MOTT MACDONALD

Mooney Mooney & Peat Island Planning Proposal

Utilities Report

August 2021

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Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	13/08/18	R. Higgisson	G. Lee	G. Lee	Draft
B	22/10/18	R. Higgisson	G. Lee	G. Lee	Minor Amendments
C	20/08/19	R. Higgisson & T. Lecomte	J. Taylor J. Plessis, & C. Chau	J. Taylor	Inclusion of Water & Sewer Modelling
D	30/09/20	T. Loder	J. Wukowic	J. Wukowic	Updated Masterplan
E	15/10/20	T. Loder	J. Wukowic	J. Wukowic	Minor Amendments
F	26/10/20	T. Loder	J. Wukowic	J. Wukowic	FINAL ISSUE – added reference to consultation
G	19/05/21	R. McNeill	T. Loder	J. Wukowic	Electrical Amendments
H	06/08/21	R. McNeill	T. Loder	J. Wukowic	Updated Layout (RevK) and removal of Water Based Marina
I	09/08/21	J. Wukowic	T. Loder	J. Wukowic	Minor changes to development yield table

Document reference: 397610 | 1 | I

Information class: Standard

Contents

1 Introduction

Mott MacDonald have been commissioned by Property and Development NSW to undertake a utilities assessment in support of a Planning Proposal for the Peat Island and Mooney Mooney redevelopment site.

1.1 The Site

The Peat Island and Mooney Mooney Redevelopment Area (PIRA) is located at the north end of the Hawksbury River Bridge which carries the Pacific Motorway and Pacific Highway across the Hawkesbury River. PIRA is situated within the recently amalgamated Central Coast Council LGA, previously Gosford City Council and Wyong Shire Council.

The study area covers an area of approximately 34 ha and is currently zoned a mixture of RE1 Public Recreation and SP2 Special Infrastructure. The study area is shown on Figure 1 below.

Figure 1: Study Area

1.2 Overview of the Proposal

This Planning Proposal has been prepared on behalf of Property & Development NSW that seeks amendments to the Gosford Local Environmental Plan 2014 (GLEP 2014) for surplus Government owned land at Peat Island and Mooney Mooney (the Site).

The aim of the Planning Proposal is to facilitate the future redevelopment of the site, for a mix of residential, community, tourism and employment generating land uses.

The Planning Proposal was first submitted to Central Coast Council in November 2016. Gateway Determination was issued by the Department of Planning, Industry and Environment (DPIE) on 10 August 2017 (PP_2017_ccpas_006_00 (17/06254). The Gateway Determination stated that while supporting studies were sufficient, a number of conditions are required to be addressed prior to progressing the Planning Proposal further. Since August 2017, Property & Development NSW has undertaken a significant amount of consultation with public authorities and Central Coast Council (Council), including the submission of a revised Planning Proposal to Council in December 2018 for review and comments.

Post the 2018 submission, Property & Development NSW has engaged technical consultants to undertake further environmental investigations to respond to Council's and public authorities feedback.

The Indicative Concept Plan has been revised in accordance with the additional technical investigation post 2018 submission. The revised indicative Concept Plan comprehensively evaluated the additional environmental and physical constraints, and responded to site's context, future amenity and connectivity.

The revised indicative Concept Plan is attached at Figure 2.

Lot 9 DP 863305 is excluded from the Planning Proposal, given it is under the care, control and management of Central Coast Council and will be retained as RE1 Public Recreation Zone. The indicative Concept Plan identifies a proposed Rural Fire Services (RFS) at this location. This RFS facility does not form part of this Planning Proposal, and is subject to further stakeholder consultation and a separate planning proposal.

The indicative Concept Plan also identifies a proposed location for a Marina Rescue NSW facility. This facility will be subject to further stakeholder consultation and a separate proposal.

A land-based marina is shown on the Indicative Concept Plan located on the foreshore of the Hawkesbury River adjacent to Peat Island. It does not form part of the planning proposal and would be subject to a separate future planning proposal if it is to proceed. This would include a detailed environmental assessment of the impacts.

This part of the site is currently zoned partly RE1 Public Recreation and partly SP2 Infrastructure (for the purpose of a hospital) under GLEP 2014 and is proposed to be rezoned to RE2 Private Recreation Zone. A car park is proposed to be an Additional Permitted Use under Schedule 1 of GLEP 2014 on a portion of the site as part of the Planning Proposal.

This Utilities Report has been prepared based on the revised indicative Concept Plan and the draft LEP zoning maps.

1.2.1 Proposed Planning Control Amendments

The Planning Proposal is seeking to amend the following provisions of the GLEP 2014:

- Amend Clause 2.1 Land Use Zones of the GLEP 2014 to include SP3 Tourist zone listed under Special Purpose Zones. The proposed SP3 Tourist Zone objectives and proposed permissible uses are consistent with the draft Consolidated Central Coast Local Environmental Plan (CCLEP). Therefore, this Planning Proposal will be consistent with draft CCLEP, subject to gazettal;
- Amend the GLEP 2014 Land Zoning Map applicable to the site, and rezone SP2 Infrastructure and RE1 Public Recreation zones to E2 Environmental Conservation, R1 General Residential, R2 Low Density Residential, RE1 Public Recreation, RE2 Private Recreation, and SP3 Tourist zones;
- Amend the GLEP 2014 Height of Buildings Map to reflect the maximum height of the buildings proposed (8.5m, 12m and 15m) across selected areas of the site as indicated on the proposed Height of Buildings Map;
- Amend the GLEP 2014 Lot Size Map to allow minimum lots size of 150sqm, 220sqm, 300sqm and 450sqm across selected areas of the site as indicated on the proposed Minimum Lot Size Map;
- Amend the GLEP 2014 Additional Permitted Uses Map and amend the GLEP 2014 Schedule 1 Additional permitted uses to include use of certain land at Mooney Mooney, including:
  - RE2 Private Recreation zoned land, being portion of Lot 11, DP 1157280, and Lot 12, DP 1158746 as identified on the Additional Permitted Uses Map.
    - To include ‘car parks’ as additional permitted use on this part of the site.
  - R1 General Residential zoned land, being the southern portion of Lot 14, DP1158746 as identified on the Additional Permitted Uses Map.
    - Development for the purposes of emergency services facility is permitted with development consent. The proposed emergency services facility is permissible with consent within the proposed R1 General Residential zone under the draft CCLEP. Therefore, this Planning Proposal will be consistent with draft CCLEP, subject to gazettal.
  - RE1 Public Recreational zoned land, being the southern portion of lot 4 DP239249 as identified on the Additional Permitted Uses Map.
    - Development for purposes of emergency services facility is permitted with development consent. The proposed emergency services facility is permissible with consent within the proposed RE1 zone under the draft CCLEP. Therefore, this Planning Proposal will be consistent with draft CCLEP, subject to gazettal,
  - R1 General Residential zoned land, being the south eastern portion of lot 12 DP1158746 located along Peats Ferry Road, lot 12, DP863305 and the southernmost portion of lot 14 DP1158746, as identified on the Additional Permitted Uses Map:
    - Development for the purpose of ‘food and drink premises’ and ‘shops’ are permitted with development consent.
    - The indicative Concept Plan comprises local shops/restaurants and cafes in the form of shop top housing within the Southern Foreshore precinct and the Chapel precinct, which has an area of approximately 200sqm. The proposed shops, food and drinks premises are of a scale that is better suited for this local area. Shops, restaurants, and cafes are prohibited under the R1 zone of the Gosford LEP and the draft CCLEP. Given the proposal no longer includes a service station and a neighbourhood centre, it is proposed to include food and drink premises and local shops to provide sufficient and much needed local retail services for exiting and incoming residents.
  - RE1 Public Recreation zoned land, being Lot 11 DP863305 as identified on the Additional Permitted Uses Map; and
    - Development for the proposed electricity generating works is permitted with development consent.

In addition, consistent with the recommendation of the CMP, this Planning Proposal includes the proposed LEP amendment to include Peat Island as an Item of Environmental Heritage (Item – General) under Part 1 – Heritage Items, Schedule 5 of the Gosford LEP.

Transport for NSW owned land, including lots 16, 17, 18, 20 DP863305 are also now excluded from the Planning Proposal. Transport for NSW have confirmed that this land is within the existing Freeway corridor

and is potentially required for a future widening of the M1 Motorway. Therefore, the previously proposed Neighbourhood Centre and Emergency Services Precinct has been removed from the Planning Proposal.

The proposal will continue to contribute to a range of key economic and community benefits for the local community and wider Central Coast Local Government Area, including:

- Injection of capital investment into the economy from expenditure on housing, infrastructure services both internal and external to the site including road, energy services, water, sewer and communication works;
- Provision of more than 2.7 km of foreshore access around Peat Island and along the river foreshore;
- Provision of up to 269 new dwellings to help meet regional housing needs;
- Preservation of the historical significance of Peat Island through the implementation of a Conservation Management Plan and the retention of nine non-listed historical buildings on Peat Island for adaptive re-use;
- The retention of the Chapel to serve the local community;
- Protection of sensitive mangroves area, thus protecting natural attributes of the site and the visual aesthetics of the site; and
- Dedication of 10.5 ha of heavily vegetated land to be dedicated as Environmental Conservation area to conserve significant bushland in perpetuity.

Following our analysis of the site and its surrounding context, we are firmly of the view that there is clear planning merit to the Planning Proposal and the revised Planning Proposal has appropriately addressed agencies concerns and the Gateway Determination conditions.

Refined land use details of the proposal are provided in Table 1.

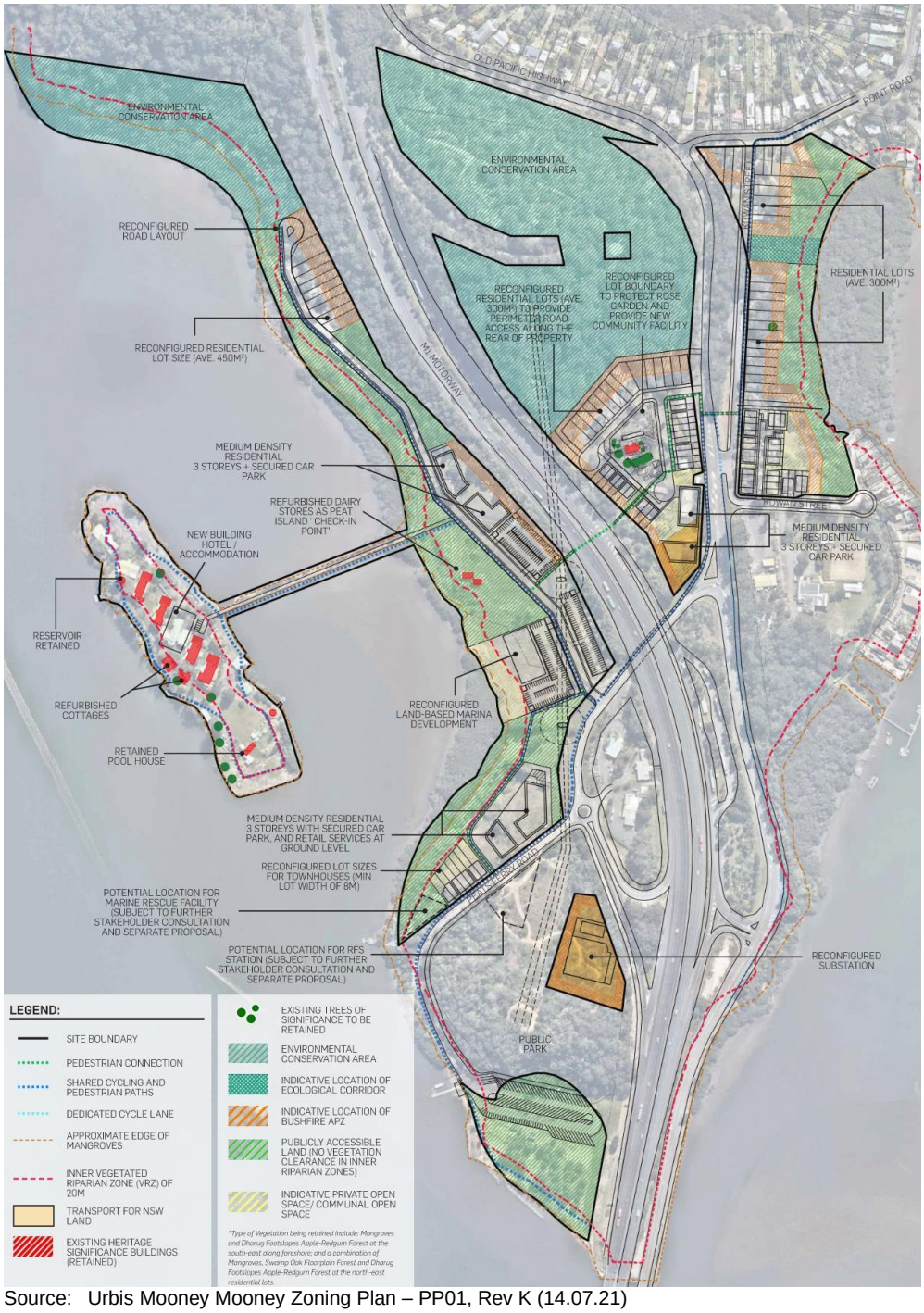
Table 1: PIRA Proposed Development

Zone	Area (sqm)
R1 – General Residential	52,591
15 residential lots	
54 townhouses	
162 apartments	
Chapel/Community Centre	3,882
Neighbourhood Shops at Southern Foreshore	
R2 – Low Density Residential	36,725
36 residential lots	
SP3 – Tourist	50,530
85 hotel rooms	
RE2 – Private Recreation	9,150
60 boat dry stack marina (assumed, part of separate Planning Proposal)	
E2 – Environmental Conversation	104,583
RE1 – Public Recreation	94,709
Electrical substation	7,400
Sub – Total Public Open Space	208,442
Total	**348,287**

Source: Mooney Mooney Planning Proposal – Concept Plan Rev K

The proposed master plan is illustrated in Figure 2 below.

Figure 2: PIRA Proposed Masterplan



Source: Urbis Mooney Mooney Zoning Plan – PP01, Rev K (14.07.21)

1.3 Purpose and Scope of Works

Mott MacDonald has been commissioned by Property and Development NSW to prepare Planning Proposal documentation to support the rezoning of the Peat Island and Mooney Mooney redevelopment area. Mott MacDonald has been engaged to conduct a technical study of the existing services in the vicinity of the site and determine a servicing strategy for the proposed development that is suitable for Planning Proposal lodgement.

The following report has been prepared to identify existing opportunities, constraints and risks for services infrastructure to support the development proposal. This report has also given consideration to the overall masterplan for the site.

As part of this infrastructure strategy the following tasks have been undertaken:

- Contact the Service Authorities and obtain a single point of contact for all liaison and applications;
- Order a Dial Before You Dig (DBYD) services search;
- Review the existing infrastructure plans for the area and neighbouring land releases;
- Undertake service load calculations to estimate the overall loads and distribution of the services load within the study area (based on an urban design layout provided to us);
- Based on an agreed development scenario, determine a service load growth over the development timeframe to completion;
- Based on the projected services loads and growth, undertake a critical review of the Service Authorities strategies for the study area;
- Meet with and liaise with the Service Authorities to negotiate and agreed position on the services provision including staging, alignments and funding;
- Identify lead-ins required to bring infrastructure to the study area; and
- Document the agreed servicing strategies.

2 Existing Infrastructure

The existing utilities assessment is primarily based on information received as a result of a Dial Before You Dig (DBYD) search. This information was supplemented by a site inspection and subsequent liaison with key personnel at the respective service authorities. Digital GIS files were provided by Sydney Water to supplement the DBYD information.

The service information has been consolidated and displayed on a number of plans which can be found in Appendix A. The details shown on the plans should be considered as indicative only as the original DBYD information is not based on detailed survey. This means that they may vary from the locations shown on plan.

The following sections provide a commentary on the existing services within and adjacent to the PIRA.

2.1 Water

The development site is currently supplied potable water by a mix of Sydney Water and Council owned infrastructure. Potable water is transferred from Sydney Water's Cowan North reservoir, 2.4 km south of the site, to Council's Mooney Mooney reservoir located within the site boundary via a 150 mm main located adjacent the highway. All infrastructure north of the Hawkesbury River is owned and operated by Council but supplied by Sydney Water.

The Cowan North reservoir is part of the Prospect North Water System and has a capacity of 2.3 ML. Sydney water have indicated that the Mooney Mooney reservoir operates at a lower Full Supply Level (FSL) to the Cowan North reservoir. The FSL of the two reservoirs is tabulated below. Sydney Water are able to maintain a head that is greater than 95 m AHD at the connection point to the Council water network, which is adequate to supply the Mooney Mooney reservoir.

Table 2: Reservoir Full Supply Levels

Reservoir	FSL (m AHD)
Cowan North	109.7
Mooney Mooney	72

Source: Data provided by Sydney Water (2019)

The Mooney Mooney reservoir has a capacity of 0.9 ML and services the existing residents along the Pacific Highway and Point Road with a 150 mm reticulation main. Potable water mains also supply the existing RMS, Ambulance Services and public toilets on the western side of the highway. Council estimate that the current max daily demand on this reservoir is approximately 0.47 ML.

Council have indicated that Peat Island is serviced via a private system which is supplied from the Mooney Mooney reservoir. Given the limited access to the island, it is assumed that these privately-operated systems will be retained. The existing reticulation mains are shown in Figure 3.

Figure 3: Existing Water Mains

Source: Sydney Water Hydra & Central Coast Council GIS Data (2018)

2.1.1 Key Constraints and Opportunities

- The site is currently serviced via a combination of Sydney Water and Council owned infrastructure. The Mooney Mooney reservoir is located within the site boundary and supplies the existing dwellings. Potable water is transferred to this reservoir via Sydney Water's Cowan North reservoir, located approximately 2.4 km south of the site.
- New development will be serviced via the Mooney Mooney reservoir. New reticulation mains may need to be provided from the reservoir to supply development. This reservoir has a total capacity of 0.9 ML and a current max daily demand of 0.47 ML.
- Potable water mains supply the RMS, Ambulance Services and public toilets on the western side of the highway. The exact location and size of these mains are unknown; however, they are likely to be minor reticulation mains and may require upsizing.
- Peat Island utilises a private potable water system which is supplied by Council's potable water network. Given the limited access to the island, future development on Peat Island will likely be serviced by this arrangement.

2.2 Sewer

Mooney Mooney has historically used on-site septic systems for treatment and disposal of wastewater. In 2009, Council introduced the Mooney Mooney Cheero Point Sewerage Scheme to replace the on-site sewerage facilities. Like the potable water system, dwellings are serviced via a combination of Sydney Water and Council owned assets.

Sewer infrastructure services approximately 215 existing dwellings via a series of low-pressure mains. Each property is fitted with a pump unit which discharges wastewater to the sewer main located in the street and ultimately to Sydney Water's Brooklyn Wastewater Treatment Plant (WWTP) on the southern side of the Hawkesbury River. Council's infrastructure extends approximately 450 m across the Hawkesbury Bridge, where it connects to a Sydney Water controlled 200 mm pressure sewer main. Sydney Water have imposed peak flow restriction for wastewater generated within Mooney Mooney which discharges to the Brookyln WWTP. To satisfy the licence agreement, a flow control valve restricts flows from Mooney Mooney to 15 L/s before discharging to the WWTP.

Peat Island is also serviced via a private sewer pump station which discharges wastewater to the sewer mains located in Mooney Mooney. A flow metre restricts flows from Peat Island to a maximum 5 L/s. As the facilities on Peat Island are now unoccupied this private system is no longer in operation. Given the limited access to the island, it is assumed that these existing assets will be retained for future use and modified where required. It is expected that the same 5 L/s flow rate would be adopted for future development and temporary storage facilities would be upgraded.

The existing sewer network is shown on Figure 3 above, while Sydney Water's sewer assets are shown on Figure 4 below.

Figure 4: Existing Sydney Water Sewer Mains

Source: Sydney Water Hydra & Central Coast Council GIS Data (2018)

2.2.1 Key Constraints and Opportunities

- The site is currently serviced by a combination of Council and Sydney Water owned wastewater infrastructure. Existing dwellings are serviced via a series of low-pressure mains which discharge to Sydney Water's Brooklyn Wastewater Treatment Plant (WWTP) on the southern side of the Hawkesbury River.
- The site is generally well serviced by sewer infrastructure, with assets located on both the eastern and western side of the Motorway.
- Upgrades to the existing network may be required to service the increased demand generated by the development. In addition, the existing network will need to be extended to service the proposed residential development north of the underpass on the western side of the Motorway. The exact upgrade requirements will be confirmed by Council.
- Peat Island is serviced via a private sewer pump which discharges to the Council owned mains in Mooney Mooney. Future development on Peat Island will likely be serviced by this arrangement.
- The capacity of the Brooklyn WWTP is not expected to pose a constraint to development. Sydney Water have indicated that external catchments serviced by this WWTP are not forecast to exceed their original licence allocation, and therefore there may be spare capacity which could be utilised by Mooney Mooney.
- Sydney Water have imposed peak flow restriction for wastewater generated within Mooney Mooney which discharges to the Brookyln WWTP. To satisfy the licence agreement, a flow control valve restricts peak flows from Mooney Mooney to 15 L/s before discharging to the WWTP. Should the proposed development discharge rates be lower than the allocated 15 L/s a new agreement may not be required. Augmentations to the sewer main crossing the Hawkesbury River would also not be required.
- Peat Island is serviced via a private sewer pump station with a flow metre which restricts flows to a maximum 5 L/s. Where possible, future development should restrict sewer outflows to this rate to limit the risk of upgrades to existing sewer infrastructure crossing the Hawkesbury River.

2.3 Electricity

Electricity is currently supplied to the PIRA and surrounding area by Ausgrid. The DBYD search indicated that there is underground reticulation within the site area, however the local area appears to be serviced predominantly by overhead power lines. PIRA is supplied from the Somersby (ZN14143) substation located approximately 22 km to the north-east of the site via a series of overhead transmission lines. Existing dwellings are serviced via rural overhead powerlines located within the road reserve. Peat Island is currently serviced by overhead assets that link in with the local Ausgrid network.

Preliminary advice obtained from Ausgrid indicated that alternate supply to the site originates from either Peats Ridge or Berowra zone substations, located approximately 22 km and 14 km from the site respectively. 132 kV transmission lines travel between these substations and bisect the centre of the site. This transmission line is owned by TransGrid has an associated easement width of 45 m. This infrastructure will need to be retained as it is unlikely that the lines will be undergrounded.

Ausgrid have advised that the existing supply to the area is from a 75 km high voltage feeder with a rural classification. The reliability performance of the feeder is poor with an average of 4.6 outages and an outage duration of 866 minutes per year across the length of the feeder. Given the development is located at the end of the feeder, the performance is considered worse than average for the site.

Ausgrid have indicated that the existing powerlines from the available substations have insufficient capacity to support the development proposal, and that a 4,000 m^2 site may need to be dedicated for a new zone substation to be constructed. The requirements to service the development will be confirmed with Ausgrid during the feasibility stage. The existing electrical network is shown on Figure 5 below.

Figure 5: Existing Electrical Network

Source: CBH Site Survey (2018)

2.3.1 Key Constraints and Opportunities

- The site currently receives electrical supply from the Somersby zone substation, located approximately 22 km to the north-east. Existing dwellings are serviced by rural overhead powerlines located within the road reserve. If required, running new electrical feeders from Somersby ZS would prove challenging given the

overall length of new cabling and the limited road access to the site. This could mean running new conduits along the length of the M1 which would be logistically and financially difficult.

- A 132 kV overhead transmission line is located on the western side of the PIRA. No development is permitted beneath the transmission line. Some minor land uses may be possible however, this will be at the discretion of Transgrid.
- There is a risk that the development cannot be serviced by the existing electrical network. Given the proximity to transmission lines, creation of a new zone substation is not expected to be a key constraint. If a substation is required, there is an opportunity to set aside land in order to reduce Ausgrid site acquisition challenges. As construction of a new substation would add significant costs to the project, any available capacity in the existing feeders should be used before a new substation is progressed.
- The redevelopment of the site provides an opportunity to underground the existing overhead powerlines. This is common practice for new developments and adds to the overall amenity of the site.
- It is unlikely that Peat Island could be serviced via an underground electrical network. It is assumed that the existing overhead servicing system will be retained.
- There is no gas supply to Mooney Mooney and as such the opportunities to convert gas to electricity to supplement any increase in demand is restricted. Alternative energy systems such as solar power could be explored however, land take and reliability of supply make these options challenging for implementation.

2.4 Telecommunications

The DBYD search has indicated that Telstra, Optus, Nextgen, AAPT and NBN Co. operate telecommunications assets in the area. It is envisaged that all future servicing for the development will extend from these services. All the underground truck telecommunications infrastructure, excluding AAPT, follow the Pacific Highway on the eastern side of the road corridor.

AAPT operate fibre optic cabling within the study area. The AAPT duct runs adjacent the road corridor on the western side, crossing to the eastern side to the north of the underpass. This infrastructure appears to be located underneath the existing electrical transmission lines. The transmission lines and fibre optic cabling are located near the proposed areas for residential development but are not expected to pose a constraint to development

Telstra appears to be the only telecommunications provider to service the western side of the precinct with underground assets, as shown in Figure 6. The data provided indicates that all the existing development west of the road corridor have a connection to this underground network.

The DBYD search also indicated that an underground Telstra asset services Peat Island, adjacent to the causeway. Given the limited access to the island, it is assumed this Telstra infrastructure will be retained.

Optus have recently installed a mobile tower within the Mooney Mooney peninsula. NBN Co. have indicated that the installation of the tower has provided the opportunity to co-locate the infrastructure for NBN Fixed Wireless, allowing future provision of NBN services to the PIRA.

The existing telecommunication services are illustrated below.

Figure 6: Existing Telecommunications Network

Source: DBYD - Telstra (2018)

2.4.1 Key Constraints and Opportunities

- Telstra, Optus, Nextgen, AAPT and NBN Co. operate telecommunications assets within the study area. All the underground truck telecommunications infrastructure, excluding AAPT, follow the Pacific Highway on the eastern side of the road corridor.
- Fibre optic cabling is located adjacent the western side of the road corridor, through the centre of the site. The infrastructure is not located within any areas of proposed development and is therefore not expected to pose a constraint to development. Should the layout change, relocation works may be required which can add time and cost delays to the project.
- NBN Co. have indicated that the area will be serviced via a fixed wireless network, therefore provision of telecommunications services is not expected to pose a constraint to development

3 Proposed Development

The following section of this report outlines the strategic servicing requirements to support the proposed development. Where possible, details of advice and correspondence from the service authorities are provided. It should be noted that this report focuses on traditional servicing methods.

The detailed utilities modelling undertaken in Section 3.1.3 and Section 3.2.3, for the previous concept plan (Mooney Mooney Planning Proposal – Concept Plan Rev F), was modelled for a conservative scenario. Given the revised concept plan (Mooney Mooney Planning Proposal – Concept Plan Rev K) results in a similar development yield (overall reduction in development yield), the previous modelling result remains valid and does not require to be updated. However, to ensure the new development yields are captured, the desktop modelling undertaken using the Central Coast Council and Sydney Water Strategy has been updated to reflect the new concept plan.

3.1 Potable Water

3.1.1 Central Coast Council Strategy

Council have undertaken a systems assessment to determine a servicing strategy for the proposed development. This involved modelling the proposed development to determine if the existing potable water network has sufficient capacity to supply the additional load.

The Mooney Mooney reservoir has a total capacity of 0.9 ML and is set to operate between 75-85 percent of its capacity (0.77 ML). The existing maximum daily demand is approximately 0.47 ML. The demand generated by the development was calculated assuming a per capita usage of 233 L/day. The modelling assumptions and calculated demands for the proposed development are tabulated below.

Table 3: Demand Generated from Proposed Development

Land Use	Yield (dwellings or Ha)	Assumed Equivalent Population (EP) per dwelling/Ha	Average Daily Demand (L/s)
Low density residential (dwellings)	51	3.0	0.41
Town houses (dwellings)	54	2.1	0.31
Apartments (dwellings)	162	2.1	0.92
Private Recreation (assumed Marina, part of separate Planning Proposal)	130	0.6	0.63
Community facilities (ha)	0.3	75	0.06
Tourism zone (ha)	5.1	20	0.28
		Total	**2.6**

Source: Central Coast Council

The results of the assessment showed that when the proposed development is included, the overall demand on the reservoir increases to 0.64 ML. The assessment also evaluated the capacity of the reservoir to support the development. Whilst the overall demand is 0.64 ML and the reservoir capacity is 0.9 ML, the Sydney Water edition of the Water Supply Code of Australia (WSA) recommends that reservoirs be sized to ensure 2/3 of the maximum daily demand is available (1/3 for operational storage and 1/3 for reserve storage). Assuming a maximum daily demand of 0.64 ML, the required storage would therefore be 0.43 ML. Given the current storage at the Mooney Mooney reservoir is 0.77 ML, it was concluded that there is sufficient capacity to support the increased demand generated by the development.

Table 4: Reservoir Capacity Evaluation

	Demand (ML)
Maximum daily demand with proposed development	0.94
2/3 of maximum daily demand with proposed development	0.43
Current operational and reserve storage	0.77

Source: Central Coast Council

The assessment recommended that additional capacity be provided as a contingency, and further analysis be undertaken to determine the adequacy of the reservoir capacity, which is expected to be undertaken by Sydney Water at a later date.

3.1.2 Sydney Water Strategy

Sydney Water undertook a system capacity assessment to determine if network upgrades would be required to support the proposed development. The Cowan North Water Supply Zone (WSZ) was assessed under two scenarios:

1. Assuming a constant transfer flow rate of 0.64 ML/day to the Mooney Mooney reservoir; and
2. Using the Hawkesbury Bridge flow meter pattern on the observed max day for the Cowan North WSZ to represent the flow transfer pattern to Mooney Mooney reservoir.

The hydraulic assessment of the Cowan North WSZ showed that the additional flow to Mooney Mooney will not have a considerable impact on the network. Therefore, it was concluded that there is sufficient capacity in the existing network to support the development without network amplifications to trunk infrastructure. Minor reticulation upgrades are expected.

3.1.3 Potable Water Modelling

Mott MacDonald has undertaken potable water modelling to determine the impacts of the proposed development on the existing potable water supply network, and to confirm the infrastructure requirements to support the proposed development.

Modelling was undertaken using the Infoworks program. A model of the existing network was provided by Sepalee Mathmaluwe of Central Coast Council on 17th April 2019. The methodology, results and recommendations are outlined in the following sections.

Given that the approximate peak instantaneous flow rate, as calculated under the Central Coast Council Strategy, hasn't been impacted significantly with the Revision K masterplan layout (overall reduction in development yield), the potable water modelling undertaken for the previous option (Revision F) is assumed as a conservative scenario and accounts for the proposed development in the revised concept plan hence remains valid for the proposal and is not required to be updated. As such, the modelling results below are in reference to the *Mooney Mooney Planning Proposal – Concept Plan Rev F*.

3.1.3.1 Demand

The development features several different end user types, as illustrated in Figure 7 below. The demand was originally estimated by Council to determine a servicing strategy for the proposed development. The following assumptions and rates were adopted by Council:

- Daily water consumption – 233 litres/person; and
- Peak day factor – 2.144.

Based on the yields outlined in Table 3 and the assumptions listed above, the peak daily demand for each land use was calculated. The results are summarised below.

Table 5: Peak Daily Demand

Proposed Development	Yield (Dwelling or Ha)	Peak Daily Demand (L/s)
Low density residential (dwellings)	82	1.40
Town houses (dwellings)	22	0.27
Apartments (dwellings)	164	1.97
Private Recreation (assumed Marina, part of separate Planning Proposal)	130	1.23
Community facilities (ha)	0.3	0.13
Tourism zone (ha)	3.7	0.42
	Total	**5.29**

Note: As mentioned, the data in this table is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

Figure 7: Demand Allocation

Note: As mentioned, the data in this figure is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F. Please note the Marina is part of a separate planning proposal.

3.1.3.2 Proposed Connection Points

Mott MacDonald modelled the additional demand generated by the development using Council's Infoworks model provided by Sepalee Mathmaluwe on 17th April 2019. Customer Points were added to the model per the locations shown in Figure 7, and each node was assigned a demand rate. The Infoworks Allocation Wizard tool allowed a spatial allocation of these demand points to the closest node within the network.

Reticulation mains to support each development site were added to the model with a default diameter of 100mm. Sizes of these mains were refined throughout the modelling process to minimise head losses.

3.1.3.3 Scenario Investigated & Design Standards

The additional demand was added to the Existing Peak Day scenario in the Infoworks model which features a peak day factor of 2.115. The system performance was assessed as per the standards outlined below which were agreed with Central Coast Council.

Table 6: Performance Requirements

Main Type	Design Criteria	Target	Source
Trunk Inlet Mains	Minimum Pressure	> 3 m	WSA 03-2011-2.3 1 (Part 1) Sydney Water edition.
	Unit Head Loss	< 3 m/km	Requested by Council.
Outlet and Reticulation Mains	Minimum Pressure	> 15 m	WSA 03-2011-2.3 1 (Part 1) Sydney Water edition.
	Maximum Pressure	< 60 m	WSA 03-2011-2.3 1 (Part 1) Sydney Water edition.

	Minimum Pressure Com / Industrial and > 4 storeys	> 35 m	Requested by Council.
	Unit head loss	< 6 m/km	Requested by Council.
	Pressure Variation	(max pressure – min pressure) < 15 m Or min pressure > 80% of maximum pressure	Requested by Council. Whichever value is lower shall be the design target.

3.1.3.4 Model Results

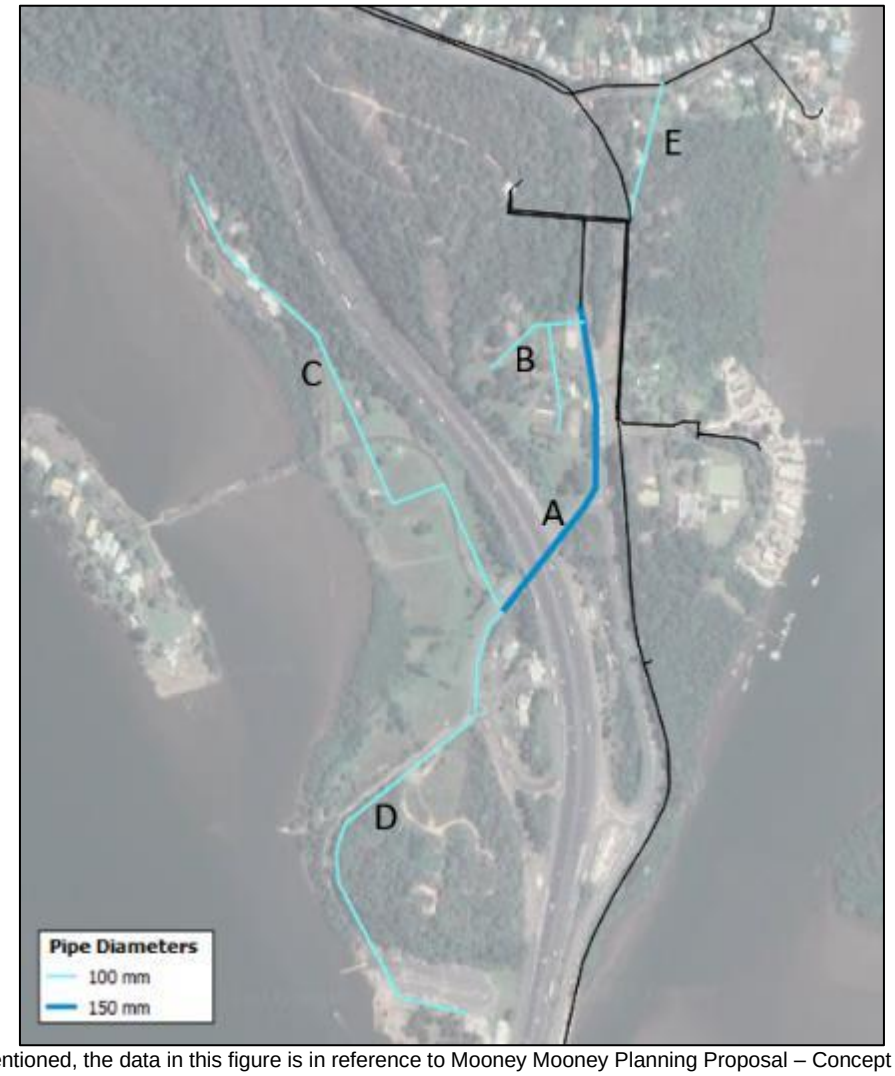
System Performance Analysis in the Proposed Developments

This section describes the results of the system performance analysis undertaken for the scenario outlined in Section 3.1.3.3. The results have been analysed to verify whether Levels of Service (LOS) can be met throughout the development site without any network modification.

Figure 8 shows the recommended reticulation main sizes for the proposed development sites. Initial model runs indicated that Segment A experienced head losses which were above the LOS requirement of 35m/km for a 100mm main. Segment A was upsized to 150mm, resulting in head losses dropping to 4m/km. Segments B, C, D and E all resulted in acceptable head losses when modelled as a 100mm main.

The pipe sizes shown in Figure 8 were used to assess the pressure network performance. Table 7 summarises the system performance within the development site for existing peak day conditions.

Figure 8: Recommended Potable Water Main Sizes



Note: As mentioned, the data in this figure is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

Table 7: System Performance – Existing Peak Day

	Minimum Pressure (m)	Maximum Pressure (m)	Maximum Head Losses (m/km)
Highest Customer (RL 21.4m)	44.4	47.9	4.0
Lowest Customer (RL 1.9m)	61.8	67.4	

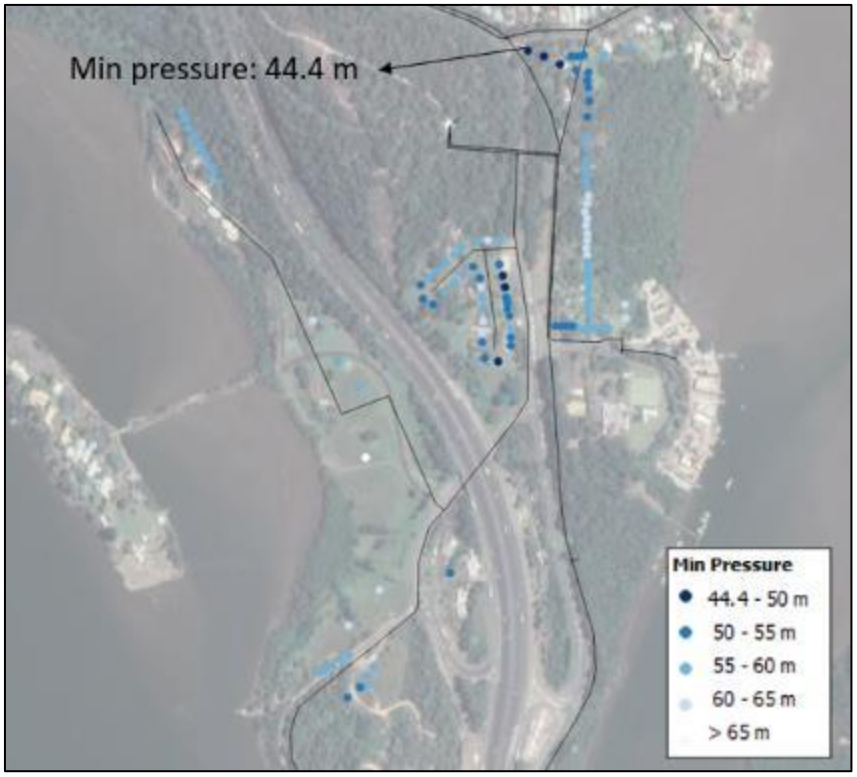
Note: As mentioned, the data in this table is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

Minimum pressures in mains supplying the proposed development are expected to meet the recommended LOS for all elevations, however the maximum pressures are above the upper limit of 60m for 34 percent of customer points. All development below an elevation of 9.3m show maximum pressure above the recommended limit.

It is important to note that elevation data was extracted from Digital Elevation Model data. It is recommended that pressures are confirmed when connection elevations are determined during the detailed design phase.

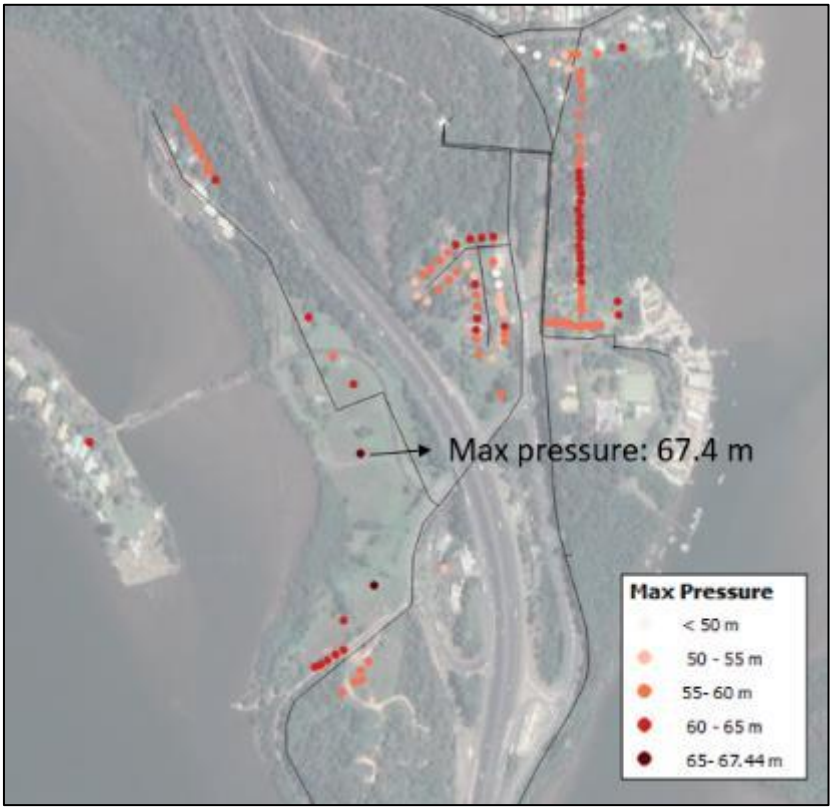
Pressure variations remain below 15m across the network. Figure 9 and Figure 10 highlight the expected minimum and maximum pressures at customer connection points across the network respectively.

Figure 9: Minimum Pressures



Note: As mentioned, the data in this figure is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

Figure 10: Maximum Pressures



Note: As mentioned, the data in this figure is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

System Performance Analysis in the External Network

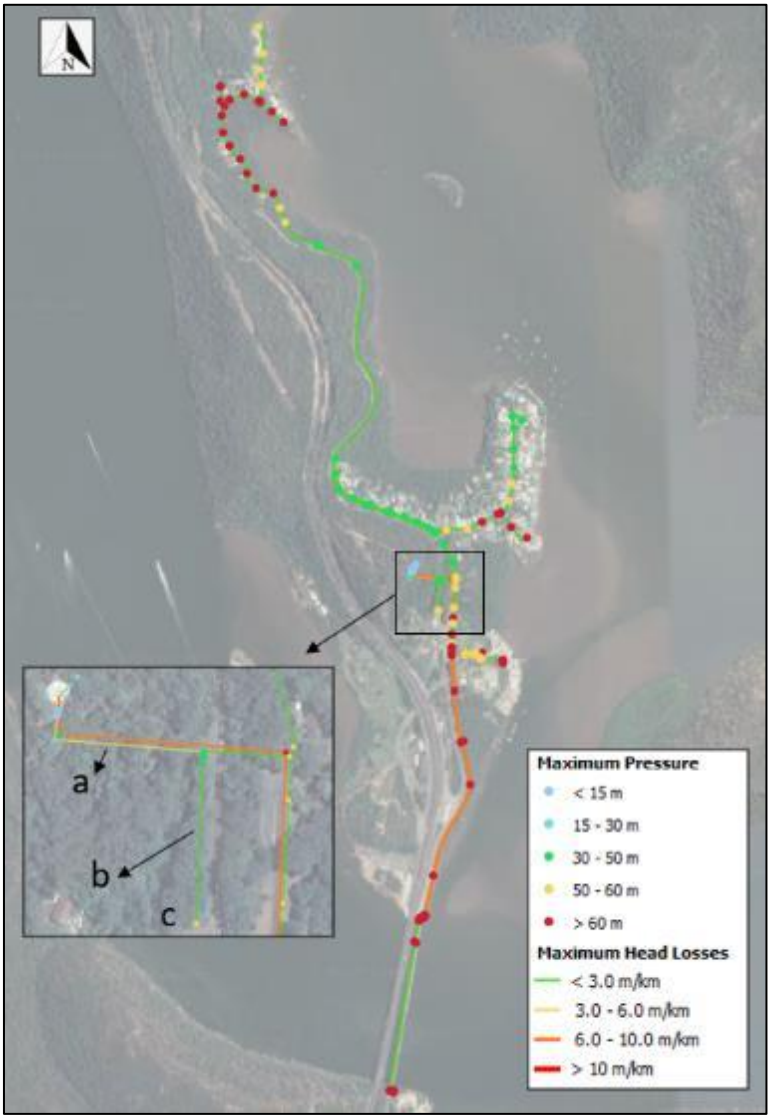
This section describes the results of the system performance in the wider Mooney Mooney water supply network. The results of the assessment have been analysed to assess the effect of the proposed development for the existing peak day scenario. The peak day system performance in the existing and proposed scenarios are shown in the Figures below.

The minimum pressure and maximum head losses expected in the existing pre-development scenario and the proposed post-development scenario are summarised in Table 8 below.

Table 8: System Performance – External Network

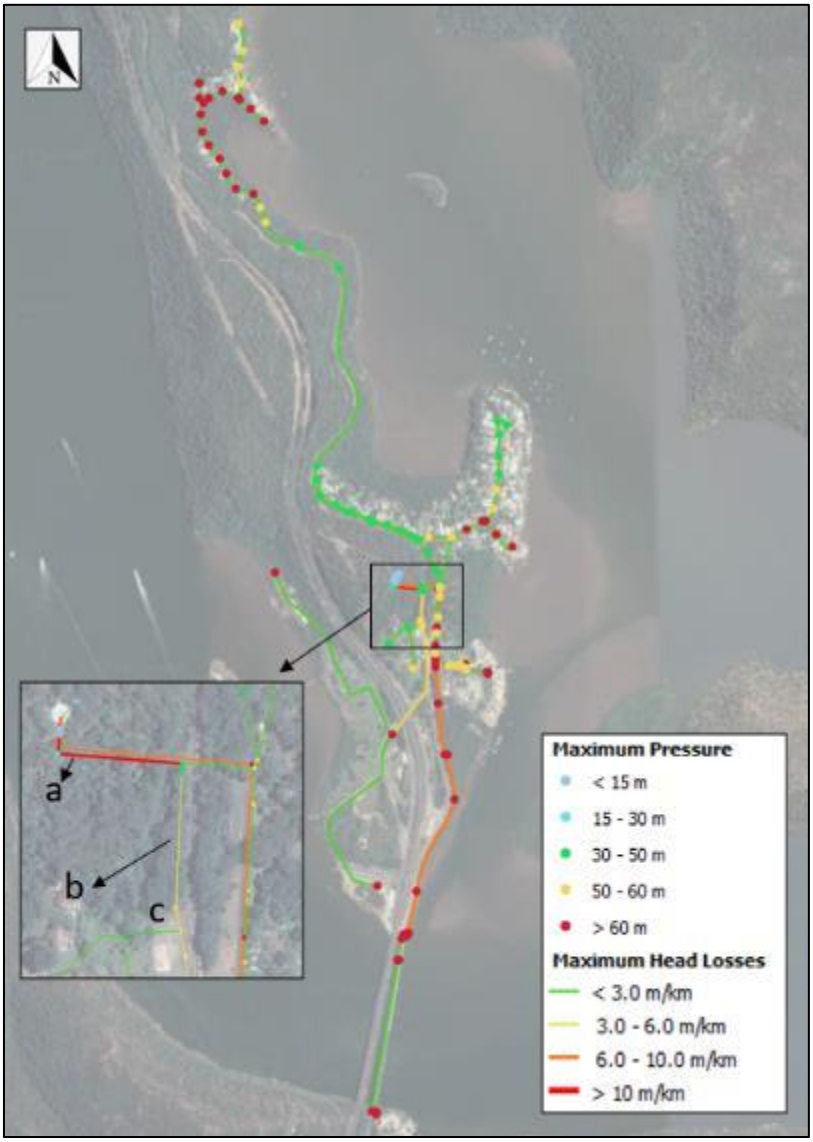
	Pre-Development	Post-Development	Difference
Minimum pressure (m) (c)	52.5	49.6	- 2.9
Maximum Head Losses (m/km) – Pipe A (reservoir outlet)	4.7	17.9	+ 13.2
Maximum Head Losses (m/km) – Pipe B	0.2	5.1	+ 4.9

Figure 11: Existing Peak Day System Performance – No Development



Note: As mentioned, the data in this figure is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

Figure 12: Peak Day System Performance – With Development



Note: As mentioned, the data in this figure is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

The proposed development is expected to have an impact on the wider potable water network performance, with a pressure drop of 2.9 m at the connection point and 13.2 m/km additional head losses predicted along the 150 mm reservoir outlet main. It is recommended that Pipe A and Pipe B shown in Figure 12 be upgraded to 200 mm diameter mains. This upgrade is expected to reduce the overall head loss to 4.7 m/km.

The proposed development improves the overall pressure across the network, which is high (>60 m) in some areas. A pressure drop of 2.9 m is expected as a result of the development.

The flow into the Mooney Mooney reservoir is dictated by the reservoir level, with a maximum flow of 14 L/s in the trunk supply main. The bulk main servicing the reservoir shows head losses in the range of 7 m/km, above the recommended LOS. These head losses could be minimised by installing a control valve between the Sydney Water network and the Mooney Mooney Reservoir, to maintain flows below 12 L/s.

3.1.3.5 Contingency

As discussed in Section 2.1, the Mooney Mooney reservoir is supplied via Sydney Water's Cowan North reservoir, located 2.4km south of the site. The total peak day demand in the Mooney Mooney area for the proposed scenario is 0.69 ML/day. The Mooney Mooney reservoir currently includes 0.9 ML storage, equating to approximately 96 percent of the total peak day demand.

This storage is considered sufficient to supply the service area in the case of transfer issues between reservoirs. Therefore, no further contingency is expected to be required for the network.

3.1.3.6 Conclusions and Recommendations

The demand from the proposed Mooney Mooney development was added to Central Coast Council's existing Infoworks model to assess the impacts on potable water supply. The proposed development was modelled to determine if suitable levels of service could be maintained.

To achieve head losses in line with the recommended LOS, it is recommended that a 150mm section of pipe is installed directly downstream of the reservoir to service the proposed development. This arrangement is shown in Figure 11. 100mm diameter reticulation mains present sufficient capacity to service the remaining development.

The system performance was assessed with the proposed development. LOS requirements for minimum pressure are expected to be achieved, however, maximum pressures are above the recommended LOS at 34 percent of demand nodes. It is recommended that pressures are confirmed when connection elevations are determined during the detailed design phase.

The system performance in the external network was also verified. The proposed development is expected to result in a decrease in pressure of 2.9m at the connection point, which is beneficial to the network which currently experiences high pressures of over 60m in some areas.

Increases in head losses are expected along the 150mm main downstream of the reservoir. It is recommended that this section of pipe be upgraded to 200mm diameter. A third scenario was simulated to verify the recommended size and showed satisfactory results in terms of head losses.

Council should also be aware of high head losses (7m/km) expected along the bulk main supplying the reservoir. These head losses could be minimised by installing a control valve between the Sydney Water network and the Mooney Mooney Reservoir, to maintain flows below 12L/s.

The existing reservoir provides 0.9 ML storage, corresponding to 96 percent of the peak day demand when including the proposed development. This storage is considered to be sufficient in case of pipe break between the Cowan North Reservoir and the Mooney Mooney Reservoir, and therefore no further network contingency is recommended at this time.

No fire flow provision was assessed during this study. Mott MacDonald recommends an assessment of fire flow be undertaken during the next phase of the project.

3.1.4 Reticulation Strategy

A reticulation strategy was developed based on the results of the modelling discussed above. New reticulation mains will be required to service development on the western side of the highway. It is envisaged that this main will extend from the existing main on Kowan Street, passing beneath the highway at the underpass however a connection could also be provided within the pedestrian access tunnel located approximately 140m north of the underpass. The proposed alignment for the potable water reticulation mains is provided in Figure 13 below.

Figure 13: Proposed Potable Water Network

3.1.5 Authority Consultation

Mott MacDonald engaged with the service authorities to determine the available capacity in the existing networks to support the development & identify any upgrades that might be required to meet a shortfall in capacity. Sydney Water provided the following response:

- Hydraulic assessment of the Cowan North system shows that the additional flow to Mooney Mooney will not have a considerable impact on the network requiring amplifications on the existing Cowan North System. Hence, the existing infrastructure has capacity to support the additional flow to Mooney Mooney due to redevelopment for Mooney Mooney and Peat Island.

3.2 Sewer

3.2.1 Central Coast Council Strategy

As discussed in Section 2.2, wastewater infrastructure in Mooney Mooney discharges to the Brooklyn WWTP, located on the southern side of the Hawkesbury River. Council's sewer network extends to the Hawkesbury River bridge, where it connects into a Sydney Water rising main. A flow control valve restricts flows from Mooney Mooney to 15 L/s before discharging to the WWTP.

Council have advised that the Mooney Mooney Cheero Point Sewerage Scheme was designed to accommodate 316 dwellings within Mooney Mooney and a peak loading of 5 L/s from Peat Island. The system was designed using the probability method which determines the peak sewerage flow rate for the equivalent lots connected. Assuming a discharge of 220 L/person/day, the system was designed with an expected peak instantaneous flow rate of 13.1 L/s.

Council have undertaken a systems assessment to develop a servicing strategy for the proposed development. The demand generated by the development was calculated assuming a per capita sewerage discharge of 206 L/day and an occupancy rate of 3 persons/dwelling. The modelling assumptions and calculated demands for the proposed development are tabulated below.

Table 9: Demand Generated from Proposed Development

Land Use	Yield (dwellings or Ha)	Average Dry Weather Flow (L/s)
Low density residential (dwellings)	51	0.36
Town houses (dwellings)	54	0.27
Apartments (dwellings)	162	0.81
Private Recreation (assumed Marina, part of separate Planning Proposal)	130	0.56
Community facilities (ha)	0.3	0.05
Tourism zone (ha)	5.1	0.24
Total		**2.32**

Source: Central Coast Council

2017 water meter data was extracted to determine the existing flow rates generated within Mooney Mooney. This was then added to the calculated flow rates for the proposed development to determine the overall expected peak load. The results of this assessment concluded an approximate peak instantaneous flow rate of 15.4 L/s could be expected, which exceeds the limit of 15.0 L/s implemented by Sydney Water for wastewater discharge from the Mooney Mooney Cheero Point Sewerage Scheme.

Council have recommended that further design investigations be undertaken, which are recommended to support future development applications.

Whilst the expected flow rates are marginally higher that the permissible discharge rate, the above assessment does not necessarily pose a constraint to development. In order to reduce the peak instantaneous flow rate for Mooney Mooney, minor storage tanks could be installed within key pump stations to allow for flow restriction when required to reduce the 15.4 L/s to the 15.0 L/s required.

3.2.2 Sydney Water Strategy

Sydney Water undertook a system capacity assessment to determine if there is sufficient capacity in the wastewater network to support the proposed development. In particular, the assessment explored the expected impact on the Brooklyn WWTP should Mooney Mooney discharge wastewater at flow rates exceeding the planned allowance of 15.0 L/s.

The results of this assessment are summarised below:

- The Brooklyn and Dangar Island sewer catchments are not forecast to exceed their original allocation. The system was designed for an equivalent population (EP) of 1,600. By 2046, it is forecast that these catchments will have a total EP of 1,490.
- To support the development, additional treatment capacity at Brooklyn WWTP would be required by 2032. It is estimated that these works would cost $12.6 million (these costs are attributable to Sydney Water and not the Mooney Mooney development).
- The proposed rezoning consumes a significant portion of the capacity at Brooklyn WWTP. The horizon of investment may shift rapidly depending on growth rates and actual loads following development.

The results of the assessment concluded that the current system has sufficient capacity to service the additional proposed growth.

3.2.3 Sewer Modelling

Mott MacDonald undertook an assessment of the existing low-pressure sewer system to determine the impacts of the proposed development on the wider sewer network. As no model is available of the existing network, the assessment was conducted using the Environment/One Design Assistant. Environment/One designed the Mooney Mooney Cheero Point Sewer Scheme and provided the grinder pumps used by the existing properties.

The Design Assistant calculation sheet was used to carry out a high-level system performance assessment to determine the impacts of the proposed development on the existing network. The extent of the model and the locations of the proposed development are shown in Figure 14. The methodology, results and recommendations are outlined in the following sections.

Given that the approximate peak instantaneous flow rate, as calculated under the Central Coast Council Strategy, hasn't been impacted significantly with the Revision K masterplan layout (overall reduction in development yield), the sewer modelling undertaken for the previous option (Revision F) is assumed as a conservative scenario and accounts for the proposed development in the revised concept plan hence remains valid for the proposal and is not required to be updated. As such, the modelling results below are in reference to the *Mooney Mooney Planning Proposal – Concept Plan Rev F*.

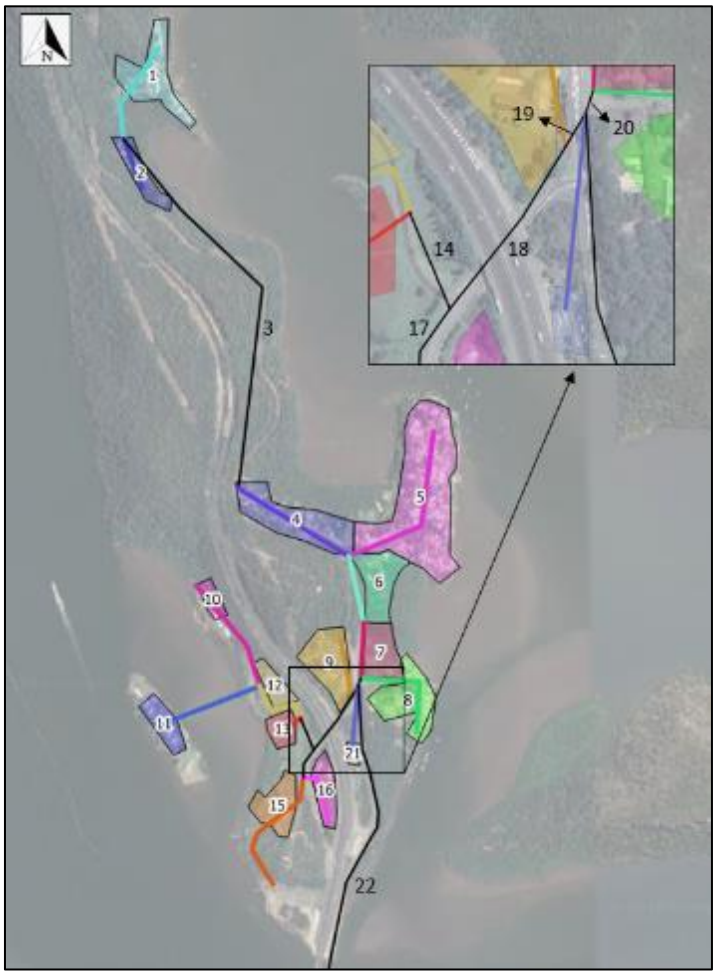
Figure 14: Development Location

Note: As mentioned, the data in this figure is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

3.2.3.1 Model Build

The Environment/One Design Assistant was used to model the network performance. The network was spatially broken down into servicing zones which included both existing and proposed developed areas. For each zone, only the largest pipe diameter was considered. Zones 1, 5 and 8 featured more detailed reticulation with smaller pipes located upstream. These branches have not been broken down any further as no development is proposed in these areas and therefore, they are not considered relevant to the study. The zones included in the model are shown in Figure 22.

Figure 15: Mooney Mooney Supply Zones



Note: As mentioned, the data in this figure is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

3.2.3.2 Flow Calculation and Routing

Wastewater loads for the development were estimated based on the population and modelling assumptions provided by Council. Given the nature of the system, neither diurnal patterns nor wet weather peak factors were applied to the model.

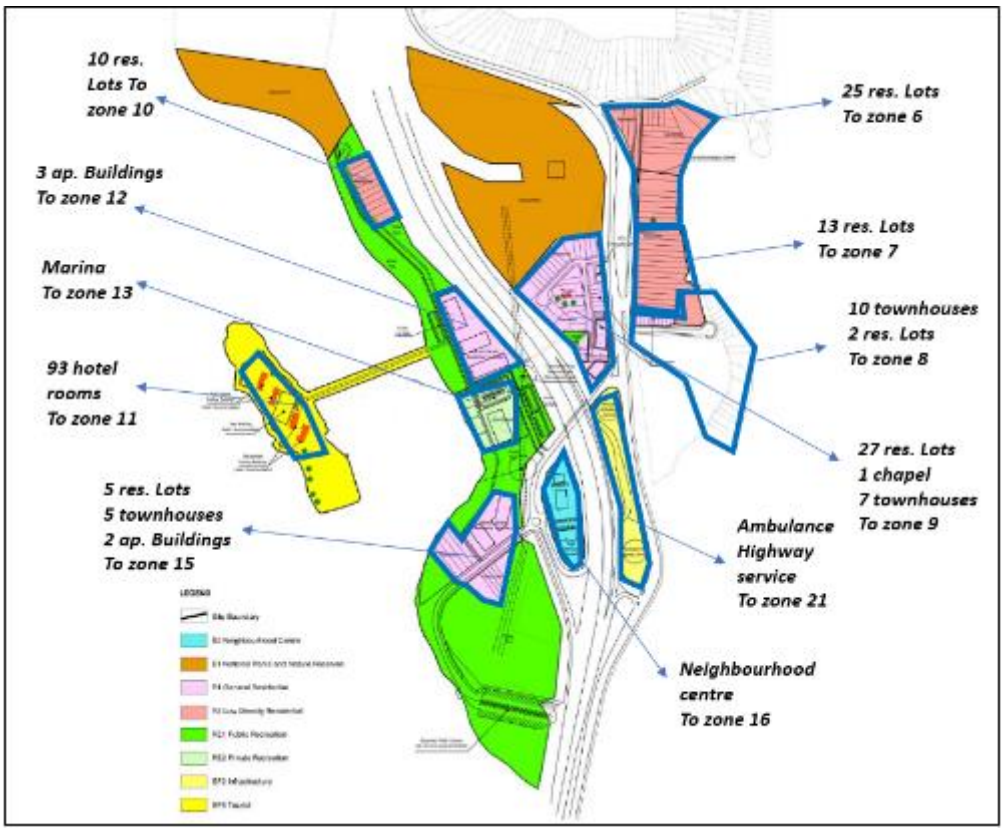
The existing population was estimated based on satellite imagery. From satellite imagery, it was determined that 249 properties may be supplied by the sewer network. While Council's study discussed in Section 3.2.1 assumed 215 property connections, 249 has been adopted for this study as it is more conservative, and the methodology allowed a spatial distribution as shown in Figure 16.

The development population was calculated using the equivalent population (EP) assumptions provided in Table 10 below.

Table 10: Assumed Equivalent Populations

Development Type	Equivalent Population (per Dwelling or Ha)
Existing properties (dwelling)	3
Low Density Residential (dwelling)	3
Town Houses & Apartments (dwelling)	2.1
Private Recreation (assumed Marina, part of separate Planning Proposal)	0.6
Community facilities (Ha)	75
Tourism Zone (Ha)	20

Figure 16: Proposed Discharge Loads



Note: As mentioned, the data in this figure is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F. Please note the Marina is part of a separate planning proposal.

The population was then estimated for each demand zone, and the number of pumps required was calculated. It has been assumed that one pump is required for every three persons. The results are provided in Table 11. The indicative sewer connections for existing properties and proposed development sites are shown in Figure 17.

Table 11: Population Estimation

Zone	Description	Development Population	Existing Population	Total Population	Number of Pumps
1	Existing		135	135	45
2	Existing		39	39	13
3	No connection				0
4	Existing		102	102	34
5	Existing		336	336	112
6	Existing + Development R2	75	15	90	30
7	Existing + Development R2	39	42	81	27
8	Existing + Development R2 and R1	27	54	81	27
9	Existing + Development R1	96	6	102	34
10	Development R1	30		30	10
11	Development SP3	74		74	25
12	Development R1	98		98	33
13	Development RE2	78		78	26
14	No connection				0
15	Development R1	91	3	94	31
16	Development B2	22	12	34	12
17	No connection				0
18	No connection				0
19	No connection				0
20	No connection				0
21	Development SP2		3	3	1
22	No connection				0

Note: As mentioned, the data in this table is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

Figure 17: Population Allocation

Note: As mentioned, the data in this figure is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

3.2.3.3 System Performance Analysis

The Design Assistant spreadsheet was populated with the following data for each zone:

- Next zone connected;
- Number of pumps in zone;
- Assumed 0.7 L/s maximum flow per pump;
- Assumed demand of 220 L/day/dwelling;
- Zone length (Main pipe length);
- Maximum main elevation; and
- Minimum pump elevation.

Elevations were determined using DEM data. Google Earth profiles were used to estimate elevations for the northern part of the network at Cheero Point. To provide a conservative assessment, the highest point of each main was adopted as the maximum elevation reached from the main to the outlet. Minimum pump elevations were selected by extracting the minimum elevation of all customer points within each zone. The extracted elevations are provided in Table 12 below.

Table 12: Maximum and Minimum Pump Elevations

Zone	Minimum Pump Elevation (m)	Maximum Pump Elevation (m)
1	1.5	31.3
2	15.0	31.3
3	14.0	31.3
4	10.3	31.3
5	1.7	30.9
6	9.6	23.5
7	4.0	14.6
8	1.3	14.6
9	12.0	17.9
10	6.0	14.6
11	2.0	14.6
12	5.0	14.6
13	0	14.6
14	3.5	14.6
15	1.5	14.6
16	6.0	14.6
17	4.0	14.6
18	10.5	14.6
19	12.0	14.6
20	12.0	14.6
21	5.8	14.6
22	4.0	14.6

Note: As mentioned, the data in this table is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

Results – Existing Scenario

In order to assess the impact of the proposed development, the system performance calculation was first undertaken on the existing system without development. The primary objective of the system performance is to assess the wastewater network capacity by assessing the velocities and the maximum dynamic head.

The results of this assessment are summarised in Table 13 below. Detailed results are provided in Appendix C.

Specific system performance limits were not provided by Council for this assessment. Pipe sizes have therefore been selected to minimise friction losses while maintaining a minimum velocity of 0.6 m/s.

The zones located on the eastern side of the highway (zone 1 to 8) show a satisfactory level of performance. Zone 1 and 5 have dynamic head above 60 m but minimum pump elevation and maximum main elevation were conservatively estimated from the DEM. Detailed information is not available for these areas, and therefore results cannot be confirmed. It is recommended that these areas be assessed in further detail at the next phase of development, should information on pump elevations be made available.

The south-western part of the network (Zones 15, 17, 18, 19, 21) feature pipes that experience low velocities in the existing scenario. Such results are expected as these pipes were designed to service future developments and are therefore oversized for the existing low discharges.

The sewer main discharging to the Brooklyn STP (Zone 22) also experiences velocities slightly below 0.6 m/s. This pipe size was likely designed to accommodate future growth in the network.

Table 13: Existing System Performance Results

Zone	Pipe Size (mm)	Max Velocity (m/s)	Total Dynamic Head	Comment
1	90	1	*64.66*	Dynamic Head above 60m
2	63	1.37	42.27	Good Performance Level
3	110	0.79	40.37	Good Performance Level
4	110	0.9	34.23	Good Performance Level
5	90	1.34	*67.46*	Dynamic Head above 60m
6	125	0.96	22.22	Good Performance Level
7	125	1.05	16.35	Good Performance Level
8	75	0.96	25.07	Good Performance Level
9	50	1.11	15.75	Good Performance Level
15	50	*0.56*	21.35	Velocity below 0.6 m/s
16	50	1.67	28.25	Good Performance Level
17	110	*0.34*	14.74	Velocity below 0.6 m/s
18	110	*0.34*	8.09	Velocity below 0.6 m/s
19	125	*0.26*	6.27	Velocity below 0.6 m/s
20	125	1.05	6.5	Good Performance Level
21	50	*0.56*	15.5	Velocity below 0.6 m/s
22	180	*0.55*	14.24	Velocity below 0.6 m/s

Note: As mentioned, the data in this table is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

Results – Proposed Scenario

System performance was then assessed for the network in the proposed scenario by adding extra customers as per the allocation method described in Section 3.2.3.2.

Zone 1 and 5 still show a dynamic head above 60 m with a slight increase from the existing scenario as a result of the proposed development. The Design Assistant calculator shows that increasing the mains servicing these zones to 110 mm in diameter would result in a dynamic head below 60 m.

According to the Design Assistant calculator, both zones would have a dynamic head below 60 m if their mains were upsized to 110 mm. However, as mentioned in Section 3.2.3.1, these two zones have been simplified as no development is proposed in these areas and they are located upstream of the development site. These zones have therefore been represented as a single main. For this reason, it is recommended that these areas be assessed in further detail at the next phase of development, should information on pump elevations be made available. No pipe upgrades have been recommended at this time.

High dynamic head is also experienced in zone 9. This zone is serviced by a 50 mm main, and the future population is estimated to reach 112 persons. It is recommended that the existing pipe be upgraded from a 63 mm to a 75 mm diameter main to support the anticipated growth.

Within the development site, future sewer mains were sized to support the proposed development. Main's servicing zones 10 to 14, on the western side of the motorway, will range from 75 to 90 mm in diameter. Zone 15 is currently serviced via a 50 mm main that is not suitable for future estimated discharge. It is recommended that this branch is upgraded to a 90mm pipe to service the future development.

In the proposed scenario, the main servicing zone 21 experiences low velocities. The nature of development in this area is complex and includes RMS highway services and ambulance services precincts. These uses have been consolidated into a single pump for the purpose of this assessment. It is recommended that the servicing strategy for this site be refined as further detail regarding the development in these areas becomes available in subsequent stages of the project. The results of the assessment are provided in Table 14 below.

Table 14: Proposed System Performance Results

Zone	Pipe Size (mm)	Max Velocity (m/s)	Total Dynamic Head	Comment
1	90	1.00	*69.20*	Dynamic Head above 60m
2	63	1.37	46.81	Good Performance Level
3	110	0.79	44.91	Good Performance Level
4	110	0.90	38.77	Good Performance Level
5	90	1.34	*72.00*	Dynamic Head above 60m
6	125	1.05	26.76	Good Performance Level
7	125	1.14	20.44	Good Performance Level
8	75	1.20	32.89	Good Performance Level
9	50	3.34	*60.82*	Dynamic Head above 60m
10	75	0.96	31.37	Dimensioned Proposed Pipes
11	90	0.84	32.49	
12	90	1.17	26.27	
13	75	1.20	29.33	
14	90	1.34	23.76	
15	50	3.34	*137.23*	Dynamic Head above 60m
16	50	2.23	45.63	Good Performance Level
17	110	0.68	21.20	Good Performance Level
18	110	1.01	14.18	Good Performance Level
19	125	0.87	10.26	Good Performance Level
20	125	1.22	10.29	Good Performance Level
21	50	*0.56*	19.21	Velocity below 0.6 m/s
22	180	0.81	17.95	Good Performance Level

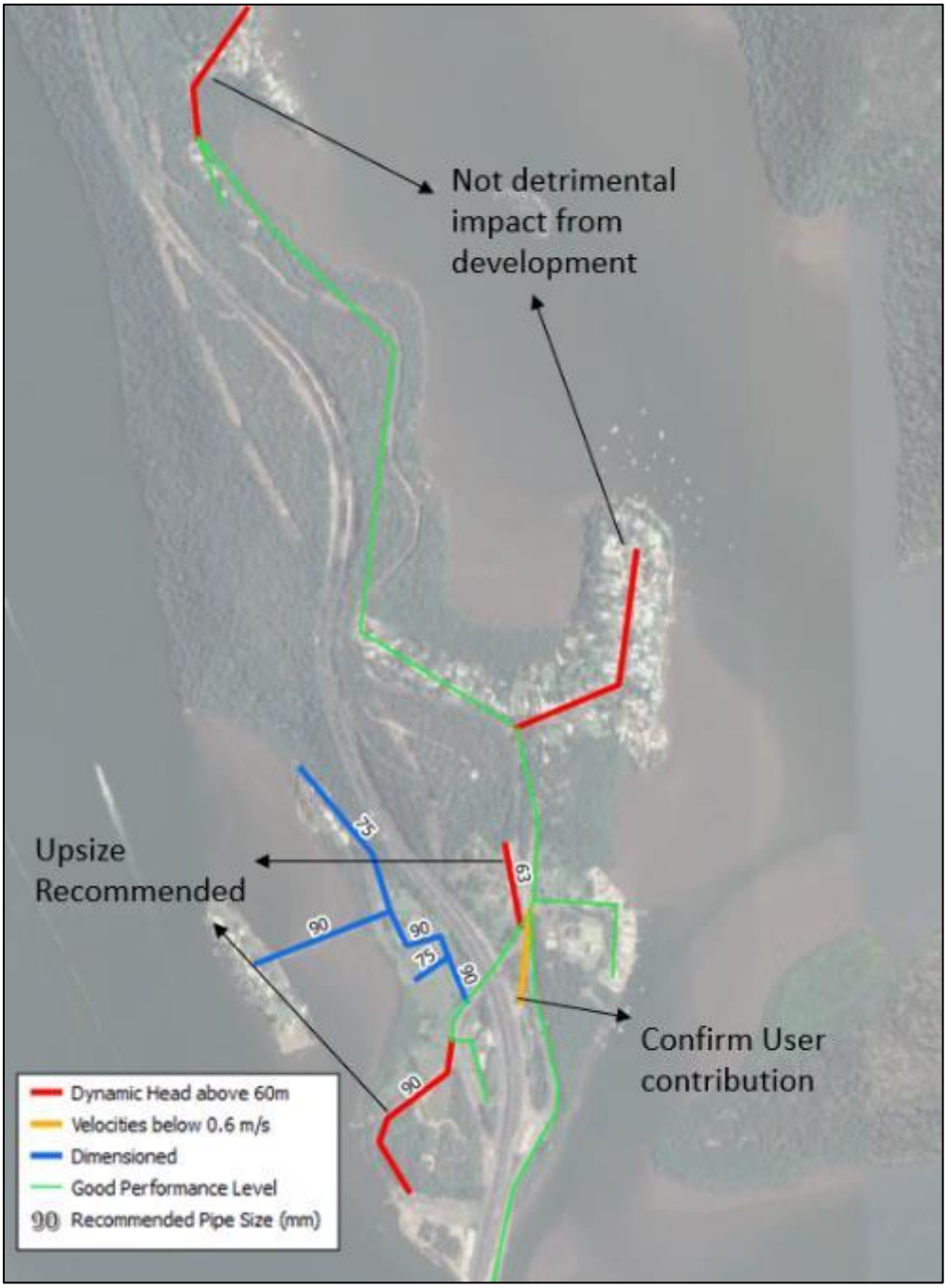
Note: As mentioned, the data in this table is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

3.2.3.4 Conclusions and Recommendations

A high-level system performance assessment was undertaken to analyse the impact of the proposed development on the existing wastewater network capacity. The network was divided into 22 zones with a simplified network (assumed one reticulation main per zone) and flows were calculated using the Environment/One Design Assistant spreadsheet. The system performance was compared in the existing and proposed scenarios and the dynamic head and pipe velocities were assessed.

The required pipe diameters to support the proposed development were determined for each zone. The results are shown in Figure 18.

Figure 18: Results and Recommendations



Note: As mentioned, the data in this figure is in reference to Mooney Mooney Planning Proposal – Concept Plan Rev F.

3.2.4 Reticulation Strategy

A reticulation strategy was developed based on the results of the assessment discussed above. A new sewer main extending from the existing infrastructure located on Peats Ferry Road will be required to service the proposed dwellings in the north-western portion of the site. Existing mains in the north east and southern areas of the site will require upsizing to accommodate the flows generated by the development. It is also anticipated that all future low-density dwellings will be required to provide a pump unit to allow wastewater to discharge to the infrastructure located within the street. The proposed sewer network is shown on Figure 19.

Figure 19: Proposed Sewer Network

3.2.5 Authority Consultation

Mott MacDonald engaged with the service authorities to determine the available capacity in the existing networks to support the development & identify any upgrades that might be required to meet a shortfall in capacity. Sydney Water provided the following response:

- Current system has the capacity to service the additional proposed growth;

- Additional treatment capacity (i.e. MBR train, filters, balancing equating to an estimated $12.6m total project cost) would be required by 2032 (see third dot point) – if the rezoning did not occur, the existing capacity would be sufficient based on the current forecast;
- The Sydney Water catchments of Brooklyn and Dangar Island catchments are not forecast to exceed their original allocation (allocation totalled 1600 EP, 2046 forecast is 1490 EP); and
- The proposed rezoning consumes a significant portion of the plant's capacity (potential in a short period) – this means that the horizon of investment may shift rapidly depending on growth rates and actual loads following development (especially in peak periods).

3.3 Electricity

3.3.1 Ausgrid Feasibility Advice

A feasibility application was lodged with Ausgrid to determine the available network capacity and required upgrade works to support the proposed development. Ausgrid have advised that there are several existing substations in the area which have historically supplied 1,000 amps at low voltage. Existing dwellings in Mooney Mooney are supplied via a 21 km high voltage rural feeder which originates from the Somersby zone substation.

The existing feeder from Somersby has poor performance reliability with an average of 4.6 outages per year and an average yearly outage duration of 866 minutes. Ausgrid have also indicated that given the site is located at the end of the feeder, expected performance is generally worse than average.

Modelling of this feeder suggests there is 800 amps of capacity available at low voltage, that can reasonably accommodate some of the development proposed. Preliminary calculations undertaken by Mott MacDonald estimate that 3,333 amps at low voltage would be required to support the proposed ultimate development as such there is a significant deficiency in the electrical network to support the proposed growth.

Ausgrid have indicated that a new substation may be required to service the ultimate development. They have recommended that a 4,000 m^2 site adjacent the existing 132 kV transmission lines be reserved for this purpose. It is anticipated that this substation would require a minimum capacity of 3 MVA to support the development, however the exact size and power requirements would need to be confirmed with Ausgrid.

A new zone substation would provide a reliable power source for the development and neighbouring residents; however, it could add a significant cost to the project. Discussions with Ausgrid will be required to confirm the funding arrangement for this infrastructure. There is potential for Ausgrid to fund construction of a substation if a site is donated for this purpose.

Should a new zone substation not eventuate, a new 11 kV feeder could be brought to the site from the Somersby ZS. This option would add a significant cost to the project as works would be required over a 21 km stretch to bring the feeder to the site. The associated costs likely prohibit this from being a viable servicing strategy for the site given the distance from the site, the challenging terrain, and the limited availability of accessible corridors.

Notwithstanding the above, Ausgrid have also indicated that there could be opportunities to utilise spare capacity in some nearby feeders to supply the proposed development. To the north of the development, the closest towns are Mount White (8.5 km from the site) and Calga (14 km from the site). Again, given the distance between the site and neighbouring towns, the costs associated with these options may also prohibit this from being a viable option. The indicative feeder routes from Mount White, Calga and the Somersby ZS are shown in Figure 20. Detailed modelling would need to be undertaken to determine if this is a viable option for the project, however, the lack of available corridors remains.

All three infrastructure options will incur significant costs. Following consultation, Ausgrid currently has no funding allocated for a new substation. It is understood that Ausgrid, as a regulated Network Service Provider, are able to seek regulatory approval from the Australian Energy Regulator for capital expenditure to augment local networks when increases in demand are forecast. In the event that capital funding cannot be secured. Contribution from the developer may be required to deliver electricity infrastructure required to accommodate the ultimate development. If this is the case, funding and delivery of this infrastructure could be bound by a special infrastructure contributions (SIC) plan. This plan will set out the funding requirements for all key stakeholders. For this development, it is assumed that the following stakeholders would be included in the SIC:

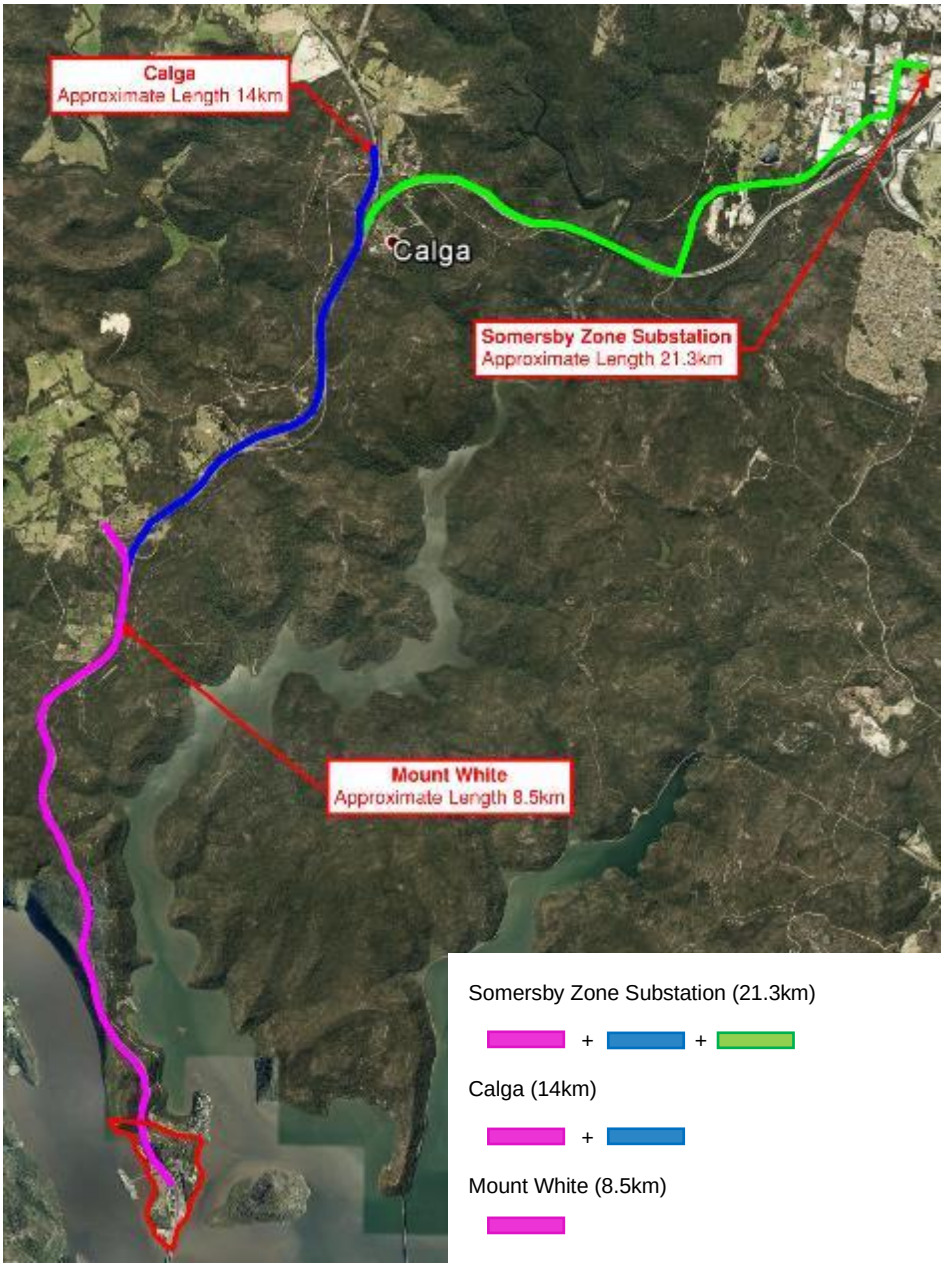
- Ausgrid;
- Central Coast Council;
- The final developer; and
- Transgrid (pending final infrastructure ownership).

The SIC will aim to balance the funding of infrastructure with broader development objectives. Where an infrastructure item is only partly required to service growth with the remainder required to service either existing demand, background growth, or growth from outside the proposed development, the cost of the infrastructure

may be apportioned to users outside of the development (i.e. the cost will be recovered from other sources than the SIC). For more information on SIC plans, reference should be made to the *Special Infrastructure Contribution Guidelines* (Draft April 2020), published by NSW Department of Planning, Industry and Environment.

With regards to timing, the plan should provide clarity on costs as early as possible in the development cycle. With that in mind, initiation of the plan development should be undertaken at the planning proposal stage.

Figure 20: Potential Feeder Locations



3.3.2 Preferred Servicing Strategy

Given the significant constraints associated with extending a high voltage feeder to the site, construction of a new zone substation has been identified as the preferred servicing option. This preference is further supported by Ausgrid's preliminary advice as detailed in Section 3.3.1.

The master plan has therefore nominated a 7,400 m^2 site for a new zone substation. Per Ausgrid's request, this site is located adjacent the existing 132 kV transmission line. The proposed location is shown on Figure 21.

Opportunities for alternative locations are limited due to the presence of flooding, heritage, fauna and flora, Aboriginal, amenity, bushfire and topography constraints. This location is therefore considered the most appropriate as the site is largely unconstrained and will not result in a decrease in the residential yield. Further assessment will be required by Ausgrid at a later date to confirm the site-specific requirements and if the 7,400 m^2 requirement could be reduced.

The proposed site location is situated between the eastern side of the transmission lines and Pacific Motorway Off-ramp. This location is also positioned outside the PMF plus Sea Level Rise flood area. Given the limited number of alternative locations the proposed site is considered low risk however, further coordination with the authorities will be required as the design progresses.

Figure 21: Proposed Zone Substation Location

3.3.3 Internal Network

As discussed above, a new substation may be required to support the proposed development. It is expected that future supply to both the proposed and existing dwellings in Mooney Mooney would originate from this substation. Should a substation be constructed, proposed apartment blocks would likely be supplied via high voltage cabling to padmount, or chamber substations located within the property boundaries. A chamber substation can service up to 150 dwellings.

New underground electrical infrastructure will be provided along all new roads to supply the proposed dwellings. There is also potential to underground overhead electrical cables located on existing roads to improve street amenity. Care should be taken to ensure the electrical connection to existing private dwellings is maintained. Existing overhead infrastructure supplying Peat Island will also need to be retained. The proposed electrical network is shown on Figure 22.

Figure 22: Proposed Electrical Network

3.4 Telecommunications

Telecommunications will be provided to the precinct by NBN Co. via the fixed wireless network. Given that the wireless tower has already been commissioned and due to the wireless nature of the NBN infrastructure, it is not expected that lead-in work will be required to service the site and new pit and pipe infrastructure will be provided to new developments where there is no existing infrastructure.

Telecommunications infrastructure supplying existing dwellings will need to be maintained. It is expected that all existing infrastructure on the western side of the motorway, with exception to infrastructure supplying Peat Island, will be decommissioned, and removed or relocated to suit the proposed master plan layout. The existing fibre optic cabling on located along the Old Pacific Highway will also need to be retained.

Appendices

A. Existing Services Plans

MOONEY MOONEY

EXISTING POTABLE WATER NETWORK

- RESERVOIR
- RETICULATION MAIN
- TRANSFER MAIN
- MINOR RETICULATION MAIN

0 0.2 0.4 0.6 0.8 km

06.08.19 | REF: MMD-00-U-GIS-0101

NSW GOVERNMENT Property NSW

MOTT MACDONALD

MOONEY MOONEY

EXISTING SEWER NETWORK

SEWER TREATMENT PLANT

SYDNEY WATER LOW PRESSURE MAIN

SYDNEY WATER PRESSURE MAIN

COUNCIL PRESSURE MAIN

0 0.35 0.7 1.05 1.4 km

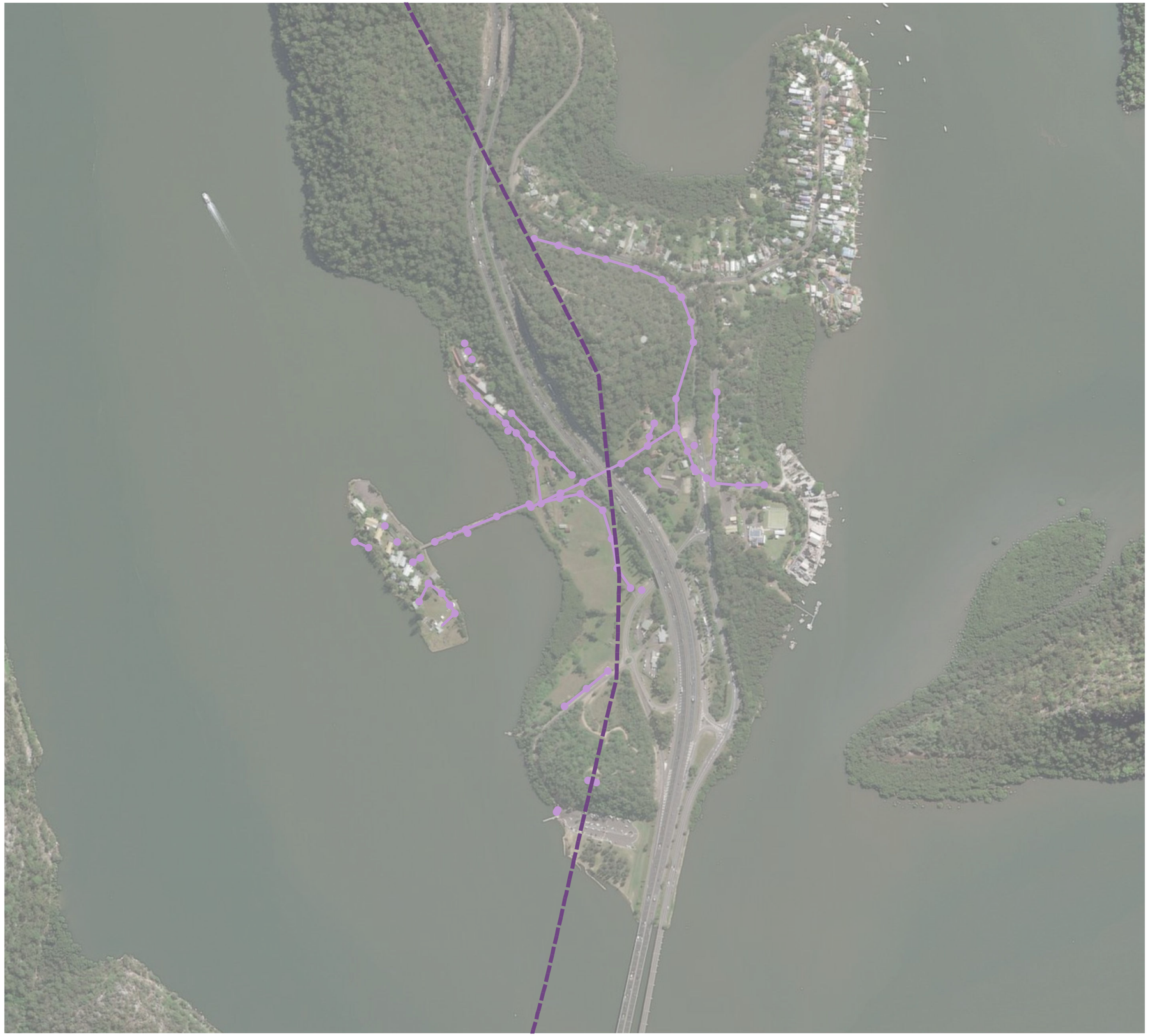
18.07.18 | REF: MMD-00-U-GIS-0201

NSW GOVERNMENT Property NSW

MOTT MACDONALD

MOONEY MOONEY

EXISTING ELECTRICAL NETWORK



132kV TRANSMISSION LINE

LOW VOLTAGE NETWORK

0 0.2 0.4 0.6 0.8 km

20.07.18 | REF: MMD-00-U-GIS-0301

NSW GOVERNMENT Property NSW

MOTT MACDONALD

B. Proposed Plans

MOONEY MOONEY

PROPOSED POTABLE WATER NETWORK

RESERVOIR

PROPOSED POTABLE MAINS

EXISTING RETICULATION MAINS

6.08.21 | REF: MMD-00-U-GIS-0111

MOONEY MOONEY

PROPOSED SEWER NETWORK

PROPOSED SEWER RETICULATION

EXISTING RETICULATION MAINS

0 0.2 0.4 0.6 0.8 km

6.08.19 | REF: MMD-00-U-GIS-0211

MOONEY MOONEY

PROPOSED ELECTRICAL NETWORK

INDICATIVE SUBSTATION LOCATION

PROPOSED ELECTRICAL NETWORK

132kV TRANSMISSION LINE

6.08.21 | REF: MMD-00-U-GIS-0311

C. Sewer Calculations

Appendix A- E/One Report Before Development.

Environment One Corporation

Pressure Sewer Preliminary Cost and Design Analysis For Mooney Mooney

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Prepared By:

Mooney Mooney No Development

July 26, 2019

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Liters/Day per Pump	Max Flow Per Pump (lps)	Max Sim Ops	Max Flow (LPS)	Pipe Size (mm)	Max Velocity (MPS)	Length of Main this Zone	Friction Loss Factor (m/100m)	Friction Loss This Zone	Accum Fric Loss (meters)	Max Main Elevation	Minimum Pump Elevation	Static Head (meters)	Total Dynamic Head (m)
This spreadsheet was calculated using pipe diameters for: SDR11PE100											Friction loss calculations were based on a Constant for inside roughness "C" of: 150						
1.00	3.00	45	45	220	.70	6	4.20	90.00	1.00	857.00	1.38	11.79	34.86	31.30	1.50	29.80	64.66
2.00	3.00	13	13	220	.70	4	2.80	63.00	1.37	78.00	3.72	2.90	25.97	31.30	15.00	16.30	42.27
3.00	4.00	0	58	220	.70	7	4.90	110.00	0.79	1,406.00	0.70	9.81	23.07	31.30	14.00	17.30	40.37
4.00	6.00	34	92	220	.70	8	5.60	110.00	0.90	557.00	0.89	4.98	13.26	31.30	10.33	20.97	34.23
5.00	6.00	112	112	220	.70	8	5.60	90.00	1.34	1,280.00	2.34	30.00	38.28	30.90	1.72	29.18	67.46
6.00	7.00	5	209	220	.70	11	7.70	125.00	0.96	292.00	0.87	2.54	8.28	23.50	9.56	13.94	22.22
7.00	20.00	14	223	220	.70	12	8.40	125.00	1.05	180.00	1.02	1.84	5.74	14.60	3.99	10.61	16.35
8.00	20.00	18	18	220	.70	4	2.80	75.00	0.96	506.00	1.56	7.87	11.77	14.60	1.30	13.30	25.07
9.00	19.00	2	2	220	.70	2	1.40	50.00	1.11	184.00	3.36	6.18	9.85	17.90	12.00	5.90	15.75
15.00	17.00	1	1	220	.70	1	.70	50.00	0.56	442.00	0.93	4.11	8.25	14.60	1.50	13.10	21.35
16.00	17.00	4	4	220	.70	3	2.10	50.00	1.67	218.00	7.12	15.51	19.65	14.60	6.00	8.60	28.25
17.00	18.00	0	5	220	.70	3	2.10	110.00	0.34	100.00	0.15	0.15	4.14	14.60	4.00	10.60	14.74
18.00	19.00	0	5	220	.70	3	2.10	110.00	0.34	218.00	0.15	0.32	3.99	14.60	10.50	4.10	8.09
19.00	22.00	0	7	220	.70	3	2.10	125.00	0.26	42.00	0.08	0.03	3.67	14.60	12.00	2.60	6.27
20.00	22.00	0	241	220	.70	12	8.40	125.00	1.05	25.00	1.02	0.26	3.90	14.60	12.00	2.60	6.50
21.00	22.00	1	1	220	.70	1	.70	50.00	0.56	329.00	0.93	3.06	6.70	14.60	5.80	8.80	15.50
22.00	22.00	0	249	220	.70	13	9.10	180.00	0.55	1,781.00	0.20	3.64	3.64	14.60	4.00	10.60	14.24

PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME (HR)

Prepared By:

Mooney Mooney No Development

July 26, 2019

Zone Number	Connects to Zone	Accumulated Total of Pumps this Zone	Pipe Size (mm)	Liters per 100 lineal meters	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
This spreadsheet was calculated using pipe diameters for: SDR11PE100								Liters per Day per Dwelling		220
1.00	3.00	45	90.00	418.54	857.00	3,586.88	9,900	2.76	8.70	44.16
2.00	3.00	13	63.00	204.28	78.00	159.34	2,860	17.95	1.34	36.80
3.00	4.00	58	110.00	622.11	1,406.00	8,746.92	12,760	1.46	16.45	35.46
4.00	6.00	92	110.00	622.11	557.00	3,465.17	20,240	5.84	4.11	19.01
5.00	6.00	112	90.00	418.54	1,280.00	5,357.29	24,640	4.60	5.22	20.12
6.00	7.00	209	125.00	801.18	292.00	2,339.46	45,980	19.65	1.22	14.90
7.00	20.00	223	125.00	801.18	180.00	1,442.13	49,060	34.02	0.71	13.68
8.00	20.00	18	75.00	292.25	506.00	1,478.77	3,960	2.68	8.96	21.94
9.00	19.00	2	50.00	125.66	184.00	231.22	440	1.90	12.61	30.74
15.00	17.00	1	50.00	125.66	442.00	555.43	220	0.40	60.59	121.89
16.00	17.00	4	50.00	125.66	218.00	273.95	880	3.21	7.47	68.76
17.00	18.00	5	110.00	622.11	100.00	622.11	1,100	1.77	13.57	61.29
18.00	19.00	5	110.00	622.11	218.00	1,356.21	1,100	0.81	29.59	47.72
19.00	22.00	7	125.00	801.18	42.00	336.50	1,540	4.58	5.24	18.13
20.00	22.00	241	125.00	801.18	25.00	200.30	53,020	264.71	0.09	12.98
21.00	22.00	1	50.00	125.66	329.00	413.43	220	0.53	45.10	57.99
22.00	22.00	249	180.00	1,651.30	1,781.00	29,409.64	54,780	1.86	12.88	12.88

Appendix B- E/One Report After Development.

Environment One Corporation

Pressure Sewer Preliminary Cost and Design Analysis For Mooney Mooney

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Prepared By:
Tom Lecomte

Mooney Mooney

July 26, 2019

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Liters/Day per Pump	Max Flow Per Pump (lps)	Max Sim Ops	Max Flow (LPS)	Pipe Size (mm)	Max Velocity (MPS)	Length of Main this Zone	Friction Loss Factor (m/100m)	Friction Loss This Zone	Accum Fric Loss (meters)	Max Main Elevation	Minimum Pump Elevation	Static Head (meters)	Total Dynamic Head (m)
This spreadsheet was calculated using pipe diameters for: SDR11PE100											Friction loss calculations were based on a Constant for inside roughness "C" of: 150						
1.00	3.00	45	45	220	.70	6	4.20	90.00	1.00	857.00	1.38	11.79	39.40	31.30	1.50	29.80	69.20
2.00	3.00	13	13	220	.70	4	2.80	63.00	1.37	78.00	3.72	2.90	30.51	31.30	15.00	16.30	46.81
3.00	4.00	0	58	220	.70	7	4.90	110.00	0.79	1,406.00	0.70	9.81	27.61	31.30	14.00	17.30	44.91
4.00	6.00	34	92	220	.70	8	5.60	110.00	0.90	557.00	0.89	4.98	17.80	31.30	10.33	20.97	38.77
5.00	6.00	112	112	220	.70	8	5.60	90.00	1.34	1,280.00	2.34	30.00	42.82	30.90	1.72	29.18	72.00
6.00	7.00	30	234	220	.70	12	8.40	125.00	1.05	292.00	1.02	2.99	12.82	23.50	9.56	13.94	26.76
7.00	20.00	27	261	220	.70	13	9.10	125.00	1.14	180.00	1.19	2.14	9.83	14.60	3.99	10.61	20.44
8.00	20.00	24	24	220	.70	5	3.50	75.00	1.20	506.00	2.35	11.90	19.59	14.60	1.30	13.30	32.89
9.00	19.00	37	37	220	.70	6	4.20	50.00	3.34	184.00	25.69	47.26	54.92	17.90	12.00	5.90	60.82
10.00	12.00	10	10	220	.70	4	2.80	75.00	0.96	392.00	1.56	6.10	22.77	14.60	6.00	8.60	31.37
11.00	12.00	25	25	220	.70	5	3.50	90.00	0.84	328.00	0.98	3.22	19.89	14.60	2.00	12.60	32.49
12.00	14.00	33	68	220	.70	7	4.90	90.00	1.17	219.00	1.83	4.01	16.67	14.60	5.00	9.60	26.27
13.00	14.00	26	26	220	.70	5	3.50	75.00	1.20	88.00	2.35	2.07	14.73	14.60	0.00	14.60	29.33
14.00	18.00	0	94	220	.70	8	5.60	90.00	1.34	110.00	2.34	2.58	12.66	14.60	3.50	11.10	23.76
15.00	17.00	31	31	220	.70	6	4.20	50.00	3.34	442.00	25.69	113.53	124.13	14.60	1.50	13.10	137.23
16.00	17.00	12	12	220	.70	4	2.80	50.00	2.23	218.00	12.12	26.43	37.03	14.60	6.00	8.60	45.63
17.00	18.00	0	43	220	.70	6	4.20	110.00	0.68	100.00	0.52	0.52	10.60	14.60	4.00	10.60	21.20
18.00	19.00	0	137	220	.70	9	6.30	110.00	1.01	218.00	1.11	2.42	10.08	14.60	10.50	4.10	14.18
19.00	22.00	0	174	220	.70	10	7.00	125.00	0.87	42.00	0.73	0.31	7.66	14.60	12.00	2.60	10.26
20.00	22.00	0	285	220	.70	14	9.80	125.00	1.22	25.00	1.36	0.34	7.69	14.60	12.00	2.60	10.29
21.00	22.00	1	1	220	.70	1	.70	50.00	0.56	329.00	0.93	3.06	10.41	14.60	5.80	8.80	19.21
22.00	22.00	0	460	220	.70	19	13.30	180.00	0.81	1,781.00	0.41	7.35	7.35	14.60	4.00	10.60	17.95

PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME (HR)

Prepared By:
Tom Lecomte

Mooney Mooney

July 26, 2019

Zone Number	Connects to Zone	Accumulated Total of Pumps this Zone	Pipe Size (mm)	Liters per 100 lineal meters	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
This spreadsheet was calculated using pipe diameters for: SDR11PE100								Liters per Day per Dwelling		220
1.00	3.00	45	90.00	418.54	857.00	3,586.88	9,900	2.76	8.70	38.00
2.00	3.00	13	63.00	204.28	78.00	159.34	2,860	17.95	1.34	30.64
3.00	4.00	58	110.00	622.11	1,406.00	8,746.92	12,760	1.46	16.45	29.31
4.00	6.00	92	110.00	622.11	557.00	3,465.17	20,240	5.84	4.11	12.85
5.00	6.00	112	90.00	418.54	1,280.00	5,357.29	24,640	4.60	5.22	13.96
6.00	7.00	234	125.00	801.18	292.00	2,339.46	51,480	22.01	1.09	8.74
7.00	20.00	261	125.00	801.18	180.00	1,442.13	57,420	39.82	0.60	7.65
8.00	20.00	24	75.00	292.25	506.00	1,478.77	5,280	3.57	6.72	13.77
9.00	19.00	37	50.00	125.66	184.00	231.22	8,140	35.20	0.68	7.87
10.00	12.00	10	75.00	292.25	392.00	1,145.61	2,200	1.92	12.50	22.77
11.00	12.00	25	90.00	418.54	328.00	1,372.81	5,500	4.01	5.99	16.26
12.00	14.00	68	90.00	418.54	219.00	916.60	14,960	16.32	1.47	10.27
13.00	14.00	26	75.00	292.25	88.00	257.18	5,720	22.24	1.08	9.88
14.00	18.00	94	90.00	418.54	110.00	460.39	20,680	44.92	0.53	8.80
15.00	17.00	31	50.00	125.66	442.00	555.43	6,820	12.28	1.95	11.80
16.00	17.00	12	50.00	125.66	218.00	273.95	2,640	9.64	2.49	12.33
17.00	18.00	43	110.00	622.11	100.00	622.11	9,460	15.21	1.58	9.84
18.00	19.00	137	110.00	622.11	218.00	1,356.21	30,140	22.22	1.08	8.27
19.00	22.00	174	125.00	801.18	42.00	336.50	38,280	113.76	0.21	7.19
20.00	22.00	285	125.00	801.18	25.00	200.30	62,700	313.04	0.08	7.05
21.00	22.00	1	50.00	125.66	329.00	413.43	220	0.53	45.10	52.08
22.00	22.00	460	180.00	1,651.30	1,781.00	29,409.64	101,200	3.44	6.97	6.97

D. Authority Correspondence

Higgisson, Rachel

From: JAISWAL, ANIL <ANIL.JAISWAL@sydneywater.com.au>
Sent: Wednesday, 8 August 2018 11:55 AM
To: Higgisson, Rachel
Cc: ROBERTSON, ALEX; GAMBOA, FERNANDO
Subject: RE: Water & sewer servicing for Mooney Mooney & Peat Island

Hi Rachel,

We have assessed the system capacity and a summary of the outcomes from the investigation is given below:

Wastewater Network
Current system has the capacity to service the additional proposed growth

Wastewater Treatment

- Additional treatment capacity (i.e. MBR train, filters, balancing equating to an estimated $12.6m total project cost) would be required by 2032 (see third dot point) – if the rezoning did not occur, the existing capacity would be sufficient based on the current forecast
- The Sydney Water catchments of Brooklyn and Dangar Island catchments are not forecast to exceed their original allocation (allocation totalled 1600 EP, 2046 forecast is 1490 EP)
- The proposed rezoning consumes a significant portion of the plant's capacity (potential in a short period) – this meanings that the horizon of investment may shift rapidly depending on growth rates and actual loads following development (especially in peak periods)

Water Network
AAJV assessed the system performance under two scenarios:

1. Assuming a constant transfer flow rate of 0.94 ML/day to Mooney Mooney reservoir
2. Using WF0934 flow pattern from IICATS on the observed max day for Cowan North WSZ (5/2/17) to represent the flow transfer pattern to Mooney Mooney reservoir

Hydraulic assessment of the Cowan North system shows that the additional flow to Mooney Mooney will not have a considerable impact on the network requiring amplifications on the existing Cowan North System. Hence, the existing infrastructure has capacity to support the additional flow To Mooney Mooney due to redevelopment for Mooney Mooney and Peat Island.
following is the summary of the outcome:

For any further queries related to water and wastewater networks please contact Fernando Gambao and for wastewater treatment contact Alex Robertson.

Kind Regards,

Anil Jaiswal
Collaborative Service Planning Manager (North & South)
Integrated System Planning | Liveable City Solutions
Sydney Water, Level 10, 1 Smith Street, Parramatta NSW 2150

Phone: 8849 4672
Mobile: 0419 222 169
anil.jaiswal@sydneywater.com.au

From: Higgisson, Rachel [mailto:Rachel.Higgisson@mottmac.com]
Sent: Monday, 6 August 2018 11:53 AM

To: JAISWAL, ANIL <ANIL.JAISWAL@sydneywater.com.au>
Subject: RE: Water & sewer servicing for Mooney Mooney & Peat Island

Hi Anil,

Just following up on the below to see how Sydney Water's study is progressing. From memory you indicated it might be ready by the end of July.

Happy to chat.

Thanks,

Rachel Higgisson
BEng (Hons)
Environmental Engineer

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From: Higgisson, Rachel
Sent: Thursday, 28 June 2018 12:06 PM
To: 'anil.jaiswal@sydneywater.com.au' <anil.jaiswal@sydneywater.com.au>; 'kate.miles@sydneywater.com.au' <kate.miles@sydneywater.com.au>
Cc: Loder, Thomas <Thomas.Loder@mottmac.com>; Lee, Greg A <Greg.Lee@mottmac.com>
Subject: Water & sewer servicing for Mooney Mooney & Peat Island

Hi Anil & Kate,

I am working on behalf of Property NSW to prepare a utilities servicing strategy for the Mooney Mooney & Peat Island redevelopment. Castor Rajanayagam has advised me to contact you both regarding a systems capacity review being prepared for the site.

We have been liaising with the service authorities to determine the available capacity in the existing networks to support the development & identify any upgrades that might be required to meet a shortfall in capacity. I understand that potable water and sewer supply are provided to the site via a combination of Sydney Water and Central Coast Council owned assets. Council have provided the following commentary on water and sewer supply for the proposed development:

- Both water supply and sewerage involve interfaces between Central Coast Council (CCC) and Sydney Water (SWC). Proposed development would become CCC customers, with CCC required to discuss capacity implications with SWC.
- Water supply to Mooney Mooney reservoir dependant on the performance of the SWC North Cowan system. Previous correspondence on the matter with SWC at the end of 2017 indicated they were undertaking a system study which was due to be completed mid 2018.
- Sewerage network is a low pressure sewer system with discharge over the bridge to SWC treatment plant at Brooklyn. An allowance for capacity for development of the site was initially purchased by NSW Govt. and built into the scheme. Assessment of current proposal to original capacity entitlement now needs to be undertaken.
- SWC discharge licence conditions still being developed for its environmental protection licence regulated by EPA. Similar to water supply, SWC were undertaking system capacity review into sewer due mid 2018.

If possible, it would be useful to understand how Sydney Water's study is progressing and any initial findings. It is particularly important for us to understand at this rezoning stage that a pathway exists to ensure the proposed development can be serviced by both the potable water and sewer networks.

We perceive there are four potential options:

1. Existing infrastructure can cater for the increase in development;
2. Existing trunk infrastructure can cater for the whole proposal and supplemented with local infrastructure upgrades;
3. Trunk infrastructure (Brooklyn STP/local reservoir) are unable to cater for all/part of the proposal and development may need to be limited to ensure adequate servicing can be provided;
4. Per Item 3, however distributed off the grid systems for water and sewer could be provided to offset the excess demand/load over and above the trunk infrastructure capacities.

Should we fall into category 3 or 4, we will need to work closely with both SW and Council to ensure there is a viable solution as this may impact the economic viability of the project for Property NSW.

Council have also undertaken a demand and systems assessment for the project however we will need to reconcile their findings with your assessment to confirm availability. I have attached this document for your reference.

Please feel free to contact me on 9098 6784 to discuss further.

Kind regards,

Rachel Higgisson
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Environmental Engineer

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