Watercare Services Limited

Queen Street Wastewater Diversion: P3 - P4 Service Connector Tunnel

Assessment Of Environmental Effects

10 NOVEMBER 2023

Queen Street Wastewater Diversion: P3 - P4 Connector Tunnel

Assessment Of Environmental Effects

Watercare Services Limited

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REV	DATE	DETAILS
0.5	5 September 2023	50% draft review
V1	02 October 2023	Internal review
V2	6 October 2023	For External review
V3.1	10 November 2023	Final

	NAME	DATE	SIGNATURE
Prepared by:	Renee Hanrahan	10 November 2023 (Final)	
Reviewed by:	Harrison Fernandes-Burnard	8 Oct 2023	
Approved by:	Alisdair Simpson	10 Nov 2023	

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Abbreviations and Definitions

AC	Auckland Council
AEE	Assessment of Environmental Effects
AT	Auckland Transport
AUP	Auckland Unitary Plan (Operative in Part)
CIA	Cultural Impact Assessment
CNVA	Construction Noise and Vibration Assessment
CNVMP	Construction Noise and Vibration Management Plan
DSI	Detailed Site Investigation
ESCP	Erosion and Sediment Control Plan
GSMCP	Groundwater Settlement and Monitoring Control Plan
HAIL	Hazardous Activities and Industries List
NES CS	National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health
mTMB	Micro-Tunnel Boring Machine
PSI	Preliminary Site Investigation
RMA	Resource Management Act
RPS	Regional Policy Statement
SMP	Site Management Plan
TIA	Traffic Impact Assessment
WSL	Watercare Services Limited
WSP	WSP New Zealand Limited

Executive summary

Watercare Services Limited ('Watercare') is undertaking an extensive programme of development and upgrades to improve Auckland's wastewater collection network and reduce wastewater overflows to the environment.

This Assessment of Environmental Effects ('AEE') has been prepared to support the application for resource consent to Auckland Council for Watercare to install a section of underground tunnel, known as the Part 3 – Part 4 Connector Tunnel ('P3-P4 Connector Tunnel'). This tunnel will provide a safe connection for power and fluid cables from the Construction Support Area (CSA) in the Carpark on Greys Avenue to the bottom of a construction shaft on the intersection of Queen Street and Mayoral Drive ('Mayoral Drive Shaft'). These cables will service the micro–tunnel boring machine ('mTBM') which will be used to construct the Part 3 alignment of pipeline from the Mayoral Drive Shaft down Queen Street.

The construction works for the P3-P4 Connector Tunnel will involve:

- Excavation of one shaft (P4MH4) in the carpark at 329 Queen Street
- Installation of 43m long, 700mm diameter tunnel from the newly constructed P4MH4 shaft to the Mayoral Drive Shaft

Construction of the P3-P4 Connector Tunnel is planned to begin in July 2024 and will take 3 months to complete. Upon completion of the Part 3 construction works, the P3-P4 Connector Tunnel will no longer be needed to service the mTBM. The tunnel will then assume its primary role as the section of permanent wastewater pipe which will convey wastewater from the new Mayoral Drive Alignment wastewater pipe (Part 4) into the newly installed Queen Street wastewater pipe (Part 3).

This AEE follows the lodgement of consent to construct Part 3 of the Queen Street Programme of works on the 5th of September 2023, reference BUN60422974.

This AEE includes an assessment of the relevant statutory provisions required for the installation and operation of the P3-P4 Connector Tunnel. Relevant provisions of the Resource Management Act 1991 ('RMA'), National Environmental Standards, National Policy Statements and the Auckland Unitary Plan ('AUP') have been considered.

Consent is required for the following activities:

- Rule E7.4.1 (A20) Take and use of groundwater for dewatering
- Rule E7.4.1 (A28) Diversion of groundwater caused by any excavation (including trench) or tunnel that does not meet the permitted activity standard.
- Rule E25.4.1 (A2) Construction noise and vibration activities that do not comply with a permitted activity standard.
- Rule E36.4.1 (A56) All other infrastructure in areas listed in the heading above (1% AEP flood plain) not otherwise provided for.
- Rule E30.4.1 (A6) Discharge of contaminants into air, water or land not meeting the relevant permitted activity standards.

In addition, consent is needed under Regulation 9 of the National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS) as a controlled activity.

The overall bundled activity status for these consents is Restricted Discretionary.

The proposal relies on the following permitted activities:

- Construction noise and vibration generated within the road reserve
- Underground pipelines and ancillary structures for the conveyance of wastewater (Including above ground ancillary structures associated with underground pipeline) in all zones.
- Ventilation facilities, drop shafts and manholes
- Earthworks relating to infrastructure
- Goods and Materials stored in the 1 per cent annual exceedance probability (AEP) floodplain
- Activities ancillary to erosion and sediment control

An assessment against the standards for these activities to be deemed permitted is included in Appendix E.

Local residents and business owners have been informed of the Queen Street Wastewater Programme of works taking place in their area through flyer drops and in-person visits.

Technical assessments have been prepared to understand the extent of any actual or potential effects and are attached as appendices to this application. Key findings from the technical assessments are:

- Predicted noise and vibration levels have been assessed against the relevant AUP standards. With the adoption of managerial and practical noise mitigation measures detailed in this report, no properties have been deemed an affected party during these works.
- The P4MH4 shaft lies within a floodplain and overland flow path. An erosion and sediment control plan has been created for establishment on site to mitigate and potentially adverse effects.
- Two recorded archaeological sites lie in the vicinity of the proposed works in the carpark at 329 Queen Street. The potential for adverse effects on the archaeological values of these sites have been assessed to likely be insignificant.
- Elevated levels of contaminants have been found at two sampling locations in the project area.
- Groundwater drawdown effects from dewatering of the P4MH4 shaft have been assessed as negligible. Effects will be managed through the provision of a groundwater and settlement monitoring and contingency plan (GSMCP).

The project works have been designed to avoid, where practicable, resultant adverse environmental effects. As such, this AEE recommends particular construction techniques and mitigation measures to ensure potential effects of the works are contained. These measures include:

- Construction hours will generally be limited to between 7am to 6pm Monday to Saturday.
- Construction methods have been thoughtfully created to reduce effects on adjacent property owners and occupants. These measures include acoustic site hoardings, trenchless tunnelling and regular onsite monitoring of equipment.
- The CSA in the Greys Avenue Carpark will be fitted with concrete bunds to divert any wet weather flooding that may occur.

Management plans have been completed and are submitted alongside this application to control effects of Construction Noise and Vibration (CNVMP), Erosion and Sediment (ESCP) and Contaminated Land (SMP).

The overall effect of the project, with the proposed mitigation strategies in place, is expected to be less than minor.

Overall, this assessment finds that the project is:

- consistent with the relevant objectives and policies of the AUP, including the Regional Policy Statement;
- an overall positive contribution to the locality, as it will support additional capacity and resilience to the wastewater network in Auckland City Centre; and
- aligned to the purpose of the RMA as it will safeguard the life-supporting capacity of surrounding waterbodies, while providing for the social, economic and cultural wellbeing of the community through the provision of necessary infrastructure.

1 Introduction

Watercare is a lifeline utility providing water and wastewater services to a population of 1.7 million people in Auckland. Its services are vital for life, keep people safe and help communities to flourish. More specifically, Watercare is the council-controlled organisation of Auckland Council responsible for municipal water supply and wastewater treatment within Auckland, and the provider of bulk water and wastewater services to Pokeno and Tuakau in the Waikato District.

Watercare are proposing to upgrade the existing wastewater network of the upper (southern) catchment of Auckland City Centre. The current network has insufficient capacity to meet the future needs based on increased development in the area. Shown in Figure 1-1 below, the wider programme works have been split into separate parts for the purpose of design, consenting and construction.

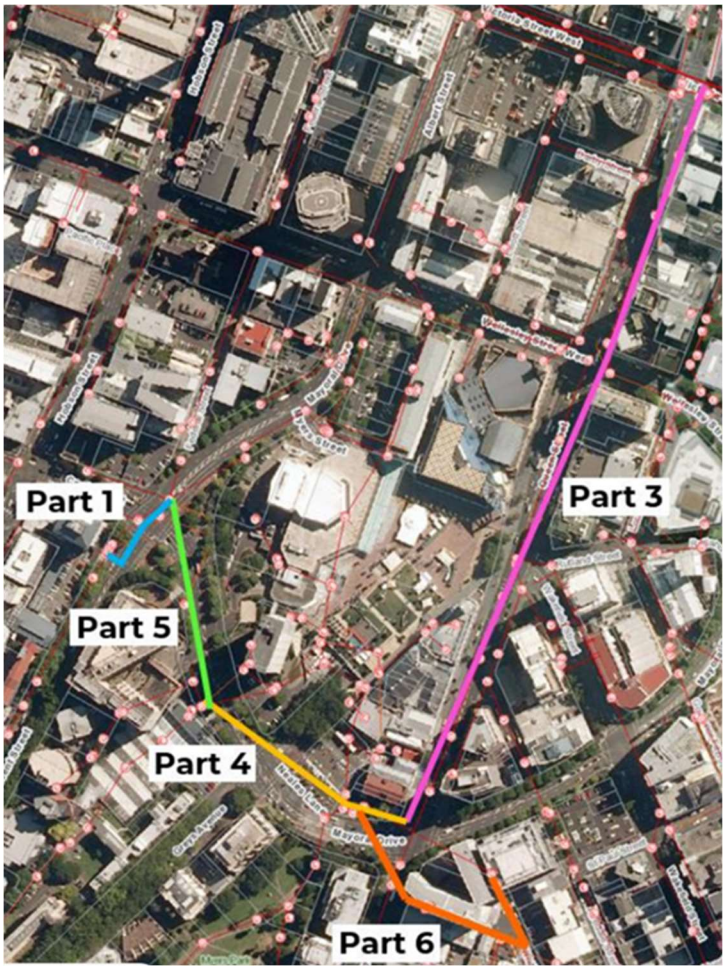

Figure 1-1: Queen Street programme of works

An application for resource consent to construct Part 3 of the alignment was lodged on the 5th of September 2023. Parts 1,4 and 5 (known as the 'Mayoral Drive Alignment') will be consented within a single application, yet to be lodged with Council. Part 6 of the alignment is currently in the preliminary design phase, consent will be sought once this is finalised.

This application relates to the early construction of a section of the Part 4 pipeline to enable the tunnelling works required for the Part 3 alignment of wastewater pipeline. These works will consist of constructing one shaft (P4MH4), shown as the yellow square at the Greys Avenue carpark in

Figure 1-2 and a 43m length of tunnel from this shaft to the Part 3 launch shaft at the intersection of Mayoral Drive and Queen Street ('Mayoral Drive Shaft').

The purpose of this tunnel is to service the micro–tunnel boring machine ('mTBM') which will be used to construct the Part 3 alignment of pipeline from the Mayoral Drive Shaft down Queen Street. During the Part 3 construction phase, the P3-P4 Connector Tunnel will carry all required power, hydraulic and other fluid hoses from the staging area in the Greys Avenue Carpark into the bottom of the Mayoral Shaft to support the operation of the mTBM.

Upon completion of the Part 3 construction works, the P3-P4 Connector Tunnel will no longer be needed to service the mTBM. The tunnel will then assume its primary role as the section of wastewater pipe which will convey wastewater from the new Mayoral Drive Alignment wastewater pipe (Part 4) into the newly installed Queen Street wastewater pipe (Part 3).

Figure 1-2: Connector Tunnel Location

1.1 Purpose of this report

The purpose of this report is to assess the actual and potential effects upon the environment generated from the construction and operation of a below ground tunnel established to connect Part 3 and Part 4 of the Queen Street Wastewater programme of works.

1.2 Resource Consent Sought

Based on the proposed works, the following reasons for consent have been triggered under the Auckland Unitary Plan (AUP):

- Rule E7.4.1 (A20) Take and use of groundwater for dewatering: **Restricted Discretionary Activity.**
- Rule E7.4.1 (A28) Diversion of groundwater caused by any excavation (including trench) or tunnel that does not meet the permitted activity standard: **Restricted Discretionary Activity.**
- Rule E25.4.1 (A2) Construction noise and vibration activities that do not comply with a permitted activity standard: **Restricted Discretionary Activity**.
- Rule E30.4.1 (A6) Discharge of contaminants into air, water or land not meeting the relevant permitted activity standards: **Controlled Activity**.
- Rule E36.4.1 (A56) All other infrastructure in areas listed in the heading above (1% AEP flood plain) not otherwise provided for: **Restricted Discretionary Activity.**

In addition, consent is needed under Regulation 9 of the National Environment Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS) as a **controlled activity.**

In addition to those consent triggers identified above, any other reasons for consent that may also be triggered by the project works also applies and being sought as part of this application.

1.3 Supporting Technical Information

To support this application for resource consent, the following technical assessment and documents have been prepared:

Table 1-1: List of Appendices

Appendix	Name of Document	Corresponding Management Plan
Appendix A	Certificate of Title	
Appendix B	General Arrangement Drawings	
Appendix C	AUP Maps	
Appendix D	Construction Methodology	
Appendix E	Permitted Activities Assessment	
Appendix F	Archaeological Assessment	Archaeological Management Plan ('AMP')
Appendix G	Flood Hazard Assessment	
Appendix H	N/A	Erosion and Sediment Control Plan
Appendix I	Noise and Vibration Assessment	Construction Noise and Vibration Management Plan ('CNVMP')
Appendix J	Detailed Site Investigation (DIS)	Site Management Plan ('SMP')
Appendix K	Assessment of Dewatering Effects	
Appendix L	Statutory Assessment	

2 Applicant and Property Details

Applicant	Watercare Services Limited
Site address	329 Queen Street, Auckland; part of Queen Street; part of Mayoral Drive; part of Wellesley Street; part of Victoria Street
Legal description	Road; Lot 1 DP 84867

Address for service	c/o William Hung Senior Resource Consents Planner Strategy and Planning Watercare Services Ltd Postal Address: Private Bag 92 521 Victoria Street West, Auckland 1142 Phone: 021 613 506 Email: William.hung@water.co.nz

3 Existing Environment

The following provides a description of the existing environment applicable to the application within which the tunnel will be constructed.

3.1 Location and Physical Environment

The project is located within Auckland City Centre in the surface carpark at 329 Queen Street and a portion of the road reserve on Queen Street. The tunnel to be constructed below ground will connect the Mayoral Drive Shaft to the Construction Support Area ('CSA') in the adjacent carpark at 329 Queen Street and 34 and 36-38 Greys Avenue, as shown in Figure 3-1 below.

Figure 3-1: P3-P4 Connector Tunnel existing environment

The land use around the intersection of Mayoral Drive and Queen Street is a mixture of retail, commercial, hospitality, civic, residential, and represents a highly developed urban environment. For the most part, retail activity is provided at street level with other uses provided above. The buildings along Queen Street are multi-levelled, with a mixture of heritage structures and more modern high-rises.

3.2 Archaeological Environment

The Queen Street area has a long history of both Māori and European occupation. Development in this area was well advanced by the 1860s as an established trade hub and thoroughfare[1]. Queen Street was historically a valley where a stream, known as the Waihorotiu, ran and was at least partly navigable by canoe. Māori gardening was recorded in the Queen Street valley as late as c.1838-40, and the large village of Te Reuroa once covered what is now Albert Park. Another settlement named Horotiu was recorded in the vicinity of the Town Hall, and a settlement known as Ngā Wharau a Tako was located on the Swanson Street ridge with a track (Te Tarapounamu) leading down to the Queen Street valley. Throughout history, other settlements and pā were located throughout the Tāmaki Isthmus, notably on Auckland's volcanic cones.

As depicted in Figure 3-2, multiply recorded archaeological sites are near the project site.

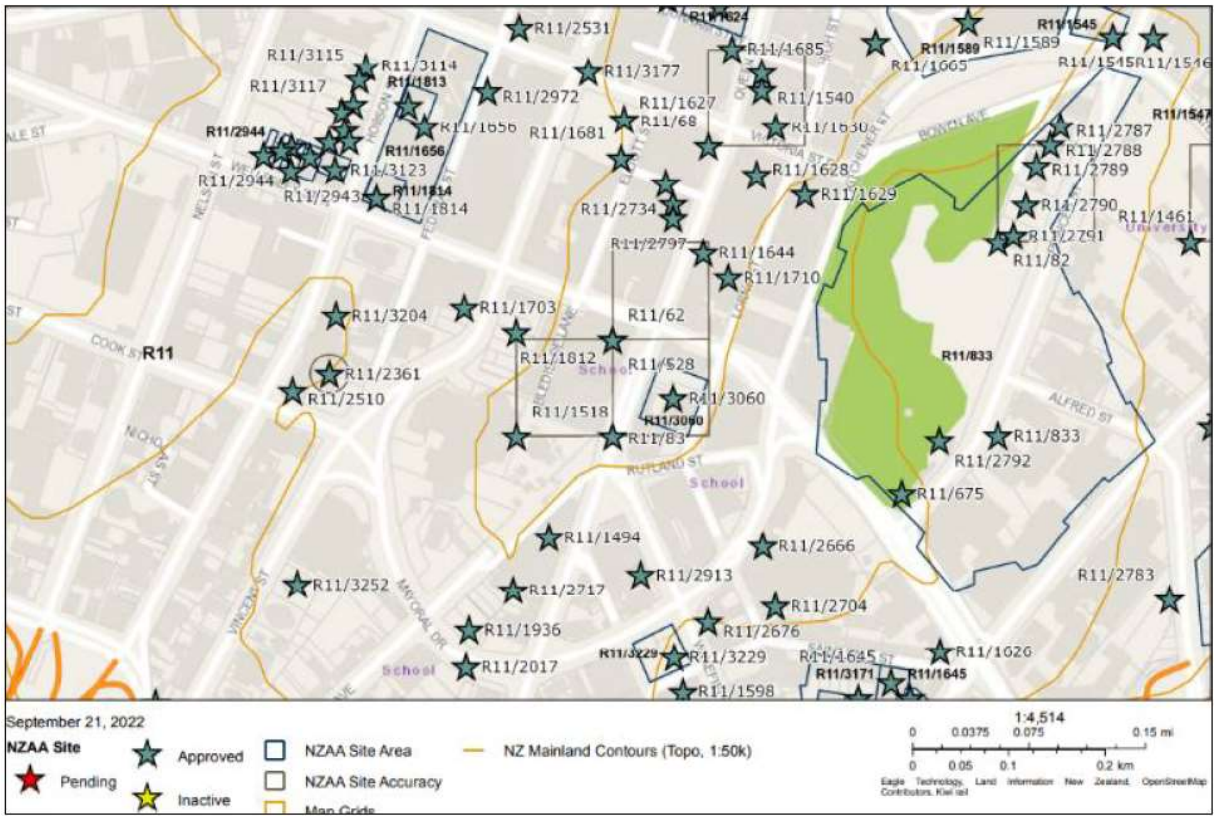

Figure 3-2: NZAA recorded archaeological sites in proximity to the Project Area.

Two recorded sites in close proximity to the project area hold potential for the survival of archaeological remains, being:

- R11/2017: European midden in Myers Park near the underpass, but likely to continue within the Greys Avenue CSA.
- R11/1936: the site of a number of 19th century businesses at 36-38 Greys Avenue, in the Greys Avenue CSA. The businesses included a harness maker, carpenter, government clerk, compositor, plumber, gasfitter and shipwright. The information is based on historical research and the extent of any surviving subsurface remains is not known.

[1] Queen Street Wastewater Diversion Part 3: Archaeological Assessment 2023

No archaeological investigations of site R11/1936 in the Greys Avenue carpark, which is the historically recorded site of 19th century businesses, have been carried out. However, some geophysical testing using Infrared and Ground Penetrating Radar, followed by pothole testing, was carried out for Auckland Council in 2019 to identify subsurface voids beneath the carpark. Potholes within the recorded location of R11/1936 adjacent to Greys Avenue found a build-up of fill consisting of brick and concrete demolition rubble. It is possible that pre-1900 remains have survived beneath the rubble and further downslope beneath the basecourse of the carpark[2].

An assessment of the project's potential and actual effects on archaeology has been carried out by local archaeology specialists, Clough and Associates and included as Appendix F. This assessment has been summarised in Section 9 of this report.

3.3 Flooding and Stormwater

Stormwater from the project site flows into the Waitematā Harbour through the piped stormwater system. As the area is highly urbanised and impervious, no natural watercourses exist downstream of the project area.

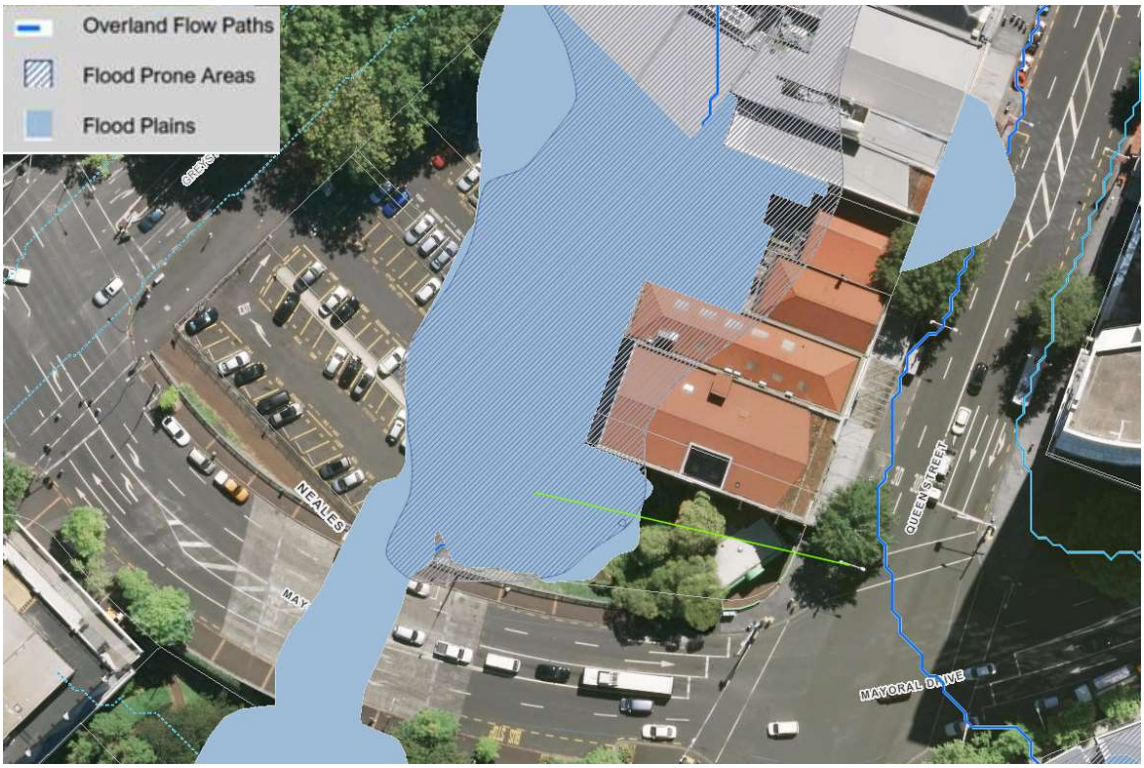

Figure 3-3: Auckland Council Flood Hazard Maps

Figure 3-3 above shows the Auckland Council Flood Hazard Geomap layers relevant to the project site. The CSA site in the Greys Avenue Carpark lies within a flood plain and flood prone area. The site is also subject to an overland flow path (OLFP). This flooding risk has been assessed in Section 10.4.

[2] ibid

3.4 Geotechnical Conditions

The published geological map information (GNS, 1992) indicates that the project area is underlain by the East Coast Bays Formation ('ECBF'), Waitematā Group ('Mwe'), comprising alternating sandstone and mudstone with variable volcanic content and interbedded volcaniclastic grits. The ECBF is typically considered the basement rock in the area.

On-site investigations to determine the geotechnical conditions of the project site were undertaken between the 14th and 21st of July 2023. Two bores were drilled within the Greys Avenue Carpark area (BH23/01 and BH23/02), and a single piezometer was installed in bore BH23/02.

The geotechnical logs for the site-specific bores confirm the published regional geological mapping, which indicates that the bedrock formation towards the south is typically ECBF mudstone and sandstone, with a thin cover (4 m) of residual ECBF soils.

Construction fill (debris, concrete, brick, rubble and reinforced steel bar) is observed in bore BH23/01 above a concrete basement slab. This construction fill is underlain by ECBF residual soils grading into highly weathered ECBF mudstone and sandstone.

3.4.1 Groundwater

A dual groundwater system has been observed in the City Centre, with a shallow perched, or near surface, aquifer system in the residual soils and a deeper, regional groundwater system within the basement ECBF (T+T, 2017; PDP, 2016, Link Alliance, 2021). This has been noted in several of the geotechnical studies conducted for various construction projects, including the City Rail Link (CRL) project.

Groundwater level loggers have been used both for the Part 3 alignment and as part of the monitoring for this project. The groundwater levels show some variation for the perched aquifer as measured in the shallow piezometer, in particular a significant increase in groundwater level after a big rainfall event on 10 May. The groundwater levels in deep piezometer in the ECBF shows very little variation.

The rainfall over the 2022/2023 summer season was higher than usual with frequent storms. The longer term groundwater level monitoring for the Part 3 project shows groundwater level highs equivalent to the winter levels. It is thus considered that the measured groundwater level is an exceptionally high level and will be used for a highly conservative analysis.

The high groundwater levels are as follows at the two shaft sites:

- Groundwater level at Mayoral Drive shaft: 24.80 m RL
- Groundwater level at the P4MH4 shaft: 17.14 m RL

4 Planning Provisions

Table 4-1: AUP Planning Provisions

Zone	• Road • Business – City Centre Zone
Precinct	• Arts, Civic and Entertainment Precinct
Overlay	Natural Heritage:

	• Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay [rcp/dp] – E10, Mount Eden, viewshaft
Controls	• Macroinvertebrate Community Index – Urban • Vehicle Access Restriction Control
Designations	• Designation 8831 – Penrose to Hobson Street Tunnel and Penrose Portal, Vector Ltd
Hydrology and Flooding	• Overland Flow Paths • Flood Prone Areas • Flood Plains
Treaty Settlement – Statutory Acknowledgement	• None
AUP Modifications	• Plan Change 78 – intensification – proposed (18/08/2022)

4.1 AUP Maps

Figure 4-1 below shows the provisions of the AUP maps which relate to the project site. The green line shows where the connector tunnel is to be constructed below ground.

A copy of the relevant planning maps is provided in **Appendix C**. A summary of these map layers is provided below.

Figure 4-1: Auckland Unitary Plan Maps

4.1.1 AUP Zoning

Figure 4-1 shows the AUP zoning provisions which surround the project site. Project works will be undertaken in the Business – City Centre Zone (pink) and the Road Zone (white)

4.1.2 AUP Overlays

The project site is subject to one overlay under the AUP, being the Mount Eden Regionally Significant Volcanic Viewshafts (ID E10) and Height Sensitive Areas. As the finished tunnel will operate entirely below ground, this overlay is not relevant to the prosed works.

4.1.3 AUP Designations

Vector hold a designation for the *Penrose to Hobson Street Tunnel and Penrose Portal (ID 8831)* in the road reserve on Mayoral Drive, shown in Figure 4-1.

As the project works are not to cross into the boundary of this designation, it is irrelevant to this application.

4.1.4 AUP Controls

The project site is subject to two controls being the Macroinvertebrate Community Index – Urban and Vehicle Access Restriction.

These controls are not relevant to the type of infrastructure works included in this proposal.

4.1.5 AUP Precincts

Figure 4-2 identifies precincts from the AUP shown by a red outline. The project works will be located within Queen Street Valley Precinct and the Arts, Civic and Entertainment Precinct.

Based on the nature of the works, the provisions of the precincts are not applicable to this proposal.

Figure 4-2: AUP Precincts Map

5 Proposal and Activities

Detailed within the Construction Methodology in **Appendix D**, establishment of the P3-P4 Connector Tunnel comprises of two main construction activities, being the post and panel shaft and the 43m length of tunnel below ground. The temporary shaft will then be backfilled to become a manhole on the Part 4 wastewater alignment.

For clarification, the shaft on Queen Street will be constructed as part of the Part 3 project works and is not assessed as part of this application.

The shaft construction is expected to take 15 days, followed by tunnelling operations which will last 20 days. Once construction is complete, the shaft and tunnel will be used to convey all required services to the mTBM for the entire Part 3 construction phase. Once the tunnel has finished being used as a duct, the shaft will be converted into a manhole, which is expected to take 10 days.

There will be a delay between "tunnel construction" and "construction of the manhole at P4MH4", as the Greys Avenue Carpark shaft will be used during other Parts of the wider Queen Street Diversion Programme of Works, although no dewatering will occur during this period. Connections from two other projects (not covered under this Application) within the programme (Mayoral Drive alignment and Queen Street Part 6 alignment) will be made to this shaft, after which the manhole will be installed.

5.1 Shaft Construction Details

The P4MH4 shaft will be constructed within the carpark at 329 Queen Street to a depth of 5.5m. The necessary plant equipment for this construction has been included in Table 5-1 below.

Table 5-1: Plant list for shaft works

Activity	Plant List
Drilling and installing steel posts	Hydrovac truck, 10-20t excavator and/or GEAX EK-40 /60
Excavating shaft	Hydrovac truck, 10-20t excavator
Spoil removal	6-wheeler or artic truck
Concrete base	Concrete truck, concrete pump truck , 10-20t Excavator

The major components of constructing the temporary post and panel shaft are outlined below and shown in the plan in Figure 5-1:

- An auger attachment on a 10 – 20t excavator or small piling rig (GEAX EK-40/60) will be used to drill 300 to 400mm diameter holes and steel H beams will be set into each with sand or concrete backfill.
- The shaft will be excavated from the top using an excavator at surface level to a depth of 5.5 metres, approximately 1m below pipe invert. Six-wheeler trucks will be used to remove spoil off site. The approximate shaft spoil volume will be 100m^3 (20 return truck trips).
- Steel road plates or timber lagging will be installed between H beams as the excavation advances.
- The shaft base will be lined out with 500mm of aggregate or blinding concrete to provide a solid and level working platform.

- If dewatering is required, a 50 to 100mm submersible pump will be used to remove water from excavation. The water will be pumped into clarifying tanks for treatment before discharging to the wastewater network. The pumps will run continuously while the trench is open and will be powered by a diesel generator or grid power from the CSA.

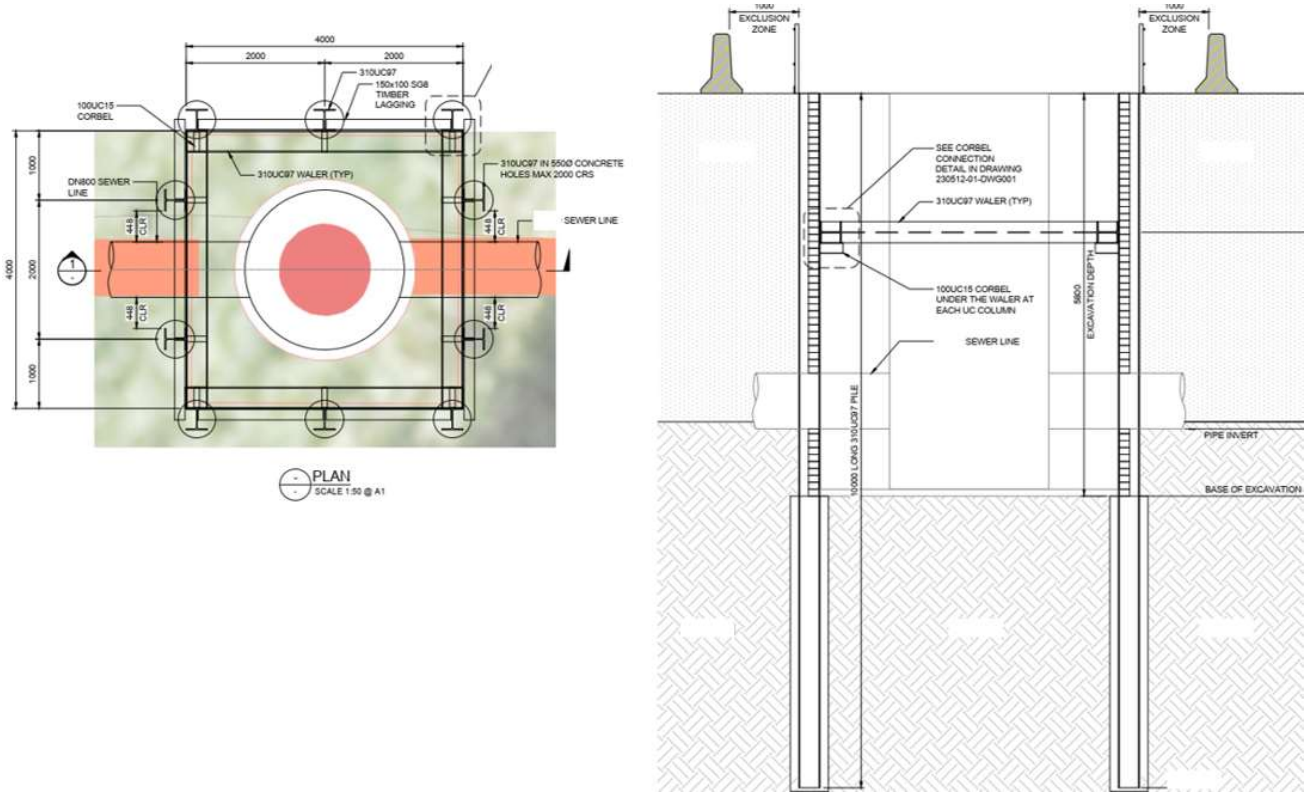

Figure 5-1: Post and panel shaft details

Following completion of the tunnelling required for the P3-P4 Connector Tunnel and the Part 3 construction works, the shaft will be backfilled to become a manhole for any necessary servicing of the pipeline in future. A concrete pump will be used to backfill the shaft with GAP65 or low strength concrete.

5.2 Trenchless Tunnel Construction Details

A trenchless construction methodology will be utilised to create the tunnel from the P4MH4 shaft to the Mayoral Shaft. The plant equipment list for tunnelling works is included in Table 5-2 below.

Table 5-2: Plant list for tunnelling works

Activity	Plant List
Tunnelling – P4MH4 Launch shaft	Crane truck, power pack container, pipe jack, sucker truck or 6 wheeler, tool truck.
Tunnelling – Mayoral Receiving shaft	Crane truck, power pack container, pipe jack, tool truck.

The major components of this tunnelling methodology are outlined below.

- Setup of power pack, pump and water tank on surface adjacent to launch pit
- Lift pilot bore rig into pit and survey into position
- Drill pilot hole to reception pit using laser guided steering head

- Install cutting reamer and pull back to launch pit
- An auger or vacuum with sucker truck will be used to remove spoil from drive to be disposed offsite using 6 wheelers or sucker trucks. The approximate wet tunnel spoil volume will be 20m^3 (8 return truck trips).
- Simultaneously jack the glass reinforced plastic pipes between pits
- Clean up and flush drill slurry out of pipe by jetting and vacuum truck
- CCTV inspection and low-pressure air test upon completion.

5.3 Earthworks

As stated above, earthworks are required during both the shaft and tunnel construction works. The total area of earthworks will be approximately 31m^2. The total volume of earthworks will be 120m^3. This accounts for the 100m^3 of spoil removed during shaft construction and the 20m^3 removed during tunnelling.

6 Consultation

The following outlines the engagement carried out by Watercare in relation to the project works.

6.1 Local Community Engagement

In recognition of the highly populated area in which works will occur, engagement has been carried out with the wider community to keep them informed of the ongoing works in their neighbourhood.

On the 25th of July 2023, an information flyer was given to local residents and business owners in the project vicinity. This flyer details the reason for improvements to the wastewater network in the City Centre and provides details on construction methodology and approximate timelines for consent approvals and construction of the wider Queen Street Wastewater programme of works.

Details on the mid town construction programme (including the Queen Street Project) were also published into the July 2023 City Centre Ratepayers Association newsletter.

6.2 Mana Whenua Engagement

Watercare has an established process for engaging with mana whenua on projects and works within the Auckland region. This process includes early notification of works to be undertaken by Watercare which, or are likely to, require resource consent.

Watercare provide a "Kaitiaki Managers Projects List" on a monthly basis to nominated representatives of all 19 mana whenua groups recognised by Auckland Council, including:

Ngāi Tai Ki Tāmaki, Ngāti Maru, Ngāti Pāoa, Ngāti Rehua Ngātiwai ki Aotea, Ngāti Tamaoho, Ngāti Tamaterā Ngāti Te Ata, Ngāti Wai, Ngāti Whanaunga, Ngāti Whātua Ōrākei, Te Ahiwaru, Te Ākitai, Te Patukirikiri, Te Uri o Hau, Waikato Tainui, Te Kawerau ā Maki, Ngāti Whātua o Kaipara, Ngāti Manuhiri, Te Rūnanga o Ngāti Whātua.

A brief summary of each project is included in the Projects List. Mana Whenua are invited to indicate which projects they have an interest in. Further information on the identified project or projects is then provided to those parties, followed by further engagement depending on the responses received.

Initial notification of the Queen Street Wastewater Project to the Kaitiaki Managers Project list occurred in September 2020, however due to inactivity was re-notified again in February 2021 with intermittent project updates (such as notification of on-site testing and design changes) provided since this time.

Six iwi groups have expressed interest in the Project, being Ngāti Maru, Te Aakitai Waiohua, Ngaati Whanaunga, Te Rūnanga o Ngāti Whatua, Te Patukirikiri and Ngati Whatua Orakei.

While Watercare has engaged iwi throughout the project design and afforded each group the opportunity to provide feedback, to date, no determination has been provided to Watercare as to whether any iwi wish to prepare and submit a CIA.

7 Other Approvals

In addition to obtaining resource consent, other approvals are necessary for the works to take place, as outlined in Table 7-1 below.

Table 7-1: Other approvals sought

Approval	Status
Archaeological Authority	Authority no 2024/149 granted 25 October 2023.
Landowner Approval	Several meetings have been held with Auckland Council and Eke Panuku in seeking landowner approval. These discussions are still in progress.

8 Reasons for Consent

Resource consent requirements for the proposed works under the AUP and NES-CS are identified in Table 8-1 below. Under the AUP, both District and Regional plan consenting provisions have been considered for this application. However, only regional rules have been triggered by the proposed works.

Table 8-1: Reasons for Consent - Regional

Reasons for Consent – Auckland Unitary Plan – Regional		
Activity Rule	Status	Relevance to application
Activity Rule E7.4.1(A20) Take and use of groundwater for dewatering	Restricted Discretionary	Consent is required for infringement to E7.6.1.6.(2): The water take for dewatering of the shaft will be for 45 days. This period is longer than the 30 days permitted. .
Activity Rule E7.4.1 (A28) Diversion of groundwater caused by any excavation, (including trench) or tunnel that does not meet the permitted activity standard.	Restricted Discretionary	Consent is required for infringement to E7.6.1.10(6): The shaft is within 10m of the Auckland Sunday School Union Building Historic Heritage Extent of Place.
Activity Rule E25.4.1 (A2) Construction noise and vibration activities that do not comply with a permitted activity standard.	Restricted Discretionary	Consent is required for exceedances to the permitted activity standards for noise and vibration.
Activity Rule E30.4.1 (A6): Discharges of contaminants into air, water or land not meeting the relevant permitted activity standards.	Controlled	Consent is required for infringement to E30.4.1: Samples taken from BH23/02 recorded an exceedance of background concentrations for lead and mercury.
Activity Rule E36.4.1 (A56)	Restricted Discretionary	Consent is required for the shaft and pipeline within the floodplain at the 329 Queen Street carpark site.

All other infrastructure in areas listed in the heading above (1% AEP flood plain) not otherwise provided for.		
NES-CS Regulation 9 Soil disturbance that does not meet the relevant permitted activity standards.	Controlled	Consent is required under Regulation 9 of the NES-CS as a controlled activity for soil disturbance exceeding the permitted earthworks volume.

Overall, the activity status of the resource consent application is restricted discretionary based on the identified reasons for consent.

8.1 Permitted Activities

In addition to the reasons for consent identified above, a number of permitted activity provisions are relied upon to undertake the works, as identified below:

- Rule E25.4.1 (A1): Construction noise and vibration generated within the road reserve
- Rule E26.2.3.1 (A4): Minor utility structure
- Rule E26.2.3.1 (A49): Underground pipelines and ancillary structures for the conveyance of wastewater (Including above ground ancillary structures associated with underground pipeline) in all zones.
- Rule E26.2.3.1 (A57): Ventilation facilities, drop shafts and manholes
- Rule E26.4.1 (A95): Earthworks up to 2500m^2 other than for maintenance, repair, renewal, minor infrastructure upgrading
- Rule E26.4.1 (A96): Earthworks up to 2500m^3 other than for maintenance, repair, renewal, minor infrastructure upgrading
- Rule E26.5.3.2 (A101): Earthworks up to 10,000m^2 where land has a slope less than 10 degrees outside the Sediment Control Protection Area other than for maintenance, repair, renewal, minor infrastructure upgrading
- Rule E26.5.3.2 (A109) Activities ancillary to erosion and sediment control.

An assessment of the relevant permitted standards for the above activities is contained in Appendix E.

9 Statutory Considerations

The RMA sets out the statutory framework within which natural and physical resources are managed. Section 104 of the RMA sets out the matters for consideration when assessing a resource consent application.

A consent authority must, subject to Part 2 of the RMA, have regard to the following matters as per Section 104:

1 Any actual and potential effects on the environment of allowing the activity;

2 Any relevant provisions of a national environmental standard, other regulations, national policy statements, the coastal policy statement, regional policy statement and plans, and the district plan including any proposed plans or regional policy statements; and

3 Any other matter the consent authority considers relevant and reasonably necessary to determine the application.

4 Section 104B of the RMA also applies as this is an application for a Discretionary Activity. Section 104B states:

104C Determination of applications for restricted discretionary activities

(1) When considering an application for a resource consent for a restricted discretionary activity, a consent authority must consider only those matters over which-

(a) A discretion is restricted in national environmental standards or other regulations;

(b) It has restricted the exercise of its discretion in its plan or proposed plan.

(2) The consent authority may grant or refuse application

(3) However, if it grants the application, the consent authority may impose conditions under section 108 only for those matters over which-

(a) A discretion is restricted in national environmental standards or other regulations;

(b) It has restricted the exercise of its discretion in its plan or proposed plan.

It is considered that the information and assessment provided in this report address the requirements of s.104 and s.104C RMA.

10 Assessment of Environmental Effects

The following is an assessment of the actual and potential effects on the environment from the proposed activities. The assessment has been prepared to meet the requirements of Schedule 4 of the RMA.

10.1 Permitted Baseline

As prescribed by Section 104(2) of the RMA, when determining the extend of adverse effects of an activity, the consent authority 'may disregard an adverse effect if a rule or national environmental standard permits an activity with that effect'. Accordingly, the permitted baseline is described as those activities which could be legally established as a permitted activity.

A number of activities associated with the project are recognised as permitted activities under the AUP, subject to compliance with the relevant standards. A table detailing these provisions, including an assessment against the permitted standards, has been included in Appendix E of this assessment. In summary, these permitted activities include:

- Construction noise and vibration generated within the road reserve
- Underground pipelines and ancillary structures for the conveyance of wastewater (Including above ground ancillary structures associated with underground pipeline) in all zones.
- Ventilation facilities, drop shafts and manholes
- Earthworks relating to infrastructure
- Infrastructure within roads or the Strategic Transport Corridor Zone in areas subject to land instability or flooding
- Goods and Materials stored in the 1 per cent annual exceedance probability (AEP) floodplain

In effect, the list of activities described above constitute the permitted baseline for this project. Any resultant adverse effects may be discounted as the level of effect arising from these activities is provided for by the AUP. It is only any other or further adverse effects arising from the proposal over and above this permitted baseline which are to be assessed.

10.2 Positive Effects

The proposed works will enable Watercare to provide for the safe and efficient conveyance of wastewater in the City Centre, which is key to supporting the existing and future well-being of the residents in Auckland.

The connector tunnel removes the need for power and fluid services to be located above ground during the tunnelling works for Part 3, avoiding nuisance for footpath users and local businesses for a period of several months.

The purpose of this tunnel is to service the mTBM which will be used to construct the Part 3 alignment of pipeline from the Mayoral Drive Shaft down Queen Street. During the Part 3 construction phase, the P3-P4 Connector Tunnel will carry all required power, hydraulic and other

fluid hoses from the staging area in the Greys Avenue Carpark into the bottom of the Mayoral Drive Shaft to support the operation of the mTBM.

As a crucial connection component within the larger Queen Street Wastewater Diversion programme of works, this connector tunnel will assist in increasing the capacity of the wastewater network and reducing the occurrence of wet weather overflows into the stormwater network. As such, the works will help to reduce contaminants flowing into coastal waters during overflow events, thus improving the quality of receiving waterbodies.

By linking together Part 3 and Part 4 of the new wastewater alignment, this project will generate positive effects by providing for future population growth in the Auckland City Centre.

10.3 Archaeological Effects

10.3.1 Description

The Auckland City Centre has an extensive history of Māori and European occupation. As the project comprises of underground tunnelling and excavation of a shaft, an assessment of effects on archaeology has been carried out by Clough and Associates. The assessment provided for this project has been included within the updated assessment of archaeology related to construction of the Part 3 alignment, provided in Appendix F.

In urban areas, such as Queen Street, archaeological sites are rarely identified prior to exposure during excavation or earthworks. As such, the approach of this assessment has been to identify historically recorded activities in this location and assess the potential for archaeological evidence to have remained despite later changes to the environment.

10.3.2 Assessment Methodology

This assessment comprised of a desktop review of local and national archaeological records. The databases include Auckland Council's Cultural Heritage Inventory ('CHI'), the AUP, New Zealand Archaeological Association's ('NZAA') site record database (ArchSite) and the HNZPT New Zealand Heritage List/ Rārangi Kōrero. These records were searched for any known archaeological or historic heritage sites in the immediate vicinity of the project works. This information was supported by relevant literature and preceding archaeological reports.

10.3.3 Actual and Potential Effects on Archaeology

Two sites of archaeological significance lie within the vicinity of the planned works at the 329 Queen Street carpark site.

As shown on NZAA's ArchSite database in Figure 3-2, the site record for R11/2017 registers the discovery of historic artefacts overlying the bed of the Waihorotiu Stream and three phases of stream channelling/ culverting adjacent to the Mayoral Drive underpass within Myers Park. It is likely this site extends to the carpark at 36-38 Greys Avenue which neighbours the project site at 329 Queen Street.

As the archaeological remains uncovered at R11/2017 were recorded at depths below 1.6m, shaft excavation works may impact the original course of the Waihorotiu Stream and its banks, as well as historic deposits containing artefacts which overlie the stream. These impacts are dependent on the extent of previous modifications at the site of the proposed shaft. Archaeological features may be observable during the initial stages of construction of the post and panel shaft.

Due to the potential exposure of remains, the archaeological values and significance of R11/2017 have been assessed against the relevant AUP and Heritage NZ criteria, summarised below.

Table 10-1: Heritage NZ criteria assessment of the archaeological values of site R11/2017 (European midden)

Value	Assessment
Condition	Remains of the stream bed, 19th century drainage and artefact layers similar to those found by Best (1998) are likely to be present subsurface.
Rarity	European midden remains and drainage are not rare in central Auckland.
Contextual Value	The site contributes in a subsidiary way to the subsurface archaeological landscape of central Auckland.
Information Potential	The site has already been recorded in some detail (Best 1998), reducing its information potential through further investigation, but could provide additional information relating to settlement adjacent to the stream and the process of drainage and infilling.
Amenity Value	The site is subsurface and has no amenity value.
Cultural Associations	The site is associated with early European settlement. The Waihorotiu Stream itself was an important part of the pre-European landscape and has Māori cultural associations, the significance of which is for mana whenua to determine.
Other	The site has moderate historic value.

The site is considered to hold limited heritage value under these criteria. The potential to uncover new archaeological information at this site has been assessed as no more than moderate.

The tunnelling works required to establish the P3-P4 Connector Tunnel are unlikely to impact on any archaeological remains as the tunnelling will occur at a depth below 4.5 metres where remains relating to site R11/2017 would be expected.

The second site recorded in the vicinity of the works at 329 Queen Street is R11/1936. This is the site of 19th century businesses, located on the western side of the Greys Avenue Carpark. Earthworks planned for the CSA site in this carpark are included within the consenting application for Part 3 works.

Overall, the project is unlikely to adversely effect upon any known archaeological sites.

10.3.4 Proposed Mitigation

To ensure a cautious approach, an Archaeological Authority has been applied for under Section 44 of the Heritage New Zealand Pouhere Taonga Act. This authority will cover all earthworks relating

to both Part 3 and the P3-P4 Connector Tunnel projects. As recommended by Clough and Associates assessment, the conditions of this archaeological authority will form the basis of mitigation actions against adverse effects on archaeology. Additionally, the standard 'accidental discovery protocols' of the AUP will apply to all excavations.

10.3.5 Summary of Archaeological Effects

Two recorded archaeological sites lie in the vicinity of the proposed works in the carpark at 329 Queen Street. The potential for adverse effects on the archaeological values of these sites have been assessed to likely be insignificant. Any observable effect is able to be appropriately mitigated subject to the adherence of conditions provided in the Archaeological Authority.

10.4 Effects on Flood Hazards and Stormwater

10.4.1 Description

An assessment of natural hazards and stormwater effects has been carried out in accordance with the requirements of the AUP in Appendix G, which includes a desktop review of existing natural hazards. The project area at 329 Queen Street lies within the 1 per cent annual exceedance floodplain, with several overland flow paths also crossing the site as shown in Figure 3-3 in Chapter 4 above.

10.4.2 Assessment Methodology

Chapter E36 of the AUP outlines the requirements of assessing development impacts on existing natural hazards. In summary these requirements include:

- Scale, type and frequency of hazard
- Type of activity being undertaken and its vulnerability to hazards
- Potential effects on public safety
- Any exabartion of an existing natural hazard risk
- Site layout and management to avoid or mitigate adverse effects of hazards
- Any proposed mitigation measures

Assessment of flood hazard effects has been based on industry best practice and desktop review of existing hazard information of Auckland Council's GeoMap service.

10.4.3 Actual and Potential Flood Hazard Effects

As identified in Figure 3-3, the project site has a 10.2ha OLFP running through it heading northbound. Passage of this OLFP is to be maintained throughout the duration of the project. As the Greys Avenue CSA will be operational for the entire construction period, there is a 0.16% probability of the site experiencing a 1% event and overland flows through the site.

The site is also subject to a 1% AEP flood plain according to Auckland Council's GeoMaps viewer. This floodplain is an extension of the OLFP mapped layer as described above. As such, the comments made above relating to flow paths also apply to this flood plain at the project site.

Once construction works are complete, the P3P4 Connector will exist entirely underground and function as a wastewater pipe. As such, there will be no permanent effects on the flow of the OLFP and floodplain, provided the works maintain existing ground level.

However, during construction, surface features including equipment, storage facilities, vehicles, materials and the P4MH4 shaft could constrict or obstruct the OLFP running through the site. Consequentially, potentially hazardous circumstances may arise where assets, materials and personnel may be endangered by flooding. As a result, an ESCP has been prepared and supplied in Appendix H outlining the control measures to be employed on site to minimise flooding hazard.

10.4.4 Proposed Mitigation

An ESCP has been prepared for use during construction. The ESCP in Appendix H outlines the measures to be implemented on site as per Auckland Council guideline GD05 – Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region. The ESCP employs the best practicable option for controlling sediment and minimising disturbance and erosion, including:

- Clean water diversion established to direct water to a clear 5-metre-wide flow path corridor through the CSA. This will be done with hot mix asphalt bunds and silt socks diverting water into existing street catchpits and stormwater channels.
- Dirty water diversions established to retain and treat dirty water on site.
- Provision of additional freeboard at the downslope of dirty water bunds.
- Catchpit protection devices installed around the CSA. These are to be checked regularly to avoid blockages.
- Stabilisation of access and entrance points to the CSA in accordance with GD05 such as retaining the existing sealed surface or installing hardfill.
- Treatment of sediment laden water, which is then discharged offsite.

Erosion and sediment control devices listed above are to be monitored and maintained at regular intervals to ensure any damage is immediately remediated. Hot mix bunds are to be inspected weekly and immediately after every rainfall event. The stabilised site entrances are to be inspected daily to preserve their function, as well as after every rainfall event.

The P4MH4 shaft will sit 3 metres away from the boundary of the constructed clean water corridor, which is expected to not obstruct any overland flow during a possible storm event.

10.4.4.1 Heavy Rainfall Response

During heavy rainfall events, there is potential for damage or displacement to erosion and sediment controls, resulting in uncontrolled sediment discharge to downstream water bodies. To mitigate against the effect of these events, the appointed contractor is to:

- Monitor weather forecasts regularly to assess the rise to erosion and sediment control measures on site.
- Inspect controls after heavy rainfall events and repair any damage immediately
- Report heavy rainfall incidents and liaise with Auckland Council as part of routine reporting.
- Report any serious incidents to Council within 24 hours.
- Contain dirty water on site until it can be appropriately treated and discharge off site.

10.4.5 Summary of Flood Hazard Effects

Once constructed, the P3-P4 Connector Tunnel will operate entirely underground and will not interfere with the flow of the existing overland flow path and floodplain. During construction, clean and dirty water corridors will divert flow around the CSA site to minimise environmental risk arising from any uncontrolled sediment during storm events.

The measures set out in the ESCP in Appendix H will be strictly adhered to as per GD05 guidelines. With the application of these best practice erosion and sediment control measures, the project will minimise the erosion and sediment effects on the surrounding environment.

The effects generated in relation to flood hazards are less than minor.

10.5 Noise and Vibration Effects

10.5.1 Description

Section 16 of the RMA instructs all occupiers of land to avoid unreasonable noise. As such, standards defining reasonable levels of noise has been taken from Chapter E25 – Noise and Vibration of the AUP. This chapter sets out noise and vibration standards for permitted activities. Where the AUP noise and/or vibration standards are exceeded, then resource consent is required as a restricted discretionary activity. Appendix I provides an assessment of Construction Noise and Vibration effects resulting from the Project.

Due to the depth of the tunnel and presence of a range of services within the vicinity of the Project, operation noise and vibration effects from the conveyance of the tunnel are assumed to be negligible.

10.5.2 Assessment Methodology

The noise and vibration effects of the Project have been assessed in accordance with the relevant provisions of Chapter E25 of the AUP.

10.5.2.1 Noise - Works outside of the Road Reserve

For the shaft construction and tunnelling works outside of the road reserve, the standards in E25.6.28 apply:

> *1. Construction activities in the Business – City Centre Zone and the Business –Metropolitan Centre Zone must comply with Standard E25.6.27(1) above for any receiver not in a Business – City Centre Zone or a Business –Metropolitan Centre Zone and must not exceed the levels in Table E25.6.28.1 and Table E25.6.28.2 when measured for any 30 minute period 1m from the façade of any building in the Business – City Centre Zone or the Business – Metropolitan Centre Zone that is occupied during the work.*

Where external measurement of construction noise is impractical or inappropriate, the upper limits for the noise measured inside the building will be 20dB less than the relevant levels.

In taking a conservative approach, the applicable noise limits from Table E25.6.28.2 have been reproduced in Table 10-2 below.

Table 10-2: AUP Construction noise limits in the Business - City Centre Zone

Time	$L_{Aeq,30\ min}$ (dB)	L_{AFmax} (dB)
Monday to Friday 6.30am – 10.30pm	75	90
Saturday 7am-11pm	80	90

Assessment has been carried out against the most stringent noise limit during this time, 75 dB LAeq(30min) / 90 dB LAFmax for construction activities.

10.5.2.2 Noise - Works within the Road Reserve

For the tunnelling works within the road reserve, the standards in E25.6.29 apply:

3. The noise levels specified in Standard E25.6.29(1) above do not apply to unplanned repair or maintenance works or planned works in the road corridor between the hours of 7am and 10pm where:

(b) because of the nature of the works and the proximity of receivers the noise generated cannot be practicably made to comply with the relevant noise levels of the following tables:

(i) Table E26.6.27.1 Construction noise limits for activities sensitive to noise in all zones except the Business - City Centre Zone and the Business – Metropolitan Centre Zone;

(ii) Table E25.6.27.2 Construction noise levels for noise affecting any other activity; or

(iii) Table E25.6.28.1 Construction noise levels for construction less than 15 consecutive calendar days duration in the Business – City Centre Zone and the Business – Metropolitan Centre Zone; or

(iv) Table E25.6.28.2 Construction Noise levels for construction of 15 consecutive calendar days or more duration in the Business – City Centre Zone and the Business – Metropolitan Centre Zone; or

(c) for planned works, a copy of the works access permit issued by Auckland Transport or approval from the New Zealand Transport Agency is provided to the Council five days prior to work commencing; or

(d) for planned works where the works will take more than 8 hours to complete a construction noise and vibration management plan is provided to the Council no less than five days prior to the works commencing in accordance with the applicable provisions of Standard E25.6.29(5) below

4A. The vibration levels specified in E25.6.29(1A)(b) do not apply to works within the road where:

(b) a construction noise and vibration management plan is provided to the Council no less than five days prior to the works commencing in accordance with the applicable provisions of Standard E25.6.29.(5) below.

5. construction noise and vibration management plan must be prepared by a suitably qualified and experienced person and include the following:

(a) details of the community consultation to be undertaken to advise the occupiers of properties located within 100m of the proposed works of all of the following:

(i) the area affected by the work;

(ii) why the work is required to be undertaken at night (where relevant);

(iii) the times and days when the noise and vibration is likely to be generated;

(iv) a contact name and number of the works supervisor who can be contacted if any issues arise and

(v) how noise and vibration complaints will be managed and responded to;

(b) a description of the works and its duration, anticipated equipment to be used, the processes to be undertaken, and the predicted noise and vibration levels; and

(c) identification of the best practicable options that will be undertaken to mitigate and minimise any noise and vibration being produced that is likely to exceed the relevant levels of the following tables:

(i) Table E26.6.27.1 Construction noise limits for activities sensitive to noise in all zones except the Business - City Centre Zone and the Business – Metropolitan Centre Zone;

6. For the purpose of Standards E25.6.29(1) to E25.6.29(4A) above:

(a) planned work means work that has been planned to take place at least seven days before the work commences;

(b) the measurement and assessment of all construction noise must be in accordance with New Zealand Standard NZS 6803:1999 Acoustics – Construction noise; and

(c) the measurement of all vibration must be in accordance with E25.6.30 Vibration.

The ability to exceed noise limits for works in the road reserve, as per item 3(d), allows for road corridor works to be completed efficiently to minimise road closures and subsequent disruptions. However, under Section 16 of the RMA, there is still a requirement for construction noise (and vibration) to not exceed a reasonable level. There is also a requirement for the CNVMP to indicate the area impacted by the works. Therefore, we have predicted noise generated by the construction activities regardless of where the works occur.

10.5.2.3 Vibration

Section E25.6.30 of the AUP outlines the relevant vibration limits:

1. Construction and demolition activities must be controlled to ensure any resulting vibration does not exceed:

a. *the limits set out in German Industrial Standard DIN 4150-3 (1999): Structural vibration – Part 3 Effects of vibration on structures when measured by that Standard on any structure not on the same site; and*

b. *the limits in Table E25.6.30.1 vibration limits in buildings in any axis when measured in the corner of the floor of the storey of interest for multi-storey buildings, or within 500 mm of ground level at the foundation of a single-storey building.*

As referenced above, the German Standard DIN 4150: 1999 Part 3 criteria is used to evaluate the effects of short-term vibration on structures that does not induce resonance in a building

structure, or long-term vibration. The vibration limits outlined in DIN 4150-3 are set such to avoid cosmetic damage to buildings.

The long-term vibration limits from DIN 4150-3:1999 are outlined in Table below:

Table 10-3: DIN 4150-3 long-term guideline vibration limits

Line	Type of Structure	Guideline values for velocity, i_i, in mm/s, of vibration in the horizontal plane of the highest floor, at all frequencies.
1	Buildings used for commercial purposes, industrial buildings, and buildings of similar design.	10
2	Dwellings and buildings of similar design and/or use.	5
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Group 1 or 2 and have intrinsic values (e.g., buildings under a preservation order).	2.5

The AUP also sets out vibration amenity limits in Chapter E25 (Table E25.6.30.1), reproduced below:

Table 10-4: AUP amenity vibration limits

Receiver	Period	Maximum Peak Particle Velocity (PPV) Limit, mm/s
Occupied activity sensitive to noise	Night-time 10pm to 7am	0.3
	Daytime 7am to 10pm	2.0
Other occupied buildings	At all times	2.0

The vibration amenity limits set out in Table 10-4 are useful to consider if an adjacent resident / occupant is likely to have their amenity 'reasonably affected' by vibration, however they should not generally be used as an absolute threshold. Surpassing these limits signals a need for the implementation of specific management measures.

10.5.3 Assessment Methodology

Taking account of the noise and vibration limits outlined above, the following sets out the methodology that has been applied to construct the CNVA for this project.

10.5.3.1 Noise Prediction Methodology

SoundPLAN Version 8.2 3D computational noise modelling software has been used to develop a noise prediction model. This prediction considers the attenuation due to distance, terrain, ground and atmosphere absorption, and reflections from building façades. Table 10-5 sets out the noise modelling parameters used in the assessment.

The assessment is based on the worst case theoretical downwind conditions in all directions from all sources, ensuring a conservative approach.

Table 10-5: Noise modelling parameters

Property	Value	Source
Calculation method	BS 5228 for construction noise ISO 9613-2 for propagation	-
Terrain contours	0.25 m vertical heights	Auckland Council GeoMaps
Buildings	Outlines of building footprints Heights set to 3.m for each story	Auckland Council GeoMaps, Heights via Google Street View.
Land parcels	Property land and road extent	Auckland Council GeoMaps
Ground Absorption Coefficient	0.1 – acoustically hard ground	Street View
Number of Reflections	3	-
Assessment location	1.0 metres from any façade	-

10.5.3.2 Vibration Prediction Methodology

Levels of vibration between the construction equipment and receiving locations has been predicted based on the methodology outlined in the *Waka Kotahi NZ Transport Agency's State Highway Construction and Maintenance Noise Vibration Guide 2019*. This methodology assumes all receiving properties have hard soil conditions and slab-on-grade foundation.

10.5.4 Actual and Potential Construction Noise and Vibration Effects

Due to the nature of the works, noise and vibration effects will be generated. The following section provides an assessment of these effects as generated by the construction of the P3-P4 Connector Tunnel.

10.5.4.1 Construction Noise Effects

As assessed in accordance with the above methodology, **Appendix G** contains the results of noise prediction modelling on adjacent properties as a result of the works.

One property, 323 Queen Street has been assessed to receive noise levels in exceedance of AUP limits during shaft construction:

Table 10-6: Noise exceedance during shaft construction works

	15 Days				10 Days	
Shaft Construction Phase:	1 Shaft extent saw cut and pavement levels excavated.	2 Auger attachment on excavator used to drill holes. Steel H beams set into holes with sand or concrete.	3 Shaft excavated to 1m below the pipe invert. Six wheeler trucks used to remove spoil off site. Steel road plates or timber lagging installed	4 Shaft base lined out with aggregate or blinding concrete. Generator used for dewatering of the shaft.	5 Concrete manhole formed and poured within the shaft using a concrete pump.	6,7 Temporary works removed using an excavator as the shaft is backfilled. Road pavement reinstated.

			between H beams.			
323 Queen Street	81	77	78	83	80	81

While this property has recorded an exceedance within each stage of shaft construction, it is unlikely these exceedances will be for the entire construction period. For example, the predicted noise from the insertion of the H-beams is when the excavator is inserting these only. There will be periods where little to no noise is generated when a new H-beam is fitted for installation to the excavator or piling rig.

Figure 10-1 below provides an indicative visual representation of the noise levels received over the façade of 323 Queen Street during Phase 1 of the P4MH4 shaft construction. This shows how noise levels decrease up the height of the building.

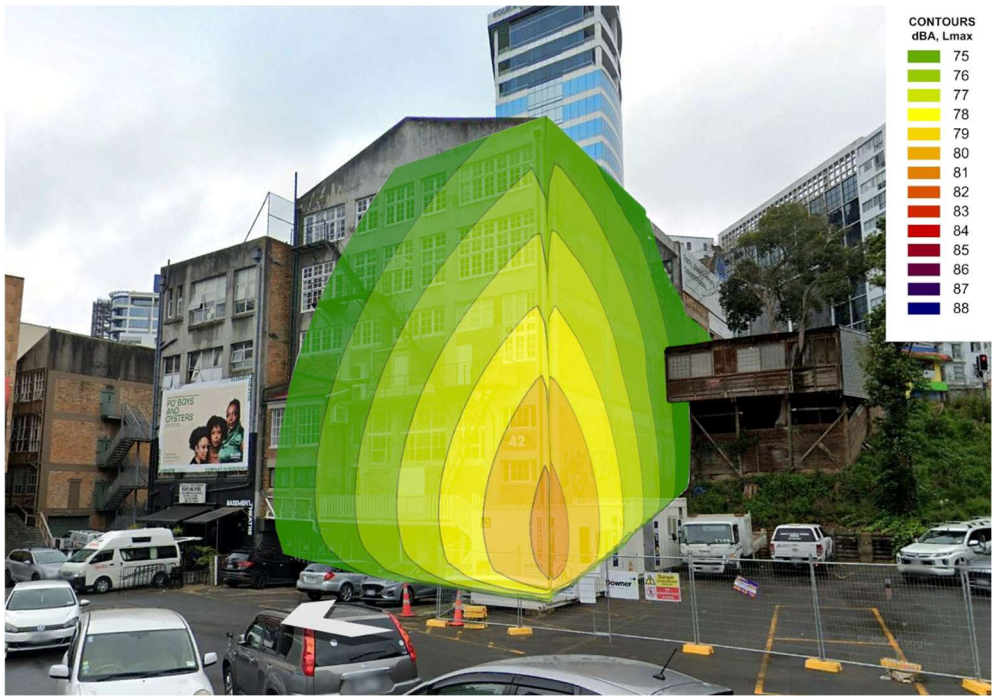

Figure 10-1: indicative representation of predicted noise level on the facades of 323 Queen Street

During the tunnelling phase of construction, three receiving properties have a recorded noise exceedance. However, this only occurs for a partial period of the construction, as in Table 10-7 below:

Table 10-7: Noise exceedance during tunnelling works

20 Days						
Tunnelling Construction Phase: 20 Days	1 Power pack, pump and water tank set up.	2 Pilot bore rig lifted into pit and surveyed into position.	3 Pilot hole drilled to Mayoral Shaft.	4 Cutting reamer installed in the Mayoral Shaft and cut	5 GRP pipes installed by pipe jacking.	6 Drill slurry flushed out of pipe with a vacuum truck, pipes cleaned.

				back to the P4MH4 shaft.		
319 Queen Street	50	50	57	77	77	55
323 Queen Street	74	74	81	81	81	79
329 Queen Street	67	67	74	80	80	72

The predicted noise levels for the trenchless construction for Phases 4 and 5 are for the equipment at the P4MH4 shaft and Mayoral Drive Shaft operating concurrently. This may not occur in practice, as when the pipe jack is operating from Mayoral Drive to Greys Ave, the Greys Ave equipment may not be used. Therefore, the total time when buildings are exposed to the predicted noise levels will be less than the 15 working day period where trenchless construction of the pipe will occur.

With the adoption of all practicable physical mitigation measures and the implementation of a CNVMP, noise effects from construction are predicted to be less than minor.

10.5.4.2 Construction Vibration Effects

Construction vibration levels are predicted to be below the criteria outlined in Section E25.6.30 (1) (a) of the AUP for all works.

Two properties are predicted to receive vibration levels above amenity limits of 2mm/s PPV, being:

- 323 Queen Street
- 329 Queen Street

These exceedances are only to occur during the pipe jacking phases of tunnelling when the pipe jack is within 8 metres of both properties. As such, these properties will be exposed to less than 10 days of vibration levels greater than 2 mm/s. The specific level of vibration is likely to be felt but is tolerable for the majority of people when given prior warning[3]. As such, the mitigation measures identified in the following section will play a key role reducing any effects associated with vibration to less than minor.

10.5.5 Proposed Mitigation

The Construction Noise and Vibration Assessment in **Appendix I** determines that mitigation is necessary to reduce impacts on adjacent properties. These measures are to be included in a CNVMP established in accordance with Section E25.6.29 (5) and enacted by the contractor for the duration of the Project.

The CNVMP shall include details of general, physical and managerial mitigation measures including:

[3] Queen Street Wastewater Diversion Part 3 Part 4 Connector Construction Noise and Vibration Assessment 2023

Table 10-8: Noise and vibration mitigation measures

General Mitigation Measures
Details of how communication is to occur between Watercare/contractors and receivers of potential noise and vibration exceedance as well as how residents may communicate any enquiries of complaints about construction noise or vibration.
Notification procedure for neighbouring properties at least 10 working days in advance of programmed noise events with an expected exceedance.
Notification procedure for properties within the 2 mm/s PPV setback distance at least 10 working days in advance of the vibratory equipment beginning operation.
Contact details of the Project Manager.
Physical Mitigation Measures
Details of site hoardings to be used to screen high noise emitting equipment when in use.
Selection of quiet equipment where possible.
Managerial Mitigation Measures
Site-specific training for all site personnel involved in noise generating construction activities.
Operation of all noise generating equipment only between 0730 and 1800 hours Monday to Saturday.
Acoustic testing of all equipment to be used on site and fitting of mufflers where practicable.
Avoidance of any unnecessary idling of equipment when not in use.

10.5.6 Summary of Noise and Vibration Effects

Based on the construction methodology and proposed mitigation, the following properties are predicted to exceed the noise limits within the AUP from construction works outside the road corridor:

- 323 Queen St

No properties are predicted to exceed the Section E25.6.30(1)(a) vibration limits. However, the following properties are predicted to exceed the Section E25.6.30(1)(b) 2mm/s PPV amenity vibration limits:

- 323 Queen St
- 329 Queen St

Physical and managerial mitigation measures are to be adopted in a CNVMP to manage the impacts of these exceedances. It is therefore recommended that as a conditions of consent a CNVMP is adopted to ensure that the best practicable option of physical and managerial noise and vibration mitigation is implemented as far as reasonably practicable.

With the adoption of the mitigation measures included in the section above, the effects associated with the construction of the shaft and installation of the wastewater pipe are predicted

to be less than minor. As such, no parties have been identified as adversely affected by noise and vibration to an extent that would require notification as an affected party under the RMA.

10.6 Land Contamination Effects

10.6.1 Description

This assessment of land contamination effects relates to the disturbance and removal of soil that may have an impact on human health and the wider receiving environment. To understand the risk of contamination, a detailed site investigation (DSI) for has been carried out at the project site. conditions under Regulation 8 (3) of the NES-CS must be met. These requirements relate to the utilisation of a SMP on site including the appropriate disposal of contaminated soil.

10.6.2 Assessment Methodology

For the P3-P4 Connector Tunnel, a DSI addendum has been carried out to support to the original DSI completed for the Part 3 alignment (WSP 2023). Both DSI reports are included in Appendix H for completeness, however the summary of effects described below relates specifically to the P3-P4 Connector Tunnel project site.

An assessment of contamination risk has been carried out in accordance with a number of applicable guidelines for human health and background concentrations as detailed in the DSI. For the P3P4 Connector Tunnel works, four soil samples were collected from two locations; BH23/03 and BH23-02 in Figure 10-2 below.

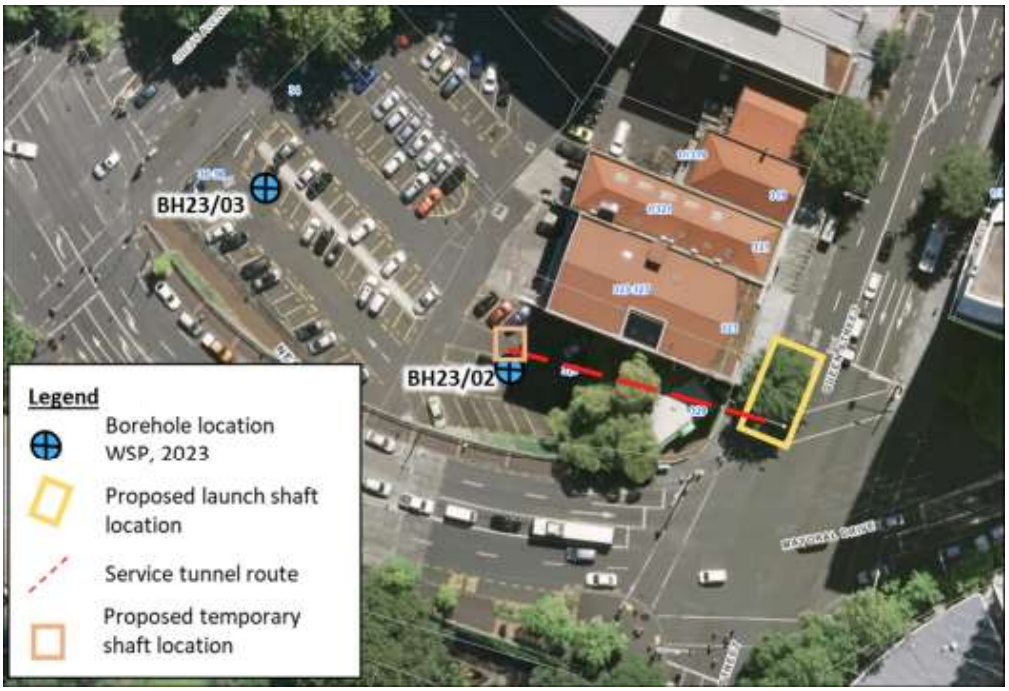

Figure 10-2: Sample locations

Samples were analysed by Watercare Laboratory Services for identification of potential contaminants of concern including heavy metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH) and asbestos.

10.6.3 Actual and Potential Land Contamination Effects

In relation to the applicable human health criteria, testing results showed no exceedances for commercial/ industrial land uses for contaminants of concern.

Samples taken from BH23/02 recorded an exceedance of background concentrations for lead and mercury. Samples from this borehole also identified PAH and TPH concentrations above laboratory detection limits and are consequently expected to be above background concentrations. Notwithstanding this, PAH was not reported above AUP permitted activity concentrations. Although these levels were below the levels determined by Auckland Council permitted activity criteria, the volume of earthworks exceeds the permitted activity standards at this site and will consequentially require consent as a controlled activity under the AUP.

Full explanation of these results including laboratory reporting is included in Appendix H.

10.6.4 Proposed Mitigation

An SMP has been developed to utilise on site which accounts for the conditions imposed by Regulation 8(3) of the NES-CS. The plan is to include an unexpected discovery protocol (UDP) outlining the procedure to be followed for any unanticipated ground conditions.

10.6.5 Summary of Land Contamination Effects

Based on the analysis undertaken, the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS) Regulations 2011 applies to the project site. As soil disturbance will exceed the permitted volumes under Regulation 8(3), consent is required as a controlled activity.

The volume of proposed earthworks and elevated levels of lead and mercury found at BH23/02 require consent to be sought for soil disturbance as a controlled activity under Chapter E30 of the AUP.

With the implementation of a SMP on site, land contamination effects are considered to be less than minor.

10.7 Groundwater Drawdown and Settlement Effects

10.7.1 Description

The abstraction of groundwater for dewatering causes a depression cone in the groundwater table. Groundwater levels generally decrease around the excavation and the area of the groundwater depression cone will extend outwards over time until dewatering ceases. Therefore, groundwater drawdowns may propagate outwards over time.

The P4MH4 shaft will be constructed using post and panel construction, which will require continuous dewatering during the construction period of the shaft, pipe jack construction works and manhole construction. The dewatering assessment (attached as Appendix K) has conservatively considered a dewatering period of 60 days, and considered the following effects:

- Effects on neighbouring bores;
- Stream depletion effects;
- Saltwater intrusion effects;

- Settlement effects on neighbouring properties and utilities due to dewatering;
- Surface flooding and water quality effects that may arise from the abstracted groundwater being diverted

10.7.2 Assessment Methodology

Dewatering Modelling

The assessment methodology for the assessment of groundwater drawdown and settlement is detailed in Section 4 of Appendix K. A brief summary of the methodology is described below.

The interpretation of the hydro-stratigraphy for the P4MH4 shaft is based on the existing geotechnical reporting undertaken for the Part 3 project, as well as the additional site investigations for the P4MH4 shaft described above.

The cross-sectional numerical groundwater model for the Mayoral Drive shaft in the Part 3 project was adapted to include the P4MH4 shaft. By doing so, the cumulative drawdown effects of dewatering for both shafts are simulated. Any additional drawdown effects on the Mayoral Drive shaft will also be addressed.

The cross-sectional numerical model was developed using SEEP/W to assess dewatering induced groundwater drawdown effects during construction of the Part 3-Part 4 Connector Tunnel. The model includes a steady state model that simulates the current hydrogeological state prior to construction, followed by a transient model that calculates the groundwater drawdown effect over the duration of the dewatering.

Water total head boundaries (i.e., constant head boundaries) representing high groundwater levels at each shaft were applied to the sides of each model. There is a significant change in elevation between the Mayoral Drive shaft and the P4MH4 shaft because of a cut west of Queen St, down to the Greys Avenue carpark. It is likely that a drainage feature (likely subsurface drainage) lowers the groundwater level to below ground surface around the P4MH4 shaft. Therefore, the water total head boundaries in the model were raised to estimate the recorded representative high groundwater table at the Mayoral Drive shaft site, and an additional seepage face was added to lower the water level at the P4MH4 shaft.

A sensitivity analysis was undertaken to assess uncertainties in adopted hydraulic parameters and the lateral extent of the geological profile.

Land Settlement Modelling

Settlement generated by drawdown in the vicinity of the P4MH4 shaft was calculated using the drawdown results generated for upper bound and low bound assumptions for the hydraulic conductivity of the soil, characterised as ‘high’ and ‘low’, respectively.

To assess the potential maximum settlement, the analyses used the maximum predicted drawdown at the location of each shaft, calculated for the assumption of ‘high’ hydraulic conductivity. The analyses used the drawdown data corresponding to ‘low’ hydraulic conductivity which yield the steepest cone of depression. All analyses were undertaken at distances of 5 m, 10 m and 20 m away from the walls of the shaft for the drawdown values provided after 60 days of dewatering, which is when dewatering at the P4MH4 shaft ceases.

Settlement was calculated assuming a linear elastic soil behaviour. The compressibility parameters were based on consistency descriptors on the borehole logs, testing and experience. The analyses were undertaken using the software *Settle3*. The groundwater drawdown was

modelled by introducing a uniform stress at the depth of the groundwater table before drawdown.

10.7.3 Actual and Potential Groundwater Drawdown and Settlement Effects

Effects on Neighbouring Bores

The lateral extent of the drawdown cone for the P4MH4 shaft is limited to a maximum of 17m from the shaft location, based on the drawdown on the north-western side, which is outside of the Mayoral shaft extent on the south-eastern side.

Water take consent WAT60315306 is 110 m from the edge of the P4MH4 shaft excavation, which is outside of the drawdown extent and no additional drawdown will occur at the take location. It is thus considered that the dewatering activity at the P4MH4 shaft will have no effect on the existing water take consent WAT60315306.

Stream Depletion Effects

There are no surface water bodies or streams in close proximity to the pipe alignment, hence the groundwater drawdown will have no stream depletion effects on surface water bodies on stream and other terrestrial and freshwater ecosystems were not conducted.

Saltwater Intrusion

Based on the assessment for the Part 3 alignment resource consent application, the likelihood of saltwater intrusion is considered negligible because the water level will not be reduced below sea level during dewatering; additional drawdown resulting from the P4MH4 shaft dewatering is limited in lateral extent (17 m) and short duration (60 days maximum).

Settlement Effects

The Burland Building Damage Assessment Classification is typically adopted to categorise buildings based on the effects from settlement. The settlement analysis conducted (refer to Table 7-1 within the dewatering report in Appendix K) suggests that the category of damage will be 0 and negligible damage is likely to incur to the adjoining building at 325 Queen Street.

A services and utilities location process will be implemented and in collaboration with the utilities' owners/authorities, a programme of relocations/diversions, protection and monitoring will be undertaken to protect the services and utilities, from risk of damage, with the proposed works.

Surface Flooding and Water Quality Effects

The dewatering water will be treated in clarifying tanks to required standards before discharge to the local stormwater network. The abstraction rates from the different shafts are very low:

- P4MH4 shaft: the dewatering rate is initially estimated to be 0.8 m^3/day reducing to 0.3 m^3/day towards the end of the dewatering period.
- This increase in total discharge from the dewatering of Mayoral Drive shaft and Greys Drive shaft, compared to what was assessed for the Part 3 consent, is minimal (being 20%).

The discharge rate for P4MH4 shaft is low and thus it is considered that flooding as a result of dewatering is unlikely.

10.7.4 Proposed Mitigation

A groundwater and settlement monitoring and contingency plan (GSMCP) has already been requested by Auckland Council for the Mayoral Drive shaft dewatering as a conservative measure for the Part 3 alignment resource consent[4] and this includes a recommendation for groundwater level monitoring, ground settlement monitoring and deformation monitoring of the heritage building (Auckland Sunday School Union Building, 325 Queen Street) on Mayoral Drive. The purpose of a GSMCP is to, so far as reasonably practical:

- Present indicative monitoring requirements for the proposed construction works
- Prevent damage related to the dewatering activity that may affect the serviceability of structures and services, and
- Provide appropriate measures to remediate or mitigate any adverse effects (including cumulative effects) as a result of the dewatering and excavation activities involved in the early works.

The likely settlement from the additional dewatering at P4MH4 shaft is considered negligible. Hence the proposed GSMCP for works to construct Mayoral Drive shaft is considered sufficient.

10.7.5 Summary of Groundwater Drawdown and Settlement Effects

Overall, the groundwater drawdown and settlement effects resulting from dewatering are assessed as being less than minor. A GSMCP is to be prepared to support the Part 3 construction works, including the construction of the Mayoral Drive shaft, and this management plan will be utilised to address the additional construction of the P4MH4 shaft proposed under this application.

10.8 Summary of Actual and Potential Effects

Overall, the effects of the Project will be less than minor subject to recommended mitigation measures.

11 Environmental Mitigation Measures

Based on the assessment of environmental effects, mitigation and management measures have been identified and recommended to avoid or reduce adverse effects upon the receiving environment. Table 11-1 below provides a high-level overview of the key recommended environmental mitigation measures for the Project.

Table 11-1: Recommended environmental mitigation and management measures

Mitigation and management measures	
Topic	Proposed measures
Archaeology	Measures to be adapted from the Archaeological Authority.
Stormwater and flooding	Works are to be carried out in accordance with the ESCP in **Appendix H**.

[4] Oise
s92 request, dated 28 September 2023

	Hot mix asphalt bunds are to be constructed around the perimeter of the Greys Avenue CSA site to create clean and dirty water diversions.
	ESCP controls are to be monitored and inspected regularly and after major rainfall events to assess flooding risk.
Noise and Vibration	Works are to be carried out in accordance with the Construction Noise and Vibration Monitoring Plan in **Appendix I**.
	Install site hoardings around high noise generating equipment.
	Ensure any property subject to a noise exceedance is informed of the works taking place with an appropriate level of notice.
Land Contamination	Works are to be carried out in accordance with the Site Management Plan (**Appendix H3**).
	All soil removed from site shall be disposed of at an appropriately licensed facility.
Groundwater and Settlement	Works are to be carried out in accordance with the GSMCP provided to Council as part of the BUN60422974 S92 response documents.

12 Affected Parties and Notification Assessment

12.1 Section 95A – Determining Public Notification

The process set out in section 95A of the RMA for determining public notification is summarised in Table 12-1, together with an assessment of the current application against each step.

Table 12-1: Notification step process

	Description of Process	Assessment
STEP 1	Mandatory public notification in certain circumstances. An application must be publicly notified if: — the applicant requests public notification — public notification is required under section 95C (which relates to notification after a request for further information or report) — the application is made jointly with an application to exchange recreation reserve land.	— The applicant does not request notification — Section 95C is not relevant as no further information has been requested at the time of lodgement — No reserve land is involved or being exchanged **Proceed to step 2**
STEP 2	If not required by step 1, public notification is precluded in certain circumstances. An application cannot be publicly notified if: — a rule or national environmental standard (NES) precludes notification — the application is for one or more of the following, but no other, activities:	There are no rules or national environmental standard that precludes notification of this application. The application is not solely related to a controlled or boundary activity.

	Description of Process	Assessment
	1. a controlled activity 2. a restricted discretionary, discretionary, or non-complying activity, but only if the activity is a boundary activity If the application is for multiple activities, public notification is only precluded for the application as a whole if each individual activity is precluded from public notification. If public notification is precluded under this step, then step 3 doesn't apply but consideration under step 4 is required (special circumstances).	Proceed to step 3
STEP 3	If not precluded by step 2, public notification is required in certain circumstances. Other than for those activities in step 2, public notification is required if: — a rule or NES requires public notification — the assessment under section 95D determines that the activity will have, or is likely to have, adverse effects on the environment that are more than minor. If the application is for multiple activities, and any part of that application meets either of the above criteria, the application must be publicly notified in its entirety.	There are no rules or provisions under the NES-CS which require public notification. The assessment of effects included in Section 9 above found that any potentially adverse effect of the project is avoided, remedied or mitigated to an acceptable level.
STEP 4	Public notification in special circumstances. If notification is precluded under step 2, or isn't required under step 3, consideration must be given to whether special circumstances exist that warrant public notification of the application. The presumption for special circumstances has changed so that, if the consent authority determines special circumstances exist, the council must notify the application (i.e. it is not discretionary).	There are no special circumstances which are relevant to this application. The application proposed a short tunnel which will facilitate a new wastewater pipeline to service Auckland City Centre. This is provided for in the AUP as a critical piece of infrastructure. As such, there is nothing unusual or exceptional about this proposal. Public notification is not required.

12.2 Section 95B – Determining Limited Notification

An assessment of the application against Section 95B of the RMA is not required as the applicant has requested public notification.

The process set out in section 95B of the RMA for determining limited notification and potentially affected persons is summarised in Table 12-2, together with an assessment of the current application against each step.

Table 12-2: Step by Step Process for Limited Notification

	Description of Process	Assessment
STEP 1	Certain affected groups and affected persons must be notified. If the consent authority determines that certain people or groups are affected, these persons/groups must be given limited notification: • affected protected customary rights groups • affected customary marine title groups (in the case of an application for a resource consent for an accommodated activity) • whether the proposed activity is on or adjacent to, or may affect, land that is the subject of a statutory acknowledgement and whether the person to whom the statutory acknowledgement is made is an affected person under section 95E	There are no customary rights groups or customary marine title groups affected by the Project. The location of the Project area is not affected by a statutory acknowledgement as identified in Appendix 21 of the AUP. Proceed to step 2
STEP 2	If not required by step 1, limited notification is precluded in certain circumstances. An application cannot be limited notified if: • a rule or NES precludes limited notification of the application • the application is for a controlled activity (but no other activities) that requires a resource consent under a district plan (other than a subdivision of land) If the application is for multiple activities, limited notification is only precluded for the application as a whole if each individual activity is precluded from limited notification. If limited notification is precluded under this step, then step 3	There are no rules or national environmental standard that precludes notification of this application. The application is not solely related to a controlled or boundary activity. Proceed to step 3

	Description of Process	Assessment
	doesn't apply but consideration under step 4 is required.	
STEP 3	If not precluded by step 2, certain other affected persons must be notified. Except for boundary activities and any activities prescribed under the regulations relating to notification of consent applications (section 360G(1)(b)), the consent authority must notify any other person they determine to be affected under section 95E. For boundary activities, only those persons whose written approval would have been required under new section 87BA are eligible to be notified. These eligible persons must be notified if they are determined to be affected persons under section 95E.	The application is not for a boundary activity or any other prescribed activities. As in Section 9 above, it is considered that any adverse effects in relation to any persons will be less than minor, and accordingly no person has been deemed adversely affected under section 95E of the RMA. Proceed to step 4
STEP 4	Further notification in special circumstances. The determination of special circumstances is new to limited notification. If the consent authority determines special circumstances exist that warrant limited notification of the application to any other persons not already determined to be eligible for limited notification (excluding persons assessed under Section 95E as not being affected persons), the council must give limited notification to those persons (i.e. it is not discretionary).	As discussed above, there are no special circumstances which are relevant to this application. Limited notification is not required

12.3 Summary of Notification

As assessed above, the application can proceed without public or limited notification.

13 Statutory Assessment

Section 104 of the RMA sets out the matters to which a consent authority must have regard to, subject to Part 2 of the RMA, when considering an application for resource consent. These are:

Any actual and potential effects on the environment of allowing the activity (refer Section 10 above);

Any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity;

Any relevant provisions of:

- a national environmental standard;
- other regulations;
- a national policy statement;
- a New Zealand coastal policy statement (not applicable);
- a regional policy statement or proposed regional policy statement;
- a plan or proposed plan; and

Any other matter the consent authority considers relevant and reasonably necessary to determine the application.

13.1 National Environmental Standards (NES)

13.1.1 NES for Assessing and Managing Contaminants in Soil to Protect Human Health (NES-CS)

The NES-CS is the only National Environmental Standard relevant to this application. The NES-CS provides national planning controls that direct the requirement for consent, or otherwise, for activities on contaminated or potentially contaminated land. All territorial authorities are required to give effect to and enforce the requirements of the NES-CS in accordance with their functions under the RMA relating to contaminated land.

The effects of the disturbance of contaminants have been addressed in section 10.6 above. Samples taken from BH23/02 recorded an exceedance of background concentrations for lead and mercury. As the works exceed the permitted volumes of soil disturbance under the NES-CS, consent is required as a controlled activity.

13.2 National Policy Statements

13.2.1 National Policy Statement on Urban Development

The National Policy Statement on Urban Development (NPS-UD) came into force in 2020 to allow for intensified urban development in areas with growth capacity. As the project area is located within the City Centre zone of the AUP, Policy 3 of the NPS-UD seeks to enable 'as much development capacity as possible' in this 'tier 1' environment. In the Policy Statement, the definition of development capacity directly relates to the 'provision of adequate development infrastructure'. As such, this project is aligned with the NPS-UD as it will provide the necessary wastewater capacity to service an increasing residential population in Auckland City Centre.

13.3 Auckland Unitary Plan

Appendix L provides a detailed a detailed assessment of the AUP provisions relevant to the Project at a regional and district scale. A summary of this assessment is provided below.

13.3.1 Regional Policy Statement

The AUP Regional Policy Statement (RPS) recognises the importance of infrastructure in enabling a high quality urban environment. Increasing wastewater capacity will provide the necessary infrastructure to support urban population growth. Located in the heart of Auckland, this project will enable the predicted population growth greater who live and work around Queen Street and adjacent areas.

The RPS recognises the importance of managing adverse effects from wastewater discharge to freshwater (B7 Toitū te whenua, toitū te taiao – Natural resources). As such, the purpose of the proposed works are considered to be consistent with the relevant provisions of the RPS.

13.3.2 Relevant Objectives and Policies

The Connector Tunnel works have been assessed against the relevant objectives and policies of the AUP, from the following chapters:

- E7 Taking, using, damming and diversion of water and drilling
- E14 Air Quality
- E25 Noise and Vibration
- E30 Contaminated Land
- E36 Natural Hazards and Flooding

A detailed assessment of the project works against the objectives and policies of the chapters in which consent is triggered is provided in **Appendix L.** In summary, the proposed works are considered to be in accordance with these provisions for the following reasons:

- In upgrading the capacity of Auckland city centre's wastewater network, the Project's purpose is to minimise wastewater overflows into the stormwater network in wet weather events. As such, the existing nuisance, public health risk and ecological effects will be reduced.
- As described in this AEE, dewatering will be required as part of shaft construction works. The method for construction is trenchless tunnelling via pipejacking. This is a water efficient method of pipe laying as it requires less excavation and reduces the amount of water required for dewatering.
- A comprehensive management plan for construction noise and vibration is included within **Appendix G2** of the application. This plan details physical and managerial mitigation measures to be implemented in order to protect people from unreasonable levels of noise.
- Extensive investigation has been carried out to ensure no discharge of contaminants harms human or environmental health as part of these works. A DSI has been completed to establish locations where soil containing contaminants may exist and application of NES CS and AUP requirements is necessary. Soil disturbance will be managed through the use of an SMP on site.
- The infrastructure works within the floodplain at the Greys Avenue Carpark are temporary in nature and will have no permanent impact on stormwater flows. Any flooding risks associated with the works locating in this area will be mitigated through the measures outline in the ESCP.

13.3.3 Relevant AUP Standards and Assessment Criteria

Based on the identified reasons for consent, the AUP provides standards and assessment criteria for evaluation of the proposed works. **Appendix L** provides an assessment of the works against these standards and criteria which demonstrates the project's ability to meet the requirements of the AUP.

For avoidance of doubt, standards relating to the permitted activities associated with these works are provided in **Appendix E** and are discussed in Section 10.1 of this report.

As the overall activity status of the Project is deemed Restricted Discretionary, assessment of this application is to be limited to the standards and assessment criteria included in **Appendix L.**

Overall, the assessment supports the project's alignment with these provisions through the provision of specified environmental mitigation measures and Management Plans to be implemented on site. These management plans include Site Management (contaminated land), Construction Nosie and Vibration, Groundwater Settlement Monitoring and Contingency and Erosion and Sediment.

13.4 Other Matters

There are no other matters relevant to this application.

14 Part 2 Considerations

Part 2 of the RMA sets out the purpose and principles of the Act. The purpose of the RMA is to promote the sustainable management of natural and physical resources.

The Court of Appeal decision in RJ Davidson Family Trust v Marlborough District Council has clarified that if a plan "has been competently prepared" then a decision maker may well "feel assured" in taking the view that there is no need to refer to Part 2 because "doing so would not add anything to the evaluative exercise". While the decision maker in relation to this resource consent application may determine that the AUP has been competently prepared, and therefore deem reference to Part 2 unnecessary. However, for completeness the matters set out in Part 2 have been assessed in this resource consent application.

14.1 Section 5

The purpose of the RMA is to promote the sustainable management of natural and physical resources. Section 5 goes on to elaborate on the definition of sustainable management, noting:

> *(2) In this Act, "sustainable management" means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while -*
>
> > *(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
> >
> > *(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
> >
> > *(c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

The proposed works as described in Section 5 of this report are required to facilitate the construction of the connecting piece of tunnel between two sections of a new wastewater trunk line in the Auckland City Centre. The proposed works will take pressure off the existing wastewater system by providing additional capacity and reducing the volume and frequency of overflows by diverting combined flows during adverse weather events, thereby safeguarding the life-supporting capacity of the coastal environment.

Overall, through avoiding overflows and increasing the capacity of the network for intensification, the works will enable people and communities to provide for their social, economic and cultural well-being for their health and safety consistent with the purpose of the RMA.

The assessment of effects in Section 9 of this report has demonstrated that long term adverse effects on the environment can be avoided, remedied or mitigated. Short term construction impacts have been avoided where possible and management and mitigation measures are suggested where they have been unable to be avoided. Given this, the proposal is broadly consistent with the purpose of the RMA.

14.2 Section 6

The matters of national importance which are relevant to this Project are:

> *(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:*
>
> *(e) the relationship of Maori and their culture and traditions with their ancestral lands, waters, waahi tapu and other taonga.*
>
> *(f) the protection of historic heritage from inappropriate subdivision, use and development*
>
> *(h) the management of significant risks from natural hazards*

These matters are addressed in Section 9 of this report and are summarised below.

As noted above, the project will reduce the frequency and volume of overflow events to the Waitematā Harbour, which will improve the existing character of the coastal environment and reducing odour.

The project will employ strict construction protocols to manage any risk from natural hazards. Whilst the works will require ground disturbance associated with the excavation of the shaft and tunnelling works, overland flow paths will be maintained during construction through ESCP controls including the creation of dirty and clean water flows. The ground will be restored to its natural level upon completion of works and will not alter the contours of the site or increase flood risk following construction. Although construction of the shaft triggers consent, it is not within the main flow channel.

The assessment of archaeological effects included in Section 10.3 details how any disturbance of historical sites can be adequately mitigated against through securing an Archaeological Authority for the proposed works.

It is noted in terms of the relationship of Māori and their culture and tradition with waters, that the overall project alleviates existing capacity constraints within the wastewater network, thereby reducing the frequency and volume of overflow discharges to Waitematā Harbour and aligning with cultural values.

The works are considered to be consistent with Section 6 of the RMA.

14.3 Section 7

Section 7 of the RMA sets out other matters to be considered. Of particular relevance to this Project are:

(a) kaitiakitanga:
(b) The efficient use and development of natural and physical resources
(f) the maintenance and enhancement of the quality of the environment:

The objective of the proposed works is to enable upgrades to the existing wastewater network in Auckland's City Centre, which will provide additional capacity to the existing system and reduce the risk of potential overflows during flooding events. This will in turn support the maintenance and enhancement of the quality of the environment, particularly within Waitematā Harbour, while providing for future development within the City Centre. The works will be installed below ground and so is considered efficient use of natural resource. Considering this, the works are consistent with Section 7 of the RMA.

14.4 Section 8

Section 8 states: *"In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi)"*. The wording "shall take into account" requires decision makers to consider the principles of the Treaty with all other matters.

The proposed works will not occur within land subject to a treaty settlement, however Watercare has engaged with their Kaitiaki Managers Projects List. No effects on cultural values or heritage from the Project have been identified by mana whenua.

15 Conclusion

Installation of the P3-P4 Connector Tunnel is a vital component of the Queen Street Wastewater Diversion programme of works. By constructing a below ground tunnel, this project will facilitate the servicing of the mTBM needed for the Part 3 tunnelling works. In serving this purpose, this project will aid in increasing the capacity of the wastewater network which will in turn enable future development in the city centre. Once Part 3 construction works are complete, the P3-P4 Connector Tunnel will function as pipe section along the wastewater alignment.

Consent is required under Chapters E7, E25, E30 and E36 of the AUP, along with the NES-CS. The overall activity status of this application is Restricted Discretionary.

Potentially adverse effects resultant from this proposal relate to the disturbance of contaminated land, infrastructure within a floodplain as well as the use and diversion of groundwater.

This AEE has concluded that any adverse effects associated with the project are temporary and will be avoided, remedied or mitigated through the implementation of mitigations measures within the appended ESCP, CNVMP, GSMCP and SMP.

The proposed works are considered consistent with the purpose of Part 2 of the RMA in that it allows for the management of natural and physical resources in a way that enables people and communities to provide for their social, economic and cultural well-being and for their health and safety. The proposal is also consistent overall with the objectives and policies of the relevant statutory documents, as it is public infrastructure and can be constructed, operated and maintained in a manner which avoids, remedies or mitigates adverse effects on the environment.

16 Limitations

This report ('Report') has been prepared by WSP New Zealand Limited ('WSP') exclusively for Watercare Services Limited ('Client') in relation to the Assessment of Environmental Effects for the P3P4 Connector Tunnel of the Queen Street Wastewater Diversion programme of works ('Purpose') and in accordance with the Master Services Agreement between the Client and Consultant dated 23 July 2022 ('Agreement'). The findings in this Report are based on and are subject to the assumptions specified in the Report. WSP accepts no liability whatsoever for any use or reliance on this Report, in whole or in part, for any purpose other than the Purpose or for any use or reliance on this Report by any third party.

In preparing this Report, WSP has relied upon data, surveys, analyses, designs, plans and other information ('Client Data') provided by or on behalf of the Client. Except as otherwise stated in this Report, WSP has not verified the accuracy or completeness of the Client Data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in this Report are based in whole or part on the Client Data, those conclusions are contingent upon the accuracy and completeness of the Client Data. WSP will not be liable for any incorrect conclusions or findings in the Report should any Client Data be incorrect or have been concealed, withheld, misrepresented, or otherwise not fully disclosed to WSP.