of the proposed water quality treatment, irrigation rates and scheduling has the potential for the deep percolation of irrigated wastewater to groundwater.

To ensure no long term impacts a detail scheme of environmental monitoring including background monitoring of surface water, ground water and plant growth will occur on an ongoing basis as part of operations. T his monitoring is to occur as described in Section 9.0 of the Integr ated Water Management Plan under Appendix C.

#### 7.5.3 Mitigation Measures

The proposal is designed with the following mitigation measures to ensure ground water quality is maintained:

- Where perched water (evaporation ponds) is to be stored on the s ite High Density Polyethylene or other suitable liners will be required to prevent loss of water into the underlying strata that could cause a watertable rise.
- Level sensors are used on the Reverse Osmosis Reject Evaporation ponds to enable detection
  of breaks in the liner and to raise alarms before the ponds are full so the operator can take
  action by either turning off the Reverse Osmosis units or road tanker pump out can be
  arranged.
- All site earthworks and construction is to be carried out in accord with a sediment and erosion control plan.
- A Stormwater Management Plan for the Sewage Treatment Plant site is to be pr epared in accord with Lake Macquarie Councils DCP No.1 Volume 2 Engineering Guidelines. N o drainage from the Sewage Treatment Plant site is to be directed to the adjacent conservation



lands. This plan is to document the site connection to the stormwater management system approved under MP10\_0204.

- The treatment and irrigation of water is to be und ertaken in accord with the Integrated Water Management Plan under Appendix C.
- Environmental monitoring is to be under taken in accord with the Integr ated Water Management Plan under Appendix C and the table below.

Туре	Parameter	Units	Туре	Location	Frequency
Turf and	Visual inspection of plant health for signs or stress	General observations	Monitor for change	Irrigation area	Ongoing
health	Laboratory biomass analysis of plant nutrients	mg/kg	ldentify deficiencies	Irrigation area	If impacts observed
	Faecal Coliform	cfu/100 mL			
	BOD	mg/L			
Surface Water	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	Monitor for	Downstream in Dam 1 and Dam	Quarterly
monitoring	Total Phosphorus & Plant available phosphours	mg/L as P	and change	2 and upstream at SW U/S.	Quarterry
	рН	pH units			
	Electrical Conductivity	dS/m			
	рН	pH units	_		
	Cations	Mg/L	_	Downstream bores BH006 and BH009 and upstream bores BH004 and BH008.	Quarterly
	Faecal Coliform	cfu/100 mL			
Ground water	Electrical conductivity	dS/m	<ul> <li>Monitor for</li> </ul>		
monitoring	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	general trends and change		
	Total Phosphorus	mg/L as P			
	Plant available phosphorus	mg/L as P			
	Water level	m AHD	_		
	Total hydraulic and nutrient	kL/year and			
	load onto each irrigation area	kg/year			
	Electrical conductivity	dS/m			
	Available Phosphorus	mg/kg			
	Available Nitrogen	mg/kg		Select irrigation	
	Available Potassium	mg/kg	_	received the	
	Chloride	meq/100g	Monitor for	highest hydraulic	
Soil monitoring	Exchangeable cations & CEC	meq/100g	and change.	Samples to be	Annual
	Exchangeable Sodium %	%	_ 0	taken from top	
	Sodium adsorption ratio	Ratio		soil and sub soil	
	Total Organic Carbon	%		layers.	
	рН	pH units			
	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/kg	_		
	Total Phosphorus	mg/kg			
	Phosphorus Sorption Capacity	mg/kg	_		



Туре	Parameter	Units	Туре	Location	Frequency
	Heavy metals	mg/kg			
	Pesticides	mg/kg			

- Irrigation areas and irrigation implementation are to incorporate the following:
  - Diversion drains as shown on drawing SW-56-C-SK50 along uphill slope to divert upslope stormwater around the irrigation areas;
  - Catch drain/swale as shown on drawing SW-56-C-SK50 along the downhill boundary of irrigation areas;
  - Exclusion fencing and signage as shown on drawing SW-56-C-SK50
  - Dense deep rooted grass vegetation will be established, e.g. kikuyu pasture;
  - Low application rate sprinklers are to be used;
  - No irrigation during rainfall when there is increased potential for run off;
  - Contour mounds to be constructed at intervals of approximately 30-50 metres;
  - 30 metre down gradient buffer to the property boundary.
  - Minimum 40m to down gradient property boundary in steeper north east corner of the irrigation area
  - 20m buffer to up gradient property boundary
  - No irrigation within the 40m wide future waterway corridor approved under MP10\_0204
  - 70m minimum buffer to nearest residential dwelling
  - System and vegetation monitoring in accord with Section 9 of the Land Capability for Effluent Irrigation Report.

These measures are to be incorporated in the Operational Environmental Management Plan for plant operation

#### 7.6 Surface Water

#### 7.6.1 Existing Environment

#### Surface water

The Sewage Treatment Plant site has a southerly fall from Montefiore Street with a defined ephemeral drainage line bisecting the lower portion of the site. This drainage ultimately drains to Munmorah State Conservation Area and di scharges at M oonee Beach, south of the ex isting Township. Ultimately drainage will be provided in accord with that approved under project approval MP10\_0204 via detention basins and bio-retention basins.

Irrigation of treated water will occur within the area of stage 6 and 7 of the appr oved subdivision under MP10\_0204. This land is located on the north facing side of a ridge with heights ranging from RL21m AHD up to R L44m AHD and which provides average slopes across the irrigation area of approximately 10%. The levels and location of the irrigation area and associated stormwater controls relative to stages 6 and 7 of MP10\_0204 is identified on Plan SW-56-C-SK50 under Appendix Q.

The proposal will also include the perched storage of Reverse Osmosis Reject for evaporation that will not overflow.



# 7.6.2 Potential Impacts

#### **General Operation**

Potential impact as part of the proposal relate to increased sediment and erosion control and nutrient runoff into the stormwater catchments in and surrounding the site or the overtopping of the reverse osmosis reject ponds

As part of the proposal a detailed stormwater management plan for the S ewage Treatment Plant building site will be prepared to direct all drainage to the stormwater management system approved under MP10\_0204, while for the irrigation areas a combination of diversion and catch drains, varying width buffers up to 50m and a low average irrigation rate of 1mm/day are provided to ensure that treated water irrigated onsite infiltrates and does not run off to the down slope lands.

To ensure the r everse osmosis ponds do not o vertop, level sensors are used on the R everse Osmosis Reject Evaporation ponds to enable detection of breaks in the liner and to r aise alarms before the ponds are full so the operator can take action by either turning off the R everse Osmosis units or road tanker pump out can be arranged.

To ensure no l ong term impacts a detai led scheme of env ironmental monitoring including background monitoring of surface water, ground water and plant growth will occur on an ongoing basis as part of operations. This monitoring is to occur as described in Section 9.0 of the Integrated Water Management Plan under Appendix C.

## 7.6.3 Mitigation Measures

The proposal is designed with the following mitigation measures to ensure surface water quality is maintained:

- A Stormwater Management Plan for the Sewage Treatment Plant site is to be pr epared in accord with Lake Macquarie Councils DCP No.1 Volume 2 Engineering Guidelines. N o drainage from the Sewage Treatment Plant site is to be directed to the adjacent conservation lands. This plan is to document the sites connection to the stormwater management system approved under MP10\_0204.
- No drainage from the S ewage Treatment Plant site is to be di rected to the adjacent conservation lands as per project approval MP10\_0204.
- A Sediment and Erosion Control plan is to be prepared.
- Wastewater reuse and recycling is maximised in the scheme through the supply of Class A+ recycled water to customers for toilet flushing, laundry and outdoor recycled water uses;
- Irrigation areas and irrigation implementation are to incorporate the following:
  - Diversion drains as shown on drawing SW-56-C-SK50 along uphill slope to divert upslope stormwater around the irrigation areas;
  - Catch drain/swale as shown on drawing SW-56-C-SK50 along the downhill boundary of irrigation areas;
  - Exclusion fencing and signage as shown on drawing SW-56-C-SK50
  - Dense deep rooted grass vegetation will be established, e.g. kikuyu pasture;
  - Low application rate sprinklers are to be used;
  - No irrigation during rainfall when there is increased potential for run off;
  - Contour mounds to be constructed at intervals of approximately 30-50 metres;
  - 30 metre down gradient buffer to the property boundary.
  - Minimum 40m to down gradient property boundary in steeper north east corner of the irrigation area
  - 20m buffer to up gradient property boundary
  - No irrigation within the 40m wide future waterway corridor approved under MP10\_0204
  - 70m minimum buffer to nearest residential dwelling



- System and vegetation monitoring in accord with Section 9 of the Land Capability for Effluent Irrigation Report.

These measures are to be incorporated in the Operational Environmental Management Plan for plant operation

• Environmental monitoring is to be under taken in accord with the Integr ated Water Management Plan under Appendix C and the table below.

Туре	Parameter	Units	Туре	Location	Frequency
Turf and	Visual inspection of plant health for signs or stress	General observations	Monitor for change	Irrigation area	Ongoing
health	Laboratory biomass analysis of plant nutrients	mg/kg	ldentify deficiencies	Irrigation area	If impacts observed
	Faecal Coliform	cfu/100 mL			
	BOD	mg/L			
Surface Water	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	Monitor for	Downstream in Dam 1 and Dam	Quarterly
monitoring	Total Phosphorus & Plant available phosphours	mg/L as P	and change	2 and upstream at SW U/S.	Quarterry
	рН	pH units			
	Electrical Conductivity	dS/m			
	рН	pH units			
	Cations	Mg/L			
	Faecal Coliform	cfu/100 mL		Downstream bores BH006 and BH009 and upstream bores BH004 and BH008.	
	Electrical conductivity	dS/m	— Monitor for		
Ground water monitoring	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	general trends and change —		Quarterly
	Total Phosphorus	mg/L as P			
	Plant available phosphorus	mg/L as P			
	Water level	m AHD			
	Total hydraulic and nutrient	kL/year and			
	load onto each irrigation area	kg/year			
	Electrical conductivity	dS/m			
	Available Phosphorus	mg/kg			
	Available Nitrogen	mg/kg		Select irrigation	
	Available Potassium	mg/kg		received the	
	Chloride	meq/100g	Monitor for	highest hydraulic	
Soil monitoring	Exchangeable cations & CEC	meq/100g	<ul> <li>general trends and change.</li> </ul>	Samples to be	Annual
	Exchangeable Sodium %	%		taken from top	
	Sodium adsorption ratio	Ratio		soil and sub soil	
	Total Organic Carbon	%		layers.	
	pН	pH units			
	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/kg			
	Total Phosphorus	mg/kg			
	Phosphorus Sorption Capacity	mg/kg	_		



Туре	Parameter	Units	Туре	Location	Frequency
	Heavy metals	mg/kg			
	Pesticides	mg/kg	_		

Free board and Level sensors are used on the Reverse Osmosis Reject Evaporation ponds to
enable detection of breaks in the liner and to raise alarms before the ponds are full so the
operator can take action by either turning off the Reverse Osmosis units or road tanker pump
out can be arranged.

# 7.7 Flora & Fauna

## 7.7.1 Existing Environment

In June 2012, the F ederal Department of S ustainability, Environment, Water, Populations and Communities (DSEWPC) approved an Environment Protection Biodiversity Conservation Act referral allowing the clearing of all vegetation within the subdivision footprint approved under MP10\_0204.

The proposed site of the Sewage Treatment Plant is located within the footprint of the approved subdivision and is to be created in accord with the existing approvals (MP10\_0204 as amended) and will be provided by Coastal Hamlets Pty Ltd to C atherine Hill Bay Water Utility Pty Ltd as a vacant clear site for construction of the Sewage Treatment Plant. The proposal would not require any clearing beyond that already approved in association with MP10\_0204.

It is also noted that at the time of preparation of this review of environmental factors the clearing permitted under MP10\_0204 and the E PBC Act approval has occurred and the site is clear of vegetation.

#### 7.7.2 Potential Impacts

As all clearing works are approved and have been undertaken as part of the works associated with MP10\_0204, The potential impacts to flora and fauna associated with the proposal relate to construction activities onsite and the S ewage Treatment Plant and irrigation areas ongoing interaction with retained vegetation adjoining the site.

Potential exists for negative weed edge effects to occur on adjoining national parks land.

#### 7.7.3 Mitigation Measures

- A Stormwater Management Plan for the Sewage Treatment Plant site is to be pr epared in accord with Lake Macquarie Councils DCP No.1 Volume 2 Engineering Guidelines. N o drainage from the Sewage Treatment Plant site is to be directed to the adjacent conservation lands. This plan is to document the sites connection to the stormwater management system approved under MP10\_0204.
- No drainage from the S ewage Treatment Plant site is to be di rected to the adj acent conservation lands as per project approval MP10\_0204.
- All site earthworks and construction is to be carried out in accord with a sediment and erosion control plan.
- All clearing works approved under MP10\_0204 must be completed in accord with the relevant approvals prior to works associated with the Sewage Treatment Plant commencing.
- The designated construction zone and boundary between the site and National Parks and Wildlife land is to be clearly marked via high visibility fencing, sediment fencing and/or signage identifying that no construction activities (including temporary storage, stockpiling, vehicle movement etc) are permitted beyond prior to commencement of any work.
- A Weed Management Plan is to be prepared for both the Sewage Treatment Plant site and Irrigation areas and included within the operational environmental management plan to ensure negative edge effects do not occur to adjoining national park lands.



• A detailed landscaping plan of the proposed irrigation area vegetation buffers including appropriate species selection is to be prepared.

# 7.8 Aboriginal Heritage

#### 7.8.1 Existing Environment

An Aboriginal cultural heritage management plan has been prepared in relation to project approval MP10\_0204. This assessment identified a single isolated stone artefact within the bounds of the Sewage Treatment Plant site, refer section 2.6.5. No other archaeological sites or features where found within the subdivision development footprint approved under MP10\_0204 as part of the Archaeological assessment of the site.

#### 7.8.2 Potential Impacts

Although identified as clear of Aboriginal Heritage with exception of one (1) isolated item during investigations for the subdivision approved under MP10\_0204, unexpected finds can occur.

#### 7.8.3 Mitigation Measures

- Should any unexpected Aboriginal heritage items be found during works all works would cease immediately and the National Parks & Wildlife Service and the relevant Local Aboriginal Land Council would be notified. Procedures to address this issue are to be included within the Construction Environmental Management Plan for the proposal.
- The procedures outlined within the Aboriginal Heritage Management Plan approved under MP10\_0204 must be implemented to r elocate the isolated artifact found ons ite prior to commencement of any works.

# 7.9 Visual Amenity

#### 7.9.1 Existing Environment

A Landscape and V isual Impact Statement has been pr epared as part of this Review of Environmental Factors. The Visual Catchments for Catherine Hill Bay are made up of two distinct primary regions, VCA1 Catherine Hill Bay Visual Catchment Area and VCA2 Moonee Visual Catchment Area. These regions are defined largely through topography with the main site ridgelines acting as the perimeters of these.

The general site topographic features reduce the potential visual impact of the Sewage Treatment Plant to a single Visual Catchment Area referred to in this report as Visual Catchment Area 2. Visual Catchment Area 2 correlates to Stage 5 of the Catherine Hill Bay development approved under MP10\_0204. Refer Landscape and Visual Impact Statement under Appendix D for detailed discussion of these Visual Catchments.

#### 7.9.2 Potential Impacts

The subject site will be vacant cleared land and as such potential impacts are limited to the introduction of structures within the locality. The potential for significant impact is associated with the three (3) main key vantage points identified within the Landscape and Visual Impact Statement.

#### 7.9.3 Mitigation Measures

To mitigate the potential impact to visual amenity the following mitigations measures are proposed

- Buffer planting as outlined within Landscape and Visual Impact Statement under Appendix D is to be implemented as part of Sewage Treatment Plant construction.
- The Sewage Treatment Plant building is to be clad in natural colours such as colorbond Pale



Eucalypt or similar.

# 7.10 Bushfire Hazard

The proposed STP is classified as a Class 10a structure pursuant to the Building Code of Australia (BCA). The Building Code of Australia does not provide for any bushfire specific performance requirements and as such AS-3959-2009 does not apply as a set of 'deemed to satisfy' provisions. The general fire safety construction provisions are taken as acceptable solutions, but the aims and objectives of Planning for Bushfire Protection 2006 apply in relation to other matters such as access, water and services, emergency planning and landscaping / vegetation management.

Development such as the pr oposed requires on site car parking and I oading space. As demonstrated on the Bushfire Management Plan under Appendix J, these areas have been located so at to al low for perimeter vehicle access over the site. This ensures that should emergency services require access during a bushfire event, all vehicles and per sonnel will be able to circumnavigate the Sewage Treatment Plant buildings and structures.

The Sewage Treatment Plant will have access to reticulated water supply and is also provided with sufficient storage tanks. A fire hydrant is to be located at site entrance into the Sewage Treatment Plant to allow for connection to the reticulated water supply and a sprinkler system is to be installed between the built structures and bushfire hazard. It is considered that the large storage tanks on site provide for a secondary water supply for firefighting purposes.

A Bushfire Evacuation Plan is to be created and a copy of the plan is to be kept within the site office. Once the road network of the adjoining subdivision has been completed, the most efficient evacuation route away from the western bushfire threat is to be identified on a plan and erected near the exit of the site office.

# 7.11 Non Aboriginal Heritage

#### 7.11.1 Existing Environment

A number of the allotments which form part of the site fall within the Catherine Hill Bay Cultural Heritage Precinct. The Catherine Hill Bay Cultural Heritage Precinct is listed on the N SW State Heritage Register. As such the proposal would require an approval in respect of doing or carrying out of an act, matter of thing under Clause 57(1) of the Heritage Act 1977

#### 7.11.2 Potential Impacts

All works located within the C atherine Hill Bay Cultural Heritage Precinct would be limited to excavation and installation of the pressure sewer units and gravity sewer connections which are located below ground. As no works are proposed in direct relation to any built structures within the Cultural Heritage Precinct impacts upon the precinct are unlikely.

#### 7.11.3 Mitigation Measures

The relevant approval under the Heritage Act 1977 for the works within the Cultural Heritage Precinct is to be obtained prior to any work commencing within the Cultural Heritage Precinct. Works within the Cultural Heritage Precinct is to be under taken in accord with any conditions of this approval.

# 7.12 Waste

The proposed sewerage treatment plant would provide five (5) waste streams. In handling the waste the proposal would undertake the following mitigation measures:

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- A register will be maintained for all waste sampling and classification results for the life of the proposal in accordance with Environmental Protection Agency's Classification Guidelines; and
- Detailed procedures for waste handling including storage and disposal procedures are be established and included within the Operation Environmental Management Plan.

# 7.13 Cumulative Impacts

Cumulative impacts have the potential to arise from the interaction of individual elements within the proposal and the additive effects of the proposal with other external projects. Clause 228 (2) of the Environmental Planning and Assessment Act 1979 r equires that potential cumulative impacts as a result of the proposal be taken into account.

The Sewage Treatment Plant will be located within the bounds of an approved residential subdivision and as such cumulative impact associated with vegetation removal does not result as part of the proposal. The proposed works may produce greenhouse gas. Due to the small scope of the proposal, these impacts do not h ave the potential to have a significant cumulative environmental effect on existing or likely future activities. The potential impacts on the environment would be minimised with the implementation of the safeguards given in this Review of Environmental Factors.

With regard to traffic impacts the proposal will not generate significant traffic during either construction or operation.

The proposed works would not significantly increase demands on resources, which are, or are likely to become, in short supply. Relatively small amounts of materials would be required for the proposed works. The safeguards listed in this Review of E nvironmental Factors would be implemented to minimise any impacts.

It is also noted the proposal makes provisions for future connection of existing Catherine Hill Bay allotments into the system. This would allow the removal of existing and aging individual effluent disposal systems and allow this effluent to be treated to an appropriate standard within the proposed system. This would allow the future removal of an existing impact in the locality.

In comparison to the previously approved business as usual model the proposal has significantly less impacts in its construction and operation. The proposal provides benefits through reduced energy consumption, reduced potable water demand, increased use of recycled water and no overflows.



# 8 – Proposal Justification

This chapter provides a justification for the proposed Sewage Treatment Plant & Sewer Reticulation Network within the following contexts:

- Biophysical effects
- Social / community effects
- Economic effects
- The principles of ecologically sustainable development (ESD).

The main beneficial effects are listed, together with the proposed development's main adverse effects.

#### 8.1 Biophysical Context

#### 8.1.1 Beneficial Effects

The proposed development is expected to have the following beneficial effects on the b iophysical environment:

- No expected impacts on any threatened species, population or ecological community, or their habitat. This option removes the impact of the previously approved servicing option which is identified as option 2 in the options discussion.
- The provision of essential infrastructure for the Catherine Hill Bay subdivision approved under MP10\_0204 which will help facilitate a significant reduction in potable water demand.

#### 8.1.2 Adverse Effects

The proposed development, if conducted in the absence of any mitigation measures, could be expected to have the following adverse effects on the biophysical environment:

- Potential for water pollution and subsequent downstream degradation from wastewater irrigation;
- Potential for noise;
- Potential for odour;

Of the above, it is considered that the potential for water quality impacts, noise and odour are the most significant potential risks upon the biophysical environment. Construction of the plant in accord with the supporting noise and odour assessment will negate the risk of adverse noise and odour. Operation of the plant in accord with the commitments contained within the Integrated Water Management Plan (and summarised in this report) and Land C apability Assessment for Effluent Irrigation (and summarised in this report) will negated any water quality impacts.

# 8.2 Social / Community Effects

#### 8.2.1 Beneficial Effects

The proposed development is expected to have the following beneficial effects on the s ocial environment:

- The proposed development would not impact upon existing community facilities or services
- There would be no significant visual impact from the proposed development



- The proposed plant will enable the ongoing development of Catherine Hill Bay subdivision approved under MP10\_0204 and will help facilitate the new community.
- The plant will provide employment during the construction and operational phase.

#### 8.2.2 Adverse Effects

The proposed development, if conducted in the absence of any mitigation measures, could be expected to have the following adverse effects on the social / community environment:

- Potential for increase in ambient noise levels;
- Potential for odours spread;
- Potential water quality impacts

Construction of the plant in accord with the supporting noise and odour assessment will negate the risk of adverse noise and odour. Operation of the plant in accord with the commitments contained within the Integrated Water Management Plan (and summarised in this report) and Land Capability Assessment for Effluent Irrigation (and summarised in this report) will negated any water quality impacts.

# 8.3 Economic Context

#### 8.3.1 Beneficial Effects

The proposed development is expected to have the following beneficial economic effects:

- Direct and indirect income benefits to the local and wider community
- Creation of employment opportunities.
- Provide essential infrastructure to facilitate the ongo ing development of the adjoining residential estate.

#### 8.3.2 Adverse Effects

The proposed development could have the following adverse effects on the economic environment if the site is not effectively managed.

 Additional expenses for Council and the general public should waste not be effectively managed on site with spin off environmental costs

# 8.4 Ecologically Sustainable Development

Ecologically Sustainable Development is a concept firmly entrenched in NSW environmental legislation and government policy. The four guiding principles of E cologically Sustainable Development (as contained in the Environmental Planning and Assessment Regulation 2000) and their relation to the proposed development are outlined below:

a) The precautionary principle – namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

The nature of the pr oposed development is such that the potential for serious or irreversible environmental damage is extremely limited. The proposal is a modern, high tech sewerage treatment plant that provides whole system management and provides an alternative water source.

Scientific modelling and parameters are well established for the control of the main potential impacts (water quality, noise & odour) associated with the proposal.

Mitigation strategies have been developed as part of the proposal system design to prevent water quality issues and prevent downstream environmental degradation. These mitigation measures have



been developed in accordance with current best management practices and with a view to achieving a sustainable long term sewerage treatment option.

*b)* Inter-generational equity – namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

The proposed development responds in the positive to inter-generational equity providing a modern alternative to traditional sewerage treatment systems, an alternative source of water and does not require typical discharges of sewerage into the environment.

The potential impacts of the pr oposal are such that long term degradation is unlikely and the mitigation measures which form a fundamental part of the proposal ensure no serious or irreversible environmental effects.

c) Conservation of biological diversity and ecological integrity – namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.

The proposed development is able to be conducted without any significant impact on the biological diversity and ecological integrity of the locality. The proposed sewerage treatment plant would be located on a c leared site provided as part of the C atherine Hill Bay subdivision approved under MP10\_0204. No Flora or Fauna is impacted as part of the proposal.

d) Improved valuation and pricing of environmental resources – namely, that environmental factors should be included in the valuation of assets and services, such as polluter pays, full life cycle costing, and utilising incentive structures / market mechanisms to meet environmental goals.

Waste is a resource. The proposed STP provides an alternative water source for reuse in the adjoining residential development.

As demonstrated above, the proposal can be undertaken in a manner which accords with the principles of Ecologically Sustainable Development. As demonstrated throughout this Review of Environmental Factors the proposed development is justifiable, as it would have minimal impact on the biophysical, social and economic environment.





#### Summary of Commitments and Mitigation Measures 9.1

The following sections summarise the commitments by the proponent regarding mitigations and control measures to be implemented for the proposal:

#### 9.1.1 Soils

- The preparation of the Remediation Action Plan as required under MP10\_0204 and any works required by this plan must be completed prior to works on the Sewage Treatment Plant & Sewer Reticulation Network commencing.
- A Sediment and Erosion Control plan is to be prepared.
- Irrigation controls and m easures are to be in accord with that described within the Land Capability Assessment for Effluent Irrigation under Appendix K and as summarized in the table below. These are to be incorporated into an Operation Environmental Management Plan for plant operations.

Issue	Measures to be Incorporated into detailed Irrigation Management Plan
Preparation of irrigation areas	During development of each stage of the residential subdivision, a minimum of 100 mm of good quality sandy loam topsoil cover is to be provided in all new irrigation areas.
	Detailed soil testing will be undertaken following the bulk earthworks and land clearing activities. Soil testing will include assessment of top soil and sub soil physical and chemical properties as well as field permeability testing. If required soil amendments, e.g. organics, gypsum, lime etc will be incorporated into the soil profile prior to commencement of irrigation.
	Detailed landscape design, vegetation species selection and irrigation system design plans are to be prepared for each stage of the development prior to construction.
Pathogen	Restricted access irrigation area with minimum of 70 metre distance to the nearest dwelling.
exposure controls	Spray drift controls through the use of large droplet sprinklers and weather station assisted irrigation scheduling, i.e. avoid irrigation during high wind or rain.
	Warning/advisory signage around all irrigation areas.
	The irrigation area will be fenced with lockable access gates. Fencing will be 0.9 m open mesh fence with warning signage.
Cross	Separate pipe network and irrigation pump supplies water to irrigation areas.
connection	Lilac pipe with identification tape and signage.
Irrigation scheduling	Irrigation scheduling to be controlled by the central control system with adjustable settings to control the time of day, frequency and duration of irrigation events.
controls	Weather station sensor override on the irrigation supply pump to ensure irrigation does not occur during or shortly after rain or during high wind conditions.
	Soil moisture probes and an irrigation control system will be used to ensure over irrigation does not occur.
	When the storage is 100% full an emergency irrigation event will be scheduled automatically.
Overflow Management	During prolonged wet weather when the wet weather storage approaches full, water will be trucked to the nearest accepting licensed facility to ensure there is no potential for any offsite or downstream impacts.

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Issue	Measures to be Incorporated into detailed Irrigation Management Plan
Non-Irrigated Buffers	<ul> <li>Minimum 30 metre buffer from irrigation area to down gradient property boundary.</li> <li>Minimum 40 metres buffer from irrigation areas to down gradient property boundary in the steeper NE corner of the irrigation area.</li> <li>20 metre buffer from irrigation area to up gradient property boundary.</li> <li>No irrigation within the 40 metre wide future waterway corridor.</li> <li>Minimum buffer to the nearest future residential dwelling is 70 metres.</li> </ul>
Monitoring	Continuous online monitoring, control and alarms on effluent turbidity, UVT%, UV intensity and other critical process parameters at the WWTP. Monthly effluent quality compliance monitoring from the wet weather storage. Detailed annual effluent quality monitoring for trace contaminants. Annual soil monitoring. Event based stormwater monitoring. Quarterly groundwater monitoring. Flow monitoring to each irrigation zone. A detailed monitoring plan will be developed prior to commencement of operation.
Maintenance of irrigation areas	Frequent mowing of irrigation area to keep grass in high growth state. Harvesting lawn clippings to remove nutrients and other pollutants from the irrigation area. Collected lawn clippings are to composted onsite and/or disposed of via green waste recycling contractor. Weekly inspection of the irrigation system for leaks, breakages of broken sprinkler heads. Weekly inspection for evidence of runoff or surface ponding of water or boggy areas. Weekly inspection of vegetation for signs of plant stress. If stress identified a specialist will be engaged and biomass analysis undertaken to identify the route cause. Weekly inspection of fencing and signage to ensure access restrictions are maintained. Weeding of the irrigation area and buffer zones and ensure crop does not spread offsite.

# Environmental monitoring is to be under taken in accord with the Integr ated Water Management Plan under Appendix C and the table below.

Туре	Parameter	Units	Туре	Location	Frequency
Turf and	Visual inspection of plant health for signs or stress	General observations	Monitor for change	Irrigation area	Ongoing
health	Laboratory biomass analysis of plant nutrients	mg/kg	Identify deficiencies	Irrigation area	If impacts observed
	Faecal Coliform	cfu/100 mL			Quarterly
	BOD	mg/L		Downstream in Dam 1 and Dam 2 and upstream at SW U/S.	
Surface Water monitoring	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	Monitor for — general trends and change		
	Total Phosphorus & Plant available phosphours	mg/L as P			
	рН	pH units			
	Electrical Conductivity	dS/m	_		
	рН	pH units		Downstream	
	Cations	Mg/L	- Monitor for	bores BH006	
Ground water	Faecal Coliform	cfu/100 mL	general trends	and BH009 and upstream bores BH004 and BH008.	Quarterly
monitoring	Electrical conductivity	dS/m	and change		
	Total Nitrogen, nitrate, nitrite,	mg/L as N			

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Туре	Parameter	Units	Туре	Location	Frequency
	TKN, Ammonia				
	Total Phosphorus	mg/L as P			
	Plant available phosphorus	mg/L as P			
	Water level	m AHD			
	Total hydraulic and nutrient	kL/year and			
	load onto each irrigation area	kg/year			
	Electrical conductivity	dS/m			Annual
	Available Phosphorus	mg/kg		0 1 1	
	Available Nitrogen	mg/kg		Select irrigation zones that received the highest hydraulic load. Samples to be taken from top soil and sub soil	
	Available Potassium	mg/kg			
	Chloride	meq/100g	Monitor for		
Soil monitoring	Exchangeable cations & CEC	meq/100g	and change.		
	Exchangeable Sodium %	%	Ū		
	Sodium adsorption ratio	Ratio			
	Total Organic Carbon	%		layers.	
	рН	pH units			
	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/kg			
	Total Phosphorus	mg/kg			
	Phosphorus Sorption Capacity	mg/kg			
	Heavy metals	mg/kg			
	Pesticides	mg/kg			

- Irrigation areas and irrigation implementation are to incorporate the following:
  - Diversion drains as shown on drawing SW-56-C-SK50 along uphill slope to divert upslope stormwater around the irrigation areas;
  - Catch drain/swale as shown on drawing SW-56-C-SK50 along the downhill boundary of irrigation areas;
  - Exclusion fencing and signage as shown on drawing SW-56-C-SK50
  - Dense deep rooted grass vegetation will be established, e.g. kikuyu pasture;
  - Low application rate sprinklers are to be used;
  - No irrigation during rainfall when there is increased potential for run off;
  - Contour mounds to be constructed at intervals of approximately 30-50 metres;
  - 30 metre down gradient buffer to the property boundary.
  - Minimum 40m to down gradient property boundary in steeper north east corner of the irrigation area
  - 20m buffer to up gradient property boundary
  - No irrigation within the 40m wide future waterway corridor approved under MP10\_0204
  - 70m minimum buffer to nearest residential dwelling
  - System and vegetation monitoring in accord with Section 9 of the Land Capability for Effluent Irrigation Report.

These measures are to be incorporated in the Operational Environmental Management Plan for plant operation



 If the irrigation area is proven to be not suitable, a portion or all of the surplus recycled water would be removed by road tanker to the nearest licensed facility and stage 3 of the proposal would be implemented.

## 9.1.2 Odour

- Ventilation stacks provided on all house connections to ensure gravity sewers are well ventilated;
- All gravity sewers designed to achieve self cleansing velocity to avoid accumulation and breakdown of solids in the network;
- Passively ventilated Mcberns activated carbon filters will be used on all air valves in the pressure sewer network;
- Actively ventilated Mcberns activated carbon filter on the Sewage Treatment Plant inlet balance tank;
- All Membrane Bioreactor biological tanks are fully enclosed and passively ventilated through McBerns activated carbon filters located on the roof of the Sewage Treatment Plant building;
- The Membrane Bioreactor room in the Sewage Treatment Plant building has automatic indoor air quality monitoring for temperature, oxygen, hydrogen sulphide and methane, with automatic operation of an evaporative air conditioning unit to maintain ventilation and air quality;
- Deodorizing sprays are included in the design of the Sewage Treatment Plant building to enable release of deodorizing sprays if required;
- Catherine Hill Bay has a 24 hour customer service call centre for fielding all odour and other complaints. All complaints are recorded, reviewed and acted upon as outlined in the Integrated Wastewater Management Plan under Appendix C.

#### 9.1.3 Traffic

• A Construction traffic management plan is to be pr epared and implemented as part of the Construction Environmental Management Plan for the proposal.

#### 9.1.4 Noise

- All sewage pumps in the pressure sewer networks are submersible pumps located below ground level in an enclosed chamber;
- The Membrane Bioreactor and Advanced Water Treatment Plant are fully enclosed within the Sewage Treatment Plant building;
- Specific "noisy" equipment items like aeration blowers etc will be housed inside custom noise enclosures. E quipment specifications and design of c ustom noise enclosures will be undertaken to en sure compliance with the N ew South Wales Industrial Noise Policy of background noise plus 5 dBA at nearest residential dwelling;
- All planned construction and r outine maintenance works will be undertaken during standard permissible hours;
- All emergency works will be undertaken to minimise noise impacts on residents;
- Catherine Hill Bay has a 24 hour customer service call centre for fielding all noise and other complaints. All complaints are recorded, reviewed and acted upon as outlined in the Integrated Wastewater Management Plan under Appendix C.
- The measures recommended within the construction noise management plan prepared by Vipac Engineers and Scientists included under Appendix O are to be included within the Construction Environmental Management Plan to be prepared for the proposal.

# 9.1.5 Ground Water

- Where perched water (evaporation ponds) is to be s tored on the site High Density Polyethylene or other suitable liners will be required to prevent loss of water into the underlying strata that could cause a watertable rise.
- Level sensors are used on the Reverse Osmosis Reject Evaporation ponds to enable detection
  of breaks in the liner and to raise alarms before the ponds are full so the operator can take



action by either turning off the Reverse Osmosis units or road tanker pump out can be arranged.

- All site earthworks and construction is to be carried out in accord with a sediment and erosion . control plan.
- A Stormwater Management Plan for the Sewage Treatment Plant site is to be pr epared in . accord with Lake Macquarie Councils DCP No.1 Volume 2 Engineering Guidelines. N o drainage from the Sewage Treatment Plant site is to be directed to the adjacent conservation lands. This plan is to document the site connection to the stormwater management system approved under MP10 0204.
- The treatment and irrigation of water is to be und ertaken in accord with the Integrated Water . Management Plan under Appendix C.
- Environmental monitoring is to be under taken in accord with the Integr ated Water • Management Plan under Appendix C and the table below.

Туре	Parameter	Units	Туре	Location	Frequency
Turf and	Visual inspection of plant health for signs or stress	General observations	Monitor for change	Irrigation area	Ongoing
health	Laboratory biomass analysis of plant nutrients	mg/kg	ldentify deficiencies	Irrigation area	If impacts observed
	Faecal Coliform	cfu/100 mL			
	BOD	mg/L			
Surface Water	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	Monitor for	Downstream in Dam 1 and Dam	Quartarly
monitoring	Total Phosphorus & Plant available phosphours	mg/L as P	and change	2 and upstream at SW U/S.	Quarterry
	рН	pH units			
	Electrical Conductivity	dS/m			
	рН	pH units			Quarterly
	Cations	Mg/L		Downstream bores BH006 and BH009 and upstream bores BH004 and BH008.	
	Faecal Coliform	cfu/100 mL			
Ground water monitoring	Electrical conductivity	dS/m	Monitor for		
	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	general trends and change		
	Total Phosphorus	mg/L as P			
	Plant available phosphorus	mg/L as P	_		
	Water level	m AHD			
	Total hydraulic and nutrient load onto each irrigation area	kL/year and kg/year			
	Electrical conductivity	dS/m	_	Select irrigation	
	Available Phosphorus	mg/kg	_	zones that	
	Available Nitrogen	mg/kg	— Monitor for	received the	
	Available Potassium	mg/kg	general trends	load.	٨٠٠٠٠
Soli monitoring	Chloride	meq/100g	and change.	Samples to be	Annual
	Exchangeable cations & CEC	meg/100g	_	taken from top	
	Exchangeable Sodium %	%	_	layers.	
	Sodium adsorption ratio	Ratio	_		
	Total Organic Carbon	%	_		
	рН	pH units	_		

Offices also at Nobbies Beach and Darwin





Туре	Parameter	Units	Туре	Location	Frequency
	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/kg			
	Total Phosphorus	mg/kg			
	Phosphorus Sorption Capacity	mg/kg			
	Heavy metals	mg/kg			
	Pesticides	mg/kg			

• Irrigation areas and irrigation implementation are to incorporate the following:

 Diversion drains as shown on drawing SW-56-C-SK50 along uphill slope to divert upslope stormwater around the irrigation areas;

- Catch drain/swale as shown on drawing SW-56-C-SK50 along the downhill boundary of irrigation areas;
- Exclusion fencing and signage as shown on drawing SW-56-C-SK50
- Dense deep rooted grass vegetation will be established, e.g. kikuyu pasture;
- Low application rate sprinklers are to be used;
- No irrigation during rainfall when there is increased potential for run off;
- Contour mounds to be constructed at intervals of approximately 30-50 metres;
- 30 metre down gradient buffer to the property boundary.
- Minimum 40m to down gradient property boundary in steeper north east corner of the irrigation area
- 20m buffer to up gradient property boundary
- No irrigation within the 40m wide future waterway corridor approved under MP10\_0204
- 70m minimum buffer to nearest residential dwelling
- System and vegetation monitoring in accord with Section 9 of the Land Capability for Effluent Irrigation Report.

These measures are to be incorporated in the Operational Environmental Management Plan for plant operation

#### 9.1.6 Surface Water

- A Stormwater Management Plan for the Sewage Treatment Plant site is to be pr epared in accord with Lake Macquarie Councils DCP No.1 Volume 2 Engineering Guidelines. N o drainage from the Sewage Treatment Plant site is to be directed to the adjacent conservation lands. This plan is to document the sites connection to the stormwater management system approved under MP10\_0204.
- No drainage from the S ewage Treatment Plant site is to be di rected to the adj acent conservation lands as per project approval MP10\_0204.
- A Sediment and Erosion Control plan is to be prepared.
- Wastewater reuse and recycling is maximised in the scheme through the supply of Class A+ recycled water to customers for toilet flushing, laundry and outdoor recycled water uses;
- Irrigation areas and irrigation implementation are to incorporate the following:
  - Diversion drains as shown on drawing SW-56-C-SK50 along uphill slope to divert upslope stormwater around the irrigation areas;
  - Catch drain/swale as shown on drawing SW-56-C-SK50 along the downhill boundary of irrigation areas;
  - Exclusion fencing and signage as shown on drawing SW-56-C-SK50
  - Dense deep rooted grass vegetation will be established, e.g. kikuyu pasture;
  - Low application rate sprinklers are to be used;



- No irrigation during rainfall when there is increased potential for run off; \_
- Contour mounds to be constructed at intervals of approximately 30-50 metres;
- 30 metre down gradient buffer to the property boundary. \_
- Minimum 40m to down gradient property boundary in steeper north east corner of the \_ irrigation area
- 20m buffer to up gradient property boundary -
- No irrigation within the 40m wide future waterway corridor approved under MP10\_0204 \_
- 70m minimum buffer to nearest residential dwelling \_
- System and vegetation monitoring in accord with Section 9 of the Land Capability for \_ Effluent Irrigation Report.

These measures are to be incorporated in the Operational Environmental Management Plan for plant operation

Environmental monitoring is to be under taken in accord with the Integr ated Water Management Plan under Appendix C and the table below.

Туре	Parameter	Units	Туре	Location	Frequency
Turf and	Visual inspection of plant health for signs or stress	General observations	Monitor for change	Irrigation area	Ongoing
health	Laboratory biomass analysis of plant nutrients	mg/kg	ldentify deficiencies	Irrigation area	If impacts observed
	Faecal Coliform	cfu/100 mL			
	BOD	mg/L	_		
Surface Water	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	Monitor for	Downstream in Dam 1 and Dam	Quartarly
monitoring	Total Phosphorus & Plant available phosphours	mg/L as P	and change	2 and upstream at SW U/S.	Quarterry
	рН	pH units			
	Electrical Conductivity	dS/m	-		
	рН	pH units	_	Downstream bores BH006 and BH009 and upstream bores BH004 and BH008.	Quarterly
	Cations	Mg/L	_		
	Faecal Coliform	cfu/100 mL	_		
0	Electrical conductivity	dS/m	_ Monitor for		
Ground water monitoring	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	general trends and change		
	Total Phosphorus	mg/L as P			
	Plant available phosphorus	mg/L as P			
	Water level	m AHD	_		
	Total hydraulic and nutrient load onto each irrigation area	kL/year and kg/year		Select irrigation	
	Electrical conductivity	dS/m		zones that	
	Available Phosphorus	mg/kg	- Monitor for	received the	
	Available Nitrogen	mg/kg	general trends	load.	Annual
Soli monitoring	Available Potassium	mg/kg	and change.	Samples to be	Annual
	Chloride	meq/100g	_	taken from top	
	Exchangeable cations & CEC	meq/100g	_	layers.	
	Exchangeable Sodium %	%	_		
	Sodium adsorption ratio	Ratio	_		

Offices also at Nobbies Beach and Darwin



Туре	Parameter	Units	Туре	Location	Frequency
	Total Organic Carbon	%			
	рН	pH units			
	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/kg			
	Total Phosphorus	mg/kg			
	Phosphorus Sorption Capacity	mg/kg	_		
	Heavy metals	mg/kg			

• Free board and Level sensors are used on the Reverse Osmosis Reject Evaporation ponds to enable detection of breaks in the liner and to raise alarms before the ponds are full so the operator can take action by either turning off the Reverse Osmosis units or road tanker pump out can be arranged.

mg/kg

#### 9.1.7 Flora & Fauna

Pesticides

- A Stormwater Management Plan for the Sewage Treatment Plant site is to be pr epared in accord with Lake Macquarie Councils DCP No.1 Volume 2 Engineering Guidelines. N o drainage from the Sewage Treatment Plant site is to be directed to the adjacent conservation lands. This plan is to document the sites connection to the stormwater management system approved under MP10\_0204.
- No drainage from the S ewage Treatment Plant site is to be di rected to the adj acent conservation lands as per project approval MP10\_0204.
- All site earthworks and construction is to be carried out in accord with a sediment and erosion control plan.
- All clearing works approved under MP10\_0204 must be completed in accord with the relevant approvals prior to works associated with the Sewage Treatment Plant commencing.
- The designated construction zone and boundary between the site and National Parks and Wildlife land is to be clearly marked via high visibility fencing, sediment fencing and/or signage identifying that no construction activities (including temporary storage, stockpiling, vehicle movement etc) are permitted beyond prior to commencement of any work.
- A Weed Management Plan is to be prepared for both the Sewage Treatment Plant site and Irrigation areas and included within the operational environmental management plan to ensure negative edge effects do not occur to adjoining national park lands.
- A detailed landscaping plan of the proposed irrigation area vegetation buffers including appropriate species selection is to be prepared.

#### 9.1.8 Aboriginal Heritage

- Should any unexpected Aboriginal heritage items be found during works all works would cease immediately and the National Parks & Wildlife Service and the relevant Local Aboriginal Land Council would be notified. Procedures to address this issue are to be included within the Construction Environmental Management Plan for the proposal.
- The procedures outlined within the Aboriginal Heritage Management Plan approved under MP10\_0204 must be implemented to r elocate the isolated artifact found ons ite prior to commencement of any works.

#### 9.1.9 Visual Amenity

- Buffer planting as outlined within Landscape and Visual Impact Statement under Appendix D is to be implemented as part of Sewage Treatment Plant construction.
- The Sewage Treatment Plant building is to be clad in natural colours such as colorbond Pale



Eucalypt or similar.

#### 9.1.10 Bushfire

- A fire hydrant is to be located at site entrance into the Sewage Treatment Plant to allow for connection to the reticulated water supply and sprinkler system is to be installed between the built structures and bushfire threat.
- A Bushfire Evacuation Plan is to be created and a copy of the plan is to be kept within the site
  office. This plan is to identify the most efficient evacuation route away from the western
  bushfire threat. This evacuation route is to be identified on a plan and erected near the exit of
  the site office. The plan must include procedures to inform employees and visitors to the site
  of the bushfire evacuation plan and its content.

#### 9.1.11 Non Aboriginal Heritage

• The relevant approval under the Heritage Act 1977 for the works within the Cultural Heritage Precinct is to be obtained prior to any work commencing within the Cultural Heritage Precinct. Works within the Cultural Heritage Precinct is to be under taken in accord with any conditions of this approval.

#### 9.1.12 Waste

- A register will be maintained for all waste sampling and classification results for the life of the proposal in accordance with Environmental Protection Agency's Classification Guidelines; and
- Detailed procedures for waste handling including storage and disposal procedures are be established and included within the Operation Environmental Management Plan.

#### 9.1.13 Environmental Management Plans

- Specific plans to manage the environmental impacts of construction and operation would be prepared as outlined within the Preliminary Infrastructure Operating Plan under Appendix N as part of the pr oposed Sewage Treatment Plant and Sewer Reticulation Network. The following plans would be prepared:
  - Construction Environmental Management Plan;
  - Operation Environmental Management Plan;
  - Emergency Response Plan;
  - Recycled Water Management Plan

#### 9.1.14 Public Health

- A Recycled Water Management Plan and Drinking Water Quality Management Plan are to be prepared.
- Consultation is to be under taken with NSW Health regarding the regulation, management and prevention of public health issues as part of the pr eparation of the Recycled Water Management Plan and Drinking Water Quality Management Plan.
- An information package is to be developed and provided to all residents of the subdivision and existing Catherine Hill Bay village identifying the following:
  - Home owner obligations relating to pr essure sewer, water use, waste disposal, incident reporting and appropriate recycled water usage protocols
  - The location of effluent irrigation areas and instruction that people should not enter these areas
  - The risk associated with coming into contact with effluent; and
  - Measure to take should contact be made with effluent.



#### 9.2 **Environmental Monitoring and Reporting**

Operational and water quality will be monitored is to be in accord with the following tables and • that required under Section 5.3 of the EPA Effluent Irrigation Guidelines.

Daramator	Unite	MBR Effluent Qua	Location	
Farameter	UIIIIS	Commissioning	Verification	LUCATION
BOD	mg/L		Monthly	MBR
Suspended Solids	mg/L	Franciant manitarian	Monthly	permeate
Ammonia as N	mg/L as N	during commissioning	Monthly	weather storage
TKN as N	mg/L as N	period to test the	Monthly	
Oxidised Nitrogen as N	mg/L as N	system under a	Monthly	
Total Nitrogen as N	mg/L as N	conditions	Monthly	
Total Phosphorus as P	mg/L as P		Monthly	
Faecal Coliforms	cfu/100 mL		Weekly	
Metals	Various	N/A	Annual	
Pesticides	Various	N/A	Annual	
Cations/Anions/SAR	Various	N/A	Annual	
All tank water levels	m	Continuous	Continuous	Online
All flows	L/s	Continuous	Continuous	
Dissolved Oxygen (CCP)	mg/L	Continuous	Continuous	
MLSS	mg/L	Continuous	Continuous	
Electrical Conductivity	dS/m	Continuous	Continuous	
рН	рН	Continuous	Continuous	
Transmembrane Pressure (CCP)	∆kPa	Continuous	Continuous	
Permeate Turbidity (CCP)	NTU	Continuous	Continuous	
UV Intensity (CCP)	mJ/cm <sup>2</sup>	Continuous	Continuous	
UVT% (CCP)	%	Continuous	Continuous	

Table - Membrane Bioreactor Effluent Quality and Operational Monitoring

Table - Advance Water Treatment Plant Validation and Verification Recycled Water Quality Monitoring

Dollutopt	Unito	Recycled Water Quality Monitoring		Location
Politiant	Units	Validation	Verification	LUCALIUII
Biochemical Oxygen Demand	mg/L		Monthly	Recycled
Suspended Solids	mg/L		Monthly	Water
Ammonia as N	mg/L as N	_	Monthly	Storage Tank
TKN as N	mg/L as N	Frequent	Monthly	
Oxidised Nitrogen as N	mg/L as N	commissioning	Monthly	
Total Nitrogen as N	mg/L as N	period to test the	Monthly	
Total Phosphorus as P	mg/L as P	system under a variety of operating conditions.	Monthly	
Faecal Coliforms	cfu/100 mL		Weekly	
Free Residual Chlorine	mg/L		Weekly	
Sodium absorption ratio	ratio		Annual	
Campylobacter (bacteria)	cfu/100 mL		Annual	

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Offices also at Nobbies Beach and Darwin



Dollutent	Unite	Recycled Water Qu	Location	
Politian	Units	Validation	Verification	LUCATION
Cryptosporidium (protozoa)	cfu/100 mL		Annual	
Adenovirus (virus)	pfu/100 mL		Annual	
Rotavirus (virus)	pfu/100 mL		Annual	
Electrical Conductivity (CCP)	dS/m	Continuous	Continuous	Online
UF Permeate Flow (CCP)	L/s	Continuous	Continuous	
UF Permeate Turbidity (CCP)	NTU	Continuous	Continuous	
UF Transmembrane Pressure (CCP)	∆kPa	Continuous	Continuous	
UF Direct Integrity Testing (CCP)	$\Delta$ kPa/time	Continuous	Continuous	
UV Intensity (CCP)	mJ/cm <sup>2</sup>	Continuous	Continuous	
UVT% (CCP)	%	Continuous	Continuous	
pH (CCP)	рН	Continuous	Continuous	
Free Residual Chlorine (CCP)	mg/L	Continuous	Continuous	

Table - Environmental Monitoring of Effluent Irrigation Scheme

Туре	Parameter	Units	Туре	Location	Frequency
Turf and	Visual inspection of plant health for signs or stress	General observations	Monitor for change	Irrigation area	Ongoing
health	Laboratory biomass analysis of plant nutrients	mg/kg	ldentify deficiencies	Irrigation area	If impacts observed
	Faecal Coliform	cfu/100 mL		Downstream in Dam 1 and Dam	Quality
	BOD	mg/L			
Surface Water	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N	Monitor for		
monitoring	Total Phosphorus & Plant available phosphours	mg/L as P	and change at SW U/S.	Quarteriy	
	рН	pH units	_		
	Electrical Conductivity	dS/m	-		
	рН	pH units		Downstream bores BH006 and BH009 and upstream bores BH004 and BH008.	Quarterly
	Cations	Mg/L	<ul> <li>Monitor for</li> <li>general trends</li> <li>and change</li> </ul>		
	Faecal Coliform	cfu/100 mL			
	Electrical conductivity	dS/m			
Ground water monitoring	Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/L as N			
	Total Phosphorus	mg/L as P			
	Plant available phosphorus	mg/L as P			
	Water level	m AHD			
	Total hydraulic and nutrient	kL/year and		Select irrigation zones that received the highest hydraulic load. Samples to be taken from top soil and sub soil	Annual
Soil monitoring	load onto each irrigation area	kg/year	Monitor for general trends and change.		
	Electrical conductivity	dS/m			
	Available Phosphorus	mg/kg			
	Available Nitrogen	mg/kg			
	Available Potassium	mg/kg			
	Chloride	meq/100g	_	layers.	

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Parameter	Units	Туре	Location	Frequency
Exchangeable cations & CEC	meq/100g			
Exchangeable Sodium %	%	-		
Sodium adsorption ratio	Ratio			
Total Organic Carbon	%			
рН	pH units			
Total Nitrogen, nitrate, nitrite, TKN, Ammonia	mg/kg	_		
Total Phosphorus	mg/kg			
Phosphorus Sorption Capacity	mg/kg	-		
Heavy metals	mg/kg			
Pesticides	mg/kg	-		

- The monitoring methods, locations, frequency, criteria, reporting and responsibilities are to be determined during preparation of the O peration Environmental Plan and are to be consistent with any relevant licence conditions and with the Integrated Water Management Plan under Appendix C, the L and Capability Assessment for Effluent Irrigation under Appendix K and the pr eliminary Infrastructure Operating Plan under Appendix N.
- The NSW Office of water (now DPI Water) is to be consulted during preparation of the Operational Environmental Plan.
- Impact Trigger Levels for surface water, groundwater and soil chemistry and salinity, and groundwater levels are to be developed based on results of baseline monitoring program and procedures for responding to and reporting exceedances of these triggers values is to be specified in the Operational Management Plan or Recycled Water Management Plan.
- Consultation is to be undertaken with NSW Health regarding the regulation, management and prevention of public health issues as part of the preparation of the Recycled Water Management Plan and Drinking Water Quality Management Plan.

# 9.3 Licensing and approvals

Table 15 provides a summary of licensing and approval required prior to construction.

Requirement	Timing
Road Occupancy License	A minimum of 10 days prior to the commencement of works (only required if public road will be occupied during construction)
Section 143 Notice under the Protection of the Environment Operations Act 1997	Prior to relocation spoil if spoil is created by earth works to form the Reverse Osmosis Reject Evaporation Ponds
Approval to alter or erect improvements within a mine subsidence district under Clause 15(2) of the Mines Subsidence Act 1961	Prior to any works onsite
Construction Certificate (or equivalent)	Prior to any works onsite
S138 Approval for works located within an existing road reserve	Prior to any works within the road reserve
Approval under Clause 57(1) of the Heritage Act 1977	Prior to the installation of any pressure sewer units and gravity connections on land within the Catherine Hill Bay Cultural Heritage Precinct.
Controlled Activity Approval under Water	Prior to installation of any component of the

#### Table 15: Licensing and approvals required



Management Act 2000	irrigation system if it is located within 40m of a water way
WICA License	Concurrent with determination of review of environmental factors



# 10 – Conclusion

The proposed Sewage Treatment Plant and Sewer Reticulation Network do not require development consent and is subject to assessment under Part 5 of the Environmental Planning and Assessment Act 1979. The Review of Environmental Factors has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposal. This has included consideration of critical habitat, impacts on thr eatened species, populations and ecological communities and their habitats and other protected fauna and native plants.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in the Review of Environmental Factors best meets the proposal objectives. Mitigation measures as detailed in this Review of Environmental Factors would ameliorate or minimise any expected impacts associated with the proposal. On balance the proposal is considered justified.

The environmental impacts of the proposal are not likely to be s ignificant and therefore it is not necessary for an environmental impact statement to be prepared or approval to be s ought for the proposal from the M inister for Planning under Part 5.1 of the Environmental Planning and Assessment Act. The proposal is unlikely to affect threatened species, populations or ecological communities or their habitats, within the meaning of the *Threatened Species Conservation Act 1995* or *Fisheries Management Act 1994* and therefore a Species Impact Statement is not required. The proposal is also unlikely to affect Commonwealth land or have an impact on any matters of national environmental significance.

The subject site is considered able to suitably accommodate the proposed Sewage Treatment Plant & Sewer Reticulation Network.

As such it is respectfully requested that the application be considered favourably and approved subject to reasonable and relevant conditions.




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.

Lance Newley Town Planner Planit Consulting Pty Ltd Date: 18/06/2015

I have examined this review of environmental factors and the certification by Lance Newley from Planit Consulting Pty Ltd and ac cept the review of environmental factors on behalf of Independent Pricing and Regulatory Tribunal.

Insert name Position title, eg Project Manager Date:



# A – Sewage Treatment Plant Plans



# B – Consideration of Clause 228(2) factors and matters of national environmental significance



# C – Integrated Water Management Plan



# D – Landscape and Visual Impact Assessment



# E – Noise Impact Assessment







# G – Project Approval MP10\_0204



# H – EPBC Act Referral Approval



# I – Reverse Osmosis Water Balance Report



# J – Bushfire Management Plan



### K – Land Capability Assessment for Effluent Irrigation



# L – EPBC Act Protected Matters Report



# M – Aboriginal Cultural Heritage Management Plan MP10\_0204



# N – Preliminary Infrastructure Operating Plan



# O – Construction Noise Management Plan







# Q – Reticulation & Irrigation Area Plans



# R – Inspection and Test Plan



# Appendix 8

CONSTRUCTION AND ENVIRONMENT MANAGEMENT PLAN - VERSION 3 JUNE 2016



# Construction and Environment Management Plan

### Wastewater Treatment Plant and Reticulation Network

Catherine Hill Bay Scheme Stages 1& 2 85 & 95 Flowers Drive, 6 Keene Street & 12 Montefiore Street, Catherine Hill Bay

Prepared for Solo Water Pty Ltd

by Planit Consulting

QUEENSLAND | NEW SOUTH WALES | NORTHERN TERRITORY

PROJECT MANAGEMENT | TOWN + ENVIRONMENTAL PLANNING | LANDSCAPE ARCHITECTURE |

MARKETING + DESIGN



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# Section 1 - Introduction

Planit Consulting has been engaged by Solo Water to prepare a Construction and Environmental Management Plan (CEMP) for the construction of a new wastewater treatment plant and reticulation network at Lot 100, 101 & 106 DP1129872, Lot 1 DP1141989, Lot 1 DP1129299, Lot 103 DP1194707, Lot 101 & 102 DP1194707, Lot 213 DP883941, Lot 1 Section I DP168, Lot 1 Section K DP163, Flowers Drive Road Reserve, Montefiore Street Road Reserve, Catherine Hill Bay, from herein referred to as 'the site'.

The wastewater treatment plant and reticulation network is required to service a subdivision approved by the Planning Assessment Commission under Project Approval MP10\_0204 on the 13 May 2011. This approval granted the following works:

- Subdivision of the site into up to 550 residential lots, 1 retail lot, 9 reserves, and 2 heritage lots
- Associated bulk earthworks
- Infrastructure works including road, drainage works and utility services provisions
- Landscaping works
- Subdivision of the Wallarah House precinct into two lots

This CEMP relates specifically to the construction of a wastewater treatment plant and associated reticulation network as an individual component of works under the above approval. The proposed wastewater treatment plant would have the peak capacity to service 330kL per day and would be commissioned in three stages. Ultimately the wastewater treatment plant would provide class A+ recycled water for domestic reuse on all allotments approved under Project Approval MP10\_0204. Domestic reuse would be facilitated via a 'third pipe' (purple pipe) reticulated network.

#### 1.1 Site Description

The subject site is located within the Lake Macquarie City Council Local Government Area. The site adjoins the Munmorah State Conservation Area to the south and west and the Munmorah State Conservation Area and Pacific Ocean to the east. To the north lies the existing village of Catherine Hill Bay.

The land on which the wastewater treatment plant would be constructed is located within the footprint of the approved subdivision at the western extent of Lot 101 DP1129872. The irrigation areas would be located within Lot 106 DP1129872 and Lot 100 DP1129872 and would occupy the land identified as subdivision stages 6 and 7 under Project Approval MP10\_0204. An aerial photograph showing the site location is shown in Figure 1, with the subdivision layout and the location of the wastewater treatment plant and irrigation area within the subdivision shown in Figure 2. Figure 3 shows the land use and zoning of the subject site and surrounding areas.





Figure 1: Aerial photograph showing site location. AOI depicts location of wastewater treatment plant.



**Figure 2:** Aerial photograph of subdivision layout and the location of the wastewater treatment plant and irrigation area within the subdivision.





**Figure 3:** Statutory zoning of site and surrounds – E1 National Parks and Nature Reserve, E2 Environmental Conservation, R2 Low Density Residential, SP2 Infrastructure, 2(1) Residential, 7(1) Conservation (Primary), 7(4) Conservation Environmental (Coastline), 8 National Park

#### **1.2 Description of Works**

This CEMP specifically relates to the construction of a wastewater treatment plant and associated reticulation network. These works are being constructed as an individual component of the broader approval for the construction of a 550 lot residential subdivision. All works associated with the construction of the wastewater treatment plant and reticulation network will be undertaken by Daracon Group who are also the principal civil contractor undertaking the construction works associated with the broader residential subdivision.

As a summary, construction of the wastewater treatment plant and reticulation network would involve the following:

# Construction of a wastewater treatment plant facility including reverse osmosis reject evaporation pond

Construction of the wastewater treatment plant will be undertaken in two stages. The following scope of works is identified for each stage of construction. Stage two would commence upon connection of 112 lots to the wastewater treatment plant.

#### Stage 1

Construction of wastewater treatment plant building and office



- Construction of membrane bioreactor and associated process tanks
- Construction of two 1ML wet weather storage tanks
- Construction of a 1ML recycled water tank
- Construction of a 1ML potable water storage tank
- Construction of a permanent fence around the perimeter of the site with a vehicular access gate
- · Sealing of all site hardstand areas including access and manoeuvring areas
- Installation of all service ducting to accommodate final Stage 2 fitout
- Installation of Stage 1 services

#### Stage 2

- Construction of advanced water treatment plant and associated process tanks
- Construction of reverse osmosis reject evaporation ponds
- Installation of Stage 2 services.

Construction of Stage 1 (including fit outs etc.) will take approximately 12 months to complete followed by Stage 2 which will take a further 6 months. All works will be undertaken by Daracon Groups existing onsite resources so as to minimise the number of additional personnel on the broader subdivision site. It is an estimated that approximately 12 people would be allocated to construction of the wastewater treatment plant.

# Installation of the irrigation system and forming of the diversion and catch drains within the ancillary irrigation area

A total of 8.5 ha of restricted access effluent irrigation area would be provided to service Stage 1 and 2 of the proposal (maximum 470ET). The irrigation area would be staged in line with the rate of production of surplus recycled water from the subdivision however a total of 4.5ha would be required for Stage 1 and a further 4ha for Stage 2. The irrigation system will be supplied from its own separate and independent irrigation network with its own irrigation pump.

Clean water diversion drains would be constructed around the upstream perimeter of the site to divert clean water away from the irrigation area. In addition, catch drains (mounds) would be constructed within the irrigation areas to capture runoff from within the site.

The irrigation area will also be fully fenced with a 0.9m chain wire fence around the perimeter to prevent access. The fencing will include warning signs not to enter and to avoid contact with recycled water every 50m.

#### **1.3 Objective of the Construction Environmental Management Plan**

The objective of this CEMP is to ensure that environmental risks associated with the construction of this project are identified and managed to minimise the environmental impacts of the development. This CEMP also aims to ensure compliance with applicable legislation, consents, licences and approvals. This will be achieved through the implementation of a range of best management practices and mitigation measures which will address any legislative and regulatory requirements that are applicable to the site.



#### 1.4 Hierarchy of the Construction Environmental Management Plan

This CEMP forms part of a suite of management plans that have been developed for the project under the overarching Project Approval MP10\_0204. For the management of this project, the CEMP combines into one document, the mitigation measures identified in each of the management plans developed for the project as well as those identified as commitments in the REF and as conditions in Project Approval MP10\_0204. Individual management plans that have been developed for the project and which are incorporated into this CEMP include:

- Landscape Plan
- Traffic and Pedestrian Management Plan
- Waste Management Plan
- Soil and Water Management Plan
- Flora and Fauna Management Plan
- Weed Management Plan
- Project Consultation Plan
- Acid Sulfate Soil Management Plan
- Aboriginal Cultural Heritage Management Plan
- Bushfire Risk Management Plan
- Construction Noise and Vibration Management Plan
- Remediation Action Plan

Compliance with the mitigation measures listed in Section 5 of this CEMP would ensure compliance with relevant legislative requirements and conditions of consent.

#### **1.5 Statement of Commitments**

Schedule 3 of Project Approval MP10\_0204 identifies a range of commitments that are applicable to the overall development. This CEMP aims to satisfy these commitments where relevant to the works which include:

#### C2 Aboriginal Heritage

Works are to be carried out generally in accordance with the Aboriginal Cultural Heritage Management Plan prepared by Insight Heritage. Details of complying with the key principals of the plan are to be submitted to the Certifying Authority.

#### C3 Environmental Management

A management plan shall be submitted to the Certifying Authority in accordance with the recommendations outlined in the Ecological Assessment Report prepared by RPS. Details are to be submitted to the satisfaction of the Certifying Authority prior to the issue of the Construction Certificate.

#### C4 Contamination

A Work Method Statement shall be submitted to the Certifying Authority in accordance with the recommendations set out in the Remedial Action Plan prepared by Geotech Solutions. Details are to be submitted to the satisfaction of the Certifying Authority prior to the issue of the Construction Certificate. The works carried out under the Work Method Statement must be certified by a DECC accredited auditor.

#### C5 Erosion and Sedimentation Control

Details of groundwater and SEPP14 Wetland sampling analysis and locations as well as ongoing reporting requirements shall be submitted to the Certifying Authority in accordance with the



recommendations set out in the Stormwater and Groundwater Monitoring Plan prepared by Cardno Geotech Solutions. Details are to be submitted to the satisfaction of the Certifying Authority prior to the issue of the Construction Certificate.

D2 Traffic and Pedestrian Management Plan

Prior to the commencement of any works on the site, a Traffic and Pedestrian Management Plan prepared by a suitably qualified person shall be submitted to and approved by the Certifying Authority. The plan shall address, but not be limited to, the following matter:

- 1. Ingress and egress of vehicles to the site
- 2. Loading and unloading, including construction zones
- 3. Predicted traffic volumes, types and routes
- 4. Pedestrian and traffic management methods

#### D3 Noise and Vibration Management Plan

Prior to the commencement of any works on the site, a Noise and Vibration Management Plan prepared by a suitably qualified person shall be submitted to and approved by the Director. The Plan shall address, but not be limited to, the following matters:

- 1. Identification of the specific activities that will be carried out and associated noise sources
- 2. Identification of all potentially affected sensitive receivers including residences, schools and properties containing noise sensitive equipment
- 3. The construction noise objective specified in the conditions of this consent
- 4. The construction vibration criteria specified in the conditions of this consent
- 5. Determination of appropriate noise and vibration objectives for each identified sensitive receiver
- 6. Noise and vibration monitoring reporting and response procedures
- 7. Assessment of potential noise and vibration from the proposed construction activities including noise from construction vehicles and any traffic diversion
- 8. Description of specific mitigation treatments, management methods and procedures that will be implemented to control noise and vibration during construction
- 9. Justification of any proposed activities outside the construction hours specified in the conditions of this consent
- 10. Construction timetabling to minimise noise impacts including time duration restrictions, respite periods and frequency
- 11. Procedures for notifying residents of construction activities that are likely to affect their amenity through noise and vibration
- 12. Contingency plans to be implemented in the event of non-compliances and/or noise complaints

#### D4 Construction Noise Objectives

Approved silencing measures shall be provided and maintained on all power-operated plant used in demolition, excavation, earthworks and construction of the building, or work.

#### 1.6 Targets

The following environmental management targets have been identified for this project

- Compliance will be achieved with all applicable legislation, consents, licences and approvals
- There will be minimal environmental impact upon the locality
- There will be minimal disturbance to the surrounding community
- Best practice erosion and sediment controls will be implemented and maintained throughout construction
- Erosion and sediment loss off the site will be minimal



- There will be minimal disturbance to the surrounding environment to prevent distress or injury to wildlife or their habitat
- There will be no significant decrease in water quality discharging from the site
- There will be no degradation of water quality in receiving waterways off site
- The effects of the development will be regularly monitored to ensure that there are no adverse environmental impacts
- There will be no environmental incidents or accidents
- There will be no complaints from the local community.

#### **1.7 Environmental Policy of Construction Contractor**

Construction of the wastewater treatment plant and reticulation network will be carried out by Daracon Group's Environmental Policy is stated as follows:

#### Our Commitment

Responsible Environmental Management is a corner stone of all our endeavours and is reflected in the conscientious attitude of every Daracon employee.

Our Environmental Management System (EMS) provides the framework for guiding performance and ensuring that we: Comply with relevant legal and other requirements Establish and review environmental objectives and targets Strive for continual improvement

Recognising our obligations to present and succeeding generations, we are committed to the prevention of pollution, conservation of biodiversity and using precautionary practices to minimise ecological disruption.

#### Initiatives

Our business covers a broad range of construction activities that can have significant impacts on the environment and includes infrastructure development, mining, soil remediation, landscaping, heavy transport, plant hire and quarry products. Having a comprehensive EMS ensures that we protect the environment by systematically identifying, assessing and controlling all environmental impacts of our work.

We make sure that all personnel are trained in environmental awareness and use of our EMS. This also extends to visitors, suppliers and subcontractors through our procedures for site induction, purchasing and subcontractor management.

#### Outcomes

Our vision for responsible management of the environment is known and practiced by every Daracon employee

There is a sincere commitment throughout our workforce to maintain a high standard of environmental performance, compliance with legislation and operational best practice.

David Mengay



# Section 2 – Statutory Matters

#### 2.1 Permits and Approvals

- Major Project MP10\_0204 (refer Attachment B)
- EPBC referral 2012/6382
- Network Operators licence 16\_035 (refer Attachment C)

#### 2.2 Legislative Responsibilities and Relevant Guidelines

Environmental legislation and policies applicable to the project are listed below along with relevant guidelines which will be followed to ensure compliance with legislation and the objectives of this CEMP.

Environmental Factor	Applicable Legislation	Relevant Guidelines
Water Quality	NSW Protection of the Environment Operations Act (1997)	Australian Water Quality Guidelines for Fresh and Marine Waters, ANZECC, 2000. Australian Standard AS2031 – Selection of containers and preservation of water samples for microbiological analysis. APHA/AWWA Standard methods for the examination of water samples.
Sediment and Erosion Control	NSW Protection of the Environment Operations Act (1997)	Managing Urban Stormwater: Soils and Construction Vol 4 (LANDCOM) (Blue Book). Lake Macquarie Council Development Control Plan No.1 Volume 2 – Engineering Guidelines - Part 1 Design Specification D7 Erosion Control and Stormwater Management.
Noise	NSW Protection of the Environment Operations Act (1997)	NSW EPA Interim Construction Noise Guidelines. EPA (OEH) NSW Industrial Noise Policy Australian Standard AS2012 - Acoustics - Measurement of airborne noise emitted by earth-moving machinery and agricultural tractors.

Table	<b>2.1</b> :	Environm	ental lea	islation a	and relev	/ant quide	lines
			••••••••••••••••••••••••••••••••••••••				



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Solo Water Pty Ltd CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN V.3

Environmental Factor	Applicable Legislation	Relevant Guidelines
		Australian Standard AS2221 - Methods for measurement of airborne sound emitted by compressor units including prime movers and by pneumatic tools and machines.
		Australian Standard AS2436 – Guide to noise control on construction, maintenance and demolition sites.
		Australian Standard AS1259 – Sound level metres.
		Australian Standard AS2659.1 – Guide to the use of sound level measuring equipment – portable sound level metres.
Air Quality and Dust	Work Health and Safety Act (2011)	NSW EPA Air Quality Guidance Notes – Construction Sites.
	NSW Protection of the Environment Operations Act (1997)	National Environment Protection (Ambient air Quality) Measure (NEPM) and Proposed Variation (2014).
		Australian Standard AS2724.3 - Ambient Air Particulate matter – Determination of total suspended particulates (TSP) – High volume sampler gravimetric method.
		Australian Standard AS3580 – Methods for sampling and analysis of ambient air.
		DECC (2005) - Approved Methods for the Modelling and Assessment of Air Pollutants in NSW.
		DECC (2006) – Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.
Waste and Hazardous Materials	NSW Protection of the Environment Operations Act (1997)	Australian Standard AS1940:2004 – The storage and handling of flammable and combustible liquids.
	Protection of the Environment Operations (Illegal Waste Disposal) Act (2013)	Australian Standard AS1216 - Class labels for dangerous goods.



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Solo Water Pty Ltd CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN V.3

Environmental Factor	Applicable Legislation	Relevant Guidelines	
	Protection of the Environment Operations (Waste) Regulation (2014) Waste Avoidance and Resource Recovery Act (2001) Environmentally Hazardous Chemicals Act (1985) Contaminated Lands Management Act (1997)	Australian Standard AS1678 - Emergency procedures guide – Transport. Australian Standard AS2508 - Safe storage and handling information cards for hazardous materials. Australian Standard AS2931 Selection and use of emergency procedure guide for the transport of dangerous goods. Australian Standard AS3780.8 – Class 8 substances – Corrosives.	
Flora and Fauna	Environmental Protection and Biodiversity Conservation Act (1999) National Parks and Wildlife Act (1974) Threatened Species Conservation Act (1995) Noxious Weeds Act (1993)	Australian Standard AS4970:2009 - Protection of Trees on Development Sites.	
Cultural Heritage	Native Title Act (1993) Aboriginal and Torres Strait Islander Heritage Protection Act (1984) National Parks and Wildlife Act (1974)	Due Diligence Code of Practice for Protection of Aboriginal Objects in NSW.	
European Heritage	The Heritage Act (1977)		
Traffic	Roads Act (1993)	Australian Standard AS1742 - Manual of Uniform Traffic Control Devices.	
Vibration	NSW Protection of the Environment Operations Act (1997)	NSW EPA – Assessing Vibration: A Technical Guideline.	



# Section 3 – Management Responsibilities

#### 3.1 Management Responsibilities

A summary is provided below highlighting the roles of key personnel within the Daracon Group who are responsible for the construction works and ensuring that the objectives of this CEMP are achieved and that the environmental impacts of the development are minimised during the construction phase.

#### 3.1.1 Project Manager

The Project Manager has overall responsibility for delivering and managing the project. The Project Manager is responsible for construction management and shall establish and maintain the Company's policies for this project and shall be responsible for their effectiveness. Where necessary, the Project Manager will delegate responsibility to his management team to ensure that environmental impacts are minimised and any environmental obligations are met.

A summary of the Project Manager's responsibilities include:

- Reviewing and authorising this CEMP and any other project plans applicable to the development
- Assigning environmental responsibilities to project personnel if required
- Leading by example and promoting sound environmental practices at every opportunity
- Ensuring all project personnel are appropriately trained in environmental matters and have the necessary skills to undertake any designated environmental responsibilities
- Monitoring the environmental performance of the development to ensure compliance with environmental requirements
- Reviewing the environmental monthly report
- Communicating the environmental performance of the development
- Providing resources to ensure environmental practices are implemented, particularly those relating to this CEMP
- Implementing corrective and preventative actions
- Ensuring project compliance with all legislation and industry codes of practice
- Ensuring that activities are assessed for risk prior to commencement.
- Establishing and maintaining company policies for the project.

#### 3.1.2 Project Supervisor

The Project Supervisor reports to the Project Manager and is responsible for the day to day co-ordination and site control of direct labour, plant, subcontractors and suppliers for construction works. The Project Supervisor has a direct role in ensuring compliance with environmental procedures and controls. The Project Supervisor is responsible for ensuring environmental controls are installed prior to works, checking the site on a regular basis and ensuring that regular maintenance is undertaken to minimise environmental impacts.

A summary of the Project Supervisor's responsibilities include:

• Ensuring any procedures or requirements identified in this CEMP are implemented and followed



- CONSULTING
  - Undertaking surveillance and monitoring of environmental controls to ensure that they are established and maintained in a proper working order
  - Ensuring the environmental protection requirements are communicated to all personnel and subcontractors under his/her control
  - Leading by example and promoting sound environmental practices at every opportunity
  - Identifying and reporting any environmental non-conformance or incidents and notifying the Project Manager
  - Overseeing rectification works after identification of any non-conformances or incidents
  - Ensuring that all site personnel, including subcontractors, undertake environmental awareness induction training prior to starting any works on site
  - Reviewing and determining when any additional environmental training is required for site personnel
  - Participating in the investigation of serious incidents
  - Ensuring all foreseeable risks are identified, documented and controlled appropriately by implementing preventative actions
  - Participating in scheduled environmental audits
  - Supervising the work of subcontractors to ensure that best practice environmental management is being undertaken.

#### 3.1.3 Subcontractors

Subcontractors and their personnel are considered as being equivalent to project personnel in all aspects of environmental management. Subcontractors and their personnel are required to comply in full with the requirements of this CEMP. Subcontractors are not excluded from having to meet the environmental requirements of this CEMP.

Subcontractors, suppliers and their personnel entering the site are to be included in all on-site induction processes and are to be made aware of any requirements of this CEMP before working on the site.

All subcontractors will be suitably qualified, experienced and licenced, where required, to undertake the works.

All subcontractors will carry out risk assessments for their scope of works.

All subcontractors will adhere to any environmental related instructions provided by the Project Supervisor.

#### 3.1.4 Environmental Representatives

The project manager will appoint an environmental representative where appropriate to ensure environmental considerations of the project are met. The Environmental Representative is responsible for the inspection and monitoring of project activities and has the authority to stop the work if an adverse impact may occur. Where an environmental representative is appointed their responsibilities will include:

- Ensuring compliance with the CEMP, environmental conditions of approval and any legislative requirements
- Communicating the performance of the CEMP to the Project Manager
- Providing advice on the CEMP to all site personnel



- Undertaking environmental monitoring and ensuring best practice environmental management is undertaken where relevant
- Maintaining environmental records and documentation including monitoring data, complaints and environmental incident reports
- Assisting subcontractors in the fulfilment of their environmental responsibilities during construction
- Liaising with external agencies where necessary
- Receiving and responding to environmental complaints
- Delivering the environmental component of site inductions
- Completing programmed environmental inspections and audits
- Reviewing and maintaining this CEMP regularly and implementing any necessary changes
- Responding to all environmental incidents; and
- Determining appropriate corrective actions where required.

#### 3.1.5 Site Personnel

All site personnel are responsible for the following:

- Working in a safe manner without risk to themselves, others or the environment
- Complying with all the requirements of the CEMP
- Reporting all incidents to the Project Supervisor
- Providing suggestions, through agreed consultation methods, on how to improve CEMP issues
- Seeking assistance if unsure of CEMP requirements
- Complying with site rules
- Correctly using all personal protective equipment
- Complying with emergency and evacuation procedures.

#### 3.2 **Project Organisational Structure**

The Principal Civil Contractor for the construction of the wastewater treatment plant and reticulation network is Daracon Group. This appointment has been made by the developer, Rose Group. The project management organisation within Daracon Group is outlined below as follows:





#### 3.3 Key Personnel Contact Details

Table 3.1 below provides the contact details of key personnel within Daracon Group.

**Table 3.1:** Contact details of key personnel

Name	Position Title	Contact No.
David Mingay	Managing Director	02 4903 7000
Jon Mingay	General Manager	02 4903 7000
Michael Rummery	Divisional Manager	0437 335 548
Bob Murphy	HSEQ Manager	0439 395 286
Joe Kelly	HR Manager	(02) 4903-7058
Rob Francis	Systems Manager	0418 653 879
David Swadling	Senior Incident Manager	(02) 4903-7039
Rod Lang	Construction Superintendent	0419 240 687
Phil Raftos	Project Manager	0447 374 539


Name	Position Title	Contact No.
Rory Charlton	Project Quality Representative	0408 527 815
Cheslyn Africa	Project Engineer	0417 430 160
Jason Cherry	Project Supervisor	0407 960 275
Garth Charlton	Project Supervisor (Subdivision)	0418 447 952
Rory Charlton	Site Engineer	0408 527 815
David Swadling	HSEQ Coordinator (Safety)	0417 651 479
Anthony Brown	HSEQ Coordinator (Enviro)	0408 217 743
Matt Anderson	Surveyor	(02) 4903-7089



## Section 4 – Communication and Records

#### 4.1 Training

The objective of environmental awareness training is to ensure that all personnel have a level of awareness of their environmental responsibilities and are adequately trained in the contents of this CEMP. Environmental awareness training will be provided to all personnel working on the project, including subcontractors.

The two main forms of training to be provided during the project will be site inductions prior to construction and toolbox meetings during construction. These are discussed as follows:

#### 4.1.1 Site Inductions

Induction training will be provided to all site personnel, including subcontractors, prior to any personnel working on the site. The objective of induction training is to ensure that all site personnel are aware of the requirements of this CEMP, including legislative requirements, conditions of consent, environmental impacts, proposed mitigation measures and emergency procedures.

Induction training shall include but not be limited to the following topics:

- Legislative requirements, conditions of consent and any licences or permits
- Roles and responsibilities of staff and management in regards to the environment
- Permissible hours of work
- Significant environmental issues including sensitive areas and site boundaries
- Storage of hazardous chemicals and fuels
- Location of hazardous chemical/fuels spill kits and contents
- Project specific and standard noise and vibration mitigation measures
- Limitations on high noise generating activities
- Locations of nearest sensitive receivers
- Construction site management including employee parking areas, loading and unloading areas and procedures, site opening and closing times (including deliveries)
- Environmental management for key issues (protected flora and fauna, acid sulphate
- Soils, salt and fresh water wet lands, flora and fauna, cultural heritage etc.
- Erosion and sediment control requirements
- Protection and maintenance of environmental controls
- Procedure for identification of cultural heritage items on site
- Incident notification and reporting procedures
- Complaint handling procedure.

#### 4.1.2 Toolbox Meetings

During construction, toolbox meetings will be undertaken weekly to ensure that relevant information is communicated to all staff and to enable staff to provide feedback on relevant issues of concern from an environmental perspective. Toolbox training will be a useful means to reinforce the importance of conformance with environmental policies and procedures and the requirements of this CEMP. Environmental topics will be discussed in toolbox meetings as required and could include:



- Content and requirements of the CEMP
- Significant environmental aspects of the project
- Roles and responsibilities for achieving conformance with the requirements of the CEMP
- Environmental benefits of improved work performance
- Environmental emergency response procedures
- Key environmental issues such as noise, vibration control, dust control, flora and fauna, and environmental protection areas
- Erosion and sediment control, installation and maintenance of controls
- Protecting waterways and riparian zones
- Management of works near no-go zones such as environmental protection areas
- Working near protected vegetation
- The efficient use of plant and equipment
- Waste management, minimisation and recycling
- Management of acid sulphate soils and contaminated soils
- Spill response equipment.

Where it is apparent that any personnel, including subcontractors, lack an understanding of the environmental requirements of the project as presented in this CEMP, the Project Supervisor will be responsible for organising appropriate retraining to ensure that the requirements of the CEMP are understood and adhered to. Additionally, environmental training will also be provided to personnel following identification of any environmental incident, near miss or non-compliance.

Records of any induction or toolbox training undertaken will be maintained in accordance with Section 4.2 of this CEMP. These records will be kept on site and will be available during construction of the project.

#### 4.2 Record Management

Records will be maintained and stored in a readily retrievable location safe from potential damage or loss. Records to be maintained on site during construction will include: the CEMP with all licenses and permits, correspondence and complaints, inspection reports, monitoring results, induction register and any site training records, environmental checklists, environmental accidents or incidents.

#### 4.3 Complaint Response and Management

Upon receiving a complaint regarding construction activities, the site supervisor will investigate the source of the complaint. The aim will be to initiate an immediate investigation no later than two hours after the complaint is made. Where practicable, a visit will be made to the complainant to verify the nature of the complaint and if justified, appropriate action will be taken to cease or amend the activity causing the complaint.

Where three or more substantiated complaints of a similar nature are received (from at least two complainants), the work element will be reviewed in order to consider whether the work methods can be changed or if additional methods can be employed in order to prevent or reduce the likelihood of further complaints being made.



Records of complaints, any correspondence and details of any corrective actions undertaken will be maintained on-site in a complaints register. The project manager will be responsible for maintaining the register tracking the response in a suitable timeframe.

#### 4.4 Environmental Incidents

An environmental incident is an unplanned event that results in environmental harm, whether significant or minor. In the event of an environmental incident, all necessary actions will be immediately undertaken to minimise the size and any adverse environmental effects resulting from the incident. To achieve this objective the following procedure will be followed:

#### Stop works potentially giving rise to the environmental incident

Where an environmental incident occurs or appears to have the potential to occur, works associated with that activity would cease immediately.

#### Determine the scale of the incident

Any personnel who identifies an incident will assess whether it can be contained locally to minimise the risk to personal health and safety and the environment.

#### Call emergency services

Where an incident cannot be contained locally, emergency services will be contacted immediately. Section 4.5 of this CEMP lists the contact details for relevant emergency services.

#### Contain the Incident

In the event of an environmental incident, all necessary actions will be undertaken to contain and minimise the impact of the incident on the environment. Emergency response equipment including fire extinguishers and spill kits will be provided on site during construction and will be kept in a readily accessible location that is clearly signed.

#### **Notify Supervisor**

The Project Supervisor will be notified of any incident as soon as practicably possible. The Project Supervisor will in turn notify the Project Manager of the incident.

#### **Report Incident**

Part 5.7 of the POEO Act 1997 requires that where an incident has caused or is threatening to cause material harm to the environment, each relevant authority is to be immediately notified of the incident and all relevant information. In notifying the authorities, the following information is to be provided:

- The name of the operator, including their registration certificate number
- The time, date, nature, duration and location of the incident
- The location of the place where the pollution is occurring or is likely to occur
- The name and telephone number of a designated contact person



- The nature, the estimated quantity or volume and the concentration of any pollutants involved, if known
- Persons involved and the circumstances in which the incident occurred
- The suspected cause of the release
- The results of any monitoring performed in relation to the release
- Actions taken to mitigate any environmental harm caused by the release
- Proposed actions to prevent a recurrence of the release.

Under Part 5.7 of the POEO Act 1997, the term 'relevant authority' includes the appropriate regulatory authority, the NSW EPA, the Ministry of Health, Safe Work NSW and NSW Fire and Rescue. This part of the Act also defines the meaning of material harm to the environment to be that which involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or which results in actual or potential loss or property damage of an amount, or amounts in aggregate exceeding \$10,000.

#### Initiate Clean-up

The Project Supervisor will be responsible for implementing and overseeing the clean-up and rehabilitation process which will be undertaken in a timely manner.

#### **Record Incident**

All environmental incidents will be recorded and investigated by the Project Manager. The Project Manager will review the incident detailing how and why the incident occurred, the severity of the incident, the effectiveness of the rectification works carried out, recommendations to prevent a repeat of the incident. The learnings of the investigation are to be communicated throughout the worksite through toolbox meetings.

Following any environmental incident, near miss or non-compliance, additional training will be provided to all necessary personnel to ensure that the incident is not repeated and that lessons learnt from the experience are shared.

All emergency response equipment such as spill kits, Safety Data Sheets, first aid supplies and firefighting equipment will be located within Daracon Group's main site office at the entry to the subdivision site. Attachment D highlights the location of the subject site in relation to the site office. Attachment D also shows the location of environmentally sensitive areas and environmental controls that have been established by Daracon Group as part of the overall project. Given that the wastewater treatment plant is a component of works within the overall residential development, these controls are directly applicable to these works



### 4.6 Emergency Contacts

#### Table 4.1: Emergency contact details.

Issue	Contact	Number
Fire and Rescue	Emergency Services	000 or 112 (from
		a mobile)
	Swansea Fire Brigade	02 4972 1040
	RFS	000 or 112 (from
		a mobile)
Ambulance	Emergency Services	000 or 112 (from
		a mobile)
Police	Emergency Services	000 or 112 (from
		a mobile)
	Swansea Police Station	131444
OHS	Work Cover / Safework NSW	131050
Air pollution	NSW EPA	131555
Chemical spills	Fire and Rescue	000 or 112 (from
		a mobile)
	NSW EPA	
		131555
Environmental contamination	NSW EPA	131555
Threatened species incidents	Office of Environment and Heritage	131555
Illegal vegetation clearing	Office of Environment and Heritage	131555
Cultural Heritage Finds/Matters	Office of Environment and Heritage	131555
Injured or orphaned wildlife	WIRES	1300 094737
Noise pollution	NSW EPA	131555
	Lake Macquarie Council	02 4921 0333
Waste contamination	NSW EPA	131555
Illegal dumping	Lake Macquarie Council	02 4921 0333
Oil Spills	Fire and Rescue	000 or 112 (from
		a mobile)
Electricity	Endeavour Energy	131003
Health Incidents	Hunter New England Local Health District	000 or 112 (from
	Emergency	a mobile)
	Non-Emergency – Health Direct Australia	1800 605 172
Non Indigenous Heritage Items	Heritage Council	02 9873 8500
Daracon Group Wallsend Office	Work Hours	02 4903 7000
	After Hours (Security – Peter Burke)	02 4991 2205
Project Manager	Phil Raftos	0447374539
Client Representative	Nick Jackman	02 83021407
Project Supervisor	Jason Cherry	0407 960 275
HSEQ Coordinator (Enviro)	Anthony Brown	0408 217 743



## Section 5 – Environmental Management

The following mitigation measures are to be implemented throughout the project to ensure that the environmental impacts of the development are minimised. Weekly monitoring will be undertaken to ensure that the mitigation measures identified in this section are being implemented and maintained. Where mitigation measures are not being implemented or maintained and which is giving rise to adverse environmental impacts, or non-conformance with the CEMP, approvals or legislation, construction works will stop immediately.

#### 5.1 Erosion and Sediment Management

#### Management Objective

To prevent erosion and sediment runoff from the site during construction and to maintain water quality in the receiving waterways.

#### Impact Assessment

The proposed works would require the disturbance of soils which could potentially lead to erosion, siltation, and the degradation of aquatic habitat within nearby waterways.

- The provision of soil erosion and silt controls on the site will be in accordance with Council's Development Control Plan No 1 Volume 2 – Engineering Guidelines in particular Part 1 Design Specification D7 Erosion Control and Stormwater Management
- Prior to the commencement of work on site, all erosion and sediment control measures will be installed and operational, including the provision of a 'shake down' area at the entrance to the site
- Where practicable, construction works will be staged to minimise the areas of disturbance
- All erosion and sediment control measures will be inspected weekly and within 24 hours of a major rainfall event to ensure that they are maintained in proper working order during the construction period
- All erosion and sediment controls will be cleaned out if filled to 50-60% capacity.
- Clean surface water will be directed away from areas of soil disturbance and material stockpiles
- Any stockpile sites will be sited outside of drainage flow paths and protected with sediment fencing
- Any fuels and chemicals kept on site will be stored in bunded areas away from drainage flow paths
- Works will stop if necessary when unsuitable working conditions are encountered, such as during and after heavy rain
- In the event that significant tracking of mud and soil occurs on adjacent roads, cleaning of the road will be undertaken as soon as practicable
- If acidic soils are identified onsite, improvement through the use of liquid lime is to occur as directed by consulting geotechnical engineer
- Disturbance onsite will be minimised by clearly marking boundaries and designating areas for construction activities and traffic movements
- Drainage system outlets will be directed to temporary or permanent retention basins



- Exposed surfaces will be stabilised as soon as possible by hydro mulching or other means, including mulch and seed
- Silt fencing will be erected along batter slopes, stockpiles, and any disturbed surfaces that may drain into any adjacent water bodies and stormwater systems
- Sandbags and other sediment controls shall be installed around stormwater inlets and outlets to prevent dirty discharge from works area entering stormwater systems
- Trucks transporting materials shall be inspected before leaving or entering the site to prevent spillage of soil and other materials on roads and footpaths

#### 5.2 Flora and Fauna Management

#### Management Objectives

To manage potential impacts to flora and fauna during construction and ensure that construction activities do not extend beyond the approved footprint. The implementation of mitigation measures will ensure that vegetation not approved from removal is not damaged during construction works.

#### Impact Assessment

Vegetation clearing permitted under Project Approval MP10\_0204 and the EPBC Act referral 2012/6382 has been previously carried out therefore the subject site is currently clear of vegetation. Notwithstanding, significant areas of vegetation are present immediately adjacent the site, however, these will remain outside the construction footprint.

#### Mitigation Measures

#### Flora

- The designated construction zone and boundary between the site and National Parks Wildlife land is to be clearly marked via high visibility fencing, sediment fencing and/or signage identifying that no construction activities (including temporary storage, stockpiling, vehicle movement etc.) are permitted beyond prior to commencement of an works
- All trees and vegetation required to be retained under the overall subdivision approval MP10\_204 are to be protected during works. Where necessary, vegetation will be protected by the erection of a 1.8m high chain wire interlocking fence in accordance with Australian Standards AS4970-2009 Protection of Trees on Development Sites
- All plant and equipment used on site will be cleaned completely free of soils, seeds and vegetative material before entering and leaving the site to prevent the spread of exotic plant species and pathogens. All vehicles and machinery will be inspected prior to site entry and those failing inspection will be sent away for cleaning
- No clearing of vegetation or storage of vehicles or machinery, waste, fill or materials or unauthorised access will occur within the fenced tree protection areas.
- Trees which contain hollows are to require specialist removal as outlined the Flora and Fauna Management Plan
- Stockpiles will be placed away from vegetated areas and drainage lines.
- On completion, the site will be restored in accordance with the specifications.
- Protected areas shall be monitored for compliance daily
- Weekly site inspections shall monitor vegetation impacts and record details.



#### Fauna

- In the event that any threatened species, populations, ecological communities or their habitats are detected during operations where there is a high likelihood of negative impact, appropriate plans of management for those species will be formulated to the satisfaction of Council's General Manager or delegate, and/or the NSW Office of Environment and Heritage. No further site works will take place until the plan of management is approved
- The construction area will be inspected daily so as to ensure that no fauna are trapped, injured or stranded at the site, or have inadvertently utilised the site as a temporary habitat. If fauna species are identified fauna is to be managed in accordance with the wildlife management strategy and the Flora and Fauna Management Plan
- Following inspection by representatives of Daracon Group, areas of existing trees, significant
  vegetation and animal habitats etc., required to be maintained, will be identified and marked to
  prevent adverse impacts.
- Sensitive areas include significant vegetation and animal habitats etc., required to be maintained, will be monitored during the work and records kept using the Site Environmental Inspection Report
- In the event that injured wildlife is encountered on the site WIRES will be contacted on 1300 094 737.

#### 5.3 Noise Management

#### Management Objectives

To manage noise from construction activities and to ensure that noise generated during construction does not negatively impact on the surrounding environment.

#### Impact Assessment

During construction an increase in ambient noise levels at the site is anticipated as a result of construction activities and from plant and equipment. Notwithstanding, an assessment of the construction noise impacts on surrounding sensitive receivers has determined these impacts to be within all applicable noise criteria during standard and outside construction working hours.

- Noise from the construction site (as measured by LA10(15 minute) descriptor) will not to exceed the background LA90 noise level by:
  - For construction period of 4 weeks and under, not more than 20dBA
  - For construction period greater than 4 weeks but not exceeding 26 weeks, not more than 10dBA; and
  - For construction period greater than 26 weeks, not more than 5dBA
- General construction works will only take place within the approved hours of 7.00am 6:00pm Monday to Fridays, 8:00am – 1:00pm Saturdays, with no works on Sundays or Public Holidays
- Any rock breaking, rock hammering, sheet piling, pile driving and any similar activity will be undertaken between 9:00am to 12:00pm and 2:00pm to 5:00pm Monday to Friday, and 9:00am to 12:00pm on Saturday
- Wherever practical, and where sensitive receivers may be affected, piling activities will be completed using bored piles. If driven piles are required they will only be installed where approved in a Construction Noise and Vibration Management Plan



- No more than four consecutive nights of high noise and/or vibration generating work may be undertaken over any seven-day period unless otherwise approved by the applicable Local Authority
- All reasonable steps will be taken to muffle and acoustically baffle all plant and equipment associated with the development
- All plant, equipment, and vehicles used on site will be well maintained and in good working order. This includes inspections of the condition and performance of mufflers
- Less noise intensive equipment will be used where reasonable and feasible
- Unnecessary revving of engines will be avoided at all times
- Plant and equipment which are used intermittently will be shut down when not in use.
- The noise level generated by plant and equipment on site would comply with limits sets by AS2436 (Guide to noise control on construction, maintenance and demolition sites)
- Where possible, plant and equipment will be located as far away as possible from sensitive receivers and orientated to direct noise away from sensitive receivers.
- Non-tonal reverse alarms will be used only. Where possible delivery and haulage trucks will organised so that they only drive forward to avoid the use of reversing alarms
- Where possible, equipment operations will be organised and scheduled to limit the noisiest machines from operating simultaneously
- Truck drivers will be informed of site access routes, acceptable delivery hours and must minimise extended periods of engine idling.

#### 5.4 Air Quality and Dust Management

#### Management Objective

To minimise dust generation during construction and to ensure that the air quality in the surrounding area is not impacted as a result of the works.

#### Impact Assessment

Air quality in the locality would be expected to be very good given its proximity to the coastline and the relatively undeveloped nature of the region with a lack of polluting industries in the immediate vicinity.

Construction works will have the potential to create minor reductions in localised air quality at the site primarily associated with wind-blown dust caused by excavations and vehicle movements as well as exhaust emissions from plant and machinery.

- All construction activities that generate dust will cease when average wind speeds exceed 15m/s (54km/h). Onsite wind speed will be monitored using a hand held wind monitor to determine if works are required to cease
- Physical barriers will be erected at right angles to the prevailing wind direction or shall be placed around or over dust sources to prevent wind or activity from generating dust emissions
- All stockpiles, exposed areas, unsealed trafficable areas and compound areas will be wet down as required to minimise wind-blown and traffic generated dust. Wetting down of these areas should not be done to the extent that run-off occurs
- All stockpiles and exposed areas will be covered where practicable (using plastic, mulch, hydromulch, dustex etc.)



- All disturbed areas will be stabilised as soon as practicable to prevent or minimise wind-blown dust
- Equipment used on site shall not emit visible exhaust fumes for no more than 10 seconds after power has been applied
- No burning or open fires will be permitted on site
- Construction plant and traffic will be confined to defined haul roads and work areas through signage and barriers to minimise vehicle movements on exposed areas
- Trucks leaving the site are to ensure their loads are covered to eliminate dust during transport
- All waste material will be stored and handled in a manner that prevents any dust emissions
- Avoid conducting excavations and earthworks during high wind conditions
- Install shaker pad at site entrance/exit
- Continual visual monitoring will be undertaken by the Project Supervisor.

#### 5.5 Vibration Management

#### Management Objective

To minimise and prevent nuisance and damage to property as a result of construction vibration activities.

#### Impact Assessment

Construction works may potentially require the use of vibratory equipment for the compaction of soils and the installation of piles. Given the current separation of the site from any buildings, these works are unlikely to result in any significant impacts as a result of vibration.

#### Mitigation Measures

- Vibration resulting from construction of project will not exceed the evaluation criteria presented in the Environmental Noise Management Assessing Vibration: A Technical Guide (DEC, 2006)
- Vibratory compactors must not be used closer than 30 metres from residential buildings unless vibration monitoring confirms compliance with the vibration criteria specified in the DEC Technical Guide referred to above.

#### 5.6 Public Safety

#### Management Objective

To ensure that the safety of the public is maintained at all times throughout the construction phase of the development.

#### Impact Assessment

The risk to public safety during construction is generally considered to be low given the site is located within a construction site removed from residential areas.



#### Mitigation Measures

- Hoarding or a safety fence is to be erected between the work site and any public place in accordance with Work Cover Authority requirements for the duration of the project
- Access to the site will be limited to construction workers and staff only. Public access will not be permitted onto the site
- Where construction works occur on or adjacent public roads, parks, or drainage reserves, warning signs, lights, barriers and fences will be provided and maintained in accordance with Australian Standard AS1742: Manual of Uniform Traffic Control Devices.

#### 5.7 Workplace Health & Safety

#### Management Objective

To ensure the safety of all personnel is maintained during construction and to minimise the risk of accidents or incidents.

#### Impact Assessment

Given the nature of the works proposed there is a level of risk to the health and safety of workers undertaking construction activities. This level of risk however, will be managed through the implementation of the range of mitigation measures listed to ensure the safety of personnel undertaking the works.

- Works will not commence until the Project Manager has prepared and put in place a Site-Specific Safety Management Plan and Safe Work Methods in accordance with:
  - Occupation Health and Safety and Rehabilitation Management Systems Guidelines, 3rd Edition, NSW Government, or
  - Australian Standard AS4804 Occupation Health and Safety Management Systems General Guidelines on Principles Systems and Support Techniques
  - Work Cover Regulations 2000
- All activities on site will be undertaken in accordance with the Site-Specific Safety Management Plan and Safe Work Methods to ensure that risks to the environment and the safety of workers and the public are identified and managed
- All workers will be required to wear protective clothing at all times and use appropriate personal protective equipment (PPE) where necessary
- The construction site will be maintained in a clean and safe condition at all times. The site safety officer will monitor the site on a daily basis and if he/she finds anything less than satisfactory then work will be stopped and the item will be addressed immediately
- Any demolition works at the site will be carried out in accordance with the provisions of Australian Standard AS2601: The Demolition of Structures and to the relevant requirements of the WorkCover NSW, Work Health and Safety Regulation 2011.



#### 5.8 Waste Management

#### **Management Objective**

To minimise the volume of waste generated by the development and to ensure that it is disposed of in an appropriate manner that does not impact upon the surrounding environment.

#### Impact assessment

Waste generated as a result of the development should not be excessive and will be recycled or reused on site where possible. During construction the following waste materials are likely to be generated as a result of the development:

- Excess spoil not suitable for reuse on site
- Construction materials
- Packaging materials
- Bitumen and concrete
- General site rubbish.

- The site shall be kept clean and tidy at all times
- Excess spoil would be reused on site where suitable. Any excess spoil to be removed from site will be classified in accordance with the Protection of the Environment Operations (Waste) Regulation 2005 (POEO (Waste) Reg.) and taken to an approved fill site
- Separate waste and recycling bins will be provided on site for the removal of workers and building rubbish
- All reasonable efforts will be made to avoid and minimise waste and to reuse or recycle where possible
- Debris from the site will at all times be disposed of at an approved waste management facility
- Arrangements will be made with a private contractor for the regular collection and disposal of all waste materials from site (both recyclable & non-recyclable)
- The Project Supervisor will be responsible for communicating directly with the private contractor to ensure that this task is regularly completed and that the site remains both clean and safe
- At no time will any combustion of waste material be undertaken on site
- All waste bins on site will have self-closing lids preventing waste from being airborne
- Waste bins will not be overfilled with waste and will be compacted as much as possible before disposal
- Any potentially contaminated, stained or odorous material will be stockpiled within an on-site containment area and covered pending testing by a suitably qualified professional
- All personnel working on the site will be educated as to the importance of recycling and waste reduction.
- Waste concrete shall be segregated, recycled or re-used in the following ways:
  - o Crushed and used as fill on site
  - Transported to a licensed recycling facility
- Chemical and contaminated waste shall be disposed of through an approved and licensed facility
- Removed native vegetation shall be separated from the general construction waste stream, mulched, and stockpiled for reuse.



• Any mulch or green waste containing weeds is to be stockpiled separately and appropriately disposed of.

- Office waste paper will be recycled and reused where possible.
- Waste monitoring will be recorded during the daily environmental inspection
- All staff should re-use office paper which shall be kept in a suitable container near the office photocopier. Excess waste paper shall be recycled through a licenced operator
- Waste cardboard including packaging materials made of cardboard shall be stored separately and included with excess waste paper for recycling
- A separate facility shall be installed to contain the waste until it can be removed by a licenced operator. Where possible, project personnel are encouraged to operate a separating system whereby different metals are collected in different bins
- Pallets still in reasonable condition (ie only one or two broken pieces of timber) are to be placed in a designated storage area to await collection by the supplier. Pallets with one of the main bearers damaged are not to be saved for repair but are to be disposed of in landfill
- A collection site shall be established for drums containing oils, greases and similar waste. All drums of oil are to be securely sealed and labelled with an appropriate sticker showing origin, date, type of oil (i.e. transformer, turbine or sump)
- Asbestos shall be managed as per Site Remediation Action Plan (RAP) which details actions to be employed if asbestos products are discovered within the course of the works
- Trees defined as greater than 5m in height and 250mm in diameter shall be demolished, chipped and stockpiled on site for later reuse as mulch. Chipped pieces shall be no larger than 75 x 50 x 15mm
- All shrubs defined as less than 5m in height and 250mm in diameter together with other sundry vegetation including roots, stumps and fallen timber shall be removed from site
- Trees will be mulched onsite and reused as mulch for construction and landscaping purposes
- Putrescible waste (also known as mixed waste) including food scraps and green waste shall be disposed of as normal garbage via the use of waste skips.
- Asphalt that is recovered from road milling is stockpiled at designated sites and re-used as road base or as temporary diversion works. Excess asphalt from road surfacing is returned to the supplier for reprocessing and use elsewhere.
- The Project Supervisor will undertake a site walkover following the completion of works and prior to demobilisation to identify any waste present on the site to be removed.

#### 5.9 Hazardous/Dangerous Material

#### Management Objectives

To minimise risks towards site personnel and to prevent contamination of the site as a result of hazardous or dangerous materials.

#### Impact Assessment

The use of hazardous and dangerous materials may be required during construction which could have the potential to result in contamination of the site and cause harm to site personnel.

#### Mitigation Measures

• Where stored on site, fuels, chemicals and dangerous goods will be kept in a bunded area with capacity to contain at least 120% of the quantity of the material being stored



- A spill kit will be kept on site at all times in a clear and easily accessible location
- All hazardous materials being used or stored on site will have their Material Safety Data Sheets (MSDS) kept in a clear and easily accessible location
- Appropriate PPE will be worn at all times when handling or using chemicals in accordance with the MSDS
- Where a spill occurs on site the environmental incident procedure described in Section 4.4 of this CEMP will be followed. Records of the incident will be maintained recording the volume, type, time, date, and remedial actions taken of the spill. Photographs will also be recorded
- All hazardous or dangerous materials that are to be removed from site will be done so in accordance with the Australian Standard and Regulations
- High risk activities such as refuelling and machine servicing will be done in designated sealed and bunded areas only, and not in the vicinity of any waterways or other environmentally sensitive areas
- All construction materials will be correctly stored in appropriate locations to prevent any leachate or hazardous materials migrating into adjacent waterways
- All machinery to be inspected daily and any leaks immediately repaired
- Waste products will be assessed and categorised as contaminated or non-contaminated and disposed of accordingly
- If contaminated material is encountered then it will be monitored for each type of material and the method of disposal recorded in the Contaminated Material Register
- All hazardous materials will be removed from site and correctly disposed on completion of the works.

#### 5.10 Traffic Impacts

#### Management Objective

To minimise impacts to traffic movement on the surrounding road network as a result of construction activities.

#### Impact Assessment

Construction of the project will require a small amount of labour that would require daily transport to the site. Additionally transportation of materials would be required throughout the project which would involve trucks travelling to and from the site for the majority of the construction period. This additional traffic however, will not impose a significant load on the existing local road network. Where impacts with traffic are anticipated, traffic management will be employed to ensure the safety of both construction workers and road users.

- All loading and unloading operations will be conducted within the internal construction zone to alleviate the need for lifting materials from off the street
- For occasions where site works will impact upon the surrounding road network, traffic management will be provided in accordance with an approved traffic management plan
- All traffic control will be carried out by trained personnel.
- Traffic control measures such as barriers, signage and line marking will be installed to ensure the safe passage of non-construction traffic.



- Truck control on the site will be appropriately signed (e.g. travel routes, speed limits) to ensure a controlled operation
- Where possible, trucks are to enter only via Montefiore Street.
- Emergency vehicle access shall be maintained along Montefiore Street, Daracon has consulted with emergency services regarding access to site.
- Access into and out of the site will be via the nominated points shown in the Traffic Management Plan.
- All public roadways adjacent to the site shall be maintained free of construction material
- Trucks leaving site will cover their loads where there is a potential to generate dust, and have tailgates closed
- The use of mobile phones is banned on this site whilst operating machinery.
- Travelling lanes adjacent to the site shall be regularly swept to ensure pavements are kept clean and safe.
- Shaker pad on exit will be maintained to ensure wheel cleanliness
- Vehicle parking for construction workers and site employees will take place on site within the internal construction zone
- Works which would result in considerable traffic delays would be avoided during peak travel periods.
- Monitoring of the traffic control measures to ensure their effectiveness and compliance with Traffic Management Plan is to be carried out by the Project Supervisor and recorded in the daily or weekly Inspection

#### 5.11 Aboriginal Cultural Heritage

#### Management Objective

To prevent damage or harm to items of aboriginal cultural significance in the event that they are discovered during construction.

#### Impact Assessment

The construction footprint exhibits a moderate level of disturbance from past and current land uses. Given the level of disturbance at the site it is unlikely that the works footprint would be of archaeological value or reveal archaeological artefacts.

- Site inductions and training will ensure all staff are aware of the correct procedures to be taken should an item of heritage significance be uncovered during the works
- If an Aboriginal object or objects, or any cultural heritage material is identified during the project, all works will stop immediately and the OEH will be notified. A temporary fence will then be erected around the site with a buffer zone of at least 10m created around the known edge of the area
- If human remains are found during the project works, then all works shall cease immediately to
  prevent any further impacts to the remains. The area must be secured within an exclusion zone
  to prevent unauthorised access and the remains themselves should be left untouched. The
  nearest police station (Toukley), the Darkinjung Local Aboriginal Land Council and the OEH
  Regional Office (Newcastle) must be informed as soon as possible



- An appropriately qualified archaeological consultant will be engaged to identify the material and it may be necessary to apply for an AHIP. The National Parks and Wildlife Act requires that, if any person finds an Aboriginal object on land and the object is not already recorded on AHIMS, they are legally bound under Section 89A of the Act to notify OEH as soon as possible of the object's location
- If the material is found to be of Aboriginal origin, the Aboriginal community is to be consulted in a manner as outlined in OEH guidelines: Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010)
- Work may only resume after agreement is reached between all notified parties
- In dealings with Aboriginal Human Remains, the proponent will use respectful language, bearing in mind that they are the remains of Aboriginal people rather than scientific specimens
- If Aboriginal cultural materials are uncovered as a result of development activities, they are to be registered as sites in the Aboriginal Heritage Information Management System (AHIMS) managed by the OEH. Any management outcomes for the site shall be included in the information provided to AHIMS
- All reasonable efforts will be taken to avoid any impacts on Aboriginal Cultural Heritage values at all stages during construction. If impacts are unavoidable, mitigation measures will be negotiated between the proponent, OEH and the Aboriginal community.

#### 5.12 European Cultural Heritage

#### Management Objectives

To prevent damage or harm to items of European cultural significance in the event that they are discovered during construction.

#### Impact Assessment

The construction footprint is located within a moderately disturbed area and it is unlikely that relics of European cultural significance would be impacted by the development.

#### Mitigation Measures

 If any item is found which is thought to be a relic work will stop and the item will be demarcated. Council's Project Manager, in consultation with Council's Environmental Scientist, shall perform an in-situ heritage assessment by completing the NSW heritage assessment criteria to determine whether the item is a relic. This assessment could also be assisted by a qualified heritage consultant. In the instance the item is concluded to be a relic, the Project Manager will notify the NSW Heritage Council as soon as practical. The NSW Heritage Council will advise the appropriate course of action to be taken concerning management of the item and heritage impact assessment requirements. Such advice should be in writing if possible or a File Note completed containing all relevant details.



#### 5.13 Community Consultation Management

#### Management Objectives

To provide information to those most likely to be affected by project works and to establish an effective public participation process.

#### Impact Assessment

Stakeholders most likely to be affected by construction works and upon which consultation is targeted includes:

- Adjoining land owners The expectation of adjoining land owners is minimal impact from project works, ready availability of information and ready access to site managers should problems arise
- Statutory Authorities The expectation of statutory authorities is policy and approvals compliance
- Service Providers The expectation of service providers is that their requirements be considered and their infrastructure, and infrastructure capacity, not be compromised by works or project outcomes.
- Community Croups Depending on the objectives of the group they may, or may not, have an interest in the project.
- Local Businesses There may be interest in business opportunities arising from the project
- Site workers The project workers and contractors become local stakeholders through site induction processes and the ongoing application of environmental management requirements.

- Community consultation will be carried out in accordance with the Catherine Hill Bay Residential Subdivision Project Consultation Plan prepared by ADW Johnson Pty Ltd. Consultative actions would include:
  - Contact Persons Contact persons will be nominated from Daracon Group and as otherwise required. Stakeholders will be encouraged to raise matters of concern with the contacts
  - Website The website will be updated prior to commencement of works to provide a library of project information including project approvals, management plans, works scheduling, and the minutes of community meetings.
  - Community meetings will be held (as part of overall subdivision construction works) to provide formal and public access to project management.
  - Signage The work site will have prominently displayed signs providing project information such as contact names, phone numbers and emergency numbers
  - Mail Postal services or email will be used to contact stakeholders
  - Complaints Process The complaints process will provide for a rapid investigation and response to problems by project management
  - News Media Notices may be published in local newspapers to advise of project events and milestones
  - Fact Sheets Fact Sheets may be prepared to provide project information to the public
  - Direct Contact From time to time stakeholders may be contacted directly by project personnel.



## Section 6 – Monitoring and Reporting

#### 6.1 Environmental Monitoring

Environmental monitoring of the construction site will be undertaken on a weekly basis to ensure that the environmental controls are being implemented and maintained and that the requirements of this CEMP and any permit conditions are being met. Environmental monitoring will address each of the environmental aspects addressed in this CEMP including:

- Erosion and sediment controls
- Flora and Fauna controls
- Air quality and dust management
- Noise management
- Waste management
- Health and Safety.

The outcome of weekly inspections and monitoring will be tabled and reviewed at internal project meetings to highlight where monitoring results indicate that environmental controls are working well, could be improved, or are not working. This information will also be used to inform reviews of the CEMP at a pre-set frequency of every three months and updated if required. In addition, the monitoring results will also be used to identify any non-compliance with management objectives of the CEMP or permit and license conditions. Where non-conformance is identified, corrective actions will be implemented to address these matters and to minimise the potential for non-conformance in the future.

#### 6.2 Corrective Actions

Where environmental monitoring identifies non-conformance with any of the objectives of the CEMP or conditions of consent, corrective actions will be implemented within 24 hours to address the issue.

Directions on any corrective actions to be implemented are to be given by either the Project Supervisor or Project Manager. Any directions given are to clearly detail the actions needed to resolve the issue, any measures to be implemented to prevent reoccurrence of the incident, timeframes for corrective actions to be completed and identification of who is responsible for undertaking and closing out the corrective action.

Any non-conformance and corrective actions implemented are to be recorded and details kept on site.

#### 6.3 Maintenance of Records

The following records will be maintained on site in a readily accessible location throughout the project:

- This CEMP
- Any approvals, licences and permits
- Correspondence with regulatory authorities
- Environmental monitoring results and audit results
- Induction and toolbox training records
- Environmental accidents/incidents/emergency reports



- Non-conformances and corrective actions lists
- Environmental compliance reports
- A list and details of any complaints
- Waste reports
- Any relevant reports submitted to regulatory agencies
- Environmental reports.

#### 6.4 Environmental Reporting

An environmental report will be prepared on a monthly basis to summarise the results of weekly monitoring. The monthly report is to be provided to the Project Manager (or other suitably senior person) for consideration. Information to be included in the monthly report should include:

- A status of environmental activities
- Complaints, infringements and penalties
- Status and details of any non-conformances and corrective actions
- Effectiveness and adequacy of the CEMP.



## Section 7 – Risk Assessment

Work Activity	Impact	Legal Instrument or Code	Likelihood	Consequence	Initial Risk Ranking	Control Measure	Responsible Person	Likelihood	Consequence	Revised Risk Ranking	Monitoring Strategy
Water											
Excavation	Dirty surface water discharge into stormwater system and / or natural watercourse	NSW Protection of the Environment Operations Act (1997) Australian Water Quality Guidelines for Fresh and Marine Waters, ANZECC, 2000. Managing Urban Stormwater: Soils and Construction Vol 4 (LANDCOM) (Blue Book). Lake Macquarie Council Development Control Plan No.1 Volume 2 – Engineering Guidelines - Part 1 Design Specification D7 Erosion Control and Stormwater	A	2	High	Implement and maintain sediment control barriers / silt fencesStabilisation of exposed excavationsAppropriate storage of stockpilesEstablish surface water diversion structures around loose materials and stockpilesStage construction works to minimise areas of disturbanceInstall shaker pads at site access	Project Quality Representative	С	2	Medium	Ensure sediment and drainage controls remain effective through regular inspections and maintenance Review Data provided by Client of Water quality
Re-fuelling of plant and vehicles Handling of hazardous materials and substances	Possible groundwater contamination	NSW Protection of the Environment Operations Act (1997) Australian Water Quality Guidelines for Fresh and Marine Waters, ANZECC, 2000. DEC groundwater guidelines; DEC chemical storage and spill	С	2	Medium	Monitoring of contaminants to be conducted by Cardno Geotech Solutions. Minimise further migration of contaminants to groundwater by removal and remediation of contaminants as per Remediation Action Plan Implement surface water diversions around source materials Where stored on site, fuels, chemicals and	Project Manager	D	2	Medium	On-going monitoring of groundwater contaminant concentrations by Cardno Geotech Solutions as part of the overall approval for the subdivision



Work Activity	Impact	Legal Instrument or Code	Likelihood	Consequence	Initial Risk Ranking	Control Measure	Responsible Person	Likelihood	Consequence	Revised Risk Ranking	Monitoring Strategy
						dangerous goods will be kept in a bunded area with capacity to contain at least 120% of the quantity of the material being stored					
Air	1						1				I
Excavation	Particulate matter (dust, smoke) exceeds EPA guidelines	NSW Protection of the Environment Operations Act (1997) NSW EPA Air Quality Guidance Notes – Construction Sites.	С	2	Medium	Use watercart to minimise dust Carry out revegetation works to stabilise soil Reduce driving on areas other than defined roads and tracks Install shaker pads at site access Avoid working in high wind condition	Project Manager	D	2	Medium	Continuous visual observation of dust levels
Plant and vehicle movement	Air pollution and gas emissions from machinery and vehicles	NSW Protection of the Environment Operations Act (1997) NSW EPA Air Quality Guidance Notes – Construction Sites.	С	3	Medium	Maintain exhaust systems undertake regular Vehicle maintenance Avoid overloading trucks	Project Manager	D	3	low	Daily check of equipment Scheduled services and inspections
Plant and vehicle movement Excavation	Odour resulting from materials or operating equipment	NSW Protection of the Environment Operations Act (1997) NSW EPA Air Quality Guidance Notes – Construction Sites.	D	4	Low	Use of suppressants Exhausted storage of odorous materials Exhaust systems (equipment)	Project Manager	D	4	low	Daily check of equipment Scheduled services and inspections
Re-fuelling of plant and vehicles Handling of hazardous materials and substances	Emission of hazardous materials during storage / handling	NSW Protection of the Environment Operations Act (1997) NSW EPA Air Quality Guidance Notes – Construction Sites.	C	3	Medium	Where stored on site, fuels, chemicals and dangerous goods will be kept in a bunded area with capacity to contain at least 120% of the quantity of the material being stored A spill kit will be kept on site at all times in a clear and easily accessible location	Project Manager	D	3	low	Inspections of storage facilities Training



Work Activity	Impact	Legal Instrument or Code	Likelihood	Consequence	Initial Risk Ranking	Control Measure	Responsible Person	Likelihood	Consequence	Revised Risk Ranking	Monitoring Strategy
						All hazardous materials being used or stored on site will have their Material Safety Data Sheets (MSDS) kept in a clear and easily accessible location Appropriate PPE will be worn at all times when handling or using chemicals in accordance with the MSDS					
Flora and Fauna		-		· · · · ·					· · · · ·		·
Excavation Plant and vehicle movement	Damage to fauna	National Parks and Wildlife Act (1974)	C	2	Medium	Inspect construction site daily for trapped fauna Engage ecologist before commencing to assess presence of fauna Identify and establish areas to be protected and control access Define access tracks Provide boundary fencing around habitat trees and sensitive areas	Project Manager	D	2	Medium	Regular inspections to assess effectiveness of controls Relevant training / induction
Excavation Plant and vehicle movement	Damage to 'critical habitat'	Environmental Protection and Biodiversity Conservation Act (1999) National Parks and Wildlife Act (1974) Threatened Species Conservation Act (1995)	D	2	Medium	Identify and establish areas to be protected and control access Implement silt fences and silt traps Provide boundary fencing around habitat trees and sensitive areas	Project Manager	D	2	Medium	Regular inspections to assess effectiveness of controls Relevant training / induction of construction personnel



Work Activity	Impact	Legal Instrument or Code	Likelihood	Consequence	Initial Risk Ranking	Control Measure	Responsible Person	Likelihood	Consequence	Revised Risk Ranking	Monitoring Strategy
Excavation Plant and vehicle movement	Spread of noxious weeds	Noxious Weeds Act 1993	С	3	Medium	Follow Weed Management Plan Decontaminate plant & equipment prior to entering and leaving the site Use topsoil that is free of weed contamination Remove and dispose of weeds onsite according to guidelines/plan	Project Manager	D	2	Medium	Visual assessment Control spread and introduction of weeds Inductions / toolbox talks
Excavation Plant and vehicle movement	Endangered / protected species present	Environmental Protection and Biodiversity Conservation Act (1999) National Parks and Wildlife Act (1974) Threatened Species Conservation Act (1995)	С	2	Medium	Identify areas to be protected during inductions Inspect construction site daily for trapped fauna Establish 'no go' zones	Project Manager	D	2	Medium	Regular inspection and maintenance of controls Inductions / toolbox talks
Excavation Plant and vehicle movement	Endangered / protected ecological community present	Environmental Protection and Biodiversity Conservation Act (1999) National Parks and Wildlife Act (1974) Threatened Species Conservation Act (1995)	D	2	Medium	I Identify areas to be protected during inductions Inspect construction site daily for trapped fauna Establish 'no go' zones Install erosion and sediment controls	Project Manager	D	2	Medium	Regular inspection and maintenance of controls Inductions / toolbox talks



Work Activity	Impact	Legal Instrument or Code	Likelihood	Consequence	Initial Risk Ranking	Control Measure	Responsible Person	Likelihood	Consequence	Revised Risk Ranking	Monitoring Strategy
Heritage											
Excavation Plant and vehicle movement	Destruction of indigenous heritage	Native Title Act (1993) Aboriginal and Torres Strait Islander Heritage Protection Act (1984) National Parks and Wildlife Act (1974)	С	2	Medium	Induction to include Heritage information as per Aboriginal cultural Heritage Management Plan. Permit to destroy / remove [sect 90/87] under supervision of heritage consultant Establish 'no go' zone / control access	Project Manager	D	2	Medium	Inductions / toolbox talks Regular inspections of heritage safeguards
Excavation Plant and vehicle movement	Destruction of non- indigenous heritage	The Heritage Act (1977)	D	3	Low	Establish 'no go' zone / control access Dilapidation survey Community consultation	Project Manager	D	3	Low	Inductions / toolbox talks Regular inspections of heritage safeguards
Excavation	Unexpected find	The Heritage Act (1977) Native Title Act (1993) Aboriginal and Torres Strait Islander Heritage Protection Act (1984) National Parks and Wildlife Act (1974)	С	3	Medium	Cease work immediately in the vicinity of any potential artefacts / heritage objects Establish 'no go' zone Contact Office of Environment and Heritage and Heritage Consultant Initiate investigation	Project Manager	D	3	Low	Inductions / toolbox talks / training Regular inspections of heritage safeguards
Noise and Vibratio	on					·	1 1				
Plant and vehicle movement and / or operation Excavation	Noise levels exceed DECC guidelines	NSW Protection of the Environment Operations Act (1997)	C	3	Medium	Restrict working times Maintenance of equipment Sound proofing / damping Community consultation	Project Manager	D	3	Medium	Community complaints Noise measurements Daily checks of equipment and scheduled maintenance



Work Activity	Impact	Legal Instrument or Code	Likelihood	Consequence	Initial Risk Ranking	Control Measure	Responsible Person	Likelihood	Consequence	Revised Risk Ranking	Monitoring Strategy
Plant and vehicle movement and / or operation Excavation	Work undertaken adjacent to heritage / protected buildings	NSW Protection of the Environment Operations Act (1997)	D	3	Low	Install all necessary vibration reduction controls Carry out dilapidation surveys	Project Manager	D	3	Low	Establish monitoring program and carry out regular inspections to assess vibration impacts
Plant and vehicle movement and / or operation Excavation	Work undertaken adjacent to underground structures	NSW Protection of the Environment Operations Act (1997)	В	5	Low	Carry out dilapidation surveys Minimise duration and frequency of vibration generating activities where possible	Project Manager	D	5	Low	Establish monitoring program and carry out regular inspections to assess vibration impacts
Contaminated Soi	I / Water										
Excavation	Latent discovery of contaminated soil / water	Contaminated Lands Management Act 1997	С	3	Medium	Cease work immediately in the vicinity of any potential contaminated soil/water Establish a 'no go' zone Initiate investigation Identify extent and severity of the contaminated soil / water Reduce spread of contaminated materials by implementing surface water diversion structures and / or containment structures	Project Engineer	D	3	Low	On-going monitoring of adjacent soils and water to ensure controls remain effective
Plant and vehicle movement Re-fuelling of plant and vehicle Handling of hazardous materials and substances	Soil/water contamination from machinery, vehicles and road surfaces.	Contaminated Lands Management Act 1997 NSW Protection of the Environment Operations Act (1997)	С	2	Medium	Develop and implement Spill Management Plan/procedure Wash wheels Offsite or bunded maintenance and service areas Bunded/sealed working area Where stored on site, fuels, chemicals and dangerous goods will be	Project Manager	D	2	Medium	Inspections and maintenance of bunded working and service areas



Work Activity	Impact	Legal Instrument or Code	Likelihood	Consequence	Initial Risk Ranking	Control Measure	Responsible Person	Likelihood	Consequence	Revised Risk Ranking	Monitoring Strategy
Re-fuelling of plant and vehicle Handling of hazardous materials and substances	Soil or water contamination during storage/handling of toxic or volatile materials (e.g. fuel spills)	Contaminated Lands Management Act 1997 NSW Protection of the Environment Operations Act (1997)	C	2	Medium	kept in a bunded area with capacity to contain at least 120% of the quantity of the material being stored A spill kit will be kept on site at all times in a clear and easily accessible location All hazardous materials being used or stored on site will have their Material Safety Data Sheets (MSDS) kept in a clear and easily accessible location Appropriate PPE will be worn at all times when handling or using chemicals in accordance with the MSDS Bunded or offsite loading / refuelling zones Where stored on site, fuels, chemicals and dangerous goods will be kept in a bunded area with capacity to contain at least 120% of the quantity of the material being stored A spill kit will be kept on site at all times in a clear and easily accessible location All hazardous materials being used or stored on site will have their Material Safety Data Sheets (MSDS) kept in a clear and easily accessible location	Project Manager	D	2	Medium	Inspections and maintenance of storage facilities Training



Work Activity	Impact	Legal Instrument or Code	Likelihood	Consequence	Initial Risk Ranking	Control Measure	Responsible Person	Likelihood	Consequence	Revised Risk Ranking	Monitoring Strategy
						Appropriate PPE will be worn at all times when handling or using chemicals in accordance with the MSDS					
Excavation	Soil/water contamination from damaging underground services (e.g. sewer pipe)	NSW Protection of the Environment Operations Act (1997)	С	2	Medium – Potential Unknown buried services	Before any excavations, Dial-Before-You-Dig 1100 Mark out and record locations of services onsite Use hand tools in areas where location of services are not certain Implement measures to control and contain spills should any pipes be damaged Immediately notify service provider should any underground services be damaged	Project Manager	D	2	Medium	Ensure marking out and records of service locations are maintained
Waste, Recycling	and reuse					-					
Plant and vehicle movement Re-fuelling of plant and vehicle Handling of hazardous materials and substances Excavation	Soil & water contamination	NSW Protection of the Environment Operations Act (1997)	C	2	Medium	Where stored on site, fuels, chemicals and dangerous goods will be kept in a bunded area with capacity to contain at least 120% of the quantity of the material being stored A spill kit will be kept on site at all times in a clear and easily accessible location All hazardous materials being used or stored on site will have their Material Safety Data Sheets (MSDS) kept in a clear and easily accessible location	Project Manager	D	2	Medium	Inspections and maintenance of storage facilities Training



Work Activity	Impact	Legal Instrument or Code	Likelihood	Consequence	Initial Risk Ranking	Control Measure	Responsible Person	Likelihood	Consequence	Revised Risk Ranking	Monitoring Strategy
						Appropriate PPE will be worn at all times when handling or using chemicals in accordance with the MSDS					
	Disposal / increase land fill	NSW Protection of the Environment Operations Act (1997) Waste Avoidance and Resource Recovery Act (2001)	В	4	Medium	Provide separate waste and recycling bins Avoid and minimise waste. Reuse and recycle where possible Ensure regular disposal of waste	Project Manager	C	4	Low	Site licences

CODE	CATEGORY	DESCRIPTOR	-	-			-	1	-
Α	Almost certain	Event is a common site problem		A	в	С	D	E	F X
В	Likely	Event is known to occur at the site. It has happened here before	37	-	The state	100	1.00		H
C	Moderate	Event could occur at the site. It has happened elsewhere	1	4	2	4	7	11	1
D	Unlikely	Event is not likely to occur. I have not heard of it happening			-			10	ī.
E	Rare	Event is practically impossible here. It may occur in exceptional circumstances	2	à	3	8	12	16	7
Consec	uence					10		-	
CODE	CATEGORY	DESCRIPTOR	3	.0	9	13	11	20	1
1	Major	Premature close of the works. Loss of company credibility, media publicity							
2	Substantial	Incident which would result in prosecution, adverse local publicity and complaints	4	10	14	18	21	23	
3	Temporary	A reportable incident not likely to result in prosecution e.g.: a minor water discharge	5	15	19	22	24	25	
4	Minor	Minor effect on the environment, such as a non- reportable environmental incident e.g.: a minor oil spill							
5	Nil	No detrimental impact on the environment is measurable or envisaged							



Attachment A – Design Plans







5	2/10/2014	SITE LEVELS AMENDED	DAC	JMK	JMK
4	23/09/2014	SITE LEVELS AMENDED	DAC	JMK	JMK
3	30/07/2014	GENERAL AMENDMENTS	LJW	JMK	JMK
2	25/07/2014	GENERAL AMENDMENTS	LJW	JMK	JMK
1	13/06/2014	ISSUED FOR REVIEW	LJW	JMK	JMK
Rev	Date	Description	Des.	Verif.	Appr.



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SITE PLAN SCALE 1:500

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Drawn LJW	Date 28/07/2014	SOLO WA
Checked JMW	Date 28/07/2014	
Designed JMK	Date 28/07/2014	CIVIL ENGINE
Verified JMK	Date 28/07/2014	
Approved JMK	Date 28/07/2014	SITE PLAN

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ш	1	30/07/2014	ISSUED FOR REVIEW	LJW	JMK	JMK
Ř	Rev	Date	Description	Des.	Verif.	Appr.





Drawn LJW	Date 28/07/2014	SOLO WA
Checked JMW	Date 28/07/2014	
Designed JMK	Date 28/07/2014	CIVIL ENGINE
Verified JMK	Date 28/07/2014	
Approved JMK	Date 28/07/2014	GENERAL AR





Date

Description

Des. Verif. Appr.

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Drawn Date Client	SCALE 1:500 @A3
LJW 28/07/2014 SOLO WATER - CATHERINE HILL	BAY WATER UTILITY
Designed Date CATHERINE HILL BAY WASTE WATER TREATMENT PLANT	PRELIMINARY
JMK 28/07/2014 CIVIL ENGINEERING DESIGN	AHD Register Scale Size
JMK 28/07/2014	Drawing Number Revision
Approved         Date           JMK         28/07/2014         GENERAL ARRANGEMENT PLAN 2	82014058-02-C5005 3

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)	30/07/2014	AMEND CUT FILL TO MATCH DESIGN	LJW	JMK	JMK
	13/06/2014	ISSUED FOR REVIEW	LJW	JMK	JMK
ev	Date	Description	Des.	Verif.	Appr.



# MONTEFIORE STREET



CUT/FILL PLAN SCALE 1:500

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Solo Water Pty Ltd CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN V.3

Attachment B – Project Approval MP10\_0204

# **Modification of Minister's Approval**

Section 75W of the Environmental Planning & Assessment Act 1979

As delegate of the Minister for Planning and Infrastructure under delegation dated 14 September 2011, the NSW Planning Assessment Commission approves the modification application referred to in schedule 1, subject to the amended modifications in schedule 2.

Garry Payne AM Commission Member

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Jan Murrell Commission Member

Sydney	27 May 2013
	SCHEDULE 1
Project Approval:	MP 10_0204 granted by the Minister for Planning and Infrastructure on 13 May 2011
For the following:	Residential Subdivision at Catherine Hill Bay
Proponent:	Coastal Hamlets Pty Ltd
Modification No. :	MP10-0204 MOD 1
Modifications:	Subdivision of the Wallarah Heritage Precinct into two allotments comprising the Jetty Maser's Cottage on Lot 102 and Wallarah House on Lot 101.
	Modification of conditions to enable accredited certifiers to deal with/approve certain elements of the listed conditions and conditions that reference standards, and to allow flexible timing of implementation of certain conditions.
	Revised subdivision layout to adjust boundaries, road alignment and lot widths to suit the development types anticipated in the Catherine Hill Bay (South) DCP. No increase in lot yield.
	Minor vegetation removal for general maintenance purposes, to manage weeds, access and fire hazard reduction.
	Modify item B6 in the Statement of Commitments to undertake a community consultation program at least 3 months prior to the start of works.
	Correct minor misdescriptions and clarify the lapse date for the approval.

# 1. Modify Schedule 1 as follows:

# **SCHEDULE 1**

# PART A — TABLE

Application made by:	Coastal Hamlets Ptv Ltd
Application made to:	Minister for Planning
Major Project Number:	10- 0204
On land comprising:	Lot 100, 101,102, 103 and 106 DP 112872, Lot 1 DP 1141989, Lot 1, DP 1129299 and Lot 1, DP 1151628.
Local Government Area	Lake Macquarie
For the carrying out of:	Subdivision of land to create up to <del>540</del> <b>550</b> residential lots, 1 retail lot and <b>7 9</b> reserves, bulk earthworks <del>and</del> infrastructure <b>and including two heritage lots.</b>
Capital Investment Value	\$54.8M.
Type of development:	Project approval under Part 3A of the EP&A Act
Determination made on:	13 May 2011
Determination:	Project approval is granted subject to the conditions in the attached Schedule 2.
Date of commencement of approval:	This approval commences on the date of the Planning Assessment Commission's approval.
Date approval is liable to lapse	On or before 1 October 2016 unless the works associated with the subdivision (including remediation) are physically commenced. 5 years from the date of determination unless specified action has been taken in accordance with Section 75Y of the EP&A Act.

# 2. Modify condition A1 as follows:

# A1 Development Description

Project Approval is granted for the following works:

- Subdivision of the site into up to 550 residential lots, 1 retail lot and 7 9 lots for reserves, and including 2 heritage lots;
- Associated bulk earthworks;
- Infrastructure works including roads, drainage works and utility services provision;
- Landscaping works
- Subdivision of the Wallarah House precinct into two lots Wallarah House (proposed Lot 101) and Jetty Master's Cottage (proposed Lot 102).

# 3. Modify condition A2 as follows:

# A2 Development in Accordance with Plans and Documentation

The development shall be in accordance with the following plans, documentation and recommendations made therein:

Environmental Assessment Report – Catherine Hill Bay - Bulk Earthworks, Infrastructure and Staged Subdivision for Residential Development, including Appendices A-O, prepared by ADW Johnson Pty Ltd

and as amended by:

- Preferred Project Report MP 10/0204 prepared by ADJ Johnson Pty Ltd, including Appendices A-M;
- The Statement of Commitments; and
- The conditions of this approval, and in particular condition A7 and the amended subdivision plan.
- The amended boundaries in the two plans titled "Plans of Stage 1 and 1b and Plan of Stage 2 Comparison of Revised Road Layout" in the report prepared by ADW Johnson Pty Ltd dated October 2012, accompanying the Mod 1 Application.

# 4. Modify condition A7 as follows:

# A7 Amendments to Subdivision Plan

The subdivision plan is to be amended prior to the issue of a Construction Certificate for subdivision infrastructure to the satisfaction of the Planning Assessment Commission as follows:

# (a) Lots 1117, 1118, 1119 and 1120 are to be deleted and the residue allotment resulting from the proposed realignment of Hale Street is to be consolidated into one single allotment comprising the Wallarah House Presinct.

(a) The plan of subdivision of the Wallarah House Precinct is to provide for no more than two lots, generally in accordance with proposed Lot 101 and Lot 102 shown on Plan of Subdivision Ref 11688, Sheet 2 of 13, Version AB (06/08/2012) as revised on 19/09/2012 and be also subject to any re-aligned boundary of Hale Street.

# 5. Modify condition B5 as follows:

# B5 Construction Waste Management

(1) Prior to the issue of any Construction Certificate which involves works that create waste, the proponent shall submit a Waste Management Plan prepared by a suitably qualified person in accordance with Council's Development Control Plan 2005 for Council's or an accredited certifier's approval. An on site storage area for reuse, recycling and disposal of materials is to be provided during construction.

# 6. Add the following condition clause to condition B10, after paragraph (11) as follows:

- (12) Minor clearing and vegetation management may be carried out at any time subject to the following:
  - Minimal ground disturbance,
  - No removal of hollow bearing trees, EEC's or riparian vegetation,
  - No works within 20 metres of the adjoining conservation lands,
  - Disposal of waste in accordance with Condition B5,
  - No native trees over 3 metres in height can be removed unless the removal is in accordance with RFS requirements,
  - Non-weed propagating trees and shrubs which are felled shall be salvaged for re-use, either in branch form or as woodchip for erosion control and/or site rehabilitation, and
  - Notification of Council, including plans indicating the location and extent of the works, at least 2 weeks prior to commencement of any such works.

# 7. Modify condition B12(3)(g) as follows:

(g) Nest boxes are to be provided on a one for one basis for any natural hollow removed by the development and are to be constructed of appropriate durable materials. All nest boxes are to be erected *prior to the issue of a Construction Certificate prior to commencement of works* and at least one month prior to vegetation clearance on the site. The monitoring of nest boxes to determine their usage and to carry out repairs or replacement (as required) every six (6) months for a minimum period of three (3) years following erection. Monitoring reports are to be forwarded to Council after each monitoring event.

# 8. Modify condition B14(1) as follows:

# B14 Landscaping Plans

(1) Prior to the issue of a Construction Certificate for subdivision infrastructure works, a Landscape Master Plan, Landscape Design Report and Landscape Construction Plan and Specifications are to be prepared by a qualified landscape architect in accordance with the requirements of Section 2.7.2 of the Lake Macquarie Development Control Plan No 1. The Landscape Master Plan, Landscape Design Report, Plans shall be submitted to and approved by Council, following which the Landscape Construction Plan and Specifications may be certified by the Council or an accredited certifier as complying. The Plan is to include, but is not limited to the following:

# 9. Modify condition B18(1) and (2) as follows:

# B18 Roads - General

(1) Separate approval from the Roads Authority must be obtained under the Roads Act 1993 prior to the issue of a Construction Certificate for *any proposed new Council roads or* works within an existing Council road reserve. Design plans must be submitted to and approved by the Roads Authority prior to issue of the Construction Certificate.

(2) Additional civil works necessary to ensure satisfactory transitions to existing work as a result of work conditioned for the development are to be provided at no cost to Council. Design plans are to be approved by the Roads Authority *for any works within an existing road reserve* prior to the issue of a Construction Certificate.

# 10. Modify condition B24(1) as follows:

(1) All water and sewer works or works impacting on water and sewer assets are to be designed and constructed to the requirements of Hunter Water as the Water Supply Authority under the Water Management Act 2000. The requirements of Section 306 of the Water Management Act, 2000 apply to this development. The design plans must be submitted to and approved by Hunter Water prior to the issue of a Construction Certificate *for those works*.

# 11. Modify condition C8(2)(b) as follows:

(b) Erection of tree protection fencing is to be confirmed to Council's Development Ecologist in writing by the consultant arborist/ecologist prior to the *issue of a Construction Certificate, commencement of those works.* 

# 12. Modify Condition D1 as follows:

# D1 Certificate/remediation/engineering details

(1) An application for a Subdivision Certificate must be submitted to and approved by the Council/Principal Certifying Authority prior to registration of the plan of subdivision.

(2) The application *for a subdivision certificate creating residential lots* must be accompanied by evidence that an accredited EPA auditor has certified that the Remediation

Action Plan has been implemented and that the whole site which is the subject of this application is suitable for the proposed residential development.

(3) The application must also include documentation to demonstrate full compliance with all approval conditions in accordance with Section 157 Clause 2 (f) of the Environmental Planning and Assessment Regulations 2000.

Prior to the issue of a Subdivision Certificate *creating residential lots,* payment must be made to Council of contributions (as contained in the attached Schedule) under Section 94 of the Environmental Planning and Assessment Act and Council's Contribution Plan. Council's contributions are adjusted on 15 February, 15 May, 15 August and 15 November each year. The amount of the contributions will be adjusted to the amount applicable at the date of payment.

The following contributions are applicable to the proposed subdivision:

Facility	Levy Per Lot (current at date of writing)
Open space land acquisition	\$7,729
Recreation Facilities	\$5,793
Community Facilities – Capital	\$2,298
Community Facilities – Land	\$640
Management	\$176
Total	\$16,636

The next indexation is to occur on 15 May 2011. Agreements will need to be reached with Council regarding the provision of works in kind for any of these contributions.

(4) The obtaining of a Section 307 Certificate of Compliance under the Water Management Act 2000 for water and sewer requirements for the development from Hunter Water as the Water Supply Authority prior to issue of the Subdivision Certificate. All works for the development must be approved by Council prior to the issue of a Certificate of Compliance.

# 13. Modify condition D4(1) as follows:

(1) All road signage and pavement marking works must be provided in accordance with the plans approved by the Local Traffic/Development Committee and approved by Council **or an accredited certifier** prior to issue of the Subdivision Certificate.

# 14. Modify condition D8(2) as follows:

(2) The provision of Works as Executed information as identified in Council's DCP No 1 Volume 2 – Engineering Guidelines prior to issue of the Subdivision Certificate. This information is to be approved by Council *or an accredited certifier* prior to issue of the Subdivision Certificate.

# 15. Modify item B6 in the Statement of Commitments to read as follows:

**B6** A detailed programme for future community consultation will be developed by the proponent (and be subject to the prior approval of the Director General) and commenced 3 months prior to the start of works.

# **ENVIRONMENTAL PLANNING & ASSESSMENT ACT 1979**

# **DETERMINATION OF MAJOR PROJECT NO. 10-0204**

# (FILE NO. 10/0204)

The Planning Assessment Commission, having considered the matters in section 75J(2) of the *Environmental Planning & Assessment Act 1979* (the Act), determine pursuant to section 75J(1) of the Act to **grant approval** to the major project referred to in the attached Schedule 1 subject to the conditions of approval in Schedule 2 and Statement of Commitments in Schedule 3.

This approval applies to the plans, drawings and documents cited by the Proponent in their Environmental Assessment, Preferred Project Report and Statement of Commitments, subject to the conditions of approval in Schedule 2.

The reasons for the imposition of conditions are:

- (1) To adequately mitigate the environmental and construction impacts of the development;
- (2) To reasonably protect the amenity of the local area; and
- (3) To protect the public interest.

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Member of the Commission

Member of the Commission

Member of the Commission

Sydney, 13 May 2011

# **SCHEDULE 1**

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PARTA — TABLE		
Application made by:	Coastal Hamlets Pty Ltd	
Application made to:	Minister for Planning	
Major Project Number:	10- 0204	
On land comprising:	Lot 100, 101,102, 103 and 106 DP 112872, Lot 1 DP 1141989, Lot 1, DP 1129299 and Lot 1, DP 1151628.	
Local Government Area	Lake Macquarie	
For the carrying out of:	Subdivision of land to create up to 540 residential lots, 1 retail lot and 7 reserves, bulk earthworks and infrastructure	
Capital Investment Value	\$54.8M.	
Type of development:	Project approval under Part 3A of the EP&A Act	
Determination made on:	13 May 2011	
Determination:	Project approval is granted subject to the conditions in the attached Schedule 2.	
Date of commencement of approval:	This approval commences on the date of the Planning Assessment Commission's approval.	
Date approval is liable to lapse	5 years from the date of determination unless specified action has been taken in accordance with Section 75Y of the EP&A Act.	

#### PART B - DEFINITIONS

In this approval the following definitions apply:

Act means the Environmental Planning and Assessment Act, 1979 (as amended).

**Environmental Assessment** means the document titled Environmental Assessment Report – Catherine Hill Bay - Bulk Earthworks, Infrastructure and Staged Subdivision for Residential Development, including all appendices, prepared by ADW Johnson Pty Ltd

BCA means the Building Code of Australia.

Council means Lake Macquarie City Council.

Certifying Authority has the same meaning as in Part 4A of the Act.

Department means the Department of Planning and Infrastructure or its successors.

**Director** means the Director of the Strategic Assessment Branch (or its successors) of the Department of Planning and Infrastructure.

Director General means the Director General of the Department of Planning and Infrastructure.

*Executive Director* means the Executive Director of the Urban Renewal and Major Sites Division (or equivalent) within the Department of Planning and Infrastructure.

*Major Project No. 10\_0204* means the project described in Condition A1, Part A, Schedule 2 and the accompanying plans and documentation described in Condition A2, Part A, Schedule 2.

Minister means the Minister for Planning and Infrastructure.

PCA means a Principal Certifying Authority and has the same meaning as in Part 4A of the Act

*Project* means development that is declared under Section 75B of the Act to be a project to which Part 3A of the Act applies.

**PPR** and **Preferred Project Report** means the document titled Preferred Project Report MP 10/0204 prepared by ADW Johnson Pty Limited

**Proponent** means the person proposing the carry out of development comprising all or any part of the project, and includes persons certified by the Minister to be the proponent.

Regulation means the Environmental Planning and Assessment Regulations, 2000 (as amended).

**Statement of Commitments** means the final Statement of Commitments submitted to the Department of Planning as part of the Preferred Project Report for this project.

Subject Site has the same meaning as the land identified in Part A of this schedule.

# **SCHEDULE 2**

# CONDITIONS OF APPROVAL

# MAJOR PROJECT APPLICATION NO. MP 10\_0204

# PART A - ADMINISTRATIVE CONDITIONS

#### A1 Development Description

Project Approval is granted for the following works:

- Subdivision of the site into up to 550 residential lots, 1 retail lot and 7 lots for reserves;
- Associated bulk earthworks;
- Infrastructure works including roads, drainage works and utility services provision;
- Landscaping works.

### A2 Development in Accordance with Plans and Documentation

The development shall be in accordance with the following plans, documentation and recommendations made therein:

Environmental Assessment Report – Catherine Hill Bay - Bulk Earthworks, Infrastructure and Staged Subdivision for Residential Development, including Appendices A-O, prepared by ADW Johnson Pty Ltd and as amended by:

- Preferred Project Report MP 10/0204 prepared by ADJ Johnson Pty Ltd, including Appendices A-M;
- The Statement of Commitments; and
- The conditions of this approval, and in particular condition A7 and the amended subdivision plan.

#### A3 Inconsistency between plans and documentation

In the event of any inconsistency between conditions of this project approval and the plans and documentation referred to above, the conditions of this project approval prevail.

# A4 Lapsing of Approval

The project approval will lapse 5 years after the approval date in Part A of Schedule 1 of this project approval unless specified action has been taken in accordance with Section 75Y of the Act.

#### A5 Compliance with Relevant Legislation and Australian Standards

The proponent shall comply with all relevant Australian Standards and Codes (including Building Code of Australia) and obtain all necessary approvals required by State and Commonwealth legislation in undertaking the project described in Condition A1, Part A, Schedule 2 of this approval.

# A6 Development Control Plan

The development control plan at Appendix F of the PPR is not approved.

# A7 Amendments to Subdivision Plan

The subdivision plan is to be amended prior to the issue of a Construction Certificate for subdivision infrastructure to the satisfaction of the Planning Assessment Commission as follows:

- (a) Lots 1117, 1118, 1119 and 1120 are to be deleted and the residue allotment resulting from the proposed realignment of Hale Street is to be consolidated into one single allotment comprising the Wallarah House Precinct.
- (b) the green ridgeline and visual backdrop to the existing Catherine Hill Bay Village is to be protected by provision of Montefiore Parkway as a public road with a width of 50m (comprising a central road reservation of 22m with 15m wide landscape buffer either side) for the entire length of Montefiore Street from the western boundary of the development site through to the intersection with the realigned Hale Street in the

east. The entire 50m road reserve which is to form the "Green Ridge" on Montefiore Street is to be within public areas of the site (i.e. not within private properties).

- (c) A 6m wide perimeter road is to be included within the development area surrounding the allotments in Stages 6 and 7 to provide an appropriate asset protection zone and interface with the adjacent Conservation Area.
- (d) Road 20 (perimeter road to Stages 2, 4 and 5) is to be widened to a carriageway width of 8m comprising one trafficable lane in each direction and parking lane. The parking lane shall be located on the southern side of the road within an informal verge on the southern side. A second direct access from Montefiore Street to Road 20 shall be provided via either Road 3 or Road 4 or Road 10. Landscaped areas must be provided within the parking lane of Road 20 at regular intervals with a minimum space of 50m.
- (e) Road 20 is to be extended to Lot 1039 and where practical to connect to Road 18 to ensure appropriate bushfire protection for allotments in this area.
- (f) Proposed Lot 1006 and Lot 1005 are to be deleted and incorporated into the adjacent Village Park with appropriate landscaping.
- (g) Proposed Lots 1001 to 1004 are to be consolidated into one allotment for the proposed retail precinct and to provide off street car parking for the retail precinct and Village Park. Any future project application for the retail development shall demonstrate appropriate frontage to Montefiore Street, Hale Street and the village park and incorporate appropriate car parking for the retail and park uses.
- (h) There must be no direct vehicular access from any residential lots onto Montefiore Street.
- (i) Allotments fronting the designated "green link" roads (north south running sections of Roads 2, 10 and 11) are to be provided with share access point.
- (j) Stage 3 of the development is to be redesigned to provide for a coastal reserve including the coastal walk. The reserve must be 40m from the cliff line south of the Bin Building and 25m from the cliff line north of the Bin Building. The cliff line is defined as the line that represents the point where the land at the cliff edge has a slope of 20%. Private property must not encroach onto the reserve.

As part of the redesign of Stage 3 (refer (j) above) consideration is to be given to minimisation of cut and fill to retain as many existing trees as possible and to minimise the visibility of the area when viewed from the north. Evidence of this analysis is to be provided prior to referral to the Commission for consideration.

- (k) Road 20 and lots in the vicinity of the SEPP 14 wetland are to be amended to provide for a primary riparian buffer of not less than 50m at any point to the "ground truthed" SEPP 14 wetland boundary as mapped in Figure 3.5 of the Ecological Assessment Report (RPS, September 2010) to development lands.
- (I) Following inclusion of perimeter roads as required above, Asset Protection Zones and requirements for dwelling construction are to comply with AS3959-2009 and be to the satisfaction of the Rural Fire Service. Evidence of the RFS agreement to the proposal should be obtained prior to referral to the Commission for consideration.

#### A8 Restoration or adaptive reuse of heritage items

No approval is granted for the restoration or adaptive reuse of any heritage items on site. These works will require a separate approval under Clause 22 of Part 14 of Schedule 3 to the Major Development SEPP.

#### A9 Bin Building

An assessment must be made of the public risk posed by the Bin Building before the Coastal Walkway is constructed and public access must be prevented to any areas of the building that are unsafe.

#### A10 Mediation

Where this approval requires further consent from Council or another Authority, the parties shall not act unreasonably preventing an agreement from being reached. In the event that an agreement is unable to be reached within 2 months or a timeframe otherwise agreed to by the Director General, the matter is to be referred to the Director General for resolution. All areas of disagreement and the position of each part are to be clearly stated to facilitate a resolution.

# PART B-PRIOR TO COMMENCEMENT OF WORKS

### B1 Coastal Walkway Design

- (1) Detailed engineering plans of the Coastal Walkway are to be approved by Council prior to the issue of the Construction Certificate for those works. These plans are to illustrate that the Coastal Walkway has been designed and will be constructed to:
  - Ensure the safety of members of the public; and
  - Take account of coastal processes and coastal hazards and potential impacts, including sea level rise.

# B2 Certificates/Engineering Details - General

- (1) A Construction Certificate is to be issued by the Principal Certifying Authority prior to commencement of any works. The application for this Certificate is to satisfy all of the requirements of the Environmental Planning and Assessment Regulation 2000.
- (2) An application for a Subdivision Construction Certificate or for approval of designs for civil engineering works is to be submitted to Council where Council is nominated as the Principal Certifying Authority or where approvals are required from Council as the Roads or Water Supply Authority.
- (3) Prior to the issue of a Construction Certificate for the relevant subdivision infrastructure, the applicant must apply under Section 305 of the Water Management Act 2000 to Hunter Water as the Water Supply Authority for any works and contributions required for the obtaining of a Section 307 Certificate of Compliance. (Note for a single dwelling the payment of the required plumbing and drainage inspection fees satisfies the requirements of the Water Management Act).
- (4) Prior to the issue of a Construction Certificate for roads, the proponent is to enter into a deed of agreement with the Roads and Traffic Authority for the intersection upgrade works to the intersection of Montefiore Street and the Pacific Highway.

#### B3 Construction Management Plan

- (1) Prior to the issue of a Construction Certificate for any works, a Construction Management Plan shall be submitted to and approved by the Certifying Authority. The Plan shall include, but not be limited to, the following:
  - (a) hours of work;
  - (b) contact details of site manager;
  - (c) written notice to the PCA and Council prior to commencement of works on site;
  - (d) induction procedures for all site workers on measures to protect Aboriginal heritage and native flora and fauna, particularly endangered ecological communities (EEC)
  - (e) integration of the following management plans:
    - construction traffic and management,
      - noise and vibration management;
      - construction waste management; and
      - erosion and sediment control.
- (2) The Construction Management Plan shall document the proposed method of work within the construction site boundaries with regard to the health and safety of the public and affect on the road reserve must be submitted to and approved by the Certifying Authority prior to the issue of the civil construction certificates. If any part of the road reserve or public land is proposed for long term (exceeding 24 hours) inclusion in the construction site boundaries this area must be identified in the Construction Management Plan and to the approval of Council.
- (3) The Proponent shall submit a copy of the approved plan to the Department and Council if Council is not the Certifying Authority.

# B4 Construction Traffic and Management Plan

- (1) Prior to the issue of a Construction Certificate, a Construction Traffic Management Plan (CTMP) prepared by a suitably qualified person shall be submitted to and approved by the Certifying Authority. The Plan shall address, but not be limited to, the following matters:
  - (a) proposals for reducing any impact of the construction site on the adjacent traffic network,
  - (b) construction staging plan indicating the estimated start and finishing date of each stage,
  - (c) traffic management of short term activities such as delivery of materials,
  - (d) accessing, exiting and parking in and near the work site by trucks, tradesmen work vehicles and the like,
  - (e) mitigation measures to ensure that delivery trucks and trade vehicles do not deposit any spoil on public roadways,
  - (f) loading and unloading, including construction zones,
  - (g) predicted traffic volumes, including traffic volumes generated from the neighbouring public school, during the peak traffic times before and after school hours, types and routes,
  - (h) pedestrian and traffic management methods, and
  - (i) Public consultation procedures procedures to be put in place for notification of adjoining residents of the relevant details of the CTMP and details of complaint handling procedures.
- (2) The Proponent shall submit a copy of the approved plan to Council, if Council is not the Certifying Authority.

### **B5** Construction Waste Management

- (1) Prior to the issue of any Construction Certificate which involves works that create waste, the proponent shall submit a Waste Management Plan prepared by a suitably qualified person in accordance with Council's Development Control Plan 2005 for Council's approval. An on site storage area for reuse, recycling and disposal of materials is to be provided during construction.
- (2) During construction, building materials must be re-used, recycled or disposed of in accordance with the Waste Management Plan.

#### B6 Erosion and Sediment Control Plan

- (1) Prior to the issue of a Construction Certificate for any works, the submission to the Certifying Authority of design plans for the control of soil erosion on the site and the prevention of silt discharge into drainage systems and waterways in accordance with Lake Macquarie Council's Development Control Plan No 1 Volume 2 Engineering Guidelines, in particular Part 1 Design Specification D7 Erosion Control and Stormwater Management is required. Details are to include all major stages of construction and sequences of the works together with treatments necessary at these stages. The design plans must be approved by the Certifying Authority prior to issue of the Construction Certificate. The plans are to include nutrient and sediment control measures to mitigate runoff affecting the SEPP 14 wetlands.
- (2) Nutrient and sediment control devices should be erected pre-clearing and post-construction works in sensitive areas where degradation processes may be triggered such as areas adjacent to watercourses until suitable rehabilitation has occurred to maintain surface integrity. Furthermore, stockpiles should be subject to individual sediment and nutrient control devices.

# B7 Environmental Management Plan

Prior to commencement of work, the proponent is to submit an environmental management plan to the Department for approval. The plan is to integrate the following management plans to ensure their implementation will complement each other and maximise the environmental outcomes of their performance.

- a. storm water management;
- b. water quality management
- c. flora and fauna management;

- d. habitat restoration; and
- e. riparian zone management.

### B8 Stormwater Management

- (1) The stormwater system for the subdivision is to be provided in accordance with Stormwater Management & Concept Engineering Report for Proposed Residential Subdivision at Montefiore Street, Catherine Hill Bay prepared by ADW Johnson December 2010 (Reference 11688SWV1). Design plans must be submitted to and approved by the Council prior to issue of a Construction Certificate.
- (2) If wetlands are to be constructed for stormwater management purposes, they shall be designed by an appropriately qualified person and generally in accordance with the Constructed Wetlands Manual (DLWC 1998).
- (3) A Wetland Management Plan must be submitted to the Council for approval prior to issue of the Construction Certificate for wetlands. Details to include operational, access and maintenance requirements and are to be included on the approved Construction Certificate plans.

### B9 Water Quality Management Strategy

- (1) An appropriately qualified person shall prepare a Water Quality Management Strategy detailing monitoring methods for surface and groundwater quality. The strategy is to be approved by Council and shall include a plan scheduling maintenance of the detention basin, detailing the type of maintenance that is required and the body that is responsible to undertake the activity.
- (2) Water quality is to meet Council's baseline environmental target objectives.
- (3) Water quality monitoring is to be carried out throughout the length of the project and for a period of 12 months after the release of the final subdivision of this approval. Details are to be submitted to the satisfaction of the Certifying Authority prior to the issue of the Construction Certificate for each stage.
- (4) Water quality testing is to be carried out under sub clause (3) immediately after each storm event and significant phase of construction, or at 3 monthly intervals.
- (5) Copies of the monitoring results are to be forwarded to Council on a quarterly basis.
- (6) If the water quality does not comply with the target levels, works are to be carried out to ensure compliance with the levels.

#### B10 Flora and Fauna Management

- (1) A management plan is to be prepared for the removal of *Cryptostylis hunteriana* within the Catherine Hill Bay Development Lands Stage 6 in accordance with the EPBC Approval.
- (2) A weed management and monitoring plan is to be developed and implemented to minimise the potential for the invasion of aquatic and terrestrial weed species into the SEPP 14 wetland and buffer zones. The weed management and monitoring plan should be consistent with management strategies undertaken for the adjacent Munmorah SCA and Offset Lands and is to be undertaken by the proponent across the site until 80% of all lots have been developed.
- (3) Prior to the issue of a Construction Certificate, a Flora and Fauna Environmental Management Plan (FFEMP) for the Site shall be prepared by a suitably qualified and experienced ecologist and submitted to and approved by the Council. The Plan shall address, but not be limited to, the recommendations in the Ecological Assessment report prepared by RPS, and include the following:
  - (a) A tree retention plan is to be prepared identifying the mature and/or hollow-bearing trees to be retained, including those identified in the Ecological Assessment Report by RPS report, where viable. The plan is also to show tree retention where possible to retain areas for shade on the site. The plan is to reference the bulk earthworks plan to demonstrate consistency,
  - (b) Pre-clearance surveys are to be conducted within the development areas before construction commences in order to identify any breeding or nesting activities by native fauna within wooded areas. No breeding attempts or active nests should be disrupted as far as is practical during the course of the project,

- (c) During the construction/vegetation removal phase, for any tree removal within forested areas, and in particular where hollow-bearing trees may be removed, all works should be supervised by an ecologist to recover any native fauna that are potentially displaced. Furthermore, where such risks occur, site-specific ecological advice should be sought to minimise impacts during the entire process. A clearing protocol should be adopted for the removal of trees containing suitable habitat hollows as follows (this is considered as a guideline, variations on the methods employed may be required to accommodate site specific factors),
- (d) All hollow bearing trees are to be flagged by an ecologist prior to the commencement of works on site,
- (e) Trees and native vegetation proposed for retention are to be clearly identified on all the final approved engineering plans. The location of any threatened species or threatened communities is also to be marked on all plans,
- (f) Underscrubbing of the entire site should be carried out by a 4x4 tractor with a slashing deck, this will minimise the establishment of degradation processes and leave a layer of mulch to aid in soil retention in the event of adverse weather. At this time felling of non habitat trees can take place, however a matrix of trees must be maintained to allow animal movement into the designated refuge area, and
- (g) After a period of two weeks, clearing of habitat trees should commence. Clearing must be carried out moving from the fringe of the matrix towards the refuge area. Trees should be 'soft felled' and inspected immediately by an ecologist for displaced fauna. All trees must be left for a minimum of two nights prior to being moved to a stockpile, to allow resident fauna to vacate tree hollows.
- (4) Clearing should take place outside of the main breeding seasons of resident fauna, preferably during late autumn and winter.
- (5) Species selection for future landscaping works and seed stock for revegetation should be limited to locally occurring native species to maintain local genetic diversity. This should include *Eucalyptus robusta* and other regionally significant species.
- (6) Earthworks should be undertaken during appropriate (i.e. dry) weather conditions to ensure that any potential erosion events are intercepted and that no downstream impacts occur within any of the drainage lines.
- (7) Management of exotic weeds and pests during the construction including infection by *Phytophora cinnomoni*, exotic perennial grasses, Bitou, Boneseed, Lantana, exotic vines and scramblers.
- (8) Appropriate methods of disposing of timber, tree waste and other vegetative matter removed through the development activity. Millable timber is to be recycled for use in construction, furniture or fencing or similar or through local saw mills or sawyers. Other tree waste must be woodchip or tub ground or used for firewood. Tree stumps that cannot be reasonably tub ground may be disposed of to a Council approved site.

Unless otherwise approved the resultant materials must be used in final landscape works for soil stabilisation, improvements and rehabilitation. It is not permitted to dispose of vegetated matter removed through development activity by burning and the NSW Rural Fire Services is unable to provide a permit to dispose of such material in this manner.

- (9) Strict management of stormwater runoff into the planning, construction and occupation phases to minimise potential impacts on EECs, known Wallum Froglet habitat and other threatened species.
- (10) Riparian vegetation, and sediment and water management strategies to mitigate the impact on the Wallum Froglet, Regent Honeyeater and Swift Parrot, which are threatened species.
- (11) Where possible, landscape sediment retention ponds with fringing wetland vegetation (eg Typha sp.) to provide habitat for species such as Green and Golden Bell Frog.

#### B11 SEPP 14 Wetlands

The impact of the proposed development on the SEPP 14 wetland, EECs and habitat of threatened species (as identified in the Ecological Assessment Report) must be minimised during the construction and occupation phases. A suitably qualified wetland engineer and ecologist must be engaged to provide advice to ensure that this is achieved.

# B12 Habitat Restoration Plan

- (1) A Habitat Restoration Plan (HRP) for the proposed habitat protection areas and buffers to the development. The HRP is to be prepared by a suitably qualified and experienced ecologist and submitted to and approved by Council. The HRP will integrate with the required Landscape Plan and Sediment and Erosion Control Plans. In preparing the HRP the applicant is to have due regard to the following specific and required components of the HRP:
  - (a) A suitably qualified and experienced professional bush regeneration contractor is to be engaged to carry out any revegetation planting, restoration and maintenance weed control specified in the Habitat Restoration Plan, and
  - (b) The minimum qualifications and experience required for the bush regeneration contractor are a TAFE Certificate 2 in Bushland Regeneration and two years demonstrated experience (for site supervisor) and a TAFE Certificate 2 in Bushland Regeneration and one year demonstrated experience (for other personnel). In addition the site supervisor is to be eligible for full professional membership of the Australian Association of Bush Regenerators (AABR).
  - (c) The mulch/tubgrindings generated from the removal and thinning of native trees associated with the development is/are to be re-used in restoring the habitat protection areas as required.
  - (d) Any natural hollows removed by the development are to be placed wherever possible as ground hollows within retained bushland under the supervision of the consulting ecologist.
  - (e) Restoration areas are to be maintained for a minimum of three (3) years. Reports are to be submitted to Council detailing the progress of the bush regeneration works twice per year, with a final report certifying the completion of the works at the end of the three year period.
  - (f) Any plant stock used in revegetation (if required) will be supplied from provenance specific seed/material collected from within the Tuggerah Lakes catchment area. Non-provenance specific material is prohibited.
- (2) A Wildlife Management Strategy (WMS) shall be prepared by a suitably qualified and experienced ecologist and submitted to and approved by the Council. The WMS is to show how mitigation against native animal welfare issues will be achieved. The WMS is to include the following protocols:
  - (a) The consultant ecologist is to identify fauna likely to occur on site and advise on management actions to mitigate any native animal welfare issues,
  - (b) The consultant ecologist is to clearly mark each potential habitat tree required to be removed,
  - (c) The consultant ecologist is to inspect all potential habitat trees prior to removal and identify evidence of fauna use. All clearing of habitat trees is to be done under the direct supervision of a consulting ecologist and/or Office of Environment and Heritage licensed wildlife carer. When fauna are present, the animals are to be removed and relocated to the adjacent bushland/nest boxes prior to felling or the tree shall be sectionally dismantled under the supervision of the ecologist or wildlife carer before relocating animals to the adjacent bushland/nest boxes,
  - (d) Clearing will commence with the most distant vegetation from secure habitat and progressively work toward the retained bushland in order to allow fauna to disperse,
  - (e) Trees should be slowly lowered or sectionally dismantled using an excavator or similar technique,
  - (f) Any natural hollows removed by the development are to be placed wherever possible as ground hollows within retained bushland under the supervision of the consulting ecologist, and
  - (g) Nest boxes are to be provided on a one for one basis for any natural hollow removed by the development and are to be constructed of appropriate durable materials. All nest boxes are to be erected prior to the issue of a Construction Certificate and at least one month prior to vegetation clearance on the site. The monitoring of nest boxes to determine their usage and to carry out repairs or replacement (as required) every six (6) months for a minimum period of three (3) years following erection. Monitoring reports are to be forwarded to Council after each monitoring event.

#### B13 Riparian Zone Management

A Riparian Zone Management Plan shall be prepared to the satisfaction of NSW Office of Water (or its successors) for the stream forming the drainage corridor between Stages 6 and 7, and for the "Village Park". The plan should include:

(a) Detailed design of the stormwater treatments, demonstrating consistency with the NSW Office of Water guidelines for controlled activities,

....

- (b) A riparian zone assessment and rehabilitation plan for the watercourses; and
- (c) Management responsibility and requirement details.

# B14 Landscaping Plans

- (1) Prior to the issue of a Construction Certificate for subdivision infrastructure works, a Landscape Master Plan, Landscape Design Report and Landscape Construction Plan and Specifications are to be prepared by a qualified landscape architect in accordance with the requirements of Section 2.7.2 of the Lake Macquarie Development Control Plan No 1. The Plans shall be submitted to and approved by Council. The Plan is to include, but is not limited to the following:
  - (a) Details of street planting with appropriate locally endemic species;
  - (b) Tree planting and embellishments in the parks including picnic tables, bbqs, play equipment and bicycle racks to encourage community interaction.
  - (c) Seating should also be provided along pathways in the road reserve.
  - (d) Details on weed control;
  - A management plan detailing on-going maintenance requirements to ensure the care and maintenance of the landscaping and revegetated areas;
  - (f) Management of stormwater runoff to minimise impact on vegetated areas; and
  - (g) The location of Water Sensitive Urban Design devices and integrate with other public domain treatments.
- (2) A Landscape Construction Plan/Specifications should be provided for each stage of the development and provide details on all landscaping to be undertaken within roads, public domain, public reserves, pedestrian links etc.
- (3) Separate landscape plans are to be provided for the Coastal Walkway and Reserve, public reserves, and treatment of the landscaped buffers to the Green Link Roads (north south running sections of Roads 2, 10 and 11) and Montefiore Parkway.

#### B15 Filling and Haulage

The final earthworks plan shall be submitted to the Department for approval prior to the issue of a Construction Certificate and shall be generally in accordance with the bulk earthworks plan (Drawing 11688-5001 Revision D prepared by ADW Johnson and dated February 2011) and the detailed geotechnical methodology and remedial strategies. Any significant variations would require a Section 75W modification.

#### B16 Geotechnical Investigations / Earthworks

Prior to the commencement of earthworks a detailed geotechnical methodology and remedial strategies are to be prepared for the approval of Council consistent with the recommendations of the Stage 1 – 5 Supplementary Geotechnical Investigation (Geotech Solutions, December 2010) and Stages 6 and 7 preliminary geotechnical investigation undertaken by Geotech Solutions (December 2010). The proposed measures should limit the need for piling and address the nature of the existing fill material on site.

#### B17 Contamination

Prior to the commencement of any works:

- (a) Supplementary investigations as identified by the Geotech Solutions (2009) are to be undertaken to provide further clarification of the likely extent of contamination;
- (b) A detailed and conservative Remedial Action Plan (RAP) is to be prepared and endorsed by a NSW EPA accredited Site Auditor certifying that the land will be suitable for the proposed residential development if the site is remediated in accordance with that Plan.
- (c) If reuse of coal rejects is proposed, further chemical testing is to be undertaken to determine acid leachate generation potential.
- (d) Any remediation works required within the proposed road reserves must be completed prior to dedication to Council.

#### B18 Roads - General

- (1) Separate approval from the Roads Authority must be obtained under the Roads Act 1993 prior to the issue of a Construction Certificate for any proposed new Council roads or works within an existing Council road reserve. Design plans must be submitted to and approved by the Roads Authority prior to issue of the Construction Certificate.
- (2) Additional civil works necessary to ensure satisfactory transitions to existing work as a result of work conditioned for the development are to be provided at no cost to Council. Design plans are to be approved by the Roads Authority prior to the issue of a Construction Certificate.
- (3) A comprehensive road signage and pavement marking plan identifying parking restrictions, accesses and traffic management facilities is to be submitted to Council for approval by the Local Traffic/Development Committee and works completed prior to issue of the Subdivision Certificate.
- (4) Proposed names for the roads under the Roads Act within the subdivision are to be submitted to Council for approval of the prior to issue of a Subdivision Certificate.

#### B19 Pacific Highway Intersections

The intersection of the Pacific Highway and Montefiore Street shall be upgraded / modified in accordance with the RTA's specifications, the RTA's Road Design Guide, the relevant Austroads guidelines and Australian Standards, to the satisfaction of the RTA prior to the issue of the first Subdivision Certificate which creates the first urban lot.

### B20 Montefiore Street Upgrade

The developer is to upgrade the road pavement and drainage for the entire length of Montefiore Street from its intersection with Hale Street in the east to the intersection with the Pacific Highway to the west in accordance with Council's requirements prior to the issue of the first Subdivision Certificate which creates the first urban lot.

#### **B21** Public Transport

- (1) The proponent is to liaise with Transport NSW and local bus operators to identify appropriate locations for bus stops.
- (2) The design of the bus stops shall address the following:
  - (a) Bus stops and bus shelters are to be provided in accordance with the requirements of the Bus Operator, TNSW and Council. All facilities need to be installed in accordance with Disability Discrimination Act (DDA) requirements,
  - (b) Footpaths and pedestrian refuges are to be provided to service the bus stops, to Council's satisfaction, to ensure pedestrian safety and encourage the use of public transport, and
  - (c) Details of proposed bus stop locations are to be submitted to Council for approval.

# B22 Dilapidation

A dilapidation report must be submitted to Council as the Roads Authority prior to the commencement of any works. The report must document and provide photographs that clearly depict any existing damage to the public road, kerb, gutter, footpath, driveways, water supply, sewer works, street trees, street signs or any other Council assets in the vicinity of the development.

#### **B23** Acid Sulphate Soils

A detailed acid sulphate soil investigation shall be undertaken and an acid sulphate soil management plan prepared where the proposed development will impact on any acid sulphate soils. The management plan shall be prepared by a suitably qualified person in accordance with the *Acid Sulphate Soil Assessment Guidelines* (Acid Sulphate Soil Management Advisory Committee, 1998) and submitted to and approved by the Certifying Authority prior to issue of a Construction Certificate.

#### B24 Water and Sewer services/Infrastructure

- (1) All water and sewer works or works impacting on water and sewer assets are to be designed and constructed to the requirements of Hunter Water as the Water Supply Authority under the Water Management Act 2000. The requirements of Section 306 of the Water Management Act, 2000 apply to this development. The design plans must be submitted to and approved by Hunter Water prior to the issue of a Construction Certificate.
- (2) Arrangements to the satisfaction of other service/infrastructure providers are to be made for the provision of services prior to the issue of a Construction Certificate for those works.

#### **B25 Water Licensing Requirements**

- (1) An authorisation under the Water Act 1912 or the Water Management Act 2000 is to be obtained from the NSW Office of Water with the appropriate purpose identified for any activity relating to the taking of or interception of groundwater prior to that activity commencing.
- (2) Prior to the construction of the detention basin, the proponent should contact the NSW Office of Water to determine is a surface water licence is required.

#### B26 Retaining Wall

Retaining walls must be designed and certified by a qualified structural engineer in accordance with AS4678 Earth Retaining Structures prior to the issue of a Construction Certificate. The retaining walls must be located fully within the boundaries of the subject property.

#### **B27** Other Authorities

Other public authorities may have separate requirements and should be consulted prior to commencement of works in the following respects:

- Australia Post for the positioning and dimensions of mail boxes in new commercial and residential developments,
- AGL Sydney Limited for any change or alteration to gas line infrastructure,
- Energy Australia for any change or alteration to electricity infrastructure or encroachment within transmission line easements, and
- Telstra, Optus or other telecommunication carriers for access to their telecommunications infrastructure.

#### B28 Aboriginal Cultural heritage

The developer shall implement the Aboriginal Cultural Heritage Management Plan (ACHMP) for the project area prepared by Insite Heritage Pty Ltd (December 2010) in consultation with the registered local Aboriginal stakeholders.

#### B29 Bushfire

- (1) Having regard to the required subdivision amendments and inclusion of perimeter roads adjacent to conservation lands, documentation is to be submitted to the Director, Strategic Assessment to demonstrate that the NSW Rural Fire Service endorse the final proposed APZ depths and dwelling construction requirements for affected allotments in accordance with AS 3959-2009.
- (2) A bushfire risk management plan is to be prepared in consultation with the Rural Fire Services by a suitably qualified person. The plan is to be submitted and approved by the Certifying Authority.
- (3) Water supply for fire fighting purposes and water, electricity and gas are to comply with Planning for Bushfire Protection 2006.
- (4) Landscaping is to be in accordance with Planning for Bushfire Protection 2006.

#### PART C-DURING CONSTRUCTION

#### C1 Approved Plans

A copy of the stamped approved and certified plans, specifications and documents incorporating conditions of approval and certification must be kept on site for the duration of site works and be made available upon request to either the Principal Certifying Authority or an officer of the Council or the Department.

#### C2 Aboriginal Relics

- (1) An Aboriginal Cultural Education Program must be developed for the induction of all personnel and contractors involved in the construction activities on site. Records are to be kept of which staff/contractors were inducted and when for the duration of the project. The program should be developed and implemented in collaboration with the local Aboriginal community.
- (2) In the event that surface disturbance identifies a new Aboriginal site, all works must halt in the immediate area to prevent any further impacts to the object(s). A suitably qualified archaeologist and representatives of the local aboriginal community must be contacted to determine the significance (cultural and scientific) of the object(s). The site is to be registered in the Aboriginal Heritage Information Management system (AHIMS) (managed by OEH) and the management outcome for the site included in the information provided to the AHIMS). The proponent will consult with the Aboriginal community representatives the archaeologist and OEH to develop and implement management strategies for all objects/sites. Works may only recommence following endorsement for such from the OEH.
- (3) The proponent is to provide fair and reasonable opportunities for the registered local Aboriginal stakeholders to monitor any initial ground disturbance works associated with the area described as a band of archaeological sensitivity, identified in Figure 4 of the report titled 'Aboriginal Cultural Heritage Management Plan for Project Approval, Catherine Hill Bay' (dated December 2010), by Insite Heritage Pty Ltd, and the area immediately adjacent to Aboriginal site 'CHB 1'. In the event that additional Aboriginal objects are uncovered during the monitoring program, the objects are to be recorded and managed in accordance with the requirements of sections 85A and 89A of the National Parks and Wildlife Act 1974.
- (4) If human remains are located in the event that surface disturbance occurs, all works must halt in the immediate area to prevent any further impacts to the remains. The NSW Police are to be contacted immediately. No action is to be undertaken until police provide written notification to the proponent. If the skeletal remains are identified as Aboriginal, the proponent must contact OEH's Enviroline on 131555 and representatives of the local Aboriginal community. No works are to continue until OEH provide written notification to the proponent.
- (5) All reasonable efforts must be made to avoid impacts to Aboriginal cultural heritage at all stages of the development works. If impacts are unavoidable, mitigation measures are to be negotiated with the local Aboriginal community and OEH. All sites impacted must have an OEH Aboriginal Site Impact Recording (ASIR) form completed and submitted to OEH AHIMS unit within three (3) months of completion of these works.

# C3 Dust Control

Adequate measures shall be taken to prevent dust from affecting the amenity of the neighbourhood during construction. In particular, the following measures must be adopted:

- Physical barriers shall be erected at right angles to the prevailing wind direction or shall be placed around or over dust sources to prevent wind or activity from generating dust emissions,
- (2) earthworks and scheduling activities shall be managed to coincide with the next stage of development to minimise the amount of time the site is left cut or exposed;
- (3) The surface should be dampened to prevent dust from becoming airborne but should not be wet to the extent that run-off occurs;
- (4) all vehicles carrying spoil or rubble to or from the site shall at all times be covered to prevent the escape of dust or other material and wheels washed before leaving the site;
- (5) Gates shall be closed between vehicle movements and shall be fitted with shade cloth; and
- (6) Cleaning of footpaths and roadways shall be carried out regularly.

#### C4 Hours of Work

- (1) The hours of construction for all stages of the project, including the delivery of materials to and from the site, shall be restricted as follows:
  - (a) Between 7.00am and 6.00pm, Monday to Fridays inclusive;
  - (b) Between 8.00am and 1.00pm, Saturday; and
  - (c) No work on Sundays and public holidays.

- (2) Works may be undertaken outside these hours where:
  - (a) The delivery of materials is required outside these hours by the Police or other authorities;
  - (b) It is required in an emergency to avoid the loss of life, damage to property and/or to prevent environmental harm;
  - (c) The work is approved through a Construction Noise and Vibration Management Plan; and
  - (d) Residents likely to be affected by the works are notified of the timing and duration of these works at least 48 hours prior to the commencement of the works.

#### C5 Construction noise objective

- (1) The construction noise objective for all stages of the project is to manage noise from construction activities (as measured by a L<sub>A10 (15 minute)</sub> descriptor) so it does not exceed the background L<sub>A90</sub> noise level by:
  - (a) for construction period of 4 weeks and under, not more than 20dBA;
  - (b) for construction period greater than 4 weeks but not exceeding 26 weeks, not more than 10dBA; and
  - (c) for construction period greater than 26 weeks, not more than 5dBA.
- (2) The Proponent shall implement all feasible noise mitigation and management measures with the aim of achieving the construction noise objective.
- (3) Any activities that have the potential for noise emissions that exceed the objective must be identified and managed in accordance with an approved Construction Noise and Vibration Management Plan.
- (4) If the noise from a construction activity is substantially tonal or impulsive in nature (as described in Chapter 4 of the NSW Industrial Noise Policy), 5dBA must be added to the measured construction noise level when comparing the measured noise with the construction noise objective.

#### C6 Construction Noise Management

The Proponent shall:

- (1) schedule rock breaking, rock hammering, sheet piling, pile driving and any similar activity only between the following hours unless otherwise approved in the Construction Noise and Vibration Management Plan:
  - (a) 9.00an to 12.00pm, Monday to Friday;
  - (b) 2.00pm to 5.00pm, Monday to Friday; and
  - (c) 9.00am to 12.00pm, Saturday.
- (2) ensure that wherever practical, and where sensitive receivers may be affected, piling activities are completed using bored piles. If driven piles are required they must only be installed where approved in a Construction Noise and Vibration Management Plan.

#### C7 Vibration Criteria and Management

- (1) For all Stages of the project, vibration resulting from construction of all stages of the project must not exceed the evaluation criteria presented in the Environmental Noise Management - Assessing Vibration: A Technical Guide (DEC, 2006).
- (2) Vibratory compactors must not be used closer than 30 metres from residential buildings unless vibration monitoring confirms compliance with the vibration criteria specified in the DEC Technical Guide referred to above.

#### C8 Ecology/Trees

- (1) The applicant is to engage a suitably qualified and experienced consulting ecologist, arborist and soil erosion consultant to supervise the construction of each stage of the development and to ensure and certify to that the trees and vegetation are adequately retained and protected during construction. The consultant ecologist and arborist are to provide reports to demonstrate the proposal is meeting tree retention and protection requirements following completion of the following stages of development:
  - (a) Following erection of required tree protection fencing (and prior to the issue of a Construction Certificate/Commencement of Works),
  - (b) Following induction of each civil contractor and subcontractor,
  - (c) Following initial clearing and excavation/filling of the site,
  - (d) Following provision of services, and
  - (e) Following completion of each construction phase (and prior to the issue of a Subdivision Certificate/Occupation Certificate/Final Certificate/Practical Completion).

- (2) The following tree protection measures shall be used during construction/vegetation clearance:
  - (a) Trees and vegetation to be retained are to be protected by the erection of 1.8 metre-high man-proof fencing as per the consulting arborist and ecologist's direction and maintained in good working order for the duration of the works,
  - (b) Erection of tree protection fencing is to be confirmed to Council's Development Ecologist in writing by the consultant arborist/ecologist prior to the issue of a Construction Certificate,
  - (c) All fenced tree protection areas and are to be clearly marked as "No Go Area" on all final approved engineering plans,
  - (d) All fenced tree protection areas and are to be clearly marked as "No Go Area" on the fencing itself. No clearing of vegetation or storage of vehicles, fill or materials or access is to occur within No Go Areas,
  - (e) The consultant arborist/ecologist may require other habitat and/or trees to be protected via fencing from time to time. This fencing is to be erected at the appropriate root zone protection limits (as determined by the consultant arborist / ecologist), prior to works being carried out around that particular habitat or tree,
  - (f) The management protocols and requirements within these conditions relating to tree and vegetation retention, protection and rehabilitation are to be included in all contract documentation, plans and specifications used by each civil contractor and sub-contractors, and
  - (g) The consultant ecologist and arborist are to induct each civil contractor and sub-contractor in relation to these ecological protocols and requirements.
- (3) All construction contractors and personnel are to be advised of the importance of conserving No Go Areas as part of their site and OH&S induction program. No clearing of trees or vegetation or storage or vehicles, fill or materials or access is to occur within retained areas.
- (4) Tree protection measures must be installed in accordance with Council's requirements prior to commencement of work. Documentary evidence from a qualified Arborist / Horticulturist that suitable tree protection measures have been installed may be submitted to the Principal Certifying Authority and Council, or alternatively Council must be notified to undertake an inspection of the works.
- (5) Native fauna must be appropriately managed during clearing and construction phases of the approved works. In this regard, an appropriately licensed fauna ecologist is to be employed to advise and supervise the clearing of trees. Where, in spite of precautions, wildlife is injured, the fauna ecologist is to take the necessary action to treat the animal, which may include veterinary treatment or transfer of the animal to a volunteer wildlife carer group such as W.I.R.E.S or Wildlife Arc.
- (6) Trees containing trunk or branch hollows provide habitat and shelter to native wildlife. Removal of hollow bearing trees is to be done under the advice and supervision of an experienced wildlife carer or consultant who holds an appropriate National Parks and Wildlife Services Licence to mitigate against any animal welfare issues. The wildlife carer or consultant ecologist is to inspect all potential habitat trees prior to removal and identify evidence of fauna use. Should a threatened species be positively identified, all clearing works are to cease and the advice of the National Parks and Wildlife must be sought. When fauna are present, the animals are to be removed and suitably relocated by the ecologist prior to felling or the tree shall be sectionally dismantled under the supervision of the ecologist before relocating animals. Wildlife must be relocated locally to an area with adequate resources and provided with a nest box or relocated hollow under instruction from the licensed carer or consultant.

#### C9 Erosion and Sedimentation Control

The provision of soil erosion and silt controls on the site in accordance with Council's Development Control Plan No 1 Volume 2 – Engineering Guidelines in particular Part 1 Design Specification D7 Erosion Control and Stormwater Management and the approved development plans prior to any works commencing on the site.

#### C10 Site requirements

- (1) Toilet facilities must be available or provided at the work site before works begin and must be maintained until the works are completed at a ratio of one toilet plus one additional toilet for every 20 persons employed at the site. Each toilet must:
  - (a) be a standard flushing toilet connected to a public sewer, or
  - (b) have an on-site effluent disposal system approved under the LGA 1993, or be a temporary chemical closet approved under the LGA 1993 supplied by a licensed contractor.

No. 1. 183

- (2) The provision of a hoarding or safety fence between the work site and the public place in accordance with Work Cover Authority requirements, for the duration of the project. Details to be submitted to the Principal Certifying Authority/appropriately Accredited Certifier unless the hoarding is required within the footpath area where approval from Council under the Roads Act as the Roads Authority is required.
- (3) The Principal Contractor (or Owner/Builder) is to erect a sign in a prominent position on the site (not attached to any tree) identifying the name, address and telephone number of the Principal Certifying Authority (PCA) for the work; the name, address and telephone number (including a number for outside of business hours) of the Principal Contractor for the work (or Owner/Builder); and stating that unauthorised entry to the site is prohibited. The sign must be maintained while the work is being carried out and is to be removed when the work is completed. Appropriate signs can be collected from Council's Customer Service Centre, where Council is the nominated PCA.
- (4) The proponent shall ensure that the outside business hours contact telephone number is attended by a person with authority over the works for the duration of the development.

#### C11 Earthworks

All earthworks are to be contained to the site and construction access is to be limited to within the site. No earthworks are to be undertaken on adjacent conservation lands nor is access for earthworks to be provided from adjacent lands unless with the prior authorisation of the Office of Environment and Heritage.

#### PART D – PRIOR TO ISSUE OF SUBDIVISION CERTIFICATE

#### D1 Certificate/remediation/engineering details

- (1) An application for a Subdivision Certificate must be submitted to and approved by the Council/Principal Certifying Authority prior to registration of the plan of subdivision.
- (2) The application must be accompanied by evidence that an accredited EPA auditor has certified that the Remediation Action Plan has been implemented and that the whole site which is the subject of this application is suitable for the proposed residential development.
- (3) The application must also include documentation to demonstrate full compliance with all approval conditions in accordance with Section 157 Clause 2 (f) of the Environmental Planning and Assessment Regulations 2000. Prior to the issue of a Subdivision Certificate, payment must be made to Council of contributions (as contained in the attached Schedule) under Section 94 of the Environmental Planning and Assessment Act and Council's Contribution Plan. Council's contributions are adjusted on 15 February, 15 May, 15 August and 15 November each year. The amount of the contributions will be adjusted to the amount applicable at the date of payment.

Facility	Levy Per Lot
-	(current at date of writing)
Open space land acquisition	\$7,729
Recreation Facilities	\$5,793
Community Facilities – Capital	\$2,298
Community Facilities – Land	\$640
Management	\$176
Total	\$16,636

The following contributions are applicable to the proposed subdivision:

The next indexation is to occur on 15 May 2011. Agreements will need to be reached with Council regarding the provision of works in kind for any of these contributions.

(4) The obtaining of a Section 307 Certificate of Compliance under the Water Management Act 2000 for water and sewer requirements for the development from Hunter Water as the Water Supply Authority prior to issue of the Subdivision Certificate. All works for the development must be approved by Council prior to the issue of a Certificate of Compliance.

#### D2 Dilapidation

Any damage not shown in the Dilapidation Report submitted to Council before site works had commenced, will be assumed to have been caused as a result of the site works undertaken and must be rectified at the proponent's expense, prior to release of the Subdivision Certificate.

#### D3 Landscaping

- (1) The landscaping and public domain works for the village park and precinct park in Stage 1 and the revegetation works in the road reserve of Montefiore Street shall be completed prior to the issue of the first Subdivision Certificate for any urban lot in Stage 1.
- (2) The landscaping and public domain works for the coastal reserve and coastal walk ("the Coastal Headland Reserve") shall be completed prior to the issue of the first Subdivision Certificate for any urban lot in Stage 2.
- (3) The landscaping works for each Stage (including street tree planting, drainage reserves and the "green links") shall be completed prior to the issue of a Subdivision Certificate for an urban lot within that Stage.
- (4) The landscape designer must provide certification to the Principal Certifying Authority certifying that landscaping has been implemented in accordance with the approved landscape plan, prior to issue of a Subdivision Certificate. Where Council is not the Principal Certifying Authority, a copy of the certificate must be provided for Council's records.
- (5) The landscaping works shall be completed by the proponent at their cost. The Coastal Headland Reserve shall be dedicated to Council or other public authority.
- (6) The proponent shall maintain all hard landscaping works in areas to be dedicated to Council for a period of 12 months after completion to ensure all maintenance and repairs required are carried out during the maintenance period. The maintenance period for all soft landscaping is 5 years following certification of completion.

#### D4 Roads

- (1) All road signage and pavement marking works must be provided in accordance with the plans approved by the Local Traffic/Development Committee and approved by Council prior to issue of the Subdivision Certificate.
- (2) All additional civil works required to ensure satisfactory transitions to existing work as a result of work conditioned for the development works are to be approved by Council prior to issue of the Subdivision Certificate.
- (3) All works within a public road such as kerb and guttering, road pavement, drainage, footpaths, cycleways, vehicular access crossings and fencing must be in accordance with Lake Macquarie DCP No 1 Volume 2 Engineering Guidelines and approved by Council as the Roads Authority under the Roads Act 1993, prior to the issue of an Subdivision Certificate.
- (4) All road works under the Works Authorisation Deed shall be completed prior to issuing a Subdivision Certificate for any lot on which development may occur.

#### D5 Maintenance Deposit

A deposit with Council (Cash or a Bank Guarantee) is required for a period of twelve months from completion of all engineering work of a sum equal to 5% of the cost of Engineering Works prior to the issue of a Subdivision Certificate for each stage. This security is to guarantee the quality of work and to ensure that the contractor carries out all maintenance and repairs required during this period.

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#### D6 Stormwater

- (1) Provision of the necessary easements for access, maintenance and operation of the detention/infiltration basins in accordance with the Stormwater Management and Concept Engineering Report for Proposed Residential Subdivision at Montefiore Street, Catherine Hill Bay (Appendix N of EA) prior to issue of the Subdivision Certificate.
- (2) The stormwater system with water quality control facilities to treat stormwater runoff from the development discharging into Council's system or public land must be approved by Council under Section 68 of the Local Government Act prior to issue of the Subdivision Certificate.

### D7 Mine Subsidence

Evidence is to be provided to the Principal Certifying Authority by a qualified structural engineer that the land as subdivided is able to meet the requirements of the Mine Subsidence Board and that stability, subsidence potential and load bearing capacity of the site have been appropriately addressed.

### D8 Subdivision Works

- (1) A report is to be provided to Council by a consulting engineer classifying each lot being created in accordance with AS2870-1996 Residential Slabs and Footings, prior to issue of a Subdivision Certificate.
- (2) The provision of Works as Executed information as identified in Council's DCP No 1 Volume 2 Engineering Guidelines prior to issue of the Subdivision Certificate. This information is to be approved by Council prior to issue of the Subdivision Certificate.

### D9 Prohibition of cats and dogs

The plan of subdivision and Section 88B instrument shall establish a restrictive covenant on all residential lots prohibiting the keeping of cats and dogs, with the Council having the benefit of this covenant and having sole authority to release vary or modify the covenant.

#### D10 Registration of Easements/Restrictions to use

- (1) Prior to the issue of any Subdivision Certificate, the Proponent shall provide evidence to the Certifying Authority that all easements for services including sewer, water supply, stormwater system and drainage and Section 88E covenants required by this approval, and other consents have been or will be registered on the certificates of title.
- (2) Covenants pursuant to the Conveyancing Act 1919 shall be established for
  - (a) the restriction on future subdivision of allotments in Stage 3;
  - (b) the provision of and maintenance of asset protection zones in accordance with Planning for Bushfire Protection 2006, on residential lots that have an asset protection zone. The extent of the land affected by the covenant shall be defined by bearings and distances shown on the plan of subdivision; and
  - (c) the prohibition of direct vehicular access from properties to Montefiore Street.
- (3) Any Section 88B or 88E Instruments creating restrictions as to user, rights of carriageway or easements which benefit Council shall contain a provision enabling such restrictions, easements or rights of way to be revokes, varied or modified only with the consent of Council.
- (4) Details are to be provided of the easement through the Munmorah State Conservation Area for the sewer infrastructure from Stage 6 of the development.

#### D11 Asset Protection Zones

The plan of subdivision and Section 88B instrument shall establish a restrictive covenant on all residential lots requiring the maintenance of the designated Asset Protection Zone in accordance with the requirements of Planning for Bushfire Protection 2006, with the Rural Fire Service having the benefit of this covenant and having sole authority to release vary or modify the covenant.

# PART E - ONGOING CONDITIONS

## E1 Mine Subsidence

Any changes to the lot numbering and registered DP than that shown in the EA shall be reported to the Mine Subsidence Board.

# E2 Aboriginal Liaison

The applicant must continue to consult with and involve all the registered local Aboriginal representatives for the project, in the ongoing management of the Aboriginal cultural heritage values. Evidence of this consultation must be collated and provided to the Council upon request.

# ADVISORY NOTES

# AN1 Requirements of Public Authorities for Connection to Services

The proponent shall comply with the requirements of any public authorities (e.g. Energy Australia, Wyong Shire Council, Telstra Australia, AGL, etc) in regard to the connection to, relocation and/or adjustment of the services affected by the construction of the proposed structure. Any costs in the relocation, adjustment or support of services shall be the responsibility of the proponent.

# AN2 Roads Act, 1993

A separate application shall be made to Council for approval under Section 138 of the Roads Act, 1993 to undertake any of the following:

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- (1) erect a structure or carry out a work in, on or over a public road, or
- (2) dig up or disturb the surface of a public road, or
- (3) remove or interfere with a structure, work or tree on a public road, or
- (4) pump water into a public road from any land adjoining the road, or
- (5) connect a road (whether public or private) to a classified road.

# AN3 Stormwater Drainage Works or Effluent Systems

Works that involve stormwater drainage work or management of waste as defined by Section 68 of the Local Government Act, 1993 require separate approval by Council under Section 68 of that Act. Applications for these works must be submitted on Council's standard Section 68 application form accompanied by the required attachments and the prescribed fees.

# AN4 Temporary Structures

An approval under Section 68 of the *Local Government Act 1993* must be obtained from the Council for the erection of the temporary structures. The application must be supported by a report detailing compliance with the provisions of the Building Code of Australia.

Structural certification from an appropriately qualified practicing structural engineer must be submitted to the Council with the application under Section 68 of the *Local Government Act* 1993 to certify the structural adequacy of the design of the temporary structures.

# AN5 Excavation – Historical Relics

Should any historical relics be unexpectedly discovered then all excavations or disturbance to the area is to stop immediately and the Heritage Council of NSW shall be informed in accordance with Section 146 of the *Heritage Act*, *1*977.

# AN6 Long Service Levy

Under Section 34 of the *Building and Construction Industry Long Service Payments Act 1986* any work costing \$25,000 or more is subject to a Long Service Levy. The levy rate is 0.35% of the total cost of the work and shall be paid to either the Long Service Payments Corporation or Council. Under section 109F(1) of the Environmental Planning & Assessment Act, 1979 this payment must be made prior to commencement of building works.

#### AN7 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth Environment Protection and Biodiversity Conservation Act 1999 provides that a person must not take an action which has, will have, or is likely to have a significant impact on a matter of national environmental significance (NES) matter; or Commonwealth land, without an approval from the Commonwealth Environment Minister. This application has been assessed in accordance with the New South Wales *Environmental Planning and Assessment Act, 1979.* This assessment has not involved any assessment of the application of the Commonwealth legislation. It is the proponent's responsibility to consult Environment Australia to determine the need or otherwise for Commonwealth approval and you should not construe this grant of approval as notification to you that the Commonwealth Act does not have application. The Commonwealth Act may have application and you should obtain advice about this matter. There are severe penalties for non-compliance with the Commonwealth legislation.

# SCHEDULE 3

# STATEMENT OF COMMITMENTS

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# PART A — ADMINISTRATIVE CONDITIONS

### A1. Development Description

The Project Application is to permit the following:

- Bulk Earthworks
- Complete the residential subdivision of 554 lots.
- Upgrade Montefiore Street,
- Carry out landscape works
- Subdivide the site into 553 residential lots and 1 retail lot.
- Dedicate Village Park, Precinct Parks and roads to Council.

#### A2. Development in Accordance with Plans

The development shall be generally in accordance with the Catherine Hill Bay Project Application No.MP10-0204.

# PART B - GENERAL

#### B1. Development Control

The Proponent commits to a set of design guidelines setout in the Draft Development Control Plan. Future development is to comply with the approved DCP.

Responsibility – Proponent and Department of Planning

#### B2. Dedications

A plan of subdivision providing for dedication of the environmental offset lands has been previously approved and the subject land transferred to DECC.

Note

#### B3. Bushfire Management

Bushfire hazard will be managed consistent with Planning for Bushfire Protection Guidelines by:

- Use of fire trails.
- Installation of hydrants as appropriate APZ's implemented as required.

Asset Protection Zones managed as follows:

 On Torrens Title subdivision lots by incorporating the APZ into the individual lots with positive covenants applying management requirements;

Responsibility – Proponent and Occupants

#### B4. Land Contamination Investigation

To ensure the site is suitable for residential purposes additional assessment will be carried out as required. Site audits will be carried out as necessary to certify the suitability of the site for the proposed uses and according to SEPP55 Guidelines.

Responsibility – Proponent

#### **B5.** Mining Activities

The proponent will negotiate with the holders of Petroleum Exploration Licence No.s 5 and 446 to allow exploration prior to construction works.

Responsibility – Proponent

#### **B6.** Community Consultation

A detailed programme for future community consultation will be formalised by the proponent and agreed by the Department, within three months after the determination date of the Project Application to the satisfaction of the Department.

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Responsibility – Proponent

#### B7. Utilities

Utilities will be provided as follows:

- Provision of water and sewer services by Hunter Water;
- Collection of stormwater for open space irrigation
- Carefully managed and treated stormwater discharges.

Responsibility – Proponent and Hunter Water

#### B8. Traffic Management

- The intersection of Montefiore Street and Pacific Highway will be upgraded as agreed with RTA;
- Intersection of Hale Street and Flowers Drive to be re-designed to create an entry statement as well as creating a greater amenity to the existing corner property.
- The areas of Montefiore Street which are currently in private ownership will be dedicated to LMC.

#### Responsibility – Proponent and RTA

#### B9. Community and Other Facilities

The Proponent shall carry out the following facilities:

- Village Park to be landscaped and dedicated to LMC. For clarity the Village Park is that land between Hale Street and the existing village.
- Retail space will be provided as part of this proposal up to a maximum of 750sqm.

#### Responsibility – Proponent

#### B10. Submission of Subsequent Applications

Subsequent project applications for the development of the subject site will be in accordance with the approved Design Control Plan(DCP).

Responsibility – Future Applicant

#### **B11.** Developer Contributions

The Proponent will pay contributions in accordance with the Lake Macquarie City Council Section 94 Contributions Plan No.1 Citywide 2004 – Belmont Catchment. The total monetary contribution will be made up of dedication, monetary contribution and Works in Kind or any combination of them.

The Proponent will enter into a Deed of Agreement with Lake Macquarie Council.

#### Responsibility – Proponent/Department of Planning

#### B12. Regional Infrastructure

The Proponent proposes to make a monetary contribution or Works in Kind for the provision of regional infrastructure as determined by the state government generally in accordance with the principles setout in the Infrastructure Contributions Plan Circular PS08-017, 23<sup>rd</sup> December 2008. The Proponent has offered to enter into a Voluntary Planning Agreement with the Minister for the amount of **\$902.26 per urban lot.** 

Responsibility – Proponent/Department of Planning

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# B13. Council Dedications and Titling Arrangements

The following items are to be dedicated to LMC at no cost to the Council:

- Village Park
- Area of land 25m wide for a clifftop walk.
- Montefiore Parkway
- Hale Street
- All other roads within the development.
- Precinct Parks as shown on the plans.

All other land is to be Torrens Title freehold land.

# PART C-PRIOR TO ISSUE OF CONSTRUCTION CERTIFICATE

# **Design Details and Changes**

### C1. Landscaping and Bushfire Management

Detailed landscape plans are to be submitted to the Certifying Authority prior to the issue of a Construction Certificate. The landscape plans are to be generally in accordance with the approved plans. The plans are to show compliance with Planning for Bushfire Protection requirements for asset protection zones.

### C2. Aboriginal Heritage

Works are to be carried out generally in accordance with the Aboriginal Cultural Heritage Management Plan prepared by Insight Heritage. Details of complying with the key principles of the plan are to be submitted to the Certifying Authority.

### C3. Environmental Management

A management plan shall be submitted to the Certifying Authority in accordance with the recommendations outlined in the Ecological Assessment Report prepared by RPS. Details are to be submitted to the satisfaction of the Certifying Authority prior to the issue of the Construction Certificate.

### C4. Contamination

A Work Method Statement shall be submitted to the Certifying Authority in accordance with the recommendations setout in the Remedial Action Plan prepared by Geotech Solutions. Details are to be submitted to the satisfaction of the Certifying Authority prior to the issue of the Construction Certificate. The works carried out under the Work Method Statement must be certified by a DECC accredited auditor.

# C5. Erosion and Sedimentation Control

Details of groundwater and SEPP14 Wetland sampling analysis and locations as well as ongoing reporting requirements shall be submitted to the Certifying Authority in accordance with the recommendations setout in the Stormwater and Groundwater Monitoring Plan prepared by Geotech Solutions. Details are to be submitted to the satisfaction of the Certifying Authority prior to the issue of the Construction Certificate.

#### C6. Geotechnical

Provide a geotechnical report confirming classification of soil and that the footing design complies with AS2870. Details are to be submitted to the satisfaction of the Certifying Authority prior to the issue of the Construction Certificate.

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# PART D --- PRIOR TO COMMENCEMENT OF WORKS

#### D1. Notice to be Given Prior to Excavation

The PCA and Council shall be given written notice, at least 48 hours prior to the commencement of excavation works on the site.

#### D2. Traffic & Pedestrian Management Plan

Prior to the commencement of any works on the site, a Traffic and Pedestrian Management Plan prepared by a suitably qualified person shall be submitted to and approved by the Certifying Authority. The Plan shall address, but not be limited to, the following matters:

- (1) ingress and egress of vehicles to the site,
- (2) loading and unloading, including construction zones,
- (3) predicted traffic volumes, types and routes,
- (4) pedestrian and traffic management methods, and

The Applicant shall submit a copy of the approved plan to the Department.

#### D3. Noise and Vibration Management Plan

Prior to the commencement of any works on the site, a Noise and Vibration Management Plan prepared by a suitably qualified person shall be submitted to and approved by the Director. The Plan shall address, but not be limited to, the following matters:

- (1) Identification of the specific activities that will be carried out and associated noise sources,
- (2) Identification of all potentially affected sensitive receivers including residences, schools, and properties containing noise sensitive equipment,
- (3) The construction noise objective specified in the conditions of this consent,
- (4) The construction vibration criteria specified in the conditions of this consent,
- (5) Determination of appropriate noise and vibration objectives for each identified sensitive receiver,
- (6) Noise and vibration monitoring, reporting and response procedures,
- (7) Assessment of potential noise and vibration from the proposed construction activities including noise from construction vehicles and any traffic diversions,
- (8) Description of specific mitigation treatments, management methods and procedures that will be implemented to control noise and vibration during construction
- (9) Justification of any proposed activities outside the construction hours specified in the conditions of this consent.
- (10) Construction timetabling to minimise noise impacts including time and duration restrictions, respite periods, and frequency,
- (11) Procedures for notifying residents of construction activities that are likely to affect their amenity through noise and vibration,
- (12) Contingency plans to be implemented in the event of non-compliances and/or noise complaints,

The Applicant shall submit a copy of the approved plan to The Department.

#### D4. Construction Noise Objective

Approved silencing measures shall be provided and maintained on all power-operated plant used in demolition, excavation, earthworks, and construction of the building, or work.

# PART E - PRIOR TO SUBDIVISION CERTIFICATE

#### E1. Subdivision of Land

This consent allows for a 556 lot land subdivision. A subdivision certificate for complying development may be issued by an accredited private certifier under Division 3 of Part 23 of the Conveyancing Act 1919.

# E2. Registration of Easements

Prior to the issue of the relevant Occupation Certificate for subsequent project applications, the applicant shall provide to the PCA evidence that all easements required by this approval and subsequent project approvals, and other relevant consents have been or will be registered on the certificates of title.



Solo Water Pty Ltd CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN V.3

Attachment C – Network Operators Licence 16\_035


## **New South Wales**

## Water Industry Competition Act 2006 (NSW)

## Grant of network operator's licence Licence no. 16\_035

I, The Hon. Niall Blair MLC, Minister for Lands and Water, under section 10 of the Water Industry Competition Act 2006 (NSW), grant a network operator's licence to:

Catherine Hill Bay Water Utility Pty Ltd (ACN 163 381 922)

to construct, maintain and operate water industry infrastructure, subject to:

- (i) the conditions imposed by the Water Industry Competition Act 2006 (NSW);
- (ii) the conditions imposed by clause 9 and set out in Parts 1, 2 and 3 of Schedule 1 to the Water Industry Competition (General) Regulation 2008 (NSW);
- (iii) the conditions imposed by the Minister in the attached Schedule A, being special Ministerially-imposed licence conditions for Catherine Hill Bay Water Utility Pty Ltd's network operator's licence; and
- (iv) the conditions imposed by the Minister in the attached Schedule B, being standard Ministerially-imposed licence conditions for all licensed network operators.

Dated this 22 nd

Minister for Lands and Water day of March 2016



# NEW SOUTH WALES GOVERNMENT

## WATER INDUSTRY COMPETITION ACT 2006 (NSW)

# **NETWORK OPERATOR'S LICENCE**

## Catherine Hill Bay Water Utility Pty Ltd

(ACN 163 381 922)

## LICENCE SCOPE

## ACTIVITIES AUTHORISED UNDER THE LICENCE AND AREA OF OPERATIONS

## S1 Activities authorised - non-potable water

- S1.1 This Licence authorises the Licensee and any authorised persons specified in Table 1.1 to construct, maintain and operate the water industry infrastructure which is specified in Table 1.2, and is substantially consistent with the water industry infrastructure described in the Review of Environmental Factors:
  - a) for one or more of the authorised purposes specified in Table 1.3; and
  - b) within the area of operations specified in Table 1.4,

subject to the conditions imposed by or under the Act, the Regulation and this Licence.

## Table 1.1 Authorised persons

Solo Water Pty Ltd (ACN 160 013 614)

## Table 1.2 Water industry infrastructure

- 1) A treatment plant for non-potable water and other water infrastructure used, or to be used, in connection with the treatment plant, where components of the treatment plant or the other water infrastructure may also be used for one or more of the following:
  - a) production of non-potable water;
  - b) treatment of non-potable water;
  - c) filtration of non-potable water;
  - d) storage of non-potable water; and
  - e) conveyance of non-potable water.
- 2) A reticulation network for non-potable water and other water infrastructure used, or to be used, in connection with the reticulation network, where components of the reticulation network or the other water infrastructure may also be used for one or more of the following:
  - a) storage of non-potable water;
  - b) conveyance of non-potable water; and
  - c) treatment of non-potable water.

## Table 1.3 Authorised purposes

Toilet flushing, laundry machine cold water connection, irrigation of private lots and footpaths, outdoor cleaning and washdown (including car and bin washing).

## Table 1.4 Area of operations

Lot 100 DP1129872, Lot 101 DP1129872, Lot 106 DP1129872, Lot 1 DP1141989, Lot 1 DP1129299, Lot 103 DP1194707, Lot 101 DP1194707, Lot 102 DP1194707, Lot 213 DP883941, Lot 1 Section I DP163, Lot 1 Section K DP163, Flowers Drive Road Reserve, and Montefiore Street Road Reserve, Catherine Hill Bay.

## S2 Activities authorised – drinking water

- S2.1 This Licence authorises the Licensee and any authorised persons specified in Table 2.1 to construct, maintain and operate the water industry infrastructure which is specified in Table 2.2, and is substantially consistent with the water industry infrastructure described in the Review of Environmental Factors:
  - a) for the authorised purposes specified in Table 2.3; and
  - b) within the area of operations specified in Table 2.4,

subject to the conditions imposed by or under the Act, the Regulation and this Licence.

## Table 2.1 Authorised persons

Solo Water Pty Ltd (ACN 160 013 614)

## Table 2.2 Water industry infrastructure

A reticulation network for drinking water and other water infrastructure used, or to be used, in connection with the reticulation network, where components of the reticulation network or the other water infrastructure may also be used for one or more of the following:

- a) storage of drinking water;
- b) conveyance of drinking water; and
- c) treatment of drinking water.

## Table 2.3 Authorised purposes

Drinking water and fire water

## Table 2.4 Area of operations

- (a) The area of the transfer pump station on Lot 12 DP598580 and Lot 13 DP598580.
- (b) The area of the transfer pipeline on Lot 649 DP1027231, Lot 204 DP1164883, Lot 12 DP1180296, Lot 145 DP755266, Lot 105 DP1129872, Lot 100 DP1129872, Lot 101 DP1129872, Kanangra Drive, Pacific Highway Road Reserve, Montefiore Street Road Reserve, Catherine Hill Bay.
- (c) Lot 100 DP1129872, Lot101 DP1129872, Lot 106 DP1129872, Lot 1 DP1141989, Lot 1 DP1129299, Lot 103 DP1194707, Lot 101 DP1194707, Lot 102 DP1194707, Lot 213 DP883941, Lot 1 Section I DP163, Lot 1 Section K DP163, Flowers Drive Road Reserve, and Montefiore Street Road Reserve, Catherine Hill Bay.

## S3 Activities authorised – sewerage services

- S3.1 This Licence authorises the Licensee and any authorised persons specified in Table 3.1 to construct, maintain and operate the water industry infrastructure which is specified in Table 3.2, and is substantially consistent with the water industry infrastructure described in the Review of Environmental Factors:
  - a) for one or more of the authorised purposes specified in Table 3.3; and
  - b) within the area of operations specified in Table 3.4,

subject to the conditions imposed by or under the Act, the Regulation and this Licence.

## Table 3.1 Authorised persons

Solo Water Pty Ltd (ACN 160 013 614)

## Table 3.2 Water industry infrastructure

- 1) A treatment plant for sewage and other sewerage infrastructure used, or to be used, in connection with the treatment plant, where components of the treatment plant or the other sewerage infrastructure may also be used for one or more of the following:
  - a) production of treated non-potable water from sewage;
  - b) treatment of sewage;
  - c) filtration of sewage;
  - d) storage of sewage; and
  - e) conveyance of sewage.
- 2) A reticulation network for sewage and other sewerage infrastructure used, or to be used, in connection with the reticulation network, where components of the reticulation network or the other sewerage infrastructure may also be used for one or more of the following:
  - a) storage of sewage; and
  - b) conveyance of sewage.

## Table 3.3 Authorised purposes

Sewage collection, transport, treatment, effluent transfer to non-potable water system

## Table 3.4 Area of operations

Lot 100 DP1129872, Lot 101 DP1129872, Lot 106 DP1129872, Lot 1 DP1141989, Lot 1 DP1129299, Lot 103 DP1194707, Lot 101 DP1194707, Lot 102 DP1194707, Lot 213 DP883941, Lot 1 Section I DP163, Lot 1 Section K DP 163, Flowers Drive Road Reserve, and Montefiore Street Road Reserve, Catherine Hill Bay.

## INTERPRETATION AND DEFINITIONS

## Interpretation

In this Licence, unless the context requires otherwise:

- (i) the singular includes the plural and vice versa;
- (ii) headings are used for convenience only and do not affect the interpretation of this Schedule A;
- (iii) a reference to a document includes the document as modified from time to time and any document replacing it;
- (iv) a reference to a person includes a natural person and any body or entity whether incorporated or not;
- (v) a reference to a clause is to a clause in this Schedule A;
- (vi) a reference to a schedule is to a schedule to this Licence;
- (vii) a reference to a law or statute includes regulations, rules, codes and other instruments under it, and consolidations, amendments, re-enactments or replacements of them; and
- (viii) explanatory notes do not form part of this Licence, but in the case of uncertainty may be relied on for interpretation purposes.

## Definitions

Expressions used in this Licence that are defined in the Act or the Regulation have the meanings set out in the Act or the Regulation.

In this Licence:

Act	means the Water Industry Competition Act 2006 (NSW).			
Agreement	means any agreement or deed provided to IPART in connection with the Licensee's application for this Licence.			
Appropriate Facilities	means a facility or facilities with the capacity to accept excess recycled water or excess sewage from the Water Industry Infrastructure specified in clause S1 and Table 1.2 and clause S3 and Table 3.2, including during wet weather periods.			
Construction Environmental Management Plan ( <b>CEMP</b> )	means a site or project specific plan which, in relation to construction works:			
	<ul> <li>(a) complies with the basic structure detailed in the "Guideline for the Preparation of Environmental Management Plans", Department of Infrastructure, Planning and Natural Resources (2004); and</li> <li>(b) identifies the environmental risks associated with the licensed activities and the mitigation measures to be implemented.</li> </ul>			
IPART	means the Independent Pricing and Regulatory Tribunal of New South Wales established under the <i>Independent Pricing and Regulatory Tribunal Act 1992</i> (NSW).			
Licence	means this network operator's licence granted under section 10 of the Act.			

Licensee	means Catherine Hill Bay Water Utility Pty Ltd (ACN 163 38 922)		
Minister	means the Minister responsible for Part 2 of the Act.		
Operational Environmental Management Plan ( <b>OEMP</b> )	means a site or project specific plan which, in relation to the operational phase:		
	<ul> <li>(a) complies with the basic structure detailed in the "Guideline for the Preparation of Environmental Managemer Plans", Department of Infrastructure, Planning and Natural Resources (2004); and</li> <li>(b) identifies the environmental risks associated with the licensed activities and the mitigation measures to be implemented.</li> </ul>		
Review of Environmental Factors ( <b>REF</b> )	means the Review of Environmental Factors for the propose sewage treatment plant and sewage and recycled water reticulation systems (prepared for IPART by Planit Consultin Pty Ltd, August 2015).		
Reporting Manual	means the document entitled "Network Operator's Reporting Manual" which is prepared by IPART and is available on IPART's website at <u>www.ipart.nsw.gov.au</u> .		
Regulation	means the Water Industry Competition (General) Regulation 2008 (NSW).		

## SCHEDULE A - SPECIAL MINISTERIALLY-IMPOSED LICENCE CONDITIONS FOR CATHERINE HILL BAY WATER UTILITY PTY LTD'S NETWORK OPERATOR'S LICENCE

This schedule sets out the conditions which the Minister imposes pursuant to section 13(1)(b) of the Act. In addition to these special Ministerially-imposed conditions, the Licence is subject to conditions imposed by the Act, the Regulation and the standard Ministerially-imposed licence conditions set out in Schedule B. The Minister may vary the conditions in this schedule or impose new conditions, provided there is no inconsistency with the conditions imposed by the Act or the Regulation.

- A1 If a party to an Agreement proposes to:
  - a) terminate the Agreement;
  - b) novate the Agreement;
  - c) assign or transfer any of its rights or obligations under the Agreement to any other person; or
  - alter the Agreement in any way that materially reduces the Licensee's technical, financial or organisational capacity to carry out the activities authorised by this Licence,

the Licensee must provide IPART with written notice as soon as practicable, but no later than 3 months, before the time when the proposed action is to occur. The written notice must include details of how the service provided under the Agreement will be provided subsequent to the proposed termination, novation, assignment, transfer or alteration.

- A2 The Licensee is to implement environmental mitigation measures substantially consistent with the environmental risk mitigation measures identified in:
  - a) the Review of Environmental Factors (**REF**) in carrying out any activities authorised under clause S1 and S3 of this Licence.
- A3 The Licensee must not commence, or authorise the commencement of, construction of any water industry infrastructure which is:
  - a) described in Clause S1 and Table 1.2; and
  - b) described in Clause S3 and Table 3.2.

## (Relevant Recycling Infrastructure)

until after the Licensee has provided IPART with a Construction Environmental Management Plan (**CEMP**), and IPART has provided written approval of the CEMP to the Licensee.

- A4 In addition to any requirements imposed by or under the Act or the Regulation, the Licensee must not commence commercial operation of, or authorise commercial operation of, the Relevant Recycling Infrastructure until the Licensee has provided:
  - a) a report addressing how the environmental mitigation measures identified in the CEMP have been implemented during the design and construction of the Relevant Recycling Infrastructure (**Report**); and
  - b) an Operational Environmental Management Plan (OEMP),

to IPART, and IPART has provided written approval of the Report and the OEMP to the Licensee.

A5 The Licensee must operate and maintain the Relevant Recycling Infrastructure consistently with the OEMP.

- A6 If the Licensee proposes to vary its environmental mitigation measures referred to in clause A2, it must first notify IPART in accordance with the Reporting Manual. The Licensee must not vary its environmental mitigation measures without the prior written approval of IPART.
- A7 As at the date of this Licence, the Licensee must have an unconditional bank guarantee executed in its favour which is:
  - a) for a value of \$2.5 million (two million and five hundred thousand dollars); and
  - b) for a term of at least five years from the day of the grant of this Licence (and such further term as directed in writing by the Minister),

and provide a certified copy of the bank guarantee to the Minister or IPART on request.

- A8 The Licensee must not commence, or authorise the commencement of, construction of any water industry infrastructure described in clause S1.1 and Table 1.2 paragraph (1) until:
  - (a) the Licensee has provided IPART a report prepared by a suitably qualified environmental consultant on the Licensee's proposed strategy of tankering out excess non-potable water as set out in its REF. The report should include:
    - modelling of truck movements during significant wet weather events or periods in the 10 year period prior to the grant of this Licence at times when irrigation would not have been undertaken;
    - an estimation of the costs of trucking during those wet weather events or periods;
    - iii) identification of Appropriate Facilities that have the capacity to accept excess recycled water (including during wet weather periods);
    - iv) evidence of agreements with the Appropriate Facilities setting out the arrangements for accepting excess non-potable water; and
    - v) confirmation that the configuration and size of the non-potable water storage tanks (as described in the REF) is adequate for the activities authorised by the Licence or, if the configuration or size of the non-potable water storage tanks is not considered adequate, advice as to any changes required to the configuration or size of the non-potable water storage tanks; and
  - (b) IPART has provided written approval of the report.

A9 Before the Licensee brings the Water Industry Infrastructure described in Table 3.2 into commercial operation, the Licensee must provide written evidence of the following to IPART:

- a) details of Appropriate Facilities that have the capacity to accept excess sewage; and
- b) evidence of agreements with the Appropriate Facilities setting out the arrangements for accepting excess sewage,

and the Licensee must obtain IPART's written approval.

## SCHEDULE B - STANDARD MINISTERIALLY-IMPOSED LICENCE CONDITIONS FOR ALL LICENSED NETWORK OPERATORS UNDER THE ACT

This schedule sets out the standard conditions which the Minister imposes on the Licensee and all other licensed network operators pursuant to section 13(1)(b) of the Act. In addition to these standard Ministerially-imposed conditions, the Licensee is subject to obligations imposed by the Act, the Regulation and the special Ministerially-imposed licence conditions set out in Schedule A. The Minister may vary the conditions in this schedule or impose new conditions, provided there is no inconsistency with the conditions imposed on the Licensee by the Act or the Regulation.

## B1 Ongoing capacity to operate

B1.1 The Licensee must have the technical, financial and organisational capacity to carry out the activities authorised by this Licence. If the Licensee ceases to have this capacity, it must report this to IPART immediately in accordance with the Reporting Manual.

## B2 Obtaining appropriate insurance

- B2.1 Before commencing to commercially operate the Specified Water Industry Infrastructure under this Licence, the Licensee must:
  - a) obtain insurance that is appropriate for the size and nature of the activities authorised under this Licence;
  - b) provide a copy of each certificate of currency of the insurance obtained to IPART; and
  - c) demonstrate that the insurance obtained is appropriate for the size and nature of the activities authorised under this Licence by providing a report to IPART from an Insurance Expert that:
    - i) certifies that in the Insurance Expert's opinion, the type and level of the insurance obtained by the Licensee is appropriate for the size and nature of the activities authorised under the Licence; and
    - ii) is in the form prescribed by the Reporting Manual.

## B2.2 [Not applicable]

## B3 Maintaining appropriate insurance

- B3.1 The Licensee must maintain insurance that is appropriate for the size and nature of the activities authorised under this Licence.
- B3.2 The Licensee must provide a copy of each certificate of currency of the insurance maintained by the Licensee to IPART in accordance with the Reporting Manual.
- B3.3 If there is to be a change in:
  - a) the insurer or underwriting panel in respect of an insurance policy held by the Licensee; or
  - b) the type, scope or limit on the amount of insurance held by the Licensee,

in relation to the activities authorised under this Licence, the Licensee must provide a report to IPART in accordance with the Reporting Manual.

B3.4 From time to time when requested in writing by IPART, the Licensee must provide a report to IPART, in the manner, form and time specified by IPART, from an Insurance Expert certifying that in the Insurance Expert's opinion the type, scope or limit on the amount of the insurance held by the Licensee is appropriate for the size and nature of the activities authorised under this Licence.

[Note: The circumstances in which IPART may request a report under clause B3.4 include (but are not limited to) the following:

- where IPART has reason to believe that there may be a change in the type, scope or limit on the amount of insurance held by the Licensee in relation to activities authorised under this Licence;
- where there is a change in the type or extent of activities authorised under this Licence; or
- where IPART or an approved auditor has reason to believe that the type, scope or limit on the amount of insurance held by the Licensee may not be appropriate for the size and nature of the activities authorised under this Licence.]
- B3.5 The Licensee must maintain professional indemnity insurance during the Design Phase and for a minimum period of 6 years from the date of the completion of the Design Phase.

## B4 Complying with NSW Health requirements

- B4.1 The Licensee must carry out the activities authorised by this Licence in compliance with any requirements of NSW Health that:
  - a) IPART has agreed to; and
  - b) are notified from time to time to the Licensee by IPART in writing.

## **B5** Complying with Audit Guidelines from IPART

B5.1 The Licensee must comply with any Audit Guidelines issued by IPART.

## B6 Reporting in accordance with the Reporting Manual

B6.1 The Licensee must prepare and submit reports in accordance with the Reporting Manual.

## **B7** Reporting information in relation to the Register of Licences

- B7.1 Within 14 days of any change in relation to the following, the Licensee must notify IPART, and provide details, of the change in accordance with the Reporting Manual:
  - a) any source from which the water handled by the Specified Water Industry Infrastructure is derived;
  - b) the Authorised Purposes of the water handled by the Specified Water Industry Infrastructure;
  - c) the identity of each licensed retail supplier or public water utility that has access to the infrastructure services provided by the Specified Water Industry Infrastructure for the purpose of supplying water to its customers;
  - d) any other water infrastructure to which the Specified Water Industry Infrastructure is connected;
  - e) the identity of each licensed retail supplier or public water utility that has access to infrastructure services provided by the Specified Water Industry Infrastructure for the purpose of providing sewerage services to its customers;
  - f) any other sewerage infrastructure to which the Specified Water Industry Infrastructure is connected;
  - g) the arrangements for the disposal of waste from the Specified Water Industry Infrastructure.

## **B8** Monitoring

- B8.1 The Licensee must undertake any monitoring that is required for the purposes of this Licence, any Plan, the Act or the Regulation in accordance with this clause B8.
- B8.2 The Licensee must keep the following records of any samples taken for monitoring purposes specified in the Water Quality Plan:
  - a) the date on which the sample was taken;
  - b) the time at which the sample was collected;
  - c) the point or location at which the sample was taken; and
  - d) the chain of custody of the sample (if applicable).
- B8.3 The Licensee must ensure that analyses of all samples taken for the purposes of Verification Monitoring are carried out by a laboratory accredited for the specified tests by an independent body that is acceptable to NSW Health, such as the National Association of Testing Authorities or an equivalent body.

## **B9** Provision of copy of Plan

B9.1 Whenever the Licensee makes a significant amendment to a Plan, the Licensee must provide a copy of the amended Plan to IPART at the same time that it provides a copy to the approved auditor engaged to prepare a report as to the adequacy of the amended Plan, as required under the Regulation.

## **B10** Delineating responsibilities – interconnections

- B10.1 If a code of conduct has not been established under reg 25 of the Regulation, the Licensee must (by a date specified by IPART) establish a code of conduct (Licensee's Code of Conduct) in accordance with this clause B10.
- B10.2 The Licensee's Code of Conduct must set out the respective responsibilities of:
  - a) the Licensee; and
  - b) each licensed network operator, licensed retail supplier and/or public water utility that:
    - (i) supplies water or provides sewerage services by means of, or
    - (ii) constructs, maintains or operates any water industry infrastructure that is connected to the Specified Water Industry Infrastructure,

by, at a minimum, providing for:

- c) who is responsible for repairing, replacing or maintaining any pipes, pumps, valves, storages or other infrastructure connecting the Specified Water Industry Infrastructure to the other water industry infrastructure;
- d) who is responsible for water quality;
- e) who is liable in the event of the unavailability of water;
- f) who is liable in the event of failure of the Specified Water Industry Infrastructure;
- g) the fees and charges payable in respect of the use of the Specified Water Industry Infrastructure; and
- h) who is responsible for handling customer complaints.

- B10.3 Before the Licensee brings the Specified Water Industry Infrastructure into commercial operation or by a later date specified by IPART (if any), the Licensee's Code of Conduct must be agreed in writing between the Licensee and the other licensed network operators, licensed retail suppliers and/or public water utilities referred to in clause B10.2.
- B10.4 [Not applicable]
- B10.5 The Licensee must not contravene the Licensee's Code of Conduct to the extent that it makes the Licensee responsible or liable for the matters set out in it.

## B11 Notification of changes to end-use

B11.1 If the Licensee proposes to operate the Specified Water Industry Infrastructure to supply water for an end-use which is not set out in the most recent Water Quality Plan provided to IPART, the Licensee must notify IPART in writing at least 3 months before commencing such operation.

## B12 Notification of changes to Authorised Person

B12.1 If an Authorised Person ceases, proposes to cease, or receives notification to cease providing any of the services relating to the activities authorised by this Licence, the Licensee must provide IPART with written notice as soon as practicable but no later than 28 days before the date of cessation of the services. The written notice must include details of how the services previously undertaken by the Authorised Person will continue to be undertaken.

## B13 Notification of commercial operation

- B13.1 This clause B13 applies each time the Licensee has brought any of the Specified Water Industry Infrastructure into commercial operation.
- B13.2 The Licensee must:
  - a) notify IPART in accordance with the Reporting Manual that it has brought the relevant Specified Water Industry Infrastructure into commercial operation; and
  - b) provide such notification within 10 days after it has brought the relevant Specified Water Industry Infrastructure into commercial operation.

## INTERPRETATION AND DEFINITIONS

## Interpretation

In this Schedule B, unless the context requires otherwise:

- (i) the singular includes the plural and vice versa;
- (ii) headings are used for convenience only and do not affect the interpretation of this Schedule B;
- (iii) a reference to a document includes the document as modified from time to time and any document replacing it;
- (iv) a reference to a "person" includes a natural person and any body or entity whether incorporated or not;
- (v) a reference to a clause is to a clause in this Schedule B;
- (vi) a reference to a schedule is to a schedule to this Licence;

- (vii) a reference to a law or statute includes regulations, rules, codes and other instruments under it, and consolidations, amendments, re-enactments or replacements of them; and
- (viii) explanatory notes do not form part of this Licence, but in the case of uncertainty may be relied on for interpretation purposes.

## Definitions

Expressions used in this Schedule B that are defined in the Act or the Regulation have the meanings set out in the Act or the Regulation.

In this Schedule B:

Audit Guidelines	means the document entitled "Audit Guideline – Water Industry Competition Act 2006" which is prepared by IPART and is available on IPART's website at <u>www.ipart.nsw.gov.au</u> , and any other guidelines issued by IPART in relation to audits under the Act.			
Authorised Person	<ul> <li>means the authorised persons specified in, as applicable:</li> <li>(i) Licence Scope, clause S1, Table 1.1;</li> <li>(ii) Licence Scope, clause S2, Table 2.1; and</li> <li>(iii) Licence Scope, clause S3, Table 3.1.</li> </ul>			
Authorised Purposes	<ul> <li>means the authorised purposes specified in, as applicable:</li> <li>(i) Licence Scope, clause S1, Table 1.3;</li> <li>(ii) Licence Scope, clause S2, Table 2.3; and</li> <li>(iii) Licence Scope, clause S3, Table 3.3.</li> </ul>			
Design Phase	means the period during which any design works are carried out in relation to the water industry infrastructure that the Licensee is authorised to construct, maintain and operate under this Licence.			
Insurance Expert	means an insurance broker which holds an Australian financial services licence under Part 7.6 of the <i>Corporations Act 2001</i> (Cth) that authorises the broker to provide financial product advice for, and deal in, contracts of insurance within the meaning of Chapter 7 of that Act.			
Licensee's Code of Conduct	has the meaning given in clause B10.1.			
NSW Health	means the Water Unit of NSW Ministry of Health and any of the local health districts as defined by the NSW Ministry of Health.			
Plan	means any infrastructure operating plan, water quality plan or sewage management plan that the Licensee is required to prepare under the Regulation.			
Specified Area of Operations	<ul> <li>means the area of operations specified in, as applicable:</li> <li>(i) Licence Scope, clause S1, Table 1.4;</li> <li>(ii) Licence Scope, clause S2, Table 2.4; and</li> <li>(iii) Licence Scope, clause S3, Table 3.4.</li> </ul>			
Specified Water Industry	means the water industry infrastructure specified in, as applicable: (i) Licence Scope, clause S1, Table 1.2;			

Infrastructure	(ii) Licence Scope, clause S2, Table 2.2; and			
	(iii) Licence Scope, clause S3, Table 3.2.			
Verification	means verification monitoring as described in the document entitled			
Monitoring	"Australian Drinking Water Guidelines" or the document entitled "Australian Guidelines for Water Recycling" as the case may be.			
Water Quality Plan	means the water quality plan that the Licensee is required to prepare under the Regulation.			



Solo Water Pty Ltd CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN V.3

Attachment D – Project Sub-Plans

> Solo Water Pty Ltd CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN





Figure D1: Environmental control plan for overall site

Solo Water Pty Ltd CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN V.3





Figure D2: Environmental control plan for overall site

Solo Water Pty Ltd CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN V.3





Figure D3: Environmental control plan for overall site

#### Solo Water Pty Ltd CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN V.3





Figure D4: Site specific erosion and sediment control plan

#### Solo Water Pty Ltd CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN V.3





Figure D5: Site specific erosion and sediment control plan.





AREA OF OPERATIONS PLAN





## Appendix 10

APPROVED STORMWATER INFRASTRUCTURE

(3/B) 3 C-1029/ WWTP BUILDING GATE VALVE TO BE INSTALLED BETWEEN 2/E AND 2/F TO ALLOW DRAINAGE TO BE DIRECTED TO WASTE PUMP STATION — RO REJECT POND 02 1740m<sup>2</sup> CATHERINE HILL BAY Water DAC MBK BSE 7/06/2017 RE-ISSUED FOR APPROVAL DAC MBK BSE 17/01/2017 ISSUED FOR APPROVAL Water Utility Solutions FK MBK BSE 22/12/2016 SUBSOIL ADDED 30/11/2016 TENDER ISSUE FK MBK BSE Δ Rev. Date Description Des. Verif. Appd.

1058-05 -D 7 10' X82 4058-05 D-Base; TP Civil & Struct 05 D-20 itle;



SCALE 1:500

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Web: www.cardno.com.au

Drawn DAC	Date 28/06/2016	Client SOLO WATER			
Checked FK	Date 29/11/2016	Project CATHERINE HILL BAY	Status	OR APPROVAL	
Designed FK	Date 28/06/2016	WASTE WATER TREATMENT PLANT	FOR CONSTRU	CTION PURPOSES WHF	EN STAMPED
Verified	Date	CIVIL ENGINEERING DESIGN	DATUM	Scale	Size
MBK	30/11/2016	Title STORMWATER LAYOUT PLAN	AHD	1:500	A1
Approved			Drawing Number	· · ·	Revision
BSE	30/11/2016		SW-56-	-WWTP-C-1025	D

SCALE 1:500







@A'





INDISTURBL

FILTER ROLL Ø0.100m AGG. PIPE (3.000m LONG) COVERED WITH FILTER SOCK AND FILLED WITH 0.005m AGGREGATE —

Drawn DAC	Date 28/06/2016	Client SOLO WATE
Checked FK	Date 29/11/2016	Project CATHERINE HILL
Designed FK	Date 28/06/2016	
Verified MBK	Date 30/11/2016	
Approved		SOIL AND WATER
BSE	30/11/2016	



## SOIL AND WATER MANAGEMENT NOTES

PERMANENT BATTERS TO BE TOPSOILED (MIN 0.100m) AND HYDROSEEDED WITH APPROVED SEED MIX. 2. ALL FOOTPATHS AND DISTURBED AREAS TO BE HYDROSEEDED IMMEDIATELY UPON COMPLETION WITH SEED MIX APPROVED BY DEPT LAND AND WATER CONSERVATION. 3. TOPSOIL TO BE STOCKPILED AS SHOWN, WITH SEDIMENT FENCE PLACED DOWNSTREAM TO PREVENT LOSS OF

MATERIAL ALL DISTURBED AREAS ARE TO BE SEEDED WITH AN APPROVED SEED MIX. 4. SEEDED AREAS TO BE REGULARLY WATERED TO PROMOTE RAPID GROWTH.

ANY REVEGETATED AREAS WHICH FAIL TO ESTABLISH WITHIN THREE MONTHS MUST BE RE-SOWN. 6. ALL SOIL AND WATER MANAGEMENT DEVICES TO BE CHECKED AND MAINTAINED WEEKLY AND AFTER EACH STORM

EVENT TO ENSURE OPERATION AND PERFORMANCE. 7. ANY INCIDENTS ON SITE LIKELY TO CAUSE POLLUTION TO BE REPORTED IMMEDIATELY TO THE SUPERINTENDENT. 8. DUST SUPPRESSION EQUIPMENT TO BE AVAILABLE AT ALL TIMES (INCLUDING WEEKENDS, ROSTER DAYS AND

PUBLIC HOLIDAYS) TO REDUCE THE EMISSION OF DUST FROM THE SITE. 9. SEDIMENT CONTROL MEASURES TO BE REMOVED WHEN REVEGETATION IS COMPLETE.

10. HAULAGE VEHICLES TO REMAIN ON SEALED ROADS OR DEFINED TRACKS AT ALL TIMES WITHIN THE SITE. 11. BITUMEN DEFLECTORS TO BE PLACED ACROSS ROAD SHOULDER IF FINAL SEAL IS NOT TO BE PLACED

IMMEDIATELY.

12. EARTHWORKS AND TRENCHING TO BE STAGED TO KEEP WORK AREAS TO A MANAGEABLE SIZE 13. EXCAVATED MATERIAL FROM TRENCHES TO BE STOCKPILED UPHILL OF TRENCH UNTIL BACKFILLING

14. PUBLIC ROADS TO BE KEPT CLEAR OF DEBRIS AT ALL TIMES.

15. CONTRACTOR TO PROVIDE SHAKER PAD FOR VEHICLES ENTERING/LEAVING SITE.

	0	10	20	30	40	50m
	SCALE	1:500				@A1
:R						
BAY REATMENT PLANT		Status FOR CON	FOF STRUCTIC	R APPRO	<b>)VAL</b> SES WHEI	N STAMPED
ING DESIGN R MANAGEMENT PLAN		datum AHD		Scale 1	:500	Size A1
		Drawing Number SW-56-WWTP-C-1050				Revision C
		01	v-00-vvv		000	

