Project Number: W-SL007.01

Watercare Services Limited: Herne Bay Trunk Sewer

7 August 2023

CONFIDENTIAL

Assessment of Environmental Effects and Statutory Assessment

wsp

150 YEARS IN AOTEAROA

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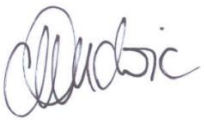
02	03/07/23	Harrison Fernandes-Burnard 	Maree Drury 	Marina Kudoic 	For Lodgement
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Glossary

Term	Definition
AUP-OP	Auckland Unitary Plan, Operative in Part
CI	Central Interceptor
CMA	Coastal Marine Area
CMP	Construction Management Plan
CNVMP	Construction Noise and Vibration Management Plan
CTMP	Construction Traffic Management Plan
Coastal Erosion Hazard Area	Any land which is at an elevation less than 7m above mean high water springs if the activity is within 50m of mean high water springs.
ECBF	East Coast Bays Formation
ESCP	Erosion and Sediment Control Plan
GD05	Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region
HDD	Horizontal Directional Drilling
HGMPA	Hauraki Gulf Marine Park Act 2000
ITA	Integrated Traffic Assessment
GSMCP	Groundwater and Settlement Monitoring & Contingency Plan
NDC	Network Discharge Consent
NPF	National Planning Framework
NBA	Natural and Built Environment Act / Bill
NES-CS	National environmental standard for assessing and managing contaminants in soil to protect human health
NES-FW	National environmental standards for freshwater
NPS-UD	National Policy Statement on Urban Development
NZCPS	New Zealand Coastal Policy Statement
the Project	The Herne Bay Trunk Sewer project, connections to overflow and manhole points, and all construction and ancillary works.

PSI	Preliminary Site Investigation
RMA	Resource Management Act 1991
Sediment Control Protection Area	100m landward of the coastal marine area
SMP	Site Management Plan
SPA	Spatial Planning Act / Bill
TBM	Tunnel Boring Machine
TPM	Tree Protection Methodology

Disclaimers and Limitations

This report ('AEE') has been prepared by WSP exclusively for Watercare Services Limited ('Client') in relation to TO-WSP-021 ('Purpose') and in accordance with the Master Services Agreement between the Client and Consultant dated 23 July 2022 and the terms of the Master Services Agreement. The findings in this AEE are based on and are subject to the assumptions specified in the TO-WSP-021 dated 11 January 2023. WSP accepts no liability whatsoever for any reliance on or use of this Report, in whole or in part, for any use or purpose other than the Purpose or any use or reliance on the Report by any third party.

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Executive Summary

Watercare Services Limited (Watercare) is a Council-Controlled Organisation (CCO) of the Auckland Council responsible for the treatment and supply of potable (drinking) water and for the collection, treatment and disposal of wastewater for around 1.7 million people in Auckland.

Watercare is undertaking an extensive programme of development and upgrades to improve Auckland wastewater collection network and reduce wastewater overflows to the environment.

This assessment of environmental effects ('AEE') has been prepared to support an application for resource consent from Auckland Council for Watercare to install a new trunk sewer line from Point Erin Park to the intersection of Marine Parade and Bella Vista Road ('the Project') in Herne Bay. This application relates to the following proposed works:

- Installation of approximately 1.5 km of 2.1m diameter trunk sewer line, constructed via a tunnel-boring machine;
- Installation of 4x interception pipes, ranging in size from 300mm to 450mm diameter, in order to collect wastewater from existing branch lines, constructed via a combination of open cut trenching and trenchless methods;
- Installation of 8x primary tunnel shafts, along with intercepting shafts connections to existing engineered overflow points ('EOP's); and
- Installation of two temporary Construction Support Areas (CSAs) at Salisbury Reserve and 94a – 94b Shelly Beach Road

The Project area is within the Herne Bay suburb of Auckland, bounded by Point Erin Park in the east, the edge of the Waitematā Harbour to the north and Marine Parade and Jervois Road to the southwest. Herne Bay is a predominantly residential suburb, with a range of typologies and architectural styles, including special character areas and modern development. Special features of the Project area include several historic heritage places, mature street trees (including various notable trees) and public open space at Salisbury Reserve and Point Erin Park.

The Central Interceptor is currently being built and is proposed to be extended from its current termination point at Grey Lynn to Point Erin Park, where it will also collect wastewater from this project.

The construction of this project is expected to take 24 months; however, the construction start and finish dates are yet to be confirmed as they are intended to occur after the Central Interceptor TBM arrives at Point Erin Park.

The statutory rules assessment considers the requirements for the installation and operation of the Project, including all enabling and accessory works. Relevant provisions of the Resource Management Act 1991 (RMA), National Environmental Standards, National Policy Statements and the Auckland Unitary Plan have been considered.

Consent is required for the following land use activities (s9):

- **Rule C1.9(2)** for an infringement to the permitted standards of Rule E26.5.3.1 (A95) *Earthworks up to 2500m^2 other than for maintenance, repair, renewal, minor infrastructure upgrading* (RD)
- **Rule E25.4.1 (A2):** Construction noise exceeding permitted activity standards in the Open Space – Informal Recreation Zone (RD);
- **Rule E26.4.3.1 (A84):** Tree trimming or alteration that does not comply with Standard E26.4.5.1 (trees in streets and open space) or Standard E26.4.5.3 (notable trees) (RD);
- **Rule E26.4.3.1 (A88):** Works within the protected root zone not otherwise provided for (RD);
- **Rule E26.4.3.1 (A92):** Tree alteration or removal of any tree greater than 4m in height and/or greater than 400mm in girth in the road or open space zone (RD);
- **Rule E26.5.3.1 (A97):** Earthworks greater than 2500m^2 other than for maintenance, repair, renewal, minor infrastructure upgrading (RD);
- **Rule E26.5.3.1 (A97A)** Earthworks greater than 2500m^3 other than for maintenance, repair, renewal, minor infrastructure upgrading (RD); and
- **Rule E31.4.3 (A101)** Storage of Sub-Class 6.3B hazardous substance over 0.3 tonnes (diesel fuel) within the Open Space – Informal Recreation zone at Salisbury Reserve (D).

Consent is required for the following regional activities (s14):

- Rule E7.4.1 (A20): Take and use of groundwater for dewatering (RD)
- Rule E7.4.1 (A28): Water permit (s14) – Temporary diversion of groundwater for dewatering (RD); and
- Rule E30.4.1 (A7): Discharges of contaminants into air, or into water, or onto or into land not meeting controlled activity Standard E30.6.2.1 (D) at CSA-1 in Salisbury Reserve.

Consent is also required under Regulation 11 of the National Environmental Standard for assessing and managing contaminants in soil to protect human health (NES-CS) as a Discretionary Activity

The overall bundled activity status for these consents is Discretionary.

The proposal also includes the following permitted activities:

- Rule E7.4.1 (A27): Diversion of groundwater caused by any excavation (including trench) or tunnel
- Rule E25.4.1 (A1): Construction noise and vibration in the road reserve;
- Rule E26.2.3.1 (A49): Underground pipelines and ancillary structures for the conveyance of wastewater (including above ground ancillary structures associated with underground pipelines) in all zones;
- Rule E26.2.3.1 (A57): Ventilation facilities, drop shafts and manholes;
- Rule E26.4.3.1 (A91): Tree alteration or removal of any tree less than 4m in height and/or less than 400mm in girth;
- Rule E26.5.3.1 (A95) and (A96): Earthworks up to 2500m^2 and 2,500m^3 other than for maintenance, repair, renewal, minor infrastructure upgrading; and
- Rule E36.4.1 (A54): Infrastructure within roads or the Strategic Transport Corridor Zone in the 1 per cent annual exceedance probability (AEP) floodplain and overland flow paths

An assessment against the relevant permitted standards of these activities is included in Appendix A.

Consultation and engagement has taken place prior to and throughout the development of the detailed design. In particular, Watercare has consulted with a range of parties including directly affected landowners (via letter drops), Ponsonby Primary School, the Herne Bay Residents' Association, the Waitematā Local Board, Mana Whenua, Auckland Council Community Facilities, Healthy Waters and Auckland Transport. Engagement with the wider community has been undertaken by way of emails, social media, the development of a Project website and open days. A summary of this engagement is included with the application at Section 10 of this AEE.

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:

- Groundwater diversion and settlement effects have been considered from the construction of shafts, trenching works and from TBM tunnelling. A conservative construction methodology (secant piling) has been proposed to reduce effects on buildings in adjacent properties, while monitoring and pre and post condition surveys will be utilised where exceedances are predicted.
- Traffic impacts are assessed for the construction of the primary shafts, interception shafts and trenching works, along with impacts from construction vehicle movements. Temporary road closures are proposed around each of the shaft construction sites, with diversions and alterations to residents' access required in some instances. Due to the construction of Shaft One, full closure of Sarsfield Street will be required for up to 100 days. This will have significant, albeit temporary, effects on the local network of Emmett and Curran Streets due to traffic rerouting through those roads. Other full and partial road closures from the construction of Shafts One, Two, Three and Four will also result in more than minor effects.

- Predicted noise and vibration levels have been assessed against relevant AUP performance standards to assess the potential effects. Overall, the works are expected to comply with these standards to most adjacent receivers. Predictions indicate worst-case noise levels of between 88 – 84 dB at six properties and noise levels of up to 92 dB La_{eq} for one property during open trenching activities when at the closest point. Construction vibration at the majority of receivers is not likely to exceed 5 mm/s DIN4150-3 limits for residential cosmetic building damage, with exceedances identified at six properties.
- The CSA site at Salisbury Reserve is surrounded by one to two storey residential properties and is expected to exceed the daytime noise limits when heavy vehicle movements are undertaken. The CSA-2 site at 94a – b Shelly Beach Road is sufficiently set back from surroundings receivers to comply with this standard;
- Works to and within the protected root zones of streets trees and trees within public open space is proposed to enable construction of surface works and provide sufficient room for construction equipment. A total of 18 trees are to be removed or relocated, of which consent is required for 14.
- Contaminated land has been identified at the two CSA sites. A draft Site Management Plan has been prepared to manage the disturbance of the contaminated soils at these sites.
- No known archaeological sites have been identified within the Project area, however given the age and history of the Herne Bay area it is possible that pre-1900 European remains, or early 1900 drainage infrastructure, will be discovered.

The detailed design has been developed to avoid, where practicable, adverse environmental effects of the Project. In this regard, construction techniques and mitigation measures are recommended to ensure that potential effects from works are contained and measures to protect identified landscape and amenity values. Proposed mitigation include:

- Consultation and engagement with the affected community prior to lodgement of this application, including community drop-in sessions, mail drop-offs and project update emails.
- Construction hours will generally be restricted to 7am and 6pm, Monday to Friday and 8am – 6pm on Saturdays.
- The construction methodology has been carefully considered to reduce effects on adjacent property owners and occupants, including measures such as acoustic fencing and trenchless construction and construction sequencing to reduce road closures. Additional measures such as monitoring and building surveys will be undertaken where required.
- Access to private properties will be maintained, even when road closures and diversions are proposed.
- Replacement tree planting will be provided where trees are to be removed and Reserve Reinstatement Plans are to be prepared once works have been completed within Salisbury Reserve and 94a – 94b Shelly Beach Road. Replanting of between 46 and 51 trees (at a minimum) is proposed.
- Management plans will be provided to Council to certify before works commence, including a Construction Management Plan ('CMP'), Erosion and Sediment Control Plan ('ESCP'), Construction Traffic Management Plan ('CTMP'), Construction Noise and Vibration Management Plan ('CNVMP'), Site Management Plan ('SMP') and Tree Protection Methodology ('TPM').

With the mitigation proposed the overall effects on the environment from the Project will range from less than minor to more than minor. However, the Project will generate temporary significant adverse effects on the surrounding transport network during the construction of Shaft One due to the full closure of Sarsfield Street for 100 days. An assessment of the alternatives to this construction methodology has therefore been undertaken in accordance with Schedule 4 RMA. Following the assessment of alternatives, it was considered that the temporary closure of Sarsfield Street is unavoidable in the context of achieving the outcomes of the Project.

Accordingly, a suite of conditions and mitigation measures are proposed that will ensure that adverse environmental effects are avoided and reduced where possible. A full list of proposed draft conditions of consent offered by the applicant is included in Appendix B.

Overall, this assessment finds that the Project:

- is consistent with the relevant objectives and policies of the Auckland Unitary Plan, including the Regional Policy Statement;
- will have positive effects (benefits) at a local and regional level, as it will improve coastal water quality by reducing the frequency of overflow events to Waitematā Harbour as well as increasing the capacity and resilience of the wastewater network; and
- achieves the purpose of the RMA as it will safeguard the life-supporting capacity of the coastal environment, while providing for the social, economic and cultural wellbeing of the community through the provision of significant new infrastructure.

Given the potential disruption to residents which may occur during construction of the Project, the Applicant is seeking public notification of the application.

1 Introduction

1.1 Project Background

Watercare Services Limited ('Watercare') is New Zealand's largest water and wastewater utility provider, responsible for the planning, maintenance, and operation of water and wastewater services to communities throughout Auckland and the northern Waikato regions. Watercare has supplied wholesale water supply and wastewater services since 1991 and is a Council Controlled Organisation ('CCO'), wholly owned by the Auckland Council.

As a lifeline utility, Watercare's services are vital for life, ensuring the safety and wellbeing of communities and helping them to flourish. Watercare's key services are:

- the collection, treatment, and distribution of drinking water from various dams, rivers and groundwater sources;
- the collection, treatment, and disposal of wastewater at various wastewater treatment plants;
- the transfer, treatment, and disposal of trade wastes; and
- the provision of commercial laboratory services.

Watercare is responsible for the management of over 410 million litres of wastewater daily, which is collected, treated, and disposed of in environmentally responsible ways. The wastewater network operated by Watercare consists of over 8,000 kilometres of pipes and 518 pump stations, directing wastewater to 18 treatment plants throughout the region.

Watercare is continually reviewing its activities and identifying maintenance, replacement, upgrading and new infrastructure projects to ensure it meets customer's needs, business objectives and statutory requirements. New infrastructure is frequently required across the region to cater for Auckland's growing population, to upgrade its assets, and to improve the security of its services.

Over the coming 20 years, Auckland's population is expected to grow by 29%, adding another 476,000 people to the current population of 1.7 million. To build a resilient water and wastewater system for this growing population, and ensure reliability of service, Watercare will invest about $18.5 billion in renewing and upgrading critical assets over the next 20 years.

1.2 Project Overview

This AEE report has been prepared on behalf of Watercare to support an application for resource consents to authorise a new trunk sewer line from Point Erin Park to the intersection of Marine Parade and Bella Vista Road in Herne Bay. This report has been prepared in fulfilment of section 88 and Schedule 4 of the Resource Management Act (RMA).

An overview of the application is provided below, and a full description of the proposed works and associated consent requirements are set out in Sections 4 and 6 of this report respectively.

Watercare is proposing through this application to build a resilient wastewater system and ensure reliability of service and reduced overflows by constructing a new wastewater trunk sewer for the Herne Bay catchment, to connect into the proposed Central Interceptor('CI') tunnel extension to Point Erin Park.

The scope of the application is for:

- Installation of approximately 1.5 km of 2.1m internal diameter trunk sewer line, constructed via a closed face tunnel-boring machine ('TBM');

- Installation of approximately 150m of 600mm diameter trunk sewer within Marine Parade, constructed via open-cut trenching;
- Construction of 8x primary tunnel shafts, ranging in diameter from 3.5m to 11m, along with 4x 3.5m diameter intercepting shafts;
- Installation of 4x interception pipes and 11x connections to existing engineered overflow points ('EOP's);
- Occupation of 2x Construction Support Areas ('CSA's) at Salisbury Reserve and 94a – 94b Shelly Beach Road, referred to as CSA-1 and CSA-2 respectively; and
- Relocation and reinstatement of utilities as required.

This resource consent application seeks approval from Auckland Council for the activities described above, hereafter referred to as 'the Project'.

The works to construct the trunk sewer line will be predominantly contained within the road corridor, with a connection to the CI to be made in Point Erin Park. One interception pipeline will extend into private property at 6 River Terrace, where an existing EOP is located, while the two CSAs will be located within Auckland Council reserves as noted above.

At present, the construction works are anticipated to commence in May 2024 and be completed by May 2026 (two years total). The construction programme is outlined in Section 4.4.

A detailed overview of the Project is provided in Section 4 below.

1.3 Purpose of the Project

The primary purpose of the Project is to reduce engineered overflow spill frequencies resulting from the aging combined sewer network in the area and to ensure ongoing compliance with Watercare's Network Discharge Consent ('NDC') conditions. This is expected to lead to improvements in bathing water quality conditions at the beaches, reduction of odour from stormwater catchpits and improved overall amenity. In addition, the new pipe will provide additional capacity for future residential intensification in the surrounding area.

The Project will utilise Watercare's significant Investment in the CI project by connecting to the CI wastewater tunnel (via the proposed extension to Point Erin Park), diverting wastewater and combined water flows away from existing coastal discharge points to the Māngere Wastewater Treatment Plant.

2 Applicant and Property Details

A summary of the site details is provided in **Error! Reference source not found.** and copies of the R ecords of Title are contained in **Appendix C**

Table 1: Applicant and Property Details

Applicant Details	Watercare Services Limited (c/o Byron De Villiers) Private Bag 92 521 Victoria Street West Auckland 1142		
Property Details Records of Title attached as **Appendix A**	**Address**	**Legal Description**	**Landowner**
	94 Shelley Beach Road (Point Erin Park)	Part Allot 10 Sec 8 SBRS OF Auckland	Auckland Council
	8 – 12 Argyle Street (CSA-1 – Salisbury Reserve)	Lot 4 DP 22075, Lot 3 DP 22075	Auckland Council
	94a Shelly Beach Road (CSA 2 – Unnamed Reserve)	SEC 1 SO 469767	Auckland Council
	94b Shelley Beach Road (CSA 2 – Unnamed Reserve)	SEC 2 SO 469767	Auckland Council
	6 River Terrace, Herne Bay	SEC 2 SO 409229, Lot 1 DP 402794	Jo-Anne Castelli-Smith, Mackie Law Independent Trustee Limited, Dale Jonathan Smith
	Herne Bay Beach (Formerly part of Herne Bay Road)	N/A	Auckland Council
Legal Roads Subject to the Application	Sarsfield Street Slack Street Wairangi Street Argyle Street Upton Street	Sentinel Road Wallace Street River Terrace Herne Bay Road Marine Parade	
Unitary Plan	Auckland Unitary Plan, Operative in Part (AUP-OP)		
Zoning	Open Space–- Informal Recreation Zone Residential – Single House Zone Strategic Transport Corridor Zone Road Reserve		
Overlays	Historic Heritage Overlay – Herne Bay Road Historic Heritage Area & 2x Residences (ID 1839 and 1901) Special Character Area Overlay – Residential Isthmus B, Herne Bay Notable Trees Overlay – Liquidambar (ID 47), Pohutukawas (ID 51 and 62) and Totara (ID 61)		
Controls	Macroinvertebrate Community Index – Urban Arterial Road (Curran Street)		
Designation	Airspace Restriction Designation–- ID 8302, Satellite earth station transmission paths (Television New Zealand Ltd)		
Hazards	Overland Flowpaths 1% Annual Exceedance Probability (AEP) Flood Plain Sediment Control Protection Area		

3 Site Description

3.1 Overview of Existing Environment

The Project is located within Herne Bay, a predominantly residential suburb on the western fringe of the Auckland City Centre. The location of the Project area within the context of Auckland is shown below in **Figure 3-1**.

Figure 3-1: Location of the project area (Herne Bay) within the context of Auckland. CSAs are highlighted in yellow

The Project area is bound by Point Erin Park in the east, the edge of the Waitematā Harbour to the north and west, and Jervois Road to the south, as shown in **Figure 3-2**.

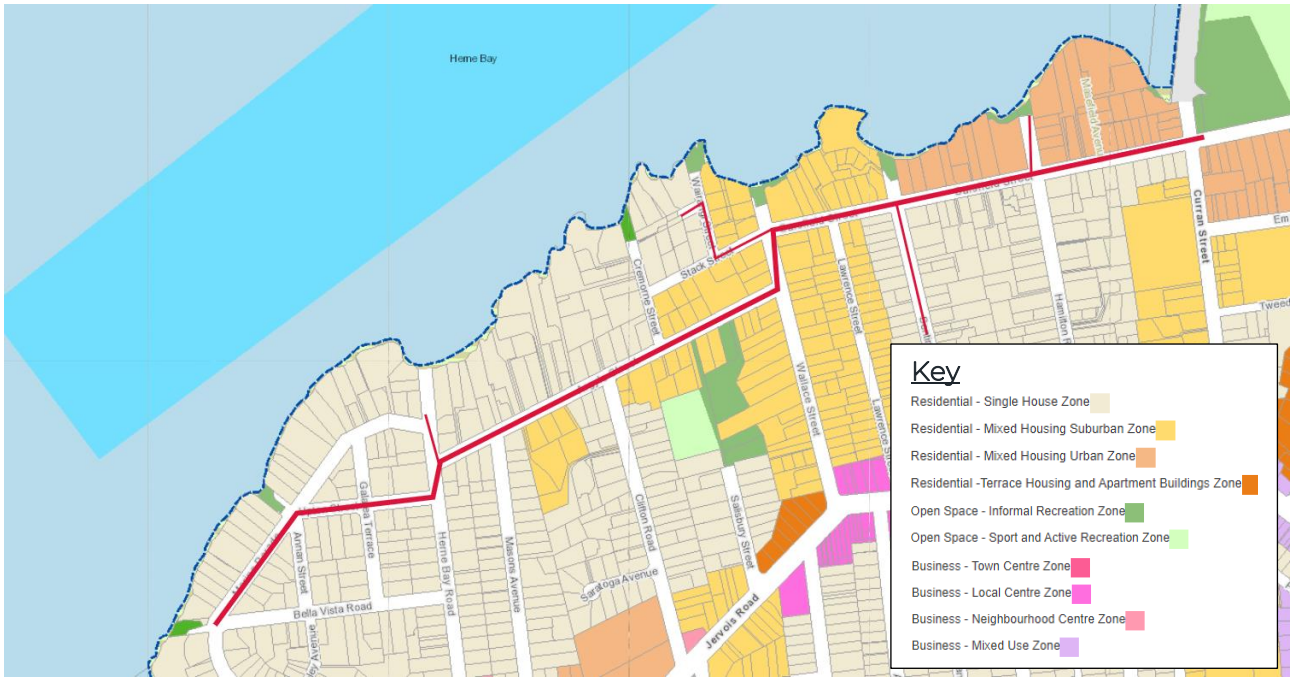


Figure 3-2: Alignment of the Project (red lines), with the underlying zoning

The Herne Bay suburb was first settled in the 1850s and contains a range of residential typologies and architectural styles. Large areas of 'special character' dwellings are present, which correlate to the 'Single House' zoning. The oldest of these special character areas (identified as 'Isthmus A' areas under the AUP-OP) are generally present in the blocks to the south of Sarsfield Street and Argyle Street and contain dwellings mostly constructed in the 1900s and 1910s. The more recent special character areas are located around Marine Parade and to the north of Argyle Street and contain dwellings mostly constructed in the 1920s (identified as 'Isthmus B').

More modern residential areas are present to the north of Sarsfield Street and within the blocks surrounding Lawrence and Wallace Streets, signified by the 'Mixed Housing Suburban' and 'Mixed Housing Urban' zoning. These areas contain a combination of larger standalone dwellings, apartment buildings and flats.

Public open space in the Project area is present at Point Erin Park and Salisbury Reserve. Several esplanade reserves also provide connections between the road reserve and the coastal edge through the Project area.

As defined within the AUP-OP, the residential dwellings directly adjacent to the works are noise sensitive receptors. In addition, Ponsonby School is located at 50 Curran Street, approximately 65m to the south of proposed trunk sewer line.

3.2 Geology and Groundwater

The Geotechnical Investigation Assessment is attached as Appendix D. This report covers the initial geological and groundwater findings in the Project area. Ground investigations are currently ongoing to further refine the initial assessment, and the findings of this work will be provided to Council once completed. A conservative approach has been undertaken in relation the findings of the geotechnical reporting to ensure the full / upper-level envelope of potential adverse effects have been captured.

A hydrogeological conceptual model of the project has been prepared based on information available to the project team, including:

- Site investigation and testing data obtained from other Watercare projects in the same geologic formations with similar lithology descriptions;
- Bore log information sourced from New Zealand Geotechnical Database (NZGD); and
- Published data including geological mapping by GNS Science, and regional/ published groundwater levels.

Published geological maps indicate that the tunnel and shafts will predominantly intercept the East Coast Bays Formation ('ECBF'), part of the Waitemata Group. GNS describes the ECBF unit as: *"alternating sandstone and mudstone with variable volcanic content and interbedded volcaniclastic grits"*.

The upper surface of the ECBF has a variable weathering profile. This material is typically a firm to stiff silt or clay with a variable sand content.

Natural Pleistocene and Holocene deposits are expected in some of the low-lying parts of the alignment. Made ground ("fill") may also be encountered at or near the ground surface in this urban environment.

Due to the limited borehole data available, three representative shaft configurations have been analysed to assess the upper bound ground settlement profile near surrounding buildings and infrastructure. The cases are summarised below:

- Case 1 (Shaft Two) – model adopted to estimate the impact of significant thickness of compressible alluvial soils overlying ECBF. Shaft geometry adopted as per Shaft 2

geometry, due to the proximity of heritage structures and presence of alluvium at this location from available borehole data.

- Case 2 (Shafts Four and Five) – model adopted to estimate the upper bound settlement profile for an anticipated typical ground profile across the scheme comprising residual ECBF soils overlying weathered ECBF and rock. The deepest shaft geometry has been modelled for this scenario (Shaft Five) while adopting the ground profile inferred at Shaft Four which recorded a locally increased thickness of weathered ECBF.
- Case 3 (Interception Shafts) – additional analysis case adopted to estimate the impact of the different construction methodology at the intercept shaft locations, adopting the temporary steel casing to full depth which will not provide outright groundwater cut-off. The ground profile and shaft geometry at SE01 (deepest intercept shaft) has been adopted, to represent the upper bound ground profile for EOP shafts where this shaft installation methodology is adopted.

Variable groundwater levels typically between 4 to 10m bgl have been observed within available borehole data. A sensitivity analysis has been undertaken by adopting upper and lower bound values of 4m and 8 m bgl, and a general hydrostatic groundwater level of 4m has been adopted. Perched groundwater above the regional groundwater table is expected between 1m and 2m.

A site investigation and drilling programme is, at the date of this report, ongoing. Further reporting based on these site-specific investigations is currently scheduled for August – September 2023.

3.3 Land Contamination

A Preliminary Site Investigation ('PSI') has been prepared and is attached within **Appendix E**. The findings of these investigations are outlined below.

Information relating to the works in the Project area was collected from a variety of sources, including Auckland Council Geomaps, Retrolens and Auckland Council's contamination enquiry.

Historic aerial photographs indicate that the area within and surrounding the alignment and connecting pipelines was urbanised since at least 1940 (shown below in Photograph 3.1). The surrounding site use has remained predominantly residential land use and subject to intensification between earliest aerials from 1940 to present.

In addition, aerial photographs for the two CSA sites were reviewed. The first CSA site at Salisbury Reserve ('CSA-1') was shown to be public open space since at least 1940, with a bowling pavilion and a pétanque club being located within the park. The second CSA site at 94a – 94b Shelley Beach Road ('CSA-2') was reclaimed from the harbour between 1950 and 1955.

A Council contamination query for the Project area and CSA-1 / CSA-2 sites was received on the 15th of February 2023 and noted the following potential HAIL activities:

Table 2: Potential HAIL sites in the Project area

Address	Land Use Activity	Potential Contamination	HAIL Reference
80 Curran Street (Masefield Reserve)	Closed landfill	Depends on type of landfill. Typical contaminants include heavy metals, asbestos, PAH, TPH and leachate/landfill gas as by-product	Activity H
19 Salisbury Street (CSA-1)	Bowling pavilion	Metals (As, Cu, Pb) and organochlorine pesticides (OCPs)	Activity A.10

94a–- b Shelley Beach Road (CSA-2)	Reclamation and filling	Wide range depending on the source of the fill. Typical contaminants, if sourced from industrial areas, include metals and PAH	Activity I

A draft Site Management Plan ('SMP') has been prepared to support the PSI and is also attached within **Appendix E**.

3.4 Surrounding Transport Network

The existing transport environment is described in the Integrated Transport Assessment ('ITA'), attached as **Appendix F**.

Carriageway widths within the Project area typically range from 7.5 m – 11 m, with roads mainly used for residential access. Most streets provide for parallel parking, with footpaths and berms on both sides of the road (apart from Marine Parade). There are no specific cycle facilities in the area, however Sarsfield Street has been recently provided traffic calming treatments, including speed tables. All posted speed limits on the route are 50 km/h.

Most roads feature low traffic volumes of less than 2,000 vehicles per day[1], except Sarsfield Street (circa 4,000 per day) and the Curran Street State Highway 1 on ramp (circa 6,000). This reflects the predominantly local access and collector function of the roading network within Herne Bay. In contrast, Sarsfield Street and Curran Street serve greater volumes of traffic as they provide connections onto the Northern Motorway.

There are no scheduled bus services within the alignment of the Project. However, there are several bus stops on Jervois Road approximately 500 m to the south of the proposed works, which are served by the 101 and the Outer Link bus routes. Bus numbers 866 and 966 also travel via Curran Street and Shelly Beach Road to/from the North Shore.

An assessment of the road safety records of the surrounding road network in the ITA concludes that there is a generally low occurrence of recorded crashes. The majority of the crashes are at the Curran Street / Sarsfield Street and Shelly Beach Road / Sarsfield Street intersections. Overall, it is considered that there are no inherent traffic safety issues present in the Project area.

3.5 Flooding Hazards

The Project area is subject to various flooding hazards, as shown below in **Figures 3-3** and **3-4**.

Flood plains are present at Shaft One, Shaft Seven and at EOP connection shafts SE03 and E04. In addition to these floodplains, major overland flowpaths (with a catchment of greater than 1ha) are also present at Shaft Two, Shaft Three, Shaft Six and EOP connection shafts SE01 and SE02.

[1] Count undertaken in 2020

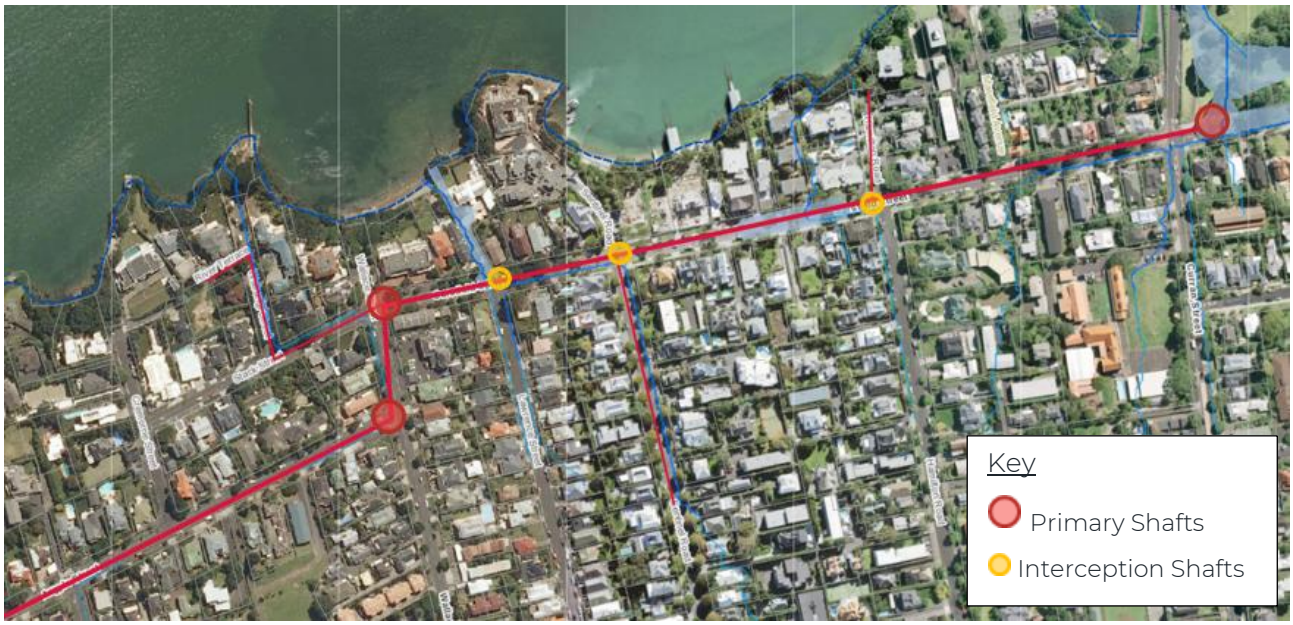


Figure 3-3: Flooding hazards along the eastern portion of the Project

Figure 3-4: Flooding hazards along the western portion of the Project

3.6 Protected Trees

Due to the age of the Herne Bay settlement, there are a large number of mature street trees within the Project area; trees that are 4m in height or 400mm in girth within the road reserve and public open space containing the CSAs are offered general protection under the AUP-OP. In addition, several scheduled 'notable trees' within adjacent properties have been scheduled under the AUP, being:

- 61 Sarsfield Street – Pohutukawa (ID 51);
- 80 Sarsfield Street – Totara (ID 61);
- 1 Stack Street – Pohutukawa x2 (ID 62); and

- 73 Argyle Street – Liquidambar (ID 47)[2].

In addition, several post-mature London Plane trees are present within the road reserve of Herne Bay Road. While these trees are not individually scheduled in the Notable Tree overlay, they are within the Historic Heritage Area extent (see Section 3.8.1 below), and are considered to significantly contribute to the heritage streetscape of this area.

These notable / protected trees are shown in **Figures 3-5 – 3-8** below. An assessment of the protected trees, including notable trees and protected trees within the road reserve / public open space affected by the proposed works is included as **Appendix G**.

Figure 3-5: Notable Pohutukawa at 61 Sarsfield Street (Source–- Google Streetview)

Figure 3-6: Notable Totara at 80 Sarsfield Street (Source – Google Streetview)

[2] While this tree is shown as being within the Notable Tree overlay of the AUP-OP, it is understood that this tree has been removed without prior authorisation of Council, as per a report to the Waitematā Local Board from June 2019. As such, this tree has not been addressed any further in this report.

Figure 3-7: Two Notable Pohutukawas at 1 Stack Street (Source–- Google Streetview)

Figure 3-8: Post-Mature London Plane Trees within the Herne Bay Historic Heritage Area (Source–- Google Streetview)

3.7 Archaeology

An Archaeological Assessment of the Project alignment has been undertaken and is attached as **Appendix H**. The findings of this assessment are summarised below.

3.7.1 Māori Settlement

Auckland and the upper Waitematā Harbour have a long history of traditional associations with Māori, depicted in the complex traditional record relating to the region that reflects the migrations, conquests and occupations that have taken place in this area over centuries. Ngāti Whātua, Te Waiohua, Ngāti Paoa and Te Kawerau a Maki in particular have historical associations with the isthmus.

The northern tip of Point Erin was once a headland pa site known as Te Koraenga Okā or Okā Pā. This site is recorded in NZAA ArchSite as R11/78 and is a scheduled Site and Place of Significance to Mana Whenua under the AUP-OP (reference ID006), with a defined Extent of Place. The works proposed under this consent are outside of this scheduled AUP-OP overlay.

During works for the construction of the Point Erin Pools in the early 1960s Okā Pā was recorded in the NZAA site records as having been destroyed. However, in 1981 the site was revisited and was considered to have a few remaining areas of archaeological potential. These include an area of crushed shell midden eroding out of the northwest edge of the headland, and possible evidence of ditch and bank fortifications south of the pool complex, near the current car park.

3.7.2 European Settlement

The land now comprising of the suburb of Herne Bay was a small part of the large 3,000 acre purchase by the Crown from Ngāti Whātua in 1840 – Deed 206 Matahareharе, Opou and Whau. These 3,000 acres included all of the land that now makes up the Auckland Central Business District (CBD) and surrounds.

The Crown subdivision of the modern Ponsonby, Herne Bay and St Marys Bay areas occurred in 1845, with the first sales in 1846. The Crown Grant named 'Erin' purchased by one John Campbell, an Irish immigrant, covered the area from Shelly Beach Road to Wallace Street and south to Jervois Road. In 1857 the wider area was proposed for subdivision and sold as 'Campbellville', with John Campbell retaining the Point Erin area as far as Sarsfield Street, which included his house and a boat shed at Shelly Beach.

In 1911 Point Erin was developed and landscaped as one of Auckland's earliest public parks.

Archaeological monitoring of earthworks in the southwestern corner of the park on the corner of Sarsfield and Curran Streets in 2012 and in 2020 did not identify any intact archaeological deposits in this area.

A road and causeway were constructed in 1931 from the foot of Curran Street, extending around the western cliff of Point Erin to link up with the breakwater of St Mary's Bay boat harbour. A wide path was also provided to link up from the road to the Shelly Beach Baths. The western cliff skirting the park had to be cut away and benched to form the road and the spoil used to form the roadway.

In 1956 work on the Harbour Bridge approaches began and an on-ramp to the motorway was constructed as an extension of Curran Street, which buried the original 1931 road to the Shelly Beach Baths and Westhaven seawall and reclaimed the eastern part of Masefield Beach along the western side of the Point Erin headland.

3.7.3 Field Survey

An archaeological site inspection of the proposed new Herne Bay Trunk Sewer line was carried out on 9 November 2022 and 26 January 2023.

Archaeological monitoring confirmed that the construction of the Curran Street motorway on-ramp had buried the entire southwestern corner of Point Erin Park under at least 6m of fill, covering the original 1931 coastal road, the eastern side of Masefield Beach and the southern gully

within the park. No archaeological deposits were identified in this area and the proposed location of Shaft 1.

Multiple existing manholes are present along the roads of the proposed tunnel alignment and shaft locations at road intersections. Some of these may relate to the location of early sewer and/or water infrastructure structures that were identified on the 1908 City of Auckland Map at:

- the intersections of Sarsfield Street and Hamilton Road;
- Sarsfield Street and Sentinel Road;
- Sarsfield Street and Lawrence Street;
- Argyle Street and Clifton Road;
- Along Argyle Street and Marine Parade; and
- at the intersection of Bella Vista Road and Marine Parade.

However, most will be later 20th century and more recent structures. Without inspection it is not possible to determine whether any of these are 19th century structures.

Except for the pipeline within Herne Bay Road that extends into the reserve to Herne Bay Beach, all the proposed interception pipelines are located within road reserve. No archaeological or other historic heritage sites were identified by background research or field survey within the alignment of the proposed four interception pipelines.

The CSA-1 site at Salisbury Reserve will be accessed via the pedestrian access at 12 Argyle Street, which contains a footpath, grass and shrub planting. This land was originally a residential property with a single bay post-1900 wooden villa, which was later converted into the Herne Bay Masonic Lodge. This property was purchased by Auckland Council in the 2010s and the lodge was removed to form an additional public accessway to the reserve in 2019. The remainder of the proposed CSA within the reserve includes the former Herne Bay Bowling Club lawn.

The area of the CSA-1 site is a well landscaped and modified area, particularly across the former bowling green, which has been levelled and raised. No archaeological or other historic heritage sites were identified by background research or field survey.

The CSA-2 site at 94a – b Shelly Beach Road is within an area created by harbour and foreshore reclamations for the Auckland Harbour Bridge approaches in the 1950s. The site is outside of the scheduled Te Rōutu o Ureia Site of Significance to Mana Whenua overlay area. No archaeological or other historic heritage sites were identified by background research or field survey.

3.8 Built Heritage and Character

3.8.1 Historic Heritage

Several scheduled heritage places are located along the alignment of the Project.

The Herne Bay Road Historic Heritage Area is located on both the western and eastern frontages of Herne Bay Road and includes the road reserve, see **Figure 3-9** below.

Figure 3-9: Herne Bay Road Historic Heritage Area (purple hatching) in relation to the Project

Two dwellings adjacent to the alignment of the Project are scheduled as historic heritage places under the AUP, as shown in Figure 3-10 below. These dwellings are located at 58 Wallace Street and 85 Sarsfield Street). Note that both of these dwellings are also included on the New Zealand Heritage List / Rārangi Kōrero.

Figure 3-10: Two scheduled dwellings (purple hatching), in relation to the Project

4 Proposed Works

4.1 Overview

A wastewater trunk sewer pipeline is proposed for the Herne Bay catchment, to connect into the proposed CI tunnel extension to Point Erin Park. The primary purpose of the Project is to reduce engineered overflow spill frequencies to ensure ongoing compliance with Watercare's NDC conditions. This is expected to lead to improvements in bathing water quality conditions in the beaches within this catchment.

The 'General Arrangement' Plans for the proposed Project are attached as **Appendix I**. **Figure 4-1** below shows a schematic of the proposed alignment of the tunnel and interception pipelines for the Project.

Figure 4-1: Alignment of the tunnel and interception pipelines for the Project

The eastern terminus of the Project is at Point Erin Park, where it will connect to the proposed CI extension via a drop chamber, which will be constructed as part of the CI extension project.

Works within Point Erin Park are to be approved by the CI extension resource consent application and do not form part of this application.

As shown in Figure 4-1, the proposed Herne Bay Trunk Sewer pipeline will commence with the connection to the CI drop shaft chamber at Shaft One, opposite Point Erin Park and continue to the west within the road reserve of Sarsfield Street for approximately 610m. It will then continue to the south within Wallace Street for approximately 80m. then west within Argyle Street, until it meets the intersection with Herne Bay Road. The Project pipeline will then travel a short distance to the south along Herne Bay Road, until the intersection with Upton Street, where it turns west along Upton Street, until it meets the intersection with Marine Parade and Annan Street. The final segment of the Project pipeline will travel for approximately 200m the south-west within Marine Parade, where it will terminate.

4.1.1 Interception Pipes

Four interception pipelines are proposed, as shown in **Figures 4-2** and **4-3**, to connect the new trunk sewer to existing engineered outflow points ('EOP's), being:

1) An 80m long, 300mm diameter extension to the north beneath Hamilton Road;
2) A 190m long, 300mm diameter extension to the south beneath Sentinel Road;
3) A 220m long, 450mm diameter extension that extends west along Stack Street, turns north along Wairangi Street and turns west along River Terrace. This pipeline terminates within 6 River Terrace, where EOP1019 is located; and
4) A 75m long, 300mm diameter extension that extends north within Herne Bay Road.

A short 25m connection between Shaft Eight and EOP199 is also required at the intersection of Marine Parade and Bella Vista Road.

Figure 4-2: Four interception pipelines (shown in pink), along with the EOP connections (yellow triangles) in the eastern portion of the alignment

Figure 4-3: Pipe extension from Shaft Eight to EOP 199 (shown in pink), along with the EOP connections (yellow triangles) in the western portion of the alignment

3.5m diameter shafts are required at the following locations to allow for the construction of connections to the EOPs shown in Figure 4-2 and 4-3 above:

Table 3: List of EOP Connections

Asset Name	Location	Depth
SE01	59 Hamilton Road	17.8m
EP202	69 Hamilton Road	1.1m
EP195	59 Hamilton Road	2.3m
SE02	80 Sarsfield Street	13.4m
EOP200	28 Sentinel Road	4.7m
SE03	91 Sarsfield Street	9m
EOP201	91 Sarsfield Street	4.1m
EOP1019	6 River Terrace	2m
EOP1019 WWMH01	12 Stack Street	7.2m
EOP1019 WWMH02	1 Wairangi Street	5m
SE04	45 Argyle Street	6.9m
EOP740A	45 Argyle Street	4.1m
EOP197	1 Marine Parade	3.6m
EOP198	22 Marine Parade	4.9m
EOP199	Bella Vista Road x Marine Parade	2.3m

Each of the interception pipes will be constructed with the following methodology:

- Hamilton Road: Trenchless
- Sentinel Road: Combination of open trenching and trenchless
- Stack Street and Wairangi Street: Trenchless
- River Terrace: Combination of open trenching and trenchless
- Herne Bay Road: Trenchless

The interception pipes and connections between the EOPs and shafts / interception shafts will be constructed with a combination of open trenching and trenchless excavation, as outlined in Table 1 of **Appendix J** – Construction Methodology Report.

4.2 Primary Construction Shafts

Shafts are required at the changes in tunnel direction to provide entry for the TBM (Thrust shafts) and to retrieve the TBM (Receiving shafts) and will be constructed as the project progresses, ensuring there is a receiving shaft as the TBM commences a drive towards it.

The proposed shaft locations correspond with the alignment described above and are shown in **Figures 4.4 – 4.9** below. The proposed shafts will be of a varying diameter and depth, depending on their location, ranging from 9m – 13m internal diameter and depths of 6.3m – 22.6m corresponding with the fall of the pipeline and the undulating topography of the Project area as detailed below. A depth range is provided for each of the shafts to allow for construction flexibility and minor adjustments to respond to anything that arises from the geotechnical investigations.

4.2.1 Shaft One – Opposite Point Erin Park

Shaft One will be the terminating shaft of the Project and the interface with the CI Extension project, where it will connect to the proposed drop shaft chamber to the CI tunnel. The location

of Shaft One is to the east of the Sarsfield Street / Curran Street intersection, as shown below in Figure 4-4.

This shaft will be used to thrust the TBM and will be constructed with a diameter of 13m, and a depth range of 11.5m–- 16.9m.

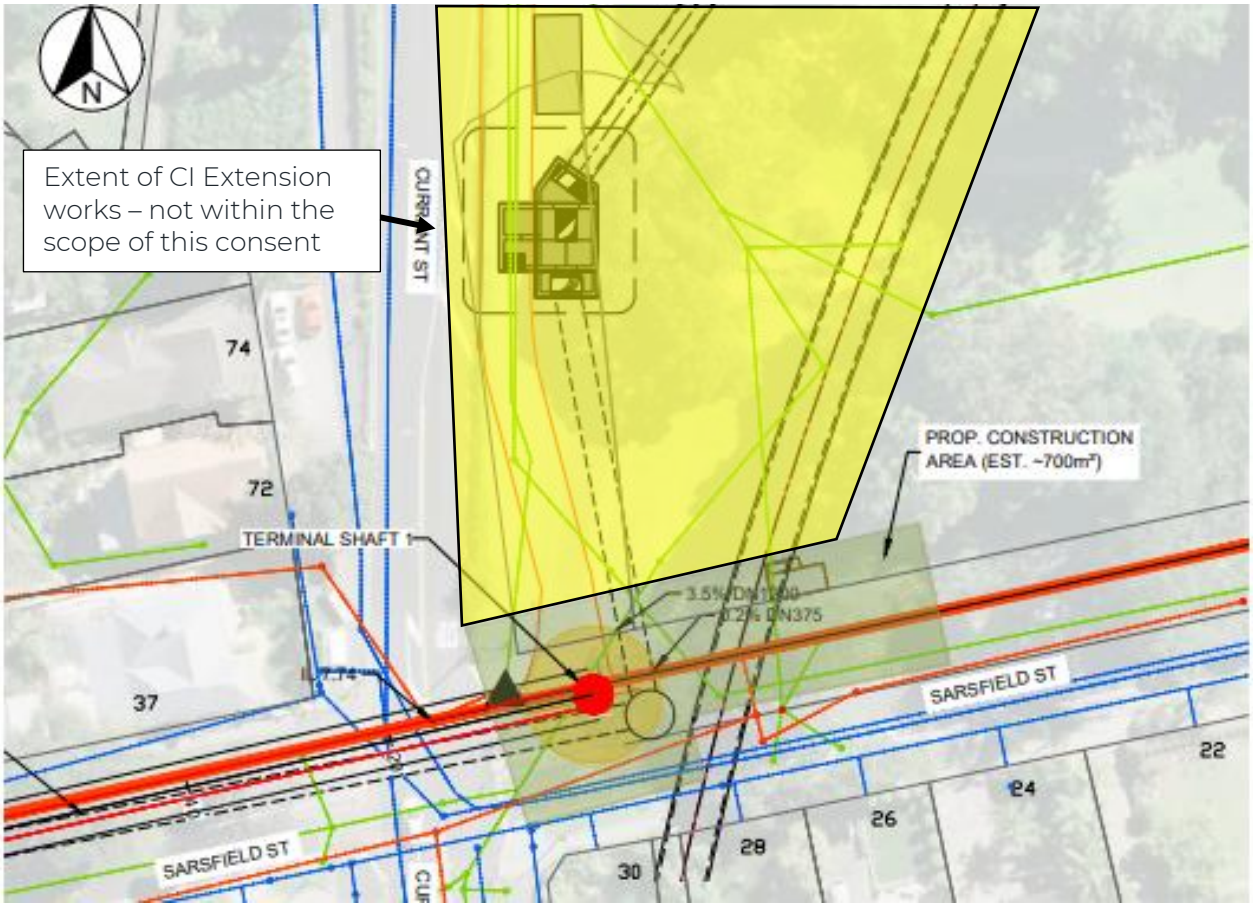


Figure 4-4: Location of Shaft One, with the connection to the CI drop shaft chamber to the north

4.2.2 Shaft Two – Intersection of Sarsfield Street and Wallace Street

Shaft Two will be used to receive the TBM and will be constructed with a diameter of 9m, to a depth range of 13.9m–- 19.3m. The location of Shaft Two is at the Sarsfield Street / Stack Street / Wallace Street intersection, shown below in Figure 4-5.

Figure 4-5: Location of Shaft Two

4.2.3 Shaft Three – Intersection of Wallace Street and Argyle Street

Shaft Three will be used to thrust the TBM and will be constructed with a diameter of 13m, to a depth range of 17.2m–- 22.6m. The location of Shaft Three is at the Wallace Street / Argyle Street intersection, as shown below in **Figure 4-6**.

Figure 4-6: Location of Shaft Three

4.2.4 Shaft Four – Intersection of Argyle Street and Herne Bay Road

Shaft Four will be used to receive the TBM and will be constructed with a diameter of 9m, to a depth range of 17.1m–- 22.6m. The location of Shaft Four is at the Herne Bay Road / Argyle Street intersection, as shown below in **Figure 4-7.**

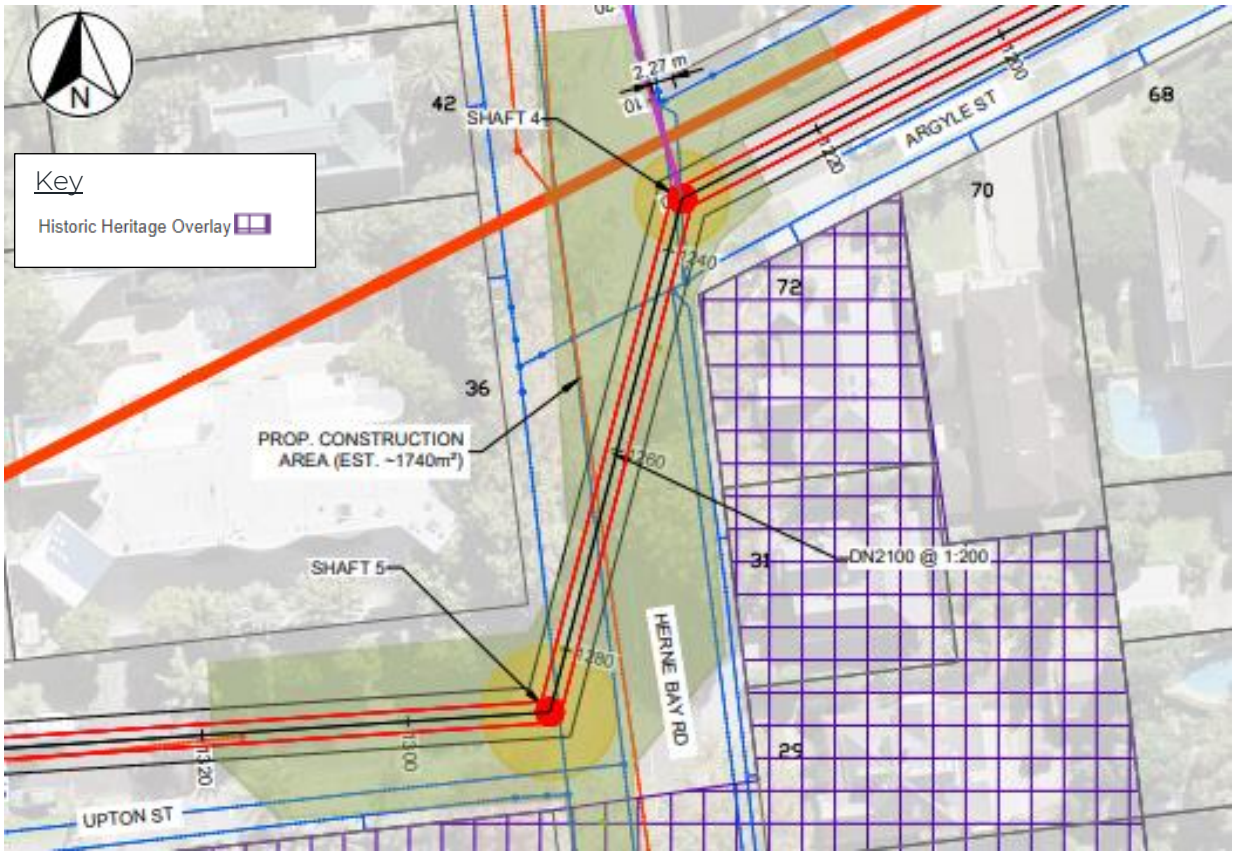


Figure 4-7: Location of Shafts Four and Five

4.2.5 Shaft Five – Intersection of Herne Bay Road and Upton Street

Shaft Five will be used to thrust the TBM and will be constructed with a diameter of 13m, to a depth range of 19.8m–- 25.1m. The location of Shaft Five is at the Herne Bay Road / Upton Street intersection, as shown above in **Figure 4-7**.

4.2.6 Shaft Six – Intersection of Upton Street and Marine Parade

Shaft Six will be used to receive the TBM and will be constructed with a diameter of 9m, to a depth range of 8.2m–- 13.6m. The location of Shaft Six is at the Upton Street / Marine Parade / Annan Street intersection, as shown below in **Figure 4-8**.

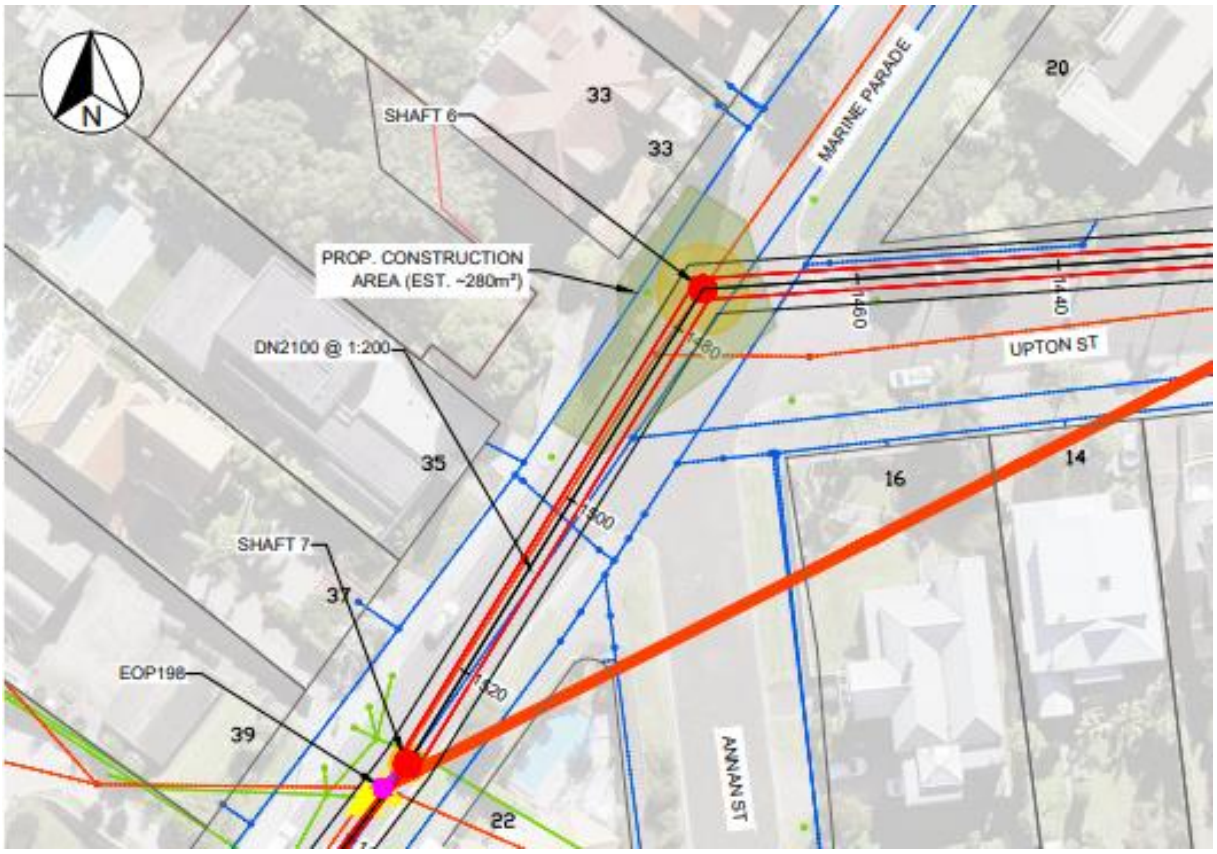


Figure 4-8: Location of Shafts Six and Seven

4.2.7 Shaft Seven – Opposite 22 Marine Parade

Shaft Seven will be used to receive the TBM and will be constructed with a diameter of 9m, to a depth range of 6.3m – 11.7m. The location of Shaft Seven is opposite 22 Marine Parade, as shown above in **Figure 4-8**.

The section of pipe between Shafts Seven and Eight will be constructed via a combination of trenching and trenchless methodology, rather than utilising the TBM.

4.2.8 Shaft Eight – Intersection of Marine Parade and Bella Vista Road

Shaft Eight will be connected to the trenched section and will be constructed with a diameter of 3.5m, to a depth of 2.4m. The location of Shaft Eight is at the Marine Parade / Bella Vista Road intersection, as shown below in **Figure 4-9**.

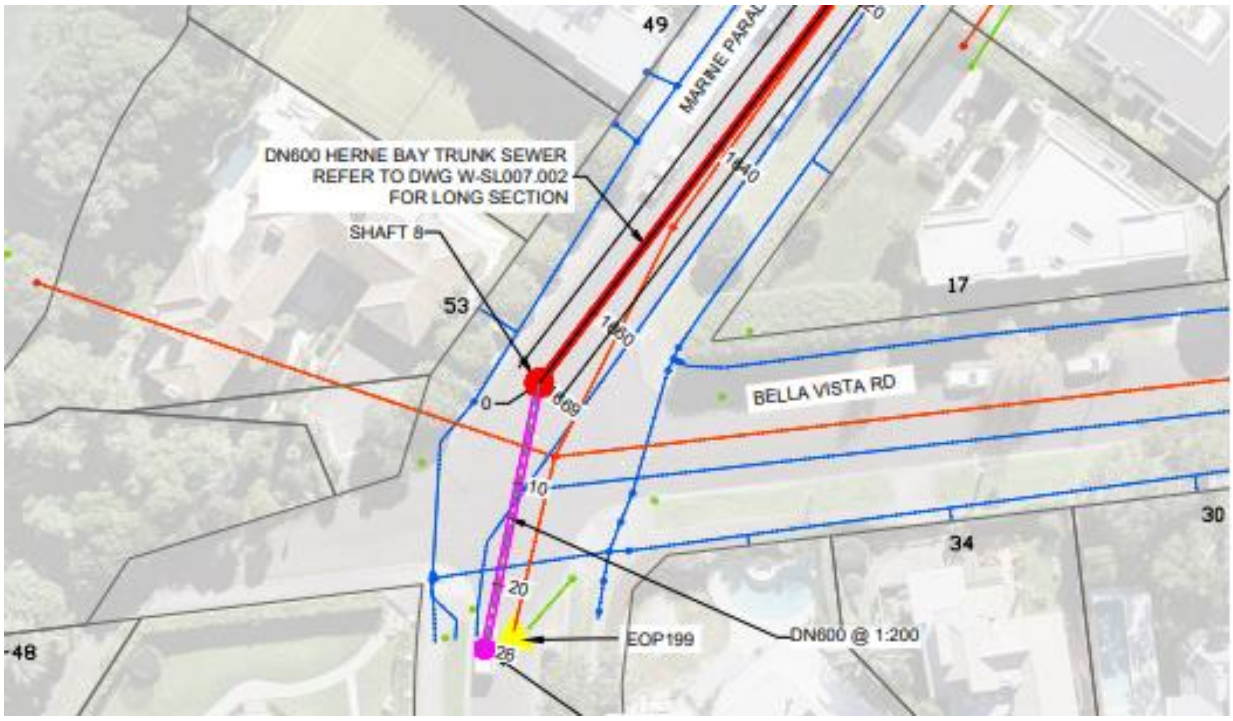


Figure 4-9: Location of Shaft Eight

4.3 Construction Methodology

The construction methodology for the Project is outlined in **Appendix J**. In summary, the methodology consists of the following activities:

- **Site establishment –** Set up of CSA-1 at Salisbury Reserve, including worker welfare facilities, temporary traffic management, plant delivery and fencing.
- **Enabling works** – Pothole services and divert services around each primary and interception shaft site.
- **Shaft Construction site establishment** – Traffic management and fencing, environmental controls, hardfill and plant delivery at each shaft construction site (primary and interception shafts)
- **Shaft piling** – Erect temporary excavation support – either sheet piling, casing shaft or secant piling and removal of spoil.
- **Primary Shaft Construction** – Concrete breaking, back excavation, de-watering of shafts and concrete construction.
- **Interception Shafts** – Construct drilling platform, drill 3.5m diameter casing and cut into main sewer.
- **Tunnelling** – Set up tunnelling rig and equipment, tunnel boring, removal of spoil, separation of soil and water from slurry, and installation of pipes.
- **Manhole Construction** – Installation of manholes within primary and interception shafts, progress backfilling of shaft around manhole, removal of sheet piling or casing shaft as required, break down concrete of secant shaft 1m below ground, reinstatement of surrounding roadway.
- **Directional Drilling** – Excavate drill pits with trench shields, drill bore and pull through drainage line.

- Open Trenching – Temporary excavation support (trench shields), removal of spoil – to be loaded onto truck and removed from site, installation of bedding and new pipe, manhole backfill and reinstatement works. Open trenching will occur between Shafts Seven and Eight and along portions of the interceptions lines (see Section 4.1.1 above), and will only be undertaken during daytime hours.
- Road Reinstatement - Concrete break out and excavation, kerbing, traffic Islands & footpaths, asphalt and line marking.

4.3.1 Construction Support Areas

The CSAs will be established to support the proposed works. These will act as hubs for the shaft construction sites at each shaft and enable short term storage of materials and plant. This will enable a reduction of materials and equipment stored at each shaft location and reduce the size of vehicles and truck movements on the local road network.

Salisbury Reserve (CSA-1) is the proposed central compound, however due to the limited size and constricted nature of the streets surrounding the area, a second hub is proposed at 94a - b Shelley Beach Road (CSA-2), off the Curran Street on-ramp. CSA-1 will act as a central site providing immediate support to the work sites, while CSA-2 will be able to provide for access to larger truck & trailers to further reduce truck movements on the local network.

The following activities will occur at each CSA site:

Table 4: Purpose of the CSA sites

CSA-1 at Salisbury Reserve	CSA-2 at 94a – b Shelly Beach Road
• Main Site office • Worker welfare facilities • Tool storage • Minor material storage, including diesel for machinery • Plant storage	• Worker muster point • Worker welfare facilities • Secondary Site office • Tool storage • Material storage and stockpiling • Truck and Trailer material delivery

Each of these sites will be hardfilled to provide an all-weather surface and environmental controls such as erosion and sediment control and containment of materials put in place along with a security fence, gate controls and semi-permanent traffic management. The CSA will be utilised for the duration of the project. Where possible services will be connected to the grid for the duration of the construction works.

Individual construction sites will be established around each shaft during construction, and will accommodate construction support equipment, such as generators, slurry separation tanks, and excavators.

The proposed locations of the CSAs for the Project are shown in Figures 4-10 and 4-11. The final layouts are to be determined pending availability and adjacent stakeholder requirements.

Further details on the CSAs are provided within the Construction Methodology Report, see Appendix J.

Figure 4-10: Proposed CSA-1 within Salisbury Reserve

Figure 4-11: Proposed CSA-2 at 94a - b Shelley Beach Road

4.3.2 Construction Hours

General construction works are proposed to occur between 7am and 6pm, Monday to Friday and 8am – 6pm on Saturdays. No works are proposed on Sundays or public holidays.

Site mobilisation and pack down works are proposed to occur 30 minutes before and after these windows.

There will be occasions where it is necessary to undertake construction activities outside of standard hours, as is similar for other Watercare project sites. Works outside of standard hours will be limited as far as is practicable, and for operational reasons may comprise:

- Site setup and packup,
- Large plant delivery early in the morning or later in the evening to avoid peak traffic volumes.
- Service relocations and their connections to reduce service disruptions.

4.4 Construction Programme

The proposed works are anticipated to take two years to construct. The construction activities and their expected duration is outlined in Table 5 below, noting that some activities are likely to overlap. The below only relates to the primary construction activities at each location, and does not include accessory activities, such as a site mobilisation. Further details about the nature of the activities required for each construction stage is provided within **Appendix J**.

Table 5: Indictive construction programme

Task name	Approximate duration
Site establishment – CSA-1 and CSA-2	15 days
Service pothole investigations and diversions	25 days
Shaft One construction	82 days
Shaft Two construction	70 days
Shaft Three construction	97 days
Shaft Four construction	82 days
Shaft Five construction	112 days
Shaft Six construction	68 days
Shaft Seven construction	60 days
Shaft Eight construction	30 days
TBM Drive One (Shaft One to Two)	113 days
TBM Drive Two (Shaft Two to Three)	35 days
TBM Drive Three (Shaft Three to Four)	100 days
TBM Drive Four (Shaft Four to Five)	31 days
TBM Drive Five (Shaft Five to Six)	52 days
TBM Drive Six (Shaft Six to Seven)	33 days
Trenched construction within Marine Parade	30 days
Interception Shaft SE01 and EOP 195 connection	60 days
Interception Shaft SE02 and EOP 200 connection	30 days
Interception Shaft SE03 and EOP 201 connection	50 days
Interception Shaft SE04 and EOP 740 connection	37 days

EOP connection at Shaft Two	65 days
EOP connection at Shaft Four	25 days
Reinstate paving and hardscaping	10 days (per shaft)
Project close-out	20 days

4.5 Temporary Traffic Management

An assessment of the construction traffic effects of the proposal is contained within the ITA, attached as **Appendix F**.

Construction vehicle movements will be required to support the Project, including movements to and from the CSAs and the shaft construction sites. The estimated construction traffic movements are outlined in **Table 6** below.

Table 6: Construction Traffic Movements

Location	Light Vehicle Movements	Heavy Vehicle Movements
To / from CSA1 at Salisbury Reserve	24x staff cars per day	1x servicing truck per day
To / from CSA1 to shaft construction sites	4x staff cars per day, including 1x car trailer carrying 500kg compactor	1x 2T digger per day 1x 5T digger per day 4x 4T tip truck per day
Concrete deliveries to / from shaft construction sites	N/A	4x trucks per site
To / from CSA1 at Salisbury Reserve to CS2 at 94a – b Shelly Beach Road	2x staff cars per day	1x servicing truck per day 2x 6-wheeler trucks for delivery of hardfill per day (Up to) 4x trucks for removing tunnel spoil
Total	30x cars per day / 60 additional vehicle movements	18x heavy vehicles / 36 additional vehicle movements

As discussed within the ITA, the additional vehicle movements represent a 0.03% (for movements on the Auckland Harbour Bridge) to 13% (residential streets west of CSA1) increase in typical traffic volumes for the surrounding transport network, with the majority of roads receiving an increase of less than 1%.

Detours and road closures will be required during construction works, as detailed in **Table 7** below. Further details of the road closures, including impacts on parking and access for residents, are detailed in the ITA.

Note that for the locations where both full and partial closures are identified, the full closure will occur first, followed by a partial re-opening of the road (partial closure), once more space becomes available for vehicle access.

Table 7: List of Road Closures and Diversions During Construction

Location	Nature of Closure	Diversion	Time and Duration
Shaft One – Sarsfield Street	Full road closure • Sarsfield Street in both directions between Curran Street and Shelly Beach Road • Resident access will be retained to/from Shelly Beach Road.	Traffic re-routed via Emmett Street and Curran Street	100 days
	Partial road closure • Sarsfield Street eastbound		147 days

	• Resident access will be retained to/from Shelly Beach Road and Curran Street		
Shaft Two – Intersection of Sarsfield Street, Wallace Street and Stack Street	Full road closure • Sarsfield St closed between Wallace St and Lawrence St (except for residential access). • Wallace St closed between Sarsfield St and Argyle Street (except for residential access). • Stack St closed between Wairangi Street and Wallace Street (except for residential access). • Access to 60 Wallace Street will be via Stack Street. • Access to 51 Wallace Street may be closed at certain times within working hours for safety. Proposal would be to open up outside of working hours and to liaise with occupants as required.	Traffic re-routed via Cremorne Street, Argyle Street, Wallace Street, Lawrence Street or Jervois Road	120 days
	Partial road closure • As above, except Sarsfield Street westbound ahead to Stack Street and right turn to Wallace Street north available.		131 days
Shaft Three – Intersection of Wallace Street and Argyle Street	Full road closure • Wallace Street closed between Sarsfield Street and Jervois Road (except for residential access). • Argyle St closed between Wallace Street and Cremorne Street (except for residential access). • Footpath from Argyle Street to Wallace Street (south) closed during shaft construction and open during tunnelling works.	Traffic re-routed via Cremorne Street, Stack Street, Clifton Road, Lawrence Street or Jervois Road	340 days
Shaft Four – Intersection of Argyle Street and Herne Bay Road	Full road closure • Herne Bay Road closed between Upton Street and Galatea Terrace (except for residential access). • Argyle Street closed between Masons Ave and Herne Bay Rd (except for residential access). • Footpath on west side of Herne Bay Road will be closed.	Traffic re-routed via Galatea Terrace, Masons Avenue, Bella Vista Road or Jervois Road	201 days
Shaft Five – Intersection of Herne Bay Road and Upton Street	Full road closure • Upton Street closed between Galatea Terrace and Herne Bay Road (except for residential access. • Herne Bay Road closed between Argyle Street and Bella Vista Road (except for residential access). No through access for Upton Street. • Due to Shafts Four and Five being so close to each other, Herne Bay Road between Argyle Street and Upton Street will be closed to accommodate storage and materials onsite.	Traffic re-routed via Galatea Terrace, Marine Parade and Bella Vista Road	233 days

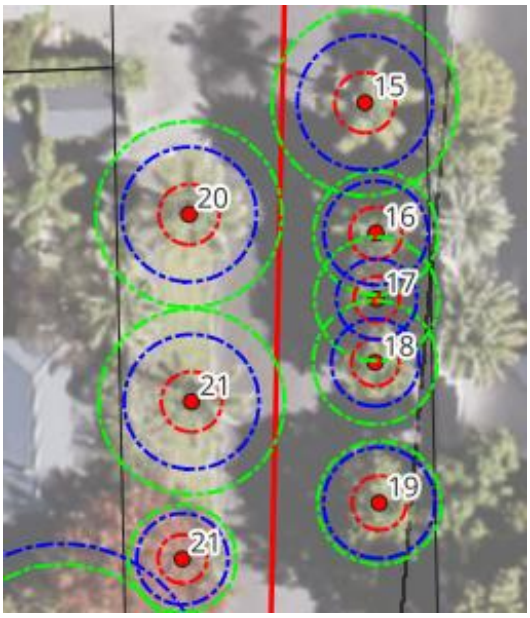
	• Footpath on Upton Street north side will be closed		
Shaft Six – Intersection of Upton Street and Marine Parade	<u>Full road closure</u> • Upton Street closed between Galatea Terrace and Marine Parade (except for residential access). • Marine Parade closed between Bella Vista Road and Galatea Terrace (except for residential access. • Annan Street closed between Bella Vista Road and Marine Parade (except for residential access). • Marine Parade west side footpath closed.	Traffic re-routed via Galatea Terrace and Bella Vista Road	100 days
	<u>Partial road closure</u> • Intersection closed except for Upton Street left turn to Annan Street and ahead to Marine Parade (south) and for movements to/from Marine Parade south and Annan Street.		70 days
Shaft Seven and EOP 198 – Marine Parade	<u>Full road closure</u> • Marine Parade closed from Annan Street to Bella Vista Road. • Footpath on east side of Marine Parade closed	Traffic re-routed via Bella Vista Road and Anna Street	94 days
Shaft Eight and EOP 199 – Intersection of Marine Parade and Bella Vista Road	<u>Full road closure</u> • Marine Parade closed from Annan Street to Bella Vista Road. • Access for residents will be managed individually as trenching passes in front of each property, will temporary access provided after construction hours. It is estimated that access will be disrupted for up to five days per property.	Traffic re-routed via Bella Vista Road and Annan Street	60 days
Interception Shaft SE01 and EOP 195 – Intersection of Sarsfield Street and Hamilton Road	<u>Full road closure</u> Sarsfield St/Hamilton St intersection closed (except for residential access). • North footpath closed.	Traffic re-routed via Sentinel Road, Jervois Road or Curran Street	20 days
	<u>Partial road closure</u> • Intersection closed except for Sarsfield Street westbound left turn to Hamilton Road, ahead on Sarsfield Street and right turn into Hamilton Road north. • All footpaths open.		30 days
Interception Shaft SE02 and EOP 200 – Intersection of Sarsfield Street and Sentinel Street	<u>Full road closure</u> • Sarsfield St/Sentinel St Rd intersection closed (except for residential access). • Residential access to Sentinel Road north from Sarsfield Street (west)	Traffic re-routed via Lawrence Street, Jervois Road or Hamilton Road	20 days
	<u>Partial road closure</u> • Intersection closed except for Sentinel Street northbound left turn to Sarsfield Street and ahead from Sentinel Street south to north.		35 days

	• Residential access to Sentinel Road north from Sarsfield Street (west) and Sentinel Street south to north.		
Interception Shaft SE03 and EOP 201 – Intersection of Sarsfield Street and Lawrence Street	<u>Full road closure</u> • Sarsfield St / Lawrence St intersection closed (except for residential access). • Access to 91 Sarsfield Street diverted via footpath with access via Sarsfield Street	Traffic re-routed via Sentinel Road, Jervois Road or Wallace Street	20 days
	<u>Partial road closure</u> • Intersection closed except for Lawrence Street northbound left turn to Sarsfield Street. • Access to 91 Sarsfield Street as above.		27 days
Interception Shaft SE04 and EOP 740 – Argyle Street	<u>Full road closure</u> • Argyle Street closed between Clifton Road and Masons Ave (except for residential access). • South footpath closed.	Traffic re-routed via Masons Avenue, Clifton Road or Jervois Road	37 days

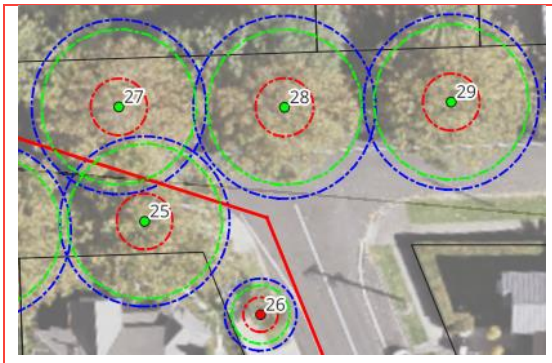
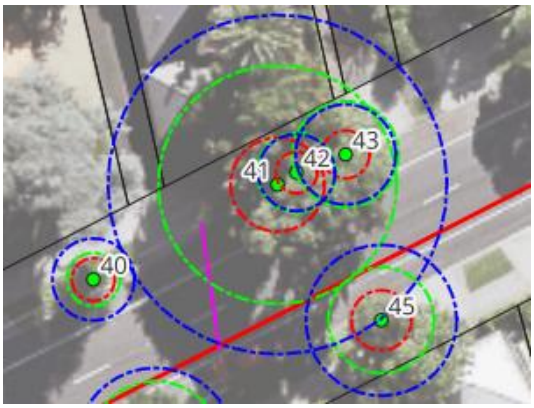
4.6 Tree Works

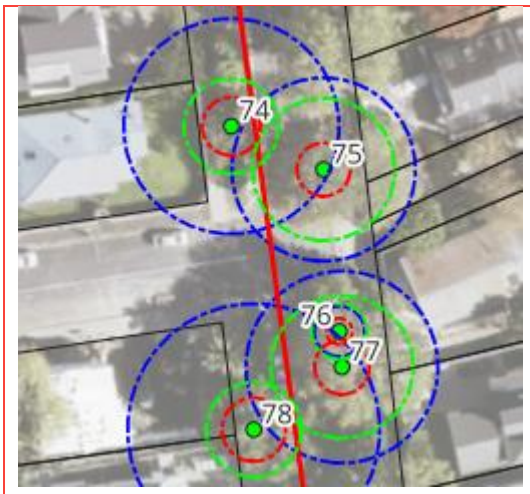
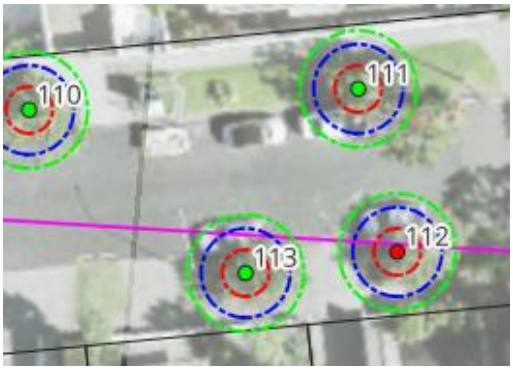
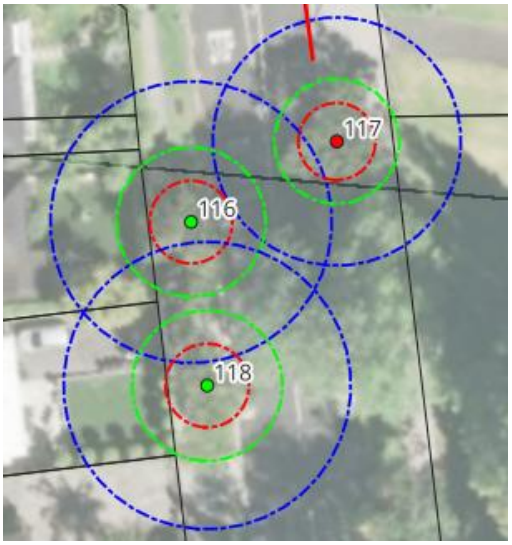
Works to protected street trees are required to enable the construction of shafts, EOP connections and pipelines. These works include tree trimming, alteration and works to protected root zones, and have been detailed within the Arboricultural Assessment (**Appendix G**). The proposed works to these trees (beyond any permitted works) are detailed in **Table 8** below.

Table 8: Works to Protected Trees

Location	Tree No.[3]	Nature of Works	Reason for Works
Upton Street – Shaft 5 	Trees 15 – 21, 26 (see plans of Shafts 4 and 5 below for Tree 26)	Tree removals	Tree removals required to accommodate construction machinery and avoid protected London Plane trees within Herne Bay Road.
Herne Bay Road – Shafts 4 and 5	Tree 28	Pruning	Branch required to be pruned to allow clearance for

[3] As per the Arboricultural Assessment

			construction machinery.
45 Argyle Street – SE04 	Tree 41	Pruning	Branch required to be pruned to allow clearance for construction machinery.
Salisbury Reserve – CSA-1 	Tree 46	Tree removal	Tree required to be removed to allow vehicle access to CSA1
Argyle Street – Shaft 3 	Trees 50, 51 and 55	Tree removals	Tree removals required to accommodate construction machinery
Sarsfield Street – SE03	Trees 75 and 77	Pruning	Overhead canopy pruning required to undertake construction works.

			
Sarsfield Street – EOP202 	Tree 112	Tree removal (and relocation)	Excavations required to form drilling pit and connection to EOP202 overlap with tree, and therefore tree 112 is required to be removed. Note that two 3.5m-tall Hibiscus shrubs adjacent to Tree 112 are also to be relocated, but this does not trigger resource consent.
Sarsfield Street – Shaft 1 	Tree 117	Tree removal	Excavation required to form Shaft 1 overlap with tree. **Note** that this tree is to be removed as part of the CI extension, and is therefore not within the scope of this consent application.

Further to the above, it is noted that three young pōhutukawa trees, likely planted in the two to three years, are required to be relocated within CSA-2 at 94a – b Shelly Beach Road. However, as this site is located within the 'Strategic Transport Corridor Zone', this relocation is not controlled by the provisions of Chapters E16 or E17 of the AUP-OP.

A Tree Protection Methodology ('TPM') has been prepared to support the construction works and is included within the Arboricultural Assessment.

4.7 Earthworks

Earthworks have been calculated for each distinct construction activity for the Project, in accordance with Chapter E26.5.3. The area and volume for each activity is shown below in Table

Table 9: Earthworks area and volume at each construction location

Location	Area (m^2)	Volume (m^3)
Primary Shafts		
Shaft One	133	2,242
Shaft Two	95	1,844
Shaft Three	133	3,010
Shaft Four	95	2,153
Shaft Five	133	3,349
Shaft Six	95	1,292
Shaft Seven	133	1,533
Shaft Eight	7	17
Interception Shafts		
SE01	10	225
SE02	10	187
SE03	10	139
SE04	10	119
Tunnel Drives		
Shaft One – Shaft Two	12	2,168
Shaft Two – Shaft Three	3	320
Shaft Three – Shaft Four	6	1,843
Shaft Four – Shaft Five	3	178
Shaft Five – Shaft Six	3	655
Shaft Six – Shaft Seven	3	192
Shaft Seven – Shaft Eight	3	1,947
EOP Connections		
EOP195	13	20
EOP202	0.2	114
EOP201	9	23
EOP1019	0.2	291
EOP740	11	30
EOP197	0.1	67
EOP198	7	16
EOP199A	53	107
CSA Sites		
CSA-1 – Salisbury Reserve	2,400	960
CSA-2 – Shelly Beach Road	3,100	1,240

5 Reasons for Consent

This section sets out the resource consent requirements for the Project as outlined in Section 4. The requirements are determined by the rules in the AUP(OP) and other relevant legislation.

A full list of permitted activities relied upon, including an assessment against relevant permitted standards, is included as **Appendix A**.

5.1 Auckland Unitary Plan (Operative in Part)

Consent is sought under the AUP-OP for the activities specified in Sections 6.1.1 – 6.1.6 below. For the avoidance of doubt, Watercare is seeking consent under the below rules and any other rules which may apply to the activity, even if not specifically noted.

5.1.1 Chapter E7 Taking, using, damming and diversion of water and drilling

Table 10: Assessment against Chapter E7

Proposed Activity	Rule Description	Permitted Standards	Assessment
Rule E7.4.1 (A20) **RD**	Dewatering or groundwater level control associated with a groundwater diversion authorised as a restricted discretionary activity under the Unitary Plan, not meeting permitted activity standards or is not otherwise listed.	**E7.6.1.6** Dewatering or groundwater level control associated with a groundwater diversion permitted under Standard E7.6.1.10, all of the following must be met: (1) The water take must not be geothermal water; (2) The water take must not be for a period of more than 10 days where it occurs in peat soils, or 30 days in other types of soil or rock; and (3) The water take must only occur during construction.	(1) No geothermal water is expected to be present **Complies** (2) No peat soils are expected to be present **Complies** The water take in non-peat soils is expected to exceed 30 days **Does not Comply** (3) Tunnel and shaft will be sealed on completion with no permanent water take **Complies**
Rule E7.4.1 (A28) **RD**	The diversion of groundwater caused by any excavation (including trench) or tunnel that does not meet the permitted activity standards or not otherwise listed.	**E7.6.1.10** Note that the activity does not fulfil the exemptions under E7.6.1.10 (1), as the tunnel diameter exceeds 1.5m, and the diversion will occur for longer than 10 days. (2) Any excavation that extends below natural groundwater level, must not exceed: (a) 1ha in areas; and (b) 6m depth below the ground level (3) The natural groundwater level must not be reduced by more than 2m on the boundary of any adjoining site. (4) Any structure, excluding sheet piling that remains in place for no more than 30 days, that physically impedes the flow of groundwater through the site must not: (a) impede the flow of groundwater over a length of more than 20m; (b) extend more than 2m below the natural groundwater level.	(2)(a) The maximum shaft diameter is 13.5m (circa 200m^2) **Complies** (2)(b) Shaft excavations will extent greater than 6m below natural groundwater level **Does Not Comply** (3) The secant wall methodology will limit the drawdown of groundwater level **Complies** (4)(a) The maximum external diameter of the shafts is 13.5m **Complies** (4)(b) Secant walls will extend more than 2m below natural water level **Does not Comply** (5)(a) Shaft excavations may extend up to approximately

<table>
<tr><td></td><td></td><td>(5) The distance to any existing building or structure (excluding timber fences and small structures on the boundary) on an adjoining site from the edge of any:

(a) trench or open excavation that extends below natural groundwater level must be at least equal to the depth of the excavation;

(b) tunnel or pipe with an external diameter of 0.5 - 1.5m that extends below natural groundwater level must be 2m or greater

(6) The distance from the edge of any excavation that extends below natural groundwater level, must not be less than:

(a) 50m from the Wetland Management Areas Overlay;

(b) 10m from a scheduled Historic Heritage Overlay;

(c) (c) 10m from a lawful groundwater take.</td><td>25.5m below ground level Does not Comply

(5)(b) Horizontally drilled shafts achieve >2m offset from neighbouring structures Complies

(6)(a) N/A

(6)(b) Shaft 4 and 5 are within 10m of overlay. Does not Comply

Shaft 2 greater than 10m from overlay Complies

(6)(c) We are not aware of any lawful groundwater takes within 10m of the proposed excavations. Complies</td></tr>
</table>

5.1.2 Chapter E25 Noise and Vibration

Table 11: Assessment against Chapter E25

<table>
<tr><th>Proposed Activity</th><th>Rule Description</th><th>Permitted Standards</th><th>Assessment</th></tr>
<tr><td>Rule E25.4.1 (A2)

RD</td><td>Noise and vibration activities that do not comply with a permitted activity standard.</td><td>E25.6.27.

(1) Noise from construction activities in all zones except the Business – City Centre Zone and the Business – Metropolitan Centre Zone must not exceed the levels in Table E25.6.27.1

<table>
<tr><th rowspan="2">Time of week</th><th rowspan="2">Time Period</th><th colspan="2">Maximum noise level (dBA)</th></tr>
<tr><th>L_{eq}</th><th>L_{max}</th></tr>
<tr><td rowspan="4">Weekdays</td><td>6:30am - 7:30am</td><td>60</td><td>75</td></tr>
<tr><td>7:30am - 6:00pm</td><td>75</td><td>90</td></tr>
<tr><td>6:00pm - 8:00pm</td><td>70</td><td>85</td></tr>
<tr><td>8:00pm - 6:30am</td><td>45</td><td>75</td></tr>
<tr><td rowspan="4">Saturdays</td><td>6:30am - 7:30am</td><td>45</td><td>75</td></tr>
<tr><td>7:30am - 6:00pm</td><td>75</td><td>90</td></tr>
<tr><td>6:00pm - 8:00pm</td><td>45</td><td>75</td></tr>
<tr><td>8:00pm - 6:30am</td><td>45</td><td>75</td></tr>
<tr><td rowspan="4">Sundays and public holidays</td><td>6:30am - 7:30am</td><td>45</td><td>75</td></tr>
<tr><td>7:30am - 6:00pm</td><td>55</td><td>85</td></tr>
<tr><td>6:00pm - 8:00pm</td><td>45</td><td>75</td></tr>
<tr><td>8:00pm - 6:30am</td><td>45</td><td>75</td></tr>
</table>

(4) For a project involving a total duration of construction work that is more than 20 weeks the noise limits in Table E25.6.27.1 shall be decreased by 5dB in all cases.

E25.6.29.

(1)Noise from any construction, maintenance and demolition activities in the road must comply with the relevant noise levels in the following relevant table:

(a) Table E25.6.27.1

(1A) Vibration from any construction, maintenance and demolition activities in the road must comply with the relevant vibration levels in the following relevant table or standard:</td><td>E25.6.27

(1) As assessed within Appendix K – Construction Noise and Vibration Assessment, CSA-1 within Salisbury Reserve is expected to exceed the permitted day-time noise standards by a maximum of 5dB to three properties. Does not Comply

E25.6.29

(1) As assessed within Appendix K, the construction works cannot comply with the standards of Table E25.6.27.1 to various receivers. Does not Comply

(1A) As assessed within Appendix K, the construction works cannot comply with the standards of German Industrial Standard DIN 4150-3 (1999).

Does not Comply

(3)(b) The proposal fulfils the definition of planned works and will take place</td></tr>
</table>

		(a) the limits set out in E25.6.30(1)(a) German Industrial Standard DIN 4150-3 (1999); and (b) Table E25.6.30.1 (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 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 practicably made to comply with the relevant noise levels of the following tables: (i) Table E25.6.27.1 (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 Standard E25.6.29(1A)(b) do not apply to works within the road where: (a) 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; and (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) A 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	between 7am and 6pm. Because of the location and nature of the works, it is not possible to achieve compliance with the permitted standards. (3)(d) A construction noise and vibration management plan has been provided with the application. **Complies** (4A) The proposal fulfils the definition of planned works and a construction noise and vibration management plan has been provided with the application. **Complies** (5) The construction noise and vibration management plan contains all of these requirements. **Complies**

5.1.3 Chapter E26 Infrastructure

Table 12: Assessment against Chapter E26

Proposed Activity	Rule Description	Permitted Standards	Assessment
E26.4 Network utilities and electricity generation – Trees in roads and open space zones and the Notable Trees Overlay			
Rule E26.4.3.1 (A84) RD	Tree trimming or alteration that does not comply with Standard E26.4.5.1 (trees in streets and open space) or Standard E26.4.5.3 (notable trees)	E26.4.5.1 (1) Tree trimming or alteration of trees in streets and open space zones must comply with the following standards: (a) the maximum diameter of any branch removed must be no greater than 100mm; (b) no more than 20 per cent of live growth of the tree must be removed which can be increased to 30 per cent under the direct supervision of a suitably qualified arborist; (c) the natural shape, form and branch habit of the tree must be retained for trees in public open space; (d) the natural shape, form and branch habit of the tree must be retained for trees in streets where practicable; an©e) All works must be carried out in accordance with best arboricultural practice. E26.4.5.2. (1) For roots under 60mm: (a) excavation undertaken by hand digging or air spade or hydro vac or machine excavator within the protected root zone without direction and/or supervision of a qualified arborist. (i) the surface area of a single excavation shall not exceed 1m^2; (ii) works involving root pruning must be less than 35mm in diameter at severance; (iii) works will disturb less than 10 per cent of the protected root zone; and (iv) any machine excavator must operate on top of paved surfaces and/or ground protection measures and must be fitted with a straight blade bucket. (b) excavation undertaken by hand digging or air spade or hydro vac or machine excavator within the protected root zone with direction and/or supervision of a qualified arborist: (i) works must not disturb more than 20 per cent of the protected root zone; (ii) works involving root pruning must not be on roots greater than 60mm in diameter at severance; and (iii) any machine excavator must operate on top of paved surfaces and/or ground protection	E26.4.5.1 Pruning of Trees 28, 41, 75 and 77 (as per the Arborist Assessment) in excess of the permitted standards is required. Does not comply
Rule E26.4.3.1 (A88) RD	Works within the protected root zone not otherwise provided for.		E26.4.5.2. While no works within the protected root zone of trees has been identified, it is possible that works may occur to roots in excess of 80mm. As such, consent is being sought on a precautionary basis. Consent required
Rule E26.4.3.1 (A92) RD	Tree alteration or removal of any tree greater than 4m in height and/or greater than 400mm in girth in the road or open space zone		Trees 15 – 21, 26, 46, 50, 51, 55, 112 and 117 (as per the Arborist Assessment) are to be removed. Consent required.

		measures and must be fitted with a straight blade bucket. (c) excavation undertaken by trenchless methods must not be undertaken at a depth less than 800mm below ground level, and does not require the direction or supervision of a qualified arborist; (d) replacement of structures kerbs, and hard surfaces must be done so that: (i) the removal of the surface is carried out without damage to any tree roots; and (ii) the machine excavator must operate on top of paved surfaces and/or ground protection measures and must be fitted with a straight blade bucket. (2) For roots greater than 60mm but less than 80mm: (a) excavation undertaken by hand digging or air spade or hydro vac or machine excavator within the protected root zone with direction and/or supervision of a qualified arborist: (i) works must not disturb more than 20% of the protected root zone; (ii) works involving root pruning must not be on roots greater than 80mm in diameter at severance; (iii) any machine excavator must operate on top of paved surfaces and/or ground protection measures and must be fitted with a straight blade bucket	
E26.5. Network utilities and electricity generation – Earthworks all zones and roads			
Rule E26.5.3.1 (A95) P	Earthworks up to 2500m^2 other than for maintenance, repair, renewal, minor infrastructure upgrading[4]	E26.5.5. Refer to E26.5.5.1 - Accidental discovery rule E26.5.5.2. (13) Works must not result in any instability of land or structures at or beyond the boundary of the property where the land disturbance occurs. (14) The land disturbance must not cause malfunction or result in damage to network utilities, or change the cover over network utilities so as to create the potential for damage or malfunction. (15) Access to public footpaths, berms, private properties, network utilities, or public reserves must not be obstructed unless that is necessary to undertake the works or prevent harm to the public.	(13) The proposal **Complies**, refer to the construction methodology and geotechnical assessment (14) All network utilities that are affected by the proposal will be relocated prior to works commencing to ensure damage is avoided. **Complies** (15) Access to private properties, berms and footpaths and public reserves need to be restricted to ensure the works can be undertaken and to maintain public
Rule E26.5.3.1 (A96) P	Earthworks up to 2500m^3 other than for maintenance, repair, renewal, minor infrastructure upgrading (All earthworks other than Shafts Three and Five)		

[4] E26 states that "for network utilities the thresholds apply to the area and volume of work being undertaken at any one time at a particular location such that, where practicable, progressive closure and stabilisation of works could be adopted to maintain the activity within the thresholds".

Rule E26.5.3.1 (A97) **RD**	Earthworks greater than 2500m^2 other than for maintenance, repair, renewal, minor infrastructure upgrading (Earthworks within CSA-2 only)	(16) Only cleanfill material may be imported and utilised as part of the land disturbance. (17) Measures must be implemented to ensure that any discharge of dust beyond the boundary of the site is avoided or limited such that it does not cause nuisance. (18) Earthworks (including filling) within a 1% AEP flood plain (excluding road network activities): must not raise ground levels more than 300mm, to a total fill volume up to 10m3 which must not be exceeded through multiple filling operations; and must not result in any adverse changes in flood hazard beyond the site. (19) Earthworks (including filling) within overland flow paths (excluding road network activities) must maintain the same entry and exit point at the boundaries of a site and not result in any adverse changes in flood hazards beyond the site, unless such a change is authorised by an existing resource consent. (20) Temporary land disturbance and stockpiling of soil and other materials within 1% AEP flood plain and/or overland flow path for up to a maximum of 28 days in any calendar year may occur as part of construction or maintenance activities.	safety, as outlined in **Appendix F** - TIA **Complies** (16) No cleanfill material is required to be imported. This will be addressed in further detail in the Construction Management Plan **Complies** (17) Measures to ensure that the discharge of dust beyond the boundaries of the site are outlined in the draft ESCP. These will be addressed in further detail in the Construction Management Plan, to be supplied to Council before works commence. **Complies** (18) No filling is proposed within 1% floodplains, ensuring that there will be no changes in flood hazards beyond the site. **Complies** (19) No changes will be made to the entry and exit points of overland flowpaths throughout the alignment. Any diversions will be temporary and will ensure that any overland flows are conveyed as existing **Complies** (20) Temporary land disturbance will be required for greater than 28 days within floodplains at Shaft One, Shaft Seven and EOP interception shafts SE03 and SE04. **Does Not Comply**, consent required under **Rule C1.9(2)**. Stockpiling of soil and other materials will occur at CSA-2, which is not affected by floodplains.
Rule E26.5.3.1 (A97A) **RD**	Earthworks greater than 2500m^3 other than for maintenance, repair, renewal, minor infrastructure upgrading (Shafts Three and Five only)		

5.1.4 Chapter E30 Contamination

Table 13: Assessment against Chapter E30

Proposed Activity	Rule reference / description	Assessment
Rule E30.4.1 (A7) D	Discharges of contaminants into air, or into water, or onto or into land not meeting controlled activity Standard E30.6.2.2	Consent is required as no DSI has been prepared in support of the application.

5.1.5 Chapter E31 Hazardous Substances

Table 14: Assessment against Chapter E31

Proposed Activity	Rule reference / description	Assessment
Rule E31.4.3 (A101) D	Storage of Sub-class 6.1C and 6.3-6.9 (Diesel) within the Open Space – Informal Recreation Zone	Storage of up to 2,000L (1.71t) of diesel proposed within CSA-1 at Salisbury Reserve

5.2 Auckland Unitary Plan - Consent Summary

Overall, consent is required under the AUP-OP as a **Discretionary Activity**.

5.3 National Environmental Standards for Assessing and Managing Contaminants in Soils

Under **Regulation 8 (3)** of the NESCS, disturbing soil is a **Permitted Activity**.

Compliance with the relevant permitted activity standards is assessed in **Table 14**.

Table 15: Compliance with Regulation 8 (3) of the NESCS

Requirement	Comment
Disturbing the soil of the piece of land is a permitted activity while the following requirements are met: *(a) controls to minimise the exposure of humans to mobilised contaminants must—* *(i) be in place when the activity begins:* *(ii) be effective while the activity is done:* *(iii) be effective until the soil is reinstated to an erosion-resistant state:*	**Will Comply** – An SMP will be provided to Council before works commence, which will outline all controls required minimise the exposure of humans to mobilised contaminants. All controls will be implemented until the soil is reinstated.
(b) the soil must be reinstated to an erosion-resistant state within 1 month after the serving of the purpose for which the activity was done:	**Complies** – All disturbed soil will be reinstated to either grass or pavement upon completion of works.
(c) The volume of the disturbance of the soil of the piece of land must be no more than 25 m^3 per 500 m^2:	**Does not Comply** – Greater than 25m^3 of soils within Salisbury Reserve are to be disturbed.
(d) soil must not be taken away in the course of the activity, except that,— *(i) for the purpose of laboratory analysis, any amount of soil may be taken away as samples:* *(ii) for all other purposes combined, a maximum of 5 m^3 per 500 m^2 of soil may be taken away per year:*	**Complies** – All soils within the CSAs will be reinstated upon completion of the works.
(e) soil taken away in the course of the activity must be disposed of at a facility authorised to receive soil of that kind:	**Will Comply –** The disposal site of any soils to be removed from the site will be confirmed in the final SMP.
(f) the duration of the activity must be no longer than 2 months:	**Does not Comply** – The proposed construction works are estimated to occur over an 18-month programme

(g) the integrity of a structure designed to contain contaminated soil or other contaminated materials must not be compromised.	N/A – No structures containing contaminants are present.

Under **Regulation 9 (1)** disturbing soil where Regulation 8 (3) is not met is a **Controlled Activity**.

Compliance with the relevant controlled activity standards is assessed in **Table 15**.

Table 16: Compliance with Regulation 9 (1) of the NESCS

Requirement	Comment
If a requirement described in any of regulation 8(1) to (3) is not met, the activity is a controlled activity while the following requirements are met: (a) a detailed site investigation of the piece of land must exist:	Does not Comply – No DSI has been prepared to support the application
(b) the report on the detailed site investigation must state that the soil contamination does not exceed the applicable standard in regulation 7:	N/A
(c) the consent authority must have the report:	
(d) conditions arising from the application of subclause (2), if there are any, must be complied with.	

Under **Regulation 10 (1)** disturbing soil where Regulation 9 (3) is not met is a **Restricted Discretionary activity**.

Compliance with the relevant restricted discretionary activity standards is assessed in **Table 16**.

Table 17: Compliance with Regulation 10 (2) of the NESCS

Requirement	Comment
The activity is a restricted discretionary activity while the following requirements are met: (a) a detailed site investigation of the piece of land must exist:	Does not Comply – No DSI has been prepared to support the application
(b) the report on the detailed site investigation must state that the soil contamination exceeds the applicable standard in regulation 7:	N/A
(c) the consent authority must have the report:	
(d) conditions arising from the application of subclause (2), if there are any, must be complied with.	

Consent is therefore required under Regulation 11 as a **Discretionary Activity** under the NES-CS.

6 Other Approvals

The following non-RMA approvals are required to support the Project and are being sought concurrently with this resource consent application:

- An Archaeological Authority from Heritage New Zealand Pouhere Taonga to modify previously unrecorded archaeological remains. This approval is being sought on a precautionary basis due to the potential to expose early European sewer and / or water infrastructure during excavations.
- Landowner Approvals and Licences to Occupy from Auckland Council for occupation of Salisbury Reserve and 94a - b Shelley Beach Road during construction. This approval is required as these reserves will be utilised as CSA sites. The application for Salisbury Reserve was lodged on in early February, while the application for 94a - b Shelley Beach Road was lodged in late March. Council Land Advisory Service has provided approval in early June for site investigation work. A decision is yet to be made on the licences to occupy.
- Tree Asset Owner Approval is required for works to protected street trees and trees within Salisbury Reserve from Auckland Council, including the removal of 14 protected trees and removal / relocation of three unprotected trees. This application was submitted on the 15th of June 2023 and will be assessed concurrently with the resource consent application.
- A Corridor Access Request from Auckland Transport for works within the road reserve during construction of the Project.

7 Assessment of Effects on the Environment

7.1 Overview

In terms of section 104(1)(a) of the RMA, when considering this application, the consent authority must have regard to any actual and potential effects on the environment of the proposed activity. This section considers those effects and is guided by Clauses 6 and 7 of Schedule 4 of the RMA and the relevant matters over which Council retain discretion of the AUP-OP. The detail of this assessment should correspond with the scale and significance of the effects that the activity may have on the environment.

The following assessment identifies and assesses the types of effects that may potentially arise from the proposed works provided for under this application. The assessment also outlines the proposed measures to avoid, remedy or mitigate any potential adverse effects on the environment.

This assessment draws on information provided in the technical reports included as part of this application and addresses the following effects:

- Positive effects;
- Construction Noise and Vibration effects;
- Construction Traffic effects;
- Effects of Groundwater Diversion and Dewatering;
- Arboricultural effects;
- Effects of earthworks;
- Disturbance of potentially contaminated soils;
- Storage of hazardous substances;
- Archaeological effects; and
- Climate change considerations.

7.2 Permitted Baseline

As prescribed by section 104(2) RMA, when determining the extent 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. This includes activities that form part of the proposal that could be undertaken at the project site(s), provided these are realistic activities which could be reasonably expected to be undertaken.

In the case of this application, the relevant permitted activities are described and assessed against the relevant standards in **Appendix A**, and include:

- **Rule E7.4.1 (A27)**: Diversion of groundwater caused by any excavation (including trench) or tunnel
- **Rule E25.4.1 (A1)**: Construction noise and vibration in the road reserve;
- **Rule E26.2.3.1 (A49)**: Underground pipelines and ancillary structures for the conveyance of wastewater (including above ground ancillary structures associated with underground pipelines) in all zones;
- **Rule E26.2.3.1 (A57)**: Ventilation facilities, drop shafts and manholes;
- **Rule E26.4.3.1 (A91)**: Tree alteration or removal of any tree less than 4m in height and/or less than 400mm in girth; and
- **Rule E36.4.1 (A54)**: Infrastructure within roads or the Strategic Transport Corridor Zone in the 1 per cent annual exceedance probability (AEP) floodplain and overland flow paths

The relevant permitted standards for the above activities are complied with. As each of these activities can be undertaken as of right, any effects arising from these activities have been

anticipated by the AUP. Accordingly, the actual and potential effects of the proposed works should be considered in this context. The full suite of effects have however been considered for this application for completeness.

7.3 Existing environment

The baseline against which the effects of an activity are assessed, as defined through case law, also incorporates the existing environment. The "environment" in s104(1)(a) RMA includes:[5]

a) *What exists in the environment at the time the application is considered, i.e. what you can see; and*

b) *The future state of the environment as it might be modified:*

   i. *By the utilisation of rights to carry out permitted activities under a district plan; and*

   ii. *By the implementation of resource consents which have been granted at the time a particular application is considered, where it appears likely that those resource consents will be implemented.*

As noted in Section 1 of this report, the proposed extension to the CI from its current termination point in Grey Lynn to Point Erin Park does not yet form part of the legal existing environment under s104(1)(a) RMA.

7.4 Positive effects

The ability for Watercare to provide for safe and efficient collection and conveyance of wastewater is key to supporting the existing and future well-being of the residents of Auckland.

The Project has a number of positive effects which include:

- Providing network capacity for existing development and future growth.
- Reducing overflows to stream and coastal environments in the catchment it services.

The Project will reduce engineered overflow spill frequencies from wet weather into the Waitematā Harbour and assist with ensuring Watercare's ongoing compliance with the NDC. This will lead to improvements in bathing water quality conditions at the beaches in the Herne Bay area, along with a reduction of odour from stormwater catchpits and improved overall amenity. The proposed wastewater upgrades will enable people and communities to provide for their social, economic and cultural well-being and for their health and safety, consistent with the principles and purpose of the RMA.

Importantly, the proposed Herne Bay tunnel will achieve the same, or better, water quality outcomes than the original proposal within the 2028 timeframe committed through the WIWQIP. This approach also provides wider network benefits which separation by itself would not provide and increases the overall resilience of the wastewater network.

Overall, the Project will generate positive effects by improving the existing combined wastewater network and providing for future population growth in the Herne Bay Area.

7.5 Construction Noise and Vibration

A Construction Noise and Vibration Assessment has been prepared to support the application and is attached as **Appendix K**. This assessment includes a consideration of effects as determined by the construction methodology, with sound power levels taken from NZS 6803 or from Tonkin

[5] *Queenstown Lakes District Council v Hawthorn Estate Limited* CA45/05.

and Taylor's library of measured levels. No form of mitigation, such as acoustic barriers or enclosures, has been included within these noise levels and they therefore represent a 'worst-case' scenario.

Note that as per Standard E25.6.29 (2) and (4) in the AUP, the noise and vibration standards do not apply to planned construction works within the road reserve. As such, consent is not specifically triggered by nature of the proposed works in the road reserve, however this does not remove the requirement to assess effects in the context of the project more broadly as a discretionary activity. Watercare is also required to manage noise and vibration effects as per Section 16 of the RMA.

Therefore, the noise and vibration effects of the Project have been assessed below and inform the controls within the draft CNVMP and Activity Specific Construction Noise and Vibration Management Plan ('ASCNVMP').

7.5.1 Noise

All shaft construction works are within the road reserve. External noise levels from construction of shafts without any mitigation in place may exceed the construction noise criterion in E25.6.29. of 70 dB at 41 receivers due to secant/auger piling to construct the primary and interception shafts. Six receivers (46 Argyle Street, 45 Argyle Street, 91 Sarsfield Street, 96 Sarsfield Street, 98 Sarsfield Street and 34 Herne Bay Road) are predicted to exceed 80 dB with a maximum noise level of 84 dB predicted at 46 Argyle Street, located less than 15 m from the piling works. It is estimated a maximum of 112 days is required to construct the larger shafts and 20-30 days for the smaller intercept shafts. Noise will not be continuous through the construction period. With a standard 1.8 m barriers around the localised construction areas in place as part of the recommended mitigation, a 1-2 dB partial reduction can potentially be achieved at first floor with and an 8 – 10 dB reduction at ground floor locations.

Trenchless horizontal directional drilling ('HDD') methodology will be used for the interception pipes and where possible to reduce the noise generated, however this is restricted in some locations due to geology, pipe depth and constructability constraints. As such, some open trenching works are required for these pipes.

Where open trenching within the road reserve is proposed, 80 receivers are predicted to exceed the 70 dB daytime construction noise criterion without mitigation. Six receivers are situated less than 10 m from the nearest trenching works and are predicted to experience noise levels above 84 dB with a maximum noise level of 92 dB at 8 Wairangi Street located less than 5 m from the trenching works. Open trenching works are expected to occur over a shorter duration than the shaft works however, typically three to four days at each receiver; as the trenching moves down the road, the effects on individual properties will decrease.

The CSA-1 site at Salisbury Reserve is surrounded by one to two storey residential properties and will therefore not comply with the AUP-OP day-time noise criterion to 4/40 Wallace Street, 6 Argyle Street and 14 Argyle Street intermittently. A 2m-tall solid acoustic fence around the site boundary is proposed to mitigate noise effects within the site and achieve compliance with the 70 dB standard to all other receivers.

The CSA-2 site at 94a – 94b Shelly Beach Road is sufficiently setback from nearby receivers to ensure compliance with the day-time noise criteria, being over 150m from the closest neighbouring residential property.

Night-time tunnelling works are not currently proposed, however if they are required in emergency situations, they may exceed the 35 dB recommended night time limit for bedrooms when the TBM is approximately 18m or less from dwellings. This does not infringe any AUP-OP standard however and is only likely to occur for one or two days for each property (if required), as the TBM moves at a rate of approximately 7 – 10m per day.

As per Chapter E25.1, the AUP-OP does not control effects from traffic noise, however as per Section 16 of the RMA there is a general obligation to adopt the best practicable option to ensure that the emission of noise from that land or water does not exceed a reasonable level. As such, the predicted noise effects from construction traffic and traffic diversion are noted below.

A change in traffic volume data by +25% or – 20% volume due to the diversion of traffic only results in 1 dB change in predicted noise level, which would be imperceptible. As such, noise levels from additional traffic movements or diverted traffic from the Project at less than 13% (as outlined in Section 4.5 above) is considered to be negligible. This applies at the where construction is required for the interception shafts and the trenched sections of pipeline.

However, the construction of Shaft One will require the full closure of Sarsfield Street for approximately 100 days, which will require the diversion of traffic onto Emmett Street and Curran Street (see Section 8.4 below for further details). This will increase traffic volumes on each street by 900% and 50% respectively, which will be a distinguishable change from the existing situation. Residents on these streets will be given advanced notice of these works.

Additionally, full and partial closures are required to accommodate shaft construction works at Shaft One, Two, Three and Four, which will divert local traffic movements as described below in detail in Section 8.4. This will temporarily increase vehicle noise to the streets outlined below, but to a lesser degree than required for the full closure of Sarsfield Street.

7.5.2 Vibration

With the exception of six properties, construction vibration effects at the majority of receivers are expected to be minor. Four properties (1 Marine Parade, 8 Wairangi Street, 6 River Terrace and 33 Marine Parade) may experience vibration levels above the 5mm/s DIN 4150-3 limits for cosmetic damage during the use of the breaker, and two properties within the Herne Bay Historic Heritage area (34 Herne Bay Road and 72 Argyle Street) are predicted to experience over the 3 mm/s DIN threshold for sensitive structures.

Vibration effects from the TBM along the alignment will be significantly less than surface works, noting the average tunnelling depths of between 9m and 17m below ground level, with all tunnelling to comply with day-time vibration standards. Daytime indoor noise due to tunnelling at a worst case scenario of 35 dB LAeq is unlikely to be noticeable from normal indoor activities and well below the AUP daytime limits.

While night-time TBM tunnelling works are not proposed as part of the regular construction programme, they may be required in emergency circumstances. Should they be required, these works are predicted to exceed the most stringent night-time vibration amenity criterion in the AUP-OP for limited durations – likely only up to one or two nights at a time. A maximum vibration level of 1.3 mm/s is predicted at the closest possible receiver (98 Sarsfield Street); vibrations are likely to be perceivable but are well below the DIN limit of 5 mm/s for cosmetic damage.

7.5.3 Cumulative Effects at Point Erin

As noted above, the Project will connect to the proposed CI Extension project at Point Erin Park.

Whilst both Shaft One construction and sheet piling works for CI are expected to take place in the south-west corner of Point Erin Park, it is understood concurrent works at this location will be avoided and close co-ordination with the CI team to schedule out overlaps during noisy works in this area will be undertaken.

Predictions for the noisiest activity from both CI extension (sheet piling) and Herne Bay (Shaft Two construction) indicated receivers situated between the two sites may experience less than 1 dB cumulative increase, which is not perceptible.

It is considered these works are clearly distinguishable and result in negligible cumulative effects.

Another construction activity undertaken around Shaft One is the terminal shaft construction for the CI project. This activity is expected to occur within the main shaft below surface level, and

support works will be shielded by a 1.8 m barrier around the CI site. The closest receivers to Shaft One at the Curran Street and Sarsfield Street intersection are within 50 m of the Herne Bay works but are over 100 m from CI works. Distance alone attenuates noise levels from the CI works at the closest Project receivers, ensuring there are no cumulative effects due to concurrent works.

Whilst every effort will be made to avoid potential cumulative noise effects, there may be occasions when works overlap due to unexpected events and delays. In case of such events, noise from the Project will be managed via the CNVMP by restricting noisy activities in coordination with CI works to ensure noisy activities from both Projects are not carried out at the same time. This will be ensured as Watercare will be the consent holder for both construction activities.

Overall, cumulative noise and vibration construction effects at Point Erin are considered to be less than minor.

7.5.4 Mitigation

To ensure that potential noise and vibration effects are sufficiently mitigated a draft Construction Noise and Vibration Management Plan ('CNVMP') has been prepared and is included within the assessment. The key mitigation measures proposed within the CNVMP included:

- Where practicable, works will be scheduled to avoid sensitive times for receivers, or occur when properties are vacant;
- Noise barriers with a minimum height of 1.8m will be installed where possible, including a 2m barrier around the perimeter of CSA1. Additional local barriers near proposed surface works will be utilised where required;
- Vibration at properties that exceed DIN thresholds for cosmetic damage or sensitive structures will be managed via consultation and monitoring, and building condition surveys will be undertaken prior to the commencement of any main construction works and following construction;
- Where works are required to occur outside of standard construction hours enhanced management measures will be utilised, including increasing frequency of communications with stakeholders, additional noise and vibration monitoring and offering temporary relocation to affected residents if unreasonable noise and / or vibration cannot be avoided;
- General mitigation measures will be used, such as avoiding unnecessary noise, orienting machinery away from sensitive receivers, utilising noise enclosures (where practical) and selecting less noisy construction equipment and methodology;
- A clear and proactive communications and engagement strategy for the Project is proposed, including the measures outlined in Section 5 above such as public drop-in sessions and letter drops. All neighbouring properties affected by particularly noisy works will be contacted prior with details of the overall nature and duration of the works and contacted details provided; and
- A community liaison officer will also be established to assist with communication between affected parties and the constructors, including recording and responding to complaints.

Overall, with the mitigation measures described above and in Appendix K, the construction noise and vibration effects on surroundings receivers will be less than minor for the majority of surrounding receivers, and minor for the following properties:

- Noise effects from primary shaft construction above 80 dB (approximately 60 - 100 days): 34 Herne Bay Road, 36 Herne Bay Road, 39 Wallace Street, 96 Sarsfield Street, 98 Sarsfield Street;

- Noise effects from interception shaft construction over 80 dB (approximately 30 - 60 days): 91 Sarsfield Street, 45 Argyle Street and 46 Argyle Street;
- Noise effects from open trenching above 84 dB (typically around three to four days): 8 Wairangi Street, 6 River Terrace, 22 Marine Parade, 49 Marine Parade, 32 Sentinel Road and 34 Sentinel Road;
- Vibration effects above 5mm/s cosmetic damage threshold or 3mm/s threshold for heritage dwellings due to the construction of primary shafts (around 60 – 100 days): 33 Marine Parade, 6 River Terrace, 72 Argyle Street and 34 Herne Bay Road; and
- Vibration effects above 5 mm/s cosmetic damage threshold from short-term surface works[6] (typically three to four days): 1 Marine Parade and 8 Wairangi Street.

7.6 Construction Transport Effects

An ITA has been prepared to assess the effects of the construction programme on the surrounding transport network, and is attached as Appendix F. The ITA has been based on an indicative construction methodology and programme, including the road closures and detours described in Section 4.5 above. A detailed construction programme and methodology will be finalised prior to the commencement of construction activities, which will be within with the envelope of effects considered below.

The proposed construction works within the road corridor will generate temporary disruption to traffic, properties access and street parking in the area. As noted in Section 7 above, Watercare will work with Auckland Transport through the Corridor Access Request process to ensure appropriate temporary traffic management measures are in place to minimise disruption to the roading network and public transport.

7.6.1 Road Closures and Detours

As detailed above in Table 7, residential roads are required to be fully or partially closed for the construction of the primary shafts, interception shafts and connections to existing EOPs, including where trenching is required. These closures will be required for timeframes ranging from 60 days (for Shaft Eight) to 340 days (for Shaft Three) for the primary shafts and between 37 days (for SE04) and 55 days for the interception shafts and EOPs. Diversions have been identified for each site, and the vehicle movements displaced to surrounding roads are generally expected to be within the capacity of these roads, given the low traffic volumes and lack of through traffic within Herne Bay. Residential access will be maintained most location, either with active traffic management or through the creation of temporary property accessways, apart from where detailed below. As such, the effects of road closures and diversions on the road network on a project-wide scale will be less than minor.

Despite the findings above, there will be temporary localised effects that are either more than minor or significantly adverse. These are discussed below.

Shaft One – Full Closure

The full closure of Sarsfield Street for construction of Shaft One for up to 100 days will have temporary significant adverse effects on Emmett and Curran Streets. Most movements would be diverted to Emmett Street, which will see an increase of daily light vehicle movements from 532 to 4,8111 and daily heavy vehicle movements from 5 to 233; this will represent an approximately 900% increase in total traffic movements on this street compared to the existing situation. As noted in Section 8.3 above, this increase in traffic will also result in a perceptible noise change.

In addition, Curran Street will see an increase in daily average movements from 8,179 to 12,347, which includes an increase of heavy vehicle movements from 654 to 884 which will also represent a 52% increase on the already-congested arterial road. While all of these additional

[6] This includes the use of a breaker to remove the road surface and from trenching excavation activities.

vehicle movements would pass Ponsonby Primary School, an on-site traffic survey on the 04/04/23 identified that few school children appear to walk to school on Sarsfield Street and Curran Street during the AM peak of that day[7]. The school currently operates a 'walking bus' from Clarence Street and Jervois Road for students who walk to the school, which would not be impacted by the traffic. Watercare has contacted representatives from the primary school to discuss the impacts of the diversion, and will work with the school to identify any additional mitigation measures that may be required, such as temporary crossing patrols to assist pedestrians crossing Curran Street.

While these effects on Emmett Street and Curran Street are considered significant, albeit on a temporary basis, they are not avoidable if the Project is to proceed. An assessment of alternatives for the construction of Shaft One and closure of Sarsfield Street is contained in Section 8 below.

Shaft One – Partial Closure

The partial closure of Sarsfield Street for up to 147 days to eastbound traffic is estimated to divert 542 vehicles per day, of which 20 would be heavy vehicles. An eastbound closure would not result in any re-routing of the Project construction traffic nor of any re-routing of the Point Erin CI construction traffic. This will result in an approximately 100% increase in vehicle movements on Emmett Street. This is anticipated to result in a temporary more than minor effect on users of Emmett Street, although it is not anticipated to generate significant congestion.

The diverted traffic is expected to increase vehicle movements on Curran Street by approximately 4%, which is within the expected day to day fluctuation of movements. As such, it is not expected to impact on congestion or residents' ability to access their homes, as effects will be less than minor.

Shaft Two

The construction works at Shafts Two will occur for up to 251 days, resulting in full and partial closures to sections of Sarsfield Street, Wallace Street and Stack Street. These closures are expected to divert some traffic to Jervois Road, which may increase congestion in peak, but would be within the capacity of this road off-peak. As such, effects on Jervois Road would be less than minor.

However, the effects of the additional vehicle movements from traffic diverted to Cremorne Street, Argyle Street, Wallace Street and Lawrence Street due to a combination of duration of works and the quieter nature of these streets would be more than minor. Despite this, the additional vehicle movements are not expected to congestion or residents' ability to access their homes, apart from 51 Wallace Street, which will have temporary restrictions to its access as detailed in Section 4.5 above.

Shaft Three

The construction works at Shaft Three will occur for up to 340 days, resulting in the full closure of sections of Wallace Street and Argyle Street. These closures are expected to divert some traffic to Jervois Road, which may increase congestion in peak, but would be within the capacity of this road off-peak. As such, effects on Jervois Road would be less than minor.

However, the effects of the additional vehicle movements from traffic diverted to Cremorne Street, Stack Street, Clifton Road and Lawrence Street due to a combination of duration of works and the quieter nature of these streets would be more than minor. Despite this, the additional vehicle movements are not expected to congestion or residents' ability to access their homes.

Shaft Four

The construction works at Shaft Four will occur for up to 201 days, resulting in the full closure of sections of Herne Bay Road and Argyle Street. These closures are expected to divert some traffic

[7] Refer to Appendix A within the ITA

to Jervois Road, which may increase congestion in peak, but would be within the capacity of this road off-peak. As such, effects on Jervois Road would be less than minor.

However, the effects of the additional vehicle movements from traffic diverted to Bella Vista Road, Masons Avenue and Clifton Road due to a combination of duration of works and the quieter nature of these streets would be more than minor. Despite this, the additional vehicle movements are not expected to congestion or residents' ability to access their homes.

Shaft Eight / Trenching Construction on Marine Parade

The construction of the Project between Shafts Seven and Eight will require open-cut trenching along the Marine Parade corridor. These works will require the closure of the road and the restriction of general traffic movements, although residents' access will be granted. As such, access to private property along this corridor during construction will be temporary affected and will need to be managed with owners and occupiers to reduce disruption.

The effects of this disruption to property access during these works will be significant, however they will be short term – estimated to be up to five days per property, or a total of 30 days for the full trenching programme and 30 days for the construction of Shaft Eight. Watercare and the Project constructors will engage with these property owners early to ensure that access is managed sufficiently, which is likely to involve providing a temporary platform over the excavated trench before and after construction hours. This will ensure that some access to the affected properties is still provided during these works.

Overall, it is assessed that the effects of the Shaft Eight / trenching construction work on Marine Parade will be minor.

7.6.2 Construction Vehicle Movements

The Project works will generate construction traffic, including on average 60 light vehicle and 36 heavy vehicle movements per day. These vehicle movements are required for staff travelling to and from the CSA sites and shaft construction sites, for delivery of materials to site and for the removal of spoil from the tunnel. This represents an increase of between 0.03% and 1% on motorways and arterials, and between 2% and 13% for residential streets. In addition, the use of the CSA-2 site for storage of materials and fill will reduce heavy vehicle movements through residential streets and allow smaller trucks to undertake deliveries to shaft construction sites. Overall, the effects of the increase in vehicle movements from construction traffic will be less than minor.

7.6.3 Effects on Pedestrian and Cycling Movements

While the construction works will require road closures and traffic diversions to accommodate construction works, pedestrian access has been maintained. Footpaths will need to be temporarily closed on one side of the road to accommodate some construction works (such as at Shaft Five or SE04), but the footpath on the other side of the road will remain open to allow for pedestrian movements. Other infrastructure such as crossings and raised platforms will need to be temporarily removed during construction, but will be reinstated upon completion of the works.

Cyclist movements will be impacted where road closures are required; cyclists will therefore need to follow diversion routes as cars do.

7.6.4 Mitigation

To mitigate potential adverse effects from the proposed works on the transport network, a Construction Traffic Management Plan ('CTMP') will be prepared before works commence. The CTMP will address the following:

- Construction vehicle routing, including to and from the CSAs and shaft construction sites;

- Access to and from the CSAs, including details on how the effective, efficient and safe operation of the Curran Street from CSA-2 will be maintained. It is proposed that ingress and egress from this site will only be permitted outside of the weekday peak hours (7am – 9am, 4pm – 6pm);
- Details on how pedestrian access will be maintained where road closures are proposed, and where footpath closures are required (such as outside of Shaft One or Salisbury Reserve), including mitigation requirements;
- Road closures and detours for construction works at each shaft site (including primary and interception shafts);
- Site traffic management requirements to manage the movement of construction traffic, staff traffic and residential access and ensure the safe movement of vehicles and people;
- Movement of specialised machinery, large components and / or over-sized dimension vehicles, including the provision of a Site-Specific Traffic Management Plan ('SSTMP') where required;
- The design and provision of temporary accessway and vehicle crossings, where these are required to maintain access to residential properties;
- Provision of wheel wash facilities and staff parking at the CSA sites;
- Signage requirements, including temporary speed limits (where required);
- Reinstatement of raised platforms, footpaths, vehicle crossings and kerbs (where required); and
- Public communication requirements.

Further recommendations are included within the ITA to specifically manage the effects during the full closure of Sarsfield Street for Shaft One construction. These additional measures include:

- Vehicle tracking of the construction vehicles from the Project will need to be carried out and any temporary physical works improvements at the Emmett Street intersections with Shelly Beach Road and Curran Street will need to be identified and implemented prior to the temporary closure taking effect. This could include temporary removal of on street parking on Curran Street and Shelly Beach Road to assist vehicles turning at the intersections and to provide improved sight lines;
- Given the narrow width of Emmett Street, the temporary removal of on street parking is recommended to accommodate the increased level of traffic along the whole length of the street;
- A temporary 30 Km/h speed limit shall be implemented on Emmett Street to reduce vehicle speeds and hence injury severity in the event of an accident;
- Continuous communications with residents on Emmett Street and Curran Street, and Ponsonby Primary School is required address any traffic issues should they arise;
- Provisions for restricting movements of construction traffic during peak school drop-off and pick-up times (between 8.15 – 9am and 2.45 and 3.15pm); and
- Clear signing of the diversion routes and in particular, of the existing right turn ban from Emmett Street to Shelly Beach Road and the need to use Tweed Street for this manoeuvre.

Further details on the requirements of the CTMP are contained within the ITA. The conditions outlining the above have been included within the list of proposed conditions, attached as **Appendix B**.

7.6.5 Summary of Transport Effects

Overall, the effects of the Shaft One construction works, and closure of Sarsfield Street, will have unavoidable significant temporary adverse effects on the surrounding transport network.

Additional full and partial road closures at Shafts One, Two, Three and Four will result in more than minor effects, while the trenching construction works at Shaft Eight / Marine Parade will result in minor effects due to short term disruptions to property access. For the remainder of the works, including the mitigation proposed, the effects from construction vehicle movements, road closures and detours will be less than minor.

7.7 Effects of Groundwater Diversion and Dewatering

Groundwater diversion and dewatering are required to undertake the construction of the trunk sewer line. The effects of the required dewatering at the shaft locations for the bored tunnels, trenches and manholes have the potential to result in the settlement of surrounding land if not controlled appropriately.

The potential effects of groundwater diversion and dewatering for the interception lines have not been considered where they are to be constructed via trenchless methods, as all of these lines are 300mm – 450mm in diameter and are therefore excluded from consideration under E7.6.1.10. (1) (a).

Modelled settlement profiles for shaft construction, tunnelling and open trench construction activities are contained within the Geotechnical and Groundwater Assessment (Appendix D). This assessment indicates that ground settlement and dewatering effects arising from the proposed works can be appropriately managed using a conservative and robust construction methodology, including the use of secant piling (which seals the shaft and minimises seepage cut-off performance) and operation of the TBM in 'closed mode'.

Potential damage to utilities within the road reserve has been conservatively calculated, including a range of range of utility types and materials, with the maximum allowable differential settlement ranging from 1:67 for PVC & HDPE to 1:500 for cast iron pipes. The estimated settlement for the Project is anticipated to be within the allowable tolerances of these services.

A Groundwater and Settlement Monitoring and Contingency Plan ('GSMCP') has been prepared to address groundwater and settlement monitoring during each of the relevant Project stages to ensure potential adverse effects on surrounding properties are identified and rectified (included within Appendix D). This GSMCP establishes a set of project controls to measure groundwater drawdown and ground settlements, and to address potential geotechnical effects related to the project works. The GSMCP also provides contingency and mitigation measures that may be applied should monitoring results indicate ground settlement and groundwater drawdown to be approaching or likely to exceed established alert and alarm limits. Further condition surveys may be undertaken at the discretion of the construction project manager.

As noted above, on-site investigations are currently ongoing. The findings of this programme will be available in August – September 2023 and will inform the detailed design of the Project. These investigations will further refine the ground and hydrogeological models (including groundwater monitoring) and will review any changes to the construction methodology resulting from the on-site investigations. These findings will be incorporated into the final GSMCP, which will be certified by Council prior to works commencing.

Overall, it is considered that effects from groundwater diversion and dewatering will be less than minor.

7.8 Effects on Protected Trees

The alignment of the Project contains a number of protected trees, including large street trees protected under Chapter E26 of the AUP-OP and individually protected 'notable trees'. Excavations are proposed within close proximity to the protected root zones of these trees, particularly at the shafts, while some pruning of limbs is required to enable sufficient clearance for construction equipment, such as crane and excavators. An assessment of the effects of the

proposal on protected trees in the road reserve and public open space is attached as Appendix G – Arboricultural Assessment,

Standard tree protection measures and appropriate work methods will be adopted when working around these trees as recommended in the TPM within the Arboricultural Assessment. These measures include:

- Engagement of a suitably qualified and experienced on-site supervisory arborist for all works to protected trees;
- All tree removal and pruning works to be undertaken by the on-site arborist in accordance with current accepted arboricultural techniques; and
- Use of tree protection fencing and ground protection (such as 'Trak-mat') at the 'Tree Protection Area', where a permeable surface exists.

In addition, the location of the shafts and trenching construction works have sought to avoid or reduce works on protected trees. As a result, no trees will be removed within the Notable Trees and Historic Heritage overlays (see Figures 3-5 to 3-8 above), thereby protecting the heritage, landscape, ecological and amenity values associated with these trees.

Despite this, the removal of some protected trees is required along the alignment of the Project, as described in Section 4.6 above. A total of 14 trees within the road reserve and public open space are to be removed, including Willow Myrtle, Jacaranda, Flowering Cherry, Pohutukawa, Queen Palm and Magnolia specimen trees. Where tree removal is required, it is because there is a functional and operational need for their removal to enable the construction of shafts / interception shafts, or to provide sufficient room for construction machinery to construct these shafts.

Of particular note, a collection of three Queen Palms and four early-mature Magnolia trees on Upton Street are to be removed to ensure that there is sufficient room for construction vehicles at Shaft Five and to ensure that the arboriculturally superior London Plane trees within the adjacent Herne Bay Historic Heritage area are protected. Relocation of these trees has been explored, however is infeasible due to the presence of underground services. These trees are shown in Figure 7-1 below.

Figure 7-1: 3x Queen Palm (left) and 4x Magnolia (right) trees to be removed on Upton Street (Source – Google Streetview)

There will be short to medium-term effects on the streetscape of Upton Street due to the removal of these trees. When removed, there will be a loss of amenity and visual interest from the streetscape, with the shading and cooling effects of the Magnolia trees lost in the short term. Despite this, the trees to be removed are not visually significant within the context of the Herne Bay area, where large and mature trees are common. Further, the removal of these trees will enable the far larger and historically significant London Plane trees on Herne Bay Road to be retained, which contribute far more to the amenity of the streetscape.

The proposed mitigation planting has been discussed and agreed with Council's arborist on a site walkover on the 14th of April 2023. To mitigate the loss of the Queen Palm and Magnolia trees on Upton Street, it was agreed with Council's arborist that the replanting of larger, 160L-grade trees in the road berm would be appropriate. As the site will be used for construction activities, the underlying soil may become compacted. Undertaking remedial works to the soil, including de-compaction, will aid in the successful establishment, growth, and development of the new trees. Species of the new trees should be those that can develop to comparable dimensions of the existing magnolia and palm trees.

In total, it is recommended that at least 46 exotic or 51 native trees are replanted; a draft replanting plan is provided within the Arborist Assessment and a Reserve Reinstatement Plan will be provided upon completion of the construction works.

The above mitigation and protection measures will be implemented to ensure that the effects of the works on protected trees is minimised to an acceptable level. As such, effects will be less than minor overall.

7.9 Earthworks

Earthworks are required along the alignment of the Project, including bored tunnelling, trenching and piling of the shafts. All earthworks for the Project generally fall within permitted thresholds, apart from at Shafts Three and Five, where a volume of 3,010m^3 and 3,349m^3

respectively is required, and the preparation works within CSA-2 at 94a – 94b Shelly Beach Road, where an area of 3,100m^2 is required.

To ensure that adverse effects on surrounding properties and downstream receivers from these earthworks are avoided a draft Erosion and Sediment Control Plan ('ESCP') has been prepared and is attached as Appendix L. The ESCP is consistent with the requirements of the Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region (known as 'GD05') and includes both general project controls and site-specific controls at the shaft and CSA locations.

The following measures are proposed:

- Silt / super silt fencing and hot-mix asphalt diversion channels / bunds around the perimeter of work sites;
- Stabilised construction entrances;
- Compost filled filter socks and catchpit filters; and
- Soils from the proposed works will be removed from the shafts and loaded onto trucks to avoid stockpiling at the shaft sites and at CSA-1. This will minimise the risk of sediment runoff during wet weather events.

As discussed above in Section 6.1.3, the closure of public footpaths, berms and private driveways will be required to enable the construction activities. The effects of these closures are discussed in Section 8.4 above.

Earthworks will occur within floodplains at Shaft One, Shaft Seven and interception shafts SE03 and SE04. Earthworks at these locations will include shaft piling and some minor trenching works at SE03 and SE04. Earthworks at these shaft sites will occur for longer than 28 days, infringing standard E26.5.5.2.(20).

Notwithstanding this, all proposed earthworks will be cut, rather than fill, ensuring that no flood waters will be permanently displaced to surrounding properties. The existing road surface will be reinstated to the existing levels and condition after the works are complete. In addition, diversion bunds are proposed at each shaft construction site to direct overland flows away from the shafts during severe flooding events,

Overall, it is considered that potential adverse effects associated with earthworks, including erosion, land instability and sediment runoff can be adequately remedied through the controls proposed in the ESCP, such that effects will be less than minor.

7.10 Disturbance of Contaminated Soils

The consent requirements for the disturbance of contaminated soils are a Discretionary Activity, and as such, there are no relevant matters of discretion.

A PSI has been prepared to support the application (attached as Appendix E) and has identified potentially contaminated 'HAIL' sites at CSA-1 (Salisbury Reserve) and CSA-2 (94a – b Shelly Beach Road), along with nearby Masefield Reserve.

Of these sites, only the CSAs will be disturbed as the topsoil will be scraped and laid with hardstand and aggregate. Given prior use as a bowling green, contamination of surface soils with metals and pesticides may have occurred. An estimated volume of 960m^3 of soil will be disturbed.

Should the on-site investigations confirm the level of contaminants exceed background concentrations, mitigation measures will be undertaken in accordance with the SMP, attached within Appendix E. These measures include:

- Site establishment controls;

- Measures for the excavation, disposal and transport of excavated soils;
- Water management;
- Protocols for imported materials;
- Measures for handling unexpected contamination;
- Emergency responses; and
- Complaints protocol.

In addition, the SMP recommends several health and safety procedures for the contractors / on site workers to follow in the event of soil with elevated levels of contaminations or unexpected contamination are identified, including the steps to be taken when a new hazard is found; the provision of Personal Protective Equipment (PPE) and the importance of practising good hygiene by the workers, etc. It is considered the SMP, if strictly adhered to, would be sufficient in mitigating the potential adverse effects of soil contamination from the CSAs during the construction, ensuring that effects are less than minor.

7.11 Storage of Hazardous Substances

The consent requirement for the storage of hazardous substances is a Discretionary Activity, and as such, there are no relevant matters of discretion.

As noted above, up to 2,000L of diesel is proposed to be stored at the CSA-1 site in Salisbury Reserve. This is required at this site to refuel the machinery, and to reduce heavy vehicle trips through the residential area to refuel machinery at the CSA-2 site.

The diesel will be stored in a sealed container on the site, with bunding surrounding the tank to ensure that spills are contained and not discharged to the environment. Flames and flammable materials will be appropriately setback from the storage container to reduce the risk of fires.

It is proposed that spill containment procedures be provided within the CMP, to be certified by Council before works commence.

Overall, the effects from the storage of hazardous substances at Salisbury Reserve will be less than minor.

7.12 Archaeological Effects

The Archaeological Assessment (attached as **Appendix H**) has established that the proposed excavations will not affect any known archaeological remains. However, the works do have the potential to affect unidentified subsurface archaeological remains and therefore archaeological monitoring will be undertaken of initial earthworks at the proposed shaft sites, any areas of open trenching and the CSA-1 site at Salisbury Reserve. If suspected archaeological remains are exposed during Project works, the Accidental Discovery Rule (E12.6.1) set out in the AUP-OP will be implemented.

7.13 Climate Change Considerations

The Resource Management Amendment Act 2020 changes to the RMA enable decision-makers to consider the effects of a resource consent application on climate change. These changes came into effect on the 30th of November 2022.

There are no direct / operational greenhouse gas emissions from the Project and any indirect effects (ie greenhouse gas emissions from the production of construction material) are not considered to be relevant for this project as they fail the tests of nexus and remoteness under the RMA.

In any event, Watercare maintains a '40/20/20' vision for its capital works programme that seeks to reduce the imbedded carbon of all new infrastructure by 40% through design and construction efficiencies. Watercare continue to seek designs, construction methods and process that reduce impact of their operations on climate change.

It is important to note that wastewater overflows currently result in greenhouse gas emissions to the coastal environment. The project will significantly reduce wastewater overflows and greenhouse gas emissions in the long run.

Overall, the effects of the Project on climate change are considered to be negligible.

7.14 Summary

The proposed works are critical to improving the resilience and capacity of the existing wastewater network in the Herne Bay area. The Project has a range of social, environmental and economic benefits, including reducing the number of uncontrolled overflows into the Waitematā Harbour and providing for future residential intensification. This will in turn support the maintenance and enhancement of the quality of the environment while maximising the existing investment in the larger CI project.

The key potential adverse effects of the proposal relate to temporary construction effects, groundwater diversion and dewatering, transport effects and effects on protected trees. The effects of diverting traffic from Sarsfield Street to Emmett Street and Curran Street during the construction of Shaft One will generate temporary significant adverse effects for the neighbouring properties, while the effects from construction noise and vibration over various phases of the will be minor to the properties identified above, and less than minor for all remaining properties.

Construction monitoring will be in place to ensure that vibration and dewatering does not result in damage to buildings and night works do not result in sleep disturbance. Detours will be in place where road closures are required and access to residents' properties will be maintained at all times, even when temporarily altered for some access points. Draft management plans have been prepared and will be certified by Council before works commence, including a CMP, CNVMP, ESCP, SMP, GSMCP, CTMP and TPM. Along with the construction methodology employed, the management plans will ensure that effects during construction are either avoided, remedied and / or mitigated, where this is possible to do so.

8 Assessment of Alternatives

Under the RMA, consideration of alternative routes, sites and methods are required in certain circumstances. Relevant to this application an assessment of alternatives is provided in relation to the resource consent application whereby:

- *the information to be included in an AEE must include a description of possible alternative locations or methods for undertaking the activity where it is likely that the activity will have a significant adverse effect on the environment*[8]

The ITA (**Appendix F**) finds a temporary significant adverse traffic effect on Emmett Street and Curran Street for 100 days (approximately 3 months) due to the redirection of traffic during the full closure of Sarsfield Street, as outlined in Section 4.5 and 7.6 above. In accordance with Schedule 4 of the RMA, an analysis of the alternate routes, sites and construction methods is provided in relation to these significant adverse effects, see **Appendix N**. A summary of the findings of this memo is provided below.

8.1 Route Selection

The project objective is to reduce wastewater overflow to Herne Bay, Home Bay and Cox's Bay. To do this the Herne Bay Trunk Sewer needs to collect existing EOPs within the catchments of these bays.

Figure 8-1 below shows there are four EOPs (circled in yellow) passing through or near Sarsfield Street. The only alternative route to connect to the overflow points and central interceptor is through Jervois Road, which is not considered a practical or constructable alternative.

Figure 8-1: Pipeline route selection in relation to EOPs (yellow circles) in the Herne Bay catchment

A primary objective for the shaft location and pipeline route is the avoidance of impacts on private property to reduce possible shaft construction impacts on private property. As such, alignments outside of the road reserve were not considered.

[8] Schedule 4, Clause 6(1)(a)

8.2 The location of Shaft One and Shaft Two and pipeline alignment

Shafts are required to access the network for operations and maintenance purposes and are required at changes in direction of flow as per Watercare standards[9]. The construction methodology selected for installation of deep shafts and pipeline is tunnelling (via a TBM), which requires a straight pipe alignment from Shaft One to Two.

Shaft One is the entrance point for the TBM and connection between the new trunk sewer to the CI extension to Point Erin Park. The size of Shaft one is required to be 13m outside diameter to accommodate the required sewer pipe size and the TBM sleeve. Shaft Two's location is set by distancing away from a building within the Historic Heritage overlay (at 58 Wallace Street) as much as possible, restricting alternative positions for Shaft Two.

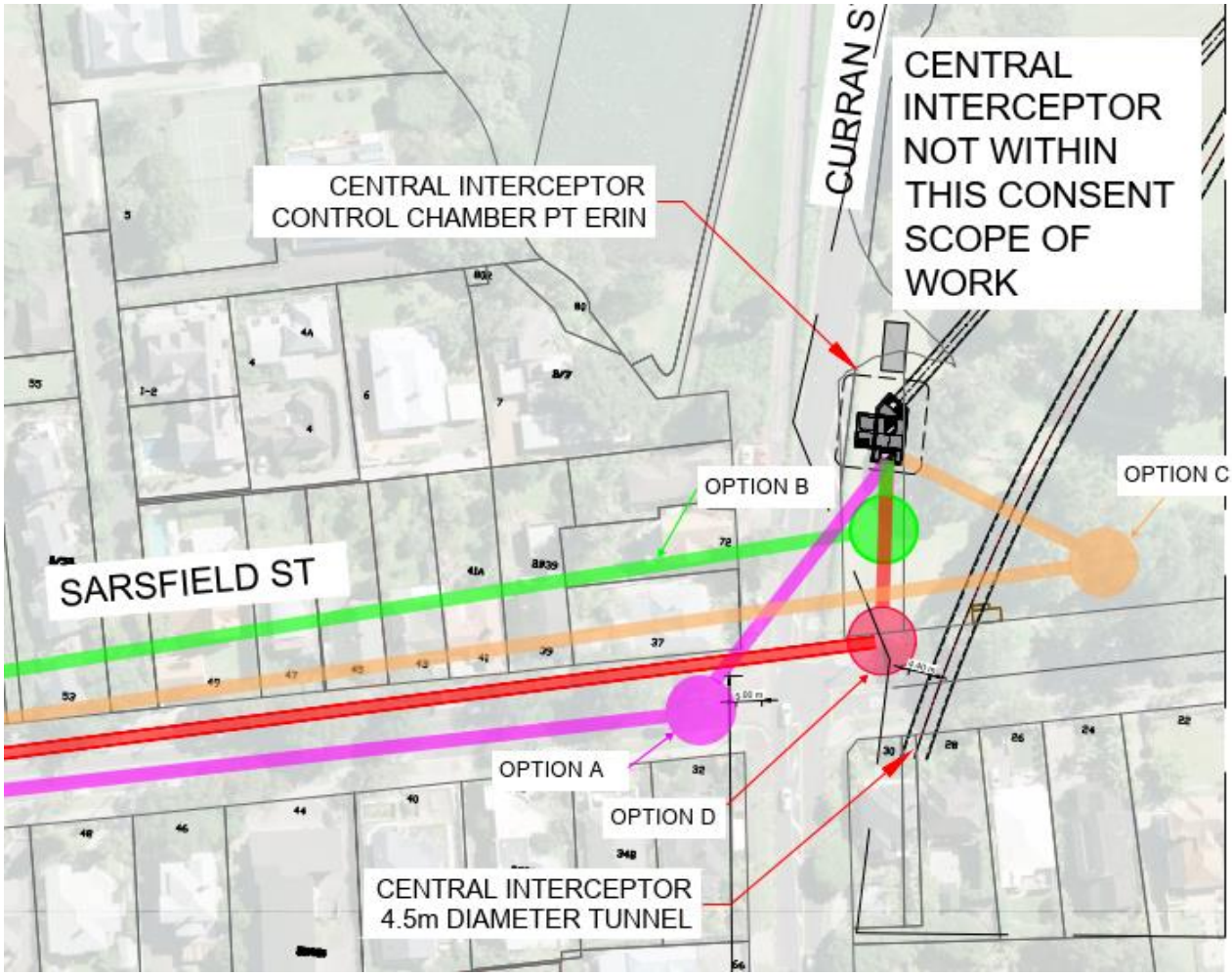


Figure 8-2: Shaft and truck sewer alignment options Sarsfield street

Figure 8-2 shows the preferred Shaft One location (in red) and alignment of the trunk sewer pipeline, along with two alternative alignments (in green, pink and yellow). Placing Shaft One within Point Erin Park (green circle) was considered to avoid traffic disruption, but this shaft position resulted in a clash with construction space needed for the CI project and the alignment of the CI control chamber. The sewer pipe alignment needed for this shaft position also results in crossing at least seven private properties.

The location of Shaft One to the south of Sarsfield Street (purple alignment) is not possible as it will impact Curran Street, which is a critical arterial road and connection to Auckland Harbour Bridge / State Highway One from the City Centre and Ponsonby.

[9] Watercare construction standard DP-07

Shaft One location to the east of the preferred location (yellow alignment) results in a clash with the construction space position of the proposed 4.5m diameter CI tunnel, with soil bearing pressures affecting the structural integrity of Herne Bay Trunk Sewer if installed after the CI tunnel or vice versa. There is also steep terrain in this location, resulting in more earthworks and limitations on constructability and equipment movement. A shaft at this location would also require removal of established trees in Point Erin Park and a truck sewer alignment as shown in green that impacts on at least seven properties.

A shaft location to the west of the preferred (pink alignment) means that the trunk sewer alignment connection to CI crosses under 37 Sarsfield Street and will still result in full closure of Sarsfield Street for five months.

The duration of full road closure from the preferred option on Sarsfield St reflects most efficient construction methodology. However, based on tunnel sizing and position, for safe site mobility of construction equipment full road closure of Sarsfield Street will be required for 100 days.

In summary, the proposed position of Shaft One is considered the most appropriate, as the alignment is not under any private property, protects heritage buildings, reduces the effects of road closures / diversions and minimise clashes with CI.

8.3 Construction methods

The construction methodology proposed for the truck sewer is predominantly tunnel boring and HDD, with limited open cut trenching where needed to connect into existing overflow points and interception pipes. Relocation of utilities will also require open cut trenching for their safe identification.

Given the depths of excavation to connect to existing sewers and the CI tunnel, the use of a TBM is required. It also represents a low impact construction solution, reducing the duration of disruption on the surface in relation to construction noise and vibration, traffic, earthworks and management of groundwater. Trenching is required for sections of construction nearer the surface, were connection to existing shallow infrastructure, such as EOPs occurs.

The construction of shafts cannot be avoided as they are required at the changes in tunnel direction to provide entry for the TBM (thrust shafts) and to retrieve the TBM (receiving shafts).

While the diameter of Shaft One is 13.5m, the entire carriageway of Sarsfield Street is required to be closed as sufficient horizontal clearance is required for a crane to lower construction materials and the TBM into the shaft.

As a result of the engineering logistical requirements, the mitigation proposed, and the critical need for the Shaft One to connect to the existing CI, the chosen design and construction method are the preferred options.

8.4 Traffic Management

The ITA (Appendix G) assesses various traffic management approaches for managing the closure of Sarsfield Street, including alternative diversion routes (Shelly Beach Road / Jervois Road / Curran Street, or diverting only heavy vehicle movements via Jervois Road), however these options were not feasible or enforceable, as many vehicles would be likely to use the shorter Emmett Street route.

9 Statutory Assessment

9.1 Notification Assessment

The applicant requests that the application proceed with public notification.

9.2 Consideration of Applications – Section 104 Assessment

Section 104(1) of the RMA sets out the matters to which a consent authority must have regard to, subject to Part 2 RMA, when considering an application for resource consent. These are:

- Any actual and potential effects on the environment of allowing the activity (section 104(1)(a)). This is discussed in Section 8 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 (section 104(1)(ab)).
- Any relevant provisions of:
    - A national environmental standard
    - Other regulations
    - A national policy statement
    - A New Zealand Coastal Policy Statement
    - A regional policy Statement or proposed regional policy statement
    - A plan or proposed plan
- Any other matter the consent authority considers relevant and reasonably necessary to determine the application (section 104(1)(c)).

9.3 Applications that relate to a wastewater network – section 104(2D)

When considering a resource consent application that relates to a wastewater network, as defined in Section 5 of the Water Services Act 2021 (WSA 2021), Section 104(2D) requires that a consent authority:

a) Must not grant the consent contrary to a wastewater environmental performance standard made under section 138 of that Act; an
b) Must include, as a condition of granting the consent, requirements that are no less restrictive than is necessary to give effect to the wastewater environmental performance standard.

The application relates to a wastewater network under the WSA 2021 however there are no standards under s138 that apply as at the date of this application.

9.4 Statutory Considerations for Discretionary Activities

Section 104B of the RMA provides for consideration of discretionary activities, as follows:

1) *After considering an application for a resource consent for a discretionary activity or non-complying activity, a consent authority—*

    (a) may grant or refuse the application; and

    (b) if it grants the application, may impose conditions under section 108.

An assessment has been undertaken under Section 8 which concludes that effects of the construction phase of the application range from temporary significant (traffic) to less than minor. With the management and mitigation measures proposed the effects of the application are minor overall and hence consent can be granted. A list of proposed draft conditions has been prepared to support the application and is attached as **Appendix B**.

9.5 Proposed conditions of consent – Sections 108 and 108AA

Section 108 of the RMA provides that except as expressly provided in that section and subject to Section 108AA and any regulations, a resource consent may be granted on any condition that the consent authority considers appropriate.

A set of draft conditions proposed by the applicant are set out in **Appendix B**. These represent key conditions which capture the mitigation measures and management plans identified in the specialist reports and assessment of effects which are considered necessary to address the potential adverse effects of the proposed activity on the environment.

9.6 New Zealand Coastal Policy Statement

The New Zealand Coastal Policy Statement ('NZCPS') provides objectives and policies to achieve the purposes of the RMA in relation to the coastal environment of New Zealand. While the Project is located in part near the coastline, no part of the activity will occur within an area directly affected by coastal processes.

Notwithstanding this, a brief assessment against the key provisions of the NZCPS is made below:

- **Objective 1** and **Policy 21** seek to safeguard the integrity, form, functioning and resilience of the coastal environment, while maintaining and enhancing coastal water quality. Erosion and sediment controls will be implemented during construction to ensure no discharge of sediment laden water occurs to the coast, while the new wastewater line will divert existing overflows to the harbour, ensuring coastal water quality is improved.
- **Objective 6** and **Policy 6** seek to enable development and infrastructure in the coastal environment that will contribute to the social, economic and cultural wellbeing of communities. In this case, the Project provides new wastewater infrastructure that will improve the amenity of the Herne Bay area through a reduction of odour and enable future growth.
- **Objective 2** and **Policy 13** seek to preserve the natural character of the coastal environment from inappropriate development. In this case, while the works will have temporary visual effects in Point Erin Park from earthworks during construction, the site will be reinstated after all works are completed. As such, any effects on the natural character of the coastal environment will be insignificant.

9.7 National Policy Statements – Section 104(1)(b)

9.7.1 National Policy Statement on Urban Development 2020

The National Policy Statement on Urban Development (NPS-UD) 2020 sets out the objectives and policies for improve planning processes and enabling more development to contribute to well-functioning urban environments under the RMA. The NPS-UD is focused on providing sufficient development capacity to meet the different needs of people and communities and integrating land use planning and infrastructure planning.

The key provisions of the NPS-UD in regard to the project include Objective 1, Objective 4, Policy 2, and Policy 6. The proposal is consistent with these provisions as once complete, it will enable added network capacity across Herne Bay and directly contribute to the resilience of the

wastewater network in the Herne Bay Area. The project directly contributes to the direction established through the NPS0-UD.

9.8 National Environmental Standards – Section 104(1)(b)

9.8.1 NES for Assessing and Managing Contaminants in Soil to Protect Human Health (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 7.10 above.

9.9 Auckland Unitary Plan

The AUP became operative in part on 15 November 2016. The AUP contains the Regional Policy Statement (RPS), Regional Coastal Plan (RCP) and Regional Plan (RP) and District Plan (DP) objectives and policies. An assessment of the proposed works in relation to the key policy direction of the AUP is set out below. Relevant objections and policies are set out in Appendix M.

9.9.1 Auckland Unitary Plan (Operative in Part) Regional Policy Statement

The AUP-OP Regional Policy Statement (RPS) recognises the importance of the management of and investment in infrastructure (B3 Ngā pūnaha hanganga, kawekawe me ngā pūngao - Infrastructure, transport and energy).

The RPS recognises the importance of natural resources, in particular the importance of integrated management between development (including infrastructure) and freshwater as well as manging adverse effects from wastewater discharges to coastal water (B7 Toitū te whenua, toitū te taiao – Natural resources). As discussed in this report, the Project has been designed to reduce the frequency and volume of wastewater overflow events into the Waitematā Harbour.

In terms of managing and providing for Auckland's growing population, the RPS recognises the importance in providing for supporting infrastructure (i.e. water, wastewater and stormwater infrastructure). This is recognised through B2 Tāhuhu whakaruruhau ā-taone - Urban growth and form.

In light of the above and the detailed assessment in Section 8 above, the proposed works are considered to be consistent with the relevant objectives and policies of the RPS.

9.9.2 Auckland Unitary Plan (Operative in Part)

The proposed works have been assessed against the objectives and policies of the AUP-OP, in particular those of relevance in Chapters E7 Taking, using, damming and diversion of water and drilling, E16 Trees in Open Space Zones, E17 Trees in Roads, E25 Noise and Vibration, E26 Infrastructure, E30 Contaminated Land and E31 Hazardous Substances. The works are considered to be in accordance with the AUP(OP) for the following reasons:

- The proposed works will improve resilience of Auckland's wastewater infrastructure and will service the needs of existing and planned use and development of Herne Bay
- Earthworks associated with the proposal have been designed to avoid temporary adverse effects from the discharge of sediment through erosion and sediment control measures, while dust into the environment during construction will be managed through the ESCP. The proposed earthworks are not expected to exacerbate the risk of flooding, as any excavated areas will be protected during construction and returned to their present levels state.

- Measures and controls stipulated in the CMP will be implemented to ensure that the storage of hazardous substances (diesel) at CSA-2 will be not adversely affect the surrounding environment.
- The construction methodology has been determined to minimise effects on protected trees within the road reserve and public open space, with a particular focus on mature specimen within the Historic Heritage Area and Notable Trees overlays. While a total of 13 protected trees are required to accommodate surface works and construction equipment, this will be mitigated through a planting of at least 46 – 51 trees.
- The potential for settlement and drawdown effects from the diversion and dewatering of groundwater will be controlled using a conservative construction methodology, including the use of closed-mode TDM tunnelling and secant piling. The effects on potential settlement, water quality and allocation are expected to be minimal. A GSMCP has been prepared to monitor and assess settlement effects on property during each of the construction stages, including adjacent heritage structures. The landowners of all potentially affected properties will be consulted with prior to works commencing, with building condition surveys to be undertaken where required.
- While the works will generate effects on the surrounding traffic network during construction, access to private properties will be maintained. Extensive consultation will be undertaken to ensure that effects to residents are minimised or mitigated, where it is possible to do so.
- Any potential noise and vibration disturbances caused by the works will be mitigated and managed during construction through the CNVMP.

A detailed assessment against the relevant objectives and policies is provided in **Appendix M**.

9.10 Other Relevant Matters – Section 104(1)(c)

There are no other matters relevant to this application.

9.11 Purpose and Principles of the RMA – Part 2

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.

9.11.1 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.

Considering the above, the proposed works as described in Section 4 of this report are required to facilitate the construction of the new wastewater trunk line within the suburb of Herne Bay. The proposed works will take pressure off the existing wastewater system by providing additional capacity and reduce the volume and frequency of overflow events by diverting combined flows into the new CI extension tunnel, thereby safeguarding the life-supporting capacity of the coastal environment.

Overall, though avoiding overflows and increasing the capacity of the network for infill growth 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 8 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.

9.11.2 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 8 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 in the Herne Bay area, reducing odour and swimming restrictions.

Whilst the works will require ground disturbance associated with the excavation for the pipeline, overland flow paths will be maintained during construction and 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.

The archaeological assessment did not identify any historic heritage that would be affected by the construction, however if unidentified artefacts are discovered the accidental discovery protocols will be implemented.

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.

9.11.3 Section 7

Section 7 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 Herne Bay, 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 enabling future residential intensification within Herne Bay. 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.

9.11.4 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, and the project is understood to be generally supported by this group. The Project will reduce the frequency and volumes of wastewater discharges to the Waitematā Harbour, which is a coastal statutory acknowledgement area.

10 Community Engagement

Watercare has undertaken engagement with key stakeholders as part of the wider 'Western Isthmus Water Quality Improvement Programme' of works, with more recent engagement on the Herne Bay Trunk Sewer taking place throughout 2022 and 2023, which is still ongoing. Specific stakeholder and community engagement undertaken for the Herne Bay Trunk Sewer is outlined below.

The organisations, agencies and stakeholders that have been consulted with include:

- Auckland Council
- Mana Whenua
- Waitematā Local Board
- Herne Bay Residents' Association
- St Marys Bay Residents Association
- Adjacent private property owners/occupiers
- Ponsonby Primary School
- Waka Kotahi NZ Transport Agency
- Auckland Transport
- The wider community in the Herne Bay and St Marys Bay catchments.

Engagement methods have included:

- A media release on the 28th of September 2022 about the CI extension and Herne Bay projects;
- Emails providing a high-level overview on the CI extension and Herne Bay projects and providing details of drop-in sessions sent on the 28th of September 2022, 23rd of November 2022, 9th of December 2022, 20th February 2023, and 1st June 2023;
- Email newsletter to the community detailing the Project and providing notice of the geotechnical investigations on the 20th of February 2022;
- A project-dedicated Watercare project page: https://www.watercare.co.nz/About-us/Projects-around-Auckland/Herne-Bay-wastewater-trunk-sewer-upgrade; as well as a dedicated email address: hernebayproject@water.co.nz.
- A letter drop to some of the most affected properties along the tunnel alignment.

Watercare has received a number of enquiries from the Project open days and through the Project email address. The majority of inquiries thus far have related to noise, vibration, traffic and the construction effects of the proposal.

The following sections provide details on the consultant and engagement undertaken with specific stakeholders.

10.1 Mana Whenua

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 in the Auckland Council area being:

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 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.

The Project was introduced on the Kaitiaki Managers Projects List back in October 2022. To date, Te Ākitai Waiohua has registered their interest to be engaged on the Project. No specific concerns have been raised and Watercare is keeping Te Akitai Waiohua updated as the Project progresses.

Engagement with Mana Whenua partners is ongoing and will continue through the Project development and delivery phases. Feedback received from Mana Whenua will be provided to Council either directly or at their request

10.2 Auckland Council

10.2.1 Healthy Waters

The Project team has engaged with Auckland Council Healthy Waters regarding the Project. The original separation project was developed with Healthy Waters and proposed separating the old, combined stormwater and wastewater pipes. This project included a new public wastewater network, storage and a new pump station at Point Erin Park, as well as private drainage separation and connections. Due to cost escalations this project has now been deferred.

Watercare has continued to work with Healthy Waters to implement the purpose of the original separation project, with Healthy Waters' head of planning attending a drop-in session. Watercare will continue to work with Healthy Waters in relation to the Project delivery programme.

10.2.2 Community Facilities / Parks

Applications to utilise Salisbury Reserve and 94a – b Shelly Beach Road as CSAs were submitted to Auckland Council Land Advisory department in early February and May 2023 for landowner approval.

The Project will also affect some trees on the road and in the CSAs, as outlined in Section 4.5 above. An application for tree asset owner approval has been submitted to the Auckland Council Urban Forest Specialist for approval in parallel with the resource consenting process.

10.2.3 Consents

The Project Team held a pre-application meeting with Council's resource consents planners on the 2nd of February 2023 to introduce the project. Following this meeting, a site walkover with planning, noise and vibration, archaeology, land contamination, built heritage geotechnical and arboricultural specialists representing Watercare and Council, along with the WSP wastewater engineers and Project constructors, was undertaken on the 10th of March 2023.

10.3 Auckland Transport

Watercare has consulted Auckland Transport ('AT') regarding the extent and impact of the proposed construction work in the road corridor. An introductory meeting of the Project was held 30 November 2022 with representatives from AT Works Coordination and Corridor Access Request ('CAR') teams in exchanging high level options around sequencing of road works, impact to local traffic and public services, reinstatement of roading assets, etc.

Subsequently a CAR application was submitted in January 2023 for the implementation traffic controls to undertake geotechnical investigation on road reserve.

A follow up meeting with held on the 22nd of March where the indicative traffic impacts of the Project on the road network were discussed with representatives from AT and Auckland Council. Watercare intends to continue engaging with AT representatives on key aspects of the proposal.

10.4 Residents and Local Community

Local open days were undertaken on the 12th of October and 15th of December 2022 and the 8th of March 2023 and 20th June 2023 to discuss the Project. The open day on the 15th of December was held at Ponsonby Community and largely focused on the proposed alignment of the Project.

The follow up open day in March 2023 and June 2023 shared further details of the construction details, duration and methodology, including the excavation method (trenching vs boring), the pipe size and depth and the area and depth of the shafts.

10.4.1 Residents' Association

Ongoing engagement with the Herne Bay Residents' Association has occurred throughout 2022. Members of the Residents' Association were invited to the March 2023 community open day.

As agreed with the members of the Residents' Association, independent engineer Ian Wallis has been engaged to undertake a review of the programme of works to ensure it achieves the required reduction in overflows.

Watercare will continue to keep the Residents' Association informed with the progress of the consent application and future construction works.

10.4.2 Property Owners and Occupiers

The following engagement with the owners and occupiers of properties in proximity to the proposed trunk sewer alignment and associated construction areas has been undertaken by Watercare:

- All directly affected property owners and occupiers were invited to the March 2023 open day and subsequent community session in June 2023.
- A letter drop to directly affected residents occurred in early March 2023 with details of the Project.
- Watercare staff have been available to meet with all residents adjacent to primary or interception shafts that will be affected by noise and vibration effects and answer any questions they may have after the letter drop.
- Ongoing engagement with affected landowners and residents in the immediate vicinity of the project works, including offers to meet and discuss directly, is occurring and will continue throughout the consent application process.

10.4.3 Ponsonby Primary School

Engagement with Ponsonby Primary School has been undertaken, with Watercare meeting representative from the school on 8th June 2023. Key aspects raised at the meeting were around adequacy of traffic managements in place during construction to ensure safety of students walking to school or being drop off and access to Pt Erin Pool to host an annual community event. Watercare has taken on these recommendations and will continue to keep the school informed about the Project as further details arise.

10.5 Waitematā Local Board

The Waitematā Local Board have been kept up to date with the Project. Watercare's elected member relationship manager Ben Halliwell provided a high-level update to the Local Board on the 15th of November 2022 and will continue to update the Local Board as more updates become available.

11 Conclusion

The proposed works are part of Watercare's programme of works to upgrade the existing combined sewer network in the Herne Bay catchment of the wider Western Isthmus area. The purpose of this Project is to reduce the volume and frequency of overflow events from the existing network into the Waitematā Harbour during flooding events, along with providing additional wastewater capacity. The works are required for Watercare to meet the conditions of the existing NDC. The proposed works are located within the road reserve, along with two CSAs at Salisbury Reserve and 94a – b Shelly Beach Road.

Consent is required under Chapters E7, E25, E26, E30 and E31 of AUP:OP, along with the NES-CS. The overall activity status of the application is Discretionary.

The key potential adverse effects of the proposal relate to land settlement from the diversion and take of groundwater, disruption from road detours and construction traffic and construction noise and vibration on private properties. It is assessed that any adverse effects associated with the works are temporary and will be avoided, remedied or mitigated through the implementation of mitigation measures such as the ESCP, CNVMP, SMP, TPM, GSMCP and CTMP, and appropriate construction methodologies.

Public notification of the application is sought for the following reasons:

- Significant adverse traffic effects on Emmett Street and Curran Street resulting from the full closure of Sarsfield Street during the construction of Shaft One;
- More than minor adverse effects on various roads resulting from full and partial closures during the construction of Shafts One, Two, Three and Four; and
- Minor adverse construction noise and vibration effects generated by the proposal during construction to the owners and occupiers of the identified surrounding properties, and from open cut construction works along Marine Parade, which will temporarily disrupt property access.

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.

Appendix A
Permitted Activity Assessment

Appendix B
Proposed Conditions

Appendix C

Records of Title

Appendix D
Geotechnical and Groundwater Assessment

Appendix E
Land Contamination: Preliminary Site Investigation (PSI) Report and SMP

Appendix F
Integrated Traffic Assessment (ITA)

Appendix G
Arboricultural Assessment

Appendix H
Archaeological Assessment

Appendix I
General Arrangement Plans

Appendix J
Construction Methodology

Appendix K
Construction Noise and Vibration Assessment

Appendix L
Erosion and Sediment Controls Plan (ESCP)

Appendix M
AUP-OP Objectives and Policies Assessment

Appendix N
Assessment of Alternatives

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