## Document Control

<table>
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<tr>
<th>Date</th>
<th>Version</th>
<th>Description</th>
<th>Prepared by</th>
<th>Reviewed by</th>
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<tr>
<td>29/10/18</td>
<td>1</td>
<td>For Issue</td>
<td>K Rigter / K Johnson</td>
<td>A Richardson / T Allsopp-Smith</td>
<td>R Reinen-Hamill</td>
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<td>K Johnson</td>
<td>A Richardson / T Allsopp-Smith</td>
<td>A Richardson / T Allsopp-Smith</td>
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### Distribution:

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1 Introduction

Auckland Transport (AT) has engaged Tonkin & Taylor Ltd (T+T) to undertake the civil design for the relocation of Pier 3 and Pier 4 ferry terminals in Auckland City Ferry Basin to the west side of Queens Wharf and proposed modifications to the existing ferry terminal building.

The purpose of this report is to assess the adequacy of the existing infrastructure for stormwater, sanitary sewer, water supply, and services (data, power, and communications) and describe the proposed changes to the existing infrastructure to support the proposed development.

We have completed the Resource Consent design of the proposed services, which includes sanitary sewer, stormwater, water supply and other services, however it is intended that a detailed design of the proposed infrastructure will follow at a later date which will be used to lodge other applicable consent applications including Building Consent.

2 Existing site description and layout

The subject site is located on Queens Wharf, Downtown Auckland adjacent to the Waitematā Harbour. The existing Downtown Ferry Terminal (DFT) is located on Queens Wharf itself (as shown in Figure 2-1 below). Queens Wharf is relatively flat, with a deck level of approximately RL3.0 m, and being approximately 375 m long by 88 m wide, having an overall site area of 3 Ha.

Queens Wharf also houses two existing event facilities; The Cloud and Shed 10, which are used at various times for public and private functions. Furthermore, the east of Queens Wharf is used for mooring larger Cruise ships, with passenger disembarking into Downtown and onto busses and a Taxi rank from the wharf located outside the existing ferry terminal adjacent to Quay Street. An existing container village and open spaces are also located here.
The Existing Terminal and Pier 1, see Figure 2-2, houses ticket offices; waiting areas and several existing public and staff toilets; complete with showers and wash basins. These are serviced by existing water, wastewater and electrical installations throughout the terminal, which also includes existing wastewater (sullage) tanks used by the ferries operating out of the terminal. Sullage from these operations connects to existing sewage tank prior to discharge into the public sewer systems on Quay Street based on existing service plans prepared by GHD.

Mapping of the existing services was undertaken by GHD in April 2018 and includes the Ferry Terminal and Pier 1. These plans of existing services at the southern end of Queens Wharf are attached in Appendix A and illustrate the known arrangements of water connections, sullage tanks and dry services.

### 3 Proposed development

As part of the Downtown Ferry terminal (DFT) redevelopment six new berths, will be located along the western edge of Queens Wharf, to the north of the existing Ferry Terminal/ Pier 1 (as shown in Figure 3-1 below). Three new gangways will connect the six berths to Queens Wharf. The proposed development layout and details are attached in Appendix B, however a general overview of the layout is included in Figure 3-1 below.
The proposed changes to the existing infrastructure include new services to these new berths including potable water supply and a new standalone sullage system with connections back to the existing reticulation on Quay Street. Overall, as the new berths are to replace existing berths (Pier 3 and 4) and retain the existing ferry capacity; the overall net increase in wastewater will be minimal and is described in more detail in the following sections.

Further changes are proposed to the terminal building infrastructure on Pier 1; these currently include a nominal but relatively small increase in numbers of public toilets and hand basin facilities. These arrangements and details are still being developed but it is envisaged these will connect onto the existing private systems within the terminal. No significant or major changes are envisaged to the existing network.

These additional facilities will have a small net increase in the overall wastewater generation and water demand but not significant in the context of the current upstream Downtown CBD environment. Calculations on the proposed increase in wastewater and water supply detailed further in sections 5 and 6 below. This will be reviewed with Watercare prior to detailed design and where connections involve changes or additions to the private system these will be covered under separate Building Consent application.

4 Stormwater

As described in the previous sections the existing Queens Wharf super-structure will be retained, therefore there will be no impact on the impervious area from either the Wharf or the ferry terminal/ Pier 1 buildings and therefore there will be no change in run off as a result.

Proposed arrangements include for the new pontoons, gangways and associated shelter areas on Queens Warf West (as was shown in Figure 3-1); however runoff will not be captured nor treated.
from these surfaces and therefore will runoff into the ferry basin as per the existing catchment arrangements.

All new pontoons, gangways and shelter materials will comprise of inert materials which will not have high contaminant yielding and as such treatment of the runoff is not proposed.

Overall, the proposed new pier development is not expected to have an effect on the existing stormwater infrastructure and is not discussed further in this report.

5 Wastewater

5.1 Existing Infrastructure

Information relating to the existing sanitary services on and around Queens Wharf is limited. However based on the service mapping undertaken by GHD (Appendix A), three separate connections service the private facilities on Queens Wharf, these includes the ferry terminal, ferry infrastructure (Pier 1), the container village, the Cloud and Shed 10. Currently private lines from Pier 1 and the Ferry Terminal; and from Pier 2, transfer wastewater flows from sullage and other activities to the main wastewater network. The diameter and material of these private system pipes is unknown, and where these pipes connect exactly to the main network is also unknown.

For the Public System both Auckland Council (GIS) and Watercare (GIS) indicate a 100 mm diameter PVC public wastewater pipe that runs parallel to Quay Street in front of the Ferry Building. It is assumed that wastewater discharges from the Ferry Building flow into this 100 mm diameter pipe, though the connection to this pipe is unknown. This 100 mm diameter pipe then connects to a 150 mm diameter earthenware (EW) pipe running across Quay Street, which then discharges into a 375 mm diameter concrete pipe crossing Queen Street.

5.1.1 Current wastewater generation

The existing wastewater infrastructure within the Ferry Terminal and Pier 1 comprises of:

- two sullage points (boat sewer discharge points – 1B, 1C).
- two staff toilet facilities (3 WC, 3 basin, 1 kitchenette sink, 1 shower); and
- one public toilet facility ( 5 WC, 2 Urinals, 5 basins) within the ferry terminal.

The wastewater generated is pumped to a sewer holding tank located on Queens Wharf to the east of the Downtown Ferry Terminal (DFT). The sewer holding tank has an approximate capacity of 5000 litres based on information available. From the sewer holding tank, a sewer discharge pipe runs north-south along Queens Wharf towards Quay Street and flows to the main line.

The existing wastewater infrastructure within Pier 2 comprises of three sullage points (boat sewer discharge points – 2B, 2C, 2D). These are all pumped to a second tank located on the eastern side of Pier 2. A sewer discharge pipe runs along Pier 2 towards Quay Street transferring flows to the main line.

It is currently unclear how and where the sewer pipes from both tanks connect to the main line as noted in Section 5.1. However, the sewer holding tanks are sensor driven to ensure the downstream wastewater system is not overloaded. Further detailed discussions are ongoing around there operation including connection will be discussed with Watercare and the Ferry Terminal operators which will inform the detailed design. We note that given we are providing a new sullage system to service the new berths, discharges to the existing system are expected to reduce.
Flows from the current toilet blocks from the Ferry Terminal have been estimated based on a passenger count undertaken by T+T between 24 and 25 October 2018 during peak hours. The assessment assumes a non-peak hour use of 50% of the peak hour use, at a 10 L usage per person.

The flows from the existing sullage tanks have been estimated based on our conversations with Fullers and the AT operational team. As an initial estimate, we have conservatively assumed that each tank is emptied 6 times per day for the basis of our analysis.

Wastewater from The Cloud and Shed 10 discharge to the same public network pipes, however they will not be affected by our proposals for the DFT. A survey of the services from these buildings was not undertaken and details of wastewater is also uncertain. Based on the limited information, we have not calculated for any wastewater generation from these two buildings specifically; however we have taken consideration of wastewater discharges from the Queens Wharf in general through the terminal usage and conservative estimates, assumptions will be reviewed with Watercare to identify any issue or constraints that arise with respect to Shed 10 and The Cloud on the DFT proposals.

Other sources of upstream wastewater generation include the CBD buildings and properties, which contribute to the wastewater collected by the downstream 375 mm diameter concrete pipe crossing Queen Street. The flows from upstream CBD buildings have been estimated following the design approach outlined in the Watercare Water and Wastewater Code of Practice for Land Development and wastewater flows have been estimated based on the total floor area of each structure assuming “office and dry retail use”. Diagrams are provided in Appendix C of the existing catchments considered upstream of the main connections at Queens Wharf into which all DFT and Queens Wharf discharge into.

This is considered to be a conservative estimate of the actual wastewater upstream as some of the buildings in the catchment area will be classified in-use as hotels or other uses. Having reviewed the sensitivity to this assumption we have concluded this would generally generate less wastewater per m² than calculated therefore we have detailed a conservative estimate based on the limited information available for those reasons given above.

5.2 Proposed infrastructure

As part of the new berths along Queens Wharf West the berths will be serviced by three new sullage points. It is intended that similar arrangements to the existing sullage operations from Pier 1 using a dedicated sullage discharge tank and new connection to the public reticulation will be provided for the new berths to minimise and mitigate the impact on the existing private infrastructure. A new pump system will be required to connect the sullage points to the tank along the approximately 300 m distance from the furthest berth to the holding tank. The location of proposed sullage points and pipes are shown on Dwg, 1004393.1000-RC109 in Appendix B. This will be confirmed at detailed design.

This tank will then connect to the public system in a similar arrangement to the existing. The exact details and connections are still being developed and will be discussed and resolved in coordination with Watercare.

Proposals include for new wastewater facilities within the ferry terminal these include an additional 7 No. WC, 7 No. basins, 1 No. shower and 2 No. commercial kitchen sinks. These will require some modification to existing system but largely represent an increase in connections onto the existing private system arrangements within the ferry terminal only.

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No other changes in the infrastructure impact on the wastewater generation.

5.3 Changes in wastewater generation

The follow is concluded with respect to new wastewater generation:-

There is no expected increase in the wastewater generated by the new sullage points, as currently there is no proposed increase to the number of ferries in service. Therefore, the wastewater generated from the current number of ferry services per day is considered to be the same pre- and post-development.

As for the Ferry Terminal redevelopment the additional public toilets and staff facilities will increase the net change in wastewater generation. This approximately doubles the current amount of toilet and basin systems from the existing. We have therefore estimated that the wastewater generation from these facilities is also doubled.

The results of the wastewater assessment are presented in Table 5-1 below.

These Pre- and post-development wastewater flows vary day to day given variations in the number of persons using the facilities, however we will be refining these estimates at later stages following further discussions with Watercare. Full wastewater calculations and diagrams of catchment areas used in determining these figures are attached in Appendix C.

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Pre-development (Upstream CBD contribution)</th>
<th>Pre-development (Piers 1 and 2 contribution)</th>
<th>Estimated post-development increase (From additional toilets and public staff/amenities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average daily demand</td>
<td>m(^3)/day</td>
<td>1465</td>
<td>82</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>l/s</td>
<td>17</td>
<td>0.9</td>
<td>0.05</td>
</tr>
<tr>
<td>Peak daily flow</td>
<td>l/s</td>
<td>84.7</td>
<td>5.9</td>
<td>0.3</td>
</tr>
</tbody>
</table>

The contribution from the net increase in wastewater generation is expected to be a change of 0.3% of the pre development. Overall, this is a minimal increase to the expected wastewater generation as detailed above because of the small numbers of additional amenities involved when compared with the more significant upstream CBD contributions.

It is therefore estimated that the changes in the new wastewater generation from the DFT redevelopment taking into account the sensitivity of the total wastewater generation is considered minimal.

5.3.1 Downstream capacity utilisation

The downstream pipe capacity of the 375 mm EW pipe has been estimated to be approximately 96 l/s. From the analysis of the wastewater network, the contribution from the upstream CBD buildings is expected to not change and therefore maintains an estimated utilisation of 88.2% of the capacity of this line. As noted above the overall usage including the post development ferry terminal increase is expected to increase the utilisation from 94.3% be 94.6% as shown in Table 5-2.

Based on the expected current contributions and future changes it is not expected that the capacity of the 375 mm EW pipe will be exceeded.
Table 5-2: Capacity Utilisation of 375 mm diameter wastewater line

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Upstream CBD contribution</th>
<th>Piers 1 and 2 contribution + Toilets</th>
<th>Total Capacity Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-development capacity used</td>
<td>%</td>
<td>88.2</td>
<td>6.1</td>
<td>94.3</td>
</tr>
<tr>
<td>Post-development capacity used</td>
<td>%</td>
<td>88.2</td>
<td>6.4</td>
<td>94.6</td>
</tr>
</tbody>
</table>

There may be downstream capacity issues with the 400 mm pipe which connects downstream of the 375 mm pipe, as the lesser slope gradient indicates a slightly lower capacity and therefore a possible slightly higher utilisation (<98%). However, as the values presented in this report are conservative and net increases are minimal, it may not be an actual constraint. This is currently being discussed and coordinated with Watercare to ensure existing issues are not a concern and refine the existing utilisations estimates, where appropriate.

Based on our current estimate, the analysis indicates that the existing public wastewater network in the direct vicinity of the development is likely to have sufficient capacity to accommodate the proposed development.

The intention will be for this report to be updated once further refinement of estimated volumes and discharges have been undertaken with Watercare.

6 Water supply

6.1 Existing Infrastructure

As described above in Section 2 the existing Queens Wharf area consist of existing event facilities and the existing ferry terminal, these are currently serviced facilities and are therefore assumed to be compliant to the requirements of Watercare water supply\(^2\).

Auckland Council GIS indicates a 150 mm and 200 mm diameter CI water main running along the northern side of Quay Street. It is assumed that all water to Queens Wharf, Piers 1 and 2 and the ferry building are obtained from this line. A water meter is located at both the east and west side of the ferry building.

Two public fire hydrants are in close proximity to the entrance to the site along Quay Street and a further three private fire hydrant have been located based on a site walkout located along Queens Wharf West.

The location of existing water mains and fire hydrants are shown on the Watercare services plan attached in Appendix D.

6.2 Proposed Infrastructure

The current, pre-development water demand includes all water demand to Pier 1, Pier 2, the Ferry Building and the Ferry Terminal. The Cloud and Shed 10 buildings are also likely serviced by the same 150 mm CI pipe along north side of Quay Street.

Additional new water supply points will be provided to each of the new six berths along Queens Wharf West (via one new proposed connection to the public reticulation) however as described

\(^{2}\) Watercare Standards specify a minimum supply pressure of 250kPa at the supply point.
previously with respect to no expected net change in sullage as a result of no expected increase in ferry services, a similar conclusion is taken on the supply of new water at these berths.

The post-development demand is however expected to increase due to the additional public/staff toilets and amenities only within the ferry terminal, in line with those new amenities mentioned previously in Section 5.2.

6.3 Changes in Water Supply demand

Water demand for the pre and post development cases have been estimated based on the estimated wastewater generation values. Due to the nature of this development, we have assumed that wastewater flow generated within the subject site constitutes 90% of the total water demand.

The estimated pre and post development water demand is summarised in Table 6-1 below:

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>Pre-development</th>
<th>Post development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average daily demand</td>
<td>m³/day</td>
<td>91</td>
<td>96</td>
</tr>
<tr>
<td>Peak daily demand</td>
<td>l/s</td>
<td>1</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Therefore, as the relative net increase in wastewater generation as described in Section 5.3 was low the net water use demand increase is expected to be minimal also.

6.4 Firefighting requirements

The proposed design includes a fire hose reels at each berth (six total) in addition to the water supply points mentioned above. These will be serviced from the same water connection.

As detailed above two public fire hydrants are located on Quay Street within approximately 200 to 375 m from the new berths as identified on the Auckland Council GIS. However a further three private fire hydrants are located along Queens Wharf alongside the proposed berths, and would be proposed to be used for firefighting requirements.

A specific fire-fighting assessment will need to be undertaken to determine the fire-fighting water supply requirements for the development and the appointment of a fire specialist is underway and confirm the fire hydrant use above.

Hydrant flow testing has not been undertaken and will be undertaken as part of a site specific firefighting assessment to confirm the design of the system and identify any capacity constraints in the town supply to meet the firefighting water supply requirements for the development. However, as the increase in water demand is expected to be limited to 0.3 l/s or 18 l/min, it is likely that the existing public supply can adequately supply the estimated peak daily demand of 6.9 l/s from the proposed development. Should it be found that the existing pressure is less than required, booster pumps maybe required.

Furthermore as the existing infrastructure around Queens Wharf houses the two large event facilities there is a valid assumption that the existing is already compliant and therefore should not result in any major issues for the new proposals.

Overall, as the site is located in the CBD, we consider that the current water supply infrastructure will be able to provide the required capacity without the need for additional booster pumps. However, this will be subject to confirmation with the Fire Specialist and Watercare with respect to a compliant detailed design.
7 Other services and proposed service corridor

Dry services such as power, CCTV and communications, as well as the wastewater, fire main and water lines will connect with the existing services and to the existing distribution room. A services corridor will carry the services to the proposed new ferry berths.

The location of the proposed service corridors is shown on the Dwg. 1004393.1000-RC108 and 109 attached in Appendix B.

8 Conclusions

Based on our initial infrastructure assessment, we consider the following:

- Stormwater from the proposed berths and gangways will discharge into the Waitemata Harbour as per the existing situation.
- There is an estimated minor increase in wastewater generation contributing to 0.3% of the existing infrastructure capacity due to the proposed development. The contribution from the upstream CBD buildings is expected to utilise 88.2 % of the capacity of the 375 mm EW wastewater pipe assessed.
- Therefore, it can be considered that the sensitivity of this analysis to the new wastewater generation is minimal. Our initial calculations suggest the existing 375 mm EW wastewater pipe across Queen Street will increase from approximately 94.3% to 94.6% of capacity utilisation. Pre- and post- development wastewater flows can be refined at later stages following discussions with Watercare.
- There is an expected minor increase in water supply demand to service the proposed development. Hydrant flow testing will be undertaken at a later stage, but it is likely that the existing public reticulation can adequately supply the estimated peak daily demand from the proposed development.
- The current proposed design includes a fire hose reels at each berth (six total). As presented above two fire hydrants are located on Quay St within approximately 200 to 375 m from the new berths. A specific fire-fighting assessment will need to be undertaken to determine the fire-fighting water supply requirements for the development.
- Dry services such as power, CCTV and communications, as well as the wastewater, fire main and water lines will connect with the existing services and to the existing distribution room. A services corridor will carry the services to the proposed new ferry berths.
9  Applicability

This report has been prepared for the exclusive use of our client Auckland Transport, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Tonkin & Taylor Ltd

Report prepared by: Report reviewed by:

.......................................................... ...........................…...............
Katie Rigter / Kevin Johnson A Richardson / Tim Allsopp-Smith
Civil Engineer Senior Civil Engineer

Authorised for Tonkin & Taylor Ltd by:

..........................................................
Richard Reinen-Hamill
Project Director

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Appendix A: Services Plan

NOTES FOR PIER 2:

77 PHOTO 68 IDENTIFY CABLES AND TEST AND MAKE SECURE.
76 PHOTO 66 UNDER SUB BOARD (MONTROSE BOX).
75 PHOTO 64 OLD WATER MAIN SUPPORTING OTHER.
73 PHOTO 62 WATER PUMP TYPE HOSE HANGING ON WATER.
61 PHOTO 22, 23 UNSUPPORTED POWER CABLE TO BE TESTED.
56 PHOTO 15 WATER SUPPLY FOR PIER 2 COFFEE CART.
54 PHOTO 13 TRAY AND SEWAGE PIPE AND POTABLE WATER.
53 PHOTO 11 TRAY AND SEWAGE DISCHARGE.
52 PHOTO 4 WATER MAIN SUPPLY PIPE.
70 PHOTO 50, 51 POWER CABLE NEED TO BE IDENTIFIED AND TEST.
68 PHOTO 42, 43 POWER CABLE NEED TEST AND IDENTIFY. NEED.
67 PHOTO 40, 41 POWER CABLE NEED TEST AND IDENTIFY. NEED.
64 PHOTO 33, 34 HANGING CABLES NEED TO BE IDENTIFIED AND.
60 PHOTO 21 CABLES HANGING INTO WATER TO BE TESTED.

IDENTIFY AND MAKE SAFE. CUT BACK IF NOT IDENTIFIED.
IDENTIFY AND MAKE SAFE.
IDENTIFY AND MAKE SAFE.
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Appendix B: Proposed Development Plans
PROPOSED TRENCH TO CARRY POWER, COMS, CCTV, WATER DUCTS
DUCTS TO GO ON THE UndERSIDE OF GANGWAY
PROPOSED SERVICES TO CONNECT WITH EXISTING SERVICES AND CONNECT TO DISTRIBUTION ROOM
EXISTING DISTRIBUTION ROOM
POWER TO FERRY TERMINAL
POWER TRANSFORMER
EXISTING SERVICE PATH
ALBERT ST
FERRY TERMINAL
QUEENS WHARF
PRINCES WHARF
PIER 1
PIER 2
PIER 3
PIER 4
QUEENS WHARF
THE CLOUD
Princes Wharf
Ferry Building
Princes Wharf
Queens Wharf
The Cloud
Shed 10
Ferry Terminal
Princes Wharf
Ferry Terminal
Queens Wharf
THE CLOUD
Shed 10
Ferry Terminal
Queens Wharf
Princes Wharf
Power Transformer
Existing Service Path
Power to Ferry Terminal
Power to Ferry Terminal

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. COORDINATE DATUM: NZ GEOETRIC DATUM 2000, MT EDEN CIRCUIT.
3. LEVEL DATUM: AUCKLAND VERTICAL DATUM 1946 (MSL) CD = -1.743m AVD-46.
4. THE LOCATION OF ALL EXISTING SERVICES IS INDICATIVE ONLY, AND WILL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION OF NEW SERVICE CONNECTION.

CLIENT: AUCKLAND TRANSPORT
PROJECT: DOWNTOWN FERRY BASIN REDEVELOPMENT STAGE 1
TITLE: QUAY STREET, AUCKLAND CBD
PROPOSED GENERAL SERVICES ARRANGEMENT

SCALE (A3): 1:1250
DRAWN: 2018-Nov-09
Plotted By: TREVOR JONES

NOT FOR CONSTRUCTION

SCALE (A3): 1:1250
DRAWN: 2018-Nov-09
Plotted By: TREVOR JONES
NOTES:
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EXISTING SEWER DISCHARGE PIPE CONNECTS TO MAIN LINE
EXISTING SEWER DISCHARGE PIPE (INDICATIVE ONLY)
EXISTING SEWER LINE
NEW WW CONNECTION TO PUBLIC SYSTEM FROM NEW SULLAGE TANK
EXISTING WASTEWATER LINE

NOTE:
1. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED.
2. THE LOCATION OF ALL EXISTING SERVICES IS INDICATIVE ONLY, AND WILL BE CONFIRMED BY THE CONTRACTOR PRIOR TO CONSTRUCTION OF NEW SERVICE CONNECTION.

LEGEND
- EXISTING SULLAGE PIPE
- PROPOSED SULLAGE PIPE
- EXISTING SULLAGE POINT
- PROPOSED SULLAGE POINT
- SS
- EXISTING SEWER LINE

THANKS TO:
AUCKLAND TRANSPORT
DOWNTOWN FERRY BASIN REDEVELOPMENT STAGE 1
QUAY STREET, AUCKLAND CBD
PROPOSED SULLAGE ARRANGEMENT

DESIGNER: TREVOR JONES
DRAWING CHECKED: GWP
DESIGN CHECKED: RBS
DRAWN: A3 SCALE 1:1250

COPYRIGHT ON THIS DRAWING IS RESERVED DO NOT SCALE FROM THIS DRAWING - IF IN DOUBT, ASK.
THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED.
SINGLE SHEET

A3 SCALE 1:1250
0 25 50 75 (m)

ORIGINAL IN COLOUR
NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
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EXISTING SEWER DISCHARGE PIPE CONNECTS TO MAIN LINE
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LEGEND
- EXISTING SULLAGE PIPE
- PROPOSED SULLAGE PIPE
- EXISTING SULLAGE POINT
- PROPOSED SULLAGE POINT
- SS
- EXISTING SEWER LINE

THANKS TO:
AUCKLAND TRANSPORT
DOWNTOWN FERRY BASIN REDEVELOPMENT STAGE 1
QUAY STREET, AUCKLAND CBD
PROPOSED SULLAGE ARRANGEMENT

DESIGNER: TREVOR JONES
DRAWING CHECKED: GWP
DESIGN CHECKED: RBS
DRAWN: A3 SCALE 1:1250

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SINGLE SHEET
NOT FOR CONSTRUCTION

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. CONTRACTOR TO LIAISE WITH ELECTRICAL CONTRACTOR REGARDING ELECTRICAL, DATA CABLE AND DUCTING REQUIREMENTS FOR THE PONTOON AND GANGWAY.
3. ALL DUCTING FOR POWER, COMMUNICATIONS / DATA AND WATER TO BE CONCEALED WITHIN THE PONTOON OR BENEATH THE RAISED DECK SECTIONS.
4. PONTOON CONTRACTOR TO DETERMINE LOCATION OF DUCTING AND SERVICE PITS TOGETHER WITH ELECTRICAL CONTRACTOR.
5. ONE EMPTY 100mm DIA SERVICE DUCT IS TO BE PROVIDED DOWN THE CENTRE OF ALL PONTOONS AND ON THE GANGWAY.
6. FINAL LAYOUT OF SERVICE DUCTS AND LOCATIONS TO BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
LEGEND

SL  SAFETY LADDER
SPO  SHORE POWER OUTLET
LR  LIFE RING
FHR  FIRE HOSE REEL
FE  FIRE EXTINGUISHER
LP  LIGHT POLE
CAM  SECURITY CAMERA MOUNTED ON LIGHT POLE
WHR  WASH DOWN HOSE REEL (24m HOSE LENGTH)
ECP  EMERGENCY CALL POINT, ORANGE

NOTES:
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AUCKLAND TRANSPORT
DOWNTOWN FERRY BASIN REDEVELOPMENT STAGE 1
QUAY STREET, AUCKLAND CBD
24m BERTH PONTOON SERVICES PLAN
SCALE 1:200

DESIGN  CHECKED
DRAWING CHECKED

REV  DESCRIPTION  AS HAVING BEEN  DRAWN BY  DATE  DRAWING STATUS
1  FIRST DRAFT ISSUE  TJJ  MEFF  08.11.18  NOT FOR CONSTRUCTION
2  RESOURCE CONSENT ISSUE  TJJ  MEFF  20.09.18
3  RESOURCE CONSENT ISSUE  MSG  MEFF  21.09.18
4  RESOURCE CONSENT ISSUE  TJJ  RBS  08.11.18
NOT FOR CONSTRUCTION

AUCKLAND TRANSPORT

DOWNTOWN FERRY BASIN REDEVELOPMENT STAGE 1

TITLE
QUAY STREET, AUCKLAND CBD
SHORT 24m BERTH PONTOON SERVICES PLAN

SCALE: 1:200

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
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THROUGHOUT THIS DRAWING IS RESERVED DO NOT SCALE FROM THIS DRAWING - IF IN DOUBT, ASK.

NOT FOR CONSTRUCTION
Appendix C: Wastewater Calculations
Wastewater Assessment

Pre-Development Assessment

Upstream Catchments

*Refer to upstream catchment plan for area. The final wastewater values presented below are based on the method presented in Watercare Water and Wastewater Code of Practice, where the land use is assumed to office buildings & dry retail flows from Table 5.1.3. Values can be refined upon further discussions with WaterCare and by using specific land use values where known (i.e. isolate hotels etc.)

**Upstream catchment contributing to Line 1**

Assume land use type = CBD

- Total floor area: 337676 m²
- 1 person per: 15 m²
- People: 22512 People
- Wastewater generation: 65 l/person/day
- ADWF: 1463263 l/day
- Peaking factor (Normal PDWF): 2
- PDWF: 33.87 L/s
- Peaking factor (Peak Design Flow): 5
- PWWF: 84.7 l/s

**Upstream catchment contributing to Line 2**

**Ferry building**

Assume land use type = CBD

- Total floor area: 4120 m²
- 1 person per: 15 m²
- People: 275 People
- Wastewater generation: 65 l/person/day
- ADWF: 17853 l/day
- Peaking factor (Normal PDWF): 2
- PDWF: 0.41 L/s
- Peaking factor (Peak Design Flow): 5
- PWWF: 1.0 l/s

**Toilet blocks**

Non Peak Hour People: 16 People

- Non Peak hour ADWF: 3520 l/day
- ADWF: 4180 l/day
- Peaking factor (Normal PDWF): 2
- PDWF: 0.10 L/s
- Peaking factor (Peak Design Flow): 5
- PWWF: 0.2 l/s

**Sullage**

ADWF: 60000 l/day

- Peaking factor (Normal PDWF): 5
- PDWF: 3.47 L/s
- Peaking factor (Peak Design Flow): 6.7
- PWWF: 4.7 l/s

**Cloud and Shed 10**

The capacity of The Cloud and Shed 10 is currently unknown, and has currently been assumed to be nil.

**Total flows for line 2**

- Total ADWF: 82033 l/day
- Total PDWF: 3.98 L/s
- Total PWWF: 5.9 l/s
Post-Development Assessment

Upstream catchment contributing to Line 1
We believe that no change will occur to the upstream wastewater generation for line 1
PWWF: 84.7 l/s % of Line 3 Capacity 88.2

Upstream catchment contributing to Line 2
Ferry building
We believe that no change will occur to the ferry building wastewater generation
PWWF: 1.0 l/s

Sullage
A new sullage tank will be installed next to the current one at Pier 1. However, we believe that the current sullage demands will not increase with the installation of 6 new ferry berths.
PWWF: 4.7 l/s

Toilet Blocks
Information from Isthmus (email dated 16 October 2018), shows the proposed plans as doubling the current amount of toilet and basin systems. As the toilet facilities are proposed to be made public, it is assumed that double the amount of people will use both in peak and non-peak hours.

| Non Peak Hour People | 32 People | Assumed to be 50% of peak capacity |
| Peak Hour ADWF | 1320 l/day | Assuming 10 l/person, 2 peak hours per day |
| Non Peak Hour ADWF | 7040 l/day | Assuming 10 l/person, 2 peak hours per day |
| ADWF | 8360 l/day | Average Dry Weather Flow |
| 0.1 l/s | 0.1 | 5.3.5.1.aii |
| Peak hour PDWF | 0.19 l/s | Peak Dry Weather Flow |
| Infiltration | 5 |
| PWWF | 0.5 l/s | Peak Wet Weather Flow |

Capacity of downstream pipes
For Concrete pipes Manning's Coefficient = 0.013. Invert levels and pipe sizes obtained from Auckland Council GIS

| ID | Diameter (mm) | IL In | IL Out | Length | Slope (m/m) | ADWF l/s | Non Peak | Peak Hour | Non Peak | Peak Hour | Non Peak | Peak Hour | Non Peak | Peak Hour |
|----|---------------|------|-------|--------|------------|----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|
| Line 3 | 375 | 0.08 | 0.07 | 46 | -0.003 | 90.8 | 94.6 |
| Line 4 | 400 | -0.07 | -0.25 | 93 | -0.002 | 90.8 | 94.6 |

Post development capacity used
Line 3 PWWF 94.6 l/s Not including additional contribution from downstream CBD buildings
Line 4 PWWF 97.7 l/s
From our analysis it is anticipated the pipes within the immediate vicinity of the development will have sufficient capacity to accommodate the wastewater flows from the proposed development.
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Water Supply
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