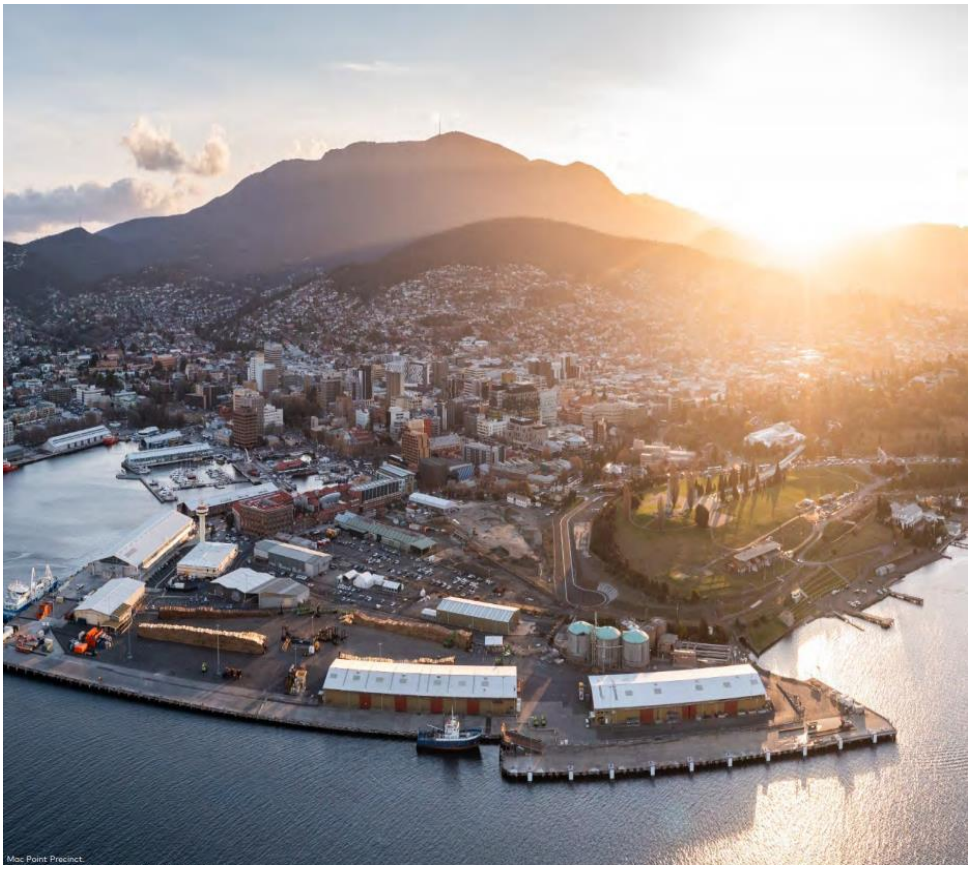
SERVICES REPORT

MACQUARIE POINT INFRASTRUCTURE STRATEGY

MACQUARIE POINT DEVELOPMENT CORPORATION
AUGUST 2024



MACQUARIE POINT PRECINCT

Appendix A – JMG Drawings

Appendix B – Sewer and Water Load Calculations

Appendix C – Cox Architect Residential Development Plans

Appendix D – Water Modelling Advice From TasWater

Appendix E – AECOM Stadium Demands

Issuing Office: 117 Harrington Street, Hobart 7000 **JMG Project No. J230498CS**								
Document Issue Status								
Ver.	**Issue Date**	**Description**	**Originator**		**Checked**		**Approved**	
1	15/12/2023	Draft Issue	JMB		CCH		CCH	
2	29/01/2024	Final Issue	JMB		CCH		CCH	
3	20/02/2024	Revised Final issue	JMB		CCH		CCH	
4	27/06/2024	Draft POSS Submission for Review	CAG		CCH		CJM	
5	9/07/2024	Updated for PoSS Submission	CAG		CCH		CJM	
6	15/07/2024	Updated for PoSS Submission	CAG		JMB		CJM	
7	24/07/2024	Revised Electrical Drawings	CAG		JMB		CJM	
8	21/08/2024	Revised stadium capacity figures	JMB		CAG		CJM	

Executive Summary

Macquarie Point Development Corporation (MPDC) are currently developing the design for the Macquarie Point precinct including the Multipurpose Stadium and a multi-residential area at Regatta Point, in accordance with the Macquarie Point Draft Precinct Plan.

This Report assesses the servicing requirements of the proposed development areas and how they will connect to and through the site.

The services covered by this report include:

- Sewerage
- Potable water, including firefighting requirements
- Stormwater collection, reuse, treatment and discharge
- District Infrastructure Scheme (DIS) to supply HV electrical and potentially heated and chilled water from a central plant to each development area
- Electrical HV reticulation fed from the DIS
- Gas services
- Telecommunications

Sewerage

The site is well located for access to existing and proposed TasWater sewerage infrastructure.

There is a large bore trunk sewer that traverses the site from Evans Street through to the Macquarie Point Sewage Treatment Plant (STP). This sewer is proposed to be relocated to the south and east of the site and deliver sewage to a new pumping station that will enable the decommissioning of the existing STP. The sewer main relation, pump station and rising main works are being co-ordinated by TasWater and do not form part of this report.

The Macquarie Point site naturally drains to the southeast, providing the opportunity to connect to the new trunk sewer, either at a point adjacent to the Western Integrated Mixed Use Zone (CIMU) or the southern side of the stadium adjacent to Evans Street. The invert level for connections will be controlled to RL2.5 by the Macquarie Point SPS overflow level (at RL 2.0). These connections should be allowed for in the design and construction of the new trunk sewer, scheduled for construction in 2025.

The Regatta Point site will require a private pumping station and rising main to connect to an existing gravity TasWater sewer main that terminates at the Hobart Rivulet.

Water

The site is well located for access to existing TasWater reticulated water infrastructure.

The Macquarie Point Precinct is surrounded by 200mm and 150mm diameter water mains that are fed from a 600mm diameter bulk transfer main in Davey Street. The supply is high pressure and the proximity of large bore pipelines results in high flow capacity.

Additional TasWater modelling is required to confirm that downstream system upgrades are not required based on the Stadium proposing a full tank fire solution for sprinklers and hydrants.

Three connection points to TasWater's Infrastructure are proposed to service the private domestic and fire service pipework within the Macquarie Point precinct which will be developed as a single site with strata or lease boundaries. Connections are proposed as follows:

- Connection 1 – Fed from the existing DN200 metered supply adjacent to the Royal Engineers Building at 2 Davey Street.
- Connection 2 –Fed from the existing DN200 main located towards the eastern end of Evans Street.
- Connection 3 – Fed off a DN150 water main adjacent to the existing STP and northern access road.

Stormwater

The site is reasonably well located for access to existing stormwater infrastructure.

A DN750 stormwater main has recently (2021) been installed to service the northern part of the Macquarie Point site and discharge to the Hobart rivulet outlet. Davey Street is well-serviced by existing DN300 pipes that have some additional capacity as well as DN300 pipes that services Evans Street. DN525 pipes are located at the eastern end of Evans Street and also through TasPorts land to the east. An existing DN300 services the Regatta Pavilions and runs through the proposed residential area.

Depending on the distribution of run-off from the stadium roof, the existing system has capacity for the 5% Annual Exceedance Probability (AEP) runoff from the precinct. Roof discharge from the stadium will need to be managed to discharge to the north and into the existing DN750 pipeline draining to the Hobart Rivulet, southeast and east to DN525 pipes under Evans Street and through the TasPorts land. The system can also provide additional storage for non-potable water reuse. Additional outfalls to the River Derwent can be avoided.

Electrical

The site is serviced by TasNetworks HV feeders on Evans Street and Tasman Highway. The projected maximum demand for the redeveloped site, i.e. for Stadium, CIMU Zone, Antarctic Facilities Zone and residential totals 10.7MVA. This load has been provided to TasNetworks to assess the impact on their network and to provide a proposal to supply the site, from spare capacity in existing feeders, and/or through upgrading of the network.

We are awaiting the outcome of these discussions between MPDC and TasNetworks to advise the preferred method of supply for this load, and the extent of network infrastructure upgrading required.

The intent is to consolidate the supply through the central DIS, and from there to distribute to substations located to meet the load centre requirements across the various precincts. It is recommended that the site has two diverse points of supply, to achieve a higher resilience of supply which is considered particularly important for the Stadium, as a major public facility.

This report provides a proposal for indicative location of new substations, connected via an HV ring main arrangement to service the various precincts, based on two substations for the Stadium, interlinked via an internal ring main, and single substations for each of the other precinct developments.

The primary supply point is taken from Tasman Highway, near the Royal Engineers Building, and a second point of supply could be taken from the Evans Street Substation, which will require relocation and upgrade to support construction of the Stadium.

Should the DIS not proceed, the option remains for a similar arrangement of substations to service the site, to be installed as an extension of the TasNetworks distribution network.

Gas

Gas is currently available in Evans Street, however, it is assumed for the purposes of this report, that gas would not be a preferred source of energy, for heating or for cooking. This supports the proposed 6-star Green Star energy rating that the site is seeking to attain.

Telecommunications

Telstra and NBN services are available to the site from Tasman Highway and from Evans Street. Initial discussions have been conducted with NBN regarding services to the site, however, in order to determine more detail of potential network upgrading needs, NBN require a higher level of customer information, with numbers of connections, types of services and likely volume of usage.

We envisage these discussions should occur at a later stage when more detail is available.

1. Introduction

Macquarie Point Development Corporation (MPDC) are currently developing a new Precinct Plan to support the development of the proposed Multipurpose Stadium (the Stadium), Integrated Mixed Use Zones, a Carpark and Public Open space at Macquarie Point and a Residential area at Regatta Point.

JMG have been engaged to assess the servicing requirements of the proposed development areas and how they will connect to and through the site. The assessment will be informed by the Master Plan and the Stadium Concept design plans. It is therefore a living document that will require revisions as the Master Plan and Stadium design is developed.

The services covered by this report include:

- Sewerage
- Potable water, including firefighting requirements
- Stormwater collection, reuse, treatment and discharge
- Electrical power services
- Consideration of District Infrastructure Scheme (DIS) to supply HV electrical and potentially heated and chilled water from a central plant to each development area
- Gas services
- Telecommunications

2. Basis of Design

The assessment of required infrastructure is based on the following development areas and usages (also refer Appendix A for a site plan and Appendix B for calculations).

Table 1 – Summary of Proposed Development Areas and Usages

ID	Description	Approximate site area (m^2)	Development area (GBFA* m^2)
AFZ	Antarctic Facilities Zone	2,875	11,500
CP	AFZ Carpark	7,700	23,100
CIMU	Complimentary Integrated Mixed-Use Zone (small-scale retail shop including bars, cafes and restaurants)	3,700	22,200
Res	Regatta Point (residential units and small commercial)	5,900	8,400
Stadium	Multipurpose Stadium	44,000	NA
POS	Public Open Space	15,000	15,000

**Gross Building Floor Area*

Future land titles are unknown at this stage. For the purposes of this report, it is expected that some of the usage areas will be split off as strata titles but there will be two main titles requiring separate services as follows:

1. Macquarie Point – Consisting of the POS, Stadium, CIMU Zone and Carpark.
2. Regatta Point – Residential and small commercial area.

The northern access road is an ideal corridor to accommodate services such as water, sewer, stormwater, power and communications.

The Macquarie Point precinct may be serviced by a District Infrastructure Scheme (DIS) that could provide High Voltage power and potentially heated and chilled water to the surrounding commercial developments and stadium.

Due to the size of the development areas and expected peak loads, it is likely that multiple service connections will be required. These are outlined further below.

3. Sewerage Services

3.1 Existing Infrastructure

The site is well located for access to existing sewerage infrastructure.

On the eastern boundary, lies the Macquarie Point Sewage Treatment Plant (STP) that services Hobart's CBD and generally all properties within the Hobart Rivulet catchment. The STP is earmarked for decommissioning and a pumping station is proposed to transfer sewage to an upgraded Selfs Point STP in New Town Bay.

Design of the new pump station and associated rising main and gravity feeds is currently underway by TasWater but not expected to be complete until late 2024. The key interfaces that will need to be managed during the design phase include:

- Relocation of the existing DN1050 trunk sewer main that currently transects the site from Evans Street through to the STP.
- Allowance for property connections for the proposed development into the new trunk gravity main.
- Alignment of the sewer rising main that will transfer sewage from the new pump station through to Selfs Point. This pipe will have to pass between the proposed Carpark area on Macquarie Point and the residential area at Regatta Point, likely along the proposed northern access road.

The trunk sewer main diversion is proposed to continue down Evans Street before turning north through TasPorts land and into the new pumping station. The main will be considerably deeper than the existing main (down to -1.7m AHD), potentially allowing for a deeper sewer connection. However, the design of the new pumping station has an overflow to environment level of 2.0m AHD, which means that sewage flows can back up to above this level. It is recommended that private gravity sewerage pipes are above 2.5m AHD to avoid potential back flow issues. Inspection openings should be above 2.8m AHD to allow a 300mm buffer prior to discharge to the environment. If servicing below this level is required, some form of back flow prevention should be considered (pumped system or reflux valve) and an associated maintenance plan developed to ensure correct functionality.

Existing sewerage infrastructure is shown in Figure 1 and proposed sewerage infrastructure detailed in Drawing C02 in Appendix A.

Figure 1 – Existing Macquarie Point Sewage Treatment Plant and incoming gravity sewer mains. (Source*: ListMap*)

3.2 Basis of Design

In order to estimate design sewer flows, it is necessary to estimate what each site will be used for and the expected extent of usage. For this assessment, the following has been assumed for each site.

3.2.1 Antarctic Facilities Zone

The allotment area for this site is approximately 4,000m^2. It is assumed that buildings with a footprint of approximately (2,875m^2) could be developed. Assuming four stories, this equates to approximately 11,500m^2 of usable floor area. It is expected that the floor area will be used for offices (60%), education (20%) and laboratories (20%).

TasWater provides a methodology to relate particular units (such as floor area, number of students/occupants/dwellings or hotel rooms) to equivalent tenements (ET's). Each ET can then be related to sewer flows based on a series of calculations and assumptions as follows:

- Average Dry Weather Flow (ADWF) assumed at 450L/ET/day.
- Peak Dry Weather Flow (PDWF) is based on a peaking factor related to the size of the development. The peaking factor is quite high for a small area such as the AFZ and is estimated at around eight times the average dry weather flow.
- During wet weather, it is assumed that some rainfall will end up in the sewer system, either through direct connection or infiltration from leaky drains. Given the small area, this component of the design sewer flow is estimated at only 0.6l/s (or 3% of the total).

To estimate the number of students serviced for the assumed floor area of the educational facility, a ratio of 1 student per 15m^2 has been assumed.

The resultant design sewer flow, inclusive of peaking factor and wet weather allowance is estimated at **11.1l/s**.

It should be noted that this estimate is quite sensitive to the assumed area of the laboratory, which currently contributes to approximately 75% of the design flow. This is likely an upper limit and therefore conservative.

3.2.2 Carpark

The proposed car park, with an area of approximately 23,100m^2 (GBFA) is likely to require public toilets to cater for patrons. The exact number of sanitary facilities will be determined during detailed design but in the context of the overall precinct will be minimal. For concept design purposes a design sewer flow of **3.60l/s** has been assumed.

3.2.3 Complimentary Integrated Mixed Use (CIMU) Zone

The assumed development area for this CIMU is approximately 3,700m^2. Assuming four storeys, this equates to approximately 22,200m^2 of usable floor area. It is expected that the majority of this floor area will be used for hotel rooms (80%), with the remaining 20% being dedicated to small-scale retail shops, beverage facilities including bars, cafes and restaurants.

The number of hotel rooms has been estimated at 178, assuming a room-to-floor area ratio of 100m^2 inclusive of common areas. The restaurants and cafes generate equivalent tenements of 0.008 ET per m^2 of Gross Building Floor Area (GBFA).

The resultant design sewer flow is estimated at **6.2l/s**.

3.2.4 Residential Area (Regatta Point)

Cox Architects have developed preliminary plans for a residential development adjacent to the Regatta Grounds (refer to Appendix C). The proposal consists of four buildings totalling approximately 400m^2 of commercial area and 8,400m^2 of residential area (94 apartments). For the purposes of estimating sewer flows, it has been assumed that half the units are two-bedroom and the other half three-bedroom. The commercial area has been considered to be a restaurant.

The resultant design sewer flow is estimated at **4.30l/s.**

3.2.5 Multipurpose Stadium

The Stadium development has been considered for a seating capacity of 24,500 (with an additional 500 staff) and maximum concert capacity of 30,000 (with an additional 1,000 staff).

Peak sewer flows align with game or event breaks when patrons use the amenities and supporting services are in full operation. Estimating peak flows is challenging and is generally based on the number of patrons. To establish a ratio of persons to peak sewer flows, the following methods have been investigated.

<u>First Principal Design</u>

Mott Macdonald Consulting Engineers undertook detailed design for the Canterbury 28,000 seat stadium in Christchurch, New Zealand. Peak flows were estimated based on the number of fixture units and the expected simultaneous flow from each unit. For a crowd of 28,000, a peak sanitary flow of 50l/s was estimated. This includes approximately 11.4l/s trade waste. The corresponding flow per person is 0.0018 l/s/person.

<u>National Construction Code (NCC) and Probable Simultaneous Demand (PSD) to AS3500</u>

The NCC (Table F4D4j) provides requirements for the number of closet pans (toilets), urinals and washbasins per spectator and participant at a sporting venue. AS3500 provides a comparison between the likely water demand and the number of residential units. Assuming that a typical

residential unit would have the equivalent of (say) one closet pan, one urinal and one washbasin, a comparison can be drawn to estimate the maximum probable simultaneous water demand and/or corresponding sewer flow (conservatively assuming a 1:1 ratio between water usage and sewer flows).

Given these assumptions, the equivalent number of units has been estimated at 500 for a 24,500 seat stadium. The corresponding peak sewer flows is estimated at 25.6l/s, which equates to a flow per person of approximately 0.00104 l/s/person.

Water Services Association of Australia (WSAA) Usage Classification

Appendix B of the Gravity Sewerage Code of Australia (WSA 02-2014-3.1) provides a figure of 0.01429 ET's per visitor for a usage category of *General public entertainment facilities*. The corresponding peak design sewer flow is 12.25l/s for a 24,500 seat stadium. This equates to approximately 0.0005l/s/person.

Adopted Design Flows

AECOM, the stadium designers have advised that the peak sewerage outflow demand should be considered to match the peak water demand, which is approximately **42** litres per second for a peak concert loading of 31,000 people inclusive of staff (0.00136 l/s/person). This falls within the range of the methods outlined above and has been adopted as the stadiums Peak Flow.

3.2.6 Public Open Space (POS)

The POS is approximately 15,000m^2 and is expected to accommodate an Aboriginal Culturally Informed Zone, plaza entry areas. It has been assumed that some public amenities may be required and hence sewer flows from this area have been conservatively estimated using the TasWater classification for public amenities (20 toilets), which results in a design sewer flow of **0.90l/s**.

3.2.7 Estimated Design Sewer Flow Summary

Estimated design sewer flows are summarised in Table 2.

Table 2 – Design Sewer Flow Summary

Site	Floor area/seats	Design Sewer Flow (l/s)
AFZ	11,500 m^2	11.1
AFZ Carpark	23,100 m^2	3.60
Complimentary Integrated Mixed-Use Zone	22,200 m^2	6.20
Residential	8,400 m^2	4.30
Multipurpose Stadium*	25,000 seats 31,000 Concert	33.0 42.0
Public Open Space	15,000 m^2	0.90

** For the purposes of design flow, likely staffing figures have been added to patron numbers (500 for game day, 1,000 for concert).*

Note that there will also be a small wastewater flow from the DIS that can be readily accommodated within the above allowances.

3.3 Proposed Sewer Infrastructure

The site is well located for access to existing gravity sewer connections. The site is to be developed as a Strata Title or leased development across a single title however due to is size it is proposed that several connections to the TasWater's network be provided. Limitations

Option 1 – Rationalised Connections

Assuming that the site is effectively strata titled and the number of sewer connections kept to a minimum, the following connections are proposed:

- If required a DN150 branch to service the POS on the western side of the stadium can be installed to service an amenities block. This could be via an extension of the branch that currently services the Royal Engineers Building and Matrix Management Group office building
- A single DN375 branch to the new DN1200 gravity sewer main to service the eastern side of the Stadium, AFZ, Carpark and CIMU zones. The best location for this connection is the relocated trunk sewer midway along the eastern boundary between the AFZ and mixed use zones. Private subbranches would service individual developments.
- A single DN300 / 375 branch to the relocated DN1200 sewer in Evans Street to service the southern side of the stadium.
- The residential area at Regatta Point will require a private pumping station to deliver flows to the existing DN150 sewer branch that crosses over the Hobart Rivulet.

Table 3 - Minimum Sewer Branch Sizes for Individual Connections

Site	Branch Size (mm)
AFZ and Carpark Zone	225
Complimentary Integrated Mixed-Use Zone	150
Residential	150
Multipurpose Stadium (25,000 seats, 31,000 Concert)^	375 *
Public Open Space	150
District Infrastructure Scheme	150

* *Sewer connections to the stadium may be split with corresponding smaller connections to the east and south.*

^ *For the purposes of design flow, likely staffing figures have been added to patron numbers (500 for game day, 1000 for concert).*

The trunk sewer main is currently in the final stages of design with construction scheduled for 2025. It is therefore recommended to adopt a servicing strategy and allow for future lot connections in the design of the trunk sewer. Construction of lot connections after commissioning of the trunk sewer would be significantly more challenging and therefore costly.

It is recommended that lot connections to the trunk sewer be installed 0.5m above the SPS overflow level of RL2.0, i.e. 2.5m. Any inspection openings will need to be above 2.8m AHD to allow for a surcharge in the system during emergency relief to the environment from the proposed pumping station.

TasWater has not advised of any capacity constraints in their sewer system to accommodate the expected flows.

The proposed concept of sewer servicing is shown in the drawings in Appendix A.

4. Water Services

4.1 Existing Infrastructure

The site is well located for access to existing water infrastructure. Water supply is from the Domain Reservoirs with the following properties:

- Floor level = 97.30m
- Top Water Level = 106m

A DN450/600 bulk water main transfers water from the reservoirs, down Brooker Avenue and Campbell Street to Davey Street, approximately 2.7km from the reservoirs. A DN250 water main then runs up Davey Street to an existing DN200 water meter adjacent the Royal Engineers Building that currently services a portion of the site. The Macquarie Point precinct is encircled by minimum DN150 water mains.

The following customer connection points currently service the site:

- L474425 – DN200 near the Royal Engineers Building off the DN250 DICL water main in Davey Street.
- L115729 (20mm) and L135202 (50mm) that currently service Matrix Management Group off the DN250 DICL water main in Davey Street.
- L450332 (25mm) and L443057 (50mm) that currently service 6 Evans Street off the DN200 DICL water main in Evans Street.
- L95559 (20mm), L450443 (65mm) and L26023 (32mm) that currently service the Goods Shed off the DN150 DICL water main in Evans Street.
- L491923 (unknown size) that currently services the Red Shed (Hobart Brewing Company) and L160426 (32mm) that currently services 16a Evans Street, both off the DN150 DICL water main in Evans Street.

Static head at Macquarie Point is around 1000kPa. Given the close proximity to the supply reservoirs and well-connected large bore pipelines, head loss between the reservoirs and the precinct is low. The site therefore has good access to high pressure and flow water supply.

Existing bulk water infrastructure is shown in Figure 2 and proposed water infrastructure detailed in Drawing C04 in Appendix A.

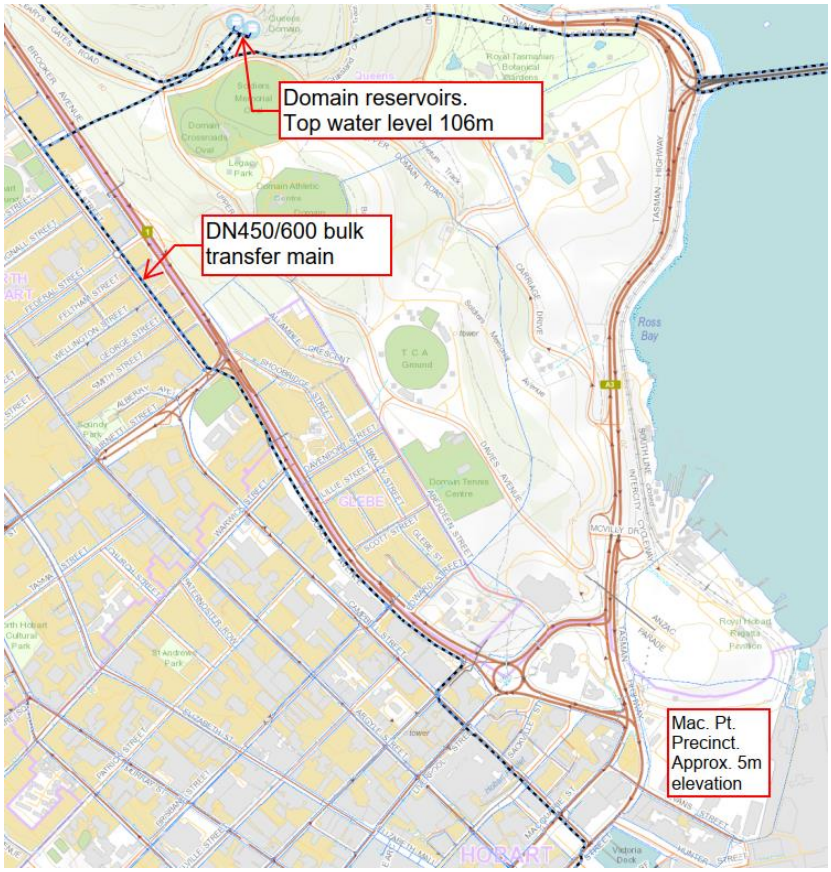


Figure 2 – Bulk water supply infrastructure to Macquarie Point

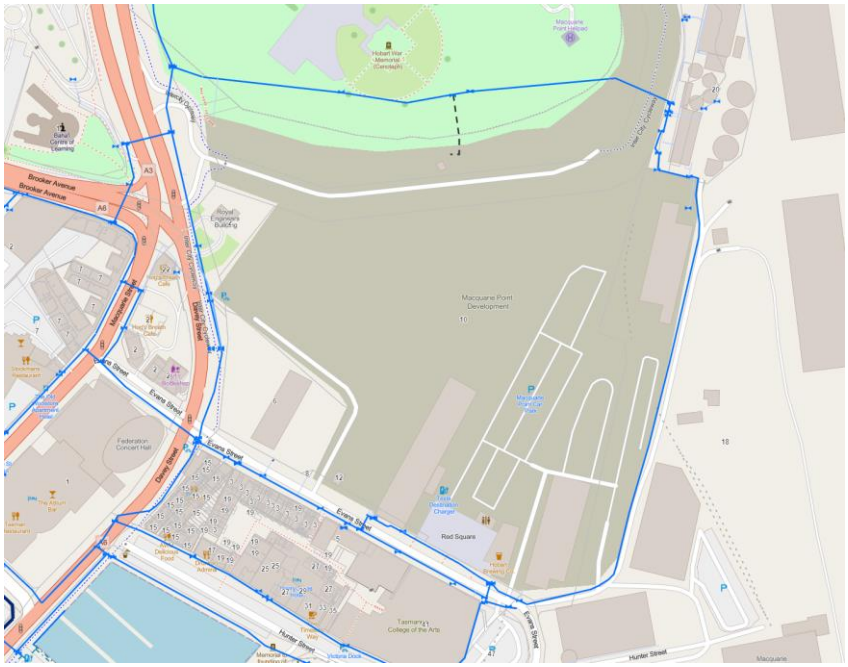


Figure 3 – Macquarie Point Water Supply Infrastructure

4.2 Basis of Design

Similar to sewer design flow calculations, water supply requirements have been estimated based on land use and AECOM's stadium design advice as described below for each development area.

4.2.1 Antarctic Facilities Zone

The allotment area for this site is approximately 4,000m^2. It is assumed that a building with a footprint of approximately (2,875m^2) could be developed. Assuming four stories, this equates to approximately 11,500m^2 of usable floor area. It is expected that the floor area will be used for offices (60%), education (20%) and laboratories (20%).

Using TasWater's conversion rates for the above usage classifications results in approximately 180 Equivalent Tenements (ET's). Applying an average day water demand of 685L/ET/day in accordance with TasWater standards, the resulting average day water demand is **1.43l/s**.

Peak day demand is generally regarded as 2.5 times average day demand and peak hour demand twice peak day demand, or five times greater than average day demand (per TasWater Standards). The resulting peak hour demand for water modelling purposes has therefore been estimated at 7.15l/s.

An alternative approach, considering probable simultaneous demand (PSD, per AS3500) has also been checked, which results in a peak hour water demand of 11.50l/s for the estimated 180 ET's. Flow estimation based on PSD is only recommended for 100 ET's or less and the calculation of ET's for the AFZ is considered conservative. In this case, WAS 03-MRWA V2.0 Water Supply has been adopted.

Therefore, **7.15l/s** has been adopted as a peak hour demand for modelling purposes, applied on a commercial demand pattern (throughout the day).

Fire flows for the AFZ are estimated at 32l/s to allow for two fire plugs at 10l/s each and 12l/s sprinkler flow.

4.2.2 Carpark

The proposed car park, with an area of approximately 23,100m^2 (GBFA), similar to the Sewer analysis, is likely to require public toilets to cater for patrons. The exact number of sanitary facilities will be determined during detailed design but in the context of the overall precinct, will be minimal. For concept design purposes a design flow of 3.60l/s has been assumed.

The basement carpark will also require sprinklers in accordance with AS2419. The required combined sprinkler and hydrant flow rate has been assumed to match the AFZ zone.

4.2.3 Complimentary Integrated Mixed Use Zone

A 178-room hotel and ground floor Restaurant/Café have been allowed for in the calculation of peak water demands for the CIMU zone.

Using TasWater's conversion rates, this equates to 84 ET's and a resulting peak hour water demand of **3.3l/s**. This demand is assumed to be applied on a residential pattern with morning and evening peaks.

Fire flows for the CIMU zone are estimated at 26l/s to allow for two fire plugs at 10l/s each and 6l/s sprinkler flow.

4.2.4 Residential Area (Regatta Point)

Approximately 94 housing units (half two-bedroom, half three-bedroom) and 400m^2 supporting commercial (restaurant) areas have been assumed in calculations of water demands for this precinct (based on a preliminary design by Cox Architects). The resultant peak hour water demand using TasWater conversion rates is estimated at 2.60l/s.

This has been cross-checked with probable simultaneous demand (per AS3500), which is recommended for 100 ET's or less. The resultant peak demand is estimated at **5.2l/s** (for the 57 ET's) and has been adopted for this precinct. This demand is assumed to be applied on a residential pattern with morning and evening peaks.

Fire flows for the Residential area are estimated at 26l/s to allow for two fire plugs at 10l/s each and 6l/s sprinkler flow.

4.2.5 Multipurpose Stadium

The Stadium's estimated water demand has been adopted based on the AECOM preliminary design advice that the stadium will have a peak water supply demand of **35l/s** for the 25,000 seating and staff capacity. For concert events with a total capacity 31,000 patrons and staff, this demand has been extrapolated to **42l/s**.

Their concept design for the fire water infrastructure of the stadium, is utilising a full-capacity tank solution. This design necessitates only the consideration of tank fill time. The current fill rates are 5 l/sec for the hydrant system and 1.2 l/sec for the sprinkler system, totalling 6.2 l/sec for the tank fill rates.

4.2.6 Precinct Fire Water Supply

Given that the current strategy is a precinct-wide fire water solution, it is recommended that the fire service design accommodate the highest fire water demand of 36.2 l/sec.

Tas Fire Service will be consulted regarding the proposed infrastructure to ensure that they support the precinct-wide fire water strategy.

4.2.7 Public Open Space

The 15,000m^2 public open space area is assumed to have a peak water demand of 0.3l/s, based on a potential public amenities block with approximately 20 toilets. There will be a small additional demand for irrigation, however, it is assumed that any landscaping would be drought-resilient and could be irrigated with reuse water.

4.2.8 Estimated Water Demands Summary

Design peak water demands are summarised in Table 4.

Table 4 - Peak water Demand and Fire Flow Summary

Site	Floor area/seats	Peak Water Demand (l/s)	Demand Pattern	Fire Flow (l/s)
Carpark and AFZ	34,600 m^2	7.20	Residential	32
Complimentary Integrated Mixed-Use Zone	22,200 m^2	3.30	Residential	26
Residential	8,400 m^2	2.20	Residential	26
Multipurpose Stadium*	25,000 seats 31,000 concert	35.0 42.0	1pm, 4pm and 7pm peaks	6.2
Public Open Space	15,000 m^2	0.30	Residential	NA

** For the purposes of design flow, likely staffing figures have been added to patron numbers (500 for game day, 1000 for concert).*

4.3 Proposed Water Infrastructure

It is proposed that the site will be developed as a strata-title and that the internal domestic and fire service mains will be owned and operated by the precinct operator. To assess capacity constraints, it is assumed that a minimum of three connections to the TasWater network will be required, as follows:

1. A DN200 connection at the current location on the Tasman Highway, adjacent to the Royal Engineers Building.
2. A DN150/200 connection off Evans Street adjacent to 12 Evans Street (the current TasNetworks substation).
3. A DN100/150 connection on the northern extent of the proposed Carpark, adjacent to the western boundary of the current Macquarie Point Sewage Treatment Plant.

These locations are shown in the drawings in Appendix A and in Figure 4 below.

Figure 4 – Modelled water connection locations

TasWater undertook network modelling in November 2023 for a 40,000 seat stadium option with a fire demand of 66l/s to understand capacity constraints within their network. The following scenarios were modelled:

Non-Fire, Peak Hour Demand

- Connection 1 – Half the Stadium demand.
- Connection 2 – Half the Stadium demand, CIMU zone, POS.
- Connection 3 – Regatta residential area and AFZ.

Fire Flows

Only one fire demand needs to be applied at a time. The Stadium fire flow was considerably larger than other fire flows and was thoroughly assessed. Three scenarios were considered:

1. Half fire flow from Connection 1 and the other half from Connection 2, with 2/3 peak hour background demand.
2. Full fire demand from Connection 1, with 2/3 peak hour background demand.
3. Full fire demand from Connection 2, with 2/3 peak hour background demand.

A fourth scenario was also considered, a 26l/s fire demand from Connection 3 (for the residential area), with 2/3 peak hour background demand.

Modelling Results

TasWater's 2023 modelling for the 40,000-capacity stadium showed that there was adequate pressure and flow available in the network to cater for the proposed demands for both fire and non-fire scenarios. However, several pipes in the vicinity of the proposed development experienced excessive pressure loss above the maximum allowable 5m/km. Refer Appendix D for TasWater's advice.

AECOM have advised that their preliminary fire infrastructure design for the 31,000 maximum occupancy stadium is proposing a full-capacity tank solution with substantially reduced fire tank's water filling demands of 6.20l/s. TasWater were therefore requested to review their modelling based on this reduced demand. The results showed that there are still some excessive pressure losses potentially requiring some infrastructure upgrades. Refer Appendix D for the full response.

5. Stormwater

5.1 Existing Infrastructure

The site is quite close to the Derwent Estuary and is adequately serviced by existing stormwater infrastructure. For the purposes of this report, the existing stormwater infrastructure that can be utilised to service the development has been identified as Catchments 1 to 6.

Catchment 1 – Existing DN750 Northern Connection to Hobart Rivulet

A DN750 concrete stormwater pipe was installed as part of the MPDC subdivision along the northern escarpment. This was constructed to take runoff from the new northern subdivision road to the Hobart Rivulet adjacent to its outlet to the Derwent Estuary. The pipe is flat at only 0.5% and is fitted with a Rocla Gross Pollutant Trap (GPT). Its HGL capacity is estimated at approximately 1100l/s.

Catchment 2 – Existing DN300 Under Davey Street

There is an existing DN300 Council-owned concrete stormwater drain under Davey Street adjacent to 2 Davey Street. This line drains west along Davey Street, increasing in size to DN600 before discharging into Victoria Dock. The critical section is a DN375 pipe just upstream of Evans Street. Its capacity is estimated at 250l/s. An extension of this DN300 main from the stormwater grated pit on the southern side of Davey Street can provide a connection to the POS on this side of the building.

Catchment 3 -Existing DN300 Northwestern End of Evans Street

The southwestern corner of the site is serviced by an existing DN300 Council-owned stormwater main within Evans Street. This flows into a DN600 concrete pipe that passes under Sullivans Cove Apartments at 3 Evans Street, 19 Hunter Street and discharges into Victoria Dock. The Council advises that this pipe has a low grade, is subject to tidal inundation and has issues with sediment build up. Its maximum capacity is estimated at 450l/s. Additionally, the DN300 pipe has less than 500mm cover and is laid with its invert close to the obvert of TasWater's DN1200 trunk sewer main running down Evans Street. While further investigation is required the grade of the existing DN300 pipe is assumed to be in the vicinity of 1% giving a maximum capacity of 70l/s.

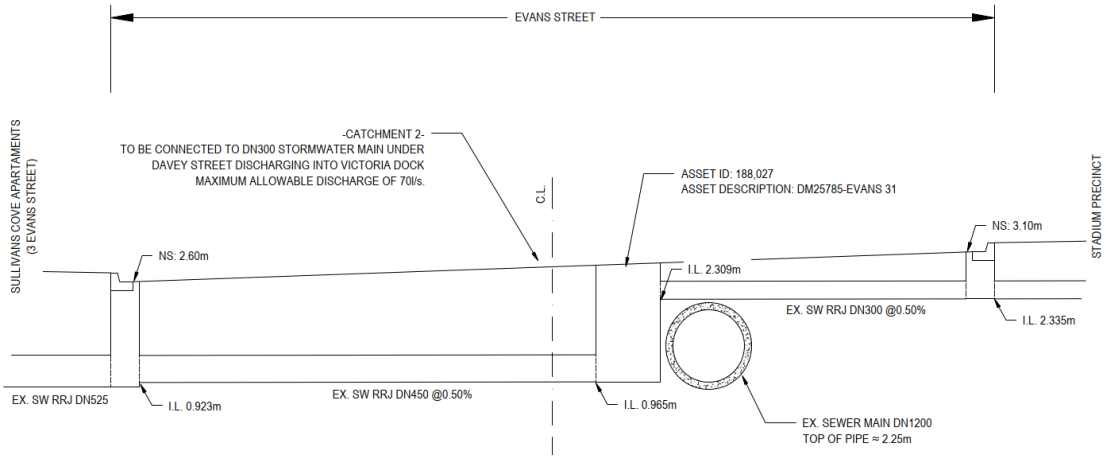


Figure 5 – Catchment 3 Evans Street Stormwater

Catchment 4A & 4B -Existing DN300 Southwestern End of Evans Street and Existing DN525 to TasPort

The southeastern corner of the site is serviced by a DN300 Council-owned stormwater main, catchment 4A, within Evans Street adjacent to No. 41. Council records indicate that this main passes under Evans Street before running northwest along the southern side of the road, connecting with the DN600 pipe servicing Catchment 3.

There is also stormwater infrastructure at the eastern end of Evans Street, catchment 4B, which from preliminary investigation is believed to be a DN525 pipe, this drains south to Sullivans Cove in the vicinity of Mac 2. Subject to confirmation of the pipes invert level and condition it is proposed to utilise capacity within this system to take flows from the stadium roof. Subject to this investigation and final roof discharge design the capacity of this system could be increased by replacement of the existing pipework. This strategy would potentially reduce the need for roof stormwater storage, split the roof catchment to the north and south and improve overall runoff management.

Catchment 5 -Existing DN525 Through TasPorts

The centre of the Macquarie Point precinct is serviced by a series of pits and pipes that transfer runoff via a DN525 concrete pipeline, through TasPorts land to the east and into the Derwent Estuary. The extent of this pipeline has not been fully determined and it does not form part of the City of Hobart's stormwater network. Therefore, limited information is available on its condition and depth. It is recommended that the pipeline's condition should be inspected by CCTV investigation and depths should be confirmed through an additional survey.

Catchment 6 – Existing DN300 Domain Regatta Pavilion

There is an existing DN300 concrete stormwater line that takes runoff from the existing Regatta pavilion and roadway to the Derwent Estuary. It is possible that this pipe will have to be relocated to allow for the construction of the proposed housing development, but the outfall could potentially be reused. There is currently no stormwater treatment control on this outfall. Its capacity is estimated at 380l/s.

5.2 Basis of Design

The existing infrastructure to the south of the site is significantly more constrained than the relatively new infrastructure to the north. It is therefore proposed to direct as much of the runoff

as possible to the north. Additionally, Catchment 4B and 5, which may have potential extra capacity, will be further investigated and confirmed as the other preferred options for discharge.

Council also advise that the development is within the jurisdiction of the Sullivans Cove Planning Scheme, which requires strict compliance with runoff quality and quantity requirements. These include Water Sensitive Urban Design (WSUD) principles, stormwater harvesting/reuse and adequacy of existing systems for stormwater conveyance. Therefore, stormwater treatment to best practice and capture of roof runoff for non-potable reuse is assumed to be required.

Pit and pipe design shall be sized for a 5% Annual Exceedance Probability (AEP) rainfall event and overland flow paths shall cater for a 1% AEP rainfall event.

5.2.1 Runoff Estimation

To estimate capacity constraints in the receiving system, runoff from each catchment has been calculated for a 5% AEP rainfall event with the following results.

Table 5 – Stormwater Catchment Characteristics and Runoff.

Catchment	Pipe Capacity (l/s)	Catchment Area (m^2) - *External to Stadium*	Runoff Coefficient	5% AEP Rainfall Peak Runoff *External to Stadium* (l/s)	Capacity available for Stadium roof (l/s)	Invert Level at the Connection Point
Catchment 1 Hobart Rivulet DN750 Northern pipe to Rivulet	1,130	2,900 40,000 4,000	0.9 0.5 0.9	630	500	2.90m
Catchment 2 Davey Street DN300 under Davey Street	130	6,900	0.6	115	15	To Be Confirmed
Catchment 3 Evans St Southwest DN300 under Evans Street to Victoria Dock	80	2,450	0.9	50	30	2.33m
Catchment 4A Evans St Southeast DN300 under Evans St	65	5,350	0.9	65	0	2.35m
Catchment 4B Evans St DN525	430	2,640	0.9	180	250	To Be Confirmed
Catchment 5 – DN525 TasPorts	500	9,450	0.9	200	300	To Be Confirmed
Catchment 6 DN300 at Regatta Grounds	380	10,000	0.7	165	N/A	To Be Confirmed
TOTAL	2,715	83,690	-	1,405	1,095	

5.3 Precinct Stormwater Infrastructure

5.3.1 Quantity Control

Table 5 shows that there is sufficient capacity within the existing stormwater network to take runoff from the precinct with approximately 1,095 l/s available for the Stadium roof.

Preliminary calculations from the Stadium Designers estimate that the 5% AEP stadium roof discharge will be 855 l/s increasing to 1,360 l/s for the 1% AEP event. If discharge from the Stadium roof can be split between catchments 1, 4B & 5 (with an available capacity of 1,050 l/s) detention for the roof run-off may not be required.

The Sullivans Cove Planning Scheme requires comprehensive consideration of stormwater harvesting and reuse. Given the numerous existing outfalls to the Derwent Estuary, new outfalls should be able to be avoided and it is proposed to utilise the existing outfalls.

5.3.2 Quality Control

Please refer to BMT Stormwater Report – No.003353**

**BMT has developed a comprehensive stormwater report – (Macquarie Point Development Corporation, identified as Project No. 003353). This report includes a dedicated section focused entirely on Quality Parameters & Control, presenting all aspects of water quality management. The BMT Stormwater Report addresses the range of approaches to achieve the required environmental targets.

6. Electrical Supply

6.1 Predicted Loads

To formulate a strategy for the provision of electricity supply to the Macquarie Point precinct we have considered the following aspects.

1. Predicted load analysis.
2. Existing TasNetworks supply feeder network.
3. Options for upgraded supply.

It should also be noted that in terms of the reticulation of supply around the site, the intent is to implement a centralised District Infrastructure Scheme (DIS) – which will provide for a primary point of connection for power to the site, and similarly for centralised heating/cooling water, for distribution as a private network around the site.

However, as a comparison, a traditional configuration with a connection to the TasNetworks distribution network at multiple points, and site reticulation to the substation as part of the public network will also be assessed.

MPDC has undertaken preliminary discussions with TasNetworks and the preferred DIS provider regarding the provision of supply. The following load data and commentary has formed part of those discussions.

Initial electrical loads were determined from several sources of data, i.e.

- Data from other comparable stadia in Australian and New Zealand, as provided by Mott MacDonald Consulting Engineers.
- Typical VA/seat rate applied to the Stadium, as a further comparison.
- Floodlighting load as required to achieve guidelines for high-definition CCTV broadcast for AFL football.
- Typical area-based rates or W/m^2, or KVA/residential unit, applied to the Complimentary Integrated Mixed-Use Zone, and Residential precincts.

Due to the lack of any detailed design knowledge of the various facilities proposed for the precinct, professional judgement and experience was applied to determine the final stated figures. It was also important to make allowance for the energy source to be electric only, and no use of gas, e.g. for heating, hot water, cooking, or otherwise. This factor impacts on the Stadium load where traditionally the use of gas for cooking for catering outlets and the main kitchen(s) has been significant compared to the electrical load, and similarly for changerooms hot water.

As a result, electrical loads could increase significantly with the addition of large conference/function areas and increased kitchen facilities.

Subsequent maximum demand data for the Stadium has been provided by AECOM, as the lead engineers for the Stadium design, which is used in the Table 6 below.

Table 6 – Electrical Loads

Facility	Floor Area / Units	Load	Comments
Multipurpose Stadium*	25,000 seats 31,000 Concert	4.6 MVA	All electric cooking
Antarctic Facility Zone	11,500 m^2	1.2 MVA	
Complementary Integrated Mixed Use Zone	22,200 m^2	2.2 MVA	
Residential	100 units	0.6 MVA	
Subtotal		8.6 MVA	
Contingency		2.1 MVA	Allow +25%
Total Load		**10.7 MVA**	

** For the purposes of design loads, likely staffing figures have been added to patron numbers (500 for game day, 1000 for concert).*

We expect the above load estimates to be conservative and do not take into account diversity across the day/night for the various facilities, and the contrasting functions and usage. In that sense the contingency factor may be excessive. At this stage, we would advise that the total predicted load of 10.7 MVA be considered as a sensitivity analysis in terms of the impact on the TasNetworks network capacity in the area. The resulting concept design solution options should then be reviewed as the designs for the various facilities progress and the loads are refined.

6.2 Existing TasNetworks Supply

At present the site is serviced by two 11kV feeders:

- Feeder 14061 – From East Hobart Zone Substation (tbc) via the Domain Shipyards / Regatta Grounds foreshore to the TasWater sewerage treatment plant (STP).
- Feeder 14062 – From East Hobart Zone Substation to Evans Street substation.

Note that the Evans Street substation operates on a HV switching station for the TasPorts HV network. Also note that Feeder 14061 connects to a private HV network of TasWater, to service the STP and sewerage pump station.

Any re-work of the TasNetworks network for the Macquarie Point and Regatta Ground precincts should take into account current and future loads and connection points for TasPorts facilities, and the STP which will be replaced by a new larger pump station when the STP operations are relocated to Selfs Point.

We also understand that TasPorts are proposing a significant increase in power supply needs to service ship-to-shore power to visiting ships, to take the place of on-board diesel generator power.

We understand that with recent developments in the area of East Hobart Zone Substation the available spare capacity is limited, and so there may be a need to access supply from North Hobart Zone Substation to free up capacity at East Hobart.

The 11kV network in the Hobart CBD is also a limitation in servicing the proposed development loads, as 11kV feeder capacity is limited to between 5.6 MVA and 6.5 MVA depending on the condition of the infrastructure.

6.3 Supply Upgrade Options

TasNetworks prepared a Connection Capability Report in December 2019, which responded to an earlier development scenario proposed for Macquarie Point for a range of facilities but did not include a stadium. That proposal was based on a 3-stage development for a total load of 7.5 MVA.

The Report put forward two options for providing an upgraded supply to the precinct:

1. The reinforcement of existing 11 kV feeders top provide a shared N-1 arrangement from three distribution feeders.
2. A dedicated N-1 supply arrangement from two new distribution feeders from East Hobart Zone substation.

This Report will be updated to reflect the current DIS, Stadium and other proposed uses for the Precinct.

For a Stadium it is important that the supply solution provides a higher level of resilience, as appropriate to a large capacity public facility, operating as a national sporting venue, with nationally broadcast television coverage, i.e. an N+1 redundancy arrangement.

it is expected that there be an immediate power backup arrangement, with capacity to maintain power to much of the facility, including a high level of emergency lighting, ground lighting, broadcast, IT, communications, security and other power.

Provision of backup power to this extent could either be provided by multiple diesel generators, or alternatively better achieved by having a hot standby feeder to the site. We understand that the preference is to avoid the need for generator backup, and to rely on alternative TasNetworks feeder backup.

The proposed supply arrangement for the precinct is to provide TasNetworks supply to the DIS from which HV reticulation will feed each of the precinct zones via localised substations sized to meet the demand. However, the options also consider the impact of reverting to a conventional network forming part of the TasNetworks distribution. As part of this assessment, the means of electricity metering needs to be considered, whether at high voltage, or at low voltage, or as a combination of the two options, dependent upon the final arrangement and management of the facilities.

Title arrangements will also impact the solution, whether the precinct is under a single title, strata titles, and separate titles.

From discussions with TasNetworks to date, the current supply solution is formulated as:

- Primary supply taken from East Hobart Zone Substation via Feeder 14062 to a new Davey Street Switching Station as the northern point of supply connection to the DIS.
- The relocation and upgrading of Evans Street Substation, fed from Feeder 14062, and an alternative Feeder 14060, as the southern point of supply to the Stadium and the Precinct. This connection provides an alternative connection via an internal ring to the south and north Stadium substations to the DIS, allowing diversity of supply, within the Stadium.
- A separate HV ring main will feed from Evans Street Substation to substations for the Complementary Integrated Mixed Use and Antarctic Facility zones, through to the DIS.
- The Residential zone be either fed from the DIS, or if considered separate from the Precinct, could be fed directly off a nearby TasNetworks feeder on the Regatta Grounds.

- The Davey Street Switching Station will also feed a new TasWater Substation via a new HV cable, and connect to the TasPorts Private HV Network. The upgraded Evans Street Substation will provide a second point of supply to the TasPorts Private HV Network.

The appended JMG Drawing No. C06 indicates locations of existing substations and HV reticulation, indicative locations for new substations, proposed new TasNetworks connections and HV reticulation to the new substations.

Ongoing discussions with TasNetworks and the DIS provider will allow clarification of these supply proposals.

7. Gas

We understand that it is not proposed to use gas as an energy source for the site, due to environmental considerations including the goal to maximise Green Star Communities points. We note that recent stadia developments from where we have gained energy data, have been established as all electric based facilities, including as the energy source for cooking in catering areas.

Accordingly, we have not considered the options for gas supply to the site further.

We do note that there is a 90mm diameter TasGas service available along Evans Street should gas supply be required.

8. Telecommunications

The site is currently served by Telstra underground conduit services, primarily along Evans Street and Tasman Highway.

NBN have previously planned for new services to the Macquarie Point precinct, based on the needs of the previous Escarpment residential development proposal, which indicated new services to run along the existing Escarpment roadway. As this development proposal did not proceed the NBN work was also not progressed.

The process for providing NBN services relies on applications to be made for specific services, to which NBN respond with a proposal to either provide services from the existing NBN backbone, or by installing further network services to meet the customers' requirements. Once more detail regarding numbers of connections, and types and volumes of services is available, the network capacity is reviewed from a network planning viewpoint. A design proposal will then be provided, which will include network upgrading costing if applicable.

Pathways for services within the site are the responsibility of the Stadium development, to provide a conduit and pit system sufficient to accommodate the required cabling, the cabling to be installed by NBN. The design of the conduit and pit system is required to follow NBN design guidelines, and the associated portal based documentation and application process.

Existing Telstra services within the site will become redundant and will be required to be removed. This work should be undertaken in conjunction with Telstra.

NBN have advised the services for the Stadium, Complimentary Integrated Mixed Use Zone, and Antarctic Facilities Zone are best provided off Evans Street only. The residential precinct will be served off Tasman Highway, via existing underground duct. In each case lead-in conduit should be provided by the developer.

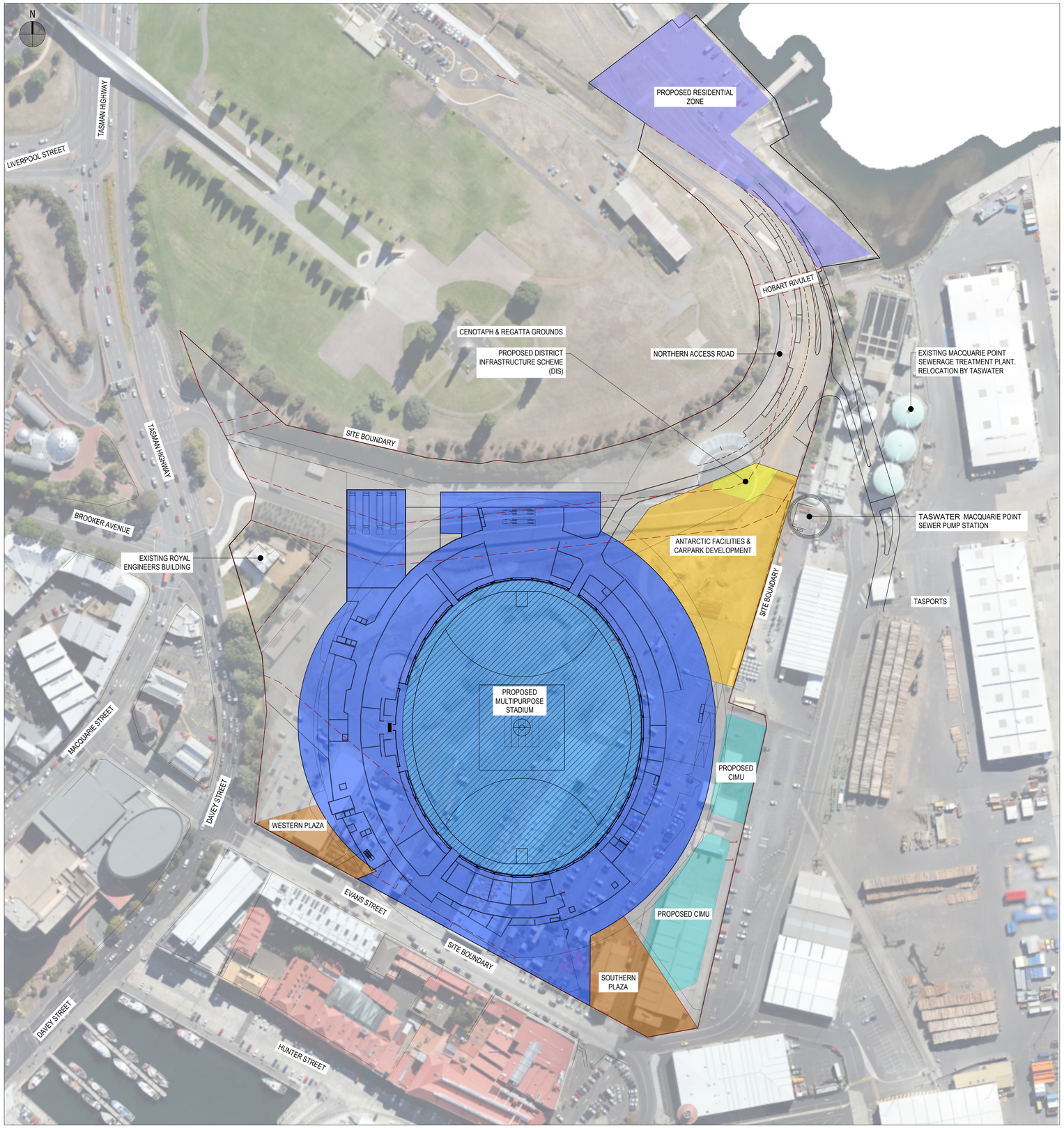
Typically NBN only provide a single fibre service, and achieve diversity only through their network, rather than provide a second diverse path service. However, once a retail service provider is engaged, they may design a system with additional diversity or redundancy, which could involve other technologies (example, other fibre, 5G or satellite).

APPENDIX A

Drawings

SITE LEGEND

- ROOFED STADIUM PITCH (19,500m²)
- ROOFED STADIUM BUILDING FOOTPRINT (32,800m²)
- WESTERN PLAZA
  SOUTHERN PLAZA
- ANTARCTIC FACILITIES ZONE AND CARPARK (6,800m²)
- COMPLIMENTARY MIXED USE ZONE (4,000m²)
- RESIDENTIAL ZONE (2,500m²)
- PUBLIC OPEN SPACE (17,000m²)



REV	DATE	REMARK
DA1	24.07.2024	REVISED SUBMISSION
DA	08.07.2024	ISSUE FOR PoSS SUBMISSION
P2	02.07.2024	DRAFT PoSS SUBMISSION
P1	13.12.2023	PRELIMINARY ISSUE

SAFETY IN DESIGN REPORT PER WHS REGULATIONS

The following risks which are unique to this design have been identified:	NIL
This report does not relieve contractors from their responsibilities under the Act to identify, report, mitigate and manage all aspects of risk and safety.	

Accepted (Discipline Head)	CJM	Date
Accepted (Team Leader)	JMB	Date
Approved (Principal)	CCH	Date

This document must be signed "Approved" by JMG to authorise it for use. JMG accept no liability whatsoever for unauthorised or unlicensed use.

SCALES @ A1	DESIGNED BY	DRAWN BY
	CCH	CEF
1:1500	PLOT DATE	24/07/2024

DO NOT SCALE. Use only figured dimensions. Locations of structure, fittings, services etc on this drawing are indicative only. CONTRACTOR to check Architects & other project drawings for coordination between structure, fabric, fixtures, fittings, services etc.CONTRACTOR to site check all dimensions and exact locations of all items. JMG accepts no responsibility for dimensional information scaled or digitally derived from this document.

JOHNSTONE McGEE & GANDY PTY LTD
117 Harrington Street, Hobart TAS (03) 6231 2555
49-51 Elizabeth Street, Launceston TAS (03) 6334 5548
www.jmg.net.au infohbt@jmg.net.au infoltn@jmg.net.au

PROJECT
MACQUARIE POINT SITE INFRASTRUCTURE STRATEGY

TITLE
PROPOSED MACQUARIE POINT PRECINCT SITE DEVELOPMENT ZONES

PROJECT NO. J230498CS
DWG NO. C01
REVISION DA1
PLOT DETAILS J230498CS - SERVICES.DWG

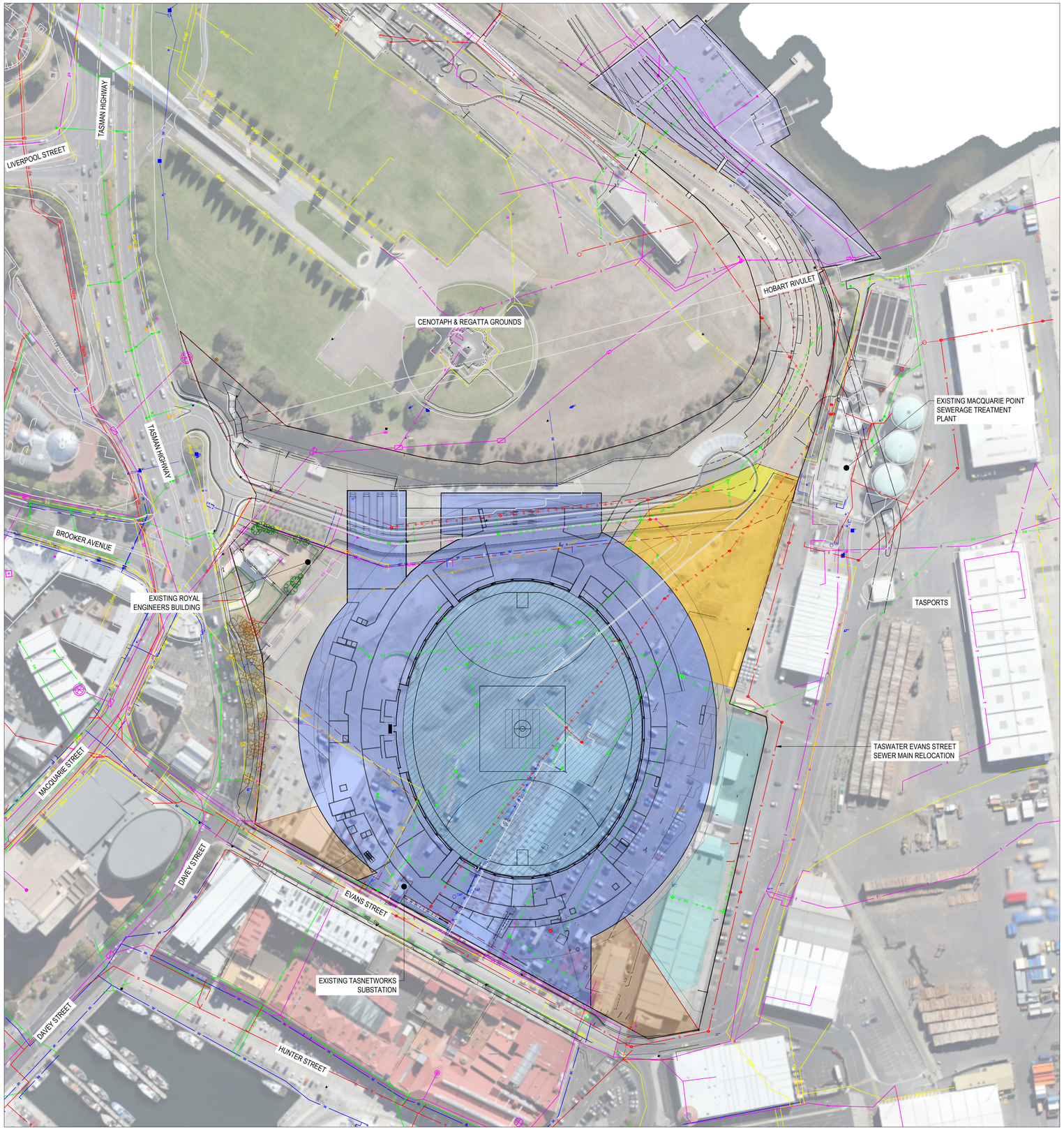
N

EXISTING SERVICES LEGEND

- EX. SEWER
- EX. SEWER RISING MAIN
- EX. SEWER I.O
- EX. SEWER MAN HOLE
- EX. STORMWATER MAIN
- EX. STORMWATER GRATED_PIT
- EX. STORMWATER MANHOLE
- DRAINAGE_SW_PIPE_AG
- DRAINAGE_SW_PIPE_UG
- E. WATER MAIN
- EX. STOP VALVE
- EX. FIRE HYDRANT
- EX. WATER HYDRANT
- EX. TAP
- EX. WATER METER
- EX. OPTIC FIBRE
- EXISTING COMMS DOUBLE PIT
- EX. COMMS PIT
- EX. TELSTRA
- EX. COMMS
- EX. COMMS JUNCTION
- EX. PARKING METER
- EX. UNDERGROUND ELECTRICAL
- EX. ELEC HV
- EX. ELEC LV
- EX. LIGHT POLE
- EX. OVERHEAD POWER
- EX. POWER POLE
- EX. GAS VALVE
- EX. GAS
- EX. FUEL
- EASEMENT
- EX. FENCE
- EXISTING ELECTRICAL SUBSTATION

REDUNDANT SERVICES LEGEND

- REDUNDANT SEWER
- REDUNDANT STORMWATER
- REDUNDANT WATER



REV	DATE	REMARK
DA1	24.07.2024	REVISED SUBMISSION
DA	08.07.2024	ISSUE FOR PoSS SUBMISSION
P2	02.07.2024	DRAFT PoSS SUBMISSION
P1	13.12.2023	PRELIMINARY ISSUE

SAFETY IN DESIGN REPORT PER WHS REGULATIONS

The following risks which are unique to this design have been identified:	NIL

This report does not relieve contractors from their responsibilities under the Act to identify, report, mitigate and manage all aspects of risk and safety.

Accepted (Discipline Head)	CJM	Date
Accepted (Team Leader)	JMB	Date
Approved (Principal)	CCH	Date

This document must be signed "Approved" by JMG to authorise it for use. JMG accept no liability whatsoever for unauthorised or unlicensed use.

SCALES @ A1	DESIGNED BY	DRAWN BY
	CCH	CEF
1:1500	PLOT DATE	24/07/2024

DO NOT SCALE. Use only figured dimensions. Locations of structure, fittings, services etc on this drawing are indicative only. CONTRACTOR to check Architects & other project drawings for coordination between structure, fabric, fixtures, fittings, services etc. CONTRACTOR to site check all dimensions and exact locations of all items. JMG accepts no responsibility for dimensional information scaled or digitally derived from this document.

JOHNSTONE McGEE & GANDY PTY LTD
117 Harrington Street, Hobart TAS (03) 6231 2555
49-51 Elizabeth Street, Launceston TAS (03) 6334 5548
www.jmg.net.au infohbt@jmg.net.au infoltn@jmg.net.au

PROJECT
MACQUARIE POINT SITE
INFRASTRUCTURE STRATEGY

TITLE
EXISTING SERVICES
SITE PLAN

PROJECT NO. J230498CS
DWG NO. C02
REVISION DA1
PLOT DETAILS J230498CS - SERVICES.DWG

N

EXISTING SERVICES LEGEND

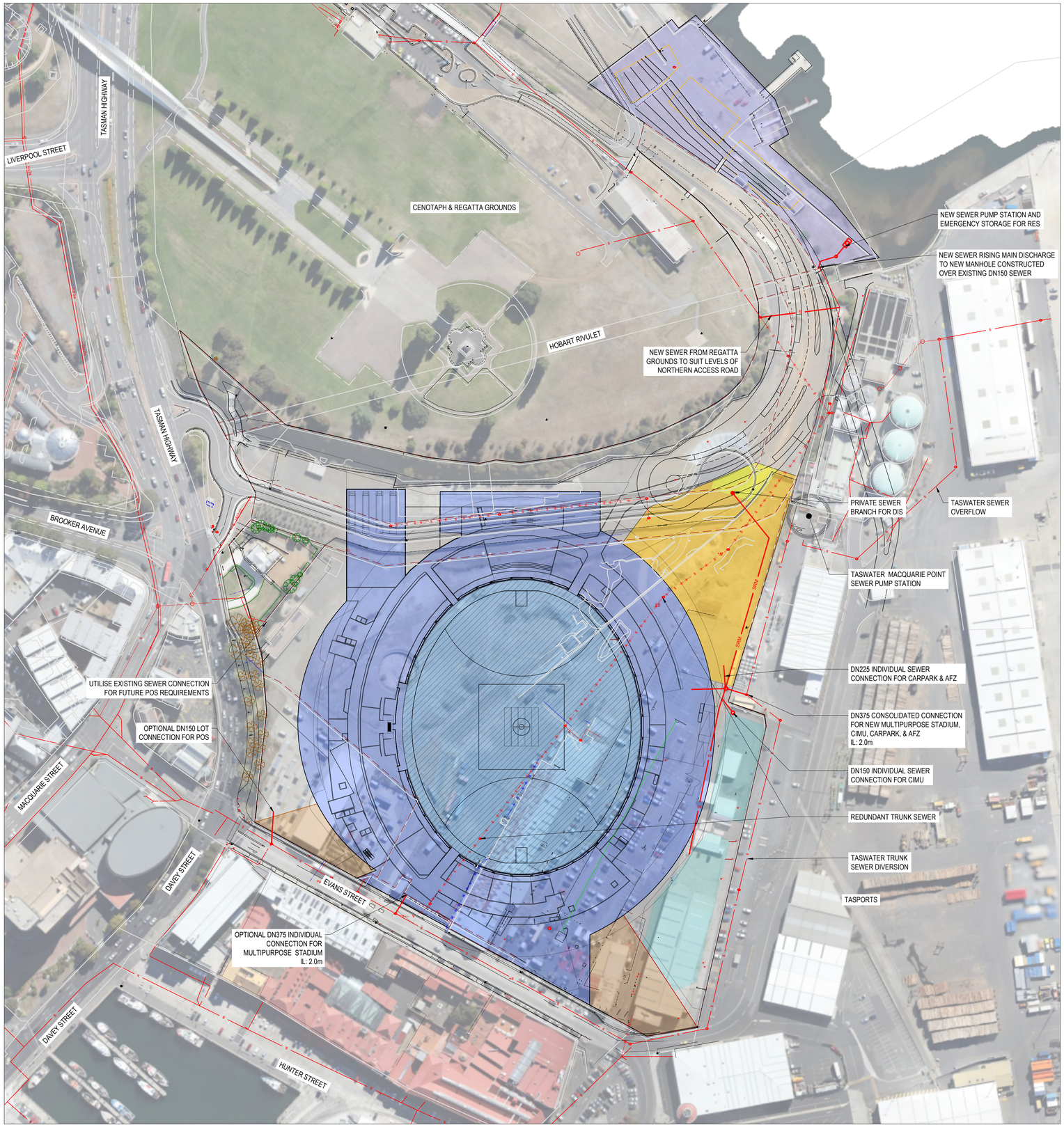
- EX. SEWER
- EX. SEWER RISING MAIN
- EX. SEWER I.O
- EX. SEWER MAN HOLE

NEW SERVICES LEGEND

- NEW SEWER
- NEW SEWER MANHOLE
- NEW SEWER PROPERTY CONNECTION

REDUNDANT SERVICES LEGEND

- REDUNDANT SEWER



REV	DATE	REMARK
DA	24.07.2024	REVISED SUBMISSION
DA	08.07.2024	ISSUE FOR PoSS SUBMISSION
P2	02.07.2024	DRAFT PoSS SUBMISSION
P1	13.12.2023	PRELIMINARY ISSUE

SAFETY IN DESIGN REPORT PER WHS REGULATIONS

The following risks which are unique to this design have been identified.	NIL
This report does not relieve contractors from their responsibilities under the Act to identify, report, mitigate and manage all aspects of risk and safety.	

Accepted (Discipline Head)	CJM	Date
Accepted (Team Leader)	JMB	Date
Approved (Principal)	CCH	Date

This document must be signed "Approved" by JMG to authorise it for use. JMG accept no liability whatsoever for unauthorised or unlicensed use.

SCALES @ A1	DESIGNED BY	DRAWN BY
	CCH	CEF
1:1500	PLOT DATE	24/07/2024

DO NOT SCALE. Use only figured dimensions. Locations of structure, fittings, services etc on this drawing are indicative only. CONTRACTOR to check Architects & other project drawings for coordination between structure, fabric, fixtures, fittings, services etc.,CONTRACTOR to site check all dimensions and exact. locations of all items. JMG accepts no responsibility for dimensional information scaled or digitally derived from this document.

JOHNSTONE McGEE & GANDY PTY LTD
117 Harrington Street, Hobart TAS (03) 6231 2555
49-51 Elizabeth Street, Launceston TAS (03) 6334 5548
www.jmg.net.au infohbt@jmg.net.au infoltn@jmg.net.au

PROJECT
MACQUARIE POINT SITE INFRASTRUCTURE STRATEGY

TITLE
EXISTING & PROPOSED SEWER

PROJECT NO.	230498CS
DWG NO.	C03
REVISION	DA1
PLOT DETAILS	J230498CS - SERVICES.DWG

N

EXISTING SERVICES LEGEND

- EX. STORMWATER MAIN
- EX. STORMWATER GRATED_PIT
- EX. STORMWATER MANHOLE
- DRAINAGE_SW_PIPE_AG
- DRAINAGE_SW_PIPE_UG
- EASEMENT

NEW SERVICES LEGEND

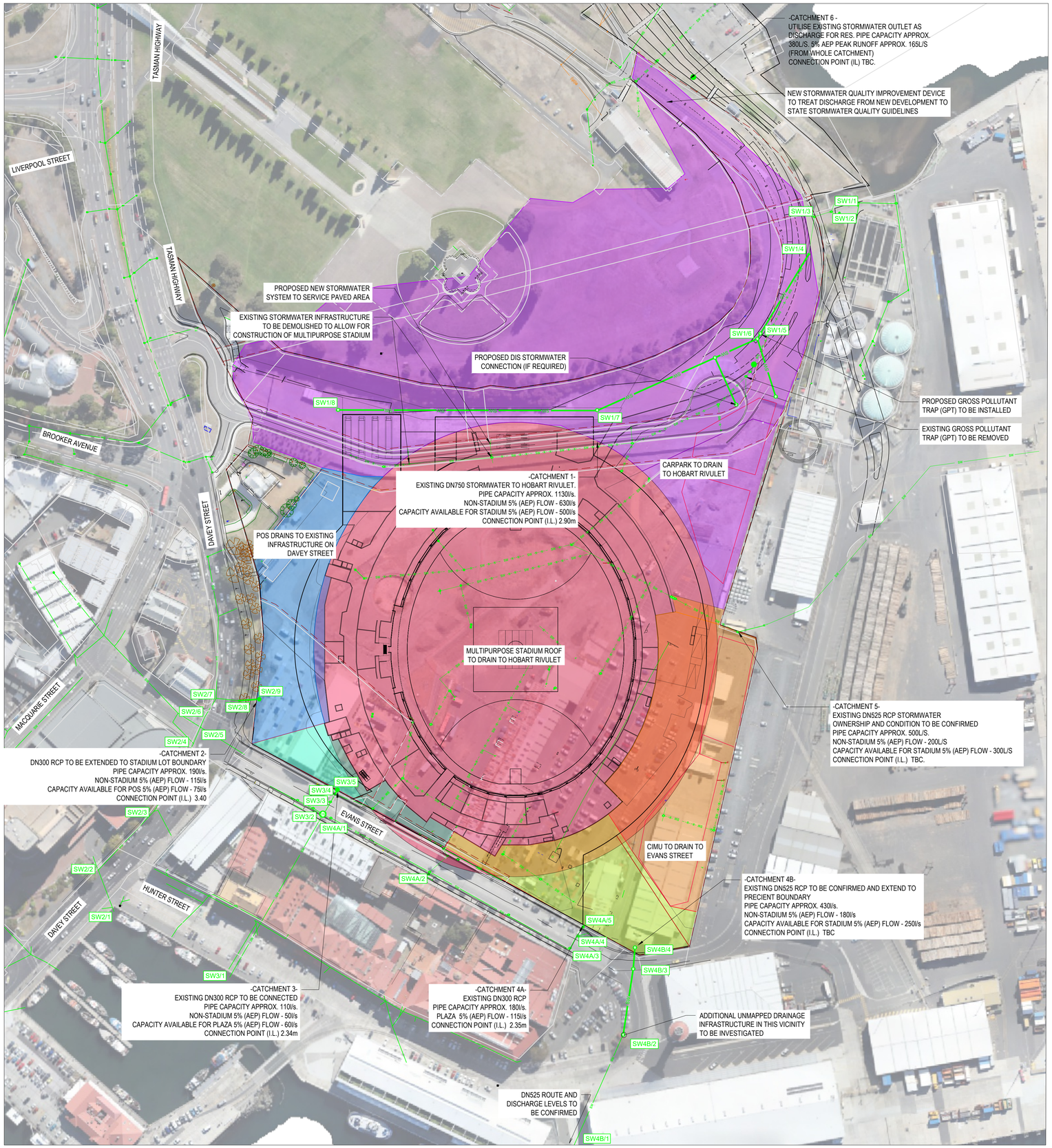
- NEW STORMWATER
- NEW STORMWATER MANHOLE
- NEW STORMWATER PROPERTY CONNECTION

REDUNDANT SERVICES LEGEND

- REDUNDANT STORMWATER

CATCHMENT LEGEND

- CATCHMENT 1
- CATCHMENT 2
- CATCHMENT 3
- CATCHMENT 4
- CATCHMENT 5
- CATCHMENT 6
- STADIUM



DA1 24.07.2024 REVISED SUBMISSION
DA 08.07.2024 ISSUE FOR PoSS SUBMISSION
P2 02.07.2024 DRAFT PoSS SUBMISSION
P1 13.12.2023 PRELIMINARY ISSUE

REV	DATE	REMARK

SAFETY IN DESIGN REPORT PER WHS REGULATIONS

The following risks which are unique to this design have been identified:	NIL

This report does not relieve contractors from their responsibilities under the Act to identify, report, mitigate and manage all aspects of risk and safety.

Accepted (Discipline Head)	CJM	Date
Accepted (Team Leader)	JMB	Date
Approved (Principal)	CCH	Date

This document must be signed "Approved" by JMG to authorise it for use. JMG accept no liability whatsoever for unauthorised or unlicensed use.

SCALES @ A1	DESIGNED BY	DRAWN BY
	CCH	CEF
1:1500	PLOT DATE	24/07/2024

DO NOT SCALE. Use only figured dimensions. Locations of structure, fittings, services etc on this drawing are indicative only. CONTRACTOR to check Architects & other project drawings for coordination between structure, fabric, fixtures, fittings, services etc. CONTRACTOR to site check all dimensions and exact locations of all items. JMG accepts no responsibility for dimensional information scaled or digitally derived from this document.

JOHNSTONE McGEE & GANDY PTY LTD
117 Harrington Street, Hobart TAS (03) 6231 2555
49-51 Elizabeth Street, Launceston TAS (03) 6334 5548
www.jmg.net.au infohbt@jmg.net.au infoltn@jmg.net.au

PROJECT
MACQUARIE POINT SITE INFRASTRUCTURE STRATEGY

TITLE
EXISTING & PROPOSED STORMWATER

PROJECT NO. 230498CS
DWG NO. C04
REVISION DA1
PLOT DETAILS J230498CS - SERVICES.DWG

N

EXISTING SERVICES LEGEND

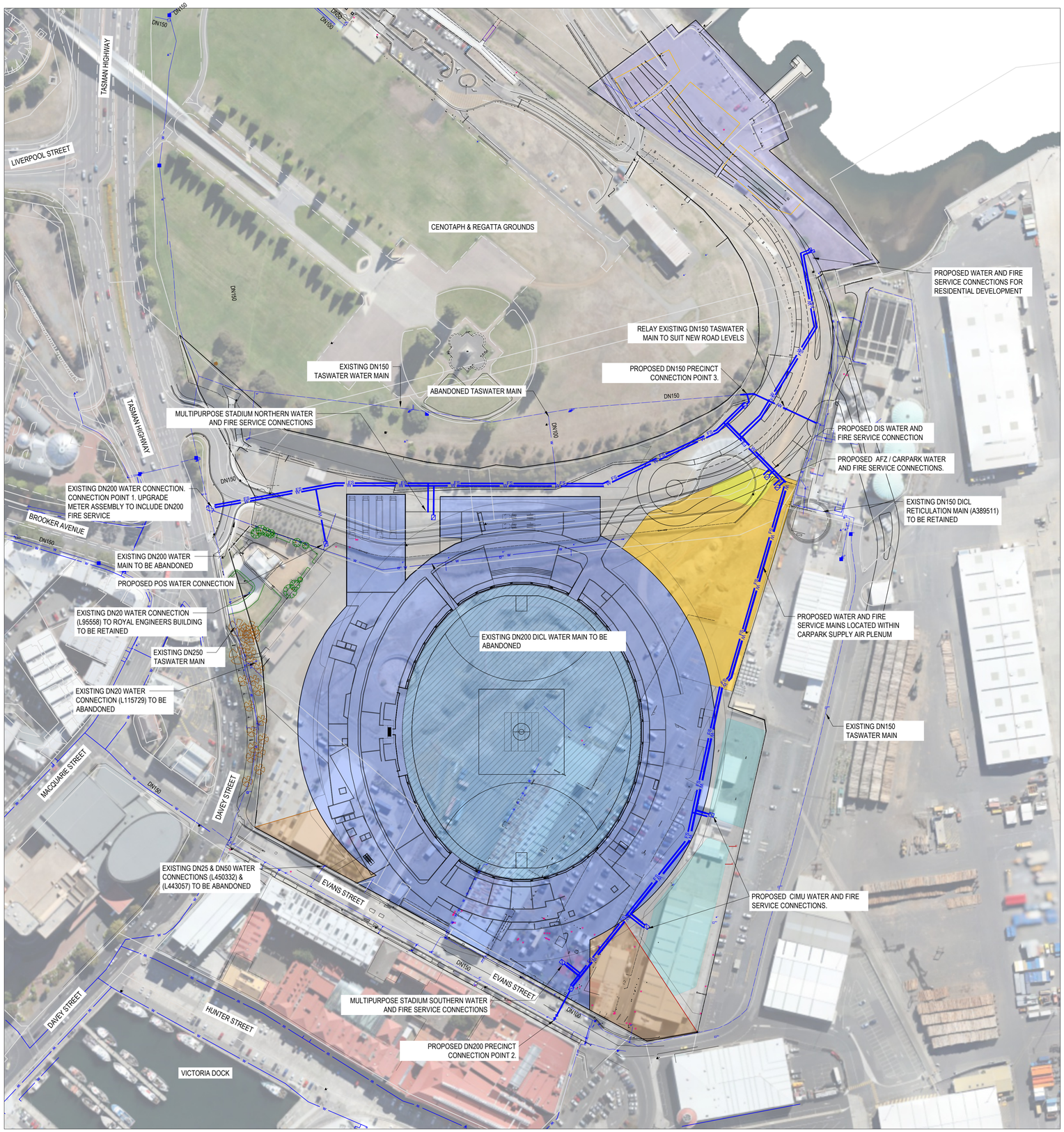
- E. WATER MAIN
- SV — EX. STOP VALVE
- FH — EX. FIRE HYDRANT
- WH — EX. WATER HYDRANT
- TAP — EX. TAP
- WM — EX. WATER METER

NEW SERVICES LEGEND

- FS — NEW FIRE SERVICES (PRIVATE)
- W — NEW WATER (PRIVATE)
- NEW WATER PROPERTY CONNECTION
- NEW WATER STOP VALVE

REDUNDANT SERVICES LEGEND

- REDUNDANT WATER



REV	DATE	REMARK
DA	24.07.2024	REVISED SUBMISSION
DA	08.07.2024	ISSUE FOR PoSS SUBMISSION
P2	02.07.2024	DRAFT PoSS SUBMISSION
P1	13.12.2023	PRELIMINARY ISSUE

SAFETY IN DESIGN REPORT PER WHS REGULATIONS

The following risks which are unique to this design have been identified:	NIL
This report does not relieve contractors from their responsibilities under the Act to identify, report, mitigate and manage all aspects of risk and safety.	

Accepted (Discipline Head)	CJM	Date
Accepted (Team Leader)	JMB	Date
Approved (Principal)	CCH	Date

This document must be signed "Approved" by JMG to authorise it for use. JMG accept no liability whatsoever for unauthorised or unlicensed use.

SCALES @ A1	DESIGNED BY	DRAWN BY
	CCH	CEF
1:1500	PLOT DATE	24/07/2024

DO NOT SCALE. Use only figured dimensions. Locations of structure, fittings, services etc on this drawing are indicative only. CONTRACTOR to check Architects & other project drawings for coordination between structure, fabric, fixtures, fittings, services etc.CONTRACTOR to site check all dimensions and exact. locations of all items. JMG accepts no responsibility for dimensional information scaled or digitally derived from this document.

JOHNSTONE McGEE & GANDY PTY LTD
117 Harrington Street, Hobart TAS (03) 6231 2555
49-51 Elizabeth Street, Launceston TAS (03) 6334 5548
www.jmg.net.au infohbt@jmg.net.au infoltn@jmg.net.au

PROJECT
MACQUARIE POINT SITE INFRASTRUCTURE STRATEGY

TITLE
EXISTING & PROPOSED WATER AND FIRE SERVICE LAYOUT

PROJECT NO.	J230498CS
DWG NO.	C05
REVISION	DA1
PLOT DETAILS	J230498CS - SERVICES.DWG

N

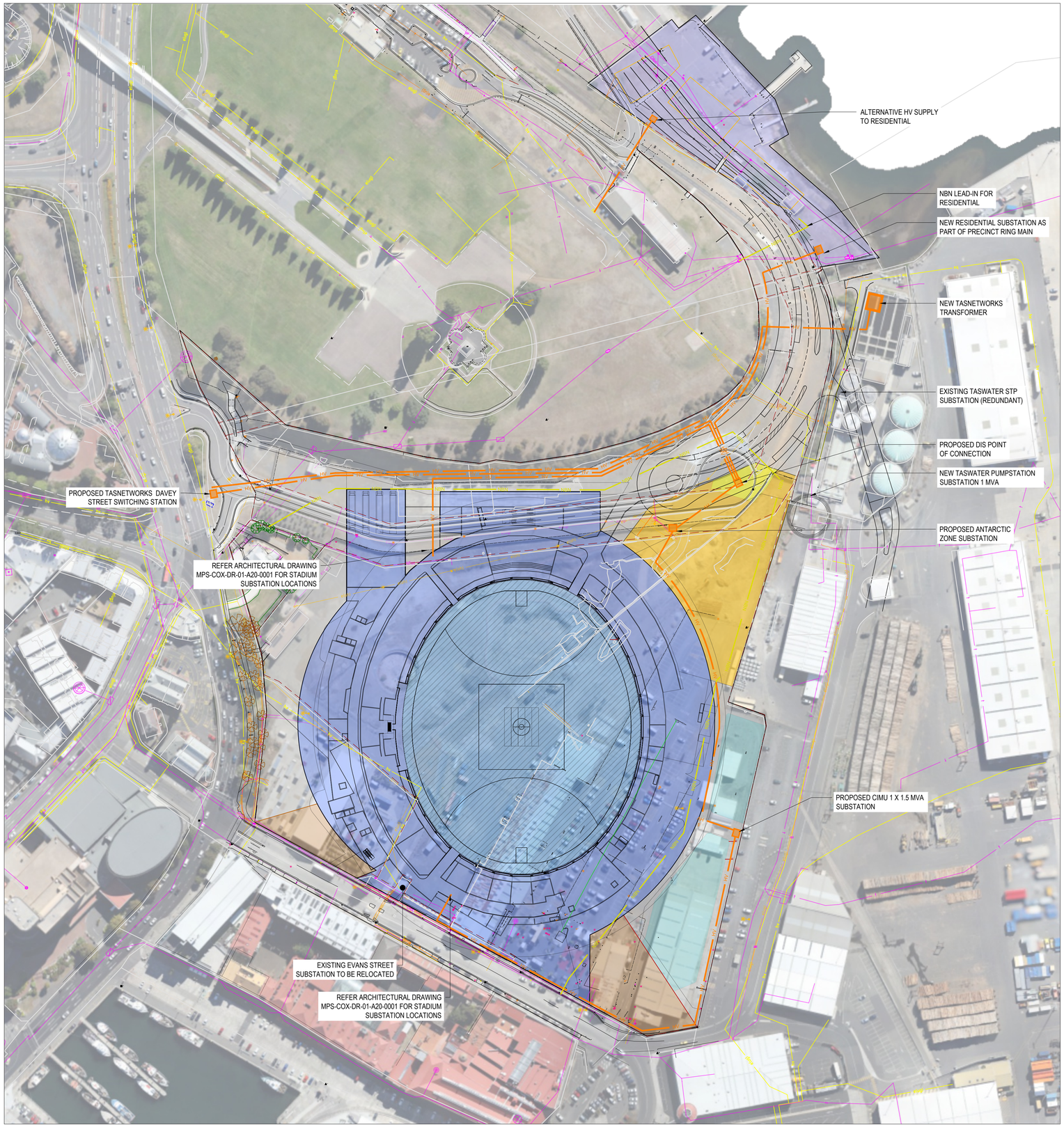
0 0.5 1 1.5 2 2.5m
SCALE 1:50

EXISTING SERVICES LEGEND

- EX. COMMS JUNCTION
- EX. PARKING METER
- EX. UNDERGROUND ELECTRICAL
- EX. ELEC HV
- EX. ELEC LV
- EX. LIGHT POLE
- EX. OVERHEAD POWER
- EX. POWER POLE
- EX. GAS VALVE
- EX. GAS
- EX. FUEL
- EASEMENT
- EXISTING ELECTRICAL SUBSTATION

NEW SERVICES LEGEND

- NEW UNDERGROUND ELECTRICAL
- NEW ELECTRICAL SUBSTATION
- NEW UNDERGROUND ELECTRICAL PROPERTY CONNECTION
- NEW UNDERGROUND NBN



REV	DATE	REMARK
DA1	24.07.2024	REVISED SUBMISSION
DA	08.07.2024	ISSUE FOR PoSS SUBMISSION
P2	02.07.2024	DRAFT PoSS SUBMISSION
P1	13.12.2023	PRELIMINARY ISSUE

SAFETY IN DESIGN REPORT PER WHS REGULATIONS

The following risks which are unique to this design have been identified:	NIL
This report does not relieve contractors from their responsibilities under the Act to identify, report, mitigate and manage all aspects of risk and safety.	

Accepted (Discipline Head)	CJM	Date
Accepted (Team Leader)	JMB	Date
Approved (Principal)	CCH	Date

This document must be signed "Approved" by JMG to authorise it for use. JMG accept no liability whatsoever for unauthorised or unlicensed use.

SCALES @ A1	DESIGNED BY	DRAWN BY
	CCH	CEF
1:1500	PLOT DATE	24/07/2024

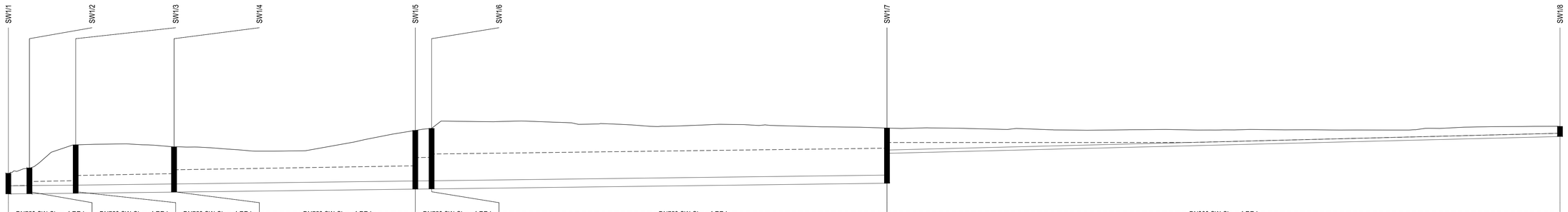
DO NOT SCALE. Use only figured dimensions. Locations of structure, fittings, services etc on this drawing are indicative only. CONTRACTOR to check Architects & other project drawings for coordination between structure, fabric, fixtures, fittings, services etc.CONTRACTOR to site check all dimensions and exact locations of all items. JMG accepts no responsibility for dimensional information scaled or digitally derived from this document.

JOHNSTONE McGEE & GANDY PTY LTD
117 Harrington Street, Hobart TAS (03) 6231 2555
49-51 Elizabeth Street, Launceston TAS (03) 6334 5548
www.jmg.net.au infohbt@jmg.net.au infoltn@jmg.net.au

PROJECT
MACQUARIE POINT SITE INFRASTRUCTURE STRATEGY

TITLE
EXISTING & PROPOSED ELECTRICAL SUPPLY & NBN

PROJECT NO.	230498CS
DWG NO.	C06
REVISION	DA1
PLOT DETAILS	J230498CS - SERVICES.DWG



PIPE DETAILS SLOPE/GRADE	DN750 SW-Class 4 RRJ 0.5% (1:200.0)		DN750 SW-Class 4 RRJ 0.4% (1:285.4)		DN750 SW-Class 4 RRJ 0.5% (1:212.6)		DN750 SW-Class 4 RRJ 0.5% (1:200.0)		DN750 SW-Class 4 RRJ 0.5% (1:200.0)		DN750 SW-Class 4 RRJ 0.5% (1:200.0)		DN300 SW-Class 4 RRJ 1.0% (1:100.0)		
RL -3.00m															
PIPE VELOCITY (m/s)	2.61m/s		2.61m/s		2.63m/s		2.43m/s		2.43m/s		2.14m/s		0.00m/s		
PIPE HGL CAPACITY (l/s)	918l/s		766l/s		890l/s		918l/s		918l/s		918l/s		120l/s		
PIPE DESIGN FLOW 5% AEP (l/s)	Q=1135 l/s		Q=1137 l/s		Q=1141 l/s		Q=1056 l/s		Q=1057 l/s		Q=930 l/s		Q=0 l/s		
DEPTH TO INVERT	1.90	2.35	4.43	4.14		5.37	5.53			5.04	2.31			0.93	
INVERT LEVEL	1.70	1.72	1.76	1.87		2.14	2.16			2.68	5.41			6.95	
DESIGN SURFACE		4.08	6.19	6.00		7.51	7.69			7.72				7.88	
EXISTING SURFACE															
CHAINAGE	0.00	4.81	10.56	15.37	22.44	37.81	55.06	92.87	3.71	96.58	103.92	200.50	153.58	354.08	

CATCHMENT 1
STORMWATER PROFILE
SCALES: 1:500(H) 1:200(V)

PIPE DETAILS SLOPE/GRADE	DN600 SW-Class 4 RRJ 1.0% (1:100.0)	DN600 SW-Class 4 RRJ 1.0% (1:100.2)	DN600 SW-Class 4 RRJ 1.4% (1:69.9)	DN375 SW-Class 4 RRJ 2.4% (1:42.4)	DN375 SW-Class 4 RRJ 2.0% (1:50.3)	DN300 SW-Class 4 RRJ 1.3% (1:77.6)	DN300 SW-Class 4 RRJ 1.3% (1:77.6)
RL -4.00m							
PIPE VELOCITY (m/s)	2.47m/s	2.46m/s	2.78m/s	2.68m/s	2.46m/s	1.74m/s	1.67m/s
PIPE HGL CAPACITY (l/s)	736l/s	735l/s	881l/s	334l/s	306l/s	137l/s	137l/s
PIPE DESIGN FLOW 5% AEP (l/s)	Q=577 l/s	Q=562 l/s	Q=494 l/s	Q=205 l/s	Q=185 l/s	Q=93 l/s	Q=75 l/s
DEPTH TO INVERT	0.76	1.26 / 1.22	1.05	1.11 / 0.89	1.15	1.01 / 0.93	1.08 / 1.80
INVERT LEVEL	0.67	0.93 / 0.98	1.46	2.12 / 2.35	2.74	3.01 / 3.09	3.26 / 3.39
DESIGN SURFACE	1.43	2.19	2.51	3.23	3.89	4.02	4.34 / 5.19
EXISTING SURFACE	1.43	2.19	2.51	3.23	3.89	4.02	4.34
CHAINAGE	0.00	26.24	74.42	120.79	137.58	150.92	164.07 / 174.52
	26.24	48.19	46.36	16.79	13.34	13.15	10.45

CATCHMENT 2
STORMWATER PROFILE
SCALES: 1:500(H) 1:200(V)

0 2 4 6 8 10m (V)
0 5 10 15 20 25m (H)
SCALE 1:500 (H) 1:200 (V)

DA1 24.07.2024 REVISED SUBMISSION
DA 15.07.2024 ISSUE FOR PoSS SUBMISSION

REV	DATE	REMARK

SAFETY IN DESIGN REPORT PER WHS REGULATIONS

The following risks which are unique to this design have been identified:	NIL
This report does not relieve contractors from their responsibilities under the Act to identify, report, mitigate and manage all aspects of risk and safety.	

Accepted (Discipline Head)	CJM	Date
Accepted (Team Leader)	JMB	Date
Approved (Principal)	CCH	Date

This document must be signed "Approved" by JMG to authorise it for use. JMG accept no liability whatsoever for unauthorised or unlicensed use.

SCALES @ A1	DESIGNED BY	DRAWN BY
1:500(H)	CCH	CEF
1:200 (V)	PLOT DATE	24/07/2024

DO NOT SCALE. Use only figured dimensions. Locations of structure, fittings, services etc on this drawing are indicative only. CONTRACTOR to check Architects & other project drawings for co-ordination between structure, fabric, fixtures, fittings, services etc.CONTRACTOR to site check all dimensions and exact locations of all items. JMG accepts no responsibility for dimensional information scaled or digitally derived from this document.

JOHNSTONE McGEE & GANDY PTY LTD
117 Harrington Street, Hobart TAS (03) 6231 2555
49-51 Elizabeth Street, Launceston TAS (03) 6334 5548
www.jmg.net.au infohbt@jmg.net.au infoltn@jmg.net.au

PROJECT
MACQUARIE POINT SITE
INFRASTRUCTURE STRATEGY

TITLE
CATCHMENT ONE
STORMWATER PROFILE
SHEET 1

PROJECT NO. 230498CS
DWG NO. C07
REVISION DA1
PLOT DETAILS J230498CS - SERVICES.DWG

N

EXISTING SERVICES LEGEND

- EX. STORMWATER MAIN
- EX. STORMWATER GRATED_PIT
- EX. STORMWATER MANHOLE
- DRAINAGE_SW_PIPE_AG
- DRAINAGE_SW_PIPE_UG
- EASEMENT

NEW SERVICES LEGEND

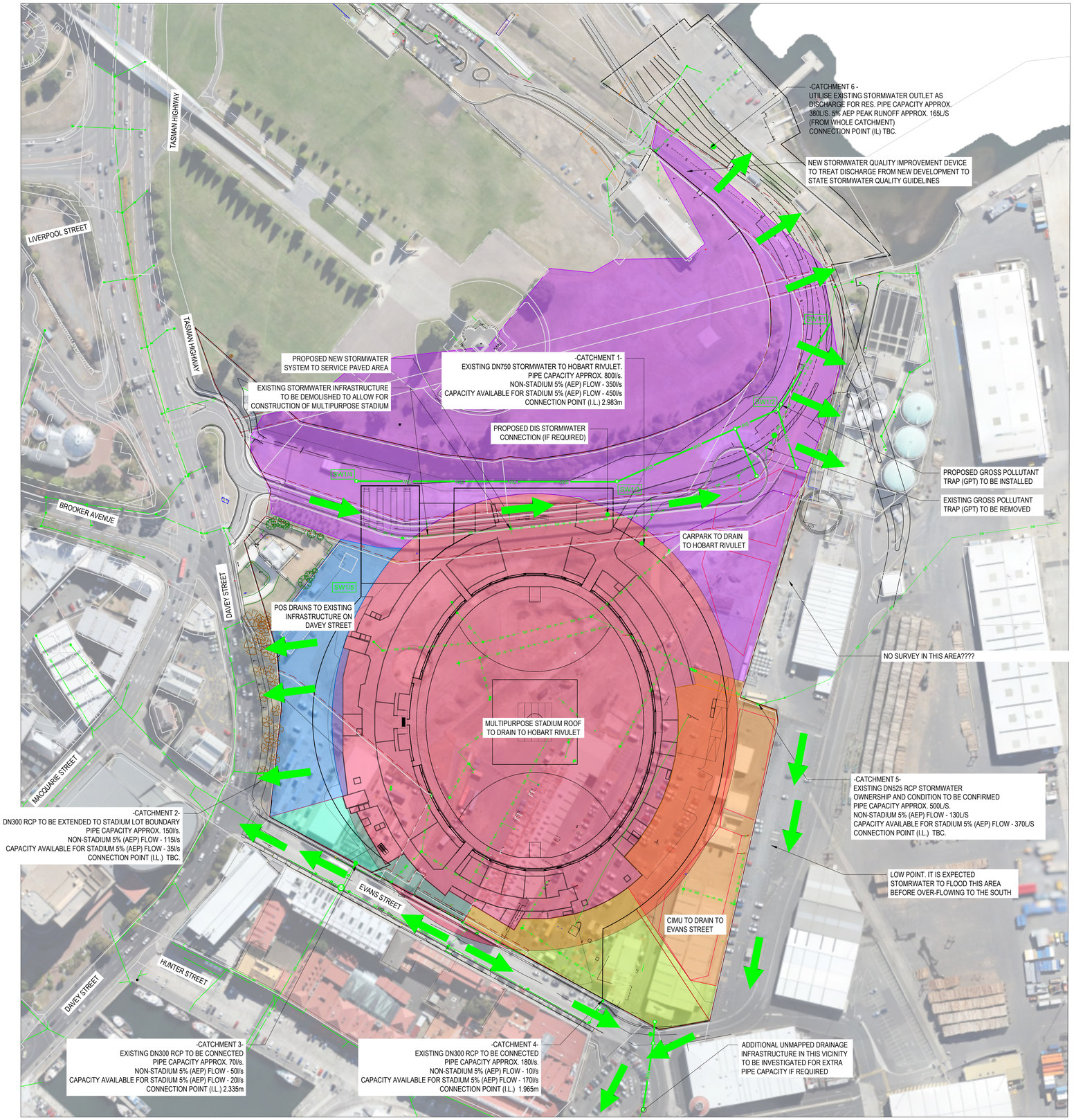
- NEW STORMWATER
- NEW STORMWATER MANHOLE
- NEW STORMWATER PROPERTY CONNECTION

REDUNDANT SERVICES LEGEND

- REDUNDANT STORMWATER

CATCHMENT/ OVERLAND FLOW LEGEND

- CATCHMENT 1 - OVERLAND FLOW TO THE EAST
- CATCHMENT 2 - OVERLAND FLOW TO DAVEY STREET
- CATCHMENT 3 - OVERLAND FLOW TO DAVEY STREET
- CATCHMENT 4 - OVERLAND FLOW TO HUNTER STREET
- CATCHMENT 5 - OVERLAND FLOW TO HUNTER STREET
- CATCHMENT 6 - OVERLAND FLOW TO NORTH EAST
- STADIUM
- OVERLAND FLOW DIRECTION



DA 08.07.2024 ISSUE FOR PoSS SUBMISSION

REV	DATE	REMARK

SAFETY IN DESIGN REPORT PER WHS REGULATIONS

The following risks which are unique to this design have been identified.	NIL
This report does not relieve contractors from their responsibilities under the Act to identify, report, mitigate and manage all aspects of risk and safety.	

Accepted (Discipline Head)	CJM	Date
Accepted (Team Leader)	JMB	Date
Approved (Principal)	CCH	Date

This document must be signed "Approved" by JMG to authorise it for use. JMG accept no liability whatsoever for unauthorised or unlicensed use.

SCALES @ A1	DESIGNED BY	DRAWN BY
	CCH	CEF
1:1500	PLOT DATE	24/07/2024

DO NOT SCALE. Use only figured dimensions. Locations of structure, fittings, services etc on this drawing are indicative only. CONTRACTOR to check Architects & other project drawings for coordination between structure, fabric, fixtures, fittings, services etc.CONTRACTOR to site check all dimensions and exact locations of all items. JMG accepts no responsibility for dimensional information scaled or digitally derived from this document.

JOHNSTONE McGEE & GANDY PTY LTD
117 Harrington Street, Hobart TAS (03) 6231 2555
49-51 Elizabeth Street, Launceston TAS (03) 6334 5548
www.jmg.net.au infohbt@jmg.net.au infoln@jmg.net.au

PROJECT
MACQUARIE POINT SITE
INFRASTRUCTURE STRATEGY

TITLE
STORMWATER OVERLAND FLOW

PROJECT NO.	230498CS	
DWG NO.	C08	REVISION DA
PLOT DETAILS	J230498CS - SERVICES.DWG	

APPENDIX B

Sewer and Water Load Calculations

Macquarie Point and Regatta Point Development Job No. J230498CS

Design sewer flows and water demands

References are to WSA 02-2014-3.1 Gravity Sewerage Code of Australia and WSA 03-MRWA V2.0 Water Supply Code of Australia

Site ID	Description	Allotment Area (m2)	Assumed development area (m2)	Number of Floors	Assumed gross building floor area (GBFA, m2)	TasWater Classification	Percentage of development area	Units	Floor area (m2)	Quantity of Units	ET/unit (Sewer)	ET/unit (Water)	Equivalent Tenements (ET) Sewer	Sewer ADWF (l/s)^^^	Equivalent Tenements (ET) Water	Average Day Water Demand (L/s) ''	Peak Day Demand (l/s)	Peak Hour Demand (l/s)
AFZ	Antartic Facilities Zone	2875	2875	4	11500	CF03 - Education^^	20%	Student	2300	153	0.057	0.037	8.7	0.046	5.7	0.04	0.11	0.22
						BE04 - Offices	60%	GBFA (m2)	6900	6900	0.006	0.004	41.4	0.216	27.6	0.22	0.55	1.09
						SL01 - Laboratories	20%	GBFA (m2)	2300	2300	0.064	0.064	147.2	0.767	147.2	1.17	2.92	5.84
						TOTAL	**100%**		**11500**				**197.3**	**1.028**	**180.5**	**1.43**	**3.58**	**7.15**
CP	Carpark	7700	7700	3	23100	*ID referenced on AS3500.1 as - Closet Cistern - Sink (standard tap) Fixture(***)*	*100%*	*Fixed Fixture Per Toilet (3 Water Closet Cistern & 3 Sinks with Standard Taps)*	-	-	-	-	-	**Design Flow**	-	**Design Flow**	-	-
						TOTAL	***100%***						**0.0**	**3.600**		**3.600**	**3.60**	**3.60**
CIMU	Complimentary Integrated Mixed Use Zone	3700	3700	6	22200	AS03 - Hotel^	80%	Room	17760	178	0.45	0.3	79.9	0.416	53.3	0.42	1.06	2.11
						MP01 - Restaurant/Café	20%	GBFA (m2)	4440	4440	0.008	0.007	35.5	0.185	31.1	0.25	0.62	1.23
						TOTAL	**100%**		**22200**				**115.4**	**0.601**	**84.4**	**0.67**	**1.67**	**3.34**
Res	Regatta Pt residential area (80-120 2/3 bdr apartments)	5900	2800	3	8400	RA02 - 2 bed apartment*	50%	Dwelling	4200	47	0.75	0.5	35.0	0.182	23.3	0.18	0.46	0.92
						RA03 - 3+ bed apartment**	50%	Dwelling	4200	47	1	0.67	46.7	0.243	31.3	0.25	0.62	1.24
						MP01 - Restaurant	NA	GBFA (m2)	400	400	0.008	0.005	3.2	0.017	2.0	0.02	0.04	0.08
						TOTAL	**100%**		**8400**				**84.9**	**0.442**	**56.6**	**0.45**	**1.12**	**2.24**
Stadium	Multipurpose Stadium	44000	44000	NA	NA	REFER TO APPENDIX E- AECOM STADIUM DEMANDS								42				42
POS	Public Open Space	15000	15000	1	15000	CF09 - ~20 toilets	100%	#toilets	15000	20	0.6	0.4	12	0.063	8.0	0.06	0.16	0.32
TOTAL - 30,000 people concert + 1000 staff													**212.3**	**46.7**	**149.0**	**4.8**	**6.6**	**51.5**

*RA02 - 2 bedroom apartments - GFA to apartment ratio of 90m2 per apartment (inclusive of common areas)

**RA03 - 3+ bedroom apartments - GFA to apartment ratio of 90m2 per apartment (inclusive of common areas)

*** - Average of 0.65l/s as per table 3.2.1 AS3500.1 (Fixture/Appliance)

^AS03 - Hotel rooms - GFA to room ratio of 100m2 per room (inclusive of common areas and dead space)

^^CF03 - Education - GFA to student ratio assumed at 15m2 per Equivalent Full Time Student

^^^ - Average Dry Weather Flow (ADWF) at 450L/ET/day [TasWater supplement to WSAA 02 2014 3.1, Clause 2.4.1]

'' - Average Day Water Demand @ 685L/ET/day [TasWater supplement to WSAA03-MRWA V2.0, Clause 2.3.1]

SEWER SUMMARY

Sewer Summary - 30,000 people concert + 1000 staff

Connection point	Area for infiltration (m2)	ET's	ADWF (l/s)	PDWF (l/s)	Design Flow, PWWF (l/s)	Assumed lot connection size (DN) (Table 5.6)
AFZ	2875	197	1.0	10.8	11.1	225
Carpark	7700	0	3.6	3.6	3.6	150
CIMU	3700	115	0.6	5.9	6.2	150
Residential	5900	85	0.4	3.9	4.3	150
Stadium (Refer to AECOM Stadium Analysis)	44000	-	-	-	42.0	300
POS	15000	12	0.1	0.4	0.9	150
Total to connection 1 (Mac Pt)			1.7	17.2	63.8	375
Total to connection 2 (Regatta Pt)			0.4	3.9	4.3	150
TOTAL	**79175.0**	**409.6**	**5.7**	**24.6**	**68.1**	

WATER SUMMARY

Water Summary - 30,000 people concert + 1000 staff

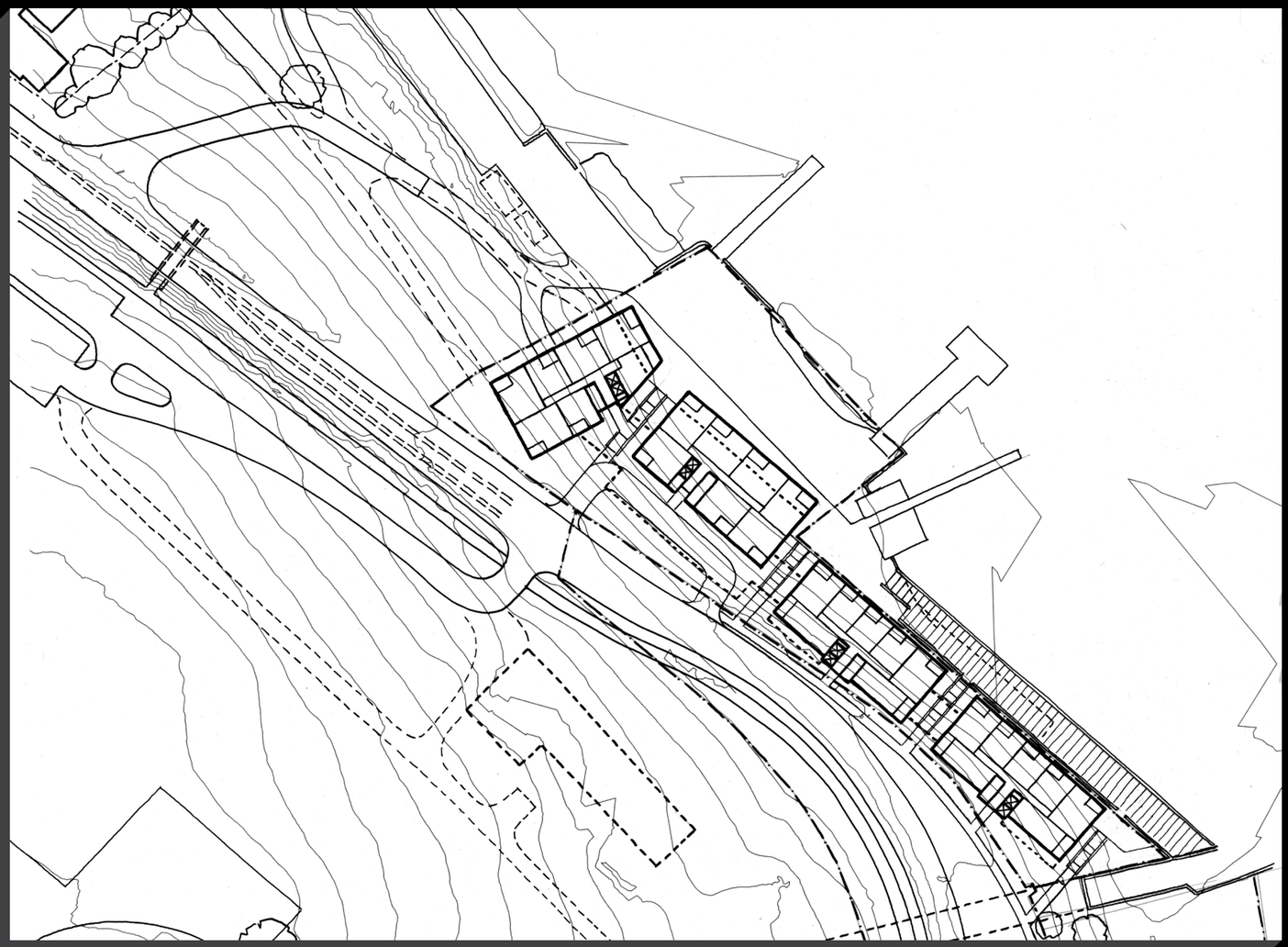
Connection point	ET's	Average Day Water Demand (L/s)	Peak Day Demand (l/s)	Peak Hour Demand (l/s)
AFZ	180.5	1.4	3.6	7.2
Carpark	0.0	0.7	1.8	3.6
CIMU	84.4	0.7	1.7	3.3
Residential	56.6	0.4	1.1	2.2
Stadium (Refer to AECOM Stadium Analysis)	0.0	8.4	21.0	42.0
POS	8.0	0.1	0.2	0.3
TOTAL	**329.4**	**11.7**	**29.3**	**58.7**

APPENDIX C

Cox Architect Residential Development Plans

October 2023

Mac Point
Residential Development and Public Foreshore Zone



DRAFT

Residential Development - Residential Plan and Yields

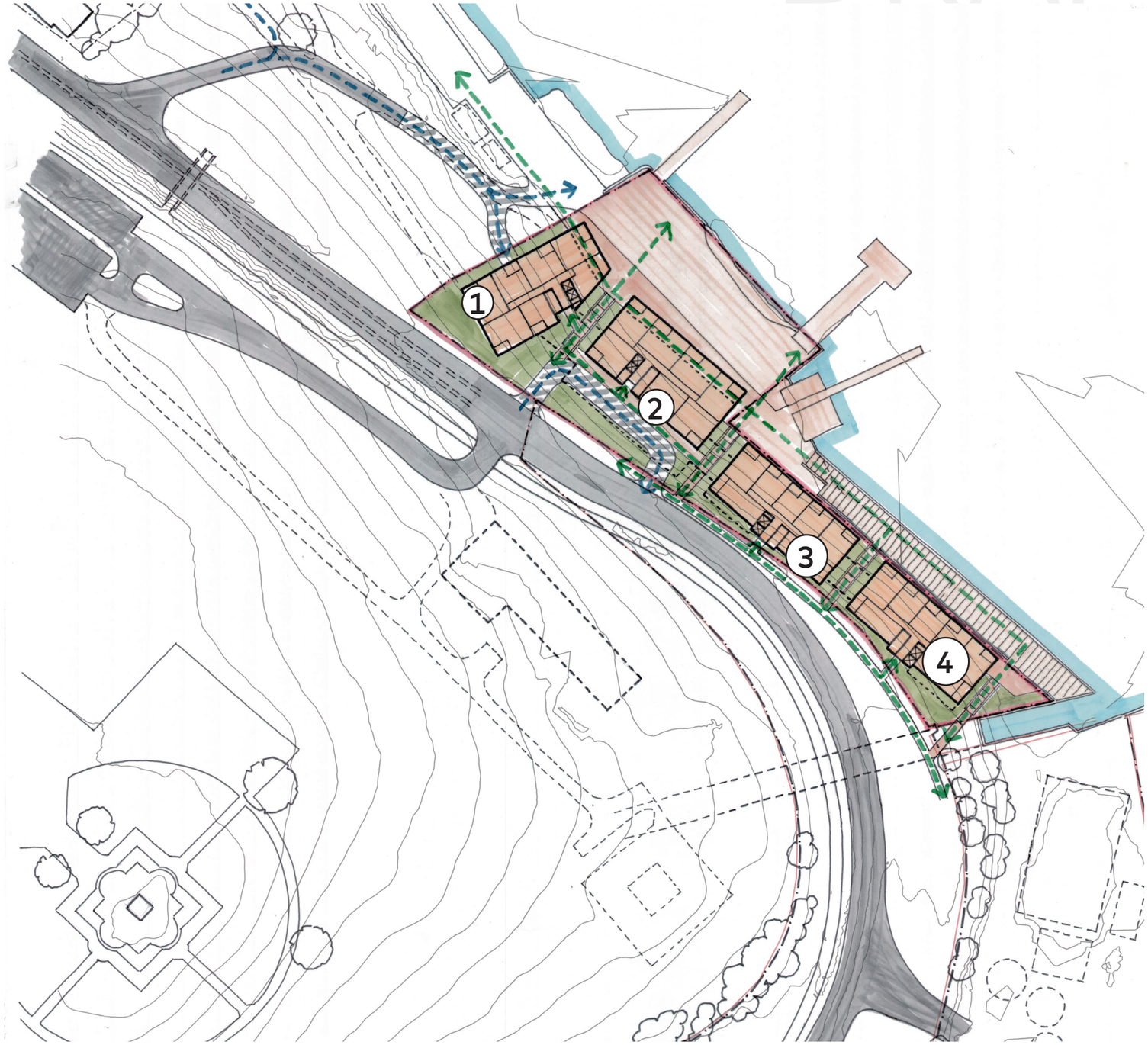
Building 1
Foreshore Commercial 80m2 GFA
+ 4 levels residential 2,160m2 GFA
(24 apartments @ 90m2 GFA ave.)

Building 2
Foreshore Commercial 200m2 GFA
+ 4 levels residential 2,400m2 GFA
(26 apartments @ 90m2 GFA ave.)

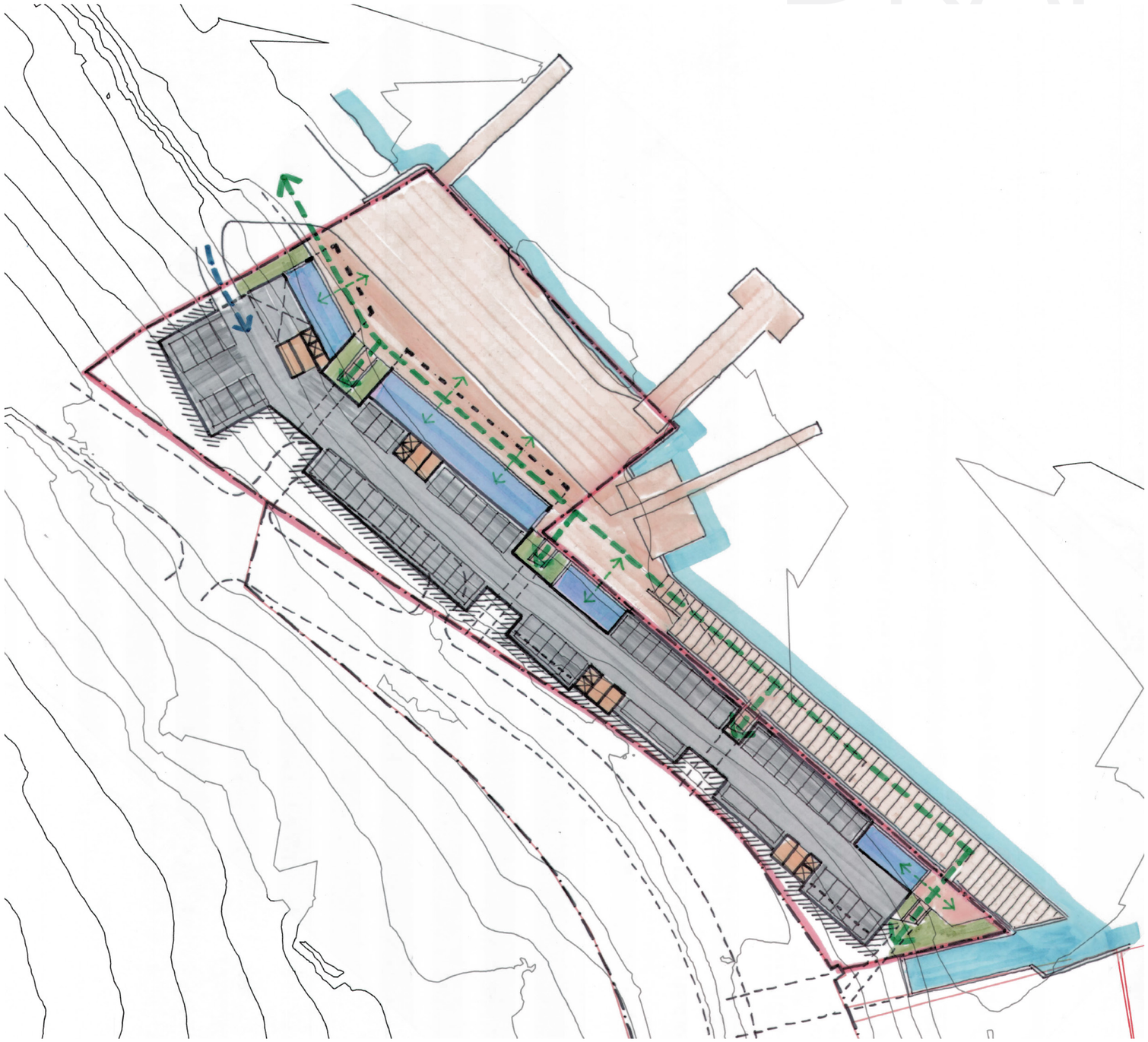
Building 3
Foreshore Commercial 60m2 GFA
+ 4 levels residential 1,920m2 GFA
(22 apartments @ 90m2 GFA ave.)

Building 4
Foreshore Commercial 60m2 GFA
+ 4 levels residential 1,920m2 GFA
(22 apartments @ 90m2 GFA ave.)

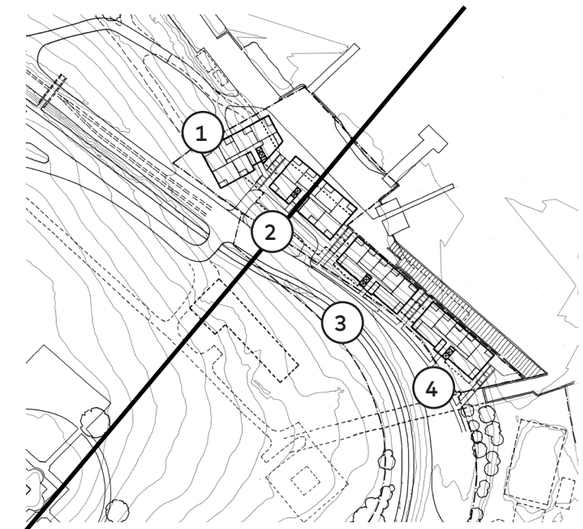
Total Yield:
Foreshore Commercial 400m2 GFA
+ 4 levels residential 8,400m2 GFA
(94 apartments @ 90m2 GFA ave.)
66 car spaces in lower level.

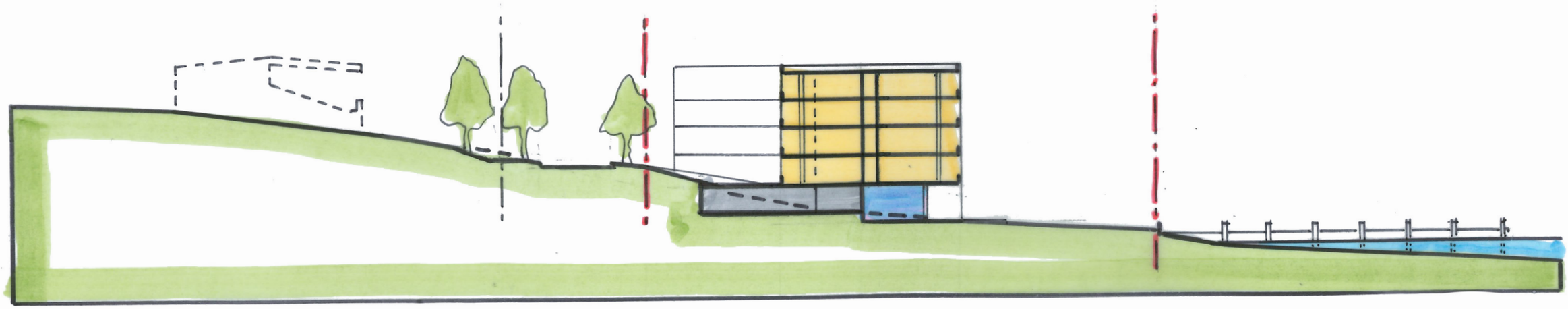


Residential Development - Lower Ground Parking Plan

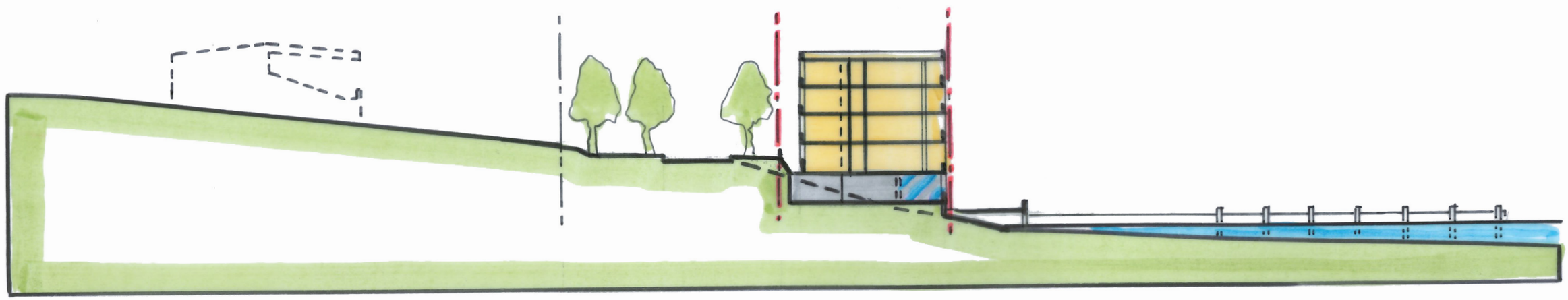


Residential Development - Section through Building 2





Residential Development - Section through Building 3



APPENDIX D

Water Modelling Advice From TasWater

Justin Boocock

From: Henderson, Grant <Grant.Henderson@taswater.com.au>
Sent: Friday, 24 November 2023 4:45 PM
To: Justin Boocock
Cc: TasWater Development Mailbox; Verdouw, Shaun; Carter, Jason
Subject: RE: Mac Point Stadium - servicing strategy SI 2023/00758-HCC

Hi Justin

We have completed modelling based on the flows you provided and found that there are no major issues with pressure at the connection points or elsewhere in the network. There are however issue with high velocity and headloss in the nearby reticulation during peak usage at events within the stadium. Fire Flow was

Scenarios modelled are set out as follows

There are three proposed water connections, these are estimated at this point and final locations may impact on the following advice.

1. At the Royal Engineers Building – there is an existing 200mm main that was constructed along the road built by MPDC, the road will be realigned but the connection point will remain.
2. On Evans Street near number 12 (which is a Tasnetworks Transformer)
3. Near the western Boundary of the Mac Point STP site.

The flows assigned to each connection are as follows for normal flows (flows are based on the 40,000 seat stadium):

- A&SP – applied to point 3 – commercial pattern with peak day demand of 8.0L/s and peak hour demand of 15.9L/s – 12 hours of water usage at 15.9L/s

- Commercial – applied to point 2 – residential pattern with peak day demand of 3.0L/s and peak hour demand of 6.1L/s – standard res pattern due to this being hotel type development.
- POS – applied to point 2 – commercial pattern with peak day demand of 0.4L/s and peak hour demand of 0.7L/s
- Residential – applied to point 3 – residential pattern with peak day demand of 1.2L/s and peak hour demand of 2.5L/s – standard res pattern
- Stadium – applied half each to point 1 and point 2 – peak demand (1/2 hour) at 49.9/L/s this was modelled at 1:00pm 4:00pm and 7:00pm. It won't happen at all of these every day but the impact at any of these times is understood and reflects a period of 0.5 hours of high intensity usage, such as half time in a football match or similar

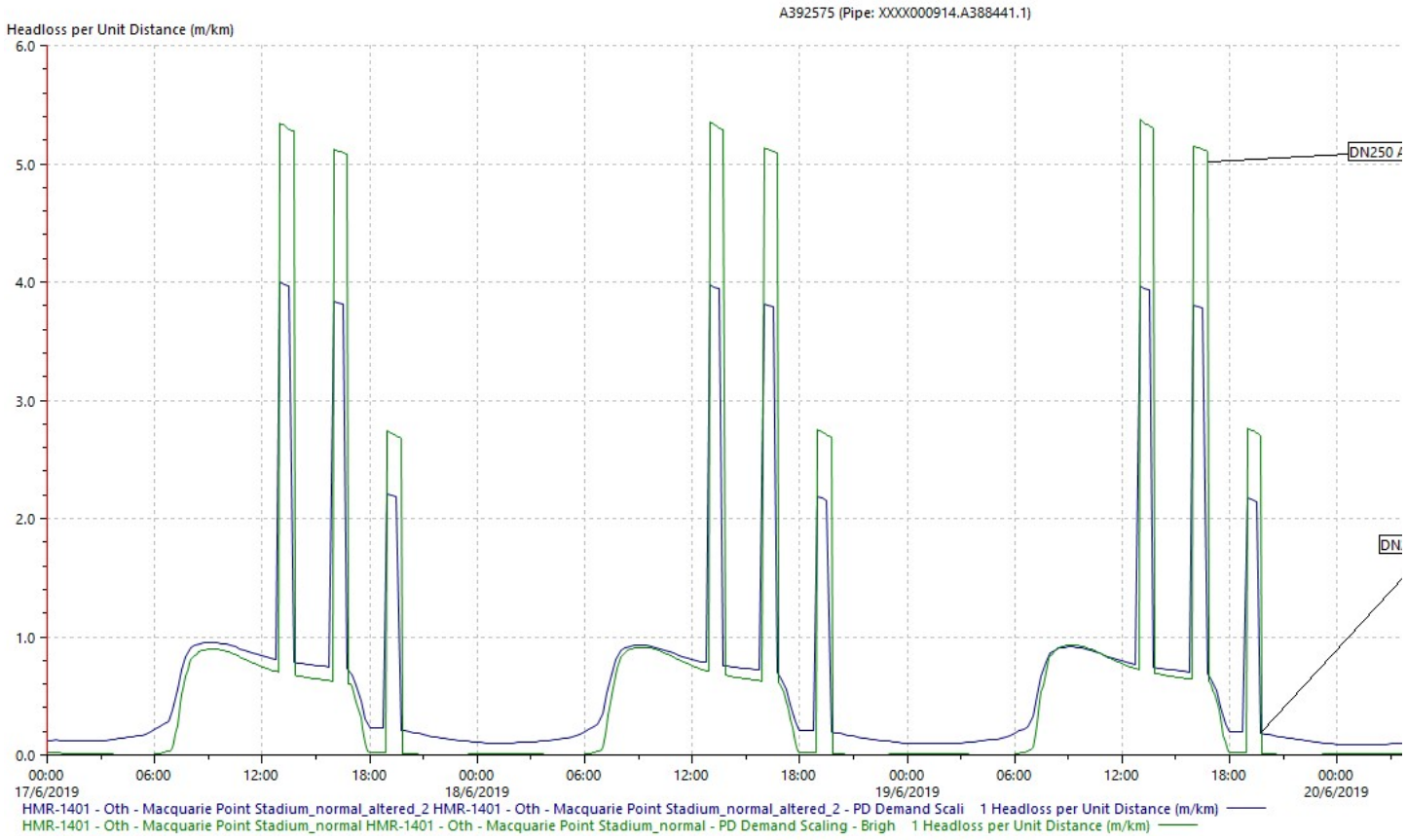
Fire Flow scenarios 1-3 (stadium)
For fire flow 1 - Based on the nominated stadium fire fighting flow of 65L/s, it was assumed that this corresponds to 40L/s at connection point 1 and 40L/s at connection point 2. This includes provision for some other water usage in the stadium. This was modelled as a 2 hour pattern at 2/3 peak hour.
All other flows as per above.
For fire flow 2 and 3, 65L/s at connection point 1 and 2 respectively. This was a 2 hour pattern at 2/3 peak hour with other flows as per the normal flow regime in the network.

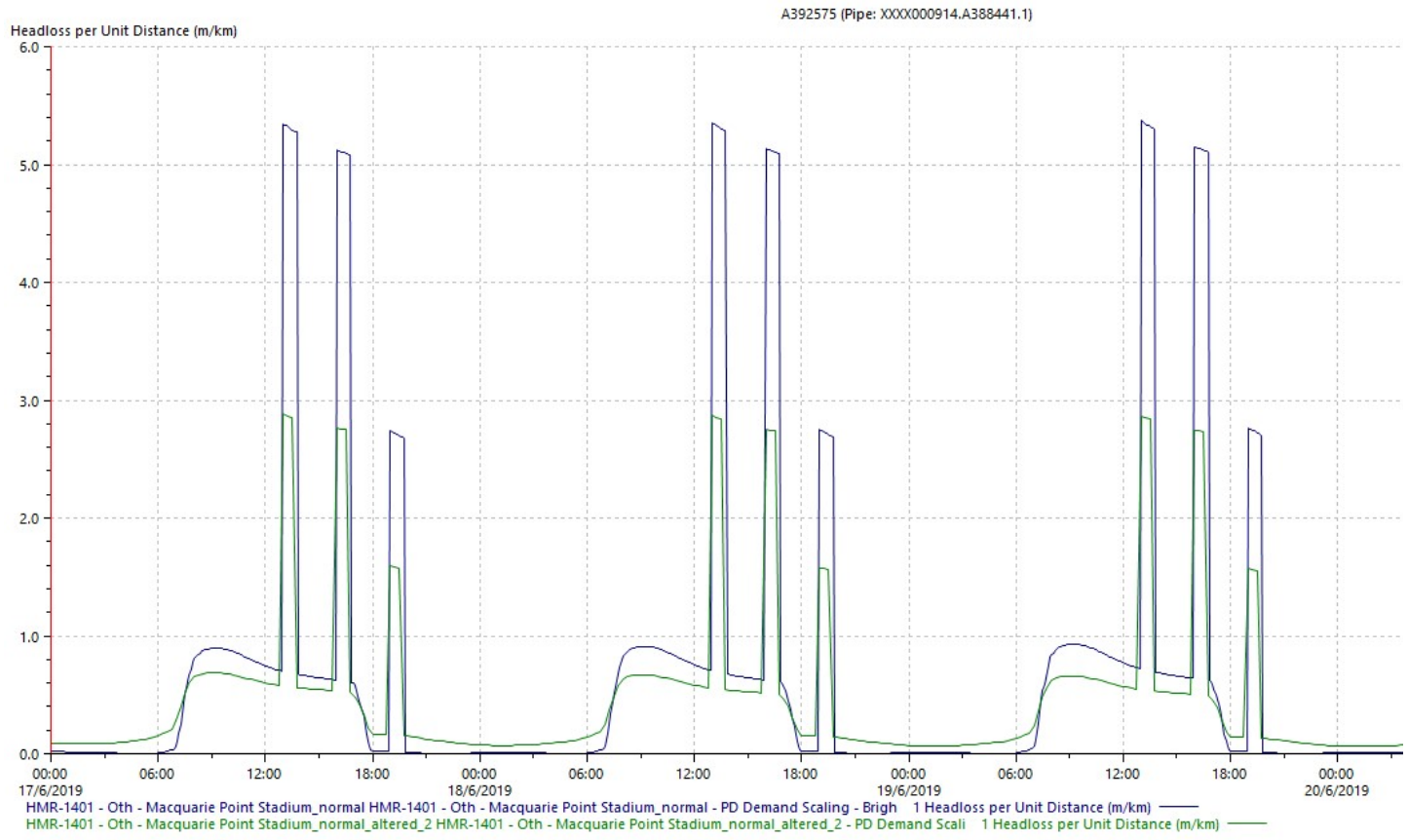
Fire Flow scenario 4 (residential)
The residential area is the most disadvantaged in terms of the network, it is nominated as apartment style so the fire flow is assumed to be sprinkler system or similar. Unlikely to occur when the stadium is also on fire so modelled as a commercial fire during 2/3 peak hour requiring 26L/s. This was modelled assuming the other developments are operating eg 2/3 peak hour plus assume 2/3 of peak in the stadium load – 17L/s at each stadium connection point during the normal 2/3 peak hour period.

Modelling Results

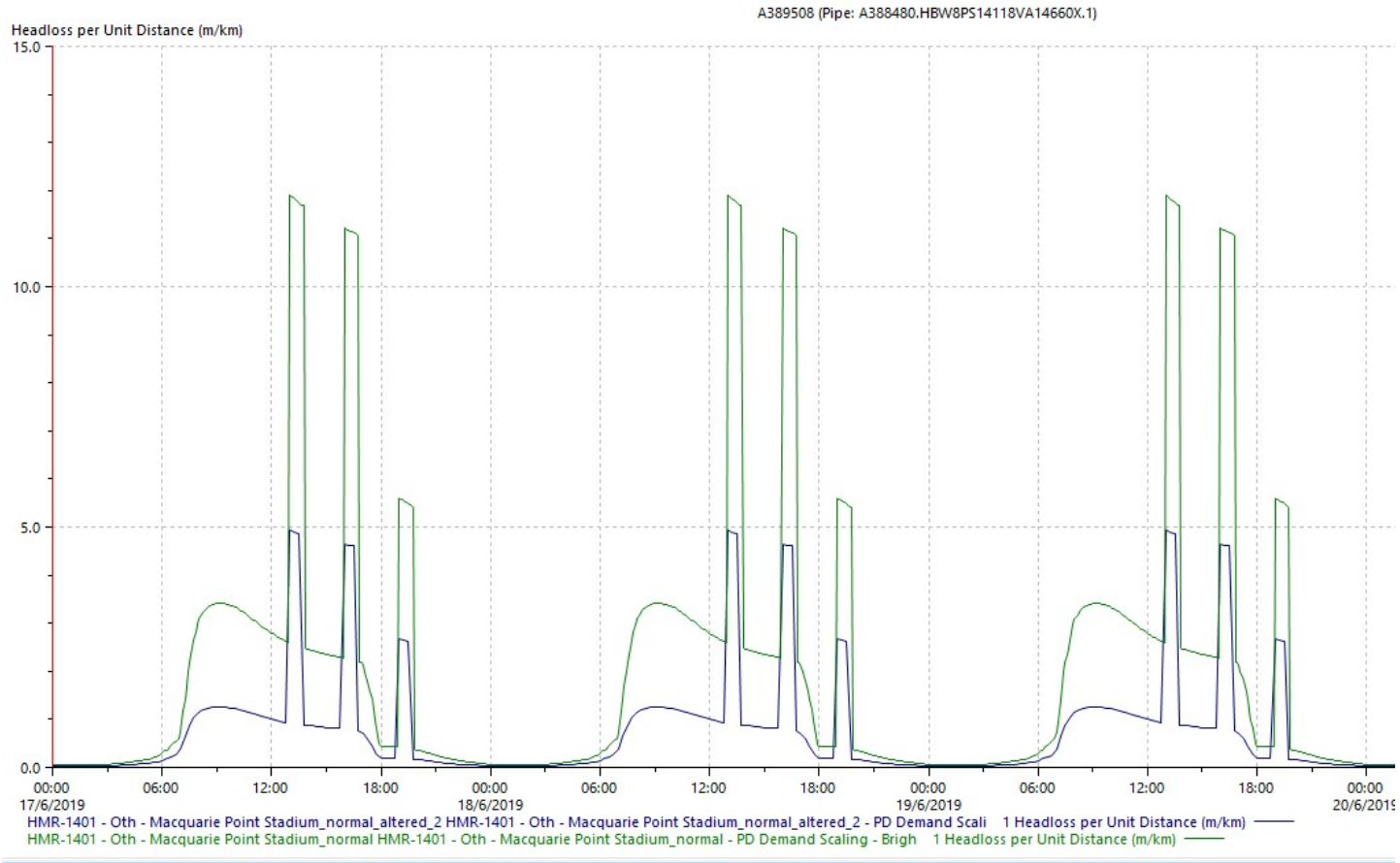
Results indicate velocity and headloss above TasWater standards in the mains along Evans Street and also along Davey Street and in the pipe crossing the Tasman Highway about 40m north of the Tasman Highway Brooker Avenue intersection.

Results for the pipe section along Davey Street past Hunter Street are shown below with augmentation in 150mm (upper image) and 200mm (lower image) included. You can see that both of these augmentations reduce headloss to below 5m/km.

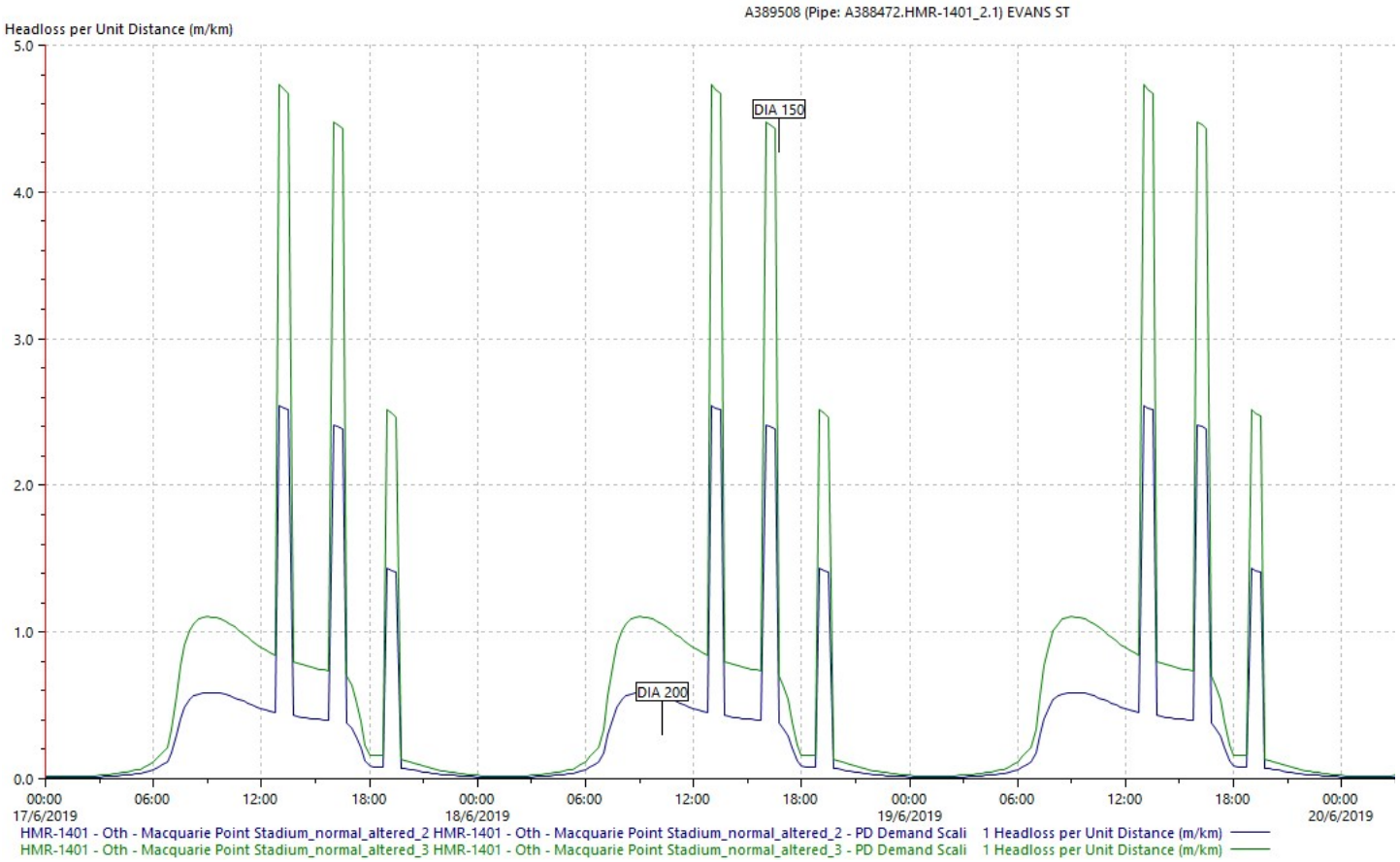




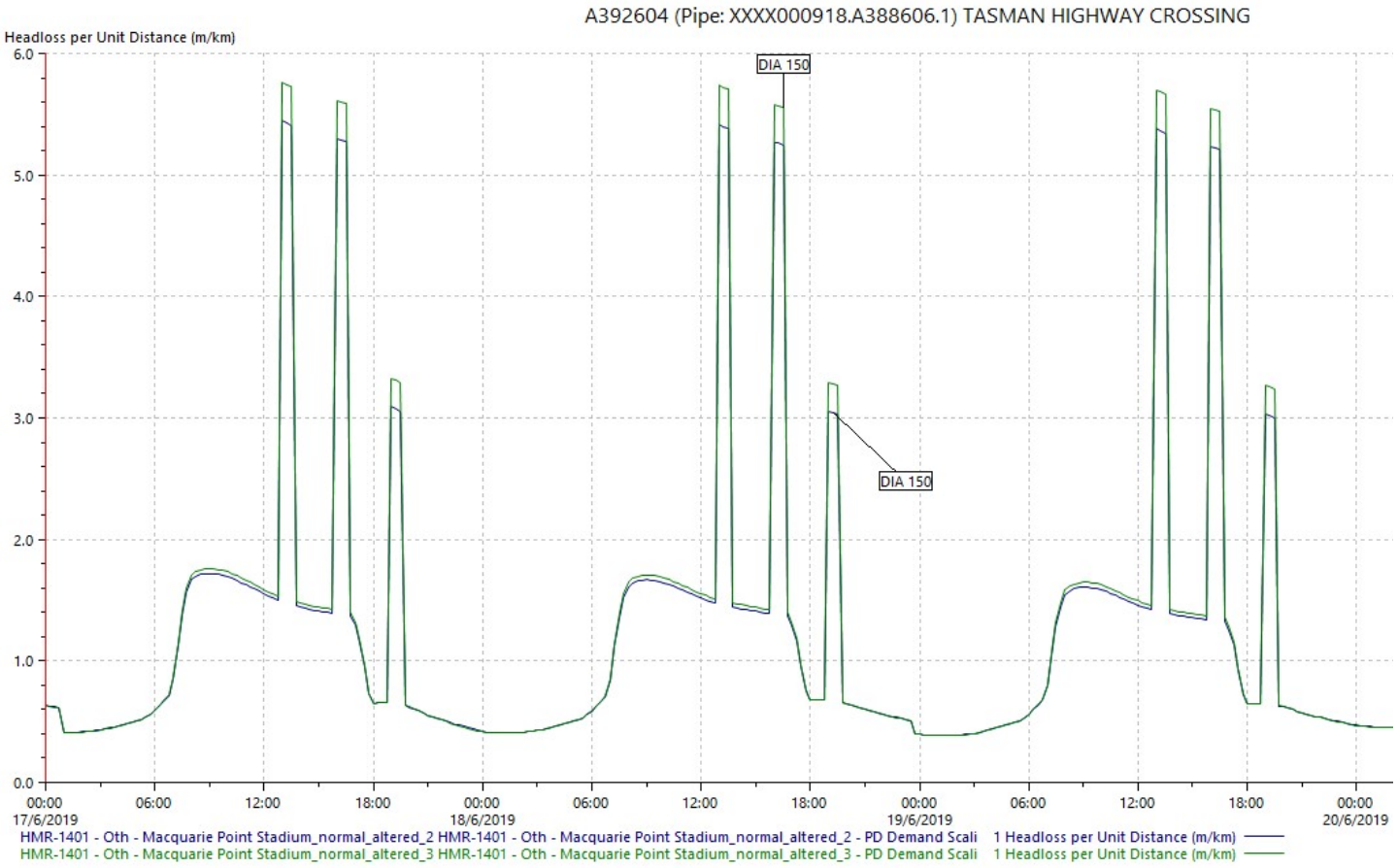
For Evans Street headloss is very high in the existing main to Connection point 2, with a 150mm augmentation headloss reduces to just under 5.0m/km.



This next chart shows the difference between augmenting with a 150mm in Evans Street and Augmenting with a 200mm in Evans Street

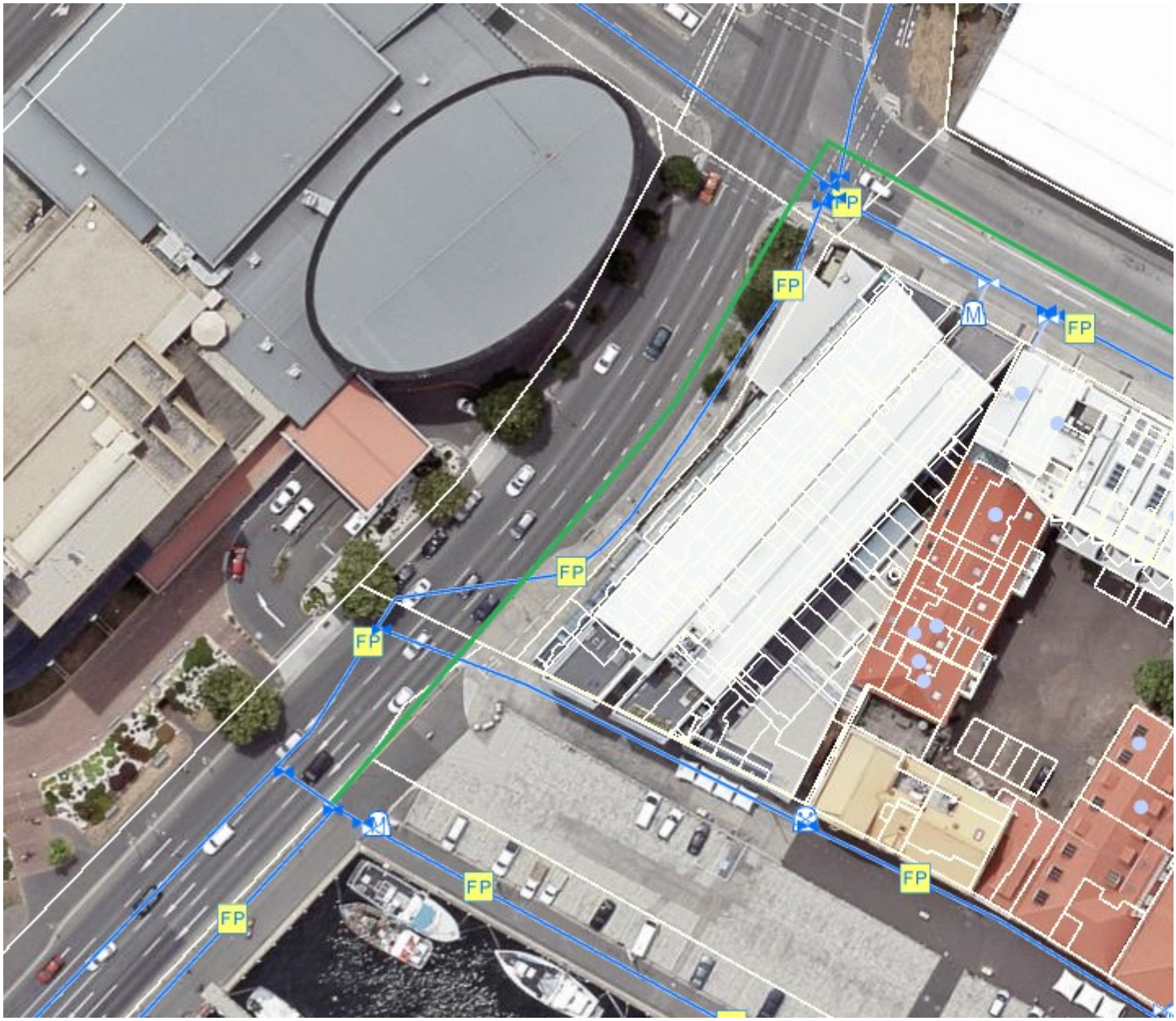


A final chart shows headloss in the high way crossing, which does not drop below 5.0m/Km in any of the simulations. We have assumed that augmentation across the highway is not ideal, as this would need to extend back to Campbell Street either along Brooker Avenue and the Collins Street or along Macquarie Street, both of which have significant services to cross including the Hobart Rivulet, Selfs Point to Blinking Billy Pipelines and the Mac Point Trunk Sewer



note this chart labelled incorrectly the blue line is DIA 200

Given the uncertainty around the design flows and that the headloss in the highway crossing is not able to be practically reduced below TasWater Standards it is recommended that the best out come is a 200mm augmentation along Davey Street from Hunter Street to Evans Street and also 200mm augmentation along Evans Street to the connection point. The pipeline is shown in green below and connections should be made at the intersections along the route.



It should also be noted that MPDC previously constructed a water main along the road from connection point 1. This pipe likely requires replacement to facilitate the stadium, if it is replaced, and the pipe is to ultimately be gifted to TasWater, it should be sized such that headloss in the pipe is below TasWater standards for the design flows. Once beyond the connection to the stadium in this scenario the pipe may be reduced to a smaller size if modelling confirms it is appropriate.

If a 23,000 seat stadium were to be constructed the same augmentations would be required, and at this point in time it should be assumed the same pipe sizes would apply. As better understanding of stadium configuration and likely flows evolve over time sizing can be re-examined but given the number of assumptions at this stage assuming a somewhat conservative approach is prudent.

Sewerage

The sewer trunk main is being realigned along the TasPorts/MPDC boundary with a nominal offset of 3.0m into the TasPorts Land. Connection to this sewer is possible at any of the manholes along its length, advice as to which manholes require connections and what size ASAP will allow provision for them to be included in the construction of the sewer

rather than them being made post construction and possibly to a live sewer. The system is designed to overflow at 2.0m AHD. This will mean that the level in the sewer upstream of the pump station will be higher than 2.0m during spill events and that any connections to the sewer should be made above this level, possibly not lower than 2.5m AHD. For any basement level facilities it will likely be necessary that flows are pumped to ensure that high levels in the sewer do not flow back into the buildings via connections.

If you need further clarification of the above please get in touch.

Grant Henderson
Senior Planning Engineer (Principal Engineer Civil /Mechanical)

M 0428 137 647
F 1300 862 066
A GPO Box 1393, Hobart TAS 7001
169 Main Road, Moonah, TAS 7009
E grant.henderson@taswater.com.au
W http://www.taswater.com.au/

Have I been helpful? Please provide feedback by clicking here.

From: Justin Boocock <jboocock@jmg.net.au>
Sent: Monday, November 20, 2023 3:52 PM
To: Henderson, Grant <Grant.Henderson@taswater.com.au>
Cc: TasWater Development Mailbox <Development@taswater.com.au>
Subject: RE: Mac Point Stadium - servicing strategy SI 2023/00758-HCC

Hi Grant,
How are you going with this request? I'm looking to write this up this week.
Regards,

Justin Boocock | Associate / Senior Civil Engineer
JMG

117 Harrington Str. Hobart Tas 7000
E: jboocock@jmg.net.au
P: 03 6231 2555
M: 0427 244 736

From: Henderson, Grant <Grant.Henderson@taswater.com.au>
Sent: Friday, November 10, 2023 4:14 PM
To: Justin Boocock <jboocock@jmg.net.au>
Cc: TasWater Development Mailbox <Development@taswater.com.au>
Subject: RE: Mac Point Stadium - servicing strategy SI 2023/00758-HCC [Filed 10 Nov 2023 17:22]

Justin Boocock

From: Cengia, Anthony <Anthony.Cengia@taswater.com.au>
Sent: Wednesday, 24 July 2024 7:35 AM
To: Christopher Males
Cc: Jade.Kaye@rarein.com.au
Subject: Mac Point Stadium - servicing strategy SI 2023/00758-HCC

Hi Chris,
Our modelling team have reviewed the latest information and provide the following in response –

Estimates of water requirements at the Mac Point Stadium have been revised. The history of this is tabulated below.

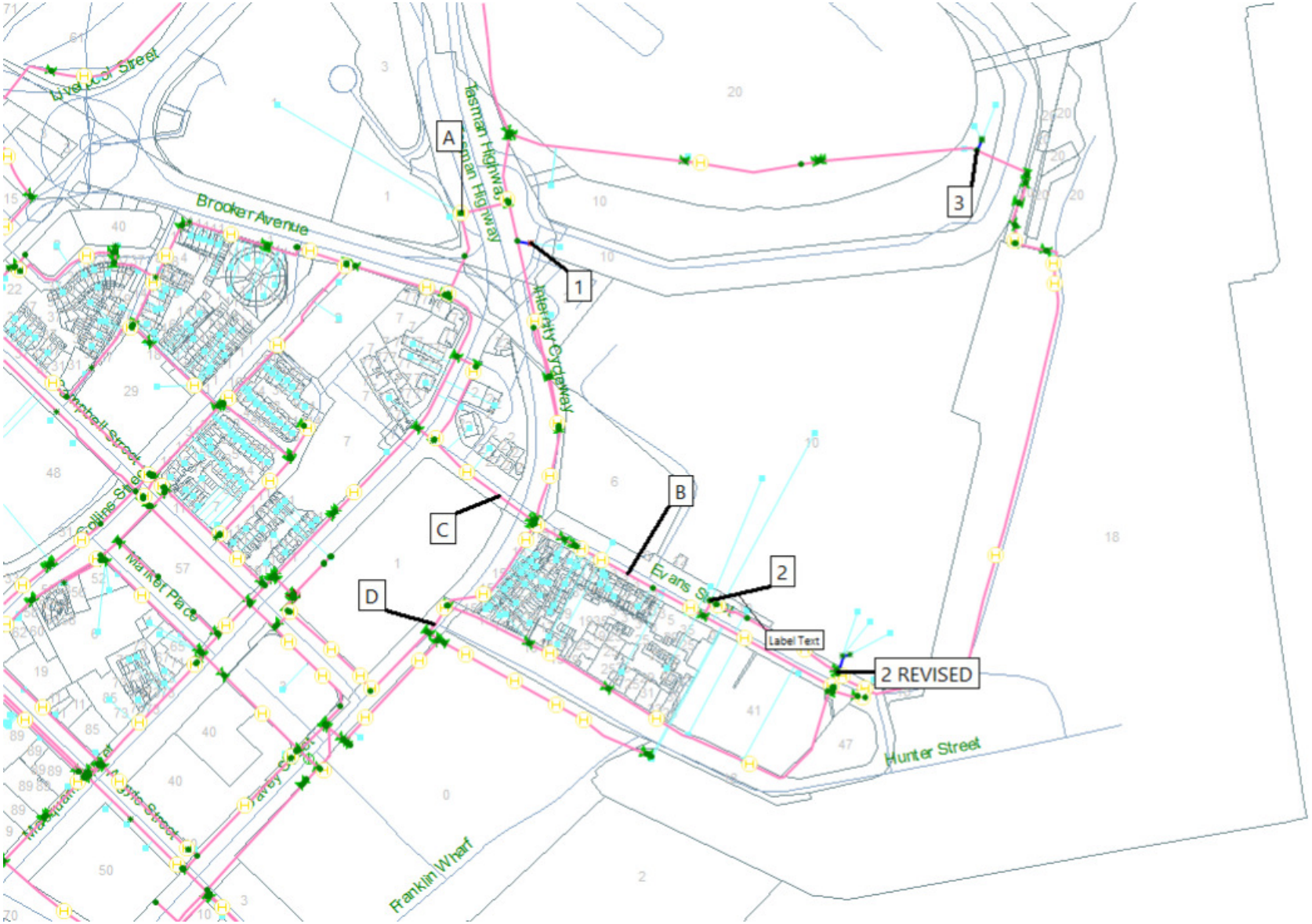
TABLE 1 – MACQUARIE POINT STADIUM – DEMAND FOR WATER

ITEM	11/23 flow	units	Peak flow in l/s	Connection point	Source	7/24 flow	Units	Peak flow 1 in l/s	Connection point	Source	Peak flow 2 in l/s	Connection point
A&SP Renamed as AFZ	8	l/s avg industrial	16	3	JMG email 10/11/23	201 ET	residential	7.2	3	Services report 6/24	7.2	3
Commercial (hotel and restaurant) renamed CIZ	3	l/s avg residential	6	2	JMG email 10/11/23	92 ET	residential	3.3	2	Services report 6/24	3.3	2
Half stadium flow	135000	l/day over 90 minutes	25	1	JMG email 10/11/23	113,400	l/day over 90 minutes	21	1	Services report 6/24		
Other Half stadium flow	135000	l/day over 90 minutes	25	2	JMG email 10/11/23	113,400	l/day over 90 minutes	21	2	Services report 6/24		

Public OS	0.4	l/s avg commercial	0.7	2	JMG email 10/11/23	9 ET	residential	0.3	2	Services report 6/24	0.3	2
Regatta point residential	1.25	l/s avg residential	2,5	3	JMG email 10/11/23	61 ET	residential	2.2	3	Services report 6/24	2.2	3
Fire tank filling						6	l/s cts.			Services report 6/24	6	1
Irrigation						10	l/s cts.			Services report 6/24	10	1
Fire Flow	FIRE FLOW INCLUDED: case 1 - 65 l/s point 1 case 2 – 40l/s point 1 40 l/s point 2					FIRE FLOWS EXCLUDED (internal tanks and pumps)						

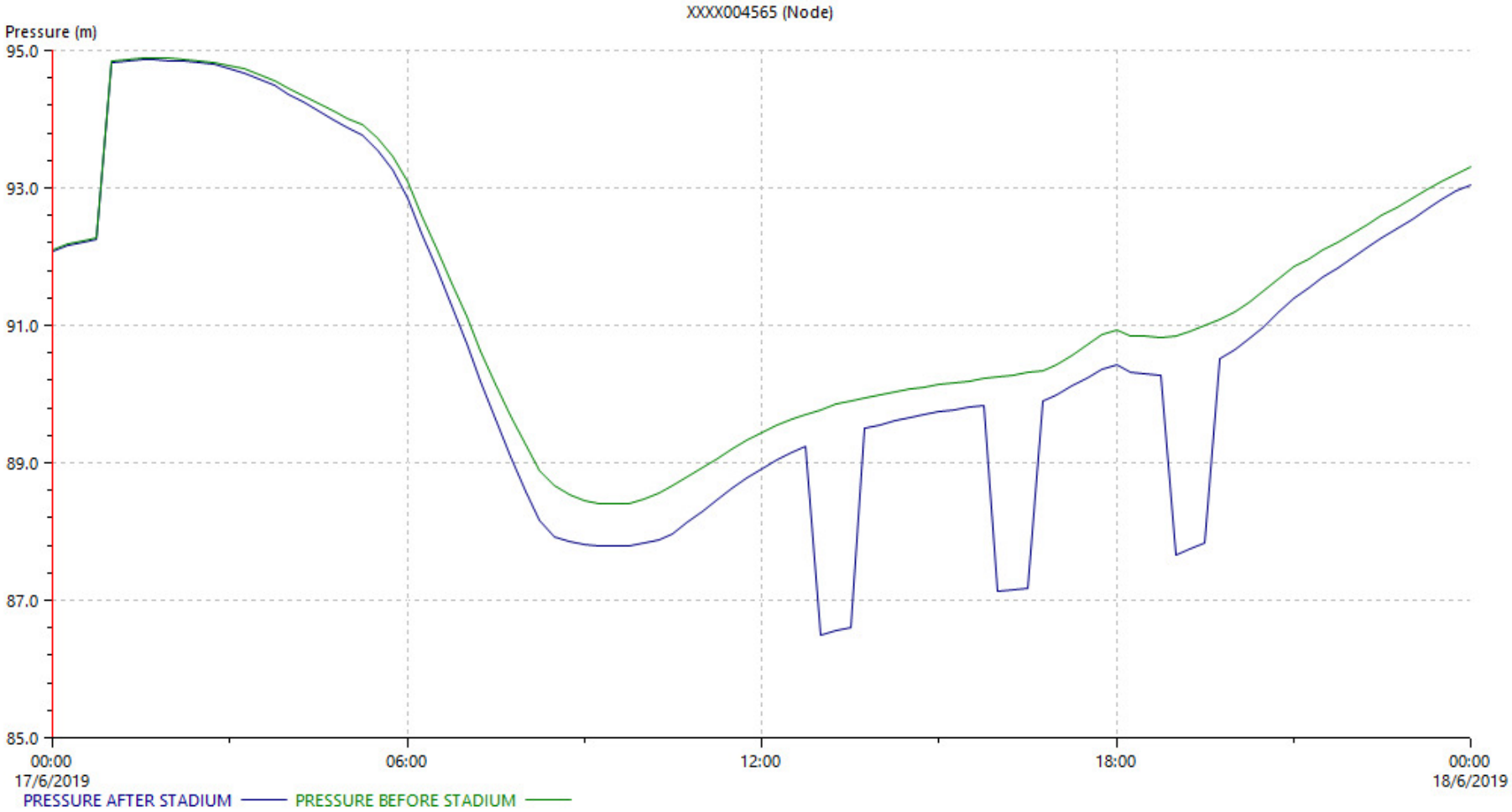
The simulation of the effect of this new stadium has been revised using the latest flow figures. The Largest changes are the lower “intermission” flows and reduced flows to the Antarctic area. Selected results are shown below.

MAP OF CONNECTION POINTS AND LOCATIONS SELECTED FOR GRAPHICAL DISPLAY.

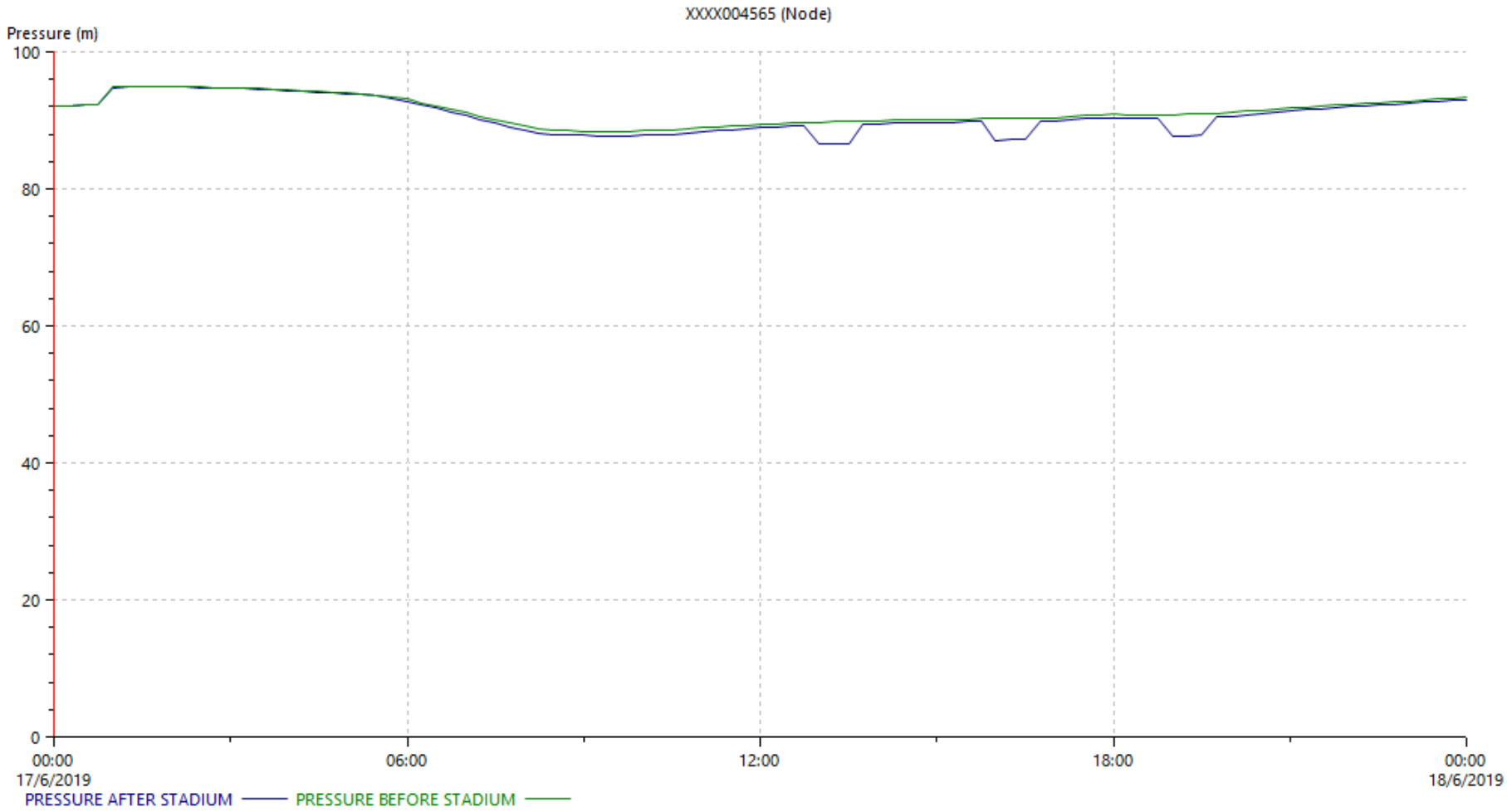


GROUP 1 – THE EFFECT OF STADIUM FLOWS ON PRESSURE

EFFECT OF THE JUNE 2024 LOADS ON PRESSURE AT POINT 2 REVISED (NON ZERO AXIS) **BELOW**



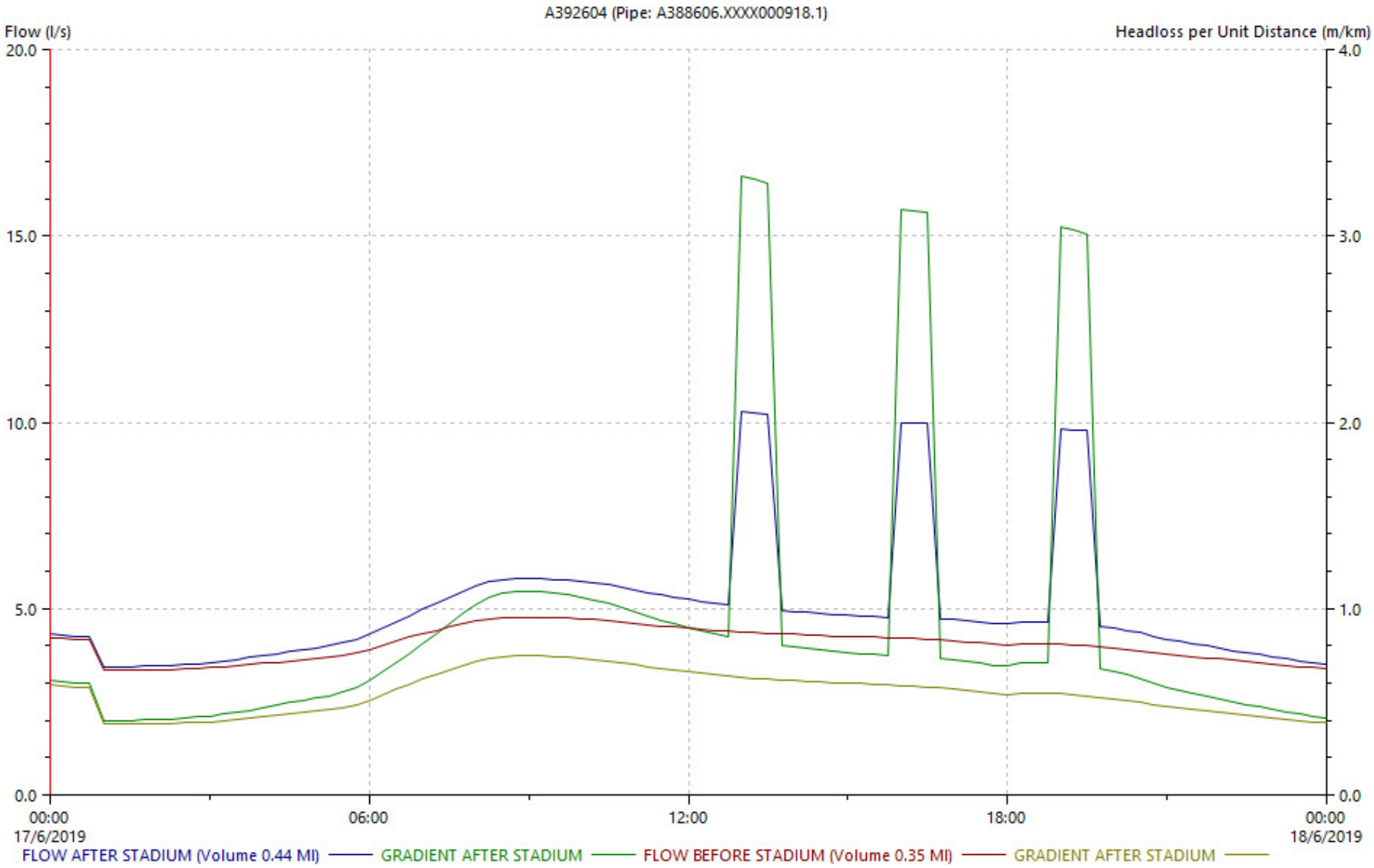
EFFECT OF THE JUNE 2024 LOADS ON PRESSRUE AT POINT 2 REVISED (ZERO AXIS) **BELOW**



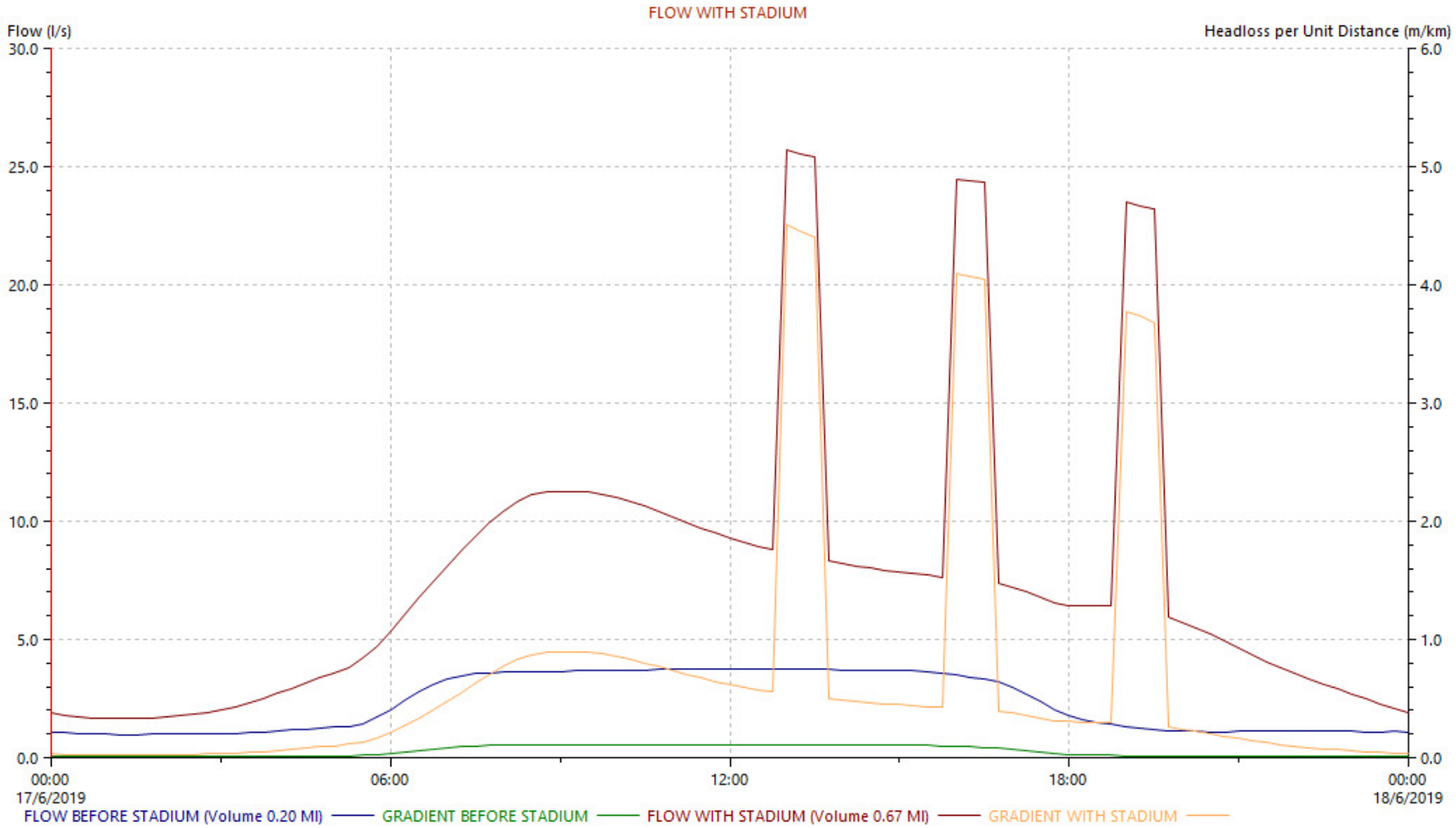
Graphs for the other two supply points are similar.

GROUP 2 – THE EFFECT OF STADIUM FLOWS ON NETWORK CAPACITY

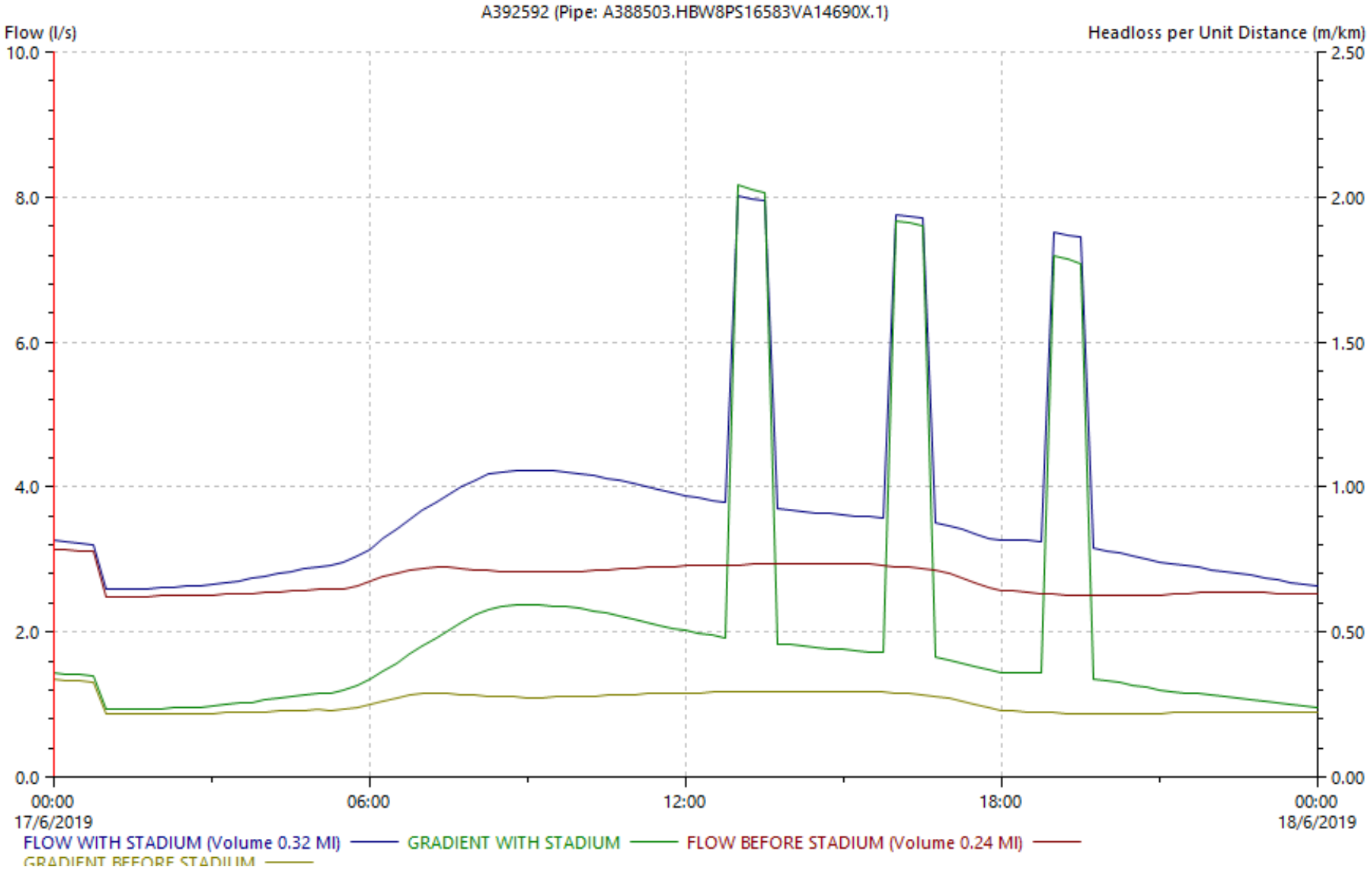
FLOW AND HYDRAULIC GRADIENT AT POINT A WITH AND WITHOUT JUNE 2024 LOADS


A392604 (Pipe: A388606.XXXX000918.1)
Flow (l/s)
Headloss per Unit Distance (m/km)
20.0
15.0
10.0
5.0
0.0
4.0
3.0
2.0
1.0
0.0
00:00
17/6/2019
06:00
12:00
18:00
00:00
18/6/2019
FLOW AFTER STADIUM (Volume 0.44 Ml)
GRADIENT AFTER STADIUM
FLOW BEFORE STADIUM (Volume 0.35 Ml)
GRADIENT AFTER STADIUM

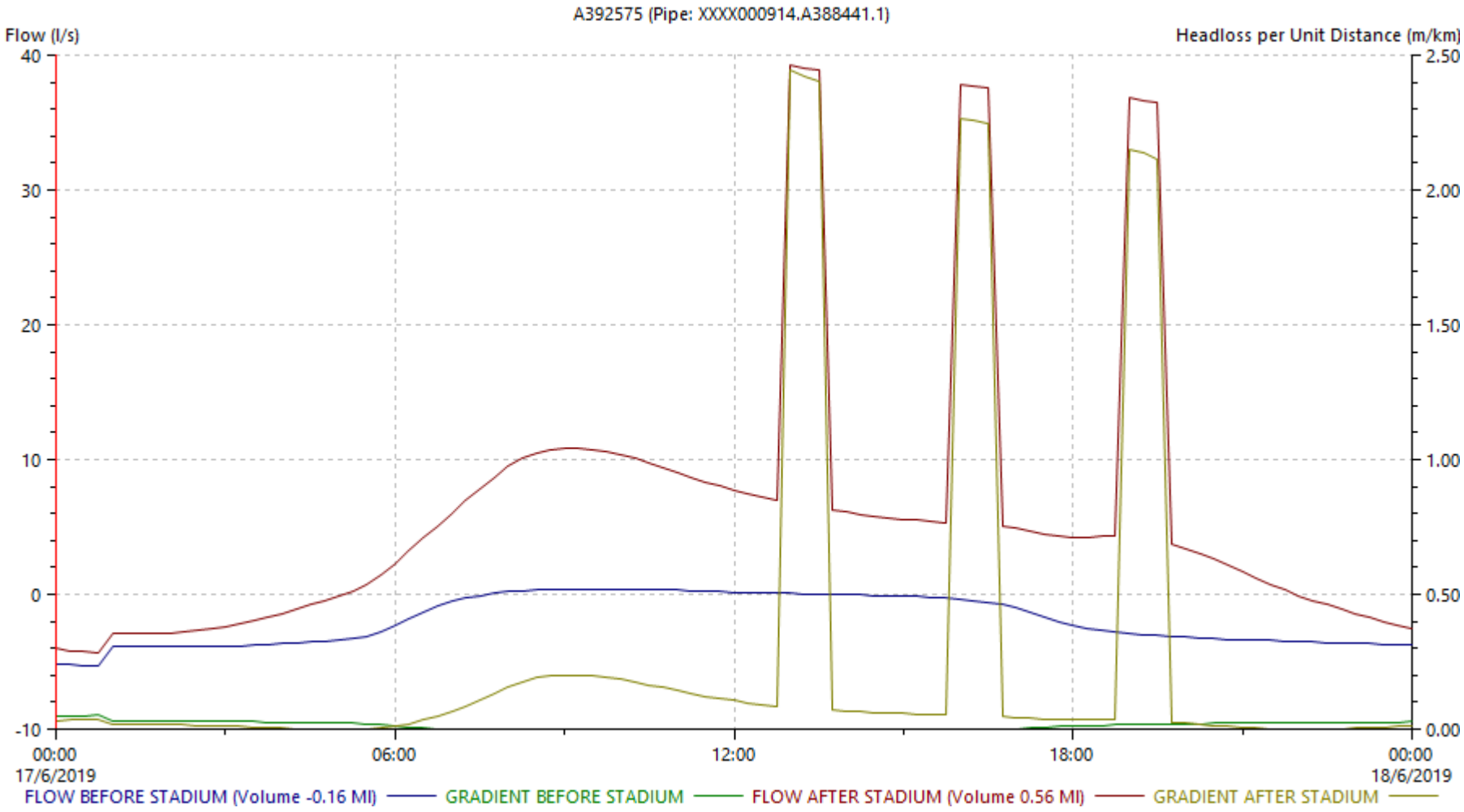
FLOW AND HYDRAULIC GRADIENT AT POINT B WITH AND WITHOUT JUNE 2024 LOADS



FLOW AND HYDRAULIC GRADIENT AT POINT C WITH AND WIOTHOUT JUNE 24 LOADS.

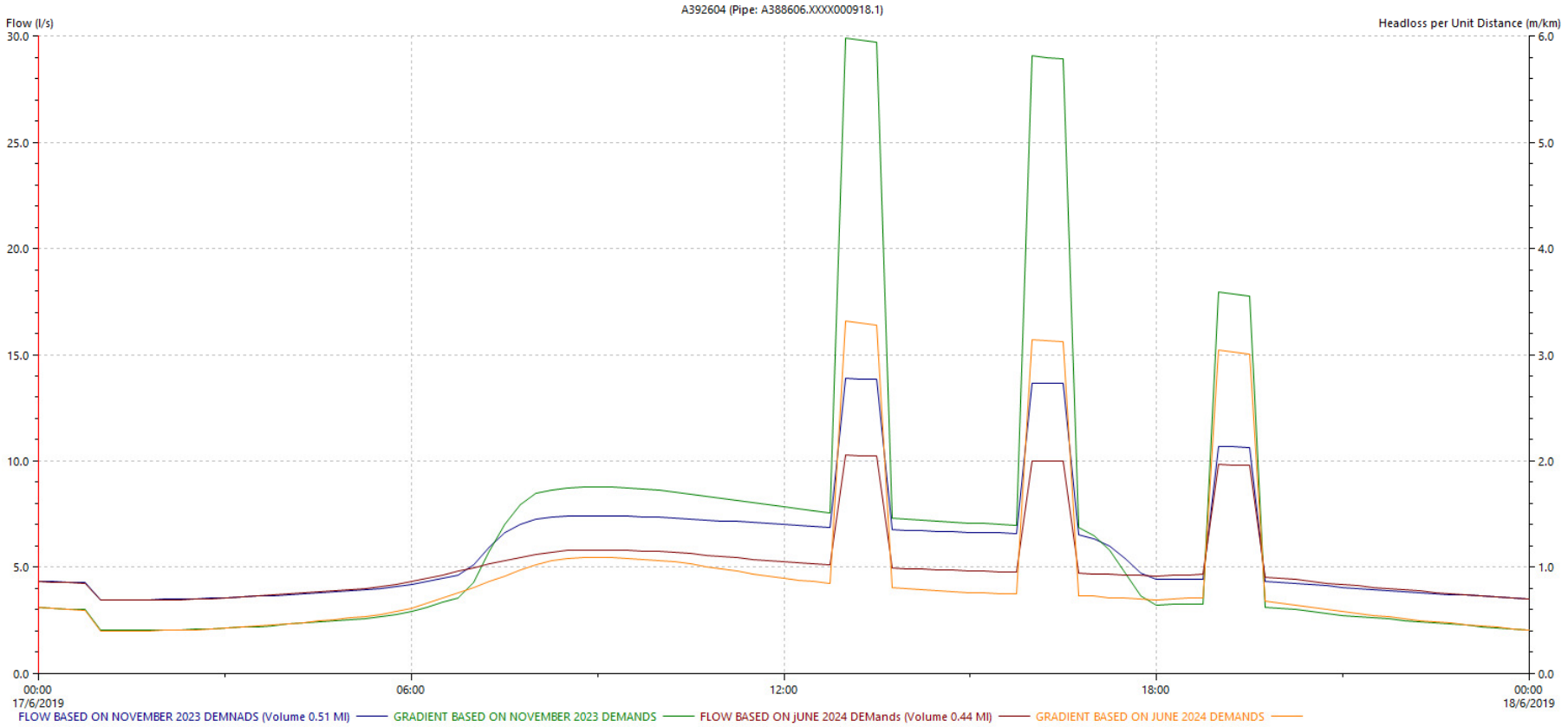


FLOW AND HYDRAULIC GRADIENT AT POINT D WITH AND WITHOUT JUNE 2024 LOADS

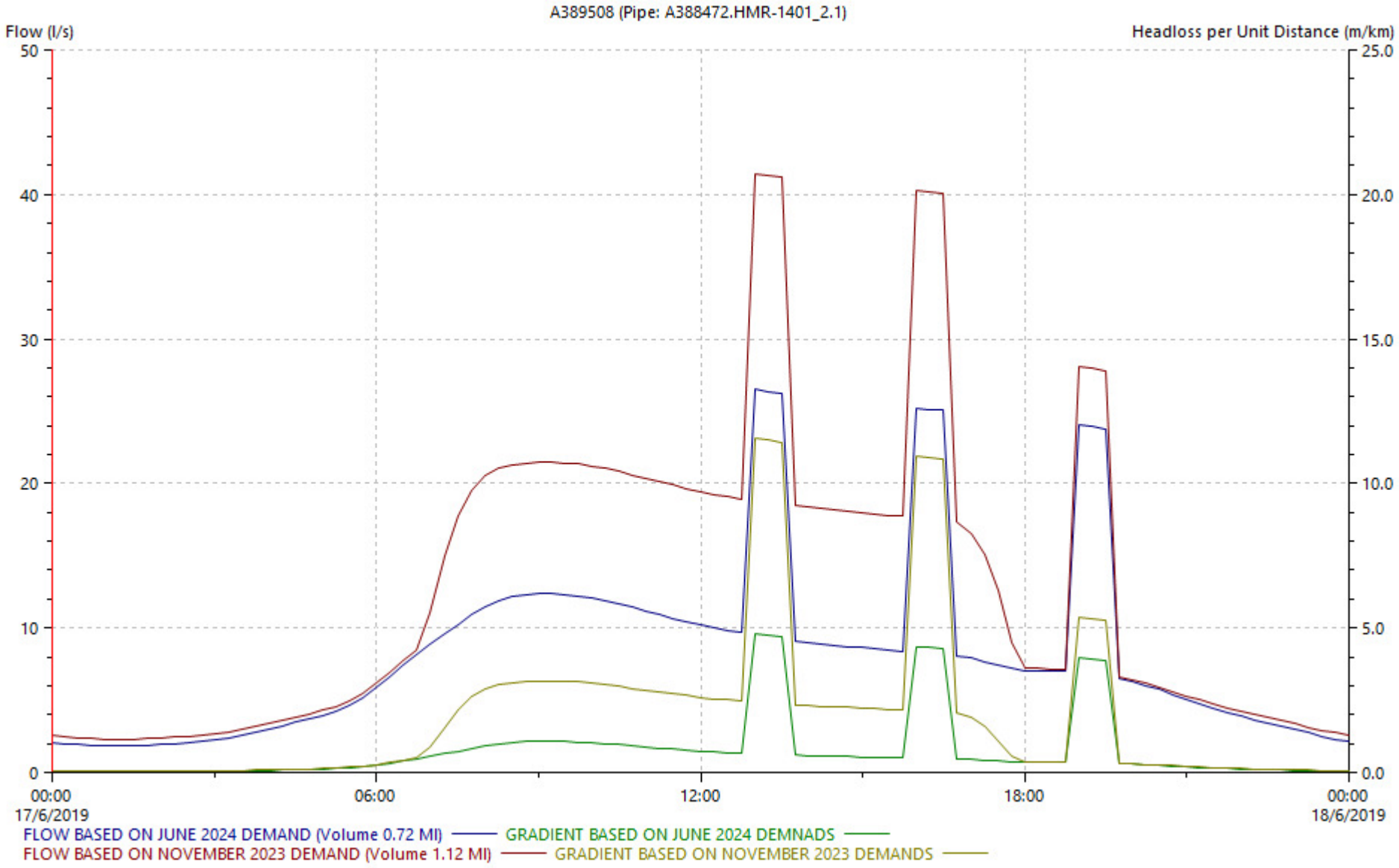


GROUP 3 – CHANGES IN GROUP 2 RESULTS BETWEEN NOVEMBER 23 AND JUNE 24

FLOW AND HYDRAULIC GRADIENT AT POINT A WITH JUNE 2024 AND NOVEMBER 2023 DEMAND



FLOW AND HYDRAULIC GRADIENT AT POINT B WITH JUNE 2024 AND NOVEMBER 2023 DEMAND



GROUP 4 – NETWORK LOCATIONS WHERE THE STADUIM DEMANDS CAUSE NETWORK OVERLOAD

The images below provide two pieces of information. Firstly it provides a profile of pressures in the Hobart CBD during a first quarter break at 13:15. This depicts a busy city and a mass exodus to the stadium toilets at the same time. Each node in the model is assigned a colour based on the calculated pressure. The cooler the colour (i.e. indigo) the higher the pressure. This shows how well serviced the stadium will be. Areas of concern show up red and this image shows a low-pressure area at the north East corner of the Glebe. Secondly pipes highlighted in orange are pipes where:

- Before the construction of the stadium, over the course of a peak day, the hydraulic gradient in the pipe conformed to clause 3.1.6.2 of WSA 03-2011 in that the hydraulic grade within them was less than 5 m/km.
- After the construction of the stadium, over the course of a peak day, the hydraulic grade within them was greater than 5 m/km.

The areas where this has occurred are tabulated below:

LOCATION	IMAGE	ASSET ID	BACKGROUND
Argyle St. Federal to Burnett	1	A392873, A392879, A392877	Pre-existing condition not urgent
Campbell St Burnett to Warwick	1	A393605, A393603	Pre-existing condition not urgent
Elizabeth Burnett to Tasma	1	A392854	Pre-existing condition not urgent
Corner Campbell and Brisbane	1	A391473	Pre-existing condition not urgent
Campbell Brisbane to Melville	1	A393649	Pre-existing condition not urgent
Campbell Bathurst to Liverpool	1	A392297	Pre-existing condition some concern
Liverpool at the railway roundabout	1	A392356, A392322,	Caused by Stadium some concern
Liverpool, past Aquatic Centre to Aberdeen street.	1	A392354,A389759,A392307,A391701 A391705,A389529,A391758,A391696 A391703	Pre-existing condition some concern
Brooker Collins to Macquarie	2	A392627	Caused by Stadium action required
South end of Mall	2	A389653	Caused by Stadium some concern
Evans Street	2	A389508	Caused by Stadium action required
Crossing Evans street Eastern end	2	A391588	Caused by Stadium action required
Corner Macquarie and Campbell	2	A389744,392505	Caused by Stadium action required

IMAGE 1 CBD

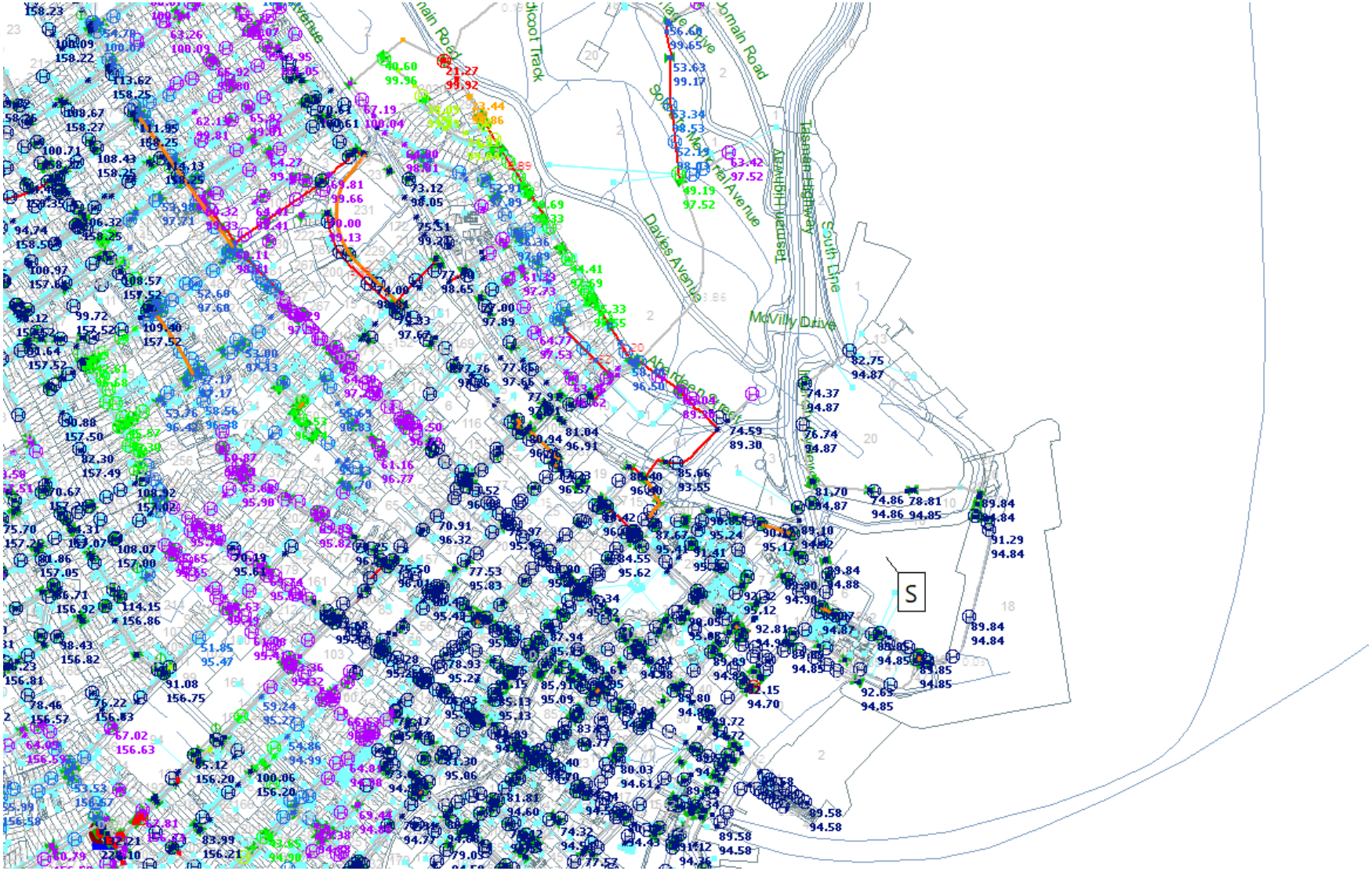
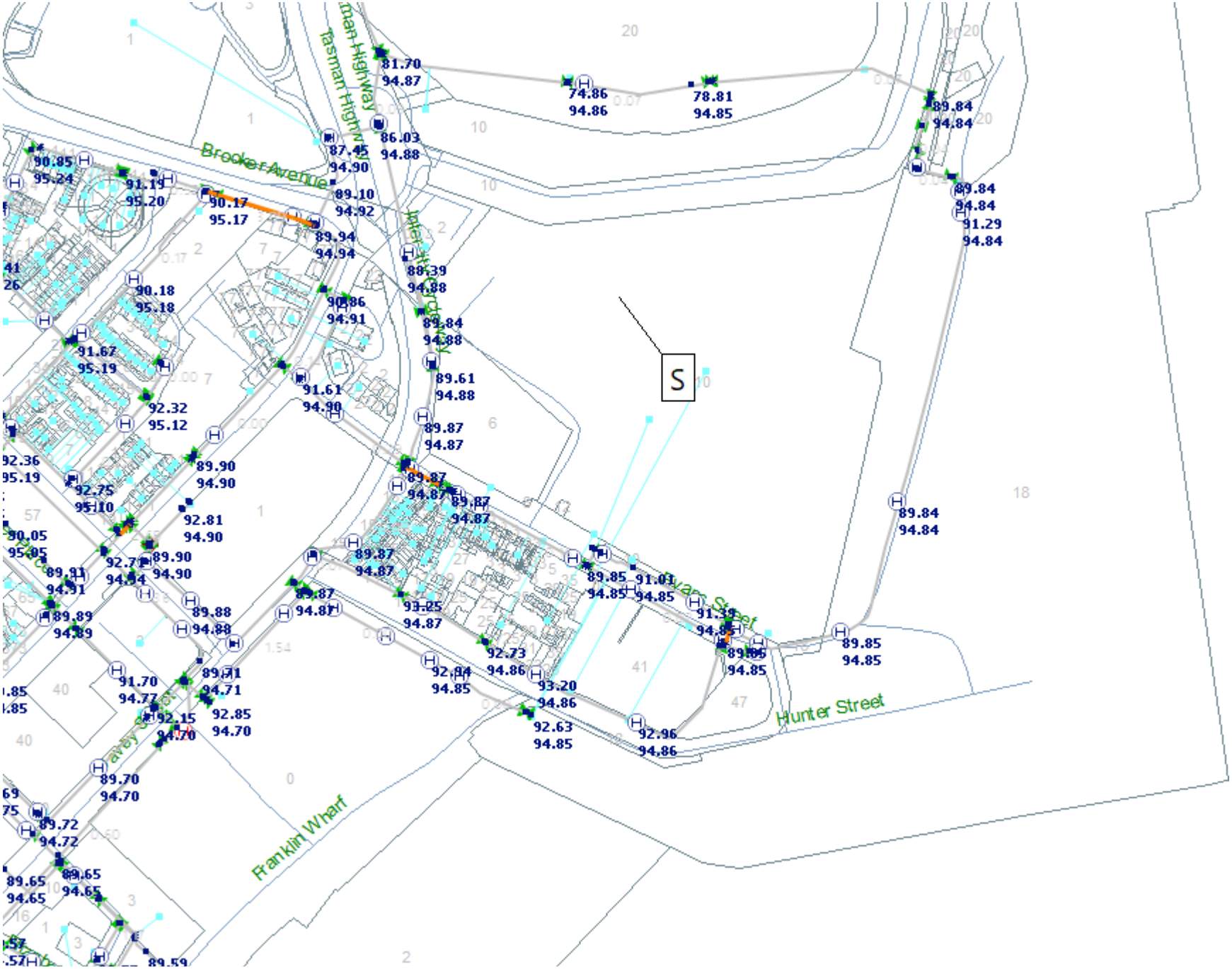


IMAGE 2 PORT AREA


Brooker Avenue
Tasman Highway
Tasman Highway
Hunter Street
Franklin Wharf
S

CONCLUDING

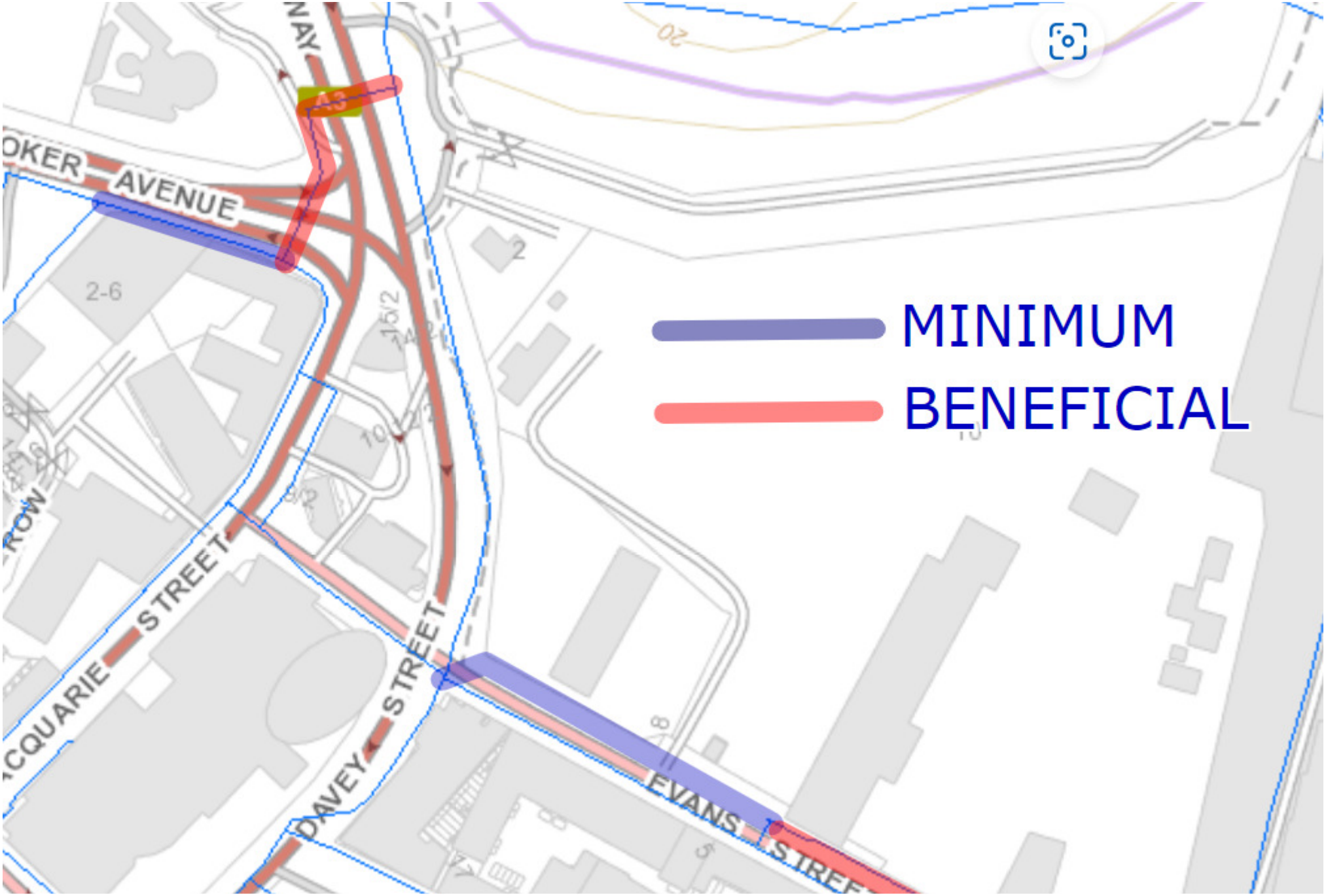
The stadium design team have achieved a significant reduction in water usage at the new Macquarie Point Stadium. There are fewer serious concerns about pipe overload in the model for the June 24 loads, than were present in November 23 but action in four areas is still needed as shown in the table above. The head (not pressure) available at each connection point is tabulated below. This assumes no works external at this stage. These values allow for the Domain reservoirs to be 1/3 full.

Location	Available H.G.L. (m)	Asset No
Connection Point 1 Davey Street	89	A392615
Connection Point 2 Evanas Street	88	A391596
Connection Point 3 Macquarie Point	88	A391607

These are heads within the TasWater network, so they do not account for losses in customer piping and fittings. This result is based on a sound but imperfect knowledge of conditions in the field and those who use this information should allow an appropriate margin of error in their design.

The Peak flow 2 scenario shown in Table 1 has been simulated. This does not result in conditions worse than those generated by a football game, but it is likely that irrigation will use the most water because of the long duration of the flow.

The image below shows the areas where modelling indicates that augmenting pipes will ensure adequate supply to the stadium and prepare the Macquarie Point precinct for future growth. This incorporates the overloaded pipes tabulated above, which could be described as the minimum required. It also includes some “no regrets” work that would reduce the likelihood of disruptive roadworks in the area for years to come.


MINIMUM
BENEFICIAL
OKER AVENUE
2-6
CQUARIE STREET
DAVEY STREET
EVANS STREET

Regards,
Anthony Cengia
Development Technical Specialist

M 0474 933 293
E anthony.cengia@taswater.com.au
A GPO Box 1393, Hobart, TAS 7001
A 169 Main Road, Moonah, TAS 7009
—
taswater.com.au

Please note that I am working from both home and the office on a 9 day fortnight, every second Monday is my non-work day.

TasWater confirms that you have made a pre-lodgement enquiry for the above proposal. TasWater's servicing advice in this response to the above proposal is based on the water and sewerage components of the proposal only. The other aspects of the proposal will be assessed by the relevant Planning Authority, or the Development Assessment Panel established under section 60G of the *Land Use Planning and Approvals Act* ("the Act") where the proposal is declared as a major project under 60C of the Act.

Despite anything else in the servicing advice TasWater reserves its rights regarding this proposal, when it is submitted for assessment as required by law under the Act.

From: Christopher Males <cmales@jmg.net.au>
Sent: Tuesday, July 9, 2024 9:05 AM

APPENDIX E

AECOM Stadium Demands

Christopher Males

Subject: FW: Macquarie Point Stadium
Attachments: MPS - Hydraulic- Sewer & Water Connection.pdf

From: Hinds, Darren <Darren.Hinds@aecom.com>
Sent: Tuesday, July 2, 2024 9:47 AM
To: Christopher Males <cmales@jmg.net.au>
Cc: Jade Kaye <Jade.Kaye@rarein.com.au>; Tanno Goncalves <cgoncalves@jmg.net.au>; Stephen Masters <smasters@pittsh.com.au>; Mathew Joy <mathew.joy@introba.com>; Jackson, Phillip <phillip.jackson@aecom.com>; Brenden McGrath <brenden.mcgrath@introba.com>
Subject: RE: Macquarie Point Stadium

Hi Chris,

Estimated Water Demands

The estimated peak water demand for the Stadium has been assessed and considered in various ways to determine suitable load volumes with a peak flow adopted.

The peak flow assessment has been carried out for 26,000 and 36,000 Stadium capacities, and the results have been determined, as noted below.

The various methods considered in assessing the peak water demands are as follows:-

1. An assessment of anticipated probable loading based on fittings in accordance with AS/NZ 3500.1 and adopting a peak flow 2.5 times the probable load.
2. The allowance of water used per person is in litres per person (15 L) for potable and toilet flushing over a typical match day, with consideration for 30% of the volume used in a peak hour.
3. Allowance of water in a flow rate per person (0.00125 l/sec), similar to allowances considered within the stadium's initial infrastructure report.
4. Consideration for original peak volume allowance considered within the infrastructure report for 23,000 and 40,000 seat stadium and extrapolating loads to suit the revised Stadium capacities.

For a 26,000-capacity stadium the calculated peak flow rates for each method are as follows: -

1. 33.3 l/sec.
2. 33.0 l/sec.
3. 32.5 l/sec.
4. 32.6 l/sec.

For a 36,000-capacity stadium the calculated peak flow rates for each method are as follows: -

1. 44.1 l/sec.
2. 45.0 l/sec.
3. 45.0 l/sec.
4. 45.2 l/sec.

Based on the above calculated loads, the peak water supply demand is 35 l/sec for 26,000 capacity Stadium and 47 l/sec for 36,000 capacity Stadium.

The peak water supply loadings are within the anticipated loads set out previously and do not exceed the 50 l/sec noted for a 40,000 capacity Stadium.

The peak sewage outfall demand is anticipated to be similar to the loadings noted for water supplies.

We note that the peak water demand does not consider irrigation supply uses or demands. It is anticipated that the irrigation demand will occur after hours, outside the times of any peak domestic water demand and possibly in the order of a 10l/sec flow rate.

Fire Water Demands

The current design we are progressing through concept design for the fire water infrastructure for the stadium has been designed to be a full capacity tank solution. What this means for the stadium, is that we need to allow for the tank fill time only. The fill rate

for the tanks is currently 5L/sec for the hydrant portion and 1.2L/sec for the sprinkler portion totalling to 6.2 L/sec required for the tank fill rates for the stadium.

Noting the current strategy is a precinct wide fire water solution, we recommend the water authority as part of the upgrade strategy allow for (as nominated in the JMG report) the next highest fire water demand of 32L/sec. This will allow the most flexibility as the design progresses into the next phase without imposing the onerous 66L/sec previously nominated and the precinct wide fire water can be agreed with other parties and the strategy endorsed by Tas Fire.

We note that Tas Fire Service raised concerns on the existing infrastructure in the area and mentioned the prospect of providing a sea water pump station to provide an alternate supply (not required under the NCC). This would need to be considered under the precinct wide fire water strategy.

Indicative Connection Locations

Please find attached markup showing the indicative locations of the proposed sewer and water connections. The final location of these shall be subject to discussion with TasWater and the broader precinct infrastructure team.

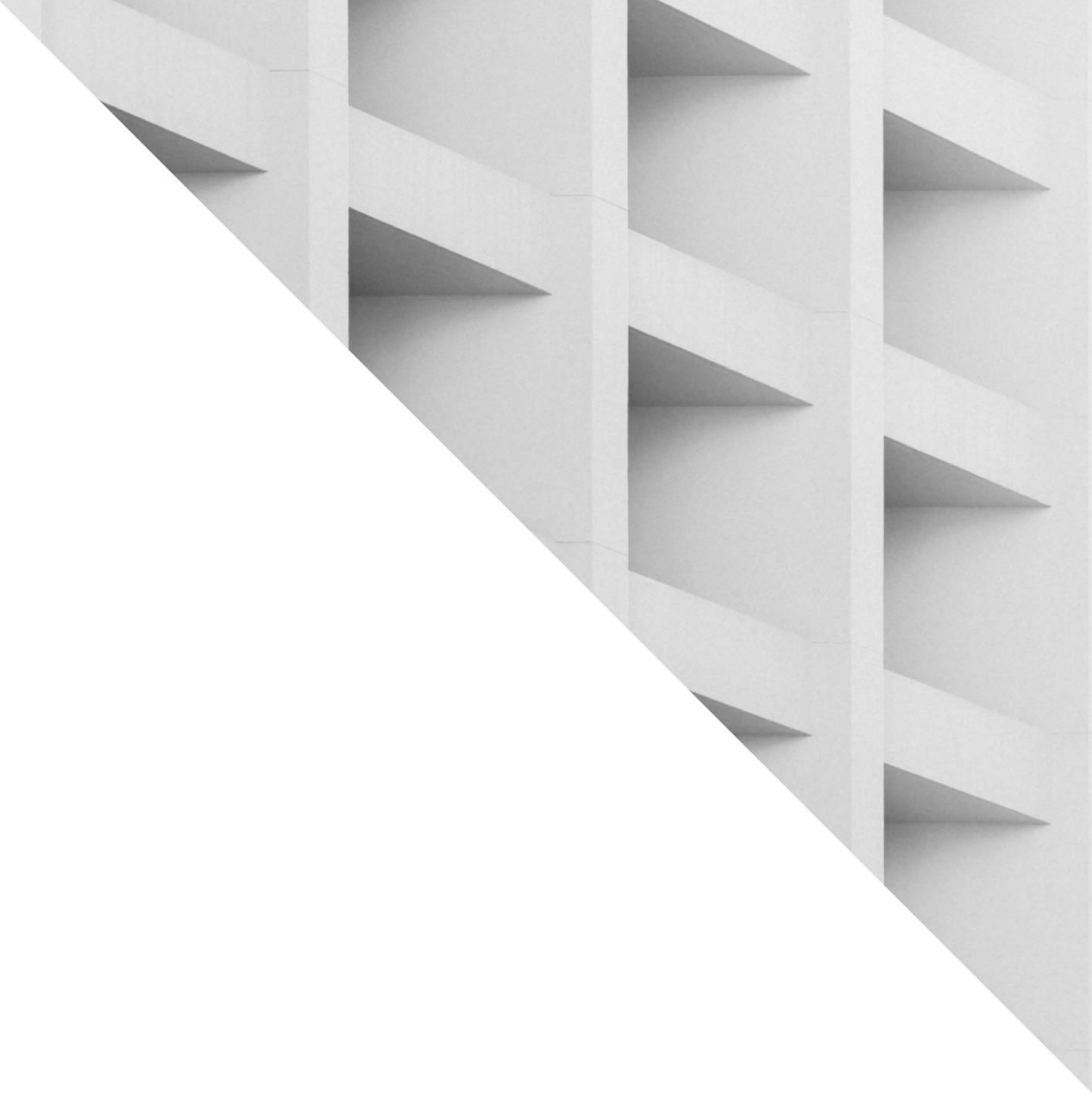
Regards,

Darren Hinds

Technical Director, Buildings and Places, QNT
M +61 418 585 042
darren.hinds@aecom.com

AECOM
Level 8, 540 Wickham Street
Fortitude Valley
QLD 4006, Australia,
T +61 1800 868 654
aecom.com

From: Christopher Males <cmales@jmg.net.au>
Sent: Thursday, June 27, 2024 3:58 PM
To: Hinds, Darren <Darren.Hinds@aecom.com>
Cc: Jade Kaye <Jade.Kaye@rarein.com.au>; Tanno Goncalves <cgoncalves@jmg.net.au>; Stephen Masters <smasters@pittsh.com.au>
Subject: Macquarie Point Stadium



ACN 009 547 139 | ABN 76 473 834 852

117 HARRINGTON STREET, HOBART (03) 6231 2555
GROUND FLOOR, 73 PATERSON STREET, LAUNCESTON (03) 6334 5548
www.jmg.net.au