Assessment of Effects on the Environment

Project title and description

Northern Interceptor Wastewater Project

VOLUME 1: Assessment of Effects on the Environment and Appendices A - G

prepared for Watercare by:

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SUSTAINABILITY REPORTING AWARDS

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QUALITY STATEMENT

PROJECT MANAGER	PROJECT TECHNICAL LEAD
Chris van der Boom	Chris Povey

PREPARED BY		
Chris Scrafton, Megan Couture, Annika Swanberg, and Jay Burgess	.....	05/10/2016
CHECKED BY		
Chris Scrafton	.....	05/10/2016
REVIEWED BY		
Garrett Hall	.....	05/10/2016
APPROVED FOR ISSUE BY		
Chris van der Boom	.....	05/10/2016

AUCKLAND
MWH House Level 3, 111 Carlton Gore Road, Newmarket, Auckland 1023
PO Box 13 052, Armagh, Christchurch 8024
TEL +64 9 580 4500, FAX +64 9 580 7600

REVISION SCHEDULE

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Executive Summary

Watercare Services Limited (Watercare) provide bulk water supply and wastewater services for the Auckland Region. Future development and population growth predictions for Auckland identify the need to provide additional water and wastewater infrastructure to accommodate this growth.

Population forecasts indicate that the Northern Waitakere area, inclusive of the North West Transformation Area (NWTA) inclusive of Massey North Whenuapai and Hobsonville, and South Rodney, inclusive of Kumeu, Huapai and Riverhead (Service Catchment) will grow significantly, from 75,000 to potentially over 350,000 people over the next 50 years. In response to the projected population growth and accompanying increase in wastewater flow Watercare has assessed the existing capacity in the wastewater network. This assessment identified that by around 2020 the existing capacity will need to be increased.

In response, Watercare has explored numerous options for servicing this anticipated growth and has ultimately identified the Northern Interceptor (NI) as the preferred option.

The Northern Interceptor Project comprises new wastewater pipelines and associated infrastructure that will connect flows originating from North West Auckland to the Hobsonville Pump Station, from where they will be conveyed to the Rosedale Wastewater Treatment Plant (WWTP). The Northern Interceptor was identified as the preferred solution to growth as:

a) It provides the most construction staging flexibility;

b) It provides the additional benefit of more efficiently utilising the existing capacity of the Rosedale WWTP and the release of capacity at the Mangere WWTP for southern and central growth;

c) Operationally it has lower operational complexities than other options considered;

d) It has the lowest treatment risk given the available and planned capacity upgrades at the Rosedale WWTP ;

e) It results in lower environmental, social and cultural effects as it utilises the existing Rosedale WWTP and requires less infrastructure.

f) It has the lowest whole of life cost

g) It achieves the Project Objectives (refer to Section 9.5 of this Report).

Due to the uncertainty of population growth it is difficult to cater for populations in 2070 while maintaining serviceability until that time. For example, to provide infrastructure capacity today to service a 50 year planning horizon is inefficient as it would require large capital investment to service a projected population that may not occur. This will lead to underutilised infrastructure capacity, or alternately, undersized infrastructure requiring additional unplanned and problematic expansion at a later date. Other issues such as septicity can arise when infrastructure is not designed or sized appropriately. Subsequently, the Northern Interceptor Project is proposed to be constructed in phases.

Consent for Phase 1 of the Northern Interceptor was granted in January 2016. The Phase 2 works share the same corridor as the North Harbour 2 Watermain and are subject to a Notice of Requirement (NoR) for that shared corridor. Notice of Watercare's Requirement for these works was served to Council in May 2016.

This Assessment of Effects on the Environmental report (AEE) provides support for Watercare to designate the remainder of the land areas along the Northern Interceptor alignment to appropriately and sufficiently enable both their construction and on-going operation and maintenance of the Northern Interceptor. In addition, this AEE also provides support for an alteration to an existing designation.

The two designations proposed are:

1. **NOR – NI (Waitakere)**: which will transfer wastewater flows from The Concourse Storage Tank to Hobsonville Road, where it will connect with the works in the shared corridor; and
2. **NOR – NI (North Shore)**: which will transfer wastewater flows from the edge of the future harbour crossing at the eastern abutment of the Greenhithe Bridge to the Rosedale WWTP.

The alteration proposed is an alteration to the following designation:

1. Designation WSL8 - Auckland Council District Plan (Waitakere Section) 2003;
2. Designation 9327 – Proposed Auckland Unitary Plan

Assessments have been undertaken to identify potential adverse effects on the environment and recommend appropriate avoidance, remediation and mitigation measures. These measures can be appropriately implemented through use of construction management practices and mitigation measures for noise, vibration, traffic, dust, visual and landscape effects and include adopting erosion and sediment control measures for earthworks activities; monitoring the effects of excavation on settlement; remedial planting alongside pipe bridges and other above ground ancillary componentry. Post construction, effects of the Project will result in an overall positive net benefit on the environment insofar as the Project will provide significant infrastructure services considered necessary to support the growth aspirations of the Auckland region.

A statutory assessment forms part of the AEE and confirms that the Project is consistent with the relevant objectives and policies of the Auckland regional and district plans, and the PAUP. The statutory assessment confirms that the Projects pass the relevant statutory tests of section 171 of the Resource Management Act.

Consultation and engagement has been undertaken with affected parties, key stakeholders and interested iwi groups. This consultation is ongoing and will ensure that the Project is well-communicated to all those with an interest through to their commissioning.

Overall the Project has significant positive effects, potential adverse effects during construction that can be adequately mitigated, and has been assessed against the relevant statutory criteria and found to support the purpose of the Resource Management Act.

Watercare Services Limited

Northern Interceptor

CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

TECHNICAL REPORTS

Technical Report E	Assessment of Ground Settlement Effects
Technical Report F	Assessment of Landscape and Visual Effects
Technical Report G	Assessment of Noise and Vibration Effects
Technical Report H	Traffic Assessment for Construction and Operation

TERMS AND ABBREVIATIONS

Term/ Abbreviation	Description
ACDP: NS	Auckland Council District Plan (North Shore Section)
ACDP: W	Auckland Council District Plan (Waitakere Section)
ACRP:ALW	Auckland Council Regional Plan: Air, Land and Water
ACRP:C	Auckland Council Regional Plan: Coastal
ACRP:SC	Auckland Council Regional Plan: Sediment Control
AEE	Assessment of Effects on the Environment
ARPS	Auckland Regional Policy Statement
AT	Auckland Transport
CAR	Corridor Access Request
CCO	Council-Controlled Organisation
CHI	Cultural Heritage Index
CIA	Cultural Impact Assessment
CMA	Coastal Marine Area
CNMP	Construction Noise Management Plan
CNVMP	Construction Noise and Vibration Management Plan
CoPTTM	Code of Practice for Temporary Traffic Management
Council	Auckland Council
CPTED	Crime Prevention Through Environmental Design
DN	Nominal Diameter
DSI	Detailed Site Investigation
EED	Engineering Exception Decision
EOP	Engineered Overflow Point
GPC	Greenhithe Pony Club
GRDA	Greenhithe Riding for the Disabled
HAIL	Hazardous Activities and Industries List
HDD	Horizontal Directional Drilling

Term/ Abbreviation	Description
HDPE	High Density Polyethylene
HNZPTA	Heritage New Zealand Pouhere Taonga Act 2014
KHR	Kumeru/Huapai/Riverhead
LGA	Local Government Act 2002
MCA	Multi-Criteria Assessment
MWKF	Mana Whenua Kaitiaki Forum
NHAGC	North Harbour Air Gun Club
NoR	Notice of Requirement
The Northern Interceptor	The Northern Interceptor comprises Phases 1 to 6
NoRSGA	Northern Strategic Growth Area
NPS:FM	National Policy Statement for Freshwater Management
NPV	Net Present Value
NSGC	North Shore Golf Club
NSMP	North Shore Memorial Park
NWTA	North West Transformation Area
NZAA	New Zealand Archaeological Association
NZCPS	New Zealand Coastal Policy Statement
OPW	Outline Plan of Works
PAUP	Proposed Auckland Unitary Plan
PS	Pump Station
PSR	Auckland Council Parks, Sports and Recreation
PSI	Preliminary Site Investigation
PARPS	Proposed Auckland Regional Policy Statement
The Project	The Project comprises Phases 3 to 6 of the Northern Interceptor Project
RCRRJ	Reinforced Concrete Rubber Ring Jointed
RMA	Resource Management Act 1991
SEA	Significant Ecological Area

Term/ Abbreviation	Description
Service Catchment	The Service Catchment includes the North West Transformation Area (NWTA), Kumeu, Huapai, Riverhead (KHR), Northern Waitakere catchments and South Rodney areas.
SH16	State Highway 16
SH18	State Highway 18
SMP	Site Management Plan
TBM	Tunnel Boring Machine
the Transport Agency	NZ Transport Agency
TP90	Auckland Council Technical Publication 90: Erosion and Sediment Control Guidelines for Land Disturbing Activities
Watercare	Watercare Services Limited
WCC	Waitakere City Council
WWTP	Wastewater Treatment Plant

1 Watercare's Purpose and Strategic Intent

Watercare Services Limited ("Watercare") supplies potable water and collects, treats and disposes of wastewater. Watercare has supplied wholesale water supply and wastewater services since 1991. On 1 November 2010, Watercare took over ownership and management of all the water and wastewater assets within the Auckland Council area and became responsible for the fully integrated water and wastewater services.

Watercare is wholly owned by Auckland Council ("Council") and became a Council Controlled Organisation (CCO) on 1 July 2012. The company's obligation to deliver water and wastewater services for Auckland is established under section 57(1) of the Local Government (Auckland Council) Act 2009.

Watercare's vision and key goals are set out in its Statement of Intent for the period 2015 - 2018. The vision is "outstanding and affordable water services for all the people of Auckland." "Outstanding" means Watercare will provide safe drinking water, promote efficient water use, and protect waterways and the environment through the effective transport and treatment of wastewater. "Affordable" water services means that Watercare will run an efficient business and keep the overall costs of services to customers (collectively) at minimum levels.

Watercare's service objectives require development of resilient assets to meet required service delivery standards and foreseeable future needs. This includes providing sufficient capacity to convey and treat wastewater.

In accordance with the Local Government Act 2002 (LGA), Watercare is required to develop and to be consistent with a Statement of Intent. The Watercare Strategic Intent 2015 – 2018 outlines four strategic priorities – these priorities reflect the organisation's focus on (amongst other things) continuing to consistently deliver reliable, affordable, high quality, sustainable wastewater services. The four strategic priorities are as follows:

- **Customer Focus** – Putting customers at the heart of our business by aligning processes, people and systems to deliver exceptional performance at minimum cost;
- **Business Excellence** - We deliver positive customer outcomes by being a commercially-savvy, performance-based organisation that prioritises the development and well-being of our people and the long-term resilience of our assets;
- **Financial Responsibility** – We are a financially responsible and efficient business, balancing our long-term financial obligations with our requirement to be a minimum cost provider; and
- **Fully Sustainable** - As custodians of the environment, we effectively manage and minimise the impact of our operations on the environment and embed sustainability into all aspects of our business.

2 Introduction and Background

Prior to the amalgamation of the legacy Auckland Councils in 2010, the former Waitakere City Council (WCC) identified that the north western area of the city had insufficient zoned land to meet the demands of projected growth within the area. To address the situation, the Northern Strategic Growth Area (NorSGA) project was initiated in partnership with land developers with the intention of delivering new employment and housing opportunities in the area. Three plan changes were promulgated to facilitate the anticipated growth.

Cognisant of the anticipated growth of the Service Catchment, Watercare undertook a series of investigations that looked at the ways in which it might deliver the future wastewater services in the Auckland Region, starting with the Three Waters Strategic Planning Programme. The primary drivers behind this programme were the need to service growth, to deliver specified levels of service, and to meet its requirements as a service provider under various legislation (e.g. the LGA).

The outcome of this strategic planning exercise was the development of the "Three Waters - Final 2008 Strategic Plan" (Watercare, 2008). This comprehensive exercise looked at long term planning relating to water supply, wastewater management, and stormwater. Watercare facilitated this strategic planning exercise working with the Auckland water and wastewater service providers and the Auckland territorial local authorities and Regional Council, along with government departments and community stakeholder groups.

A key conclusion from the Three Waters process was that ongoing wastewater treatment at the Mangere and Rosedale wastewater treatment plants represented the best medium to long term options for servicing Auckland's future needs.

Post amalgamation, the NorSGA project was renamed the North West Transformation Area (NWTA) with responsibility transferred to Auckland Council. Auckland Council largely adopted the growth vision for this area in its Auckland Plan, and identified Auckland's North West as one of the eight priority areas for growth and development within the Auckland region. Stage 1 of the development is currently underway. This stage entails 435 hectares consisting of Hobsonville Point, Hobsonville Corridor, and Westgate/Massey North.

The northern Waitakere area, including the NWTA, and Kumeu, Huapai, Riverhead (KHR) is collectively referred to as the "Service Catchment" in this Report (see Figure 1 below).

Watercare's assessment of the latest growth projections provided by Auckland Council show that the ultimate population of the Service Catchment could be 350,000 people by 2070, a growth of 275,000 over the next 50 years.

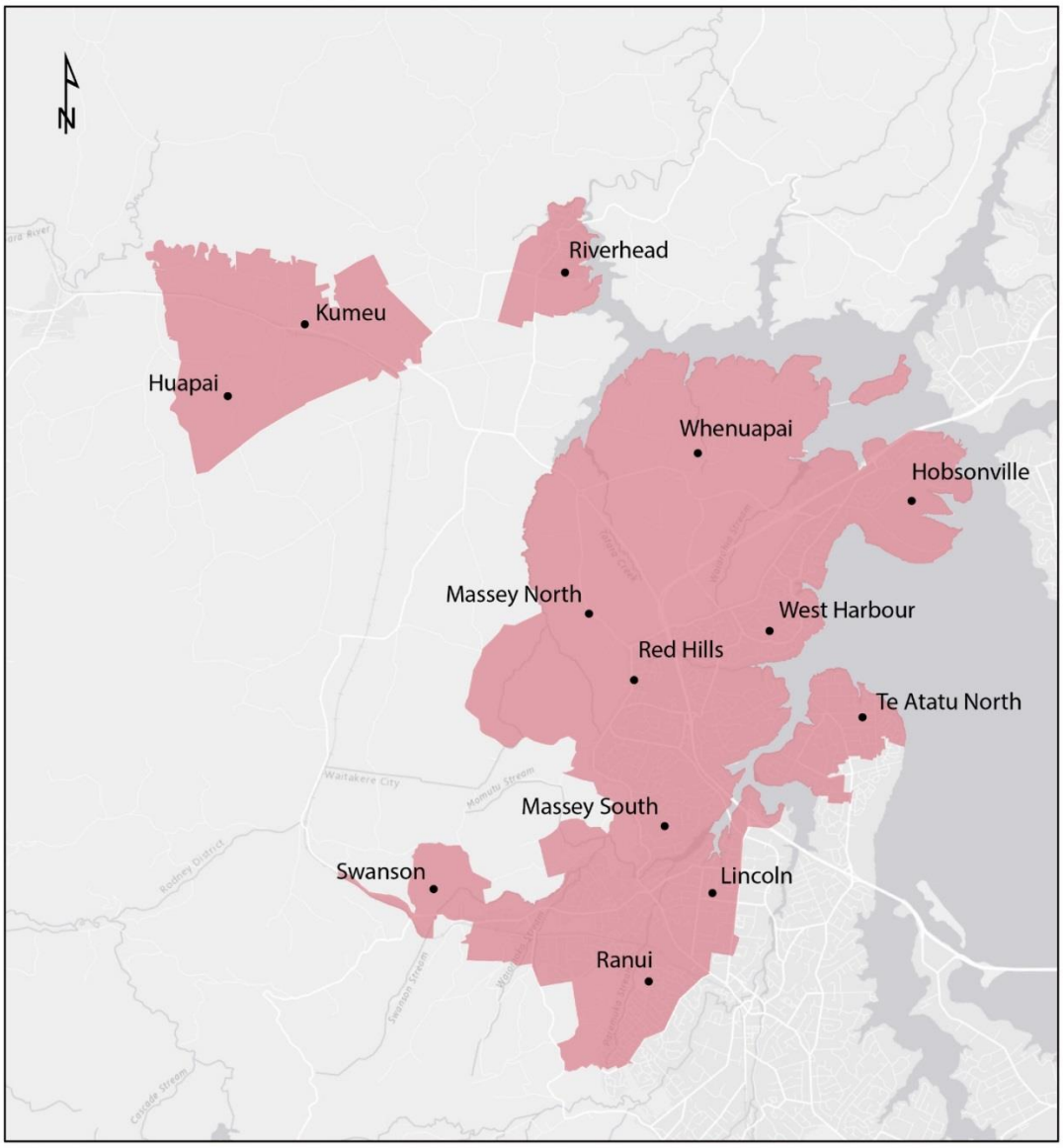

Figure 1: Northern Interceptor Service Catchment (shaded red)

2.1 Existing Wastewater Issues

As outlined above:

a) The Service Catchment is subject to a significant amount of anticipated growth in the next 50 years;

b) Mangere and Rosedale wastewater treatment plants have been identified as the best medium to long term options for servicing Auckland's future wastewater management needs.

Notwithstanding this, there are a number of existing issues that also need to be considered when determining an appropriate wastewater network solution for servicing the Service Catchment. These are discussed below.

2.1.1 Wastewater Treatment Plant Capacity

Wastewater flows from the Service Catchment, Central Auckland and South Auckland are all currently directed to the Mangere WWTP, with the Rosedale WWTP taking flows from the North Shore. Whilst capacity exists at Mangere to service these areas, it is considered that problems will arise as these areas grow and intensify. As noted above, the Service Catchment is anticipated to increase in population from

75,000 to 350,000 over the next 50 years. Other areas of Auckland that are currently serviced by the Mangere WWTP are also anticipated to grow and intensify. This anticipated growth will put considerable pressure on the capacity of the Mangere WWTP without some form of response.

2.1.2 Conveyance Capacity

In addition to the above, it is understood that major components of Auckland's wastewater infrastructure are at, or near capacity in Central Auckland, some of which cannot be maintained because they flow full for significant periods of time. Flows from the Service Catchment add to this issue, as flows from the Service Catchment presently utilise this conveyance system on the way to the Mangere WWTP.

Watercare's wastewater network comprises a number of interceptors, trunk sewers and wastewater treatment facilities. As Auckland continues to grow and develop, the network is under an increasing amount of pressure to accommodate these additional flows. The wastewater network that services the Service Catchment is already at, or quickly nearing capacity.

The Whenuapai branch sewer[1] is nearing capacity. At the present growth rate, a solution is needed by 2020.

The Whenaupai and Massey North PSs are reaching their capacity, and are anticipated to be unable to accommodate anticipated additional flows resulting from growth in the region. As they are currently configured, the Massey North and Whenuapai PS act in a "daisy-chain" configuration with the Hobsonville PS moving wastewater towards the Western PS and onto the Mangere WWTP.

The Western Interceptor accommodates flows from the Whenuapai branch sewer and Western PS, conveying this wastewater to the Mangere WWTP. Existing capacity restrictions in the Western Interceptor reduces the operability to approximately 60%, resulting in the use of the Concourse Storage Tank during wet weather events and increasing the risk of potential overflows to Henderson Creek.

2.1.3 Local Infrastructure

Some local infrastructure (e.g. property connections and local wastewater collection) are at capacity. Exceeding capacity could result in overloads of the network causing public health and environmental issues, such as an increase in overflows during wet weather events.

2.2 Servicing the Growth of the Service Catchment

As noted above, the Service Catchment is expected to grow in population significantly over the next 50 years, and the Mangere WWTP and Rosedale WWTP were identified, at a strategic level, as the preferred medium to long term wastewater management solution for the Auckland Region. Whilst the Service Catchment currently flows to the Mangere WWTP, this may not be feasible in the future as the Service Catchment grows. With this in mind, and as discussed in more detail in the Consideration of Alternatives contained in Appendix A, in 2014 Watercare undertook further work to:

a) Review and develop the broad approaches to the Three Waters strategy shortlist options with regards to the Service Catchment; and

b) Summarise the development of these options, and identify the preferred solution.

In undertaking this further analysis, Watercare was guided by the following Project Drivers:

- **Providing for future growth estimates** - Growth forecasts indicate that population in the Service Catchment will increase from 75,000 to over 350,000 people within the next 50 years.

[1] Which transfers flows from the Hobsonville Pump Station (PS70), Hobsonville, West Harbour, Royal Heights and the northern tip of the Te Atatu Peninsula to the Swanson Branch sewer and ultimately to the Western PS and onto the Mangere WWTP

- **Providing for conveyance capacity** - There are capacity constraints within the existing network, and the growth proposed by Council in the Service Catchment will result in wastewater flows exceeding the system capacity.
- **Consistency with the Three Waters Final Strategic Plan -** The key findings of the *Three Waters Final Strategic Plan* relating to the treatment capacity were:
    i. The Rosedale WWTP should be developed as a second regional wastewater treatment facility; and
    ii. Given the imposed volume limits and remaining available capacity at the Mangere WWTP, some of the projected growth within the Mangere WWTP service area should be transferred to an alternate location for treatment.
    iii. Rosedale WWTP has the ability to receive flows transferred from the Mangere WWTP service area, freeing up capacity at Mangere to service projected growth in southern Auckland (e.g. Papakura).
- **Achieving levels of service** –Watercare's region wide network discharge consent requires an average of no more than two wet weather overflow events per Engineered Overflow Point per year, unless an alternate has been determined through a Best Practicable Option process.

Having regard to the Project Drivers and further analysis undertaken, the strategic review focussed on five broad options:

a) Option 1 – Do Nothing: This option provides no additional wastewater conveyance or treatment capacity for the Service Catchment and would constrain urban development. This option would not meet targets for wastewater overflows, nor Watercare's Statement of Intent. Therefore, this option was not considered further.

b) Option 2 – Mangere WWTP: This option is an extension and expansion of the existing wastewater infrastructure to increase the transfer capacity through the Whenuapai trunk wastewater network and the upper sections of the Western Interceptor. This option would be intended to connect the Western Interceptor to the proposed Central Interceptor to convey all flows to the Mangere WWTP.

c) Option 3 – Rosedale and Mangere WWTPs: This option includes a new Northern Interceptor to collect wastewater flows from the Service Catchment and transfer the wastewater across the Upper Waitemata Harbour to the Rosedale WWTP. This would be combined with upgrades to the upper sections of the Western Interceptor to convey the projected increased flows from the northwest Auckland to Mangere WWTP via the proposed Central Interceptor.

d) Option 4 – Rosedale WWTP: This option seeks to limit flows in the Whenuapai Branch sewer and the upper sections of the Western Interceptor to current design capacities by constructing a new Northern Interceptor to collect all wastewater flows from the Service Catchment, and transfer these across the Upper Waitemata Harbour to Rosedale WWTP.

e) Option 5 – North Western Regional WWTP: This option was originally considered under the "Three Waters - Final 2008 Strategic Plan" (Watercare, 2008). The concept envisaged was to construct a new North Western Regional WWTP and associated conveyance system to service wastewater needs for the Service Catchment. The proposed WWTP would discharge treated wastewater to the Tasman Sea via a long gravity ocean outfall.

These options were assessed against qualitative (technical, operational, risk, environmental, social and cultural) and quantitative (economic) criteria to identify a preferred solution. Ultimately, Option 4 – Rosedale WWTP (Northern Interceptor) was identified as the preferred option for the following reasons:

a) It provides the most flexibility of all options in terms of the ability to stage construction;

b) It provides the additional benefit of more efficiently utilising the existing capacity of the Rosedale WWTP and the consequential reduction in flows and loads to the Mangere WWTP;

c) Operationally it is similar to Options 2 and 3, but it has lower operational complexities than Option 5;

d) It has the lowest overall risk in terms of treatment requirements given the available capacity at the Rosedale WWTP and the ability to utilise the long ocean outfall;

e) The option results in lower environmental, social and cultural effects than Options 2, 3 and 5 given the use of the Rosedale WWTP and the smaller area of construction effects; and

f) It has the lowest overall whole of life cost;

g) It achieves the Project Objectives (these are outlined in Section 9.5 of this Report).

3 The Northern Interceptor

As noted above in Section 2.3, the 'Northern Interceptor' was identified as the preferred option for servicing the Service Catchment. The Northern Interceptor is a new conveyance system comprising pipelines and pump stations that will connect flows originating from the Service Catchment to the Hobsonville PS, from where they will be conveyed to the Rosedale WWTP.

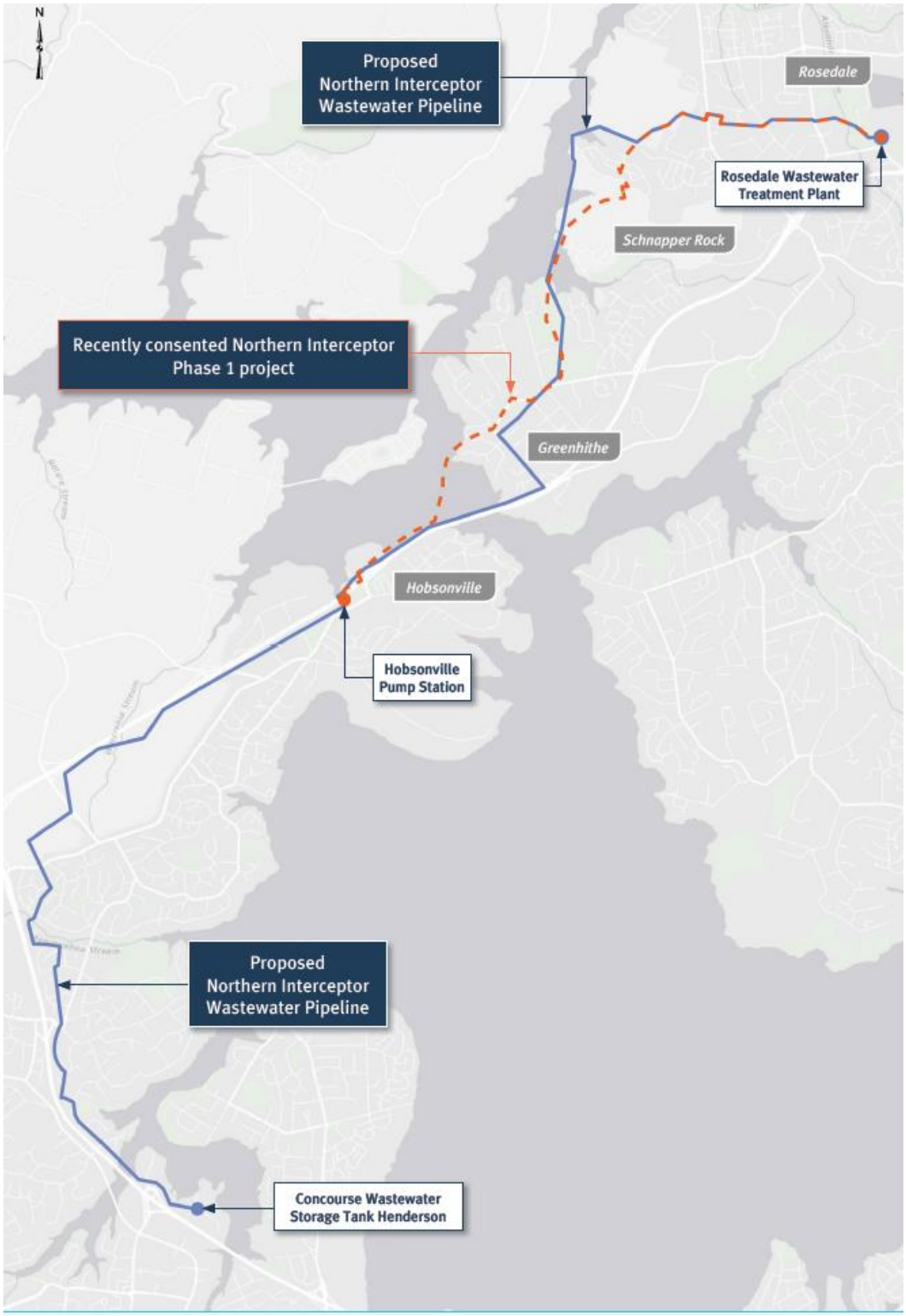

Figure 2: Northern Interceptor (including recently consented Phase 1 Project)

3.1 Project Staging Rationale

As noted above in Section 2, the Service Catchment is anticipated to increase in population from 75,000 to 350,000 over the next 50 years. However, there is considerable uncertainty as to how this growth will manifest itself in that time. In this regard it is important that wastewater infrastructure is sized in a manner that ensures that the system operates efficiently and cost-effectively.

Due to the uncertainty in population models, it is difficult to predict how to cater for populations and business/industrial growth in 2070, while maintaining serviceability until that time. For example, to provide infrastructure capacity today to service a 50 year planning horizon would be inefficient, as it would require large capital investment to create new infrastructure to service an 'ultimate' projected population that would go underutilised for an unknown amount of time as growth occurs, creating redundant infrastructure capacity.

Other issues such as septicity and providing the appropriate level of service can arise when infrastructure is not designed or sized appropriately. As such, and as discussed in greater detail in the consideration of alternatives report, a key design parameter in the design of the Northern Interceptor has been the ability to stage the construction so as to adequately respond to actual population growth, rather than build an oversized pipeline based on conservative population projections. By enabling the staging of the Northern Interceptor construction and operation potentially gains:

a) Flexibility to respond in design and delivery to actual future demand;

b) Further ability to utilise existing design life in current assets; and

c) The ability to defer large capital expenditure until the community has grown to support it.

This also allows capital costs to be spread over a number of years, and to be responsive to actual population growth.

Subsequently, the following Project phasing has been developed to guide the construction and operation of the Northern Interceptor:

Table 3-1: Northern Interceptor Project Phasing

Phase	Estimated construction timeframes	Description	Interrelationship with other Project phases	Implementation
1	2017-2020	**Hobsonville to Rosedale** This will serve the immediate population growth. Existing flows from the Hobsonville PS are transferred to the Rosedale WWTP, crossing the Upper Waitemata Harbour and through Greenhithe. Resource consents were granted in January 2016. Construction is expected to begin between 2016 and 2018.	The existing Hobsonville PS pumps up to 120L/s to the Whenuapai Branch Sewer. The Project will divert all of the Hobsonville PS flow away from this branch sewer and deal with immediate growth within the Service Catchment.	Resource Consent granted in January 2016.
2	2022-2027	**Westgate to Hobsonville PS** This comprises the installation of a tunnel from near Westgate to the Hobsonville PS, along State Highway 18 (SH18), and is mostly within the NZ Transport Agency's	Primarily to convey flows to Hobsonville, but will also serve flows from newly developed and developing areas in the Service Catchment. These flows will then be diverted north to the	Notice of Requirement given May 2016

Phase	Estimated construction timeframes	Description	Interrelationship with other Project phases	Implementation
		(the "Transport Agency") designation.	Rosedale WWTP, via the Phase 1 pipeline.	
3	2022-2027	**Wainoni Park (Booster PS)** This Phase is a new Booster PS that will increase the capacity of the Phase 1 pipeline from 275L/s to 520L/s.	This PS will double the flow transferred to the Rosedale WWTP and extend the capacity of the Phase 1, deferring large upgrades. This is considered necessary as it is anticipated that the Hobsonville PS will exceed capacity sometime around 2022 – 2027.	Subject to these Notices of Requirement.
4	2032-2035	**Greenhithe to Rosedale and Wainoni Park (Intermediate PS)** This includes a new pipeline from the Hobsonville PS, across the Upper Waitemata Harbour, through Greenhithe to the Rosedale WWTP. This Phase follows a similar alignment to Phase 1, and will include an Intermediate PS in Wainoni Park North. Phase 4 will transfer flows from Red Hills, Kumeu, Huapai, Riverhead, Whenuapai and Hobsonville Ultimately, Phase 4 will also pick up the flows from the future Phase 5 pipeline.	Phase 4 will accommodate the flows coming from Phase 2 & 5 and will transfer up to 1,820L/s flow from the Concourse Storage Tank to the Rosedale WWTP.	Subject to these Notices of Requirement.
5	2035+	**The Concourse to Hobsonville Road (Westgate)** The purpose of this connection is to divert flows away from the Western Interceptor (Swanson area) to free capacity at Mangere WWTP. The PS that will be installed at The Concourse will transfer flow northward, to the Rosedale WWTP.	Divert flows away from the Western Interceptor and the Concourse Storage Tank to free up capacity at Mangere WWTP	Subject to these Notices of Requirement.
6	2035+	**Greenhithe to Rosedale** This Phase involves the duplication of the rising main sections of Phase 4 and increases the capacity of the Intermediate PS at Wainoni Park.	Phase 6 increases the capacity of Phase 4 from 1,850 L/s up to 3,600 L/s to accommodate growth.	Subject to these Notices of Requirement.

Consent for Phase 1 of the Project was granted in January 2016. The Phase 2 works are subject to a separate notice as they are included in the NoR for the North Harbour 2 (watermain) and Northern Interceptor Shared Corridor. Notice of Watercare's Requirement for these works was given to Council in May 2016.

Subsequently, this AEE relates only to Phases 3 – 6 ("the Project").

4 Report Structure and Purpose

The purpose of this Report is to support the Notices of Requirement (NoR) to enable the Project. The Report describes the proposed works, consultation undertaken, and the potential effects arising from the activities for which the designations are sought. The report also assesses the Project against the relevant statutory documents.

This NoR has been prepared in accordance with Section 181 of the Resource Management Act 1991 (RMA) and seeks to designate the land required for the Project (for construction, operation and maintenance) identified in Table 4-1. The proposed works are described in Section 6 of this Report.

This report comprises three volumes as follows:

Table 4-1: Structure of this Report

Volume 1	**Assessment of Effects on the Environment**	
	Appendix A	Assessment of Alternatives
	Appendix B	Watercare Gazette Notice
	Appendix C	Agreement in Principle (NZTA)
	Appendix D	Land Requirement Plans and Property Schedule
	Appendix E	Relevant Statutory Provisions
	Appendix F	Draft Conditions
	Appendix G	Private Properties directly affected by the Designation
Volume 2	**Technical Reports**	
	Technical Report A	Assessment of Arboricultural Effects
	Technical Report B	Archaeological Assessment
	Technical Report C	Ground Contamination Assessment
	Technical Report D	Ecological Assessment
	Technical Report E	Assessment of Ground Settlement Effects
	Technical Report F	Assessment of Landscape and Visual Effects
	Technical Report G	Assessment of Noise and Vibration Effects
	Technical Report H	Traffic Assessment for Construction and Operation
Volume 3		**Drawing Set**

The proposed works are described in the following sections of this Report, with references to drawings contained within the separate A3 Drawing set (Volume 3), and titled “Designation Plans” referred to hereafter as “the drawing set”.

5 Notices of Requirement

Watercare holds requiring authority status pursuant to Section 167 of the RMA. Watercare was approved as a requiring authority by notice in the New Zealand Gazette No. 169 on 21 June 2012. A copy of the gazette notice is included in Appendix B.

Section 168 of the RMA provides the power for a requiring authority to issue a Notice of Requirement for a project or work to the Territorial Local Authority having jurisdiction for the area within which the designation is sought. Watercare is giving its Notices of Requirement pursuant to Section 168 of the RMA for the Project to provide for the construction, operation and maintenance of the proposed wastewater interceptor and all associated pump stations, tunnels, pipeline structures and related infrastructure for these works.

Watercare is also giving its Notice of Requirement to alter the designation WSL8, Auckland Council District Plan (Waitakere Section) (No. 9327 in the Proposed Auckland Unitary Plan (Notified 30 September)) under Section 181 of the RMA, to provide for a future pump station at The Concourse Storage Tank.

The scope of the Notices of Requirement are set out in Sections 6.1 and 6.2 of this Report, and have been prepared in accordance with Section 168 of the RMA. The Notices of Requirement are summarised as follows:

Table 5-1: Overview of Notices of Requirement

NoR Reference	Description
NoR - NI (Waitakere)	The works within NoR – NI (Waitakere) will transfer wastewater flows from a pump station at the Concourse Storage Tank to Hobsonville Road, where it will connect with the pipeline being constructed in the shared corridor with NH2.[2] (shown in **orange** in Figure 3)
NoR – NI (North Shore)	The works within NoR – NI (North Shore) will transfer wastewater from the eastern abutment of the Greenhithe Bridge (from the edge of the Upper Waitemata Harbour) through Greenhithe to the Rosedale WWTP, and includes the construction of pump stations, pipeline, and associated structures. Construction will be staged in response to growth in the area. (shown in **green** in Figure 3)
Alteration	Watercare is seeking to alter the purpose of the existing designation at 59 The Concourse from "Wastewater purposes – peak flow storage station" to "wastewater purposes – peak flow storage station and the construction operation and maintenance of a pump station." This will enable the construction of a future pump station within this site.

[2] The Phase 5 works are being provided for within a separate Notice of Requirement as part of the North Harbour No. 2 Watermain Project (No. Henderson: REG-2016-1032, REG-2016-1033, REG-2016-1034, REG-2016-1036, REG-2016-1037 & REG-2016-1039; Takapuna: REG-2142955, REG-2142956, REG-2142957, REG-2142958, REG-2142959 & REG-2142965)

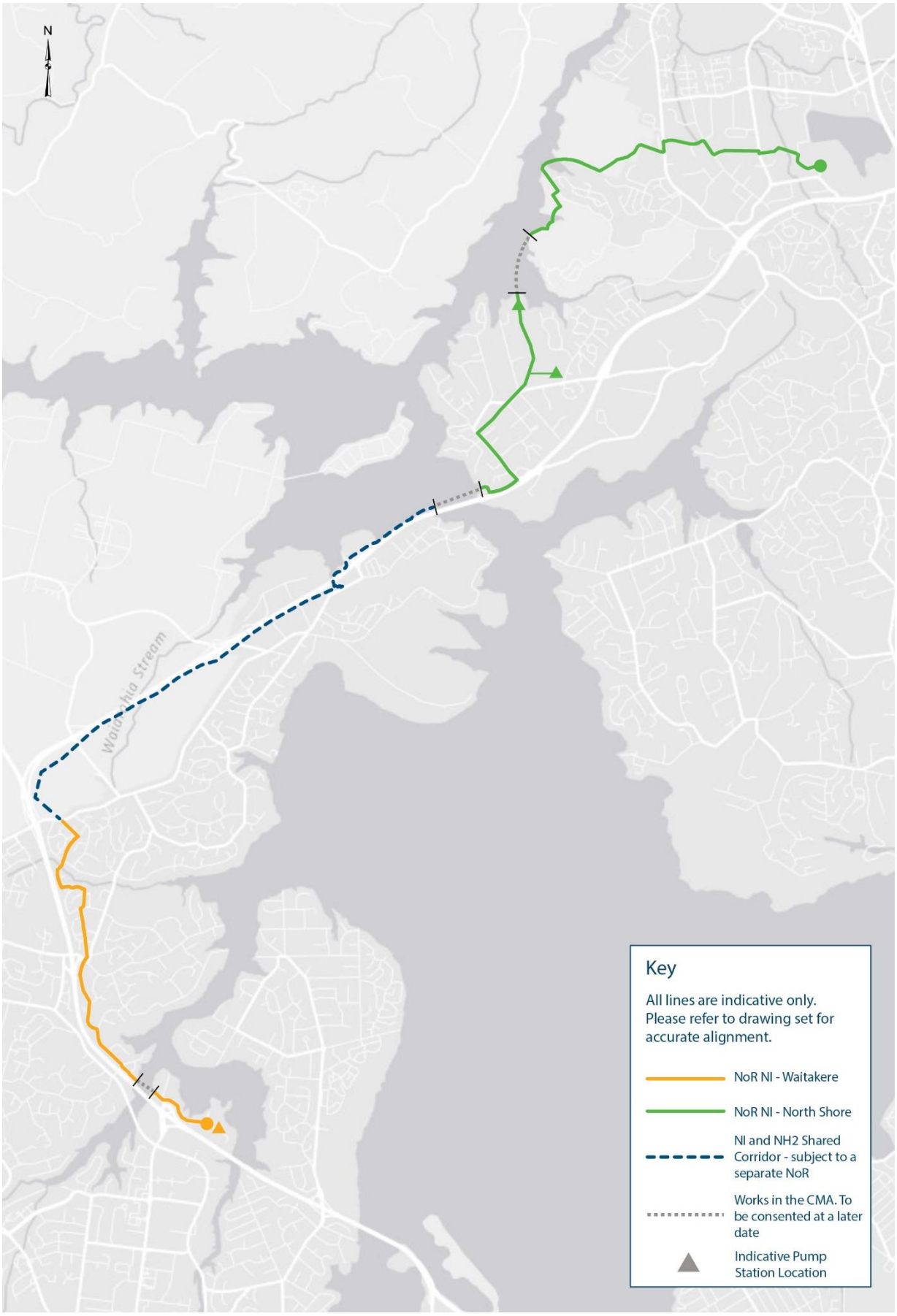

Figure 3: Overview of Notices of Requirement

5.1 Purpose of Designations

In accordance with Section 176 of the RMA, the purpose of the designations is as follows: for the "construction, operation and maintenance of wastewater infrastructure." The activities to be authorised by the designations are described in Sections 6.1 and 6.2 of this Report.

5.2 Lapse Period

As discussed in Section 3 above, the Project is designed to be staged and phases will be required within different timeframes. In some cases, a phase of works may not be required for 15-20 years as the rate and timing of growth and development in the Service Catchment is both uncertain and beyond Watercare's control.

Pursuant to Section 184(1)(c) of the RMA, and having regard to the time anticipated to be required to give effect to the works and the anticipated demand for Project phases, Watercare proposes an extended lapse period of 20 years for the Project. Further detail regarding the necessity for, effects associated with and rationale for an extended lapse period of 20 years is provided in Section 12 of this Report. To summarise:

a) The Project does not need to be built now but will be required in the future to enable the growth of the Service Catchment.

b) By identifying the need to designate the Project, Watercare is:

    i. Enabling an efficient and adaptive infrastructure response to anticipated future growth; and

    ii. Providing certainty to landowners and communities.

c) It is likely that some phases of the Project will be required within different timeframes and in some cases a phase of works may not be required for 15-20 years. There is uncertainty regarding when infrastructure will be required, as the rate and timing of growth and development in the Service Catchment is both uncertain and beyond Watercare's control.

d) An extended lapse period is necessary to:

    i. Provide statutory protection of the designation corridor for a long term strategic infrastructure project and to ensure that there is certainty that the Project can be constructed and operated.

    ii. Provide certainty to affected landowners and the community as to the location and nature of the Project through the inclusion of the designations in the appropriate district and unitary plans.

    iii. Provide sufficient time to give effect to construction of the Project including undertaking property and access negotiations, further site investigations and design.

    iv. Provide sufficient time to obtain the necessary resource and building consents and to undertake necessary tendering / procurement, and other processes associated with the Project construction.

    v. Provide certainty to other network utility operators. The majority of the proposed designation corridor will be contained within road corridors which traditionally accommodate numerous network utilities. The Project constitutes relatively large diameter pipelines that are generally less flexible in terms of location within the road corridor. By providing certainty regarding where the pipelines are proposed to be located, other network utility operators are able to 'plan around' the Project.

5.3 Other Approvals

5.3.1 Outline Plan of Works

Section 176A of the RMA requires the submission of an Outline Plan of Works (OPW) and sets out the requirements of an OPW for works to be constructed on designated land. OPWs will be prepared as appropriate in accordance with Section 176A(3) of the RMA prior to the commencement of construction.

5.3.2 Resource Consents

Resource consents have not been applied for at this time because, commensurate with the "route protection" phase that the Project has reached, only a concept level of design has been undertaken and this is insufficient to inform those regional resource consent applications. The necessary regional resource consents will be applied for at the time of preliminary and detailed design of the network in the future. This will also allow for the technical standards that apply at the time of detailed design and construction to be observed in the consenting regime, as well as allowing the natural and physical environment that exists at the time to be taken into account.

5.3.3 Other Approvals

Other approvals may be required, and may include those under the s12 of the Heritage New Zealand Pouhere Taonga Act (HNZPTA) 2014, the Reserves Act 1997, Public Works Act 1982, and Building Act 2004. Corridor Access Request (CAR) will also be required for those works within the road reserve.

6 Project Description

The following section of this Report provides a description of the proposed Project works including:

- A description of the proposed works within NoR: NI (Waitakere); and
- A description of the proposed works within NoR: NI (North Shore);

A description of the anticipated typical construction methodologies is provided in Section 7 of this Report.

As discussed above, commensurate with the "route protection" phase that the Project has reached, only a concept level of design has been undertaken. As such, proposed construction methodologies are considered to be indicative. In this respect, the pipeline materials, dimensions and other requirements are indicative only. These matters will be progressively refined as the design is completed over time.

6.1 Works within the Notice of Requirement: Northern Interceptor (Waitakere) and the alteration to the existing designation

The works within NoR - NI (Waitakere) will transfer wastewater flows from the Concourse Storage Tank to Hobsonville Road, where it will connect with that part of the Northern Interceptor constructed within the corridor shared with NH2. These works will divert flows from the Massey and Swanson branch sewers away from the Western Interceptor to the Hobsonville PS and from there to the Rosedale WWTP. Figure 4 outlines the extent of NoR – NI (Waitakere).

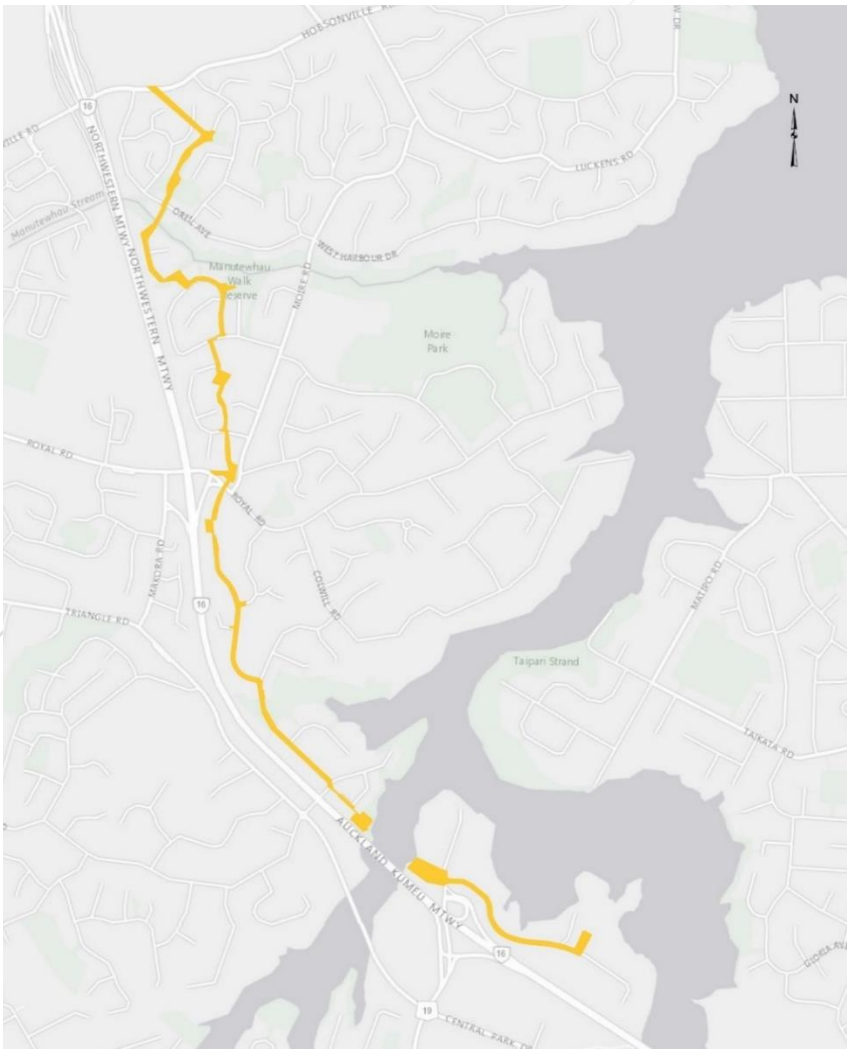

Figure 4: NoR - NI (Waitakere) extent of proposed designation boundary

It is anticipated that this section of works will need to be constructed by 2035. Designation plans are provided in Volume 3, and are outlined below.

Based on the concept design to date, the proposed nominal diameters (DN) and materials associated with the pipeline are:

- 900mm DN High Density polyethylene (HDPE) pipeline for trenched sections; and
- 1350mm and 2100mm DN Reinforced Concrete Rubber Ring Jointed (RCRRJ) pipeline for trenchless sections and pipe bridges.

Based on the concept design to date components of the Project include:

- A new PS at the Concourse Storage Tank site;
- Pipeline (as described above), including installation of pipe below some private properties;
- Air and scour valves including connection and overflow pipelines;
- Break pressure chamber;
- Baffle drop structure;
- Air treatment facilities, including associated electrical and mechanical equipment buildings and ductwork at pump stations, drop structures and break pressure chambers; and
- Pipe bridge at Manutewhau Reserve, West Harbour.

Sections 03.1 to 6.8 of the Report describe the various sections of the Project associated with NoR – NI (Waitakere) in geographical order, starting from the Concourse Storage Tank and then working northwards towards Hobsonville Road. For ease of reference, the alignment has been divided into sections. These sections are described in Table 6-1 below. Drawings can be found in the drawing set (Volume 3).

For each of the sections, information is provided on the concept design and the indicative construction methodology. These construction methodologies and the associated activities are described in full in Section 7 of this Report.

Table 6-1: NoR – NI (Waitakere) project sections and phases

Report Section	Location (general area)	Project Phase	Drawing Reference
6.3	The Concourse to Selwood Road	5	Designation Plan: Sheet 1 of 6
6.4	Selwood Road to Huruhuru Road	5	Designation Plan: Sheet 2 of 6
6.5	Huruhuru Road to Cedar Heights Avenue	5	Designation Plan: Sheet 3 of 6
6.6	Cedar Heights Avenue to Holmes Reserve	5	Designation Plan: Sheet 4 of 6
6.7	Holmes Reserve to Holmes Drive	5	Designation Plan: Sheet 5 of 6
6.8	Holmes Drive to Hobsonville Road	5	Designation Plan: Sheet 6 of 6

6.2 Works within Notice of Requirement: Northern Interceptor (North Shore)

The works within NoR - NI (North Shore) will transfer wastewater flows from the eastern abutment of the Greenhithe Bridge to the Rosedale WWTP, and include the construction of pump stations, pipeline, and associated structures. Construction will be staged in response to growth in the area. Figure 5 outlines the extent of NoR – NI (North Shore).

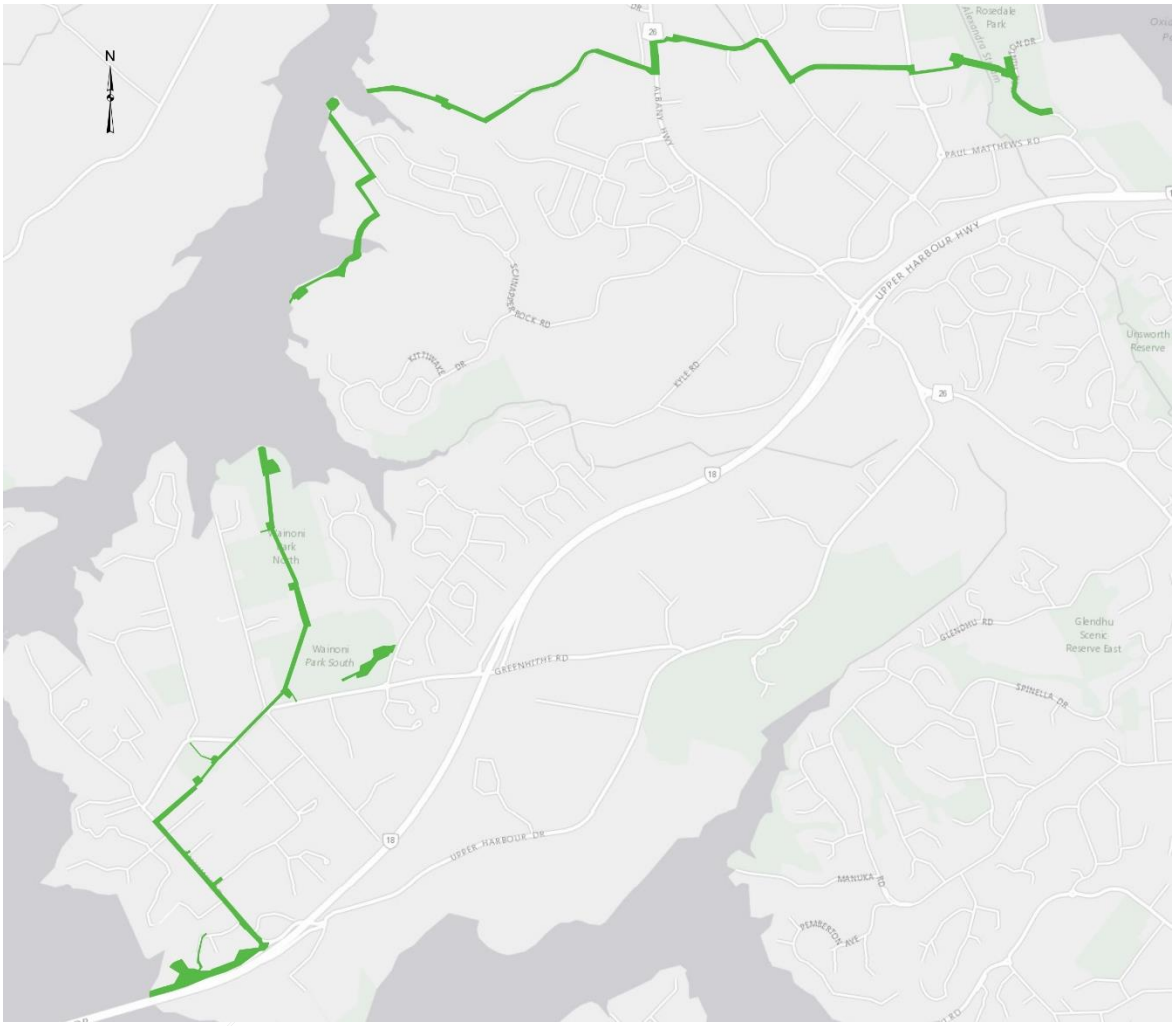

Figure 5: NoR - NI (North Shore) extent of proposed designation boundary

The indicative timeframes, geographic extent and key activities associated with each phase of the Project are described in Table 6-2 below.

Table 6-2: Overview of NoR – NI (North Shore) phases, timeframes and key works

Indicative construction timeframes	Geographic extent	Description
2022-2027	Wainoni Park	New booster PS that will increase the capacity of Phase 1 from 275L/s to 520L/s.
2032-2035	Eastern abutment of the Greenhithe	New pipeline from the eastern abutment of the Greenhithe Bridge to the Rosedale WWTP and a new Intermediate PS in Wainoni Park

Indicative construction timeframes	Geographic extent	Description
	Bridge to Rosedale WWTP	North. Travelling east to west, the pipeline will be installed from Hobsonville Road to the western abutment of the Greenhithe Bridge as outlined in the NoR for the shared corridor (Phase 2). As the pipeline needs to cross the Upper Harbour from the western to the eastern abutments of the Greenhithe Bridge, it is not possible to protect this section of the corridor by way of NoR (as it is within the Coastal Marine Area). As such, resource consents for this section of the corridor will be sought at a later date. These works will transfer flows from Red Hills, Kumeu, Huapai, Riverhead, Whenuapai and Hobsonville and ultimately the flows being diverted from The Concourse Storage Tank.
2035+	Intermediate PS to Rosedale	Duplication of the pipeline from the Intermediate PS to the Rosedale WWTP, and increased capacity of the Intermediate PS.

Designation plans are provided in Volume 3.

Based on the concept design to date, the proposed DN and materials associated with the pipeline are:

- 1200mm DN HDPE pipeline in trenched sections and pipe bridge; and
- 2100mm DN RCRRJ pipeline in trenchless sections.

Air treatment facilities will be required at pump stations, drop structures and break pressure chambers, including associated electrical and mechanical equipment buildings and ductwork, will be required at points along the route (The Knoll, Collins Park and Wainoni Park). An air intake structure will also be required within Wainoni Park.

Sections 6.9 to 6.18 of this Report describes the various sections of the Project associated with NoR – NI (North Shore) in geographical order, starting from the eastern abutment of the Greenhithe Bridge and then working northwards towards the Rosedale WWTP. For ease of reference, the alignment has been divided into sections. These sections are described in Table 6-3 below. Drawings can be found in the drawing set (Volume 3).

For each of the sections, information is provided on the concept design and the indicative construction methodology. These construction methodologies and the associated activities are described in full in Section 7 of this Report.

Table 6-3: NoR – NI (North Shore) project sections and phases

Report Section	Location (general area)	Project Phase	Drawing Reference
6.9	The eastern abutment of the Greenhithe Bridge to Collins Park	4 and 6	Designation Plan: Sheet 1 of 10
6.10	Collins Park to Wainoni Park	4 and 6	Designation Plan: Sheet 2 of 10
6.11	South Wainoni Park	3, 4 and 6	Designation Plan: Sheet 3 of 10
6.12	North Wainoni Park to NSMP	4 and 6	Designation Plan: Sheet 4 of 10
6.13	NSMP to Schnapper Rock Road	4 and 6	Designation Plan: Sheet 5 of 10
6.14	Schnapper Rock Road to NSGC	4 and 6	Designation Plan: Sheet 6 of 10
6.15	NSGC to Appleby Road	4 and 6	Designation Plan: Sheet 7 of 10
6.16	Appleby Road to William Pickering Road	4 and 6	Designation Plan: Sheet 8 of 10

Report Section	Location (general area)	Project Phase	Drawing Reference
6.17	William Pickering to Bush Road	4 and 6	Designation Plan: Sheet 9 of 10
6.18	Bush Road to Rosedale WWTP	4 and 6	Designation Plan: Sheet 10 of 10

6.3 The Concourse to Selwood Road

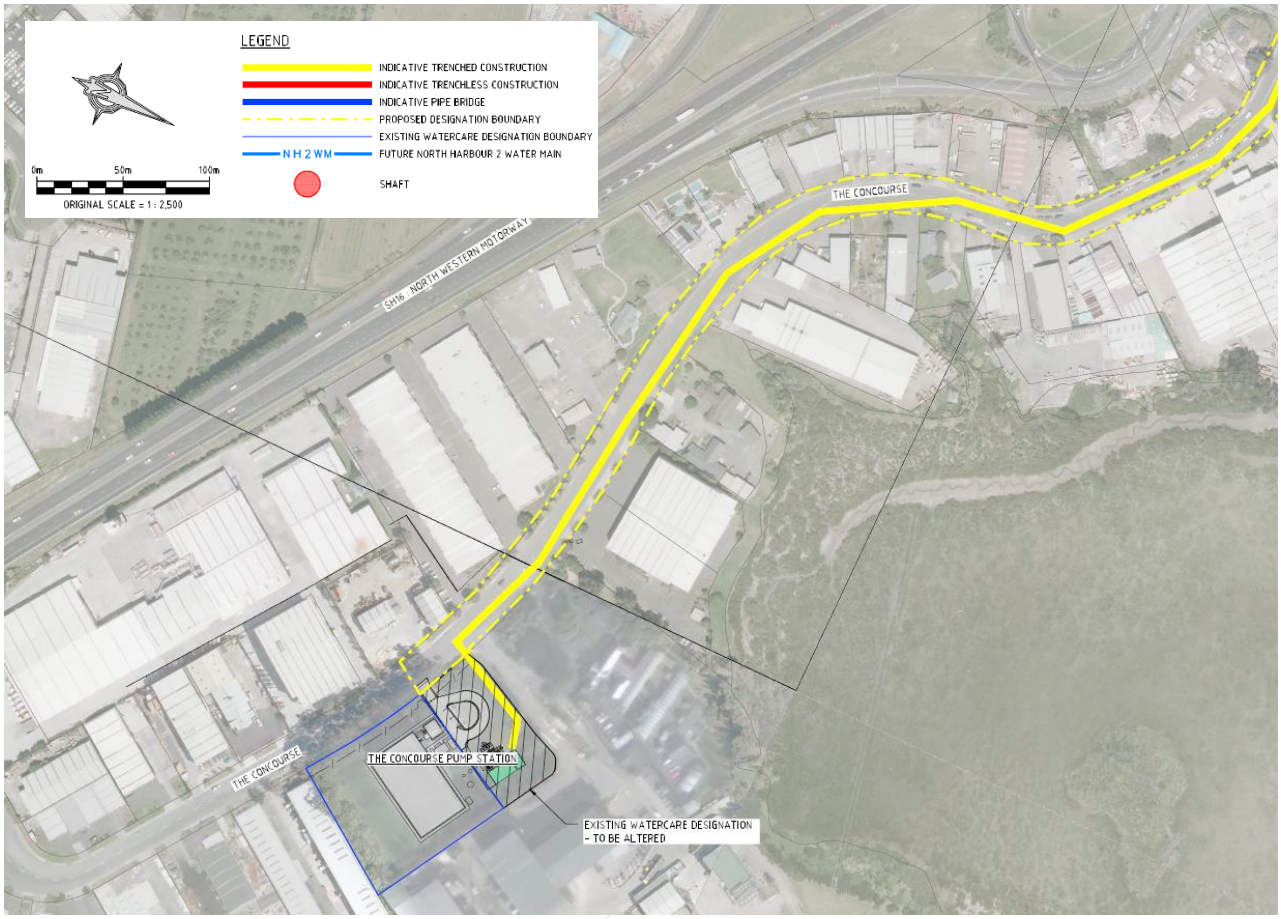

Figure 6: The Concourse to Selwood Road

6.3.1 Existing Environment, Zoning and Notations

Land Use	The predominant land use in this area is industrial.
Community and Recreational Facilities	No community or recreational facilities are located in this section of the proposed route.
Watercourses	The boundary of the proposed designations lies on the landward side of Henderson Creek (Coastal Marine Area)
Vegetation and Ecology	Native vegetation (less than six years old) along the road frontage of the Concourse Storage Tank site includes cabbage trees, kohuhu, flax, tarata and puka which is located outside the boundary fence of the site. In the northwest corner of the site there are a group of native and exotic trees (greater than 10m tall), including two pohutukawa, a golden totara, a large pin oak and several other exotic trees.
Historic Heritage and Archaeological Values	The majority of recorded archaeological sites in the area are located on the coastal edge, away from the proposed designation corridor. The sites comprise of shell midden deposits associated with pre-European Maori occupation as well as brickworks and a wharf associated with early European settlement. No archaeological or other historic heritage sites are recorded within 100m of this section of the proposed route.
Zoning (Operative District Plan)	Working (Human Environment) Transport Environment (Human Environment) General (Natural Area)

Zoning and Overlays Proposed Auckland Unitary Plan (PAUP)	**Zone** Heavy Industrial Light Industrial Strategic Transport Corridor	**Overlay** Natural Hazard Coastal Inundation
Designation(s), Requiring Authority and/or other notations	**ACDP:W** • Designation No. WSL8 Watercare Services Limited: Wastewater purposes - peak flow storage tanks. **PAUP** • Designation No. 9327 Watercare Services Limited: Wastewater Purposes – Peak Flow Storage Tanks (Underground). • Designation No. 6742 New Zealand Transport Agency: State Highway 16.	

6.3.2 Description of Works

Reference drawing sheet 1 of 6

6.3.2.1 Within the Alteration to the Existing Designation

As per the current concept design a new PS will be constructed at the existing Concourse Storage Tank site in the unused northwest corner of the Watercare-owned property at 59 The Concourse. The concept design indicates that the PS will:

- Be approx. 5m high, 15m long, 8m wide and will have a depth of 10m below ground level;
- Require mechanical and electrical equipment (e.g. pumps, valves, pipes, transformer, gantry crane and extraction fans);
- Require ancillary above ground structure (e.g. chemical dosing facility, biofilter, control room).

The expected duration of the works in this area is approximately 1.5 to 2 years for the construction of the pump station at the Concourse Storage Tank site.

6.3.2.2 Within the Proposed Designation

Once leaving the new PS, the pipeline will likely be constructed with the use of trenching through the Watercare owned Concourse Storage tank site and onto the Concourse, then trenched towards Selwood Road.

The expected duration of the works in this area is approximately 2 to 5 months for the installation of the pipeline to Selwood Road.

6.4 Selwood Road to Huruhuru Road

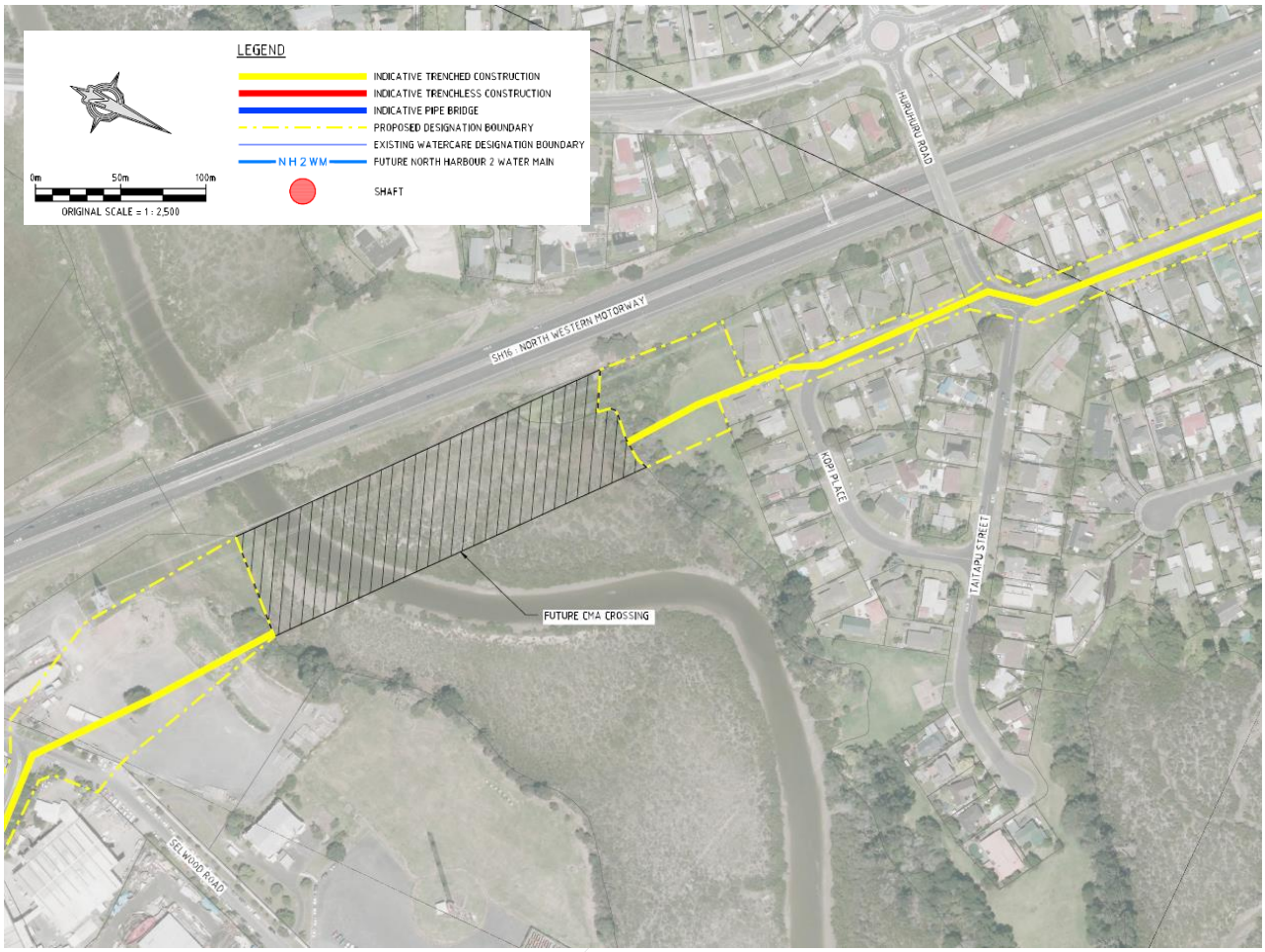

Figure 7: Selwood Road to Huruhuru Road

6.4.1 Existing Environment, Zoning and Notations

Land Use	Land use in this section is industrial from Selwood Road to the eastern edge of Henderson Creek, and transitions to residential with single- and multiple-storey dwellings.
Community and Recreational Facilities	The proposed designation enters into Taitapu Park on the western edge of Henderson Creek, before reaching Kopi Place.
Watercourses	Henderson Creek (Coastal Marine Area)
Vegetation and Ecology	Vegetation fringing the creek on the south eastern side is composed of pest plants such as brush wattle and pampas. On the north-western side within Taitapu Park young re-vegetation planting of common native shrubs such as kanuka, cabbage tree, karamu, flax, tarata and mahoe are found along the coastal edge. Planted vegetation at Taitapu Park supports indigenous copper skinks and may also support other native lizard species, as well as being a nesting or roosting habitat for native birds.
Historic Heritage and Archaeological Values	As with the previous section, the majority of recorded archaeological remains in the area are located on the river banks to the north and east of the proposed area of works. The sites comprise shell midden deposits associated with pre-European Maori occupation as

	well as a historic brickworks located at the end of Selwood Road. The Auckland Council Cultural Heritage Inventory (CHI) records one historic industrial building 100m north of the proposed designation corridor. The building comprises the Radio New Zealand Transmitter Building. The building is scheduled within the Auckland Council District Plan – Operative Waitakere Section 2003 and as a Category A historic heritage place within the PAUP (Appendix 9: 56). There are currently no other archaeological or other historic heritage remains recorded within 100m of the proposed designation corridor.	
Zoning (Operative District Plan)	Transport Environment (Human Environment) Living (Human Environment) Open Space (Human Environment)	
Zoning (PAUP)	**Zone** Strategic Transport Corridor Light Industrial Public Open Space – Conservation Single House Mixed Housing Urban	**Overlay** Air Quality Transport Corridor Separation
State/Crown Entities	Radio New Zealand (2-12 Selwood Road) Housing New Zealand (16 and 35 Kopi Place)	
Designation(s), Requiring Authority and/or other notations	**ACDP:W** • Designation No. New Zealand Transport Agency: NZTA5 State Highway 16 • Designation No. RNZ3, Radio New Zealand: Telecommunication and Radiocommunication Facilities **PAUP** • Designation No. 6742 New Zealand Transport Agency: State Highway 16. • Designation No. 7301, Radio New Zealand: Telecommunication and Radiocommunication Facilities	

6.4.2 Description of Works

Reference drawing Sheet 2 of 6

Within this location, the concept design indicates that the pipeline will:

- Cross Selwood Road and enter the Radio NZ property at 2-12 Selwood Road; and
- Cross Henderson Creek on the northern side of State Highway 16 (SH16) from the Radio New Zealand property to Taitapu Park before proceeding along Kopi Place.

Trenched technologies will likely be used to install the pipeline to the coastal edge. The marine crossing will either be completed by trenched or trenchless means (subject to coastal permit to be lodged at a later date).

As per the concept design, the pipeline is then trenched between 21 and 23 Kopi Place then between 16 and 35 Kopi Place before entering Huruhuru Road.

The expected duration of these works is approximately 3-5 months.

6.5 Huruhuru Road to Cedar Heights Avenue

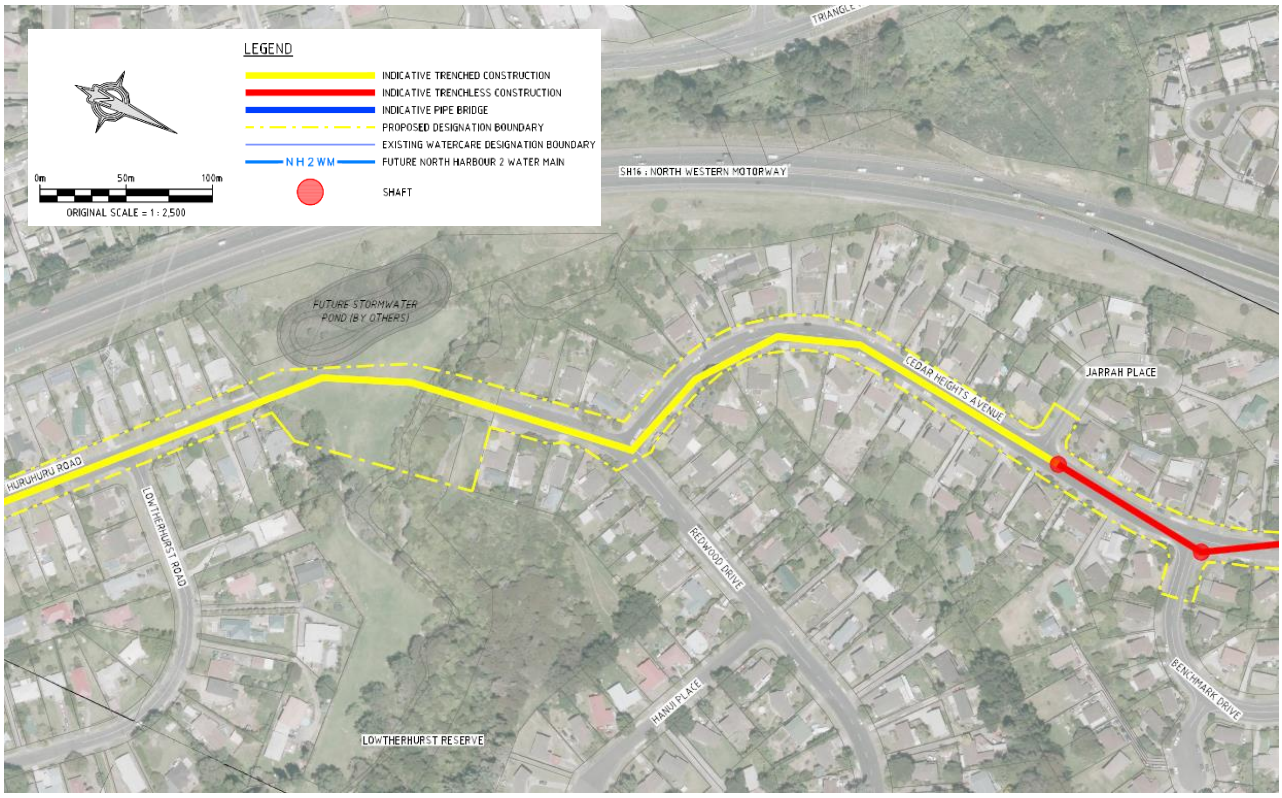

Figure 8: Huruhuru Road to Cedar Heights Avenue

6.5.1 Existing Environment, Zoning and Notations

Land Use	The land use is in this area is predominantly residential, with single- and multi-storey dwellings.
Community and Recreational Facilities	The proposed designation enters the Lowtherhurst Reserve.
Watercourses	Rarawaru Stream which is located in Lowtherhurst Reserve. It is proposed that trenched construction will be used to cross this stream.
Vegetation and Ecology	The largest most significant trees consist of rewarewa and towai, many seedling from both of these species are also present. There is also a significant number of native trees and shrubs, including six redwood species growing at the end of Redwood Drive. The predominant vegetation in this area is native and provides a suitable habitat for at least five native lizard species, four of which have an “At Risk” threat classification. In Lowtherhurst Reserve there is mown grass. The native vegetation surrounding Rarawaru Stream is within a Significant Ecological Area (SEA). The Rarawaru Stream has a high level of shading, lack of fine sediment and a high level of hydrologic heterogeneity, including pools, riffles, runs, chutes and small cascades. Three native fish species are located within the stream. These are; the banded kokopu, shortfin eel and the inanga.
Historic Heritage and Archaeological Values	The closest recorded archaeological site is located more than 150m to the east of the proposed designation corridor along Huruhuru Road. The site comprises a shell midden deposit located on the banks of the creek. The New Zealand Archaeological Association’s (NZAA) site record for this archaeological site notes that scattered

	patches of shell were observed over an extensive area of 40m by 10m at the head of the small inlet adjacent to a waterfall at Lowtherhurst Reserve in 1977.	
Zoning (Operative District Plan)	Transport Environment (Human Environment) Open Space (Human Environment) Living (Human Environment) Managed (Natural Area) Riparian Margin (10m) (Natural Area)	
Zoning (PAUP)	**Zone** Public Open Space – Conservation Single House Mixed Housing Urban Mixed Housing Suburban	**Overlay** Air Quality Transport Corridor Separation Stormwater Management Area (Flow 2)
Designation(s), Requiring Authority and/or other notations	**ACDP:W** • Designation No. WCCA22 Waitakere City Council: Roading and access purposes. • Designation No. NZTA6 New Zealand Transport Agency: State Highway 16. **Proposed Auckland Unitary Plan** • Designation No. 6743 New Zealand Transport Agency: State Highway 16.	

6.5.2 Description of Works

Reference drawing Sheet 3 of 6

At this location the concept design proposes to install the pipeline via trenched technologies:

- Along Huruhuru Road into and through Lowtherhurst Reserve;
- Across a small tributary in Lowtherhurst reserve and into the end of Redwood Drive; and
- Along Cedar Heights Avenue until the intersection with Jarrah Place where the pipeline changes size from 900mm to 1350mm in a break pressure chamber.

The break pressure chamber is likely to be constructed on the corner of Jarrah Place and Cedar Heights Avenue. The concept design indicates that the break pressure chamber will:

- Be approximately 5m long, 2m wide and 4.5m below ground level;
- Require permanent entry facilities through manholes; and
- Require air treatment facilities.

The expected duration of the trenching activities is approximately 2-5 months. The expected duration of construction activities at each of the microtunnel pit sites is approximately 4-5 months.

As per the concept design, an air treatment facility (e.g. biological trickling filter or biofilter) may need to be located in the vicinity of Cedar Heights Avenue and Jarrah Place. This may require the removal of a dwelling in this area to facilitate the formation of a construction yard and contractor facilities, construction of hard standing and parking areas, construction of a service building containing the air treatment facility. However, the requirements and preferred location for this facility is uncertain at present.

6.6 Cedar Heights Avenue to Holmes Reserve

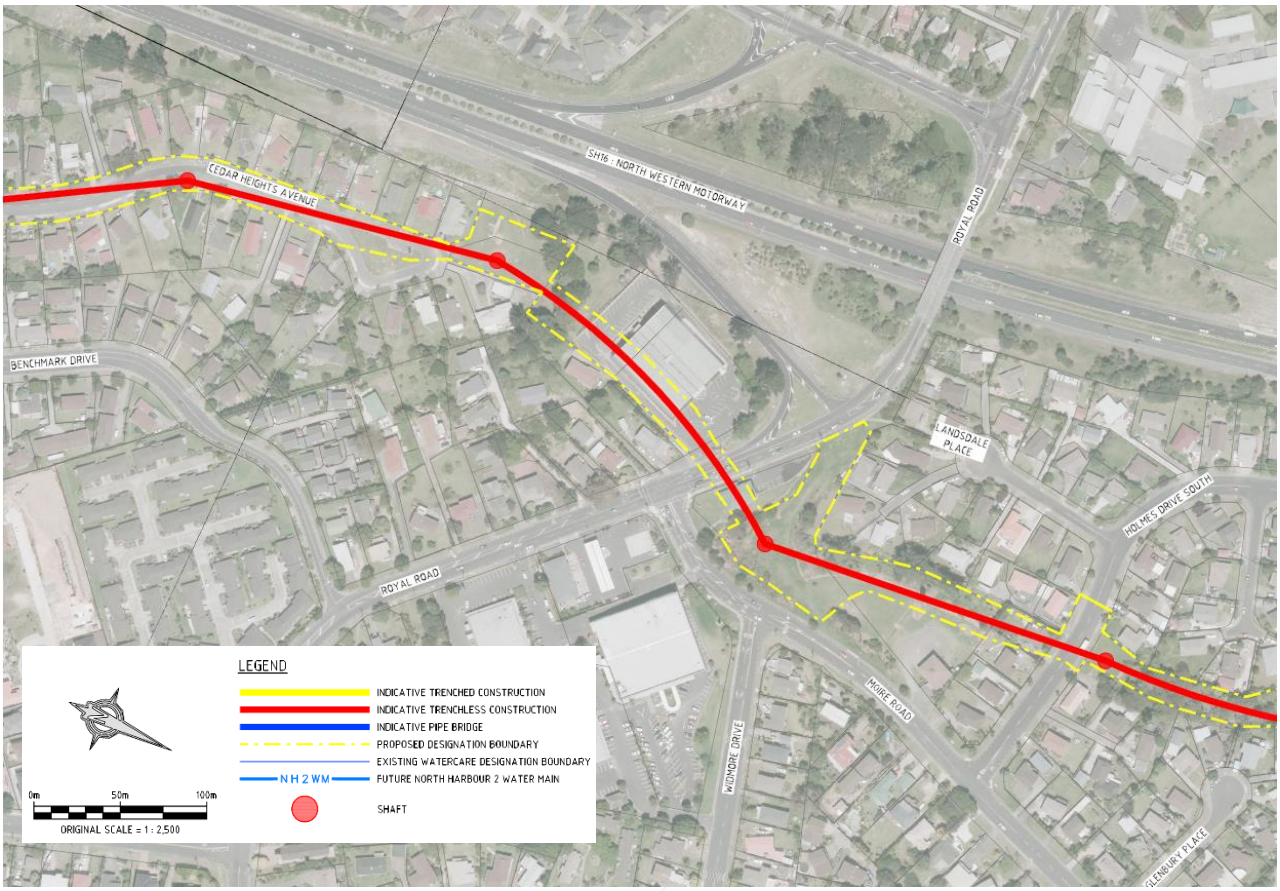

Figure 9: Cedar Heights Avenue to Holmes Drive

6.6.1 Existing Environment, Zoning and Notations

Land Use	The land use is in this area is predominantly residential, with single- and multi-storey dwellings.
Community and Recreational Facilities	No community or recreational facilities are located in this section of the proposed route.
Watercourses	The trenchless construction runs parallel to with a minor tributary of the Manutewhau Stream.
Vegetation and Ecology	A medium sized titoki tree and a large liquidambar tree are located outside 22 Cedar Heights Drive. There is a medium sized pohutukawa tree on 21 Cedar Heights Avenue. There is a group of tall pine trees in Makora Park which may have tap roots 5-6m deep depending on the soil type.
Historic Heritage and Archaeological Values	There are currently no archaeological or other historic heritage sites recorded within 100m of the proposed designation corridor in this section.
Zoning (Operative District Plan)	Transport Environment (Human Environment) Living (Human Environment) Open Space (Human Environment) Riparian Margin (10m) (Natural Area) Ecological Linkage Opportunity

Zoning (PAUP)	**Zones** Single House Mixed Housing Urban Public Open Space – Conservation Public Open Space – Informal Recreation Public Open Space – Sports and Active Recreation.	**Overlay** Air Quality Transport Corridor Separation. Aquifer Stormwater management Area (Flow 2)
Designation(s), Requiring Authority and/or other notations	**ACDP:W** • Designation No. NZTA6 New Zealand Transport Agency: State Highway 16. **PAUP** • Designation No. 6743 New Zealand Transport Agency: State Highway 16.	
State/Crown Entities	Diocese (2-22 Moire Road, Massey)	

6.6.2 Description of Works

Reference drawing Sheet 4 of 6

The concept design indicates that, at this location, the pipeline will likely be installed via trenchless technology, varying in depth between 7m and 30m and that the pipeline will pass under:

- Cedar Heights Avenue and into Makora Park;
- Royal Road to the corner of Royal Road and Moire Road; and
- Private property on Holmes Drive South and into Holmes Reserve.

The concept design indicates that a drop structure may be required in Holmes Reserve in order to lower the pipeline to follow the terrain. The concept design indicates a 6m diameter manhole with a number of baffle steps to drop to a lower pipeline. The drop structure will likely require permanent access to allow maintenance and provide air relief to the pipeline. The drop structure will likely be approximately 14m deep and could be used as a microtunnel shaft before the drop structure is constructed. Air treatment facilities may be required in this location.

The expected duration of construction activities at each of the microtunnel pit sites is approximately 4-5 months.

6.7 Holmes Reserve to Holmes Drive

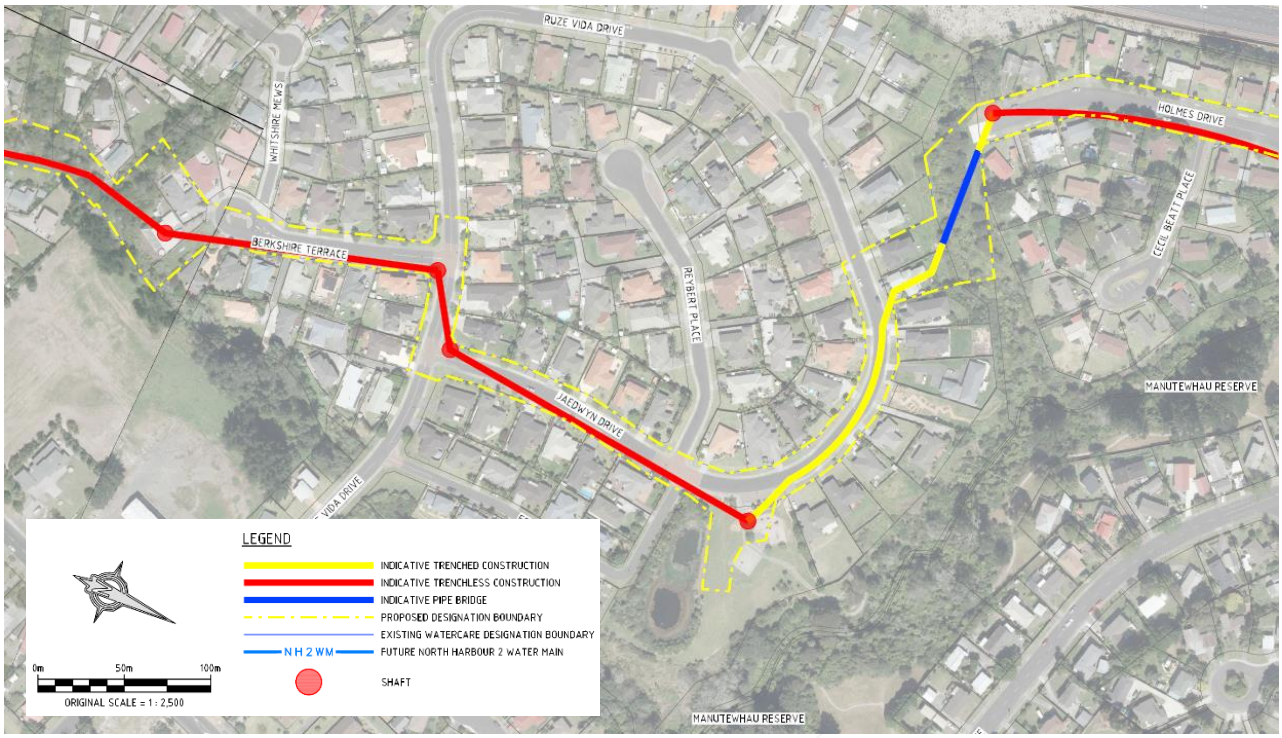

Figure 10: Holmes Reserve to Holmes Drive

6.7.1 Existing Environment, Zoning and Notations

Land Use	The land use in this area is primarily residential, with areas of open space throughout.
Community and Recreational Facilities	Holmes Reserve and Manutewhau Reserve.
Watercourses	The trenchless construction crosses a confluence of two minor tributaries of the Manutewahu Stream within the property of 15 Berkshire Terrace.
Vegetation and Ecology	The vegetation within Holmes Reserve is generally a mixture of exotic trees such as poplar, pine and wattles with young natives such as kanuka and karamu. Young native vegetation along the Tihema Stream at the pipe crossing site within the Manutewhau Reserve includes kanuka, kohuhu, silver tree fern, karamu, mapou and cabbage trees. Other important species located in Manutewhau Reserve according to the Arborist (Technical Report A) are a large number of native tree ferns ponga, mamaku, and wheki. The riparian corridor along the Tihema Stream is a SEA and the vegetation in this area is predominately native and provides suitable habitat for at least five native lizard species (four of which have a threatened classification of “At Risk”). The Tihema Stream provides suitable habitat for native fish.
Historic Heritage and Archaeological Values	There are currently no archaeological sites or other historic heritage sites recorded within 100m of the proposed designation corridor in this section.
Zoning (Operative District Plan)	Transport Environment (Human Environment) Living (Human Environment) Open Space (Human Environment) Riparian Margin (10m) (Natural Area) Managed (Natural Area)

Zoning (PAUP)	**Zones** Single House Mixed Housing Urban Public Open Space – Conservation	**Overlays** Air Quality Transport Corridor Separation. Aquifer Stormwater management Area (Flow 2)
State/Crown Entities	Housing New Zealand (33 Jadewynn Drive)	

6.7.2 Description of Works

Reference drawing Sheet 5 of 6

The concept design indicates that the pipeline at this location will be installed by trenchless technologies under the stream bed in Holmes Reserve until it reaches Berkshire Terrace. In this scenario, the properties at:

- 15 Berkshire Terrace;
- 33 Jadewynn Drive; and
- 35 Jadewynn Drive

will likely have to be acquired to facilitate the construction of a microtunnel shaft (15 Berkshire Terrace) and a pipebrige (33 & 35 Jadewynn Drive).

The concept design indicates that the pipeline travels under:

- Berkshire Terrace until it intersects with Ruze Vida Drive. At this location, two microtunnel shafts will likely be required, (one of which will be located within the boundaries of 15 Berkshire Terrace) to redirect the pipeline under Jaedywn Drive to a shaft in Manutewhau Reserve; and
- Jadewynn Drive until a shaft proposed to be located within the boundaries of 33 and 35 Jadewynn Drive.

The pipeline will then cross the stream in Manutewhau Reserve with a pipe bridge into Holmes Drive. To cross the Manutewhau Creek, the concept design currently indicates that a pipe bridge is the preferred crossing option. The pipe bridge will originate from 33 and 35 Jadewynn Drive, and the removal of these properties will likely be required to facilitate the construction of the pipe bridge. The pipe bridge will terminate in Manutewhau Creek below Holmes Drive and is proposed to be trenched for a short distance before returning to trenchless.

The concept design indicates that the pipe bridge is likely to be approximately 100m long and designed as a light weight steel structure with a central pier. The pipe bridge is at a low elevation (24m RL) compared to the local houses (30m RL).

The expected duration of construction activities is approximately 4-5 months.

6.8 Holmes Drive to Hobsonville Road

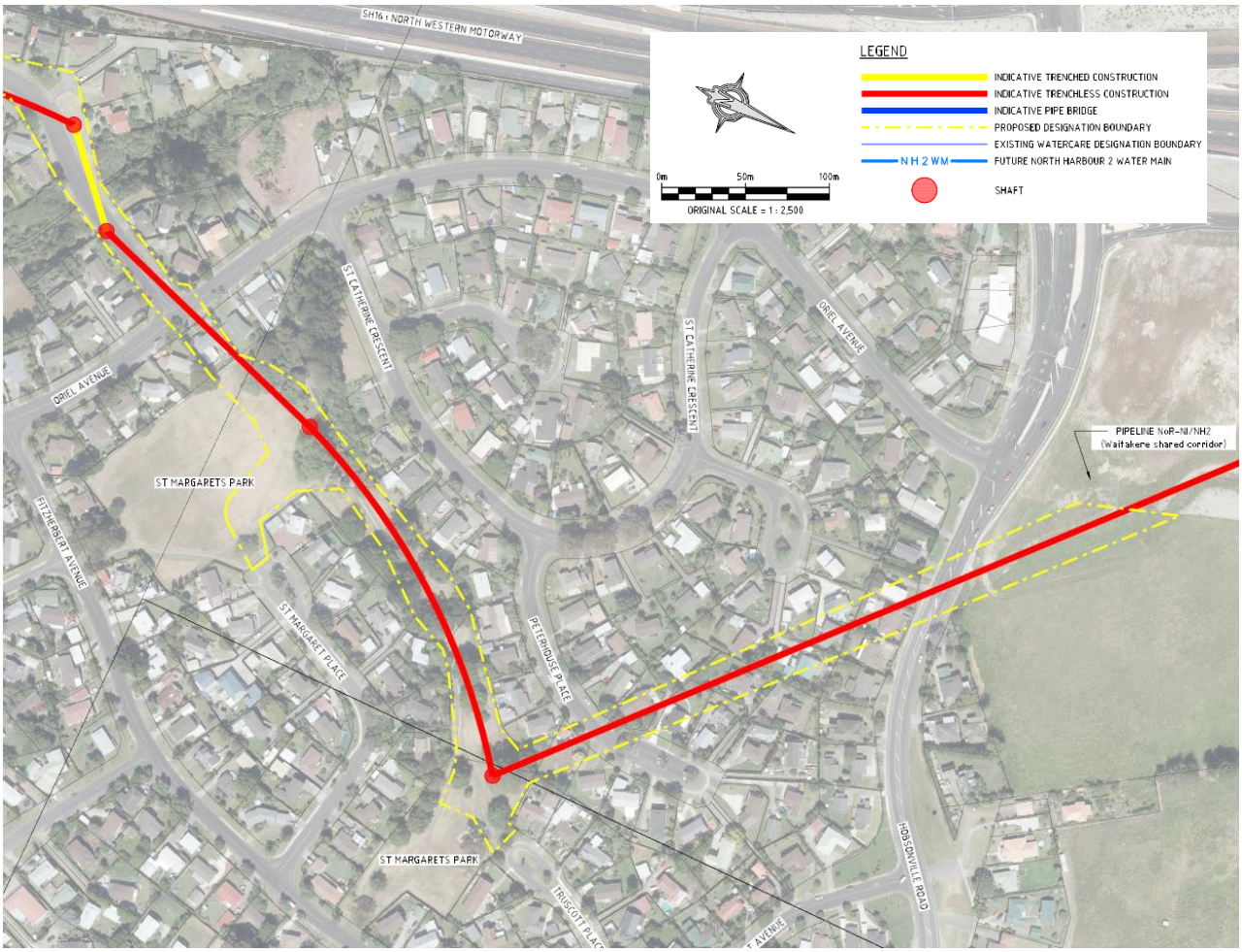

Figure 11: Holmes Drive to Hobsonville Road

6.8.1 Existing Environment, Zoning and Notations

Land Use	The land use in this area is primarily residential, with areas of open space throughout.
Community and Recreational Facilities	Trenchless construction will go through St Margarets Park.
Watercourses	A short (50m) length of trenched construction is proposed along Holmes Drive where the road crosses a culverted section of the Manutewhau Stream.
Vegetation and Ecology	In St Margaret's Park there is a group of trees containing tall totara (15m), a large plane tree and cypress trees with a sparse understory of native shrubs such as karamu, kohuhu and mapou.
Historic Heritage and Archaeological Values	There are currently no archaeological sites or other historic heritage sites recorded within 100m of the proposed designation corridor in this section.
Zoning (Operative District Plan)	Transport Environment (Human Environment) Living (Human Environment) Open Space (Human Environment) Countryside (Human Environment) Riparian Margin (7m) (Natural Area)

Zoning (PAUP)	**Zones** Public Open Space – Informal Recreation Mixed House Urban Future Urban	**Overlays** Air Quality Transport Corridor Separation Aquifer Stormwater Management Area (Flow 2)
Designation(s), Requiring Authority and/or other notations	**ACDP:W** • Designation No. NZTA2 New Zealand Transport Agency: State Highway 18. **PAUP** • Designation No. 1437 Auckland Transport: Transport Corridor.	

6.8.2 Description of Works

Reference drawing Sheet 6 of 6

The concept design indicates that the pipeline in this location will be constructed by trenchless technology until a point near 8 Holmes Drive, where there is a large stormwater pipe in the roadway. At this location, the pipeline will be installed by trenching technology above the stormwater pipe, before transitioning back to trenchless technology.

From here, the pipeline continues under:

- Oriel Avenue at a depth of approx. 13m;
- The private property at 40 Oriel Avenue;
- St. Margarets Park to Hobsonville Road; and
- Eight private properties on Peterhouse Place, Magdalen Place and Hobsonville Road, at a depth of between approx. 10m and 20m.

The concept design indicates that a drop structure may be required in St Margarets Park in order to lower the pipeline to follow the terrain. The concept design indicates a 6m diameter manhole with a number of baffle steps to lower the wastewater to drop to a lower pipeline. The drop structure will likely require permanent access to allow maintenance and provide air relief to the pipeline. The drop structure will likely be approximately 14m deep and could be used as a microtunnel shaft before the drop structure is constructed. Air treatment facilities may be required in this location.

The trenchless construction will terminate at Hobsonville Road.

The expected duration of the works in this area is as follows:

- Approx. 4-5 months at each of the microtunnel pit sites
- Approx. 5 months for the construction of the pipe bridge
- Approx. 2-3 months for trenching activities

6.9 The Eastern Abutment of the Greenhithe Bridge to Collins Park

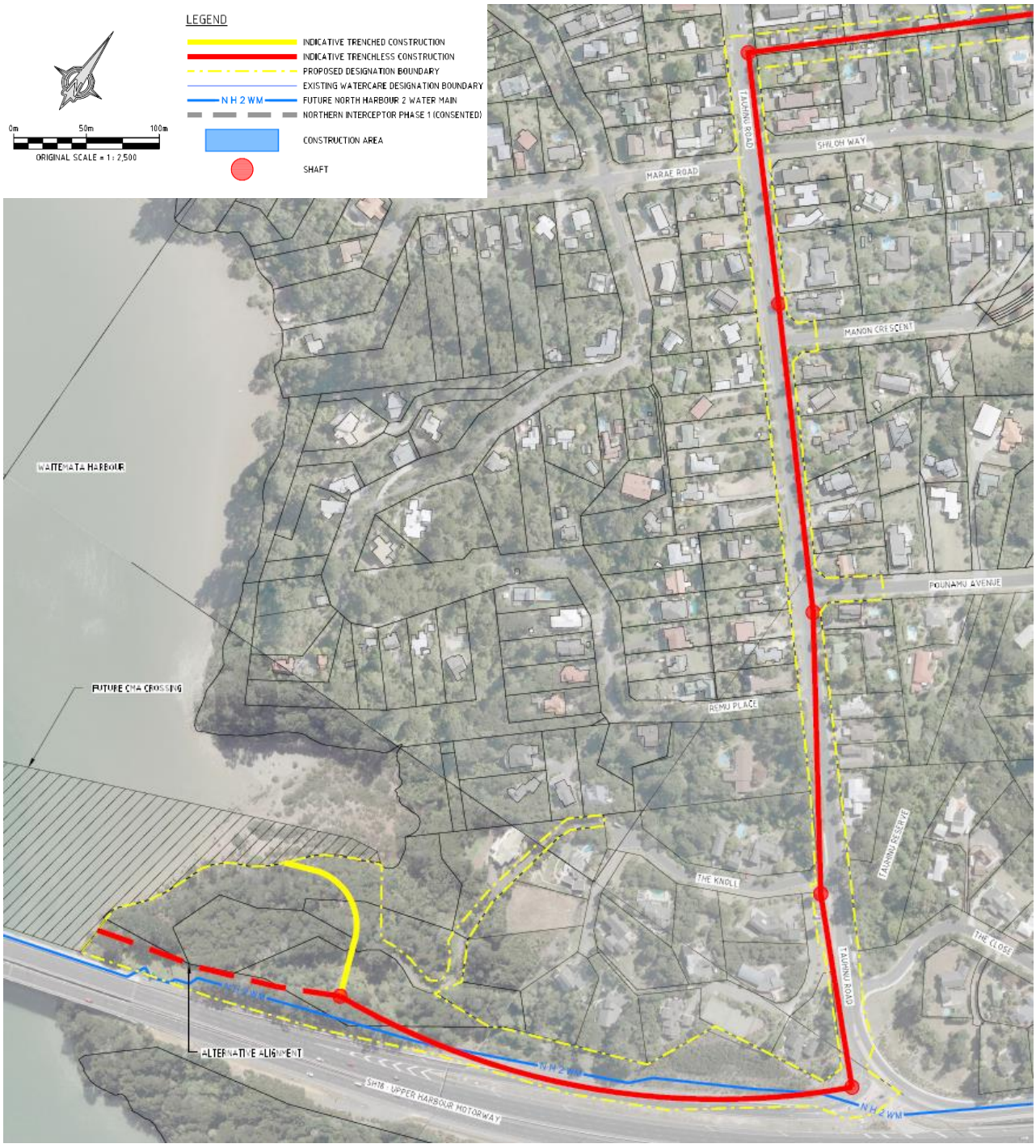

Figure 12: The Eastern Abutment of the Greenhithe Bridge to Collins Park

6.9.1 Existing Environment, Zoning and Notations

Land Use	Land use surrounding the alignment in this location is predominately residential, with a reserve at the landing site and along Greenhithe Road (Collins Park).
Community and Recreational Facilities	Located on Greenhithe Road is Collins Park. Access to the park is primarily via Greenhithe Road, with a walking path providing access at the southern end of the park via Shiloh Way. The park presently contains a cricket pitch and a youth facility (skate

	park). Adjacent to Collins Park to the west is the Greenhithe Playcentre, and an early childhood education facility. Along Greenhithe Road is the Greenhithe Fire Station and Greenhithe Town Centre, containing shops, restaurants and offices. Greenhithe Primary School is located adjacent to the Greenhithe Road/Churchouse Road/Isobel Road roundabout.	
Watercourses	Upper Waitemata Harbour (Coastal Marine Area)	
Vegetation and Ecology	The vegetation within the eastern abutment of the Greenhithe Bridge is a mixture of open ground with kikuyu, a gravel driveway and kanuka scrub under a broken canopy of black wattle. Understorey plants include tauhinu, kumerahou, mingimingi and corokia. Several large kahikatea trees were noted in the gully between 15 and 9 The Knoll. The proposed designation boundary borders the coastal edge and indicates trenched construction through the Eastern Abutment of the Greenhithe Bridge, which supports native scrub that is covered by SEA_T_8319. Vegetation within the SEA at this location supports suitable potential habitat for at least five indigenous lizard species, four of which have a National threat classification of "At Risk". The forest gecko, copper skink and ornate skink have been recorded within this SEA. This vegetation also provides habitat for native bird species. The tree species within the Knoll Reserve and within the large designation footprint consists of diverse native bush made up of regenerating podocarp-broad leaf forest, specimen trees and exotic weed species. The north eastern boundary of the designation comprises of the most significant native vegetation from the edge of the Knoll Reserve to the coastline and westward around the coastline to Greenhithe Bridge.	
Historic Heritage and Archaeological Values	There are currently no archaeological or other historic heritage sites recorded within 100m of the proposed designation corridor in this section.	
Zoning (Operative District Plan)	Residential 1 Landscape Protection Area – Enhancement Road, Service Land, Accessway.	
Zoning (PAUP)	**Zones** Large Lot Residential Public Open Space – Conservation	**Overlays** Significant Ecological Area (Land) Air Quality Transport Corridor Separation Stormwater Management Area (Flow 2)
Designation(s), Requiring Authority and/or other notations	**ACDP:NS** • Designation 160 NZ Transit Authority: State Highway 18. • Designation 156 North Shore City Council: Proposed Road. **PAUP** • Designation 6756 New Zealand Transport Agency: State Highway 18.	

6.9.2 Description of Works

Reference drawing Sheet 1 of 10

The concept design indicates that after crossing the Upper Waitemata Harbour, the pipeline will enter the private property at 15 The Knoll, connecting with a break pressure chamber.

The concept design indicates that the break pressure chamber will:

- Be approximately 9m long, 4m wide and 7m below ground level;
- Require permanent entry facilities through manholes; and
- Require air treatment facilities.

A biological trickling filter and activated carbon unit will also be required at the break pressure chamber (70m², 10m x 7m at 5.2m in height) within 15 The Knoll, as will construction of permanent site access.

The extent of the designation boundary at 15 The Knoll is intentionally large to allow for flexibility to accommodate the preferred construction methodology to cross the Upper Waitemata Harbour, which will not be confirmed until closer to the time of construction (coastal permits for these works will be sought at a later date). In other words, it is unknown where the preferred landing site for the harbour crossing will be at this time. Once the preferred construction method is known, Watercare will reconsider the extent of the designation boundary in accordance with Section 181 of the RMA.

From this location, the concept design currently indicates that the pipeline will be constructed by trenchless technology, and will:

- Follow the SH18 designation boundary, travelling under the existing cycleway to Tauhinu Road;
- Continue under Tauhinu Road until reaching a point near 6 Tauhinu Road, where it then changes direction towards Collins Park; and
- Continue under twelve properties at Tauhinu Road, Greenhithe Road and Shiloh Way at a depth of approx. 7m and 16m before entering Collins Park.

This alignment may be revised at detailed design and as the design of the harbour crossing is confirmed.

The expected duration of the works for the construction of the break pressure chamber and at each of the microtunnel pits is approx. 4-6 months.

6.10 Collins Park to Wainoni Park

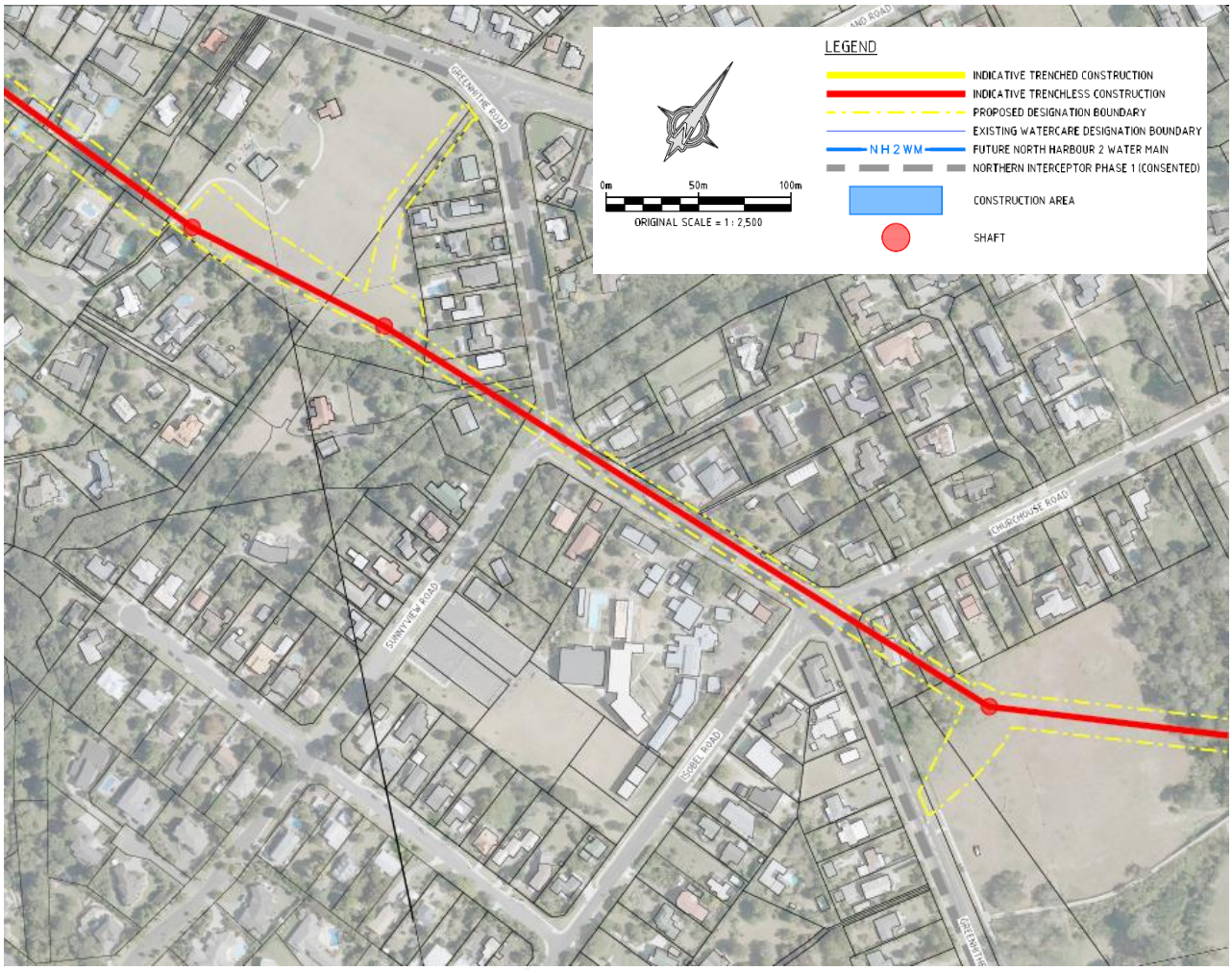

Figure 13: Collins Park to Wainoni Park

6.10.1 Existing Environment, Zoning and Notations

Land Use	The predominant land use in this area is residential, with areas of open space throughout.
Community and Recreational Facilities	Wainoni Park is presently used for equestrian activities by the Greenhithe Pony Club (Wainoni Park South) and Greenhithe Riding for the Disabled (Wainoni Park North). The majority of the park is in pasture. The park is also used by the North Shore Air Gun Club and the North Shore Dog Training Club.
Watercourses	The route goes beneath a watercourse at Sunnyview Road.
Vegetation and Ecology	There is no vegetation or ecological aspects to this section of the designation.
Historic Heritage and Archaeological Values	Auckland Council CHI site 12928 is located within 100m north of the proposed designation corridor through Collins Park. The site comprises the former Greenhithe School building. The site is scheduled within the Auckland Council District Plan – Operative North Shore Section 2002 and within the PAUP as a Category B Significant Historic Heritage Place.

Zoning (Operative District Plan)	Recreational Zone 2 Recreation Zone 4 Residential 1 Road, Service Lane, Accessway.	
Zoning (PAUP)	**Zones** Large Lot Residential Public Open Space – Informal Recreation Public Open Space – Sports and Active Recreation.	**Overlays** Stormwater Management Area (Flow 2)

6.10.2 Description of Works

Reference drawing Sheet 2 of 10

At this location the concept design proposes to install the pipeline by trenchless technology:

- Under Collins Park towards Greenhithe Road; and
- Under private properties at Greenhithe and Churchouse Road to Wainoni Park (South).

Also required are:

- Site establishment at each temporary shaft and landing site including Collins Park and Wainoni Park;
- Construction of hard standing and parking areas;
- Construction of permanent site access via gravel driveway from Greenhithe Road
- Construction of a drop structure in Collins Park;
- Construction of a biological trickling filter and activated carbon unit area 60m² (6m x 10m by 5.2m in height) in Collins Park;
- Surface reinstatement such as roads, driveways and grass areas.

The expected duration of the works for construction at each of the microtunnel pits is between approx. 3-4 and 6-8 months, depending on location.

6.11 South Wainoni Park

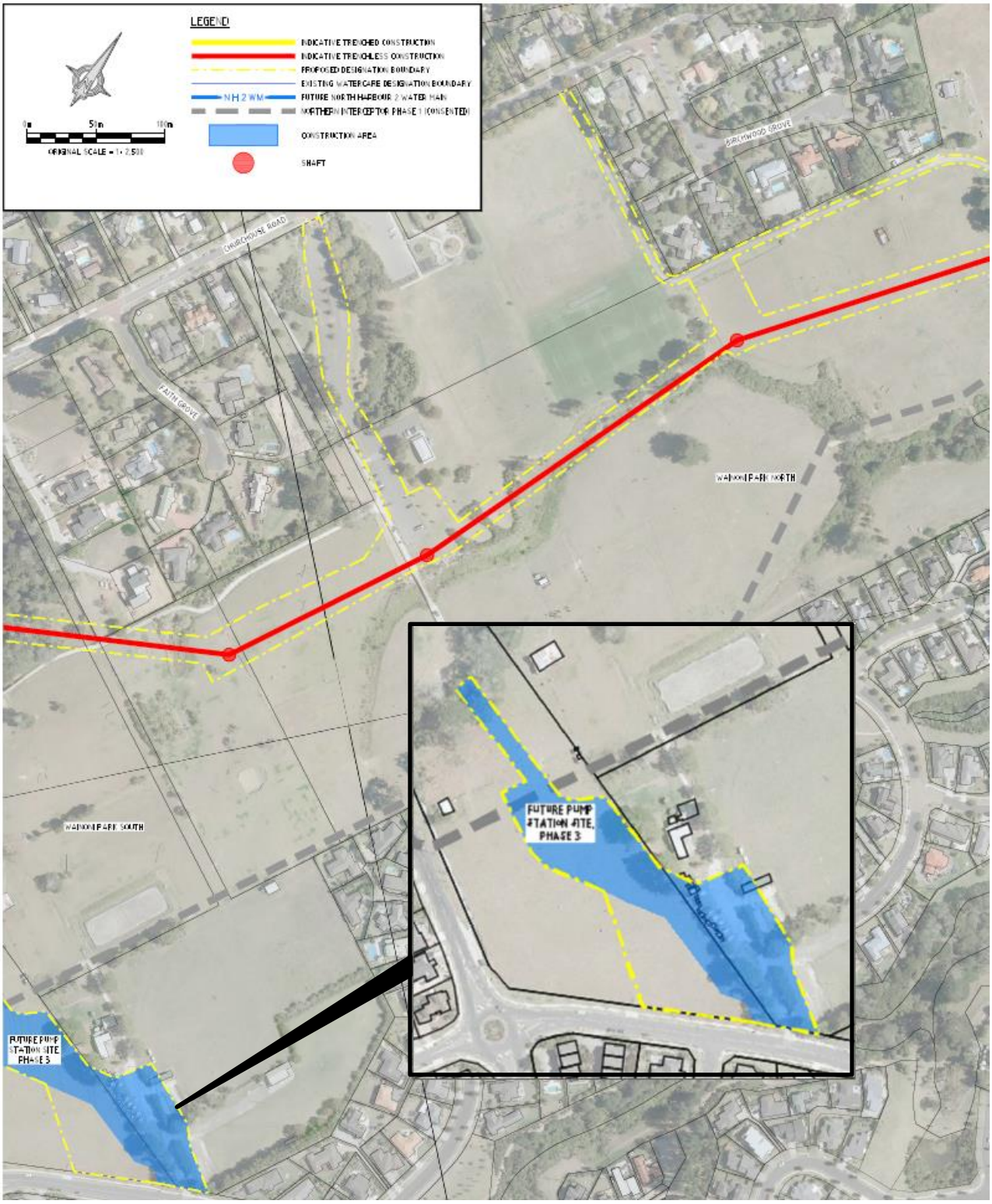

Figure 14: South Wainoni Park (Alignment)

6.11.1 Existing Environment, Zoning and Notations

Land Use	The primary land use in this location is recreational.	
Community and Recreational Facilities	Wainoni Park is presently used for equestrian activities by the Greenhithe Pony Club (Wainoni Park South) and Greenhithe Riding for the Disabled (Wainoni Park North). The majority of the park is in pasture. The park is also used by the North Shore Air Gun Club and the North Shore Dog Training Club.	
Watercourses	No significant watercourses have been identified in this area.	
Vegetation and Ecology	In the south eastern corner of Wainoni Park the vegetation is mainly exotic trees such as macrocarpa, pines, and wattles. A few kanuka and cabbage trees are also found in the vicinity.	
Historic Heritage and Archaeological Values	There are currently no archaeological or other historic heritage sites recorded within 100m of the proposed designation corridor in this section.	
Zoning (Operative District Plan)	Recreational Zone 4	
Zoning (PAUP)	**Zones** Public Open Space – Sports and Active Recreation	**Overlays** Stormwater Management Area (Flow 1 and 2)

6.11.2 Description of Works

Reference drawing Sheet 3 of 10

The concept design indicates that the pipeline will be installed by trenchless technologies from the southern boundary of Wainoni Park, to a point in Wainoni Park North near Te Wharau Creek.

Within Wainoni Park South a new shallow PS will likely be constructed at the south eastern corner of Wainoni Park, off Orwell Road. The concept design indicates that the PS will:

- Be approx. 6m high, 15m long, 7m wide and will have a depth of 6m below ground level;
- Require mechanical and electrical equipment (e.g. pumps, valves, pipes, transformer, gantry crane and extraction fans);
- Require overflow pipe from the PS to an existing stormwater channel; and
- Require ancillary above ground structure (e.g. chemical dosing facility, biofilter, control room).

An air inlet vent (approx. 400mm in dia. by 6m in height) will be required at the south westernmost corner of Wainoni Park South.

The expected duration of the works for construction at each of the microtunnel pits is between approx. 3-4 and 6-8 months, depending on location. The anticipated duration of the pump station is 1 to 1.5 years.

6.12 North Wainoni Park to North Shore Memorial Park

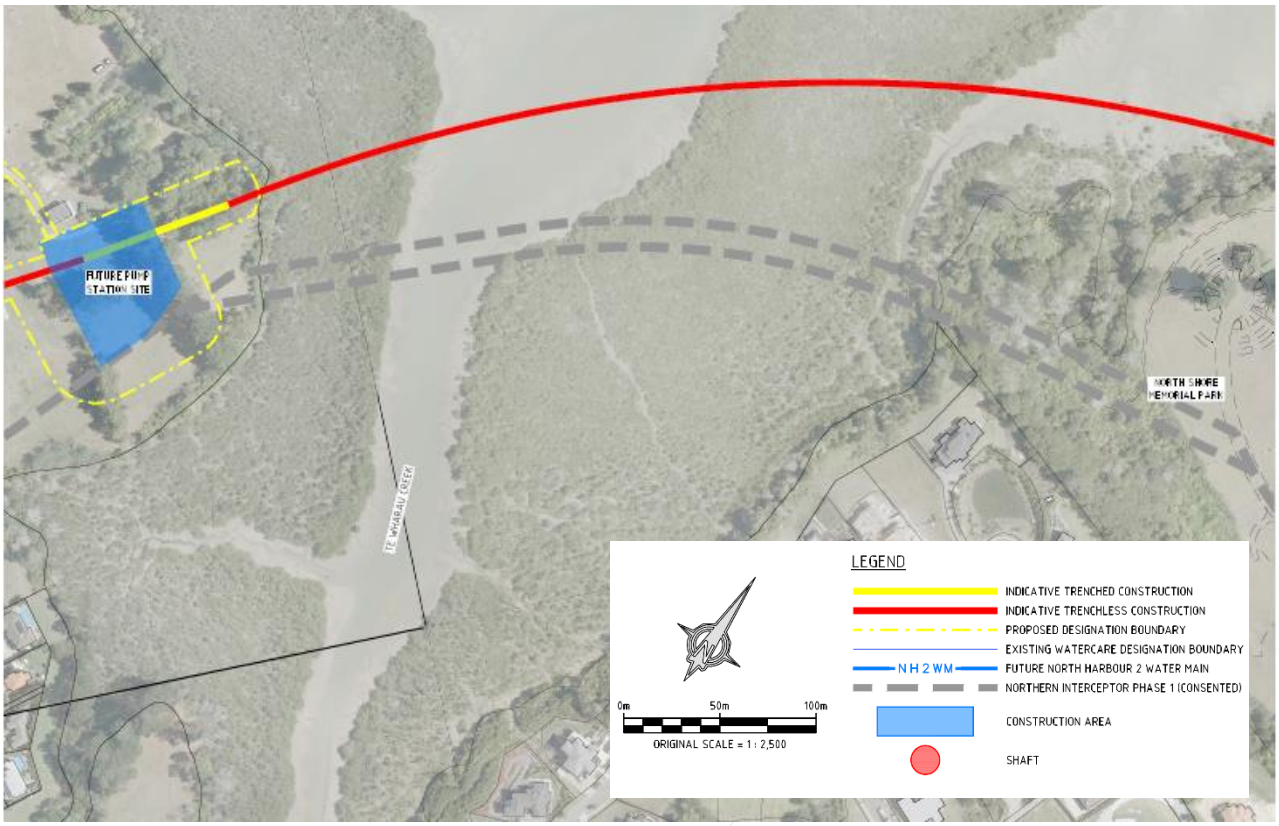

Figure 15: North Wainoni Park to North Shore Memorial Park

6.12.1 Existing Environment, Zoning and Notations

Land Use	The primary land use in this location is recreational, and transitions to cemetery, chapel and crematorium.
Community and Recreational Facilities	Wainoni Park is presently used for equestrian activities by the Greenhithe Pony Club (Wainoni Park South) and Greenhithe Riding for the Disabled (Wainoni Park North). The majority of the park is in pasture. The park is also used by the North Shore Air Gun Club and the North Shore Dog Training Club. The North Shore Memorial Park is a Council-owned and operated facility and is one of the largest cemeteries in the Auckland region. The 90-acre Memorial Park is accessed from Schnapper Rock Road in Albany, and is surrounded by residential development to the north, east and south. Lucas Creek marks the boundary of the Memorial Park to the west.
Watercourses	Te Wharau Creek (Coastal Marine Area)
Vegetation and Ecology	The northern corner of North Wainoni Park has large macrocarpa trees, pines and poplars. There is an English Oak and Monterey cypress trees in this section of the designation. The northern end of North Wainoni Park supports potential habitat for two indigenous lizard species, one of which has a National threat classification of “At Risk”. The vegetation also has the potential to support roosting and nesting habitat for banded rail.
Historic Heritage and Archaeological Values	There are a number of archaeology sites located within 100m of the proposed designation corridor. Identified archaeological sites within Wainoni Park are focused around the northern edge that is bounded by Te Wharau Creek and comprise of shell midden deposits. It was also noted around the foreshore area were four discrete

	patches of mixed historic and modern rubbish. It was found that the rubbish had probably been dumped there more recently and is therefore not historically 'in situ'. The northern end of this section of the alignment passes within 100m of three shell midden sites that are scheduled as sites and places of value to Mana Whenua within the PAUP.	
Zoning (Operative District Plan)	Recreation 4 Special Purpose zones: 4 Cemetery and Crematorium Landscape Protection Area – Enhancement Significant Landscape Features.	
Zoning (PAUP)	**Zones** Public Open Space – Sports and Active Recreation Public Open Space – Conservation Special Purpose	**Overlays** Significant Ecological Area (Marine 2)
Mana Whenua (relevant overlays and identified cultural values)	Sites and Places of Value to Mana Whenua: • PAUP ID: 3217, CHI ID: 17736 NZAA Site Number: R10_1187 Site Type: Archaeology of Maori Origin	

6.12.2 Description of Works

Reference drawing Sheet 4 of 10

At this location (Wainoni Park North), the concept design indicates that a pump station will likely be constructed in the area near the North Shore Air Gun Club (NSAGC). The exact location and layout of the PS is pending consultation with relevant stakeholder input, however it is considered that the spatial extent of the designation sought through this NoR will adequately provide for its footprint.

The concept design indicates that the PS will:

- Be approx. 6m high, 25m long and 18m wide and will have a depth of 15m below ground level;
- Mechanical and electrical equipment (e.g. pumps, valves, pipes, transformer, gantry crane and extraction fans);
- New access from Churchouse Road;
- Require overflow pipe from the PS to an existing waterway; and
- Require ancillary above ground structure (e.g. chemical dosing facility, storage tanks biofilter, control room).

From this location the pipeline will cross under Te Wharau Creek using trenchless technology and will land at a point within the North Shore Memorial Park. Coastal permits for these works will be sought at a later date.

The expected duration of the works for construction at the microtunnel pit is approx. 2-4 months, and the anticipated duration of the pump station is 1 to 2 years. Trenchless construction under Te Wharau Creek (including set up on the landward site of the Creek) will be approx. 9-11 months.

6.13 North Shore Memorial Park to Schnapper Rock Road

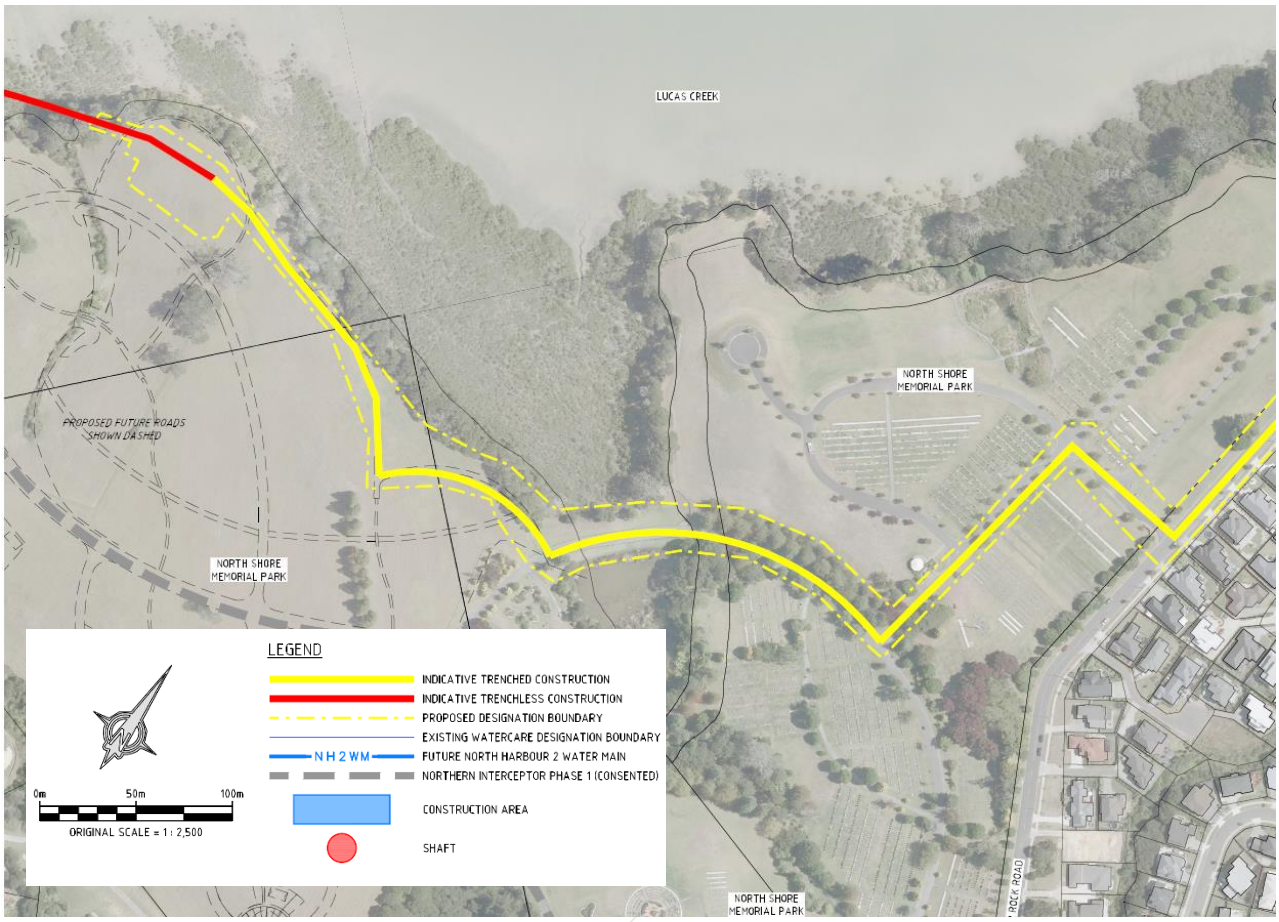

Figure 16: North Shore Memorial Park to Schnapper Rock Road

6.13.1 Existing Environment, Zoning and Notations

Land Use	The land use in this area is cemetery, chapel and crematorium, and transitions to residential once reaching Schnapper Rock Road.
Community and Recreational Facilities	The North Shore Memorial Park is a Council-owned and operated facility and is one of the largest cemeteries in the Auckland region. The 90 acre Memorial Park is accessed from Schnapper Rock Road in Albany, and is surrounded by residential development to the north, east and south. Lucas Creek marks the boundary of the Memorial Park to the west.
Watercourses	The alignment runs adjacent to Lucas Creek. There were no significant watercourses identified within the vicinity of North Shore Memorial Park or Schnapper Rock Road.
Vegetation and Ecology	There is a band of tall (greater than 10m) kanuka scrub that fringes the Lucas Creek Estuary along the north western edge of the park. The understory is composed of common shrubs such as mapou, mahoe, silver tree fern, and karamu. There are a group of 22 Pin Oaks and a group of 18 London Plane trees within this designation section.
Historic Heritage and Archaeological Values	There are two archaeological sites recorded within 100m of the proposed designation corridor. These sites comprise two midden deposits recorded as eroding out of the foreshore bank. Both sites are scheduled as sites and places of value to Mana Whenua within the PAUP. Additional shell midden sites have also previously been recorded

	along the coastal margins of the Memorial Park, but are located well away from the current project area.	
Zoning (Operative District Plan)	Special Purpose Zones: 4 Cemetery and Crematorium Landscape Protection Area – Enhancement Road, Service Lane, Accessway	
Zoning (PAUP)	**Zones** Special Purpose	**Overlays** Stormwater Management Area (Flow 2)
Mana Whenua (relevant overlays and identified cultural values)	Sites and Places of Value to Mana Whenua • PAUP ID: 1978, CHI ID: 11170 NZAA Site Number: R10_817 Site Type: Archaeology of Maori Origin • PAUP ID: 3210, CHI ID: 17729 NZAA Site Number: R10_1180 Site Type: Archaeology of Maori Origin • PAUP ID: 3209, CHI ID: 17728 NZAA Site Number: R10_1179 Site Type: Archaeology of Maori Origin • PAUP ID: 3212, CHI ID: 17731 NZAA Site Number: R10_1182 Site Type: Archaeology of Maori Origin • PAUP ID: 3211, CHI ID: 17730 NZAA Site Number: R10_1181 Site Type: Archaeology of Maori Origin	

6.13.2 Description of Works

Reference drawing Sheet 5 of 10

Once within North Shore Memorial Park, the concept design indicates that the pipelines will be installed by trenched technologies under future and existing roads and paths, towards Schnapper Rock Road.

The expected duration of these works is approximately 2-5 months.

6.14 Schnapper Rock Road to North Shore Golf Course

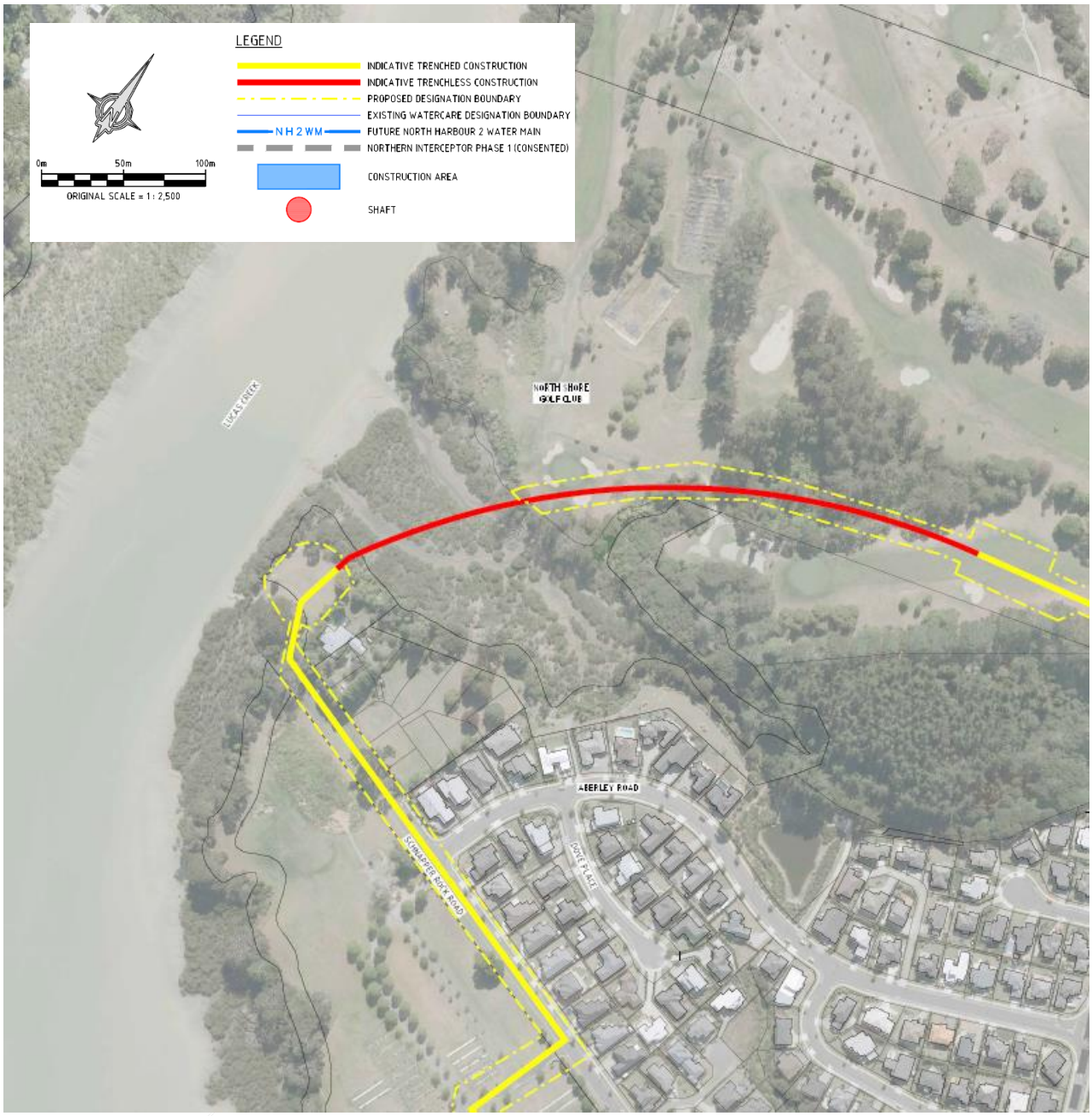

Figure 17: Schnapper Rock Road to North Shore Golf Course

6.14.1 Existing Environment, Zoning and Notations

Land Use	The primary land use in this location is residential, with single and multiple-storey dwellings.
Community and Recreational Facilities	No community or recreational facilities are located in this section of the proposed route.
Watercourses	Lucas Creek is located at the edge of the trenched construction at the end of Schnapper Rock Road.

Vegetation and Ecology	The area comprises of primarily planted specimen trees along Schnapper Rock Road, Wharepapa reserve and mixed regenerating native trees along the coastal edge. There is a very large pine tree adjacent to the proposed alignment and it has a large and extensive root system.	
Historic Heritage and Archaeological Values	Archaeological and other historic heritage sites recorded in the general area tend to be focused around the banks of the creek, with very few sites being recorded more than 50m inland. There are currently two archaeological sites recorded within 100m of the proposed designation corridor. The sites comprise one shell midden deposit and a historic jetty. The midden deposit is scheduled as a site and place of value to Mana Whenua within the PAUP. A historic rubbish tip site is also recorded just over 100m north-west of the proposed designation corridor on the southern banks of the North Shore Golf Club.	
Zoning (Operative District Plan)	Road, Service Lane, Accessway. Special Purpose Zones: 4 Cemetery and Crematorium Recreational Zone 3 Recreational Zone 4 Landscape Protection Area Significant Landscape Feature	
Zoning (PAUP)	**Zones** Special Purpose Public Open Space – Informal Recreation Public Open Space – Sports and Active Recreation	**Overlays** Significant Ecological Area (Marine 2)
Mana Whenua (relevant overlays and identified cultural values)	Sites and Places of Value to Mana Whenua • PAUP ID: 1976, CHI ID: 11168 NZAA Site Number: R10_815 Site Type: Archaeology of Maori Origin	

6.14.2 Description of Works

Reference drawing Sheet 6 of 10

The concept design indicates that the pipelines will be installed by trenched technology along Schnapper Rock Road and into Wharepapa Reserve. From this location, the concept design indicates that the pipelines will likely be constructed by trenchless technology below a tributary of Lucas Creek tributary, before entering into the North Shore Golf Course. Coastal permits for these works will be sought at a later date.

Once within the North Shore Golf Course, the concept design indicates that the pipeline will be installed by trenched construction. The expected duration of these works is approximately 2-5 months for trenching, and 5-6 months for trenchless installation of the pipeline.

6.15 North Shore Golf Course to Appleby Road

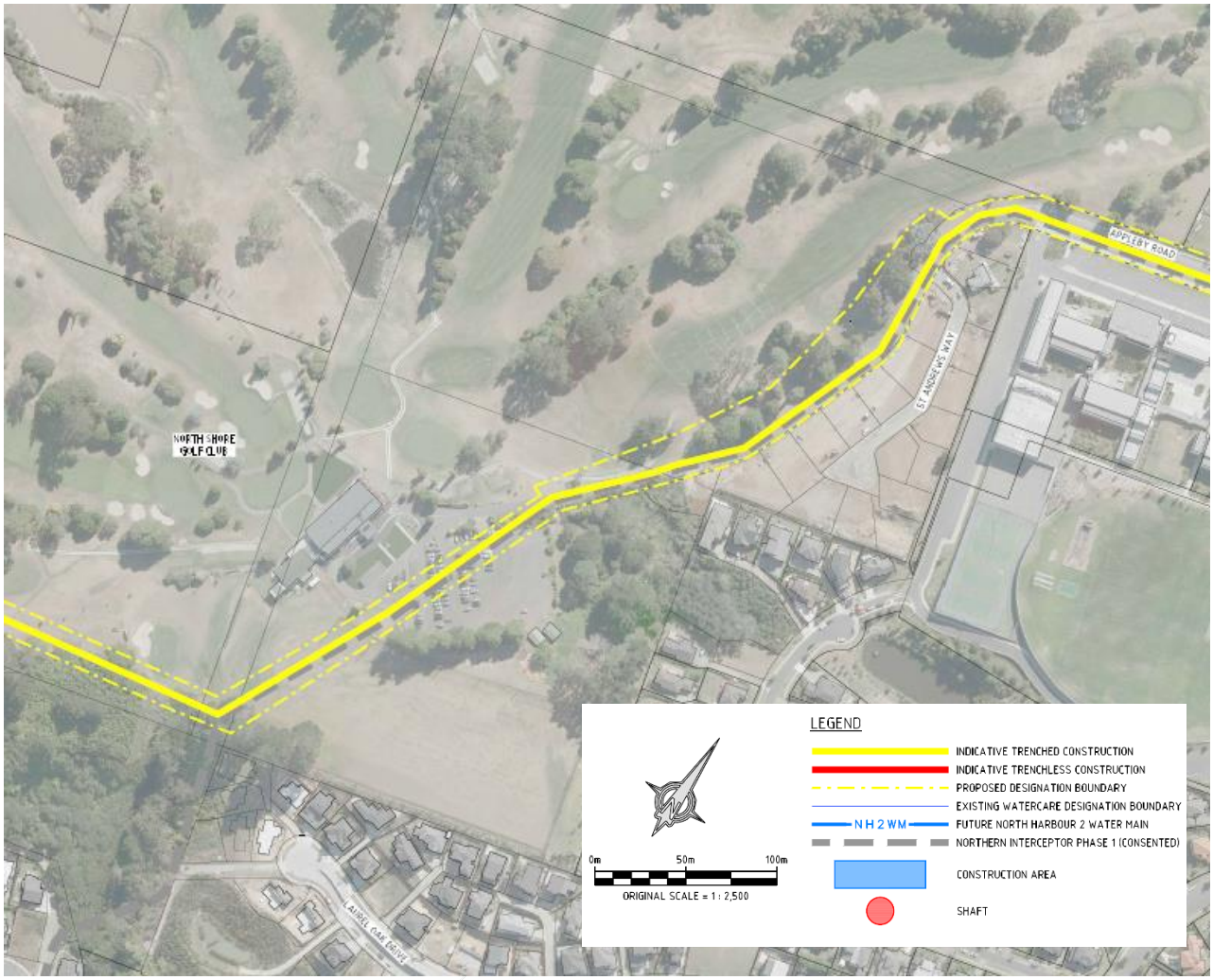

Figure 18: North Shore Golf Course to Appleby Road

6.15.1 Existing Environment, Zoning and Notations

Land Use	Land use in this location is primarily recreational (golf course) with residential and community uses located near the intersection of Appleby Road with Albany Highway.
Community and Recreational Facilities	The North Shore Golf Course is a 27-hole golf club. To the north of the NSGC is Kristin School. Albany Junior High School is located further to the east, and Lucas Creek marks the boundary of the course to the west.
Watercourses	The concept design indicates trenchless construction from Wharepapa Reserve under a tributary of Lucas Creek will continue into the south-western corner of the North Shore Golf Course for approximately 300m.
Vegetation and Ecology	The area comprises of mainly stand-alone mature specimen trees. The southern edge of the golf course passes through the edge of predominantly exotic (bamboo) vegetation and across open ground to Appleby Road. The exotic and weedy vegetation along the edge of the existing golf course may provide some habitat value to native skinks.

Historic Heritage and Archaeological Values	There are currently no archaeology or other historic heritage sites recorded within 100m of the proposed designation corridor in this section.	
Zoning (Operative District Plan)	Recreational Zone 1 Recreational Zone 4 Residential Zone 5 Road, Service Lane, Accessway Reserve/ Open Space Linkages	
Zoning (PAUP)	**Zones** Public Open Space - Sports and Active Recreation Mixed Housing Suburban	**Overlays** Stormwater Management Area (Flow 2)

6.15.2 Description of Works

Reference drawing Sheet 7 of 10

The concept design indicates that the pipelines will be installed by trenched technology:

- Along the southern boundary of the North Shore Golf Course, before heading northeast through the car park;
- Along the private access road to Appleby Road; and
- Continues along Appleby Road towards Albany Highway.

The concept design indicates that a gully along the private access road may require widening to allow the construction of the pipeline alongside an existing pipeline in this location. The expected duration of these works is approximately 2-5 months.

6.16 Appleby Road to William Pickering Road

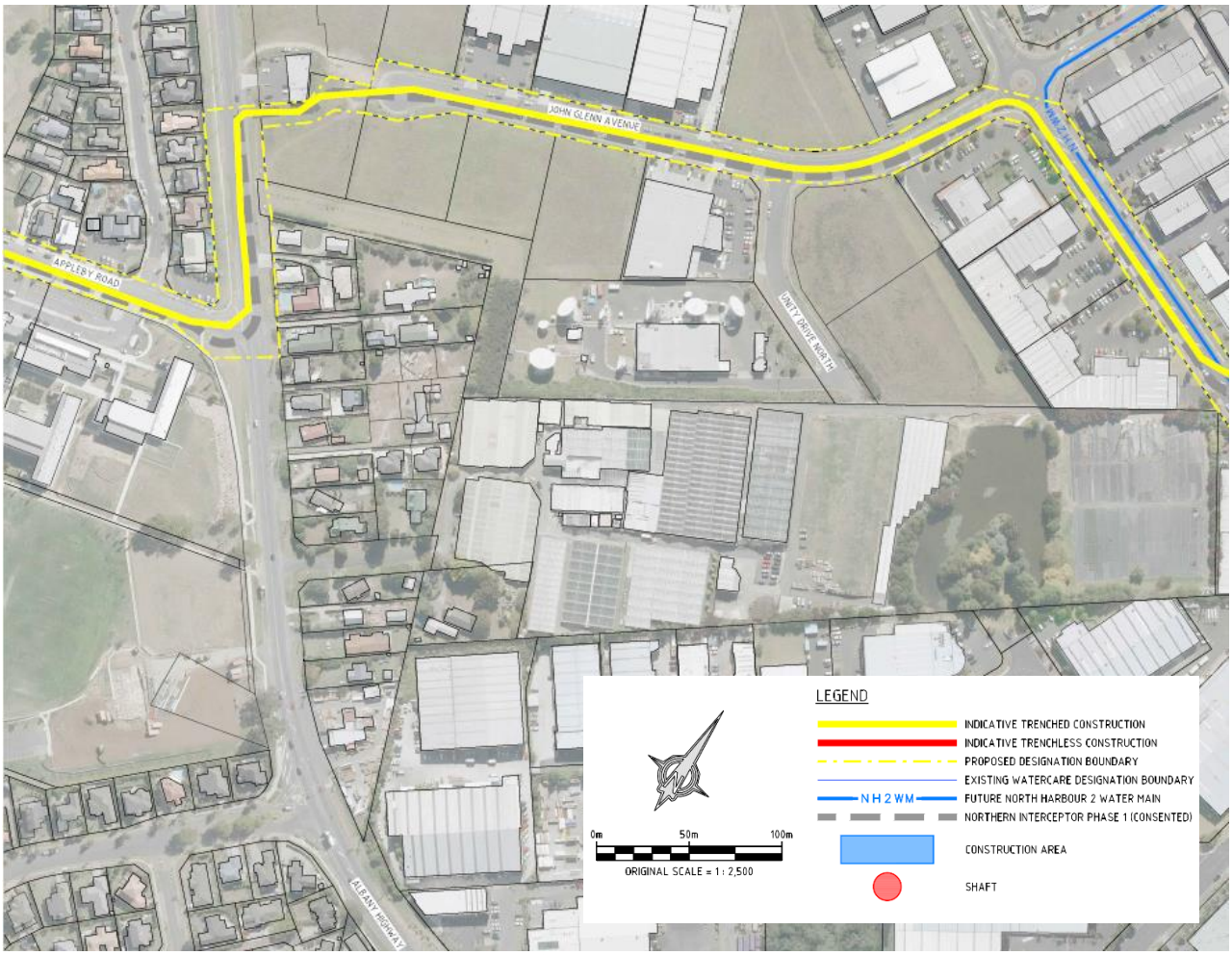

Figure 19: Appleby Road to William Pickering Drive

6.16.1 Existing Environment, Zoning and Notations

Land Use	The land use in this location is predominantly residential and commercial.
Community and Recreational Facilities	No community or recreational facilities are located in this section of the proposed route.
Watercourses	No significant watercourses have been identified in this section.
Vegetation and Ecology	There is no vegetation or ecological aspects to this section of the designation.
Historic Heritage and Archaeological Values	There are currently no archaeological or other historic heritage sites recorded within 100m of the proposed designation corridor in this section.
Zoning (Operative District Plan)	Business Zone 9 Road, Service Lane, Accessway Recreational Zone 2
Zoning (PAUP)	Light Industry

Designation(s), Requiring Authority and/or other notations	**ACDP:NS** • Designation No. 190 Road – Auckland Transport: To widen and upgrade Albany Highway between Schnapper Rock Road/ Bush Road to State Highway 17 and all associated works. **PAUP** • Designation 1469 Auckland Transport: Albany Highway.

6.16.2 Description of Works

Reference drawing Sheet 8 of 10

At this location the concept design proposes to install the pipeline by trenched technology:

- Along Appleby Road to Albany Highway; and
- From Albany Highway to John Glenn Avenue towards William Pickering Drive.

The expected duration of these works is approximately 2-5 months.

6.17 William Pickering Drive to Bush Road

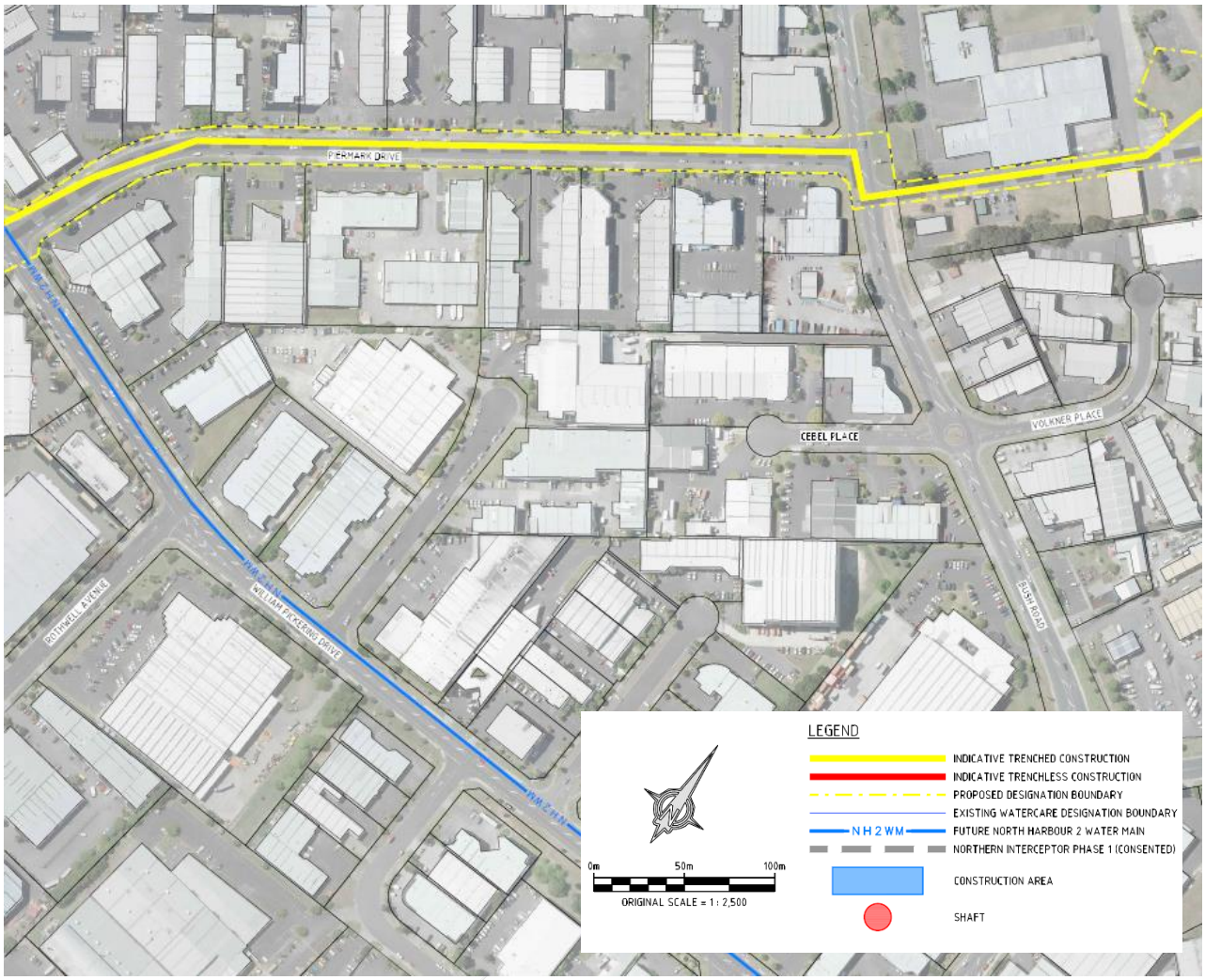

Figure 20: William Pickering Drive to Bush Road

6.17.1 Existing Environment, Zoning and Notations

Land Use	The land use in this location is predominantly commercial.
Community and Recreational Facilities	No community or recreational facilities have been identified in this portion of the route.
Watercourses	No significant watercourses have been identified.
Vegetation and Ecology	There is no vegetation or ecological aspects to this section of the designation.
Historic Heritage and Archaeological Values	There are currently no archaeological or other historic heritage sites recorded within 100m of the proposed designation corridor in this section.
Zoning (Operative District Plan)	Business Zone 9 Business Zone 10 Road, Service Lane, Accessway

Zoning (PAUP)	**Zones** Light Industry	**Overlays** Stormwater management Area (Flow 2)
Designation(s), Requiring Authority and/or other notations	**ACDP:NS** • Designation 63 United Networks Limited: Future Substation. **PAUP** • Designation 8868 Vector Ltd: Substation.	

6.17.2 Description of Works

Reference drawing Sheet 9 of 10

The concept design indicates that the pipeline will be installed by trenched technology:

- From William Pickering Drive through to Piermark Drive; and
- Continues from Piermark Drive to 169 and 179 Bush Road.

The expected duration of these works is approximately 2-5 months.

6.18 Bush Road to Rosedale WWTP

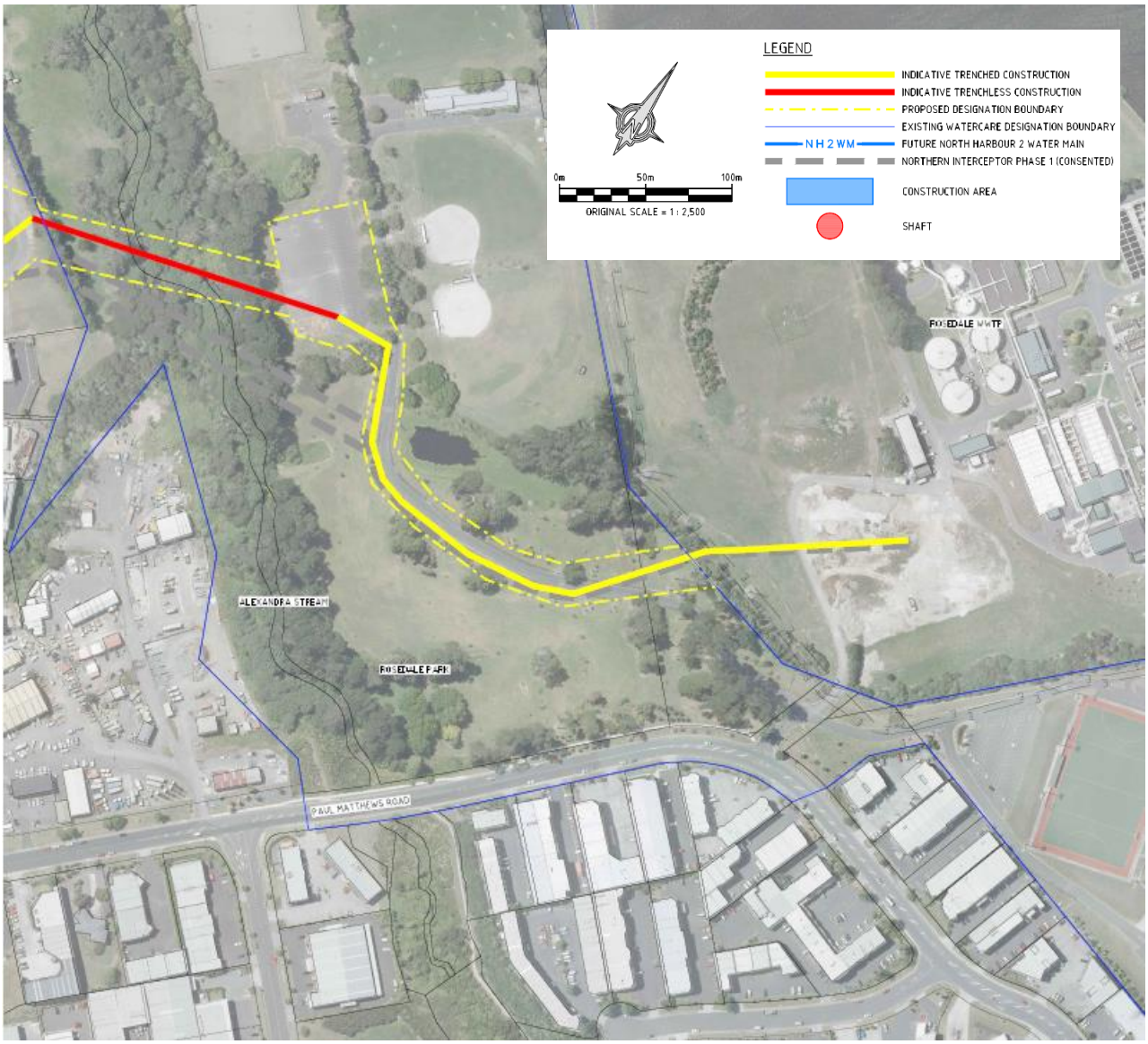

Figure 21: Bush Road to Rosedale WWTP

6.18.1 Existing Environment, Zoning and Notations

Land Use	Land use in this location transitions from commercial to recreational as the alignment enters Rosedale Park. The area west of Alexandra Stream within the Park is presently undeveloped.
Community and Recreational Facilities	Rosedale Park is a regional facility that offers passive and active recreational opportunities, and is the home field for Albany United Football Club, and North Harbour Softball Association. Rosedale Pony Club and North Harbour BMX also utilise the Park, and there are a number of cricket pitches provided. Access to club facilities is provided off Jack Hinton Drive. The park is surrounded by residential development to the north, and commercial/industrial areas to the south and west. The Rosedale WWTP is located on the eastern side of the park.

Watercourses	Alexandra Stream	
Vegetation and Ecology	The crossing of Alexandra Stream is located within a SEA. The rest of this section follows road ways and open ground. The area comprises of mainly stand-alone mature specimen trees and groups of trees.	
Historic Heritage and Archaeological Values	There are currently no archaeological or other historic heritage sites recorded within 100m of the proposed designation corridor in this section.	
Zoning (Operative District Plan)	Business Zone 10 Recreational Zone 4 Special Purpose Zone 3: Wastewater Treatment Plant	
Zoning (PAUP)	**Zones** Public Open Space – Sports and Active Recreation Light Industry	**Overlay** Stormwater Management Area (Flow 2) Significant Ecological Area (Land)
Designation(s), Requiring Authority and/or other notations	**ACDP:NS** • Designation 163 Wastewater Treatment Plant Odour Buffer – Watercare Services Limited **PAUP** • Designation 9310 Wastewater Purposes – Watercare Services Limited: Wastewater Treatment Plant Odour Buffer Area.	

6.18.2 Description of Works

Reference drawing Sheet 10 of 10

The concept design indicates that the pipeline at this location will be installed by trenchless technology under Alexandra Stream from 179 Bush Road, into Rosedale Park. From this location, the concept design indicates that the pipelines will then be installed by trenched technology through Jack Hinton Drive and into the Rosedale WWTP.

The expected duration of these works is approximately 2-4 months for trenched construction, and 5-6 months for trenchless construction under Alexandra Stream.

7 Typical Construction Methodologies

The Project primarily involves the installation of pipelines underground and the construction of pump stations. It is anticipated pipelines will be installed by a combination of routine trenching and trenchless methods typical of construction work which is carried out almost on a daily basis within Auckland and successfully managed in many other construction projects.

Given the long timeframe until construction, new technologies may become available. Notwithstanding this, it is considered that a reasonable degree of confidence can be had with regards to trenched and trenchless methods. This is demonstrated on the Project Drawings where anticipated construction methods are shown in different colours. It is considered that this establishes an effects envelope (i.e. trenched versus trenchless) with regards to the installation of pipelines.

Overall if construction techniques change, they will be within the envelope of effects assessed in this Report.

The following sections provide details of the typical construction methodologies anticipated for the Project.

7.1 Note on Coastal Marine Crossings

In some locations, the crossing of the Coastal Marine Area will be required. RMA approval (regional consents) for works in the Coastal Marine Area (CMA) will be sought at a later date, however, the construction activities on the landward side of the CMA are covered by this AEE.

As the Project has only reached a concept level of design, the method to cross these marine areas has not yet been finalised. Depending on the construction methodology selected (described in further detail below), the following activities may occur at either end of the marine crossing:

- Site establishment at each end of the drill hole for horizontal directional drilling activities, including vegetation clearance, establishment of working areas, offices and storage containers and the construction of hard standing and parking areas. This will also include the installation of mud separators, drill rod racks, mud storage containers and associated plant at the entry site;
- Construction of temporary jacking and receiving shafts to facilitate microtunnelling activities, which may include piling and dewatering;
- If marine trenching is selected, two site compounds will be set up at either side of the marine crossing. This may include vegetation clearance, establishment of working areas, offices and storage containers and the construction of hard standing and parking area.

7.2 Open Trenching

The majority of the Project will be constructed by conventional open trenching methods and predominantly located within road reserve.

Typically the construction corridor will be approximately 12 to 22 metres wide within the designation corridor. This width is necessary to provide room for the trench, the construction machinery, temporary storage of materials to be used, and safety set-backs for traffic, public and construction crew. Entire work areas are expected to be no more than 200m long for any construction site, to include approach areas for distance and setbacks required for traffic management at either end of the work area. The length of open trench at any one time will generally be 20-40 metres with gradients of the trenching to generally follow land topography. The pipe trench itself will be between 2-3m wide and 3-4m deep. The pipeline will normally be buried underground with a minimum cover (top of pipe to ground level) of 1.5m to provide protection and to avoid creating a barrier for the installation of future utility services. Figure 23 shows an example of an open trench being dug into a local road. Figure 24 shows large pipeline section being lowered into trench. Figure 25 shows an example of an open trench construction area.

Figure 23: Trench being dug in road reserve

Figure 22: Pipe section being lowered into trench

Figure 24: Example construction area with traffic management

The typical plant and equipment required for trenching includes a 20-30 tonne excavator, 6 wheeler tip trucks, support vehicles, construction equipment and site facilities.

Construction may be undertaken at a number of concurrent work areas along the pipeline route. Concurrent construction areas are not uncommon on linear projects such as this (for example Hunua 4 has multiple work areas open at any one time). The traffic management plan process will ensure that traffic effects from different work sites do not result in any significant cumulative traffic effects on any community. The Corridor Access Request process will provide further checks during construction to ensure that impacts on traffic disruption are minimised.

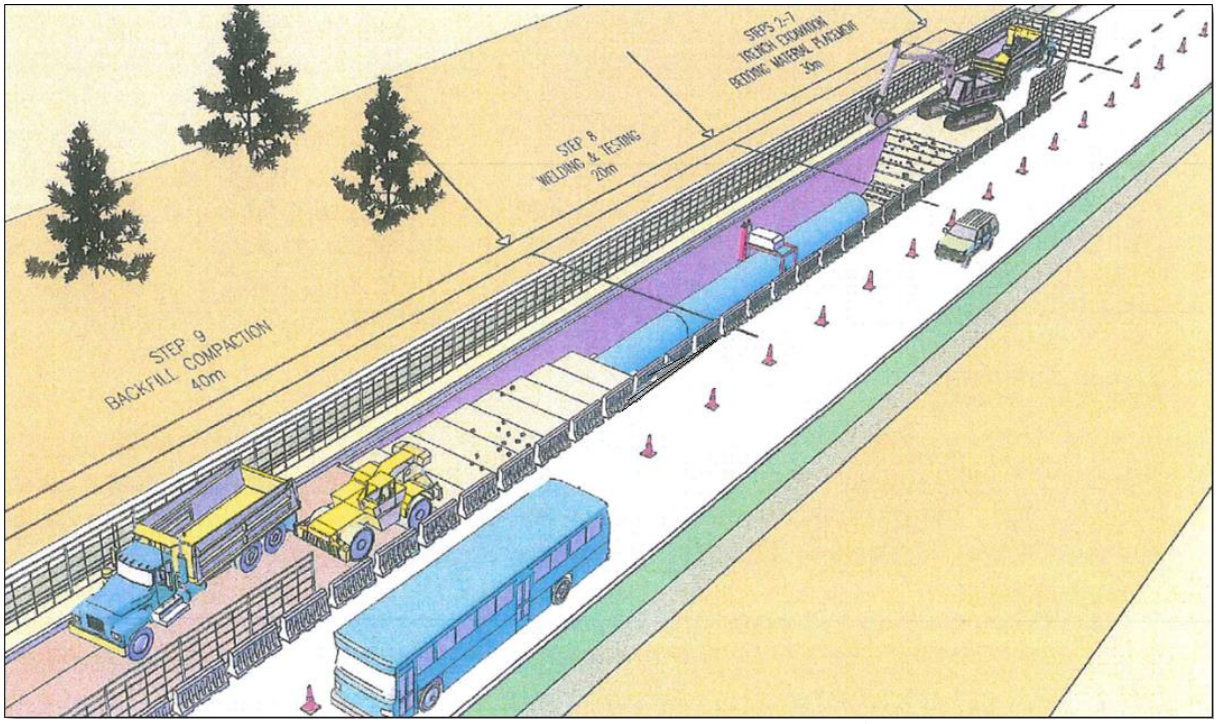

Figure 25: Typical trenching construction footprint

The following outlines the typical sequence for open trenching construction for the Project illustrated in Figure 25:

- Site safety and traffic control set up as required;
- Cut into ground surface, with road surface and sub-base removed for disposal;
- Where required, place trench support with the type and extent determined by geotechnical conditions anticipated to vary along the project route;
- Excavation of trench to approximately 150-300mm below the pipe invert level with the majority of excavated material loaded onto a truck for immediate removal from site;
- Dewatering as required, depending on groundwater table level;
- Placement of granular pipe bedding material;
- Pipes lowered into the trench using a large excavator or crane;
- Where required, installation of shoring boxes for safe welding and wrapping of pipe joints;
- Welding of pipe joints carried out and tested;
- Backfilling of trench and compaction up to ground level. Compaction usually required in 200-300mm;
- Reinstatement of the road surface with pavement material to match the adjacent pavement in compliance with the Code of Practice for Temporary Traffic Management (COPTTM);
- Removal of site safety and traffic controls.

7.3 Trenchless Technology

7.3.1 Horizontal Directional Drilling

Watercare prefer the trenchless technology method described in section 7.3.2. However Horizontal Directional Drilling (HDD) may be considered in some locations by Watercare if that method is not viable.

HDD is a steerable trenchless method of installing underground pipes in a shallow arc along a prescribed bore path using a surface launched drilling rig.

The HDD process involves drilling an electronically steered pilot bore from one end of a crossing to the other (Figure 26). A back ream, in effect a second larger drill bit, is connected to the pilot drill stem at the far end of a crossing and drawn back through the hole left by the pilot bore. Construction sites are thus required at both ends of the HDD alignment. This process continues until the hole is of a larger diameter than the pipe to be installed.

Prior to pipe installation pipe lengths will be welded into long strings at one end of the construction site. The pipe will then be pulled through the HDD bore hole by the drill rig. Specialised drilling fluids are injected into the hole to assist in maintaining the drill hole open, lubricating the drill and recovering drilled materials. The drilling fluids are re-cycled through the segregation plant and waste material removed from site by trucks.

The construction area at HDD sites will likely be used to store the drill rods used in the drilling process, recycle and pump drilling fluids, power packs to drive the HDD machine, contractor facilities, material stockpiling and other equipment.

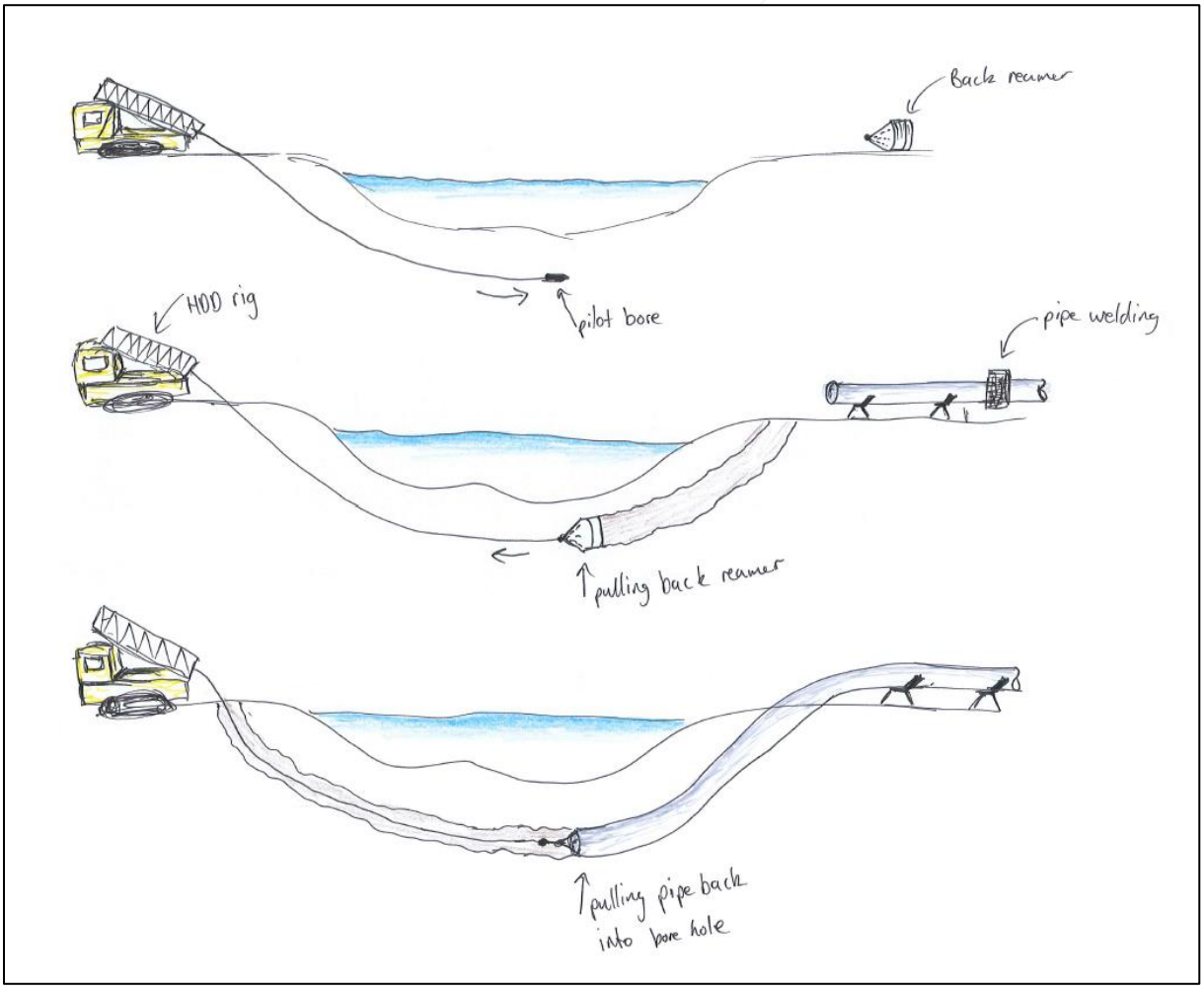

Figure 26: Horizontal Directional Drilling

HDD generally comprises the following construction activities:

- Site establishment at each end of the drill hole, including vegetation clearance, establishment of working areas, offices and storage containers and the construction of hard standing and parking areas;
- Set up for directional drilling activities;
- HDD pipe installation as described previously;
- Installation of line and scour valve chambers at each end as required; and
- Site reinstatement.

HDD installation activities can take anywhere between 10 and 20 weeks to complete for each drill shot, depending on the site. A large amount of this time is in the mobilisation and demobilisation of the directional drilling machine, the actual drilling process can take between 2 and 4 weeks depending on the pipe diameter and geology. To reduce project risks of the ground relaxing around the prepared holes, HDD drilling is typically continuous.

7.3.2 Microtunneling

Microtunneling is a trenchless technology that involves the use of a tunnel boring machine (TBM) to create a tunnel. The TBM is propelled by being 'pushed' through the hole by the pipes. A jacking shaft, is required to launch the TBM and to provide a "thrust wall" (Figure 27). Typically, these jacking shafts are reinforced by sheet piles to resist large forces imposed. The TBM is installed by crane into the jacking frame and is hydraulically pushed in the direction of trajectory. Once the TBM is pushed into the ground, the jacking machine is retracted and a jacking concrete pipe is installed behind the TBM, this jacking pipe is then pushed behind the TBM and forces the machine further along its trajectory. This is repeated until the TBM is pushed to its receiving shaft. The receiving shaft is used to retrieve the TBM machine. Where a large tunnel is needed, the receiving shaft can be converted to a jacking shaft and the TBM will continue to be pushed from this shaft.

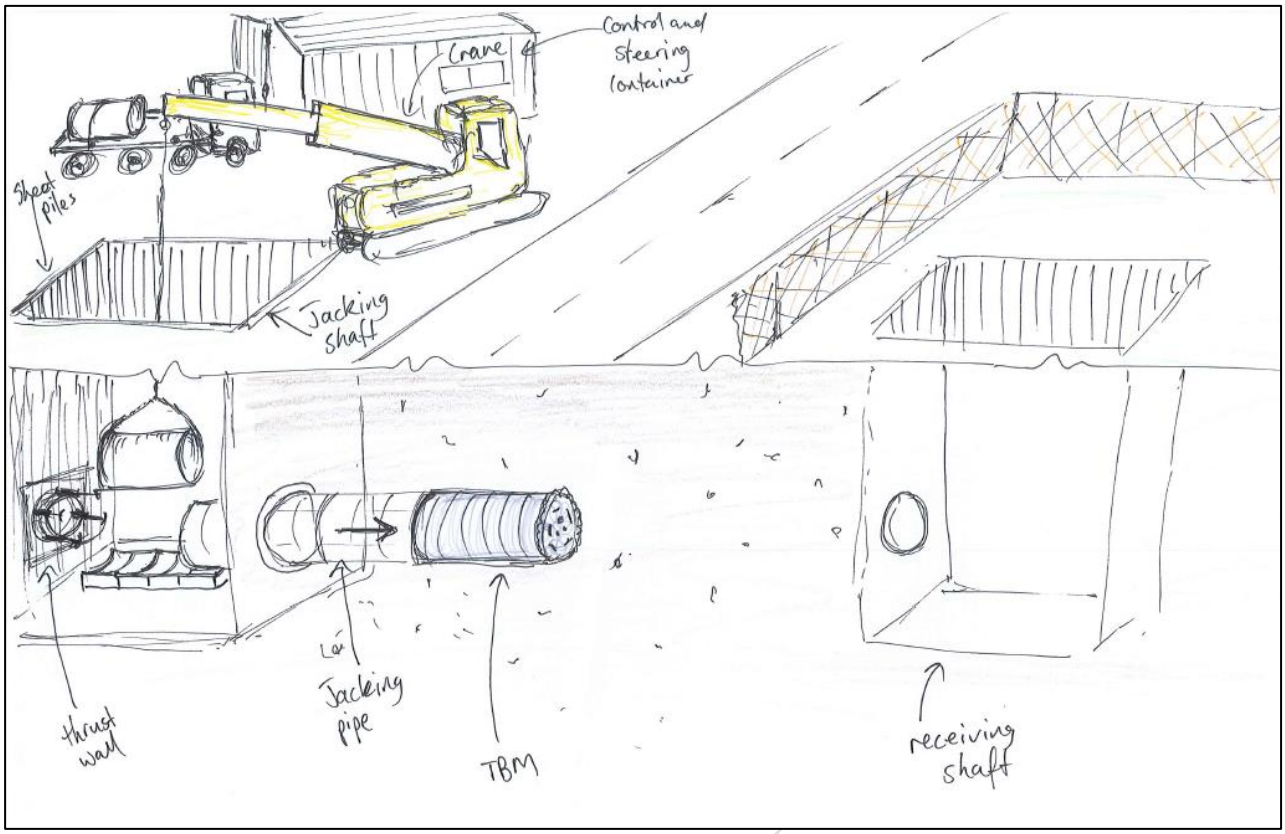

Figure 27: Microtunneling

Microtunneling generally comprises the following construction activities:

- Construction of temporary jacking and receiving shafts to facilitate micro-tunnelling activities (may include piling and dewatering;
- Micro-tunnelling; removal of excavated material, jacking pipe supply;
- TBM recovery;
- Construction of permanent access and drop shafts, or backfill of the temporary construction shafts;
- Road, driveway and grass surface reinstatement; and

Microtunneling can typically achieve 5m - 10m progress per day.

7.4 Trenching of the Coastal Marine Area and Freshwater Streams

The design requires trenching within the Coastal Marine Area (CMA) and freshwater streams. Works associated with trenching within the CMA and freshwater streams are likely to include:

- Site establishment at launching and landing sites on land; and
- Trenching and laying of pipelines within the CMA or within the bed of freshwater streams.

RMA approval (regional consents) for works within the CMA and freshwater streams will be sought at a later date and as such the majority of associated effects (e.g. ecological effects, effects on marine processes etc.) will be assessed through the future resource consent process.

This Report only considers the effects of trenching that relate to Section 9 of the RMA (e.g. noise, traffic etc.) at either end of the marine or freshwater crossings.

7.5 Pump Stations

Pump stations and storage tanks will be constructed on sites at The Concourse Storage Tank, Wainoni Park South and Wainoni Park North.

Pump stations generally consist of below ground structures for pump station wells, storage tanks and chambers, above ground structures for switchroom, biofilter, chemical storage tanks, and dosing facility together with incoming and outgoing pipework and pipe overflow, paved vehicle access and stormwater drainage. Typical works associated with construction at pump station sites include:

- Site clearance, topsoil removal and excavation for below ground structures;
- Piling;
- Dewatering of excavations;
- Construction of concrete pump station wet well and dry well chambers and precast concrete storage tanks and chambers;
- Construction of above ground pump station and switchroom buildings;
- Trenching and laying of pipework; and
- Site reinstatement.

Typical drawings and site layouts are provided in Volume 3.

7.6 Air Treatment Facilities

As described in Section 6, air treatment facilities will be required at sites along the length of the pipeline at pump stations, break pressure chambers and tunnel structures, and will be of varying types including:

- Biofilters generally consist of a partially above ground open concrete chamber with filter media and associated buried ducting with mechanical and electrical equipment housed in a building enclosure of approximately 4 – 5m eaves height;
- Biological trickling filters generally consist of a number of tanks ranging in height from 3 – 5m and associated access platforms and ductwork with mechanical and electrical equipment housed in a building enclosure. These can typically be accommodated on a footprint of approximately 50 – 100m^2. Tanks ductwork and equipment can be left in the open with screening or enclosed in a building; and
- Inlet vent shaft (approx. 6m high by 400mm dia.).

Permanent paved vehicle access is required at each facility for inspection and maintenance purposes.

As the design progresses beyond concept design and further investigations are undertaken, the exact size and location of these air treatment facilities will be refined and confirmed.

Typical works associated with construction of air treatment facilities include:

- Site clearance, topsoil removal and excavation for foundations and below ground elements of structures;
- Construction of concrete foundations and chambers;
- Construction of buildings to house electrical and mechanical equipment or for tank enclosure;
- Installation and commissioning of tanks, access platforms, mechanical and electrical equipment

- Trenching and laying of ductwork and stormwater drainage;
- Formation of paved surfaces;
- Installation of site fencing; and
- Site reinstatement.

8 Consultation

In the early consultation phase, consultation activities for the North Harbour 2 Watermain and Northern Interceptor projects were combined, as these share similar geographic areas. The Greenhithe Bridge Watermain Duplication & Causeway and Northern Interceptor Phase 1 Projects were subsequently developed as a standalone physical works package, and the later Mana Whenua consultation records reflect that. At present consultation is underway for both the North Harbour 2 Watermain and Northern Interceptor projects. This consultation section highlights the aspects/outcomes of consultation as it relates to the Project.

8.1 Auckland Council

8.1.1 Local Boards

The Project is within the Upper Harbour and Henderson-Massey Local Board areas. Watercare has maintained engagement with the Local Boards regarding these works since 2013, and has recently provided them with an update on the status of the Project. Consultation is ongoing and regular updates have also been provided to other Local Boards as part of discussions on the Mangere WWTP.

8.1.1.1 Henderson-Massey Local Board

Watercare presented to the Henderson-Massey Local Board in March 2016. This presentation provided the Local Board with an overview of both the North Harbour 2 Watermain and Northern Interceptor, and discussed the proposed works within the Henderson-Massey Local Board Area, particularly those with parks and reserves. In May 2016, members of the Local Board attended a site visit with Watercare staff, where they visited various sites along both project alignments from Henderson to Albany.

8.1.1.2 Upper Harbour Local Board

Watercare presented to the Upper Harbour Local Board in April 2016. This presentation provided the Local Board with an overview of the North Harbour 2 Watermain and Northern Interceptor, and discussed the proposed works within the Upper Harbour Local Board Area. The focus of this presentation was primarily on the works within Wainoni Park, and the Board noted the following with respect to the Project:

- Residents have raised concerns over the disruption that will result from construction activities, and the uncertainty over the timing of the works;
- The Local Board would like to see further detail as to the extent of the proposed designation boundary and the footprint of the final pump station sites, and what construction activities will consist of;
- Possibility of improving the walking network around the park following completion of the works;

8.1.2 Parks, Sports and Recreation

The Project involves works within a number of parks and reserves managed by Auckland Council Parks, Sports and Recreation (PSR), and discussions have been ongoing since 2013 regarding the alignment and facilities to be located within parks. These parks include:

Table 8-1: Relevant Parks and Reserves

Relevant NoR	Local Board	Park/Reserve
NoR – NI (Waitakere)	Henderson-Massey	Taitapu Park
NoR – NI (Waitakere)	Henderson-Massey	Lowtherhurst Reserve
NoR – NI (Waitakere)	Henderson-Massey	Makora Park

Relevant NoR	Local Board	Park/Reserve
NoR – NI (Waitakere)	Henderson-Massey	Holmes Reserve
NoR – NI (Waitakere)	Henderson-Massey	Manutewhau Reserve
NoR – NI (Waitakere)	Henderson-Massey	St Margaret's Park
NoR – NI (North Shore)	Upper Harbour	Esplanade Reserve (Upper Harbour Highway)
NoR – NI (North Shore)	Upper Harbour	Collins Park
NoR – NI (North Shore)	Upper Harbour	Wainoni Park
NoR – NI (North Shore)	Upper Harbour	Wharepapa Reserve
NoR – NI (North Shore)	Upper Harbour	Rosedale Park

Watercare has held a number of meetings with PSR (North and West, Waitakere Ranges, and Henderson-Massey) since early 2015 to discuss the proposed works associated with the Project, and on occasion, PSR representatives to the local board have attended local board meetings alongside Watercare.

A site visit was held with the PSR team (North and West) in March 2016 to provide them with an overview of the proposed designation within Collins and Wainoni Park (break pressure chamber in Collins Park, and a Booster and Intermediate Pump Station in Wainoni Park). During this site visit, Watercare and the PSR team were able to meet with key a number of stakeholders – the Greenhithe Riding for the Disabled and North Harbour Air Gun Club – who lease park land in Wainoni Park, and Watercare staff were able to meet with the Greenhithe Pony Club separately. The potential effects of the proposed works on the operation of the clubs, the present and future uses of the park, as well as the potential location of infrastructure within the park was discussed at these meetings.

During this site visit, the PSR team raised a number of concerns regarding the proposed designation, including:

a) Whether PSR would be able to develop the parks over designated areas;

b) What the extent of the designation boundaries will be once works have been completed;

c) What the construction areas and duration of works would be; and

d) A number of large infrastructure projects are underway in multiple parks/reserves, which are disruptive to users and restricts the ability to use/change use within the park/reserve;

A further site visit with PSR (Henderson-Massey) was held in May 2016, with members of the local board. A number of sites were visited, including St. Margarets Park and Manutewhau Reserve. In addition to the concerns raised by the PSR (North and West) team, PSR (Henderson-Massey) noted the following with respect to the proposed designation:

e) What will above ground structures look like, and will they impact the use of the parks; and

f) What alternatives (e.g. what alignments outside of parks/reserves) were considered?

Watercare has been working with the PSR team to address these issues, and has provided PSR with further details on alternatives considered and works/projects with other infrastructure providers are being coordinated. Furthermore, Watercare has engaged with PSR on conditions relating to points a), b) and e) above (refer to Section 10.11.13 of this Report and Appendix F for further details).

8.1.3 Regulatory

Watercare has maintained engagement with Council's Major Infrastructure Projects Resource Consents team, as well as the North West Planning and Policy Team. These discussions covered matters such as the need and scope for the project, the statutory requirements and process, and the potential effects of the works. This has included a site visit in March 2016, and various meetings (including a pre-lodgement meeting in September 2016) to discuss the Project.

8.2 Mana Whenua

Watercare has led the engagement process to date with Mana Whenua. Watercare's summary of the engagement undertaken, and the key matters raised, is set out below.

8.2.1 Mana Whenua Participants

The 19 Mana Whenua entities with a potential interest in the Northern Interceptor Project include:

Ngāi Tai Ki Tāmaki	Ngāti Te Ata	Te Akitai
Ngāti Manuhiri	Ngāti Wai	Te Kawerau a Maki
Ngāti Maru	Ngāti Whanaunga	Te Patukirikiri
Ngāti Paoa	Ngāti Whatua o Kaipara	Te Rūnanga o Ngāti Whatua
Ngāti Rehua Ngātiwai Ki Aotea	Ngāti Whatua o Orakei	Te Uri o Hau
Ngāti Tamaoho	Te Ahiwaru	Waikato Tainui
Ngāti Tamaterā		

Mana Whenua underlined in the above list have indicated a particular interest in the Project and have participated in the engagement process to date.

8.2.2 Engagement Process

The engagement process has involved:

- Initial briefing to Watercare's Mana Whenua Kaitiaki Forum (MWKF) in July 2013;
- Initial briefing meetings in late 2013 with Mana Whenua who indicated an interest in the projects;
- Further engagement with interested Mana Whenua, including meetings and site visits as appropriate;
- Update on the projects to all Mana Whenua entities in November 2014 to confirm those parties already involved in the process, and to invite others to participate if they wished to do so, with the focus being primarily on the Greenhithe Bridge Watermain Duplication & Causeway and Northern Interceptor Phase 1 Projects;
- Further engagement with the interested Mana Whenua entities;
- Supply and review of Cultural Impact Assessments (CIA);
- Update on the projects to all Mana Whenua entities in August, November and December 2015 to confirm those parties already involved in the process, and to invite others to participate if they wished to do so, for the projects; and
- Further engagement with interested Mana Whenua in early 2016, including meetings and site visits as appropriate;

8.2.3 Kaitiaki Managers' Projects List

An established process is in place for Mana Whenua engagement on projects initiated by Watercare. This process includes early notification of works to be undertaken by Watercare which do or are likely to require resource consent.

A "Kaitiaki Managers Projects List" is provided on an approximately monthly basis to nominated representatives of all 19 Mana Whenua in the Council area. A brief summary of each project is included in the list, along with an identification of the applicable PAUP CIA rules. 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 Northern Interceptor project has been on the Kaitiaki Managers Project List provided to Mana Whenua since July 2013. Eight Mana Whenua entities indicated their interest at the start of the projects, and to date, six Mana Whenua entities have been actively involved in hui and site visits with Watercare.

- Ngāti Manuhiri;
- Ngāti Whātua o Ōrākei;
- Te Kawerau a Maki;
- Ngāti Maru;
- Te Akitai;
- Te Rūnanga o Ngāti Whātua;
- Ngaati Whanaunga; and
- Ngāti Paoa.

Those Mana Whenua that are underlined, also indicated an interest in the North Harbour 2 Watermain project. Due to the close interrelationship of these projects, conversations about the projects would naturally overlapped, a fact that is reflected in the record of engagement (Table 8-2 below).

8.2.4 Cultural Impact Assessments

A number of CIAs were prepared for Phase 1 of the Northern Interceptor and in some instances, they address the entire project area. Key points raised within these CIAs are summarised in the discussion below, and were previously supplied to Council. With respect to CIAs for the future phases (the subject of this Report), Mana Whenua have noted that they would like to be engaged closer to the time construction is expected to commence. In the interim, Watercare will continue regular discussions with all Mana Whenua who have expressed an interest in the Project.

8.2.5 Mana Whenua Involvement

The following table summarises the engagement undertaken to date with Mana Whenua.

Table 8-2: Summary of Mana Whenua Engagement

Mana Whenua	Involvement to Date
Ngāi Tai Ki Tāmaki	Ngāi Tai Ki Tāmaki was initially advised of the projects (both the North Harbour No. 2 Watermain and Northern Interceptor Projects) via the MWKF and distribution of the Kaitiaki Managers Projects List in July 2013. Ngāi Tai did not register their interest in the projects at that stage. Subsequent to this, an update on the projects were provided to all Mana Whenua in November 2014. This updated included an invitation to participate in further engagement. At this stage, Ngāi Tai responded confirming their interest in the projects, and requested further involvement.

Mana Whenua	Involvement to Date
	As such, a hui was held in November 2014 to update Ngāi Tai on the process to date and to provide further information on the projects. Upon reviewing the information, Ngāi Tai confirmed their interest in the preparation of a CIA for the Greenhithe Bridge and Watermain Duplication & Causeway project, and the North Harbour No. 2 Watermain project. In January 2015, the following CIAs were received from Ngāi Tai: • Cultural Impact Assessment Report: North Harbour No. 2; and • Cultural Impact Assessment Report: Greenhithe Bridge Duplications. A further update on the status of the projects was provided to all Mana Whenua in August 2015, which included an invitation to discuss the projects further, to which Ngāi Tai Ki Tamaki replied indicating their interest to meet. A hui was then arranged in September 2015, and the following points were discussed: • Alternatives considered for the GBWD&C and Northern Interceptor Phase 1 projects, and the preference for works to be undertaken outside the CMA; • Proposed conditions; and • Involvement of iwi entities going forward and opportunities for cultural elements to be incorporated in to the final design. In August and December 2015 a further update on the NH2 Watermain and Northern Interceptor NoRs was provided to all Mana Whenua, both included an invitation to meet to discuss these projects further. At this stage, Ngāi Tai indicated their continued interest in the project, and a Watercare arranged a hui that took place in May 2016. At this meeting, the following matters were discussed: • The Northern Interceptor Project and the recently lodged consent application and notices of requirement for the North Harbour No. 2 Watermain project; • Areas of primary interest to Ngāi Tai, including works near stream crossings, public reserves and coastal areas; and • Proposed conditions recommendations for works associated with these projects. Following this hui, Watercare provided a formal response to Ngāi Tai Ki Tāmaki's recommendations, which also included proposed conditions. Although these recommendations relate to the North Harbour No. 2 Watermain project, this Project has used these as the basis for the proposed conditions (attached as Appendix F).
Ngāti Manuhiri	Ngāti Manuhiri was initially advised of the projects (both the North Harbour No. 2 Watermain and Northern Interceptor Projects) via the MWKF and distribution of the Kaitiaki Managers Projects List in July 2013. Ngāti Manuhiri registered their interest in the projects at that time, and further correspondence was provided in November 2013, which provided an overview of the projects. The works and proposed alignments were discussed at a meeting in February 2014 and the draft archaeological assessment for the NH2 Watermain project provided in March 2014. Ngāti Manuhiri confirmed their primary interest is in the works north of the Greenhithe Bridge, particularly works in coastal areas, stream crossings and mitigation planting. Cultural monitoring was requested for works near any known recorded archaeological sites. An update on the projects was provided in November 2014, including a request to meet to discuss the projects. Ngāti Manuhiri responded confirming they wish to prepare a CIA. An update meeting was held with Ngāti Manuhiri and Te Kawerau a Maki in November 2014. Concerns regarding proposed Northern Interceptor works within the North Shore Memorial Park were raised. Ngāti Manuhiri confirmed that although their primary interest lies north of the Greenhithe Bridge, they support Te Kawerau a Maki's views on proposed works in the Upper Harbour, and also the identified opportunities to recognise cultural values. A further site visit was held with Ngāti Manuhiri in May 2015. A further update on the status of the projects was provided to all Mana Whenua in August 2015, and included a request to meet to discuss the projects, of which Ngāti Manuhiri confirmed their interest. In the interim, Watercare received a CIA from Ngāti Manuhiri in

Mana Whenua	Involvement to Date
	October 2015 relating to the combined Greenhithe Bridge Watermain Duplication and Causeway and Northern Interceptor (Phase 1) Projects. A hui was held with Ngāti Manuhiri in November 2015 to discuss the works associated with components of the Northern Interceptor project. A hui was held with Ngāti Manuhiri in November 2015, and the following topics were discussed: • Alternative alignments considered through the NSMP, as Ngāti Manuhiri do not support the pipeline passing through an urupā; • The recommendations included in the CIA; • Timing of engagement prior to construction activities being undertaken; and • Construction methodologies for works within the CIA. Following this meeting, Watercare provided Ngāti Manuhiri with a response to the recommendation set out in the CIA, as well as an overview of alternatives considered through the NSMP. In August and December 2015, an update on the status of the NH2 Watermain and Northern Interceptor NoRs was provided to all Mana Whenua. Both updates included an invitation to discuss these projects further. Ngāti Manuhiri replied and indicated their continued interest in the project, and a meeting was held to discuss the project in February 2016. At this meeting, Ngāti Manuhiri expressed interest in the works around the Schnapper Rock Road, as these areas were highly trafficked by Mana Whenua in the area. Ngāti Manuhiri would like to ensure that as far as possible, the sensitivity and integrity of the site (at Schnapper Rock Road and the North Shore Memorial Park) is considered in the development of the project, and any potential and actual effects are managed appropriately. Further information and technical reports have been provided to Ngāti Manuhiri. At this time, Ngāti Manuhiri indicated that as physical works associated with this Project will not be undertaken for a number of years, a CIA was not considered necessary at this stage.
Ngāti Maru	Ngāti Maru was initially advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013. Ngāti Maru registered their interest at that time. An additional letter was sent in November 2013 including an overview of the projects and requesting further confirmation of their interest. Watercare met with Ngāti Maru in December 2013 and provided an overview of the works. Items discussed included construction methodology, services relocation, potential for discovery of koiwi and lava caves during construction, and potential cultural monitoring requirements in some areas. Further updates on the projects were provided to Ngāti Maru at regular meetings during 2014. Ngāti Maru confirmed their primary area of interest is in the proposed works north of the Greenhithe Bridge. Watercare received a CIA from Ngāti Maru in July 2014 relating to the NH2 project. Ngāti Maru's main concerns were discussed in the CIA, including the potential impact on land of significance to Ngāti Maru due to its past history and usage, and the potential for disturbance of remaining historical evidence. The project corridor intercepts two historic coastal settlement areas accessed by the Marutahu people in the west for fishing, hunting and trapping. Cultural monitoring has been requested. In mid-December 2014, Ngāti Maru advised that they would defer to Ngāti Manuhiri for the proposed works in Greenhithe, but advised that they wished to prepare a CIA for the Northern Interceptor, which was received in January 2015. In August and December 2015, an update on the status of the NH2 Watermain and Northern Interceptor NoRs was provided to all Mana Whenua. Both updates included an

Mana Whenua	Involvement to Date
	invitation to discuss these projects further. To date, Ngāti Maru have not indicated any further interest in the project.
Ngāti Whatua o Orakei	Ngāti Whatua o Orakei were initially advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013, and registered their interest at that time. An additional letter was sent in November 2013 including an overview of the projects and requesting further confirmation of their interest. Watercare met with Ngāti Whatua o Orakei in February 2014. Points discussed included the opportunity for Ngāti Whatua o Orakei to be involved in possible cultural arts initiatives, the use of native vegetation for reinstatement planting, extent of mangrove removal associated with the proposed causeway widening, and the effects of stormwater and wastewater discharges. An e-mail confirming Ngāti Whatua o Orakei's interest was received following the meeting. This included avoiding cultural heritage and archaeological sites, and opportunities for works around waterways to enhance ecological function and native habitat / biodiversity. Watercare met again with Ngāti Whatua o Orakei in May 2014 to provide an update on the projects, relating primarily to the Greenhithe Bridge Watermain Duplication & Causeway and Northern Interceptor projects. Topics discussed included the potential integration of project works with future cycleway development, the methodology for stream crossings, riparian planting and proposed causeway widening. An update on the projects was provided to Ngāti Whatua o Orakei in November 2014, including a request to meet to discuss the project. No response was received at this time, however, Ngāti Whatua o Orakei attended a site visit in May 2015 and raised concerns regarding works within the CMA and alternatives considered. In August and December 2015, an update on the status of the NH2 Watermain and Northern Interceptor NoRs was provided to all Mana Whenua. Both updates included an invitation to discuss these projects further. Ngāti Whatua o Orakei indicated their continued interest in the projects, and a hui was held at Ngāti Whatua's offices to discuss these projects in January 2016. Points discussed included the opportunity for Ngāti Whatua to be involved in the provision of native vegetation for reinstatement planting, and with respect to the GBWD&C and NI Phase 1 projects, to be involved in any discussions around the naming of the shared path along the reclamation.
Te Akitai	Te Akitai was initially advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013, and registered their interest at that time. Subsequent to this, an introductory letter was sent in November 2013 which included an overview of the projects and requested further confirmation of their interest. At a meeting in December 2013, Te Akitai indicated their particular areas of interest on the NH2 Watermain related to any potential discharges, stream crossings, areas of work not within road reserve, and landscape modifications. General project updates were provided to Te Akitai at regular meetings during 2014, and a written update provided in November 2014. The need for the proposed causeway widening at Hobsonville, and the options considered were a key point of discussion at a meeting with Te Akitai in November 2014. In August and December 2015, an update on the status of the NH2 Watermain and Northern Interceptor NoRs was provided to all Mana Whenua. Both updates included an invitation to discuss these projects further. To date, no response has been received from Te Akitai to confirm their continued interest.

Mana Whenua	Involvement to Date
Te Kawerau a Maki	Te Kawerau a Maki was initially advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013, and registered their interest at that time. Subsequent to this, an introductory letter was sent in November 2013, which included an overview of the projects and requested further confirmation of their interest. Watercare met with Te Kawerau a Maki later that month to provide an overview of the NH2 and Northern Interceptor projects. Potential areas of interest to Te Kawerau a Maki were discussed. This included Lucas Creek as a significant cultural area, preference for works to take place where land has already been modified rather than coastal areas, and opportunities for ecological enhancement. Te Kawerau a Maki's initial CIA for the Northern Interceptor project was received in February 2014. The main points noted, and which confirmed the points discussed at the previous meeting, were: • Their preference for works to take place within the road corridor or other modified sites and to avoid the shorelines and waterways; • Any works within the coastal environment should be deep or well under harbour channels. Ecological enhancement will be necessary where works pass through the coastal environment; • A taniwha is present in the South East portion of the project corridor; therefore works around Hellyers Creek should be avoided; and • Lucas Creek and Bomb Point should be avoided due to high environmental and cultural values, and the future development of a Marae. Watercare and Te Kawerau a Maki met again in March 2014. Feedback from Te Kawerau a Maki included support for integration of the NH2 project works with future cycleway development, their preference for the proposed pipelines to be located within roads and motorway corridors, and opportunities for stream crossings to include enhancement works. An update meeting was held with Ngāti Manuhiri and Te Kawerau a Maki in November 2014. The significance of the Upper Harbour and Lucas Creek to Te Kawerau a Maki was restated. Opportunities for ecological restoration at stream crossings and at the proposed causeway widening were discussed. It was also suggested that a cultural art work could be installed on the widened causeway, acknowledging the history and significance of the area. In August and December 2015, an update on the status of the NH2 Watermain and Northern Interceptor NoRs was provided to all Mana Whenua. Although no response was received, Watercare followed up in February 2016 and a time, Te Kawerau a Maki confirmed their continued interest. Subsequent to this, Watercare arranged a hui and site visit in March 2016. Discussed at this meeting was a concern over the presence of Kauri dieback, which is prevalent in the Albany Area (particularly around Oteha Stream, which is part of the North Harbour No. 2 Watermain Project), and how this was going to be managed during construction.
Te Rūnanga o Ngāti Whatua	Te Rūnanga o Ngāti Whatua was initially advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013. They did not register an interest in the projects. An update on the projects was provided to all Mana Whenua in November 2014, including an invitation to engage further. Te Rūnanga o Ngāti Whatua responded requesting that Watercare provide them with the responses received from Mana Whenua engaged in the projects to date and would provide their confirmed position following this. In August and December 2015, an update on the status of the NH2 Watermain and Northern Interceptor NoRs was provided to all Mana Whenua. Both updates included an invitation to discuss these projects further. Te Rūnanga o Ngāti Whatua replied and indicated their continued interest in the project, and a meeting was held to discuss the project in February 2016. Overall, Te Rūnanga o Ngāti Whatua noted that they support

Mana Whenua	Involvement to Date
	the project, and would like to continue discussions. Watercare confirmed that engagement with Te Runanga o Ngāti Whatua will continue during project development.
Ngāti Tamaoho	Ngāti Tamaoho was initially advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013. They did not register an interest in the projects. An update on the projects was provided to all Mana Whenua in November 2014, including an invitation to engage further. Ngāti Tamaoho responded confirming that they would defer to Mana Whenua already engaged in the projects.
Ngāti Whatua o Kaipara	Ngāti Whatua o Kaipara was initially advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013. They did not register an interest in the projects. An update email was sent regarding the NH2 Watermain project in May 2014, advising which iwi were involved at that time, and offering further information or a meeting to discuss the project. No response was received. An update on the projects was provided to all Mana Whenua in November 2014, including an invitation to engage further. No response was received from Ngāti Whatua o Kaipara. A further update on the status of the projects, and an invitation to engage further, was provided to all Mana Whenua in August 2015. Ngāti Whatua o Kaipara replied at this time, indicating their interest, and requested a site visit. A hui and site visit was held in September 2015. Points discussed included their support of the projects, the opportunity for Ngāti Whatua o Kaipara to be involved in possible cultural arts initiatives, the use of native vegetation for reinstatement planting, and pest control. In August and December 2015, an update on the status of the NH2 Watermain and Northern Interceptor NoRs was provided to all Mana Whenua. Both updates included an invitation to discuss these projects further. A hui was held with Ngāti Whatua o Kaipara in March 2016, and the following points were discussed: • Areas of interest to Ngāti Whatua o Kaipara with respect to the Project, and areas which are to be deferred to Ngāti Whatua o Orakei; • Recently consented works; • Cultural monitoring and further engagement during construction activities; and • The ability for Ngāti Whatua o Kaipara to have involvement in the provision of planting and interpretation signage once works are complete; Watercare will continue to engage with Ngāti Whatua o Kaipara on these matters.
Ngāti Whanaunga	Ngāti Whanaunga was initially advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013. They did not register an interest in the projects. An update email was sent regarding the NH2 Watermain project in May 2014, advising which iwi were involved at that time, and offering further information or a meeting to discuss the project. No response was received. An update on the projects was provided to all Mana Whenua in November 2014, including an invitation to engage further. No response was received from Ngāti Whanaunga. Ngāti Whanaunga registered their interest in the projects for the first time via the Kaitiaki Managers Projects List in February 2015. Updated information on the projects was provided to Ngāti Whanaunga including another invitation to engage further, no response was received. In August and December 2015, an update on the status of the NH2 Watermain and Northern Interceptor NoRs was provided to all Mana Whenua. Both updates included an invitation to discuss these projects further. To date, no further response has been received from Ngāti Whanaunga.

Mana Whenua	Involvement to Date
Te Uri o Hau	Te Uri o Hau was initially advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013. They did not register an interest in the projects. An update on the projects was provided to all Mana Whenua in November 2014, including an invitation to engage further. Te Uri o Hau responded confirming that the projects are outside their statutory area of interest.
Waikato Tainui	Waikato Tainui was initially advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013. They did not register an interest in the projects. An update on the projects was provided to all Mana Whenua in November 2014, including an invitation to engage further. Waikato Tainui responded requesting that Watercare undertake a full assessment against the Waikato Tainui Environmental Plan to ensure consistency with it.
Ngāti Paoa Ngāti Rehua Ngātiwai Ki Aotea Ngāti Tamaterā Ngāti Te Ata Te Ahiwaru Te Patukirikiri	Ngāti Paoa, Ngāti Rehua Ngātiwai Ki Aotea, Ngāti Tamaterā, Ngāti Te Ata, Te Ahiwaru and Te Patukirikiri were initially advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013. They did not register an interest in the projects. An update on the projects was provided to all Mana Whenua in November 2014, including an invitation to engage further. No responses were received from Ngāti Paoa, Ngāti Rehua Ngātiwai Ki Aotea, Ngāti Tamaterā, Ngāti Te Ata, Te Ahiwaru or Te Patukirikiri.
Ngāti Wai	Ngāti Wai was advised of the projects via the MWKF and distribution of the Kaitiaki Managers Projects List in 2013. They did not register an interest in the projects.

8.2.6 Mana Whenua Recommendations

As noted above, engagement for this Project, and the North Harbour No. 2 Watermain Project, has been ongoing since 2013. A number of CIAs have been prepared that relate to both the wider components of works (being the North Harbour 2 Watermain and Northern Interceptor in their entirety) as well as the recently consented Greenhithe Bridge Watermain Duplication & Causeway and Northern Interceptor Phase 1 projects.

These CIA contained a number of recommendations as to how potential cultural effects could be addressed. Generally, the issues raised were related to (in part) erosion and sediment control matters, accidental discovery protocols and the management of construction activities. Watercare considered these recommendations and where possible, incorporated them into the conditions for the Greenhithe Bridge Watermain Duplication & Causeway and Northern Interceptor Phase 1 Projects. These final conditions have been the foundation for drafting the conditions for this Project.

8.3 Transport Authorities

The Project interfaces with the State Highway and local road network at a number of locations, as summarised earlier in this report. Meetings with representatives of the NZ Transport Agency, Auckland Motorway Alliance (AMA), and Auckland Transport (AT) have taken place to discuss the proposed works.

8.3.1 NZ Transport Agency and Auckland Motorway Alliance

Watercare, the NZ Transport Agency and AMA staff have met since 2014 to discuss the organisations' various projects in the northern and north-western parts of Auckland, including the Northern Interceptor. This liaison will continue into the future and will include detailed consideration of the progress and schedule of the works under and along the motorway corridor. Detailed design reports will be submitted

to the NZ Transport Agency and AMA as part of the Corridor Access Request (CAR), and Watercare has an Agreement in Principle for works within the motorway corridor. This agreement is contained in Appendix C.

8.3.2 Auckland Transport

Initial discussions with AT have canvassed the general scope of the Project, as much of the works are within the road corridor. Trenching activities within road carriageways are common throughout Auckland and there are well established procedures in place to manage the associated traffic impacts.

AT will be closely involved in detailed design of the project and during preparation and implementation of the required Traffic Management Plans. CARs will be submitted to AT for approval for all works within roads. As roads in the North Shore section of the District Plan are also designated, works undertaken in North Shore roads will also require written approval under Section 176 of the RMA. AT in its provision of the Works Access Permit provides its approval under Section 176.

Watercare has recently presented to AT's planning and program delivery teams in June and September 2016.

8.4 Network Utilities

The Project interfaces with other utility services along the full length of the proposed route. These include (but are not limited to):

- Vector Ltd.
- Radio New Zealand

Watercare meet regularly with Vector Ltd. at bi-monthly project coordination meetings, and have met with Radio New Zealand on a number of occasions to discuss the proposed designation. Watercare will continue to engage with these and other network utilities during the design process in order to confirm the locations of existing services or any future development plans in the vicinity of the proposed construction sites.

During the preparation and implementation of the Construction Management Plan (CMP) Watercare will work collaboratively with network utility operators in relation to the management of potential adverse effects on the assets network utility operators (refer to Appendix F for the proposed conditions). The CMP will also detail the procedures for the management of works that are in close proximity to or directly affected network utilities.

8.5 Other Agencies

8.5.1 Heritage New Zealand

Although no known archaeological sites will be affected by the proposed works, Watercare intends to apply for an archaeological authority under Section 44(a) of the Heritage New Zealand Pouhere Taonga Act (2014) (HNZPTA) to cover all works undertaken for the project as a precaution.

8.6 Directly Affected Landowners

The directly affected landowners are listed in Appendix D. These include private landowners, Crown agencies, Council and AT. Watercare note that landownership is presently in flux, due to ongoing development occurring in this area, and efforts have been made to ensure that the list of directly affected landowners is accurate.

All owners of land in which the proposed works are to be located have been contacted by Watercare. The consultation undertaken with the directly affected landowners is summarised below.

8.6.1 Residential Landowners and Developers

A number of private residential properties and land earmarked for development will be directly affected by the proposed designation. The owners of these properties have been contacted by Watercare, and have been provided with an overview of the proposed works as it relates to their property, and an invitation to meet with Watercare to discuss the projects. Initial discussions have commenced, and matters raised by directly affected landowners and developers will be addressed as part of the ongoing negotiations between each of the landowners and Watercare.

8.6.2 Commercial Landowners

Watercare has begun consultation with representatives from each of the commercial properties listed in Appendix D. The effects on these private properties include both temporary and permanent effects. Depending on the extent of work at each site, Watercare will seek agreements for access and occupation at each of these properties.

At the time of writing this report, the necessary property access and occupation arrangements are not finalised, but initial discussions have commenced. Matters raised by directly affected commercial landowners will be addressed as part of the ongoing negotiations between each of the landowners and Watercare.

8.6.3 Landowners in Proximity

In order to raise awareness of the proposed works for those landowners in proximity to the designation boundary, and those in the surrounding community, Watercare has distributed project flyers to owners/occupiers within the vicinity of the proposed designation. Included in this invite was an invitation to Open Evenings, which were held in early April 2016.

Landowners and occupiers along the proposed route will also be contacted as part of the pre-construction and construction phases of the project to provide information on the proposed works, to request information on any special access or other requirements, and to ensure potentially affected parties have a key point of contact during construction activities. This communication is an integral part of Watercare's construction works throughout Auckland and is a well-established process.

8.7 Other Interest Groups and Organisations

8.7.1 Greenhithe Pony Club

The Greenhithe Pony Club (GPC) leases the grounds at Wainoni Park South from Auckland Council and adjoins the land leased by Greenhithe Riding for the Disabled Association at Wainoni Park North. The pony club's facilities include a cross country course, all weather floodlit arena, equipment sheds, covered grooming area and clubhouse. The pony club are generally supportive of the proposed works and have indicated that the proposed construction works within Wainoni Park can be accommodated with sufficient notice. Furthermore, opportunities have been identified to achieve mutually beneficial outcomes such as alleviating safety concerns with the existing access road by creating a new access way for construction. Watercare will continue to consult with the Greenhithe Pony Club as the project progresses.

8.7.2 Greenhithe Riding for the Disabled

The Greenhithe Riding for the Disabled Association (GRDA) is a non-profit organisation that provides opportunities for anyone with a disability to enjoy horse riding and horse related activities. The GRDA leases the grounds at Wainoni Park North from Auckland Council.

Watercare has met with the GRDA to discuss its facilities and operations on site. The GRDA were understanding of the need to provide for critical infrastructure and identified potential opportunities for improvements to their facilities that could be incorporated into the proposed works. Watercare will continue to consult with GRDA to further refine these potential opportunities and ensure that the needs of both parties can be accommodated.

8.7.3 North Harbour Air Gun Club

The North Harbour Air Gun Club (NHAGC) leases land at the northern-most part of Wainoni Park North. The club shoots paper target, metallic silhouettes and field targets. The club have a storage container on site and hold shooting events on alternate Sundays. Watercare has discussed the proposed works with the president of the NHAGC, who is understanding of the need for critical infrastructure. The opportunity to provide an earth bund around the edge of the shooting area to increase safety was also identified and may be incorporated into the proposed works subject to Council approval. Watercare will continue to consult with the NHAGC to ensure that any concerns about impacts on their operations are appropriately addressed and to further explore any opportunities for beneficial outcomes.

8.8 Public Consultation Events

Public consultation events were held at the following locations:

- Albany Junior High School, Appleby Road (March 25, 2015)
- Hobsonville Point Primary School, De Havilland Road (March 30, 2015)
- North Shore Dog Club, Wainoni Park (March 31, 2015)
- Hobsonville Point Secondary School, Hobsonville Road (April 12, 2016)
- Old School Building, Collins Park (April 13, 2016)
- Titirangi Primary School, Atkinson Road (April 14, 2016)
- Hobsonville Point Secondary School, Hobsonville Road (April 20, 2016)

Matters raised at these events included:

- Queries around the proposed alignments (particularly through Greenhithe) and alternatives considered;
- Confirmation that the proposed pipelines are to be installed below ground;
- Queries relating to the timing and duration of construction activities in residential areas;
- Broader inquiries with regard to the wastewater network outside the scope of the proposed works;

8.9 Key Consultation Outcomes

8.9.1 Summary of Key Issues

Generally, the parties consulted to date have been supportive of the Northern Interceptor project, acknowledging the need for new infrastructure to support Auckland's future growth and development. The main outcome of the consultation process to date has been the changes in alignment and refinements made along the proposed route and at some key sites.

Identifying opportunities to achieve mutually beneficial outcomes with affected landowners and occupiers, has also formed a key part of the consultation and will continue as the design is further developed.

8.9.2 Ongoing Consultation

The ongoing consultation process prior to construction will incorporate:

- Targeted and wider community consultation during the statutory process;
- Consultation with directly affected parties on matters of detail to be incorporated in final design; and
- Consultation with directly affected parties prior to construction to develop the details of the construction methodology and construction management plans.

A detailed project communications plan will also be developed prior to construction. The communications plan will cover matters such as:

- The methods of consultation and liaison with key stakeholders, owners and occupiers of neighbouring properties and the wider community regarding the likely timing, duration and effects of construction works;
- Name and contact details for the nominated community liaison person and alternative contact details in the event of that person not being available (to ensure a contact person is available during the construction phase); and
- Procedures to record and respond to complaints.

The communications plan will be implemented during construction, and updated and revised as appropriate.

9 Statutory Context

9.1 Section 171 of the RMA

Given Watercare is seeking to implement the Project by way of designation and an alteration to a designation, Section 171 of the RMA is relevant. Section 171 of the RMA sets out the matters that a territorial authority must, subject to Part 2[3], have particular regard to when considering the effects on the environment of allowing a Requirement[4]: These matters are set out in the table below.

Table 9-1: Section 171 Considerations

Section 171 Matters to consider	
a) Any relevant provisions of *i. A national policy statement* *ii. A New Zealand coastal policy statement* *iii. A regional policy statement or proposed regional policy statement* *iv. A plan or proposed plan;*	Refer to Section 9.2 and Appendix E of this Report.
b) Whether adequate consideration has been given to alternative sites, routes, or methods of undertaking the work if *i. The requiring authority does not have an interest in the land sufficient for undertaking the work*	Refer to Section 9.4 and Appendix A of this Report.
c) Whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought	Refer to Section 9.5 and Appendix A of this Report.
d) Any other matter the territorial authority considers reasonably necessary in order to make a recommendations on the requirement	Refer to Section 9.3 of this Report.

9.2 Relevant Statutory Documents and Provisions

Council must have particular regard to the relevant provisions of any national policy statement, regional policy statement, and regional and district planning documents when considering the effects on the environment of allowing a NoR. It is noted that, as this process is related to a NoR and unlikely to be constructed for a number of years, resource consents (e.g. regional consents) are not being sought at this time. Subsequently, consideration of the relevant statutory framework should be in the context of what is required for an NoR process, with the understanding that a number of matters will be (appropriately) addressed in greater detail through a future consenting process which will have the benefit of greater detail with regards to the design.

This section of the Report provides a summary of the statutory planning assessment undertaken for the Project. A list of the relevant statutory provisions are provided in Appendix E.

The relevant statutory planning documents include:

- New Zealand Coastal Policy Statement (2010)
- National Policy Statement for Freshwater Management (2014)
- Auckland Regional Policy Statement (1999)
- Proposed Auckland Regional Policy Statement (2013)
- Auckland Council Regional Plan: Coastal (2004)
- Auckland Council Regional Plan: Sediment Control (2001)

[3] See section 12 for an assessment of Part 2 matters

[4] See section 10 for an assessment of environmental effects of allowing the requirement

- Auckland Council Regional Plan: Air, Land and Water (2010)
- Auckland Council District Plan, North Shore Section (2002)
- Auckland Council District Plan, Waitakere Section (2003)
- Proposed Auckland Unitary Plan (2013)

9.2.1 New Zealand Coastal Policy Statement

The New Zealand Coastal Policy Statement (NZCPS) sets out objectives and policies in order to achieve the purpose of the RMA in relation to the coastal environment of New Zealand.

The NZCPS took effect on 3 December 2010 and replaces the NZCPS 1994. It contains objectives and policies which include those aimed at safeguarding the integrity, form, functioning and resilience of the coastal environment and sustaining its ecosystems, and preserving the natural character of the coastal environment. Local authorities are required by the RMA to give effect to the NZCPS through plans and policy statements.

The key objectives and policies of the NZCPS in relation to the Project are:

Table 9-2: Relevant Objectives and Policies (NZCPS)

Theme and Relevant Objectives/Policies	Comment
Safeguarding the integrity, form, functioning and resilience of the coastal environment ***Objective 1***	There will be temporary adverse effects on the coastal environment resulting from construction activities which may result in temporary adverse effects on the form of the coastal environment. However, once reinstated, it is considered that the Project will not result in adverse effects on integrity, form, functioning and resilience of the coastal environment.
Preserve and protect natural character and features, through the recognition of these characteristics, encouraging restoration of the coastal environment and identification and protection of those areas where use and development would be inappropriate. *The protection of indigenous biological diversity.* ***Objective 2, Policy 11, 13 and 15***	Vegetation within SEA_T_ SEA_T_8319 at The Eastern Abutment of the Greenhithe Bridge supports suitable potential habitat for at least five indigenous lizard species, four of which have a National threat classification of 'At Risk'. Threat rankings for some of these species, particularly those 'At Risk', may increase over the next 20 years. It is noted that the forest gecko, copper skink and ornate skink have been recorded from SEA_T_8319. The vegetation also has the potential to support roosting and nesting habitat for a range of common native bird species. Technical Report D recommends that preclearance surveys for lizards and nesting birds be undertaken where they have been identified as potentially present, and that a Lizard Management Plan should be prepared to address the potential presence and management of geckos and /or skinks within these areas. Through the adoption of proposed mitigation measures, it is considered that the Project will be consistent with this theme.
Recognise the role of tangata whenua as kaitiaki and provide of tangata whenua involvement in coastal environment management, taking into account the principles of the Treaty of Waitangi ***Objective 3***	Initial conversations with Mana Whenua have indicated that there are values associated with the coastal edges around Lucas Creek, in particular at the reserve located at Schnapper Rock Road, as well as within the Upper Waitemata Harbour. Watercare has engaged with tangata whenua throughout the investigation of alternatives and development of the Project, with the proposed route avoiding as far as practicable any ancestral lands, sites, waahi tapu and other taonga identified as being of significance to tangata whenua.

Theme and Relevant Objectives/Policies	Comment
	As noted in Section 8.2 of this Report, with respect to CIAs for the future phases of the Northern Interceptor, Mana Whenua have noted that they would like to be engaged closer to the time construction is expected to commence. In the interim, Watercare will continue regular discussions with all Mana Whenua who have expressed an interest in the Project.
Maintain and enhance public open space qualities and recreation opportunities in the coastal environment ***Objective 4***	There will be short term restrictions on public access and recreation in the coastal environment as a result of construction activities to ensure appropriate health and safety. Construction sites and works through these areas will be designed to minimise disruption on recreation and public access to and along the CMA and to publicly-owned land in the coastal environment as far as practicable. However, there will be temporary effects on public access during construction. Where temporary restrictions are necessary, Watercare will continue to consult with affected organisations to identify opportunities to address any restrictions.
Enable use and development of the coastal area to provide for people and communities social, economic, and cultural wellbeing as well as their health and safety (Objective 6) and acknowledging the importance of infrastructure while managing any adverse effects on identified and protected coastal environment values ***Objective 6 and Policy 6***	The Project has been developed to avoid as far as practicable adverse effects on the coastal environment. In the overall context of the Project the area of the coastal environment affected is relatively small and any impact on access to the affected area of coastal environment will be temporary. The provision of infrastructure to service growth in the area is essential in order to enable the people and communities of those areas to provide for their social and economic wellbeing and for their health and safety by providing for appropriate conveyance of sewage to the Rosedale WWTP. Policy 6 recognises that the provision of infrastructure is important to the social, economic and cultural well-being of people and communities. The Project is therefore consistent with Policy 6.
Require that use and development is not to result in a significant increase in sedimentation in the coastal marine area. ***Policy 22(2)***	The proposed earthworks will be undertaken in accordance with erosion and sediment control measures (TP90) and earthworks will be sequenced, limiting the amount of earthworks being undertaken at any one time. The implementation of erosion and sediment control measures outlined above should avoid any adverse effects on the mauri of waterbodies and riparian margins around the coastal environment.

In light of the above, it is considered that the proposed works are consistent with the requirements of the NZCPS. The designation corridor will take into account identified coastal values which warrant protection, and any mitigation of affects will be addressed during the pre-construction or construction phase.

9.2.2 National Policy Statement for Freshwater Management

The National Policy Statement for Freshwater Management (NPS:FM) sets out the objectives and policies for freshwater management under the RMA.

The NPS:FM endeavours to safeguard freshwaters ecological and human health values through the sustainable management of land and discharges of contaminants, manage freshwater quantity, manage by catchments, and provide for community and tangata whenua involvement in management. The NPS:FM also identifies tangata whenua and community values regarding freshwater and uses water quality measures to set objectives to protect these values. Relevant to the Northern Interceptor, the NPS:FM aims to:

Table 9-3: Relevant Objectives and Policies (NPS:FM)

Theme and Relevant Objectives/Policies	Comment
Safeguard the life-supporting capacity, ecosystem processes and indigenous species, and the health of people of communities which come into contact with freshwater ***Objective A1***	Erosion and sediment control measures in accordance with Technical Publication 90 – Erosion and Sediment Control: Guidelines for Land Disturbing Activities in the Auckland Region (TP90) or a similar standard, will be implemented throughout the Project area during all land disturbance works. These measures are expected to contribute towards the safeguarding of the life-supporting capacity of the waterbodies and ensure the overall freshwater quality is maintained. The proposed designation will safeguard the wastewater pipeline route, enabling these future communities to be serviced by the city's sewage treatment facilities, controlling discharges and overflows – meeting community and freshwater health outcomes, and avoiding sensitive freshwater habitats where practicable.
Ensure that tāngata whenua values and interests are identified and reflected in freshwater management through providing for iwi and hapū involvement ***Objective D1***	The NoR has been developed following engagement with a variety of stakeholders, including tāngata whenua and local communities. The designation covers a large corridor, and detailed design of the pipeline itself will further identify specific community and tāngata whenua interests and address them accordingly.

Overall, it is considered that the proposed designation is consistent with the objectives and policies above, and therefore with the NPS:FM.

9.2.3 Operative Auckland Regional Policy Statement

The Operative Auckland Regional Policy Statement (ARPS) became operative on 31 August 1999. The focus of the ARPS is the management, use, development, and protection of natural resources of the Auckland Region. The aim of the ARPS is to achieve certainty through integrated, consistent and coordinated management of the Auckland Region's resources.

The key objectives and policies of the ARPS (including Strategic Objectives and Policies) in relation to the Project are summarised and assessed below.

Table 9-4: Relevant Objectives and Policies (ARPS)

Theme and Relevant Objectives/Policies	Comment
Accommodate growth by giving effect to the purpose and principles of the RMA and LGA (Auckland) *Use natural and physical resources efficiently, while managing their use in an integrated matter to improve the overall health, wellbeing and quality of life in the region* ***Strategic Objectives 2.6.1.1, 2.6.1.12, 2.6.1.16 and 2.6.1.17 and Strategic Policy 2.6.14***	The Project, which is considered to be regionally significant infrastructure, will provide additional wastewater conveyance and treatment infrastructure to service the increasing urban development in the North West Auckland (the Service Catchment). The Project is needed to provide safe and efficient wastewater services to the growing Auckland Region. The proposed designation will safeguard the wastewater pipeline route, enabling these future communities to be serviced by the city's sewage treatment facilities, controlling discharges and overflows – meeting community and freshwater health outcomes. The construction and operation of the Project will provide necessary infrastructure that supports the economic and social wellbeing of the region.

Theme and Relevant Objectives/Policies	Comment
Involve tangata whenua in resource management decision making, to enable kaitiakitanga, take into account the principles of the Treaty of Waitangi and sustain the mauri or resources ***Objectives 3.3.1, 3.3.3 and 7.3.9***	Watercare has engaged with tangata whenua throughout the investigation of alternatives and development of the Project, with the proposed route avoiding as far as practicable any ancestral lands, water, sites, waahi tapu and other taonga identified as being of significance to tangata whenua. A range of mitigation measures, such as erosion and sediment controls in accordance with TP90 during construction, will be undertaken which will assist in sustaining the mauri of natural resources such as waterbodies and the coastal environment.
Preserve and protect the diverse range of the regions heritage resources and in particular, Outstanding Natural Landscapes are protected from inappropriate subdivision, use and development ***Objective 6.3.1***	As noted in Technical Report B, one heritage building is recorded within c.100m of the proposed NoR – NI (Waitakere). This is the Radio New Zealand Transmitter Building which is scheduled within the Auckland Council District Plan – Operative Waitakere Section 2003 (ID 1174) and as a Category A historic heritage place within the PAUP (Appendix 9: ID 56). The proposed works are anticipated to have no effect on the recorded extent of this site.
Preserve natural character and protect outstanding natural features from inappropriate use, while allowing for appropriate use and development and maintaining public access to and along the CMA and to publicly-owned land in the coastal environment ***Objectives 7.3.1, 7.3.3, 7.3.4 and 7.3.6 and Policies 7.4.4, 7.4.10 and 7.4.13***	The infrastructure associated with the Project will generally be sub-surface, and any infrastructure located above ground will not be within any known areas of high natural character. The proposed alignment traverses a number of reserves and public open spaces. Construction sites and works through these areas will be designed to minimise disruption on recreation and public access to and along the CMA and to publicly-owned land in the coastal environment as far as practicable. However, there will be temporary effects on public access during construction. Public access will only be restricted temporarily to the extent necessary to carry out the works in a safe manner, and will only be restricted for the relatively short period of construction in the coastal environment.
Maintain and enhance water quality by controlling elevated sediment discharges and recognising Maori traditional values in the management of water resources ***Objective 8.3.1 and Policy 8.4.7.3***	In some instances, earthworks will be required in riparian margins. Erosion and sediment control measures will be implemented (TP90) for the duration of the land disturbance activities undertaken as part of the project. The measures are expected to prevent the discharge of sediment laden water to nearby waterbodies, particularly in areas on slopes and land subject to instability. Resource consents have not been applied for at this time because, commensurate with the "route protection" phase that the project has reached, only a concept level of design has been undertaken of the network and this is insufficient to inform those resource consent applications. The necessary resource consents (include those for coastal permits) will be applied for at the time of detailed design of the network in the future.
To remedy or mitigate any adverse effects of existing contaminated sites ***Objective 17.3.1***	As noted in Technical Report C, the Preliminary Site Investigation indicated that there is potential to encounter contaminated soil during the works, and that there is a very low to moderate risk for significant contamination to be encountered (depending on the source of contamination). Subject to the adoption of recommended mitigation measures, it is considered that the proposed works can be undertaken in

Theme and Relevant Objectives/Policies	Comment
	a manner that mitigates any adverse effects on existing contaminated sites.

The Project achieves these objectives and policies as it is a strategic piece of infrastructure, required to service the future growth of the region. Based on the assessment above it is considered that the Project is consistent with the ARPS.

9.2.4 Proposed Auckland Regional Policy Statement

The Proposed Auckland Regional Policy Statement (PARPS) focuses on the management, use, development, and protection of natural resources of the Auckland Region. The aim of the PARPS is to achieve certainty through integrated, consistent and coordinated management of the Auckland Region's resources.

At the time of writing this Report, the Independent Hearing Panel has provided its recommendations to the Auckland Council and the Auckland Council has released the decision version of the Auckland Unitary Plan (AUP) on 19 August. The following table provides an assessment of the Project against the relevant Objectives and Policies of the decision version of the AUP:

Table 9-5: Relevant Objectives and Policies (PARPS)

Theme and Relevant Objectives/Policies	Comment
Provide for sufficient development capacity to accommodate projected population and business growth, and avoiding development of land within a close proximity to planned infrastructure **Objective B2.2.1(3) and Policy B2.4.2(6)**	The Project is regionally significant infrastructure, in that it will provide additional wastewater conveyance and treatment infrastructure to service the increasing urban development in the North West Auckland (the Service Catchment). The Project constitutes an integrated and cost effective solution for the network, addressing the capacity of the network to provide for increased growth in the Service Catchment. Once completed, the Project will facilitate the continued effective operation of the wastewater network generally, and provide capacity in the wastewater network for future growth and development in the Auckland region.
Provide resilient and high quality infrastructure which services the wider community and enable the development, operation, maintenance and upgrading of significant infrastructure which is integrated with landuse development and protected from reverse sensitivity effects while managing adverse environmental effects ***Objectives B3.2.1(1), B3.2.1(2), B3.2.1(3), B3.2.1(4), B3.2.1(5), B3.2.1(6) and B3.2.1(8); Policies B3.2.2(1), B3.2.2(3), B3.2.2(4), B3.2.2(6), B3.2.2(7) and B3.2.2(8)***	The increasing urban development in the Service Catchment area requires additional wastewater conveyance and treatment infrastructure to service this growth. The construction and operation of the Project will therefore provide infrastructure that supports the economic and social wellbeing of the region. Watercare's service objectives require development of resilient assets to meet required service delivery standards and foreseeable future needs. This includes providing sufficient capacity to convey and treat wastewater. Once completed the Project will facilitate the continued effective operation of the wastewater network generally, and provide capacity in the wastewater network for future growth and development in the Auckland region. This will also help to prevent further major wastewater overflows by providing appropriate infrastructure. Watercare will maintain and enhance the wastewater infrastructure for the northern Auckland Region by implementing the Project. This will ensure the long-term integrity for the expected population increase over the next 30 years.

Theme and Relevant Objectives/Policies	Comment
	The proposed designation will safeguard the wastewater pipeline route, enabling these future communities to be serviced by the city's sewage treatment facilities, controlling discharges and overflows – meeting community and freshwater health outcomes. The Project is proposed to be staged so as to adequately respond to actual population uptake, rather than build an oversized pipeline based on conservative population projections. The designation will give Watercare the capability to undertake construction as things change in the network, and will give developers and Auckland Council certainty that critical infrastructure will be provided. This also provides assurance that the areas being developed will be serviced (or have the ability to be serviced/connected to), supporting residential and business growth. The provision of infrastructure to service growth in the area is essential in order to enable the people and communities of those areas to provide for their social and economic wellbeing and for their health and safety by providing for appropriate conveyance of sewage to the Rosedale WWTP.
Avoid significant adverse effects to significant historic heritage places and encourage new development to have regard to the protection and conservation of any surrounding or adjacent significant historic heritage places ***Objective B5.2.1(1) and Policy B5.2.2(8)***	As noted in Technical Report B, one heritage building is recorded within c.100m of the proposed NoR – NI (Waitakere). This is the Radio New Zealand Transmitter Building which is scheduled within the Auckland Council District Plan – Operative Waitakere Section 2003 (ID 1174) and as a Category A historic heritage place within the PAUP (Appendix 9: ID 56). The proposed works should have no effect on the recorded extent of this site.
Enable use and development of, and the safeguarding of the integrity, form and function (including public access) of the coastal environment whilst avoiding, remedying or mitigating any potential adverse effects ***Objectives B2.7.1(2) B8.2.1(2), B8.3.1(1), B8.3.1(2), B8.3.1(5), B8.3.1(6), B8.4.1(1) and B8.4.1(3); Policies B7.4.2(1), B8.3.2(3), B8.3.2(4), B8.3.2(5), B8.2.3(7) and B8.4.2(1)***	During construction it is likely that there will be adverse effects on the natural character of the coastal environment. Adverse effects are associated with construction activities (e.g. the presence of the drilling rig and vegetation removal). These adverse effects are considered to be temporary and not significant, having regard to proposed mitigation. There are not considered to be any significant adverse effects on the natural character associated with permanent works. With respect to public access, There may be short term restrictions on public access and recreation in the coastal environment as a result of construction activities to ensure appropriate health and safety. Construction sites and works through these areas will be designed to minimise disruption on recreation and public access to and along the CMA and to publicly-owned land in the coastal environment as far as practicable.
Recognise the role of Mana Whenua as kaitiaki and involve Mana Whenua in resource management processes in ways which take into account the principles of the Treaty of Waitangi. ***Objectives B6.2.1(1), B6.2.1(2) and B7.4.1(6); Policies B6.2.2(1), B6.3.2(3), B6.3.2(6), B6.5.2(4), B6.5.2(6), B6.5.2(8) and B8.5.2(13)***	Watercare have engaged with tangata whenua throughout the investigation of alternatives and development of the Project, with the proposed route avoiding as far as practicable any ancestral lands, sites, waahi tapu and other taonga identified as being of significance to tangata whenua. As noted in Section 8.2 of this Report, with respect to CIAs for the future phases of the Northern Interceptor, Mana Whenua have noted that they would like to be engaged closer to the time construction is expected to

Theme and Relevant Objectives/Policies	Comment
	commence. In the interim, Watercare will continue regular discussions with all Mana Whenua who have expressed an interest in the Project.
Enable the use and development of public open spaces whilst managing adverse effects ***Policy B2.7.2(1) and B2.7.2(7)***	The proposed alignment traverses a number of reserves and public open spaces. Watercare has been working with Auckland Council Parks, Sports and Recreation regarding proposed works in these spaces. There will be short term restrictions on public access and recreation within public open spaces as a result of construction activities to ensure appropriate health and safety. Construction sites and works through these areas will be designed to minimise disruption on recreation and public access as far as practicable. Where temporary restrictions are necessary, Watercare will continue to consult with affected organisations to identify opportunities to address any restrictions.
Terrestrial, marine and freshwater biodiversity values are protected, and adverse effects associated with development are avoided, remedied or mitigated ***Objectives B7.2.1(1) and B7.3.1(3); Policies B7.2.2(5) and B7.3.2(1)***	In some instances, earthworks will be required in riparian margins (including coastal edges). Erosion and sediment control measures will be implemented (TP90) for the duration of the land disturbance activities undertaken as part of the project. The measures are expected to prevent the discharge of sediment laden water to nearby waterbodies, particularly in areas on slopes and land subject to instability. Resource consents have not been applied for at this time because, commensurate with the "route protection" phase that the project has reached, only a concept level of design has been undertaken of the network and this is insufficient to inform those resource consent applications. The necessary resource consents (include those for coastal permits and earthworks) will be applied for at the time of detailed design of the network in the future. Refer to Section 10.6 of this Report for further information.

Based on the above assessment, it is considered that the Project is consistent with the PARPS.

9.2.5 Auckland Council Regional Plan: Coastal

The Auckland Council Regional Plan: Coastal (ACRP:C) provides the framework to promote the integrated and sustainable management of the Auckland Regions coastal environment.

As noted above, resource consents have not been applied for at this time because, commensurate with the "route protection" phase that the Project has reached, only a concept level of design has been undertaken of the network and this is insufficient to inform those resource consent applications. The necessary resource consents will be applied for at the time of detailed design of the network in the future.

In light of this, and noting that regional planning matters will be addressed at the time of applying for regional resource consents, the following table summarises the key themes of the relevant objectives and policies of the ACRP:C and provides a broad assessment against these themes.

Table 9-6: Relevant Objectives and Policies (ACRP:C)

Theme and Relevant Objectives/Policies	Comment
Recognising the natural character of the coastal environment and avoiding, remedying or mitigating adverse effects ***Objective 3.3.1 and Policy 3.4.1***	While there will be short term effects on the coastal environment resulting from construction activities, overall the works will appropriately avoid, remedy or mitigate adverse effects on the natural character of the coastal environment. Vegetation within SEA_T_ SEA_T_8319 at The Eastern Abutment of the Greenhithe Bridge supports suitable potential habitat for at least five indigenous lizard species, four of which have a National threat

Theme and Relevant Objectives/Policies	Comment
	classification of 'At Risk'. Threat rankings for some of these species, particularly those 'At Risk', may increase over the next 20 years. It is noted that the forest gecko, copper skink and ornate skink have been recorded from SEA_T_8319. The vegetation also has the potential to support roosting and nesting habitat for a range of common native bird species. Technical Report D recommends that preclearance surveys for lizards and nesting birds be undertaken where they have been identified as potentially present, and that an Ecological Management Plan should be prepared to address the potential presence and management of geckos and /or skinks within these areas. During construction it is likely that there will be adverse effects on the natural character of the coastal environment associated with construction activities (e.g. the establishment of construction sites, vegetation removal, and permanent structures in the vicinity of the coastal environment). With the exception of the pump stations, most of these are considered to be temporary in nature. In these areas, a suite of mitigation measures have been proposed that seek to reduce the visual and landscape effects that the works will have, whilst taking into consideration the natural character of the surrounding environment in the overall design. With the adoption of recommended mitigation measures in consultation with PSR and park users, it is considered that potential adverse effects can be appropriately managed.

9.2.6 Auckland Council Regional Plan: Sediment Control

The Auckland Council Regional Plan: Sediment Control (ACRP:SC) addresses the issue of sediment discharge and defines the mechanisms Auckland Council has chosen for managing adverse effect on the environment due to sediment discharges from bare earth surfaces.

As noted above, resource consents have not been applied for at this time because, commensurate with the "route protection" phase that the Project has reached, only a concept level of design has been undertaken of the network and this is insufficient to inform those resource consent applications. The necessary resource consents will be applied for at the time of detailed design of the network in the future.

In light of this, and noting that regional planning matters will be addressed at the time of applying for resource consents and permits, the following table summarises the key themes of the relevant objectives and policies of the ACRP:SC and provides a broad assessment against these themes.

Table 9-7: Relevant Objectives and Policies (ACRP:SC)

Theme and Relevant Objectives/Policies	Comment
Maintain or enhance the quality of water in waterbodies and coastal waters through the management of land disturbing activities ***Objective 5.1.1***	Resource consents have not been applied for at this time because, commensurate with the "route protection" phase that the project has reached, only a concept level of design has been undertaken of the network and this is insufficient to inform those resource consent applications. The necessary resource consents (include those for coastal permits and earthworks) will be applied for at the time of detailed design of the network in the future. Earthworks will be undertaken in accordance with erosion and sediment control measures and earthworks will be sequenced, limiting the amount of earthworks being undertaken at any one time. The implementation of erosion and sediment control measures outlined above should avoid any adverse effects on the mauri of waterbodies and riparian margins.

9.2.7 Auckland Council Regional Plan: Air, Land and Water

The Auckland Council Regional Plan: Air, Land and Water (ACRP:ALW) provides for the management of air, land and water resources in the Region including: air, soil, rivers and streams, lakes, groundwater, wetlands and geothermal water.

As noted above, resource consents have not been applied for at this time because, commensurate with the "route protection" phase that the Project has reached, only a concept level of design has been undertaken of the network and this is insufficient to inform those resource consent applications. The necessary resource consents will be applied for at the time of detailed design of the network in the future.

In light of this, and noting that regional planning matters will be addressed at the time of applying for resource consents and permits, the following table summarises the key themes of the relevant objectives and policies of the ACRP:ALW and provides a broad assessment against these themes.

Table 9-8: Relevant Objectives and Policies (ACRP:ALW)

Theme and Relevant Objectives/Policies	Comment
To provide for the ongoing operation, maintenance, development and upgrading of physical infrastructure, in a manner that meets regional growth requirements and supports the economic, social and cultural wellbeing of the Region's people and communities and provides for their health and safety, while avoiding, remedying or mitigating adverse effects on the environment ***Objective 2.2.3.4 and 5.3.7; Policy 2.2.4.4***	The increasing urban development in the Service Catchment, requires additional wastewater conveyance and treatment infrastructure to service this growth. The construction and operation of the Project will therefore provide infrastructure that supports the economic and social wellbeing of the region. The Project is expected to cause some adverse effects due to construction activities. However, these effects will be temporary and will be managed though a construction management plan which seeks to avoid, minimise or mitigate any adverse effects. Watercare's service objectives require development of resilient assets to meet required service delivery standards and foreseeable future needs. This includes providing sufficient capacity to convey and treat wastewater. Once completed the Project will facilitate the continued effective operation of the wastewater network generally, and provide capacity in the wastewater network for future growth and development in the Auckland region. This will also help to prevent further major wastewater overflows by providing appropriate infrastructure. Watercare will maintain and enhance the wastewater infrastructure for the northern Auckland Region by implementing the Project. This will ensure the long-term integrity for the expected population increase over the next 30 years. The proposed designation will safeguard the wastewater pipeline route, enabling these future communities to be serviced by the city's sewage treatment facilities, controlling discharges and overflows – meeting community and freshwater health outcomes.
To involve tangata whenua in resource management processes in ways which take into account the principles of the Treaty of Waitangi ***Objectives 2.3.3.1, 2.3.3.2 and 2.3.3.3***	As noted previously, Watercare has engaged with tangata whenua throughout the investigation of alternatives and development of the Project, with the proposed route avoiding as far as practicable any ancestral lands, sites, waahi tapu and other taonga identified as being of significance to tangata whenua.

9.2.8 Auckland Council District Plan (North Shore Section)

The Auckland Council District Plan (North Shore Section) (ACDP:NS) contains objectives, policies and methods to manage activities and development. Chapters 6 (Managing Urban Growth and Development of the City), 7 (Tangata Whenua Values), 8 (Natural Environment), 9 (Subdivision and Development), 10 (Pollution, Hazardous Substances and Waste Management), 11 (Cultural Heritage) and 14 (Network Utilities and Designation) are relevant chapters of the ACDP:NS.

The following table provides an assessment of the Project against the relevant Objectives and Policies of the ACDP:NS.

Table 9-9: Relevant Objectives and Policies (ACDP:NS)

Theme and Relevant Objectives/Policies	Comment
Taken into account the principles of the Treaty of Waitangi and the concept of kaitiakitanga in the management of the city's natural and physical resources through the inclusion and recognition of tangata whenua in the management of resources throughout the city ***Objective 7.3***	Watercare has engaged with tangata whenua throughout the investigation of alternatives and development of the Project, with the proposed route avoiding as far as practicable any ancestral lands, water, sites, waahi tapu and other taonga identified as being of significance to tangata whenua. A range of mitigation measures, such as erosion and sediment controls in accordance with TP90 during construction, will be undertaken which will assist in sustaining the mauri of natural resources such as waterbodies and the coastal environment.
Protect sites of significance of tangata whenua, cultural heritage values, ecology, the coastal environment and natural character within the city, through the protection of natural character and native flora and fauna ***Objectives 7.4, 8.3.1 and 9.3.1; Policies 8.3.1.5, 8.3.1.8, 8.3.2.5, 8.3.2.6 and 9.3.1.3***	The most significant changes and resultant effects on visual amenity will arise from vegetation removal, earthworks, trenching and construction activity and construction vehicle movements. As discussed in Section 10.8, these effects can be appropriately managed. Earthworks and vegetation removal will adversely affect several areas along/adjacent to the alignment. The works have been designed as far as practicable to avoid ecosystems and habitats, however, where vegetation removal and earthworks are required measures remedy and mitigate these effects are contained within Technical Report D. Subject to the implementation of the proposed mitigation outlined within this report, it is considered that the residual net effects on ecosystems and habitats will be appropriately managed. Measures have been proposed to mitigate adverse ecological effects and overall the effects can be appropriately managed. The Project is expected to cause some adverse effects due to construction activities relating to emissions of noise, vibration, etc. However, these effects will be temporary and will be managed through a construction management plan which seeks to avoid, minimise or mitigate any adverse effects. The construction of the pipeline through Wainoni Park, North Shore Memorial Park and North Shore Golf Club will have a number of adverse visual and landscape effects due to the natural state of the parks at present and their recreational and memorial use. Adverse effects are associated with construction activities (e.g. the presence of the drilling rig and vegetation removal). Construction sites and works through parks and reserves will be designed to minimise disruption on recreation and public access as far as practicable, and access to sports fields will be retained. With the exception of the pumps stations and other above ground structures, these adverse effects are considered to be temporary and there are not considered to be any significant adverse effects on the

Theme and Relevant Objectives/Policies	Comment
	natural character associated with permanent works, as these works will be sub-surface. The location of above ground structures, such as pump stations and pipe bridges, will continue to be discussed with PSR and other key stakeholder. As far as practicable – and as discussed in Sections 8 and 0 – the location of these structures will be cited in a way that minimises impacts on recreational use, and are designed using recessive materials so as to limit any visual effects. The most appropriate means of managing the effect on the coastal environment are to minimise the works footprint and the duration of works. These objectives have been central to the development of the construction method.
Enable the construction, operation and maintenance of effective and efficient network utilities which meets the needs of communities and recognises reverse sensitivity effects while having regard to the operation and technical requirement or constraints of the operation of placement of network utilities ***Objectives 14.3.1.1, 14.3.1.2, and 14.3.1.3; Policies 6.4.10, 14.3.2.3, 14.3.2.4, 14.3.2.5, 14.3.2.6 and 14.3.2.7***	Once completed the Project will facilitate the continued effective operation of the wastewater network generally, and provide capacity in the wastewater network for future growth and development in the Auckland region. The Project will provide regionally significant infrastructure that directly supports the social, economic, environmental and cultural wellbeing of the whole community. As with other underground network utilities, the proposed pipeline will be co-located within the road reserve while avoiding impacts on other network utilities as far as practicable. Measures will be used to mitigate the effects of construction activity such as the use of traffic management measures, and noise barriers where necessary. The proposed alignment traverses a number of reserves and public open spaces. Construction sites and works through these areas have been located and designed to minimise disruption on recreation and public access as far as practicable, and access to sports fields will be retained. At Wainoni Park, works will disrupt the normal activities associated with the Pony Club, as areas may need to be fenced off from users, and facilities (fences/jumps) relocated. In light of this, there will be temporary effects on public access during construction, and short-term effects on amenity.
Avoid, remedy or mitigate any adverse environmental effects of network utilities and ensure that health, safety and wellbeing is not adversely affected by the construction, operation and maintenance of network utilities ***Objectives 9.3.2, 10.3.4 and Policy 10.3.2.4,***	Erosion and sediment control measures will be implemented for the duration of the land disturbance activities required as part of the project to prevent the discharge of sediment laden water to nearby waterbodies, particularly in areas on slopes and land subject to instability Network utility companies will be contacted during the design process in order to confirm the locations of existing services or any future development plans in the vicinity of the proposed construction sites, such as those within Vector's site at 179 Bush Road. Where Requiring Authority Approvals are required under sections 176(1)(b) of the RMA, these will be sought prior to construction.

Based on the assessment above, it is considered that the proposed works are consistent with the objectives and policies as set out above. The Project is a necessary network utility in order to provide for future development and growth of the region and result in effective utilisation of the Rosedale WWTP. A

number of alternative routes through North Shore City were considered and the preferred route has been selected based on technical constraints and potential effects on the environment and communities.

9.2.9 Auckland Council District Plan (Waitakere Section)

The Auckland Council District Plan (Waitakere Section) (ACDP:W) contains objectives, policies and methods to manage activities and development. These can be found in the chapter titled 'Objectives, policies and methods significant resource management issues'.

The following table provides an assessment of the Project against the relevant Objectives and Policies of the ACDP:W.

Table 9-10: Relevant Objectives and Policies (ACDP:W)

Theme and Relevant Objectives/Policies	Comment
Manage the adverse effects of land use on natural resources, including the life-supporting capacity, ecosystem functioning, biodiversity, cultural and recreational values of natural resources ***Objectives 2, 3, 7 and 8; Policies 1.6, 2.4, 2.15, 3.5, 5.1, 5.3, 7.4, 8.1, 8.4 and 8.5***	Earthworks will be undertaken in accordance with erosion and sediment control measures and earthworks will be sequenced, limiting the amount of earthworks being undertaken at any one time. The implementation of erosion and sediment control measures outlined above should avoid any adverse effects on the mauri of waterbodies and riparian margins. The proposed works will be undertaken in a modified environment. The removal of vegetation (both native and exotic) will be required to facilitate construction activities. Vegetation removal will be undertaken in accordance with good practices and the recommendations of the Tree Protection Methodology. As the permanent works will be located below ground, activities will not impede the regeneration, or future regeneration, of native vegetation. Construction activities will be temporary in nature during and immediately following the construction period and will be mitigated through replacement planting. Land disturbance activities outside of the CMA will be predominantly open cut, and are to be undertaken progressively in stages. This will minimise the proportion of soil/rock exposed at any one time, minimising any adverse effects on the surrounding topsoil and soil structure. Permanent visual effects will predominantly result from the removal of vegetation and the presence of built structures (the pump station at No. 56 The Concourse, the pump stations within Wainoni Park, and a pipe bridge (crossing Manutewhau Creek) and surface features such as pipe bridges, inlet vent and biotrickling filters. Subject to the mitigation measures proposed, the majority of the adverse landscape and visual effects anticipated in the construction and operation phases of the Project can be managed and mitigated to result in low (less than minor) adverse effects overall.
Maintain and enhance amenity values that contribute to the health and well-being of communities ***Objective 10 and Policies 10.10, 11.2, 11.3, 11.4, 11.7, 11.8, 11.9 and 11.18***	Following completion of the works, replacement planting will assist in returning sites to their previous appearance. Furthermore, noise mitigation measures will be implemented on-site and be monitored to ensure that proposed works do not have a detrimental impact on the health and safety of sensitive receivers.
Manage the adverse effects of landuse activities on heritage values	As noted in Technical Report B, one heritage building is recorded within c.100m of the proposed NoR – NI (Waitakere). This is the Radio New Zealand Transmitter Building which is scheduled within the Auckland

Theme and Relevant Objectives/Policies	Comment
Policies 12.4 and 12.5	Council District Plan – Operative Waitakere Section 2003 (ID 1174) and as a Category A historic heritage place within the PAUP (Appendix 9: ID 56). The proposed works should have no effect on the recorded extent of this site.

Based on the assessment above, it is considered that the proposed works are consistent with the objectives and policies as set out above. The Project is regionally significant infrastructure, and as such it is important to designate this route to ensure that any future development will not adversely affect the future development of the Northern Interceptor. The site selection process undertaken to select the route for the Northern Interceptor has considered potential adverse effects on amenity, cultural and ecological values protected in the ACDP:W.

9.2.10 Auckland Unitary Plan

The Proposed Auckland Unitary Plan (PAUP) contains objectives, policies and methods to manage activities and development. At the time of writing this Report, the Independent Hearing Panel has provided its recommendations to the Auckland Council and the Auckland Council has released the decision version of the Auckland Unitary Plan (AUP) on 19 August. The following table provides an assessment of the Project against the relevant Objectives and Policies of the decision version of the AUP.

Table 9-11: Relevant Objectives and Policies (PAUP)

Theme and Relevant Objectives/Policies	Comment
The benefits of the safe, efficient and secure development, operation and upgrading of infrastructure is enabled while managing the adverse effects and ensuring the infrastructure is protected from reverse sensitivity. ***Objectives E26.2.1(1), E26.2.1(2), E26.2.1(3), E26.2.1(4), E26.2.1(5), E26.2.1(6), and E26.2.1(9); Policies E26.2.2(1), E26.2.2(2), E26.2.2(3), E26.2.2(4), E26.2.2(5), E26.2.2(6), E26.2.2(8) and E26.2.2(11)***	Once completed the Project will facilitate the continued effective operation of the wastewater network generally, and provide capacity in the wastewater network for future growth and development in the Auckland region. The Project will provide regionally significant infrastructure that directly supports the social, economic, environmental and cultural wellbeing of the whole community. The proposed designation will safeguard the wastewater pipeline route, enabling these future communities to be serviced by the city's sewage treatment facilities, controlling discharges and overflows – meeting community and freshwater health outcomes. The Project is proposed to be staged so as to adequately respond to actual population uptake, rather than build an oversized pipeline based on conservative population projections. The designation will give Watercare the capability to undertake construction as things change in the network, and will give developers and Auckland Council certainty that critical infrastructure will be provided. This also provides assurance that the areas being developed will be serviced (or have the ability to be serviced/connected to), supporting residential and business growth. An Assessment of Alternatives (Appendix A) has considered a number of different routes with the preferred alignment being the Northern Interceptor Project. Where possible, the pipeline is located within the road reserve.
The tangible and intangible values of sites and places of value to Mana Whenua are protected and	Watercare has engaged with tangata whenua throughout the investigation of alternatives and development of the Project, with the proposed route avoiding as far as practicable any ancestral lands, sites,

Theme and Relevant Objectives/Policies	Comment
enhanced, including any accidental discovery of sites. ***Objective E1.2(2) and Policies E3.3(6), E11.3(1), E11.3(3)***	waahi tapu and other taonga identified as being of significance to tangata whenua. As noted in Section 8.2 of this Report, with respect to CIAs for the future phases of the Northern Interceptor, Mana Whenua have noted that they would like to be engaged closer to the time construction is expected to commence. In the interim, Watercare will continue regular discussions with all Mana Whenua who have expressed an interest in the Project. Protocols for the management of accidental discoveries of archaeological material have been provided in the draft conditions (refer Appendix F) A range of mitigation measures, such as erosion and sediment controls in accordance with TP90 during construction, will be undertaken which will assist in sustaining the mauri of natural resources such as waterbodies and the coastal environment.
Protect and maintain indigenous vegetation and vegetation in sensitive environments by avoiding, mitigating or remedying adverse effects while avoiding for reasonable use and development. ***Objectives D9.3(1), D9.3(3), D9.3(6), D9.3(8) and E15.2(1); and Policies E15.3(1), E15.3(2) and 15.3(7)***	During construction it is likely that there will be adverse effects on the natural character of the coastal environment associated with construction activities (e.g. the establishment of construction sites, vegetation removal, and permanent structures in the vicinity of the coastal environment). With the exception of the pump stations, most of these are considered to be temporary in nature. Effects upon terrestrial ecosystems from construction activities primarily relate to vegetation clearance. A range of measures are therefore proposed such as replanting, avoiding vegetation clearance during peak bird breeding season where practicable and salvaging lizards prior to clearance commencing
Contaminated land is managed to protect human health and the environment and to enable this land to be used for suitable activities. ***Objective E30.2(1) and Policy E30.3(2)***	Technical Report C notes that there is potential to encounter contaminated soil during the works, and that there is a very low to moderate risk for significant contamination to be encountered. Further testing to establish contamination levels within sections of the designation where potentially contaminating activities have been identified will be undertaken once the location of excavation works has been established.
Construction activities in, on, under, or over the bed of a river or stream, wetland and any associated diversion of water will be reasonably necessary while protecting the water body. ***Objective E3.2(4) and Policies E3.3(1), E3.3(7), E3.3(9) and E3.3(15)***	Where the trenching of a stream is required, the effects include temporary stream bed disturbance, possible increases in sediment and a decrease in water quality. Regional consents for these works will be applied for closer to the time of construction, and mitigation measures will be implemented to address any potential effects on the environment.
Avoid, remedy or mitigate adverse effects on amenity and amenity values ***Objectives E24.2(2), E25.2(1) and E25.2(2) and Policies E24.3(2), E25.3(2) and E25.3(10)***	A number of noise and vibration mitigation measures will be set out in the Construction Noise and Vibration Management Plan. Other mitigations will include fitting mufflers to trucks, good site management, maintenance of equipment to a high level, the replacement of audible reversing alarms with visual or lower noise broadband audible reversing alarms, and the use of noise barriers and through the increased vigilance of heavy equipment operators.
The amenity values of public open spaces are protected while enabling	Permanent visual and amenity effects with public open spaces will predominantly result from the removal of vegetation and the presence of

Theme and Relevant Objectives/Policies	Comment
buildings that complement and protect the values and qualities of the public open space. ***Objectives E16.2(1), H7.2(2), H7.4.2(1) and H7.4.2(2); Policies E16.3(2), H7.3(4), H7.4.3(1), H7.4.3(2), H7.4.3(3), H7.4.3(4), H7.4.3(5), H7.4.3(7), H7.5.3(2), H7.5.3(4), H7.5.3(5) and H7.6.3(3)***	built structures (the pump station at No. 56 The Concourse, the pump stations within Wainoni Park, and a pipe bridge (crossing Manutewhau Creek)) and surface features such as manhole covers which are proposed to sit flush within road corridors and open grass areas. Subject to the mitigation measures proposed, the majority of the adverse landscape and visual effects anticipated in the construction and operation phase of the Project can be managed and mitigated to result in low (less than minor) adverse effects overall.
Recognising the natural character of the coastal environment and avoiding, remedying or mitigating adverse effects ***Objective E18.2(1) and Policies E18.3(1) and E18.3(3)***	There will be temporary adverse effects on the coastal environment resulting from construction activities which may result in temporary adverse effects on the form of the coastal environment. However, once reinstated, it is considered that the Project will not result in adverse effects on integrity, form, functioning and resilience of the coastal environment. Vegetation within SEA_T_ SEA_T_8319 at the eastern abutment of the Greenhithe Bridge supports suitable potential habitat for at least five indigenous lizard species, four of which have a National threat classification of 'At Risk'. Threat rankings for some of these species, particularly those 'At Risk', may increase over the next 20 years. It is noted that the forest gecko, copper skink and ornate skink have been recorded from SEA_T_8319. The vegetation also has the potential to support roosting and nesting habitat for a range of common native bird species. Technical Report D recommends that preclearance surveys for lizards and nesting birds be undertaken where they have been identified as potentially present, and that an Ecological Management Plan should be prepared to address the potential presence and management of geckos and /or skinks within these areas. Through the adoption of proposed mitigation measures, it is considered that the Project will be consistent with these objectives.

Based on the assessment above, it is considered that the proposed works are generally consistent with the objectives and policies as set out above. The Project is regionally significant infrastructure, and as such it is important to designate this route to ensure that any future development will not adversely affect the future development of the Northern Interceptor.

9.3 Other Matters

9.3.1 Three Waters Strategy

The Three Waters Strategic Planning Programme was a Watercare-led initiative that investigated ways to deliver the future water supply, wastewater and stormwater services in the Auckland region. The primary drivers behind this programme, as identified by Watercare, were the need to service growth, to deliver specified levels of service, and to meet its requirements as a service provider under various legislation (e.g. LGA).

The outcome of this programme was the development of the "Three Waters - Final 2008 Strategic Plan" (Watercare, 2008), which provided an overview of the investigations undertaken by that project team. The Plan covered potential long-terms strategies, and options to address urgent wastewater issues, which was identified as the most pressing three waters issue facing the region.

The Northern Interceptor is part of a wider programme of works to address the issues identified, and will be a critical component of the wastewater network. Watercare aims to respond to the future growth in the northern Auckland Region, as recognised in the Three Waters Strategy by implementing the Northern Interceptor to manage the increase in wastewater.

9.3.2 The Auckland Plan

The Auckland Plan sets out a strategy for the development of Auckland over the next 20-30 years, which includes moving to a quality, compact Auckland through integrated planning. To accomplish this goal in the north western part of the city, the Plan adopted the growth vision for the North West Transformation Area and identified areas to prioritise supporting growth and development. These areas include the Hobsonville/Westgate, and Massey North areas.

Watercare is a CCO wholly owned by Council. The company's obligation to deliver water and wastewater services for Auckland is established under section 57(1) of the Local Government (Auckland Council) Act 2009. Watercare's service objectives require development of resilient assets to meet required service delivery standards and foreseeable future needs. This includes providing sufficient capacity to convey and treat wastewater.

The Northern Interceptor (including the Project) will enable Watercare to meet its obligations under the LGA, and will provide the infrastructure needed to service a growing Auckland. As identified in the Auckland Plan, there will be a population growth of 1 million people in the next 30 years. One of the big issues that The Auckland Plan addresses is the need for more housing which will need sufficient wastewater infrastructure to support the increased growth. The Northern Interceptor (including this Project) will provide for the increase in population in the northern Auckland Region.

9.3.3 Local Government Act 2002 and Local Government (Auckland Council) Act 2009

Under Section 59(1) of the Local Government Act 2002, Watercare's principal objective, as a CCO, is to:

a) Achieve the objectives of its shareholders, both commercial and non-commercial, as specified in the statement of intent; and

b) Be a good employer; and

c) Exhibit a sense of social and environmental responsibility by having regard to the interests of the community in which it operates and by endeavouring to accommodate or encourage these when able to do so; and

d) Conduct its affairs in accordance with sound business practice.

Watercare is also subject to particular statutory obligations as an Auckland water organisation under the Local Government (Auckland Council) Act 2009. Section 57 (1) of that Act says that Watercare must, amongst other things:

> *"manage its operations efficiently with a view to keeping the overall costs of water supply and wastewater services to its customers (collectively) at the minimum levels consistent with the effective conduct of its undertakings and the maintenance of the long-term integrity of its assets".*

Watercare will maintain and enhance the wastewater infrastructure for the northern Auckland Region by implementing the Northern Interceptor. This will ensure the long-term integrity for the expected population increase over the next 30 years. The Project is the lowest cost option to respond to future need for wastewater infrastructure.

9.3.4 Health Act 1956

The Health Act 1956 is administered by the Ministry of Health and provides for improving, promoting and protecting public health.

Section 25 of the Health Act sets out the local authority's responsibility to provide sanitary works. The Project is needed to provide safe and efficient wastewater services to the growing northern Auckland Region. The Project protects human health through the effective treatment of the wastewater before it enters any water bodies.

9.3.5 Watercare Statement of Intent 2015-2018

In accordance with the Local Government Act 2002 (LGA) Watercare is required to develop and to be consistent with a Statement of Intent. The Watercare Strategic Intent 2015 – 2018 outlines four strategic priorities – these priorities reflect the organisation's focus on (amongst other things) continuing to consistently deliver reliable, affordable, high quality, sustainable wastewater services. The four strategic priorities are as follows:

- **Customer Focus** – Putting customers at the heart of our business by aligning processes, people and systems to deliver exceptional performance at minimum cost;
- **Business Excellence** - We deliver positive customer outcomes by being a commercially-savvy, performance-based organisation that prioritises the development and well-being of our people and the long-term resilience of our assets;
- **Financial Responsibility** – We are a financially responsible and efficient business, balancing our long-term financial obligations with our requirement to be a minimum cost provider; and
- **Fully Sustainable** - As custodians of the environment, we effectively manage and minimise the impact of our operations on the environment and embed sustainability into all aspects of our business.

The Northern Interceptor (including this Project) will support these four strategic priorities. The Northern Interceptor (including this Project) has a customer focus as it will provide for the needs of the future increased population in the northern Auckland Region. Watercare is looking into the future and providing for the wastewater needs of future generations. The Northern Interceptor will enable Watercare to continue to be a minimum cost provider. The Northern Interceptor will ensure all wastewater in the northern Auckland Region will be treated before being discharged, thus being sustainable. This AEE demonstrates that currently, with the recommended mitigations, the effects of construction on the environment will be less than minor.

Watercare's service objectives require development of resilient assets to meet required service delivery standards and foreseeable future needs. This includes providing sufficient capacity to convey and treat wastewater. The Northern Interceptor promotes these objectives.

9.3.6 Utilities Access Act

The Utilities Access Act 2010 establishes a framework for a national code of practice to regulate how utility operators (including water and wastewater operators) and corridor managers coordinate their activities relating to access to transport corridors.

Under the Act, the National Code of Practice for Utility Operators' Access to Transport Corridors has been developed and came into effect on 1 January 2012. The Code seeks to minimise disruptions to roads, motorways, and railways caused by work by utility operators and maintain safety.

The construction activities associated with the project will be undertaken in accordance with the requirements of the Code and any required CAR will be sought from AT and the Transport Agency prior to construction commencing.

9.3.7 Iwi Management Plans

Ngati Whatua o Orakei Maori Trust Board has produced an Iwi Management Plan for their rohe, including the Upper Waitemata Harbour. The key issues, objectives and policies of that plan relevant to

the Project are 7.1 Te Wai Ora a Tane and Mauri Moana (Waters and their Ecological Communities) and 7.2 Te Wao Nui a Tane (terrestrial biodiversity).

The provision of the Project reinforces the reliance throughout the region on infrastructure that minimises to the greatest extent possible, adverse effects on the environment that would result from poorly designed and inadequate wastewater infrastructure. This supports Ngati Whatua o Orakei objectives to maintain and restore the mauri of waimaori networks and the moana. As discussed in Section 7, Watercare will assist Ngati Whatua o Orakei to achieve the objectives and policies within the Iwi Management Plan where practical within the context of the Project.

The Waikato Tainui Iwi Management Plan's overarching purpose is to provide a map or pathway that will return the Waikato-Tainui rohe to the modern day equivalent of the environmental state that it was in when Kiingi Taawhiao composed his maimai aroha. Although Waikato Tainui did not express an interest in the Project, an assessment against the Waikato Tainui Environmental Plan has been undertaken to ensure the Project's consistency with it. The key issues, objectives and policies of this plan relevant to the Project are 25 Ngaa whakaritenga moo ngaa whenua o Waikato-Tainui (Land use planning) and Waihanga matua (Infrastructure).

The diversion of wastewater flows away from already constrained infrastructure will increase capacity in other parts of the wastewater network, enabling growth across the region. As above, this will minimise to the greatest extent possible, adverse effects on the environment or cultural and/or spiritual values that would result from poorly designed and inadequate wastewater infrastructure.

9.3.8 Reserves Act 1977

The Reserves Act 1977 is administered by the Department of Conservation and provides for the acquisition of land for reserves, and the classification and management of reserves (including leases and licences). At present, it is understood that there are three Reserve Management Plans relevant to the Project.

- Waitemata Harbour Foreshore Reserves Management Plan (2007) which provides a framework for the management of Lowtherhurst Reserve, Massey, and Taitapu Park, Henderson;
- Rosedale Park Reserve Management Plan (1996) which provides a framework for the management of Rosedale Park, Rosedale; and
- Wainoni Park Reserve Management Plan (1994), which provides a framework for the management of Wainoni Park, Greenhithe.

In some locations designation corridor crosses reserve land, which may require the granting of a right of way or unregistered easement. Where there are permanent aboveground facilities that require ongoing use by Watercare (e.g. Wainoni Park), a change in classification to the purpose of the reserve may be required.

With regards to Wainoni Park, the area of reserve where above ground infrastructure is proposed to be located is identified in the Management Plan as being for Recreation Purposes. Subsequently, consideration of whether the area of the Reserve where above ground structures are located (once constructed) should still be deemed as being for Recreation Reserve, may be required in the future. Watercare will to continue to consult with PSR on works within reserves to confirm any approvals required under the Reserves, and to confirm the form of the authorisation required.

9.4 Consideration of Alternatives

Section 171(1) (b) of the RMA outlines that when making a recommendation on an NoR, a Territorial Authority shall consider whether adequate regard has been given to alternative sites, routes or methods of undertaking the work if the requiring authority does not have an interest in the land sufficient for undertaking the work, or it is likely that the work will have a significant adverse effect on the environment.

With regards to the Northern Interceptor Project, Watercare does not have sufficient interest in the land within NoR – NI (Waitakere) or NoR – NI (North Shore) for undertaking the work and as such, an assessment of whether adequate consideration has been given to alternative sites, routes and methods of undertaking the work is required.

In forming a view as to whether adequate consideration has been given to alternative sites, routes or methods to undertake the work, it is considered appropriate to be "guided" by case law such as the High Court decisions in *Meridian Energy Ltd v Central Otago District Council* and *New Zealand Transport Agency v Architectural Centre Inc*.

In *Meridian Energy* the High Court states that in respect of section 171(1)(b) of the RMA:

> *"Over time the Courts have taken a relatively narrow approach to this provision. If the Environment Court is called upon to review the decision of the territorial authority, it is required to consider whether alternatives have been properly considered rather than whether all possible alternatives have been excluded or the best alternative has been chosen".*[5]

In *New Zealand Transport Agency v Architectural Centre Inc.,* the Court makes it clear that what is needed to satisfy section 171(1)(b) will depend on the circumstances, in particular on the extent of the project's adverse effects on the environment, or on private land interests.[6] Projects with greater adverse effects may require closer scrutiny in terms of:

a) The transparency of the assessment process, including identification of criteria and the weight given to each[7];

b) The range of alternatives considered.

c) A decision maker must assess an "appropriate range" of alternatives, and a failure to consider an alternative which is more than hypothetical, and which would have less adverse effects on the environment or land interests, may suggest a failure to satisfy section 171(1)(b)[8]; and

d) Clear and consistent rationales for the assessment of each alternative.

Furthermore, in the Waterview Connection decision, the Board of Inquiry found as follows in respect of section 171(1)(b):

> *"…we are to address the question of whether alternatives have been adequately considered, rather than whether all possible alternatives have been excluded, or the best alternative has been chosen."*[9]

Having regard to the above, the following principles have been adopted for the consideration of alternatives for the Northern Interceptor Project:

a) The process shall be adequately transparent and robust;

b) An appropriate range of alternatives shall be considered; and

c) The veracity of consideration (including the matters identified as a) and b) above) shall be proportional to the potential effects of the scenarios being considered

Noting that:

a) The focus is on the process not the outcome;

[5] *Meridian Energy Ltd v Central Otago District Council And Ors* HC DUN CIV 2009412 000980 [16 August 2010], paragraph 81
[6] *New Zealand Transport Agency v Architectural Centre Inc* [2015] NZHC 1991
[7] At [175] – [187]
[8] [145] – [156]
[9] BOI Final report and Decision into the NZTA Waterview Connection Proposal at paragraphs [996] and [997]

b) The policy function of determining the most suitable alternative lies with the requiring authority;

c) There is no obligation to consider every alternative, but rather a suitable and refined selection of most relevant alternatives; and

d) The process does not have to be linear per-se provided it is both transparent and robust.

The following section of this report provides a summary of the consideration of alternatives for the Northern Interceptor Project. The full Assessment of Alternatives Report is contained within Appendix A of this Report.

It is noted that the Assessment of Alternatives Report (Appendix A) relates to the Northern Interceptor Project in its entirety (i.e. Phases 1 – 6) whereas the scope of consideration of alternatives relevant to NOR – NI (Waitakere) and NOR – NI (North Shore) is limited to Phases 3 – 6. Notwithstanding this, it is considered appropriate to adopt the overall consideration of alternatives (Phases 1 – 6) for the Project (Phases 3 – 6).

In response to the issues summarised above at Section 2.1 of this Report, Watercare has undertaken an iterative process of considering alternatives over a number of years to:

a) Understand the network capacity and performance of wastewater infrastructure within the Service Catchment; and

b) To investigate the potential options for responding to the issues that the Service Catchment currently faces and can expect to face in the future.

Subsequently, a proposed solution to the wastewater needs of the Service Catchment has been in development since at least 2008. Over this period of time a wide variety of alternative options have been considered and summarised through numerous reports. The development of alternatives (Figure 28) and the process used to assess and compare options to identify the preferred solution, is documented in the Assessment of Alternatives Report attached as Appendix A and outlined in Figure 25 below.

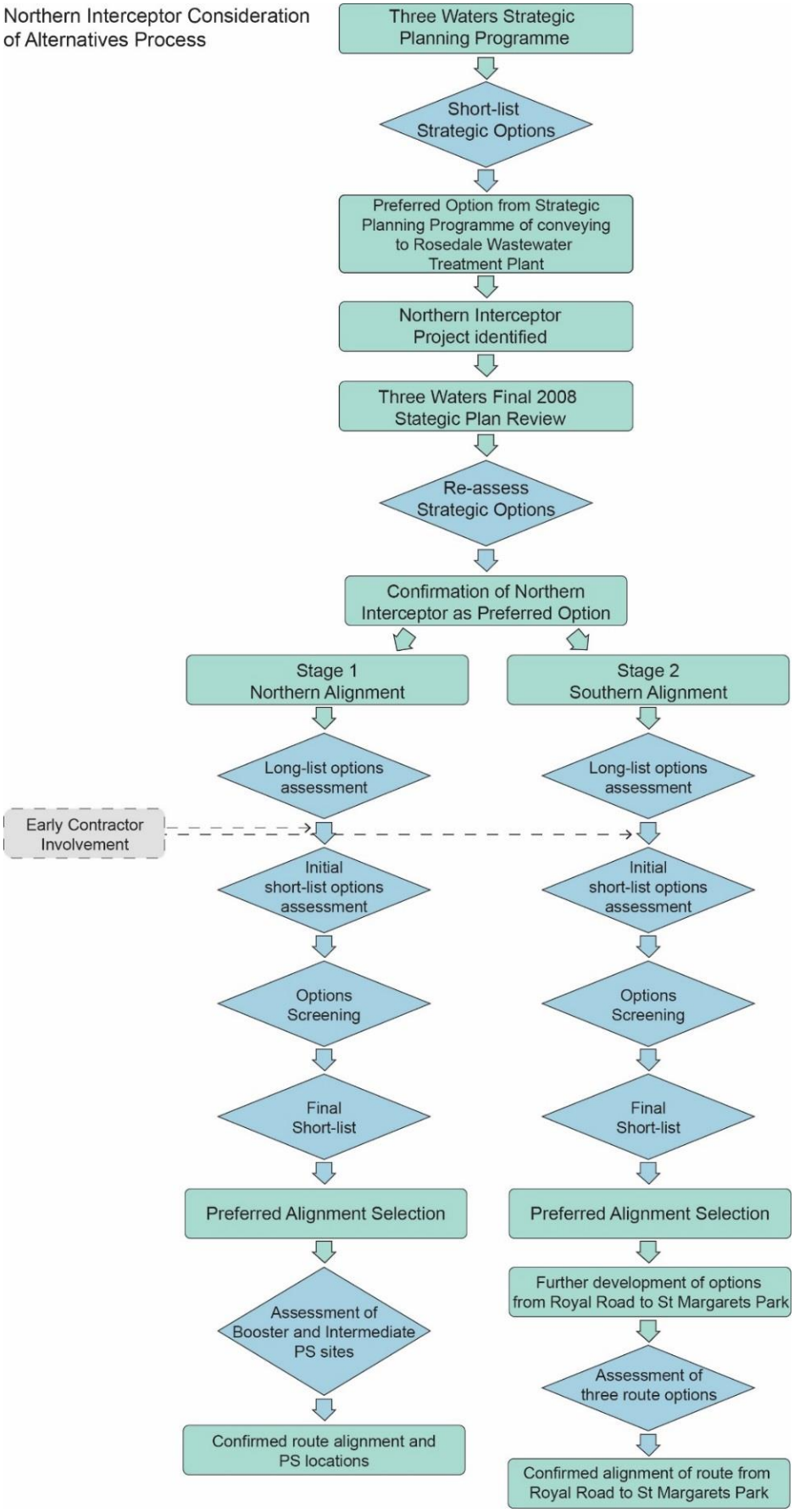

Figure 28: Northern Interceptor Consideration of Alternatives Process

Watercare has evaluated a wide range of alternatives for addressing the wastewater network needs for the Service Catchment. That evaluation process confirmed the delivery of wastewater to Rosedale WWTP for treatment and discharge is the preferred option. The Northern Interceptor Project was confirmed as the preferred integrated network upgrading solution. A subsequent detailed consideration of alignment options and design and construction configurations confirmed the alignment.

The specific objectives of the route selection process and consideration of alternative routes were:

> *To identify an optimal wastewater management response to the issues outlined above at Section 1.2 in a manner:*
>
> *a) Consistent with Watercare's strategic objectives; and*
>
> *b) Consistent with Section 171(1)(b) of the RMA*

The consideration of alternative options for the Northern Interceptor adopted the ACRE (Area, Corridor, Route, Easement) methodology for route evaluation and consideration of opportunities and constraints:

- **The Area** – Is identified as the Service Catchment.
- **The Corridor** – Is identified as being a route from the Concourse Storage Tank to the Rosedale WWTP.
- **The Route** – Is identified as both a northern, and southern alignment.
- **The Easement** – Is identified as the designation corridor being sought through the NoRs relevant to the Project.

In assessing each of the ACRE stages a number of analytical processes, such as Multi-Criteria Analysis (MCA), have been utilised to narrow consideration of alternative from a longlist through a shortlist to a preferred option.

As noted above, at a high level, the Northern Interceptor option was identified as the preferred option. The key aspects of the Northern Interceptor comprise two stages:

- A pipeline from the Hobsonville PS to the Rosedale WWTP (Stage 1); and
- A pipeline from the Concourse storage tank to the Hobsonville PS (Stage 2).

As such, it is considered that there are three "fixed points" for the Project being the Concourse Storage Tank, the Hobsonville PS and the Rosedale WWTP. These fixed points are considered significant in the context of the consideration of alternatives associated with the alignment of the Project as they are critical and existing components of the Project. As such, the adoption of the Project as the preferred option inherently means the adoption of these fixed points and subsequently any further consideration of alternatives is limited.

In this regard, the consideration of alternative route alignment was undertaken in two stages, the first being from Hobsonville PS to Rosedale WWTP, the second considered alternative route alignments from the Concourse Storage Tank to the Hobsonville PS.

The Northern Interceptor project works described in this Report represents the outcome of that process and is considered to be the option that best provides for future wastewater network needs and best meets Watercare's Strategic Intent and the Project Objectives. The work lays the foundations for the wastewater network in this part of Auckland for the next 50 years and represents a cost effective solution to provide for future growth, asset risk management and an appropriate level of overflow mitigation.

9.5 Whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought

Section 171(1)(c) requires consideration of whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought. The specific Project Objectives are as follows:

a. To provide additional capacity in the wastewater network for growth and development in the North West Auckland in a manner that:
    - Protects public health;
    - Is consistent with Watercare's Strategic Objective of being a minimum cost service provider;
    - Avoids, remedies or mitigates adverse environmental, cultural and social effects to the greatest extent practicable; and
    - Provides for flexibility of construction staging to recognise the uncertainties of projected growth.

b. To provide statutory protection for the Northern Interceptor and to enable its future construction, operation and maintenance.

With respect to the Project, the physical works and designation are considered reasonably necessary to achieve the objectives for which the designation is sought for the reasons set out below.

Table 9-12: Whether the work and designation are reasonably necessary

Project Objective	Comment – Works Reasonably Necessary	Comment – Designation Reasonably Necessary
To provide additional capacity in the wastewater network for growth and development in North West Auckland.	As described above, wastewater flows from numerous parts of Auckland (including the Service Catchment) are all currently directed to the Mangere WWTP. Whilst capacity exists at Mangere to service these areas, it is considered that problems will arise as these areas grow and intensify. In addition, it is understood that major components of Auckland's wastewater infrastructure is at or near capacity in Central Auckland, some of which cannot be maintained because they flow full for significant periods of time. Flows from the Service Catchment add to this issue, as flows from the Service Catchment presently utilise this conveyance system on the way to the Mangere WWTP. The Northern Interceptor will divert flows away from the Whenuapai branch sewer toward the Rosedale WWTP, alleviating capacity restrictions and addressing the immediate issues relating to overflows.	The designation provides a statutory mechanism to implement the works and achieve the capacity benefits described. As such, it is considered that the designation is reasonably necessary to achieve this project objective.

Project Objective	Comment – Works Reasonably Necessary	Comment – Designation Reasonably Necessary
	Amongst other things, the Northern Interceptor Project will: a) Take flows from the Whenuapai and Massey North pump stations (both of which are near capacity), releasing capacity in the northwest and improving the efficiency of each pump station; and b) Free up capacity in the Western Interceptor by taking flows away from the Western PS and Western Interceptor and transferring wastewater to the Rosedale WWTP. Overall, it is considered that the works associated with the Project (and the Northern Interceptor as a whole) are reasonably necessary to provide additional capacity in the wastewater network to accommodate growth and development in the Service Catchment. Furthermore, the diversion of flows away from already constrained infrastructure will increase capacity in other parts of the wastewater network, enabling growth across the region. As such, it is considered that the proposed works are reasonably necessary to achieve this project objective.	
To provide additional capacity in the wastewater network for growth and development in North West Auckland in a manner that: *a) Protects public health;*	Prior to the construction of the wastewater system in Auckland, untreated wastewater was discharged directly to freshwater and coastal receiving environments, resulting in considerable adverse effects on public health and degradation of the environment. The development of a wastewater system, and subsequent significant improvements made over the years to the wastewater network and treatment systems have resulted in a significant reduction in the incidence of water-borne diseases, considerable improvements in water quality of freshwater and coastal environments, and avoidance of adverse effects on amenity caused by untreated wastewater discharges. The ongoing operation of the wastewater network has significant	The designation provides a statutory mechanism to implement the works and thus achieve the public health benefits described. As such, it is considered that the designation is reasonably necessary to achieve this project objective.

Project Objective	Comment – Works Reasonably Necessary	Comment – Designation Reasonably Necessary
	positive public health, social, environmental and cultural effects. The Project will reduce the potential for wastewater overflows from the network by providing appropriate infrastructure to service growth thus resulting in positive effects on public health and the environment through the continued effective operation of the wastewater network generally. As such, it is considered that the proposed works are reasonably necessary to achieve this project objective.	
To provide additional capacity in the wastewater network for growth and development in North West Auckland in a manner that: *b) Is consistent with Watercare's Strategic Objective of being a minimum cost service provider;*	As discussed in the Consideration of Alternatives Report, the preferred Northern Interceptor option constitutes the lowest overall combined capital and operating cost solution when factoring in the expected savings in infrastructure servicing costs. The Project is a component of the Northern Interceptor and as such, it is considered that the proposed works are reasonably necessary to achieve this project objective.	The designation provides a statutory mechanism to implement the works. As such, it is considered that the designation is reasonably necessary to achieve this project objective.
To provide additional capacity in the wastewater network for growth and development in North West Auckland in a manner that: *c) Avoids, remedies or mitigates adverse environmental, cultural and social effects to the greatest extent practicable;*	See Section 0 of this Report, it is considered that, with the adoption of proposed mitigation measures the proposed works will avoid, remedy or mitigate adverse environmental, cultural and social effects to the greatest extent practicable. As such, it is considered that the proposed works are reasonably necessary to achieve this project objective.	See Section 0 of this Report, it is considered that, with the adoption of proposed mitigation measures the proposed designation provides will avoid, remedy or mitigate adverse environmental, cultural and social effects to the greatest extent practicable. As such, it is considered that the designation is reasonably necessary to achieve this project objective.
To provide additional capacity in the wastewater network for growth and development	See Section 2 above. A key design parameter in the design of the Project was the ability to stage the construction so as to adequately respond to actual	The designation provides a statutory mechanism to implement the works. As such, it is considered that the

Project Objective	Comment – Works Reasonably Necessary	Comment – Designation Reasonably Necessary
in North West Auckland in a manner that: *d) Provides for flexibility of construction staging to recognise the uncertainties of projected growth.*	population uptake, rather than build an oversized pipeline based on conservative population projections. By enabling the staging of the pipeline the Project potentially gains: • Flexibility to respond in design and delivery to actual demand; • Further ability to utilise existing design life in current assets ; and • The ability to defer large capital expenditure until the community has grown to support it. As such, it is considered that the proposed works are reasonably necessary to achieve this project objective.	designation is reasonably necessary to achieve this project objective.
To provide statutory protection for the Northern Interceptor and to enable is future construction, operation and maintenance.	Not Applicable	As per Section 176(1)(b) of the RMA, a designation provides statutory protection for the construction and operation of the Northern Interceptor. As such, it is considered that the designation is reasonably necessary to achieve this project objective.

10 Effects on the Environment

Sections to 10.2 to 10.11 of this Report provide and assessment of the potential effects on the environment. This assessment of effects is structured as follows:

- Section 10.1 – Overview of the existing environment as it relates to this Project;
- Section 10.2 – Overview of positive effects;
- Section 10.3 to 10.11 – Assessment of effects on the environment

For further detail and assessment on these matters, refer to the referenced Technical Reports contained within Volume 2.

Conditions are proposed to appropriately manage the actual and potential adverse effects on the environment. These are contained in Appendix F of this Report.

10.1 Existing Environment

Consideration of the effects on the environment requires consideration of the effects of the proposal on the receiving environment as it exists, or as it would likely exist at the time the proposed works are undertaken. The receiving environment constitutes:

a) Existing development that has been legally established;

b) Proposed development that has been granted resource consent and that is not speculative or fanciful; and

c) Activities that are permitted activities within the relevant statutory framework.

An overview of the Existing Environment, including relevant operative zoning and proposed future zoning (PAUP), has been provided in Section 6 of this Report. Existing known consents and areas of development in and around the Service Catchment relevant to this Project include:

Table 10-1: Existing known consents and development

Location	Reference	Description
Greenhithe Bridge Watermain Duplication And Causeway Northern Interceptor Phase 1	LUC-2015-1326, LUC-2015-1346 REG-2015-1328, LUC-2015-1329 REG-2015-1330, REG-2015-1332 REG-2015-1333, REG-2015-1334 REG-2015-1335, REG-2015-1336 REG-2015-1337, REG-2015-1338 LCO 20141617, LQ 2141618	The Greenhithe Bridge Watermain Duplication and Causeway project involves construction, operation and maintenance of new trunk watermain located adjacent to State Highway 18 at Hobsonville and attached to the existing Greenhithe Bridge The Northern Interceptor Phase 1 (wastewater) project involves construction, operation and maintenance of a new wastewater pipeline from the existing Hobsonville Pump Station to the Rosedale Wastewater Treatment plant in Albany
84 Laurel Oak Drive, Schnapper Rock	LP-2140693	Application for 23 lot residential subdivision

Location	Reference	Description
Moire Road, Massey	Special Housing Area No 112 (Tranche 9)	The 9.2ha site at 81-89 Moire Road Massey, purchased by the Ministry of Business Innovation and Employment (MBIE), from the Ministry of Education last year, is now ready for development. It is expected to enable the development of at least 175 homes, including 30 per cent affordable or social housing, over three years. MBIE will make it a condition of the development that the first home is completed by August 2017, with the entire development completed by April 2019.
Massey Cluster, Massey	Special Housing Area No 32 (Tranche 3)	This area includes the properties at 46-58 Cedar Heights Avenue (even numbers only), 5 Darcy Place, 3-21 and 4-22 Hanui Place and 16 Redwood Drive, Massey. It is intended that some of this area be developed into approximately 102 new sections and dwellings.
North West Auckland	The Transport Agency	A number of transport projects to support growing areas in north-west Auckland are already complete, underway, nearing construction or well advanced in planning: • Greenhithe-Hobsonville Deviation project on State Highway 18 (SH18). • Upgrades to the Northwestern Motorway (SH16). • Waterview tunnels. • Priority bus shoulders on the Western Ring Route. • New bus stations and a dedicated busway. New localised transport improvements will be provided for special housing areas as they are built. This will include upgrades of some existing roads, new local roading and provision for bus routes, cycle and pedestrian networks.

10.2 Positive Effects

The Project constitutes an integrated and cost effective solution for the wastewater network, addressing existing issues within the network and providing sufficient capacity to provide for increased growth in the Service Catchment.

Once completed, the Project will provide the following key benefits, which are seen as positive benefits:

a) The provision of capacity in the wastewater network for future growth and development in Auckland;

b) Reducing the potential for untreated wastewater overflows from the network by providing appropriate infrastructure to service growth;

c) Positive effects on public health and the environment through the continued effective operation of the wastewater network generally.

10.2.1 Network Capacity

The Three Waters Strategic Plan (Watercare, 2008) identified the need for additional trunk sewer capacity to provide for Auckland's growth as the capacity of the existing network is insufficient. Based on current projections, without the provision of additional wastewater conveyance or treatment capacity to service growth in the Service Catchment, Watercare would be unable to service any additional growth in the Whenuapai Branch sewer catchment in the near future and the Western Interceptor catchment from 2035 without the risk of significant increases in the frequency and associated effects of wastewater overflows.

The alternative to not increasing the capacity of the network is that either:

a) Restrictions or limitations are placed on land that has previously been identified for urban development; or

b) That there will be an increase in wastewater overflows and subsequent degraded environmental outcomes.

Neither of these outcomes are deemed appropriate or would be consistent with the Auckland Plan strategic direction for providing for, improving and protecting strategic infrastructure.

10.2.2 Benefits of the Wastewater Network

Aucklanders expect that infrastructure will be planned, delivered and maintained in a way that will make Auckland liveable and resilient. (Auckland Plan Strategic Direction 12). The ongoing operation of a reticulated wastewater system that includes uninterrupted wastewater treatment is expected by urban Auckland's residents, businesses and visitors.

The need for a reticulated wastewater system to support Auckland's population growth was first recognised in the late 19th century to address concerns about the discharge of raw wastewater into local streams and bays. Development of the current wastewater network and treatment systems, and subsequent upgrades undertaken over the years since have resulted in a significant reduction in the incidence of water-borne diseases, considerable improvements in water quality of freshwater and coastal environments, and avoidance of adverse effects on amenity caused by untreated wastewater.

The ongoing operation of the wastewater network of which this project is part has significant positive public health, social, environmental and cultural effects.

10.2.3 Overflow Mitigation

Wet weather overflow mitigation is also required in the Northern Waitakere area to meet Regional Plan targets of no more than two events per discharge location per year in the separated network. Watercare needs to progress the development of overflow mitigation options, such as the proposed Northern Interceptor scheme, to achieve targeted levels of service. The proposed works will reduce the potential for overflows. This will in turn:

- Minimise potentially harmful pathogens reaching freshwater and coastal environments;
- Minimise the potential for adverse amenity effects on public areas and recreation values and
- Assist in the restoration of the mauri of waterways and coastal waters.

10.3 Arboricultural Effects

As discussed in Technical Report A, the proposed works will require the removal of areas of vegetation, individual and groups of trees, works within the dripline of trees, and associated pruning. Due to the changing nature of the tree resource over time, in determining a benchmark from which the future tree environment can be estimated, the approximate growth rates and anticipated tree removals that may occur from time to time have been considered.

Technical Report A states that the proposed works have the potential to adversely affect the arboricultural qualities within the following locations:

- Lowtherhurst Reserve, Massey;
- Manutewhau Reserve, Massey;
- St Margarets Park, West Harbour;
- The eastern abutment of the Greenhithe Bridge, Greenhithe;
- North Wainoni Park, Greenhithe;
- North Shore Memorial Park, Schnapper Rock;
- Wharepapa Reserve, Schnapper Rock;
- North Shore Golf Course, Albany; and
- Rosedale Park, Rosedale.

10.3.1 Mitigation

In general, most potential arboricultural effects can be managed through the adoption of standard arboricultural practices, including:

a) Where existing vegetation is to be removed it is proposed that this will be replaced by planting of native trees and quality specimen trees. Where the vegetation being removed is part of a continuous area of vegetation replanting should be done so the existing natural environment is replicated or enhanced. This will require removal and control of weed species as well as tree planting/revegetation. The Replacement Planting Protocol in Appendix A of Technical Report A sets out measures that will assist to develop mitigation measures that are suitable to mitigate the scale of effects generated by tree removal;

b) Where existing stand-alone trees are required to be removed these will be replaced in consultation with the asset manager or land owner for the site, as necessary. Where larger trees (exceeding 4m in height) are required to be removed, these should, with the agreement of the land-owner, be replaced with two replacement trees;

c) Provided that the works occur in accordance with tree protection measures that are suitable for the scale of the pipe installation operations and site specific works are designed to prevent harm to the trees adjacent to the route, damage to the above ground portions of the trees can be avoided; and

d) Protection of trees will need to include protection of their growing environment, which will require the permeable rootzone areas of trees to be protected from soil compaction, and contamination from activities associated with the works. The Tree Protection Methodology in Appendix B of Technical Report A sets out measures that are suitable to minimise effects on trees that are to be retained;

In addition to the above, due to the changing nature of the tree resource within the project area, the project requires a protocol-based approach to tree and vegetation management to reflect the state of trees and vegetation at the time of construction. This will require that Watercare and their contractors confirm construction methodologies in consultation with an arborist at the time of final design and construction with a view to avoiding and mitigating adverse effects on trees.

Technical Report A recommends that, where trees that are within or in close proximity to the designated corridor, consideration should be given to pro-active management of trees to maintain a clear corridor, so as to minimise the effects of pruning when the pipeline is under construction. Regular minor pruning of the trees that may in future conflict with construction vehicles and machinery movement would significantly reduce the conflict that will result from branches growing unchecked across the designated construction corridor.

Technical Report A concludes that subject to the implementation of the site-specific tree protection and project-wide mitigation measures, the Northern Interceptor will have minor impacts in the trees within the proposed alignment during construction. Once completed, the operation and maintenance of the Northern Interceptor is not considered to have adverse effects on trees.

10.4 Archaeological Effects

Technical Report B assesses the effects of the proposed Northern Interceptor Project on archaeological and historic heritage values. In doing so, the Report considered the New Zealand Archaeological Associations site record database, Auckland Council's Cultural Heritage Inventory, Auckland Council District Plans – Operative North Shore Section 2002 and operative Waitakere Section 2003, the Proposed Auckland Unitary Plan schedules, and the Heritage New Zealand NZ Heritage List were searched to determine whether any archaeological sites had been recorded on or in the immediate vicinity of the proposed designation. Visual inspections were also undertaken along the proposed alignment in March 2016.

Within NoR – NI (Waitakere), the Report notes that a number of archaeological and historic heritage sites have been identified within 100m of the proposed route. Only one historic heritage site has been previously recorded within the NoR – NI (Waitakere). This heritage site has been identified as the Radio New Zealand Transmitter Building located at 2-12 Selwood Road. Although visual survey and testing did not identify any archaeological or other historic heritage remains within the proposed area of works at Lowtherhurst Reserve, there is considered to be some potential for previously unrecorded archaeological remains to be exposed as a result of the proposed works within this area.

There were a number of archaeological and historic heritage sites that have been recorded within the proposed NoR – NI (North Shore). These sites are clustered in close proximity to the proposed areas of Works at North Wainoni Reserve, the North Shore Memorial Park, and Wharepapa Reserve at the end of Schnapper Rock Road. Only one of these sites is currently located within the immediate area of the proposed alignment (R10/1180), but this is an area of proposed trenchless construction and there is therefore scope for avoiding the site. The former Greenhithe School House is also located within 100m of the proposed alignment within Collins Park, however, the current proposed alignment should have no effects on the scheduled extent of this site.

The Report notes that unrecorded subsurface archaeological sites could be exposed during development within Lowtherhurst Reserve, North Wainoni Park, North Shore Memorial Park, Wharepapa Reserve and North Shore Golf Club.

10.4.1 Mitigation

An Authority for the Project will be applied for under Section 44(a) of the Heritage New Zealand Pouhere Taonga Act as a precaution prior to the start of earthworks. This will establish appropriate procedures for the management of any archaeological remains, should they be discovered.

In addition to the above, the following mitigation measures are recommended:

a) That the detailed development plans should take into account the locations of the recorded archaeological sites and ensure that they are avoided to the extent possible;

b) That earthworks at Lowtherhurst Reserve, Wainoni Park North, North Shore Memorial Park, Wharepapa Reserve and North Shore Golf Club should be monitored by an archaeologist to establish whether any unrecorded subsurface archaeological remains are present.

c) That an Accidental Discovery Protocol should apply to any areas not covered by the archaeological Authority;

d) That in the event of koiwi tangata (human remains) being uncovered, work should cease immediately in the vicinity of the remains and tangata whenua, Heritage New Zealand, the New Zealand Police and Council should be contacted so that appropriate arrangements can be made; and

e) That since archaeological survey cannot always detect sites of traditional significance to Maori, such as waahi tapu, tangata whenua should be consulted regarding the possible existence of such sites along the length of the proposed alignment, and regarding the scheduled sites and places of value to Mana Whenua in the vicinity of the alignment.

Technical Report B concludes that the potential effects on archaeological and historic heritage values are considered likely to be minor.

10.5 Contaminated Land Effects

A Preliminary Site Investigation (PSI) has been undertaken along the proposed alignment for the Northern Interceptor (refer to Technical Report C).This included review of geological and hydrogeology information, review of historical aerial photos, review of a Council 'Site Contamination Enquiry', and a drive-by inspection. Most of the land comprises areas of former horticulture, with some minor industrial/commercial activity located in the southern part of the NoR – NI (Waitakere) section.

The Report identified that the following Hazardous Activities and Industries List (HAIL) activities were (or are likely to have been) undertaken at various locations along the designation:

a) Use of persistent pesticides at former and existing horticultural land and sports turfs; and

b) Intentional or accidental release of hazardous substances which could migrate onto the land from:

    i. former and existing horticultural activities;

    ii. an existing cemetery;

    iii. a dye spill incident at Unity Drive North, Rosedale in 2008;

    iv. an electric equipment storage facility in Rosedale; and

c) Intentional or accidental release of hazardous substances as a result of placement of contaminated fill during land development and construction of roads along the designation.

Based on the identified potentially contaminating activities, the PSI indicates that there is potential to encounter contaminated soil during the works, and that there is a very low to moderate risk for significant contamination to be encountered (depending on the source of contamination).

10.5.1 Mitigation

The key mitigation measures proposed are as follows:

a) Further testing to establish contamination levels within sections of the designation where potentially contaminating activities have been identified, once the location of excavation works have been established.

b) The preparation of a Contamination Site Management Plan (SMP) which includes:

    i. Excavation, handling and storage requirements;

    ii. Dust and erosion control measures to prevent the discharge of contamination;

    iii. Health and safety procedures;

    iv. Disposal of contaminated soils to a landfill approved to take the material; and

    v. Procedures for identifying and managing unexpected discovery of contaminated soils or hazardous materials.

c) Appointment of a Contaminated Land Specialist who meets the requirements of a Suitably Qualified and Experienced Practitioner set out in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health Users Guide (2012).

Based on the above, it has been conservatively assumed that the potential contamination sources may pose some risk to human health and the environment during construction of the project. However, Technical Report C notes that the works should be able to be carried out with less than minor effects to the environment with the implementation of a number of standard earthworks measures.

10.6 Ecological Effects

The ecological effects of the proposed alignment of the Project have been assessed in detail in Technical Report D. This assessment was based on current ecological values and potential ecological values after a period of 20-30 years, when Project impacts are anticipated to occur. These can be categorised as terrestrial effects, and freshwater and marine effects, and are described in the following sections.

10.6.1 Terrestrial Ecology

The vegetation along the proposed route consists of a mixture of indigenous and introduced species of varying ecological value. Vegetation that is currently young could have established a canopy of trees over the next 20 years.

A number of SEAs have been identified. These are:

a) **SEA_T_4654 within Lowtherhurst Reserve** – vegetation in this area is predominately native and provides a suitable habitat for at least five native lizard species, four of which have a have a threat classification of “At Risk”. It also has the potential to support roosting and nesting habitat for a range of native bird species, including Kereru, which is a keystone species involved in maintaining ecosystem functions. The potential effect of the Project on this vegetation has been determined as moderate.

b) **SEA_T_2040 and SEA_T_4866 at Oreil Avenue (Manutewhau walk)** – this is a riparian corridor and the vegetation is predominantly native and provides suitable habitat for at least five native lizard species, four of which have a threat classification of “At Risk”. The potential effects of the Project can be mitigated to be minor.

c) **SEA_T_8319 at the Eastern Abutment of the Greenhithe Bridge** – vegetation in this area consists of exotic and native scrub which provides a suitable habitat for five native lizard species, including four which have a threat classification of “At Risk”. Forest gecko, copper skink and ornate skink have all been recorded from this SEA. The potential effects of removing vegetation on loss of habitat for common native birds and lizards would be moderate.

d) **SEA_T_8084 and 8082 at Bush Road to Rosedale Treatment Plant** – this includes the crossing of Alexandra Stream.

Areas of ecological interest that comprise of non-significant vegetation and that may require vegetation removal include:

a) Native vegetation may have grown to a significant size from the Concourse to Selwood, providing habitat for native fauna;

b) A small section of vegetation along the fringe within Taitapu Park may result in the loss of several medium sized native trees;

c) A pohutukawa tree is located in the vicinity at 21 Cedar Heights Avenue which may have increased in size in the future and the effects of construction on this tree may be moderate to significant; and

d) There is vegetation that buffers Lucas Creek which should try to be protected from construction effects.

10.6.2 Freshwater and Marine Ecology

The Project traverses a number of streams or creeks along the proposed route. As noted above, regional resource consents have not been applied for at this time because, commensurate with the “route protection” phase that the Project has reached, only a concept level of design has been undertaken of the

network and this is insufficient to inform those resource consent applications. The necessary resource consents will be applied for at the time of detailed design of the network in the future. Notwithstanding this, the following table provides an assessment of the effects on the streams:

Table 10-2: Relevant streams and likely effects

Stream	Effect
Henderson Creek	Moderate adverse effects through sediment runoff if not appropriately managed.
Rawawaru Stream	Supports five native fish species (one which has a national threat status of "At Risk"). The Ecologist notes that more species may become "At Risk" within the next 20 years. Minor adverse effects include sediment runoff and vegetation removal.
Tihema Stream	This stream is of moderate ecological value and provides suitable habitat for native fish. Minor adverse effects include sediment runoff and vegetation clearance.
Te Wharau Creek	Moderate adverse effects on the marine ecology of the creek through sediment runoff may occur.
Lucas Creek	Moderate effects may occur due to sediment runoff.

As indicated in Technical Report D the majority of effects are not directly from the construction, but associated sediment runoff and vegetation removal. Generally, the Project only impacts on small areas of mostly young native vegetation, where trenched construction, shafts or pipeline bridges are proposed.

10.6.3 Mitigation

With regards to effects on ecology, the following mitigation measures are recommended in Technical Report D:

a) Assessment of the botanical values should generally be undertaken at the time of detailed design and immediately prior to the construction of open trenching, installation of shafts and jacking stations and the construction of pump stations;

b) During detailed design, attention should be given to avoiding effects on mature native trees as identified for each location, including siting structures away from the dripline of mature native trees and areas of native vegetation;

c) In Lowtherhurst Reserve the construction of the pipeline bridge and trenched construction should avoid the largest native trees;

d) Replacement vegetation and the maintenance of that vegetation for a period of at least 3 years would mitigate any vegetation removal;

e) A suitable mitigation planting plan for all affected areas should be developed by a qualified plant ecologist;

f) Preclearance surveys for lizards and nesting birds should be undertaken where they have been identified as potentially present;

g) A Lizard Management Plan should be prepared to address the potential presence and management of geckos and/or skinks within these areas;

h) Locations recommended for fauna management are: Taitapu Park, Lowtherhurst Reserve, Tinema Stream Riparian Corridor, the Eastern Abutment of Greenhithe Bridge, North Wainoni Park and North Shore Golf Course edge;

i) Any construction or earthworks in close proximity to a watercourse (within 10m) or coastal areas should be timed to avoid predicted heavy rain and should incorporate standard sediment controls (TP90 – Erosion and Sediment Control: Guidelines for Land Disturbing Activities in the Auckland Region), as a minimum, to prevent sediment runoff into any watercourses or marine environments; and

j) In addition to the above sediment control mitigation, for the Rawawaru Stream Crossing, the works would require a full ecological assessment as well as a fish recovery and relocation management plan.

Technical Report D concludes that effects on the botanical values of the vegetation and flora are expected to be temporary and minor if good quality replacement planting is carried out immediately following construction. The removal of any weedy tree species will be beneficial, and where possible, mitigation planting should be carried out ahead of construction impacts. Moderate effects of the construction of the pipe bridge on the good quality native vegetation surrounding the Rawawaru Stream in the Lowtherhurst Reserve will need to be adequately mitigated. This would involve replacement planting of the site post construction and additional planting and/or other actions such as weed control.

Potential effects of the Project on habitat values to native fauna are associated with trenched construction only. Shafts associated with trenchless construction are located on open ground and these do not impact on habitat values at present, nor would they be expected to over the next 20 years.

Trenched construction would have low to moderate impact on fauna habitat values at six locations, including at Taitapu Park, Lowtherhurst Reserve, Tinema Stream Riparian Corridor, the Eastern Abutment of the Greenhithe Bridge, North Wainoni Park and North Shore Golf Course edge. Provided that the recommended preclearance surveys for lizards and nesting birds are undertaken and a Lizard Management Plan is prepared and implemented, these effects would be less than minor.

All proposed works within proximity of watercourses or coastal areas can be mitigated with standard sediment control measures, bank stabilisation and re-vegetation.

10.7 Ground Settlement Effects

Technical Report E provides a preliminary assessment of the potential ground settlement along and adjacent to the proposed designation boundary that may result from construction and operation of the pipeline. The Report identifies two sources of settlement associated with the construction and operation of the proposed pipeline. These are:

a) Mechanical settlement – settlement due to physical movement of the ground, either as a result of lateral movement at the perimeter of the trenches/ excavations or volume loss resulting from over excavations of tunnels. This type of settlement typically occurs within a short period of time and is controlled by the construction methodology.

b) Consolidation settlement – settlement due to lowering of groundwater levels (resulting in a reduction in porewater pressure within the solids). This settlement is dependent on the rate, magnitude and extent of groundwater levels lowering and the sensitivity of the soils to consolidation, and is controlled by the pipeline and structures design and specification.

Technical Report E notes that the level of settlement that is generally accepted in New Zealand as being the upper limit for buildings is a total settlement of 50mm and a differential settlement of 1:1000. These settlement limits are conservative values which apply to a broad range of structures, including structures of timber, concrete and brick construction and are considered unlikely to result in damage to standard, modern industrial/commercial buildings and residential buildings of timber and brick construction.

The following table provides comments on the areas along the designation corridor identified in Technical Report E where the level of settlement may exceed acceptable tolerances, prior to mitigation. The mitigation measures outlined in Section 10.7.1 below are expected to control the settlements to within acceptable tolerances.

Table 10-3: Areas where level of settlement may exceed acceptable tolerances

Geographic Extent	Potential Effect
The Concourse to Selwood Road	Excavations associated with the construction of the proposed new pump station have the potential to impact buildings within 20 m of the excavation before implementation of mitigation measures.
Selwood Road to Huruhuru Road	The pipeline in this area is expected to be constructed between 2 m and 5 m deep by a combination of trenched and trenchless technologies within private, public and road reserve. Where the pipeline is shallow (2 m deep or less) and more than 10 m away from structures, buildings are unlikely to be affected by construction or operation induced settlement. Where the pipeline is constructed between 2 m and 5 m deep, settlements are expected to be more significant and have the potential to impact existing houses, in the area north of Henderson Creek. The mitigation measures outlined below are expected to control the settlements to within acceptable tolerances.
Holmes Reserve to Holmes Drive	The pipeline is planned to be constructed between approximately 6 m and 14 m deep by trenchless construction within the road reserve. Where the pipeline is at its deepest the construction related settlements could impact the existing houses adjacent to the alignment.
Holmes Drive to Hobsonville Road	The pipeline is planned to be constructed between approximately 8 m and 19 m deep by trenchless construction within public and road reserve. Where the pipeline is at its deepest the construction related settlements have the potential to impact the existing structures at the southern end of the alignment where construction is through Tauranga Group and ECBF soils. The northern portion of the pipeline in this area is through ECBF rock and at such a depth that surface settlements are expected to be negligible.
The eastern abutment of the Greenhithe Bridge to Wainoni Park	The pipeline is planned to be constructed between approximately 15 m and 21 m deep by trenchless construction within public and road reserve and through private properties. Where the pipeline is at its deepest the construction related settlements could impact the existing houses adjacent to the alignment. A portion of SH18 west of Tauhinu Road may also be affected.
Appleby Road to William Pickering Drive	The pipeline is currently planned to be constructed between approximately 4.5 m and 6 m deep by trenched construction within the road reserve and through private property (14 John Glenn Drive). Under the current concept design, the construction related settlements have the potential to impact existing structures adjacent to the designation.
William Pickering Drive to Bush Road	The pipeline is currently planned to be constructed between approximately 4-5 m and 6 m deep by trenched construction within the road reserve. Where the pipeline is at its deepest the construction related settlements could impact existing structures adjacent to the alignment.
Bush Road to the Rosedale WWTP	The pipeline is currently planned to be constructed approximately 4.5 m deep by trenched construction predominantly on public land and within the road reserve with a short section through private property. The central portion of this section will be installed by trenchless construction across the waterway. Construction related settlements may impact the existing commercial premises at the western end of this section

10.7.1 Mitigation

Where the estimated ground movements are anticipated to exceed the tolerances either during construction (mechanically induced) or in the long term as a result of consolidation settlement, the following mitigation measures are recommended:

a) Reduce depth of excavation (where possible for rising main sections);
b) Install excavation wall support/struts earlier or at closer vertical spacing to reduce wall deflections;

c) Pipe joints and buried structures being sealed to a high standard;
d) Adopt a tight construction programme (e.g. by reducing the length of excavations open at any one time);
e) Increase the size of the struts being installed to reduce excavation wall deflections;
f) Design and install low permeability backfill and/or construct drainage cut-offs to reduce long term groundwater drawdown;
g) Adopt rigid retaining wall systems such as diaphragm or secant pile systems for deep, permanent excavations such as pump stations, to minimise ground settlement induced by wall deflection; and
h) Adopt a "tanked" system for deep, permanent excavations such as pump stations, to minimise the degree to which groundwater levels are affected during operation.

In addition, it is recommended that where site specific groundwater monitoring indicates that groundwater drawdown exceeds seasonal lows, or if it is desired to achieve tighter tolerances, further mitigation may be required and could include settlement compensation measures at locations where settlement tolerances are likely to be exceeded and affect private property.

Notwithstanding the above, it is noted that issues associated with groundwater drawdown will be and are best placed to be considered through a future resource consents process. The design of these future mitigation measures, and the particular locations where they may be required would be the subject of the more detailed design phases that would support any future resource consents required for the works. They would be supported by more comprehensive geotechnical and hydrogeological investigation data than is available at this early stage of project design.

Subject to the mitigation measures outlined above, the Technical Report concludes that the short and long term settlement effects of the project on existing buildings and structures along the alignment can be expected to be controlled to less than minor adverse effects.

10.8 Landscape and Visual Effects

Technical Report F assesses the potential landscape and visual effects related to the construction, operation and maintenance of the Project. For each of the effects anticipated in the construction phase and operation phase, a level of effect rating has been given, ranging from "Very High Adverse Effects" (-5) to "Very High Beneficial Effects" (+5). For assessment purposes under the Resource Management Act, 1991, any effects that score -1 and -2 are considered to be *less than minor*; whereas a score of -3 are considered *minor*, and scores of -4 and -5 are considered to be *more than minor*.

In most areas, anticipated effects are considered to be less than minor. However, in nine sections the effects (pre-mitigation) are considered minor or more than minor. These areas are described in the following table:

Table 10-4: Summary of potential visual and/or landscape effects

Area	Level of Temporary Visual and/or Landscape Effects
Cedar Heights Avenue to Holmes Reserve	Areas of the project, located within reserves or grass areas are generally contained by low lying areas or adjacent residential properties. Although residents in the immediate area will be impacted, a small number would be affected and therefore the level of visual effects is considered to be less than minor (-2) to minor (-3) given their close proximity.
Holmes Reserve to Holmes Drive	Construction works within No 15 Berkshire Terrace and Manutewhau Reserve, with relation to the pipe bridge, will result in the removal of a sizeable area of vegetation. The overall level of temporary landscape effects is considered minor (-3). It is also anticipated that for the construction of the pipe bridge a crane and contractor facilities would be present at 33 and 35 Jaedwyn Drive during construction which would result in temporary adverse visual effects to surrounding residents. In addition to these areas, construction works within Manutewhau Reserve, where the pipe bridge is proposed to be located, would require the clearance of vegetation including screening trees, and

Area	Level of Temporary Visual and/or Landscape Effects
	therefore the temporary effect will be prominent. Therefore the level of visual effects prior to mitigation is considered to be high (more than minor) particularly from residents in close proximity to the works (-4). The loss of some vegetation and disturbance to the waterway during construction and installation of the pipe bridge are considered minor (-3).Technical Report F notes that revegetation and mitigation to the stream embankments will reduce the level of permanent effects, with the presence of the pipe bridge having a permanent effect on the natural character. The permanent natural character effects are considered less than minor (-2) to minor (-3).
The eastern abutment of the Greenhithe Bridge to Collins Park	Construction within The Knoll reserve and private property No 15 The Knoll will affect an area of existing vegetation and trees within an SEA area. It is anticipated that a 10m wide band of vegetation would be removed (across approximately 100m) in the reserve and property from the foreshore to the BPC and biotrickling filter. It is noted that large areas of vegetation have recently been removed from the property during construction of a residential dwelling with no certainty as to future replanting. The overall level of temporary effects is considered minor (-3). Views towards works within the road corridor would primarily be from road users and residents along Tauhinu Road. The visual amenity effects are considered to be low given construction works within road corridors from time to time can be generally expected. However vegetation clearance will increase the degree of views into 15 The Knoll. Because of this highly visible area and the viewing audience being in close proximity to prominent visible works and vegetation removal, the visual effects are considered minor (-3). The natural character of the environment consists of the Upper Waitemata Harbour and the vegetated harbour embankments. The works will result in the loss of some vegetation within the reserve adjacent to and within 15 The Knoll. Although a minor (-3) effect on the natural character is considered, these effects are predominantly temporary in nature and affecting a limited area of vegetation.
Collins Park to Wainoni Park	The visual presence of machinery in the park are considered to be temporary elements, visible for a limited duration. However this combined with the construction of the biofilter in Collins Park will result in temporary adverse visual effects which are considered minor (-3).
Wainoni Park South	Construction works within South Wainoni Park will likely involve the removal of a number of trees and grass areas, therefore temporary landscape effects are considered minor (-3). Works within South Wainoni Park will be visible from a number of locations and viewing audiences including the Greenhithe Pony Club, North Shore Dog Training Club and residents on Orwell Road (particularly from No's 3, 7, 9 and 11) approximately 50m from the proposed pump station. Construction works for the installation of the inlet vent shaft will also be visible to road users and residents along Churchouse Road and Greenhithe Road. Technical Report F concludes that because of this, the visual effects are considered minor (-3) during construction.
Wainoni Park North to North Shore Memorial Park	Construction works associated with the pipe line installation and pump station within North Wainoni Park would involve the removal of trees and grass areas. These trees within the designation area consist of species such as English Oak (Querus robur) and Monterey cypress (Cuppressus macrocarpa) and reach a height of approximately 20m. The

Area	Level of Temporary Visual and/or Landscape Effects
	landscape effects resulting from construction activities are considered minor to more than minor (-3 to -4). Trenchless technologies within the park will produce some adverse visual effects due to the presence of work areas. However, the most predominant visual change would result from the removal of screening vegetation and construction activities around the proposed pump station. These changes will be visible from distant residential properties including Schopolo Place, Kerema Way, Kittiwake Drive and Rangi Ave. In addition to these properties, close proximity properties in Birchwood Grove, as well as park facilities including Greenhithe Riding for the Disabled and North Shore Air Gun Club will be impacted. The visual effects are considered more than minor (-4) for close proximity viewing audiences and minor (-3) for distant residential viewing audiences. The natural character of the coastal environment consists of the northern most point of Wainoni Park and the mangrove embankments of Te Wharau Creek. The temporary natural character effects are considered minor (-3) as the affected area is limited and temporary in nature. Once construction activities have been completed, and the remedial and mitigation measures have been put in place, the level of landscape effects overall is considered minor (-3). The introduction of the pump station and ancillary buildings would bring visual change within the park. Affected viewing audiences in the construction phase would now afford views of the completed buildings within the park landscape. As such, the level of permanent visual effects and effects on the natural character of the environment in this location is considered low to minor (-3).
North Shore Memorial Park to Schnapper Rock Road	Views towards construction works within NSMP will be visible to visitors to the park as well as some residents along the southern and eastern edges of Schnapper Rock Road. Because this method of pipe installation is particularly visible and is in the presence of sensitive viewing audiences the temporary visual effects is considered minor (-3) during construction.
Schnapper Rock Road to North Shore Golf Course	The method of construction works will be particularly visible from residents along the road, visitors to the North Shore Memorial Park, the North Shore Golf Course, and Wharepapa Reserve. However some of viewing audiences will be experiencing visual impacts towards locations within the road corridor were works are an anticipated activity. Along this segment, the level of visual effects is considered minor (-3) during construction.
North Shore Golf Course to Appleby Road	Works within the North Shore Golf Course and along Appleby Road will be visible from visitors to the golf course as well as some residents along Laurel Drive, English Oak Drive, St Andrews Way and Appleby Road as well as visitors and students of Albany Junior High School. As such, the temporary visual effects is considered minor (-3).

Permanent visual effects will predominantly result from the removal of vegetation and the presence of built structures (the three pump stations, No. 56 The Concourse, and Wainoni Park North and South), a pipe bridge (crossing Manutewhau Creek) and surface features such as manhole covers inlet vent, biotrickling filters and biofilters.

As noted in Technical Report F, construction of the Project will be phased and therefore temporary visual effects will not occur simultaneously or over a wide area.

10.8.1 Mitigation

The following table outlines and describes the proposed landscape and visual mitigation measures relevant to the project, grouped by activity. Following construction and after the implementation of mitigation measures, the level of landscape and visual effects differs but in all instances is minor or less.

Table 10-5: Summary of potential visual and/or landscape mitigation measures

Activity	Proposed Landscape & Visual Mitigation Measures
Installation of pipe line via trenched & trenchless technology	a) Limit works area to the greatest extent practicable; b) Works within road reserve should wherever practicable aim to be located within the carriageway; c) Works areas within public reserves should be limited as far as practicable; d) Avoid removal of trees and vegetation where possible; e) Consider final treatment of drop shafts. This could include backfilling if access is not required, or covering in soil and re-grassing or other suitable material whilst still allowing for required periodic access. Alternatively, consider creating a seating area in conjunction with large drop shaft lids, maintaining provision for future access when required; f) Manholes in open grass areas should sit flush with the finished ground level and soil areas reseeded as soon as practicable (within the next planting season (April to September); g) Remove construction access roads apart from those providing access for maintenance within reserves. Consider reinstating surface with “grass cell” or similar reinforcing and re-grass to provide all-weather trafficable access for maintenance vehicles; h) Re-seal asphalt roads and concrete surfaces; i) Reinstate vegetation and grass areas; j) Reinstate children’s playground equipment in public spaces (if affected); k) Works adjacent to CMA and within watercourses should: ○ Conduct the construction phase as quickly as possible and during low flows to reduce effects on the quality of water and marine ecology ○ Minimise excavation and disturbance of watercourse / coastal edge ○ Keep contaminants such as concrete and soil stockpiles out of the stream channel ○ Consider diverting water from the site away from watercourse / coastal edge during construction, Erect silt fences ○ Recontour disturbed watercourse banks ○ Provide replacement planting above watercourse in disturbed areas
Break Pressure Chamber	a) Limit works area to the greatest extent practicable; b) Avoid removal of trees and vegetation where possible; and c) Reinstate vegetation and/or vegetate above the Break Pressure Chamber.
Pipe Bridge	a) Limit works area to the greatest extent practicable; b) Minimise removal of trees and vegetation; c) Restore disturbed ground around the pipe bridge to a condition suitable for planting; d) Prepare a detailed landscape and planting plan in line with CPTED principles; e) Remove construction access apart from those providing access for maintenance. Retain with “grass cell” or similar reinforcing and re-grass to provide all-weather trafficable access for maintenance vehicles if practicable; f) Consider pedestrian access and cycle access across pipe bridge for the benefit of the wider community; and g) Appropriately integrate pipe bridge design and use recessive materials.
Permanent above ground infrastructure, including pump station(s) and ancillary buildings /	a) Limit works area to the greatest extent practicable; b) Limit height of structure as far as practicable; c) Avoid locating in visually prominent location, ideally clustered around built structures (where possible); d) Consider low planting around the base;

Activity	Proposed Landscape & Visual Mitigation Measures
Structures, including biofilters, biotrickling filters, inlet vent and activated carbon units	e) Consider establishment of vegetation, including trees, in areas which are highly visible to viewing audiences prior to any works. This vegetation should be located where it may remain during the construction and operation of the project, and therefore provide visual mitigation of the works and permanent features; f) During construction phase consider installation of construction fencing with interpretive panels in selected areas which are visible to the public, to provide information about the project and its progress; g) Avoid removal of trees and vegetation where possible; h) Restore disturbed ground around the pump stations and ancillary buildings / structures including biofilters, biotrickling filters, inlet vent and activated carbon units to a condition suitable for planting; i) Prepare a detailed landscape and planting plan in line with CPTED principles j) Remove construction access roads apart from those providing access for maintenance within reserves. Consider reinstating surfaces with “grass cell” or similar reinforcing and re-grass to provide all-weather trafficable access for maintenance vehicles; and k) Appropriately integrate building / structure design suitable for the receiving environment, and use recessive materials and colours for pump stations and ancillary buildings / structures.

Further to the above, where the public are in close proximity to the works in reserve areas fencing may include branded screens with viewing holes to the site and interpretive panels providing key information on the project and its progress.

Technical Report F concludes that the majority of the adverse landscape and visual effects anticipated in the construction and operation phases of the Project can be managed and mitigated to result in low (less than minor) adverse effects overall.

10.9 Noise and Vibration Effects

Technical Report G assessed the potential noise and vibration effects related to the construction, operation and maintenance of the Project. In undertaking this assessment, two pipeline route inspections were carried out in the daytime, during which existing ambient and background noise levels were measured in accordance with the relevant standards. To assist with quantifying the night-time ambient and background noise environment in the vicinity of residential receivers around the proposed Wainoni Park pump stations, long-term noise logging was carried out.

The proposed works were assessed in the context of the receiving environment (i.e. the existing and likely future acoustic environments) along the pipeline route. The relevant underlying zones of the PAUP and operative district plans were used as they give a good indication of permitted activity development that can occur on land adjacent to the pipeline route as of right and, therefore, the likelihood for the future acoustic environment to change from what currently exists can be inferred.

The day and night-time construction noise and vibration standards used for in this assessment are outlined in Section 3 of Technical Report G.

Exceedances of the Construction Noise Standard are predicted during construction of the micro-tunnel pit shafts. As the shafts will require extensive excavation and wall retention in relatively close proximity to dwellings, a quieter, less vibration-intensive form of piling should be used as a best practice provision. If possible, 2.5 metre high site hoardings should be erected as soon as possible to minimise noise effects on adjacent receivers (not required for Pit 5).

Night-time tunnelling operations above-ground at shaft sites will require management via the Construction Noise and Vibration Management Plan (CNVMP" and Site Specific Noise Management Plan (SSCNMP) and will require implementation of enhanced noise mitigation measures.

10.9.1 Construction Noise and Vibration

Noise and vibration levels from the proposed construction activities have been predicted for receivers adjacent to the works, as well as at nominal setback distances that will be encountered across the Project. Various construction activities have been identified as being likely to generate noise levels in excess of the daytime noise standard, and construction activities occurring at night that utilise trenchless technologies are predicted to generate noise levels in excess of the night-time external noise standard.

Potential also exists for night-time tunnelling vibration to exceed the recommended regenerated noise standard at points along the route that are relatively shallow (i.e. are less than 15-18 metres slant distance). This has the potential to result in sleep disturbance for some affected parties.

Vibration from pipe-jacking within 18 metres slant distance of single storey dwellings (15 metres for 2-storey dwellings with bedrooms on upper level), occurring during the night-time, has the potential to exceed the regenerated noise criterion of 35 dB LAeq. An SSCNMP will be required where night-time tunnelling occurs within these distances.

10.9.2 Operational Noise and Vibration

The assessment found that some audible noise may be emitted from break pressure chambers and drop shafts under high flow conditions. These events are considered to be short-term in nature, would generally occur at the same time as heavy rainfall, and would therefore result in no more than slight noise effects. Another source of noise would be the arrival and departure of maintenance crews i.e. light vehicle noise, which would happen infrequently and would result in negligible noise effects.

The Report concludes that the most significant source of ongoing operation noise and vibration is considered to be from the two pump stations proposed to be located in Wainoni Park, and the third on The Concourse.

10.9.3 Mitigation

For the activities identified as potentially exceeding the Project construction acoustic criteria, an adaptive mitigation / management approach will be adopted to avoid, remedy or mitigate adverse effects as far as practicable. The specifics of the required measures will be detailed in the CNVMP, which will be formulated and submitted to Council prior to construction commencement.

The primary mitigation measures for project construction noise and vibration effects are summarised below:

a) Construction hours span two time periods being 6:30am-7:30am, and 7:30am-6:00pm. Early morning site activities need to be appropriately managed to prevent noise levels going over the 'morning shoulder' limits;

b) The use of noise barriers;

c) Avoidance of unnecessary noise and vibration by fitting mufflers to trucks, good site management, maintenance of equipment to a high level, the replacement of audible reversing alarms with visual or lower noise broadband audible reversing alarms, and through the increased vigilance of heavy equipment operators; and

d) The development, implementation and adherence to a CNVMP that, as a minimum, includes:

    i. A summary of the project noise criteria;

    ii. A summary of construction noise assessment/ predictions;

    iii. General construction practices, management and mitigation;

iv. Noise management and mitigation specific to activities and/ or receiving environments;

v. Monitoring and reporting requirements;

vi. Procedures for handling complaints; and

vii. Procedures for review of the CNVMP throughout the Project.

e) Any residents potentially affected by noise levels higher than the recommended Project noise criteria would need to be communicated with, prior to works starting, in relation to the proposed works and given the opportunity to provide feedback / input to mitigation measures. Communication should occur with stakeholders by means of letter drop or face-to-face contact.

f) Where project standards are likely to or have been exceeded, the development and implementation of an SSCNMP which will provide reasoning for the exceedance and a framework to demonstrate how the exceedance will be minimised to the greatest extent practicable.

It is considered that the best practicable option for this Project is to ensure that construction acoustic effects are managed with the aim of meeting the recommended Project Acoustic Criteria set out in Technical Report G, and any potential exceedances are addressed via the CNVMP process so as to mitigate / manage effects on stakeholders to acceptable levels. Where exceedances of the relevant criteria are likely, a SSCNMP will be required to detail the enhanced mitigation measures, and will be kept up-to-date regarding actual timing of activities, equipment use and methodologies.

With respect to operational noise and vibration, it is considered that with appropriate acoustic design, the pump stations can be designed and operated so as to generate only slight/minor acoustic effects. The design of these structures will be finalised during the detailed design phase of the Project.

10.10 Traffic Effects

Technical Report H assessed the potential traffic and safety effects related to construction, operation and maintenance of the Project. In undertaking this assessment, an investigation of the complete designation route including the adjacent side roads and adjoining land use activity was undertaken to record key road dimensions and a obtain a general description of the current operating environment. Following this, available background data was sourced on the current traffic environment, and a projection was made on the future traffic environment.

This future traffic environment was then used as the background environment against which to assess the potential effects of the construction activities proposed. The potential effects were broadly broken down into two aspects; the effects on the road network due to the presence of construction activities (e.g. construction using trenched technologies in a traffic lane), and the effects to the transport of materials to and from a work site (be that a fixed work site in the case of trenchless construction, or a moving work site for trenched technologies construction).

The assessment noted that the primary traffic effects are from:

a) Construction works required in the road corridor, particularly for those sections of the pipeline to be constructed by trenched technologies; and

b) The unloading and storage of construction materials, particularly for the sections of the pipeline to be constructed via trenchless methods where there will only be limited number of work sites as these sites will be in operation for months rather than days or weeks (as would be the case with trenched construction).

The effects from traffic associated with the transport of materials and staff to and from the sites are generally minor, except in some specific areas of the construction route. The main traffic effects revolved around maintaining access, including access to roads, properties and businesses, pedestrian access, and providing temporary construction vehicle access.

Thanks to its progressive nature, the duration of effects on traffic from construction by trenched technologies are limited at a particular location (e.g. outside a specific property). However the use of the

road carriageway as a construction corridor does have the potential to create significant effects on the adjacent road network when the works are in the area.

Conversely, the trenchless works will typically have less direct effect on the road carriageway and general road corridor, as smaller proportion of the total is used for construction activity, but a greater direct effect in the areas where work sites are located as these works sites will be active for a longer period of time (months vs. weeks).

10.10.1 Mitigation

Once the pipeline and pump stations are constructed and in operation it is considered that the traffic generation and effect of their operation will be negligible. The pump stations will require regular inspection visits and servicing but the frequency of such visits will be low, e.g. two trips per week per pump station by a light vehicle (ute) and less frequent visits by a medium sized truck to deliver supplies and maintenance equipment. Such a low level of trip generation is not expected to have any noticeable effect on the road network.

In developing mitigation for the effects relating to the wider network during construction, the following general mitigation measures are proposed:

a) All temporary traffic management measures should meet or exceed the requirements in the Code of Practice for Temporary Traffic Management (CoPTTM);

b) Where the physical or operational constraints of a site area make compliance with CoPTTM impractical or inappropriate, and a solution outside of the standard scope is proposed, such solution should not reduce safety levels (for employees and road users). Moreover, any such solution shall be approved via an Engineering Exception Decision (EED) submitted with the relevant Construction Traffic Management Plan (CTMP); and

c) A further detailed CTMP for the project should also be submitted to the local Road Controlling Authority (Auckland Transport) for approval prior to the commencement of works, and this CTMP should incorporate any amendments to the construction methodology.

Technical Report H recommends a number of route-wide, and site-specific mitigation measures (section 8 of the Report). These measures incorporate the following mitigation measures:

a) The length or effect of an active construction zone should be controlled to ensure traffic delays of no more than 5 minutes (due to the construction activities and exclusive of any other pre-existing delays which may be present on the road);

b) When side roads or intersections must be crossed, construction should be staged to prevent their full closure, particularly where the affected road has only one connection to the road network; and

c) The option of working outside of normal construction hours (i.e. night time) to take advantage of lower traffic volumes on the roads in business / industrial areas should be considered to mitigate the potential transportation impact on business and traffic operations. As the construction works will involve the operation of heavy machinery, open excavations and the storage of plant and works materials in close proximity to the public road corridor or in some situations within public recreation areas, appropriate measures, including fencing and barriers, should be employed to provide adequate and appropriate separation between members of the public and the work site.

Technical Report H concludes that, subject to the adoption of the above mitigation measures, adverse transport effects associated with the construction of the Project can be appropriately managed. Once constructed it is considered that the day to day operations of the pipeline will have a negligible effect on the operation of the road network.

10.11 Effects on Public Access and Recreation

The Project will potentially result in adverse effects on parks and facilities whose primary purpose is to provide for sport and recreation activities for the well-being of the community. A number of reserves, public open spaces and recreational facilities will likely be affected by the Project. These include:

- Taitapu Park;
- Lowtherhurst Reserve;
- Makora Park;
- Holmes Reserve;
- Manutewhau Reserve;
- St Margarets Park;
- Collins Park;
- Wainoni Park (north and south);
- North Shore Memorial Park;
- North Shore Golf Course; and
- Rosedale Park.

As part of the consultation process (discussed in Section 8 of this Report) Watercare has consulted with a number of groups and clubs concerning the proposed works to identify matters to be considered, values associated with these facilities, and potential effects that the works may have. Construction sites and works through these will be designed to minimise disruption on recreation and public access as far as practicable, and access to sports fields will be retained.

10.11.1 Taitapu Park

The indicative concept design shows that the pipeline will cross Henderson Creek on the northern side of State Highway 16 from the Radio New Zealand property to Taitapu Park by trenchless technology. Within Taitapu Park, a landing site will need to be established to facilitate construction activities.

To facilitate works in this area, the site may need to be fenced off and access to parts of the park restricted during construction. The anticipated duration of construction activities within the Park is between 5-10 weeks.

10.11.2 Lowtherhurst Reserve

The concept design indicates that the pipeline will be installed via trenched technologies along Huruhuru Road into and through Lowtherhurst Reserve, and across a small tributary within the reserve into the end of Redwood Drive. To facilitate works in this area, the site may need to be fenced off and access to parts of the park restricted during construction. The anticipated duration of construction activities within the Park is between 10-15 weeks.

10.11.3 Makora Park

The concept design indicates that the pipeline will likely be installed via trenchless technology, varying in depth between 7m and 30m and that the pipeline will pass under Cedar Heights avenue into a microtunnel shaft within Makora Park. To facilitate works in this area, the site may need to be fenced off and access to parts of the park restricted during construction. The anticipated duration of construction activities within the Park is between 15-20 weeks.

10.11.4 Holmes Reserve

The concept design indicates that the pipeline at this location will be installed by trenchless technology under the stream bed in Holmes Reserve until reaching Berkshire Terrace. To facilitate works in this area, the site may need to be fenced off and access to parts of the park restricted during construction. The anticipated duration of construction activities within the Park is between 15-20 weeks.

10.11.5 Manutewhau Reserve

The concept design shows that the proposed alignment will cross the stream in Manutewhau Reserve via pipe bridge, into Holmes Drive. To facilitate works in this area, the site may need to be fenced off and access to parts of the park restricted during construction. The anticipated duration of construction activities within the Park is between 15-20 weeks for Microtunneling activities, and up to 20 weeks for the installation of the pipe bridge.

10.11.6 St Margarets Park

At this location, the concept design shows that the pipeline will continue under St Margarets Park to Hobsonville Road. Within St Margarets Park, a microtunnel shaft site may need to be established. To facilitate works in this area, the site may need to be fenced off and access to parts of the park restricted during construction. The anticipated duration of construction activities at each microtunnel pit within the Park is between 15-20 weeks.

10.11.7 Collins Park

At this location, the concept design proposed to install the pipeline by trenchless technology under Collins Park towards Greenhithe Road. A microtunnel pit at the southwest corner of the park may need to be constructed. Access to the park at Greenhithe Road may be temporarily disrupted when construction activities are undertaken at this location, and use of the park may be affected during the proposed works. The anticipated duration of construction activities within the Park is between 3-4 months.

10.11.8 Wainoni Park

The concept design indicates that the pipeline will be installed by trenchless technologies from the southern boundary of Wainoni Park, to a point in Wainoni Park North, near Te Wharau Creek.

Within Wainoni Park South, a new shallow pump station will likely be constructed at the south eastern corner of Wainoni Park, off Orwell Road. The concept design indicates that the pump station will:

- Be approx. 6m high, 15m long, 7m wide and will have a depth of 6m below ground level;
- Require mechanical and electrical equipment (e.g. pumps, valves, pipes, transformer, gantry crane and extraction fans);
- Require an overflow pipe from the PS to an existing stormwater channel; and
- Require ancillary above ground structures (e.g. chemical dosing facility, biofilter, control room).

An air inlet vent (approx. 400mm in dia. by 6m in height) will be required at the south westernmost corner of Wainoni Park South.

At Wainoni Park North, the concept design indicates that a pump station will likely be constructed in the area near the North Shore Air Gun Club. The concept design indicates that the pump station will:

- Be approx. 6m high, 25m long and 18m wide and will have a depth of 15m below ground level;
- Require mechanical and electrical equipment (e.g. pumps, valves, pipes, transformer, gantry crane and extraction fans);
- Require new access from Churchouse Road;
- Require an overflow pipe from the PS to an existing waterway; and

- Require ancillary above ground structures (e.g. chemical dosing facility, biofilter, control room).

To facilitate the works during construction, fencing and jumps within the Greenhithe Pony Club's cross-country course may need to be temporarily relocated as machinery moves through, and access for horses, ponies, and riders/users may need to be restricted at times. Although most of the effects on the Pony Club stem from construction activities, a few minor aboveground structures (e.g. manhole covers) will be required along the alignment as a permanent feature. A number of aboveground structures exist in the paddocks already, which are fenced off to prevent injuries to animals and the structures themselves. A similar treatment will be required for the manhole covers within the Park, which may affect some use of areas by riders within the Club.

Access to the park from Churchouse Road should not be impacted. Access to walking facilities, paths and sports fields (outside the Pony Club) will also be retained.

The expected duration of the works for construction at each of the microtunnel pits is between approx. 3-4 and 6-8 months, depending on location. The anticipated duration of the pump station is 1 to 1.5 years.

The expected duration of the works for construction at the microtunnel pit is approx. 2-4 months, and the anticipated duration of the pump station is 1 to 2 years. Trenchless construction under Te Wharau Creek (including set up on the landward site of the Creek) will be approx. 9-11 months.

10.11.9 North Shore Memorial Park

Construction activities will consist of open trench excavation through the existing open field and road reserve. Consultation has been ongoing with NSMP, to ensure that the works coincide as far as possible with planned development.

Although access to NSMP will not be closed off, construction activities will disrupt the experience of visitors to the park, and access from the ring road and car park may be restricted at times as works approach this area. Indicative timeframes for construction activities through NSMP Park is between 2-5 months, and effects on park users are therefore likely to be of relatively short duration. As noted previously, special construction management plans will be developed to ensure that construction activities within the park are managed in a way that recognises the sensitive nature of the setting, and careful management of construction traffic and the timing of works will be required to ensure visitors are not disrupted.

10.11.10 Wharepapa Reserve

The concept design indicates that the pipeline will be installed by trenched technology along Schnapper Rock Road and into Wharepapa Reserve. From this location, the concept design indicates that the pipelines will likely be constructed by trenchless technology below a tributary of Lucas Creek, before entering into the North Shore Golf Course. To facilitate works in this area, the site may need to be fenced off and access to parts of the park restricted during construction.

10.11.11 North Shore Golf Course

The alignment enters into the NSGC at the western boundary. It then enters into the car parking area near the Clubhouse and follows the road reserve to Albany Highway.

Watercare has worked with the NSGC to identify an alignment that has minimal effect on golfing activities. Where the alignment runs along the boundary of the site, disruption to visitors to the golf club should be minimal, although works may be audible. As works enter into the car parking area, visitors may experience a temporary disruption to parking and access to the grounds as works travel through the car park towards Appleby Road. While works will occur in the North Shore Golf Club for up to 2-5 months, the works across the car parking area (which are likely to be the most disruptive to golf club users) will only occur for a small proportion of this time.

10.11.12 Rosedale Park

The proposed alignment enters into Rosedale Park North at the western boundary (via 169/179 Bush Road), crossing beneath Alexandra Stream and landing near the car parking area. The route then generally follows the road reserve prior to entering into the Rosedale WWTP in order to minimise effects on park users.

The preparation of a site compound to receive supporting equipment (e.g. HDD drill rig, excavation equipment, etc.) will be required on either side of Alexandra Stream. On the eastern side of the Stream, the site compound that will be established at this site will extend from outside the Stream to the road reserve, resulting in temporary effects on traffic travelling through the park. Although access to the park may be disrupted, access to facilities, paths and sports fields should not be impacted during construction.

The expected duration of these works is approximately 2-4 months for trenched construction, and 5-6 months for trenchless construction under Alexandra Stream.

10.11.13 General Mitigation Measures

Construction sites and works through the parks and reserves have been designed to avoid effects on recreation and public access as far as practicable. Further mitigation measures during construction generally include:

- Reinstatement works will be developed in conjunction with PSR, Local Boards, and landowners where required, and will consider the long term goals as identified in relevant Reserve Management Plans;
- Fencing off of construction activities and sites;
- Use of Crime Prevention through Environmental Design (CPTED) measures at construction sites;
- The development and implementation of a traffic management plan; and
- Ongoing communication with affected parties around timing and staging of works;

In Wainoni Park South, Watercare has consulted on a number of occasions with the GPC, who lease the space where the proposed pump station will be located and are generally receptive to the works (refer Section 8.7.1). These discussions have provided Watercare with an understanding of the varying uses of the space, which have aided in identifying a preferred location. Additionally, opportunities have also been identified in conjunction with GPC to alleviate safety concerns with the existing access road by creating a new access way for construction. As the Project progresses, Watercare will continue to work with the GPC in finalising the location and overall design of the pump station, so that any effects on the recreational use of the space is minimised as far as practicable.

At Wainoni Park North, Watercare has been in discussion with the GRDA and NHAGC, who lease the space where the proposed pump station will be located (refer Sections 8.7.2 and 8.7.3). As with the GPC, the GRDA and NHAGC are understanding of the need for the Project, and have identified a preferred location within the leased space for the pump station to be cited. As the Project progresses, Watercare will continue to consult with the GRDA and the NHAGC in finalising the location and overall design of the pump station, so that any effects on the recreational use of the space is minimised as far as practicable.

Further to the above, Watercare will continue working with PSR who manage these spaces, on identifying appropriate mitigation measures in these locations, as well as opportunities to enhance public access and recreational opportunities within the parks and reserves impacted by the Project. Within Wainoni Park, this may include enhancing access along the eastern boundary of the park, or access improvements at the GPC. At Manutewhau Reserve, PSR have identified a potential opportunity to connect the two sections of the reserve with the provision of a footbridge over the proposed pipe bridge, and to re-locate existing park infrastructure from Holmes Reserve to Manutewhau Reserve, where it will be better utilised by the community.

As noted in Section 8, Watercare has developed conditions to manage the actual and potential effects of the proposed designation. These conditions seek to coordinate future works around PSR projects in parks and reserves, and ensure that PSR feedback is incorporated in to the final design of above ground structures as far as practicable. They also seek to enable PSR to undertaken urgent repair works and renewal works on

existing PSR infrastructure without seeking Watercare's approval. In addition to these conditions, following the completion of the Project, Watercare will review the area of land designated for the project and remove those that are no longer necessary for the construction and on-going maintenance of the Project.

10.12 Maori and Cultural Heritage Effects

A description of engagement with Mana Whenua is contained in Section 8.2 of this report. As discussed in this section, a number of CIAs were prepared for Phase 1 of the Northern Interceptor. In some instances, these CIAs addressed the entire project area. The recommendations to manage any actual and potential effects on cultural values which were provided in these CIAs, and the recommendations made during various hui and site visits, have been responded to and taken into consideration during the development of the proposed conditions. The table below summaries the broad recommendation and Watercare's response.

10.12.1 Mitigation

Table 10-6: Mana Whenua Recommendations

Recommendation	Response
Accidental Discovery The development of a protocol between Mana Whenua and Watercare relating to any subsurface archaeological matters and koiwi	Accidental discovery protocols have been included in the proposed conditions.
Landscaping Input into the preparation of landscaping plans, and the inclusion of locally or eco-sourced vegetation	A site reinstatement and open space restoration plan condition has been included, which includes a provision that plant species to be used should be appropriate to the area, and be chosen for site-specific conditions. Where possible, these will be eco-sourced. A number of mana whenua have expressed an interest in being involved in the sourcing of plants for the purposes of landscaping, and have provided their details to Watercare.
Cultural Monitors That provision for cultural matters be made if requested by Mana Whenua who have expressed an interest in the project, where iwi deem appropriate.	Contained within the accidental discovery protocol condition, is a provision that requires Water to invite mana whenua cultural monitors to be present during any excavation, or during the disturbance of Maori archaeology (where they have been identified).
Tikanga To enable mana whenua to express tikanga	Prior to works being undertaken, Watercare will liaise with relevant iwi entities to confirm any necessary ceremonies that may need to be undertaken in accordance with tikanga.
Works near streams/riparian margins A number of Mana Whenua entities were interested in locations where works might affect coastal areas and riparian margins	Measures that have been proposed with respect to ecological effects at stream crossings include: • The preparation of an Erosion and Sediment Control Plan; • A Lizard Management Plan; • Restriction of vegetation removal on or adjacent to the Wallace Inlet outside peak breeding season; and

Recommendation	Response
	• The incorporation of eco-sourced indigenous species of trees and shrubs as far as practicable (sourced within the ecological district as is achievable)

It is considered that, with the adoption of appropriate protocols, any potential adverse effects on cultural values can be appropriately managed.

10.13 Private Properties Directly Affected by the Project

A number of private properties will be directly affected by the proposed designation. As the Project utilises a combination of gravity and pressure systems to transport wastewater through the network, the extent of effects on these properties is dependent on the construction methodology used to install the Project. To summarise, there are five different scenarios associated with the Project that will impact on private property.

These are as follows:

1. Pressure/Rising Main installation;
2. Gravity Main installation;
3. Break Pressure Chamber installation;
4. Pipe bridge installation; and
5. Microtunnel shaft installation.

These methods and the potential effects are described in the table below:

Table 10-7: Potential impacts on private properties

Method	Description	Potential impacts on private property during construction	Potential impacts on private property post-construction
Pressure (Rising) Main	With a pressure (rising) main, the wastewater is pressurised to get from a low point to a high point. To install a pressure main, both trenched and trenchless technologies can be used. The concept design indicates that the rising main components of this Project will be installed by trenched technologies.	During construction, temporary access within private property will be required to facilitate the installation of the pressure (rising) main. Trenching typically requires the establishment of a working site in order to install the pipeline. When trenching activities will be undertaken within private property, efforts will be made to reduce the construction area as far as practicable, in consultation with the landowner. Trenching involves excavating the ground at a depth and width wide enough to install the pipleline. This is then	Where a pressure/rising main is proposed within private property, a permanent easement will be required for operational and maintenance purposes. No property acquisition is required for a pressure/rising main. Based on the current concept design, the depth of trenching will typically be about 1.5m and in some areas as much as 4m.

Method	Description	Potential impacts on private property during construction	Potential impacts on private property post-construction
		backfilled and the site reinstated post-construction. Trenching is expected to progress at a rate of 5-20m/day, however, duration is dependent on each site.	
Gravity Main	A gravity main uses gravity to transfer wastewater from a high to a low point. Gravity mains can be installed at significant depths below ground. To install a gravity main, trenchless technologies are commonly used (such as microtunneling), but they can also be installed by open cut. The concept design indicates that the gravity sections of the Project will be installed by trenchless technology.	As the pipeline will be installed by trenchless technology, no access onto the surface of private properties during or post-construction will be required.	Depending on the size of the pipe, maintenance can be undertaken remotely or via access through manholes. For gravity mains, any maintenance required will be undertaken remotely, and permanent access is likely to not be required within property. However, due to the various depths in which the pipeline will be installed (between 7m and 40m below ground), an easement may be required to protect the gravity main from development where depths are shallow (e.g. between 7m and 15m). All easements and any permanent requirements will need to be assessed on a case by case basis. No property acquisition is required for a gravity main.
Break Pressure Chamber	Break Pressure Chambers are required at the interface between pressure and gravity mains, to account for the change in pressure. These are usually located at high points along a route. Microtunnel shafts, which are required as part of mircrotunneling activities, can be converted into a break pressure chamber once the pipeline has been pulled through the ground. This will occur at 15 The Knoll and Cedar Heights Avenue	The mircrotunnel shaft/ break pressure chamber will be approx. 9m long, 4m wide and 7m below ground level. The following activities will need to occur to facilitate the installation of the chamber: • Site clearance • Excavation (undertaken as part of Microtunneling) • Installation of the break pressure chamber • Site reinstatement	Watercare is seeking to acquire the private property (15 The Knoll) where a Break Pressure Chamber is required.

Method	Description	Potential impacts on private property during construction	Potential impacts on private property post-construction
		The anticipated duration of construction activities is between 4-6 months.	
Pipe Bridge	For this Project, where it is not possible to use trenched or trenchless technologies (e.g. to cross beneath a stream or gully) a pipe bridge has be used. This is the case at Manutewhau Reserve, West Harbour.	Due to the location of the pipe bridge, construction sites on either end of the pipe bridge will need to be cleared to enable the construction of bridge abutments, and to lower the pipe bridge into place by crane. Site clearance in this instance will mean the removal of buildings at 33 and 35 Jadewynn Drive. The anticipated duration of construction activities is between 4-5 months.	Watercare is seeking to acquire the private properties immediately adjacent to the stream and gully system at Manutewhau Reserve (being 33 and 35 Jadewynn Drive) where a pipe bridge is required.
Microtunnel shaft	A mircrotunnel shaft will send/receive the pipeline. Microtunnel shaft are required at certain locations along the alignment, where the pipe changes direction, and at approx. every 400m (as the TBM can only tunnel so far).	The following activities will need to occur to facilitate the installation of the chamber: • Site clearance • Excavation to install the microtunnel shaft • TB activities • Site reinstatement The anticipated duration of construction activities is between 4-6 months.	Watercare is seeking to acquire the property at 15 Berkshire Terrace

In the majority of cases where the Project enters private property, it does so via trenchless technology and at a depth of between 7m and 40m below ground. Where the pipeline is proposed to pass through a private property below ground, it is anticipated that acquisition of the affected property will not be required, however, as noted above there are a limited number of cases where property will likely be acquired to facilitate the Project.

The table provided in Appendix G identifies the private properties that the designation is likely to pass through (directly affected parties), the anticipated depth that the pipeline will pass through the property, and they type of pipeline to be installed. Not included in this tables are parks, reserves, roads and motorways. A full list of all properties affected by the designation is provided in Appendix D.

11 Rationale for Lapse Period

Pursuant to Section 184(1)(c) of the RMA, having regard to the time anticipated to be required to give effect to the works, including the anticipated demand for Project phases, Watercare proposes an extended lapse period of 20 years for the Project.

As discussed in more detail above, it is likely that some phases of the Project will be required within different timeframes and in some cases a phase of works may not be required for 15-20 years as the rate and timing of growth and development in the Service Catchment is both uncertain and beyond Watercare's control. As such, an extended lapse period is required. By seeking a designation now, Watercare is ensuring that, as the need for the Project or a component of the Project emerges in the future, Watercare is able to provide an efficient and adaptive response to infrastructure needs in a manner that supports the urban growth of the Service Catchment.

Conversely, it would be inappropriate to construct the Project without the urban growth required to support its use. A key design parameter in the design of the Project was the ability to stage the construction so as to adequately respond to actual population uptake, rather than build an oversized tunnel based on conservative population projections. In this regard, an extended lapse period enables Watercare to time the provision of infrastructure with the actual rate of growth. If Watercare were to provide infrastructure capacity today to service a 50 year planning horizon, it would require large capital investment to create new infrastructure to service an 'ultimate' projected population that would go underutilised for an unknown amount of time as growth occurs, creating redundant infrastructure capacity. An extended lapse period will provide Watercare with the ability to defer large capital expenditure until the community has grown to support it.

In addition to the above, an extended lapse period:

a) Provides statutory protection of the designation corridor for a long term strategic infrastructure project and ensures that there is certainty that the Project can be constructed and operated.

b) Provides certainty to affected landowners and the community as to the location and nature of the Project through the inclusion of the designations in the appropriate district and unitary plans.

c) Provides certainty to developers within the Service Catchment that wastewater capacity will be available as required to support urban growth.

d) Provides sufficient time to give effect to construction of the Project including undertaking property and access negotiations, further site investigations and design.

e) Provides sufficient time to obtain the necessary resource and building consents and to undertake necessary tendering / procurement, and other processes associated with the Project construction.

f) Provides certainty to other network utility operators. The majority of the proposed designation corridor will be contained within road corridors which traditionally accommodate numerous network utilities. The Project constitutes relatively large diameter pipelines that are generally less flexible in terms of location within the road corridor. By providing certainty regarding where the pipelines are proposed to be located, other network utility operators are able to 'plan around' the Project.

g) Provides the flexibility to enable the construction of Phases of the Project as and when required resulting in the efficient provision of significant wastewater infrastructure

It is noted that the 'default' lapse period for a designation under the RMA is 5 years. However, it is not uncommon for designations, particularly for major infrastructure projects to have an extended lapse period, in some cases up to and beyond 20 years. The following table provides a summary of a number of NoR processes undertaken within the last 10 years and the lapse periods sought and subsequently confirmed:

Table 11-1: Summary of lapse periods sought and confirmed

Requiring Authority	Project	Confirmed lapse date	Decision notified
Manukau City Council	Whitford Link Road	30 years	2006
NZ Transport Agency	Southern Links	20 years	2014
KiwiRail	Marsden Point Rail Line	20 years	2012
Transit New Zealand	Tauranga Eastern Arterial	20 years	2009
Watercare	Central Interceptor	15 years	2013
NZ Transport Agency	Transmission Gully	15 years	2012
Transit New Zealand	Manukau Harbour Crossing	15 years	2007
Auckland Transport	City Rail Link	10 years	2014

11.1 The Effects of an Extended Lapse Period

Broadly speaking, the adverse effects of an extended lapse period relate to the creation of a lack of certainty as to when construction will commence, and if land is to be acquired, the timing and process associated with that. As discussed above and outlined in Appendix G, a number of private properties are likely to be affected to varying degrees by the Project. Potential effects on private property include:

a) Pipelines passing at significant depths below private property;

b) Trenching through private property followed by reinstatement works;

c) Property acquisition.

The degree of effect resulting from a lack of certainty is generally proportional to the length of the lapse period. In other words, a longer lapse period can create greater uncertainty for those affected. In the absence of being able to provide a specific construction commencement date, and other precise information regarding construction duration within any specific area, it is considered that an appropriate approach to managing any outstanding uncertainty is through pre-construction communication and consultation with affected landowners that (amongst other things):

a) Informs the community of Project progress and likely commencement of construction works and programme;

b) Provides details of a property acquisition strategy to directly affected landowners whose properties require acquisition; and

c) Provides a forum to obtain feedback and input from affected parties regarding the development of proposed mitigation measures.

12 Notification

In accordance with Section 95A(2)(b) of the RMA, Watercare requests public notification of both NoR: NI (Waitakere); and NoR: NI (North Shore).

With regards to the alteration of the existing designation WSL8, Auckland Council District Plan (Waitakere Section) (No. 9327 in the Proposed Auckland Unitary Plan (Notified 30 September)), it is considered that the proposed alteration will enable the construction of a pump station within the existing designated site. Given the existing designation already enables the construction of infrastructure required for wastewater purposes, the scale of potential effects associated with the proposed alteration is well within the effects envelope enabled by the designation. As such, it is considered that the effects associated with the alteration are less than minor and subsequently no form of notification of the proposed alteration is required.

13 Part 2 Assessment – Purpose and Principles

The following table provides an assessment of the Project against the RMA principles.

Table 13-1: Consideration of Section 6 and 7 of the RMA

Matters of National Importance	
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	The Project, which is regionally significant infrastructure, will provide additional wastewater conveyance and treatment infrastructure to service the increasing urban development. During construction it is likely that there will be adverse effects on the natural character of the coastal environment associated with construction activities (e.g. the establishment of construction sites, vegetation removal, and permanent structures in the vicinity of the coastal environment). With the exception of the pump stations, most of these are considered to be temporary in nature. In these areas, a suite of mitigation measures have been proposed (and further will be proposed through future regional resource consent processes) that seek to minimise adverse effects that the works will have, whilst taking into consideration the natural character of the surrounding environment in the overall design. With the adoption of recommended mitigation measures in consultation with PSR and park users, it is considered that potential adverse effects can be appropriately managed.
b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development	No outstanding natural features or landscapes are anticipated to be affected by the Project.
c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna	As discussed in Section 10.6, the Project will involve the removal of vegetation at four SEAs and areas of ecological interest which contain potential habitats. With the adoption of recommended mitigation measures, it is considered that potential adverse effects can be appropriately managed to ensure the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna
d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers	The Project will limit public access to and along isolated areas of the CMA and rivers during construction activities. Public access will be limited for health and safety reasons. It is considered that alternative access will be available for the temporary duration of construction activities. Subsequently, it is considered that the process is consistent with this matter of national importance.
e) the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	See Section 8.2 for details. It is considered that ongoing engagement and the adoption of appropriate protocols at the time of construction will ensure that the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga will be appropriately managed.
f) the protection of historic heritage from inappropriate subdivision, use, and development	See Section 10.4. The Project will have no effect on any known site of historic heritage. An Authority for the project will be sought under Section 44(a) of the HNZPTA as a precaution prior to the start of earthworks.

g) the protection of protected customary rights	There are no known protected customary rights that will be affected by the Project.
Other Matters	
a) kaitiakitanga	See Section 8.2 and 10.12. Engagement with tangata whenua has been ongoing throughout the Project and CIA's have been prepared to guide the Project. The engagement with tangata whenua will appropriately provide for kaitiakitanga.
aa) the ethic of stewardship	See above.
b) the efficient use and development of natural and physical resources	See Section 10.2. The Project will enable the further growth of the Service Catchment in a manner that will result in positive public health and amenity effects. It is considered that the project constitutes the efficient use and development of natural and physical resources.
ba) the efficiency of the end use of energy	Not considered relevant.
c) the maintenance and enhancement of amenity values	As discussed in Section 0, there is the potential for temporary and permanent adverse amenity effects associated with the construction of the Project. Key amenity values potentially affected include visual, acoustic and vibration effects. Generally, it is considered that these potential effects can be appropriately managed to ensure the overall maintenance of amenity values. Further the project will contribute to the facilitation of further urban growth within the Service Catchment, subsequently providing for the future enhancement of amenity values.
d) intrinsic values of ecosystems	As discussed in Section 10.6, the Project will involve the removal of vegetation at four SEAs and areas of ecological interest which contain potential habitats. With the adoption of recommended mitigation measures, it is considered that potential adverse effects can be appropriately managed. The Project constitutes the provision of wastewater infrastructure to an area that is facing significant growth pressures and is approaching capacity. Without the Project (and assuming growth continues) it is possible that there could be significant adverse effects on ecosystems associated with increased wastewater overflows.
f) maintenance and enhancement of the quality of the environment	See Section 0. Temporary adverse effects on the quality of environment are anticipated; however it is considered that they can be appropriately managed. In the long term, it is considered that the quality of the environment will be maintained and enhanced through the provision of an urban wastewater network to service future growth..
g) any finite characteristics of natural and physical resources	Land is a finite resource. The Project will enable the efficient development of the Service Catchment.
h) the protection of the habitat of trout and salmon	No known habitat of trout or salmon will be affected by the Project.
i) the effects of climate change	Not considered relevant.
j) the benefits to be derived from the use and	Not considered relevant.

development of renewable energy	

With regards to Section 8 – Treaty of Waitangi, a summary of the ongoing engagement with Mana Whenua is summarised in Section 8.2 and the potential effects on Maori and Cultural Heritage matters are discussed in Section 10.12. As the project progresses, Mana Whenua who have expressed an interested in the Project will continue to be engaged, and as noted previously, the preparation of CIAs will be discussed closer to the time of construction. The ongoing engagement with tangata whenua will ensure that appropriate regards has been had for treaty matters.

Taking the above into account, it is considered that overall, the Project is generally consistent with Sections 6, 7 and 8 of the RMA.

With regard to the purpose of the RMA, the issues once distilled down, relate to balancing the community, district-wide, and region-wide benefits of the Project against the adverse construction and operation effects on individuals and the local community, and whether there are appropriate mitigation measures that can effectively manage these effects.

With regards to the positive effects of the Project, it is considered that the Project is necessary to enable the further growth of the Service Catchment in a manner that will ensure that associated wastewater will be appropriately managed. Once completed, the Project will:

a) Provide the necessary capacity in the wastewater network for future growth and development in Auckland;

b) Reduce the potential for wastewater overflows from the network by providing appropriate infrastructure to service growth; and

c) Provide certainty that the areas being developed will be serviced, supporting residential and business growth;

d) Ensure the continued effective operation of the wastewater network generally, which positively impacts public health and the environment.

To summarise, the Project enables these future communities to be serviced by the city's wastewater treatment facilities, controlling discharges and overflows – meeting community and freshwater health outcomes. Therefore, it is considered that, without the Project:

a) The growth within Service Catchment will continue to put pressure on existing infrastructure, resulting in exceeding capacity and potentially increasing the potential for overflows in the network; or

b) Development within the Service Catchment will be restricted; and

c) In either of the above scenarios, Watercare will be unable to meet its statutory requirements as a service provider.

With regards to adverse effects, as outlined in Section 0, it is considered that adverse effects are predominately associated with the construction of the Project and are thus generally temporary in nature. Further, it is considered that, with the adoption of the proposed mitigation measures, generally adverse effects can be appropriately managed.

In areas where there will be permanent operational effects (e.g. above ground structures in parks and reserves), a number of mitigation measures have been proposed to reduce the visual and landscape effects. Subject to the implementation of these recommendations, it is considered that the majority of the adverse landscape and visual effects can be managed and mitigated to result in less than minor adverse effects overall. With respect to effects on public access and recreation, discussions with key stakeholders to date have been positive, and both PSR and users of parks and reserves have been understanding of the need for the works. As the Project progresses, Watercare will continue to consult with these stakeholders

and engage with Mana Wheua in finalising the location and overall design of the pump station, so that any effects on the recreational use of the space is minimised as far as practicable.

Taking the above into account, it is considered that the Project constitutes the sustainable management of natural and physical resources.

14 Conclusion

The Project will form an integral part of Auckland's wastewater network and, as outlined above, will have significant positive effects, particularly by providing necessary infrastructure for the continued growth in North West Auckland.

During construction, there will be a range of potential and actual adverse effects within the vicinity of the construction areas, but, with the adoption of proposed mitigation measures, any adverse effects will be temporary in nature and can be appropriately managed. Permanent effects are generally associated with above ground structures (such as visual effects of pump stations) and it is considered that these effects can be adequately managed through the adoption of proposed mitigation measures.

Once completed, the majority of the Project works will be underground and temporary construction areas will be reinstated in an appropriate manner.

The Project is consistent with the purpose 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 wellbeing and for their health and safety. The Project gives effect to, or is consistent with, the objectives and policies of the relevant statutory plans.

Appendix A Assessment of Alternatives

Appendix B Watercare Gazette Notice

Appendix C Agreement in Principle (NZTA)

Appendix D Land Requirement Plans and Property Schedule

Appendix E Relevant Statutory Provisions

Appendix F Draft Conditions

Appendix G Private Properties affected by the Proposed Designation