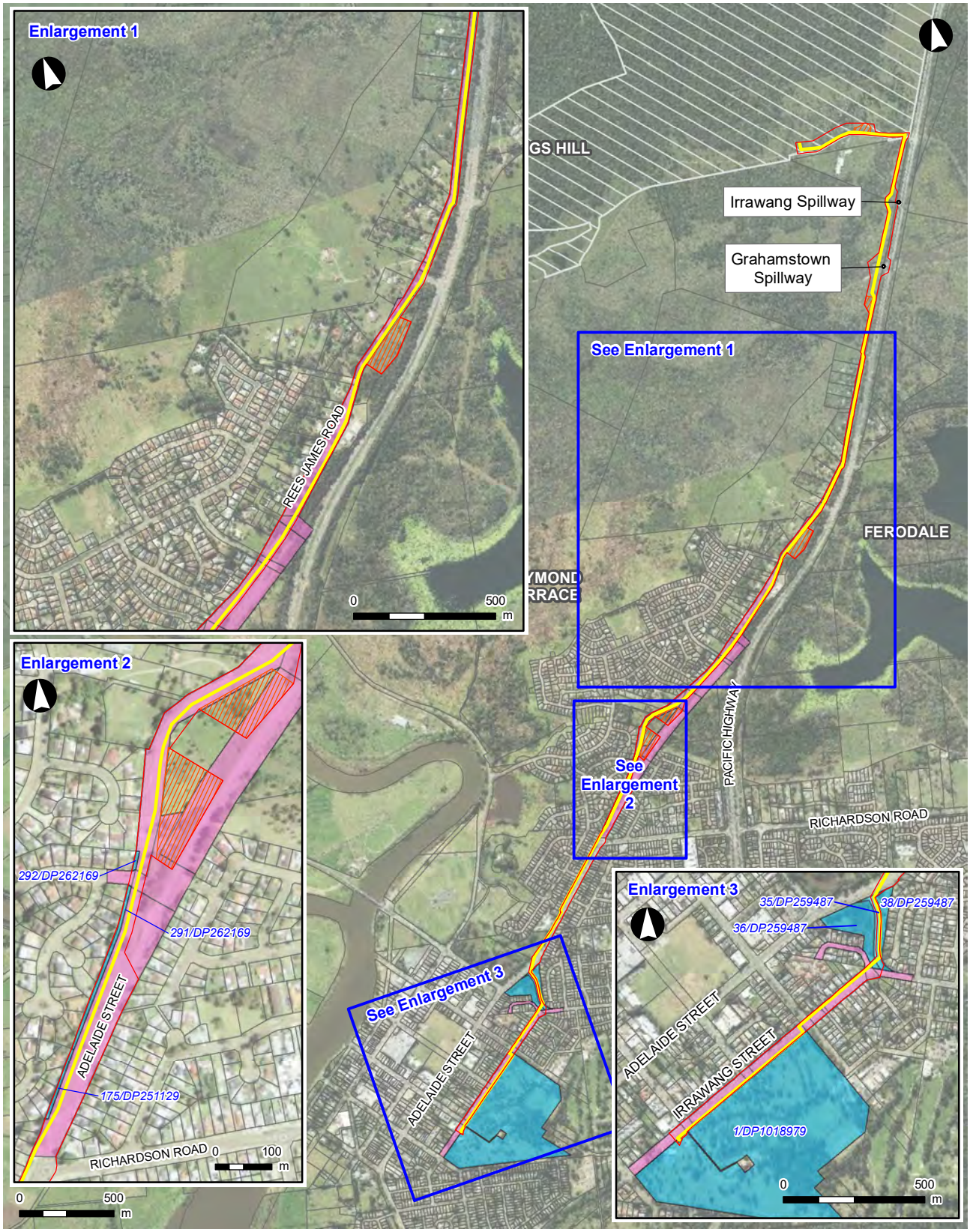


LEGEND

- Pipeline Construction Footprint
- Proposal alignment
- Council Land
- Road Reserve - Council
- Lot boundary
- Compound
- Kings Hill URA


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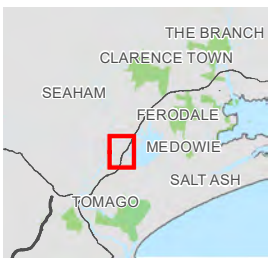


Figure 2-4 Port Stephens Council impacted lots


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Created by : LH
QA by : EM

# 3 PROPOSAL JUSTIFICATION, NEED AND OPTIONS CONSIDERED

## 3.1 Proposal need and strategic justification

The *Hunter Regional Plan 2036* (the Plan) is a 20-year blueprint for the future of the Hunter. The Plan outlines the NSW Government's land use planning priorities and decisions over the next 20 years, which includes the provision of more housing and greater housing choice throughout the Hunter region.

The Plan states that an additional 70,000 dwellings will be needed in the Hunter region by 2036, which will be provided through both infill and greenfield development. The Plan identifies Kings Hill URA as one of the three future housing opportunities for the Port Stephens LGA. Kings Hill URA is expected to yield in excess of 3,500 residential dwellings over a twenty-five-year period.

Land at Kings Hill comprises "greenfield" land and as such, there is currently no water and wastewater infrastructure present with the capacity to service the Kings Hill URA.

Therefore, to support the development of residential dwellings, as well as a town centre (including a school, commercial and mixed-use development) within the Kings Hill URA, the provision of water and wastewater infrastructure is needed, specifically:

- Pipes and pumping station(s) to convey wastewater from Kings Hill URA to a wastewater treatment works, where wastewater is treated before being discharged to waterways or reused
- Pipes to convey drinking water from an existing water main trunk to Kings Hill URA.

Therefore, the Proposal is considered necessary to support the additional housing goals for NSW strategic planning.

## 3.2 Consistency with strategic planning policies

### 3.2.1 Hunter Regional Plan 2036

The Proposal's consistency with the *Hunter Regional Plan 2036* (NSW Department of Planning and Environment, 2016) is described in Section 3.1. Specifically, the Proposal would support the following goals:

- Goal 2 - A biodiversity-rich natural environment, specifically:
  - Direction 14 – Protect and connect natural areas:

    The Proposal would support this direction by protecting areas of high environmental value through minimising impacts as part of the selected alignment and mitigation measures (in particular water quality and biodiversity offsets)
  - Direction 15 – Sustain water quality and security:

    The Proposal would support this direction by the construction and operation of a pipeline that would supply water to the Kings Hill URA, which mitigating water quality impacts on surface water flows
- Goal 4 – Greater housing choice and jobs, specifically:
  - Direction 26 – Deliver infrastructure to support growth and communities:

    The Proposal would support this direction by providing a water and wastewater supply pipeline and a WWPS to support the development of the Kings Hill URA.

The Proposal is therefore considered consistent with the relevant goals of the *Hunter Regional Plan 2036*.

### 3.2.2 Port Stephens Planning Strategy 2011-2036

The *Port Stephens Planning Strategy 2011-2036* (Port Stephens Council, 2008) identifies the development of the town centre at Kings Hill, located within the Primary Growth Corridor of the LGA, as a proposal that has the potential to greatly impact on economic growth and jobs in the LGA. The strategy also forecasts that Kings Hill will support a population of up to 11,000 people. The town centre and residential dwellings would all require connection to water and wastewater infrastructure, and therefore the Proposal is consistent with the overarching land use strategy.

### 3.2.3 Lower Hunter Regional Strategy 2006-2031

The *Lower Hunter Regional Strategy 2006-2031* (the Strategy), prepared by the Department of Planning, applies to five Local Government Areas (LGAs) with the primary purpose of ensuring adequate land is available and appropriately located to sustainably accommodate the projected housing and employment needs of the region's population over a 25-year period. Kings Hill development would support approximately 3,500 residential dwellings and a town centre, therefore by providing the necessary water and wastewater infrastructure to support the URA, the Proposal is consistent with the overarching strategy.

### 3.2.4 NSW 2021: A plan to make NSW number one

*NSW 2021: A plan to make NSW number one* (NSW 2021) (Department of Premier and Cabinet, 2011) is a 10-year plan to rebuild the economy, provide quality services, renovate infrastructure, restore government accountability, and strengthen local environment and communities. The Proposal would support the goals set by NSW 2021 through the provision of infrastructure that drives the state economy and improves people's lives and local environments. Additionally, the Proposal represents an investment in regional infrastructure that would secure potable water supplies to the growing community at Kings Hill URA.

## 3.3 Options considered

Three options were considered to meet the Proposal objective (Section 1.3):

- Option 1: Do Nothing
- Option 2: construction of Wastewater Option SE2 identified by SMEC (2014) and Water Option 3 identified by SMEC (2017)
- Option 3: construction of Water Option 3 identified by SMEC (2017) and alternate wastewater option identified by Northrop (2017).

### 3.3.1 Option 1: Do Nothing

Under Option 1, development of water and wastewater infrastructure would not occur.

Land at Kings Hill has been rezoned specifically to support the development of 3,500 residential dwellings and a town centre, and Kings Hill has been identified as a Future Growth Area of economic importance by *Port Stephens Planning Strategy 2011-2036*. However, given that there is currently no water and wastewater infrastructure present with the capacity to service Kings Hill URA, the provision of water and wastewater infrastructure is required to facilitate the development of the Kings Hill URA. Without

adequate water and wastewater infrastructure, the development of the Kings Hill URA could not feasibly occur.

As such, the “do nothing” option was not considered viable and was not considered further.

### 3.3.2 Option 2: Construction of Wastewater Option SE2 and Water Option 3 identified by SMEC (2017)

Under Option 2:

- The preferred option for wastewater infrastructure identified by *Kings Hill Development Wastewater Servicing Strategy* (SMEC 2014, Revision G) would be developed
- Stage 1 of the preferred option for water infrastructure identified by *Kings Hill Development Water Servicing Strategy* (SMEC 2017, Revision H) would be developed.

The preferred option identified by each strategy (Table 3-1) was selected following the review of several options for servicing Kings Hill URA. The option analysis considered technical constraints (including existing capacity), environmental constraints, performance of the infrastructure, maintenance requirements, stakeholder constraints and costs.

The preferred wastewater option was chosen due to the reduced lifecycle costs and staging benefits. The route selected is also within majority owned HWC-owned land, therefore limited acquisition costs would apply.

The preferred water option was chosen due to the ability to utilise capacity within the existing HWC system. This option is the most cost-effective servicing option and presents greater flexibility for a staged rollout for future water infrastructure that would be required.

*Table 3-1 Preferred options identified by Kings Hill water and wastewater strategies*

| Infrastructure | Description of preferred option |
|---|---|
| Wastewater | **Option SE2**[1]: A WWPS in the eastern catchment of Kings Hill URA connected to a series of rising mains and gravity mains which delivers flows to Raymond Terrace Waste Water Treatment Works (WWTW).<br><br>From the eastern WWPS, the alignment would traverse a portion of KHD-owned land within Kings Hill URA, before deviating south and traversing HWC-owned land. Within HWC-owned land, the alignment is located adjacent to the western margin of the Pacific Highway, crossing both Irrawang Spillway and Grahamstown Spillway, before deviating in a south-west direction where the alignment is located at the rear of properties along Holwell Circuit and Dalyell Way. The alignment would then deviate west until Newline Rd, then follow Newline Rd until it intersects with Seaham Rd. From here, much of the proposed alignment would be located in the verge of existing roads in urban and residential areas of Raymond Terrace, before crossing through Boomerang Park and connecting with Raymond Terrace WWTW.<br><br>Common trenching would be carried out where possible along the alignment. A trenchless crossing (i.e. underboring) would be required under Adelaide St in Raymond Terrace. To cross both Grahamstown Spillway and Irrawang Spillway, underboring or strapping the watermain to the underside of the Pacific highway bridge would be required. |
| Water | **Option 3:** Staged development of infrastructure that utilises available capacity within the existing HWC network. Stage 1 would consist of 6.7km of DN300 watermain, adjustment to pump set points and minor modification to surrounding pipework.<br><br>Connecting to an existing water pump station at Raymond Terrace, near the corner of Irrawang Street and William Street, much of the southern extent of the proposed alignment would be located in the verge of existing roads in urban and residential areas of Raymond Terrace. Common trenching would be carried out where possible along the alignment. A trenchless crossing (i.e. underboring) would be required under Adelaide St in Raymond Terrace. The alignment continues north, along the verge of Rees James Road. North of Rees James Road, the alignment traverses HWC-owned land, adjacent to the western margin of the Pacific Highway. To cross both Grahamstown Spillway and Irrawang Spillway, underboring or strapping the watermain to the underside of the Pacific Highway bridge would be required. At the northern extent of the alignment, the watermain would enter KHD-owned land within Kings Hill URA. |

[1] Additional wastewater infrastructure is identified in this option in SMEC 2014, Revision G. This infrastructure would be required to service Kings Hill URA as additional stages are developed and does not comprise part of the Proposal.

### 3.3.3 Option 3: Construction of Water Option 3 identified by SMEC (2017) and alternate wastewater option identified by Northrop (2017)

Under Option 3:

- The preferred option for water infrastructure identified by *Kings Hill Development Water Servicing Strategy* (SMEC 2017, Revision H) would be developed
- The alternate option for wastewater infrastructure identified by Northrop in December 2017 would be developed.

The water infrastructure proposed in Option 3 identified by SMEC (2017) is described in Table 3-1.

In December 2017, an addendum to *Kings Hill Development Wastewater Servicing Strategy* (SMEC 2014, Revision G) was prepared by Northrop.

The addendum compared the preferred wastewater infrastructure option identified by the strategy (i.e. proposed under Option 2) with an alternate option that more closely followed the preferred water infrastructure option alignment identified by *Kings Hill Development Water Servicing Strategy* (SMEC 2017, Revision H). The alignment of both wastewater options proposed under Option 2 and Option 3 are shown in Figure 3-1.

The alignment of Option 3 differs from the preferred wastewater infrastructure option alignment proposed under Option 2 by the proportion of the alignment that was located at the rear of properties along Holwell Circuit and Dalyell Way being relocated to the verge of Rees James Road. The alternate wastewater infrastructure would connect to the existing gravity network at a maintenance hole near Panorama Close (MH K1950).

This alternate option minimises the extent the rising main that traverses land mapped as a Coastal Wetland the Coastal Management SEPP, which is also land that HWC proposes to establish as a biodiversity stewardship site under the *Biodiversity Conservation Act 2016*. In addition, Option 3 is located on slightly higher elevation than the preferred wastewater infrastructure option proposed under Option 2, and as such, it is expected that the alternate option may encounter smaller areas of potential acid sulfate soils (PASS) and intercept less groundwater.


LEGEND

Kings Hill URA

NSW Coastal Management SEPP (2018):

Coastal Wetlands

Coastal Wetlands Proximity Area

Option 2

Option 3 (Preferred Option)

Existing Rising Main

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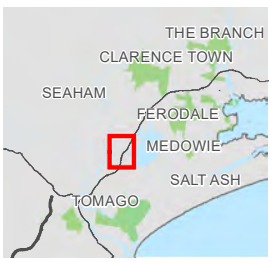


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Figure 3-1 Wastewater pipeline alignment options

## 3.4 Preferred option

Following consideration of environmental constraints, topography, conflicts with existing infrastructure, the location and capacity of existing HWC assets, and the outcomes of extensive consultation with HWC, it was determined that Option 3 is the preferred option for the Proposal.

Option 3 best meets the proposal objectives while minimising potential environmental impacts, due to the realignment of the wastewater infrastructure. Benefits of the wastewater infrastructure alignment proposed under Option 3 when compared to that proposed under Option 2 include:

- Reduces the overall length of wastewater rising main alignment, from approximately 4.8 kilometres to approximately 4.2 kilometres
- Avoids land that HWC proposes to establish as a biodiversity stewardship site
- Reduces the length of wastewater rising main alignment that traverses a Coastal Wetland from approximately 4.6 kilometres to approximately 960 metres
- Has a lower risk of encountering PASS
- Has a lower risk of groundwater dewatering required, due to higher topography of the alignment
- Connects to the existing gravity network, rather than Raymond Terrace WWPS, avoiding the need for an upgrade to support the proposed wastewater infrastructure
- Common trenching could be carried out with the water infrastructure alignment for almost the entire alignment of the wastewater infrastructure, thereby reducing the overall disturbance footprint of the Proposal.

The preferred option water and wastewater alignments are shown in Figure 4-10.

Key environmental issues and mitigation for the preferred option are outlined in Section 6.

### 3.4.1 Refinement of water infrastructure alignment

The southern portion of the water infrastructure alignment identified in *Kings Hill Development Water Servicing Strategy* (SMEC 2017, Revision H) has been further refined as part of the concept design.

Originally, the alignment followed Irrawang Street from the existing water pumping station north-east to Kangaroo Street, where the alignment turned north-west along Kangaroo Street to Adelaide Street. From here, the alignment followed Adelaide Street north-east to Reese James Road and the northern portion of the alignment.

The alignment has been refined to follow Irrawang Street from the existing water pumping station north-east to Newbury Park, where the alignment passes through the park to Adelaide Street and continues north-east to Reese James Road and the northern portion of the alignment.

This refinement of the alignment was undertaken to minimise the length of the alignment following along Adelaide Street, as this is a high traffic area (i.e. minimise traffic conflicts during construction). The refinement also limits the works to be completed in close proximity to the main area of the Raymond Terrace Grey-headed Flying-fox camp located in the Ross Wallbridge reserve.

The original and final (the Proposal) alignments are shown in Figure 3-2.


LEGEND

- Kings Hill URA
- Proposed water infrastructure alignment
- Alternate water infrastructure alignment

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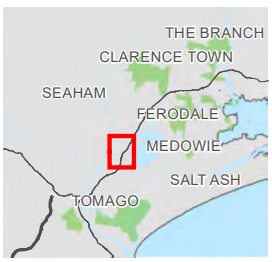


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Figure 3-2 Refinements to the water infrastructure alignment

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# 4 PROPOSAL DESCRIPTION

Approval for the Proposal is sought as Designated Development under Part 4 of the *Environmental Planning and Assessment 1979* (EP&A Act).

Included within this section of the EIS is a description of the built form of the Proposal, the indicative construction methodology, and the operational procedures to be implemented. This section should be read in conjunction with the Preliminary Design Drawings prepared by Northrop provided at Appendix B.

This proposal description has been prepared based on the design identified in Option 3 (the Preferred Option) (as described in Section 3.3.3). The Proposal design may be further refined and updated where practicable.

## 4.1 Proposal overview

Water and wastewater infrastructure would be developed to service the first stage of development of Kings Hill URA. Key components of the Proposal include:

- A water pipeline approximately 6.7 kilometres in length that would connect to existing Hunter Water Corporation (HWC) infrastructure in the south and Kings Hill URA in the north
- A wastewater pipeline approximately 4.2 kilometres in length that would connect to existing HWC infrastructure in the south and the wastewater pumping station (WWPS) to be constructed within Kings Hill URA in the north
- A WWPS within Kings Hill URA, including a hardstand area for vehicular access during operation
- Temporary compound areas to be utilised during construction.

An overview of the Proposal is shown in Figure 4-1. The alignment, built form, construction and operation of the Proposal is described in detail in the following sections (4.1.1 to 4.4).

The Proposal includes the connection of the URA to the existing water and wastewater services. The proposed pipelines terminate at the south of the URA. Further development of water and wastewater infrastructure (i.e. additional or upgraded infrastructure) would be required to service Kings Hill URA as additional stages are developed. This further development of water and wastewater infrastructure does not comprise part of the Proposal, i.e. is subject to future approval.


LEGEND

- Compound
- Kings Hill URA

NSW Coastal Management SEPP (2018):

- Coastal Wetlands
- Coastal Wetlands Proximity
- Proposed water and wastewater infrastructure alignment

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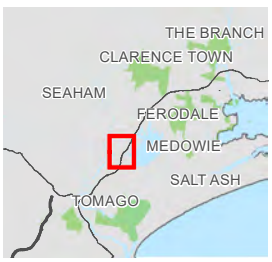


Figure 4-1 Context of the Proposal

### 4.1.1 Infrastructure alignment

In the south, the proposed watermain would connect to the existing Raymond Terrace Water Pump Station located near the intersection of Irrawang Street and William Street (Figure 4-2). The alignment of the watermain would be located in the road verge of Irrawang Street, Adelaide Street (Figure 4-3) and Rees James Road (Figure 4-4), and would pass through Council-owned land, Newbury Park, between Adelaide Street and Mount Hall Road (Figure 4-5).

The proposed wastewater rising main would be connected to the existing gravity network at a maintenance hole near Panorama Close (MH K1950). From this point, the alignment of both the watermain and wastewater rising main is shared and would be located in the verge of Rees James Road before entering HWC-owned land to the north of the end of Rees James Road.

Within the HWC-owned land, the alignment is located in proximity to the western side of the Pacific Highway and beneath an existing overhead electrical easement, from which trees and shrubs have been removed (Figure 4-6). The alignment would cross both Grahamstown Spillway (Figure 4-7), and further north, Irrawang Spillway (Figure 4-8).

North of Irrawang Spillway, the alignment deviates north-west into Kings Hill URA (Figure 4-9), where the wastewater rising main would connect to the proposed WWPS.

The alignment of the pipelines and associated infrastructure may be altered (subject to remaining within the construction footprint (refer to Sections 4.2 and 4.3)) during detailed design of the Proposal.

*Figure 4-2 Existing Raymond Terrace Water Pump Station, near the intersection of Irrawang Street and William Street*

*Figure 4-3 Grassy verge of Adelaide Street, Raymond Terrace*

*Figure 4-4 Grassy verge of Rees James Road, Raymond Terrace*

*Figure 4-5 Council-owned land - Newbury Park*

*Figure 4-6 Overhead electrical easement within HWC-owned land*

*Figure 4-7 Grahamstown Spillway within HWC-owned land, and Pacific Highway bridge across the Spillway*

*Figure 4-8 Irrawang Spillway within HWC-owned land*

*Figure 4-9 KHD-owned land within Kings Hill URA*

## 4.2 Built form

The water and wastewater pipelines would follow the same alignment, with the pipes laid on top of and surrounded by single sized aggregate embedment material in parallel trenches approximately 600 millimetres and 900 millimetres wide, respectively. The trenches would be a maximum of six metres deep and would be situated approximately 600 millimetres apart.

Where the pipelines would intercept already existing infrastructure, the alignments may be separated by a greater distance to avoid relocation of existing infrastructure. This would be confirmed as part of detailed design.

The pipes would be buried using excavated material and topsoil retained from the trench excavation. At sections of the alignment where open trenching is not possible, underboring would be the preferred method. This process is described in Table 4-1. Locations where this would occur includes, but is not limited to:

- Irrawang Spillway
- Grahamstown Spillway
- Adelaide Street.

The alternative option for crossing Irrawang and Grahamstown Spillways would be to attach the pipelines to existing above-ground spillway infrastructure or to the existing bridges where the Pacific Highway crosses the spillways. The final built-form approach (underboring or attaching to existing infrastructure) would be confirmed as part of detailed design.

This section should be read in conjunction with Figure 4-10.

### 4.2.1 Wastewater infrastructure

Wastewater infrastructure would be designed and constructed in accordance with the requirements of *Wastewater Supply Code of Australia (WSA 03) – Hunter Water Edition.* The wastewater infrastructure included in the Proposal is discussed below.

#### WWPS

A WWPS would be designed and constructed in accordance with HWC's specifications within the south-eastern portion of Kings Hill URA.

Underground infrastructure would generally include (but not be limited to):

- An induct and educt vent pipe
- Stop valves and reflux valves
- A valve pit
- A wet well constructed of concrete with gas-tight cover
- A collecting maintenance hole and flow relief structure pipework
- Water service pipes
- Electrical conduits and connections.

Aboveground infrastructure would include:

- An induct vent cover
- An educt vent stack
- A valve pit cover
- A maintenance hole cover
- The outlet point of the flow relief structure

- A water meter
- A standpipe and yard tap
- Septicity management system
- An electrical switchboard and connection box
- A concrete hardstand area and access track
- Security fencing, gates and/or chains, as required.

A flow relief structure would be incorporated into the WWPS design as an emergency precaution due to the potential for sewer overflows to occur. The structure would ensure flow relief occurs at a planned rather than an unplanned location.

The exact location of the WWPS would be determined during detailed design. Figure 4-10 identifies the area within which a final location would be chosen.

A pump station design report would be issued to HWC for review and approval during detailed design. This report would consider multiple aspects as required by HWC guidelines, including a separate Emergency Relief Overflow Structure Report that would provide further detail on the Emergency Relief Structure (ERS). Detail regarding the potential impacts of the WWPS and ERS on the surrounding environment during construction and operation is provided in Section 7.2.

### Pipeline

The wastewater pipeline would be approximately 4.2 kilometres long and would convey wastewater from the WWPS within Kings Hill URA in the north, to HWC's existing network in Raymond Terrace in the south.

From the wet well within the WWPS, wastewater would be pumped through a continuous rising main, constructed of polyvinylchloride (PVC), ductile iron with concrete lining (DICL) or polyethylene (PE), before connecting to a gravity main and discharging into the existing gravity network at a maintenance hole near Panorama Close (MH K1950) in Raymond Terrace.

Ventilation stacks would be constructed to provide effective odour removal along the wastewater pipeline. A stack is already located at MH 1950 where the proposed pipeline would connect to the existing gravity network. Additional stacks would be located at the WWPS and, where required, at high points along the alignment. The exact location of the stacks would be determined during detailed design.

## 4.2.2 Water infrastructure

Water infrastructure would be designed and constructed in accordance with the requirements of *Water Supply Code of Australia WSA – 2002-2.3 Hunter Water Edition.*

A watermain would convey potable water from HWC's existing network in Raymond Terrace in the south to Kings Hill URA in the north.

The watermain, constructed of polyvinylchloride (PVC), ductile iron with concrete lining (DICL) or polyethylene (PE), would be connected to an existing water pump station at Raymond Terrace, located near the intersection of Irrawang Street and William Street. Water would flow through the watermain about 6.7 kilometres to the south-eastern portion of Kings Hill URA.

Construction of this water infrastructure would also include adjustment to pump set points, and minor modifications to surrounding pipework at the existing water pump station at Raymond Terrace.

Hydrants and stop valves would be installed at regular intervals along the pipeline in easily accessible locations, as per HWC requirements.

A number of scour valves and air valves would be installed along the alignment at topographic low points and high points, respectively, as identified in the Preliminary Engineering Design Plans at Appendix B. These would be constructed as per HWC requirements.

A chorine injection point would be required at the northern end of the pipeline adjacent to KHD. The exact location of the point would be determined during detailed design. Figure 4-10 identifies the area within which a final location would be chosen. This point would be designed as per HWC specifications. Detail regarding the potential impacts of the chlorine injection point on the surrounding environment during construction and operation is provided in Sections 7.1 and 8.1.


LEGEND

- Compound
- Kings Hill URA
- Proposed wastewater pumping station
- Proposed water infrastructure alignment
- Proposed wastewater infrastructure alignment
- Chlorine injection point indicative location
- Existing manhole MH1950
- Existing water pumping station


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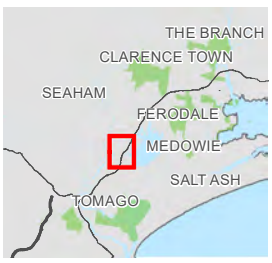


Figure 4-10 Water and wastewater infrastructure build form features


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### 4.2.3 Utilities interaction

The Proposal is designed to generally avoid interaction with existing utilities, such as power and gas lines, where practicable. The preferred option would be to lay the two pipes above the existing utilities infrastructure with minimum clearance achieved in accordance with Part 1, Table 5.5 of the *Water Supply Code of Australia (WSA 03 – 2011)* and Part 1, Table 5.4 of the *Gravity Sewerage Code of Australia (WSA 02 – 2014)*. Where interaction is unavoidable, utility providers would be consulted regarding the relocation of existing structures during detailed design. Utilities with which the Proposal would likely interact include:

- Electrical
- NBN
- Gas
- Telstra
- Optus
- Stormwater
- Water
- Wastewater

The Proposal would connect to existing HWC infrastructure in Raymond Terrace. HWC has been consulted regarding connection to existing infrastructure and access to HWC property (refer to Section 6 of this EIS).

### 4.2.4 Subdivision and easements

The Proposal would connect to existing HWC infrastructure in Raymond Terrace. HWC has been consulted regarding connection to existing infrastructure and access to HWC property (refer to Section 6 of this EIS).

## 4.3 Construction

Construction of the Proposal would be undertaken generally in accordance with HWC Standard Technical Specifications and Water Services Association of Australia (WSAA) Codes, including, but not limited to:

- *Hunter Water Corporation Standard Technical Specification for Construction of Sewer Rising Mains (STS403)*
- *Hunter Water Corporation Standard Technical Specification for Construction of Submersible Sewage Pumping Stations (STS402)*
- *Hunter Water Corporation Standard Technical Specification for Chemical Storage and Delivery Systems (STS670)*
- *Hunter Water Corporation Standard Technical Specification for Environmental Protection Measures for Construction sites (STS900)*
- *Wastewater Supply Code of Australia (WSA 02-2014) – Hunter Water Edition*
- *Water Supply Code of Australia (WSA 03 – 2011) – Hunter Water Edition.*

An overview of the construction footprint for the Proposal is shown in Appendix C.

### 4.3.1 Scheduling and staging

Construction for the Proposal would be likely to begin in first quarter of 2020 and last approximately nine (9) months. Construction would be likely to occur concurrently in multiple decentralised work zones, and as such work would be at various stages at different points within the Proposal site. Construction in the vicinity of Adelaide Street

between William Bailey Street and the Sleepy Hill Motor Inn, as well as construction through Newbury Park (as identified in Figure 4-11), would occur between March and August only (refer to Section 7.3.4). Construction along the remainder of the alignment would occur year-round.

The final construction program would be determined prior to construction and be subject to the timing of the KHD URA development (separate approvals and market demands).

An indicative sequence of construction is provided in Table 4-1. The construction works have been divided into seven ‘works stages’ which are interrelated and would potentially overlap. Subject to confirmation from the construction contractor, the order and staging of these construction works periods may change.


LEGEND

- Development site
- Construction Constraints
- Proposed water infrastructure alignment

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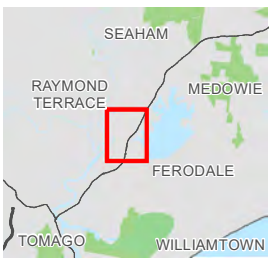


ARCADIS

Figure 4-11 Construction Time Constraints

Date: 22/10/2019 Path: \\HC-AUS-NS-FS-01\jobs\AA006855\L-GIS\A_Current\B_Maps\Pipeline_EIS\EIS\KHD_PipelineEIS_005_GreyHeadedFlyingFox_A4P_v4.mxd
Created by : AB
QA by : EM

*Table 4-1 Indicative sequencing of construction works*

| Works stage | Description |
|---|---|
| 1. Site establishment | • Establishment of formal site access<br>• Establishment of construction compounds and stockpile areas<br>• Installation of construction environmental management measures (e.g. erosion and sediment control)<br>• Delivery of site materials<br>• Installation of site fencing<br>• Survey of alignment and placement of alignment pegs. |
| 2. Vegetation clearing | • Tree protection areas established (“no-go” zones)<br>• Clearing of groundcover and vegetation within the construction footprint and compound areas<br>• Stockpiling of topsoil in compound areas for reuse throughout construction, as discussed in Section 4.3.5. |
| 3. Trenching and underboring | • Excavation of trench<br>• Dewatering of open trench, if necessary<br>• Management of acid sulphate soils<br>• Underboring in certain locations. This process would generally include:<br>– Excavating launch and retrieval pits<br>– Erect under bore rig<br>– Pilot bore<br>– Bore and drag the casing.<br>• Excavated material and topsoil would be stockpiled for reuse or disposed of appropriately (as presented in Sections 7.1 and 7.6) if contaminated. |
| 4. Installation of water and wastewater pipelines | • Bedding material placed at the bottom of the trench<br>• Laying of pipes<br>• In the case of under bored areas, pipe would be fed through the casing, the annulus would be grouted, and the pipe would be connected. |
| 5. WWPS construction | • Excavation of a pit and placement of appropriate foundations in the base of the pit<br>• Management of acid sulphate soils<br>• Dewatering of pit, if necessary<br>• Construction of the concrete wet well<br>• Mechanical installation of pumps, valves and fittings<br>• Installation of electrical components<br>• Construction of adjacent hardstand area. |
| 6. Connection to existing HWC infrastructure | • Commissioning of proposed pipelines<br>• Connection to live water and wastewater systems |
| 7. Site restoration | • Backfill trench using stockpiled excavated material and topsoil |

| Works stage | Description |
|---|---|
| | • Landscaping and restoration of surfaces to pre-construction condition where practicable<br>• In the case of under bored areas, backfill the launch and retrieval pits<br>• Removal of construction environmental management measures where not required for operation. |

## 4.3.2 Plant and equipment

A range of plant and equipment would be required for the construction of the Proposal. This includes, but is not limited to:

- Excavators
- Tipper trucks
- Light vehicles
- Flat-bed delivery trucks
- Rollers
- Skid steers
- Street sweepers
- Water carts
- Boring machines
- Jackhammers
- Mobile cranes
- Backhoes
- Compactor
- Concrete agitators (or similar)
- Concrete pumps
- Concrete saws
- Air compressors
- Dozers
- Mulchers
- Piling rigs
- Forklifts
- Small earthmoving equipment
- Welder.

## 4.3.3 Construction hours and workforce

### Construction hours

The proposed working hours for construction activities (including the delivery of plant and equipment) would be limited to recommended standard hours outlined by *Interim Construction Noise Guideline* (DECC 2009) for the majority of the works, where feasible and reasonable. These standard construction hours are:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- Sunday and public holidays: No work.

Some additional construction works would be undertaken outside of standard daytime construction working hours. This may include:

- Cut in to existing live water and wastewater networks[2]
- Crossing of roads including (but not limited to) Irrawang Street, Adelaide Street, Tregenna Street and Alton Road, if open trenching methodology required
- Relocation of other services, if required.

In addition to the above, outside of hours works may also include:

- Any works which would not result in audible noise emissions at any nearby sensitive receptors or an outside of hours noise protocol would be prepared
- The delivery of oversized plant and/or structures that police or other authorities determine require special arrangements to transport along public roads
- Emergency work to avoid the loss of lives, property and/or to prevent environmental harm
- Maintenance and repair of public infrastructure where disruption to essential services and/or consideration of worker safety do not allow work within standard construction hours
- Public infrastructure works that shorten the length of the project and are supported by noise-sensitive receivers
- Construction works where it can be demonstrated and justified that these works are required to be undertaken outside of standard construction hours (e.g. during connection of water and wastewater infrastructure when shutdowns are necessary).

Extended hours could include the above works and any the considered suitable may be undertaken 24 hours, six (6) days a week.

## Construction workforce

It is anticipated that approximately 34 to 55 personnel would be required during the construction of the Proposal. The total construction workforce would include (but not be limited to) the following:

- tradespeople and construction personnel
- sub-contractor construction personnel
- engineers
- functional and administrative staff.

The construction work areas would consist of a central site shed with approximately four to five (5) decentralised work zones in operation at any one time. Approximately 4 to 5 people would be anticipated at the site shed, and 6 to 10 people at each work zone. Therefore, approximately 34 to 55 people would be anticipated on site at any one time.

[2] This may require the temporary shut-down (at night) of existing services.

### 4.3.4 Earthworks

The Proposal would require the excavation of approximately 78,000 cubic metres of excavated material and topsoil during trenching and underboring. Where practicable and subject to its suitability, excavated soil would be reused on-site for foundation preparation, levelling works, access track maintenance and backfilling of trenches and boring pits at the completion of construction. Potential construction traffic, noise and air quality related impacts associated with earthworks activities are described and assessed in Section 7.9, Section 7.8 and Section 7.7 of this EIS, respectively.

Excavated soil which is not considered suitable for re-use on site would be temporarily stockpiled within the compound area and then transferred off site. All soil to be transferred off site would be tested and deposited at a suitable collection facility based on its determined category. Fill would be imported to site as required.

A preliminary Cut and Fill Plan has been prepared by Northrop and is provided at Appendix K.

### 4.3.5 Soil and water management

#### Erosion and sediment control

Temporary construction erosion and sediment control measures that would be implemented prior to construction of the Proposal include sediment fences, temporary sediment ponds, shaker grids and/or wash down areas at all vehicle access points, and sandbags (or similar) for protection of all existing stormwater infrastructure. These control measures would be constructed, monitored and maintained by the contractor in accordance with relevant guidelines (refer to Section 4.3.10).

#### Stockpiling of excavated material and topsoil

Excavated material and topsoil would be stockpiled within designated compound areas (refer to Section 4.3.6). Stockpiling may also occur in the vicinity of the trench within the construction footprint of the Proposal. The stockpiles would be temporary in nature and would be removed at the completion of construction.

#### Encountering groundwater

Interaction with groundwater is considered likely due to the depth of the pipes. Any temporary or permanent interaction would be confirmed following geotechnical studies during detailed design. Where dewatering would be required as a result of trenching or underboring activities, it would be undertaken to limit discharge of groundwater to the environment and maintain safe construction work environment. An aquifer interference licence would be obtained in accordance with the *Water Management Act 2000*, as described in Section 5.

#### Encountering surface water

The alignment of the Proposal would cross a number of drainage lines. Construction would be undertaken during dry weather, when there is anticipated to be no water present. If water is present at the time of construction, dewatering of the drainage lines would be required and a temporary diversion would be installed with the use of a dam structure such as a low flow earth mound or coffer dam, with water pumped (mechanically) around the site. Water diversion would be undertaken in accordance with relevant guidelines and would only occur during construction. Pre-construction conditions would be re-established at the completion of construction, where practicable.

### Encountering acid sulfate soils

The Port Stephens LEP Acid Sulfate Soils mapping identifies the Proposal site as Class 5 category, the lowest probability of encountering acid sulfate soils. However, the Proposal site also marginally intersects a Class 3 category soil at the northern portion of the Proposal site. Therefore, there is potential for acid sulfate soils to be encountered, disturbed, exposed and/or drained during excavation works (refer to Section 7.1).

An Acid Sulphate Soil Management Plan (ASSMP) would be prepared for any Classed 3 category soils to be excavated within the Proposal site. Subject to the implementation of the ASSMP, the Proposal is not anticipated to result in any adverse impact on classed soils.

In the event that acid sulfate soils are encountered during construction, work would cease in the vicinity and an environmental consultant would be engaged to advise on the appropriate course of action in accordance with relevant guidelines (refer to Section 4.3.10).

## 4.3.6 Compound areas

A minimum of five (5) compound would be established as presented in Figure 4-1. These compound areas would be set up during the site establishment stage and would be utilised throughout the construction of the Proposal. The primary compound area would be located within KHD-owned land at the northern extent of the Proposal. Secondary compounds would be located on HWC-owned land south of Grahamstown Spillway, Rees James Road near Kuranga Avenue, land between Rees James Road and Adelaide Street and adjacent to the existing water pump station on Irrawang Street.

It is anticipated that the compound areas would generally include, but not be limited to, the following:

- Site shed (office) and amenities
- Staff parking areas
- Equipment storage
- Laydown areas for construction materials (e.g. pipes, fittings, pre-cast concrete components)
- Stockpiling of excavated materials and soil
- Bunded chemical and/or fuel storage areas.

Additional compound areas may be required during construction of the Proposal. The location of these would be determined prior to and during construction. To ensure that associated impacts are minimised, any compound areas would comply with the following criteria for site selection:

- readily available access to the local road network
- relatively level land
- greater than 50m from a watercourse
- greater than 50m from threatened species and endangered ecological communities
- greater than 100m from a residential dwelling
- no requirement to remove any native vegetation
- no impact on any heritage items (Indigenous or non-Indigenous)
- not unreasonably affect the land use of adjacent properties.

Compound areas would be temporary in nature and removed from site upon completion of the works.

### 4.3.7 Site access and traffic management

The majority of the alignment of the Proposal is on the road verge, and therefore access would be via the adjacent roads. The two locations where this would not be feasible would be:

- Hunter Water land – the water and wastewater pipelines would be constructed adjacent to an existing gravel track that runs beneath existing overhead power lines. Site access to Hunter Water-owned land would be through gates at the northern end of Rees James Rd and the Riding for Disabled lot
- KHD site – the existing access track to the site would be adopted, ensuring that safe access is maintained.

Traffic management would likely be required where open trenching occurs in close proximity to local roads (therefore requiring a minimum safe distance for workers from live traffic) and where underboring is proposed to occur, such as (but not limited to) under Adelaide Street in Raymond Terrace. No traffic management along the Pacific Highway is anticipated to be required.

Open trenching along the road verge in front of residential properties may result in temporary changes to property access, where open trenching intersects driveways.

Temporary pedestrian diversions would likely be required where open trenching conflicts with public footpaths.

Further details of site access and traffic management associated with the Proposal are described and assessed in Section 7.9 of this EIS.

### 4.3.8 Commissioning of assets

The water and wastewater pipelines would be commissioned in sections as construction progresses. Commissioning would involve flushing the pipelines with potable water to remove any debris present. The water pipeline would also likely need to be disinfected, which would involve super-chlorinating the pipe until two consecutive water quality samples show no faecal coliforms present. The pipe would be dechlorinated using sodium thiosulfate (or equivalent) before water is discharged. Disinfection would not be necessary for the wastewater pipe. Hunter water protocols will be followed.

Between approximately 800 and approximately 1,500 kilolitres of water would be discharged to land or adjacent waterways during pipeline commissioning. The variance in the amount of water required is due to the quantity of debris that needs to be flushed from the pipeline and the requirement to achieve safe water quality levels.

### 4.3.9 Rehabilitation

Upon construction completion, site rehabilitation works would be undertaken where practicable. This would include:

- Earthworks to reinstate previous topography
- Decommissioning of compound areas
- Stabilising disturbed soils in accordance with relevant guidelines
- Removal of water diversion and reinstatement of flows
- Removal of erosion and sediment controls.

### 4.3.10 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) would be prepared prior to the construction of the Proposal. The CEMP would provide the framework for the management of all potential environmental impacts resulting from the construction

activities. The CEMP would be prepared based on the mitigation and management measures in the EIS (refer to Section 11) and the conditions of approval.

## 4.4 Operation

Table 4-2 provides a description of indicative operational works associated with the Proposal.

*Table 4-2 Indicative operational works*

| Work stage | Description |
|---|---|
| 1. Routine delivery of water | ▪ The Proposal would be expected to deliver approximately 1,080 megalitres of water to Kings Hill URA per year |
| 2. Routine pumping of wastewater | ▪ The Proposal would be expected to pump approximately 1,420 megalitres of wastewater away from Kings Hill URA per year |
| 3. Inspection and maintenance of water and wastewater pipelines | ▪ Routine maintenance and inspections would be carried out at<br>o valve, hydrant and/or scour locations<br>o chlorine injection point<br>o the WWPS<br>▪ This would occur sporadically throughout the year, or as required in the instance a fault is detected<br>▪ 1-5 personnel expected per inspection/ maintenance activity |
| 4. Inspection and maintenance of chlorine injection point | |
| 5. Inspection and maintenance of the WWPS | |

# 5 STATUTORY PLANNING APPROVALS

## 5.1 Overview

This section provides an overview of the relevant legislation and planning instruments applicable to the Proposal. The SEARs relating to the statutory planning approvals for the Proposal, and a summary of where it is addressed, is presented in Appendix A.

## 5.2 Commonwealth Legislation

### 5.2.1 Environmental Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined in the Act as Matters of National Environmental Significance (MNES) – as well as to govern actions undertaken on Commonwealth land. The MNES that are protected under the EPBC Act are:

- World heritage properties
- National heritage places
- Wetlands of international importance (listed under the Ramsar Convention)
- Threatened species and ecological communities
- Migratory species protected under international agreements
- Commonwealth marine areas
- The Great Barrier Reef National Park
- Nuclear actions (including uranium mines).

Under the EPBC Act, actions that have, or are likely to have, a significant impact on a MNES requires approval from the Australian Government Minister for the Department of the Environment and Energy (DotEE) (the Minister). Assessments have been prepared for potential impacts to MNES in the Biodiversity Development Assessment Report (BDAR) prepared by Arcadis (Appendix D) in accordance with the *Matters of National Environmental Significance: Significant impact guidelines 1.1* (Commonwealth of Australia, 2013).

## 5.3 NSW Legislation

### 5.3.1 Environmental Planning and Assessment Act 1979

The EP&A Act and EP&A Regulation provide the regulatory framework for planning approval and environmental assessment in NSW. The EP&A Act sets out how land in NSW is to be developed and managed, including the process for making environmental plans and requirements for development assessment.

The Proposal triggers the requirements for Designated Development under Part 4 of the EP&A Act, as the Proposal will involve development within a mapped Coastal Wetland listed under *State Environmental Planning Policy – Coastal Management (2018)* (Coastal Management SEPP), as defined by Part 2, Division 10(2) of the Coastal Management SEPP (refer to Section 5.4.5 or further detail). While the majority of the Proposal is located outside of a mapped wetland, for simplicity, the Applicant is seeking approval for the entire proposal as Designated Development.

A DA in respect of a Designated Development must be accompanied by an EIS prepared by or on behalf of the Applicant in the form prescribed by the regulations.

## 5.3.2 Biodiversity Conservation Act 2016

The purpose of the *Biodiversity Conservation Act 2016* (BC Act) is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act replaced and repealed the *Threatened Species Conservation Act 1999* (TSC Act) on 25 August 2017.

The BC Act incorporates broadly similar objectives to those identified the TSC Act, and additionally seeks to establish a framework for assessment and offsetting of development impacts as well as investment in biodiversity conservation. T

he NSW Biodiversity Offsets Scheme (BOS) is established under Part 6 of the BC Act and the Biodiversity Assessment Method (BAM) is established under Section 6.7 of the BC Act. The purpose of the BAM is to prescribe requirements for the assessment of certain impacts on threatened species and Threatened Ecological Communities (TECs), and their habitats, and the impact on biodiversity values, where required under the BC Act.

For proposals assessed under Part 4 of the EP&A Act, the application for development consent must be accompanied by a Biodiversity Development Assessment Report (BDAR) as required by the BAM if it is likely to 'significantly impact on threatened species'. The thresholds for determining whether the Proposal is likely to significantly impact on threatened species are defined in Clause 7.1(1b) of the *Biodiversity Conservation Regulation 2017* and include:

- The clearing of native vegetation on land included on the Biodiversity Values Map; or
- The clearing of native vegetation exceeding the following thresholds:
  - 0.25 hectares or more for minimum lot size less than 1 hectare
  - 0.5 hectares or more for minimum lot size less than 40 hectares but not less than 1 hectare
  - 1 hectare or more for minimum lot size less than 1,000 hectares but not less than 40 hectares
  - 2 hectares or more for minimum lot size 1,000 hectares or more.

The Proposal occurs on land identified on the Biodiversity Values Map which triggers the threshold for entry into the BOS. Accordingly, a BDAR (Appendix D) has been prepared by Arcadis, an accredited assessor under the BAM.

The BDAR identifies how the Applicant proposes to avoid and minimise impacts, any potential impact that could be characterised as serious and irreversible, and any obligation required to offset the likely biodiversity impacts of the proposal. Further information is provided in Section 7.3.

## 5.3.3 Fisheries Management Act 1994

The *Fisheries Management Act 1994* (FM Act) provides for the identification, conservation and recovery of threatened fish, aquatic invertebrates and marine vegetation. The Act also covers the identification and management of key threatening processes which affect threatened species or could cause other species to become threatened.

If a planned development or activity is likely to have any impact on a threatened species listed under the FM Act, an Assessment of Significance must be undertaken. If the impacts are likely to be significant, or if critical habitat is affected, a species impact statement must be prepared.

Irrawang Spillway and its tributaries are mapped as Key Fish Habitat by NSW DPI (2007) as shown in the BDAR (Appendix D). Key Fish Habitat is not defined in the FM Act, however one of the objectives of the FM Act is to conserve key fish habitats.

Under Clause 201 of the FM Act, a permit is required for dredging and reclamation. The Proposal would require dredging and reclamation at the Kings Hill URA watercourse, where trenching is required for pipeline installation triggering the requirement for a permit. As prescribed under Clause 219 of the FM Act, fish passage must not be blocked.

Other second order streams would also occur within the Proposal site, such as watercourses associated with Irrawang Spillway and Grahamstown Spillway. In addition to these second order streams, there is a first order stream immediately downslope of the central compound that drains to Grahamstown Dam.

### 5.3.4 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) establishes a regulatory framework for the protection and restoration of the environment. It provides a mechanism for licensing for certain activities, listed in Schedule 1 of the POEO Act.

The current Raymond Terrace Waste Water Treatment Works (WWTW) Environment Protection Licence (EPL) (No. 217) includes both the WWTW and the associated reticulation system that is owned and operated by HWC. The current Raymond Terrace WWTW EPL (No. 217) includes an annual maximum discharge of 1,000 to 5,000 megalitres and a daily maximum discharge of 90,000 kilolitres. The daily quantity of wastewater transferred through the proposed WWPS would be approximately 1,420 megalitres of wastewater per year and 3,890 kilolitres per day, which is covered under the current EPL. Therefore, a separate EPL under Schedule 1 of the POEO Act would not be required for the Proposal. However, the design and operation of the Proposal would be in accordance with the conditions in the current Raymond Terrace WWTW EPL (No. 217).

### 5.3.5 Contaminated Land Management Act 1997

The general intention of the *Contaminated Land Management Act 1997* (CLM Act) is to establish a process for investigating and (where appropriate) remediating the land that the EPA considers to be contaminated significantly enough to require regulation.

Section 5 of the CLM Act defines the contamination of land as:

*The presence in, on or under the land of a substance at a concentration above the concentration at which the substance is normally present in, on or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment (CLM Act, s5).*

A preliminary investigation of contamination has been undertaken for the Proposal and is provided at Appendix H. The PSI prepared by Arcadis found that there was a low likelihood of contamination being present within the Proposal site. Therefore, the PSI notes that the Proposal site is considered suitable for the proposed use subject to the mitigation measures outlined in the report. Section 7.1 outlines measures that should be undertaken should areas of potential environmental concern be disturbed.

### 5.3.6 Roads Act 1993

The *Roads Act 1993* (Roads Act) administers activities in, on under or over a public road. This Act is administered by NSW Roads and Maritime Services (Roads and Maritime), the local council or the NSW Land and Property Management Authority depending on the road classification. Roads and Maritime has authority over major roads, and the local council over local roads. Under Section 138 of the Roads Act approval is required before any works can be undertaken within a public road reserve.

As noted in Section 4.1.1, the Proposal's alignment would be located in the road verge of Irrawang Street, Adelaide Street and Rees James Road, and would pass through Council-owned land, Newbury Park, between Adelaide Street and Mount Hall Road.

Concurrence is therefore required under Section 138 of the Roads Act from Roads and Maritime and Council for the proposed works located on public road reserves.

Consultation undertaken to date with Roads and Maritime and Council regarding the Proposal is summarised in Section 6.3. Further concurrence with Roads and Maritime and discussions with Council would be undertaken throughout the exhibition and assessment periods for this DA.

A discussion of the traffic impacts associated with the Proposal and mitigation measures proposed to ameliorate those impacts are presented in the TIA (Appendix E) and Section 7.9 of this EIS.

## 5.3.7 Water Management Act 2000

The object of the *Water Management Act 2000* (WM Act) is to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations.

The WM Act provides for the preparation of water sharing plans that set extraction limits and rules for water access, available water determinations, account management and trading in order to protect water sources and their dependent ecosystems, whilst recognising the social and economic benefits of the sustainable and efficient use of water (NSW Aquifer Interference Policy).

As noted above, the Proposal site is located within the geography of two significant waterbodies, being Grahamstown Dam and Irrawang Swamp. Further, the Proposal would require the excavation of approximately 78,000 cubic metres of excavated material and topsoil during trenching and underboring as described in Section 4.3.4.

As noted in Section 4.3.5, interaction with groundwater is considered likely due to the depth of the excavation required for the installation of the pipes. Any temporary or permanent interaction would be confirmed following geotechnical studies during detailed design. Where dewatering would be required as a result of trenching or underboring activities, it would be undertaken to limit discharge of groundwater to the environment and maintain safe construction work environment. An aquifer interference licence would be obtained in accordance with the WM Act as relevant.

As discussed above, the Proposal would involve watercourse crossings for the installation of the pipelines, which include second order streams such as the Kings Hill URA watercourse, and watercourses associated with Irrawang Spillway and Grahamstown Spillway. Therefore, the Proposal also has the potential to be considered a ‘controlled activity’ and require a ‘controlled activity approval’ under Section 91 of the WM Act.

## 5.3.8 Heritage Act 1977

The object of the *Heritage Act 1977* (Heritage Act) is to identify and conserve items of local and state historical significance. This can be in relation to a building, work, relic, moveable object or precinct and significant in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the place or item. The Heritage Act informs the State Heritage Register (SHR) which lists places and items of particular importance to the state. Items are added to the SHR on the recommendation of the Heritage Council.

Under Section 4 of the Heritage Act and the EP&A Act it is illegal to cause harm to items identified on the State heritage register or to disturb or excavate land where the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed without the approval of the NSW Heritage Council. Further, Sections 139 to 145 of the Heritage Act prevent the excavation or disturbance of land known or likely to contain relics, unless under an excavation permit. Section 139 (1) states:

> *A person must not disturb or excavate any land knowingly or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, damaged or destroyed unless the disturbance is carried out in accordance with an excavation permit.*

Excavation permits are issued by the Heritage Council of NSW, or its Delegate, under Section 140 of the Heritage Act for relics not within SHR curtilages, or under Section 60 for significant archaeological remains within SHR curtilages.

An assessment of the heritage impact of the Proposal has been undertaken (refer to Section 7.5). This assessment states that there are two items listed on the HWC s170 register: Irrawang Pottery Site (SHI#3630109) and Grahamstown Dam (which includes the spillways) (SHI# 3630054). The curtilage of the Irrawang Pottery Site on the HWC s170 register is the same as the *Port Stephens Local Environmental Plan 2013* (Port Stephens LEP) listing for the same item (Register ID 127).

A program of archaeological test excavation would be undertaken at detailed design to identify if relics are present and to it there is a possibility of avoiding them by refining the pipeline alignment. An application for a s139 exception under the Heritage Act to undertake archaeological test excavation would be submitted to the heritage division of DPIE (formerly OEH) and be in place prior to commencement of archaeological investigation.

Based on the results of the s139 archaeological testing, the final pipeline alignment would be refined to avoid as much impact as possible to significant archaeological remains. Depending on the results of the s139 archaeological testing a call-out procedure and/or archaeological monitoring may be required during construction works.

If there is still potential to impact relics during the construction works, despite the refining the alignment, then a s140 permit for salvage and impacts may be required. Further detail is provided in the Statement of Heritage Impact (SoHI) prepared by Artefact at Appendix G.

### 5.3.9 National Park and Wildlife Act 1974

The objectives of the National Parks and Wildlife Act 1974 (NP&W Act) are to conserve nature, objects, places or features of cultural value within the landscape including but not limited to:

- Places, objects and features of significance to Aboriginal people
- Places of social value to the people of New South Wales
- Places of historic, architectural or scientific significance.

The Act also aims to foster public appreciation of nature and cultural heritage and provide for management of land reserved under the NP&W Act. Under Section 85 of the NP&W Act, the Director General of the Office of Environment and Heritage (OEH) has the authority for the protection of Aboriginal objects and Aboriginal places in NSW. Under the NP&W Act it is illegal to impact or cause the destruction of Aboriginal objects, including for the purposes of investigations, without an Aboriginal Heritage Impact Permit (AHIP) (s90, NP&W Act and s4.41 EP&A Act).

An Aboriginal Cultural Heritage Assessment Report (ACHAR) was prepared by Artefact (Appendix F), which indicates that, two newly recorded Aboriginal sites were located during a surface survey and have been registered with the Aboriginal Heritage Information Management System: AHIMS ID 38-4-2023 - KHW01 Artefact Scatter and Potential Archaeological Deposit (PAD) and AHIMS ID 38-4-2025 - KHW02 PAD. A program of test excavation under the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (OEH, 2010a) will be undertaken at AHIMS ID 38-4-2023 - KHW01 (if impacts cannot be avoided) and AHIMS ID 38-4-2025 - KHW02 prior to commencement of earthworks in these areas to determine if there are subsurface artefacts present and to determine their extent. Any newly identified sites will be

submitted to the Aboriginal Heritage Information Management System (AHIMS). If impacts on surface artefacts cannot be avoided, and further investigations confirm the significance of artefacts, an AHIP (under s90 of the NP&W Act) may be required for impact to, or salvage of, subsurface artefacts prior to commencement of construction works. Any AHIP works will be undertaken in accordance with DPIE requirements. Further detail is provided in Section 7.4 of this EIS.

## 5.3.10 Environmental Planning and Assessment Regulation 2000

Clauses 6 and 7 of Schedule 2 of the EP&A Regulation prescribe the requirements for preparing an EIS. This EIS has been prepared in accordance with the EP&A Regulation as outlined in Table 5-1.

*Table 5-1 Clause 6 and 7 of Schedule 2 of the EP&A Regulation requirements*

| Schedule 2 Subclause | Comment |
|---|---|
| **6 Form of environmental impact statement**<br>An environmental impact statement must contain the following information:<br>(a) the name, address and professional qualifications of the person by whom the statement is prepared,<br>(b) the name and address of the responsible person,<br>(c) the address of the land:<br>(i) in respect of which the development application is to be made, or<br>(ii) on which the activity or infrastructure to which the statement relates is to be carried out,<br>(d) a description of the development, activity or infrastructure to which the statement relates,<br>(e) an assessment by the person by whom the statement is prepared of the environmental impact of the development, activity or infrastructure to which the statement relates, dealing with the matters referred to in this Schedule,<br>(f) a declaration by the person by whom the statement is prepared to the effect that:<br>(i) the statement has been prepared in accordance with this Schedule, and<br>(ii) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and<br>(iii) that the information contained in the statement is neither false nor misleading. | Requirements have been addressed in the body of this EIS. |
| **7 Content of environmental impact statement**<br>(1) An environmental impact statement must also include each of the following:<br>(a) a summary of the environmental impact statement,<br>(b) a statement of the objectives of the development, activity or infrastructure, | (1)(a) A summary of the EIS is undertaken in the Executive Summary section of the EIS<br>(1)(b) A statement of the objectives of the Proposal is outlined in Section 1.3 |

| Schedule 2 Subclause | Comment |
|---|---|
| (c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure, | (1)(c) An analysis of the feasible alternatives and the consequences of not carrying out the Proposal is outlined in Section 3.3 |
| (d) an analysis of the development, activity or infrastructure, including: | (1)(d) An analysis of the Proposal is undertaken in Section 3.4 |
| (i) a full description of the development, activity or infrastructure, and | (d)(i) A full description of the Proposal is set out in Section 4 |
| (ii) a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and | (d(ii) A description of the environment likely to be affected by the proposal is undertaken in Section 7 |
| (iii) the likely impact on the environment of the development, activity or infrastructure, and | (d)(iii) An analysis of the likely impact on the environment is undertaken in Sections 7, 8 and 9 |
| (iv) a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and | (d)(iv) A description of the measures proposed to mitigate any adverse impacts of the Proposal is undertaken in Section 11 |
| (v) a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out, | (d)(v) A list of any approvals that must be obtained under any other Act or Law before the Proposal may be lawfully carried out in outlined in Section 5.3 |
| (e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv), | (1)(e) A list of all measures referred to in (d)(i) to (d)(v) is included in Section 11 |
| (f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4). | (1)(f) The proposal is consistent with the principles of ESD as addressed in Section 8.2 |
| (2) Subclause (1) is subject to the environmental assessment requirements that relate to the environmental impact statement. | |

## 5.4 State Environmental Planning Policies

### 5.4.1 State Environmental Planning Policy (State and Regional Development) 2011

The aim of the *State Environmental Planning Policy (State and Regional Development) 2011* (State & Regional SEPP) is to identify development that is State significant development, State significant infrastructure (including critical infrastructure), and regionally significant development. The Proposal does not meet the requirements for development under the State & Regional SEPP.

Pursuant to Part 4 of the EP&A Act, the Proposal is considered Designated Development as a result of the Proposal traversing a mapped Coastal Wetland (ID 36586) under the Coastal Management SEPP. For further detail refer to Section 5.4.5.

## 5.4.2 State Environmental Planning Policy (Infrastructure) 2007

*State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) aims to facilitate the effective delivery of infrastructure across the State.

Under Division 24 of the Infrastructure SEPP, development of 'water supply systems' may be carried out on any land without development consent on behalf of a public authority. A 'water reticulation system' is included within the definition of a water supply system under the Infrastructure SEPP. The Infrastructure SEPP also allows for water reticulation systems to be undertaken by 'any person on any land' with development consent.

Under Division 18 of the Infrastructure SEPP, development of 'sewerage systems':

- May be carried out without consent on any land in the prescribed circumstances, namely:
  - Carried out by, or on behalf of a public authority; or
  - Consists of construction of water industry infrastructure and, under the *Water Industry Competition Act 2006*, a network operator's licence is required before the development may be carried out.
- In other circumstances, may be carried out with consent on any land. Meaning that a private party has the potential to develop this infrastructure within any zoning, subject to development consent

Sewerage systems include, amongst other infrastructure, sewage reticulation systems.

Therefore, the Infrastructure SEPP facilitates for the development of the Proposal, under Part 4 of the EP&A Act, subject to development consent.

Notwithstanding, a portion of the Proposal will traverse a coastal wetland and therefore, approval is sought under Part 4 of the EP&A Act as the Proposal is considered Designated Development under the Coastal Management SEPP as addressed in Sections 5.3.1 and 5.4.5.

## 5.4.3 State Environmental Planning Policy (Primary Production and Rural Development) 2019

The *State Environmental Planning Policy (Primary Production and Rural Development) 2019* was introduced on 28 February 2019 (repealing and replacing SEPP Rural Lands 2008) with the aim to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources.

The Proposal does not affect land identified for agricultural purposes or aquaculture development as established under this Policy.

## 5.4.4 State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017

The aim of *State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017* (Vegetation SEPP) is to protect the biodiversity values of trees and other vegetation in non-rural areas of the State.

In accordance with Clause 5(b), the Vegetation SEPP applies to land with the following zones that are found in the development site:

- Zone E2 Environmental Conservation
- Zone R1 General Residential
- Zone R2 Low Density Residential

- Zone R3 Medium Density Residential
- Zone RE1 Public Recreation
- Zone SP1 Special Activities (Hunter Water)
- Zone SP2 Classified Road

Approval from the Native Vegetation Panel is required for clearing of native vegetation that exceeds the BOS threshold. As noted in Section 5.3.2 of this EIS, the BOS threshold is triggered by the Proposal. In determining an application for approval, the Native Vegetation Panel is to take into consideration the following:

- The likely impact of the proposed clearing on biodiversity values as set out in the BDAR
- Whether the clearing of the native vegetation is likely to cause or increase soil erosion, salination, acidification, land slip, flooding, pollution or other adverse land or water impacts
- Any future clearing of native vegetation on the land that has been duly authorised or notified but not yet carried out
- Any biodiversity or heritage matter that an applicable environmental planning instrument or development control plan requires the Panel to take into consideration in relation to the impact of the proposed clearing.

Biodiversity impacts and impacts to soil and water as a result of vegetation clearing for the Proposal are outlined in Section 7.3.3.

No approval for future vegetation clearing on the Proposal site is currently known.

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

*State Environmental Planning Policy No 14 – Wetlands* was repealed and replaced by the Coastal Management SEPP on 3 April 2018.

The aim of Coastal Management SEPP is to promote an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the *Coastal Management Act 2016*, including the management objectives for each coastal management area, by:

a) managing development in the coastal zone and protecting the environmental assets of the coast.

b) establishing a framework for land use planning to guide decision-making in the coastal zone.

c) mapping the 4 coastal management areas that comprise the NSW coastal zone for the purpose of the definitions in the *Coastal Management Act 2016*.

The mapping associated with the Coastal Management SEPP shows that approximately 700 metres of the water and wastewater infrastructure alignment transects the eastern margin of Coastal Wetland (ID 36586) and its associated Proximity Area.

Under Part 2, Division 10(2), development (including vegetation clearing and earthworks) within a mapped Coastal Wetland (other than development for the purpose of environmental protection works), is declared to be Designated Development for the purposes of the EP&A Act.

## 5.4.6 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

*State Environmental Planning Policy No. 33 – Hazardous and Offensive Development* (SEPP 33) provides definitions of hazardous and offensive industries and activities, Certain activities may involve handling, storing or processing a range of materials, which, in the absence of controls, may create risk outside of operational borders to people, property or the environment. Such activities would be defined by SEPP 33 as a 'potentially hazardous industry' or 'potentially offensive industry'.

SEPP 33 applies to any industrial development proposals which fall within these definitions. This includes the requirement for undertaking a Preliminary Hazard Analysis if the development is identified to be a ‘potentially hazardous industry’.

The Proposal involves the installation of underground water and wastewater pipelines. Therefore, it does not comprise a development for the purposes of ‘industry’ and SEPP 33 is not considered to be applicable to the Proposal.

As noted previously in this EIS, a chorine injection point would be required during operations for the water pipeline. Chlorine is classified as hazardous chemical by SafeWork Australia as noted in Section 7.1 of this EIS. Notwithstanding, the chlorine injection point would be designed and managed in accordance with *HWC Standard Technical Specification – Chemical Storage and Delivery Systems* (STS 670) and the relevant Australian Standards and legislative requirements. Therefore, the use of chlorine is not anticipated to have adverse impacts on the environment as a consequence of the operation of the Proposal. For further details on hazard and risk refer to Section 8.1.

As such, the Proposal would not involve any potentially hazardous activities that would pose a significant risk to human health, life or property, or to the biophysical environment. In addition, the environmental assessment undertaken as part of this EIS indicates that with the implementation of proposed mitigation measures, the Proposal would not pose a potentially offensive development to existing or likely future land use. Therefore, the Proposal does not represent a potentially ‘hazardous’ or ‘offensive’ industry as prescribed by SEPP 33.

## 5.4.7 State Environmental Planning Policy No. 44 – Koala Habitat Protection

*State Environmental Planning Policy No.44 - Koala Habitat Protection* (SEPP 44) aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure that permanent free-living populations are protected in their present range, and to reverse the current trend of population decline.

SEPP 44 contains prescriptions for the consideration of ‘potential Koala habitat’ and ‘core Koala habitat’ for developments within LGAs listed in Schedule 1 of the Policy. SEPP 44 applies to the Proposal as the Port Stephens LGA is listed in Schedule 1.

*Port Stephens Comprehensive Koala Plan of Management 2002* (CKPoM) applies to the Proposal site and an assessment of Koala habitat in accordance with SEPP 44 and the CKPoM has been undertaken as part of the BDAR (Appendix D).

In summary, no ‘core Koala habitat’ was identified within the Proposal site. Therefore, in accordance with Clause 8 of SEPP 44, development consent may be granted for impacts to potential Koala habitat that is not considered ‘core Koala habitat’. For further detail refer to the BDAR and Section 7.3 of this EIS.

### 5.4.8 State Environmental Planning Policy No. 55 – Remediation of Land

The objective of SEPP 55 is to provide for a coordinated state-wide planning approach for the remediation of contaminated land. SEPP 55 aims to promote the remediation of contaminated land with the objective of reducing the risk of harm to human health or other aspects of the environment.

Clause 7 of SEPP 55 requires the approval authority to have regard to certain matters before granting approval. These matters include:

- Whether the land is contaminated.
- Whether the land is, or would be, suitable for the purpose for which development is to be carried out.
- If remediation is required for the land to be suitable for the proposed purpose, whether the land will be remediated before the land is used for that purpose.

SEPP 55 also imposes obligations to carry out any remediation work in accordance with relevant guidelines, developed under the CLM Act (discussed in Section 5.3.5) and to notify the relevant council of certain matters in relation to any remediation work.

A PSI (Appendix H) has been undertaken for the Proposal and summarised in Section 7.1. The assessment found that there was a low likelihood of contamination being present within the Proposal site. Accordingly, Section 7.1 outlines measures that should be undertaken should areas of potential environmental concern be disturbed.

## 5.5 Local Environmental Plan and Development Control Plan

### 5.5.1 Port Stephens Local Environment Plan 2013

The *Port Stephens Local Environmental Plan 2013* (Port Stephens LEP) is the primary Environmental Planning Instrument (EPI) that applies to the site Proposal site. The aims of the Port Stephens LEP include:

- to cultivate a sense of place that promotes community well being and quality of life
- to provide for a diverse and compatible mix of land uses supported by sound planning policy to deliver high quality development and urban design outcomes
- to protect and enhance the natural environmental assets of Port Stephens
- to continue to facilitate economic growth that contributes to long-term and self-sufficient employment locally
- to provide opportunity for housing choice and support services tailored to the needs of the community
- to conserve and respect the heritage and cultural values of the natural and built environments
- to promote an integrated approach for the provision of infrastructure and transport services
- to continue to implement the legislative framework that supports openness, transparency and accountability of assessment and decision making
- to achieve intergenerational equity by managing the integration of environmental, social and economic goals in a sustainable and accountable manner.

This EIS (refer to Sections 7 and 8) discusses the potential impacts of the Proposal on the environment, and identifies the measures that would be employed to minimise those impacts and ensure that the aims of the Port Stephens LEP are achieved.

The Proposal traverses land which is zoned under Clause 2.1 of the Port Stephens LEP, namely (north to south):

- Zone E2 Environmental Conservation
- Zone R1 General Residential
- Zone R2 Low Density Residential
- Zone R3 Medium Density Residential
- Zone RE1 Public Recreation
- Zone SP1 Special Activities (Hunter Water)
- Zone SP2 Classified Road

The Port Stephens LEP land use zones located within and around the Proposal site are illustrated in Figure 5-1 below.

Under the R1, R2, R3 zones 'water reticulation systems' are permissible with development consent. Under RE1 zone, 'water supply systems' are permissible with development consent. Under the E2 zone 'water supply (includes a water reticulation system)' is permissible with development consent. Under the SP1 and SP2 zones, development with consent is required to be for the purposes shown related to the land (i.e. Hunter Water infrastructure or a road) and includes development that is ordinarily incidental or ancillary to development.

As the Proposal is for the purposes of HWC infrastructure (and therefore permissible with development consent under the identified zoning), development consent is sought, in accordance with the Port Stephens LEP.


LEGEND

Kings Hill URA

Proposed water and wastewater infrastructure alignment


ARCADIS AUSTRALIA PACIFIC PTY LTD
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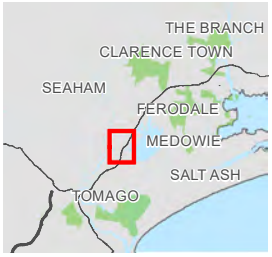
Coordinate System: GDA 1994 MGA Zone 56
Date issued: October 18, 2019
Aerial imagery supplied by NSW LPI

1:25,000 at A4




ARCADIS

Figure 5-1 Port Stephens LEP Zoning

The consistency of the Proposal with the relevant requirements of the Port Stephens LEP is provided in Table 5-2.

*Table 5-2 Port Stephens LEP provisions relevant to the Proposal*

| Provision | Description | Compliance |
|---|---|---|
| **5.10 Heritage conservation** | As noted in Section 5.3, the Proposal site contains a heritage-listed item (Irrawang Pottery Site) under the Port Stephens LEP (Item No. A4). Also, part of the Proposal site is located within an area of potential archaeological significance. This EIS is supported by the corresponding heritage assessments (SoHI and ACHAR) prepared by Artefact. As outlined in Sections 7.4 and 7.5 of this EIS, the Proposal site may be considered suitable for the proposed development subject to the implementation of measures identified in both heritage assessments. | Yes |
| **5.11 Bush fire hazard reduction** | Part of the Proposal site is considered bushfire prone land. A Bushfire Assessment Report (Appendix I) has been prepared for the Proposal. As noted in Section 7.10, the Proposal would be designed to consider any relevant bushfire risks. | Yes |
| **6.5 Infrastructure – Pacific Highway access** | The Proposal would not impede the safe and efficient operation of the Pacific Highway as part of the national highway network. As noted above, the Proposal does not include works on the Pacific Highway, which the exception of some minor works on the road reserve (outside of the carriageway). Therefore, no impacts on the Pacific Highway are anticipated as part of the Proposal. Furthermore, the construction and operation of the Proposal would ensure adequate levels of access to Pacific Highway from the surrounding road network. Further details are provided as part of the TIA (Appendix E) and under Section 7.9. | Yes |
| **6.6 Access from precinct areas to Pacific Hwy, Kings Hill** | The Proposal would not alter any access from the Pacific Highway to the Kings Hill URA. Refer to the TIA (Appendix E) and Section 7.9 for further details. | Yes |
| **7.1 Acid sulfate soils** | The Proposal includes excavations which have the potential to impact on classed acid sulphate soils (refer to Section 7.1). An ASSMP would be prepared as part of the CEMP for the Proposal to manage any adverse impacts on soil. | Yes |
| **7.2 Earthworks** | As noted above, the Proposal would involve earthworks. A Preliminary Geotechnical Assessment has been undertaken by Douglas Partners and is provided at Appendix J. Further assessment would be undertaken for the Proposal as part of detailed design. | Yes |
| **7.3 Flood planning** | As noted in Section 7.2, part of the Proposal site is located above the Irrawang Swamp probable maximum flood (PMF) level, including the proposed WWPS. The Proposal would be located above the 100-year flood level and outside of the riparian corridors of ephemeral watercourses, and no flooding impacts are expected as part of the Proposal. Flooding can be adequately managed in the Proposal site subject to the measures identified in the Stormwater Impact Assessment (Appendix L). | Yes |

| Provision | Description | Compliance |
|---|---|---|
| **7.9 Wetlands** | As discussed throughout the EIS, the Proposal traverses a mapped Coastal Wetland (ID 36586) under the Coastal Management SEPP. Section 7.3 of this EIS summarises the measures identified by the BDAR (Appendix D) to protect the subject wetland. | Yes |

In summary, the Proposal is considered consistent with the objectives and the development standards identified within the Port Stephens LEP.

## 5.5.2 Port Stephens Development Control Plan 2014

The *Port Stephens Development Control Plan 2014* (Port Stephens DCP) supports the Port Stephens LEP by providing more detailed controls that apply to the Port Stephens LGA.

An assessment of the Proposal having regard to the relevant sections of the Port Stephens DCP is provided in Table 5-3 below. In summary, the Proposal is generally consistent with the requirements of the Port Stephens DCP.

*Table 5-3 Proposal's consistency with the Port Stephens DCP*

| Aspect | Requirements | Comment | Compliant? |
|---|---|---|---|
| **B1 Tree Management** | • Clearing of native vegetation in non-rural areas<br>• Native Vegetation Panel approval | The Proposal requires the clearing of native vegetation that exceeds the BOS threshold under the BC Act as discussed in Section 5.3.2.<br>As noted in Section 5.4.4, approval from the Native Vegetation Panel is required for clearing of native vegetation that exceeds the BOS threshold. | Yes.<br>Sections 5.3, 0, 7.3.3 and Appendix D – BDAR |
| **B2 Natural Resources** | • Environmental significance<br>• Biodiversity offsets<br>• Noxious weeds<br>• Koalas | As discussed in Section 5.3, the Proposal occurs on land identified on OEH's Biodiversity Values Map which triggers the threshold for entry into the BOS. Accordingly, a BDAR (Appendix D) has been prepared for the Proposal.<br>An assessment of Koala habitat in accordance with SEPP 44 and the CKPoM has been undertaken as part of the BDAR as discussed in Section 5.4.7 of this EIS.<br>Protocols to manage weeds and pathogens would be implemented in a Flora and Fauna Management Plan (or equivalent) to be prepared as part of the CEMP. | Yes.<br>Section 7.3 and Appendix D – BDAR |
| **B3 Environmental Management** | • Acid sulfate soils<br>• Air quality<br>• Noise<br>• Earthworks | • <u>Acid sulfate soils:</u><br>As noted in the PSI, there is potential for Class 3 category acid sulfate soils to be encountered during excavation works. Accordingly, an ASSMP would be prepared as part of the CEMP for any Classed 3 category soils to be excavated within the Proposal site. | Yes.<br>Section 7.1 and Appendix H – PSI |
| | | • <u>Air quality:</u><br>An AQA has been undertaken for the Proposal. The assessment concluded that air quality impacts can be minimised subject to the implementation of the mitigation measures outlined in the report. | Yes.<br>Section 7.7 and Appendix M – AQA |
| | | • <u>Noise:</u><br>A NVIA has been prepared for the Proposal. The assessment includes impacts on sensitive receivers surrounding the Proposal site and identifies measures to mitigate those impacts. | Yes.<br>Section 7.8 and Appendix N – NVIA |
| | | • <u>Earthworks:</u><br>As discussed above, the Proposal would involve earthworks. A Preliminary Geotechnical Assessment (Appendix J) and a Cut and Fill Plan (Appendix K) have been prepared for the Proposal. | Yes.<br>Section 4.3.4, Appendix J and Appendix K |

| Aspect | Requirements | Comment | Compliant? |
|---|---|---|---|
| **B4 Drainage and Water Quality** | • Stormwater drainage<br>• On-site detention / filtration<br>• Water quality<br>• Riparian corridors | A Stormwater Impact Assessment provides an assessment of the key water and hydrology-related issues for the Proposal. Some requirements under this part may be applicable to locations within 40 meters of ephemeral watercourses crossing the Proposal site as well as the WWPS. The detailed design of the Proposal would address the applicable requirements to the satisfaction of Council. Impacts to water quality in Irrawang swamp and changes to biophysical properties are likely to be minor or negligible and localised during construction, as discussed in both the Stormwater Impact Assessment and BDAR. | Yes.<br>Section 7.2 and Appendix L – Stormwater Impact Assessment<br>Section 7.3 and Appendix D – BDAR |
| **B5 Flooding** | • Flood planning<br>• Flood hazard | As discussed above, the proposed WWPS is expected to be located above the FPL. Also, the Proposal site is located above the Irrawang Swamp PMF level. The SIA provides appropriate mitigation measures to any flooding risks associated with the Proposal. | Yes.<br>Section 7.2 and Appendix L – SIA |
| **B8 Heritage** | • Heritage impact<br>• Aboriginal heritage | A SoHI has provided an assessment of the non-Aboriginal (European) heritage issues related to the Proposal. As noted above, two heritage-listed items have been identified within the Proposal site: Irrawang Pottery Site (SHI#3630109) and Grahamstown Dam (which includes the spillways) (SHI# 3630054). As previously discussed, a program of archaeological test excavation would be undertaken at detailed design to identify if relics are present and to it there is a possibility of avoiding them by refining the pipeline alignment.<br>As mentioned above, an ACHAR prepared for the Proposal states that two newly recorded Aboriginal sites were found during a surface survey: AHIMS ID 38-4-2023 - KHW01 Artefact Scatter and PAD, and AHIMS ID 38-4-2025 - KHW02 PAD. The ACHAR recommends that further testing is undertaken during detailed design to determine the extent of subsurface artefacts that may be within the Proposal site. An AHIP may be required if impacts on surface artefacts cannot be avoided as part of the Proposal. | Yes.<br>Section 7.5 and Appendix G – SoHI<br>Section 7.4 and Appendix F – ACHAR |
| **B9 Road Network and Parking** | • Traffic impacts | A TIA provides an assessment of the construction and operation impacts, vehicle movements, and safety and function of the road network. The assessment identifies mitigation and management measures that can be implemented to minimise potential impacts, including traffic and transport management controls during construction. Additionally, a preliminary Construction Traffic Management Plan (CTMP) has been provided as part of the TIA. | Yes.<br>Section 7.9 and Appendix E – TIA |
| **D14 Kings Hill – Raymond Terrace** | • Drainage and water quality<br>• Natural resources | Drainage, water quality and natural resources have been discussed above in this table (Parts B2 and B4). | Yes.<br>See above. |

# 6 CONSULTATION

## 6.1 Overview

Consultation activities undertaken for the Proposal provided information to relevant State Government agencies, service and infrastructure providers, the community and nearby landowners and allowed the opportunity for interested stakeholders and community members to provide feedback on the Proposal. This section summarises the community and stakeholder engagement activities and feedback received during the preparation of the EIS.

The SEARs relating to consultation, and a summary of where they are addressed, are provided in Appendix A.

## 6.2 Concurrent consultation

Ongoing consultation with government agencies and stakeholders, service and utility providers, affected landowners and the local community has been undertaken for the number of applications that are currently in progress to support the development of the Kings Hill URA as outlined in Section 1.2 of this EIS.

These applications include a DA for the concept approval (subdivision), and two REFs for the proposed intersection and stormwater channel. It is anticipated that future consultation will be undertaken as part of the exhibition of the REFs, as well as before and during construction of the above projects.

## 6.3 Government agency consultation

A number of government agencies were consulted with during the preparation and assessment of the Proposal. The SEARs (No. 1291) suggested consultation should be undertaken with the following:

- Department of Planning, Environment & Industry (DPIE)
- Hunter Water Corporation (HWC)
- Environmental Protection Authority (EPA)
- Office of Environment and Heritage (OEH)
- Department of Industry – Water (DoI Water)
- Roads and Maritime Services (Roads and Maritime)
- Rural Fire Service (RFS)
- Port Stephens Council (Council).

The abovementioned government agencies were consulted with in the form of meetings, telephone conversations, email and/or letter correspondence.

### 6.3.1 Department of Planning, Industry and Environment

The Department of Planning, Industry and Environment (DPIE) has been consulted throughout the preparation of this EIS regarding various elements of the Proposal. SEARs (No. 1291) were issued for the Proposal on 19 February 2019. A summary of the SEARs and where they are addressed in this EIS is provided in Appendix A.

Table 6-1 provides detail on specific information requested by DPIE as part of the SEARs and how they have been addressed in this EIS.

*Table 6-1 Details of SEARs (No. 1291) issued by DPIE*

| Requested information | Clarification/outcome |
|---|---|
| Detailed consideration of *State Environmental Planning Policy (State and Regional Development) 2011* which demonstrates the proposal does not trigger State Significant Development (SSD) | As noted in Section 5.4.1, the Proposal does not meet the requirements for development under the State & Regional SEPP.<br>Pursuant to Part 4 of the EP&A Act, the Proposal is considered Designated Development as a result of the Proposal traversing a mapped Coastal Wetland (ID 36586) under the Coastal Management SEPP. For further detail refer to Section 5.3.1. |
| Strategic context details, including detailed justification for the proposal and suitability of the site for the development, demonstration that the proposal is consistent with all relevant planning strategies, instruments and plans (or justification for any inconsistencies), and a list of approvals that must be obtained | The Proposal is consistent with all relevant planning strategies as described in Sections 3.1 and 3.2, which include:<br>• *Hunter Regional Plan 2036*<br>• *Port Stephens Planning Strategy 2011-2036*<br>• *Lower Hunter Regional Strategy 2006-2031*<br>• *NSW 2021: A plan to make NSW number one.*<br>The Proposal's consistency with the relevant EPIs, including Port Stephens DCP, is discussed in Sections 0 and 5.5 of this EIS.<br>As noted in Section 5.3.6, the Proposal has been identified as Integrated Development for the purposes of Roads Act and WM Act. Accordingly, approvals would be sought from both Roads and Maritime and DoI Water. |
| Detailed assessment of key environmental issues, including:<br>• Soil and water<br>• Coastal wetlands<br>• Flooding<br>• Biodiversity<br>• Heritage<br>• Waste management<br>• Air quality and odour<br>• Noise and vibration<br>• Traffic and transport<br>• Bushfire | Detailed environmental assessments have been conducted for key and non-key environmental issues in accordance with the SEARs. These assessments have been summarised in Sections 7 and 8.<br>Other environmental issues which were not raised in the SEARs (No. 1291) however are considered of relevance to the assessment of the Proposal are addressed in Section 8 and include:<br>• Hazard and risk<br>• Landscape and visual amenity<br>• Socio-economic<br>• Land use and property<br>• Ecological sustainable development. |

## 6.3.2 Hunter Water Corporation

Hunter Water Corporation (HWC) were consulted regularly throughout the preparation of this EIS regarding various elements of the Proposal. Consultation has been undertaken in the form of meetings, telephone conversations and correspondence (emails and letters).

HWC was consulted by DPIE upon receipt of the letter for a request for SEARs. In their response, HWC raised a number of areas for consideration. A letter was provided to HWC in April 2019 to provide an overview of the Proposal, specialist investigations to be carried out, and how areas for consideration raised by the HWC during the request for SEARs would be addressed.

A meeting was held with HWC on 30 April 2019 to further discuss matters raised by HWC and any other key areas for consideration in the EIS. A summary of key areas raised and how they have been addressed in this EIS is provided in Table 6-2.

As part of the ongoing consultation with HWC, a letter was provided via email on 25 July 2019 to provide an overview of the Proposal and relevant specialist investigation carried out to support compilation of this EIS. No further requests were received from HWC during this consultation period.

*Table 6-2 Summary of areas for consideration raised by HWC during DPIE request for SEARs (SEAR 1291)*

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| Areas for consideration raised by HWC during DP&E request for SEARs (SEAR 1291) | | |
| Potential impact of the discharge of water and/or sediment during construction | This EIS has assessed the likelihood of runoff and sediments from construction activities in specific areas of the Proposal site. Mitigation measures, including erosion and sediment controls, have been identified for the Proposal and implemented where required. | Section 7.2 & Appendix L – Stormwater Impact Assessment |
| Potential impact of the discharge of potable water from pipe flushing during commissioning and operation | Section 4.3.8 of this EIS describes the commissioning process for the proposed water and wastewater pipelines. This EIS has assessed the existing conditions and the potential impact that discharging potable water would have on the environment. Suitable mitigation measures have been addressed to mitigate negative environmental impacts where practicable. | Section 4.3.8, Section 7.2 & Appendix L – Stormwater Impact Assessment |
| Potential impacts of wet and dry weather overflows from wastewater system on the community and the environment | The existing conditions and the potential impact that discharging sewerage would have on the community and the environment have been assessed in this EIS. A flow relief structure would be incorporated into the WWPS design as an emergency precaution due to the potential for sewer overflows to occur. The commissioning of the proposed pipelines, ongoing inspection of the pipelines and management of the WWPS overflow relief would be undertaken in accordance with HWC standards. | Section 7.2 & Appendix L – Stormwater Impact Assessment |
| Potential impact of scouring the pipes, the need for dechlorination and scour control | As outlined in Section 4.2.2, a number of scour valves and air valves would be installed along the alignment at topographic low points and high points, respectively. These would be constructed as per HWC requirements. Stormwater outlets to the watercourse would be strategically positioned to minimise the potential for localised scouring with scour protection provided where required. A chorine injection point would be installed at the northern end of the pipeline adjacent to KHD. The exact location of the chlorine injection point would be determined during detailed design and its installation would be in accordance with HWC specifications. | Section 4.2.2, Section 7.2 & Appendix L – Stormwater Impact Assessment |

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| Potential odour impacts from WWPS, pipeline or air vents on surrounding receivers | The EIS has assessed air quality and odour-related issues, including impacts on sensitive receivers surrounding the Proposal site as a result of construction activities and operations. Maintenance activities at valve, hydrant and scour locations may generate odour emissions. However, these would be minimum and short-term in nature. Impacts associated with the WWPS would involve emissions from the pump well, valve pit and any educt ventilation stacks. Appropriate mitigation measures have been identified and would be implemented where required. | Section 7.7 and Appendix M – AQA |
| Clarification of wastewater infrastructure is needed | The wastewater infrastructure included in the Proposal is discussed in Section 4.2.1. A WWPS would be installed within the south-eastern portion of Kings Hill URA. The wastewater pipeline would convey wastewater from the proposed WWPS within Kings Hill URA in the north, to HWC's existing network in Raymond Terrace in the south. Wastewater would be pumped through a continuous rising main, before connecting to a gravity main and discharging into the existing gravity network at a maintenance hole near Panorama Close (MH K1950) in Raymond Terrace. Ventilation stacks would be installed at the WWPS and, where required, at high points along the alignment. A stack is already located at MH 1950 where the proposed pipeline would connect to the existing gravity network. The exact location of the WWPS and the stacks would be determined during detailed design. Potential environmental impacts of this infrastructure have been assessed in this EIS, and mitigation measures have been implemented where practicable. | Sections 4.2.1, 7 and 8.1 |
| Options for crossing spillways should be assessed | The Proposal's built form is discussed in Section 4.2 and construction activities are described in Section 4.3. Alternative options for crossing Irrawang and Grahamstown Spillways have been considered and would include attaching the pipelines to the existing above-ground spillway infrastructure or to the existing bridges where the Pacific Highway crosses the spillways. Another option is to underboring at both spillways. The final built-form approach (underboring or attaching to existing infrastructure) would be confirmed as part of detailed design. Potential environmental impacts, including the likelihood of groundwater disturbance, has been assessed in this EIS. Appropriate mitigation measures have been identified where required. | Section 4.2, Section 4.3, Section 7.2 & Appendix L – SIA |
| Width of corridor for pipelines needs to | A Proposal site boundary has been identified with a buffer on either side of the potential location of the pipelines. This boundary would allow for construction activities and also | Section 4.2 |

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| be clarified and assessed | refinement of the pipeline (within the Proposal site) during detailed design.<br><br>Trench width and dimensions have been discussed in Section 4.2 of this EIS. The water and wastewater pipelines would follow the same alignment, with the pipes laid on top of and surrounded by single sized aggregate embedment material in parallel trenches approximately 600 millimetres and 900 millimetres wide, respectively. The trenches would be a maximum of 6 metres deep and would be situated approximately 600 millimetres apart. Where the pipelines would intercept already existing infrastructure, the alignments may be separated by a greater distance to avoid relocation of existing infrastructure. This would be confirmed as part of detailed design. | |
| Key areas for consideration raised by HWC during 30 April 2019 meeting | | |
| The proposed WWPS to be potentially assessed as a separate REF due to the identified potential environmental impacts | The proposed WWPS is being considered under this EIS, including appropriate mitigation measures for the identified potential environmental impacts. Therefore, it was considered that a separate REF for the WWPS would not need to be prepared (i.e. approval for the WWPS is sought within this EIS). HWC agreed with this approach on the basis that consultation is undertaken with HWC during detailed design (i.e. post approval of the Proposal in this EIS). | Sections 4.2.1, 7 and 8.1 |
| Potential noise impacts of the central construction compound on residential properties | The location of this construction compound has been chosen for its size, central location and proximity to the wastewater pipeline connection point. This EIS has considered the potential noise impacts of this compound (and associated works) on surrounding residential receivers. Mitigation measures would be installed to minimise this impact during construction. | Section 7.8 & Appendix N – NVIA |
| The Proposal is adjacent to the Grey-headed Flying-fox camp on Adelaide Street | This EIS has considered the Grey-headed Flying-fox camp (the camp) on Adelaide Street, as well as the time of the year (August to February) when they are most sensitive to construction noise as females are reaching the end of their gestation period and are giving birth. Therefore, cconstruction activities would only occur within 250 metres of the camp, between the months of March and July. This and other mitigation measures have been addressed as part of the NVIA and BDAR. | Section 7.3, Section 7.8, Appendix D – BDAR & Appendix N - NVIA |

In addition, Northrop undertook consultation with HWC on the proposed route alignment as part of the concept design stage in 2017. HWC have agreed in principle to the selected alignment, which follows on from the approval of the *Kings Hill Water Servicing Strategy* (Revision H, May 2017) and the *Kings Hill Water Servicing Strategy*

*Supplement* (Revision 2). Further to this, Northrop obtained approval from HWC on the sewer strategy addendum detailed in the *Kings Hill Rising Main Route Modification Report* (December 2017).

### 6.3.3 Environmental Protection Authority

Environment Protection Authority (EPA) was initially consulted by DPIE upon receipt of the letter for a request for SEARs, which provided background information and sought comments on the Proposal. EPA did not raise any specific areas of concern within the SEARs.

Subsequently, a letter was provided to EPA on 25 July 2019 to provide an overview of the Proposal, including a number of issues assumed to be relevant to EPA.

On 9 August 2019, an email was received from Genevieve Lorang (EPA Operations Officer) confirming that the Proposal does not involve an activity listed under Schedule 1 of the POEO Act, and therefore, EPA had no further concerns in this regard.

Further information regarding compliance with POEO Act is provided in Section 5.3.

### 6.3.4 Office of Environment and Heritage

The Office of Environment and Heritage (OEH) was initially consulted by DPIE upon receipt of a letter for a request for SEARs which provided background information and sought comments on the Proposal. A summary of these areas for consideration and how they have been considered is provided in Table 6-3. Subsequently, a letter was provided to OEH on 25 July 2019 to provide an overview of the Proposal, specialist investigations carried out, and how areas for consideration raised by OEH during the request for SEARs had been addressed. OEH advised that they had no further assessment requirements for the Proposal to those already addressed on the SEARs.

*Table 6-3 Summary of areas for consideration raised by OEH during DPIE request for SEARs (SEAR No. 1291)*

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| Areas for consideration raised by OEH during DPIE request for SEARs (No. 1291) | | |
| **Aboriginal cultural heritage:** | | |
| Identification and description of Aboriginal cultural heritage values that exist across the area affected by the Proposal | An Aboriginal Cultural Heritage Assessment Report (ACHAR) has been prepared to support this EIS. The ACHAR includes identification of cultural heritage values and demonstrates attempts to avoid impacts upon cultural heritage values, while identifying appropriate conservation outcomes.<br><br>The ACHAR includes a surface survey undertaken in areas with potential for subsurface Aboriginal deposits. Consultation with Registered Aboriginal parties (RAPs) has been undertaken and documented in the ACHAR.<br><br>If an Aboriginal object or place is identified and cannot be avoided and an Aboriginal Heritage Impact Permit (AHIP) would be requested. The ACHAR outlines procedures to be followed if Aboriginal objects, burials or skeletal material are found at any stage of the life of the development | Section 7.4 & Appendix F – ACHAR |

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| | to formulate appropriate measures to manage unforeseen impacts. | |
| **Historical Heritage:** | | |
| Heritage assessment including (but not limited to) an assessment of impacts to State and local heritage | A Statement of Heritage Impact (SoHI) has been prepared in accordance with relevant guidelines, as well as the relevant requirements of the Port Stephens LEP, Port Stephens DCP and HWC.<br>The SoHI includes a description of heritage items either in the vicinity of, or overlapping, the Proposal site, as well as a statement of significance and a statement of heritage impact. Mitigation and management measures, where required, have been outlined in the report.<br>As the Proposal site overlaps with a listed archaeological item (Irrawang Pottery Site [6400]), an archaeological assessment has been prepared as part of the SoHI. | Section 7.5 & Appendix G – SoHI |
| **Biodiversity:** | | |
| Impact of development on biodiversity values to determine if the proposed development is "likely to significantly affect threatened species" (Section 7.2 BC Act) | Assessment of biodiversity as part of the EIS has be undertaken within a BDAR prepared in accordance with the requirements of the Biodiversity Assessment Method (BAM) by Arcadis' accredited personnel. The BDAR includes:<br>• Identification of biodiversity values on land proposed to be developed for the Proposal<br>• Potential impacts of the Proposal on biodiversity values, including any potential impacts of the Proposal that could be characterised as serious and irreversible<br>• Identification of measures to avoid and minimise impacts on biodiversity<br>• Quantification and description of the biodiversity credits required to offset the residual impacts of the Proposal. | Section 7.3 & Appendix D – BDAR |
| **Coastal wetlands:** | | |
| Assess impacts in accordance with *State Environment Planning Policy (Coastal Management) 2018* | As described in previous sections of this EIS, the planning approval pathway is triggered as a result of the proposal traversing a mapped Coastal Wetland under the Coastal Management SEPP.<br>The EIS has assessed the impacts on the Coastal Wetland area in accordance with the Coastal Management SEPP and has identified measures taken to protect biophysical and hydrological processes and ecological integrity. | Section 7.2, Section 7.3, Appendix D – BDAR & Appendix L – SIA |
| **Water and soils:** | | |

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| Description of background condition of water sources and assessment of impacts of the proposal on water quality, hydrology and flooding | This EIS provides an assessment of the impacts of the Proposal on water quality and hydrology, and includes:<br>• Compilation and review of background information on water contamination, flooding and drainage relevant to the proposal area, including data on existing water quality<br>• Identification of any sensitive receiving waterways (within 500m from the site) and groundwater dependent ecosystems<br>• Identification and assessment of construction and operational activities that may impact on groundwater and on the water quality of receiving environments<br>• Identification of likely impacts on surface quality and groundwater resulting from proposed construction activities and operation of the Proposal. | Section 7.1, Section 7.2, Appendix H – PSI & Appendix L – SIA |
| Assessment of potential impacts of the proposal on acid sulfate soils and mitigation and management options that will be used to prevent, control, abate or minimise potential impacts | A PSI has been prepared to support this EIS. The PSI includes an assessment of the potential impact of the proposal on acid sulfate soils. The majority of the Proposal site is located within a Class 5 category soil. However, it does also marginally intersect a Class 3 category at its northern portion.<br>Under Subclause 7.1(3) of the Port Stephens LEP, an ASSMP would be required for any Class 3 category soils to be encountered during excavation works. Subject to the implementation of this ASSMP (prepared at detailed design), the Proposal is not anticipated to result in any adverse impact on classed soils. | Section 7.1 & Appendix H – PSI |

## 6.3.5 Department of Industry – Water

Department of Industry – Water (DoI Water) was initially consulted by DPIE upon receipt of the letter for a request for SEARs which provided background information and sought comments on the Proposal. DoI Water did not raise any specific areas of concern within the SEARs.

Subsequently, a letter was provided to the DoI Water on 25 July 2019 to provide an overview of the Proposal, including a number of issues assumed to be relevant to DoI Water. No response has been received from DoI Water prior to lodgement of this EIS (DA).

## 6.3.6 Roads and Maritime Services

Roads and Maritime Services (Roads and Maritime) was initially consulted by DPIE upon receipt of a letter for a request for SEARs which provided background information and sought comments on the Proposal. A summary of these areas for consideration and how they have been considered is provided in Table 6-4.

Subsequently, a letter was provided to Roads and Maritime in 25 July 2019 to provide an overview of the Proposal, specialist investigations carried out, and how areas for

consideration raised by Roads and Maritime during the request for SEARs had been addressed. This letter included content similar to that provided below, to consider comments raised during SEARs. The TIA supporting this EIS has addressed the matters raised by Roads and Maritime. A summary of matters raised by Roads and Maritime in their letter, and a response to each issue, is presented in Table 6-4.

*Table 6-4 Summary of areas for consideration raised by Roads and Maritime during DPIE request for SEARs (No. 1291)*

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| Areas for consideration raised by Roads and Maritime during DP&E request for SEARs | | |
| **Traffic management plan and transport study** | This EIS provides an assessment of traffic, transport, construction and operational impacts of the Proposal with reference to the surrounding road and related facilities. A TIA has been prepared to support this EIS. The TIA has determined the impacts of the construction and operation of the Proposal on the existing transport network and has also identified appropriate mitigation and management measures to minimise these impacts. This include:<br>• Review of existing traffic and transport conditions surrounding the Proposal site<br>• Detailed description of proposed works<br>• Traffic generation (i.e. estimation of peak construction traffic)<br>• Impact of construction traffic on surrounding transport network<br>• Identification of mitigation and management measures include:<br>– Providing safe and accessible facilities for pedestrians and cyclists during construction for all proposed worksites<br>– Maintaining public transport services past the worksites (where required), minimising delays on existing bus services through the implementation of appropriate detours and general traffic measures<br>– Managing general traffic through and around the worksites, with consideration of local traffic<br>– Implementing appropriate haulage routes for construction traffic<br>– Minimising the impact of construction on residents and businesses.<br>• A preliminary CTMP has been provided as part of the TIA. This preliminary CTMP provides a guide to be used for the final CTMP. | Section 7.9 & Appendix E – TIA |
| **Construction impacts on the existing road network** | The TIA accompanying this EIS has assessed construction and operation impacts on the existing road network and identified the appropriate mitigation measures, where required. These include, but are not limited to the following roads: | Section 7.9 & Appendix E – TIA |

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| | • Adelaide Street (MR104)<br>• Mount Hall Road (Council Road)<br>• Irrawang Street (Council Road)<br>• Rees James Road (Council Road)<br>Construction works would be located in the verge of Rees James Road in proximity to the western side of Pacific Highway. However, no impact on the Pacific Highway is anticipated as part of the Proposal. The TIA supporting this EIS provides an assessment of the impacts and function of the road network, and identifies mitigation and management measures that can be implemented to minimise potential impacts, including traffic and transport management controls during construction. | |
| Areas for consideration raised by Roads and Maritime as part of their response to the letter dated 25 July 2019 | | |
| Roads and Maritime would need to be involved where a pipe crosses underneath a classified road, and accurate information such as the exact location and depth will be required for this assessment | Roads and Maritime-owned land that would be impacted during construction of the Proposal includes a portion of the road reserve at Adelaide Street. Works within the Pacific Highway Roads and Maritime land (outside of the carriage way) would only occur should the alignment need to move east to avoid heritage items present on the adjacent lots. Temporary access tracks (as shown in Section 7.9) would be provided along HWC-owned land and therefore, the Pacific Highway would not be impacted if these works should occur. This would be confirmed during detailed design and Roads and Maritime would be involved as required. | Section 2.3, Section 4.1.1 and Section 7.9 |
| The proposed water infrastructure may be located within the future Pacific Motorway (M12RT) road corridor. This would have to be confirmed with Roads and Maritime | The revised concept design (Roads and Maritime, October 2019) for the future extension of the M1 Pacific Motorway shows that the proposed upgrade works to the road would be located between M1 Pacific Motorway and Tomago. This area is outside the Proposal site and therefore, the Proposal is not anticipated to impact on these works. | N/A |

Further to this, Northrop undertook consultation with Roads and Maritime during early stages of concept design regarding works within the Pacific Highway road reserve. Roads and Maritime advised that these works would require consent under Section 138 of the Roads Act (i.e. the Proposal would be considered Integrated Development).

Other matters discussed with Roads and Maritime during concept design included the potential to fix utilities to Roads and Maritime's highway structures, and the preferred method for crossing Grahamstown Dam Spillway and the Pacific Highway bridge.

## 6.3.7 Rural Fire Service

Rural Fire Service (RFS) was initially consulted by DPIE upon receipt of the letter for a request for SEARs which provided background information and sought comments on the Proposal. RFS provided specific bushfire assessment requirements as part of the SEARs, which included an assessment of the risk of bushfire, addressing the requirements of *Planning for Bush Fire Protection 2006* (PBP) and any proposed Asset Protection Zones (APZs). These matters have been addressed in detail in Section 7.10.

Subsequently, a letter was provided to RFS on 25 July 2019 to provide an overview of the Proposal and relevant specialist investigation carried out to support compilation of this EIS.

A response letter from RFS was received on 13 August 2019 with further advice regarding bushfire protection measures for the Proposal. The Bushfire Assessment Report supporting this EIS has addressed the bushfire protection measures raised by RFS. A summary of matters raised by RFS in their letter, and a response to each issue, is presented in Table 6-5.

*Table 6-5 Summary of areas for consideration by RFS*

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| The EIS should address the following bush fire considerations: | | |
| Mapped bush fire prone land within 140 metres of the infrastructure footprint | The Bushfire Assessment Report prepared by Australian Bushfire Consulting Services (ABCS) in support of this EIS has considered all mapped and unmapped bushfire hazards within 140 metres of the Proposal site and the potential risks of ignition from operation.<br><br>Where a mix of hazards is found, the highest hazard has been considered for the purposes of the bushfire assessment for the Proposal. | Section 7.9 & Appendix I – Bushfire Assessment Report |
| Potential ignition risks from infrastructure installation and operation | Potential ignition risks from infrastructure installation include human activity (e.g. smoking), vandalism (e.g. arson), sparks from plant or machinery operations (e.g. grinding, rock cutting) and Hot Work operations (e.g. welding, gas cutting). Mitigation measures have been identified as part of the bushfire assessment to mitigate potential impacts.<br><br>The majority of the Proposal includes underground infrastructure (water and wastewater pipelines), with the exception of some aboveground components located at the northernmost portion of the Proposal site which may be exposed to bushfire risk (e.g. WWPS and ventilation stacks). However, these components are considered as non-habitable structures in accordance with PBP. However, interim APZs would be provided to avoid flame contact and minimise the risk of material ignition within the WWPS footprint.<br><br>The flammability of the proposed ventilation stacks was considered as part of the assessment, including the need for ember protection mesh instead of the standard bird protection mesh. Nevertheless, ABCS confirmed with HWC that | Section 7.9 & Appendix I - Bushfire Assessment Report |

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| | ember mesh would not be necessary in this instance. | |
| Strategies to minimise identified ignition risks and to facilitate firefighting operations. | Bushfire protection measures, such as the provision of interim APZs and advice on construction materials and services supply have been identified to minimise potential ignition risks and to facilitate firefighting operations.<br><br>Recommendations have also been included to address bushfire safety within the future Safe Work Operating Procedures during construction and operational activities (including plant and equipment). | Section 7.9.4 & Appendix I – Bushfire Assessment Report |

## 6.3.8 Port Stephens Council

Port Stephens Council (Council) has been consulted throughout the preparation of this EIS, regarding various elements of the proposal. Consultation has been undertaken in the form of meetings and correspondence (emails and letters).

A letter was provided to the Council in 18 April 2019 to provide an overview of the Proposal, special investigations to be carried out and how areas for consideration assumed to be relevant to Council would be addressed. Subsequently, a meeting was held on 30 April 2019 with Council to discuss the contents of this letter and any other key areas for consideration in the EIS.

A formal pre-lodgement meeting was held on 10 May 2019, the minutes of which are included within Appendix O. A summary of the areas for consideration raised at the pre-lodgement meeting and how they have been addressed in this EIS is provided in Table 6-6.

As part of the ongoing consultation with Council, a letter was provided via email on 25 July 2019 to provide an overview of the Proposal and relevant specialist investigation carried out to support compilation of this EIS.

A response from Ryan Falkenmire (Senior Development Planner) was received via email on 8 August 2019. Areas for consideration raised by Council as part of their response included additional assessment requirements related to hazard and risk, landscape and visual impact, socio-economic, land use and property, and community consultation. A response to each issue has been provided in Table 6-6.

*Table 6-6 Summary of areas for consideration raised by Council during the pre-DA meeting*

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| Areas for consideration raised by Council during meeting held on 10 May 2019 | | |
| **Planning** | • Designated Development:<br><br>Planning approval pathway was confirmed as a result of the Proposal traversing a mapped Coastal Wetland (ID 36586) under Coastal Management SEPP.<br><br>All matters identified within the SEARs issued by DPIE have been assessed throughout this EIS and associated appendices accompanying this EIS. | Section 5.3.1 & Section 7 |

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| | • Owners Consent:<br>Council confirmed that owners consent from landowners of all properties subject to development works must be obtained prior to DA lodgement. Accordingly, consent letters from all impacted landowners have been submitted with the DA. | N/A |
| | • Construction Footprint:<br>The construction footprint (Proposal site), including the location of compounds, has been identified within Section 4 of this EIS. The construction methodology is described in this EIS, including the assessment of key environmental issues addressed in Section 7 of this EIS. Mitigation measures have been identified for each issue to address potential impacts to surrounding properties during construction and of the Proposal. | Section 4.3, Section 7, Appendix B – Preliminary Engineering Design Plans & Appendix C – Construction Footprint Overview |
| | • Visual Impact:<br>The Preliminary Engineering Design Plans accompanying this EIS include elevations of the proposed pipelines and aboveground infrastructure (i.e. WWPS and ventilations stacks). Additionally, visual impacts have been assessed as part of the EIS, including mitigation measures for both construction and operational activities. | Section 8.1 & Appendix B – Preliminary Engineering Design Plans |
| | • Cost Summary Report:<br>A detailed Cost Summary Report prepared by APLAS Group Pty Ltd has been provided to Council, outlining the capital investment value of the Proposal, which is estimated at $11,517,499 (including GST). | Submitted under separate cover |
| **Natural Resources** | As noted in Section 6.3.4 above, a BDAR has been provided with this EIS in accordance with the requirements of the BC Act. The BDAR contains an assessment against SEPP 44, Coastal Management SEPP and relevant EPBC matters. The BDAR also includes an assessment of the potential impacts to the Grey-headed Flying-fox camp on Adelaide Street, including the identification of mitigation measures to avoid and minimise those impacts. | Section 7.3 & Appendix D – BDAR |
| **Engineering** | Northrop Consulting Engineers (Northrop) have consulted the relevant representatives in Council's Engineering and Assets teams in relation to the proposed water and wastewater alignment design.<br>Northrop has provided ongoing advice via telephone and email in relation to the Proposal's design. Northrop and the Applicant will continue to consult with Council as part of | N/A |

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| | the detail design stage, including any potential changes that may arise as the design progresses. | |
| Areas for consideration raised by Council as part of their response to the letter dated 8 August 2019 | | |
| **Hazard and risk** | As discussed in Section 5.4.6 of this EIS, a chorine injection point would be required during operations for the water pipeline. However, the Proposal is not considered 'hazardous' as defined by SEPP 33. Furthermore, the chlorine injection point will be designed and managed in accordance with HWC standards. The appropriate measures and management controls would be implemented to mitigate any potential risks. | Section 5.4.6 and Section 8.1 |
| **Landscape and visual impact** | Potential impacts on visual amenity have been discussed in this EIS. Potential visual receptors impacted by aboveground components of the Proposal have been identified. However, impacts are expected to be negligible given the distance, topography and vegetation surrounding the Proposal site. Construction works would involve temporary visual impacts, relatively short term in nature. Suitable mitigation measures have been identified to ensure a minimal visual intrusion on surrounding areas to the Proposal site. | Section 8.1 |
| **Socio economic** | Socio-economic impacts related to the construction of the Proposal would be temporary (approximately nine months) and largely localised to the construction area. The construction of the Proposal would result in short-term adverse impacts, as presented in Sections 7 and 8.1 of this EIS. Positive socio-economic impacts have also been discussed, including employment generation during construction, positive employment impacts as a result of the operation of the Proposal, and the provision of water and wastewater services to the Kings Hill URA. | Section 8.1 |
| **Land use and property** | The Proposal intercepts a variety of land uses between Raymond Terrace (south) and Kings Hill URA (north). Land ownership along the Proposal site is addressed in Section 2.2 of this EIS. As previously discussed, no private properties would be directly impacted as a result of the Proposal. Potential impacts would be temporary and generally occur during construction. Any impacts arising from the Proposal would be minimised where practicable to the extent necessary during construction and operation. | Section 2.2 and Section 8.1 |
| **Community consultation** | Council recommended undertaking additional consultation with the local community groups associated with Boomerang Park. Details | Section 6.5.2 |

| Matter raised | Response to matter | Where addressed |
|---|---|---|
| | regarding this consultation are provided in the section below. | |

## 6.4 Other consultation

### 6.4.1 Aboriginal consultation

Consultation with Registered Aboriginal Parties (RAPs) was undertaken by Artefact as part of the Aboriginal Cultural Heritage Assessment Report (ACHAR) for the Proposal. Consultation was undertaken in accordance with the OEH 'Aboriginal cultural heritage consultation requirements for proponents 2010'. This included:

- Notification of the Proposal and registration of interest (including advertisement on the local paper, letters to agencies and identified knowledge holders)
- Participation of RAP representatives during a field survey
- Provision of a draft copy of the ACHAR sent to RAPs for comments.

A total of 13 RAPs were consulted for the Proposal as outlined in Table 6-7 RAPs registered for the Proposal.

*Table 6-7 RAPs registered for the Proposal*

| Organisation | Representative Name |
|---|---|
| Nur-Run-Gee Pty Ltd | Leonard Anderson |
| Didge Ngunawal Clan | Paul Boyd and Lilly Carroll |
| Undisclosed* | Undisclosed* |
| Mur-Roo-Ma Inc | Anthony Anderson |
| AHCS | Amanda Hickey |
| A1 Indigenous Services | Carolyn Hickey |
| Widescope Indigenous Group | Steven Hickey |
| Worimi Traditional Owners Indigenous Corporation | Candy Lee Towers |
| Murra Bidgee Mullangari Aboriginal Corporation | Ryan Johnson & Darleen Johnson - Carroll |
| Muragadi | Anthony Johnson |
| Merrigarn | Shaun Carroll |
| Worimi Aboriginal Cultural Services | Tamara Towers |
| Karuah Indigenous Corporation | David Feeney |
| Worimi Local Aboriginal Land Council | Andrew Smith |

*One of the RAPs consulted requested to remain anonymous.

The draft ACHAR was sent out to the RAPs on 27 September 2019 with a 28 day review period provided to the RAPs. Three (3) responses were received for the draft report and have been documented in the final ACHAR. These responses are summarised below:

- Karuah Indigenous Corporation sent an email (dated 12 October 2019) indicating they are satisfied with the draft report

- A1 Indigenous Services sent an email (dated 13 October 2019) indicating that they supported the findings in the ACHAR and would like to be involved in future works
- Mur-Roo-Ma sent a letter (dated 23 October 2019) and indicated they agreed with the results of the survey, agreed with the mitigation options for the Proposal and would like to be consulted for any future works.

For further detail on Aboriginal heritage and RAPs consultation refer to Section 7.4 and ACHAR (Appendix F).

### 6.4.2 WaterNSW

WaterNSW were initially consulted by DPIE upon receipt of a letter for a request for SEARs which provided background information and sought comments on the Proposal. A response email was received by DPIE on 10 January 2019 from WaterNSW confirming that the Proposal site is not located near any WaterNSW land, assets or infrastructure and therefore, WaterNSW did not have any particular assessment requirements for the Proposal. For this reason, WaterNSW were not requested to be consulted within the SEARs.

### 6.4.3 Department of Industry – Crown Lands

Department of Industry – Crown Lands (DoI CL) were initially consulted by DPIE upon receipt of a letter for a request for SEARs which provided background information and sought comments on the Proposal. A response email was received on 22 January 2019 from DoI CL noting that DoI CL did not have any comments for the Proposal. For this reason, DoI CL were not requested to be consulted within the SEARs.

### 6.4.4 Service and utility providers

#### Ausgrid

Northrop undertook consultation with Ausgrid during the second half of 2019 regarding the potential impacts of the Proposal on Ausgrid assets, such as the existing overhead mains located within road reserves and private property. Accordingly, Ausgrid discussed the conditions and statutory requirements to be considered during the installation of the Proposal adjacent to Ausgrid's underground infrastructure. It was determined that further consultation with Ausgrid would be undertaken as part of detailed design.

#### Telstra

Telstra have been identified as the only telecommunications provider that may be directly impacted by the Proposal. Northrop consulted Telstra during the second half of 2019 to discuss the extent of potential impacts on telecommunications infrastructure within the Proposal site. The appropriate control measures and activities would be further discussed with Telstra as part of detailed design. Any need to relocate services would be incorporated as the design progresses.

## 6.5 Community consultation

### 6.5.1 Community consultation undertaken during the development of the EIS

RPS Group were engaged by the Applicant to undertake community consultation. During the development of the EIS, consultation was primarily undertaken to facilitate

engagement between the project team and key community stakeholders. This engagement served a dual purpose:

- To identify key community issues for consideration in the EIS and associated technical studies
- To create broad awareness of the Proposal so as to remove uncertainty around the proposed activities.

The community consultation program commenced on 29 July 2019 and responses to the community were issued until 25 September 2019. Landowners and residents located within close proximity of the Proposal site were consulted as part of this program. Consultation activities undertaken include:

- A contact number (02 4940 4200), project email address (rachel.cogger@rpsgroup.com.au), and postal address (Unit 2A, 45 Fitzroy Street, Carrington NSW 2294) were used to provide a central point of contact for community enquiries.
- A total of 420 letters were mailed out to landowners and the community seeking feedback on the Proposal. A community consultation map provided in Appendix P shows the consulted residents and landowners. The letters contained the background of the Proposal and its key components, the key environmental impacts and assessment proposed, a project timeline, as well as methods for submitting enquiries.

RPS Group responded to all residents whom raised comments on the Proposal. A summary of the comments raised by the residents and where they have been addressed in the EIS is provided in Table 6-8.

*Table 6-8 Key issues raised during community consultation*

| Issue | Description | Response | Where addressed |
|---|---|---|---|
| **Location and extent of the Proposal** | Some residents were concerned that the Proposal may be impacting on residential properties located along the proposed alignment. | It was clarified that no private property would be directly impacted, and the proposed works would only be occurring at the driveways (Council land) fronting residential properties. There would be limited access interruptions and the area would be reinstated on completion of the works, noting that further information would be provided on submission of the DA along with further direct communication and co-ordination with any disrupted landowners. | Section 4.1, Section 4.2 |
| **Construction activities** | Concerns about construction hours, operation of heavy machinery and installation of temporary construction compounds. | Information was provided on the proposed working hours for construction activities, which would be limited to recommended standard hours outlined by *Interim Construction Noise Guideline* (DECC 2009) for the majority of the works. Additionally, it was clarified that some additional construction | Section 4.3 |

| Issue | Description | Response | Where addressed |
|---|---|---|---|
| | | works may be undertaken outside of standard daytime construction working hours, and the activities to be undertaken outside standard construction hours were explained in detail. Consultation for out of hours works would be undertaken in accordance with HWC guidelines. In addition, justification was provided on the location of the temporary compound areas, including the ancillary facilities and activities to be undertaken during construction activities. | |
| **Further information and assessment** | Some residents requested further information on the design of the Proposal, including detailed assessment of key issues that may impact on surrounding residential properties. | The community were informed on the project's timeframes and estimated DA lodgement date. It was clarified that the EIS to be submitted with the DA was still under preparation at the time community consultation was undertaken. Accordingly, it was explained that more detailed information on the Proposal would be available during the DA exhibition period, giving the community further opportunities to comment on the Proposal during the assessment of the DA. | Section 4.3.1 |

Following lodgement of the EIS, additional communications and engagement will be undertaken with community groups, stakeholders and other individuals, as required.

### 6.5.2 Local Community Groups associated with Boomerang Park

As discussed above, Council recommended undertaking additional consultation with the local community groups associated with Boomerang Park. These include:

- Raymond Terrace Park, Reserves and Tidy Towns Committee
- Raymond Terrace Senior Citizens Hall Management Committee
- Raymond Terrace Men's Shed
- Port Stephens Dog Sports Club
- Raymond Terrace Outside School Hours Care.

Consultation letters were sent to the above groups via email on 21 August 2019.

No response was received from any community group during the consultation period.

## 6.6 Ongoing future consultation

### 6.6.1 EIS public display and response to submissions

This EIS would be placed on public display for 28 days in accordance with Schedule 1, Division 2 (Part 8, Designated Development Applications) of the EP&A Act. This public display period would provide an opportunity for all stakeholders to comment on the Proposal. On completion of the public display period, all submissions received would be considered in a formal response to Council. General consultation activities

PM No. 1 Pty Ltd, as the Applicant, is committed to undertaking regular consultation with stakeholders, including the community throughout the planning, construction and operational phases of the Proposal.

Opportunities would be provided for the community to provide feedback as well as for the dissemination of up-to-date information on the Proposal via an email feedback system with RPS Group (kingshill@rpsgroup.com.au) and the maintenance of a free-call information line (1800 887 598).

In addition, the Project website (https://kingshill.engagementhub.com.au/) would be regularly updated throughout construction of the Proposal, to provide accessible, up-to-date information regarding the Proposal.

### 6.6.2 Consultation during construction of the Proposal

A number of mitigation measures have been provided throughout this EIS to reduce the impact of the Proposal on surrounding stakeholders, including the community (refer to Section 11 for a summary of mitigation measures for the Proposal).

The Applicant and RPS Group will continue community consultation throughout the duration of the Proposal via consultation mediums outlined above. Continued update and operation of the project website, email feedback system and free-call information line (1800 887 598) would be maintained throughout the construction phase of the Proposal.

### 6.6.3 Consultation during operation of the Proposal

Consultation during operation of the Proposal would be determined by HWC at a later stage.

# 7 KEY ENVIRONMENTAL ISSUES

## 7.1 Soils and contamination

This assessment is based on a Preliminary Site Investigation (PSI) in relation to potential contamination undertaken by Arcadis. This report is provided in Appendix H.

The key issues which have been raised in the SEARs (No. 1291) under 'soil and water' relate to an assessment of soil and water-related issues, including the potential for existing soil and groundwater contamination, as well as for the presence of acid sulfate soils at the Proposal site.

A summary of the relevant SEARs and where they are addressed in this section is provided in Appendix A.

### 7.1.1 Methodology

A PSI was undertaken by Arcadis to identify the potential for issues, concerns or environmental risks and liabilities associated with the current and historical uses of the Proposal site. The methodology implemented in the PSI for the Proposal includes:

- Inspection and walkover at the Proposal site were conducted on 2 August 2019 to characterise the property setting, including inspection of the surface at the Proposal site for obvious signs of potential contamination and/or contaminant sources
- A visual evaluation of surrounding land uses to identify any neighbouring activities which may have affected or present a potential risk to the environmental quality of the Proposal site
- A review of available zoning plans and Council documents to determine potentially contaminating activities that may have occurred on the Proposal site
- A review of EPA Records (notified and regulated sites under Section 60 of the *Contaminated Land Management Act* (CLM Act))
- An evaluation of aerial photographs to assist in assessing historical land uses and conditions on and adjacent to the Proposal site
- A review of the environmental setting with regards to geology, topography, hydrology and hydrogeology
- Preparation of a PSI in general accordance with the requirements stated in the NSW OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*, with reference to other relevant NSW EPA endorsed guidelines.

### 7.1.2 Existing environment

#### Geology

The 1:250,000 Geological Survey of NSW map of Newcastle indicates that the Proposal site is underlain by the following geological units:

- Quaternary aged alluvium and lacustrine sediments
- Palaeozoic aged Dalwood Group comprising sandstone, lithic sandstone, conglomerates, siltstone and basalt
- Palaeozoic aged Greta Coal Measures comprising coal seams, siltstone, sandstone and conglomerates
- Palaeozoic aged Branxton Formation of the Maitland Group comprising conglomerates, sandstone and siltstone.

The Soil Conservation Service of NSW Sydney 1:100,000 Soil Landscapes Series Newcastle Sheet indicates that the landscape of the region of the Proposal site comprises of the following Soil Landscapes:

- Erosional Bolwarra Heights
- Estuarine Millers Forest
- Residual Wallalong
- Aeolian Shoal Bay
- Disturbed Terrain.

## Hydrogeology

Groundwater is expected to be present within the unconsolidated sediments associated with creeks and lakes.

A review of DoI Water records for groundwater bores within a 2 km radius of the Proposal site indicated the presence of twenty-two (22) water bores located offsite around the southern portion.

The majority of these boreholes were used for domestic purposes but were also used for monitoring, irrigation, stock and dewatering purposes. The Standing Water Level (SWL) measured from these boreholes ranges between 1.0 and 6.7m bgl as recorded in 2012 and 2004, respectively.

Due to the undulating natural topography along and around the Proposal site, the groundwater flow direction is expected to be variable and influenced by local conditions.

Refer to the PSI (Appendix H) for further information on the boreholes surrounding the Proposal site.

## Hydrology

Various watercourses and ponds are located around the Proposal site, including Grahamstown Dam to the east (approximately 300m at its nearest point) and Williams River to the west (approximately 700m at its nearest point).

The Proposal site would cross three ephemeral watercourses, two of which are associated with Irrawang Spillway and Grahamstown Spillway. The third watercourse is from Kings Hill URA, draining from the north of the Proposal site.

## Acid Sulfate Soils

As outlined in Table 7-1, a review of the Port Stephens LEP shows that the Proposal site is largely situated in a Class 5 Acid Sulfate Soil category, however, does also marginally intersect a Class 3 category at its northern portion. Figures showing these acid sulfate soils along the Proposal site are provided in the PSI at Appendix H**.**

*Table 7-1 Acid Sulfate Soils*

| Class of Land | Works |
|---|---|
| Class 3 | Works more than 1 metre below the natural ground surface.<br>Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface. |
| Class 5 | Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land. |

## Potential for Contamination

A search of the NSW EPA Contaminated Land Database for the Proposal site was conducted as part of the PSI. The Proposal site is not listed on the EPA list of contaminated sites in NSW, under Section 60 of the CLM Act. However, this list is not considered conclusive and many sites which are contaminated in NSW are not currently included in this listing.

Based on the observations made during the walkover at the Proposal site and the analysis of the historical land uses at the Proposal site, Arcadis is of the opinion that there is a low risk of contamination present on the Proposal site. This is based on the following findings as outlined in the assessment undertaken in the PSI:

- The Proposal site and immediate surrounding area have primarily been vacant or used for residential/rural purposes and has no history of major industrial or manufacturing uses
- Historically, some farming and agricultural land use has occurred in the surroundings to the Proposal site
- No olfactory evidence of contamination or staining was noted during the Proposal site walkover
- No staining or other visual indicators of contamination were observed at the Proposal site
- The undulating surface along the Proposal site's alignment and the rubbish noted within the drainage lines (tyres and plastics) is a potential indication of fill material. The nature and extent of this potential fill material is unknown.

Potential sources of contamination at the Proposal site and the associated contaminants of potential concern (CoPC) are listed in Table 7-2.

*Table 7-2 Potential Contaminant Sources*

| Source | Associated Chemicals | CoPC |
|---|---|---|
| **Potential Onsite Sources** | | |
| **Unknown fill materials and wastes:**<br>The undulating surface along the length of the Proposal site's alignment indicated the potential presence of fill material. The quality of this fill is unknown.<br>Some general wastes such as tyres and plastics were also observed along some of the drainage lines present within the site boundary. | Asbestos, ash, slag, construction waste, demolition waste. | Heavy metals, TRH, BTEX, PAHs, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs), phenols and asbestos. |
| **Herbicides and Pesticides:**<br>Some of the surrounding land to the Proposal site was formerly used for farming and agricultural purposes which likely utilised herbicides and pesticides. | Herbicides and pesticides. | Organochlorine pesticides (OCPs) and organophosphate pesticides (OPPs). |

## 7.1.3 Potential impacts

### Construction

#### Contamination

Based on the CoPC outlined in the section above, the potential for contamination at the Proposal site is considered low. Potentially affected media at the Proposal site include soil and groundwater. Pathways or transport mechanisms by which receptors may be exposed to contamination on and off-site include:

- Direct contact with contaminated soil/groundwater
- Ingestion of soil/abstracted groundwater
- Inhalation of dust
- Vertical migration of spills/leaks to groundwater.

Potential receptors include surrounding residents, construction workers and groundwater users beyond the Proposal site.

An exposure assessment including the potential pathways and potential receptors are outlined in Table 7-3.

*Table 7-3 Exposure Assessment*

| Source | Pathway | Receptor | Exposure Assessment |
|---|---|---|---|
| **Fill Materials** | Direct contact | Construction workers | Earthworks are required during the construction of the Proposal. As a result, there is potential for construction workers to come in contact with any underlying fill. |
| | Ingestion | Construction workers | Construction workers may be at risk of ingesting fill material (dust) during earthworks. |
| | Inhalation | Surrounding residents and construction workers | Nearby residents and construction workers may be exposed to dust from the fill material during earthworks. |
| | Leaching | Groundwater and offsite groundwater users | Fill material have the potential to leach into the underlying groundwater and reach offsite groundwater users. |
| **Herbicides and Pesticides** | Direct contact | Construction workers | Earthworks are required during the construction of the Proposal. As a result, there is potential for construction workers to come in contact with impacted soil and/or groundwater. |
| | Ingestion | Construction workers | Construction workers may be at risk of ingesting herbicides and/or pesticides during earthworks. |

| Source | Pathway | Receptor | Exposure Assessment |
|---|---|---|---|
| | Inhalation | Surrounding residents and construction workers | Nearby residents and construction workers may be exposed to dust impacted by herbicides and pesticides during earthworks. |
| | Leaching | Groundwater and offsite groundwater users | Pesticides generally do not leach into the groundwater. This pathway is not complete. |

Mitigation measures have been provided below to manage this potential low level of risk.

### Acid Suflate Soils

As defined in the *NSW EPA Waste Classification Guidelines Part 4: Acid Sulfate Soils (2014)*, acid sulfate soils are those naturally occurring sediments and soils which contain sulfides, mainly iron sulfide and iron disulfide or their precursors. Exposure of these sulfides in the soil to oxygen – often as a result of drainage or excavation – can produce sulfuric acid, which may have a significant impact on the environment. Leaching of sulfuric acid into waterways can cause serious water quality problems, resulting in fish kills and damage to infrastructure, such as floodgates and bridges.

Due to the presence of a Class 3 Category soils within the Proposal site, there is potential for acid sulfate soils to be encountered, disturbed, exposed and/or drained during excavation works.

Therefore, under Subclause 7.1(3) of the Port Stephens LEP, an Acid Sulphate Soil Management Plan (ASSMP) would be prepared for any Classed 3 category soils to be excavated within the Proposal site. Subject to the implementation of the ASSMP, the Proposal is not anticipated to result in any adverse impact on classed soils.

## Operation

As stated in Section 4.2.2 of this EIS, a chorine injection point would be required during operations for the water pipeline. Chlorine is classified as hazardous by SafeWork Australia as it produces acute toxicity and irritation.

The Australian Government Department of Health – National Industrial Chemicals Notification and Assessment Scheme (NICNAS) established the Inventory Multi-tiered Assessment and Prioritisation (IMAP) framework for assessment of existing chemicals in Australian. Accordingly, chlorine is listed as a Tier II Human Health as assessed by IMAP. The Human Health risk concluded that existing regulatory controls are considered sufficient and references WorkSafe Australia classification.

The chlorine injection point will be designed and managed in accordance with *HWC Standard Technical Specification – Chemical Storage and Delivery Systems* (STS 670) and the relevant Australian Standards and legislative requirements. Therefore, from a contamination perspective, the use of chlorine is not anticipated to have adverse impacts on the environment as a consequence of the operation of the Proposal.

## 7.1.4 Mitigation measures

### Construction

- Whilst there is a low risk of contamination, given that some potential onsite sources of contamination have been identified (i.e. potential fill, acid sulfate soils and presence of herbicides and pesticides), a protocol for managing contamination (if it is uncovered) is to be detailed within the CEMP
- In order to confirm that contamination will not pose a risk to human health or the environment, Arcadis recommend undertaking:
  - A Detailed Site Investigation (DSI) of the site soils prior to any excavation works to confirm that risk to human health or the environmental is removed or minimised within the Proposal site. The DSI should be completed in accordance with the *NSW OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites* and the *NEPC (2013)*; and/or
  - Having an experienced contaminated land professional present on the Proposal site throughout the excavation works to screen the soils and manage the stockpiling of excavated materials.
- All materials requiring removal from the Proposal site will need to be classified in accordance with the *NSW EPA (2014) Waste Classification Guidelines*. This material should only be transported from the Proposal site to an appropriately licensed landfill for disposal or to an appropriately licenced recycling facility which is licenced to receive this material, and waste disposal dockets kept for 'cradle to grave' waste tracking purposes
- An ASSMP would be prepared as part of the CEMP for any Classed 3 category soils to be excavated within the Proposal site.

### Operation

It is anticipated that prior operation, the Proposal site would have been deemed suitable for the intended use. Therefore, no mitigation measure would be required during operation.

## 7.2 Water and hydrology

The information presented in this section is based on the findings of the Stormwater Impact Assessment undertaken by Arcadis (refer to Appendix L).

The key issues which have been raised in the SEARs (No. 1291) identified an assessment of the key water and hydrology-related issues for the Proposal, including soils, water and flooding.

A summary of the relevant SEARs and where they are addressed in this section is provided in Appendix A.

### 7.2.1 Methodology

The methodology implemented in the Stormwater Impact Assessment for the Proposal includes:

- Compilation and review of background information on groundwater, hydrology, flooding and drainage relevant to the Proposal site, including data on existing water quality
- Identification of any sensitive receiving waterways (within 500m from the Proposal site) and groundwater dependent ecosystems
- Identification and assessment of construction and operational activities that may impact on groundwater and on the water quality of receiving environments
- Identification of likely impacts on surface quality, existing wetlands and groundwater resulting from proposed construction activities and operation of the Proposal
- The Proposal has been assessed against the following legislation, policies and guidelines:
  - *Water Management Act 2000*
  - *State Environmental Planning Policy (Coastal Management) 2018*
  - *Port Stephens Local Environmental Plan 2013*
  - *Port Stephens Development Control Plan 2014*
  - *Guidelines for Controlled Activities on Waterfront Land* (NRAR, 2018)
  - *The Kings Hill Urban Release Area Water Management Strategy Guidelines* (BMT WBM, 2013)
  - *HWC Standard Technical Specifications and Water Services Association of Australia (WSAA) Codes*
  - *Guidelines for Controlled Activities on Waterfront Land* (NRAR, 2018)
  - *Williams River Flood Study* (BMT WBM, 2009)
  - *Landcom 2004 Managing Urban Stormwater: Soils and Construction – Volume 1* ('Blue Book')

### 7.2.2 Existing environment

#### Soils

The soil runoff potential and erosion hazard has been reviewed based on the *Landcom 2004 Managing Urban Stormwater: Soils and Construction – Volume 1* (commonly known as the 'Blue Book'). The following soils landscapes were identified for the Proposal site based on the Soil Conservation Service of NSW Sydney 1:100,000 Soil Landscapes Series Newcastle Sheet:

- Wallalong – residual: located in the Proposal site, north of the Grahamstown Spillway
- Bolwarra Heights – erosional: located in the Proposal site, south of the Grahamstown Spillway.

These soils are considered to have a moderate to high runoff potential with a slow to moderate rate of infiltration. Based on the site location and typical slopes for the Proposal site the potential erosion hazard is generally considered to be low.

## Topography and Hydrology

As outlined in Section 7.1, the Proposal site is located between two significant waterbodies with Grahamstown Dam to the east and Irrawang Swamp to the west. The Proposal site (along with the Pacific Highway and Adelaide Street) typically follows the north/south ridgeline dividing the catchment areas of these waterbodies.

Grahamstown Dam covers 2,800 hectares and is the Hunter's largest drinking water supply dam. In the event of overflow, flows from Grahamstown Dam can discharge to the Irrawang Swamp via the Grahamstown Spillway. The smaller Irrawang Spillway (located north of Grahamstown Spillway) is no longer operational. Irrawang Swamp is located within the larger Williams River floodplain. Williams River drains south to the Hunter River and ultimately discharges to the ocean at Newcastle. Site photos of both spillways are provided in the Stormwater Impact Assessment (Appendix L).

The existing topography and watercourses of the region are illustrated in Figure 7-1.

Along the Proposal site elevations regularly undulate ranging from high points of 33mAHD down to as low as 4mAHD in low lying areas. The lowest locations along the Proposal site occur at the spillway locations and the southern area of the Raymond Terrace urban areas where the Williams River meets the Hunter River. The WWPS location sits at a high point of the surrounding terrain.

Stormwater runoff from the majority of the Proposal site would generally drain west to Irrawang Swamp as overland sheet flow with little to no formal drainage network present. Through the Raymond Terrace residential area and sections of the Proposal site, located north of the Richardson Road and Pacific Highway intersection, may drain to Grahamstown Dam via the local pit and pipe drainage network and roadways.

The Port Stephens Council pit and pipe drainage network at times is present along the Proposal site. The drainage network serves the residential development and is expected to be more prevalent in denser and newer residential areas, along the main roadways and low points in the topography.

The Proposal site crosses an ephemeral watercourse from the Kings Hill URA area draining from the north (part of the Kings Hill South sub-catchment area). This watercourse crosses the Proposal site at the unnamed road upstream of the RDA property. The upstream of this watercourse is predominately undeveloped bushland. The watercourse as viewed from the unnamed road is illustrated in Figure 7-2.

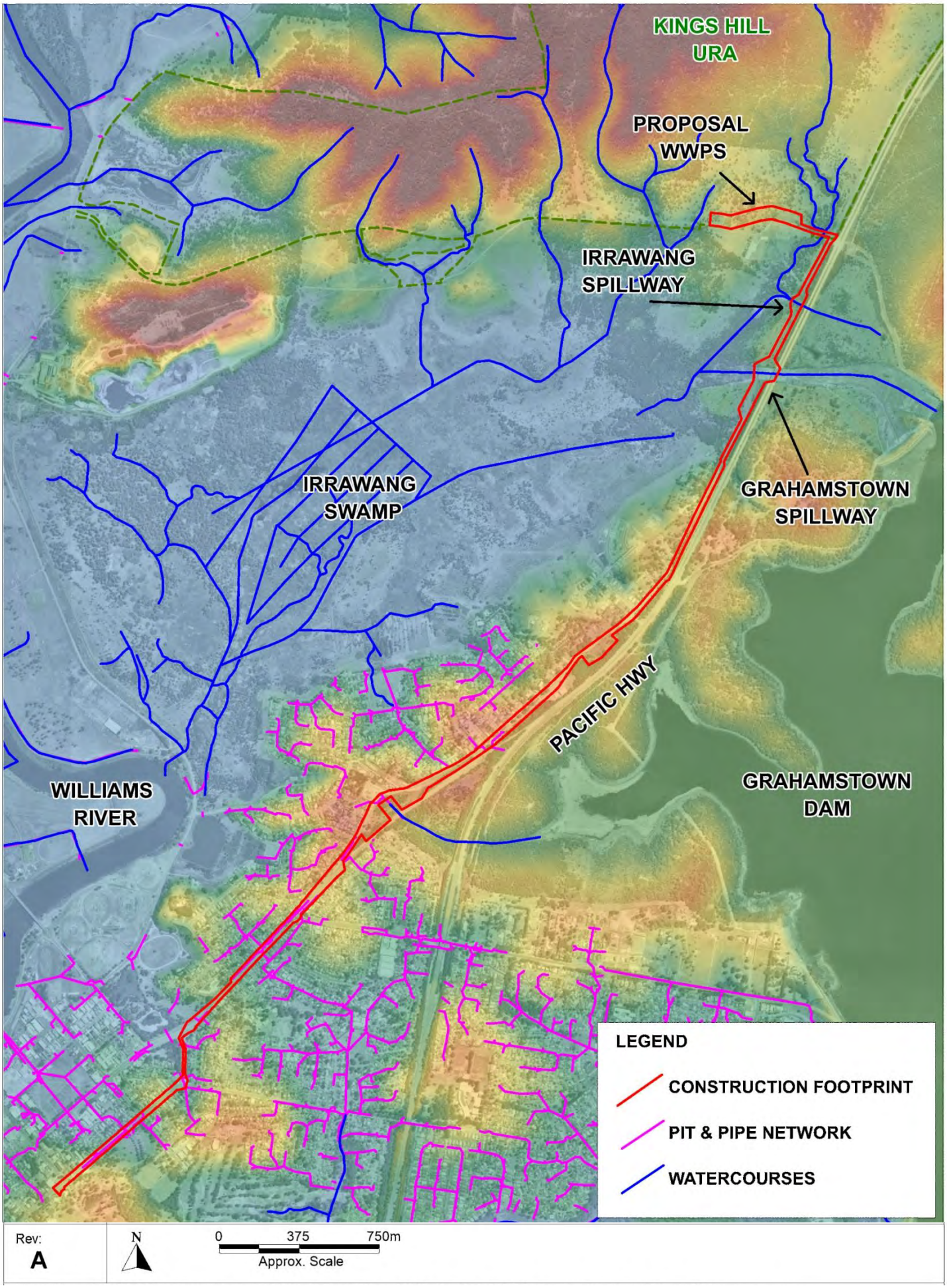



*Figure 7-1 Regional Topography and Watercourses*

*Figure 7-2 Kings Hill URA Watercourse*

## Flooding

The majority of the Proposal site is outside of the flood prone land as outlined in Council's flood hazard mapping included in the Stormwater Impact Assessment (Appendix L). Near the northern and southern extents of the Proposal site some areas are within the low hazard flood fringe and flood planning area.

The *Williams River Flood Study* was prepared by BMT WBM (2009) for Port Stephens Council and Dungog Shire Council to describe and define the existing flood behaviour for the Williams River area. The flood study provides the following estimated design flood levels for the Irrawang Swamp:

- Irrawang Swamp (Location 18):
  - 10% AEP = 2.3mAHD
  - 5% AEP = 4.1mAHD
  - 1% AEP = 4.6mAHD
  - PMF = 9.6mAHD.

The majority of the Proposal site is located above the Irrawang Swamp probable maximum flood (PMF) level including the WWPS.

## Kings Hill Urban Release Area Water Management Strategy Guidelines

The *Kings Hill Urban Release Area Water Management Strategy Guidelines* (BMT WBM, 2013) considered the impact of the proposed Kings Hill URA development on flooding. The report assumes that stormwater runoff from the Kings Hill East sub catchment will be collected and diverted south to the existing watercourse adjacent to the RDA property.

Flood mapping from the BMT WBM report for Kings Hill URA developed scenario along with flood impact mapping of the development for the 20% and 1% AEP have been provided in the Stormwater Impact Assessment (Appendix L). The flood mapping of the

developed scenario does not appear significantly different to the Port Stephens LEP flood hazard mapping mentioned above. It is possible that the flood mapping from the BMT WBM report has been used for the LEP flood hazard mapping, which can be confirmed with Council during detailed design.

The BMT WBM flood impact mapping demonstrates that the development of the Kings Hill URA is expected to increase peak flood levels upstream of the RDA property by 0.25 meters in the 1% AEP and 0.5 meters in the 20% AEP. This flood impact has largely resulted from the diversion of the Kings Hill East sub catchment to the watercourse adjacent to RDA. This flood impact is to be addressed as part of the Kings Hill URA development (subject to separate approval).

## 7.2.3 Potential impacts

### Construction

Construction activities with the potential to impact the surface water quality and quantity of the downstream environment associated with the Proposal construction include:

- Alteration of the topography and associated catchment areas of the Proposal site
- Alteration or removal of drainage pathways across the Proposal site
- Removal or modification of existing drainage, retention or diversion structures
- Concentration of surface water flows
- Use of water for construction activities such as dust suppression, commissioning of the pipelines and dewatering
- Vegetation clearing
- Demolition or removal of existing structures, infrastructure or materials
- Stockpiling of materials
- Spills or leaks of substances such as oil, hydraulic fluids and fuels
- Waste materials from construction activities
- Movement of vehicles and equipment.

The risk of construction activities impacting water quality or water quantity is increased in proximity to areas such as:

- Concentrated flow paths such as the ephemeral watercourses and the existing pit and pipe drainage lines
- Flood planning areas which may be impacted by flooding in a large event
- Construction compound areas where stockpiling of materials and equipment occurs
- Locations where the pipeline commissioning will involve discharging of water to adjacent land or waterways.

Overall, these risks can be managed through the implementation of the mitigation measures outlined in Section 7.2.4.

The construction footprint of the WWPS would be located both above the 100-year flood level and outside of the riparian corridors of the ephemeral watercourses in accordance with HWC requirements. However, the exact location of the WWPS would be determined at detailed design.

Given the relatively small footprint of the WWPS in relation to the upstream catchment area and being located above the FPL, the WWPS it is not expected to produce a significant water quality or quantity impact on the downstream environment. This would be confirmed during detailed design.

### Operation

Once the proposed pipelines have been constructed, the construction footprint would be rehabilitated generally to its existing condition (with the exception of the areas which included native vegetation) along the full length of the pipelines. Backfilling of the pipeline trench may reduce the permeability of the Proposal site due to compaction, potentially resulting in increased stormwater runoff volumes.

Given the above, existing stormwater runoff quality, volumes and peak flows are not expected to be significantly impacted as a result of operation of the proposed pipelines.

Whilst unlikely, there is the risk of the pipelines leaking or spillage during maintenance activities which could potentially impact the downstream water quality.

Construction and operation of the WWPS have the potential to impact water quality and quantity by:

- Altering the topography and associated catchment areas
- Concentrating surface water flows
- Increasing the imperviousness of the ground cover
- Reducing flood storage
- Providing a source of contaminants including discharge from the overflow relief structure

The above may increase stormwater runoff volumes, peak flows and pollutant loads discharging to the downstream environment.

However, the Proposal is not anticipated to have any significant operational impacts on water quality and quantity as the ground surface will be returned to its existing condition with little aboveground infrastructure present.

## 7.2.4 Mitigation measures

### Construction

#### Infrastructure design and construction management

- Detailed topographic survey would be undertaken during detail design to ensure any constructability issues and impacts on the existing drainage, catchment areas and topography are identified and minimised as far as practicable
- The WWPS will require on-site detention to mitigate peak flows to existing conditions in accordance with the Port Stephens DCP requirements. Additional water quality treatment may also be required. This would be determined during detailed design based on the size and configuration of the aboveground footprint in accordance with Council requirements
- Staging and timing of works are particularly important when working in higher risk areas for impacts such as near concentrated flow paths (existing or temporary), watercourses and riparian corridors, spillways, the existing pit and pipe drainage network and areas below the flood planning level. Construction activities will be staged and timed to limit the area and duration of disturbance, as well as avoid wet weather periods
- Any concentrated stormwater discharge or sewer overflow relief would be directed east. Stormwater outlets to the watercourse would be strategically positioned to minimise the potential for localised scouring due to point discharge with scour protection provided where required
- Installation of the WWPS flow relief structure would be in accordance with HWC standards.

## Erosion and Sediment Control

- A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP), or equivalent, would be incorporated into the Construction Environmental Management Plan (CEMP) for the construction of the Proposal. The SWMP and ESCP would be developed in accordance with the principles and requirements of the 'Blue Book'. The ESCP will be progressively updated to reflect the changing nature of the Proposal site as construction activities progress. The following aspects would be addressed within the SWMP and ESCP:
  - Appropriate sediment and erosion controls to be implemented prior to soil disturbance
  - Demarcation of vegetation clearing boundaries, sensitive areas and vegetation within vicinity of the construction footprint that is to be retained prior to construction, clearing or stripping works commencing
  - Stormwater management to avoid flow over exposed soils
  - Location of stockpiles to be outside of localised depressions, overland flow paths, riparian corridors and areas below the flood planning level as far as practicable
  - Inspection of all erosion and sedimentation control works prior to and post rainfall events
  - Reinstatement of disturbed areas is to be undertaken as soon as practicable progressively throughout the phased works to minimise disturbed areas exposed to the forces of erosion at any one time
  - Wheel wash or rumble grid systems installed at exit points to minimise dirt on roads
  - Construction traffic restricted to delineated access tracks and maintained until construction complete
  - Pre-start checks, as well as maintenance in accordance with manufacturers requirements to be undertaken on equipment to minimise the potential for leaks and spills from vehicles
  - Storage of materials on-site to be minimised
  - Suitable waste receptacles to be provided and maintained
  - Storage of any fuels, oils, lubricants, chemicals and Dangerous Goods and similar products will be stored in accordance with appropriate standards with emergency spill kits maintained on-site
  - Wet weather monitoring protocol including Grahamstown Dam water levels as well as predicted rainfall events
  - Site boundary controls will be implemented (e.g. sediment fencing, earth banks, mulch bunds, swales and table/diversion drains) around the perimeter of the site, as early in the construction process as possible
  - Temporary construction erosion and sediment control measures that would be implemented prior to construction of the Proposal include sediment fences, temporary sediment ponds, shaker grids and/or wash down areas at all vehicle access points, and sandbags (or similar) for protection of all existing stormwater infrastructure
  - In addition, the SWMP will include the protocol and specific mitigation measures related to the pipeline commissioning in accordance with HWC requirements
  - Inspection and monitoring of erosion and sediment control measures, pipeline performance, watercourses and downstream water quality will be undertaken regularly throughout the construction period and following large rainfall events.

## Operation

- The commissioning of the pipelines, ongoing inspection of the pipelines and management of the WWPS overflow relief would be in accordance with HWC standards
- For a period of six (6) months following construction, regular monitoring will be undertaken for the Proposal site rehabilitation, pipeline performance, watercourses and downstream water quality. Any scour, vegetation or water quality issues that arise would be investigated and rectified.

## 7.3 Biodiversity

This section presents an assessment of the potential impacts of the Proposal on biodiversity and identifies safeguards to minimise and reduce these impacts. The assessment presented in this section draws on information provided by the Biodiversity Development Assessment Report (BDAR) (Appendix D) undertaken for the Proposal by Arcadis.

A summary of the relevant SEARs and where they are addressed in this section is provided in Appendix A.

### 7.3.1 Methodology

The BDAR was prepared by an accredited assessor in accordance with the Biodiversity Assessment Method (BAM) as prescribed under Section 6.7 of the BC Act. Assessments of potential impacts to Matters of National Environmental Significance (MNES) identified under the EPBC Act have been prepared in accordance with *Matters of National Environmental Significance: Significant impact guidelines 1.1* (Commonwealth of Australia, 2013). Potential impacts to Key Fish Habitat have been assessed to determine if any threatened species listed under the FM Act would be impacted by the Proposal.

The methodology implemented in the BDAR for the Proposal includes:

- A review of information from relevant databases, vegetation maps, topographic maps, aerial photography, reports and published literature
- Field surveys undertaken in November and December 2018 and August 2019, including:
  - Random meander surveys to verify vegetation communities and the condition of vegetation across accessible land within the Proposal site and adjacent areas
  - Vegetation integrity plots involving quantitative (quadrat/transect) site surveys in accordance with the BAM
  - Floristic analysis of vegetation plot data to determine vegetation community and plant community types (PCTs)
  - Targeted flora and fauna surveys for species identified as having a high or moderate likelihood of occurrence in areas that may be impacted by the Proposal, as identified through the desktop assessment.
- Aquatic habitat values assessed against the *NSW Department of Primary Industries Policy and Guidelines for Fish Habitat Conservation and Management* (DPI 2013)
- Assessment of potential impacts to the Coastal Wetland – Irrawang Swamp (ID 36586), listed under the Coastal Management SEPP
- Assessments of potential impacts to Matters of National Environmental Significance (MNES) identified under the EPBC Act in accordance with *Matters of National Environmental Significance: Significant impact guidelines 1.1* (Commonwealth of Australia, 2013)
- Potential impacts to Key Fish Habitat and any threatened species listed under the FM Act.

## 7.3.2 Existing environment

### Terrestrial flora

#### Vegetation communities

Vegetation communities within the Proposal site are summarised in Table 7-4 below and shown in Figure 7-3 and Figure 7-4.

Three native vegetation communities were identified within the Proposal site, consistent with the following PCTs:

- PCT 1590: Spotted Gum/Broad-leaved Mahogany/Red Ironbark shrubby open forest
- PCT 1600: Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
- PCT 1619: Smooth-barked Apple - Red Bloodwood - Brown Stringybark - Hairpin Banksia heathy open forest of coastal lowlands

Together these PCTs cover approximately 5.22 hectares within the Proposal site.

Three non-native vegetation types that are not equivalent to a PCT are also present in the Proposal site: Cleared grassland, Exotic trees and Urban verges. This vegetation covers around 13.07 hectares within the Proposal site.

*Table 7-4 Vegetation communities within the Proposal site*

| Mapped vegetation | Corresponding plant community type (PCT) | Location within the construction footprint | Area within the construction footprint (ha) |
|---|---|---|---|
| Native vegetation community | Spotted Gum/ Broad-leaved Mahogany/ Red Ironbark shrubby open forest (PCT 1590) | This community in the Proposal site consists of several fragmented patches in varying condition, including regrowth from previous clearing and planted road batters. | 0.60 |
| Native vegetation community | Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter (PCT 1600) | This community is located in the very northern extent of the Proposal site. Here, the vegetation is located in semi-intact patches which adjoin large, intact expanses of native vegetation to the north, south and west. | 1.32 |
| Native vegetation community | Smooth-barked Apple - Red Bloodwood - Brown Stringybark - Hairpin Banksia heathy open forest of coastal lowlands (PCT 1619) | The areas mapped as this community within and adjoining the Proposal site consist of fragmented patches of disturbed regrowth, roadside vegetation that has likely been planted, and planted street trees in road verges. This vegetation is variable and does not directly correspond to any PCT. Given the dominance of *Angophora costata* in the better condition areas and the mapping of this PCT across the southern parts of the Proposal site in the most recent vegetation map (OEH 2012), this disturbed vegetation has been assigned to PCT 1619. | 3.30 |
| **Total area of mapped native vegetation communities** | | | **5.22** |
| Cleared grassland | Not consistent with the definition of any PCT | Cleared grassland occurs across the Proposal site, in grazed areas in the north of the Proposal site, across most areas within and adjoining access track on Hunter Water land, and on regularly mown or slashed road verges in the central and southern parts of the Proposal site.<br>While there are occasionally scattered trees and shrubs in areas mapped as cleared grassland, ongoing maintenance activities such | 11.49 |

| Mapped vegetation | Corresponding plant community type (PCT) | Location within the construction footprint | Area within the construction footprint (ha) |
|---|---|---|---|
| | | as slashing and mowing prevent the regeneration of trees and shrubs in these areas. | |
| Exotic trees | Not consistent with the definition of any PCT | There are small areas of densely planted exotic trees along Rees James Drive, mainly conifers such as *Pinus radiata* and *Cupressus* species. | 0.22 |
| Urban verges | Not consistent with the definition of any PCT. | The southern parts of the Proposal site are located within the more urbanised areas of Raymond Terrace. This vegetation type consists of smaller, fragmented patches of mown exotic grass lawns and planted ornamental shrubs, trees and groundcovers in residential gardens and verges. It also includes paved driveways and walking paths. | 1.36 |
| **Total vegetation within construction footprint (including native vegetation communities)** | | | **13.07** |

## IBRA Bioregions

The Proposal site lies within two Interim Biogeographic Regionalisation of Australia (IBRA) bioregions: The Sydney Basin bioregion (Hunter subregion), and the North Coast bioregion (Karuah Manning subregion). In accordance with the BAM, separate species and PCTs have been split and assessed according to their IBRA bioregion association.

## Threatened ecological communities

None of the vegetation in the Proposal site is equivalent to any Threatened Ecological Community (TEC) listed under the BC Act or the EPBC Act.

## Threatened flora

A total of 39 threatened flora species (species credit species) listed under the BC Act and/or EPBC Act have been identified for assessment in the Biodiversity Assessment Method Calculator (BAMC) (Version 1.2.4.00) and database searches. A likelihood of occurrence assessment was undertaken for each species and is provided in the BDAR at Appendix D. One threatened flora species, *Callistemon linearifolius,* is considered to have a moderate likelihood of occurrence on the Proposal site based on the presence of marginal suitable habitat and nearby records of the species. The area of potential suitable habitat for the species within the Proposal site is small, comprising the patches of PCTs 1590 and 1600 in moderate condition in the north of the Proposal site.

All other threatened flora species are considered to have a low likelihood of occurrence in the Proposal site, based on the lack of suitable potential habitat for the species. No threatened flora species were recorded in the Proposal site.


LEGEND

Development site

Vegetation Community Type

PCT

1590 - Spotted Gum/ Broad-leaved Mahogany/ Red Ironbark shrubby open forest

1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter

1619 - Smooth-barked Apple - Red Bloodwood - Brown Stringybark - Hairpin Banksia heathy open forest of coastal lowlands

Other

Cleared grassland

Exotic trees

Spillway

Urban verges

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Date issued: October 21, 2019
Aerial imagery supplied by NSW LPI

1:12,000 at A4

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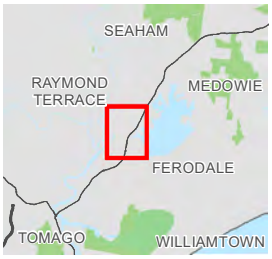


Figure 7-3 Distribution of plant community types and other vegetation