1.0 Introduction

This Assessment of Effects on the Environment (AEE) supports the Notices of Requirement (NoRs) for the Auckland Light Rail (ALR) Project (the Project) lodged under s168(2) by Auckland Light Rail Limited (ALRL) as a requiring authority under the Resource Management Act 1991 (RMA).

The NoRs propose new designations for the construction, operation and maintenance of the Auckland Light Rail corridor. They include the stations, infrastructure, and ancillary facilities required in connection with the Project. The necessary approvals for the Project will be sought in a two-part progressive lodgement programme as described in sections 1.4, consisting of at least 22 NoRs. This application is Package 1.

Applications for regional consents under the Auckland Unitary Plan (Operative in Part) (AUP) and relevant National Environmental Standards will be lodged in late 2023.

This section provides information necessary to understand the application that follows. It covers:

- ALRL's status and powers as a requiring authority (section 1.1)
- ALRL's Project objectives (section 1.2)
- An overview and history of the Project (section 1.3)
- The statutory authorisation strategy for the Project (section 1.4)
- Request for public notification (section 1.5)
- Suite of documents (section 1.6)

1.1 Requiring Authority: Auckland Light Rail Limited

Auckland Light Rail Limited (ALRL) is a Crown Entity Company, named under Schedule 2 of the Crown Entities Act 2004. It was incorporated as a limited liability company under the Companies Act 1993 in October 2022. The ALRL governance structure is shown in Figure 1.

ALRL's purpose is to progress the Project as a part of Auckland's rapid transport system.

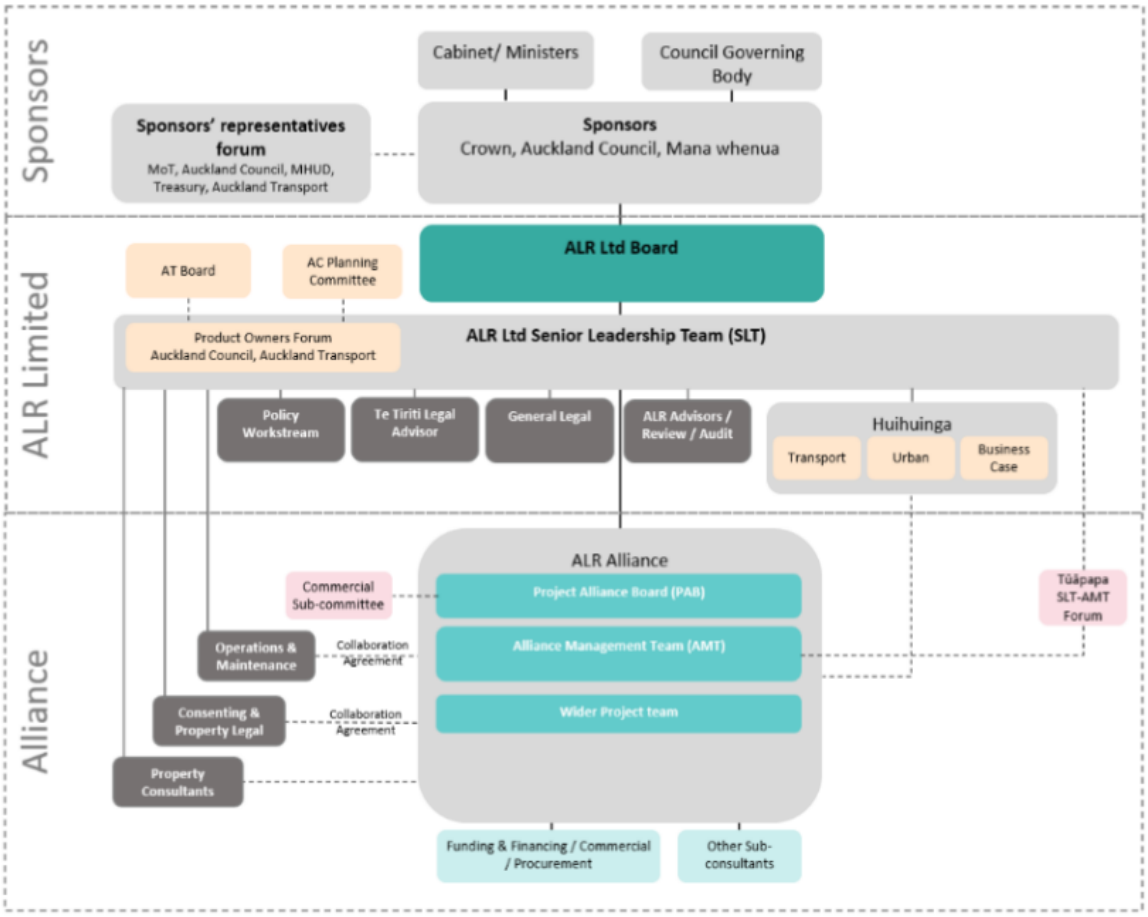

Figure 1: Auckland Light Rail project governance structure

In July 2023, ALRL was approved under section 167 of the RMA as a Requiring Authority as a network utility operator by xxx gazette notice. Pursuant to the xxxx gazette notice, ALRL may designate land, water, subsoil or airspace for the construction and operation (including maintenance, improvement, enhancement, expansion, realignment and alteration) of railway.

1.2 In the context of this project, ALRL is the requiring authority for NoRs 1-22. ALRL's Project Objectives

Section 171(1)(c) of the RMA directs a territorial authority to consider a requiring authority's objectives when making a recommendation on a NoR.

> *"When considering a requirement and any submissions received, a territorial authority must, subject to Part 2, consider the effects on the environment of allowing the requirement, having particular regard to –*
>
> *[…]*
>
> *(c) whether the work and designation are reasonably necessary for achieving the objectives of the requiring authority for which the designation is sought"*

The Environment Court, when making a decision on a NoR, must also have regard to section 171(1)(c) as if it were a territorial authority under s198E(6)(a) of the RMA.

The Project objectives supporting the NoRs have a different focus to the investment objectives developed for the Indicative Business Case. The Project objectives support the NoRs for the transport infrastructure and are used to test the reasonable necessity of the extent of the NoR footprints. Investment objectives guide the outcomes for the entire ALR corridor, comprising both the Project alignment and surrounding urban development, and therefore they have a broader focus.

1.2.1 **Auckland Light Rail Limited Project Objectives**

ALRL's Project objectives are to:

Provide a rapid transit service between Auckland City Centre and Mangere that:

(a) is reliable, frequent, affordable, and safe for all transport users;
(b) unlocks significant urban development potential, supporting a compact urban form, and enables quality integrated communities;
(c) integrates with the existing and planned public transport network, including Auckland's future rapid transit network;
(d) contributes to mode shift by improving travel choice and access to key destinations along the corridor, contributing to a reduction in Auckland's transportation emissions; and
(e) can be delivered in a staged manner

These Project objectives were developed from the ALRL overall investment logic mapping objectives[1] and problem statement. The inclusion of a staging objective acknowledges the potential for staged construction and delivery of the Project.

Section 12.X contains an assessment of the Project against the objectives, outlining why the designations are required for the Project.

[1] ALRL's investment objectives are:

1. Unlocking significant urban development potential, supporting a compact urban form and enabling quality integrated communities
2. A transport intervention that reduces Auckland's carbon footprint
3. A rapid transit service that
    a. Is attractive, reliable, affordable, frequent, safe and equitable
    b. Is integrated with the current and future public transport network
    c. Improves access to jobs, education and other opportunities

1.3 Auckland Light Rail Project Overview and History

Auckland is growing rapidly, with the city expected to reach a population of 2.3 million by 2048. As the population grows, infrastructure needs to keep pace and provide for the population in a sustainable way, including by providing sustainable modes of transport. The Project is both an urban and transport project. It aims to deliver a sustainable light rail system across the Auckland Isthmus and create opportunities for new and denser urban forms around the stations.

Table X sets out key Project milestones to date, while Figure X shows the governance structure of ALRL. This shows the continued involvement of central and local government in progressing the project.

Table 1: Key project milestones

1. Date	Milestone
March 2021	Waka Kotahi, working with the Ministry of Transport, Auckland Council and Auckland Transport, prepared an indicative business case to identify a solution that would deliver the best outcomes. Section 7 summarises some of this thinking.
Sept-Oct 2022	Auckland Light Rail Limited established under the Companies Act 1993 and made a Crown Entity named under Schedule 2 of the Crown Entities Act 2004. An ALR Alliance (with a range of technical inputs including planning, engineering and legal) was also appointed to progress the project.
Oct 2022 to current	ALR Alliance Corridor Business Case and consent design stages progressed. Consent design supports the identification of NoR boundaries.
April 2023	Public engagement on proposed ALR alignment and stations. Please refer sections 7-8 for more detail.
INSERT DATE	Auckland Light Rail Limited made a requiring authority. Ref gazette notice.

1.4 Statutory Authorisation Strategy

The Project statutory authorisations are being prepared in two Packages. This AEE relates to Package 1 and lodgement of Package 2 is planned for later in 2023.

ALRL acknowledges the significance of the Project to the communities through which it will pass and to Auckland as a whole. In light of this, Package 2 will contain elements of the Project that require more detailed investigation, design and engagement prior to confirming the preferred options to form the basis of the statutory applications.

Beyond Package 2, the Project will continue southwards from Landing Drive Station, eventually terminating at stations within the Auckland International Airport Limited (AIAL) site. The statutory authorisations for components of ALR within the AIAL site are discussed in section XX.

The remainder of this section summarises the two-stage lodgement packages, as well as highlighting important elements of current and future packages, and an associated plan change.

1.4.1 Lodgement Packages

This AEE covers Package 1 of the Project. Package 1 includes the tunnel and surface alignment, stations, shafts and a rail depot on land from Auckland central city to Te Ararata Station near Fatafehi Place.

In total, Package 1 will include 12 stations along a 24 km alignment: 6 underground and 7 at the surface. A total of XX km of track will be located within a tunnel running from the City Centre to Wesley.

The rail alignment will run on a viaduct, at grade and in a trench in various locations parallel to State Highway 20 (SH20). It will be in the existing KiwiRail Designation 6303 through to Onehunga Station before crossing the Manukau Harbour. On the southern side of the Manukau Harbour, the alignment will continue south to Te Ararata Station near Fatafehi Place as a surface track at grade and in trenches, adjacent to SH20, with some trenched sections.

The second part of the progressive two-stage lodgement programme will consist of NORs for the remaining Project alignment and two stations. It will also include the resource consent applications for the Manukau Harbour Crossing, Onehunga Lagoon section and the Te Ararata Creek Crossing, all three of which intersect the coastal marine area (CMA). Resource consents for NES and other regional matters will also be included. This part will be referred to as Package 2 with lodgement programmed for later in 2023.

The lodgement packages are summarised in the tables below and shown in **Error! Reference source not found.** and **Error! Reference source not found.**.

Package 2	
Notice	**Description**
NoR 9	Wesley Station
NoR 19 and 21	Surface Track from north of Mangere Town Centre Station to Landing Drive Station

NoR 20 and 22	Stations, ancillary facilities and infrastructure
Resources consents relating to: • Manukau Harbour Crossing; • Te Tauranga (Onehunga Lagoon); and • Te Ararata Creek Crossing. • NES and regional consent matters for all NoRs	

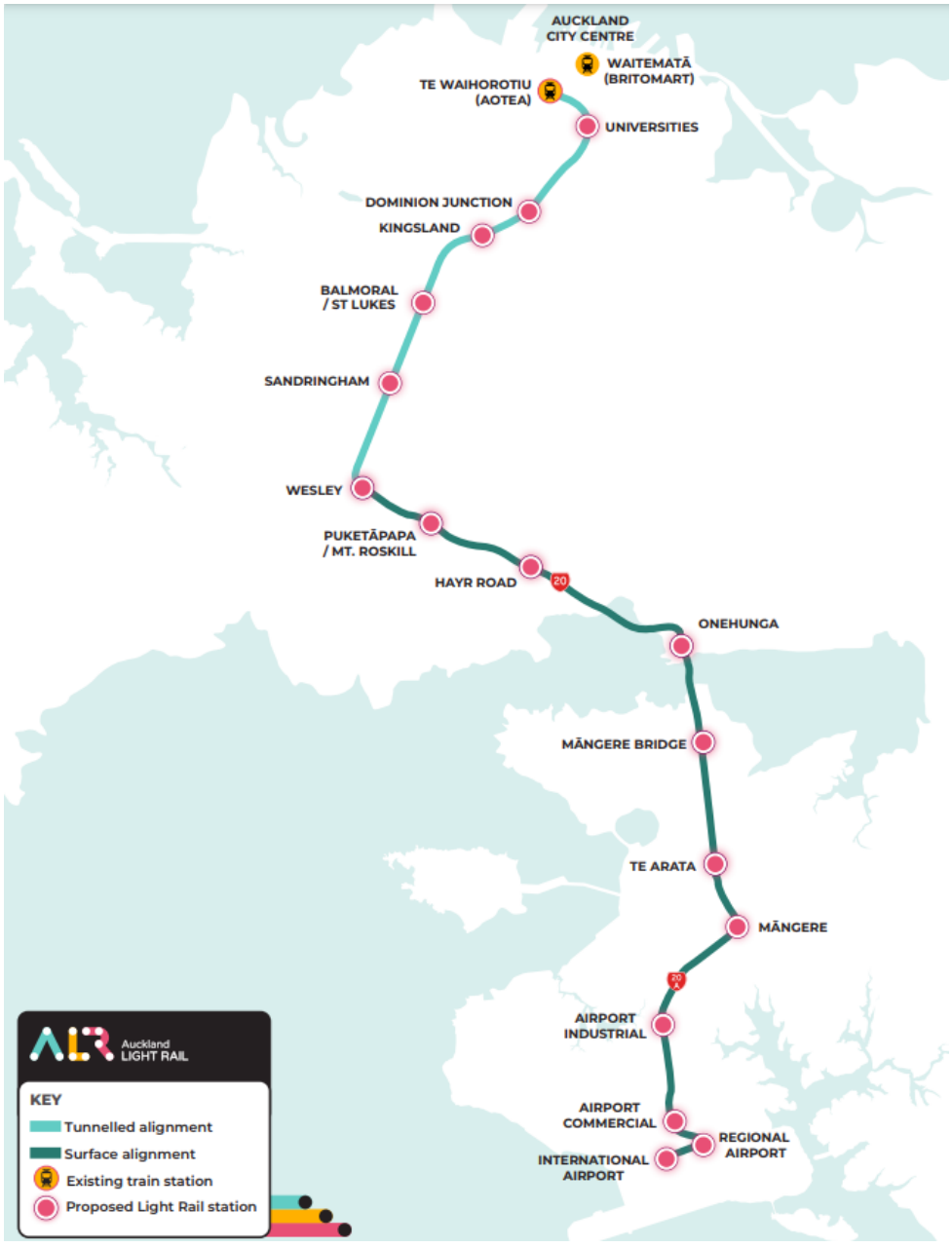

Figure 2 Lodgement Packages 1 and 2

Figure 3: Overview of NoRs sought for ALR project

Section 5 of this AEE provides a more detailed description of Package 1, including the purpose of each NoR. Appendix X provides a completed Form 18 for each proposed NoR.

The AEE and supporting technical assessments have been developed in an integrated manner. Whilst this report covers all aspects of Package 1 needed for consideration of the NoRs, some aspects of this report will only be relevant to specific geographical areas, NoRs, or components of Package 1.

- coastal construction and occupation consent applications.

1.4.2 Wesley

Write me if required

1.4.3 Mangere Town Centre

The Project will provide a rapid transit network capable of moving people fast and reliably to workplaces and education facilities. In addition, the Project will unlock significant urban development potential along the route.

The Mangere community were asked to provide feedback on two potential options for the location of a light rail station; a station located close to SH20 and a station located closer to Mangere Town Centre. Section XX and Appendix XX provide more detailed discussion on this engagement.

Feedback from the Mangere community showed further engagement was required to achieve a good level of understanding by the community, stakeholders and organisations for progression of a station location.

Delaying lodgement of the NoRs for Mangere Town Centre Station, Landing Drive Station, and the remaining sections of the rail alignment allows sufficient time for engagement with the Mangere community on the location of the Mangere Town Centre Station and rail alignment.

Te Ararata Station was chosen as the southern extent for Package 1. This enables the concept design for the Mangere Town Centre to Landing Drive alignment and stations to continue independent of the Package 1 alignment. Flexibility remains for identification of a preferred alignment and station locations southwards, without impacting on the location of Te Ararata Station.

1.4.1 Coastal Marine Area

Components of the Project will interface with the CMA in the following three locations.

- Manukau Harbour
- Te Tauranga (Onehunga Lagoon)
- Te Ararata Creek

The New Zealand Coastal Policy Statement (NZCPS) recognises the significance and challenges faced in the coastal environment with respect to sustainable management. Regional policy statements, regional plans and district plans are required to give effect to the NZCPS. When considering a resource consent or requirement for a designation a consent authority must have regard to the NZCPS. Adequate consideration of the matters directed by the NZCPS necessitates a sufficient degree of design detail.

Through fortnightly engagement with Mana Whenua Project partners, matters of particular interest to Mana Whenua in the coastal environment have been identified. Project parameters were set, shaping the option selection process used to identify the preferred Project alignment past and adjacent to the coastal environment.

Lodgement of the coastal construction and occupation resource consents associated with Project works impacting the Manukau Harbour, Te Tauranga (Onehunga Lagoon) and Te Ararata Creek, as part of Package 2 allows:

- additional time to identify and address issues of concern to Mana Whenua partners and confirm preferred options; and
- additional time to develop designs to a level of detail necessary to support Auckland International Airport

Auckland International Airport is covered by Designation 1100 in the AUP. The site is located at George Bolt Memorial Drive, shown in Figure 4.

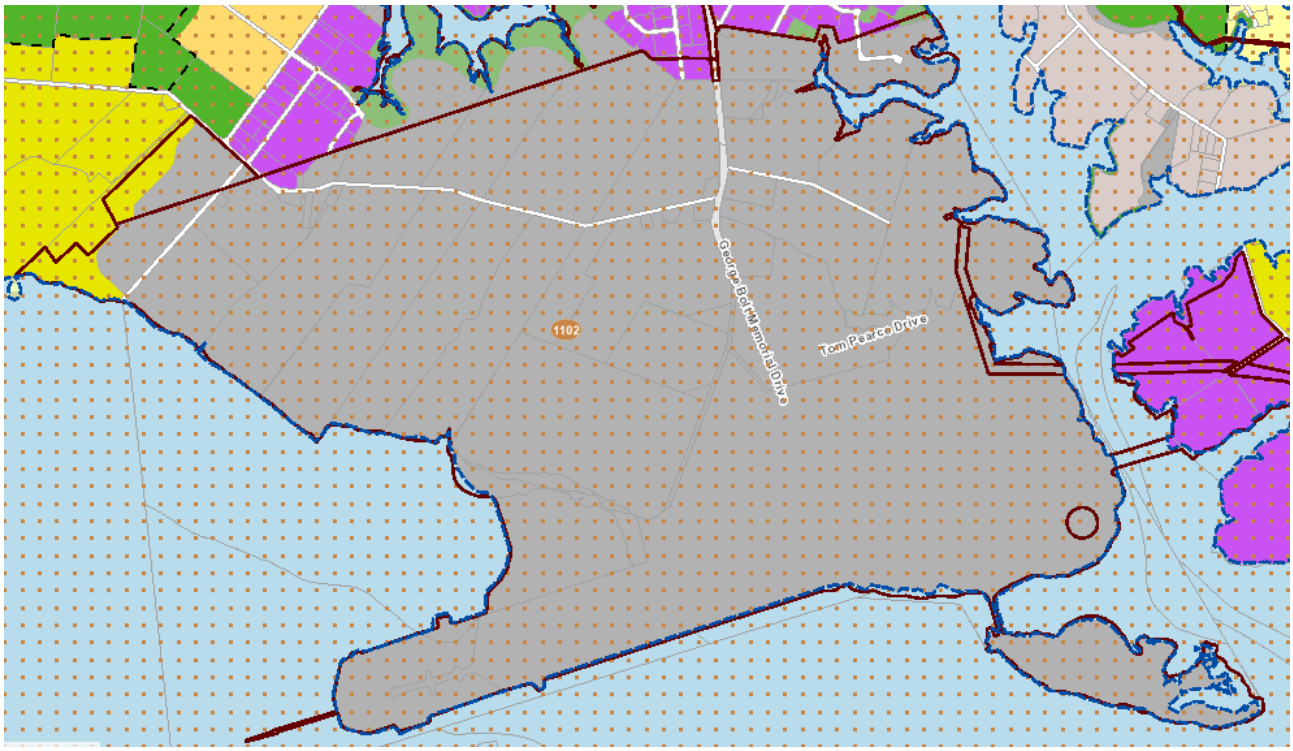

Figure 4 Auckland International Airport Limited Designation 1100, Source: Auckland Unitary Plan (Operative in Part) 2016

Designation 1100 includes the following condition 30:

> *AIAL shall provide and protect mass rapid transit corridors (meaning dedicated land corridors within which mass rapid transit will be located) within the Auckland Airport Precinct. The corridors shall connect:*

a. A point in the vicinity of SH20A on the northern boundary of the Auckland Airport Precinct (to connect to the future City Centre to Māngere mass rapid transit route); and

b. A point in the vicinity of Puhinui Road / SH20B on the eastern boundary of the Auckland Airport Precinct (to connect to the future Airport to Botany mass rapid transit route) with the integrated Airport terminal and the Auckland Airport business precinct (at a minimum).

The mass rapid transit corridors shall be set back a minimum of 20 metres from Mean High Water Springs except for the approaches to the Pūkaki Creek

Note: 'Mass rapid transit' means public transport capable of moving a large number of people, for example light rail and dedicated bus routes. Common characteristics of rapid transit include frequent services, fast loading and unloading capability, and largely dedicated or exclusive right-of-way routes.

On this basis, the Project alignment and stations within the AIAL site can be authorised by an Outline Plan in accordance with the AIAL Designation 1100. Existing AIAL resource consents may also be sufficient to encompass required regional consenting matters required for the construction of the Project on the AIAL site.

ALRL will continue engagement with AIAL to ensure the successful integration of the Project infrastructure with the light rail infrastructure to be constructed within the AIAL site.

1.4.5 Plan Change

Auckland Council's Plan Change 78 responds to the National Policy Statement for Urban Development 2020 (NPS UD). It excluded the ALR corridor due to uncertainty surrounding the Project alignment and station locations. Work is now underway on an "ALR plan change" to the Auckland Unitary Plan. The purpose of the plan change is to remedy the exclusion of the light rail corridor from PC78 and appropriately respond to the NPS UD.

1.5 Request for Public Notification

ALR requests this application is publicly notified under X

1.6 Suite of Documents

Table X sets out the suite of documents that support the NORs for the project.

Table 2 ALR NoR Suite of Documents

Volume	Description of Contents
Volume 1 NoR	• NoR Overview document • XXX NoR Forms • Land Requirement Plans (attached to each NoR Form) • Schedule of Directly Affect Properties (attached to each NoR Form and relating to the relevant land requirement plans)
Volume 2 AEE	AEE Appendices to the AEE comprising: • Appendix 1: XXX • XXX • XXX
Volume 3 Technical Reports	Appendices to the AEE • Appendix 1: XXX • XXX • XXX

2. Partnership with Mana Whenua

ALRL recognises and respects Te Tiriti o Waitangi as Te Tūāpapa (foundation) and is committed to working in partnership with Māori throughout the development of the Project. Māori are Treaty Partners with the Crown and local authorities act as agents of the Crown. Therefore, the role of Māori, and in particular Mana Whenua, is a critical success factor for the delivery of ALR.

This section summarises:

- ALR's Mana Whenua partners
- Partnership with Mana Whenua
- Mana Whenua Partnership Outcomes
- Engagement undertaken with ALR's Mana Whenua Partners

2.1 ALR's Mana Whenua Partners

There are 19 Mana Whenua groups across Tāmaki Makaurau. Fifteen of these Mana Whenua groups have territorial affiliations and customary interests across the Project area.

To date, representatives from eleven of these Mana Whenua groups have actively contributed to the Project:

- Te Ahiwaru
- Te Ākitai Waiohua
- Ngaati Whanaunga
- Te Kawerau ā Maki
- Ngāti Whātua Ōrākei
- Ngāti Te Ata
- Ngāi Tai ki Tāmaki
- Te Patukirki
- Ngāti Maru
- Ngāti Tamaterā
- Ngāti Paoa Trust Board

The following four Mana Whenua groups have received material for the Project but have not engaged in the process to date:

- Te Runanga ō Ngāti Whātua
- Ngāti Whātua ō Kaipara
- Waikato Tainui
- Ngāti Tamaoho

Mana Whenua also have representation as sponsors, alongside the Government and Auckland Council, at the decision-making table.

2.2 Partnership with Mana Whenua

ALRL has committed to establishing a strong and enduring partnership with its Mana Whenua Partners. This commitment has influenced all stages of the project to date.

This has meant proactive engagement with its Mana Whenua Partners throughout the early stages of project development, seeking their input and involving them in all layers of decision-making at governance, management and kaitiaki levels.

This involvement has included:

- ALRL partnering with Mana Whenua with interests in the ALR project area (identified above), with 11 Mana Whenua groups actively involved in the Project
- leadership representation at Project Sponsor level (three Mana Whenua Sponsors with decision-making roles)
- fortnightly hui with the 15 Mana Whenua groups with interests in the Project area (listed above)
- preparation of Te Terewhiti ki Tāmaki Makaurau Te Rautaki Huanga Māori 2021 (ALR Māori Outcomes Strategy) (discussed below)
- active involvement of Mana Whenua kaitiaki in the MCA process to determine route and station locations, including the identification and mapping of specific Project constraints, including impacts on wai, moana, Māori land and sites of significance
- Reviewing and providing feedback on the draft consent design with the Te Tiriti Partnerships team
- The appointment and resourcing of technical specialists to support Mana Whenua in the NOR and consenting process

ALR's engagement with its Mana Whenua Partners is ongoing (at governance, leadership and kaitiaki levels).

2.3 Mana Whenua Partnership Outcomes

The ALR Māori Outcomes Strategy 2021 sets out the position of Mana Whenua leadership on the Project, as agreed by Ministers for the IBC. It outlines the desired Māori Outcomes and ALR commitment to establishing an enduring and genuine partnership with Mana Whenua and Mataawaka in and around the corridor, and clear guidance for how ALR will work with its Treaty Partners through the establishment of:

- Ngā Uara: Values to guide engagement with Mana Whenua throughout the consenting process, being rangatiratanga, manaakitanga, kaitiakitanga, whanaungatanga and mana o te reo Māori.
- Ngā Mātāpono: Principles for Engagement. These form the basis for ALR kōrero with Mana Whenua kaitiaki.
- Ngā Putanga: Outcomes for ALR. These are the outcomes and success factors identified by Mana Whenua in the IBC phase, to be realised through later stages of the Project.

Table X outlines the agreed Ngā Mātāpono: Principles for Engagement

Principles	Description
Rangatira ki te Rangatira	i. Give particular respect and regard to the level of conversations we will be having and ensure we have the appropriate people in the room to address any issues.
Kanohi ki te kanohi	ii. Where possible, engagement will be face to face or brought online if there is an elevation in Covid alert levels.
Whakapono	iii. Acknowledgement, understanding and adherence to kawa (protocols), tikanga (customs).

Tauututu	iv. Provide opportunity for Mana Whenua to participate in the process and engage their own specialist where required, who will be able to provide them with timely expert advice.
Huna kore	v. Adopt a 'no surprise' approach to engagement, engage early and ensure information flows both ways.
Manarite	vi. Cultivate a culture whereby everyone's input is valued and should be treated with respect

Table X outlines the agreed Ngā Putanga Māori Outcomes for the Project.

Table 1: Ngā Putanga Māori outcomes

Category	Ngā Putanga Māori Outcomes
Access and Integration	• Deliver patronage and improved access to employment and education for Māori • Achieve better transport and urban renewal outcomes alongside Mana Whenua • Reconnect Māori communities to their marae, whare karakia, kōhanga reo and Kura Kaupapa Māori
Environment	• Build patronage for ALR maximising the use of a safer and more sustainable transport mode and reducing reliance on private vehicles • Ensure Mana Whenua knowledge about natural environments and sites of significance is incorporated in to planning and design to deliver sustainable environmental outcomes • Work with Mana Whenua to provide better than expected outcomes for the environment
Customer Service	• Ensure Mana Whenua values recognising services standards, experience and safety are fed into the process to achieve better customer experience outcomes • Incorporate Māori culture into solutions and service and promote the use of te reo Māori
Enabling the quality of integrated urban communities, especially around Mangere, Onehunga and Mount Roskill.	• Incorporate Mana Whenua history and culture into the urban design and planning process to develop clear sense of space and a rich cultural identity • Identify intensification issues including gentrification and affordability
Value for Money	• Engage Mana Whenua as genuine partners to develop solutions and address issues to optimise delivery time and costs • Identify and incorporate ongoing cultural, social and economic opportunities that will provide improved outcomes and value for their communities.

Further desired outcomes were also identified in the report that set the foundation for the detailed design and delivery of the Project with Mana Whenua, being genuine partnership, Mana Whenua leadership, kaitiakitanga and promoting Tāmaki Makaurau.

2.4 Engagement undertaken with ALR's Mana Whenua Partners

Engagement with its Mana Whenua Partners has assisted ALR to identify potential constraints and opportunities along the Project corridor from a Mana Whenua perspective. Feedback obtained to date has informed the design and decision-making for the overall project so that positive outcomes can be achieved.

ALRL is engaging with Mana Whenua in a number of ways, including:

a. Individual Mana Whenua Governance (Rangatira to Rangatira) hui with the ALRL Board Chair and ALRL Board Members; and

b. Individual Mana Whenua Leadership / Operations hui with the ALRL Chief Executive and ALRL General Manager Te Tiriti Parnerships; and

c. Engagement with Mana Whenua Kaitiaki with the ALRL Te Tiriti Partnerships Alliance Lead and wider Project team on a range of NOR and Consenting matters. The Mana Whenua Kaitiaki Working Group was established in October 2022, with representatives from mana whenua entities with a recognised interest in the project area, and their independent Mana Whenua advisors, invited to participate.

Where engagement relates to the Project in general Mana Whenua Kaitiaki are engaged via a Mana Whenua Kaitiaki Working Group facilitated by the ALRL Te Tiriti Partnerships Alliance Lead and supported by the wider Project team.

Where a group prefers to be engaged individually or where engagement relates to iwi specific issues this is accommodated.

The focus of the NOR a summary of the engagement hui held with Mana Whenua Kaitiaki to date is included in Appendix X.

2.5 How Mana Whenua Kaitiaki feedback has been integrated into the process to date.

a) Multi-Criteria Analysis Process on the emerging preferred Corridor, Route and Stations (October 2022 to May 2023)

The initial phase of engagement between October 2022 to May 2023 focussed on introducing Mana Whenua to the project. It included a site visit along the route and participation in a series of Multi-Criteria Analysis Workshops to seek feedback on the emerging preferred Corridor, Route and Stations.

The MCA process of engagement with Mana Whenua:

- Step 1 – MCA Technical workshops
- Step 2 – MCA re-cap and reporting back on any issues/questions identified in the initial sessions.
- Step 3 – Mana Whenua feedback used to inform options. Feedback from mana whenua was balanced against the Project objectives and used to inform options to determine an emerging preferred route and station locations.
- Step 4 - Final decisions on preferred route and station locations are then reported to the ALR Board and Sponsors Group.

Meeting recordings and transcripts were available for those who were unable to attend. Information was shared with Mana Whenua after the workshops.

It is important to acknowledge that Mana Whenua Kaitiaki technical feedback received through the MCA process was informal and based on their understanding of the project at a point in time.
Mana Whenua feedback to the MCA process identified the following Project Constraints:

i. Impact on Māori Land and Treaty Settlements
ii. Impacts on Sustainability, Climate Change, Carbon, Flooding
iii. Impacts on Māori Heritage, Archaeology, Sites of Significance to Mana Whenua
iv. Impacts on Wai (Water)
v. Impacts on Moana (Coastal Area)
vi. Impacts on Geology, Maunga and Volcanic Landforms
vii. Impacts on Communities

A summary of the Mana Whenua feedback and the ALR response is documented in Appendix X.

b) Mana Whenua Constraints Maps (May 2023)

The Ngā Putunga Māori Outcomes identified in Te Rautaki Huanga Māori 2021 and the constraints identified by Mana Whenua through their informal feedback on the MCA process were used to develop a series of Mana Whenua Constraints maps using publicly available information.
The Mana Whenua Constraints Maps were used to identify cultural features within the existing environment within the Proposed Station Location (PSL) where Mana Whenua values may be affected.
They identified cultural features to be avoided in the development of the NoR boundaries, station location and alignment.
A table summarising the information that has been considered in describing the and identifying potential constraints Cultural Environment is included in the Existing Environment sections of the NoR documentation.
The following NoR's have been identified by ALR as having potential effects on Mana Whenua values. A summary of the extent to which each NoR impacts the Cultural features listed below is described in the Existing Environment section of the relevant NoR's.

i. Impact on Maunga and Lava Caves
- NOR 3 - Te Waihorotiu (Aotea)
- NOR 7 - Balmoral / St Lukes
- NOR 5 - Dominion Junction
- NOR 12 - Puketāpapa / Mt Roskill
- NOR 14 - Onehunga
- NOR 17 - Mangere Bridge
- NOR 18 - Te Ararata
- NOR 15 - Depot

ii. Impact on sites of significance to Mana Whenua
- NOR 3 - Te Waihorotiu (Aotea)
- NOR 4 - Universities
- NOR 6 - Kingsland
- NOR 14 - Onehunga

iii. Impact on Areas of Historic Māori Occupation

- NOR 14 - Onehunga

iv. Impact on Wai (Water)

- NOR 7 - Balmoral / St Lukes
- NOR 5 - Dominion Junction
- NOR 6 - Kingsland
- Wesley (Not included in Lodgement Pack 1)
- NOR 12 - Puketāpapa / Mt Roskill
- NOR 13 - Hayr Road
- NOR 14 - Onehunga
- NOR 17 - Mangere Bridge
- NOR 15 - Depot

v. Impact on Moana (Coastal Areas)

- NOR 15 - Depot

c) <u>Review of NOR documentation (AEE, Technical Reports, Conditions and Consent Design Plans) (May 2023 – ongoing)</u>

From May 2023 onwards the regular updates on the NOR work programme have been provided to the fortnightly Mana Whenua Kaitiaki Working Group hui.

Draft NoR documentation has been shared with Mana Whenua and their specialists at the same time that it has been shared with Technical Specialists. This has provided the opportunity for Mana Whenua and their specialists to review the materials and provide early feedback to conditions.

Mana Whenua have received the following draft information to date:

i. Summary Version of Consent Design Sketchbooks dated 10 May 2023
ii. Consent Design Sketchbooks – Rev C – 16 June 2023
iii. Consent Design Sketchbooks – Rev C – 26 June 2023
iv. Draft Technical Reports v1 - 12 June 2023
v. Draft Technical Reports v2 - 22 June 2023
vi. Draft Technical Reports v3 – 13 July 2023
vii. Draft Conditions – Corridor wide v1 – 6 June 2023
viii. Draft Conditions – Corridor wide v2 – 14 June 2023
ix. Draft Consent Design Drawings – 12 July 2023
x. Draft Mana Whenua Content to be included in the NoR – 13 July 2023

Mana Whenua were invited to review the documentation and provide feedback on draft materials.

Feedback was received from Mana Whenua specialists on the 10 May 2023 versions of the Consent Design Sketchbooks and the Draft Conditions. The feedback reflects their understanding of the Project based on information provided to them at the time and may be subject to change.

The feedback was shared with the Project team to respond and has helped to inform the NoR materials including the Consent Design and Conditions.

In the feedback received to date on the draft NoR materials Mana Whenua have raised the following key themes and bottom lines for the ALR Project team to take into account:

1. Avoid negative project impacts on whenua, moana, takutai, hau takiwā and ngāhere and surrounding catchments

2. Te Hōpua ā Rangi strongly recognized as a no-go area

3. Protect and enhance Maunga, included related viewshafts, puna (springs), waterways and coastal areas, former pā sites, natural features and other places of significance to mana whenua

4. ALR infrastructure intruding into scheduled Maunga viewshafts and height sensitive areas must be avoided – including on the whenua (land) and moana (CMA).

5. Any tunnelled section must avoid lava caves and subsurface streams and groundwater features.

6. Maintain the ability for mana whenua to freely participate in their traditional and cultural practices in engaging with the coastal marine resources of their rohe.

7. Future infrastructure must be cost effective, flexible and adaptable to change and uncertainty to support future generations.

8. Spiritual and cultural concepts recognized by mana whenua in the management of the environment are recognized and actively enhanced and facilitated.

9. Avoid adverse impacts on Māori land and Marae

10. Strong preference for construction commencing at the southern end to support more equitable transport options for those communities

11. Strong preference for a hospital station to support more equitable transport options for communities

12. Strong preference for opportunities for environmental enhancement over and above RMA requirements e.g. Depot and Manukau Harbour.

At the time of writing engagement on how the Project will respond to the above matters was continuing with Mana Whenua and will be documented in the Mana Whenua Cultural Values Report.
The ALR Project team are committed to sharing information as it becomes available so that Mana Whenua can provide early inputs into the materials and to enable adverse effects on Mana Whenua values to be identified early and responded to.
ALR are currently working collaboratively with Mana Whenua kaitiaki and their specialists on how the Project will respond to the issues that have been raised and this will inform the NoR documentation.

It is important to note that the feedback provided to date is interim and Mana Whenua kaitiaki are not in a position to provide a formal position until they see the final set of lodgement materials in October 2023.

2.6 Post lodgement & on-going engagement

Extensive engagement with Mana Whenua groups across Tāmaki Makaurau has been undertaken to date and ALRL are committed to continuing engagement and collaboration with Mana Whenua following lodgement of the NORs and resource consents. This will include the preparation of a Mana Whenua Cultural Values Report that reflects mana whenua values within the Project area, engagement processes undertaken, key feedback and how this has shaped the Project.

While every effort has been made by ALR to give effect to the Ngā Mātāpono: Principles for Engagement set out in Te Rautaki Hūanga Māori (summarised above), Mana Whenua have identified challenges with the engagement process, including that the consenting process is moving too fast, and this is limiting their ability to contribute in a meaningful way. In addition to clearer process improvements, ARL have proposed that an integrated work programme be developed up until notification in February 2024 (following both the 11 August and 20 October 2023 NOR and resource consent lodgements), to enable Mana Whenua input to be meaningfully reflected and any necessary design improvements to be made.

ALR are committed to working together in partnership to improve its engagement process with its Mana Whenua Partners through the next phase of the consenting process, and supporting the development of the Mana Whenua Cultural Values Report.

The Mana Whenua Cultural Values Report will contain a summary of the engagement process along with key information that has been used to inform the Assessment of Effects on Mana Whenua values and proposed mitigation.

A template outlining the proposed content of the Mana Whenua Cultural Values Report is contained in Appendix X.

Appendix X – Engagement with Mana Whenua Kaitiaki Working Group

The ALR Mana Whenua Working Group engagement commenced in October 2022 and is on-going. Engagement will continue throughout the NOR process post notification.

Date of Hui	Description
28 October 2022	ALR Mana Whenua Working Group
9 November 2022	ALR Mana Whenua Working Group
23 November 2022	ALR Mana Whenua Working Group
1 December 2022	Corridor MCA – Māngere to Airport
1 December 2022	Corridor MCA – Roskill to Onehunga
2 December 2022	Corridor MCA – Central Isthmus
2 December 2022	Corridor MCA – City Centre
7 December 2022	ALR Mana Whenua Working Group / Corridor MCA Recap
21 December 2022	ALR Mana Whenua Working Group

25 January 2022	ALR Mana Whenua Working Group
10 February 2023	Catchment MCA
15 February 2023	ALR Mana Whenua Working Group / Catchment MCA Recap
24 February 2023	Catchment MCA
1 March 2023	ALR Mana Whenua Working Group / Catchment MCA Recap
10 March 2023	Catchment MCA
15 March 2023	ALR Mana Whenua Working Group / Catchment MCA Recap
16 March 2023	Depot and Onehunga Alignments MCA
23 March 2023	Route and Stations MCA
24 March 2023	Long List Manukau Harbour Crossing
29 March 2023	ALR Mana Whenua Working Group / Final Route and Stations & Depot MCA
5 April 2023	Manukau Harbour Crossing – Short List Options
12 April 2023	ALR Mana Whenua Working Group / Manukau Harbour Shortlist Recap
8 May 2023	Total Project Staging – Short List Options
10 May 2023	ALR Mana Whenua Working Group
24 May 2023	ALR Mana Whenua Working Group
7 June 2023	ALR Mana Whenua Working Group
21 June 2023	ALR Mana Whenua Working Group
5 July 2023	ALR Mana Whenua Working Group
19 July 2023	ALR Mana Whenua Working Group

Appendix X. Mana Whenua Themes from Engagement on the MCA Process

Note: This information will be updated for notification – should it be included in the August lodgement?

It is important to acknowledge that Mana Whenua Kaitiaki feedback received through the MCA process was informal and based on information shared with them at workshops. This feedback represents a point in time and has not been endorsed by Mana Whenua leadership or kaitiaki.

Despite this not representing a formal position from Mana Whenua. This informal feedback was useful for the ALR Project team to identify and look at ways to avoid any key constraints and potential issues for Mana Whenua early in the process.

A high-level summary of the key themes identified by mana whenua through the MCA process and have informed the final recommendations is included in the Tables below.

Table 1.X. Theme - Impact on Māori Land and Treaty Settlements

Ref	Mana Whenua Commentary	ALR Response
1.1	Importance of engaging directly with identified marae along the route to understand potential issues and opportunities.	Engagement meetings commenced with Trustees and Operational Groups where potential impact on marae - further meetings planned.
1.2	Avoid negative impacts / further alienation of Māori land along the route.	Māori Land mapped in ALR GIS viewer and identified as part of MCA process. Māori land avoided with Route and Stations.

1.3	Identify opportunities for environmental enhancement and commercial opportunities on Māori land along the route.	Māori Land mapped in ALR GIS viewer and identified as part of MCA process. On-going engagement with Trustees and Operational Groups to identify opportunities through next phase of consenting process.
1.4	Identify opportunities for remediation of areas of reclaimed land in the Manukau Harbour.	Original Manukau harbour shoreline mapped in ALR GIS viewer to inform MCA process. Opportunities for remediation of areas of reclaimed land to be considered in more detail in environmental assessments and through next phase of consenting process.
1.5	Importance of considering opportunities for partnerships on land subject to Treaty Settlements.	Treaty Settlements are in the process of being mapped in the ALR GIS viewer. Commercial redress land considered as part of the MCA process.
1.6	Support for development in areas of Crown owned land subject to Right of First Refusal.	Meetings initiated with Iwi leadership to explore opportunities for Te Tiriti Partnerships on Right of First Refusal land.

Table 2.X. Theme – Impacts on Sustainability, Climate Change, Carbon, Flooding

Ref	Mana Whenua Commentary	ALR Response
2.1	Importance of taking a more holistic view of sustainability – not limited to just carbon.	A broad approach to sustainability has been implemented through the MCA assessments. Further engagement with the Kaitiaki Forum is required to endorse the approach.
2.2	Sustainability needs to be considered across all aspects of the project – economy, environment, communities etc.	Recognition that Mana Whenua will have a view of sustainability holistically across all aspects of the project.
2.3	Many of the environments are highly degraded – just sustaining the existing environment is not enough.	Recognition of Mana Whenua's historic association with the Manukau Harbour and wider study area. Options being developed to explore how wider Te Tiriti outcomes beyond RMA mitigation can be delivered through the project will be explored in the next phase of consenting and through the business case. Discussions required with Mana Whenua leadership.
2.4	Need to think about regeneration of the existing environment to sustain life and support future generations.	As per point 2.3 above.
2.5	A longer-term view is needed, e.g., Manukau Harbour is highly degraded, Onehunga foreshore is reclaimed land that has been	As per point 2.3 above.

	used as a landfill, what can the project do to identify opportunities to improve the environment in these locations?	
2.6	MCA process breaks things down into silos and does not look holistically from a Māori worldview.	Acknowledgment that the MCA process has required a bottom-up approach to determine the route and stations. Once the preferred route and station locations has been confirmed by Sponsors a more holistic view top-down view of the project will be available for Mana Whenua to input into.
2.7	Need to consider work underway by Auckland Council looking at Shoreline Adaptation plans and realigning coastal edges to allow for flooding, sea level rise etc. Having a large number of structures on the coastal edge creates an increased risk when cyclones, flooding occurs as we have observed lately.	Technical specialists have been engaged to consider these issues. Mana Whenua kaitiaki will have an opportunity to review and provide feedback on those reports through the next phase.

Table 3.X. Theme – Impacts on Māori Heritage, Archaeology, Sites of Significance to Mana Whenua

Ref	Mana Whenua Commentary	ALR Response
3.1	Importance of looking at areas of known archaeology so that areas at high risk of discovery can be avoided. e.g. Auckland Airport second runway a significant accidental discovery of 14th century origin.	Areas of known archaeology and sites of significance to Mana Whenua have been mapped in ALR GIS. This has been considered as part of the MCA process. In addition, Mana Whenua feedback and an Archaeological review has reviewed the route and proposed stations and provided feedback on high-risk areas of accidental discovery of archaeology of Māori origin, this has been used to confirm the Route and Stations.
3.2	A process will be needed to support cultural monitoring of earthworks and accidental discovery protocols. A designated area for reinternment may be required.	This will be included as part of the NOR condition set and will be developed in partnership with Mana Whenua.
3.3	A number of sites of significance to Mana Whenua are located along the route that are part of the Auckland Council Māori Heritage Programme. Importance of working with Mana Whenua to identify sites and avoid further destruction and impact on cultural and spiritual values. E.g. Te Hōpua ā Rangi (Tuff Crater) and the Waiokauri Portage Route.	The ALR Te Tiriti Partnerships team are working closely with the Auckland Council Māori Heritage team and individual Mana Whenua groups regarding the Management Statements for nominated sites along the route. Work is on-going through the Consenting process to develop and agree appropriate management approaches to avoid further destruction of the cultural and spiritual values of known sites of significance.

3.4	Recognition of Māngere as one of the oldest settlements in NZ.	ALR acknowledges Māngere as one of the oldest settlements in NZ and we have identified an Route and Station location that minimises impact. This route and location cannot be confirmed until further community consultation is undertaken.
3.5	A number of known sites of significance to Mana Whenua have been identified in close proximity to the emerging route. Not all of these are scheduled. Priority locations for Mana Whenua input into location, design and mitigation as part of the next phase of work in relation to cultural heritage include Hayr Road, Onehunga, Manukau Harbour Crossing, Māngere Bridge, Landing Drive, Wesley, Sandringham, Mt Roskill and Te Waihorotiu.	ALR will continue to work with Mana Whenua through the next phase of consenting to manage the effects on significant sites along the route.

Table 4.X. Theme – Impacts on Wai (Water)

Ref	Mana Whenua Commentary	ALR Response
4.1	Te Ararata Stream identified as an important location.	Te Ararata Stream is acknowledged as an important location for Mana Whenua. A bridge over this stream will be required however we will avoid impact on this important waterway.
4.2	Avoid adverse impacts on aquifers and water as a result of tunnelling.	The impact of tunnelling on Puna (springs) and aquifers has been acknowledged. The IBC tunnel alignment passed though various lava flows and aquifers. The Route selected has been designed to avoid the lava flows and aquifers and the tunnel now passes beneath these lava flows. This has involved adjustments both the vertical and horizontal alignment of the tunnel particular in the vicinity of Balmoral station where the station was moved to the east to balance station depths whilst still passing beneath the basalt flows. At Wesley station it was not possible to develop an underground alignment without impacting on the Puketāpapa flows and an alternative viaduct solution has been prepared to avoid impact on the aquifer and potential lava caves. We have some station shaft excavations though basalt however these have been positioned on the edge of flows where the likelihood of caves is decreased and borehole drilling will be used to confirm that there are no caves present in the cave locations.

4.3	Impact of tunnelling on the spiritual and cultural aspects of Puna (springs) need to be considered.	See point 4.2 above.
4.4	Need for greater consideration of the impact of flood waters as a result of tunnelling – where will water be diverted and what will the impact be on flooding in surrounding areas.	Tunnelling is not expected to cause flooding. Bunding will be required to protect the tunnel portals from flood inundation, however this will be designed so it does not exacerbate any flooding issues.

Table 5.X. Theme – Impacts on Moana (Coastal Area)

Ref	Mana Whenua Commentary	ALR Response
5.1	For Māori there is more than just water quality issues in the CMA to consider – there are cultural / spiritual concerns that cannot be measured through an MCA process.	For the required Manukau Harbour crossing options have been developed to minimise the impact on the harbour including maximising the reuse of the existing structure.
5.2	When the harbour is unwell, we are unwell – we are connected to it like an invisible umbilical cord.	ALR acknowledge the significant historical and cultural associations that Mana Whenua have with the Manukau Harbour. Ongoing engagement at both Kaitiaki and Leadership levels on how the project will respond to the broader Te Tiriti outcomes identified by Mana Whenua at all levels in the project.
5.3	The Manukau Harbour remains degraded from past effects. Mana Whenua often promote the necessity to explore ecological health inside the Manukau Harbour. More often than not structures go up and the budget set aside to generate ecological mitigation goes amiss at the end of the day once the structure is up.	Ecological mitigation will be developed in the next phase of the consenting assessment phase.
5.4	Need for greater consideration of flooding and coastal inundation along the route – a holistic view is required.	All MCA's have considered resilience including flooding and sea level rise. The ALR route and stations will be designed to provide a resilient connection during flooding and above sea level rise.

Table 6.X. Theme – Impacts on Geology, Maunga and Volcanic Landforms

Ref	Mana Whenua Commentary	ALR Response
6.1	Importance of avoiding adverse effects on the extensive volcanic landscape containing many maunga and stonefields within Māngere / Ihumatao.	The Route and Stations have been located to avoid maunga and also stations have been located outside of Volcanic view shafts.

6.2	Many of our maunga have already been completely quarried. Avoid further destruction of our volcanic landscape as a result of tunnelling.	Maunga and known volcanic features have been mapped in the ALR GIS, consideration of the effects on Maunga and volcanic features into the MCA assessment. The IBC alignment passed through the lava flows however we have developed horizontal and vertical alignments that avoid the lave flows.
6.3	A number of areas identified along the route where there are known lava caves and lava flows that are of significance to Mana Whenua that should be avoided e.g. Te Hopua ā Rangi (Tuff Crater)	The presence of lava caves is being investigated with geophysical methods however the tunnels have been design to avoid the lava flows. There are a few station shafts that intersect the basalt however the geotechnical investigations are proposed to confirm that there are no lava caves in these locations.
6.4	Avoiding infringing Maunga Viewshafts and Height Sensitive Areas around the maunga with stations and infrastructure. Future intensification will be limited if the walkable catchments are within viewshafts.	Station locations have been located to avoid Volcanic Viewshafts.
6.5	Need for more information on the depth of tunnels, Ground penetrating radar and aquifers to better understand the impacts of tunnelling.	An extensive subsurface investigation is being undertaken presently and will continue for the next 6-9 months. The data being collected is being included in a 3-D geological model. The model and all the results of the investigations will be shared with Mana Whenua.
6.6	Mana Whenua are aware of areas along the route where there is a high likelihood of encountering basalt and aquifers – Dominion Road, Te Auanga, Sandringham Road, these areas are fraught with problems.	Refer to previous responses to the tunnel horizontal and vertical alignment. We have designed the alignment so the tunnelling avoids the lava flows and aquifers.

Table 7.X. Theme – Impacts on Communities

Ref	Mana Whenua Commentary	ALR Response
7.1	Communities that will be affected by development are in areas that are lacking in investment in terms of health, quality schooling, housing.	ALR is being specifically designed to service a number of these communities including large parcels of Kainga Ora land. The development of the ALR transport route will bring additional housing and investment in these areas.
7.2	What will the project do to attract people to these areas that will benefit existing Māori communities? e.g. Wai 8 Claim – Ihumatao community was one of the last to be connected to the Māngere Wastewater	The project is working with Auckland Transport to redesign the bus network so that there are local routes that connect to the ALR stations. We are also preparing a Corridor Strategic

	Treatment Plant despite being one of the greatest affected.	Framework that includes 8 sustainable strategies and will define the changes to the urban form. We have just started engaging with the Kaitiaki Forum on these strategies.
7.3	What are the sustainable economic outcomes for iwi. This project is highlighting historic issues again – risk that the project might push out and marginalise existing Iwi and Māori communities.	We are working with Iwi leadership to identify economic opportunities.
7.4	Strong support for a station in close proximity to the Hospital. Importance of considering the social benefits for those communities who need to access the hospital and cannot afford parking.	The desire for a Hospital station is acknowledged. The ALR will significantly improve the public transport access to the hospital by connecting the area serviced by the ALR route to Kingsland Station where passengers can interchange for Grafton Station to access the hospital. Modelling shows a very significant increase in usage of Grafton Station once ALR is in place. This a 550m walk to the station with a bus connection provided for less able passengers.
7.5	Support for alignment with Kainga Ora and enabling urban development areas.	ALR is partnering with Kainga Ora and the route have been selected to service significant KO land holdings allow significant redevelopment of this land.
7.6	Opportunities to connect our young people to high performing schools outside of the area to get a quality education.	ALR will significantly improve access to education and employment for all passengers including young people. There are very significant reductions in travel times along the route which will improve accessibility.
7.7	Improving access to the Māngere Town Centre will enable better access to Māori Health providers in the area.	A Station is proposed in Māngere that will improve the access to MTC.ALR is proposing further work with the community to determine the location of that station.
7.8	Consideration of how social impacts will be managed, including impacts on Homeless communities.	Social impacts will be addressed in the Corridor Strategic Framework which is under development. The details of the CSF including the development of the strategies will be shared with the Kaitiaki Forum.
7.9	Impacts on gentrification and housing affordability.	

1. **Appendix X – Mana Whenua Values Summary Report Template** (refer to separate attachment)

5. Project Description

This chapter expands on the overview provided in Section 1 of the AEE, providing more information on the project design and its individual NoRs. This relies on information contained in the Design and Constructability Report (Appendix X).

It covers:

- Project and NoR overview (Section 1)
- Underground infrastructure NoRs (Section 1.1)
- Shaft NoRs (Section 1.2)
- Surface Rail NoRs (Section 1.3)
- Station NoRs (Section 1.4)
- Depot NoR (Section 1.5)
- Indicative construction methodology (Section 2)
- Subsequent works (Section X)

1. Project and NoR Overview

Package 1 includes 18 new designations for the construction, operation and maintenance of the Auckland Light Rail corridor and its stations, infrastructure, and ancillary facilities. These NoRs cover the Project alignment, shafts, stations and a rail depot on land from Auckland City Centre to Te Ararata Station near Fatafehi Place.

Auckland Light Rail will be a fully segregated system operating with autonomous train control. The trains will be 'rolling stock' that run on standard gauge tracks on a 'track slab', powered by overhead catenary lines. This basic form will apply within the proposed tunnel (NoR 1), surface rail (NoR 11 and 16), stations (NoR 3-9, 12-14, and 17-18) and depot (NoR 15) designations.

The entire railway will be supported by signalling, communication and power systems to ensure safe and efficient operation. Specialist ICT infrastructure will be used in underground tunnel and station sections.

Auckland Light Rail's design will allow for 30 trains per hour per direction, with approximately 800 passengers per train. Modelling shows comment about passenger numbers.

To deliver the project there are six different types of designations proposed by this project, set out in Table X. NoRs 2 and 10 are both associated with the tunnel infrastructure. Figure X shows the location of each NoR.

Figure 1: General location of the stations, depot and light rail corridor (tunnelled rail and surface track).

Table 1: ALR Designation Type Overview

Type	Description
Underground infrastructure (NoR 1)	NoR 1 contains the tunnel and rail alignment and the adits connecting the tunnel to stations.
Underground protection layer (NoR 2)	NoR 2 is a protection layer which acts as a buffer between activities on the ground surface and the sub-stratum infrastructure that forms part of NoR 1
Shafts (NoR 10)	NoR 10 contains shafts connecting to the tunnel. The shafts at Vernon Street, Burton Street, and New North Road provide emergency egress. They also provide above ground infrastructure, including [look at sketchbook and add detail].
Surface track (NoR 11 & 16)	NoR 11 and 16 contain the surface track for ALR north (NoR 11) and south (NoR 16) of Manukau Harbour. This includes the viaducts at Wesley and Onehunga and trenched sections along the route.
Stations (NoR 3-9, 12-14, and 17-18)	The station NoRs contain the station and supporting infrastructure and facilities in the station precinct.
Depot (NoR 15)	NoR provides for a rail depot and the supporting infrastructure and facilities it requires.

1. Underground Infrastructure NoRs

NoR 1 and NoR 2 are both underground, with very different features:

- NoR 1 will incorporate a single bore twin track tunnel (also called a 'monotube tunnel') with turnbacks and passing loops to allow for train operation and service requirements, as well as associated infrastructure.

- NoR 2 provides additional statutory protection for the tunnel and associated infrastructure, but no physical works.

Both proposed designations (NoR 1 and 2) do not reach the surface. Figure X shows that NoR 1 is located underground, around the physical infrastructure required, while NoR 2 goes from the top of NoR 1 to a specified point under the surface.

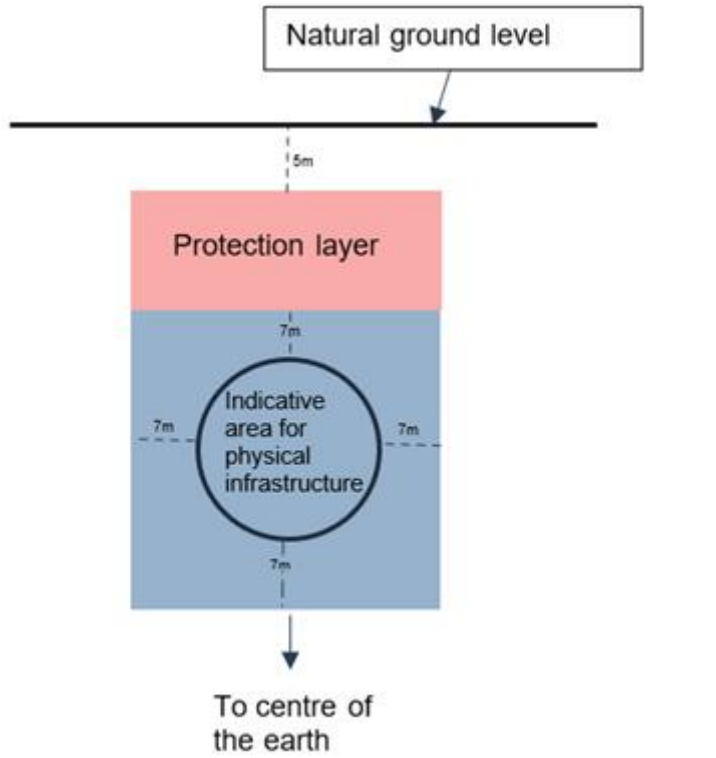

Figure 2: Tunnel cross-section diagram showing NoR 1 and 2

In contrast, station, shaft and depot designations extend from the centre of the earth to the sky. Figures X-X show diagrams that explain how the tunnel and protection layer designations interact with each other and stations/vent shafts. Figure X then applies this across the route, showing how topography affects this relationship.

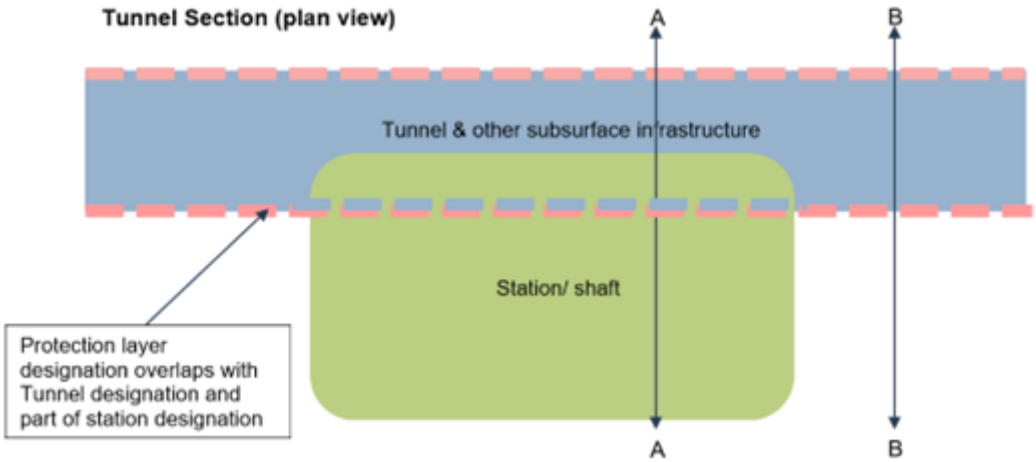

Figure 3: Plan view showing tunnel, protection and vent shafts and/or stations designations

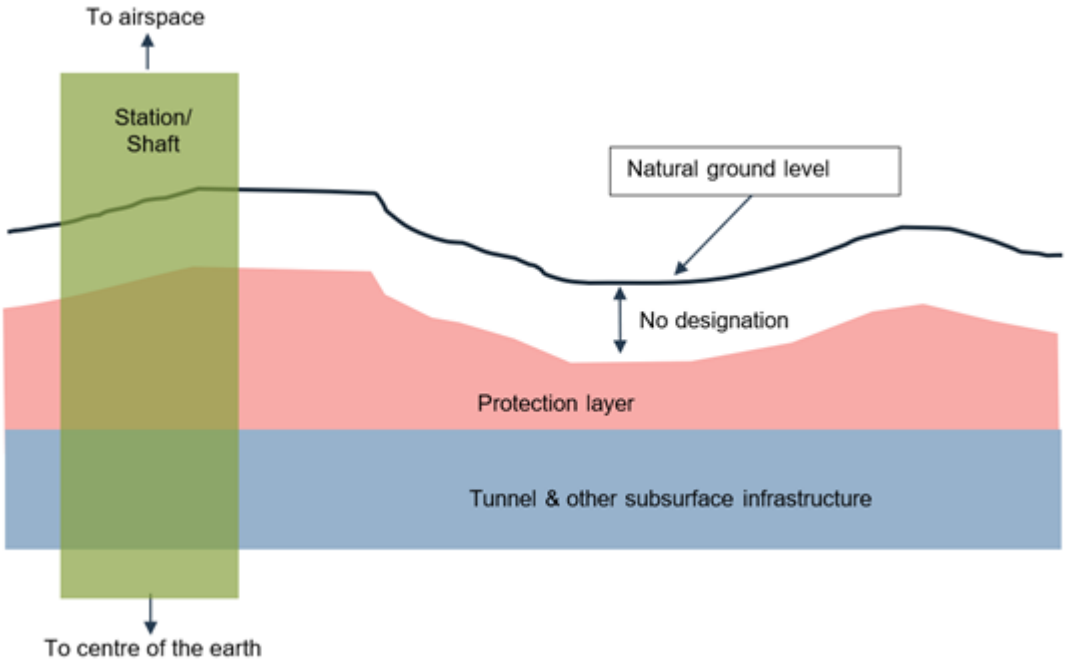

Figure 4: Long section view showing tunnel, protection and vent shafts and/or station designations

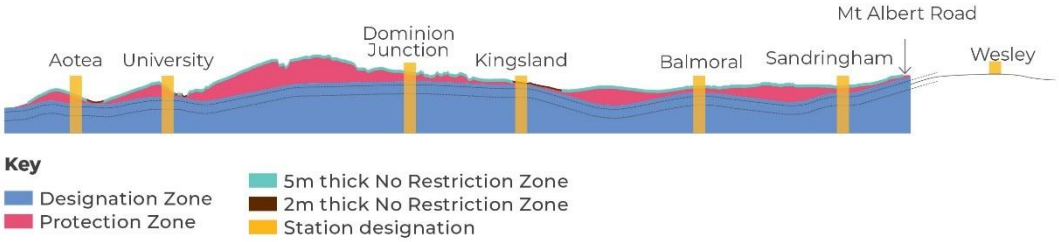

Figure 5: Diagram showing how NoRs 1-9 relate to each other.

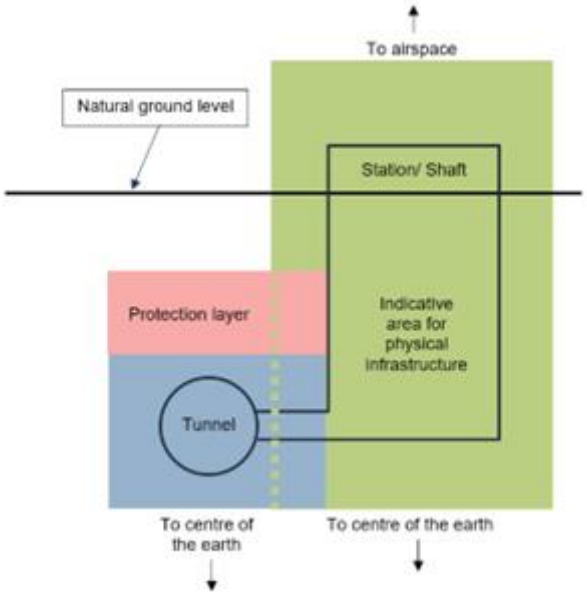

Figure 6: Cross section showing relationship between tunnel, protection layer,

The tunnel will be constructed using a tunnel boring machine (TBM) using precast concrete segments. The TBM will be launched at [Mt Albert Road Box] and Dominion Junction, and removed from Vernon Street.

The tunnel will also incorporate infrastructure to ensure sufficient services, ventilation and emergency access within the tunnel. This will include three auxiliary shafts, which are addressed in section X below.

Table X set out the purpose for NoRs 1 and 2. A 20 year lapse date is proposed for both, with supporting assessment provided in Section 12.X.

NoR number	Type	Purpose	NoR chapter
NoR 1	Tunnel	A substrata (TUNNEL) designation of land below the ground surface to provide for the construction, operation, maintenance and renewal of the Project including ancillary structures and activities. This designation sits underneath the substrata (PROTECTION) designation and extends from Victoria St W/Wellesley St W to the Wesley Portal.	Section 10.X
NoR 2	Protection	A substrata (PROTECTION) designation that acts as a buffer between activities on the ground surface and the substrata (TUNNEL) designation (NoR 1) that provides for Auckland Light Rail tunnel, ancillary activities and adits. This designation sits above NoR 1, starting from 5 metres below the ground surface and extending from Victoria St W/Wellesley St W to the Wesley Portal.	Section 10.X

2. Shaft NoRs

The tunnel route (delivered through NoR 1) requires three auxiliary shafts to allow for ventilation, emergency intervention and maintenance access. These will extend from the centre of the earth to the sky.
Table X set out the purpose for NoR 10. This NoR has a proposed 20 year lapse date, with supporting assessment provided in Section 12.X.

Table 2: Shafts NoR

NoR number	Type	Purpose	Further Information
NoR 10	Shafts	A designation for the construction, operation, and maintenance of the shafts and associated infrastructure at Vernon Street, Burton Street and New North Road.	Section 10.X

3. Surface Rail

NoR 11 and NoR 16 provide for surface rail sections running between the Wesley Portal in the north and Auckland Airport in the south. These sections largely (but not exclusively) run alongside SH20. All sections are fully segregated from general traffic. Overall:

- NoR 11 (see Figure X) runs from the Wesley Portal to the Manukau Harbour Crossing, providing space for 4 stations and one rail depot. It contains surface, trenched and viaduct sections.
- NoR 16 (see Figure X) runs from Manukau Harbour Crossing to Auckland Airport, providing space for 4 stations. It contains surface and trenched sections, as well as a new bridge to cross Te Ararata Creek.

Figure 7: Stylised image of NoR 11

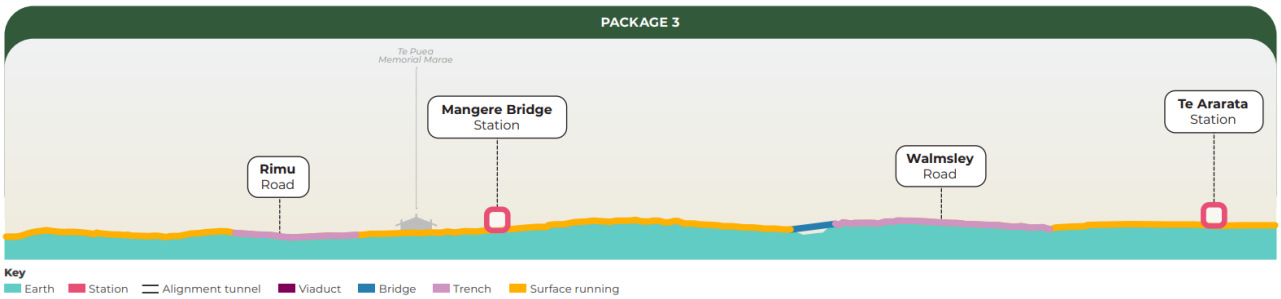

Figure 8: Stylised image of NoR 16

Viaducts will be provided for in Wesley and around Onehunga (from Onehunga Bay Reserve to the Manukau Harbour Crossing). The height of the viaduct varies along the alignment from X to X, with the piers typically located 30 to 35m apart. The new bridge at Te Ararata Creek has a XX span to avoid works in the CMA.

Surface rail and station NoRs go from the centre of the earth to the sky. There may be some overlap between the two, as shown by Figure X.

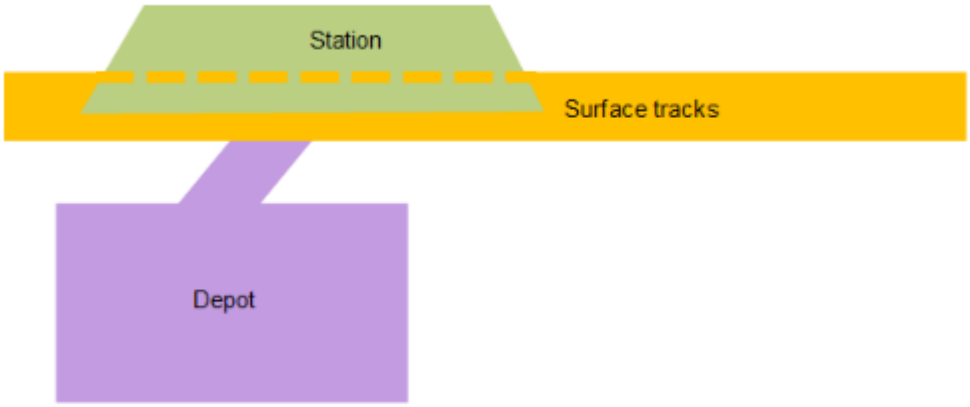

Figure 9: Surface rail, station and depot designation diagram - plan view

Table X set out the purpose for NoRs 11 and 16. A 20 year lapse date is proposed for both, with supporting assessment provided in Section 12.X.

Table 3: Surface rail NoRs

NoR number	Type	Purpose	Further Information
NoR 11	Surface rail	A designation for the construction, operation, and maintenance of rail (way lines) and associated infrastructure from Wesley Portal to the Manukau Harbour.	Section 10.X
NoR 16	Surface rail	A designation for the construction, operation, and maintenance of rail (way lines) and associated infrastructure from Manukau Harbour to Te Ararata Station.	Section 10.X

4. Stations

The Project includes 12 Station NoRs, which extend from the from the centre of the earth to the sky. Each NoR boundary has been defined to include sufficient space for the construction, operation and maintenance of each station and its associated infrastructure.

There are three types of stations – underground, at grade, and elevated. Stations (NoR 3-8) that connect to the tunnel are underground. All others stations are at grade (NoRs 12-14 and 17-18), aside from Wesley (NoR 9) and Onehunga (NoR 15) where there the stations have been elevated.

Underground stations have station buildings at ground level and below, with platforms and circulation shafts underground (between 25-40m) deep. Within these stations, the main station entry and circulation shafts will connect to up to two stacked platforms via adits. Underground elements will largely be constructed offline from the tunnel to minimise the need for (and effects associated with) large-scale open excavation. However, Dominion Junction will be constructed via cut and cover. Include reason for this difference.

At grade stations will have stations entrances and side/island platforms at ground level. Building to platform access varies between stations, with some connections direct, and others via an underpass or overpass.

Onehunga and Wesley are elevated stations with side platforms and a viaduct (widened to accommodate station platforms) running through the middle. Lifts and escalators will provide access to the platforms.

All indicative station footprint within these NoRs have been sized to reflect anticipated patronage level and provide enough room for a user-friendly experience, while allowing sufficient flexibility at the detailed design stage.

The Station NoRs also incorporate road and streetscape upgrades. As the details vary for each station, proposed changes are set out in the individual NoR chapters in Section 10.X-10.X.

Tables X set out the purpose for all station NoRs within Package 1. A 20 year lapse date is proposed for all, with supporting assessment provided in Section 12.X.

Table 4: Station NoRs

NoR number	Station Name	Purpose	Further Information
NoR 3	Te Waihorotiu Station	A designation for the construction, operation, and maintenance of a	Section 10.X

		public transport facility and associated infrastructure in the vicinity of Wellesley Street West, Federal Street and Mayoral Drive	
NoR 4	University Station	A designation for the construction, operation, and maintenance of a public transport facility and associated infrastructure in the vicinity of Symonds Street and Saint Paul Street	Section 10.X
NoR 5	Dominion Junction Station	A designation for the construction, operation, and maintenance of a public transport facility and associated infrastructure in the vicinity of New North Road and Dominion Road	Section 10.X
NoR 6	Kingsland Station	A designation for the construction, operation, and maintenance of a public transport facility and associated infrastructure in the vicinity of New North Road, Sandringham Road, and Bond Street	Section 10.X
NoR7	Balmoral/St Lukes Station	A designation for the construction, operation, and maintenance of a public transport facility and associated infrastructure in the vicinity of Balmoral Road, Lancing Road, and Sandringham Road	Section 10.X
NoR 8	Sandringham Station	A designation for the construction, operation, and maintenance of a public transport facility and associated infrastructure in the vicinity of Lambeth Road and Sandringham Road	Section 10.X
NoR 9	Wesley Station	A designation for the construction, operation, and maintenance of a public transport facility and associated infrastructure in the vicinity of Stoddard Road, Sandringham Road Extension, and Williams Blofield Avenue	Section 10.X
NoR 12	Puketapapa/ Mt Roskill Station	A designation for the construction, operation, and maintenance of a public transport facility and associated infrastructure in the vicinity of Denbigh Avenue and May Road	Section 10.X

NoR 13	Hayr Road Station	A designation for the construction, operation, and maintenance of a public transport facility and associated infrastructure in the vicinity of Carr Road, Hayr Road, Clinker Street and the Southwestern Motorway	Section 10.X
NoR 14	Onehunga Station	A designation for the construction, operation, and maintenance of a public transport facility and associated infrastructure in the vicinity of Princes Street, Onehunga Mall, Neilson Street and Selwyn Street.	Section 10.X
NoR 17	Mangere Bridge Station	A designation for the construction, operation, and maintenance of a public transport facility and associated infrastructure in the vicinity of Mahunga Drive, the southern motorway, Miro road, and Coronation road.	Section 10.X
NoR 18	Te Ararata Station	A designation for the construction, operation, and maintenance of a public transport facility and associated infrastructure in the vicinity of Elmdon Street, Hall Avenue, Fatafehi Place, and Donnell Avenue	Section 10.X

5. Depot

The rail depot at Onehunga will be the operational and administrative headquarters of the operating and maintenance entity, as well as providing a location for storing and maintaining rolling stock. This will include warehouses for maintenance and storage, office buildings, vehicle parking, a power intake substation, laydown areas for track maintenance and renewal, and likely a test track.

Tables X set out the purpose for all station NoRs within Package 1. A 20 year lapse date is proposed for all, with supporting assessment provided in Section 12.X.

Table 5: Depot NoR

NoR number	Type	Purpose	Further Information
NoR 15	Onehunga Depot	A designation for the construction, operation, and maintenance of a railway depot to support a passenger rail network including ancillary structures and activities.	Section 10.X

6. NoR Construction Requirements

The boundary of each NoR has been designed to allow sufficient space for construction and operation of the Project. A summary of the assessment of alternatives undertaken to confirm the preferred design and corresponding footprint for each NoR is contained in section X with a comprehensive Assessment of Alternatives attached as Appendix X.
Once construction is complete, the extent of the designations will be reviewed to identify areas of designated land that ALRL no longer requires for the on-going operation and maintenance of the Project or mitigation of operational effects associated with the Project. Condition X (refer to Appendix X) provides for this process.

2. Indicative Construction Methodology

This section sets out an indicative construction methodology for the Project, based on the level of design undertaken to date and the current land use and form along the ALR corridor. Some of this methodology could apply across the route, while other elements are relevant only to specific elements (e.g. the tunnel, vent shafts, surface rail section, stations, rail depot, etc.).
While the methodology set out in Sections X-X below may change[1], it provides a framework for understanding the actual and potential effects from the construction phases of the project set out in Section 10. It also helps understand the mitigation required for the Project's construction phases, which is covered holistically in Section 11, and individually within Section 10 where relevant.
I note that the indicative construction methodology will require the submission of Outline Plans and management plans to Auckland Council before construction can commence for the Project. The methodology also set out some activities that may trigger the need for NES and regional resource consents. These will be addressed as part of Package 2.

1. Site preparation and establishment

Site preparation works will be undertaken prior to the main construction works in each NoR.
First the site will be cleared to allow for construction. This will include building demolition and tree removal, unless specific buildings/trees have been identified for retention and protection within a specific NoR.
All sites will be screened/fenced, with erosion and sediment measures established. Access will be closed to surrounding properties, and construction support areas created. These will likely include:

- Buildings and amenities to support construction works (site offices, lunchrooms, etc)
- Vehicle parking and maintenance
- Storage of spoil, topsoil, waste, materials, etc (some within containers)

1. Utilities

Any utilities that are in direct conflict or close to ALR infrastructure will need to be relocated or diverted. Note consents will be sought if required for any relocation/diversion required later in the design process, but before construction begins, as outlined in Section X.

1. Earthworks

The Project's potential earthworks include topsoil stripping, cut and fill construction, contouring, and pavement construction. Small scale earthworks

will likely occur year around, with bulk scale earthworks (to be covered within a future application) occurring during Auckland's earthworks season.
Earthworks will be undertaken to achieve/construct the following:

- Elevated surface levels above the 1% Annual Exceedance Probability (AEP) flood level.
- Design surface cross falls (minimum of 1% and a maximum of 5%).
- Overall site grading.
- Main station access road bus interchange.
- Station carpark and bus interchange.
- Recontouring excavation in order to volumetrically offset potential flood effects from construction of new hard stand areas.
- Excavations associated with foundation works for station building structures and pedestrian overbridges.

2. Tunnel

The tunnel will be constructed using a tunnel boring machine (TBM). This machine will excavate the tunnel (anticipated at a rate of 9.5m/day), remove the tunnel spoil (which will likely be disposed offsite), and install precast reinforced concrete segments for the tunnels. The TBM will make two tunnelling drives. The first will start at Sandringham South and end at Dominion Junction, where the TBM will be removed. The second will start at Dominion Junction and end at the Vernon Street Shaft.
Adits (horizontal tunnels) will be constructed for station platforms, connecting the underground station shafts to the main ALR tunnel. Construction methods will vary, although most will be constructed via open face excavation. Once constructed, adits will have a reinforced concrete lining with a waterproofing membrane.

3. Shafts

Underground station shafts will be constructed to connect stations (NoR 3-8) with audits. These will have strong perimeter retaining walls, and a structural base slab at the bottom of the shaft. Once complete, the shafts will be fitted out with escalators, lifts, transformers, and other mechanical, electrical, fire systems and hydraulics equipment.
Three auxiliary shafts (NoR 10) will also be required for tunnel ventilation, emergency intervention and maintenance access. All three shafts will have a base slab and walls made from reinforced concrete. Some construction will be bottom up, while some elements will be evacuated from the surface.

4. Surface Rail, trenching & viaducts

Approximately half of the ALR alignment will run across the surface. The construction of these sections will follow the following process:

1. Earthworks – land will be cleared, then excavated/filled according to plans. This may include compacting soil or rock to create a level and stable track foundation.
2. Track slab – a track slab will be installed across the alignment. This will likely be manufactured offsite then transported to site, although it could be poured in-situ.
3. Rail alignment and levelling – Rails will be aligned and levelled once track components are in place. The point machine will be fixed in the slab next to the turnout, to make interfacing with subsequent signalling and turnout easier).

4. Signalling and communication – rail tracks will be equipped with signals, switches and other communication devices.

5. Electrification – overhead catenary masts with overhead wires will be installed to supply power to the trains.

Some of the 'surface rail' NoR will run through trenches to avoid existing SH20 roading infrastructure. These trenches will have depths between 5-13m and be constructed using cut and cover techniques., with secant pile walls installed before the ground between them is excavated. Basalt may be encountered during excavation, requiring blasting.

The surface rail sections will also include sections on viaducts at Wesley and through Onehunga. These will be founded on piled foundations, installed with a bored piling rig. The viaduct will largely be constructed in-situ out of concrete.

3. Subsequent works

This application does not include all statutory approvals required for the ALR Project.

ALR Ltd intends on lodging subsequent statutory applications to deal with the matters summarised in Table X below.

Table 6: Subsequent applications

Name	Overview	Anticipated date
ALR NOR Package 2	This application will cover: • The Project alignment from the southern end of Te Ararata Station to Auckland Airport • Māngere Town Centre Station • Airport Industrial/Landing Drive Station	Lodgement in 2023
Manukau Harbour Crossing, Te Tauranga (Onehunga Lagoon) and Te Ararata Creek Consents	This application will cover all consents required to construct, operate and maintain the ALR connection between NoR 11 and NOR 18 where the Project's interaction with the CMA requires coastal construction and occupation consents.	Lodgement in 2023
Regional/ NES consents	This application will cover all remaining regional consents under the AUP and all relevant NES consent matters required for construction of the Project.	Lodgement in 2023
Outline Plans	Given the likely staged construction of the Project, Outline Plans will be prepared prior to a Stage of Work.	Prior to construction
Archaeological authorities	Archaeological authorities will likely be required from Heritage New Zealand Pouhere Taonga under s44 of the Heritage New Zealand Pouhere Taonga Act 2014.	Prior to construction
Asset Owner Approval	Asset Owner Approval will be required for any trees in roads or open space proposed to affected (removed or altered) by the Project.	Prior to construction

7. Consideration of Alternatives

7.1 Statutory requirement to consider alternatives

Section 171(1)(b) of the Resource Management Act 1991 (RMA), requires that when making a recommendation on a NoR, a territorial authority shall consider whether adequate regard has been given to alternative sites, routes or methods of undertaking the work in circumstances where:

> *"(i) the requiring authority does not have an interest in the land sufficient for undertaking the work; or*
> *(ii) it is likely that the work will have a significant adverse effect on the environment."*

There are several principles and key considerations for a requiring authority to apply and adhere to when undertaking an assessment of alternatives and identifying a preferred option. Of note are the following:

a. The process should be adequately transparent and robust, and clearly recorded so it can be understood by others;
b. An appropriate range of alternatives should be considered; and
c. The extent of options considered, and the assessment of these options, should be proportional to the potential effects of the options being considered.

Auckland Light Rail Limited does not currently have an interest in all of the land required for the construction, operation, and maintenance of the Project. Accordingly, a full evaluation of alternative sites, routes, and methods has been undertaken. A summary of the assessment of alternatives is provided below. Appendix X of this report sets out the assessment in detail.

7.2 Summary of alternatives assessment process

This section summarises the methods used to identify and assess options for the Project. This was carried out through a combined business case (Detailed Business Case (DBC)) and resource management planning process. A summary of the process, involving the following five main phases, is shown in Figure 7.1 and described below:

(i) Phase 0: Indicative Business Case, Cabinet Paper and Ministerial Letter (Point of Entry and Approach to Business Case Phases 1-2b)
(ii) Phase 1: Corridor Options Development and Assessment
(iii) Phase 2a: Catchment Options Development and Assessment
(iv) Phase 2b: Total Project Components Development and Assessment
(v) Phase 3: Consenting Design

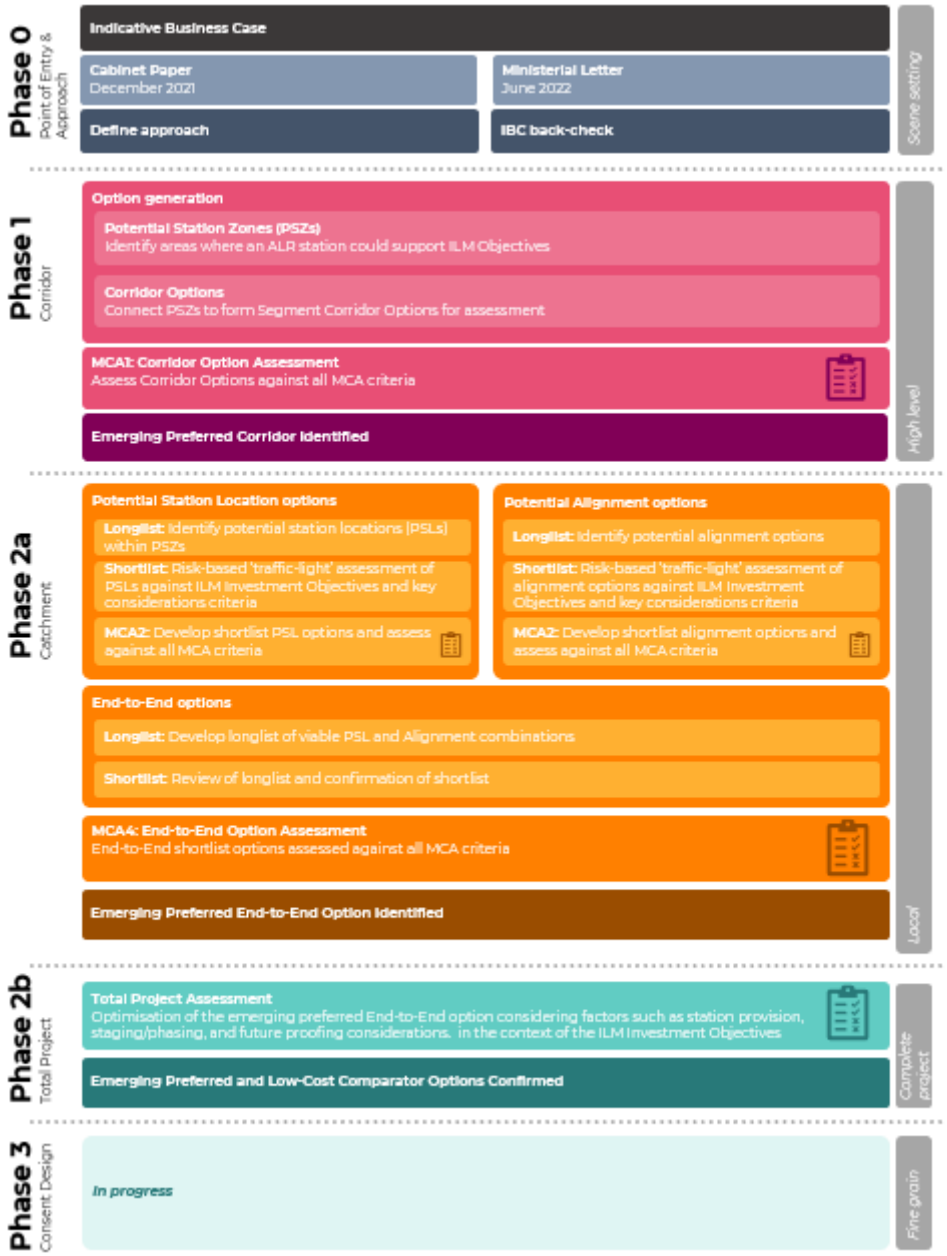

Figure 7.1 Alternatives assessment phases Diagram to be updated with consent design process

Phase 0

The ALR Indicative Business Case (IBC), submitted October 2021, investigated a rapid transit solution along the City Centre to Māngere (CC2M) corridor. The CC2M corridor is part of the Auckland Regional Transport Plan (ARTP) which aims to:

- relieve congestion in key north-south routes in the isthmus
- reduce travel times to and from south of Manukau Harbour
- provide fast and reliable public transport options.

The IBC developed the CC2M corridor to enable higher density and better-quality urban development, leading to stronger, more resilient communities, improved liveability and attractive, compact urban form. The ALR Urban Ambition articulated the scale of change likely from the different modes analysed, with a

light metro system expected to deliver fewer stations, concentrating urban regeneration in key areas along the corridor.
The IBC explored a wide range of options including modes of public transport such as light rail, light metro, heavy rail and bus rapid transit. Several route options were identified and assessed using multi-criteria analysis (MCA). This identified the Tunnelled Light Rail as offering the best balance of costs and benefits.
Endorsing the IBC in December 2021, Cabinet confirmed that further investigations should follow, with increased focus on the integration of transport and urban development to optimise outcomes, as well as further analysis of the benefits and costs of grade-separated options. The Ministerial Letter in 2022 confirmed that the Tunnelled Light Rail, as set out in the IBC, should be the broad 'point of entry' for the DBC but further exploration and refinement was requested.
Developed as part of the IBC, Te Rautaki Huanga Māori (Māori Outcomes Strategy) sets out the aspirations and considerations for Mana Whenua and Māori for CC2M and is future focused.

Phase 1 to 2a-2b

The Detailed Business Case (DBC) phase was undertaken as part of a Combined Business Case (CBC). The CBC represents a change in how large infrastructure projects are developed in Aotearoa, New Zealand. As well as ascertaining the costs and benefits of the transport infrastructure, it also seeks to understand and identify the potential for complimentary integrated urban investments that can accelerate and increase the realisable benefits achievable through investment in transport alone. The transport infrastructure component of the CBC will respond to DBC requirements, while the urban components will reflect at IBC thresholds.
The CBC - the first of its kind in Aotearoa – recognises that the benefits of transport infrastructure can only be fully realised when combined with urban interventions that amplify community adoption.
The options development and assessment approach for the DBC phase involved high-level analysis through to greater detail encompassing the following phases:

- Phase 1: Station zones and corridor selection

The purpose of Phase 1 of the DBC is to confirm the ALR corridor by identifying potential station zones (PSZs) within a 1.4km width running from Waitematā Harbour to the north and Auckland Airport to the south.
The Phase 1 option development process identified a series of Potential Station Zones (PSZs) within each of the geographic segments based on their ability to deliver urban regeneration and transport opportunities. The PSZ options within each geographic segment were then connected using various combinations to create Segment Corridor Options (SCOs) for assessment. The proposed SCOs were subjected to multi-criteria assessment (MCA) incorporating commentary and scoring, to support the identification of emerging preferred corridor option(s) for each geographic segment. Emerging preferred potential station zone options were then selected to generate a provisional view of the Preferred Corridor, which was taken through to the next phase of the DBC.

- Phase 2a-2c: Station location and route alignment

The purpose of Phase 2 of the DBC is to define the preferred locations of ALR stations along the corridor and the preferred alignment of the route connecting

the stations. This also includes further analysis of key route-wide considerations including:

- AWHC and airport integration
- Location of depot
- Staging

Each of the PSZs identified within the 'emerging preferred whole corridor' in Phase 1 was reviewed to explore the issues and opportunities that would influence the location of the station within in. After generating a longlist of PSLs within a given PSZ, a 'Traffic light' assessment was performed to identify a shortlist. Through MCA assessment, the pros and cons of the shortlisted PSL were identified. This process was conducted without being constrained by a particular alignment. A range of potential alignments through the surface section of the route were examined through an MCA assessment to identify their issues and opportunities without being constrained by particular station locations along the route. The alignments and station locations examined were then brought together and examined through an MCA assessment.

Phase 3

The DBC phase was followed by the Consenting Design phase, wherein key constraints were mapped, and the alignment was refined on the basis of this mapping. Where the effects of these constraints could not be avoided, stations were located and designed to manage those effects.

Where only one practicable option emerged from phases 0-2c and the detailed constraints mapping, the Project team undertook a qualitative consideration of alternatives with reference to the detailed constraints map. Where the detailed constraints map identified more than one potential station option within the proposed station location, a targeted MCA framework or technical assessment was then applied to this process, with a localised list of criteria used focusing on the key issues of relevance.

7.3 Consideration of alternative methods

As part of the consideration of alternatives, an evaluation of alternative methods was undertaken. This focused on methods that enabled route protection and future implementation of projects and were considered light of importance, delivery urgency / timing, complexity and risk profile. An assessment of a range of methods was undertaken, including:

a. AUP Overlay
b. Resource consents
c. Landowner/developer negotiation
d. Traditional property acquisition
e. Designation including alteration to existing designation

Of the identified methods, AUP overlay and resource consents were not considered appropriate methods for the Project from the outset because they would not offer the appropriate long-term protection of land required to implement the Project.

Designations (new) were identified as the preferred method in the context of the Project as these were considered to be most logical and effective method to protect a corridor in an evolving environment for the following reasons:

a. A designation provides certainty to all parties including the community and affected landowners.

b. It is a well-recognised and understood tool for route protection which also enables land acquisition process through the link to the Public Works Act 1981 (PWA).
c. Maximises flexibility for future implementation.
d. Negates the need for additional land use consents to implement works authorised under the district plan (s9(3) of the RMA).
e. Will continually provide for future operation and maintenance requirements.

7.4 Summary

The sites, routes, methods chosen will achieve the overarching purpose, which is to identify the… [to be completed]. It will also enable long term integrated planning and investment, route protect the required land and corridor, enabling phased deliver in line with land release and funding.

The preferred option for each NoR has been based on comprehensive and robust optioneering process considering specialist assessment and feedback. As such it is concluded that adequate consideration has been given to alternative sites, routes and methods for undertaking the work, satisfying the requirements of s171(1)(b) of the RMA.

9. Consultation and Engagement

This chapter provides an overview of consultation and engagement for the ALR Project, summarising the comments received and noting how they have influenced the design to date.

This chapter:

- Summarises engagement undertaken for the indicative business case (section 9.1)
- Outlines engagement for the NoR phase of the Project, covering from when NoRs began to be prepared in late 2022 to lodgement in 2023 (section 9.X), covering:
    - Programme and delivery partners (section X)
    - Key stakeholders (section 9.X.X)
    - Public engagement (section 9.X.X)
    - Affected landowners (section X)

Note Section 2 addresses engagement with Mana Whenua, our Treaty Partners.

9.1 Early engagement for the indicative business case

Engagement with the wider community and key stakeholders informed earlier stages of the ALR Project. The Summary of Public Engagement for the Indicative Business Case[1] sets out the engagement that occurred during mid 2021.

Varied methods were used to reach a wide range of people, with the later stages of engagement being digital or phone-based only given the high Covid-19 alert levels in Auckland. The methods used included print, radio, bus, billboard, and digital advertising, brochures, community events, stakeholder events, e-newsletters, creation of a ALR project website, and material translated into 10 different languages. Feedback was gathered from over 115 key stakeholder groups and advocates in addition to the wider public. Groups engaged with included: elected members and MPs; specific interest groups (transport advocacy, environmental advocacy); residents/business associations; community groups, facilities and trusts (including churches); Auckland Council advisory panels and groups; peak body groups; and large businesses and utility service providers. Much of this occurred through dedicated meetings.

Engagement[2] found 66% of all respondents supported the ALR project. Another 14% had mixed feedback (supportive with some concerns/mixed feedback), with 20% against. Brief comment on how statistics were collected and collated, and if they include key stakeholder or not.

Broad themes from all respondents are summarised in Table X. This feedback has been considered and integrated where possible into the project outcomes, objectives and design.

Table 1: Feedback themes from early engagement on indicative business case

Theme	Public Engagement Feedback	Key Stakeholder Feedback
Environment	The majority of people (51%) said reducing Auckland's carbon emissions was very important to them, with a few (3%) uncertain about the benefits light rail would have in this space.	Stakeholders identified opportunities such as creating a cleaner, greener city with increased travel choice, and enhancing green spaces alongside urban renewal.

Access and integration	The public spoke of their desire to see a connected network of public and active transport (30%) and not needing a car to get around (20%). Other comments noted light rail would help ease congestion (16%) and make it easier to travel across town (22%).	Stakeholders mentioned benefits such as increased connections and reliability but noted light rail should be well integrated with universal access.
Experience	The public spoke of the need for a fast (12%) and reliable (17%) service, as well as something accessible, safe and comfortable (16%).	Stakeholders saw light rail as a safe option for women but noted people outside walkable catchments would need safe access to light rail, and that diverse feedback would ensure better design.
Urban and community	Some respondents (37%) supported density and intensification along the route, with 5% stating light rail would attract them to live along the corridor considered, visual and aesthetic appeal highlighted, and the overall return on investment understood to ensure success.	Stakeholders talked about light rail catalysing growth, creating job opportunities, and showcasing local culture and places of cultural significance. However, they also noted that business disruption needed to be managed, civic/heritage places protected, gentrification

2. Engagement during NoR Project phase

This section summarises the engagement with the programme partners, key stakeholders, the wider public and affected landowners. Each section provides an overview of the engagement process, then discusses key themes from that engagement and how it has influenced the Project.

Engagement will continue after lodgement.

1. Programme and delivery partners

1. Mana whenua

Section 2 addresses engagement with Mana Whenua, while section 9.2.2.11 below addresses mataawaka engagement.

2. Auckland Council

ALRL regularly meets with Auckland Council's (**Council**) Plans & Places department and the Premium Consenting team to discuss and coordinate the Project statutory applications. This includes discussions around the consenting and NoR processing, lodgement and supporting technical assessments.

ALRL has also met with Healthy Waters, discussing enabling infrastructure, sustainability, and Healthy Waters' assets. Further meetings will be held after lodgement as the design becomes more detailed.

Council staff are also working within ALR to ensure the Project progresses smoothly and are leading the work for a plan change to the AUP with the wider ALR team. The variation will address the ALR corridor area which was excluded[3] from Council's recent proposed Plan Change 78. The anticipated changes to the AUP in the ALR corridor have been discussed at section 10.4 of this AEE.

Engagement with Council's elected representatives (councillors and local board members) is addressed in Section X below.

3. Auckland Transport

ALRL has undertaken frequent engagement with Auckland Transport regarding the development of the Project. This is important due to Auckland Transport being assigned dual roles, as both the proxy future operator and the proxy owner of future ALRL assets. Auckland Transport staff are also embedded within the ALR organisation to ensure integrated project development between the organisations.

Key topics discussed during meetings include:

- Dominion Road/New North Road flyover removal
- Impacts on existing Auckland Transport assets
- Network integration (including the planned wider rapid transit network, active modes, train, and bus connections)
- Delivery of wider active mode connections
- Design standards and requirements
- NoR conditions

Auckland Transport has provided a letter of support for the Project (refer Appendix X).

4. Auckland International Airport Limited

ALR has had ongoing meetings with AIAL, who will be delivering the part of the ALR route within the airport designation. This is discussed in section 1.X of this AEE.

AIAL has provided a letter of support for the Project (refer Appendix X).

2. Key stakeholder engagement

ALR has identified and met with a wide range of stakeholders. Much of this engagement is ongoing and will continue after lodgement of Package 1 and Package 2. This section also includes consultation that occurred in early 2023 as part of wider public engagement for the Project.

1. Elected representatives

There are ongoing discussions with elected representatives, with ALRL attending quarterly meetings for the six local boards within the ALR corridor and the Auckland Council Transport and Infrastructure Committee to discuss the Project where necessary. Regular outreach also occurs with corridor-based Councillors and electorate Members of Parliament.

Extensive engagement was carried out with these elected representatives during March-April 2023, providing the opportunity for knowledge sharing, advocacy, and representing community aspirations and needs. Written feedback was provided by 6 local boards[4], and discussions held during local board meetings.

Key matters raised at this time included:

- Overall support for the Project was consistent due to the considerable transport, economic and development benefits light rail can enable.
- Recommendations to consider the scale of change presented by light rail, and whether communities across the corridor understand its full extent.
- The need for flooding resilience

- Support for better use of land around Dominion Junction, and that ALRL encourages mixed use residential, commercial and public amenity around stations to support the creation of station hubs.
- Specific matters relating to the Project route through Onehunga (regarding using the existing KiwiRail land and combining light and heavy rail, plus consideration of a tunnelled solution) and the location of Māngere Town Centre (preferred closer to the town centre).

These comments have been addressed in varied ways by the Project. ALRL are currently working on a comprehensive engagement programme to raise awareness of the full extent of Project in communities, including visual representations. The need for flooding resilience has been considered in detail with the Flooding Assessment (Appendix X) that set standards (confirmed by condition 11 in Appendix X) that ensure flooding effects will be suitably managed. In Onehunga, the Project avoids use of KiwiRail land contained within AUP designation 6303, although a tunnelled option was not practicable.

ALRL has also removed the NoR for Māngere Town Centre from Package 1 to allow more time to continue engagement and work through the design.

2. Huihuinga Excellent Forum

Three Technical Excellence Huihuinga (forums) have been set up to provide advice to ALRL on an ongoing basis. They are intended to provide ongoing technical guidance through supporting, reviewing, and interrogating Project proposals (such as specific topics, issues and packages of work).
Table 2 shows the three Huihuinga and their members, although additional participants have been invited on an ad hoc basis. Huihuinga feedback has shaped the Project and thus the NoRs within this application. Approximately [number] Huihuinga have been held so far and more will continue after lodgement.

Table 2 - Huihuinga membership

Huihuinga Name	Membership
Business Case Huihuinga	Treasury; Ministry of Transport; Auckland Council; Let's Get Wellington Moving; Te Waihanga; Waitemata Harbour Connections; Waka Kotahi
Urban Huihuinga	Auckland Council; Watercare; Kāinga Ora; Eke Panuku; Ministry of Transport; Ministry for Housing and Urban Development; Treasury; Te Whatu Ora; Waitematā Harbour Connections; Ministry for the Environment; Ministry of Education; Let's get Wellington Moving
Design Huihuinga	Auckland Transport; Waka Kotahi; KiwiRail; Let's get Wellington Moving; City Rail Link Ltd; Auckland Council; Ministry of Transport; Waitematā Harbour Connections

3. Department of Conservation

ALRL has met with the Department of Conservation (DoC) to walk through the Project extent. The main area of interest from DoC is associated with works in the Manukau Harbour and stream environments which is covered in Package 2 (containing the coastal resource consents) and future regional consents. These

conversations will continue after lodgement of the NoRs, particularly as work proceeds on the coastal and stream components of the Project.

4. Kāinga Ora

ALRL meets with Kāinga Ora on a regular, ongoing basis to discuss the Project and its design. Key topics of discussion include:

- Design development of and around stations (particularly Wesley)
- Specified development plans in key areas along the route
- Walking and cycling connections to support better urban outcomes (for example near Te Ararata station)
- NoR conditions

These meetings will continue after lodgement to ensure continued integration.

5. Waka Kotahi

ALRL and Waka Kotahi meet on a regular and ongoing basis via a monthly interface meeting as well as holding regular design catchups. This ensures effective design coordination in locations where Waka Kotahi land and the Project will connect or interact, including for the Additional Waitematā Harbour Crossing, around Universities station (NoR 4) and the SH16 motorway in the city centre, and at various points near SH20. Meetings have also included KiwiRail when appropriate, given the location of KiwiRail assets.
ALR will seek s177(1)(a) approval from Waka Kotahi before construction, once detailed design is complete, because parts of the Project intersect with Waka Kotahi's existing designations.
Waka Kotahi have provided a letter of support for the application in Appendix X.

6. KiwiRail

ALRL and KiwiRail meet on an ongoing regular basis to discuss development of the design for the surface rail section of alignment between Wesley and Onehunga stations. It has been agreed that the Project will run on the northeastern side of the future proposed KiwiRail Avondale to Southdown line (which is the subject of a designation by KiwiRail), between Sandringham Road Extension and Hillsborough Road. Ongoing design collaboration will continue after lodgement.
KiwiRail have provided a letter of support for the application in Appendix X.
ALRL will also seek s177(1)(a) approval from KiwiRail before construction if required once detailed design is complete because parts of the Project intersect with KiwiRail's existing designations.

7. Transpower

ALRL has regular and ongoing engagement with Transpower on the Project. This was led by Waka Kotahi before work began, with regular meetings now being held between Transpower and ALRL.
Key issues discussed include:

- Impact on assets (particularly towers in Onehunga)
- Requirements for access to and across Transpower's electricity transmission corridor when ALR operational

These discussions will continue post lodgement.

8. Heritage New Zealand Pouhere Taonga

ALRL has met with Heritage New Zealand Pouhere Taonga (HNZPT) to discuss ALRL's proposed conditions addressing heritage effects and an approach to obtaining Archaeological Authorities under the Heritage New Zealand Pouhere Taonga Act 2014 (later in the process, once detailed design is confirmed). Further meetings will be held when they are required after lodgement.

9. Eke Panuku Development Auckland

ALRL and Eke Panuku meet on a regular basis to discuss wider development opportunities associated with the Project, such as developments around the proposed stations. There has also been coordination linked to Eke Panuku's existing project areas, such as Onehunga.

10. Watercare

ALRL and Watercare have met on several occasions, and Watercare has attended previous Urban Huihuinga.

Key issues discussed include:

- Impacts on proposed and current assets (including a Queen Street sewer and the Central Interceptor)
- Enabling infrastructure.

11. Mataawaka Engagement

Mataawaka marae support and advocate for Māori who live in Tāmaki Makaurau but have iwi affiliations outside of Auckland, unlike Mana Whenua who have a direct connection to Tāmaki Makaurau.

The ALR Tiriti Partnerships team has held hui with Mangere-based Mataawaka marae to provide an update on the ALR project and keep marae informed about progress. They include Te Puea Marae, Mataatua Marae and Ngā Whare Waatea Marae (Manukau Urban Māori Authority).

The themes from the conversations included:

- Impact of the project on Marae as they have future plans underway
- The views of Mana Whenua as it relates to Te Taiao and whenua
- Support the need for reliable public transport to address congestion
- Consultation and Communications for marae and community, including Pasifika, important so the community understands the project;
- Opportunities the project could deliver for marae

ALRL has contacted other marae, kura, wananga and health providers to provide an update about the project. A grassroots focussed campaign is also being finalised to support awareness of the project and will incorporate a range of tactics across a range of channels, including digital advertising and social media. This campaign is due to go live in August 2023.

12. Neighbourhood Liaison Groups

ALRL established five Neighbourhood Liaison Groups, covering the City Centre, Eden Valley/Central Isthmus, Mt Roskill, Onehunga and Māngere and their surrounding areas. These groups are made up of community representatives who were engaged previously during key stakeholder engagement for the 2021 Indicative Business Case phase of the project.

Engagement with Neighbourhood Liaison Groups is ongoing via facilitated engagement sessions at which information regarding the Project is shared and discussed. This included five workshops over March-April 2023, with Table X

summarising the feedback received from the Neighbourhood Liaison Groups and ALRL's responses.

Table 3: Neighbourhood Liaison Group feedback and ALRL responses

Neighbour-hood Liaison Group	Key themes	Response
City Centre	Feedback covered the importance of accessibility and passenger safety, along with potential impacts from any surface routes, flooding, and queries about mode shift.	Technical reports reflect and address these themes. For example, the Integrated Transport Assessment modelling shows likely increases in public transport trips (to 34,000-43,000), and the proposed conditions will ensure flooding is managed.
Eden Valley	Feedback covered the importance of public transport and the value of connecting with key destinations (Auckland Airport, Māngere Town Centre, St Lukes Mall, the universities), and the need for safety, accessibility and cycling provision. There was also some support for higher density living.	The route has been designed to connect with key destinations. The Urban and Landscape Design Guidelines that are required by the condition set (condition 9) will address safety and accessibility. Many NoRs include provision for cycling through streetscape improvements and/or cycle parking.
Mt Roskill	Feedback covered the importance of integrating public and active transport, considering flooding impacts, and ensuring universal access. Route along SH20 supported, with further information on construction impacts desired.	The Urban and Landscape Design Guidelines will ensure works will be high quality, and the project inherently integrates public and active transport through proposed walking and cycling upgrades for some NoRs. The proposed conditions set includes standards to manage flooding. The design and constructability report has an indicative construction methodology.
Onehunga	Feedback discussed the impacts of the KiwiRail route, the consenting and construction process and staging and flooding concerns. There were requests for undergrounding this section and providing increased detail on environmental outcomes.	The Project alignment now follows SH20 rather than KiwiRail designation 6303, and conditions ensure flooding will be suitably addressed. Staging and construction is covered in the Design and Constructability Report offered in Appendix X. Undergrounding this section was not practicable, so this option was not progressed for the

		reasons outlined in Section 7 of this AEE.
Māngere	Feedback covered connections and accessibility to Mangere Town Centre, construction impacts on rail and businesses, the need for transport integration (parking, walking & cycling), local demographics, and a desire for more detailed information.	This station has been removed from Package 1 to allow more time to engage further and address community feedback.

13. Vector Limited

There is regular and ongoing engagement with Vector on the Project to ensure utilities are well managed. This was led by Waka Kotahi in the Indictive Business Case stages of the Project, with regular meetings now being held between Vector and ALR Ltd.

Key issues discussed include:

- Impact on Vector assets (e.g. CBD tunnel and utilities for stations)
- Access to and across ALR corridor once operational
- Planning for areas of future growth
- Technical data and requirements

14. Chorus

ALRL and Chorus meet when required to discuss the Project, with discussions to date focusing on their assets in Onehunga. These discussions have followed initial engagement between Waka Kotahi and Chorus in the early stages of the Project.

ALRL will seek s177(1)(a) approval from Chorus before construction if required once detailed design is complete because parts of the Project may intersect with Chorus' existing designations.

15. Educational Facilities

ALRL engaged with teachers and students from a range of educational facilities. In person presentations and workshops were held in 'communities of learnings' forums at AUT, Selwyn College, Onehunga Kahui Ako School Enviro Group, the University of Auckland, Onehunga High School and Royal Oak Intermediate School.

Key feedback included:

- The need to prioritise station safety and security
- Concerns around the KiwiRail land route for potential impacts on Onehunga Primary School and biodiversity
- Suggestions to include safe and secure bike storage at all stations
- The need to support activating space under viaducts, similar to Melbourne.

The Landscape and Visual assessment (Appendix X) has assessed the Project using relevant professional standards, including the Ministry of Justice's National Guidelines for Crime Prevention through Environmental Design (CPTED). This assessment also covered the need for activation and design features for elevated structures (the viaducts) along the route. The Landscape and Visual assessment has informed the design guidelines referred to in ALRL's proposed condition 9 (Urban and Landscape Design Guidelines).

It is no longer proposed to use land adjacent to Onehunga School within KiwiRail designation 6303 for the Project.

16. Other key stakeholders

Separate meetings were held with other stakeholders interested in the Project during March and April 2023. Some meetings were one-offs, while others were separate sessions that followed a wider meeting as part of a Neighbourhood Liaison Group.

Table 4: Examples of engagement and feedback received from other key stakeholders

Stakeholder	Feedback	Response
Uptown Business Association	At an online meeting, confirmed support in principle for the development opportunity at Dominion Junction, and the need to maximise urban outcomes	This has informed the development of Dominion Junction. UEF comment
Property Council New Zealand	During working group forums, provided feedback on intensification and the need for greater density to make development commercially viable	This feedback will inform work on a variation to PC 78 for the ALR route.
Environmental Groups	Very focused on Onehunga station, acknowledging the need for new public transport. They provided feedback on the need for flood resilience, the use of designated KiwiRail land, and connections to the Port and waterfront area.	The Project design does not use designated KiwiRail land within designation 6303. Conditions ensure flooding will be addressed. UEF may comment on connections to Onehunga waterfront/ Eke Panuku aspirations??
Mangere Bridge Residents and Ratepayers Association	Focused on customer safety, including the need for CPTED principles in the design process	The Landscape and Visual Assessment has been informed by CPTED principles and provided design principles for Project locations.
Eden Park representatives	Feedback was generally supportive and covered the tangible urban and economic benefits associated with light rail, and the need for intuitive connections to public transport.	Will the UEF mention wayfinding?

3. Public Engagement

ALR Ltd dedicated approximately a month[5] to public engagement during the NoR phase. Engagement occurred face to face with people at venues along the corridor and in the community wherever possible, although some engagement occurred online to ensure it was accessible and convenient for all.

The team used varied methods to reach people and receive feedback, to help make the process more accessible. This included holding community events and meetings; using digital, radio and billboard advertising; and distributing

digital/hard-copy information (which was translated from English into 5 other languages) through flyers, a public engagement brochure/survey, and an interactive digital engagement tool. The result was feedback from all ages and backgrounds, with approximately 77% of people from a corridor community. The team sought feedback on three key issues[6]. This was collected through meetings and from 1497 completed feedback forms. Table X summarises this feedback and ALR's response to it.

Engagement also asked about people's views and potential use of light rail. Responses indicated approximately three quarters of all respondents (74%) supported light rail. Other people either had concerns (19.5%) or provided an unclear or no response (7%). This shows a high level of public support. 75% of respondents also said they or their family/ household members would use light rail.

TABLE GOES HERE IF POSSIBLE FORMATTING WISE

10. Project-wide Assessment of Effects

Section 171 sets out the matters that must be considered by a territorial authority when making a recommendation on a NoR for a new designation. This section also applies to the Environment Court when considering a NoR under s198E(6)(a). Matters to be considered include an assessment of the effects on the environment.

1. Effects Assessment Structure

The following effects assessment has been divided into 18 separate sections (one for each NoR) to ensure the positive and potential adverse effects associated with each NoR can be easily identified and assessed. Table X shows how each NoR chapter is structured and how these sections build upon other elements of the AEE.

Table 1: Individual NOR Assessment Sections and how they link to other sections of the AEE

NoR Section	Relationship to other AEE Sections
NoR Description	This section builds on the Project Description (Section 5) and the Design and Construction Report (Appendix X).
Description of the environment	This section builds on the approach to Assessing the Existing Cultural and the Likely Receiving Environment (summarised below in 10.3 and 10.4 below) and the Technical Reports (Appendix X-X)
Assessment of effects on the environment	These sections build on the Approach to Assessing Effects (section 10.5), the Project-wide Positive Effects (section 10.6), and all identified route-wide effects (sections 10.7-10.X), the proposed mitigation and conditions (Section 11 and Appendix X), and all technical reports (Appendix X-X)
Conclusion	This is a standalone conclusion for every NoR.

The rest of this chapter covers the approach to determining the receiving environment and assessing effects in the subsequent NoR sections, including introducing the technical reports used to support these assessments. It then covers positive and potential adverse effects common to the Project as a whole and identifies the proposed mitigation of these adverse effects.

A full discussion of the proposed Project mitigation is contained in Section 11.

2. Approach to Assessing the Existing Cultural Environment

Assessing potential cultural effects requires an understanding of what known cultural features exist in any given environment. This is why each description of the environment in Sections XX to XX includes information on known features associated with Mana Whenua's relationship with their culture and traditions, ancestral lands, water, sites, waahi tapu and other taonga.

Information on these features was sourced from Auckland Council Geomaps. Note Sections XX to XX do not include any culturally sensitive features, such as unmapped sites of significance identified via engagement. However, Package 2 of the Project will include a Cultural Values Assessment and information on the process taken for managing culturally sensitive features.

3. Approach to Assessing the Likely Receiving Environment

Assessing effects on the environment requires an understanding of the existing environment where those effects will occur. The existing environment includes activities currently being undertaken, AUP permitted activities, and any

activities allowed by a resource consent and likely to be implemented. Case law has also confirmed that a relevant fact can be plan changes to rezone land. This section summarises the relevance of the National Policy Statement on Urban Development (NPS-UD) to the Project. The NPS-UD requires the AUP to enable building heights of at least 6 storeys within a walkable catchment of existing and planned rapid transit stops (i.e. 800m of ALR stations). As the Project will unlock urban development potential and be a catalyst for intensification, it is reasonable to consider this level of urban development as part of the real-world future environment in which the Project will operate. Auckland Council's Proposed Plan Change 78: Intensification (PC78) responds to the NPS-UD. At the time of lodgement, PC78 hearings are ongoing[1], meaning provisions may still change. However, PC78 also excludes much of the Project route (excluding within the city centre) on the basis that the station locations are not yet confirmed. As described in Section 1.X, a variation to PC78 will address the intensification requirements around the Project stations in accordance with the provisions of the NPS-UD.

On this basis, this AEE makes the following assumptions for increased densities around Project stations:

- Walkable catchments are based on a 10 minute walk (around 800m) around existing and planned rapid transit spots
- Residential zones within walkable catchments will be rezoned to Terrace Housing and Apartments[2] (THAB) unless qualifying matters such as a special character area overlay apply, in which case residential zones will remain low density.
- Business zones within walkable catchments will not be rezoned, although their provisions will change to allow for heights of at 6 storeys (if they don't already)
- Open space zones will be retained
- Within the AUP ALR corridor, but outside that walkable catchment, it is assumed that heights of up to three storeys will generally be enabled, as required by section 77G of the RMA

<u>Receiving environment for construction and operational effects</u>

ALRL anticipates that construction of the Project will begin in 2025 and last for 6-8 years. The likely receiving environment for construction will be similar to today, with higher densities anticipated around walkable catchments of stations during the later stages of construction.

Once the Project becomes operational, the receiving environment around stations will include higher densities within walkable catchments.

4. Approach to Assessing Effects

Section 10.6 of this AEE assesses the Project's positive effects, while Section 10.7-10.X assesses the Project's potential adverse effects that are common across many or all NoRs.

Sections 10.1 to 10.19 of this AEE assess the potential positive and adverse effects relevant to each of the Projects NoRs in the context of the existing and likely real-world environment in which they are located.

As described in Section 5.X, resource consents required under National Environmental Standards or the regional rules of the AUP are not addressed in this application. As such, this assessment of effects is limited to the following effects considered relevant when assessing the Project NoRs:

- Traffic and transport
- Urban design, landscape and visual
- Social
- Cultural
- Built heritage
- Archaeology
- Arboriculture
- Open space
- Flooding
- Construction noise and vibration
- Operational noise and vibration
- Blasting overpressure and vibration
- Settlements and structures
- Geological heritage

Table X provides a summary of the technical reports supporting these assessments.

Table 2:

Effect Name	Report	AEE Reference
Traffic and transport	Integrated Transport Assessment by Flow	Appendix X
Urban design, landscape and visual	Landscape and Visual Assessment by Isthmus and Boffa Miskell	Appendix X
Social	Social Impact Report by Just Add Lime	Appendix X
Cultural	Cultural Values Report by XX	Appendix X
Built heritage	Built Heritage Assessment by Salmond Reed	Appendix X
Archaeology	Archaeology Assessment by CFG Heritage	Appendix X
Arboriculture	Arboriculture Assessment by CWCA Ltd	Appendix X
Open space	Open Space and Recreation Assessment by Xyst	Appendix X
Flooding	Stormwater Flooding Assessment by Arup	Appendix X
Construction noise and vibration	Construction Noise and Vibration Assessment by Marshal Day Acoustics	Appendix X
Operational noise and vibration	Operational Noise and Vibration Assessment by X	Appendix X
Blasting overpressure and vibration	Blasting Management Assessment by Heilig & Partners Pty. Ltd	Appendix X
Settlement and structures	Structures and Settlement Assessment by Aurecon	Appendix X
Geological heritage	Geological Heritage Report by Ian Smith	Appendix X

1. Project-Wide Positive Effects

The Project will create significant transport benefits for Auckland by:

- Creating a better public transport system by improving travel choice across the city. This is through the construction of a 24km connection between the city centre, central suburbs, and Landing Drive Station, and because stations along the route will link to current and future public transport (heavy rail, buses).
- Enabling the increased use of public transport, reducing congestion and encouraging mode shift. Across Auckland, public transport trips will increase by 34,000-43,000 and car trips will reduce by 60,000-73,000 per day, while public transport mode share will increase along corridor communities[3]. Integrated Transport Assessment (ITA) modelling also shows reduced total traffic flows across Auckland as well as fewer buses entering the CBD.
- Significantly improving connectivity and access to key destinations, jobs and educational opportunities across Auckland[4].
- Ensuring a more reliable public transport system, through designing a light rail system that operates on a separate corridor that won't be affected by congestion.

The Project will also have significant urban development benefits and increase sustainability by:

- Reducing greenhouse gas emission from transport, which currently represent over 40%[5] of Auckland's total emissions. ITA modelling shows modest reductions via vehicle kilometres travelled and therefore greenhouse gas emissions (noting that the anticipated electrification of the vehicle fleet will also result in CO[6] and CO_2 reductions). There will also be improvements and support for active modes via streetscape upgrades and provision for bike parking within station precincts.
- Supporting compact urban development through improving existing areas of the city, which are anticipated to contain 22% of Auckland's population growth and 37% of job growth over the next 30 years[7].
- Unlocking new urban development around stations (via direction in the NPSUD for planned rapid transit stations). Modelling shows this could enable 66,000 new homes to be built within walkable catchments by 2051[8].

2. Traffic and Transport Effects

The Integrated Transport Assessment (ITA), included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operational phases of the Project. Sections 10.2.-10.19 discuss traffic and transport effects specific to each NoR. The following sections 10.7.X-10.7.X discuss these potential effects on a Project-wide level.

10.4.2.1.Positive Effects

Most positive transport effects have been listed in Section 10.5 above, as they are significant positive effects for the project. However, there are also common positive effects that occur within most NoRs across the route (excluding NoRs 1-2), such as:

- Improved active transport facilities in and/or near station precincts. For example, by providing cycle parking in station NoRs and improving streets and roads for these modes (via removing slip lanes, streetscape upgrades, new pedestrian crossings, etc.).
- Improved public transport facilities in many station precincts. For example, by relocating bus stops to more suitable locations, enhancing bus stops, or providing bus/rail interchange locations.

1. Construction effects

The ITA construction assessment considered locations of construction sites, spoil removal locations and quantities, truck movements (including effects on key intersections and likely truck routing), and traffic management measures that could result in a temporary reduction in capacity for any transport mode. The Design and Construction Report (Appendix X) provided information on an indicative construction methodology, which is summarised in Section 5.X of the AEE.

Specific transport-related construction effects vary across each NoR. However, there are some common adverse effects that occur across the Project (excluding NoR 1-2), such as:

- **Public transport (buses):** The Project will result in delays to at least one bus route within most (but not all) NoRs, although some bus routes will be unaffected. The cause of these delays range from specific construction works with a NoR, to the temporary removal of bus priority lanes or a general increase in construction traffic on the road network. Where delays are significant or roads have been closed, detours or diversions to bus services may be necessary.
- **Public transport (rail):** Four NoRs (3, 5, 6 and 14) are located close to existing heavy rail stations. Construction works at two of these (5 and 6) may require some temporary overnight closures on the Western Line. There will be no other impacts on train services.
- **Walking**: The Project will result in the temporary closure of roads and footpaths near many, but not all, NoRs. Footpaths may also be temporarily realigned in some locations. This will primarily be managed by diverting and redirecting pedestrians, although some locations will use alternative means (such as creating temporary new pedestrian paths, crossings, or access points, or only closing roads at night).
- **Cycling**: The Project will likely have adverse effects on cyclists, who will be required to navigate and negotiate road sections that may be narrowed and/or congested due to construction. Some NoRs will also have specific effects on existing cycle facilities.
- **Private vehicles:** The Project will cause varied impacts across the route. Most locations will see an increase in heavy vehicle and construction traffic, which may translate delays near NoR construction sites or on nearby streets/intersections. Effects will be more noticeable in locations using traffic management measures such as reduced lanes and contraflow sections. There will also be temporary closures in at least seven NoRs (7, 8, 11, 12, 13, 16, 17), with diversions, nightworks and project staging proposed to help mitigate adverse impacts.

- **Parking and loading:** The ITA did not identify specific parking and loading effects for most NoRs. However, a temporary loss of carparking is likely in NoRs 6, 10 and 18, with individual NoR chapters providing details.
- **Emergency services:** Construction works for the Project may delay emergency services in and around NoR sites. These delays could result from being unable to bypass queued traffic (particularly near intersections), or from specific traffic management measures (such as contraflow lanes) near individual NoRs.
- **Freight:** The Project's impacts on overdimension and overweight routes vary. No effects were identified for number NoR (3, 5, 6, 7, 10, 16, 17, 18), although there will be impacts in some others (4, 8, 11, 12, 13, 14, 15,). The reason for these impacts varies – covering pedestrian/bus stop improvements, construction site access/traffic and temporary road/footpath closures. It is also noted that construction works will introduce additional truck movements and that freight generally may experience similar effects to those outlined in the 'private vehicle' bullet point above**.**

2. Operational effects

The operational effects assessment relies on transport modelling. This modelling compared a Project Scenario against a Do Minimum Scenario (where ALR is not built), using three key inputs and various sensitivity tests, which are summarised below:

- **Land use**: Each scenario uses slightly different models given a Project Scenario is likely to result land use changes that affect which locations will be used for growth. Both scenarios use assumptions from LUTI Consulting and the MSM transport model produced by the Auckland Forecasting Centre[9].
- **Transport network:** Both scenarios incorporate a list of projects – some committed and funded projects, others not yet fully committed. Including uncommitted projects such as Waitematā Harbour Connections was considered necessary to ensure the transport model was not out of balance with the significant land use change envisioned by the Project.
- **Transport policy:** Scenarios include versions covering both active and no congesting pricing, given uncertainty around its future use in Auckland.
- **Sensitivity tests:** These consider the potential of three light rail projects (ALR plus Waitematā Harbour Connections and North West Rapid Transit) plus potential variation in travel demand forecasts out to 2065.

The Project Scenario also incorporates assumptions around travel patterns to help determine total trip totals and vehicle kilometres in Auckland; the number of jobs, households and educational opportunities within 45 minutes of specific destinations; corridor effects on mode share, travel time, and passenger numbers; traffic flow changes; and emissions.

Most transport-related operational effects will be positive. They have either a Project-wide impact (addressed in Section 10.5) or are common across many NoRs (addressed in 10.6.1 above).

Some NoRs have identified adverse operational effects, particularly on general vehicles. However, there were no common adverse operational effects across all NoRs.

3. Mitigation

The ITA recommends using a construction traffic management plan (CTMP) to manage and mitigate potential construction traffic effects. The CTMP would pick up on any specific mitigation measures required for each NoR. The requirement to prepare a CTMP is addressed in proposed condition XX, in Appendix XX.

5. Landscape and Visual Effects

The Landscape and Visual Assessment (LVA) included in Appendix XX of Volume 3, assesses any actual and potential effects during both the construction and operational phases of the Project. Sections XX-XX discuss XXX effects specific to individual NoRs. The following sections XX to XX discuss these potential effects on a Project-wide level.

The landscape and visual assessment is consistent with the 'Te Tangi a te Manu – Aotearoa New Zealand Landscape Assessments Guidelines' and was informed by relevant professional standards and guidelines[10]. This assessment:

1. Reviewed the Project to identify relevant aspects for landscape and visual effects, including temporary construction works.
2. Reviewed the AUP provisions to help frame the assessment and identify relevant issues and considerations.
3. Identified the relevant landscape context and scope of the assessment.
4. Assessed the character and values of the existing urban landscape at at three varied geographical scales (looking at all of Auckland, then seven distinct landscapes within Auckland, then each NoR locality), considering physical, associative and perceptual aspects.
5. Assessed landscape, visual & natural character effects for each NoR, including natural and urban elements, perceptual and associative aspects, and construction.
6. Recommended measures to mitigate adverse effects and to enhance potential positive effects, framed as designed outcomes to be incorporated into the Urban Environment Framework.

1. Existing environment

The LVA report describes the existing environment at different geographical scales. Individual NoR chapters describe relevant aspects of this existing environment. These should be considered in the context of the wider Auckland environment that is volcanic (incorporating maunga, craters, and lava caves); largely cleared of its original vegetation (thought to be lowland forest); with short streams flowing into tidal estuaries, underground water within lava fingers, and piped streams. Within Auckland, seven distinct character areas have also been identified along the ALR route, each reflecting the period in which the area was developed.

2. Positive Effects

The LVA report identifies a range of positive operational effects (but no positive construction effects).

While the specific positive effects for each individual NoR differ, positive effects were primarily related to urban structure, activities and built character. For example, many positive effects relate to better transport network legibility, increased accessibility and/or spatial definition, and the potential for more activation or redevelopment, or consideration of how the stations and associated buildings are in keeping with existing urban landscape patterns or contribute to the streetscape.

3. Construction effects

Construction will cause general disruption in the vicinity of NoR areas, mostly to roads and transport networks. It will also cause adverse visual effects associated with property demolition, construction sites, and construction activities.
In some NoRs, these effects are cumulative (when considered in the context of other large construction projects) and thus more impactful.

4. Operational effects

Operational effects include consideration of both the natural and urban landscape aspects. These can include adverse effects on

- **Natural elements:** effects on topography and landforms (including any special features), on water (potential effects on natural streams, wetlands, harbours), on vegetation, and any ecological aspects that form part of the landscape.
- **Built elements:** effects on urban structure (patterns of roads and blocks), streetscape, and such qualities as legibility and connectivity, and
- **Visual effects:** on amenity values (public places and private property).

Adverse operational effects vary between individual NoRs and their surrounding environment.

5. Mitigation

While the LVA identifies many positive effects as a result of the Project implementation, it suggests mitigation through design requirements for adverse effects. Specific design requirements vary, with common categories relating to legibility, access, context, elevated structures, natural character, and visual and pedestrian amenity.
The ALR Urban Environment Framework (UEF) identifies the urban design principles and objectives intended to guide the future design phases of the Project. The UEF encapsulates Mana Whenua aspirations which along with the principles have been translated into design outcomes that will mitigate potential adverse landscape and visual effects identified in the LVA. The UEF provides both line wide and station and place design requirements, reflecting the varied environments in which the Project will be located.
Proposed condition X in Appendix XX provides for these design outcomes through the preparation of Urban and Landscape Design Guidelines and the Urban and Landscape Design Masterplan.

6. Social Effects

The Social Impact Assessment (SIA) will assess the actual and potential effects of the Project. It will be included as Appendix XX of Volume 3 and be addressed in this and individual NoR chapters at a later date.

7. Cultural

Extensive engagement with Mana Whenua groups across Tāmaki Makaurau has been undertaken to date. ARL are committed to continuing engagement and collaboration with Mana Whenua following lodgement of the NORs and resource consents. This will include the preparation of a Mana Whenua Cultural Values Report that reflects mana whenua values within the Project area, engagement processes undertaken, key feedback and how this has shaped the Project.
The Mana Whenua Cultural Values Report will be submitted as part of Package 2. However, Appendix X includes a Consultation Summary report that summarises engagement to date.

8. Built Heritage

The Built Heritage Assessment (BHA), included in Appendix XX of Volume 3, assesses any actual and potential built heritage effects during the construction phases of the Project. Sections XX-XX discuss XXX effects specific to NoRs 3-18. The following sections XX to XX discuss these potential effects on a Project-wide level.
A complete assessment of built heritage effects depends on first identifying built heritage and character sites and their significance, and then determining and assessing potential impacts upon them. This was done by:

1. Setting a 100m buffer surrounding the NoR boundary for completing subsequent investigation and assessment, as buildings beyond this radius are unlikely to be affected.
2. Identifying built heritage and character sites within this 100m buffer, which determined 3 NoRs (16-18) would have no heritage impacts.
3. Verifying heritage/ character sites and their surrounding environments through desktop assessments and site visits.
4. Determining impacts and assessing effects, considering both temporary and permanent, direct and indirect, and adverse and beneficial elements by:
    a. Determining the level of impact on a 5 point scale (from 'no impact' to a 'very high' impact)
    b. Determining the impact's outcome by assessing its magnitude on a given place on a 5 point scale (from no or negligible effects to significant or critical effects)
    c. Determining when identified effects are likely to occur: during enabling works, during construction, or during operation.
5. Providing recommendations to avoid, remedy or mitigate identified effects.

The BHA found no heritage impacts at 7 NoRs, including NoR 1 and 2 (tunnel and protection layer), NoR 11 and 16 (surface rail), and NoR 9, 17, and 18 (Wesley, Māngere Bridge and Te Ararata Creek stations).

1. Positive Effects

The BHA notes the Project will have indirect positive effects on historic heritage places once ALR is operational. Positive effects include:

- Improved accessibility/ visitation opportunities for historic heritage places, increasing the use and appreciation of these sites

- Improved care and maintenance of historic heritage places, due to the increased desirability

Any interpretation signage provided will also have positive effects by reinforcing public interest in built heritage places. The BHA recommends interpretation signage in Kingsland and suggests it is considered in other locations. The potential for interpretative signage is provided for by condition 25(x)(b) through the Archaeology and Built Heritage Management Plan (ABHMP).

2. Construction effects

The BHA report identifies both temporary and potentially permanent adverse effects on some built heritage places during Project construction. No effects were expected in five NoR (2, 7, 13, 16 and 18), negligible to minimal effects in four NoR (8, 12, 15 and 17)) and potentially moderate or significant adverse effects within seven NoR (3, 4, 5, 6, 10, and 14).

Note the potential adverse effects of construction vibration and excavation induced settlement are covered in Sections 10.1.X and 10.1X below.

Temporary[11] adverse effects from construction include:

- A general loss of amenity (which may reduce aesthetic or historic context heritage values associated with a site, or reduce visitor numbers)
- Temporary relocation of built heritage during construction (which is an option for Vernon Street lamps in NoR 10)
- Dust (triggering the need for a conservation cleaning)
- Redirection of utilities (I don't actually understand why this is an issue? Report doesn't explain but lists it as an effect in multiple places. Is it because this could have unexpected structural impacts on heritage sites??)

Potentially permanent adverse effects from construction include:

- Demolition or substantial demolition, resulting in a loss of place or historic fabric (only relevant to NoR 6 and NoR 14)
- Relocation or removal, resulting in a partial loss of place or historic fabric (only relevant to NoR 6, 10 and 14)
- Cosmetic damage (from construction vibration or settlement)
- Accidental or structural damage (from temporary structures such as hoardings or scaffolding, vehicle/plant movement, acute settlement, etc)
- Degradation of fabric while buildings are unoccupied (from vandalism, theft, lack of maintenance or activity)

3. Operational effects

The BHA report identifies some potential adverse effects from the operational phase of the project. These include:

- Permanent effects from construction (listed in the section above), unless these are remedied and managed through the construction phases.
- Visual detractions and cumulative impacts (from new visual clutter, or visual dominance/instruction of new developments)
- Operational noise (covered in Section X below, noting the OVA considers that any operational noise and vibration effects can be suitably managed)

- Construction settlement (from gradual settlement after construction)

4. Mitigation

The Project will mitigate actual and potential built heritage effects through an Archaeology and Built Heritage Management Plan (ABHMP), provided for by condition 24. The ABHMP will provide methods of avoiding, remedying or mitigating the adverse effects set out in sections X-X above.
In NoRs where the Project may cause moderate to significant adverse effects, the BHA recommends specific mitigation measures to be managed via the ABHMP. These are explained in the individual NoR chapters that follow.

9. Archaeological Effects

The Archaeology Assessment (AA), included in Appendix XX of Volume 3, assesses any actual and potential archaeological effects during the construction phases of the Project. Sections XX-XX discuss XXX effects specific to NoRs 3-18. The following sections XX to XX discuss these potential effects on a Project-wide level.
A complete assessment of archaeological effects depends on establishing and understanding the archaeological history of ALR locations. This was done through a two-step process:

7. Desktop research (using NZAA[12] site records, results of previous archaeological investigations, the New Zealand Heritage List, Auckland Council CHI[13] and Geomaps, LINZ historic maps and plans, various aerial photography, soil information, lava caves and ALR station and route information) to screen locations for heritage constraints and review areas where ground disturbance is likely. As part of this process, 200m buffers were established around all NZAA sites, CHI items and scheduled historic heritage items to account for locational inaccuracies.

8. Field surveys to determine the existing environment, assess the condition of recorded sites or items, and allow for potential identification of unrecorded sites/items.

Once a location's archaeological history was established and understood, the report assessed the tangible archaeological and heritage values within the proposed extent of works. This assessment used criteria set out in the HNZPT[14] (2014) and Auckland Council's Methodology and Guidance for Evaluation Auckland's Historic Heritage (2019) and assumed all land with NoR boundaries would be subject to ground disturbance unless otherwise specified.
The AA does not anticipate positive or adverse effects being associated with NoRs 1-2 because:

- The depth of works (between 4-45m) for NoR 1 means there is no reasonable cause to suspect that archaeological sites will be impacted *and*
- There are no physical works associated with NoR 2.

1. Positive Effects

The constraints-led design process has avoided effects on potential archaeological sites. Further information is provided in the Alternative of Assessments report in Appendix X and the NoR 3 chapter.
Although archaeological sites encountered within NoRs are likely to be destroyed, condition 25(iv) ensures that all unrecorded archaeological sites will

be recorded, while condition 25(x) notes that the Archaeology and Built Heritage Management Plan may include methods to ensure increased public awareness and interpretation signage, which would help preserve this history along the route.

2. Construction effects

Earthworks during construction may remove archaeological features that may exist during the surface, modifying and/or destroying them.

The Archaeology Assessment and individual NoR chapters address the overall likelihood of unrecorded archaeological sites being contained within the NoR boundary. In summary, there was potential for 14 NoRs to contain unrecorded archaeological sites that would be modified or destroyed. However, there was no reasonable cause to suspect archaeological sites in one other location (NoR 13).

Effects on known archaeological sites are contained and addressed within NoR-specific chapters.

3. Mitigation

To mitigate the archaeological affects outlined above, the Archaeological Assessment recommends preparing and implementing a Archaeology and Built Heritage Management Plan (ABHMP), updating the CHI with information sourced during construction works, and ensuring earthworks are monitored by an archaeologist. This is provided through condition 25, which provides for an ABHMP that will include information on Project personnel involved in construction works monitoring, how information is recorded, and the process for updating the Auckland Council CHI.

The Archaeological Assessment also recommends applying for a Heritage Authority under Section 44 of the HNZPT Act in locations where there is the potential for unrecorded sites, and then undertaking archaeological investigations and recording affected sites in accordance with that authority. As outlined in Section 5 of this AEE, archaeological authorities will be sought prior to construction for all relevant NoRs once detailed design is complete.

10. Arboriculture Effects

The Arboriculture Assessment, included in Appendix XX of Volume 3, assesses any actual and potential arboricultural effects during the construction phases of the Project. Sections 10.2-10.19 discuss arboricultural effects specific to individual NoRs. The following sections 10.13.1 to 10.13.3 discuss these potential effects on a Project-wide level.

A complete assessment of arboricultural effects depends on identifying and mapping trees present. This was done through a four stage process:

1. Desktop study to identify trees and check how they interact with AUP provisions

2. Site visits to verify desktop study and record relevant details (including crown dimensions, trunk diameter, tree condition) using an app with georeferencing capability.

3. Protected root zone (PRZ), tree protection zone (TPZ), and structure root zone (SRZ) calculated using field measurements in accordance with AS4970-2009.

4. Trees mapped using QGIS

Once trees had been identified and mapped, trees in each location were assessed based on information provided on the project in the Design and Constructability report (Appendix X).
The Arboricultural Assessment notes there will be no arboricultural effects for NoRs 1-2, because NoR 1 works will occur below the depths where tree routes could be encounted and There will be no physical works associated with NoR 2.

1. Positive effects

The constraints-led design process has avoided some effects on scheduled trees in specific NoR locations, ensuring their retention. Some NoRs also contain pest plants which will be removed and replaced, or provide opportunities for new or improved street tree planting, increasing canopy cover and species diversity. These effects are noted in specific NoR chapters where relevant.

2. Construction effects

Construction activities may cause tree removal, relocation, alteration, or damage. This is an adverse arboricultural effect as it will generally reduce the amenity or ecological value associated with affected trees. Within NoRs 3-5 and 7-18, some trees will be removed to allow space for construction and future buildings (such as stations and their ancillary facilities and infrastructure). The most significant removals will be for the surface rail sections (NoRs 11 and 16) where the scale of removals will result in a significant loss of tree canopy cover unless suitably mitigated.
Nearby trees may also be affected. For example, large machinery may conflict with tree canopies, construction works may occur within tree protection zones, and installation or diversion of underground network utilities may require activities such as trenching or pit excavation. Many potential adverse effects on these trees can be successful avoided or mitigated through the implementation of the tree protection measures addressed below.

3. Mitigation

Typical mitigation proposed for individual NoRs includes tree protection measures for specific trees, replanting to remediate the loss of ecological services, and integrating planting with urban design and landscape recommendations.
Condition 26 provides a Tree Management Plan to manage effects on protected trees. Condition 9 also requires that Urban and Landscape Design Guidelines reflect Auckland's Urban Ngahere Strategy and the urban, landscape, open space and visual requirements of Condition X. This will ensure replanting is integrated with wider urban design and landscape recommendations.
Together, these conditions will ensure the Project provides suitable mitigation for any adverse arboricultural effects.
A future application (as set out in Section 5) will address stormwater discharges and design, and ensure integration with any new tree planting so that new trees become part of green infrastructure.

11. Open Space Effects

The Open Space Assessment (OSA), included in Appendix XX of Volume 3, assesses any actual and potential effects on public open space (POS) during the construction and operational phases of the Project. Sections 10.2-10.19 discuss open space effects specific to NoRs, while the following sections 10.14.1 to 10.14.5 discuss these potential effects on a Project-wide level.

To complete the assessment, the OSA first defined and identified open space, and then assessed it using the following process:

1. Defined POS as any areas zoned open space in the AUP, and any areas providing offroad shared connections to them (including areas that are not legally POS or reserve land, and could be within legal roads).
2. Identified POS potentially impacted by the Project by determining which POS were within a 300m radius of a NoR boundary, excluding substratum NoR elements.
3. Undertook a desktop assessment of potentially impacted POS, determining their values and relative importance through reviewing publicly available information and considering the current and future environment. The POS values were then assigned a sensitivity rating using a 5 point scale (from negligible to very high), while catchment sizes informed relative importance. Site visits verified the results of the desktop assessment.
4. Identified effects, describing their nature, scale and timeframes. The magnitude of these effects was assessed using a 6 point scale, from positive to major [adverse effect]. The significance of these effects was then assessed using a matrix that combined the effect magnitude with the sensitivity rating. Effects deemed to have a moderate-major [adverse impact] were considered sensitive.
5. Proposed mitigation and management measures to address identified effects, and reassess effects on that basis.

1. Impacted POS

Using the above methodology, the OSA identified 5 POS (in NoRs 11, 14-16) that could be impacted by the Project.

I note the OSA identified many POS in the general vicinity of the Project – most within 300m, with a few further away. The OSA did not consider these POS affected by the project, so POS values and potential effects and mitigation measures were not assessed. However, the report highlights potential opportunities for improving these public spaces if desired.

The OSA assumes substratum activities will have no effects on POS, so did not assess NoRs 1 and 2.

2. Positive Effects

The OSA only identified positive effects from the Project for NoR 15 (Onehunga Depot), which are summarised in Section 10.16.X. However, it notes there are many opportunities to improve POS values (including via mitigation) of open spaces in the Project vicinity.

3. Construction effects

The OSA identified adverse effects from construction on all five POS impacted by the Project. These effects were assessed as having a large to very large significance before mitigation was applied.

During construction, the Project will restrict restrict access to POS, resulting in a temporary loss to either all or part of the POS. Durations and degrees of loss vary and are specified in individual chapters. The OSA also noted that there could be visual impacts and vegetation removal that could impact multiple POS.

4. Operational Effects

The OSA identified adverse operational effects from operation on 4 POS impacted by the Project. The scale of these effects (before mitigation) was generally smaller, ranging from neutral to large.
The project will result in the permanent loss of land for these POS, although the scale of loss varies. The report also notes all five POS may experience additional visual and noise impacts (addressed in more detail in sections 10.8 and 10.X of this report respectively).

5. Mitigation

The OSA suggests different mitigation measure to manage adverse construction and operational effects.
The [XX] Management Plan will address construction effects, including maintaining access during works where practicable and reinstating affected areas at the end of each stage of works. Operational mitigation will be provided for through a combination of design outcomes for open spaces within the UEF and specific conditions.

12. Flooding Effects

The Stormwater Flooding Assessment (SFA), included in Appendix X of Volume 3, assesses any actual and potential effects from flooding during the Project. Sections 10.2-10.19 discuss flooding and water quality effects specific to NoRs 3-18. The following sections 10.15.1 – 10.15.4 discuss these potential effects on a Project-wide level.
The assessment assumes NoRs 3-18 in this application will manage flooding and surface water effects to ensure:

- No new/increased areas of flooding up to 10% AEP flood events
- No new/ increased depth of building flooding on other properties up to 1% AEP flood events
- No increase to erosion or scour downstream of the Project,
- No increased flood hazard to other properties, and
- No conspicuous oil or grease films, scums, foams, floating or suspended materials, changes to colour or clarity, or objectionable odours in the discharged water.

To determine and manage Project effects, the assessment:

1. Reviewed flooding metrics from Auckland Council Geomaps and Project concept designs and NoR boundaries contained in the Design and Construction Report, Appendix XX
2. Identified floodplains, overland flow paths and potential sources of flooding relevant to the project through a desktop assessment and site visits
3. Determined locations where the project could change a landform within a floodplain (causing displacement effects), change imperviousness (affecting runoff rates and volumes and contaminant generation), or intersect with existing watercourses, overland flow paths, or culverts
4. Ensured there was sufficient space with the NoR boundary to manage these effects (based on estimates from Auckland Council recommended methodologies)
5. Recommended mitigation where appropriate

Note NoRs 1-2 were not assessed because the report considers the underground section of the alignment will not have an effect on floodplains or water quality.

1. Positive Effects

There is the potential for positive effects relating to flooding and surface water, due to the proposed flood hazard conditions associated with NoRs. Meeting these conditions will require work (detailed in section 10.15.4 below) to manage flood risk and surface water. Across the project, this could result in:

- Improved management of floodplains and overland flow paths across the Project, reducing flood risk in those locations
- Water sensitive urban design measures implemented within NoR footprints (reducing peak flowrates leaving the site)
- Maintained or improved stormwater quality (as managing surface water is likely to incorporate treatment devices that capture contaminants, and there are no know water quality treatment devices within the proposed route)

2. Construction Effects

The Project passes through floodplains, overland flow paths, and flood prone areas. Construction of the Project and associated infrastructure and facilities may increase total impervious area and displace existing floodplain storage within the route. This could increase adverse effects such as increased flows, velocities, scouring and erosion, flood hazards, and flood duration in, adjacent and downstream to these locations, unless effects are appropriately mitigated.

3. Mitigation

The effects outlined in section 10.15.2 can be managed through design. For example, on-site storage and slow release of flood water can manage flood effects, while proprietary treatment devices can capture contaminants and reduce discharge rates due to increased impervious surfaces.

This AEE does not specify how effects will be managed, as this will be determined as part of detailed design. However, condition 11 specifies that the effects will be managed to an acceptable level, with verifiable detail submitted as part of future outline plans.

ALR Ltd notes that if these effects cannot be managed, an NoR alteration or new NoR will be will required.

13. Geological Heritage

The Geological Heritage Assessment (GHA), included in Appendix XX of Volume 3, assesses the actual and potential geological heritage effects on the environment from the Project's construction and operational phases. Sections XX-XX discuss potential geological heritage effects specific to each NoR, while the following sections XX to XX discuss these effects on a Project-wide level.

To determine potential volcanological effects, the project first needed to identity and assess volcanic features. This was done by:

1. Describing the formation of the feature, and its nature and origin;
2. Explaining how the feature has been modified;
3. Identifying the values of the feature, taking into account the relevant factors for which it has been identified as an Outstanding Natural Feature (ONF) in the AUP and the author's assessment of the remaining geological features that contribute to those values; and
4. Assessing the effects of the Project on those identified values.

The GHA has also provided a summary of the Auckland Volcanic Field and relevant definitions to frame the above assessment.

1. Positive Effects

The GHA did not identify any positive effects, although it notes that no volcanological issues have been identified in 7 NoRs. This is partially a result of the Project's constraints-led design process, which sought to avoid basalt and maunga, and therefore any associated effects on geological heritage, wherever practicable.

2. Adverse Geological Heritage Effects

Modifications to Auckland's maunga could cause adverse effects on geological heritage due to the maunga's [importance to Auckland's character and history].
The Project could cause adverse effects on geological heritage during construction. These effects would be linked to the permanent project infrastructure, so would persist into the operational phases of the project.
The GHA highlights that a large number of Project NoRs (NoRs 1, 5, 6, 11 and 16) will largely avoid or only have less than minor to minimal effects of geological heritage. This is largely linked their location – with surface works having minimal interaction with volcanological features, underground station works primarily being on the margin of lava flow fields, and the tunnel largely avoiding volcanic deposits.
A few NoRs (7 and 10) will involve construction within a lava flow or through volcanic deposits including tuff and scoria. The GHA report considers these will cause only minimal geological heritage effects.

3. Mitigation

This section of the A report is currently empty.

14. Construction Noise and Vibration Assessment

The Construction Noise and Vibration Assessment (CNVA), included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phase of the Project. Sections XX-XX discuss construction noise and vibration effects specific to each NoR. The following sections XX to XX discuss these potential effects on a Project-wide level.
Construction noise and vibration management principles aim to ensure noise and vibration emissions are reasonable. Noise and vibration from construction activities in unavoidable and best practicable options to ensure emissions do not exceed a reasonable level are to be applied.
The Project CNVA used the following methodology to determine appropriate Project noise and vibration criteria:

- Review of relevant legislation, guidance, performance criteria and the Project indicative construction methodology contained in the Design and Construction Report, Appendix XX
- Identification of receivers (notable and sensitive) and sensitive structures, including consideration of the future environment
- Measurement of noise and vibration levels at each NoR location to quantify the baseline existing environment
- Preparation of predicted construction noise and vibration emissions to identify infringements in each NoR location

i.Positive Effects

There are no positive effects associated with construction noise. It is noted however, that appropriate mitigation and management of this effect can have a positive outcome through successfully alleviating the impact of construction noise during the course of a project.

ii. Construction Noise

Construction noise associated with the Project will vary depending on the nature of the construction activities, duration of works and location and type of receiver. Night works in an environment characterised by residential receivers will have a greater impact than daytime works in a mixed-use environment where ambient noise levels are already high. The noise level received inside a sensitive space (e.g. bedroom, office, living room) will depend on the external noise level, the façade performance (particularly the glazing) and the acoustics of the room. The impact of this effect will vary depending on the nature of the occupant (i.e. who a building occupant is and when they are present in the building).

The Project works involve a broad range of construction activities, some with potentially high noise generating levels based on equipment size (e.g. concrete or rock breaking, piling, tunnel boring machine (TBM) support equipment). Identification of where these types of activities are likely to occur enables the potential for infringement of Project noise criteria and the development of applicable best practice mitigation and management measures.

iii. Construction Vibration

Construction vibration result in two different effects:

- The impact on the amenity of receivers
- Potential building damage

The primary concern for building owners is damage caused by the vibration generated from construction activities. However, vibration will be felt at levels much lower than those necessary for building damage to occur. In addition, some construction activities can cause reradiated noise where a building vibrates at audible frequencies and is heard rather than felt. Where both noise and reradiated noise occur, it can be difficult for a building occupant to distinguish between the two effects.

iv. Mitigation

The Project CNVA recommends the preparation and implementation of Construction Noise and Vibration Management Plans (CNVMP). The management plan should address requirements of Annex E of NZS 6803:1999 Acoustics – Construction noise and any best practice methods for minimising construction noise and vibration effects. The CNVA recommends a series of objectives and principles to be applied in the preparation and implementation of a CNVMP.

Fundamental to the success of a CNVMP in mitigating effects is communication with receivers in advance of construction activities commencing.

b. Operational Noise and Vibration Effects

The Operational Noise and Vibration Assessment (ONVA), included in Appendix XX of Volume 3, assesses the actual and potential effects of the operational phase of the Project.

To determine operational noise and vibration effects, the ONVA:

1. Established and justified relevant noise and vibration limits across Project sites, using:
    a. Relevant AUP zone noise limits for non-residential sites
    b. Noise limits within the AUP business zone interface standard for residential sites
    c. An additional 10dB to limits from *a-b* for emergency plant operation
    d. AUP vibration standards
2. Determined likely noise and vibration sources within stations, shafts and the depot, as well as likely mitigation methods
3. Used modelling to confirm assumptions for Onehunga Depot

The report found that one NoR would have no operational and vibration noise effects (2), while a later assessment will consider a few NoRs (1, 9, 11 and 16).

i.Operational Effects

The Project CNVA has identified typical noise and vibration sources located in stations, shafts and the depot. These include:

- **Stations:** primary tunnel ventilation fans, building mechanical services, emergency plant, electricial power infrastructure and assets, and public address systems.
- **Shafts:** Tunnel ventilation fans, building mechanical services, and electrical power infrastructure and assets
- **Depot:** Workshop activity (e.g. power tools, vehicle movements), train wash and cleaning facilities, public address and audible warning systems, building mechanical services, electrical power infrastructure and assets and water treatment plant.

Comment required on tunnel/ surface rail sections when available.

ii. Mitigation

The Project CNVA found that the potential adverse noise and vibration effects of station and shaft NoR can be easily managed through measures such as:

- Site design (e.g. enclosing substation or using acoustic screening)
- Choosing appropriate equipment (e.g. low noise plant, anti-vibration mounts, PA speakers that meets noise limits, fan discharge plena and stacks that allow for high performance attenuation)
- Maintaining equipment while limiting testing to off peak daytime periods

Specific recommendations were made for Onehunga Depot NoR, based on modelling for this location and a nearby cemetery. However, many suggested mitigation measures are similar, relating to site design and the selection of appropriate equipment.

Conditions 33 and 34 establish noise and vibration standards that the stations, depot, shafts (and supporting surface infrastructure) must meet. This ensures their operational noise and vibration effects will be reasonable, and within the limits set by the AUP.

Comment required on tunnel/ surface rail sections when available.

c. Blasting Overpressure and Vibration Effects

The Blast Management Assessment (BMA) included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phase of the Project. Sections XX-XX discuss blasting vibration and overpressure effects

specific to each NoR where blasting will occur (noting this only NoRs 4-8 for Dominion Junction, Kingsland, Balmoral and Sandringham Stations, and NoR 10 in the George Street shaft). The following sections XX to XX discuss these potential effects on a Project-wide level.

The main effects of blasting relate to vibration, overpressure and flyrock. The Project BMA assessed blasting vibration and overpressure using:

- British, German and Australian standards, which have been used by other large scale construction projects in New Zealand.
- Vibration equations based on AS2187.2 – Use of Explosives and data reflecting established blasting relationships for vibration propagation from other construction projects
- A standardised blast design

The Project BMA also noted that blasting should be reviewed to ensure its safety for possible flyrock impact. One sentence explanation if suitable – e.g. this would typically be done by XXX.

i. Positive Effects

There are no positive effects associated with blasting vibration and overpressure.

However, the report notes that blasting can have a positive impact when used in hard rock areas. This is because blasting generally allows work to be completed in shorter timeframes (albeit at higher amplitudes) when compared to alternative excavation methods such as hydraulic hammering. This typically produces an overall reduced impact on sensitive receivers when compared to alternative methods, as it reduces the overall duration of vibration impacts and decreases excavation timeframes.

1. Vibration

The project will cause blasting vibration effects when blasting occurs. Many variables affect the overall impact, including the distance between measurement points and blastholes, weight of explosive per delay, local geology and topography, building type (residential, heritage, etc.), and individual perception and sensitivity. This is why trial blasts and monitoring are required to ensure vibration remains within specified criteria, as well as good communication (to help manage people's sensitivity to the vibration).

Vibration limits are typically set to maintain amenity and are therefore at levels well below those at which property damage could occur. The limits proposed in the conditions and the report use Australian Standard AS2187.2 rather than the AUP standards.

2. Overpressure

The project will cause overpressure effects when blasting occurs. Overpressure is also affected by many variables, including blast design, topography, atmospheric conditions, and the orientation of blast. The Project BMA notes that predicting overpressure levels can be difficult, but that modifying blast patterns designed for vibration criteria compliance (through variations to uncharged collar, burden or initiation sequence) typically achieves overpressure criteria compliance as well.

3. Mitigation

The project Blasting Management Assessment recommends appropriate constraints on drilling and blasting activities to ensure adjacent infrastructure is protected from structural integrity and superficial damage, and that blasting

does not impose on the quality of life for persons within the proposed blast areas. This should be achieved by meeting appropriate vibration and air overpressure criteria (incorporated into condition 22, which modelling shows the Project should be able to meet) and proactive and transparent communications with anyone potentially affected (provided for via condition 14/19).

Management methods will be able to ensure blasting meets conditioned criteria through trial blasts and monitoring combined with changes to blast design when required (e.g. via limiting quantities of explosives, reducing blasthole diameter, etc).

2. Structures and settlement

The Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential construction vibration and ground settlement and movement[15] effects on buildings[16] during the construction phases the of the Project. This assessment will determine the potential risk of structural damage to buildings due to these effects.

Sections XX-XX discuss XXX effects specific to NoRs. The following sections XX to XX discuss these potential effects on a Project-wide level.

The following methodology was used to determine effects:

1. Influence zones were established for each NoR
2. Existing building structures within defined influence zones were surveyed (via a visual survey) and reviewed (using construction drawings from Auckland Council property files) to determine their current state and evaluate potential sensitivity to construction works.
3. Vibration building damage risk assessments were completed using:
    a. Marshal Day Acoustic's ground vibration predictions, regression analyses, and vibration propagation assessments (outlining setback distances)
    b. *DIN 4150-3:2016* long term vibration criteria
    c. Construction methods that minimise noise and vibration
4. Ground settlement linked to the tunnel shaft and vertical shafts predicted using computer modelling analyses from the Settlement Principles Report (Appendix X)
5. Surface settlement linked to trench excavations for surface rail sections predicted using "a method proposed by Bowles".
6. Physical effects on at risk buildings assessed using the Burland Classification Method, assessing building damage across 6 categories (0-5): negligible, very slight, slightly, moderate, severe, or very severe. Rating determines level of assessment given to the building, with buildings potentially subject to higher levels of damage assessed in more detail.

1. <u>Positive Effects</u>

There are no positive effects associated with construction vibration and ground settlement effects on buildings, although it is noted that the constraints led design process has avoided and designed out effects on more sensitive locations (as detailed in section X).

2. <u>Vibration Effects</u>

Construction activities (including excavation and tunnelling induced ground movement) across the route have the potential to cause damage to nearby buildings and structures. Effects will require mitigation (addressed in section XXX below) for any building located within the vibration setback threshold. Specific NoR chapters address potential effects on specific buildings.

3. Settlement Induced Effects

Excavation may induce settlement effects on buildings. Specific NoR chapters outline what effects are predicted.

When predictions indicate that effects (without controls) will cause moderate to very severe impacts on buildings, mitigation will be required.

4. Mitigation

To mitigate adverse construction vibration effects on buildings within the vibration setback threshold, the Structures Assessment recommends:

- suitably qualified structural engineers complete precondition surveys for all buildings
- qualified acoustic engineers monitor vibration during construction
- Buildings are assessed once construction works are complete, and any damage (expected to be superficial only) are remediated

To mitigate adverse settlement induced effects, the assessment recommends:

- suitably qualified structural engineers complete precondition surveys for any building predicted to have moderate to very severe building damage from excavation inducted settlement
- Monitoring vibration
- Remedied via redecoration and simple remediation of cracks
- Mitigated via changing the stiffness characteristics of the ground (e.g. via injecting the ground with grouting) or by changing the construction method or design to limit ground movement

A settlement management plan will be prepared that incorporates the above recommendations.

1. Notice of Requirements

1. Substrata NoR 1

This section:

- Describes NoR X – XX Alignment (section X.2)
- Summarises the existing and receiving environment (section X.3)
- Assesses effects and outlines mitigation (section X.4)

2. NoR description

The NoR runs from Vernon Street Shaft to Wesley Portal. Figure 1 shows an overview of the proposed NoR boundary and its surrounds.

Figure 1 Substratum Vernon Street to Wesley Portal Alignment NoR Plan

For ease of description, the alignment has been split into eight sections. These include:

- Vernon Street Shaft to Te Waihorotiu (Figure 2)
- Te Waihorotiu to Universities (Figure 3)
- Universities to Burton Street Shaft (Figure 4)
- Burton Street Shaft to Dominion Junction (Figure 5)
- Dominion Junction to Kingsland (Figure 6)
- Kingsland to Balmoral (Figure 7)
- Balmoral to Sandringham (Figure 8)
- Sandringham to Wesley (Figure 9)

Figure 2 Vernon Street Shaft to Te Waihorotiu section of substratum alignment

Figure 3 Te Waihorotiu to Universities section of substratum alignment

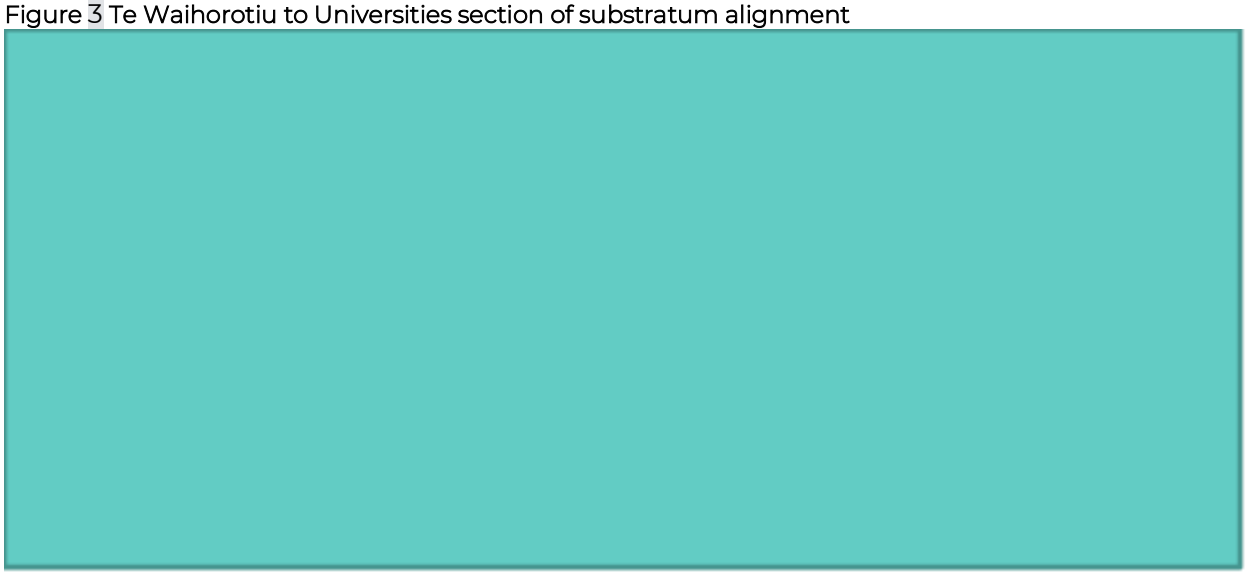

Figure 4 Universities to Burton Street Shaft section of substratum alignment

Figure 5 Burton Street Shaft to Dominion Junction section of substratum alignment

Figure 6 Dominion Junction to Kingsland section of substratum alignment

Figure 7 Kingsland to Balmoral section of substratum alignment

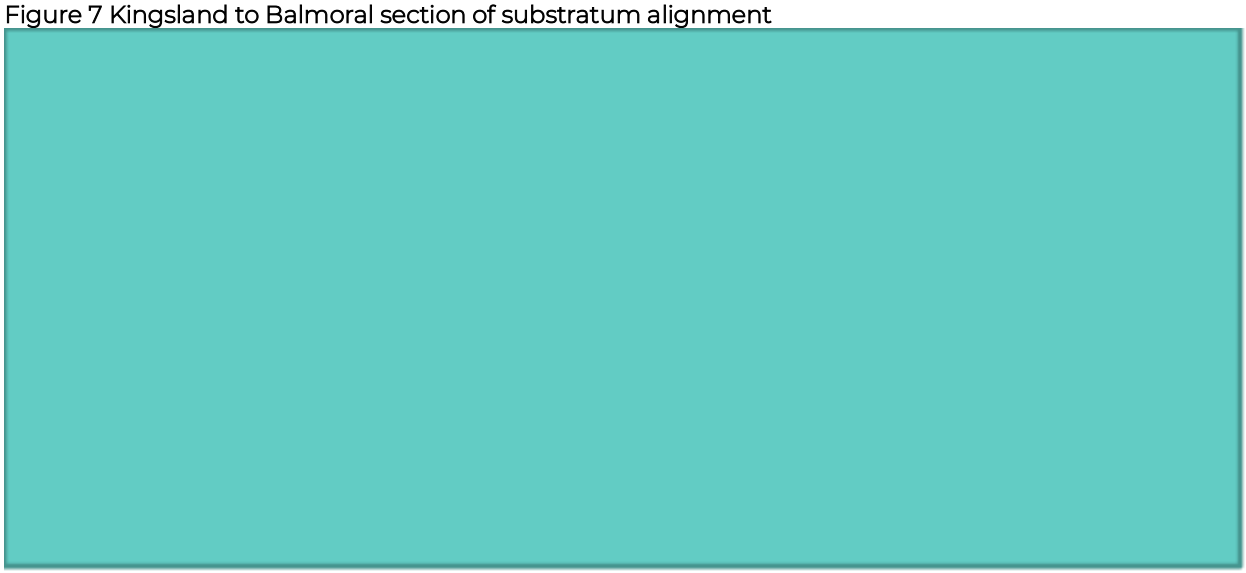

Figure 8 Balmoral to Sandringham section of substratum alignment

Figure 9 Sandringham to Wesley section of substratum alignment

Table 1.1 describes the features of the alignment as they relate to the separate sections of the alignment.

Table 1.1 Vernon Street to Wesley Portal section of substratum alignment description

	Vernon Street Shaft to Te Waihorotiu	Te Waihorotiu to Universities	Universities to Burton Street Shaft	Burton Street Shaft to Dominion Junction
Rail type	•	•	•	•
Alignment type	•	•	•	•
Tunnel type	•	•	•	•
	Dominion Junction to Kingsland	**Kingsland to Balmoral**	**Balmoral to Sandringham**	**Sandringham to Wesley**
Rail type	•	•	•	•
Alignment type	•	•	•	•
Tunnel type	•	•	•	•

1. Construction methodology

Construction works for the Vernon Street to Wesley Portal will consist of a tunnelled substratum alignment with a monotube typology. This tunnel will be designed with a diameter of 13m to accommodate a stacked track arrangement and allows reasonable spatial tolerances for turnback and passing loops, ancillary support beyond the tunnel, and future design developments. The typical construction methodology of this section of the alignment is set out in Sections 1.2.1.1 to 1.2.1.4 below.

1. Site preparation

Prior to works commencing, initial site preparation will be undertaken at sites where the tunnel boring machine (TBM) will be driven or extracted, including Sandringham, Dominion Junction, and the Vernon Street Shaft. This will typically include:

- Protection or diversion of utilities, as required
- Demolition of existing buildings and structures
- Site clearance including vegetation removal and ground preparation as appropriate
- Implementation of erosion and sediment control measures and dewatering systems
- Creation of temporary pedestrian and vehicle routes
- Establishment of welfare facilities (offices and amenities) and storage/laydown areas

2. Duration and timing of works

The duration of site preparation activities can differ between launch/retrieval sites, but is generally expected to take approximately 3-6 months. Tunnelling works are anticipated to be undertaken 24/7 for the duration of the drives required. Standard hours of work for any

associated surface works and activities undertaken at these sites are anticipated to be 7am-6pm Mon-Sat. Any works outside of these hours will be notified and coordinated with impacted local residents. Works will be staged, beginning with the site preparation activities set out above.

3. Site access

The site access for the substratum alignment will typically be from TBM driving and extraction points at Sandringham, Dominion Junction, and the Vernon Street Shaft. Existing private access to surrounding properties will be closed by fencing and gates, and a new access road established to provide construction site access. Around these sites, temporary traffic management will be undertaken in accordance with measures set out in the DCR and Integrated Transport Assessment.

4. Alignment construction

1.
    1.
    2.
        1.
            1.
            2.
            3.
            4.
                1. *Tunnelled alignment*

Construction of the tunnelled alignment will typically involve the following:

- Tunnel Excavation: Use of a TBM to progressively excavate and line the monobore tunnel with segmental concrete units at an anticipated rate of 9.5m/day, including stoppage. The TBM will be launched from a cut and cover dive portal in Mount Eden, retrieved at Dominion Junction, and then re-launched for the northern drive towards Te Waihorotiu. Excavated spoil will be removed at tunnelling sites.
- Internal Slabs: Installation of the internal structural slabs separating the upper and lower tracks will be undertaken by gantries trailing the TBM and completed at a similar construction rate.
- Utility Relocation: Utilities which are in directly conflict with the alignment route will be relocated or diverted. While the risk of encountering such infrastructure is lowered due to the depth of tunnelling, any utilities encountered will be larger gravity assets or those of critical importance, which are more difficult and costly to relocate.
- Rail Alignment and Levelling: Rail will be installed on modular precast track slabs across the entire Project alignment. Following this, rails will be aligned and levelled to a maximum vertical grade of 6% within tunnels.
- Electrification: A 25kV overhead traction power system will be installed using a fixed conductor bar within tunnels.
- Signalling and Communication: Rail tracks will be equipped with signals, switches, and other communication devices including Communication Based Train Control (CBTC system) to enable continuous Automatic Train Control (ATC) and ensure safety. Control and Information Systems (CIS) and Information Communications Technology (ICT) will also be utilised to support functions including railway operations, passenger information, and video surveillance.
- Tunnel Ventilation: A Tunnel Ventilation System (TVS) will be installed to ensure the safety and comfort of passengers and staff during a range of operational conditions., including potential emergencies. -
- Low Voltage Systems: Low Voltage (LV) systems will provide for lighting (including emergency lighting) within tunnels, alongside general power, cabling, and surge protection.

3. Existing environment

This section sets out the existing and receiving environment for substratum alignment NoR 1. It builds on the assumptions outlined in Section XX.

Tables 2.1 to 2.10 describe the surrounding area and features and relevant statutory considerations respectively for each section of the alignment. Any property directly affected by

this NoR is listed in Appendix X to NoR 1 Form 18.

1. Notice of Requirements

1. NoR 2 – Substrata protection layer

1. NoR 2 - Substrata protection NoR

This section:

- Describes NoR 2 - Substratum protection (Section 1.1.2)
- Assesses potential effects and outlines proposed mitigation (Section 1.1.3)

2. NoR description

The purpose of the substratum protection layer, as set out in Section XX is to act as a buffer between activities on the ground surface and the substratum tunnel, ancillary activities, and adits. This designation is generally located 5 m below the ground surface to above the separate tunnel designation (NoR 1) for the entirety of the alignment. Where the tunnel is shallower (i.e. less than 5 m from the surface level) the protection layer will sit just below the surface of the natural ground level. The general function of this layer is shown in Figure 1, 2 and 3 below with more detailed diagrams included in NoR drawings XX to XX.

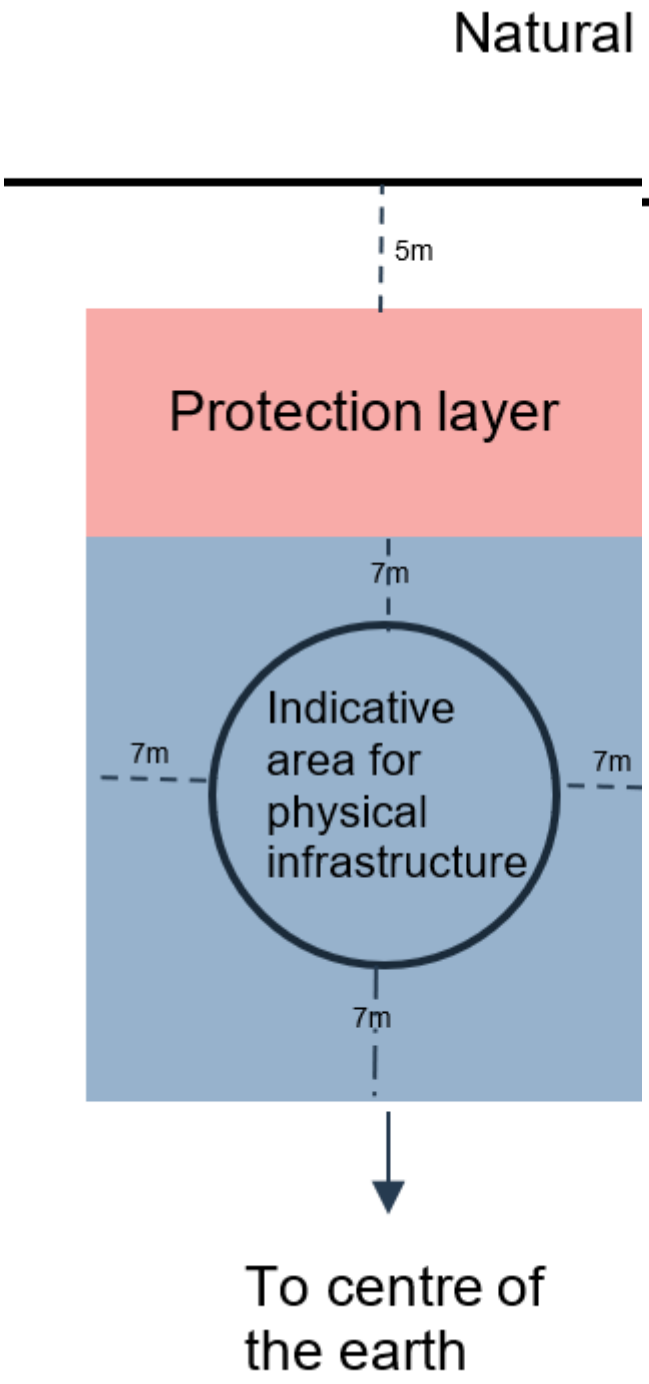

Figure 1 Typical tunnel and substratum designation cross-section

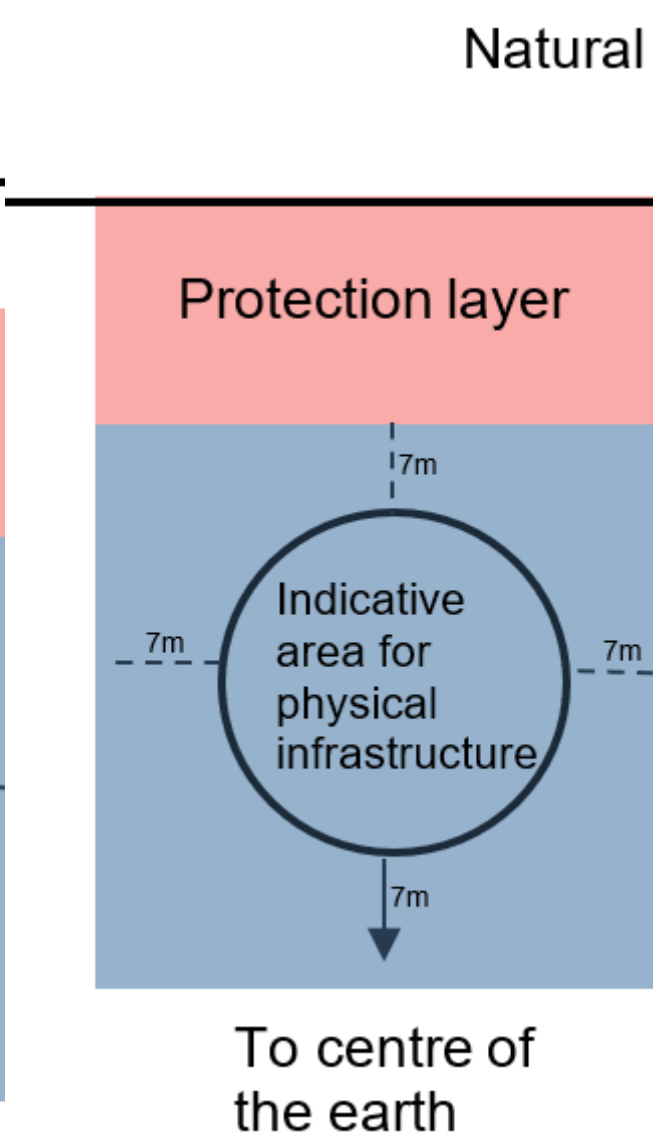

Figure 2 Tunnel and protection layer designation where tunnel is less than 5 m from the surface

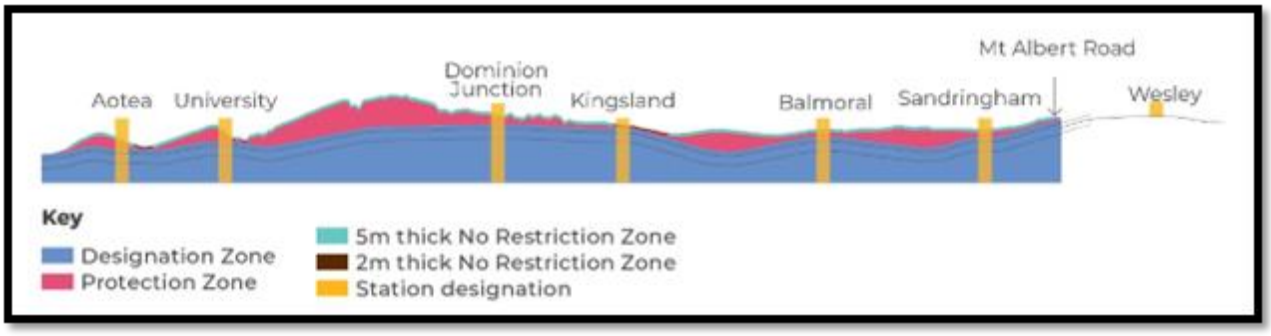

Figure 3 Designation interrelationship

3. Assessment of effects on the environment

There are no physical works proposed within the protection layer, therefore no assessment of effects has been undertaken.

1. Notice of Requirement

1. NoR 3 - Te Waihorotiu Station NoR

This section:

- Describes NoR 3 – Te Waihorotiu Station (Section 1.2)
- Summarises the existing and receiving environment (Section 1.3)
- Assesses potential effects and outlines proposed mitigation (Section 1.4)

2. NoR description

The Te Waihorotiu Station NoR is located in the city centre at the corner of Wellesley Street West, Federal Street and Mayoral Drive. The land use activities surrounding the station are predominantly commercial activities, including offices, retail, food and beverage as well as residential uses and various community and entertainment facilities.

Figure 1 shows the Te Waihorotiu Station and NoR boundary. **Figure 2** shows the NoR boundary on aerial imagery (outlined in red). Table 1 summarises the Te Waihorotiu Station's permanent features and temporary construction works.

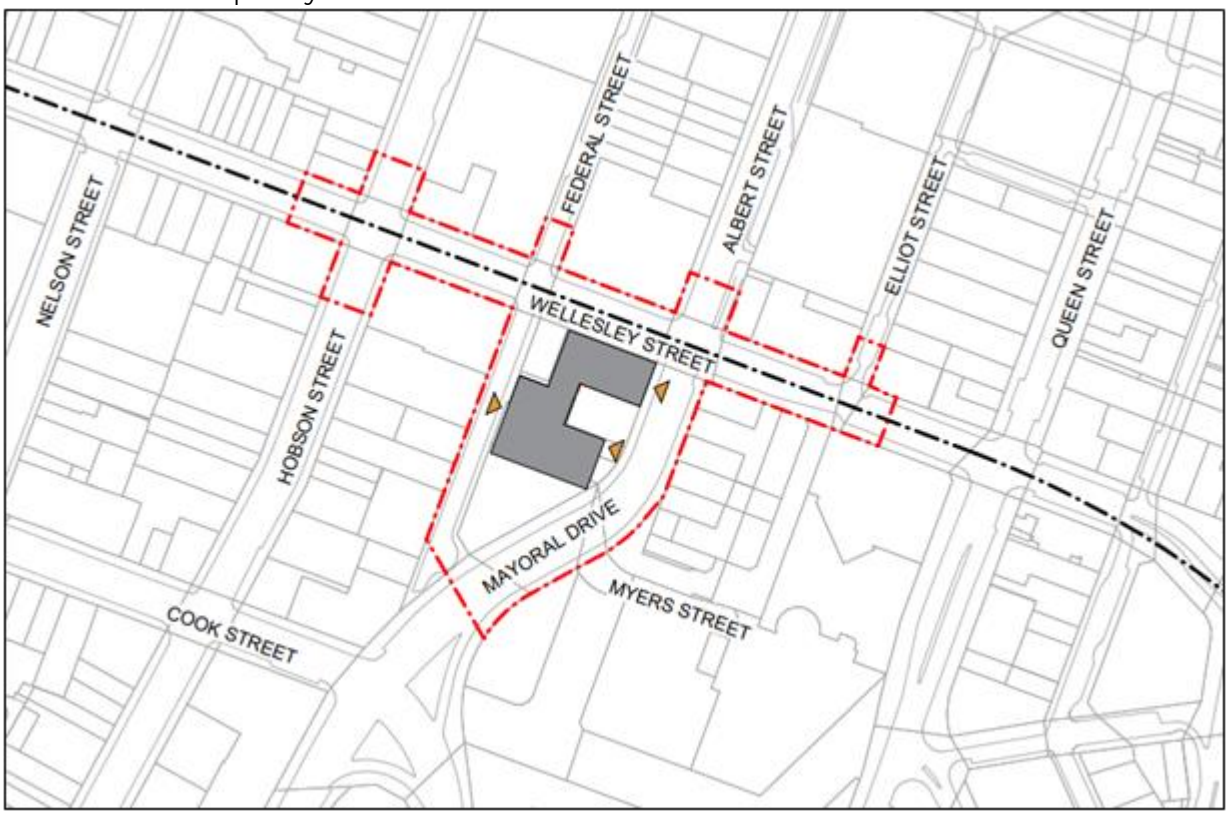

Figure 1 Te Waihorotiu Station Location Plan

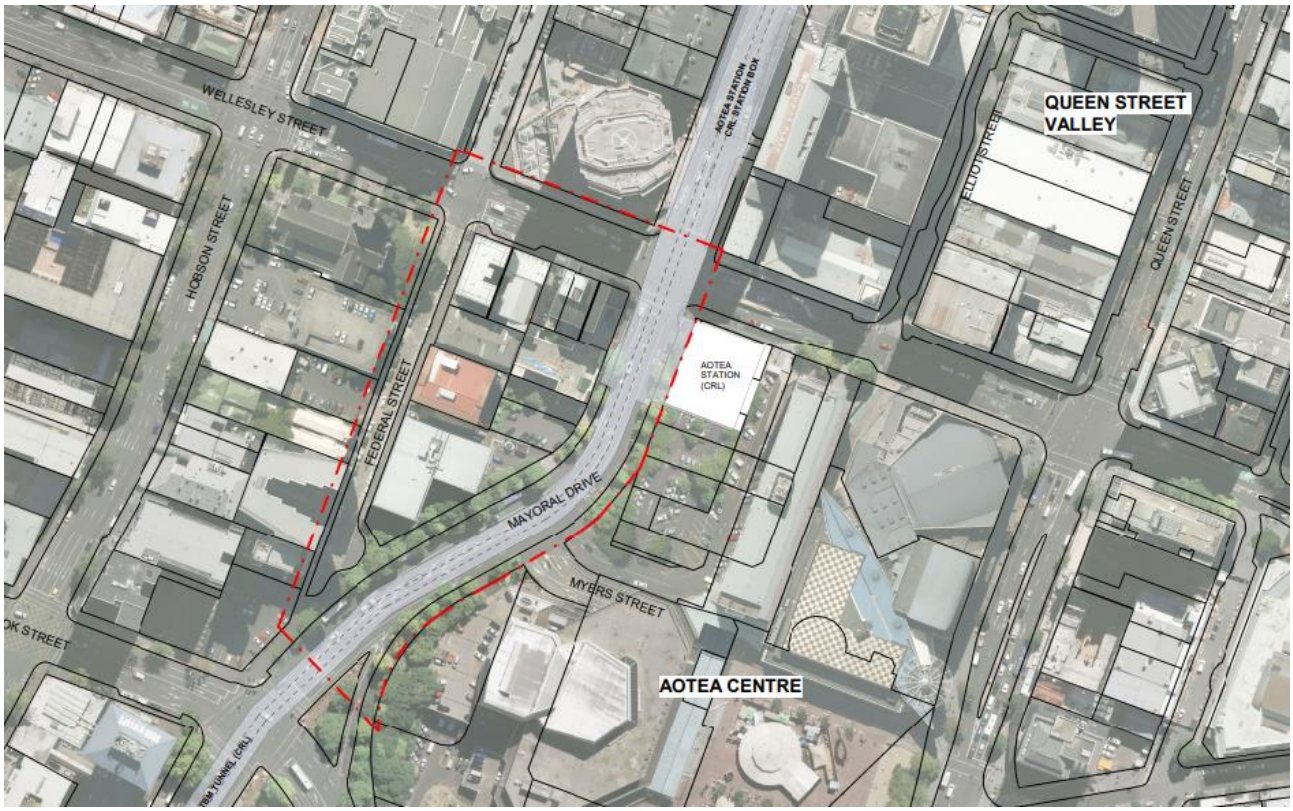

Figure 1 Te Waihorotiu NoR boundary on aerial imagery

Table 1 Te Waihorotiu Station NoR description

Permanent features	
Station	• Station located at the corner of the Wellesley Street West, Mayoral Drive and Federal Street; • Entrances on Wellesley Street West and Mayoral Drive, potential for east-west site connection via Mayoral Drive (east) and Federal Street (west); • Fire egress points are available within the Te Waihorotiu Station NoR that will connect to the wider tunnel designation/ alignment.
Platforms	• Underground, stacked platforms
Public realm	• New plaza within the station precinct
Road and streetscape	• Provision for new dedicated cycling connections to Mayoral Drive and Albert Street • Provision for new bus interchange on Wellesley Street West • Provision for new bus stops west of Mayoral Street and east of Queen Street • Provision for new pedestrian footpaths and shared active transit spaces • A midblock crossing is proposed on Mayoral Drive, to improve pedestrian accessibility between the ALR Station and Aotea Square
Parking and loading	• Provision for cycle parking and storage • Kiss and ride services • Vehicle loading bays for maintenance and emergency vehicles • Taxi pick up and drop off bays
Other new infrastructure	• N/A
Anticipated patronage	• High patronage.

Other	• CRL has future proofed a connection point for direct interchange with Te Waihorotiu CRL Station via below ground concourse. • Retention of heritage buildings at 182 Federal Street (Hampton Court) and 11 Mayoral Drive (Public Trust Building)
Anticipated construction works	
Construction methodology and staging	Refer to AEE Section 6 and DCR Section X for more detail. At a high level the construction activities will include: • Demolition and site clearance (including relocation and protection of utilities); • Removal of existing trees along Mayoral Drive; • Protection and monitoring installed to heritage buildings if required; • Establish site offices, amenities, dewatering and sediment control systems; • Installation of ground support along the station perimeter, including anticipated secant piles or diaphragm walls; • Excavation of station shaft, including installation of propping and internal concrete wall lining; • Mine audits to connect shaft to monotube tunnel; • Station fitout; and • Upgrades and reinstatement of the surrounding streetscape.
Access to the site	• Access during construction will generally occur from Wellesley Street West, accessed at the Wellesley Street West/Federal Street intersection, and Mayoral Drive, accessed at the sites southern end, with some short-term access from Federal Street; • Pedestrian access along Western side of Mayoral Drive will likely be closed and diverted to opposite side of the road
Other	• Retention of heritage buildings at 182 Federal Street (Hampton Court) and 11 Mayoral Drive (Public Trust Building)

3. Description of the environment

This section sets out the existing and receiving environment for the Te Waihorotiu Station NoR. It applies the parameters on the assumptions outlined in Section XX.

Table 2 describes the surrounding area and features. Any property directly affected by this NoR is listed in NoR 3 and Form 18 in Appendix XX.

Table 1 Existing environment description

Feature	Description
Current land use	The land use within the vicinity of Wellesley Street West, Federal Street and Mayoral Drive is predominantly used for commercial activities, including offices, retail, food and beverage as well as residential uses and various community and entertainment facilities. There are no open space areas within the NoR footprint or immediate vicinity.
Physical Environment	
Transport	• Te Waihorotiu CRL station is located directly west of the NoR with the heavy line sited to the south of the site • Wellesley Street West and Mayoral Drive are both identified as arterial roads • Federal Street is identified as a primary collector road • Part of the NoR footprint on Wellesley Street forms part of an existing Midtown bus improvement project • Wellesley Street West is a key east-west bus route through the central city
Infrastructure	• No infrastructure at this location.

Community facilities and key attractions	There are no key community facilities or attractions within the NoR, however, there are various facilities within the immediate vicinity which are listed below: • Auckland Council Service Centre (Bledisloe House) • Civic Theatre • Sky City Theatre • Te Waihorotiu CRL Station • Auckland City Mission • St Matthews in the City
Sensitive noise receivers	• Quest on Hobson Apartment/Hotel (127 Hobson Street) • St Matthew's in the City (132 Hobson Street) • Auckland City Mission (140 Hobson Street) • Public Trust Building (11 Mayoral Drive) • The Grand by Sky City Hotel (90 Federal Street) • EconoLodge City Central/City Central Hotel (37 Wellesley Street West) • Crowne Plaza Auckland (128 Albert Street) • Elliot Street Apartments Hotel (15-31 Wellesley Street West)
Historic heritage	There are two scheduled buildings on the NZHPT register within the NoR: • Hampton Court Apartments (Cat B) - (182 Federal Street) • Public Trust Building (Cat B) - (11 Mayoral Drive)
Archaeology	The following NZAA archaeological site is recorded within the NoR: • R11/1703 (Mackle's Coachworks and Gledhill Cordial Manufacturer)
Cultural	TBC – Need further information from Te Tiriti Partnerships Team
Natural Environment	
Topography	• Undulating topography – there is a 10m grade difference between Mayoral Drive and Federal Street
Geology	• N/A
Catchment	• Waitemata stormwater catchment
Flooding & hydrology	• Floodplain within Mayoral Drive located south-east of the station box within the NoR footprint • Flood prone area located on the eastern side of Mayoral Drive (final NoR boundary mapping will confirm if this applies) • Overland flow paths within the NoR are largely contained within the road boundaries of Wellesley Street West and Mayoral Drive
Trees and vegetation	• Various street trees along Mayoral Drive • There are x3 scheduled tulip trees (ID 13) on western side of Mayoral Drive
Terrestrial Ecology	• The exotic and native street trees on Mayoral Drive near the intersection with Wellesley Street West are identified terrestrial habitats within this NoR
Freshwater Ecology	• There are no known freshwater ecological values at the proposed Te Waihorotiu Station location.

Figure 3 and Table 3 identify the relevant statutory considerations within the Te Waihorotiu Station NoR footprint

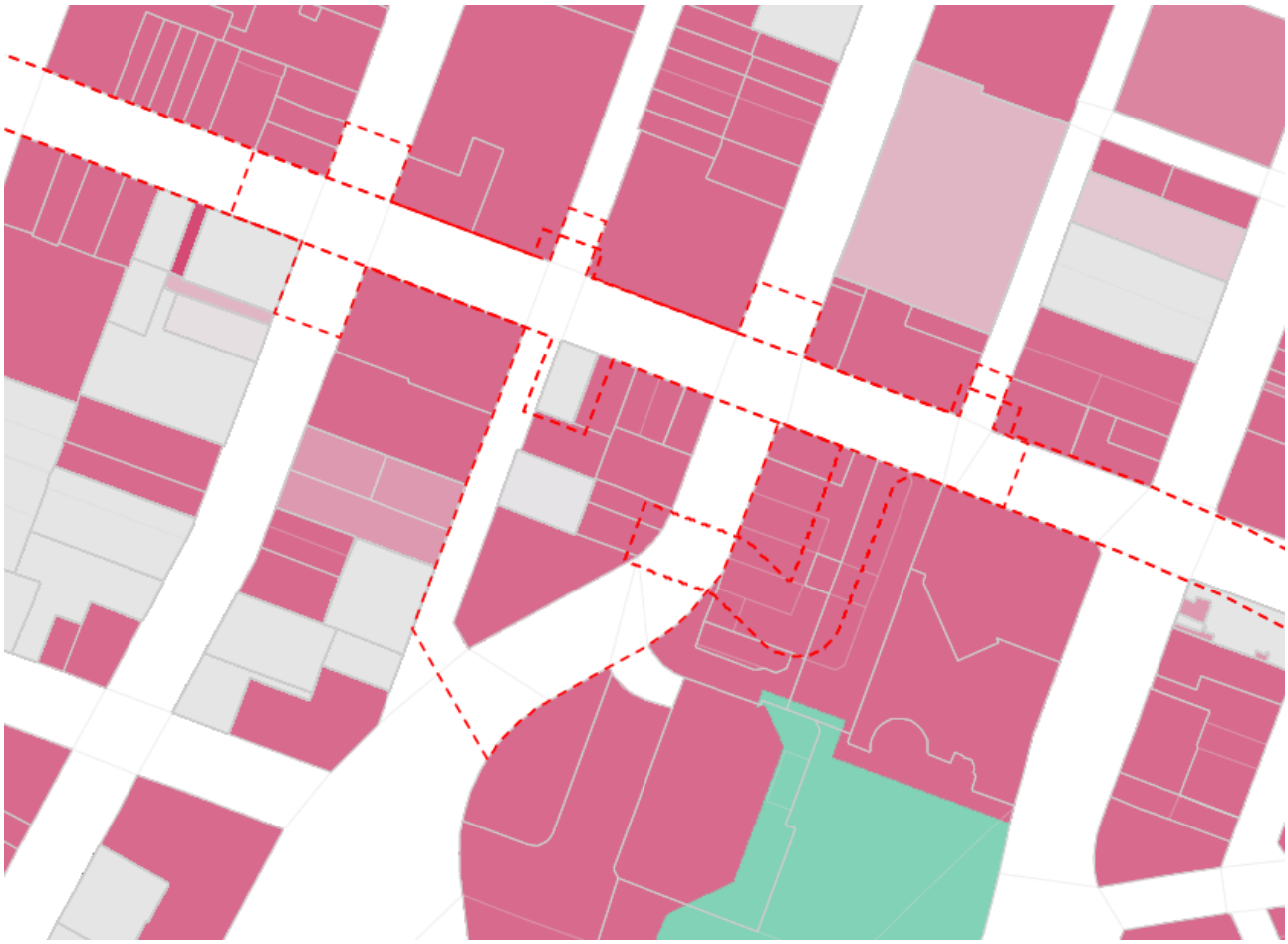

Figure 3 Te Waihorotiu NoR zoning and overlays in the AUP

Table 1:Te Waihorotiu Station NoR statutory environment

Name	Description	Comment
Current Zoning	Business – City Centre Zone	Zoning applies to entire NoR footprint
	Road	Applies to all roads within the NoR boundary
Precincts	Arts, Civic and Entertainment	Applies from Te Waihorotiu Station to Wellesley Street West
Controls	Macroinvertebrate Community Index - Urban	Applies to the entire NoR footprint
	Vehicle Access Restriction Control - General	Applies to frontage along Wellesley Street West and Mayoral Drive, notably, the CRL Te Waihorotiu Station entrance. Also applies to the corner of 72-78 Victoria Street located in north-west corner of NoR footprint
	Control: Arterial Roads	Applies to Wellesley Street West and Mayoral Drive
Overlays	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place [rcp/dp] – 1965, Hampton Court	Applies to site at 182 Federal Street
	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place [rcp/dp] – 1985, Public Trust Building	Applies to 11 Mayoral Drive
	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place [rcp/dp] - 2730, Bledisloe House	Applies to 24 Wellesley Street West
	Natural Heritage: Notable Trees Overlay - 13, Tulip Tree, Unverified position of tree	Located within Mayoral Drive

	Natural Heritage: Notable Trees Overlay - 10, Pohutukawa, Verified position of tree	Applies to 132 Hobson Street which is adjacent to the NoR.
	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place [rcp/dp] - 1971, St Matthew-in-the-City	Applies to 132 Hobson Street which is adjacent to the NoR.
Designations	Designation – 2500-2, City Rail Link-substrata, Mayoral Drive to New North Road, City Rail Link Limited	Applies to 11 and 13 Mayoral Drive
	Designation – 2500-1, City Rail Link-substrata, Mayoral Drive to New North Road, City Rail Link Limited	Applies to 11 & 13 Mayoral Drive and 135 Albert Street. The area included within the NoR is limited to the site frontage.
	Designations: Designations - 8831, Penrose to Hobson Street Tunnel and Penrose Portal, Designations, Vector Ltd	Applies to Federal Street, 132 Hobson Street and part of Mayoral Drive road boundary
	Designations: Designations - 2500-3, 2500-3 City Rail Link-strata Mayoral Dr to New North Rd, Designations, City Rail Link Limited	Applies to Mayoral Drive
Regional Plan Controls and Overlays	Natural Heritage: Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay – E10, Mount Eden - Viewshafts	Applies to the areas to the west of the Albert Street and Wellesley Street West intersection within the NoR
Zoning within 800m catchment	• Business – City Centre Zone • Business – Mixed Use Zone • Residential – Terrace Housing and Apartment Buildings Zone (south-west) • Open Space – Civic Spaces Zone • Open Space – Informal Recreation Zone • Open Space – Community Zone (east) • Open Space – Conservation Zone (north-east)	Zoning currently within 800m of the Te Waihorotiu Station NoR
Anticipated future zoning within 800m catchment (construction, operation)	No change to current zoning.	Several qualifying matters apply to the NoR footprint, which reflect the overlays, designations and controls captured in the table above.
Other relevant considerations	N/A	N/A

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operation phases of the Project as they relate to the Te Waihorotiu Station NoR.

This builds on the technical assessments included in Volume 3 and the Design and Construction Report in Appendix XX. Section XX outlines the indicative methodology used for these assessments.

1. Traffic and transport

The Assessment of Transport Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on traffic and transport. This section focuses on the transport effects specific to Te Waihorotiu Station NoR. Further discussion on the route-wide transport effects is considered in Section XX.

Key transport features within and adjacent to the Te Waihorotiu Station NoR include:

- **Public transport (bus services):** Numerous bus stops and routes are located within close proximity to the Te Waihorotiu Station, including several bus stops on Wellesley Street (between Mayoral Drive and Queen Street) and stops for north-south services on Queen Street and Hobson Street.
- **Public transport (heavy rail):** The Te Waihorotiu Station is located adjacent to the CRL Te Waihorotiu Station heavy rail network which is currently under construction.
- **Roading networks**: Wellesley Street West (to the north) is classified as an Arterial Road and Mayoral Drive is a Collector Road under the AUP(OP). Daily traffic movements along these roads are approximately 7,640 (Wellesley) and 8,990 (Mayoral Drive) respectively.
- **Walking**: There are good walking facilities within the city centre with a grid network of streets and pedestrian cut-throughs. As the Te Waihorotiu Station is located within the city centre, there is significant walking activity between public transport facilities and origin destinations.
- **Cycling:** Cycle facilities within the immediate vicinity of the Te Waihorotiu Station are limited to unprotected cycle lanes on Vincent Street and the southern side of Mayoral Drive. There are also shared zones on Federal Street and Elliot Street
- **Parking:** Limited parking is available within the vicinity with a mix of on-street parking and loading bays on Federal Street.
- **Loading:** There are no dedicated loading bays within the NoR footprint, however, there would be adequate space for loading vehicles to temporarily park on Federal Street.
- **Freight**: There are no strategic freight routes within the city centre in and around the proposed Te Waihorotiu Station.

The Te Waihorotiu Station will form part of the future light rail network, improving connectivity along the alignment.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, Te Waihorotiu Station will provide:

- Enhanced walking environment within the wider area and compliment the Wellesley Street Bus Improvements Project [1] which seeks to create a pedestrian/bus only route with wider footpaths and better crossing facilities between Wellesley Street West and Albert Street.
- Improved connectivity across public and active transport modes within the vicinity of the NoR footprint with high interchange rates between the CRL Te Waihorotiu Station and bus network anticipated.

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section XX. The proposed works at Te Waihorotiu Station NoR will potentially result in the following adverse construction traffic effects:

- **Public transport (bus services)**: Noting the Te Waihorotiu Station is a key interchange for public and active modes of transport, existing bus services are anticipated to experience delays due to the increase of construction traffic around and within the NoR. Further, the Mayoral Drive bus lane will become a shared bus and general traffic lane due to the closure of three lanes on Mayoral Drive which contributes to increased traffic delays.
- **Public transport (heavy rail)**: It is anticipated that the operation of train services via the Te Waihorotiu CRL Station and entry/exit via Mayoral Drive and Wellesley Street West will be maintained throughout construction activities.
- **Roading network:** Road closures are required to accommodate construction activities**.** This includes the closure of two northbound lanes and one southbound lane on Mayoral Drive. One lane in each direction on Wellesley Street West will also be closed during construction works.
- **Walking**: The southern footpath on Wellesley Street West will be closed for periods during the works. The western footpath on Mayoral Drive will be closed, with pedestrians diverted to the eastern side of the road.

- **Cycling**: While there are no dedicated cycling facilities impacted by construction in the NoR, cyclists will be required to navigate a new road layout that may change with construction phasing, and likely experience increased travel times corresponding to road closure and diversions.
- **Private vehicles**: Increased heavy traffic movements at the site will see a marginal increase in travel times by general traffic during construction. Some delays will be incurred by vehicles rerouting to avoid the closure of Mayoral Drive northbound. Effects of the road diversions will be largely concentrated at Wellesley Street West/Mayoral Drive intersection, and main intersections opposite the construction works identified within the NoR footprint.
- **Parking**: The on-street parking available on Federal Street will be temporarily closed. Alternative parking locations available near the Te Waihorotiu Station, including the Civic and Downtown car park buildings.
- **Loading**: The unofficial loading bay areas on Federal Street will be closed during construction works.
- **Emergency services**: Emergency vehicles travelling to and around the immediate vicinity of the site may experience delays relating to construction traffic.
- **Freight**: N/A - The roads within the NoR footprint are not identified freight routes. As such, there will be no additional effects over and above the route-wide effects discussed in Section XX.

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Construction Traffic Management Plan (CTMP) as specified in proposed condition 17 of the draft condition set in Appendix XX. The Assessment of Transport Effects recommends the following opportunities for inclusion in a CTMP in relation to Te Waihorotiu Station:

- **Public transport (bus services)**: Prioritising of bus movements within shared traffic lanes on Mayoral Drive where possible to allow buses ahead of general traffic.
- **Public transport (heavy rail)**: Staging construction works to provide minimal disruption to operation of the Te Waihorotiu CRL Station.
- **Roading network**: The construction site entry and exit onto Wellesley Street West in both directions. This option gives trucks more flexibility and efficiency to carry out required deliveries and minimises impact on inner city streets. Maintaining at least one southbound lane on Mayoral Drive and one lane in each direction on Wellesley Street West will support continued traffic flows.
- **Walking**: Maintaining access at all times for the businesses and residents located on Federal Street for the duration of construction works.
- **Cycling**: No additional effects over and above the route-wide effects discussed in Section XX are anticipated with respect to cycling.
- **Parking:** It is considered that there are alternative parking locations available near the Te Waihorotiu Station, including the Civic and Downtown car park buildings, such that no mitigation is required for the loss of parking spaces during construction. Therefore, no additional effects over and above the route-wide effects discussed in Section XX are anticipated.
- **Loading:** There will be no additional effects over and above the route-wide effects discussed in Section XX.
- **Emergency services**: Provision for emergency services in and around the construction site. will be made, this will be discussed with emergency service providers prior to construction being undertaken.
- **Freight:** N/A

4. Operational effects

There are no adverse operational effects on transport from Te Waihorotiu Station NoR. Following construction at the station, the road layout will be improved as per the schedule of completed works listed in the Design and Construction Report.

5. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3 Appendix XX and the proposed mitigation, the actual and potential traffic and transport effects associated with the Project will be appropriately managed.

2. Landscape and Visual

The Assessment of Landscape and Visual Effects (LVA), included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to the effects on the natural and urban landscape (including visual effects). This section focuses on the landscape and visual effects specific to the Te Waihorotiu Station NoR. Further discussion on the route-wide landscape and visual effects is considered in Section XX.

The urban form within the Te Waihorotiu Station NoR represents the original nineteenth century walkable city between Queen Street and Eden Terrace. The Te Waihorotiu Station is located just off the ridge on the western side of the Queen Street Valley, at the intersection of two key central streets being Wellesley Street West and Albert Street/Mayoral Drive. The built character surrounding the NoR reflects a diverse range of activities within the immediate vicinity, including commercial, retail, residential, entertainment and community facilities.

The natural landscape within the Te Waihorotiu Station NoR is characterised by the undulating topography between the Federal Street ridge dropping steeply to the Waihorotiu Stream valley (Queen Street). The Waihorotiu Stream is fully piped and there are no rivers or permanent streams within the NoR.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, this station will provide:

- Activation of the street frontages on Mayoral Drive and Wellesley Street West, attracting and delivering high pedestrian flows (cumulative to those generated by the CRL Te Waihorotiu Station), and repairing the existing poor activation of these frontages.
- Contribution to the legibility of the transport network. The station building will have visibility in sightlines along Wellesley Street (including from the intersection with Queen Street) and Albert Street/Mayoral Drive.
- Spatial definition of the intersection of Wellesley Street and Mayoral Drive, repairing the existing weak definition of this corner.

2. Construction effects

The construction works within the Te Waihorotiu Station NoR will involve typical construction activities, including the demolition of buildings to enable development, and therefore any adverse effects would be limited to the immediate surrounds. In this case, the proposed construction works will require the removal of three buildings at 44-52 and 54 Wellesley Street West and 190 Federal Street. In this regard, it is considered the proposal will not result in any additional effects on the landscape and urban environment than those discussed in the route-wide effects in Section XX.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects and specified in the proposed draft condition set in Appendix XX.

4. Permanent infrastructure

The works within the Te Waihorotiu Station NoR will result in a change in the urban form and natural landscape. In particular, these changes involve the removal of three buildings. The design, quality, and contribution of these buildings to the streetscape has been assessed in the LVA, and the following conclusions are made:

- The building at 44-52 Wellesley Street West is occupied by a ten-level tower, car parking at the street level and under-scale podium to Mayoral Drive. The building has an ordinary appearance with a large blank wall facing Wellesley Street West that has poor urban design qualities. As such, it is considered the proposal provides an opportunity for an improved streetscape and amenity outcome provided by the construction of the Te Waihorotiu Station.
- The building at 190 Federal Street is occupied by a two-storey mid-century commercial building currently utilised as a gym. This building provides little contribution to the streetscape such that its removal provides opportunities to promote better urban design outcomes and improve streetscape amenity along Federal Street.
- The building at 54 Wellesley Street West is occupied a four level, traditional masonry building that contains an office lobby, car park access at street level and local shop. This building does contribute positively to existing streetscape character, however, it is considered the effects associated with removing this building are

outweighed by the overall positive effects resulting from improved streetscape amenity and integration opportunities created by the construction of the Te Waihorotiu Station.

Having regard to the above, it is considered that the removal of these buildings will not result in any adverse landscape and visual effects.

5. Permanent infrastructure and mitigation measures

Mitigation of landscape and visual effects common to the whole Project is discussed in Section XX and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to the Te Waihorotiu Station NoR, the Assessment of Landscape and Visual Effects identifies the following opportunities for inclusion in the CULDG when undertaking the design of the station:

- Design requirements including façade treatment, colour/material palette, must be well integrated with buildings in the surrounding environment and respond to the specific streetscape and road context on Wellesley Street West, Mayoral Drive and Federal Street. In particular, the station should compliment the CRL Te Waihorotiu Station which is nearing completion; provision for wider footpaths on Wellesley Street West and Mayoral Drive to accommodate increased pedestrian flows; and
- Reinstate the shared multi-modal transit space on Federal Street post works completion.

6. Conclusion of landscape and visual effects

Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Social

[ASSESSMENT OF POTENTIAL ADVERSE SOCIAL IMPACT EFFECTS TO BE PROVIDED]

4. Cultural

[**TBC on cultural reporting**]

5. Built heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the enabling works, construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the Te Waihorotiu Station NoR.

The key historic heritage features within the Te Waihorotiu NoR are listed below and shown in Figure 4 below:

- Hampton Court Apartments (182 Federal Street)
- Public Trust Building (11 Mayoral Drive)
-

Figure 4 Historic heritage within Te Waihorotiu Station NoR

For context, the Hampton Court Apartment is a mid-rise Category B heritage building of reinforced concrete construction with brick infill facades founded on shallow spread footing foundations. The Public Trust Building is a low to mid-rise Category B heritage building incorporating reinforced concrete floors and framing and reinforced brick masonry perimeter walls and founded on shallow foundations.

Other buildings immediately adjacent the NOR boundary and closest to development include St Matthews-in-the-City, Bledisloe House and the Civic Theatre. The latter has a small overlap with the NoR 3 boundary.

1. Positive effects

In addition to the positive route-wide effects outlined in section X, the Project design has been undertaken in a manner that retains the above-mentioned heritage buildings in their current form.

2. Construction effects

The construction works within the Te Waihorotiu Station NoR will involve typical construction activity including demolition of adjoining buildings, groundworks and construction. Cumulatively, the higher potential impact on the Hampton Court Apartments and Public Trust Building built heritage places of considerable values will result in potentially moderate to significant adverse effects on the heritage values that require careful consideration and management.

Effects associated with wider construction related activities have been addressed in Section 1.4.10 (Construction Noise and Vibration) and Section 1.4.13 (Settlement and Structures).

3. Construction mitigation measures

Mitigation of built heritage effects common to the whole Project are discussed in Section XX. This mitigation takes the form of an Archaeology and Built Heritage Management Plan (ABHMP), specified in proposed condition 25 of the draft condition set in Appendix XX. Although risks are identified, they are also typically well understood as construction risks. They can be readily managed and avoided or reduced in intensity through good construction practices which will be set out in the HHMP. Should adverse effects to built heritage fabric accidentally occur, despite precautions to manage such risk, they are likely to be of a low adverse nature and can be typically remediated or mitigated if required. Therefore, no additional mitigation is recommended other than what may be set out in an ABHMP. For these places, specific features and details may be identified through onsite survey at an appropriate time, to be established via engagement required under the CNVMP or as required under the SMP and cross-referenced to the HHMP for each NoR.

4. Operational effects

There are negligible operational effects on built heritage requiring any mitigation beyond that set out in a ABHMP or associated management plans for noise and vibration.

5. Operational mitigation measures

For mitigation of these effects, the Assessment of Historic Heritage Effects recommends:

- Preparation of a ABHMP to manage any actual and potential adverse effects.
- With reference to the NoR CNVMP and SMP, further assessment at an appropriate stage to confirm if vibration / settlement monitoring is required.

6. Conclusion of built heritage effects

Based on the assessment above, the Built Heritage Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on Built Heritage associated with the Project will be appropriately managed.

6. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to the Te Waihorotiu Station NoR. Further discussion on the route-wide effects on archaeology is considered in Section XX.

In pre-European history, Māori settlement was featured predominantly in the CBD, with the three bays (Waiatarau, Horotiu and Te Toangaroa) separated by a headland pa. Waihorotiu was a prominent stream that emptied into these bays that ran down the gully now known as Queen Street. In addition to the pa, several kainga were present in the CBD in vicinity of Queen Street. In the 19th century, the block where the Te Waihorotiu Station is proposed has been used for a range of commercial and industrial uses. In the 1970s, the block was modified when Albert Street and Federal Street were truncated to form Mayoral Drive.

There are no known lava flows that will be affected by the proposed works. In this case, there are a total of 65 archaeological sites (NZAA) and heritage items (CHI) identified within 200m of the NoR footprint, however, only three items are determined to be within the NoR footprint and therefore relevant for the purpose of this assessment.

The archaeological and heritage features identified within the Te Waihorotiu Station NoR are listed below and shown in **Figure 5** below:

- R11/1703 Mackies Coachworks and Gledhill Cordial Manufacturer ('**Mackie's Coachworks'**) (previously Lot 4 and Part Lot 5 Sect 30, City of Auckland)
- Hampton Court Apartments (182 Federal Street)
- Public Trust Building (11 Mayoral Drive)

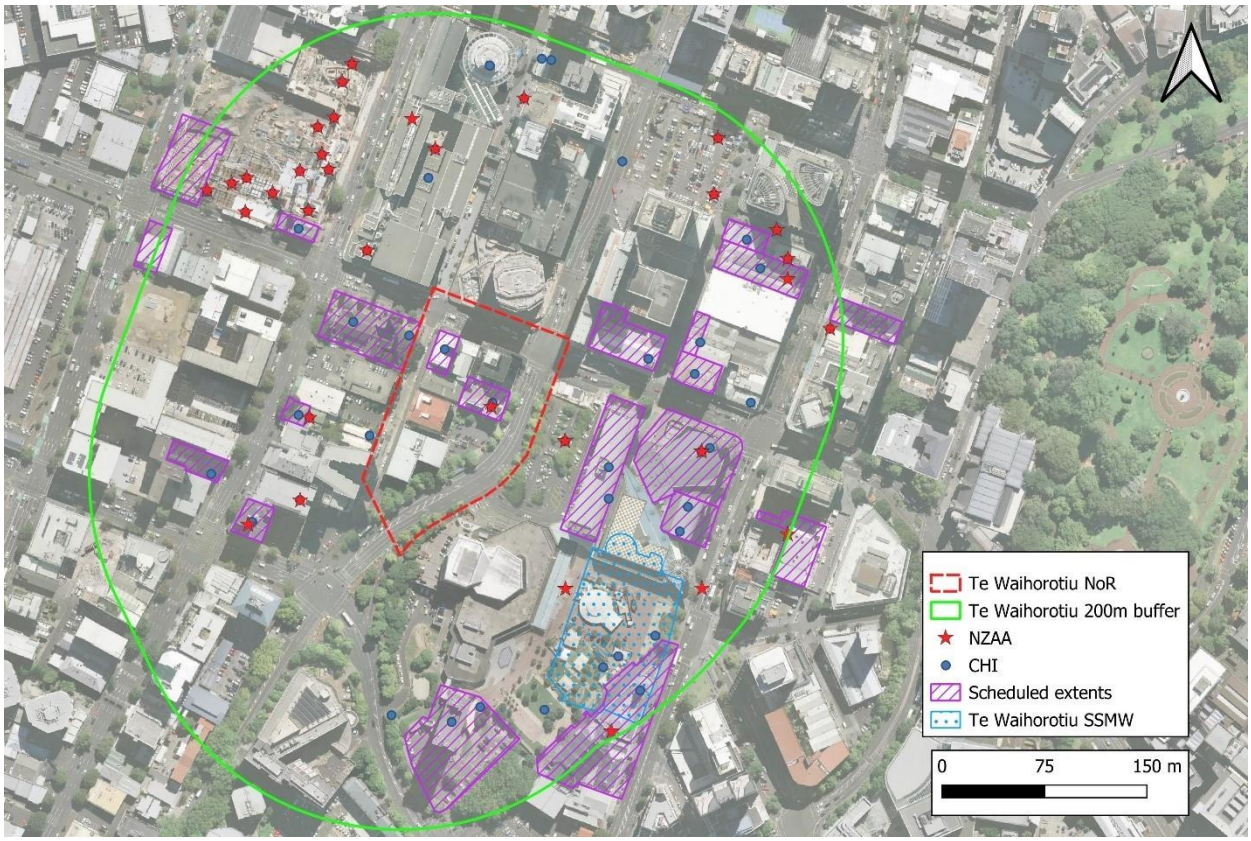

Figure 5 Archaeology within Te Waihorotiu Station NoR

Effects associated with the Public Trust Building and Hampton Court Apartments have been discussed in Section 1.4.6 above and will not be subject to further archaeological assessment.

The Mackie's Coachworks (R11/1703) is the only identified historic NZAA archaeological site within the Te Waihorotiu Station NoR. This site was originally recorded in 1990, however was subsequently demolished and does not exist in built form within the existing environment. Despite the building being demolished, it is possible that sub-surface features are located underneath where the structure was located. The surrounding area has been significantly modified over time such that there are no physical or aesthetic values attributable to this location, rather the value is limited to historical association only. The site's historical value is no longer legible, and does not hold the same value or significance as it would if the building was still standing. Overall, this site has limited heritage values.

1. Positive effects

No positive effects on archaeology have been identified as by its very nature, construction requires disturbance of the ground in which archaeological remains may be present. However, management processes can be established to enable the recording of archaeological material found during construction of the Project, providing valuable insight into the history of a site.

2. Construction effects

The construction works at Te Waihorotiu Station will potentially result in damage to sub-surface materials in the vicinity of the site that was formally occupied by the Mackie's Coachworks (R11/1703) site, which holds limited archaeological value. Aside from potential damage to sub-surface materials, it is considered the construction works within the Te Waihorotiu Station NoR will not result in any additional construction effects than those set out in the route wide effects included in Section XX.

3. Construction mitigation measures

Mitigation of archaeological effects common to the whole Project is discussed in Section XX. This mitigation takes the form of an Archaeology and Built Heritage Management Plan (ABHMP), inclusive of accidental discovery protocols for archaeological features, specified in proposed Condition 25 of the draft condition set in Appendix XX. There are no specific archaeological effects that require mitigation with respect to the Te Waihorotiu Station NoR.

In addition, an Authority to Modify or Destroy the whole or any part of both a recorded site (Mackie's Coachworks R11/1703) and unrecorded archaeological sites will be sought from Heritage New Zealand Pouhere Taonga under s44 of the Heritage New Zealand Pouhere Taonga Act 2014.

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during the construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on archaeology associated with the Project will be appropriately managed.

7. Arboriculture

The Arboricultural Assessment, included as Appendix XX in Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on arboriculture. This section focuses on the arboricultural effects specific to the Te Waihorotiu Station NoR. Further discussion on the route-wide arboricultural effects is considered in Section XX.

Arboriculture within the Te Waihorotiu Station NoR includes generally protected street trees located within roads, and a number of scheduled trees which are listed as follows and shown in **Figure 6**.

- Mayoral Drive contains an avenue of tulip trees that are scheduled notable trees in the AUP(OP).
- Scheduled pohutukawa tree within road reserve adjacent to 187 Federal Street (proposed to be retained)

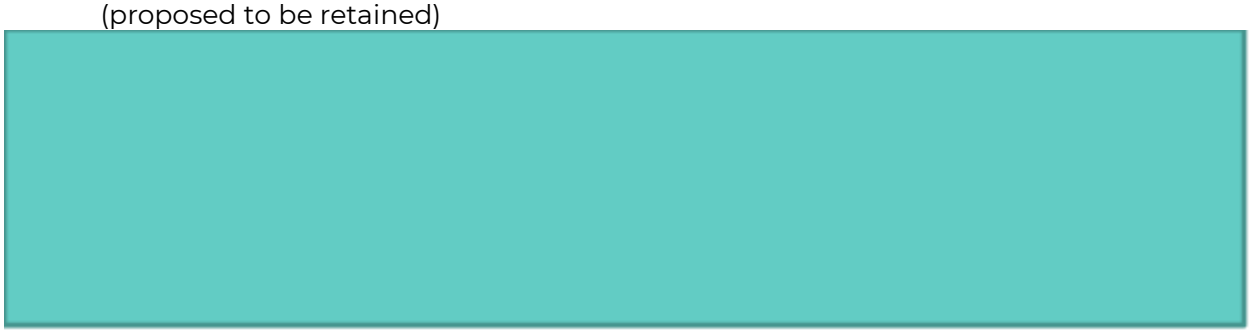

Figure 6 Protected trees within Te Waihorotiu Station NoR

1. Positive effects

The proposed station works will retain some of the scheduled pohutukawa trees within the NoR along Mayoral Drive.

2. Construction effects

Up to six tulip trees and one Queensland Box are required to be removed on Mayoral Drive to facilitate the construction of the station building and provide sufficient space for construction traffic to enter and exit to the site. Three of the tulip trees are scheduled notable trees.

3. Construction mitigation measures

Mitigation of arboricultural effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Tree Management Plan (TMP), specified in proposed condition 26 of the draft condition set in Appendix XX. In addition, the following mitigation measures are proposed in respect to the Te Waihorotiu Station NoR:

- At times where site access is required off Federal Street, the crown of the scheduled pohutukawa tree in the road reserve and plaza trees should be fenced off from any access and other activities for the duration of station construction.
- Replacement planting should be provided where possible. The development of replacement planting should include consideration of the notable features of the tree, such as the reason for scheduling and any special characteristic the tree has. Replanting should aim to replicate the special characteristics of the tree.

4. Operational effects

There are no operational effects on arboriculture. The potential for adverse effects on arboriculture will occur only during the construction of the Project.

5. Conclusion of arboricultural effects

Based on the assessment above, the Arboricultural Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on arboriculture associated with the Project will be appropriately managed.

8. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project, as they relate to hydrology and flooding. This section focuses on the hydrology and flooding effects specific to the Te Waihorotiu Station NoR. Further discussion on the route-wide hydrological effects is considered in Section XX.

The Te Waihorotiu Station NoR is located within the Waitemata stormwater catchment. The key hydrological features, inclusive of flooding hazards are listed below and shown in Figure 7 below:

- Overland flow path along Wellesley Street West falling the same direction as the surface gradient, with ponding on the junction of Queen Street.
- Flood prone areas on the eastern side of Mayoral Drive.
- No floodplains identified within the proposed Te Waihorotiu Station location, however, there is a floodplain that extends along Federal Street and Albert Street to the north of the station which is captured within the Te Waihorotiu Station NoR footprint.

The key hydrological features, inclusive of flooding hazards are shown in **Figure 7** below:

Figure 7 Hydrology within the Te Waihorotiu Station NoR

1. Positive effects

There are no positive effects in relation to flooding on this site. In particular, the Project has been designed to ensure construction and operation works will not alter, divert or change, increase or exacerbate existing flooding hazards, to ensure no adverse effects on people and the environment.

2. Construction effects

The construction works at Te Waihorotiu Station have been designed to ensure no adverse impact on flooding hazards, including overland flow paths and floodplains within the vicinity. Any effects associated with flooding on the wider Project are discussed in the route wide flooding effects assessment in Section XX.

3. Operational effects

[TBC following the report. Will need to assess the impact of the permanent infrastructure within flood plain and overland flow path]

4. Mitigation measures

[TBC]

5. Conclusion of flooding effects

Based on the assessment above, the Hydrological Assessment in Volume 3 of Appendix XX and the proposed mitigation, the actual and potential effects on flooding associated with the Project will be appropriately managed.

9. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phases of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to the Te Waihorotiu Station NoR. Further discussion on the route-wide construction noise and vibration effects are considered in Section XX.

The existing ambient environment is dominated by traffic and mechanical services noise. Typical of a city centre acoustic environment.

The sensitive receivers are listed within Table 2 of this NoR, however those of particular note within the Te Waihorotiu Station NoR include the following buildings which will be acquired and unoccupied during construction:

- Hampton Court Apartments (182 Federal Street identified as 6 below)
- Former Public Trust Office (11 Mayoral Drive identified as 7 below)

These sensitive receivers are also shown in **Figure 7** below. It is noted that there are three notable receivers within approximately 45m to 125m of the Te Waihorotiu Station (outside the NoR), including Sky City Theatre (identified as 5 below), Civic Theatre (identified as 17 below) and Aotea Theatre (identified as 18 below).

Figure 7 Potential receivers within and near to Te Waihorotiu NoR

1. Positive effects

Section X of this AEE outlines route wide positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. Construction noise effects

The construction works at Te Waihorotiu Station will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the CBD Worksite construction noise standards as applicable in this location. As the Hampton Court Apartments and Public Trust Office will be acquired and unoccupied during the construction works no assessment of noise effects in relation to these receivers is required.

Based on the noise modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts that there will be infringements of the Suburban Worksite noise standards at receiver ID 8 in Figure 7 during the day. These infringements could range from 5-10 decibels, typically one to three hours at a time. The nature of these effects ranges from hearing protection for long-term exposure (outdoors) to unacceptable noise levels indoors for any extended periods. In general, most construction activities would comply with the noise standards.

The Construction Noise and Vibration Assessment has considered noise effects on the three notable receivers and concluded that the internal noise levels would be just audible at times. As events at these receivers are generally held outside construction hours a potential adverse noise effect on these receivers is unlikely.

3. Construction noise mitigation measures

Mitigation of construction noise effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved via a Schedule to the CNVMP. No additional noise measures are required at Te Waihorotiu Station.

4. Construction vibration effects

The construction works at the Te Waihorotiu NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted the potential infringement of the vibration standards in this location using compaction activity given the sustained vibration produced, usually over a period of days while fill is compacted.

The effects of construction vibration take two forms:

- Potential for building damage; and
- Potential for loss of amenity.

Building damage

Based on the vibration modelling undertaken for the site, applying the highest vibration generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts that there will be infringements of the Suburban Worksite cosmetic building damage vibration standards at receivers identified in Figure XX as 6 and 7.

Vibration levels are predicted to comply with the cosmetic building damage vibration standards at the three notable receivers identified.

Amenity

The Construction Noise and Vibration Assessment predicts vibration levels to be up to 0.5mm/sPPV, complying with the Project construction vibration amenity standards.

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction vibration standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project vibration standards can only be achieved only via a Schedule to the CNVMP. The Construction Noise and Vibration Assessment

recommends the following with respect to receiver No 6 Hampton Court Apartments and receiver No 7 Former Public Trust Office:

- Identify the location of the vibration sensitive features.
- Identify existing measures to mitigate environmental vibration within the receiving building and its vibration sensitive features.
- Monitoring for compliance and management purposes.

6. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

10. Operational noise and vibration

[ASSESSMENT OF POTENTIAL OPERATIONAL NOISE AND VIBRATION EFFECTS TO BE PROVIDED]

11. Blasting overpressure and vibration

Construction activities requiring blasting to be undertaken are not anticipated in the Te Waihorotiu Station NoR.

12. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project as related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blast Management Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of damage to buildings and structures.

This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to Te Waihorotiu Station NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.

For context, the existing built environment within and surrounding the Te Waihorotiu NoR footprint ranges from modern multi-storey piled structures to low-rise heritage brick masonry buildings on shallow foundations. Building use comprises a mix of residential, historic, religious, entertainment, commercial and retail.

The only buildings identified as falling within the Project vibration threshold setback by the Settlement and Structures Assessment are 182 Federal Street (Hampton Court Apartments) and 11 Mayoral Drive (Former Public Trust Building).

The characteristics of these buildings with respect to settlement/structures is summarised below:

- Hampton Court is a mid-rise Category B heritage building of reinforced concrete construction with brick infill facades founded on shallow spread footing foundations.
- Public Trust Buildings is a low to mid-rise Category B heritage building incorporating reinforced concrete floors and framing and reinforced brick masonry perimeter walls and founded on shallow foundations.

1. Positive effects

There are no positive effects on buildings or structures with respect to vibration and settlement.

2. Construction vibration induced effects

Vibration induced building damage common to the entire Project area is discussed in Section XX. The Structures and Settlement Assessment has identified the following potential effects on the Public Trust Building and Hampton Court, both located within the NoR footprint and being retained:

- Cracking or extension of existing cracks of a superficial nature to facades and brick cladding, unreinforced brick masonry walls; and
- Cracking of a superficial nature to joints of plasterboard wall and ceiling linings to the interior of the buildings.

For surrounding buildings that fall outside the vibration threshold setback distances the potential for damage to these buildings is negligible.

3. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Sections XX and XX, in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CNVMP, and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Settlement effects common to the entire Project area are discussed in Section XX. The Structures and Settlement Assessment has identified the following potential effects on the Public Trust Building and Hampton Court, both located within the NoR footprint and being retained:

- Cracking of a superficial nature to facades, walls and plasterboard joints;
- Superficial cracking of floor slabs;
- Roof drainage affected;
- Grade effects at building entrances; and
- Possible stuck windows and minor redecoration.

The Structures and Settlement Assessment has identified the Public Trust Building and Hampton Court fall within a risk category of Moderate or greater.

There are no buildings adjacent to the Te Waihorotiu Station NoR with potential settlements greater than 10 mm and ground slopes greater than 1/500. This corresponds to effects that are expected to be at worst, 'Very Slight' but will typically be Negligible.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx, in the form of a Settlement Management Plan (SMP), recommended in condition XX to to provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. Operational settlement and vibration induced effects

There are no settlement induced effects associated with the operation of the Project. The potential for settlement effects will occur only during the construction of the Project.

Vibration effects on buildings, resulting from the operation of the Project are addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section xx.

7. Conclusion of settlement and structure effects

Based on the assessment above, the Settlement and Structure Assessment in Volume 3 (Appendix XX) and the proposed mitigation, the actual and potential effects on buildings will be appropriately managed.

13. Geological Heritage

The Geological Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects on geological heritage features during the construction phase of the Project as they relate to construction activities in proximity to these features. This section focusses on the volcanic features within the vicinity of the Te Waihorotiu Station NoR. Further discussion on the route-wide effects on volcanology is considered in Section XX.

The Te Waihorotiu Station NoR footprint is in the Waitemata sediment foundations. There are no volcanological issues or impacts on geological heritage in this location.

1. Notice of Requirement

1. NoR 3 - Te Waihorotiu Station NoR

This section:

- Describes NoR 3 – Te Waihorotiu Station (Section 1.2)
- Summarises the existing and receiving environment (Section 1.3)
- Assesses potential effects and outlines proposed mitigation (Section 1.4)

2. NoR description

The Te Waihorotiu Station NoR is located in the city centre at the corner of Wellesley Street West, Federal Street and Mayoral Drive. The land use activities surrounding the station are predominantly commercial activities, including offices, retail, food and beverage as well as residential uses and various community and entertainment facilities.

Figure 1 shows the Te Waihorotiu Station and NoR boundary. **Figure 2** shows the NoR boundary on aerial imagery (outlined in red). Table 1 summarises the Te Waihorotiu Station's permanent features and temporary construction works.

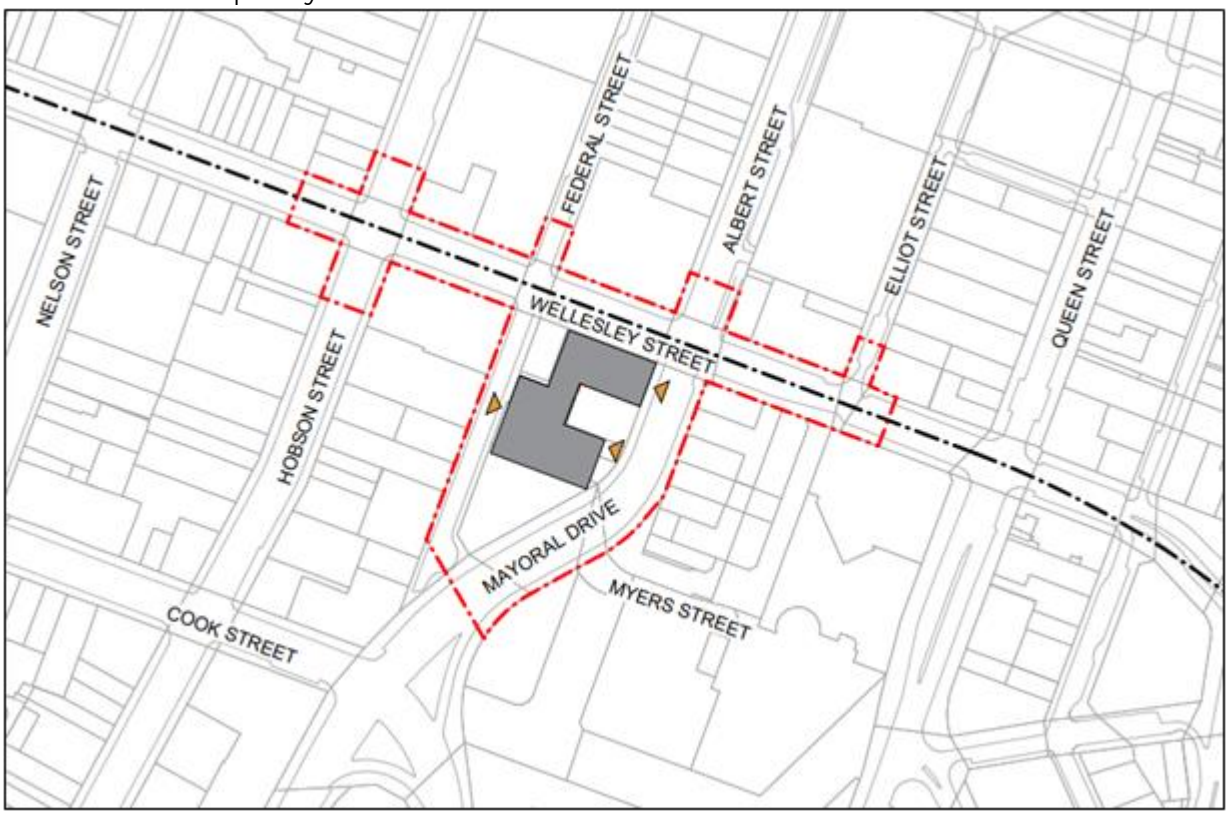

Figure 1 Te Waihorotiu Station Location Plan

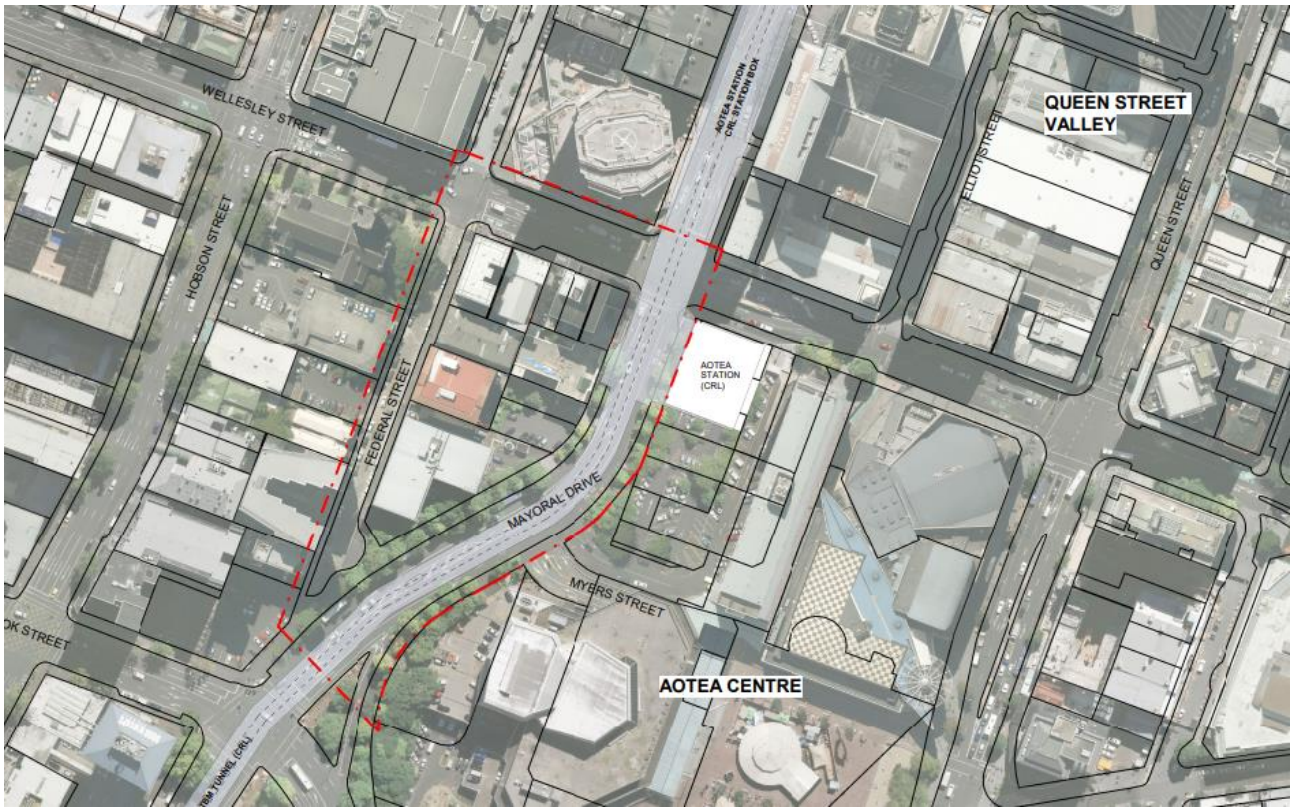

Figure 1 Te Waihorotiu NoR boundary on aerial imagery

Table 1 Te Waihorotiu Station NoR description

Permanent features	
Station	• Station located at the corner of the Wellesley Street West, Mayoral Drive and Federal Street; • Entrances on Wellesley Street West and Mayoral Drive, potential for east-west site connection via Mayoral Drive (east) and Federal Street (west); • Fire egress points are available within the Te Waihorotiu Station NoR that will connect to the wider tunnel designation/ alignment.
Platforms	• Underground, stacked platforms
Public realm	• New plaza within the station precinct
Road and streetscape	• Provision for new dedicated cycling connections to Mayoral Drive and Albert Street • Provision for new bus interchange on Wellesley Street West • Provision for new bus stops west of Mayoral Street and east of Queen Street • Provision for new pedestrian footpaths and shared active transit spaces • A midblock crossing is proposed on Mayoral Drive, to improve pedestrian accessibility between the ALR Station and Aotea Square
Parking and loading	• Provision for cycle parking and storage • Kiss and ride services • Vehicle loading bays for maintenance and emergency vehicles • Taxi pick up and drop off bays
Other new infrastructure	• N/A
Anticipated patronage	• High patronage.

Other	• CRL has future proofed a connection point for direct interchange with Te Waihorotiu CRL Station via below ground concourse. • Retention of heritage buildings at 182 Federal Street (Hampton Court) and 11 Mayoral Drive (Public Trust Building)
Anticipated construction works	
Construction methodology and staging	Refer to AEE Section 6 and DCR Section X for more detail. At a high level the construction activities will include: • Demolition and site clearance (including relocation and protection of utilities); • Removal of existing trees along Mayoral Drive; • Protection and monitoring installed to heritage buildings if required; • Establish site offices, amenities, dewatering and sediment control systems; • Installation of ground support along the station perimeter, including anticipated secant piles or diaphragm walls; • Excavation of station shaft, including installation of propping and internal concrete wall lining; • Mine audits to connect shaft to monotube tunnel; • Station fitout; and • Upgrades and reinstatement of the surrounding streetscape.
Access to the site	• Access during construction will generally occur from Wellesley Street West, accessed at the Wellesley Street West/Federal Street intersection, and Mayoral Drive, accessed at the sites southern end, with some short-term access from Federal Street; • Pedestrian access along Western side of Mayoral Drive will likely be closed and diverted to opposite side of the road
Other	• Retention of heritage buildings at 182 Federal Street (Hampton Court) and 11 Mayoral Drive (Public Trust Building)

3. Description of the environment

This section sets out the existing and receiving environment for the Te Waihorotiu Station NoR. It applies the parameters on the assumptions outlined in Section XX.

Table 2 describes the surrounding area and features. Any property directly affected by this NoR is listed in NoR 3 and Form 18 in Appendix XX.

Table 1 Existing environment description

Feature	Description
Current land use	The land use within the vicinity of Wellesley Street West, Federal Street and Mayoral Drive is predominantly used for commercial activities, including offices, retail, food and beverage as well as residential uses and various community and entertainment facilities. There are no open space areas within the NoR footprint or immediate vicinity.
Physical Environment	
Transport	• Te Waihorotiu CRL station is located directly west of the NoR with the heavy line sited to the south of the site • Wellesley Street West and Mayoral Drive are both identified as arterial roads • Federal Street is identified as a primary collector road • Part of the NoR footprint on Wellesley Street forms part of an existing Midtown bus improvement project • Wellesley Street West is a key east-west bus route through the central city
Infrastructure	• No infrastructure at this location.

Community facilities and key attractions	There are no key community facilities or attractions within the NoR, however, there are various facilities within the immediate vicinity which are listed below: • Auckland Council Service Centre (Bledisloe House) • Civic Theatre • Sky City Theatre • Te Waihorotiu CRL Station • Auckland City Mission • St Matthews in the City
Sensitive noise receivers	• Quest on Hobson Apartment/Hotel (127 Hobson Street) • St Matthew's in the City (132 Hobson Street) • Auckland City Mission (140 Hobson Street) • Public Trust Building (11 Mayoral Drive) • The Grand by Sky City Hotel (90 Federal Street) • EconoLodge City Central/City Central Hotel (37 Wellesley Street West) • Crowne Plaza Auckland (128 Albert Street) • Elliot Street Apartments Hotel (15-31 Wellesley Street West)
Historic heritage	There are two scheduled buildings on the NZHPT register within the NoR: • Hampton Court Apartments (Cat B) - (182 Federal Street) • Public Trust Building (Cat B) - (11 Mayoral Drive)
Archaeology	The following NZAA archaeological site is recorded within the NoR: • R11/1703 (Mackle's Coachworks and Gledhill Cordial Manufacturer)
Cultural	TBC – Need further information from Te Tiriti Partnerships Team
Natural Environment	
Topography	• Undulating topography – there is a 10m grade difference between Mayoral Drive and Federal Street
Geology	• N/A
Catchment	• Waitemata stormwater catchment
Flooding & hydrology	• Floodplain within Mayoral Drive located south-east of the station box within the NoR footprint • Flood prone area located on the eastern side of Mayoral Drive (final NoR boundary mapping will confirm if this applies) • Overland flow paths within the NoR are largely contained within the road boundaries of Wellesley Street West and Mayoral Drive
Trees and vegetation	• Various street trees along Mayoral Drive • There are x3 scheduled tulip trees (ID 13) on western side of Mayoral Drive
Terrestrial Ecology	• The exotic and native street trees on Mayoral Drive near the intersection with Wellesley Street West are identified terrestrial habitats within this NoR
Freshwater Ecology	• There are no known freshwater ecological values at the proposed Te Waihorotiu Station location.

Figure 3 and Table 3 identify the relevant statutory considerations within the Te Waihorotiu Station NoR footprint

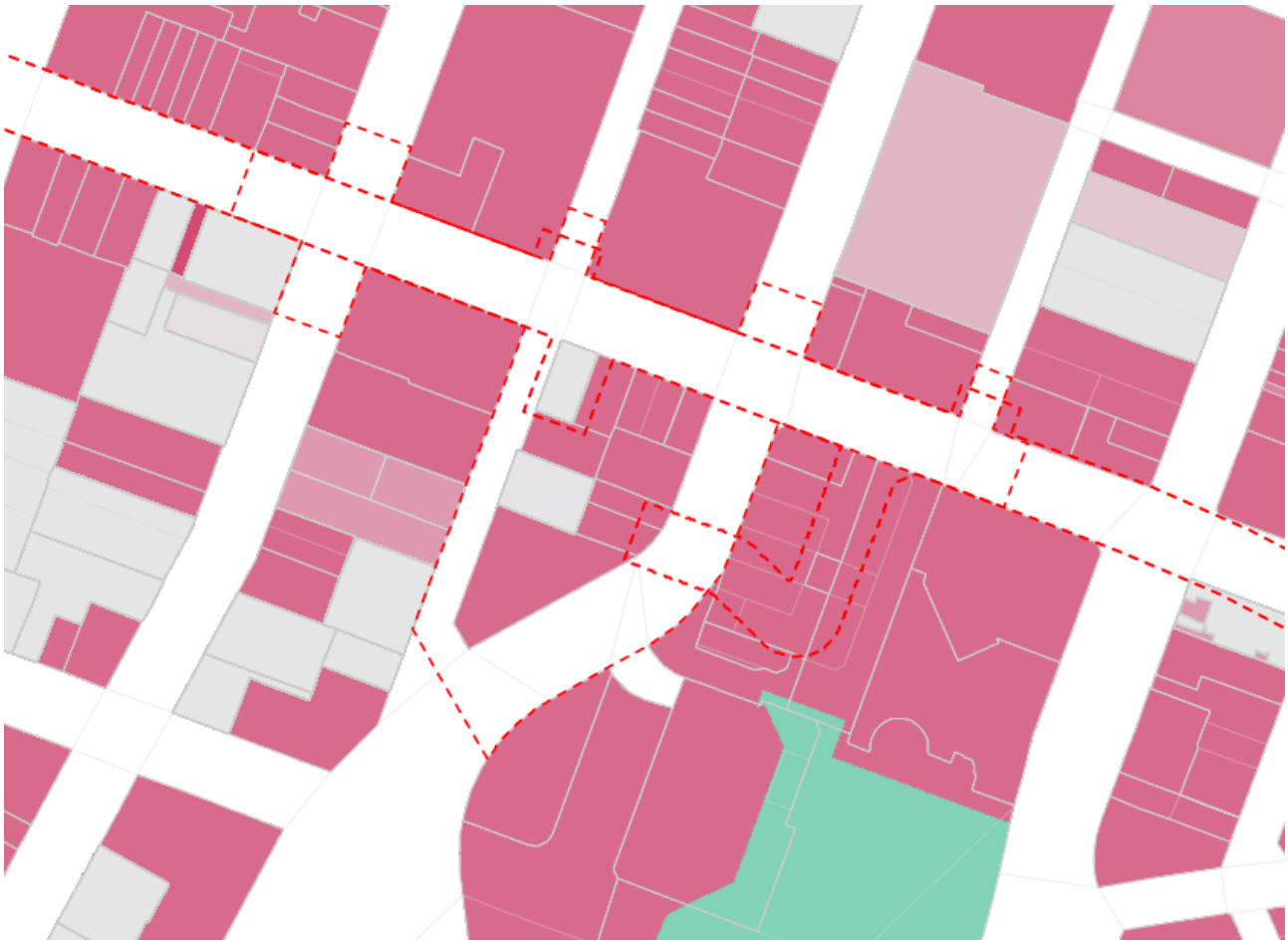

Figure 3 Te Waihorotiu NoR zoning and overlays in the AUP

Table 1:Te Waihorotiu Station NoR statutory environment

Name	Description	Comment
Current Zoning	Business – City Centre Zone	Zoning applies to entire NoR footprint
	Road	Applies to all roads within the NoR boundary
Precincts	Arts, Civic and Entertainment	Applies from Te Waihorotiu Station to Wellesley Street West
Controls	Macroinvertebrate Community Index - Urban	Applies to the entire NoR footprint
	Vehicle Access Restriction Control - General	Applies to frontage along Wellesley Street West and Mayoral Drive, notably, the CRL Te Waihorotiu Station entrance. Also applies to the corner of 72-78 Victoria Street located in north-west corner of NoR footprint
	Control: Arterial Roads	Applies to Wellesley Street West and Mayoral Drive
Overlays	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place [rcp/dp] – 1965, Hampton Court	Applies to site at 182 Federal Street
	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place [rcp/dp] – 1985, Public Trust Building	Applies to 11 Mayoral Drive
	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place [rcp/dp] - 2730, Bledisloe House	Applies to 24 Wellesley Street West
	Natural Heritage: Notable Trees Overlay - 13, Tulip Tree, Unverified position of tree	Located within Mayoral Drive

	Natural Heritage: Notable Trees Overlay - 10, Pohutukawa, Verified position of tree	Applies to 132 Hobson Street which is adjacent to the NoR.
	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place [rcp/dp] - 1971, St Matthew-in-the-City	Applies to 132 Hobson Street which is adjacent to the NoR.
Designations	Designation – 2500-2, City Rail Link-substrata, Mayoral Drive to New North Road, City Rail Link Limited	Applies to 11 and 13 Mayoral Drive
	Designation – 2500-1, City Rail Link-substrata, Mayoral Drive to New North Road, City Rail Link Limited	Applies to 11 & 13 Mayoral Drive and 135 Albert Street. The area included within the NoR is limited to the site frontage.
	Designations: Designations - 8831, Penrose to Hobson Street Tunnel and Penrose Portal, Designations, Vector Ltd	Applies to Federal Street, 132 Hobson Street and part of Mayoral Drive road boundary
	Designations: Designations - 2500-3, 2500-3 City Rail Link-strata Mayoral Dr to New North Rd, Designations, City Rail Link Limited	Applies to Mayoral Drive
Regional Plan Controls and Overlays	Natural Heritage: Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay – E10, Mount Eden - Viewshafts	Applies to the areas to the west of the Albert Street and Wellesley Street West intersection within the NoR
Zoning within 800m catchment	• Business – City Centre Zone • Business – Mixed Use Zone • Residential – Terrace Housing and Apartment Buildings Zone (south-west) • Open Space – Civic Spaces Zone • Open Space – Informal Recreation Zone • Open Space – Community Zone (east) • Open Space – Conservation Zone (north-east)	Zoning currently within 800m of the Te Waihorotiu Station NoR
Anticipated future zoning within 800m catchment (construction, operation)	No change to current zoning.	Several qualifying matters apply to the NoR footprint, which reflect the overlays, designations and controls captured in the table above.
Other relevant considerations	N/A	N/A

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operation phases of the Project as they relate to the Te Waihorotiu Station NoR.

This builds on the technical assessments included in Volume 3 and the Design and Construction Report in Appendix XX. Section XX outlines the indicative methodology used for these assessments.

1. Traffic and transport

The Assessment of Transport Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on traffic and transport. This section focuses on the transport effects specific to Te Waihorotiu Station NoR. Further discussion on the route-wide transport effects is considered in Section XX.

Key transport features within and adjacent to the Te Waihorotiu Station NoR include:

- **Public transport (bus services):** Numerous bus stops and routes are located within close proximity to the Te Waihorotiu Station, including several bus stops on Wellesley Street (between Mayoral Drive and Queen Street) and stops for north-south services on Queen Street and Hobson Street.
- **Public transport (heavy rail):** The Te Waihorotiu Station is located adjacent to the CRL Te Waihorotiu Station heavy rail network which is currently under construction.
- **Roading networks**: Wellesley Street West (to the north) is classified as an Arterial Road and Mayoral Drive is a Collector Road under the AUP(OP). Daily traffic movements along these roads are approximately 7,640 (Wellesley) and 8,990 (Mayoral Drive) respectively.
- **Walking**: There are good walking facilities within the city centre with a grid network of streets and pedestrian cut-throughs. As the Te Waihorotiu Station is located within the city centre, there is significant walking activity between public transport facilities and origin destinations.
- **Cycling:** Cycle facilities within the immediate vicinity of the Te Waihorotiu Station are limited to unprotected cycle lanes on Vincent Street and the southern side of Mayoral Drive. There are also shared zones on Federal Street and Elliot Street
- **Parking:** Limited parking is available within the vicinity with a mix of on-street parking and loading bays on Federal Street.
- **Loading:** There are no dedicated loading bays within the NoR footprint, however, there would be adequate space for loading vehicles to temporarily park on Federal Street.
- **Freight**: There are no strategic freight routes within the city centre in and around the proposed Te Waihorotiu Station.

The Te Waihorotiu Station will form part of the future light rail network, improving connectivity along the alignment.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, Te Waihorotiu Station will provide:

- Enhanced walking environment within the wider area and compliment the Wellesley Street Bus Improvements Project [1] which seeks to create a pedestrian/bus only route with wider footpaths and better crossing facilities between Wellesley Street West and Albert Street.
- Improved connectivity across public and active transport modes within the vicinity of the NoR footprint with high interchange rates between the CRL Te Waihorotiu Station and bus network anticipated.

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section XX. The proposed works at Te Waihorotiu Station NoR will potentially result in the following adverse construction traffic effects:

- **Public transport (bus services)**: Noting the Te Waihorotiu Station is a key interchange for public and active modes of transport, existing bus services are anticipated to experience delays due to the increase of construction traffic around and within the NoR. Further, the Mayoral Drive bus lane will become a shared bus and general traffic lane due to the closure of three lanes on Mayoral Drive which contributes to increased traffic delays.
- **Public transport (heavy rail)**: It is anticipated that the operation of train services via the Te Waihorotiu CRL Station and entry/exit via Mayoral Drive and Wellesley Street West will be maintained throughout construction activities.
- **Roading network:** Road closures are required to accommodate construction activities**.** This includes the closure of two northbound lanes and one southbound lane on Mayoral Drive. One lane in each direction on Wellesley Street West will also be closed during construction works.
- **Walking**: The southern footpath on Wellesley Street West will be closed for periods during the works. The western footpath on Mayoral Drive will be closed, with pedestrians diverted to the eastern side of the road.

- **Cycling**: While there are no dedicated cycling facilities impacted by construction in the NoR, cyclists will be required to navigate a new road layout that may change with construction phasing, and likely experience increased travel times corresponding to road closure and diversions.
- **Private vehicles**: Increased heavy traffic movements at the site will see a marginal increase in travel times by general traffic during construction. Some delays will be incurred by vehicles rerouting to avoid the closure of Mayoral Drive northbound. Effects of the road diversions will be largely concentrated at Wellesley Street West/Mayoral Drive intersection, and main intersections opposite the construction works identified within the NoR footprint.
- **Parking**: The on-street parking available on Federal Street will be temporarily closed. Alternative parking locations available near the Te Waihorotiu Station, including the Civic and Downtown car park buildings.
- **Loading**: The unofficial loading bay areas on Federal Street will be closed during construction works.
- **Emergency services**: Emergency vehicles travelling to and around the immediate vicinity of the site may experience delays relating to construction traffic.
- **Freight**: N/A - The roads within the NoR footprint are not identified freight routes. As such, there will be no additional effects over and above the route-wide effects discussed in Section XX.

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Construction Traffic Management Plan (CTMP) as specified in proposed condition 17 of the draft condition set in Appendix XX. The Assessment of Transport Effects recommends the following opportunities for inclusion in a CTMP in relation to Te Waihorotiu Station:

- **Public transport (bus services)**: Prioritising of bus movements within shared traffic lanes on Mayoral Drive where possible to allow buses ahead of general traffic.
- **Public transport (heavy rail)**: Staging construction works to provide minimal disruption to operation of the Te Waihorotiu CRL Station.
- **Roading network**: The construction site entry and exit onto Wellesley Street West in both directions. This option gives trucks more flexibility and efficiency to carry out required deliveries and minimises impact on inner city streets. Maintaining at least one southbound lane on Mayoral Drive and one lane in each direction on Wellesley Street West will support continued traffic flows.
- **Walking**: Maintaining access at all times for the businesses and residents located on Federal Street for the duration of construction works.
- **Cycling**: No additional effects over and above the route-wide effects discussed in Section XX are anticipated with respect to cycling.
- **Parking:** It is considered that there are alternative parking locations available near the Te Waihorotiu Station, including the Civic and Downtown car park buildings, such that no mitigation is required for the loss of parking spaces during construction. Therefore, no additional effects over and above the route-wide effects discussed in Section XX are anticipated.
- **Loading:** There will be no additional effects over and above the route-wide effects discussed in Section XX.
- **Emergency services**: Provision for emergency services in and around the construction site. will be made, this will be discussed with emergency service providers prior to construction being undertaken.
- **Freight:** N/A

4. Operational effects

There are no adverse operational effects on transport from Te Waihorotiu Station NoR. Following construction at the station, the road layout will be improved as per the schedule of completed works listed in the Design and Construction Report.

5. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3 Appendix XX and the proposed mitigation, the actual and potential traffic and transport effects associated with the Project will be appropriately managed.

2. Landscape and Visual

The Assessment of Landscape and Visual Effects (LVA), included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to the effects on the natural and urban landscape (including visual effects). This section focuses on the landscape and visual effects specific to the Te Waihorotiu Station NoR. Further discussion on the route-wide landscape and visual effects is considered in Section XX.

The urban form within the Te Waihorotiu Station NoR represents the original nineteenth century walkable city between Queen Street and Eden Terrace. The Te Waihorotiu Station is located just off the ridge on the western side of the Queen Street Valley, at the intersection of two key central streets being Wellesley Street West and Albert Street/Mayoral Drive. The built character surrounding the NoR reflects a diverse range of activities within the immediate vicinity, including commercial, retail, residential, entertainment and community facilities.

The natural landscape within the Te Waihorotiu Station NoR is characterised by the undulating topography between the Federal Street ridge dropping steeply to the Waihorotiu Stream valley (Queen Street). The Waihorotiu Stream is fully piped and there are no rivers or permanent streams within the NoR.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, this station will provide:

- Activation of the street frontages on Mayoral Drive and Wellesley Street West, attracting and delivering high pedestrian flows (cumulative to those generated by the CRL Te Waihorotiu Station), and repairing the existing poor activation of these frontages.
- Contribution to the legibility of the transport network. The station building will have visibility in sightlines along Wellesley Street (including from the intersection with Queen Street) and Albert Street/Mayoral Drive.
- Spatial definition of the intersection of Wellesley Street and Mayoral Drive, repairing the existing weak definition of this corner.

2. Construction effects

The construction works within the Te Waihorotiu Station NoR will involve typical construction activities, including the demolition of buildings to enable development, and therefore any adverse effects would be limited to the immediate surrounds. In this case, the proposed construction works will require the removal of three buildings at 44-52 and 54 Wellesley Street West and 190 Federal Street. In this regard, it is considered the proposal will not result in any additional effects on the landscape and urban environment than those discussed in the route-wide effects in Section XX.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects and specified in the proposed draft condition set in Appendix XX.

4. Permanent infrastructure

The works within the Te Waihorotiu Station NoR will result in a change in the urban form and natural landscape. In particular, these changes involve the removal of three buildings. The design, quality, and contribution of these buildings to the streetscape has been assessed in the LVA, and the following conclusions are made:

- The building at 44-52 Wellesley Street West is occupied by a ten-level tower, car parking at the street level and under-scale podium to Mayoral Drive. The building has an ordinary appearance with a large blank wall facing Wellesley Street West that has poor urban design qualities. As such, it is considered the proposal provides an opportunity for an improved streetscape and amenity outcome provided by the construction of the Te Waihorotiu Station.
- The building at 190 Federal Street is occupied by a two-storey mid-century commercial building currently utilised as a gym. This building provides little contribution to the streetscape such that its removal provides opportunities to promote better urban design outcomes and improve streetscape amenity along Federal Street.
- The building at 54 Wellesley Street West is occupied a four level, traditional masonry building that contains an office lobby, car park access at street level and local shop. This building does contribute positively to existing streetscape character, however, it is considered the effects associated with removing this building are

outweighed by the overall positive effects resulting from improved streetscape amenity and integration opportunities created by the construction of the Te Waihorotiu Station.

Having regard to the above, it is considered that the removal of these buildings will not result in any adverse landscape and visual effects.

5. Permanent infrastructure and mitigation measures

Mitigation of landscape and visual effects common to the whole Project is discussed in Section XX and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to the Te Waihorotiu Station NoR, the Assessment of Landscape and Visual Effects identifies the following opportunities for inclusion in the CULDG when undertaking the design of the station:

- Design requirements including façade treatment, colour/material palette, must be well integrated with buildings in the surrounding environment and respond to the specific streetscape and road context on Wellesley Street West, Mayoral Drive and Federal Street. In particular, the station should compliment the CRL Te Waihorotiu Station which is nearing completion; provision for wider footpaths on Wellesley Street West and Mayoral Drive to accommodate increased pedestrian flows; and
- Reinstate the shared multi-modal transit space on Federal Street post works completion.

6. Conclusion of landscape and visual effects

Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Social

[ASSESSMENT OF POTENTIAL ADVERSE SOCIAL IMPACT EFFECTS TO BE PROVIDED]

4. Cultural

[**TBC on cultural reporting**]

5. Built heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the enabling works, construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the Te Waihorotiu Station NoR.

The key historic heritage features within the Te Waihorotiu NoR are listed below and shown in Figure 4 below:

- Hampton Court Apartments (182 Federal Street)
- Public Trust Building (11 Mayoral Drive)
-

Figure 4 Historic heritage within Te Waihorotiu Station NoR

For context, the Hampton Court Apartment is a mid-rise Category B heritage building of reinforced concrete construction with brick infill facades founded on shallow spread footing foundations. The Public Trust Building is a low to mid-rise Category B heritage building incorporating reinforced concrete floors and framing and reinforced brick masonry perimeter walls and founded on shallow foundations.

Other buildings immediately adjacent the NOR boundary and closest to development include St Matthews-in-the-City, Bledisloe House and the Civic Theatre. The latter has a small overlap with the NoR 3 boundary.

1. Positive effects

In addition to the positive route-wide effects outlined in section X, the Project design has been undertaken in a manner that retains the above-mentioned heritage buildings in their current form.

2. Construction effects

The construction works within the Te Waihorotiu Station NoR will involve typical construction activity including demolition of adjoining buildings, groundworks and construction. Cumulatively, the higher potential impact on the Hampton Court Apartments and Public Trust Building built heritage places of considerable values will result in potentially moderate to significant adverse effects on the heritage values that require careful consideration and management.

Effects associated with wider construction related activities have been addressed in Section 1.4.10 (Construction Noise and Vibration) and Section 1.4.13 (Settlement and Structures).

3. Construction mitigation measures

Mitigation of built heritage effects common to the whole Project are discussed in Section XX. This mitigation takes the form of an Archaeology and Built Heritage Management Plan (ABHMP), specified in proposed condition 25 of the draft condition set in Appendix XX. Although risks are identified, they are also typically well understood as construction risks. They can be readily managed and avoided or reduced in intensity through good construction practices which will be set out in the HHMP. Should adverse effects to built heritage fabric accidentally occur, despite precautions to manage such risk, they are likely to be of a low adverse nature and can be typically remediated or mitigated if required. Therefore, no additional mitigation is recommended other than what may be set out in an ABHMP. For these places, specific features and details may be identified through onsite survey at an appropriate time, to be established via engagement required under the CNVMP or as required under the SMP and cross-referenced to the HHMP for each NoR.

4. Operational effects

There are negligible operational effects on built heritage requiring any mitigation beyond that set out in a ABHMP or associated management plans for noise and vibration.

5. Operational mitigation measures

For mitigation of these effects, the Assessment of Historic Heritage Effects recommends:

- Preparation of a ABHMP to manage any actual and potential adverse effects.
- With reference to the NoR CNVMP and SMP, further assessment at an appropriate stage to confirm if vibration / settlement monitoring is required.

6. Conclusion of built heritage effects

Based on the assessment above, the Built Heritage Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on Built Heritage associated with the Project will be appropriately managed.

6. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to the Te Waihorotiu Station NoR. Further discussion on the route-wide effects on archaeology is considered in Section XX.

In pre-European history, Māori settlement was featured predominantly in the CBD, with the three bays (Waiatarau, Horotiu and Te Toangaroa) separated by a headland pa. Waihorotiu was a prominent stream that emptied into these bays that ran down the gully now known as Queen Street. In addition to the pa, several kainga were present in the CBD in vicinity of Queen Street. In the 19th century, the block where the Te Waihorotiu Station is proposed has been used for a range of commercial and industrial uses. In the 1970s, the block was modified when Albert Street and Federal Street were truncated to form Mayoral Drive.

There are no known lava flows that will be affected by the proposed works. In this case, there are a total of 65 archaeological sites (NZAA) and heritage items (CHI) identified within 200m of the NoR footprint, however, only three items are determined to be within the NoR footprint and therefore relevant for the purpose of this assessment.

The archaeological and heritage features identified within the Te Waihorotiu Station NoR are listed below and shown in **Figure 5** below:

- R11/1703 Mackies Coachworks and Gledhill Cordial Manufacturer ('**Mackie's Coachworks'**) (previously Lot 4 and Part Lot 5 Sect 30, City of Auckland)
- Hampton Court Apartments (182 Federal Street)
- Public Trust Building (11 Mayoral Drive)

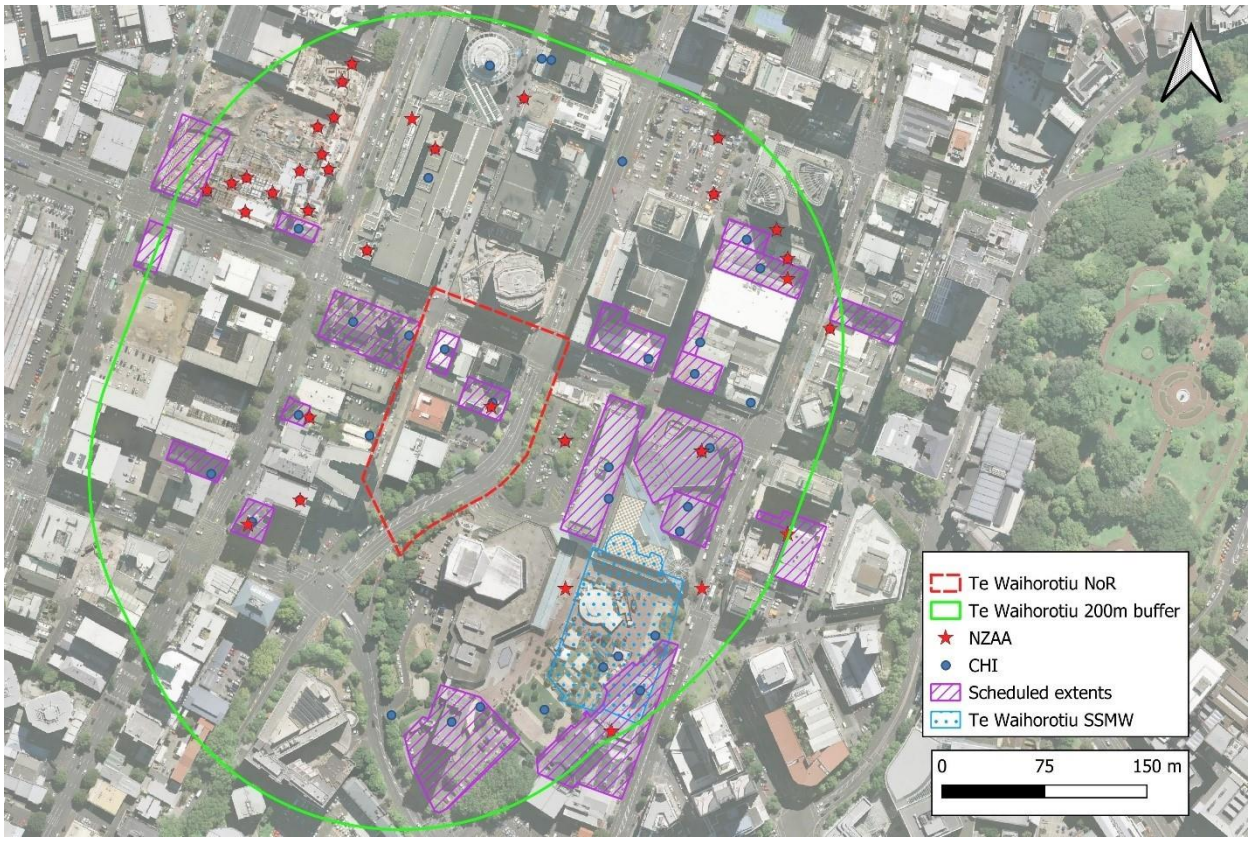

Figure 5 Archaeology within Te Waihorotiu Station NoR

Effects associated with the Public Trust Building and Hampton Court Apartments have been discussed in Section 1.4.6 above and will not be subject to further archaeological assessment.

The Mackie's Coachworks (R11/1703) is the only identified historic NZAA archaeological site within the Te Waihorotiu Station NoR. This site was originally recorded in 1990, however was subsequently demolished and does not exist in built form within the existing environment. Despite the building being demolished, it is possible that sub-surface features are located underneath where the structure was located. The surrounding area has been significantly modified over time such that there are no physical or aesthetic values attributable to this location, rather the value is limited to historical association only. The site's historical value is no longer legible, and does not hold the same value or significance as it would if the building was still standing. Overall, this site has limited heritage values.

1. Positive effects

No positive effects on archaeology have been identified as by its very nature, construction requires disturbance of the ground in which archaeological remains may be present. However, management processes can be established to enable the recording of archaeological material found during construction of the Project, providing valuable insight into the history of a site.

2. Construction effects

The construction works at Te Waihorotiu Station will potentially result in damage to sub-surface materials in the vicinity of the site that was formally occupied by the Mackie's Coachworks (R11/1703) site, which holds limited archaeological value. Aside from potential damage to sub-surface materials, it is considered the construction works within the Te Waihorotiu Station NoR will not result in any additional construction effects than those set out in the route wide effects included in Section XX.

3. Construction mitigation measures

Mitigation of archaeological effects common to the whole Project is discussed in Section XX. This mitigation takes the form of an Archaeology and Built Heritage Management Plan (ABHMP), inclusive of accidental discovery protocols for archaeological features, specified in proposed Condition 25 of the draft condition set in Appendix XX. There are no specific archaeological effects that require mitigation with respect to the Te Waihorotiu Station NoR.

In addition, an Authority to Modify or Destroy the whole or any part of both a recorded site (Mackie's Coachworks R11/1703) and unrecorded archaeological sites will be sought from Heritage New Zealand Pouhere Taonga under s44 of the Heritage New Zealand Pouhere Taonga Act 2014.

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during the construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on archaeology associated with the Project will be appropriately managed.

7. Arboriculture

The Arboricultural Assessment, included as Appendix XX in Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on arboriculture. This section focuses on the arboricultural effects specific to the Te Waihorotiu Station NoR. Further discussion on the route-wide arboricultural effects is considered in Section XX.

Arboriculture within the Te Waihorotiu Station NoR includes generally protected street trees located within roads, and a number of scheduled trees which are listed as follows and shown in **Figure 6**.

- Mayoral Drive contains an avenue of tulip trees that are scheduled notable trees in the AUP(OP).
- Scheduled pohutukawa tree within road reserve adjacent to 187 Federal Street (proposed to be retained)

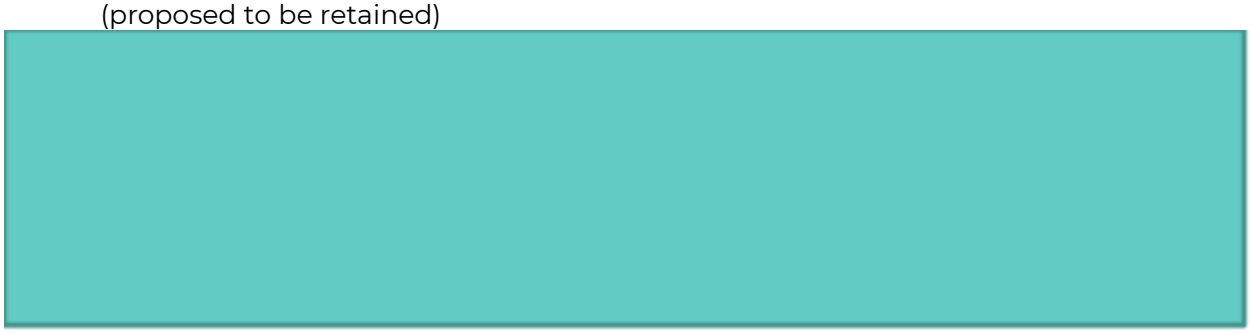

Figure 6 Protected trees within Te Waihorotiu Station NoR

1. Positive effects

The proposed station works will retain some of the scheduled pohutukawa trees within the NoR along Mayoral Drive.

2. Construction effects

Up to six tulip trees and one Queensland Box are required to be removed on Mayoral Drive to facilitate the construction of the station building and provide sufficient space for construction traffic to enter and exit to the site. Three of the tulip trees are scheduled notable trees.

3. Construction mitigation measures

Mitigation of arboricultural effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Tree Management Plan (TMP), specified in proposed condition 26 of the draft condition set in Appendix XX. In addition, the following mitigation measures are proposed in respect to the Te Waihorotiu Station NoR:

- At times where site access is required off Federal Street, the crown of the scheduled pohutukawa tree in the road reserve and plaza trees should be fenced off from any access and other activities for the duration of station construction.
- Replacement planting should be provided where possible. The development of replacement planting should include consideration of the notable features of the tree, such as the reason for scheduling and any special characteristic the tree has. Replanting should aim to replicate the special characteristics of the tree.

4. Operational effects

There are no operational effects on arboriculture. The potential for adverse effects on arboriculture will occur only during the construction of the Project.

5. Conclusion of arboricultural effects

Based on the assessment above, the Arboricultural Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on arboriculture associated with the Project will be appropriately managed.

8. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project, as they relate to hydrology and flooding. This section focuses on the hydrology and flooding effects specific to the Te Waihorotiu Station NoR. Further discussion on the route-wide hydrological effects is considered in Section XX.

The Te Waihorotiu Station NoR is located within the Waitemata stormwater catchment. The key hydrological features, inclusive of flooding hazards are listed below and shown in Figure 7 below:

- Overland flow path along Wellesley Street West falling the same direction as the surface gradient, with ponding on the junction of Queen Street.
- Flood prone areas on the eastern side of Mayoral Drive.
- No floodplains identified within the proposed Te Waihorotiu Station location, however, there is a floodplain that extends along Federal Street and Albert Street to the north of the station which is captured within the Te Waihorotiu Station NoR footprint.

The key hydrological features, inclusive of flooding hazards are shown in **Figure 7** below:

Figure 7 Hydrology within the Te Waihorotiu Station NoR

1. Positive effects

There are no positive effects in relation to flooding on this site. In particular, the Project has been designed to ensure construction and operation works will not alter, divert or change, increase or exacerbate existing flooding hazards, to ensure no adverse effects on people and the environment.

2. Construction effects

The construction works at Te Waihorotiu Station have been designed to ensure no adverse impact on flooding hazards, including overland flow paths and floodplains within the vicinity. Any effects associated with flooding on the wider Project are discussed in the route wide flooding effects assessment in Section XX.

3. Operational effects

[TBC following the report. Will need to assess the impact of the permanent infrastructure within flood plain and overland flow path]

4. Mitigation measures

[TBC]

5. Conclusion of flooding effects

Based on the assessment above, the Hydrological Assessment in Volume 3 of Appendix XX and the proposed mitigation, the actual and potential effects on flooding associated with the Project will be appropriately managed.

9. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phases of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to the Te Waihorotiu Station NoR. Further discussion on the route-wide construction noise and vibration effects are considered in Section XX.

The existing ambient environment is dominated by traffic and mechanical services noise. Typical of a city centre acoustic environment.

The sensitive receivers are listed within Table 2 of this NoR, however those of particular note within the Te Waihorotiu Station NoR include the following buildings which will be acquired and unoccupied during construction:

- Hampton Court Apartments (182 Federal Street identified as 6 below)
- Former Public Trust Office (11 Mayoral Drive identified as 7 below)

These sensitive receivers are also shown in **Figure 7** below. It is noted that there are three notable receivers within approximately 45m to 125m of the Te Waihorotiu Station (outside the NoR), including Sky City Theatre (identified as 5 below), Civic Theatre (identified as 17 below) and Aotea Theatre (identified as 18 below).

Figure 7 Potential receivers within and near to Te Waihorotiu NoR

1. Positive effects

Section X of this AEE outlines route wide positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. Construction noise effects

The construction works at Te Waihorotiu Station will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the CBD Worksite construction noise standards as applicable in this location. As the Hampton Court Apartments and Public Trust Office will be acquired and unoccupied during the construction works no assessment of noise effects in relation to these receivers is required.

Based on the noise modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts that there will be infringements of the Suburban Worksite noise standards at receiver ID 8 in Figure 7 during the day. These infringements could range from 5-10 decibels, typically one to three hours at a time. The nature of these effects ranges from hearing protection for long-term exposure (outdoors) to unacceptable noise levels indoors for any extended periods. In general, most construction activities would comply with the noise standards.

The Construction Noise and Vibration Assessment has considered noise effects on the three notable receivers and concluded that the internal noise levels would be just audible at times. As events at these receivers are generally held outside construction hours a potential adverse noise effect on these receivers is unlikely.

3. Construction noise mitigation measures

Mitigation of construction noise effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved via a Schedule to the CNVMP. No additional noise measures are required at Te Waihorotiu Station.

4. Construction vibration effects

The construction works at the Te Waihorotiu NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted the potential infringement of the vibration standards in this location using compaction activity given the sustained vibration produced, usually over a period of days while fill is compacted.

The effects of construction vibration take two forms:

- Potential for building damage; and
- Potential for loss of amenity.

Building damage

Based on the vibration modelling undertaken for the site, applying the highest vibration generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts that there will be infringements of the Suburban Worksite cosmetic building damage vibration standards at receivers identified in Figure XX as 6 and 7.

Vibration levels are predicted to comply with the cosmetic building damage vibration standards at the three notable receivers identified.

Amenity

The Construction Noise and Vibration Assessment predicts vibration levels to be up to 0.5mm/sPPV, complying with the Project construction vibration amenity standards.

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction vibration standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project vibration standards can only be achieved only via a Schedule to the CNVMP. The Construction Noise and Vibration Assessment

recommends the following with respect to receiver No 6 Hampton Court Apartments and receiver No 7 Former Public Trust Office:

- Identify the location of the vibration sensitive features.
- Identify existing measures to mitigate environmental vibration within the receiving building and its vibration sensitive features.
- Monitoring for compliance and management purposes.

6. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

10. Operational noise and vibration

[ASSESSMENT OF POTENTIAL OPERATIONAL NOISE AND VIBRATION EFFECTS TO BE PROVIDED]

11. Blasting overpressure and vibration

Construction activities requiring blasting to be undertaken are not anticipated in the Te Waihorotiu Station NoR.

12. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project as related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blast Management Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of damage to buildings and structures.

This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to Te Waihorotiu Station NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.

For context, the existing built environment within and surrounding the Te Waihorotiu NoR footprint ranges from modern multi-storey piled structures to low-rise heritage brick masonry buildings on shallow foundations. Building use comprises a mix of residential, historic, religious, entertainment, commercial and retail.

The only buildings identified as falling within the Project vibration threshold setback by the Settlement and Structures Assessment are 182 Federal Street (Hampton Court Apartments) and 11 Mayoral Drive (Former Public Trust Building).

The characteristics of these buildings with respect to settlement/structures is summarised below:

- Hampton Court is a mid-rise Category B heritage building of reinforced concrete construction with brick infill facades founded on shallow spread footing foundations.
- Public Trust Buildings is a low to mid-rise Category B heritage building incorporating reinforced concrete floors and framing and reinforced brick masonry perimeter walls and founded on shallow foundations.

1. Positive effects

There are no positive effects on buildings or structures with respect to vibration and settlement.

2. Construction vibration induced effects

Vibration induced building damage common to the entire Project area is discussed in Section XX. The Structures and Settlement Assessment has identified the following potential effects on the Public Trust Building and Hampton Court, both located within the NoR footprint and being retained:

- Cracking or extension of existing cracks of a superficial nature to facades and brick cladding, unreinforced brick masonry walls; and
- Cracking of a superficial nature to joints of plasterboard wall and ceiling linings to the interior of the buildings.

For surrounding buildings that fall outside the vibration threshold setback distances the potential for damage to these buildings is negligible.

3. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Sections XX and XX, in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CNVMP, and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Settlement effects common to the entire Project area are discussed in Section XX. The Structures and Settlement Assessment has identified the following potential effects on the Public Trust Building and Hampton Court, both located within the NoR footprint and being retained:

- Cracking of a superficial nature to facades, walls and plasterboard joints;
- Superficial cracking of floor slabs;
- Roof drainage affected;
- Grade effects at building entrances; and
- Possible stuck windows and minor redecoration.

The Structures and Settlement Assessment has identified the Public Trust Building and Hampton Court fall within a risk category of Moderate or greater.

There are no buildings adjacent to the Te Waihorotiu Station NoR with potential settlements greater than 10 mm and ground slopes greater than 1/500. This corresponds to effects that are expected to be at worst, 'Very Slight' but will typically be Negligible.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx, in the form of a Settlement Management Plan (SMP), recommended in condition XX to to provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. Operational settlement and vibration induced effects

There are no settlement induced effects associated with the operation of the Project. The potential for settlement effects will occur only during the construction of the Project.

Vibration effects on buildings, resulting from the operation of the Project are addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section xx.

7. Conclusion of settlement and structure effects

Based on the assessment above, the Settlement and Structure Assessment in Volume 3 (Appendix XX) and the proposed mitigation, the actual and potential effects on buildings will be appropriately managed.

13. Geological Heritage

The Geological Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects on geological heritage features during the construction phase of the Project as they relate to construction activities in proximity to these features. This section focusses on the volcanic features within the vicinity of the Te Waihorotiu Station NoR. Further discussion on the route-wide effects on volcanology is considered in Section XX.

The Te Waihorotiu Station NoR footprint is in the Waitemata sediment foundations. There are no volcanological issues or impacts on geological heritage in this location.

1. Notice of Requirement

1. NoR 5 – Dominion Junction Station NoR

This section:

- Describes NoR 5 - Dominion Junction Station (Section 1.2)
- Summarises the existing and receiving environment (Section 1.3)
- Assesses potential effects and outlines proposed mitigation (Section 1.4)

2. NoR description

The Dominion Junction Station NoR is located at the corner of the New North Road and Dominion Road intersection situated to the north of Eden Terrace and located to the west of the Maungawhau CRL heavy rail station. The land use activities surrounding the station are a mix of commercial, residential and recreational uses and contain various community facilities.

Figure 1 shows the Dominion Junction Station and NoR boundary. **Figure 2** shows the NoR boundary on aerial imagery (outlined in red). Table 1 summarises the Dominion Junction Station's permanent features and temporary construction works.

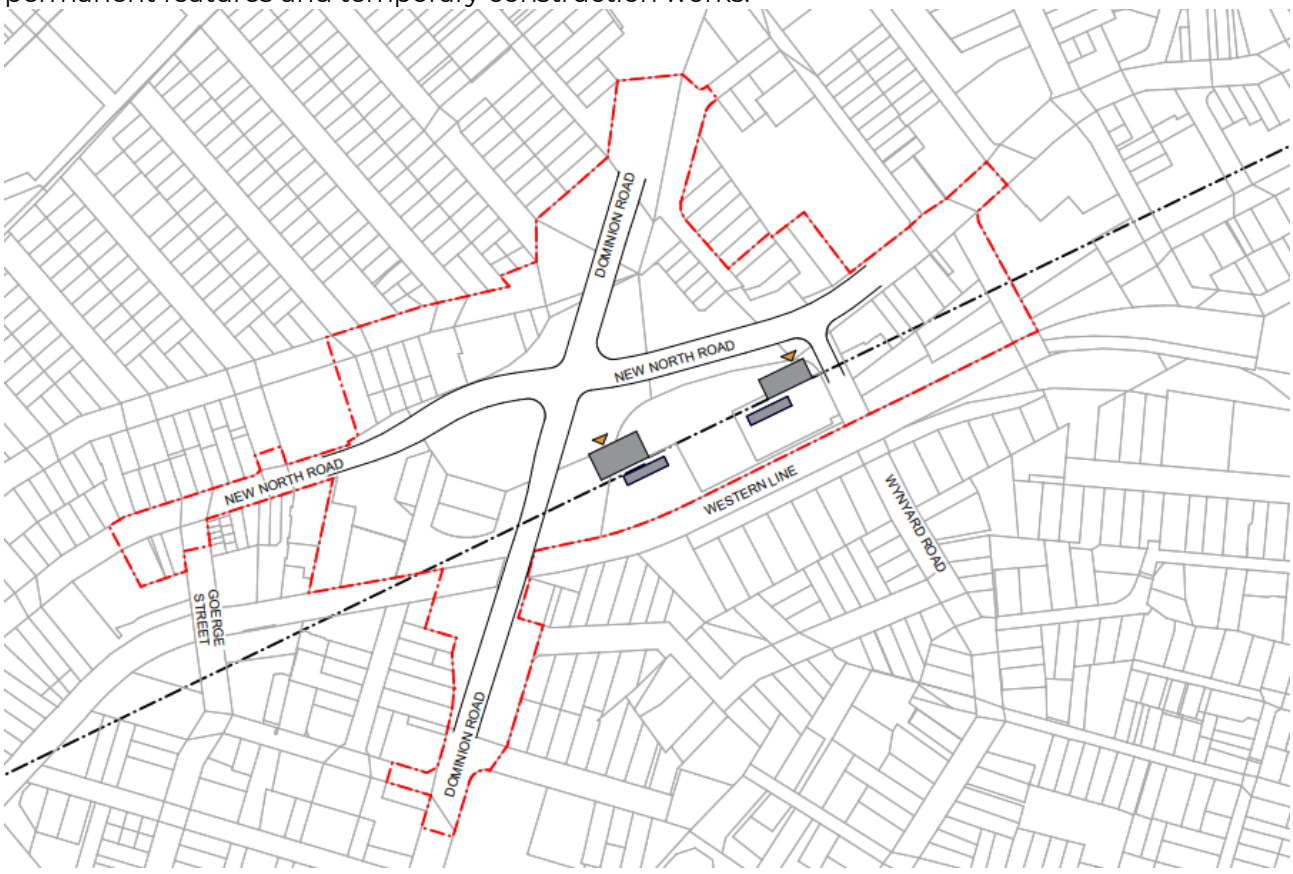

Figure 1: Dominion Junction Station location plan

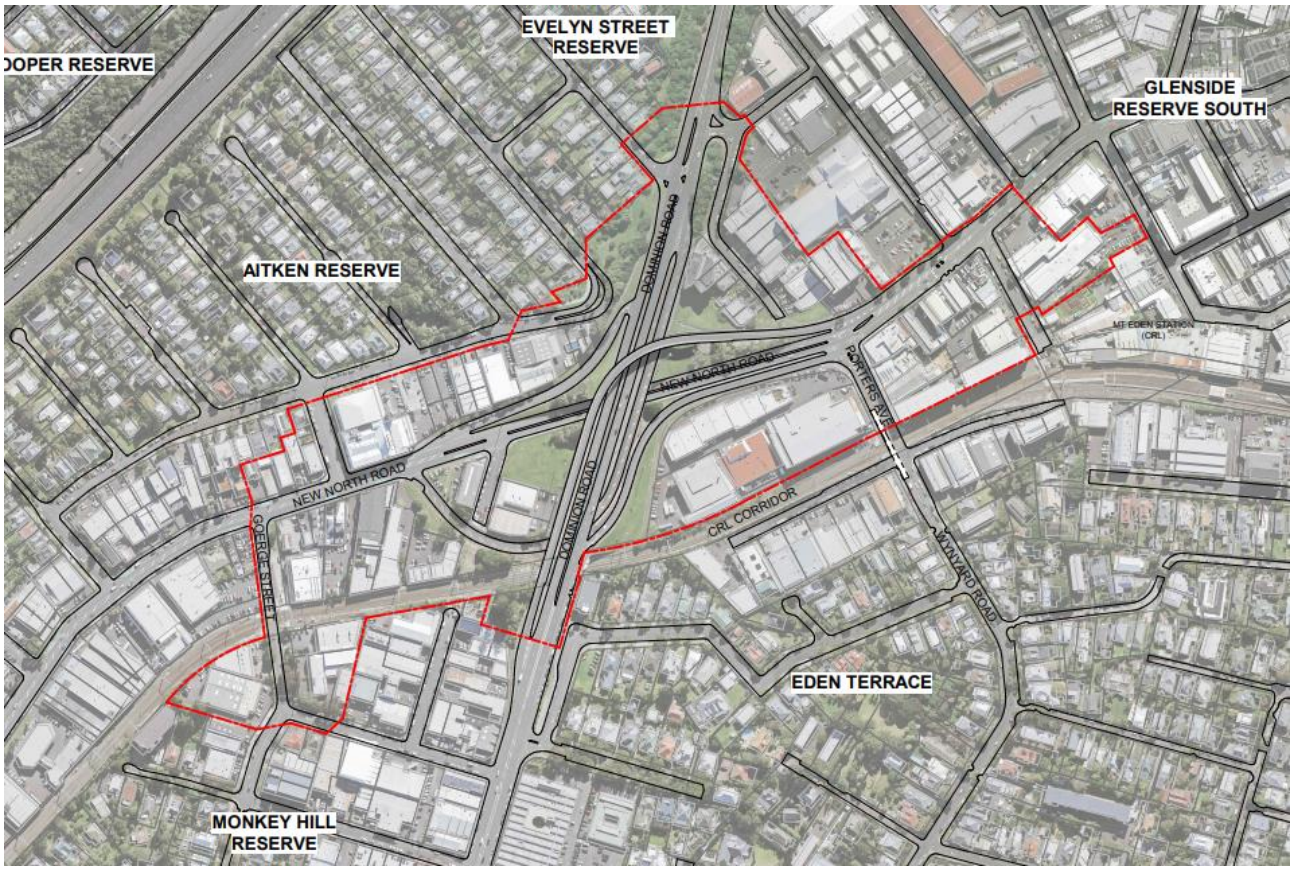

Figure 2: Dominion Junction Station NoR boundary on aerial imagery

Table 1 Dominion Junction Station NoR description

Permanent features	
Station	• Station located at the corner of the New North Road and Dominion Road intersection; • Two indicative station entrances to Dominion Road (west entrance) and New North Road/Porters Avenue (east entrance). • Fire egress are available within the Dominion Junction Station NoR that will connect to the wider tunnel designation/ alignment.
Platforms	• Underground, stacked platforms
Public realm	• Potential for new at-grade intersection at New North Road and Dominion Road
Road and streetscape	• Provision for new bus stops and bus lanes along New North Road in both directions • Provision for new pedestrian footpaths and shared active transit spaces to promote high-quality walking links between proposed Dominion Junction Station and Maungawhau CRL Station • Removal of existing Dominion Road flyover and underpasses • Provision of an at grade junction between New North Road and Dominion Road, including new pedestrian crossings adjacent to the western station entrance • Provision for direct interchange with the Maungawhau CRL Station
Parking and loading	• Kiss and ride bays • Taxi pick up and drop off bays • Secure cycle parking available • Service road provided for maintenance and emergency vehicles

Other new infrastructure	• N/A
Anticipated patronage	• Medium-high patronage.
Anticipated construction works	
Construction methodology and staging	Refer to AEE Section 6 and DCR. At a high level the construction activities will include: • Removal of existing Dominion Road flyover and underpasses; • Demolition and site clearance (including relocation and protection of utilities); • Establishment of site offices, amenities, dewatering and sediment control systems; • Installation of ground support along the station perimeter, including anticipated secant piles or diaphragm walls; Excavation of station shaft, including installation of propping and internal concrete wall lining; • Launch and retrieval sites for the TBM; • Mine audits to connect shaft to monotube tunnel; • Station fit out; and • Streetscape works along New North Road and Dominion Road.
Access to the site	• Access during construction will generally be off New North Road and Dominion Road • Pedestrian access along southern side of New North Road and eastern side of Dominion Road to the south-east of the intersection will likely be closed or diverted to the opposite of the road

3. Description of the environment

This section sets out the existing and receiving environment for the Dominion Junction Station NoR. It applies the parameters on the assumptions outlined in Section XX.

Table 2 describes the surrounding area and features. Any property directly affected by this NoR is listed in NoR 5 and Form 18 in Appendix XX.

Table 1 Existing environment description

Feature	Description
Current land use	The land use along New North Road and Dominion Road contains a mix of amenities, business and services comprising a range of commercial, residential and community facilities. The NoR footprint is located within the Eden Terrace suburb.
Physical	
Transport	• Maungawhau CRL Station is located directly east of the site (which has been closed since mid-2020 for redevelopment works) • Dominion Road and New North Road are both arterial roads
Infrastructure	• No infrastructure at this location.
Community facilities and key attractions	The key facilities within NoR boundary are listed below: • Tend Kingsland Medical Care Centre • Bear Park Early Childhood Centre • Star Jam Charitable Trust There are some local community and cultural facilities along the fringe of the NoR boundary, as listed below: • Mt Eden CRL Station • Mahatma Ghandi Centre • Auckland Indian Association • Brentwood Avenue Seventh Day Adventist Church
Sensitive noise receivers	• Brentwood Avenue Seventh-day Adventist Church (35 Brentwood Avenue) • Kainga Tiaki Centre (1A Wynward Road) • Mahatma Ghandi Centre (145 New North Road)

	• Station R Apartments (11 Fenton Street) • Residential receivers in standalone dwellings (various)
Historic heritage	There are no scheduled buildings on the HHEP register within the NoR. However, there are two scheduled buildings adjacent to the NoR • Kiwi Bacon Building (317-319 New North Road) • Bridgens and Coy Building (326 New North Road)
Archaeology	There are no recorded NZAA archaeological sites within the NoR boundary.
Cultural	Need further information from the Te Tiriti Partnerships Team
Natural	
Topography	• Station location sits below the existing highway network and there are many changes in levels within the surrounding area.
Geology	• Basalt identified within the general area
Catchment	• Motions Stormwater Catchment
Flooding	• Floodplain in the south-west corner of the New North Road and Dominion Road intersection • Flood prone areas identified within the NoR, contained within Porters Avenue, New North Road, Dominion Road and the western side of the station box • Overland flow paths across the site , including the Dominion Junction Station footprint
Trees and vegetation	• Large groups of street trees within the surrounding residential and commercial environment, including a group of Norfolk pines at the Dominion Road/Akepiro Rd/pocket park • Several pohutukawa trees located along New North Road within the NoR
Terrestrial Ecology	The following terrestrial habitats have been identified within the Dominion Junction Station NoR: • Exotic-dominated shrubland and treeland; • Native-dominated treeland; • Street trees and shrubs; • Residential habitats.
Freshwater Ecology	There are no known freshwater ecological values at the proposed Dominion Junction Station

2 **Figure 3** and **Table 3** identify the relevant statutory considerations within the Dominion Junction Station NoR footprint.

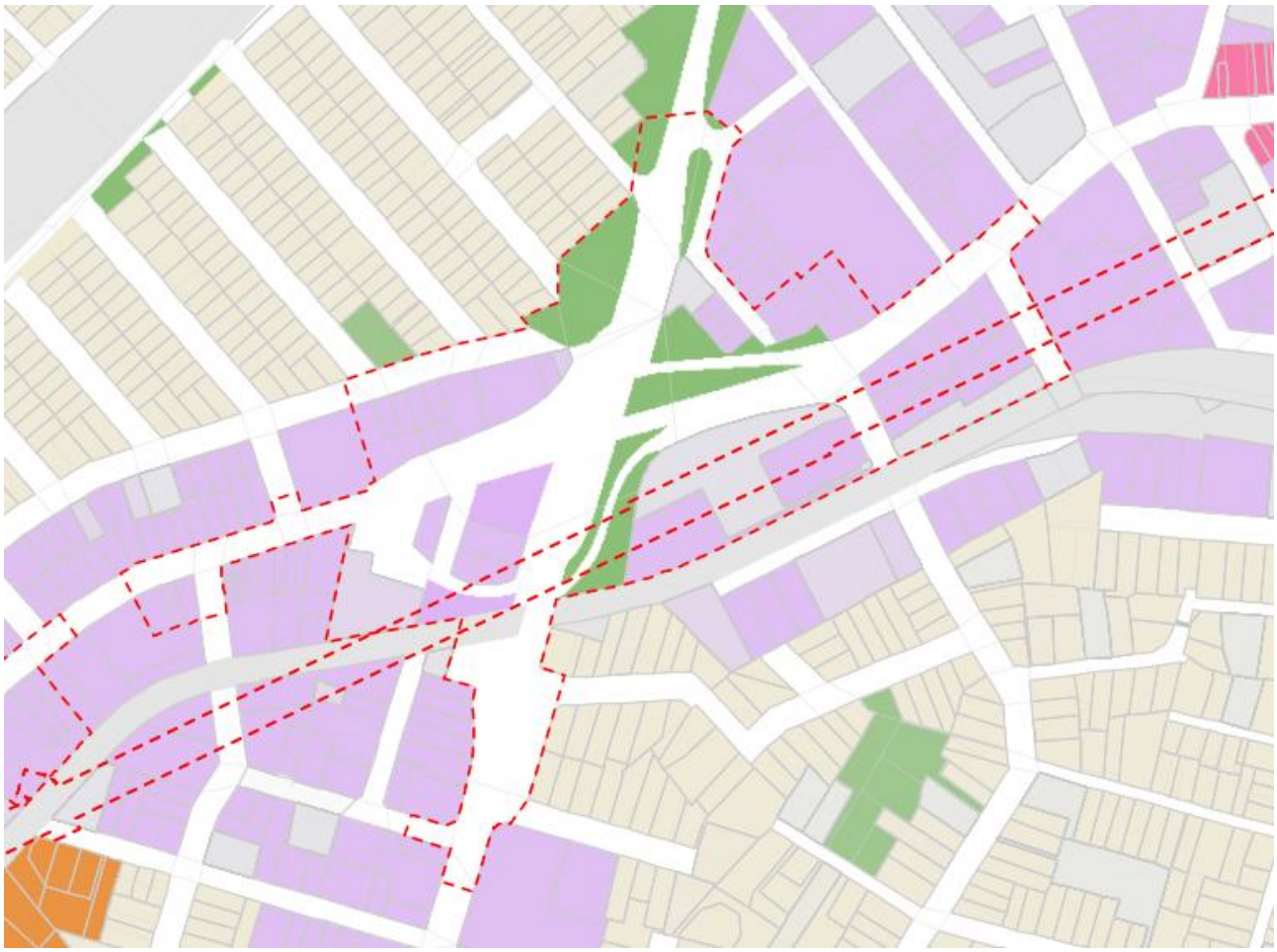

Figure 3: Dominion Junction NoR zoning and overlays in the AUP

Table 3: Dominion Junction NoR statutory environment

Name	Description	Comment
Current NoR zoning	Business – Mixed Use	Applies along properties along New North Road and to properties in the southwest of the proposed NOR boundary
	Open Space – Informal Recreation Zone	Applies to some sites along Ian McKinnon Drive and Dominion Road
	Road	Applies to roads within the NoR boundary
Precincts	N/A	
Controls	Macroinvertebrate Community Index - Urban	Applies to the entire NoR footprint
	Vehicle Access Restriction Control - General	Applies to Dominion Road, New North Road, and Ian McKinnon Drive
	Control: Arterial Roads	Applies to sites on George Street, Porters Avenue, Fenton Street and Haultain Street near the road level crossing over the North-western railway
	Height Variation Control - Newton, 21m	Western of Dominion Road, applies to sites fronting New North Road and Dominion Road. East of Dominion Road applies to all business zoned sites excluding the proposed station block.
	Centre Fringe Office Control	Applies to business zoned sites in the NoR to the north-west of Porters Avenue and New North Road
Overlays	Built Environment: Identified Growth Corridor Overlay	Applies to sites along New North Road that are west of the Dominion Road.

	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place [rcp/dp]	Applies to 326 New North Road
Designations	KiwiRail Designation #6300, North Auckland Railway Line from Portage Road, Otahuhu to Ross Road, Topuri,	Applies to the north-western train line
	Auckland Council Designation #523, Local Park	Applies to land on the corner of Dominion Road and New North Road
	Auckland Transport Designation #1609, Road Widening	Applies to sites on the southern side of New North Road from George Street to the west to 1/322 New North Road.
	City Rail Link Limited Designation #2500-6	Applies to some sites in the south-east of the NoR boundary, including part of the station location.
Regional Plan Controls and Overlays	Natural Resources: Quality-Sensitive Aquifer Management Areas Overlay [rp] – Auckland Isthmus Volcanic	Applies to south-eastern portion of the alignment
	Natural Heritage: Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay [rcp/dp] – E20, Mount Eden (Viewshafts)	Applies to some sites in the NoR boundary, to the east of Porters Avenue
Zoning within 800m catchment	• Residential– Single House Zone • Residential – Mixed Housing Suburban • Residential – Mixed Housing Urban • Residential – Terrace Housing and Apartments • Business – Mixed Use Zone • Open Space – Informal Recreation Zone Road	Sites along New North Road and to the north-east of the proposed NoR footprint are zoned Business Mixed Use. There are two areas zoned Residential – Single House to the south-east and north-west of Dominion Junction station. Further from the proposed station, there are also areas zoned Business Town Centre (to the north-east), Residential – Mixed Housing Urban (to the south-east), and Residential Terrace Housing and Apartments and Residential – Mixed Housing Suburban (to the south-west).
Anticipated future zoning within 800m catchment (construction, operation)	As above, but with: • Residential – Single House rezoned to Residential – Low Density • Residential – Mixed Housing Suburban/Urban rezoned to Terrace Housing and Apartments • Business – Mixed Use allowed increased heights	Several qualifying matters apply to the which reflect the overlays, designations and controls captured in the table above.
Other relevant considerations	N/A	

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operation phases of the Project as they relate to the Dominion Junction Station NoR.

This builds on the technical assessments included in Volume 3 and the Design and Construction Report in Appendix XX. Section XX outlines the indicative methodology used for these technical assessments.

1. Traffic and transport

The Assessment of Transport Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the traffic and transport. This section focuses on the transport effects specific to the

Dominion Junction Station NoR. Further discussion on the route-wide transport effects is considered in Section XX.

Key transport features within and adjacent to the Dominion Junction Station NoR include:

- **Public transport (bus services)**: The Dominion Junction Station is well serviced by bus services with numerous bus stops and routes along New North Road and Dominion Road, which are both strategic bus routes.
- **Public transport (heavy rail):** The Dominion Junction Station is located within close proximity to the CRL Maungawhau Station which has been closed since mid-2020 for redevelopment works.
- **Roading networks**: Dominion Road and New North Road are both classified as Arterial roads within the AUP(OP). Daily traffic movements along these two roads are 17,940 (Dominion Road) and 17,200 (New North Road) respectively. The existing Dominion Road flyover is a significant road network feature/connection in this location.
- **Walking**: The existing walking environment within the vicinity of the Dominion Junction Station NoR is poor and there are several walkability issues around the proposed Dominion Junction Station. This includes limited crossing opportunities (due to lack of pedestrian crossing infrastructure) resulting in long complex walking connections between New North and Dominion Roads, and the high number of no-exit streets to the east of Dominion Road.
- **Cycling**: New North Road is a major cycle route, whilst Dominion Road is a regional cycle route. The cycling infrastructure and facilities is however limited due to the presence of narrow shared paths and unprotected cycle lanes.
- **Parking**: Parking within the vicinity is a mix of on-street and private car parking facilities.
- **Loading:** There are no dedicated loading bays within the Dominion Junction Station NoR.
- **Freight:** Some heavy vehicles are expected noting Dominion Road and New North Road are key arterial routes. However, there are no strategic freight routes within the immediate vicinity of the Dominion Junction Station, with most heavy traffic expected to use the motorway network.

The Dominion Junction Station will form part of the future light rail network, improving connectivity along the alignment.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, Dominion Junction Station will provide:

- A new road network within the immediate vicinity of the proposed Station enabled through the removal of the Dominion Road flyovers and underpasses.
- Construction of an at-grade junction between New North Road and Dominion Road, with new pedestrian crossings, adjacent to the western station entrance.
- Improved pedestrian and cycling infrastructure within this part of the network, including a two-way cycle path on the northern side of New North Road and new bus lanes in both directions.
- Integrated transit modal system with direct connections to the Mangawhau CRL Station and main bus interchanges on New North Road and Dominion Road.

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section XX. The proposed works at Dominion Junction Station NoR will potentially result in the following adverse construction traffic effects:

- **Public transport (bus services)**: Bus routes will be disrupted as one-way lanes will be provided along Dominion Road and New North Road at different stages of construction (resulting in removal of bus only lanes), with buses required to navigate temporary layouts ys during this time.
- **Public transport (heavy rail)**: Part of the heavy line network within close proximity to Maungawhau CRL Station may require temporary closures during construction which may disrupt the operation of passenger services.
- **Roading network:** Road closures are required to accommodate construction activities. This includes short-term lane closures on Dominion Road and New North Road and multiple access restrictions/delays during the various construction phases.

- **Walking**: The footpath on the southern side of Dominion Road and any footpaths within the vicinity of the Dominion Road flyover and underpasses will be temporarily closed.
- **Cycling**: During construction, cyclists will be required to merge with the general traffic at/near the temporary intersection at Dominion Road/New North Road which could be potentially narrow and congested during the construction phase.
- **Private vehicles**: Increased heavy traffic movements at the site will see a marginal increase in travel times by general traffic during construction. Some delays will be incurred by vehicles rerouting to avoid the works associated with the removal of the flyover and underpasses.
- **Parking**: Limited on-street parking will be temporarily closed (including Porters Avenue), however, based on the availability of other on-street parks within the vicinity, the effect from this closure is expected to be negligible.
- **Loading**: There are no dedicated loading bays within the Dominion Junction Station NoR.
- **Emergency services**: Emergency vehicles travelling to and around the immediate vicinity of the site may experience delays relating to construction traffic.
- **Freight:** N/A - Neither of New North Road and Dominion Road are identified as freight routes. As such, there will be no additional effects over and above the route-wide effects discussed in Section XX.

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP), as specified in Condition 17 of the draft condition set in Appendix XX. The Assessment of Transport Effects recommends the following opportunities for inclusion in a CTMP in relation to Dominion Junction Station:

- **Public transport (bus services):** Prioritise bus movements within the eastbound and westbound shared traffic lanes along New North Road.
- **Public transport (heavy rail):** If construction works are required within the heavy rail line network, recommendation that works are undertaken outside standard working hours (7am-6pm Mondays to Saturdays) minimising the impact of the closure.
- **Walking:** Pedestrian management will be undertaken to provide for a re-aligned pathways along Dominion Road and New North Road.
- **Cycling**: N/A.
- **Roading network**: General construction traffic movements will be managed to avoid peak traffic times and the main north-south movements between Dominion Road and Ian McKinnon Drive and the main east-west movements along New North Road are to be retained to ensure continued traffic flows.
- **Parking:** It is considered that there are adequate parking locations available near the Dominion Junction Station, around the Eden Terrace village and surrounding streets, such that no mitigation is required for the loss of parking spaces during construction. Therefore, no additional effects over and above the route-wide effects discussed in Section XX are anticipated.
- **Loading:** N/A
- **Emergency services:** Provision for emergency services in and around the construction site will be made, this will be discussed with emergency service providers prior to construction being undertaken.
- **Freight:** N/A

4. Operational effects

There are no adverse operational effects on transport from Dominion Junction Station NoR. Following construction at the station, a new road network will be established at the New North Road and Dominion Road intersection.

5. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3 Appendix XX and the proposed mitigation, the actual and potential traffic and transport effects associated with the Project will be appropriately managed.

2. Landscape and Visual

The Assessment of Landscape and Visual Effects (LVA), included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to the effects on the (natural and urban) landscape (including visual effects). This section focuses on the landscape and visual effects specific to the Dominion Junction Station NoR. Further discussion on the route-wide landscape and visual effects is considered in Section XX.

The urban form within the Dominion Junction Station NoR is characterised by motorway style structures (Dominion Road flyover), areas of left-over space and landscaping and a mix of commercial and industrial buildings, including light industrial, storage, car sales yards, and storage buildings. The surrounding character north and south of the Dominion Junction Station NoR is residential with special character overlays, which is consistent with the nineteenth century development pattern with residential areas situated to the north and south of the main New North Road and Dominion Road tramlines.

The natural landscape within the Dominion Junction Station NoR is characterised by an undulating topography and is close to the significant natural landmark of Maungawhau (Mount Eden) located 1km south of the proposed station location. The Dominion Junction Station is located close to popular open spaces, including Basque Park and Edenvale Park. This area is within the upper catchment of the north tributary of Motions Creek, however, there are no natural streams within the vicinity.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, this station will provide:

- A new at-grade intersection (to replace the existing Dominion Road flyover) that will support safer pedestrian networks;
- Unlocking development potential to free up additional land for development;
- The contribution of the station to the legibility of the wider transport network for bus and heavy rail interchanges within vicinity of New North Road and Dominion Road, with the station access points sited in logical, visible locations with good access.
- Enhanced street front activation along New North Road and Dominion Road created by additional pedestrian traffic within the area.

2. Construction effects

The construction works within the Dominion Junction Station NoR will involve typical construction activity. In this case, the Project will result in the removal of the existing Dominion Road flyover and various commercial/light industrial buildings located between the heavy rail line and New North Road, and the potential loss of street trees within in NoR.

Having regard to the above, it is considered that the demolition of buildings between New North Road and the heavy rail line and associated works is typical of construction activities and will not result in any additional effects on the landscape and urban environment than those discussed in Section XX.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects and specified in the proposed draft condition set in Appendix XX.

4. Permanent infrastructure

The works within the Dominion Junction Station NoR will result in a change in the urban form and natural landscape. These changes involve:

- The demolition of existing buildings, however, this will not significantly detract or change the character of the surrounding Eden Terrace area, considering the industrial/commercial buildings proposed to be removed provide minimal contribution to the streetscape.
- The removal of the Dominion Road flyover will change the amenity within this area but as noted Section 1.4.2.1 above, this is a significant positive landscape and visual effect of the Project.
- In terms of the natural landscape, the proposal may require tree removal or alteration works, however, this will be small scale and not result in significant changes to the natural landscape.

5. Permanent infrastructure and mitigation measures

Mitigation of landscape and visual effects common to the whole Project is discussed in Section XX and will be achieved through the ongoing design of the Project in accordance with the UEF

principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to the Dominion Junction Station NoR, the Assessment of Landscape and Visual Effects identifies the following opportunities for inclusion in the CULDG when undertaking the design of the station:

- Design requirements to support the stations legibility and support direct connections between the Dominion Junction Station and the Maungawhau CRL Station.
- Design requirements to respond to the specific streetscape and road context on New North Road and Dominion Road.

6. Conclusion of landscape and visual effects

Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the project will be appropriately managed.

3. Social

[ASSESSMENT OF POTENTIAL ADVERSE SOCIAL IMPACT EFFECTS TO BE PROVIDED]

4. Cultural

[TBC on cultural reporting]

5. Built heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the Dominion Junction Station NoR.

In this case, there are no key historic heritage features identified within the Dominion Junction Station NoR. There are two scheduled historic heritage buildings adjacent the NoR (Kiwi Bacon Building - 317-319 New North Road and Bridgens and Coy Building – 326 New North Road. The Study Area (NOR boundary plus 100m buffer) includes 148 SCAR character buildings and 4 SCAB overlay sites, none of which fall inside the NoR boundary, though a total of 12 SCAR (Isthmus A) properties are adjacent to the NoR boundary. These are located primarily along Aitken Terrace and the junctions with Alexander, Buchanan, Bright and Halsett Streets (8 properties). An additional four SCAR (Isthmus A) properties are adjacent the southwestern edge of the NoR in the vicinity of Brentwood Avenue and Dominion Road. The SCAB properties are non-character contributing sites at the periphery of the overlay, associated with Symonds Street SCAB (Figure 23).

1. Positive effects

Positive effects for all Built Heritage Places within the NoR Buffer are the same as those described in the generic assessment of effects. Generally positive effects are not generated during the enabling and construction phases, but there is potential for indirect 'uplift' of Built Heritage Places within the 'Study Area as an outcome of the development and increased opportunity for visitors to visit the area.

2. Construction effects

All identified built heritage and character buildings within the NoR buffer are outside of both the NoR boundary and the construction footprint. These places are only subject to negligible or little adverse risks such as cosmetic damage from vibration. Given the anticipated future environment, any adverse changes to the broader, operational setting for intervisible sites are not likely to be significant.

Effects on the Bridgens Building have been assessed resulting from the roading works only as the station development is some distance away. There are numerous potential adverse effects due the property being in close proximity to the NoR boundary and construction including:

- Nuisance dust;
- Accidental damage;
- Utilities, arising from diversion of utilities and disturbance or re-alignment of services or infrastructure;
- Temporary structures (that may physically impact on the property such as site hoarding, scaffolding or monitoring systems;
- Construction vibration; and
- Structural settlement from enabling works.

3. Construction mitigation measures

Mitigation of built heritage effects common to the whole Project is discussed in Section XX. This mitigation takes the form of an Archaeology and Built Heritage Management Plan (ABHMP), specified in proposed condition 25 of the draft condition set at Appendix XX. Additionally, if the CNVMP identifies risk of cosmetic damage because of construction vibration or settlement arising from construction activities, then further assessment may be undertaken prior to works commencing. For these places, specific features and details may be identified through onsite survey at an appropriate time, to be established via engagement required under the CNMVP or as required under the SMP and with reference to the ABHMP.

4. Operational effects

For the Bridgens Building there is a risk that changes to the road levels and street design will affect its local landmark status and introduce additional clutter.

5. Operational mitigation measures

No additional mitigation measures are required for the Dominion Junction Station NoR over and above those captured in the ABHMP.

6. Conclusion of built heritage effects

Based on the assessment above, the Built Heritage Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on Built Heritage associated with the Project will be appropriately managed.

6. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to the Dominion Junction Station NoR. Further discussion on the route-wide effects on archaeology is considered in Section XX.

In pre-European history, the Eden Terrace is a central part of the Tamaki isthmus, providing a key connection between the Waitemata Harbour and Manukau Harbour, with many gullies and wetlands in between these areas. Mt Eden (Maungawhau) is a significant archaeological site within the vicinity of the station, however, this feature is located outside the Dominion Junction NoR. This area comprises a heavily built up residential and commercial area near Dominion Road, dominated by the existing road network, including the flyover and grade separated intersection of Dominion Road, New North Road, Ian McKinnon Drive and the Western heavy rail line.

There are no identified NZAA archaeological sites within the Dominion Junction Station NoR.

1. Positive effects

No positive effects on archaeology have been identified as by its very nature, construction requires disturbance of the ground in which archaeological remains may be present. However, management processes can be established to enable the recording of archaeological material found during construction of a project, providing valuable insight into the history of a site.

2. Construction effects

There are no archaeological features identified within the Dominion Junction Station NoR that would be impacted by the proposed construction works.

3. Construction mitigation measures

Mitigation of archaeological effects common to the whole Project is discussed in Section XX. This mitigation takes the form of an Archaeology and Built Heritage Management Plan (ABHMP), inclusive of accidental discovery protocols for archaeological features, specified in proposed condition 25 of the draft condition set in Appendix XX. There are no specific archaeological effects that require mitigation with respect to the Dominion Junction Station NoR.

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on archaeology associated with the Project will be appropriately managed.

7. Arboriculture

The Arboricultural Assessment has been undertaken and included in Appendix XX in Volume 3. Arboriculture within the Dominion Junction Station NoR boundary is limited to trees within road reserves that are generally protected by the AUP. This includes trees within the surrounding residential environment in the road reserves of Wynard Road, Brentwood Avenue, Wrights Spur, New North Road and Dominion Road. Of particular note, there is a group of large Norfolk pines at the corner of Dominion Road/Akepiro and eleven pohutukawa trees along New North Road located within the NoR.

8. Open space

An Open Space Assessment has been undertaken and included as Appendix XX in Volume 3. There is no open space identified within the Dominion Junction Station NoR boundary and therefore no assessment of effects on open space is required.

9. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to hydrology and flooding. This section focuses on the hydrology and flooding effects specific to the Dominion Junction Station NoR. Further discussion on the route-wide hydrological effects is considered in Section XX.

The Dominion Junction Station NoR is located within the Motions stormwater catchment. The key hydrological features, inclusive of flooding are shown in **Figure X** below:

- Various overland flow paths, flood plains and flood sensitive area within the Dominion Junction NoR footprint
- An unnamed watercourse that runs close to the proposed station location to the south-east corner of the station.

Figure X Hydrology within the Dominion Junction Station NoR

1. Positive effects

There are no known positive effects in relation to flooding at the site. In particular, the Project has been designed to ensure construction and operation works will not alter, divert or change, increase or exacerbate existing flooding hazards, to ensure no adverse effects on people and the environment.

2. Construction effects

The construction works within the Dominion Junction Station NoR have been designed to ensure no adverse impact on flooding hazards, including overland flow paths and floodplains within the vicinity. Any effects associated with flooding on the wider Project are discussed in the route wide flooding effects assessment in Section XX.

3. Operational effects

[TBC following the report. Will need to assess the impact of constructing infrastructure within flood plain and overland flow path]

4. Mitigation measures

[TBC]

5. Conclusion of hydrological and flooding effects

Based on the assessment above, the Hydrology Assessment in Volume 3 of Appendix XX and the proposed mitigation, the actual and potential effects on flooding associated with the Project will be appropriately managed.

10. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phases of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to the Dominion Junction Station NoR. Further discussion on the route-wide construction noise and vibration effects are considered in Section XX.

The sensitive receivers are listed within Table 2 of this NoR, however all of these receivers are located outside the Dominion Junction Station NoR as shown in **Figure X** below. There are no notable receivers in this location.

Figure X Potential receivers near to Dominion Junction NoR

1. Positive effects

Section XX of the AEE outlines route wide positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. Construction noise effects

The construction works at Dominion Junction Station will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the Urban Worksite construction noise standards as applicable in this location.

Based on the noise modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts general compliance with Project noise standards. Some infringements of the Urban Worksite noise standards at perimeters of the intersection upgrade during the day may occur. These infringements could reach up to 5 decibels, typically one to three hours at a time. The nature of these effects ranges from people moving to quieter outdoor areas to disrupted but acceptable concentration and communication indoors.

Project noise standards for night time hours are less than day time standards. During the night, infringements could reach up to 3 decibels a specific receiver, reflective of the 24-hour operation of support activities for the TBM. These effects may cause sleep disturbance if windows are open. The Construction Noise and Vibration Assessment noted that night-time construction activities (e.g., tonal alarms, heavy machinery movements) can lead to complaints even when noise standards are met.

3. Construction noise mitigation measures

Mitigation of construction noise effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved via a Schedule to the CNVMP. In addition, for mitigation of construction noise effects specific to the Dominion Junction Station NoR the Construction Noise and Vibration Assessment recommends the following for inclusion in a CNVMP:

- Use of site perimeter noise barriers and plant enclosures.

4. Construction vibration effects

The construction works at Dominion Junction Station NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted compliance with the Project vibration standards in this location using compaction activity as the highest vibration generating activity given the sustained vibration produced, usually over a period of days while fill is compacted.

The effects of construction vibration take two forms:

1. Potential for building damage; and
2. Potential for loss of amenity.

The Construction Noise and Vibration Assessment predicts compliance with Project vibration standards related to building damage and amenity at all receivers during station construction.

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction vibration standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation to the Project vibration standards can only be achieved via a Schedule to the CNVMP. No additional measures are required at Dominion Junction Station.

6. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be appropriately managed.

11. Operational noise and vibration

[ASSESSMENT OF POTENTIAL OPERATIONAL NOISE AND VIBRATION EFFECTS TO BE PROVIDED]

12. Blasting overpressure and vibration

The Blast Management Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of blasting during the construction phases of the Project as they relate to blasting noise and vibration. This section focuses on the blasting vibration and overpressure effects specific to the Dominion Junction Station NoR.

Blasting is required within the Dominion Junction Station NoR due to the presence of basalt below ground at approximately RL60m and extending to what would be the lower level of the station. All receivers within the Dominion Junction NoR and those immediately adjacent are identified as commercial, community or residential. Project vibration and overpressure standards are recommended by the Blast Management Assessment (German Standard DIN4150-3 for unoccupied buildings or where an occupant agrees to a higher level and Australian Standard AS2187.2 for occupied buildings).

1. Positive effects

Section X of the AEE outlines route wide positive effects. The Blast Management Assessment does not identify any other positive effects specific to Dominion Junction Station NoR.

2. Construction effects

Blasting has the potential the potential to cause building damage and loss of acoustic amenity because of vibration and overpressure effects. The potential for fly rock associated with a blast is considered with respect safety.

An individual person's perception and sensitivity to vibration will differ from others. Perception relates to when the vibration is detected, sensitivity addresses how it impacts upon the individual. This in turn can vary over the time an individual is exposed to vibration.

The potential for building damage from vibration will depend on the scale of explosive used, the distance to a receiving building and the type of building exposed. Vibration sensitive equipment (e.g. equipment for medical or scientific based activities) within buildings can require protection beyond that imposed by amenity and standard vibration criteria. Buildings with vibration sensitive equipment have not been identified near the Dominion Junction Station NoR.

Overpressure is pressure in excess of normal atmospheric pressure, such as that caused by an explosions shock wave and has the potential to cause building damage.

The Blast Management Assessment has classed all buildings within the area as sensitive receptors. None, however, are expected to require alternative vibration standards.

The Blast Management Assessment notes the permissible level of blasting vibration related to utilities is higher than the standards applied to residential and commercial properties meaning the scale of a blasting activity will be controlled by the standards applied to those properties rather than the utilities. Vibration standards appropriate to underground utilities in the area will be established in consultation with the asset owner, prior to construction.

3. Construction mitigation measures

Blasting at the Dominion Junction Station will be managed to comply with the Project blasting standards, identified in the Blast Management Assessment, specified in proposed conditions XX and XX of the draft condition set in Appendix XX. Variation from these criteria and standards can only be achieved via a Schedule to the CNVMP. With this compliance, it is not anticipated that there will be any impact on the integrity of the adjacent properties to the NoR, although blasting may be perceptible to some people around the blast area.

In addition, where blasting is proposed, trial blasts will be carried out and documented in a Trial Blasting Report, for the purpose of informing the design of subsequent blast events for the Project works. Blasting times will be limited to between 9am and 5pm, Monday to Saturday and each blast monitored for compliance with Project criteria.

In addition, a Blast Management Plan will also be prepared to set out the safety and environmental aspects that will be incorporated into each blast to avoid, remedy or mitigate, as far as practicable the adverse effects.

4. Conclusion of blasting noise and vibration effects

Based on the assessment above, the Blast Management Assessment in Volume 3 Appendix X and the proposed mitigation, the actual and potential effects associated with blasting and the Project will be appropriately managed.

13. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project as related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blast Management Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of damage to buildings and structures.

This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to Dominion Junction Station NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.

In this case, the existing built environment surrounding the Dominion Junction Station ranges from single storey to low rise buildings founded on shallow foundations. Building use predominantly comprises a mix of commercial and retail, such as Kennards Storage Building and the low-rise commercial buildings at 1 Porters Avenue.

All buildings identified as falling within the Project vibration setback distances are located within the NoR footprint and will be acquired and demolished to enable construction of Dominion Junction Station.

1. Positive effects

There are no positive effects on buildings or structures with respect to vibration and settlement.

2. Construction vibration induced effects

Vibration induced building damage which common to the entire Project area is discussed in Section XX. The Structures and Settlement Assessment has identified that all buildings within the NoR footprint will be acquired and demolished. Surrounding buildings fall outside the vibration threshold setback distances and as such the potential for damage to these buildings is Negligible.

3. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section xx, in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CVNMP and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Settlement effects common to the entire Project area are discussed in Section XX. There are no buildings adjacent to the Dominion Junction Station NoR with potential settlements greater than 10 mm and ground slopes greater than 1/500. This corresponds to effects that are expected to be Negligible to Very Slight at worst.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx in the form of a Settlement Management Plan (SMP), recommended in condition XX provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. Operational settlement and vibration induced effects

There are no settlement induced effects associated with the operation of the Project. The potential for settlement effects will occur only during the construction of the Project.

Vibration effects on buildings, resulting from the operation of the Project is addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section xx.

7. Conclusion of settlement and structure effects

Based on the assessment above, the Settlement and Structures Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on buildings will be appropriately managed.

5. Geological Heritage

The Geological Heritage Assessment in Appendix XX of Volume 3, assesses the actual and potential effects on geological heritage features during the construction phase of the Project, as they relate to construction activities in proximity to these features. This section focusses on the volcanic features in the vicinity of the Dominion Junction Station NoR. Further discussion on the common effects on geological heritage is considered in Section XX.

The Dominion Junction Station NoR is on the northern margin of the lava flow field from Maungawhau/Mt Eden Volcano. The volcanic deposits in this location are tuff overlying basalt lava flow with a thickness of less than 10m. The proposed works within the Dominion Junction Station NoR will not impact the integrity or values of geological heritage in this location.

1. Notice of Requirements

1. NoR 6 -Kingsland Station NoR

This section:

- Describes NoR 6 - Kingsland Station (section 1.2)
- Summarises the existing and receiving environment (section 1.3)
- Assesses potential effects and outlines proposed mitigation (section 1.4)

2. NoR description

The Kingsland Station NoR is located to the south of the existing Kingsland township and heavy rail line. In addition to the Kingsland township, land use activities surrounding the station include residential properties, Kowhai Intermediate School, and Eden Park.

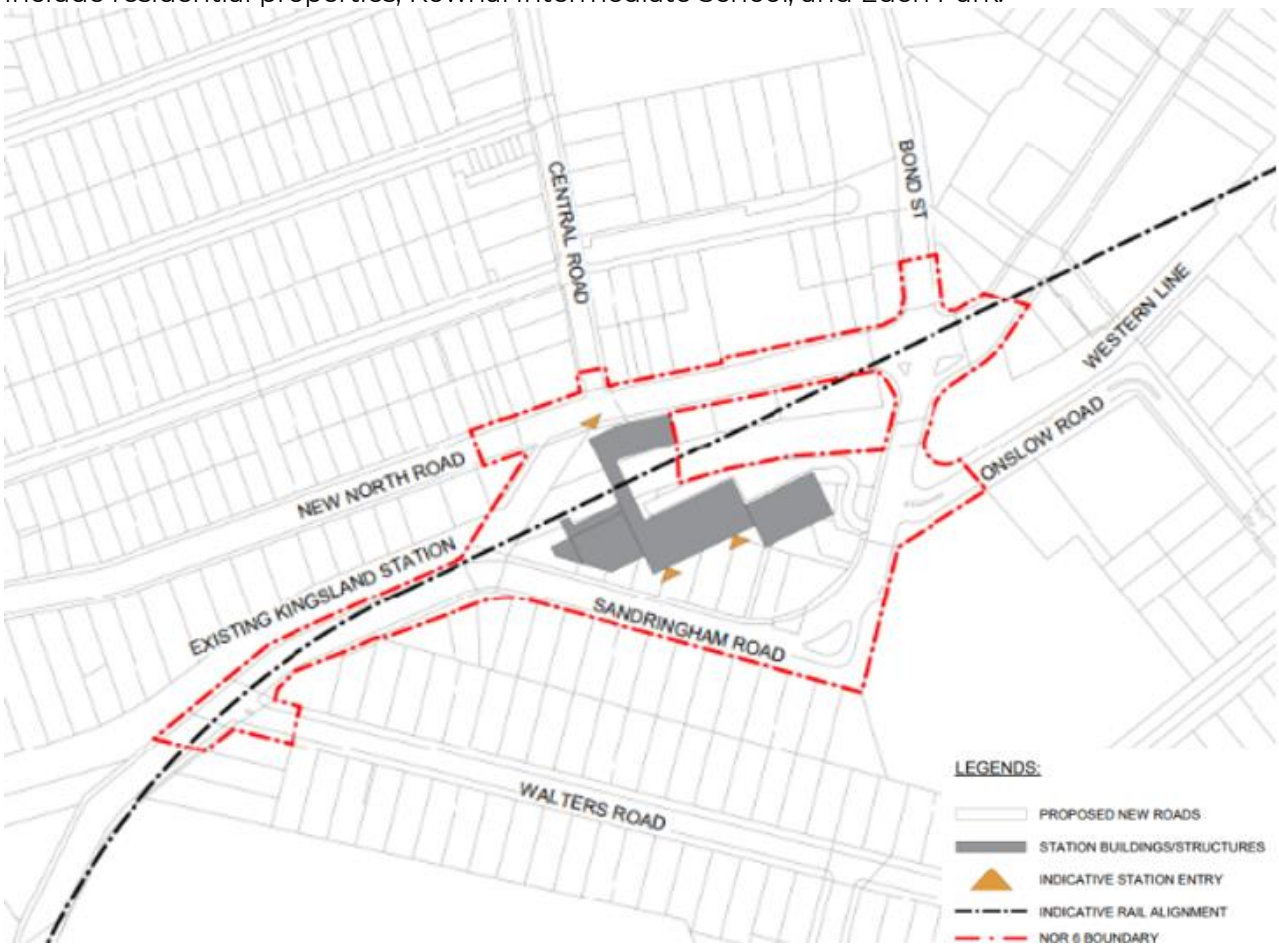

Figure 1 shows the Kingsland Station and NoR boundary. Figure 2 shows the NoR boundary on aerial imagery (outlined in red). Table 1 summarises the Kingsland Station's permanent features and temporary construction works.

Figure 1: Kingsland Station location plan

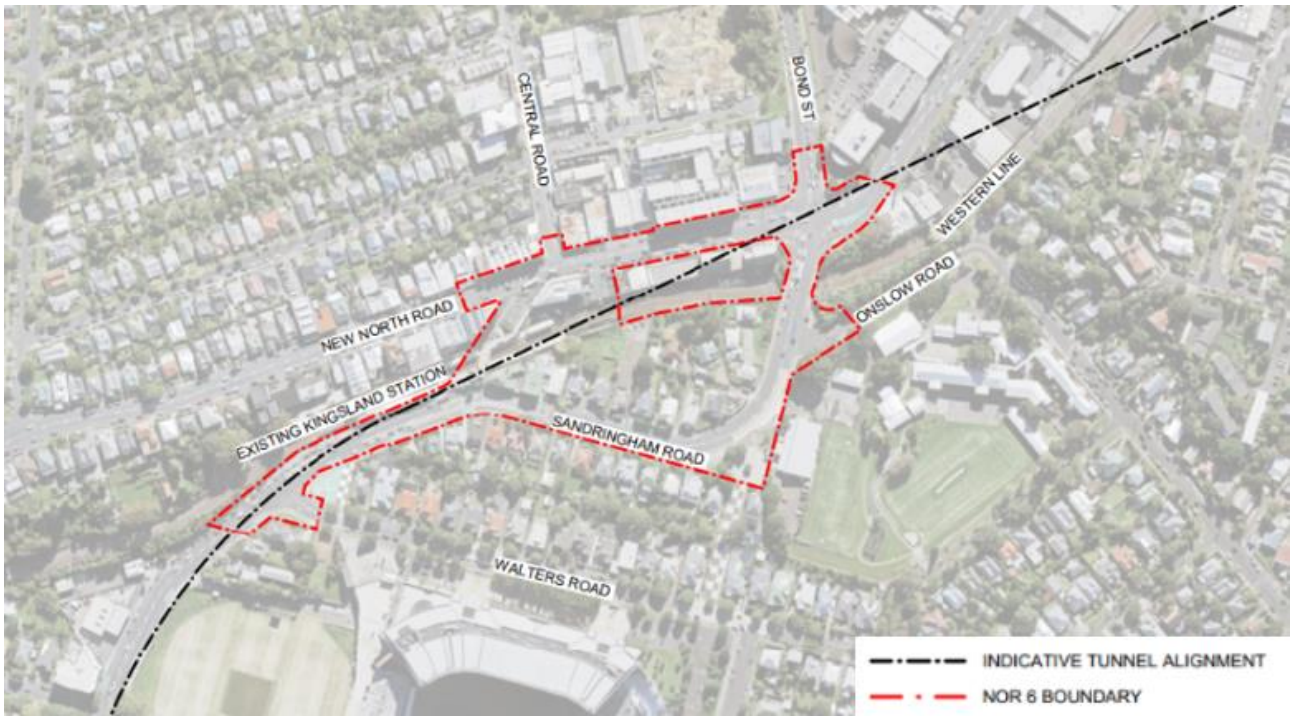

Figure 2: Kingsland Station NoR boundary on aerial imagery

Table 1.1 Kingsland Station NoR description

Permanent features	
Station	• Station located between Sandringham and New North Road. Access located off both New North Road (with overbridge connecting station over existing heavy rail)
Platforms	• Underground, stacked platforms
Public realm	• Plaza adjacent to Sandringham Road inclusive of a commercial and retail facility, overbridge across heavy rail, entrance to station off New North Road • Footpath widening
Road and streetscape	• Provision for new pedestrian crossings on New North and Sandringham Road adjacent to entry points of the station • Provision of relocated bus stops and a bus interchange for buses along Sandringham and New North Road
Parking and loading	• Cycle parking • Vehicle drop off zones • Vehicle loading bays for maintenance/emergency vehicles • Emergency parking bay
Other new infrastructure	• Inclusive of space proofing for heavy rail interface
Anticipated patronage	• High patronage
Anticipated construction works	
Construction methodology and staging	Refer AEE Section 6 and DCR Section X for more detail. At a high level the construction activities will include: • Demolition and site clearance (including relocation and protection of utilities); • Establishment of construction site and yard; • Installation of ground support around the station perimeter, stormwater and settlement management and monitoring as required; • Excavation of station shaft, including installation of propping and internal concrete wall lining;

	• Station fit out; and • Streetscape works along New North and Sandringham Roads
Access to the site	• Access during construction will generally be off Sandringham Road • Single lane closures along Sandringham Road may be required

3. Description of the environment

This section sets out the existing and receiving environment for the Kingsland Station NoR. It applies the parameters on the assumptions outlined in Section XX.

Tables 2 describe the surrounding area and features. Any property directly affected by this NoR is listed in Appendix X to NoR 6 and Form 18 Appendix XX.

Table 2: Existing environment description

Feature	Description
Current land use	The existing land use within Kingsland is split into two main types. The first is the business area within the northern section of the NoR and the second is the low-density residential areas where the main station box is proposed.
Physical	
Transport	• New North and Sandringham Roads both identified as arterial roads • Heavy rail: Kingsland Station • Strategic cycling links along New North and Sandringham Road • Large number of bus connections along New North Road and Sandringham Road
Infrastructure	• No infrastructure at this location
Community facilities and key attractions	• Eden Park • Kingsland town centre • Kingsland train station • Kingsland Trinity Methodist Church
Sensitive noise and vibration receivers	• The Kingslander (470 New North Road) • Nectar bar (470 New North Road) • Taiko Kingsland Restaurant (460 New North Road) • Little Q Café (460 New North Road) • Kingsland Social Café (462 New North Road) • King Fadez Barbershop (455 New North Road) • Idly Samber restaurant (455 New North Road) • Citizen Park bar (424 New North Road) • Atomic Coffee Roasters café (420 New North Road) • Auckland Dance Company (400 New North Road) • The Kingsland Lodge & F Bar (427 New North Road) • Trent Bray Swim School (2 Sandringham Road) • Jula Thai Massage & VR Hair (435 New North Road) • Trinity Methodist Church and Centre (400 New North Road) • Kowhai Intermediate (26 Onslow Road) • Residential receivers (Various) • Apartment buildings (431 – 439 New North Road)
Historic heritage	There are two scheduled buildings on the AUP register within the NoR: • Pages Buildings (462 New North Road) • Portland Buildings (473 New North Road)
Archaeology	The following NZAA archaeological sites are recorded within the NoR boundary: • Kingsland Station (ArchSite ID R11/3321)
Cultural	• [Need further information from Te Tiriti Partnerships team]
Natural	
Topography	• Gently sloping south towards Kingsland Railway Station and tracks, located on a ridge above Sandringham Road.

Geology	• Basalt located underground in the order of 10 m below ground, resulting from Maungawhau lava field.
Catchment	• Meola Stormwater Catchment
Flooding and hydrology	• Flood plain and flood prone area within the main station box location; • Overland flow paths across the site, most prevalent along the existing railway line and Sandringham Road.
Trees and vegetation	• Street trees along Sandringham Road • Residential gardens (not protected)
Terrestrial ecology	• There are no known terrestrial ecological values at the proposed Kingsland Station location.

Figure 3 and Table 3 identify the relevant statutory considerations within the Kingsland Station NoR footprint.

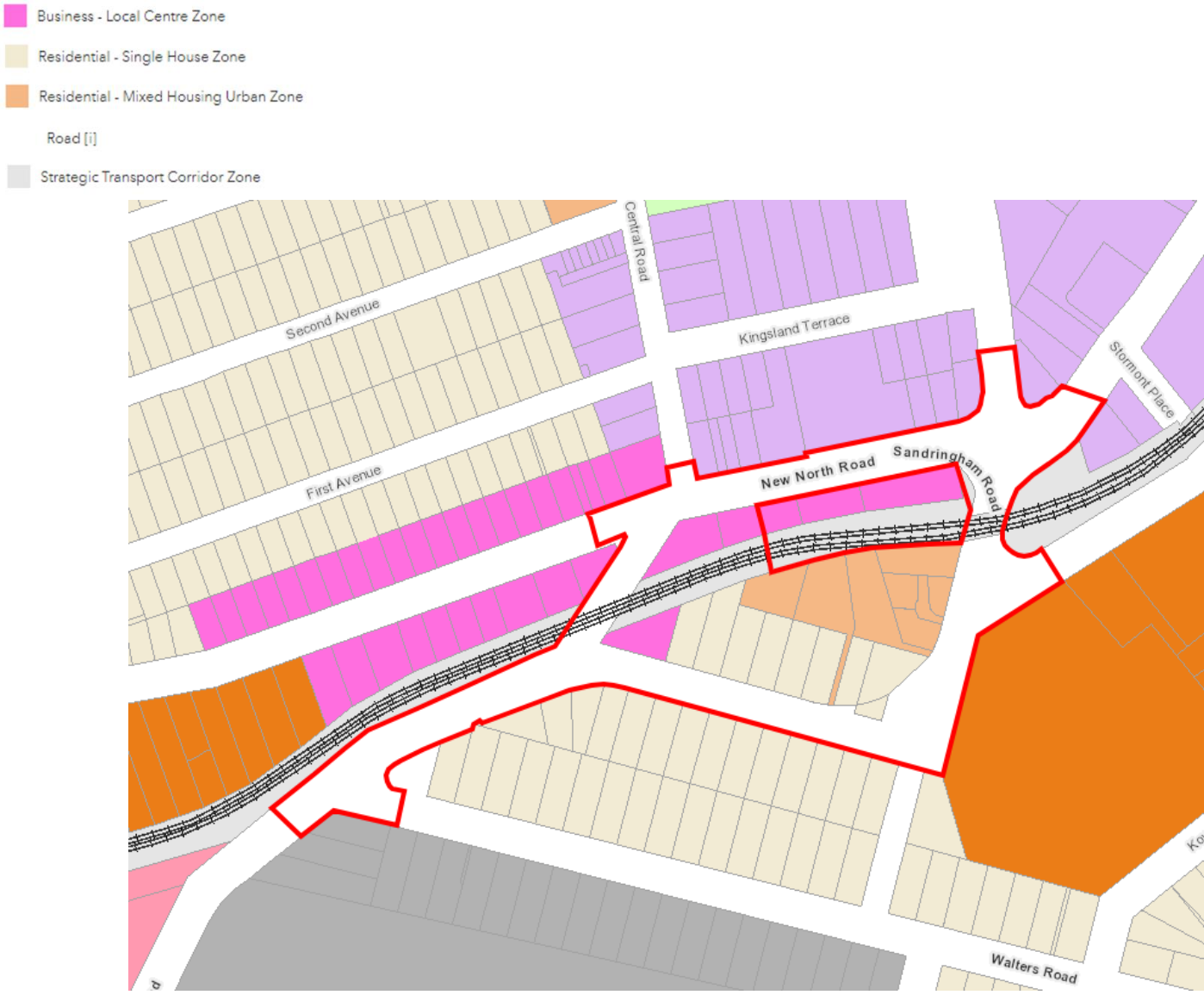

Figure 3: Kingsland Station NoR zoning and overlays in the AUP

Table 3: Kingsland Station NoR statutory environment

Name	Description	Comment
Current Zoning	Road	Applies to all the roads within the NoR boundary

	Business – Local Centre Zone	Applies to three properties within the NoR boundary including 440 New North Road, 430 – 432 New North Road and 25 Sandringham Road.
	Residential – Single House Zone	Applies to 1, 3, 11 and 17 Sandringham Road
	Residential – Mixed Housing Urban Zone	Applies to 5, 9, 13, 15, 17, 21 and 23 Sandringham Road
	Strategic Transport Corridor Zone	Applies to the heavy rail line the transects the site
Precincts	N/A	
Controls	Strategic Transport Corridor Zone	Applies to the railway line within the NoR Boundary
	Controls: Arterial Roads	Applies to New North and Sandringham Roads
	Controls: Macroinvertebrate Community Index – Urban	Applies to the entire area
	Height Variation Controls	A 13 m Height Variation Control applies to the businesses within the NoR
Overlays	Historic Heritage and Special Character: Special Character Areas Overlay Residential and Business – Business Kingsland	Applies to the businesses identified within the Business – Local Centre Zone
	Historic Heritage and Special Character: Special Character Areas Overlay Residential and Business – Residential Isthmus A	Applies to 5 - 25 Sandringham Road
	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place – 1757, Page's Building	Applies to property on the corner of New North Road and Kingsland Train Station (462 New North Road). The area included within the NoR is limited to the street frontage
	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place – 1758, Portland Buildings	Applies to property on the corner of New North Road and Central Road (473 New North Road). The area included within the NoR is limited to the street frontage
Designations	Designation – 1609, Road Widening, Designations, Auckland Transport	Applies to small section within the NoR at 430 – 432 New North Road. This designation extends along New north Road to the east and a small section to the north (outside of the designation)
	Designation – 6300, North Auckland Railway Line from Portage Road, Otahuhu to Ross Road, Topuri, Designations, KiwiRail	Applies to the railway line within the NoR Boundary
	Designation – 1613, Council carpark, Designations, Auckland Transport	Applies to the carpark (430 – 432 New North Road) within NoR boundary
	Designation – 1615, Road Widening, Designations, Auckland Transport	Applies to small section within NoR along Sandringham Road, adjacent to 59 Walters Road, 60 and 64 Sandringham Road.
Regional Plan Controls and Overlays	Natural Resources: Quality-Sensitive Aquifer Management Areas Overlay – Western Springs Volcanic Aquifer	Applies to the areas along the south of the Railway line, within the NoR
Zoning within 800 m catchment	• Residential – Single House Zone • Residential – Mixed Housing Urban Zone • Residential – Mixed Housing Urban Zone	All of these zones are currently within 800 m of the Kingsland NoR.

	• Residential – Terrace Housing and Apartment Building Zone • Residential – Mixed Housing Suburban Zone • Business – Local Centre Zone • Business Mixed Use Zone • Open Space – Informal Recreation Zone • Open Space – Sport and Active Recreation Zone • Special Purpose – Major Recreation Facility Zone • Strategic Transport Corridor Zone	
Anticipated future zoning in 800 m catchment from station	• Residential – Mixed Housing Urban Zone to change to THAB	There is only one small section of Residential – Mixed Housing Urban Zone within the 800 m catchment from the station and it is anticipated that this will be uplifted to THAB zoning. The remainder of the catchment is identified as Special Character Areas (a qualifying matter for Auckland), therefore, no other zoning changes are anticipated within this 800 m catchment.
Other relevant considerations	N/A	N/A

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operational phases of the Project as they relate to the Kingsland Station NoR.

This builds on the technical assessments included in Volume 3 and the Design and Construction Report in Appendix XX. Section XX outlines the indicative methodology used for these technical assessments.

1. Traffic and transport

The Assessment of Transport Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on traffic and transport. This section focuses on the transport effects specific to the Kingsland Station NoR. Further discussion on the route-wide transport effects is considered in Section XX.

Key transport features within and adjacent to the Kingsland Station NoR include:

- **Public transport (rail):** Kingsland Railway Station, a heavy rail station is located partially within and adjacent to the Kingsland Station NoR boundary;
- **Public transport (buses):** Numerous bus stops and routes located adjacent to Kingsland Station NoR including the strategic routes including New North Road and Dominion Road which forms part of the future transport network and provides linkage with the existing heavy rail network;
- **Walking**: Good walking facilities are located in and around Kingsland Village, with restrictions to the walking network being western railway track and SH16.
- **Cycling:** Limited with a combination of on-road unprotected cycle lanes, narrow shared paths and small sections of unconnected protected facilities.
- **Roading network:** Sandringham and New North Roads are both classified as Arterial roads within the AUP. Daily traffic movements along these two roads are 16,950 and 17,200, respectively.
- **Parking:** Parking within the vicinity is mixed on-road and private car parking facilities.

- **Loading:** Not applicable
- **Freight:** No strategic freight routes located within the Kingsland area, some heavy vehicles are expected along the arterial roads.

The Kingsland Station will form part of the future light rail network, improving connectivity along the alignment.

1. Positive effects

In addition to the route wide positive effects outlined in Section XX, Kingsland Station will provide:

- Additional pedestrian access to and from Eden Park during events at the location, specifically with the addition of the connection between New North and Sandringham Road via an overbridge (i.e. unpaid path) improving the connection between Kingsland Village on New North Road and Eden Park on Sandringham Road;
- Improved access to public transport options following major events at Eden Park, including reduced strain on existing heavy rail links and
- Provision for improved connections with existing public transport at the site, including buses and heavy rail links (existing Kingsland Rail Station).

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section XX The proposed works at the Kingsland Station NoR will potentially result in the following adverse construction effects:

- **Public transport (bus services):** As Kingsland is a public transport node for both buses and heavy rail, the potential for existing bus services to experience delays due to the increase of construction traffic around the site is likely to have a higher effect than elsewhere within the network. Additionally, bus lanes on Sandringham Road may require closure if the roadway is reduced to a single vehicular lane direction.
- **Public transport (heavy rail):** Temporary closure of the Kingsland Station heavy rail line during construction of the overhead pedestrian bridge may disrupt passenger services.
- **Roading network:** Refer to common route wide effects section (Section XX)
- **Walking:** The southern footpath along Sandringham Road will require closure during the construction period and realignment of the southern footpath along New North Road during construction for safety purposes will impact pedestrian movements in and around the site.
- **Cycling:** While existing cycling paths are not proposed to be re-aligned or closed during construction, during construction cyclists will be required to navigate and negotiate sections of road that will become single-lane on New North Road, reducing available space on the road and impacting safety.
- **Parking:** Limited street parking will be temporarily closed, however, based on the availability of other on-street car parks and paid off street carparks the effect from this closure is expected to be negligible.
- **Loading:** Not applicable within Kingsland Station NoR.
- **Freight:** Refer to common route wide effects section (Section XX)
- **Emergency services:** Emergency vehicles travelling to and around the immediate vicinity of the site may experience delays relating to construction traffic.

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP) as specified in proposed condition XX of the draft condition set in Appendix XX. The Assessment of Transport Effects identifies the following opportunities for inclusion in the CTMP in relation to Kingsland Station:

- **Public transport (bus services):** While bus lanes may be required to be closed within the construction areas, these will be maintained on the approach, providing priority to traffic queuing at the site.
- **Public transport (heavy rail):** Works will be undertaken at night where they may impact on the operation of the heavy rail network, minimising the impacts from closure.

- **Walking:** Pedestrian management will be undertaken to provide for a re-aligned pathways along Sandringham and New North Road
- **Cycling:** No formal cycle facilities will be impacted during construction, therefore no mitigation is proposed.
- **Roading network:** General construction traffic movements will be managed to avoid peak traffic times and major events at Eden Park. These will be managed via left in, left out along Sandringham Road. Additionally, heavy traffic movements will come off Sandringham Road and exit via New North Road
- **Emergency services:** Provision for emergency services in and around the construction site will be made, this will be discussed with emergency service providers prior to construction being undertaken.

4. Operational effects

There are no adverse operational effects on transport from Kingsland Station NoR. Following construction at the station the existing road layout will be reinstated.

5. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3 Appendix XX and the proposed mitigation, the actual and potential traffic and transport effects associated with the Project will be appropriately managed.

2. Landscape and visual

The Assessment of Landscape and Visual Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the (natural and urban) landscape (including visual effects). This section focuses on the landscape and visual effects specific to the Kingsland Station NoR. Further discussion on the route-wide landscape and visual effects is considered in Section XX.

The urban form within the Kingsland Station NoR comprises one of the traditional centres on New North Road, inclusive of two-storey Edwardian neo-classical masonry buildings with high parapets. The buildings along Sandringham Road are within a grid pattern and are characterised by villas and traditional villas.

The natural landscape within the Kingsland Station NoR is characterised by a hummocky topography which was historically known as Ngā Anawai, which comprised lava flows and a mosaic of wetlands and swamp (now occupied by Eden Park).

1. Positive effects

In addition to the route wide positive effects outlined in Section XX, this station will provide:

- The junction where the Kingsland Station is proposed forms a positive connection between the two main roads and will improve pedestrian linkages between these two streets,
- Reinforcement of Kingsland as a local centre, attracting pedestrian flows to the main street, increasing connections and linkages to open spaces, public transport and Eden Park;
- The contribution of the station to the legibility of the wider transport network for bus and heavy rail interchanges, with both station access points in logical, visible locations and with good access.

2. Construction effects

The construction works within the Kingsland Station NoR will involve typical construction activity and will not result in any additional effects on the landscape and urban environment than those discussed in Section XX.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

The works within Kingsland Station NoR will result in a change in the urban form and natural landscape. These changes involve:

- Special character housing located along the north of Sandringham Road will be removed to accommodate construction and station infrastructure. Removing this infrastructure will affect the built character of Sandringham Road. However, the effects of the removal of this housing will be moderated by the width of and busy and asymmetrical nature of Sandringham Road.
- Windsor Dairy Building (443 – 442 New North Road) will be required to be removed for construction. While not a scheduled historic heritage building this is identified as a Special Character area. Removal of this building will impact the traditional character of the Kingsland main street and the current definition of the Kingsland heavy rail station entrance.
- The indicative plaza forecourt located on Sandringham Road and potential back-of-house facilities within this location may result in adverse effects for people using the space or passing by due to the large-scale public space, low levels of activity and the lack of elements to support this.

5. Permanent infrastructure mitigation measures

Mitigation of landscape and visual effects common to the whole Project is discussed in Section xx and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to the Kingsland Station NoR the Assessment of Landscape and Visual Effects identifies the following opportunities for inclusion in the CULDG when undertaking the design of the station:

- Design requirements to support the station's legibility;
- Design requirements to support access to the station; and
- Design requirement to respond to the specific New North Road and Sandringham Road contexts.

6. Conclusion of landscape and visual effects

Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Social

Assessment of potential adverse social impacts effects to be provided

4. Cultural

*[**TBC on cultural reporting**]*

5. Built heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the Kingsland Station NoR.

Within the Built Heritage Assessment study area (100 m buffer of the NoR boundary) there are numerous historic heritage sites identified including Special Character Areas and Historic Heritage Extents of Place identified within the AUP, Cultural Heritage Inventory sites identified by Auckland Council and sites identified by Heritage NZ Pouhere Taonga. These are shown in Figure 4 below.

The following scheduled historic heritage building within the Kingsland Station NoR are listed below and shown in Figure XX below:

- Pages Buildings
- Portland Buildings

The Kingsland Conveniences are identified within Auckland Council's Cultural Heritage Index is located within the Kingsland Station NoR boundary as shown below on Figure 4. This is a masonry structure in an art deco style structure.
Special Character Business and Residential overlays are located within the NoR boundary, these are shown within the NoR footprint along New North Road and Sandringham Road, as shown on Figure 4 below.

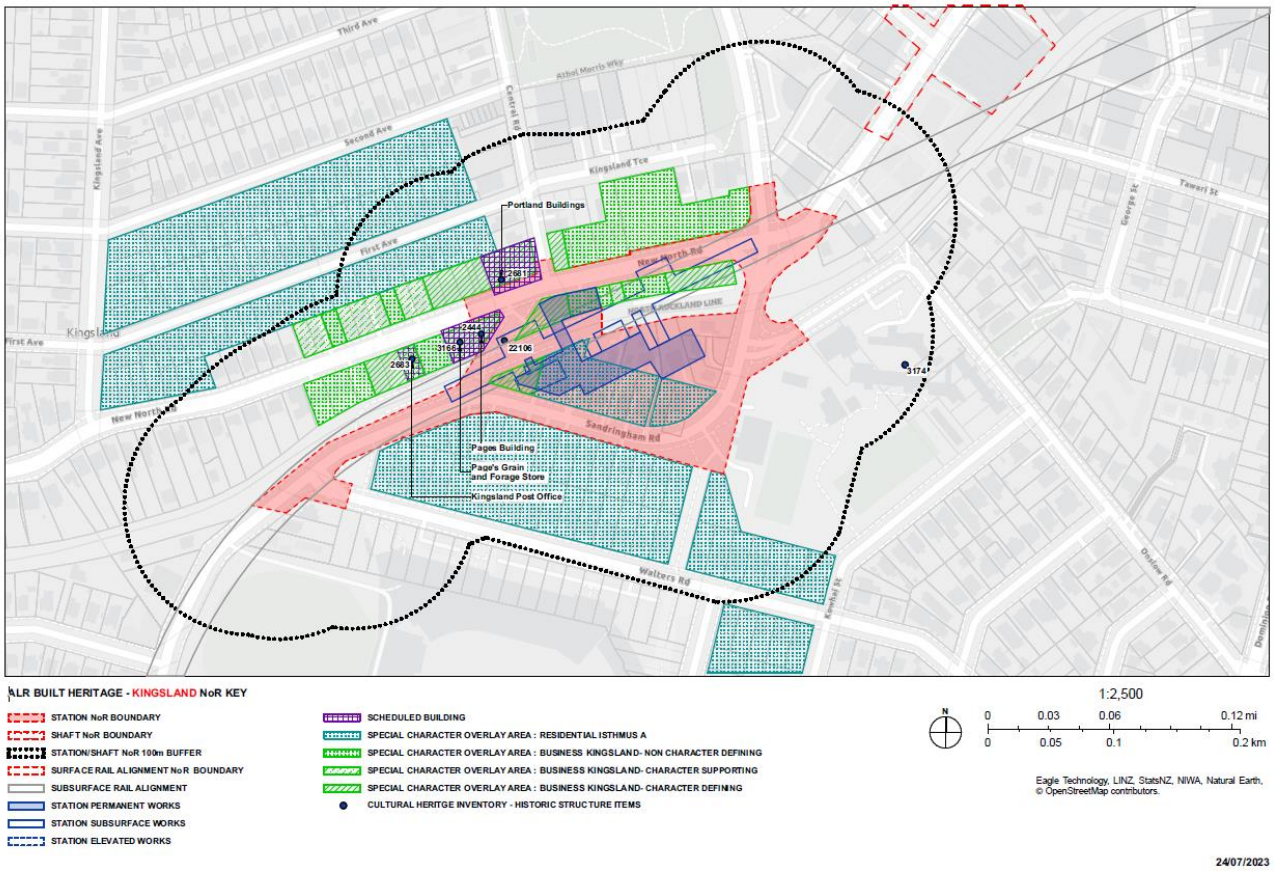

Figure 4: Historic heritage within Kingsland Station NoR

1. Positive effects

Positive effects are not generated during the enabling and construction phases, but there is potential for indirect 'uplift' of Built Heritage Places within the Study Area as an outcome of the development and increased opportunity for visitors to visit the area.

2. Construction effects

The construction works at Kingsland Station will potentially result in the following effects on built heritage, including:

- While the NoR boundary extends into the Historic Heritage Extent of Place of the Pages' Building and Portland Buildings, physical works will not impact on this area, however there is a risk of cosmetic damage or settlement vibration from the construction works associated with the station
- The Conveniences are located within the Kingsland Station NoR boundary. While these are not proposed to be removed as part of the station development. There is potential that there may be some degradation of fabric on the building as well as impacts from dust and accidental damage
- The demolition or removal of Special Character Area houses and businesses will result in a change to the streetscape and loss of character within the area
- Due to the proximity of the Methodist Church Centre there is a risk of cosmetic damage resulting from construction or settlement vibration

3. Construction mitigation measures

Mitigation of built heritage effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Historic Heritage Management Plan (HHMP), specified in proposed condition XX of the draft condition set in Appendix XX. The Built Heritage Assessment

recommends the following opportunities for inclusion in the HHMP in relation to the Kingsland Station:

- Relocation of Special Caracter Area buildings;
- Use of interactive interpretation material within the station design; and
- Salvage of materials from the removed Special Character Area buildings.

4. Operational effects

There are negligible to little operational effects on built heritage, relating to the setting of the place and new development within the NoR Boundary.

5. Conclusion of historic heritage effects

Based on the assessment above, the Built Heritage Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on Built Heritage associated with the Project will be appropriately managed.

6. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to the Kingsland Station NoR. Further discussion on the common archaeology effects is considered in Section XX.

In pre-European history Kingsland area was originally a swamp land which included underground rivers that flowed through historic lava caves in the area and was a place important for resources as it would have been used for the collection of tuna and waterfowl. Surrounding the Kingsland area was also a number of volcanic cones which were occupied and defended during this time. However, there are no pre-European scheduled features within the Kingsland NoR boundary.

In the mid-1800 European settlement began with the area subdivided and sold into private ownership. Many of the houses and associated features from this time have likely been destroyed as part of the redevelopment across the site, however there is a possibility sub-surface archaeological features remain in this area, especially in the undeveloped areas at the back of existing properties. Additionally, sections of a stone wall that historically transacted the residential area along Sandringham Roadmay still remain however, this has not been confirmed.

There are 11 identified heritage features within 200 m of the Kingsland NoR boundary, as shown in Figure 5 however only one lies within the boundary itself. This feature is identified as 'Kingsland Station' (ArchSite reference: R11/3321)

This site known as ‘Kingsland Station’ is located adjacent to the existing heavy rail line at the current Kingsland Train Station. This archaeological site has been subject to ongoing modifications, with the only remaining feature of this site being a basalt block wall. However, it is noted that this wall is not confirmed as being a part of the original train station. Therefore, the historical value of this site is no longer legible and is considered to be low.

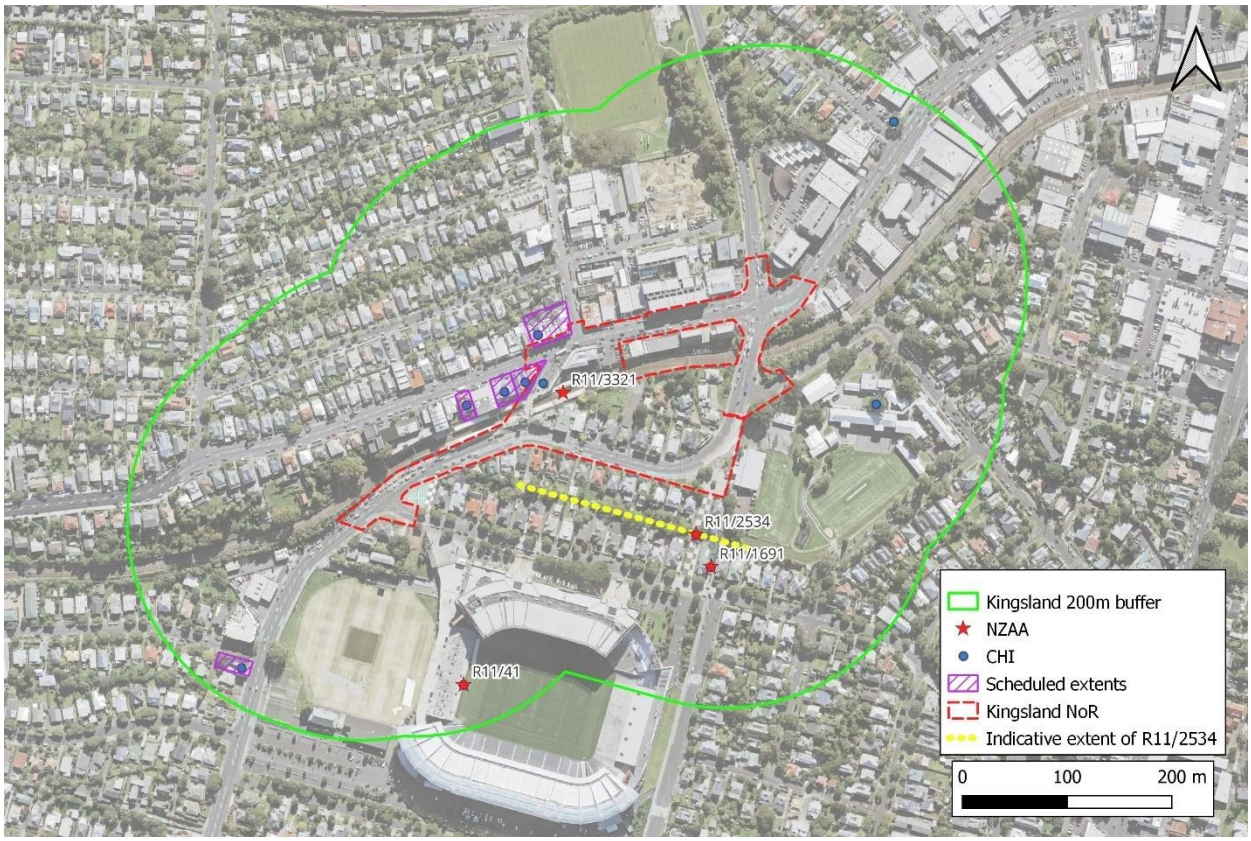

Figure 5: Archaeology within Kingsland Station NoR

1. Positive effects

No positive effects on archaeology have been identified as by its very nature construction requires disturbance of the ground in which archaeological remains may be present. However, management processes can be established to enable the recording of archaeological material found during construction of the Project, providing valuable insight into the history of a site.

2. Construction effects

While one scheduled archaeological site, Kingsland Station, is identified within the Kingsland Station NoR, this is adjacent to the heavy rail tracks, and will not be subject to any physical work therefore, there will be negligible effects on this feature.

The construction works within the Kingsland Station NoR will not result in any additional construction effects on archaeology than those set out in the common effects included in Section XX.

3. Construction mitigation measures

Mitigation of archaeological effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Historic Heritage Management Plan (HHMP), inclusive of accidental discovery of archaeological features. There are no specific archaeological effects that require mitigation with respect to the Kingsland Station NoR.

In addition, an Authority to Modify Permit will be sought from Heritage New Zealand Pouhere Toanga.

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during the construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on archaeology associated with the Project will be appropriately managed.

7. Arboriculture

An Arboriculture Assessment has been undertaken and included as Appendix XX in Volume XX. Arboriculture within the Kingsland Station NoR boundary is limited to trees within residential properties and not protected by the AUP as such no further assessment of arboriculture has been undertaken with respect to the Kingsland Station NoR.

8. Open Space

An Open Space Assessment has been undertaken and included as Appendix XX in Volume XX. There is no open space identified within the Kingsland Station NoR boundary and therefore no assessment is required.

9. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to hydrology and flooding. This section focuses on the hydrology and flooding effects specific to the Kingsland Station NoR. Further discussion on the common hydrological effects is considered in Section XX.

The Kingsland Station NoR is located within the Meola Stormwater catchment. The key hydrological features, inclusive of flooding are listed below and shown in Figure XX below:

- Flood plain located along existing railway lines, where proposed Light Rail Station is proposed to be located with expected water levels of 46.59m RL in the 1% AEP + CC flood event;
- Flood prone area located in same location as the flood plain; and
- Overland flow paths along roads and railway corridor. This is reported in the Auckland Council GeoMaps to me a 2.9 m3/s in the 1% AEP + CC flood event.

Overland Flow Paths - 100ha and above (25,000)

Overland Flow Paths - 3ha to 100ha (25,000)

Overland Flow Paths - 1ha to 3ha (15,000)

Overland Flow Paths - 4000m2 to 1ha (8,000)

Overland Flow Paths - 2000m2 to 4000m2 (5,000)

Flood Prone Areas

Flood Sensitive Area

Flood Plains

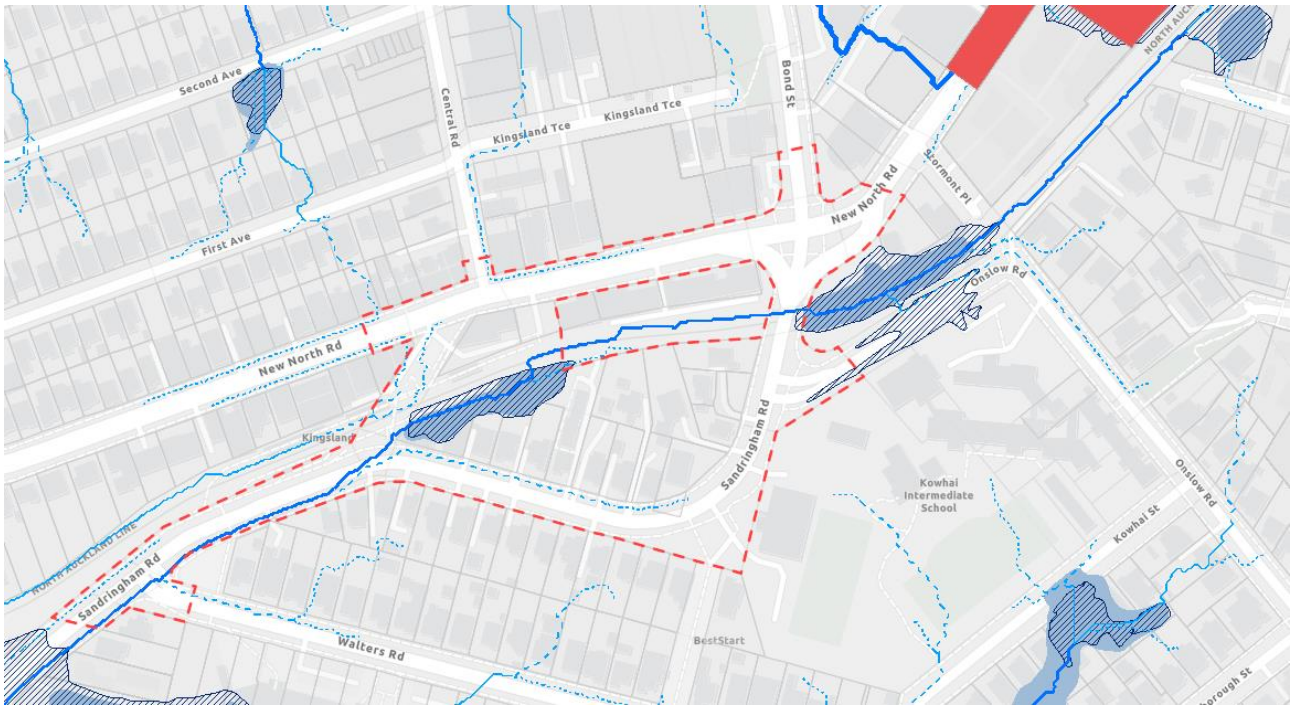

Figure 6 Hydrology within the Kingsland Station NoR

1. Positive effects

There are no positive effects in relation to flooding at the site.

2. Construction effects

The construction works within the Kingsland Station NoR will not result in any additional construction effects on flooding other than those set out in the route-wide effects included in Section XX.

3. Construction mitigation measures

Mitigation of flooding effects common to the whole Project is discussed in Section XX. This will form part of the Construction Environmental Management Plan.

As part of the preliminary design, it has been identified that 4,280 m3 of storage is required within the Kingsland Station NoR and has been allowed for within the NoR boundary.

The following storage has been identified to make up the above volumes and will include the following:

- 600 m3 of imperviousness storage
- 3,680 m3 of displacement storage.

It is likely that emptying this storage will be undertaken via pump drainage.

4. Operational effects

During the detailed design process, updated stormwater and flood modelling is proposed to be undertaken. This will inform the actual risks at the site and enable targeted stormwater and flooding management at the site.

5. Operational mitigation measures

The detailed design modelling as discussed above will help to inform the following mitigation measures at the site for the operational phases within the Kingsland NoR:

- Capture and storage of roof water runoff for non-potable use;
- Standard engineering design inclusive of below ground storage; and
- Inclusion of water sensitive urban design

6. Conclusion of flooding effects

Based on the assessment above, the Hydrology and Flooding Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on flooding associated with the Project will be appropriately managed.

10. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phase of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to the Kingsland Station NoR. Further discussion on the route-wide construction noise and vibration effects is considered in Section XX.

The sensitive receivers are listed within Table XX of this NoR, however those of particular note within XX NoR include the following:

- Jula Thai Massage & VR Hair (identified as 9 below)
- Trinity Methodist Church and Centre (identified as 10 below)
- Kowhai Intermediate (identified as 13 below)
- Residential receivers (identified as 14 below)
- Apartment buildings (shown as 16 below)

There is one vibration sensitive building, Portland Building at 463-475 New North Road, receiver No 14.

These sensitive receivers are also shown in Figure XX below. There are no notable receivers in this location.

Figure 7 Sensitive receivers within Kingsland NoR

1. Positive effects

Section X of this AEE outlines common positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. Construction noise effects

The construction works at Kingsland Station will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the Suburban Worksite construction noise standards as applicable in this location. Based on the noise and vibration modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts that there will be an infringement of the Suburban Worksite standards at ground floor receivers where high noise generating activities are undertaken at the site perimeter, including when best practice CNVMP are implemented. These standards will be exceeded at receivers No 4 and 5, where the following effects in relation to construction noise are anticipated:

- Discomfort for those passing by (i.e. pedestrians)
- Annoyance for some occupants, however, this will generally be managed by occupants with closed windows and doors during these times.

3. Construction noise mitigation measures

Mitigation of construction noise effects common to the whole Project is discussed in Section xx. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved only via a Schedule to the CNVMP. No additional noise measures are required at Kingsland Station.

4. Construction vibration effects

The construction works at Kingsland Station NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted the potential infringement of the vibration standards in this location using compaction activity given the sustained vibration produced, usually over a period of days while fill is compacted.

The effects of construction vibration take two forms:

1. Potential for building damage; and
2. Potential for loss of amenity.

Infringement of the cosmetic building damage standard is predicted at receiver No 4 for short periods of time. Potential infringement of the vibration amenity standard is predicted at other receivers.

The Construction Noise and Vibration Assessment concludes no risk of exceeding the vibration standard for sensitive buildings (applicable to receiver No 14, Portland Building).

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section xx. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required. and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction vibration standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project vibration standards can only be achieved only via a Schedule to the CNVMP. No additional measures are required at Kingsland Station.

6. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

11. Operational noise and vibration

Assessment of potential adverse operational noise and vibration impacts effects to be provided

12. Blasting overpressure and vibration

The Blast Management Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of blasting during the construction phase of the Project as they relate to blasting noise and vibration. This section focuses on the blasting vibration and overpressure effects specific to the Kingsland Station NoR.

Blasting is required within the Kingsland Station NoR due to the presence of basalt below ground at approximately RL45m down to a depth of RL25m. All receivers within the Kingsland NoR and those immediately adjacent are identified as commercial, industrial, educational or residential. Project vibration and overpressure standards are recommended by the Blast Management Assessment (German Standard DIN4150-3 for unoccupied buildings or where an occupant agrees to a higher level and Australian Standard AS2187.2 for occupied buildings).

There is one feature within the Kingsland Station NoR that alternate standards should be applied to. This is the drystone wall on the boundary of 19 and 21 Sandringham Road which is discussed within Section 1.4.7 above. The Blast Management Assessment recommends British Standards BS7385 and BS5528 in this instance.

1. Positive effects

Section X of this AEE outlines route wide positive effects. The Blasting Noise and Vibration Assessment does not identify any other positive effects specific to Kingsland Station NoR.

2. Construction effects

Blasting has the potential to cause building damage and loss of acoustic amenity because of vibration and overpressure effects. The potential for flyrock associated with a blast is considered with respect safety.

An individual person's perception and sensitivity to vibration will differ from others. Perception relates to when the vibration is detected, sensitivity addresses how it impacts upon the individual. This in turn can vary over the time an individual is exposed to vibration.

The potential for building damage from vibration will depend on the scale of explosive used, the distance to a receiving building and the type of building exposed. Vibration sensitive equipment (e.g. equipment for medical or scientific based activities) within buildings can require protection beyond that imposed by amenity and standard vibration criteria. Buildings with vibration sensitive equipment have not been identified near the Kingsland Station NoR.

Overpressure is pressure in excess of normal atmospheric pressure, such as that caused by an explosions shock wave and has the potential to cause building damage.
The Blast Management Assessment has classed all buildings within the area as sensitive receptors. None, however, are expected to require alternative vibration standards. An alternative vibration standard is recommended for a drystone wall on the boundary of 19 and 21 Sandringham Road.
The Blast Management Assessment notes the permissible level of blasting vibration related to utilities is higher than the standards applied to residential and commercial properties meaning the scale of a blasting activity will be controlled by the standards applied to those properties rather than the utilities. Vibration standards appropriate to underground utilities in the area will be established in consultation with the asset owner, prior to construction.

3. Mitigation measures

Blasting at the Kingsland Station will be managed to comply with the Project blasting standards and criteria identified in the Blast Management Assessment specified in proposed condition XX of the draft condition set in Appendix XX. Variation from these criteria and standards can only be achieved only via a Schedule to the CNVMP. With this compliance, it is not anticipated that there will be any impact on the integrity of the adjacent properties to the NoR, although blasting may be perceptible to some people around the blast area.
In addition, where blasting is proposed, trial blasts will be carried out and documented in a Trial Blasting Report, for the purpose of informing the design of subsequent blast events for the Project works. Blasting times will be limited to between 9am and 5pm, Monday to Saturday and each blast monitored for compliance with Project criteria.
In addition, a Blast Management Plan will also be prepared to set out the safety and environmental aspects that will be incorporated into each blast to avoid, remedy or mitigate, as far as practicable the adverse effects.

4. Conclusion of blasting noise and vibration effects

Based on the assessment above, the Blasting Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects associated with blasting, the Project will be appropriately managed.

13. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project as related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blasting Noise and Vibration Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of damage to buildings and structures.
This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to the Kingsland Station NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.
The existing built environment surrounding the Kingsland Station ranges from low to mid rise shallow founded buildings. Building use comprises a mix of domestic dwellings, apartments, commercial and retail activities.
The only building identified as falling within the Project vibration threshold setback is 424 New North Road (Citizen Park). This building shown in Figure XX below.

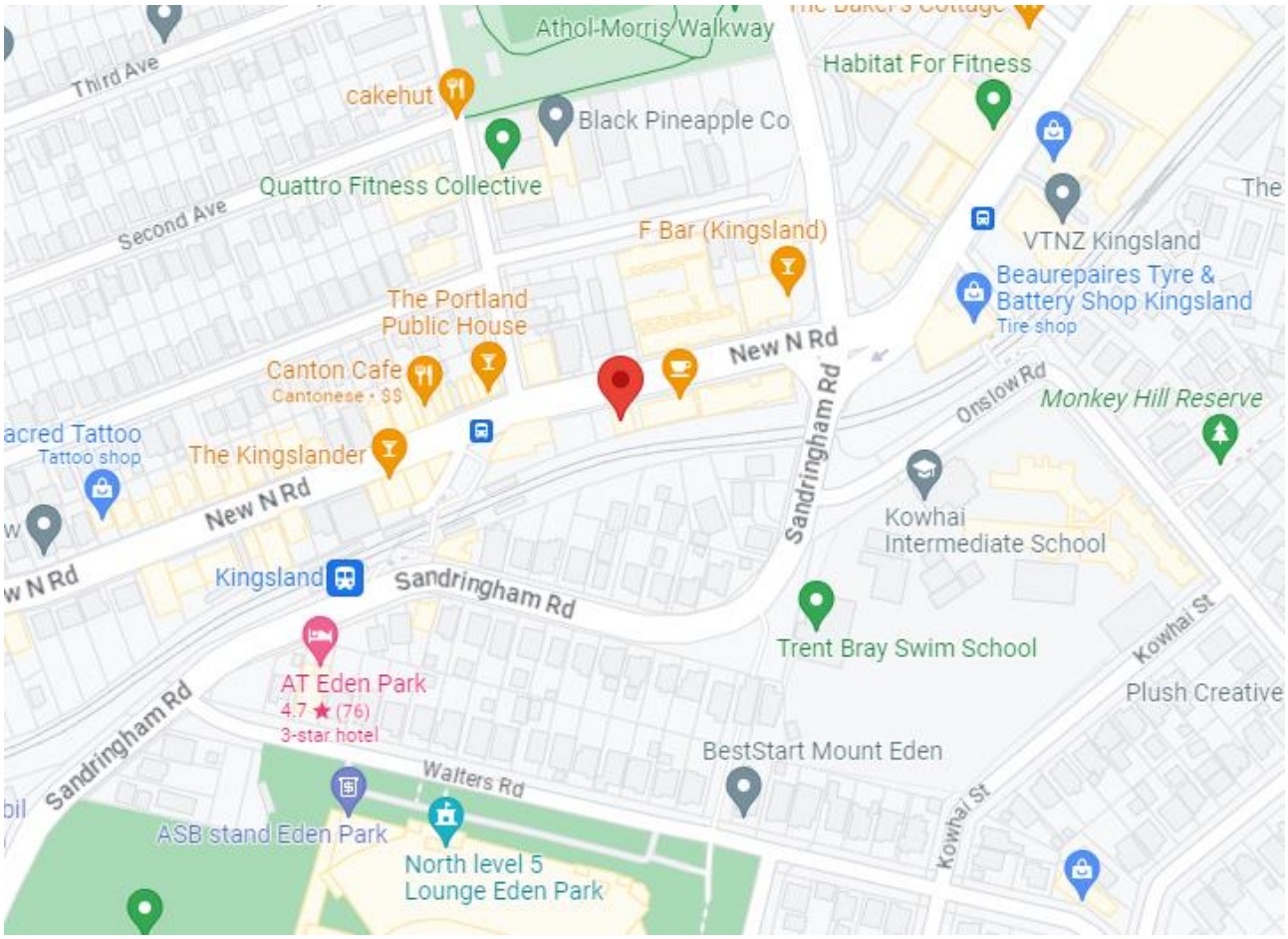

Figure 8 Sensitive structures within the Kingsland Station NoR

1. Positive effects

There are no positive effects on buildings or structures with respect to vibration and settlement.

2. Construction vibration induced effects

Vibration induced building effects common to the entire Project area is discussed in Section XX. In general, surrounding buildings fall outside the vibration threshold setback distances and as such the potential for damage to these surrounding buildings is Negligible. Receiver No 4, within the NoR footprint, will remain. The Structures and Settlement Assessment has identified:

- There is the potential for superficial damage to the interior and exterior of the building at receiver no. 4, Citizen Park Bar, 424 New North Road.

3. Mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section xx in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CVNMP and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Settlement effects common to the entire Project area are discussed in Section XX. There are no buildings adjacent to the Kingsland Station NoR with potential settlements greater than 10 mm and ground slopes greater than 1/500. This corresponds to effects that are expected to be at Negligible to Very Slight.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx in the form of a Settlement Management Plan (SMP), recommended in condition XX provide a framework for the monitoring and management of excavation induced settlement effects

associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. Operational settlement and vibration induced effects

There are no settlement induced effects associated with the operation of the Project. The potential for settlement effects will occur only during the construction of the Project. Vibration effects on building, resulting from the operation of the Project is addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section xx.

7. Conclusion of settlement and structure effects

Based on the assessment above, the Settlement and Structures Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on buildings will be appropriately managed.

14. Geological heritage

The Geological Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects on geological heritage features during the construction phase of the Project as they relate to construction activities in proximity to these features. This section focuses on the volcanic features in the vicinity of the Kingsland Station NoR. Further discussion on the common effects on geological heritage is considered in Section XX.

The Kingsland Station NoR is on the northern margin of the lava flow field from Maungawhau / Mt Eden Volcano. The proposed works within the Kingsland Station NoR- are will not encounter known lava caves or impact the geological heritage in this location.

1. Balmoral / St Lukes Station NoR 7

1. Introduction

This section:

- Describes NoR 7 - Balmoral / St Lukes Station (section 2)
- Summarises the existing and receiving environment (section 3)
- Assesses effects and outlines mitigation (section 4).

2. Balmoral / St Lukes Station NoR description

The proposed Balmoral / St Lukes Station NoR is located on the corner of Lancing Road and Sandringham Road, extending onto Watson Avenue on the west. The NoR is within close walking distance of the existing St Lukes Mall on the east and Balmoral School on the west. The NoR is surrounded by predominantly residential properties and is directly south-east of Warren Freer Park.

Balmoral / St Lukes Station is proposed to be an underground station and is anticipated to be a medium-high patronage Station.

Figure 1 shows the Balmoral / St Lukes Station and NoR boundary. **Figure 2** shows the NoR boundary on aerial imagery (outlined in red). Table 1 summarises the Balmoral / St Lukes Station's permanent features and temporary construction works.

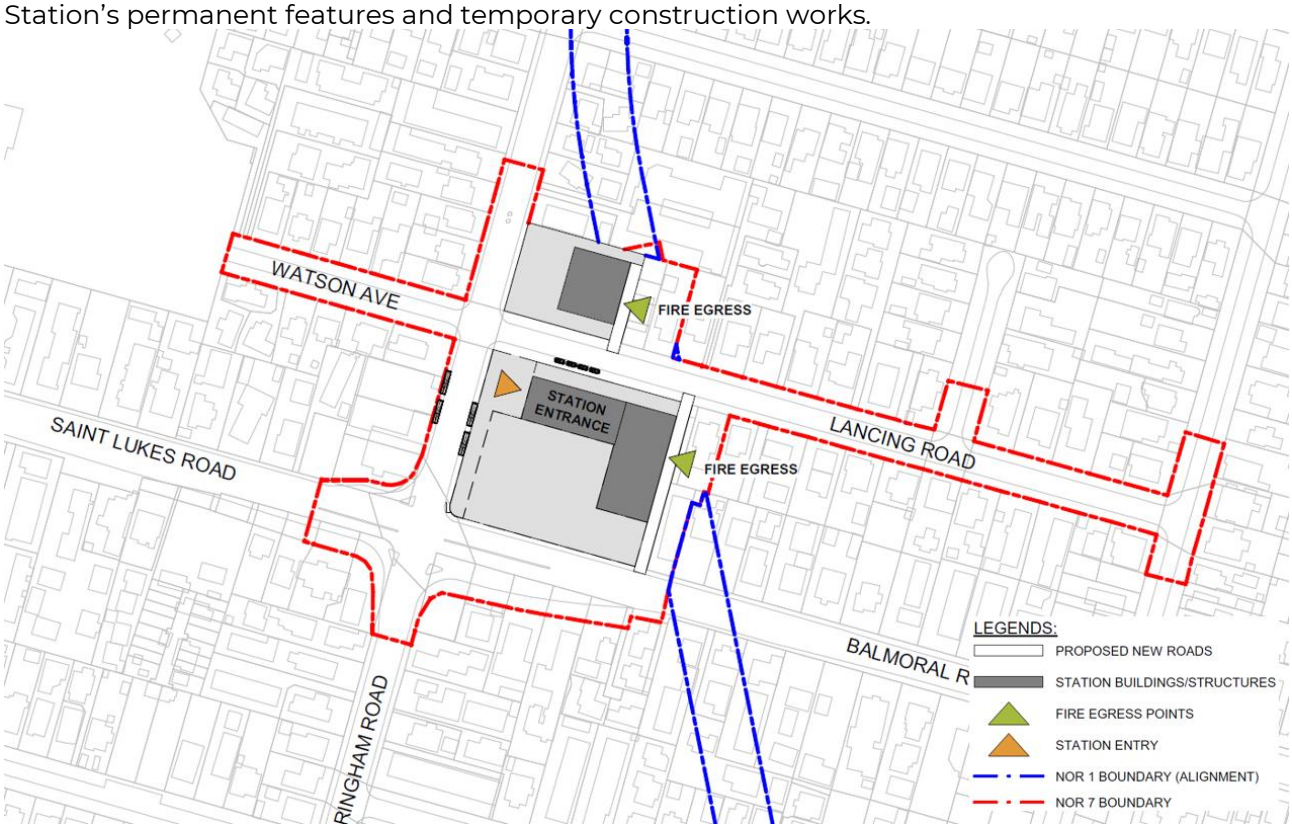

Figure 1: Balmoral / St Lukes Station NoR Location Plan

Figure 2: Balmoral / St Lukes Station NoR boundary on aerial imagery

Table 1: Balmoral / St Lukes Station NoR description

Permanent features	
Station	• Underground station accessed through Station forecourt fronting Sandringham Road • Station entrance provided from Sandringham Road.
Platforms	• Underground stacked platforms
Public realm	• New pedestrian station forecourt fronting Lancing Road / Sandringham Road intersection. • Station forecourt contains passenger amenities, bicycle storage and staff facilities.
Road and streetscape	• Potential for connection to services along Sandringham Road
Parking and loading	• Provision for bicycle storage facilities provided at primary Station entrance on Sandringham Road. • Provision for Kiss and Ride facilities provided on Lancing Road
Other new infrastructure	• Provisions for new bus stops and bus bays or relocate existing Sandringham Road bus stops closer to the Station. • Primary Services Building provided adjacent Station entrance along Lancing Road • Secondary Services Building provided opposite
Anticipated patronage	Medium-high
Anticipated construction works	
Construction methodology and staging	Refer to AEE Section 6 and DCR Section X for more detail. At a high level the construction activities at Balmoral / St Lukes Station NoR will include: • Demolition, site clearance, utilities relocation/protection. Establish site offices & amenities. • Install ground support to station shafts perimeter - anticipated bored or DTH secant pile walls (pending basalt depth confirmation) • Excavation to station shafts – anticipate blasting for basalt. • Mine adits to connect shaft to monotube tunnel. • Station internal construction and fitout. • Surface buildings and streetscaping. *Standard hours of work for this site are anticipated to be 7am-6pm Mon-Sat.*
Access to the site	• From Balmoral Road, Sandringham Road and Lancing Road via Goring Road.

Other	• Construction traffic is ranging from 25 to 130 trucks/day

3. Description of the environment

This section sets out the existing and receiving environment for Balmoral / St Lukes Station NoR. It applies the parameters on the assumptions outlined in Section 10.1.3.

Table 2 below describes the surrounding area and features. Any property directly affected by this NoR is listed in Appendix X to NoR 7 Form 18.

Table 2: Existing environment description

Feature	Description
Current land use	• Primarily residential dwellings adjacent to Lancing Road and Balmoral Road. • Z Sandringham Service Station at corner of Sandringham Road and Balmoral Road. • Road corridors including Watson Ave (west), Lancing Road (north), Balmoral Road (south) and Sandringham Road along the centre.
Physical Environment	
Transport	• Traffic volumes along St Lukes Road, Balmoral Road and Sandringham Road ranges between 17,480 – 24,380 vehicles per day. • St Lukes Road, Balmoral Road and Sandringham Road are arterial roads. • Suburban residential streets including Watson Avenue and Lancing Road within the NoR footprint. • Walking footpaths along St Lukes Road, Balmoral Road, Sandringham Road, Lancing Road and Watson Avenue. • Main pedestrian and cyclist crossing at the intersection of St Lukes Road, Balmoral Road and Sandringham Road. • St Lukes Road and Balmoral Road are “regional cycle routes”, and Sandringham Road is a “major cycle route”. Limited with on-road unprotected cycle lanes. • 9 bus stops along St Lukes Road / Balmoral Road and 9 bus stops along Sandringham Road, providing connections to the City Centre, Kingsland, Dominion Road and Mt Eden.
Infrastructure	• Vector cables running along Sandringham Road and Balmoral Road. • Multiple Chorus Telecommunication cables running across and around the NoR footprint. • Local waterpipe network across the NoR footprint along Lancing Road. • Sewer pipe east-west aligned discharging across Sandringham Road. • Local stormwater pipe along Balmoral Road.
Community facilities and key attractions	• St Lukes Westfield Shopping Centre • Mt Albert Library • Warren Freer Park • Edendale Reserve and Edendale Tennis Club • Gribblehurst Park • St Luke’s Plunket Family Centre • Bambinos Early Childhood Centre St Luke’s • Balmoral Community Hall • Lexham Gardens Rest Home • Dominion Road shops
Sensitive noise receivers	• Lexham Gardens Rest Home • St Lukes Plunket Family Centre • Commercial properties at 333, 335, 354 Sandringham Road • Bambinos Early Childhood Centre St Lukes
Built heritage	• Auckland Electric Power Board (AEPB) Sub-station building (250 Balmoral Road) approx. 300 m west of NoR.

	• Balmoral Community Hall (258 Balmoral Road) approx. 220 m west of NoR
Archaeology	• Auckland Electric Power Board (AEPB) Sub-station building (250 Balmoral Road) approx. 300 m west of NoR. • Balmoral Community Hall (258 Balmoral Road) approx. 220 m west of NoR • Winston Model Homes (26-42 Eldon Road and 41, 43 Cambourne Road)
Cultural	• [Need further information from Te Tiriti Partnerships team]
Natural Environment	
Topography	• The site is generally flat in typography with a change in elevation of 5m from St Lukes Road to Goring Road where the station ends.
Geology	• The station site lies on the basalt lava flow emanating from Te Tātua-a-Riukiuta / Three Kings and Maungawhau / Mt Eden Volcanoes.
Catchment	• Located within the Meola Stormwater catchment, with an estimated catchment size of approximately 1.5 hectares.
Flooding and hydrology	• One flood plain is present, impacting approximately 50% of the proposed site. • One overland flow path from the south flows north through the station site. • A Flood Prone Area also exists at the site with a water level above 41.46m RL in the 1% AEP + CC flood event.
Trees and vegetation	• There are no scheduled trees within the Balmoral / St Lukes Station NoR. • Various protected street trees are present in the surrounding commercial and residential environment that includes two Pōhutakawa trees. • Section 11.3 of the Arboricultural Assessment provides a full list of trees identified within and adjacent to the NoR.
Terrestrial ecology	• No recorded significant terrestrial ecological areas within or in proximity to the NoR. • Low to very high ecological values for vegetation, which includes native trees including Pōhutakawa trees, street trees and shrubs, and residential habitat. • Low to high ecological values for native lizards, including skinks and native birds, including red-billed gulls and black-billed gulls which may roost in vegetation within the NoR.

Figure 3 and Table 3 identify the relevant statutory considerations within the Balmoral / St Luke's Station NoR footprint.

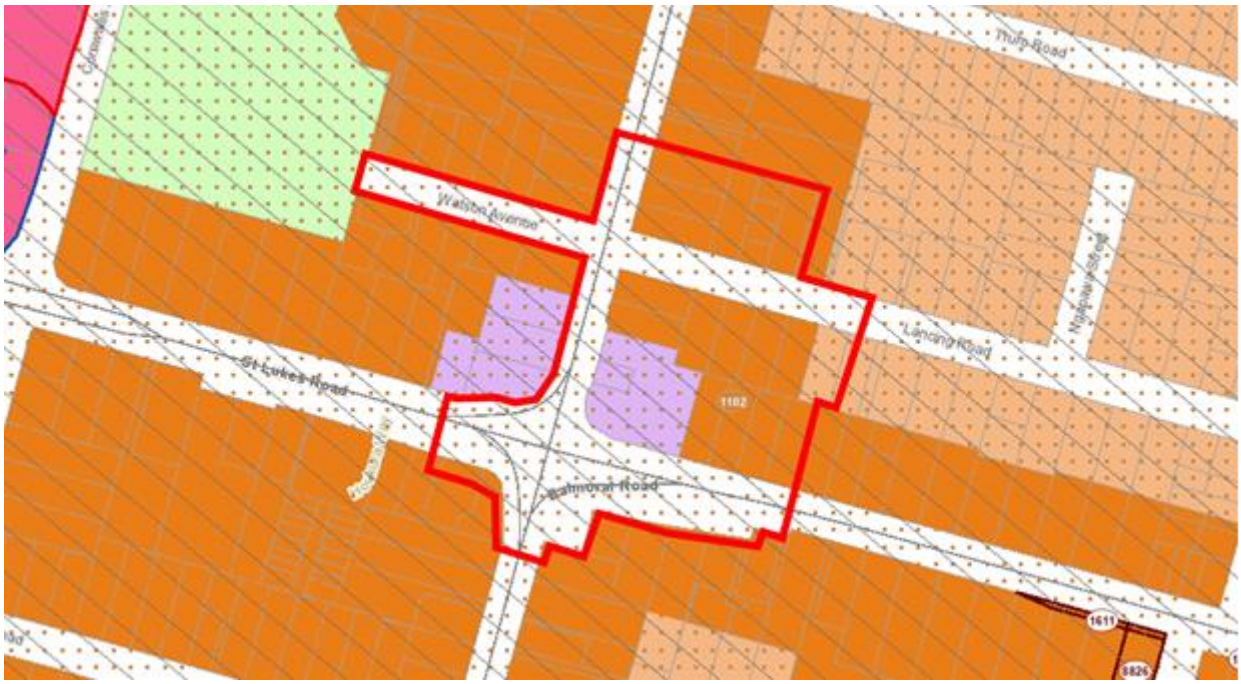

Figure 3: Balmoral / St Luke's Station NoR zoning and overlays in the AUP

Table 3: Balmoral / St Luke's Station NoR boundary outlined in red – AUP Statutory layers (Source: Auckland Council GeoMaps)

Balmoral / St Lukes Station NoR 7	Description	Comment
Current NoR zoning	Business – Mixed Use Zone	Applies to 340 and 355 Sandringham Road
	Residential – Terrace Housing and Apartment Building Zone	Applies to most residential properties within NoR footprint
	Residential – Mixed Housing Urban Zone	Applies to 11 Lancing Road
	Road	Applies to all roads within the NoR footprint
Precincts	N/A	N/A
Controls	Arterial Roads	Applies to Sandringham Road, Balmoral Road and St Luke's Road.
	Macroinvertebrate Community Index – Urban	Applies to the entire NoR footprint
Overlays	Natural Resources: Quality-Sensitive Aquifer Management Areas Overlay [rp] – Western Springs Volcanic Aquifer	Applies to the entire NoR footprint
	Natural Heritage – Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay [rcp/dp] – E6, Mount Eden	Applies to the entire NoR footprint
Designations	Airspace Restriction Designations - ID 1102, Protection of aeronautical functions - obstacle limitation surfaces, Auckland International Airport Ltd	Applies to the entire NoR footprint. Proposed works will not affect Airspace Restriction Designation.
Zoning within 800m catchment	• Residential – Terrace Housing and Apartment Building Zone • Residential – Mixed Housing Urban Zone • Residential – Mixed Housing Suburban Zone • Residential – Single House Zone	• High density residential zoning and neighbourhood, local and town centre zones. • Open spaces within 800 m of the Balmoral / St Luke's NoR.

	• Business – Neighbourhood Centre Zone • Business – Local Centre Zone • Business – Town Centre Zone • Open Space – Sport and Active Recreation Zone • Open Space – Community Zone • Special Purpose Zone – School	• Two schools in the south-eastern direction of the NoR.
Anticipated future zoning within 800m catchment from station	As above, with the following changes: • Residential – Mixed Housing Suburban/ Urban within 800m rezoned to Residential – Terrace Housing and Apartments • Business – Local Centre Zone retained with increased heights	Refer Section 10 for analysis.
Other relevant considerations	N/A	N/A

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operational phases of the Project as they relate to the Balmoral / St Lukes Station NoR.

This builds on the technical assessments included in Volume 3 and the Design and Construction Report in Appendix XX. Section X outlines the indicative methodology used for these technical assessments.

1. Traffic and transport

The Assessment of Transport Effects included in Appendix X of Volume 3 assesses any actual and potential traffic effects of the construction and operational phases of the Project as they relate to effects on traffic and transport. This section focuses on the transport effects specific to the Balmoral / St Lukes Station NoR. Further discussion on the route-wide transport effects is considered in Section XX.

The Balmoral / St Lukes NoR footprint is surrounded by St Lukes Road, Balmoral Road and Sandringham Road, which are all classified as Arterial Roads under the AUP and carry a high number of vehicle movements. Balmoral Road and St Lukes Road are regional cycle routes while and Sandringham Road is a major cycle route. The traffic environment surrounding the NoR footprint is primarily car-dominant, with the only formal pedestrian crossing being the main signalised pedestrian crossing at the intersection of St Lukes Road, Balmoral Road and Sandringham Road.

Key transport features within and adjacent to the Balmoral / St Lukes Station NoR include:

- **Public transport (bus services):** Numerous bus stops and services along Sandringham Road, providing connections to the City Centre, Kingsland, Dominion Road and Mt Eden.
- **Public transport (heavy rail):** No existing train stations exist in the vicinity of the Balmoral / St Lukes Station NoR. .
- **Roading network:** Grid-like road network in the vicinity of the NoR. St Lukes Road, Balmoral Road and Sandringham Road are classified as Arterial roads within the AUP. The suburban streets within the NoR are Watson Avenue and Lancing Road.
- **Walking:** Walking footpaths are provided along St Lukes Road, Balmoral Road, Sandringham Road, Lancing Road and Watson Avenue. Main signalised pedestrian

crossing is at the intersection of St Lukes Road, Balmoral Road and Sandringham Road.

- **Cycling:** On-road unprotected cycle lanes and no formal cycling facilities in the immediate vicinity of the NoR. St Lukes Road and Balmoral Road are regional cycle routes, and Sandringham Road is a major cycle route.
- **Private vehicles:** Daily traffic movements along St Lukes Road, Balmoral Road and Sandringham Road range between 17,480 and 24,380, reflective of the Arterial road character.
- **Roading network:** St Luke's Road, Balmoral Road and Sandringham Road are classified as Arterial roads within the AUP. Daily traffic movements along these roads range between 17,480 and 24,380. The suburban streets within the NoR are Watson Avenue and Lancing Road.
- **Parking:** Parking within the vicinity is mixed on-road and private car parking facilities. Off-street parking is prohibited along St Luke's Road and Balmoral Road.
- **Freight:** Freight vehicles expected on St Lukes Road, Balmoral Road and Sandringham Road, however none are identified as strategic freight routes.

The Balmoral / St Luke's Station will form part of the future light rail network, improving connectivity along the alignment.

1. Positive effects

In addition to the common positive effects outlined in Section XX, Balmoral / St Lukes Station will provide:

- Improved pedestrian and cyclist facilities at the major signalised pedestrian crossing at the St Lukes Road / Balmoral Road / Sandringham Road intersection.

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section X. The proposed works at the Balmoral / St Luke's Station NoR will potentially result in the following adverse construction traffic effects:

- **Public transport (bus services):** Bus services would be generally unaffected; however some bus services may experience minor delays along Sandringham Road and Balmoral / St Luke's Road during construction due to increased construction vehicles.
- **Public transport (heavy rail):** No existing train stations exist in the vicinity of the NoR, therefore no effects expected on heavy rail.
- **Roading network:** Closure of Sandringham Road / Lancing Road intersection will require vehicles to reroute via Goring Road.
- **Walking:** Closure of Sandringham Road / Lancing Road intersection will require pedestrians to reroute. Footpaths at the St Luke's / Balmoral / Sandringham Road intersection requiring some temporary alignment will impact pedestrian movement within and around the NoR.
- **Cycling:** Refer to route-wide effects section (Section XX).
- **Private vehicles**: Refer to route-wide effects section (Section X).
- **Parking:** Refer to route-wide effects section (Section XX)
- **Loading:** Refer to route-wide effects section (Section XX)
- **Emergency Services:** As with the private vehicles, emergency vehicles travelling to and around the immediate vicinity of the site may experience delays relating to construction traffic.
- **Freight:** Minimal effect on freight routes, however the footpath upgrades on St Lukes Road may affect freight routes.

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Construction Traffic Management Plan (CTMP). The Assessment of Transport Effects recommends the following opportunities for inclusion in the CTMP in relation to the Balmoral / St Lukes Station:

- **Public transport (bus services):** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Public transport (heavy rail):** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).

- **Roading network:** Closure of a section of Lancing Road to Sandringham Road at an early phase of construction.
- **Walking:** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Cycling:** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Private vehicles:** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Parking:** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Loading:** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Emergency Services:** Provision for emergency services in and around the construction site will be made, this will be discussed with emergency service providers prior to construction being undertaken.
- **Freight:** Trucks approaching and leaving NoR construction site to reroute on St Lukes Road instead of Sandringham Road to access the motorway network.

4. Operational effects

There are no adverse operational effects on transport from Balmoral / St Luke's Station NoR. Once the Balmoral / St Lukes Station is complete, it will improve pedestrian access and connectivity in the local area, particularly connecting to the nearby destinations.

5. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3 and Appendix XX and the proposed mitigation, the actual and potential traffic and transport effects will be appropriately managed.

2. Urban design, landscape and visual

The Assessment of Landscape and Visual Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the (natural and urban) landscape (including visual effects). This section focuses on the landscape and visual effects specific to Balmoral / St Luke's Station NoR. Further discussion on the route-wide landscape and visual effects is considered in Section XX.

The urban form within and surrounding the Balmoral / St Luke's Station NoR comprises a mix of service station, offices and warehouse / workshop at the corners of the St Luke's Road / Balmoral Road / Sandringham Road intersection. The wider surrounding urban form comprises residential streets, typified by transitional villas and bungalows from the 1920s and 1930s, along with some infill and redeveloped properties. Approximately 500 m west of the intersection is the St Luke's Westfield Shopping Centre, with the Mt Albert Library on the immediate east of the Shopping Centre.

The natural landscape within and surrounding the Balmoral / St Luke's Station NoR is characterised by slightly elevated topography compared to the surrounding land. There is no natural vegetation within the NoR but was historically expected to comprise mosaic lava field and swamp forest.

1. Positive effects

In addition to the route-wide positive effects outlined in Section X, this Station will provide:

- Opportunities to enhance the sense of place as the location of the Station reflects the location of the historic tram stop in Sandringham.
- Opportunities for Balmoral / St Luke's Station to become a key landmark in the area and support the existing St Luke's Westfield Shopping Centre and other nearby commercial, social and recreational facilities.
- Improving pedestrian access, particularly along Lancing Road and St Luke's Road / Balmoral Road / Sandringham Road intersection.
- Improved public realm and street front activation at the Station particularly fronting Sandringham Road / Balmoral Road intersection that would increase pedestrian traffic in the area to access the nearby facilities.

2. Construction effects

The construction works within Balmoral / St Lukes Station NoR will involve typical construction activity. The LVA identifies the follow potential effects:

- Direct adverse visual amenity effects at 1-9 Lancing Road, 2-6 Lancing Road, 310-314 Sandringham Road, corner service station at Sandringham Road / Balmoral Road and 273-275 Balmoral Road.
- Adverse visual amenity effects on the nearby residential properties associated with property demolition and construction activities., including Lexham Gardens Rest Home (304 Sandringham Road).

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

The works within Balmoral / St Lukes Station NoR will result in a change in the urban form and natural landscape. These changes involve:

- Potential permanent adverse visual amenity effects associated with back-of-house (BOH) infrastructure at the northern and north-eastern boundaries of the NoR footprint interfacing with adjacent residential properties on either sides of Lancing Road.

5. Conclusion of urban design, landscape and visual effects

Mitigation of landscape and visual effects common to the whole Project is discussed in Section XX and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to Balmoral / St Luke's Station, the Assessment of Landscape and Visual Effects recommends the following matters be recognised when undertaking the design of the Station:

- Reconfiguration of the St Luke's Road / Balmoral Road / Sandringham Road intersection to improve pedestrian use.
- Widening of footpaths along Sandringham Road, St Luke's Road, Balmoral Road and Lancing Road to provide for increased pedestrian volumes to and from the Station.
- Opportunities for future secondary connection along Watson Avenue to St Luke's Westfield Shopping Centre and Warren Freer Park.
- Layout and design of BOH infrastructure to manage amenity issues to adjacent properties on either side of Lancing Road.

Encourage quality public realm and built frontage between Station buildings and Sandringham Road, Balmoral Road and Lancing Road. Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Social

[ASSESSMENT OF POTENTIAL ADVERSE SOCIAL IMPACT EFFECTS TO BE PROVIDED]

4. Cultural

*[**TBC on cultural reporting**]*

5. Built heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the Balmoral / St Lukes Station NoR.

No known built heritage exists within the Balmoral / St Lukes Station NoR footprint. However, there are some residential properties within the 100 m buffer of the NoR footprint that are subject to the Special Character Areas overlay. These are listed below and shown in Figure 4 below:

- Auckland Electric Power Board (AEPB) Sub-station building (250 Balmoral Road) (ID 19943)
- Balmoral Community Hall (258 Balmoral Road) (ID 19973)

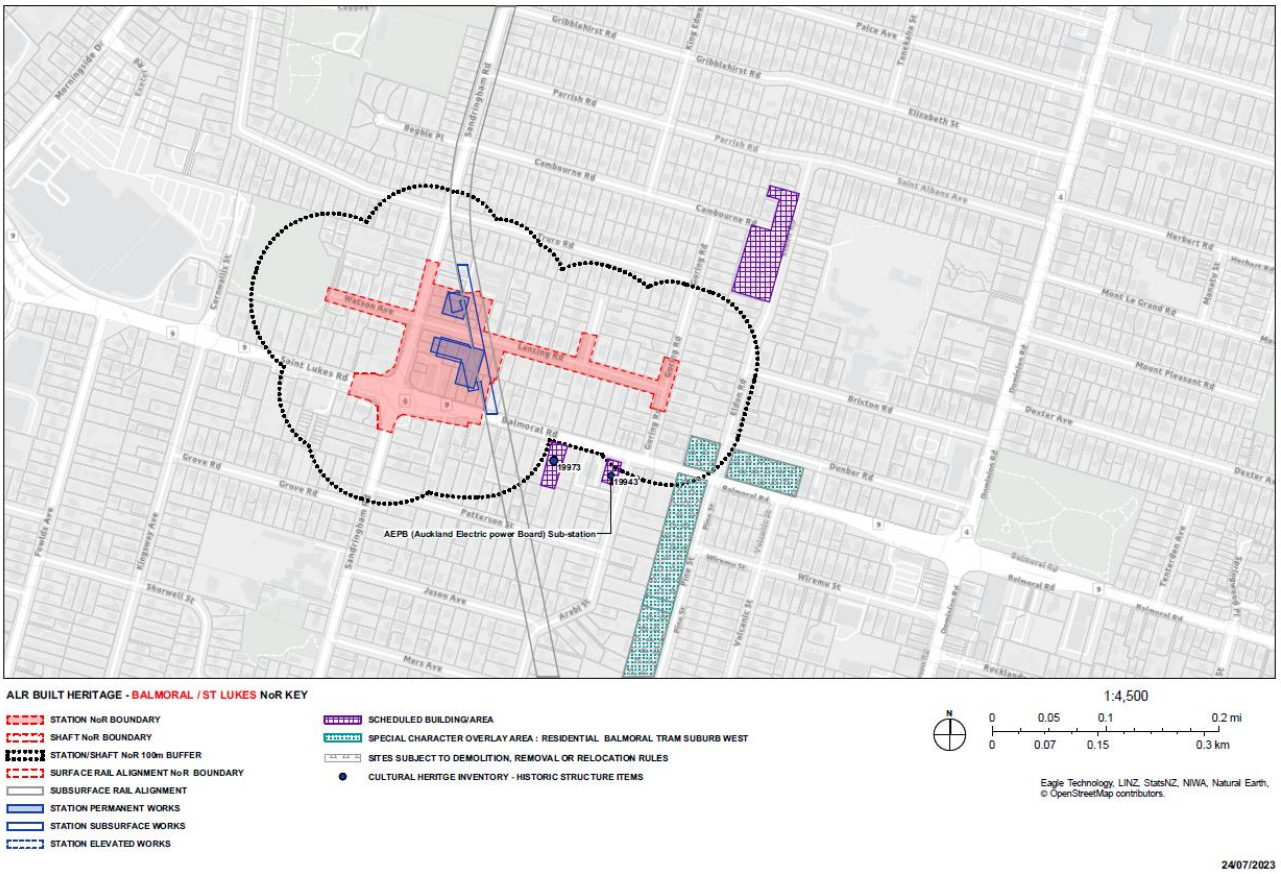

Figure 4: Built heritage within Balmoral / St Lukes Station NoR 100 m buffer

1. Positive effects

Positive effects are not generated during the enabling and construction phases, but there is potential for indirect 'uplift' of Built Heritage Places within the Study Area as an outcome of the development and increased opportunity for visitors, students etc to visit the area.

2. Construction effects

The construction works within the Balmoral / St Lukes Station NoR will not result in any additional construction effects on built heritage than those set out in the route-wide effects included in Section XX.

3. Construction mitigation measures

Mitigation of built heritage effects common to the whole Project is discussed in Section XX. This mitigation takes the form of an Archaeology and Built Heritage Management Plan (HHMP), specified in proposed Condition XX of the draft condition set in Appendix XX. There are no specific built heritage effects that require mitigation with respect to Balmoral / St Lukes Station NoR.

4. Operational effects

There are no operational effects on built heritage. The potential for adverse effects on built heritage will occur only during the construction of the Project.

5. Conclusion of built heritage effects

Based on the assessment above, the Built Heritage Assessment in Volume X Appendix XX and the proposed mitigation, the actual and potential adverse effects on built heritage associated with the Project will be appropriately managed.

6. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to Balmoral / St Luke's Station NoR. Further discussion on the route-wide archaeology effects is considered in Section XX.

The pre-European context in the area between Balmoral and Kingsland was known as Ngā Anawai, which was a reference to the water-filled lava tunnels.
Following European settlement in the mid-1800s, the historic railway running between Auckland to Helensville generated residential, industrial and commercial growth around the area. The first commercial buildings in Balmoral appeared from 1910. The Balmoral / St Luke's Station NoR straddles four original suburban farm parcels from the 1850s, which were later subdivided from 1890s onwards.
There are three archaeological items identified within 200 m of the Balmoral / St Luke's Station NoR, as shown in Figure 5 below. These are:

- 250 Balmoral Road (Auckland Electric Power Board (AEPB) Sub-Station)
- 258 Balmoral Road (Balmoral Community Centre)
- Properties between 26-42 Eldon Road and 41, 43 Cambourne Road (Winston Model Homes)

There are no heritage items within the NoR footprint itself. However, it is possible that there may be some subsurface evidence of pre-1900 farming or early suburban settlement present within the NoR footprint.

Figure 5Archaeology within 200 m of Balmoral / St Luke's Station NoR

1. Positive effects

No positive effects on archaeology have been identified as by its very nature construction requires disturbance of the ground in which archaeological remains may be present. However, management processes can be established to enable the recording of archaeological material found during construction of a project, providing valuable insight into the history of a site.

2. Construction effects

The construction works within the Balmoral / St Luke's Station NoR will not result in any additional construction effects than those set out in the route-wide effects included in Section XX.

3. Construction mitigation measures

Mitigation of archaeological effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Historic Heritage Management Plan (HHMP), inclusive of accidental discovery of archaeological features, specified in proposed Condition XX of the draft condition set in Appendix XX. There are no specific archaeological effects that require mitigation with respect to Balmoral / St Luke s Station NoR.

In addition, Authority to Modify or Destroy the whole or any part of both a recorded site and unrecorded archaeological sites will be sought from Heritage New Zealand Pouhere Toanga under s44 of the Heritage New Zealand Pouhere Taonga Act 2014.

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during the construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential adverse effects on archaeology associated with the Project will be appropriately managed.

7. Arboriculture

An Arboriculture Assessment has been undertaken and included as Appendix XX in Volume XX.
Arboriculture within the Balmoral / St Luke's Station NoR footprint is limited to street trees located within roads identified within the NoR footprint.
There are no scheduled trees identified within the NoR footprint, however there are approximately 57 trees in roads identified within the NoR footprint.
The following trees in roads have been identified within the Balmoral / St Lukes NoR extents:

- Fastigate English oak, flowering cherry, melia and feijoa trees along Balmoral Road, Sandringham Road, St Lukes Road and Watson Avenue.
- Quality street tree in Ngapawa Street.
- Pōhutukawa, titoki, silky oak, yulan magnolia, kowhai and camellia trees.

These trees along Watson Avenue and Lancing Road are mature and contribute positively to the local environment.

1. Positive effects

There are no positive effects in regard to arboriculture as the trees are required to be removed for the construction and establishment of the Balmoral / St Lukes Station.

2. Construction effects

Some trees in roads may be required to be removed or modified during construction. The following construction effects on arboriculture are expected:

- Street trees on Watson Avenue and Lancing Road may be removed or modified by active mode and bus access upgrades connecting to the Station.
- Feijoa trees in Watson Avenue might require substantial pruning to facilitate construction vehicle access and pedestrian clearance for the existing footpaths.

3. Construction mitigation measures

Mitigation of arboricultural effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Tree Management Plan (TMP), specified in proposed Condition XX of the draft condition set in Appendix XX. .
If tree removal is required from the streets within the NoR, replanting shall be undertaken and aim to remediate the loss of ecological services and amenity values that any removed trees provide, by establishing large grade trees in properly constructed planter pits in road berms or station plaza areas.

4. Operational effects

There are no operational effects on arboriculture. The potential for adverse effects on arboriculture will occur only during the construction of the Project.

5. Conclusion of arboricultural effects

Based on the assessment above, the Arboricultural Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on arboriculture associated with the Project will be appropriately managed.

8. Open space

An Open Space Assessment has been undertaken and included as Appendix XX in Volume XX.
There is no open space identified within the Balmoral / St Luke's Station NoR footprint and therefore no assessment of effects on open space is required.

9. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to

hydrology and flooding. This section focuses on the hydrology and flooding effects specific to the Balmoral / St Luke's Station NoR. Further discussion on the route-wide hydrological effects is considered in Section XX.
The Balmoral / St Lukes Station NoR is located within the Meola Stormwater catchment. The key hydrological features, inclusive of flooding are listed below and shown in Figure 6:

- Three flood plains located in the eastern portion of the NoR footprint.
- One overland flow path traversing the NoR footprint from Balmoral Road in the south and flows northwards onto Sandringham Road and continuing north. This is reported in the Auckland Council GeoMaps to be 49.4 m^3/s in the 1% AEP + CC flood event.
- Two flood prone areas contiguous with the flood plains in the eastern portion of the NoR footprint.

Figure 6 Hydrology within Balmoral / St Lukes Station NoR

1. Positive effects

There are no positive effects in relation to stormwater and flooding at the site. Further discussion on the route-wide positive effects for the Project is discussed in Section XX.

2. Construction effects

[TBC following the report. Will need to assess the impact of constructing infrastructure within flood plain and overland flow path].

3. Operational effects

[TBC following the report. Will need to assess the impact of the permanent infrastructure within flood plain and overland flow path].

4. Operational phase mitigation measures

[TBC]

5. Conclusion of hydrological and flooding effects

Based on the assessment above and the proposed mitigation, the hydrological and flooding effects will be appropriately managed.
Any adverse effects can be managed through the design process and no adverse effects on flooding is anticipated at the Balmoral / St Luke's Station NoR location.

10. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phase of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to Balmoral / St Lukes Station NoR. Further discussion on the route-wide construction noise and vibration effects is considered in Section X.
The receiving environment comprises a mix of residential dwellings, offices and workshops. The existing noise is dominated by traffic noise and those typical of a suburban context.
The sensitive receivers are listed within Table XX of this NoR, however those of particular note adjacent to the Balmoral / St Lukes Station NoR include the following:

- Lexham Gardens Rest Home (identified as 1 below)
- St Lukes Plunket Family Centre at 309 Sandringham Road (identified as 2 below)
- Various commercial properties at 333, 335 and 345 Sandringham Road (identified as 3 below)
- Bambinos Early Childhood Centre St Lukes (identified as 4 below)

These sensitive receivers are also shown in Figure 7 below. There are no notable receivers in this location.

Figure 7 Potential receivers surrounding Balmoral / St Lukes Station NoR

1. Positive effects

Section X of this AEE outlines route wide positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. Construction noise effects

The construction works at Balmoral / St Lukes Station NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the Suburban Worksite construction noise standards as applicable in this location.
Based on the noise modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts that there may be infringements of the Suburban Worksite noise standards at ground floor receivers identified in [redacted] during the day. These infringements could range up to 5 decibels, typically one to three hours at a time. The nature of these effects ranges from people moving to quieter outdoor areas to raised voices during conversation. Construction noise would be noticeable but unlikely to interfere with daily activities.

3. Construction noise mitigation measures

Mitigation of construction noise effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed Condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved via a Schedule to the CNVMP. No additional noise measures are required at Balmoral St Lukes Station.

4. Construction vibration effects

The construction works at Balmoral / St Lukes Station NoR will be involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted the potential infringement of the vibration standards in this location using compaction activities given the sustained vibration produced, usually over a period of days while fill is compacted.
The effects of construction vibration take two forms:

- Potential for building damage; and
- Potential for loss of amenity.

Building damage
Based on the vibration modelling undertaken for the site through applying the highest vibration generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts that there will be infringements of the Suburban Worksite residential cosmetic building damage vibration standards at some receivers directly bordering the works area.
Amenity
The Construction Noise and Vibration Assessment predicts potential infringement of the amenity vibration standards.

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction vibration standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation to the Project vibration standards can only be achieved via a Schedule to the CNVMP. No additional measures are required at Balmoral / St Lukes Station NoR.

6. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

11. Operational noise and vibration

The Operational Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the operational phase of the Project as they relate to operational noise and vibration. Further discussion on the route-wide operational noise and vibration effects is considered in Section XX.
The existing noise environment at this location is primarily dominated by traffic noise along Balmoral Road and Sandringham Road. The future noise environment is expected to remain dominated by traffic noise. Sensitive receivers surrounding this NoR include residential

dwellings and St Lukes Bambinos Early Childhood Centre in the immediate north, east and south of the NoR footprint.

1. Positive effects

Section X of this AEE outlines route wide positive effects. However, there are no positive operational noise and vibration effects relevant to this NoR.

2. Operational noise effects

The Operational Noise and Vibration Assessment has identified the AUP Residential – Terrace Housing and Apartment Building Zone operational noise standards are applicable in this location.

At this location, noise sources include public address system and electrical power infrastructure. These will be located underground within the Station so would not be anticipated to generate adverse noise effects on the surrounding receivers above ground.

3. Operational noise mitigation measures

Mitigation of operational noise effects common to the whole Project is discussed in Section XX. The operational noise standards are specified in proposed Condition XX of the draft condition set in Appendix XX. There are no specific operational noise effects that require mitigation with respect to the Balmoral / St Lukes Station NoR.

4. Operational vibration effects

Operational vibration levels from the Balmoral / St Lukes Station are expected to be negligible.

5. Operational mitigation measures

Mitigation of operational vibration effects common to the whole Project is discussed in Section XX. The operational vibration standards are specified in proposed Condition XX of the draft condition set in Appendix XX.

There are no additional specific mitigation measures required at the Balmoral / St Lukes Station NoR.

6. Conclusion of operational noise and vibration

Based on the assessment above, the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential operational noise and vibration effects associated with the Project will be appropriately managed.

12. Blasting overpressure and vibration

The Blast Management Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of blasting during the construction phase of the Project as they relate to blasting noise and vibration. This section focuses on the blasting noise and vibration effects specific to the Balmoral / St Lukes Station NoR.

Blasting is required within the Balmoral / St Lukes Station NoR due to the presence of basalt below ground at approximately RL40m down to a depth of RL20m. All receivers and infrastructure adjacent to the Balmoral / St Lukes Station NoR are identified as commercial, industrial, educational and residential. Project vibration and overpressure standards are recommended by the Blast Management Assessment (German Standard DIN4150-3 for unoccupied buildings or where an occupant agrees to a higher level and Australian Standard AS2187.2 for occupied buildings).

There are also two heritage properties located along Balmoral Road approximately 250 m east of the NoR footprint at 250 Balmoral Road (Power Station) and 258 Balmoral Road (Balmoral Community Centre). The Blast Management Assessment concludes no alternative vibration or overpressure standard is necessary for these buildings.

1. Positive effects

Section X of this AEE outlines route wide positive effects. The Blast Management Assessment does not identify any other positive effects specific to the Balmoral / St Luke's Station NoR.

2. Construction effects

Blasting has the potential the potential to cause building damage and loss of acoustic amenity because of vibration and overpressure effects. The potential for flyrock associated with a blast is considered with respect safety.

An individual person's perception and sensitivity to vibration will differ from others. Perception relates to when the vibration is detected, sensitivity addresses how it impacts upon the individual. This in turn can vary over the time an individual is exposed to vibration.

The potential for building damage from vibration will depend on the scale of explosive used, the distance to a receiving building and the type of building exposed. Vibration sensitive

equipment (e.g. equipment for medical or scientific based activities) within buildings can require protection beyond that imposed by amenity and standard vibration criteria. Buildings with vibration sensitive equipment have not been identified near the Balmoral / St Lukes Station NoR.
Overpressure is pressure in excess of normal atmospheric pressure, such as that caused by an explosions shock wave and has the potential to cause building damage.
The Blast Management Assessment has classed all buildings within the area as sensitive receptors. None, however, are expected to require alternative vibration standards.
The Blast Management Assessment notes the permissible level of blasting vibration related to utilities is higher than the standards applied to residential and commercial properties meaning the scale of a blasting activity will be controlled by the standards applied to those properties rather than the utilities. Vibration standards appropriate to underground utilities in the area will be established in consultation with the asset owner, prior to construction.

3. Construction mitigation measures

Blasting at the Balmoral / St Lukes Station will be managed to comply with the Project blasting standards and criteria, identified in the Blast Management Assessment specified in proposed conditions XX and XX of the draft condition set in Appendix XX. Variation from these criteria and standards can only be achieved only via a Schedule to the CNVMP. With this compliance, it is not anticipated that there will be any impact on the integrity of the adjacent properties to the NoR, although blasting may be perceptible to some people around the blast area.
In addition, where blasting is proposed, trial blasts will be carried out and documented in a Trial Blasting Report, for the purpose of informing the design of subsequent blast events for the Project works. Blasting times will be limited to between 9am and 5pm, Monday to Saturday and each blast monitored for compliance with Project criteria.
In addition, a Blast Management Plan will also be prepared to set out the safety and environmental aspects that will be incorporated into each blast to avoid, remedy or mitigate, as far as practicable the adverse effects.

4. Conclusion of blasting overpressure and vibration effects

Based on the assessment above, the Blast Management Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential blasting and vibration effects associated with the Project will be appropriately managed.

13. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project as related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blast Management Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of damage to buildings and structures.
This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to the Balmoral / St Lukes Station NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.
The existing low-rise buildings within the Balmoral / St Lukes NoR footprint comprises a mix of residential, domestic housing, commercial and retail and are founded on shallow foundations. All buildings within the NoR footprint are to be acquired and demolished to enable construction of Balmoral / St Lukes Station.

1. Positive effects

There are no positive effects on buildings or structures with respect to vibration and settlement.

2. Construction vibration induced effects

Vibration induced building damage common to the entire Project area is discussed in Section XX. The Structures and Settlement Assessment has identified that all buildings within the NoR footprint will be acquired and demolished. Surrounding buildings fall outside the vibration threshold setback distances and as such the potential for damage to these buildings is Negligible.

3. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section xx, in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CVNMP and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Settlement effects common to the entire Project area are discussed in Section XX. Buildings adjacent to the Balmoral / St Lukes Station NoR with potential settlements greater than 10 mm and ground slopes greater than 1/500, necessitating further assessment are contained in Appendix XX to the Structures and Settlement Assessment. This corresponds to effects that are expected to be at be between Slight to Negligible.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx in the form of a Settlement Management Plan (SMP), recommended in condition XX provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. Operational settlement and vibration induced effects

There are no settlement induced effects associated with the operation of the Project. The potential for settlement effects will occur only during the construction of the Project. Vibration effects on buildings, resulting from the operation of the Project is addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section xx.

7. Conclusion of settlement and structure effects

Based on the assessment above, the Settlement and Structures Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential settlement and structure effects on buildings will be appropriately managed.

14. Geological heritage

The Geological Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects on geological heritage features during the construction phase of the Project as they relate to construction activities in proximity to these features. This section focuses on the geological heritage features in the vicinity of the Balmoral / St Lukes Station NoR. Further discussion on the common effects on geological heritage is considered in Section XX. The Balmoral / St Lukes Station NoR footprint lies on the lava flow field arising from Te Tātua-a-Riukiuta / Three Kings and Maungawhau / Mt Eden volcanoes. This field consists of multiple basalt flows varying from solid basalt rock through vesicular basalt to interflow scoria. The lava is likely overlain by tuff with a thickness of approximately 30 m to 40 m.

1. Positive effects

There are no positive effects in relation to geological heritage at the site.

2. Construction effects

Effects on geological heritage common to the entire Project area is discussed in Section XX. The Geological Heritage Assessment has identified that the overall impact on the integrity and value of geological heritage features are less than minor.

3. Construction mitigation measures

Mitigation of geological heritage effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a XX Management Plan.

4. Operational effects

There are no operational effects anticipated as any impact on geological heritage will occur during construction.

5. Conclusion of geological heritage effects

Based on the assessment above, the Geological Heritage Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on geological heritage will be appropriately managed.

5. Conclusion

Overall, effects from Balmoral / St Luke's Station NoR will be appropriately managed and mitigated. During the construction phase, management plans relevant to this NoR will be prepared to manage any actual and potential adverse effects that may occur, such as the Construction Traffic Management Plan, Stakeholder Consultation and Engagement Plan, Historic Heritage Management Plan, Tree Management Plan and Construction Noise and Vibration Management Plan.

1. Balmoral / St Lukes Station NoR 7

1. Introduction

This section:

- Describes NoR 7 - Balmoral / St Lukes Station (section 2)
- Summarises the existing and receiving environment (section 3)
- Assesses effects and outlines mitigation (section 4).

2. Balmoral / St Lukes Station NoR description

The proposed Balmoral / St Lukes Station NoR is located on the corner of Lancing Road and Sandringham Road, extending onto Watson Avenue on the west. The NoR is within close walking distance of the existing St Lukes Mall on the east and Balmoral School on the west. The NoR is surrounded by predominantly residential properties and is directly south-east of Warren Freer Park.

Balmoral / St Lukes Station is proposed to be an underground station and is anticipated to be a medium-high patronage Station.

Figure 1 shows the Balmoral / St Lukes Station and NoR boundary. **Figure 2** shows the NoR boundary on aerial imagery (outlined in red). Table 1 summarises the Balmoral / St Lukes Station's permanent features and temporary construction works.

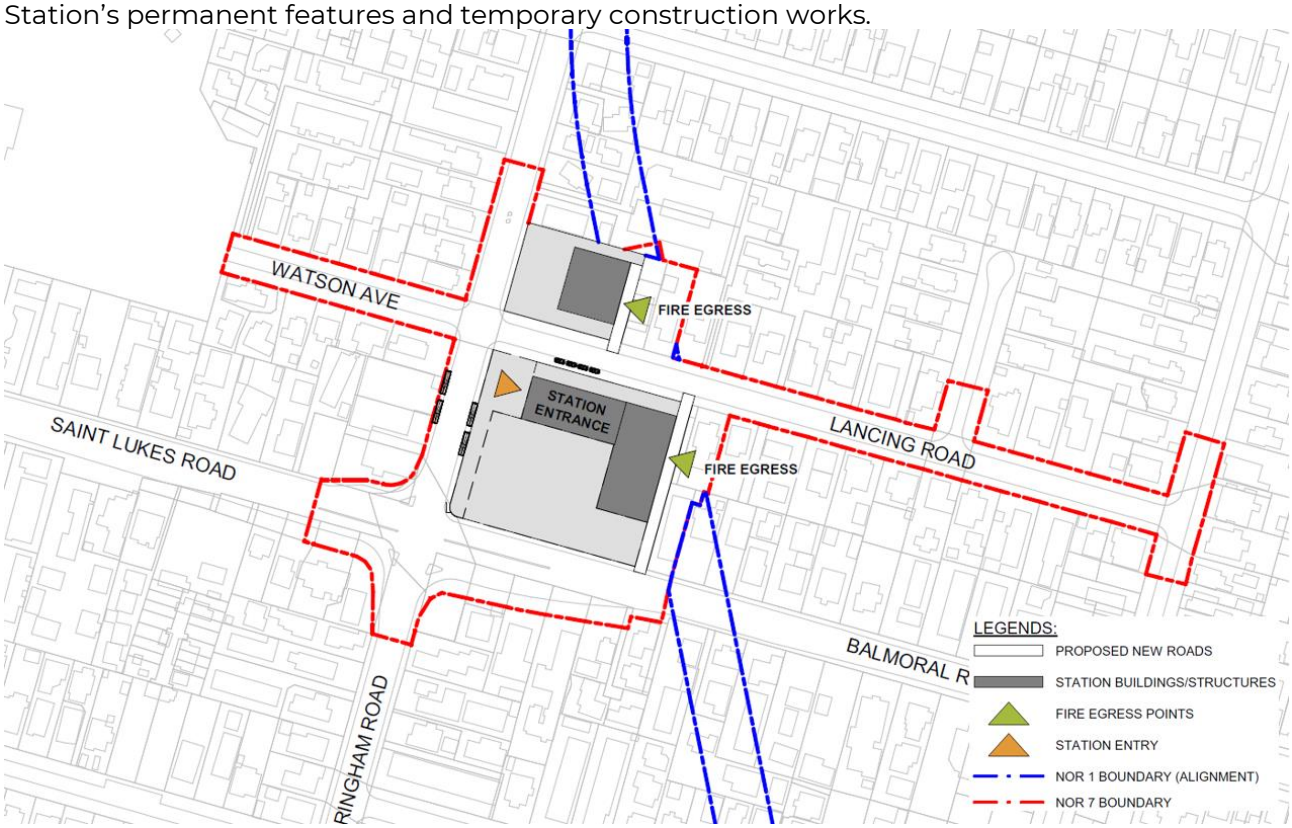

Figure 1: Balmoral / St Lukes Station NoR Location Plan

Figure 2: Balmoral / St Lukes Station NoR boundary on aerial imagery

Table 1: Balmoral / St Lukes Station NoR description

Permanent features	
Station	• Underground station accessed through Station forecourt fronting Sandringham Road • Station entrance provided from Sandringham Road.
Platforms	• Underground stacked platforms
Public realm	• New pedestrian station forecourt fronting Lancing Road / Sandringham Road intersection. • Station forecourt contains passenger amenities, bicycle storage and staff facilities.
Road and streetscape	• Potential for connection to services along Sandringham Road
Parking and loading	• Provision for bicycle storage facilities provided at primary Station entrance on Sandringham Road. • Provision for Kiss and Ride facilities provided on Lancing Road
Other new infrastructure	• Provisions for new bus stops and bus bays or relocate existing Sandringham Road bus stops closer to the Station. • Primary Services Building provided adjacent Station entrance along Lancing Road • Secondary Services Building provided opposite
Anticipated patronage	Medium-high
Anticipated construction works	
Construction methodology and staging	Refer to AEE Section 6 and DCR Section X for more detail. At a high level the construction activities at Balmoral / St Lukes Station NoR will include: • Demolition, site clearance, utilities relocation/protection. Establish site offices & amenities. • Install ground support to station shafts perimeter - anticipated bored or DTH secant pile walls (pending basalt depth confirmation) • Excavation to station shafts – anticipate blasting for basalt. • Mine adits to connect shaft to monotube tunnel. • Station internal construction and fitout. • Surface buildings and streetscaping. *Standard hours of work for this site are anticipated to be 7am-6pm Mon-Sat.*
Access to the site	• From Balmoral Road, Sandringham Road and Lancing Road via Goring Road.

Other	• Construction traffic is ranging from 25 to 130 trucks/day

3. Description of the environment

This section sets out the existing and receiving environment for Balmoral / St Lukes Station NoR. It applies the parameters on the assumptions outlined in Section 10.1.3.

Table 2 below describes the surrounding area and features. Any property directly affected by this NoR is listed in Appendix X to NoR 7 Form 18.

Table 2: Existing environment description

Feature	Description
Current land use	• Primarily residential dwellings adjacent to Lancing Road and Balmoral Road. • Z Sandringham Service Station at corner of Sandringham Road and Balmoral Road. • Road corridors including Watson Ave (west), Lancing Road (north), Balmoral Road (south) and Sandringham Road along the centre.
Physical Environment	
Transport	• Traffic volumes along St Lukes Road, Balmoral Road and Sandringham Road ranges between 17,480 – 24,380 vehicles per day. • St Lukes Road, Balmoral Road and Sandringham Road are arterial roads. • Suburban residential streets including Watson Avenue and Lancing Road within the NoR footprint. • Walking footpaths along St Lukes Road, Balmoral Road, Sandringham Road, Lancing Road and Watson Avenue. • Main pedestrian and cyclist crossing at the intersection of St Lukes Road, Balmoral Road and Sandringham Road. • St Lukes Road and Balmoral Road are “regional cycle routes”, and Sandringham Road is a “major cycle route”. Limited with on-road unprotected cycle lanes. • 9 bus stops along St Lukes Road / Balmoral Road and 9 bus stops along Sandringham Road, providing connections to the City Centre, Kingsland, Dominion Road and Mt Eden.
Infrastructure	• Vector cables running along Sandringham Road and Balmoral Road. • Multiple Chorus Telecommunication cables running across and around the NoR footprint. • Local waterpipe network across the NoR footprint along Lancing Road. • Sewer pipe east-west aligned discharging across Sandringham Road. • Local stormwater pipe along Balmoral Road.
Community facilities and key attractions	• St Lukes Westfield Shopping Centre • Mt Albert Library • Warren Freer Park • Edendale Reserve and Edendale Tennis Club • Gribblehurst Park • St Luke’s Plunket Family Centre • Bambinos Early Childhood Centre St Luke’s • Balmoral Community Hall • Lexham Gardens Rest Home • Dominion Road shops
Sensitive noise receivers	• Lexham Gardens Rest Home • St Lukes Plunket Family Centre • Commercial properties at 333, 335, 354 Sandringham Road • Bambinos Early Childhood Centre St Lukes
Built heritage	• Auckland Electric Power Board (AEPB) Sub-station building (250 Balmoral Road) approx. 300 m west of NoR.

	• Balmoral Community Hall (258 Balmoral Road) approx. 220 m west of NoR
Archaeology	• Auckland Electric Power Board (AEPB) Sub-station building (250 Balmoral Road) approx. 300 m west of NoR. • Balmoral Community Hall (258 Balmoral Road) approx. 220 m west of NoR • Winston Model Homes (26-42 Eldon Road and 41, 43 Cambourne Road)
Cultural	• [Need further information from Te Tiriti Partnerships team]
Natural Environment	
Topography	• The site is generally flat in typography with a change in elevation of 5m from St Lukes Road to Goring Road where the station ends.
Geology	• The station site lies on the basalt lava flow emanating from Te Tātua-a-Riukiuta / Three Kings and Maungawhau / Mt Eden Volcanoes.
Catchment	• Located within the Meola Stormwater catchment, with an estimated catchment size of approximately 1.5 hectares.
Flooding and hydrology	• One flood plain is present, impacting approximately 50% of the proposed site. • One overland flow path from the south flows north through the station site. • A Flood Prone Area also exists at the site with a water level above 41.46m RL in the 1% AEP + CC flood event.
Trees and vegetation	• There are no scheduled trees within the Balmoral / St Lukes Station NoR. • Various protected street trees are present in the surrounding commercial and residential environment that includes two Pōhutakawa trees. • Section 11.3 of the Arboricultural Assessment provides a full list of trees identified within and adjacent to the NoR.
Terrestrial ecology	• No recorded significant terrestrial ecological areas within or in proximity to the NoR. • Low to very high ecological values for vegetation, which includes native trees including Pōhutakawa trees, street trees and shrubs, and residential habitat. • Low to high ecological values for native lizards, including skinks and native birds, including red-billed gulls and black-billed gulls which may roost in vegetation within the NoR.

Figure 3 and Table 3 identify the relevant statutory considerations within the Balmoral / St Luke's Station NoR footprint.

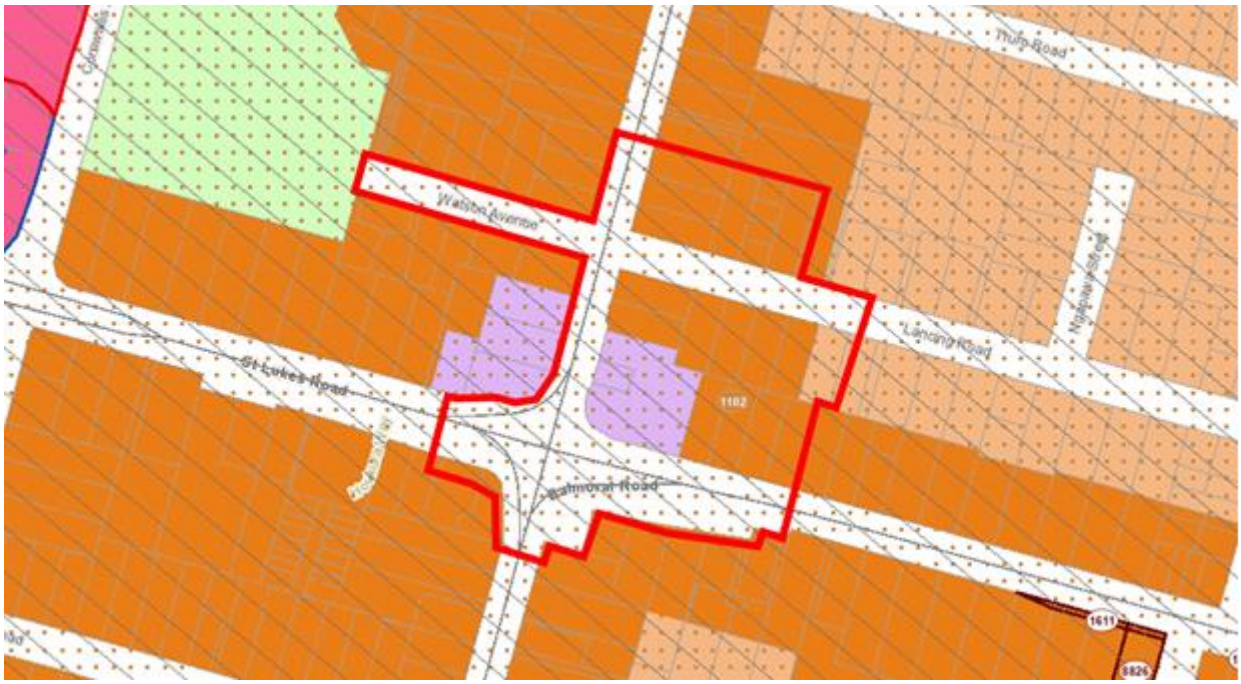

Figure 3: Balmoral / St Luke's Station NoR zoning and overlays in the AUP

Table 3: Balmoral / St Luke's Station NoR boundary outlined in red – AUP Statutory layers (Source: Auckland Council GeoMaps)

Balmoral / St Lukes Station NoR 7	Description	Comment
Current NoR zoning	Business – Mixed Use Zone	Applies to 340 and 355 Sandringham Road
	Residential – Terrace Housing and Apartment Building Zone	Applies to most residential properties within NoR footprint
	Residential – Mixed Housing Urban Zone	Applies to 11 Lancing Road
	Road	Applies to all roads within the NoR footprint
Precincts	N/A	N/A
Controls	Arterial Roads	Applies to Sandringham Road, Balmoral Road and St Luke's Road.
	Macroinvertebrate Community Index – Urban	Applies to the entire NoR footprint
Overlays	Natural Resources: Quality-Sensitive Aquifer Management Areas Overlay [rp] – Western Springs Volcanic Aquifer	Applies to the entire NoR footprint
	Natural Heritage – Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay [rcp/dp] – E6, Mount Eden	Applies to the entire NoR footprint
Designations	Airspace Restriction Designations - ID 1102, Protection of aeronautical functions - obstacle limitation surfaces, Auckland International Airport Ltd	Applies to the entire NoR footprint. Proposed works will not affect Airspace Restriction Designation.
Zoning within 800m catchment	• Residential – Terrace Housing and Apartment Building Zone • Residential – Mixed Housing Urban Zone • Residential – Mixed Housing Suburban Zone • Residential – Single House Zone	• High density residential zoning and neighbourhood, local and town centre zones. • Open spaces within 800 m of the Balmoral / St Luke's NoR.

	• Business – Neighbourhood Centre Zone • Business – Local Centre Zone • Business – Town Centre Zone • Open Space – Sport and Active Recreation Zone • Open Space – Community Zone • Special Purpose Zone – School	• Two schools in the south-eastern direction of the NoR.
Anticipated future zoning within 800m catchment from station	As above, with the following changes: • Residential – Mixed Housing Suburban/ Urban within 800m rezoned to Residential – Terrace Housing and Apartments • Business – Local Centre Zone retained with increased heights	Refer Section 10 for analysis.
Other relevant considerations	N/A	N/A

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operational phases of the Project as they relate to the Balmoral / St Lukes Station NoR.
This builds on the technical assessments included in Volume 3 and the Design and Construction Report in Appendix XX. Section X outlines the indicative methodology used for these technical assessments.

1. Traffic and transport

The Assessment of Transport Effects included in Appendix X of Volume 3 assesses any actual and potential traffic effects of the construction and operational phases of the Project as they relate to effects on traffic and transport. This section focuses on the transport effects specific to the Balmoral / St Lukes Station NoR. Further discussion on the route-wide transport effects is considered in Section XX.
The Balmoral / St Lukes NoR footprint is surrounded by St Lukes Road, Balmoral Road and Sandringham Road, which are all classified as Arterial Roads under the AUP and carry a high number of vehicle movements. Balmoral Road and St Lukes Road are regional cycle routes while and Sandringham Road is a major cycle route. The traffic environment surrounding the NoR footprint is primarily car-dominant, with the only formal pedestrian crossing being the main signalised pedestrian crossing at the intersection of St Lukes Road, Balmoral Road and Sandringham Road.

Key transport features within and adjacent to the Balmoral / St Lukes Station NoR include:

- **Public transport (bus services):** Numerous bus stops and services along Sandringham Road, providing connections to the City Centre, Kingsland, Dominion Road and Mt Eden.
- **Public transport (heavy rail):** No existing train stations exist in the vicinity of the Balmoral / St Lukes Station NoR. .
- **Roading network:** Grid-like road network in the vicinity of the NoR. St Lukes Road, Balmoral Road and Sandringham Road are classified as Arterial roads within the AUP. The suburban streets within the NoR are Watson Avenue and Lancing Road.
- **Walking:** Walking footpaths are provided along St Lukes Road, Balmoral Road, Sandringham Road, Lancing Road and Watson Avenue. Main signalised pedestrian

crossing is at the intersection of St Lukes Road, Balmoral Road and Sandringham Road.

- **Cycling:** On-road unprotected cycle lanes and no formal cycling facilities in the immediate vicinity of the NoR. St Lukes Road and Balmoral Road are regional cycle routes, and Sandringham Road is a major cycle route.
- **Private vehicles:** Daily traffic movements along St Lukes Road, Balmoral Road and Sandringham Road range between 17,480 and 24,380, reflective of the Arterial road character.
- **Roading network:** St Luke's Road, Balmoral Road and Sandringham Road are classified as Arterial roads within the AUP. Daily traffic movements along these roads range between 17,480 and 24,380. The suburban streets within the NoR are Watson Avenue and Lancing Road.
- **Parking:** Parking within the vicinity is mixed on-road and private car parking facilities. Off-street parking is prohibited along St Luke's Road and Balmoral Road.
- **Freight:** Freight vehicles expected on St Lukes Road, Balmoral Road and Sandringham Road, however none are identified as strategic freight routes.

The Balmoral / St Luke's Station will form part of the future light rail network, improving connectivity along the alignment.

1. Positive effects

In addition to the common positive effects outlined in Section XX, Balmoral / St Lukes Station will provide:

- Improved pedestrian and cyclist facilities at the major signalised pedestrian crossing at the St Lukes Road / Balmoral Road / Sandringham Road intersection.

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section X. The proposed works at the Balmoral / St Luke's Station NoR will potentially result in the following adverse construction traffic effects:

- **Public transport (bus services):** Bus services would be generally unaffected; however some bus services may experience minor delays along Sandringham Road and Balmoral / St Luke's Road during construction due to increased construction vehicles.
- **Public transport (heavy rail):** No existing train stations exist in the vicinity of the NoR, therefore no effects expected on heavy rail.
- **Roading network:** Closure of Sandringham Road / Lancing Road intersection will require vehicles to reroute via Goring Road.
- **Walking:** Closure of Sandringham Road / Lancing Road intersection will require pedestrians to reroute. Footpaths at the St Luke's / Balmoral / Sandringham Road intersection requiring some temporary alignment will impact pedestrian movement within and around the NoR.
- **Cycling:** Refer to route-wide effects section (Section XX).
- **Private vehicles**: Refer to route-wide effects section (Section X).
- **Parking:** Refer to route-wide effects section (Section XX)
- **Loading:** Refer to route-wide effects section (Section XX)
- **Emergency Services:** As with the private vehicles, emergency vehicles travelling to and around the immediate vicinity of the site may experience delays relating to construction traffic.
- **Freight:** Minimal effect on freight routes, however the footpath upgrades on St Lukes Road may affect freight routes.

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Construction Traffic Management Plan (CTMP). The Assessment of Transport Effects recommends the following opportunities for inclusion in the CTMP in relation to the Balmoral / St Lukes Station:

- **Public transport (bus services):** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Public transport (heavy rail):** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).

- **Roading network:** Closure of a section of Lancing Road to Sandringham Road at an early phase of construction.
- **Walking:** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Cycling:** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Private vehicles:** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Parking:** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Loading:** None specific to Balmoral / St Lukes Station NoR. Refer to route-wide section (Section XX).
- **Emergency Services:** Provision for emergency services in and around the construction site will be made, this will be discussed with emergency service providers prior to construction being undertaken.
- **Freight:** Trucks approaching and leaving NoR construction site to reroute on St Lukes Road instead of Sandringham Road to access the motorway network.

4. Operational effects

There are no adverse operational effects on transport from Balmoral / St Luke's Station NoR. Once the Balmoral / St Lukes Station is complete, it will improve pedestrian access and connectivity in the local area, particularly connecting to the nearby destinations.

5. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3 and Appendix XX and the proposed mitigation, the actual and potential traffic and transport effects will be appropriately managed.

2. Urban design, landscape and visual

The Assessment of Landscape and Visual Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the (natural and urban) landscape (including visual effects). This section focuses on the landscape and visual effects specific to Balmoral / St Luke's Station NoR. Further discussion on the route-wide landscape and visual effects is considered in Section XX.

The urban form within and surrounding the Balmoral / St Luke's Station NoR comprises a mix of service station, offices and warehouse / workshop at the corners of the St Luke's Road / Balmoral Road / Sandringham Road intersection. The wider surrounding urban form comprises residential streets, typified by transitional villas and bungalows from the 1920s and 1930s, along with some infill and redeveloped properties. Approximately 500 m west of the intersection is the St Luke's Westfield Shopping Centre, with the Mt Albert Library on the immediate east of the Shopping Centre.

The natural landscape within and surrounding the Balmoral / St Luke's Station NoR is characterised by slightly elevated topography compared to the surrounding land. There is no natural vegetation within the NoR but was historically expected to comprise mosaic lava field and swamp forest.

1. Positive effects

In addition to the route-wide positive effects outlined in Section X, this Station will provide:

- Opportunities to enhance the sense of place as the location of the Station reflects the location of the historic tram stop in Sandringham.
- Opportunities for Balmoral / St Luke's Station to become a key landmark in the area and support the existing St Luke's Westfield Shopping Centre and other nearby commercial, social and recreational facilities.
- Improving pedestrian access, particularly along Lancing Road and St Luke's Road / Balmoral Road / Sandringham Road intersection.
- Improved public realm and street front activation at the Station particularly fronting Sandringham Road / Balmoral Road intersection that would increase pedestrian traffic in the area to access the nearby facilities.

2. Construction effects

The construction works within Balmoral / St Lukes Station NoR will involve typical construction activity. The LVA identifies the follow potential effects:

- Direct adverse visual amenity effects at 1-9 Lancing Road, 2-6 Lancing Road, 310-314 Sandringham Road, corner service station at Sandringham Road / Balmoral Road and 273-275 Balmoral Road.
- Adverse visual amenity effects on the nearby residential properties associated with property demolition and construction activities., including Lexham Gardens Rest Home (304 Sandringham Road).

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

The works within Balmoral / St Lukes Station NoR will result in a change in the urban form and natural landscape. These changes involve:

- Potential permanent adverse visual amenity effects associated with back-of-house (BOH) infrastructure at the northern and north-eastern boundaries of the NoR footprint interfacing with adjacent residential properties on either sides of Lancing Road.

5. Conclusion of urban design, landscape and visual effects

Mitigation of landscape and visual effects common to the whole Project is discussed in Section XX and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to Balmoral / St Luke's Station, the Assessment of Landscape and Visual Effects recommends the following matters be recognised when undertaking the design of the Station:

- Reconfiguration of the St Luke's Road / Balmoral Road / Sandringham Road intersection to improve pedestrian use.
- Widening of footpaths along Sandringham Road, St Luke's Road, Balmoral Road and Lancing Road to provide for increased pedestrian volumes to and from the Station.
- Opportunities for future secondary connection along Watson Avenue to St Luke's Westfield Shopping Centre and Warren Freer Park.
- Layout and design of BOH infrastructure to manage amenity issues to adjacent properties on either side of Lancing Road.

Encourage quality public realm and built frontage between Station buildings and Sandringham Road, Balmoral Road and Lancing Road. Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Social

[ASSESSMENT OF POTENTIAL ADVERSE SOCIAL IMPACT EFFECTS TO BE PROVIDED]

4. Cultural

*[**TBC on cultural reporting**]*

5. Built heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the Balmoral / St Lukes Station NoR.

No known built heritage exists within the Balmoral / St Lukes Station NoR footprint. However, there are some residential properties within the 100 m buffer of the NoR footprint that are subject to the Special Character Areas overlay. These are listed below and shown in Figure 4 below:

- Auckland Electric Power Board (AEPB) Sub-station building (250 Balmoral Road) (ID 19943)
- Balmoral Community Hall (258 Balmoral Road) (ID 19973)

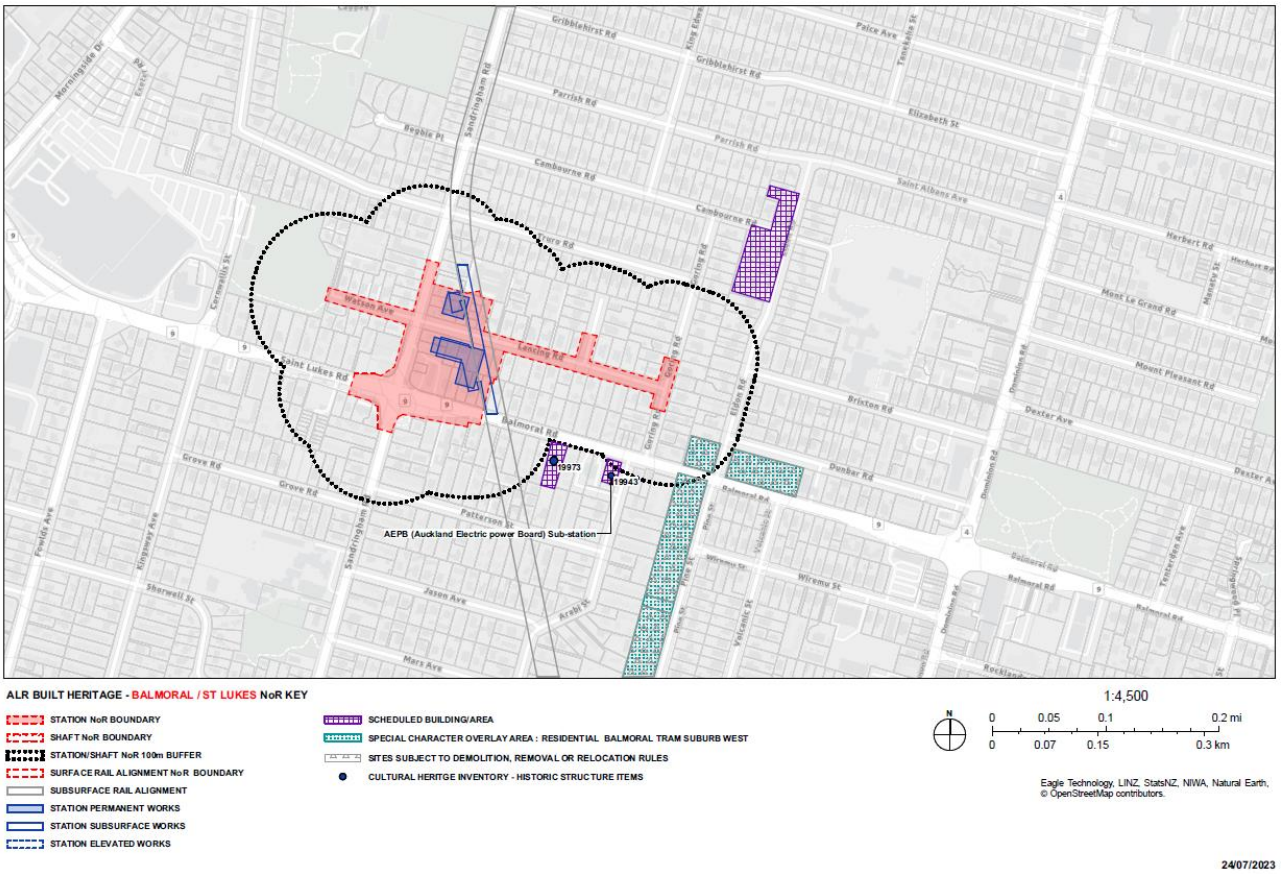

Figure 4: Built heritage within Balmoral / St Lukes Station NoR 100 m buffer

1. Positive effects

Positive effects are not generated during the enabling and construction phases, but there is potential for indirect 'uplift' of Built Heritage Places within the Study Area as an outcome of the development and increased opportunity for visitors, students etc to visit the area.

2. Construction effects

The construction works within the Balmoral / St Lukes Station NoR will not result in any additional construction effects on built heritage than those set out in the route-wide effects included in Section XX.

3. Construction mitigation measures

Mitigation of built heritage effects common to the whole Project is discussed in Section XX. This mitigation takes the form of an Archaeology and Built Heritage Management Plan (HHMP), specified in proposed Condition XX of the draft condition set in Appendix XX. There are no specific built heritage effects that require mitigation with respect to Balmoral / St Lukes Station NoR.

4. Operational effects

There are no operational effects on built heritage. The potential for adverse effects on built heritage will occur only during the construction of the Project.

5. Conclusion of built heritage effects

Based on the assessment above, the Built Heritage Assessment in Volume X Appendix XX and the proposed mitigation, the actual and potential adverse effects on built heritage associated with the Project will be appropriately managed.

6. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to Balmoral / St Luke's Station NoR. Further discussion on the route-wide archaeology effects is considered in Section XX.

The pre-European context in the area between Balmoral and Kingsland was known as Ngā Anawai, which was a reference to the water-filled lava tunnels.
Following European settlement in the mid-1800s, the historic railway running between Auckland to Helensville generated residential, industrial and commercial growth around the area. The first commercial buildings in Balmoral appeared from 1910. The Balmoral / St Luke's Station NoR straddles four original suburban farm parcels from the 1850s, which were later subdivided from 1890s onwards.
There are three archaeological items identified within 200 m of the Balmoral / St Luke's Station NoR, as shown in Figure 5 below. These are:

- 250 Balmoral Road (Auckland Electric Power Board (AEPB) Sub-Station)
- 258 Balmoral Road (Balmoral Community Centre)
- Properties between 26-42 Eldon Road and 41, 43 Cambourne Road (Winston Model Homes)

There are no heritage items within the NoR footprint itself. However, it is possible that there may be some subsurface evidence of pre-1900 farming or early suburban settlement present within the NoR footprint.

Figure 5Archaeology within 200 m of Balmoral / St Luke's Station NoR

1. Positive effects

No positive effects on archaeology have been identified as by its very nature construction requires disturbance of the ground in which archaeological remains may be present. However, management processes can be established to enable the recording of archaeological material found during construction of a project, providing valuable insight into the history of a site.

2. Construction effects

The construction works within the Balmoral / St Luke's Station NoR will not result in any additional construction effects than those set out in the route-wide effects included in Section XX.

3. Construction mitigation measures

Mitigation of archaeological effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Historic Heritage Management Plan (HHMP), inclusive of accidental discovery of archaeological features, specified in proposed Condition XX of the draft condition set in Appendix XX. There are no specific archaeological effects that require mitigation with respect to Balmoral / St Luke s Station NoR.

In addition, Authority to Modify or Destroy the whole or any part of both a recorded site and unrecorded archaeological sites will be sought from Heritage New Zealand Pouhere Toanga under s44 of the Heritage New Zealand Pouhere Taonga Act 2014.

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during the construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential adverse effects on archaeology associated with the Project will be appropriately managed.

7. Arboriculture

An Arboriculture Assessment has been undertaken and included as Appendix XX in Volume XX.
Arboriculture within the Balmoral / St Luke's Station NoR footprint is limited to street trees located within roads identified within the NoR footprint.
There are no scheduled trees identified within the NoR footprint, however there are approximately 57 trees in roads identified within the NoR footprint.
The following trees in roads have been identified within the Balmoral / St Lukes NoR extents:

- Fastigate English oak, flowering cherry, melia and feijoa trees along Balmoral Road, Sandringham Road, St Lukes Road and Watson Avenue.
- Quality street tree in Ngapawa Street.
- Pōhutukawa, titoki, silky oak, yulan magnolia, kowhai and camellia trees.

These trees along Watson Avenue and Lancing Road are mature and contribute positively to the local environment.

1. Positive effects

There are no positive effects in regard to arboriculture as the trees are required to be removed for the construction and establishment of the Balmoral / St Lukes Station.

2. Construction effects

Some trees in roads may be required to be removed or modified during construction. The following construction effects on arboriculture are expected:

- Street trees on Watson Avenue and Lancing Road may be removed or modified by active mode and bus access upgrades connecting to the Station.
- Feijoa trees in Watson Avenue might require substantial pruning to facilitate construction vehicle access and pedestrian clearance for the existing footpaths.

3. Construction mitigation measures

Mitigation of arboricultural effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Tree Management Plan (TMP), specified in proposed Condition XX of the draft condition set in Appendix XX. .
If tree removal is required from the streets within the NoR, replanting shall be undertaken and aim to remediate the loss of ecological services and amenity values that any removed trees provide, by establishing large grade trees in properly constructed planter pits in road berms or station plaza areas.

4. Operational effects

There are no operational effects on arboriculture. The potential for adverse effects on arboriculture will occur only during the construction of the Project.

5. Conclusion of arboricultural effects

Based on the assessment above, the Arboricultural Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on arboriculture associated with the Project will be appropriately managed.

8. Open space

An Open Space Assessment has been undertaken and included as Appendix XX in Volume XX.
There is no open space identified within the Balmoral / St Luke's Station NoR footprint and therefore no assessment of effects on open space is required.

9. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to

hydrology and flooding. This section focuses on the hydrology and flooding effects specific to the Balmoral / St Luke's Station NoR. Further discussion on the route-wide hydrological effects is considered in Section XX.

The Balmoral / St Lukes Station NoR is located within the Meola Stormwater catchment. The key hydrological features, inclusive of flooding are listed below and shown in Figure 6:

- Three flood plains located in the eastern portion of the NoR footprint.
- One overland flow path traversing the NoR footprint from Balmoral Road in the south and flows northwards onto Sandringham Road and continuing north. This is reported in the Auckland Council GeoMaps to be 49.4 m^3/s in the 1% AEP + CC flood event.
- Two flood prone areas contiguous with the flood plains in the eastern portion of the NoR footprint.

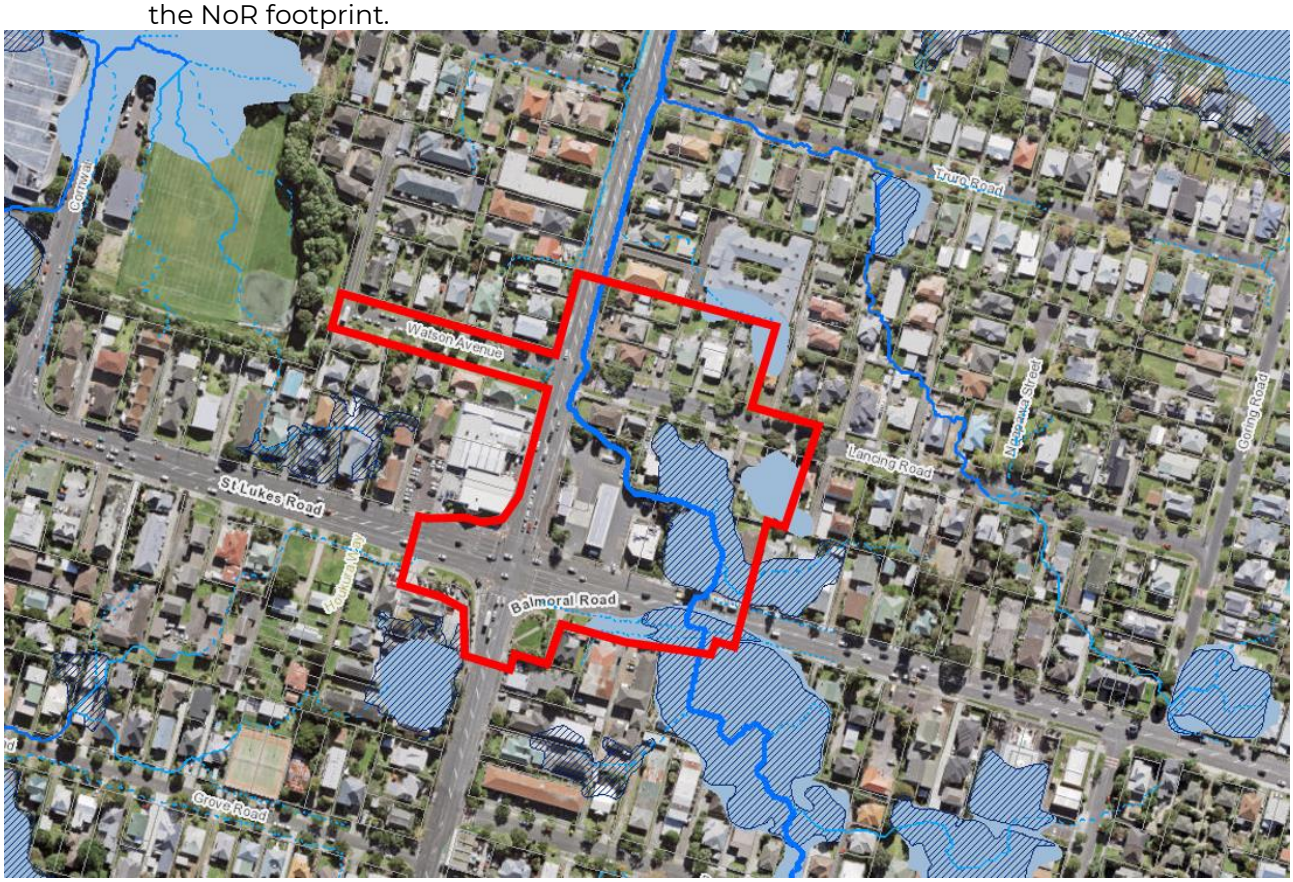

Figure 6 Hydrology within Balmoral / St Lukes Station NoR

1. Positive effects

There are no positive effects in relation to stormwater and flooding at the site. Further discussion on the route-wide positive effects for the Project is discussed in Section XX.

2. Construction effects

[TBC following the report. Will need to assess the impact of constructing infrastructure within flood plain and overland flow path].

3. Operational effects

[TBC following the report. Will need to assess the impact of the permanent infrastructure within flood plain and overland flow path].

4. Operational phase mitigation measures

[TBC]

5. Conclusion of hydrological and flooding effects

Based on the assessment above and the proposed mitigation, the hydrological and flooding effects will be appropriately managed.

Any adverse effects can be managed through the design process and no adverse effects on flooding is anticipated at the Balmoral / St Luke's Station NoR location.

10. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phase of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to Balmoral / St Lukes Station NoR. Further discussion on the route-wide construction noise and vibration effects is considered in Section X.

The receiving environment comprises a mix of residential dwellings, offices and workshops. The existing noise is dominated by traffic noise and those typical of a suburban context.

The sensitive receivers are listed within Table XX of this NoR, however those of particular note adjacent to the Balmoral / St Lukes Station NoR include the following:

- Lexham Gardens Rest Home (identified as 1 below)
- St Lukes Plunket Family Centre at 309 Sandringham Road (identified as 2 below)
- Various commercial properties at 333, 335 and 345 Sandringham Road (identified as 3 below)
- Bambinos Early Childhood Centre St Lukes (identified as 4 below)

These sensitive receivers are also shown in Figure 7 below. There are no notable receivers in this location.

Figure 7 Potential receivers surrounding Balmoral / St Lukes Station NoR

1. Positive effects

Section X of this AEE outlines route wide positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. Construction noise effects

The construction works at Balmoral / St Lukes Station NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the Suburban Worksite construction noise standards as applicable in this location.

Based on the noise modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment

predicts that there may be infringements of the Suburban Worksite noise standards at ground floor receivers identified in [redacted] during the day. These infringements could range up to 5 decibels, typically one to three hours at a time. The nature of these effects ranges from people moving to quieter outdoor areas to raised voices during conversation. Construction noise would be noticeable but unlikely to interfere with daily activities.

3. Construction noise mitigation measures

Mitigation of construction noise effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed Condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved via a Schedule to the CNVMP. No additional noise measures are required at Balmoral St Lukes Station.

4. Construction vibration effects

The construction works at Balmoral / St Lukes Station NoR will be involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted the potential infringement of the vibration standards in this location using compaction activities given the sustained vibration produced, usually over a period of days while fill is compacted.
The effects of construction vibration take two forms:

- Potential for building damage; and
- Potential for loss of amenity.

Building damage
Based on the vibration modelling undertaken for the site through applying the highest vibration generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts that there will be infringements of the Suburban Worksite residential cosmetic building damage vibration standards at some receivers directly bordering the works area.
Amenity
The Construction Noise and Vibration Assessment predicts potential infringement of the amenity vibration standards.

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction vibration standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation to the Project vibration standards can only be achieved via a Schedule to the CNVMP. No additional measures are required at Balmoral / St Lukes Station NoR.

6. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

11. Operational noise and vibration

The Operational Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the operational phase of the Project as they relate to operational noise and vibration. Further discussion on the route-wide operational noise and vibration effects is considered in Section XX.
The existing noise environment at this location is primarily dominated by traffic noise along Balmoral Road and Sandringham Road. The future noise environment is expected to remain dominated by traffic noise. Sensitive receivers surrounding this NoR include residential dwellings and St Lukes Bambinos Early Childhood Centre in the immediate north, east and south of the NoR footprint.

1. Positive effects

Section X of this AEE outlines route wide positive effects. However, there are no positive operational noise and vibration effects relevant to this NoR.

2. Operational noise effects

The Operational Noise and Vibration Assessment has identified the AUP Residential – Terrace Housing and Apartment Building Zone operational noise standards are applicable in this location.

At this location, noise sources include public address system and electrical power infrastructure. These will be located underground within the Station so would not be anticipated to generate adverse noise effects on the surrounding receivers above ground.

3. Operational noise mitigation measures

Mitigation of operational noise effects common to the whole Project is discussed in Section XX. The operational noise standards are specified in proposed Condition XX of the draft condition set in Appendix XX. There are no specific operational noise effects that require mitigation with respect to the Balmoral / St Lukes Station NoR.

4. Operational vibration effects

Operational vibration levels from the Balmoral / St Lukes Station are expected to be negligible.

5. Operational mitigation measures

Mitigation of operational vibration effects common to the whole Project is discussed in Section XX. The operational vibration standards are specified in proposed Condition XX of the draft condition set in Appendix XX.

There are no additional specific mitigation measures required at the Balmoral / St Lukes Station NoR.

6. Conclusion of operational noise and vibration

Based on the assessment above, the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential operational noise and vibration effects associated with the Project will be appropriately managed.

12. Blasting overpressure and vibration

The Blast Management Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of blasting during the construction phase of the Project as they relate to blasting noise and vibration. This section focuses on the blasting noise and vibration effects specific to the Balmoral / St Lukes Station NoR.

Blasting is required within the Balmoral / St Lukes Station NoR due to the presence of basalt below ground at approximately RL40m down to a depth of RL20m. All receivers and infrastructure adjacent to the Balmoral / St Lukes Station NoR are identified as commercial, industrial, educational and residential. Project vibration and overpressure standards are recommended by the Blast Management Assessment (German Standard DIN4150-3 for unoccupied buildings or where an occupant agrees to a higher level and Australian Standard AS2187.2 for occupied buildings).

There are also two heritage properties located along Balmoral Road approximately 250 m east of the NoR footprint at 250 Balmoral Road (Power Station) and 258 Balmoral Road (Balmoral Community Centre). The Blast Management Assessment concludes no alternative vibration or overpressure standard is necessary for these buildings.

1. Positive effects

Section X of this AEE outlines route wide positive effects. The Blast Management Assessment does not identify any other positive effects specific to the Balmoral / St Luke's Station NoR.

2. Construction effects

Blasting has the potential the potential to cause building damage and loss of acoustic amenity because of vibration and overpressure effects. The potential for flyrock associated with a blast is considered with respect safety.

An individual person's perception and sensitivity to vibration will differ from others. Perception relates to when the vibration is detected, sensitivity addresses how it impacts upon the individual. This in turn can vary over the time an individual is exposed to vibration.

The potential for building damage from vibration will depend on the scale of explosive used, the distance to a receiving building and the type of building exposed. Vibration sensitive equipment (e.g. equipment for medical or scientific based activities) within buildings can require protection beyond that imposed by amenity and standard vibration criteria.

Buildings with vibration sensitive equipment have not been identified near the Balmoral / St Lukes Station NoR.

Overpressure is pressure in excess of normal atmospheric pressure, such as that caused by an explosions shock wave and has the potential to cause building damage.

The Blast Management Assessment has classed all buildings within the area as sensitive receptors. None, however, are expected to require alternative vibration standards.
The Blast Management Assessment notes the permissible level of blasting vibration related to utilities is higher than the standards applied to residential and commercial properties meaning the scale of a blasting activity will be controlled by the standards applied to those properties rather than the utilities. Vibration standards appropriate to underground utilities in the area will be established in consultation with the asset owner, prior to construction.

3. Construction mitigation measures

Blasting at the Balmoral / St Lukes Station will be managed to comply with the Project blasting standards and criteria, identified in the Blast Management Assessment specified in proposed conditions XX and XX of the draft condition set in Appendix XX. Variation from these criteria and standards can only be achieved only via a Schedule to the CNVMP. With this compliance, it is not anticipated that there will be any impact on the integrity of the adjacent properties to the NoR, although blasting may be perceptible to some people around the blast area.
In addition, where blasting is proposed, trial blasts will be carried out and documented in a Trial Blasting Report, for the purpose of informing the design of subsequent blast events for the Project works. Blasting times will be limited to between 9am and 5pm, Monday to Saturday and each blast monitored for compliance with Project criteria.
In addition, a Blast Management Plan will also be prepared to set out the safety and environmental aspects that will be incorporated into each blast to avoid, remedy or mitigate, as far as practicable the adverse effects.

4. Conclusion of blasting overpressure and vibration effects

Based on the assessment above, the Blast Management Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential blasting and vibration effects associated with the Project will be appropriately managed.

13. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project as related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blast Management Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of damage to buildings and structures.
This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to the Balmoral / St Lukes Station NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.
The existing low-rise buildings within the Balmoral / St Lukes NoR footprint comprises a mix of residential, domestic housing, commercial and retail and are founded on shallow foundations. All buildings within the NoR footprint are to be acquired and demolished to enable construction of Balmoral / St Lukes Station.

1. Positive effects

There are no positive effects on buildings or structures with respect to vibration and settlement.

2. Construction vibration induced effects

Vibration induced building damage common to the entire Project area is discussed in Section XX. The Structures and Settlement Assessment has identified that all buildings within the NoR footprint will be acquired and demolished. Surrounding buildings fall outside the vibration threshold setback distances and as such the potential for damage to these buildings is Negligible.

3. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section xx, in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CVNMP and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Settlement effects common to the entire Project area are discussed in Section XX. Buildings adjacent to the Balmoral / St Lukes Station NoR with potential settlements greater than 10 mm and ground slopes greater than 1/500, necessitating further assessment are contained in Appendix XX to the Structures and Settlement Assessment. This corresponds to effects that are expected to be at be between Slight to Negligible.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx in the form of a Settlement Management Plan (SMP), recommended in condition XX provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. Operational settlement and vibration induced effects

There are no settlement induced effects associated with the operation of the Project. The potential for settlement effects will occur only during the construction of the Project. Vibration effects on buildings, resulting from the operation of the Project is addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section xx.

7. Conclusion of settlement and structure effects

Based on the assessment above, the Settlement and Structures Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential settlement and structure effects on buildings will be appropriately managed.

14. Geological heritage

The Geological Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects on geological heritage features during the construction phase of the Project as they relate to construction activities in proximity to these features. This section focuses on the geological heritage features in the vicinity of the Balmoral / St Lukes Station NoR. Further discussion on the common effects on geological heritage is considered in Section XX. The Balmoral / St Lukes Station NoR footprint lies on the lava flow field arising from Te Tātua-a-Riukiuta / Three Kings and Maungawhau / Mt Eden volcanoes. This field consists of multiple basalt flows varying from solid basalt rock through vesicular basalt to interflow scoria. The lava is likely overlain by tuff with a thickness of approximately 30 m to 40 m.

1. Positive effects

There are no positive effects in relation to geological heritage at the site.

2. Construction effects

Effects on geological heritage common to the entire Project area is discussed in Section XX. The Geological Heritage Assessment has identified that the overall impact on the integrity and value of geological heritage features are less than minor.

3. Construction mitigation measures

Mitigation of geological heritage effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a XX Management Plan.

4. Operational effects

There are no operational effects anticipated as any impact on geological heritage will occur during construction.

5. Conclusion of geological heritage effects

Based on the assessment above, the Geological Heritage Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on geological heritage will be appropriately managed.

5. Conclusion

Overall, effects from Balmoral / St Luke's Station NoR will be appropriately managed and mitigated. During the construction phase, management plans relevant to this NoR will be prepared to manage any actual and potential adverse effects that may occur, such as the Construction Traffic Management Plan, Stakeholder Consultation and Engagement Plan, Historic Heritage Management Plan, Tree Management Plan and Construction Noise and Vibration Management Plan.

1. Sandringham Station NoR

1. NoR 8 – Sandringham South Station NoR

This section:

- Describes NoR 8 – Sandringham Station (Section 1.2)
- Summarises the existing and receiving environment (Section 1.3)
- Assesses effects and outlines mitigation (Section 1.4)

2. NoR description

The Sandringham Station NoR is proposed to be an underground station. It will provide access for local residents in the Sandringham area, located between Lambeth Road and Harwood Street at the junction of Sandringham Road.

Figure 11: Sandringham Station NoR plan

Figure 11 shows the Sandringham Station NoR boundary and it's surrounds. Table 11 summarises the Sandringham Station's permanent features and temporary construction works.

Figure 12: Sandringham Station NoR boundary on aerial imagery

Table 11: Sandringham Station NoR description

Permanent features	
Station	• Sandringham station is located between Lambeth Road and Harwood Street along Sandringham Road; • One public entrance to the station at the junction of Lambeth Road and Sandringham Road • One service/back of house entrance of the services road to provide services access, emergency and fire brigade access
Platforms	• Underground stacked platforms.
Public realm	• New pedestrian station forecourt fronting Lambeth and Sandringham Road intersection • Upgrades to the surrounding streets to support the station connectivity with active transport modes.
Road and streetscape	• Potential for new pedestrian crossing outside station to connect with the village • Potential for road enhancements to connect with bus services
Parking and loading	• Provision for bicycle parking, loading zones, kiss and ride facilities, emergency services access.
Other new infrastructure	• N/A
Anticipated patronage	• [XXX] patronage.
Anticipated construction works	
Construction methodology and staging	Refer to AEE Section 6 and DCR. At a high level the construction activities will include: • Demolition, site clearance, utility relocation and protection; • Establish site offices and amenities; • Realign Harwood Street and close off current entrance; • Install ground support to station shafts perimeter (anticipated bored or DTH secant pile walls; • Excavation to station shafts – anticipate blasting for basalt; • Mine adits to connect shaft to monotube tunnel; • Station internal construction and fit-out; • Surface buildings and streetscaping.

Access to the site	• Primary access to the station is through the proposed forecourt at the junction of Sandringham Road and Lambeth Road; • Service primary access is proposed of the new laneway to the east of the proposed station.; • Proposed construction access will not be upheld through to operational access. -

3. Description of the environment

This section sets out the existing and receiving environment for the Sandringham Station NoR. It builds on the assumptions outlined in Section XX.

Table 12 describes the surrounding area and features and relevant statutory considerations respectively. Any property directly affected by this NoR is listed in Appendix X to NoR 8 Form 18.

Table 12: Existing environment description

Feature	Description
Current land use	• Predominantly residential land use in and surrounding the proposed station; • Sandringham commercial/retail village located north west of the proposed station. • Sandringham playground and reserve are located directly north of the station across Lambeth Road.
Physical	
Transport	• Sandringham Road is an arterial road under the AUP • Existing walking footpaths on both sides of Sandringham Road
Infrastructure	• Vector infrastructure located along Sandringham Road and Lambeth Road • A 300mm sewer pipe running through the southern portion of the site • A distribution substation located to the north of the site on the opposite side of Lambeth Road.
Community facilities and key attractions	• Sandringham Village • Dominion Road Shops; • Ethnic supermarkets; • Gribblehurst Community Park & Hub; • Sandringham Pharmacy; and • Stoddard Road Shops.
Sensitive noise and vibration receivers	None
Historic heritage	*If no information, note nothing relevant in this location. Go into relevant details where needed.*
Archaeology	• Sandringham Public Toilets (19771) – outside the scope of works/NoR boundary • Lambeth Road State Housing Conservation Area (18898) – outside the scope of works/NoR boundary
Cultural	*If no information received, note no responses from Te Tiriri team.*
Natural	
Topography	• Generally flat site that has been extensively modified as a town centre.
Geology	• Basalt identified within the general area
Catchment	• Located within the Meola Stormwater Catchment
Flooding & hydrology	• Flood plain covering 50% of the NoR footprint;

	• Two overland flow path layers across the NoR footprint; • Flood prone area located across the northern side of the NoR footprint.
Trees and vegetation	Street trees along Lambeth Street, and Harwood Street.
Terrestrial ecology	• Forest bird and skink constraints within the residential habitat present within the NoR boundary.

Figure X and Table 1-3 identify the relevant statutory considerations within the Sandringham Station NoR.

AUP Zoning figure

Figure 13 Sandringham NoR zoning and overlays in the AUP

Table 13 Sandringham Station NoR statutory environment

Name	Description	Comment
Current NoR zoning	Residential - Mixed Housing Urban Zone	Properties located along the northern side of the proposed station.
	Residential – Terrace Housing and Apartment Building Zone	Properties located in the south-western corner of the proposed station.
	Road	Surrounding the proposed station on north, west and southern boundaries.
Precincts	N/A	
Controls	Controls: Macroinvertebrate Community Index – Urban	Applies to the entire area
	Controls: Arterial Roads	Applies to Sandringham Road
	Height Variation Controls	A 13 m Height Variation Control applies to the businesses within the NoR
Overlays	Historic Heritage and Special Character: Special Character Areas Overlay Residential and Business - Business Sandringham	Applies to the businesses within the NoR
Regional Plan Controls and Overlays	N/A	
Designations	Airspace Restriction Designations – ID 1102, Protection of aeronautical functions – obstacle limitation surfaces, Auckland International Airport Limited	All properties within NoR boundary
Zoning within 800m catchment	Business - Local Centre Zone	Properties located to the north-west of the site.
	Open Space – Informal Recreation Zone	Properties to the north of the site.
	Residential – Mixed Housing Suburban Zone	Sporadic pockets of land surrounding the site.
	Residential – Terrace Housing and Apartment Building Zone	Subject site, and to the south, east and south west of the site.
Anticipated future zoning within 800m catchment (construction, operation)	• Business Mixed Use (with increased height) • Business – Town Centre (with increased height) • Residential – THAB • Residential – Single House •	Refer Section 10.1.X for reasoning and analysis.
Other relevant considerations	N/A	N/A

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operation phases of the Project as they relate to the Sandringham Station NoR.
This builds on the technical assessments included in Volume 3 and the Design and Construction Report in Appendix XX. Section XX outlines the indicative methodology used for these technical assessments.

1. Traffic and transport

The Assessment of Transport Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project. This section focuses on the transport effects specific to Sandringham NoR Further discussion on the route-wide transport effects is considered in Section XX.
Key transport features within and adjacent to the Sandringham Station NoR include:

- **Public transport**: There are several bus stops within the nearby vicinity servicing a range of routes (including the Outerlink, 650, 24B, 24R, and 66 routes) and four stops within 200-300m of the proposed station location. There are also bus priority lanes on Sandringham Road going both north and southbound. There are no existing rail stations in proximity to the Sandringham Station NoR.
- **Walking**: There are adequate walking facilities in and around the proposed station, however there is a significant lack of pedestrian crossings where only two zebra crossings are present on Sandringham Road in this area.
- **Cycling**: There are no cycling facilities in the immediate vicinity of the proposed station, aside from unbuffered cycle lanes provided on Mount Albert Road. Sandringham Road and Mount Albert Road are also classified as Major cycle routes.
- **General vehicles** : Sandringham Road is an arterial road with a speed limit of 50km/h. The area experiences approximately 18,330 vehicles per day.
- ~~**Parking:**~~
- **Freight**: Approximately 4% of the 18,330 daily vehicles serviced by Sandringham Road are classified as Heavy Commercial Vehicles, and the road is classed as an Overweight Route.

The Sandringham Station will form part of the future light rail network, improving connectivity along the alignment.

1. Positive effects

Section XX identifies the positive traffic and transport effects associated with the Project generally. Overall, the provision of a light rail station at Sandringham will support the Project objectives as discussed at section xx.

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section XX. The proposed works at Sandringham Station will potentially result in the following adverse construction effects, including:

- **Traffic management**: short term lane closures are anticipated in order to provide for pedestrian amenity improvements, and the closure of Harwood Street and reconnection to Lambeth Road in order to create a new access into the street. Further there is anticipated to be periods of increased truck movements to enable the station shaft excavation and concrete pouring for the station floor slab.
- ~~**Public transport**: There is potential for some bus services to experience minor disruptions and potential congestion due to construction traffic. It is unlikely that detours would be implored through the construction of this Station.~~
- ~~**Cycling**: There are no cycling facilities effected by construction, however any on-road cyclists will also need to navigate the local network (which may be subject to traffic management and congestion).~~
- **Walking**: Potential for footpaths along Sandringham Road and Lambeth Road needing realignment and resulting in temporary closures.
- **General vehicles**: There may be an increase in heavy vehicles at Sandringham Road/Harwood Street and the Lambeth Road/Harwood Street intersections as a result of the construction activities, these may result in short term road closures and temporary diversions.

- **Emergency services**: As with the general traffic, emergency vehicles travelling to and around the immediate vicinity of the site may experience delays relating to construction traffic

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP). The Assessment of Transport Effects identifies recommends the following opportunities for inclusion in the CTMP in relation to Sandringham Station:

- Closure of the vehicular connection from Harwood Street to Sandringham Road at an early stage of construction to allow for the permanent realignment, connecting Harwood Street into Lambeth Road;
- A permanent connection to be provided from Harwood Street to Lambeth Road prior to the closure of the connection mentioned above; and
- Routing of trucks to the site be predominantly from SH20 Majoro Street Interchange. To reduce cumulative effects resulting from other Project activities nearby, periods of high truck movements will be offset.

4. Operational effects

There are no adverse operational effects on transport from Sandringham Station. Following construction at the station the existing road layout will be reinstated.

5. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3, Appendix xx and the proposed mitigation, the actual and potential traffic and transport effects associated with the Project, will be appropriately managed.

2. Landscape and visual

The Assessment of Landscape and Visual Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the (natural and urban) landscape (including visual effects). This section focuses on the landscape and visual effects specific to the Sandringham Station. Further discussion on the route-wise landscape and visual effects is considered in Section xx.

The proposed station location is at the southern end of the Sandringham village shops, which is a centre with a range of one and two storey shops that have street frontage and upstairs accommodation and commercial facilities. The southern portion of Sandringham shops is limited to the western side of the road, with the Sandringham Reserve located on the east, adjacent to the proposed station location.

This section focusses on the landscape and visual effects specific to Sandringham Station.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, this Station will provide:

- The station will echo the areas historical character by its location near to the former historical tram terminus, without encroaching into the remaining historical fabric;
- The location of the station will provide for better visibility opposite to one of the two bends in Sandringham Road centre;
- The station will bookend the southern fringe of the town centre and contribute to defining the spatial element of the centre. The station will also serve as a new activity anchor to activate the surrounding street, generate pedestrian traffic and support the existing centre.

2. Construction effects

The construction works within the Sandringham Station NoR will involve typical construction activity and will not result in any additional effects on the landscape and urban environment than those discussed in Section XX.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

The works within Sandringham Station NoR will involve those anticipated changes that have been outlined in Section xxx and will not result in any adverse effects on the landscape and urban environment than those discussed in Section xx.

5. Permanent infrastructure mitigation measures

Mitigation of landscape and visual effects common to the whole Project is discussed in Section xx and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to the Sandringham Station NoR the Assessment of Landscape and Visual Effects identifies the following opportunities for inclusion in the CULDG when undertaking the design of the station:

- Design requirements to support the station's legibility;
- Design requirements to support pedestrian access to the station; and
- Design requirement to respond to the specific Sandringham Road contexts.

6. Conclusion of landscape and visual effects

Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Social

[ASSESSMENT OF POTENTIAL ADVERSE SOCIAL IMPACT EFFECTS TO BE PROVIDED]

4. Cultural

[***TBC on cultural reporting***]

5. Built heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the Sandringham Station NoR..

There is one scheduled Built Heritage Place located at the boundary of the Station NoR (Sandringham Public Toilets are set in a small reserve across the road from the proposed station) and several commercial SCAB buildings. Otherwise, the majority of sites identified are in the 100m buffer but at some distance from the NoR Boundary.

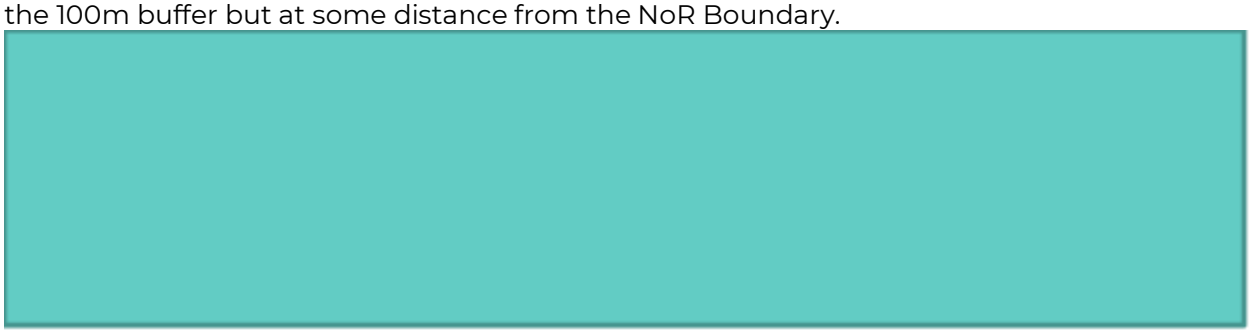

Figure 14 Historic heritage within XX NoR

1. Positive effects

Positive effects are not generated during the enabling and construction phases, but there is potential for indirect 'uplift' of Built Heritage Places within the 'Study Area as an outcome of the development and increased opportunity for visitors to visit the area.

2. Construction effects

In addition to the common construction effects set out in section X, the construction works at Sandringham Station will potentially result in the following effects, including:

- Cosmetic damage to built heritage features identified within a 100m buffer of the NoR. The risk of this effect is minor given the majority of these buildings are located outside of the NoR footprint.
- Dust and noise nuisance experienced during the construction process. As above, the most significant risk of these effects will apply for features within the NoR footprint.

1. Construction mitigation measures

Because no moderate or significant adverse effects are identified, no specific measures are recommended aside from the BAHMP.

3. Operational effects

There are no operational effects on built heritage. The potential for adverse effects on built heritage will occur only during the construction of the Project. Accordingly, no mitigation of operational effects is recommended.

4. Conclusion of historic heritage effects

Based on the assessment above, the Built Heritage Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on Built Heritage associated with the Project will be appropriately managed.

6. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to the Sandringham Station. Further discussion on the route-wide archaeological effects is considered in Section xx.

The centre of the isthmus is dominated by Maungawhau / Mt Eden and Ōwairaka / Mount Albert. Sandringham consisted of highly fertile volcanic soils, which likely contained an extensive stonefield gardening system in pre-European history. The area would have been covered with walking tracks between the maunga and water which would have made up many of the later formalised roads in the area. The area was known for its wetlands.

The 19th Century historic settlement was formed as 'Edendale' and consisted of predominantly a dairy farming community, which later went to be developed around the tram line construction in 1936. Post-1912, the block of land which contains the NoR footprint was partially subdivided to create street-facing residential sections, but plans do not denote the location of any pre-1900 buildings on this block. The majority of dwellings in the area were constructed from 1940 onwards.

There are two heritage items that have been identified within 200m of the proposed Station location which are shown in Figure xx below. Both of these features have been determined as being outside of the scope of works.

Very few archaeological surveys and investigations have been undertaken in the wider area around the NoR. As a result, there is reasonable cause to suspect that additional previously unrecorded 19th century European archaeological sites may be encountered during works.

Figure 15 Archaeology within Sandringham Station NoR

1. Positive effects

No positive effects on archaeology have been identified as by its very nature construction requires disturbance of the ground in which archaeological remains may be present. It is assumed that the entire NoR area will be subject to such ground disturbance for station construction and associated streetscape upgrades. However, management processes can be established to enable the recording of archaeological material found during construction of a project, providing valuable insight into the history of a site.

2. Construction effects

The construction works within the Sandringham Station NoR will not result in any additional construction effects than those set out in the common effects included in Section XX.

3. Construction mitigation measures

Mitigation of archaeological effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Historic Heritage Management Plan (HHMP), inclusive of accidental discovery of archaeological features. There are no specific archaeological effects that require mitigation with respect to the Sandringham Station NoR .

In addition, an Authority to Modify Permit will be sought from Heritage New Zealand Pouhere Toanga.

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during the construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on archaeology associated with the Project will be appropriately managed.

7. Arboriculture

An Arboriculture Assessment has been undertaken and included as Appendix XX in Volume XX. Arboriculture within the Sandringham Station NoR boundary is limited to street trees located within roads identified within the NoR footprint. These are subject to a separate Tree Owner Approval process. There are no scheduled trees within the Sandringham Station NoR.

Figure 6 Street trees within XXX Station NoR

The trees present in the NoR footprint are not expected to be altered substantially in a potential future environment, aside from where tree mortality or consented removal occurs.

1. Positive effects

There are no positive effects in regards to arboriculture as the trees are required to be removed for the construction and establishment of Sandringham Station.

2. Construction effects

As trees in roads are proposed to be removed and altered within the NoR location to address access conflicts, this will result in potential adverse effects, including:

- The loss in benefits that trees provide in terms of amenity values and ecological services.
- Impacts on the health, stability, and appearance of trees which require pruning and alteration works.

3. Construction Mitigation measures

Mitigation of arboricultural effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Tree Management Plan (TMP).

Where street trees are proposed to be removed, replanting shall be undertaken and aim to remediate the loss of ecological services and amenity values that any removed trees provide, by establishing large grade trees in properly constructed planter pits in grass berms or station plaza areas.

4. Conclusion of arboricultural effects

Based on the assessment above, the Arboricultural Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on arboriculture associated with the Project will be appropriately managed

8. Open space

An Open Space Assessment has been undertaken and included as Appendix XX in Volume XX. There is no open space identified within the Sandringham Station NoR boundary and therefore no assessment is required.

9. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to hydrology and flooding. This section focuses on the hydrology and flooding effects specific to the Sandringham Station NoR. Further discussion on the route-wide hydrological effects is considered in Section xx.

- The Sandringham Station NoR is located within the Meola Stormwater catchment on flat and slightly rolling land. The key hydrological features, inclusive of flooding are listed below and shown in Figure xx below:Flood plain that covers half of the north-eastern portion of the site;
- Two overland flow paths that cover the north-eastern corner of the site, with a more minor overland flow path at the northern corner;
- The northern portion of the site includes a flood prone area surrounding the area of flood plain.

Figure 17 Hydrology within Sandringham Station NoR

1. Positive effects

In addition to the positive effects outlined in section X, the Project will provide:

- An opportunity to management of the overland flow path which cross the site and separate this feature from station users through design.

2. Construction effects

The Hydrological Assessment notes that any adverse effects of the Project can be managed through the design process, owing to the highly developed location of the NoR footprint.

3. Operational effects

The Hydrological Assessment does not specifically identify any anticipated adverse operational effects at the Sandringham Station NoR. However, as above it is expected that any potential effects which may arise could be managed through the design process.

4. Mitigation measures

In order to manage the level of effects set out above, the Hydrological Assessment recommends:

- The installation of flood storage devices to offset displaced floodplain storage and reduce peak discharge rates. Considering stormwater disposal through soakage is also recommended.
- Capture and non-potable reuse of roof-water runoff within the Sandringham Station.
- Incorporation of sustainable drainage systems and water-sensitive urban design (WSUD) where possible to enable management and containment of surface water at it's source and minimise burden on local drainage infrastructure.

5. Conclusion of hydrological and flooding effects

Based on the assessment above and the proposed mitigation, the effects will be appropriately mitigated.

10. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phases of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to the Sandringham Station NoR. Further discussion on the route-wide construction noise and vibration effects is considered in Section xx.

The existing receiving environment in proximity to the Sandringham Station NoR consists of a mix of modern and older residential dwellings (of both apartment and single-detached typologies) alongside commercial shops and restaurants. The acoustic environment within the NoR is dominated by traffic noise typical of such a suburban area.

There are no notable or sensitive noise and vibration receivers or vibration sensitive buildings or features identified at the Sandringham Station NoR.

1. Positive effects

Section X of this AEE outlines common positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. Construction noise effects

The construction works at Sandringham Station will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the Suburban Worksite construction noise standards as applicable in this location.

Based on the noise modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site (rock breaking), the Construction Noise and Vibration Assessment predicts general compliance with Project noise standards. Some infringements of the Suburban Worksite noise standards at ground floor receivers during the day may occur. These infringements are anticipated to be up to 5 decibels and are similar to those for typical commercial building activities in a built-up environment. Noise-generating activities will be carried out over an extended duration, although typically for only one to three hours at a time. The nature of these effects is predicted to range from causing discomfort to nearby pedestrians

in an outdoor situation (prompting movement away from the area), to constituting an annoyance for building occupants who may need to use slightly raised voices indoors.

3. Construction noise mitigation measures

Mitigation of construction noise effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved via a Schedule to the CNVMP. No additional measures are required at Sandringham Station.

4. Construction vibration effects

The construction works at Sandringham Station NoR will be involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted the potential infringement of the vibration standards in this location using rock breaking, blasting and compaction activities given the sustained vibration produced, usually over a period of days while rock breaking is carried out (using blasting) and fill is compacted.

The effects of construction vibration take two forms:

- Potential for building damage; and
- Potential for loss of amenity.

Building damage

Based on the vibration modelling undertaken for the site, applying the highest vibration generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts that there will be infringements of the Suburban Worksite cosmetic building damage vibration standards at some receivers directly bordering the works area.

Amenity

The Construction Noise and Vibration Assessment predicts The Construction Noise and Vibration Assessment predicts potential infringement of the amenity vibration standards.

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction vibration standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation to the Project vibration standards can only be achieved via a Schedule to the CNVMP. No additional measures are required at Sandringham Station.

6. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

11. Operational noise and vibration

[ASSESSMENT OF POTENTIAL OPERATIONAL NOISE AND VIBRATION EFFECTS TO BE PROVIDED]

12. Blasting overpressure and vibration

The Blast Management Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of blasting during the construction phase of the Project as they relate to blasting noise and vibration. This section focuses on the blasting vibration and overpressure effects specific to the Sandringham Station NoR.

Blasting is required within the Sandringham Station NoR due to the presence of basalt below ground at approximately RL40m down to a depth of RL20m. All receivers and infrastructure adjacent to the Sandringham Station NoR are identified as commercial and residential. Project vibration and overpressure standards are recommended by the Blast Management Assessment (German Standard DIN4150-3 for unoccupied buildings or where an occupant agrees to a higher level and Australian Standard AS2187.2 for occupied buildings).

1. Positive effects

Section X of this AEE outlines route wide positive effects. The Blast Management Assessment does not identify any other positive effects specific to Sandringham Station NoR.

2. Construction effects

Blasting has the potential the potential to cause building damage and loss of acoustic amenity because of vibration and overpressure effects. The potential for flyrock associated with a blast is also considered with respect to safety.

An individual person's perception and sensitivity to vibration will differ from others. Perception relates to when the vibration is detected, sensitivity addresses how it impacts upon the individual. This in turn can vary over the time an individual is exposed to vibration.

The potential for building damage from vibration will depend on the scale of explosive used, the distance to a receiving building and the type of building exposed. Vibration sensitive equipment (e.g. equipment for medical or scientific based activities) within buildings can require protection beyond that imposed by amenity and standard vibration criteria. Buildings with vibration sensitive equipment have not been identified near the Sandringham Station NoR. No receiving buildings will require any adjustment of the permissible vibration level to protect integrity.

Overpressure is pressure in excess of normal atmospheric pressure, such as that caused by an explosions shock wave and has the potential to cause building damage.

The Blast Management Assessment has classed all buildings within the area as sensitive receptors. None, however, are expected to require alternative vibration standards.

The Blast Management Assessment notes the permissible level of blasting vibration related to utilities is higher than the standards applied to residential and commercial properties meaning the scale of a blasting activity will be controlled by the standards applied to those properties rather than the utilities. Vibration standards appropriate to underground utilities in the area will be established in consultation with the asset owner, prior to construction.

3. Mitigation measures

Blasting at the Sandringham Station will be managed to comply with the Project blasting standards and criteria, identified in the Blast Management Assessment and secured through conditions. Variation from these criteria and standards can only be achieved via a Schedule to the CNVMP. With this compliance, it is not anticipated that there will be any impact on the integrity of the adjacent properties to the NoR, although blasting may be perceptible to some people around the blast area.

In addition, where blasting is proposed, trial blasts will be carried out and documented in a Trial Blasting Report, for the purpose of informing the design of subsequent blast events for the Project works. Blasting times will be limited to between 9am and 5pm, Monday to Saturday and each blast monitored for compliance with Project criteria.

In addition, a Blast Management Plan will also be prepared to set out the safety and environmental aspects that will be incorporated into each blast to avoid, remedy or mitigate, as far as practicable the adverse effects.

4. Conclusion of blasting noise and vibration effects

Based on the assessment above, the Blasting Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential blasting and vibration effects associated with the Project will be appropriately managed.

13. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blasting Noise and Vibration Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of structural damage to buildings and structures. This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to the Sandringham Station NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.

The existing built environment at the Sandringham Station NoR consists predominantly of shallow founded low rise domestic dwellings and commercial buildings.

All buildings within the NoR footprint are to be acquired and demolished to enable construction of Sandringham Station.

1. Positive effects

There are no positive effects on buildings or structures with respect to vibration and settlement.

2. Construction vibration induced effects

Vibration induced building damage which common to the entire Project area is discussed in Section XX. The Structures and Settlement Assessment has identified that all buildings within the NoR footprint will be acquired and demolished to allow for construction of the Sandringham Station. All other surrounding buildings not within the footprint fall outside the vibration threshold setback distances, and as such the potential for damage to these buildings is Negligible.

3. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section xx in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CVNMP and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Conclusion of settlement induced effects

Settlement effects common to the entire Project area are discussed in Section XX. There are no buildings adjacent to the Sandringham Station NoR with potential settlements greater than 10 mm and ground slopes greater than 1/500. This corresponds to effects that are expected to range from Negligible to Very Slight.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx in the form of a Settlement Management Plan (SMP), recommended in condition XX provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. **Operational effects**

There are no settlement induced effects associated with the operation of the Project. The potential for settlement effects will occur only during the construction of the Project. Vibration effects on buildings, resulting from the operation of the Project is addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section xx.

7. **Conclusion of settlement and structure effects**

Based on the assessment above, the Settlement and Structures Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on buildings will be appropriately managed.

14. Geological Heritage

The Assessment of Geological Heritage effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project. As per Table xx above, the Assessment of Geological Heritage effects identifies that the NoR lies within the sedimentary formation lava flow field emanating from the Three Kings Volcano. There may also be thin tuff deposits at this location. Accordingly, there are no geological heritage implications at Sandringham Station

1. Notice of Requirement

1. NoR 9 – Wesley Station NoR

This section:

- Describes NoR 9 - Wesley Station (Section X.2)
- Summarises the existing and receiving environment (Section X.3)
- Assesses potential effects and outlines proposed mitigation (Section X.4)

2. NoR description

The Wesley Station NoR is located between Oakley Creek and the south-western motorway, directly adjacent to Sandringham Road and Wesley Intermediate School. The Wesley Station is a high patronage, above ground station and will become a significant bus interchange location. The NoR boundary covers the proposed station and the elevated rail alignment south of Oakley Creek.

Figure 1 shows the Wesley Station and NoR boundary. **Figure 2** shows the NoR boundary aerial imagery (outlined in red). Table 1 summarises the Wesley Station's permanent features and temporary construction works.

TBC post consultation with Kainga Ora

1. Notice of Requirements

1. Shafts NoR

This section:

- Describes the shafts located along the NoR alignment.
- Summarises the existing and receiving environment(s) (section 1.3)
- Assesses potential effects and outlines proposed mitigation (section 1.4)

2. NoR description

There are three shafts located along the alignment; Vernon Street, Burton Street and New North Road.

The Vernon Street shaft is bound by Vernon Street, Sale Street and Wellesley Streets, providing the necessary access ventilation and train movements for the turnback of trains terminating/originating at Te Waihorotiu Station.

The Burton Street shaft is located at 1 Burton Street, between the Universities and Dominion Junction stations.

The New North Road shaft is located at 326-368 New North Road, between the Dominion Junction and Kingsland Stations.

Figure 1 shows the proposed Project alignment, with the three shafts located along the tunnelled section. Table 2 summarises the three shaft location's permanent features and temporary construction works anticipated at each

Figure 1 Alignment shaft(s) Location Plan

Figure 2 Alignment shaft(s) on aerial imagery

Table 1.1 Alignment shaft(s) NoR description

Permanent features			
	Vernon Street Shaft	**Burton Street Shaft**	**New North Road Shaft**
Station	• Bound by Vernon Street, Sale Street and Wellesley Streets;	• Located at 1 Burton Street.	• Located at 326-368 New North Road.
Attributes	• TBM extraction; • Train turnback; • Emergency intervention, and escape (via stairs and lift); • Ventilation systems (including tunnel ventilation); • Traction Power spaceproofed for potential DC substation; • Maintenance access and loading facilities	• Emergency intervention (via stairs and lift); • Approximately 65m deep; • Diaphragm wall in to East Coast Bays Formation (ECBF); • Mined adit connection to TBM tunnel.	• Rail operation functionality (including Kingsland turnback, Dominion Junction turnback, upper track passing loop and lower track passing loop); • Emergency intervention and escape (via stairs and lift); • Tunnel ventilation; • Traction power substationl

			• Backup control centre; • Large vehicle access.
Public realm	N/a	N/a	N/a
Road and streetscape	•	• Diversion island on Burton Street needs to be reconfigured to allow construction traffic; •	•
Parking and loading	N/a	N/a	N/a
Other new infrastructure	N/a	N/a	N/a
Anticipated construction works			
Construction methodology and staging	Refer AEE Section 6 and DCR Section X for more detail. At a high level the construction activities will include: •		
Access to the site	•	•	•

3. Description of the environment

This section sets out the existing and receiving environment for the vent shafts along the alignment. It applies the parameters on the assumptions outlined in Section XX.
Tables 2 describe the surrounding area and features. Any property directly affected by this NoR is listed in NoR 6 Form 18 Appendix X to.

Table 2 Existing environment description

Feature	Description		
	Vernon Street Shaft	**Burton Street Shaft**	**New North Road Shaft**
Current land use	Shaft located between Sale Street, Wellesley Street and Vernon Street.	Shaft located at 1 Burton Street.	Located at 326-368 New North Road.
Transport	• Victoria Street West, Wellesley Street West and Halsey Street are arterial roads. • Sale Street, Halsey Street, Victoria Street West and Wellesley Street West are all part of the primary walking network; • An off-road shared path, and a dedicated on-	•	• New North Road is an arterial road

	road protected cycle lane on Victoria Street West.		
Infrastructure	No infrastructure at this location	•	•
Community facilities and key attractions	• Victoria Park; •	•	•
Sensitive noise receivers	•	•	•
Historic heritage	•	•	•
Archaeology	•	•	•
Cultural	[Need further information from Te Tiriti Partnerships team]	[Need further information from Te Tiriti Partnerships team]	[Need further information from Te Tiriti Partnerships team]
Topography	•	•	•
Geology	•	•	•
Catchment	•	•	•
Flooding and hydrology	•	•	•
Trees and vegetation	•	•	•
Terrestrial ecology			

Figure x, and table x identify the Vernon Road Shaft relevant statutory considerations within the shafts NoR footprint

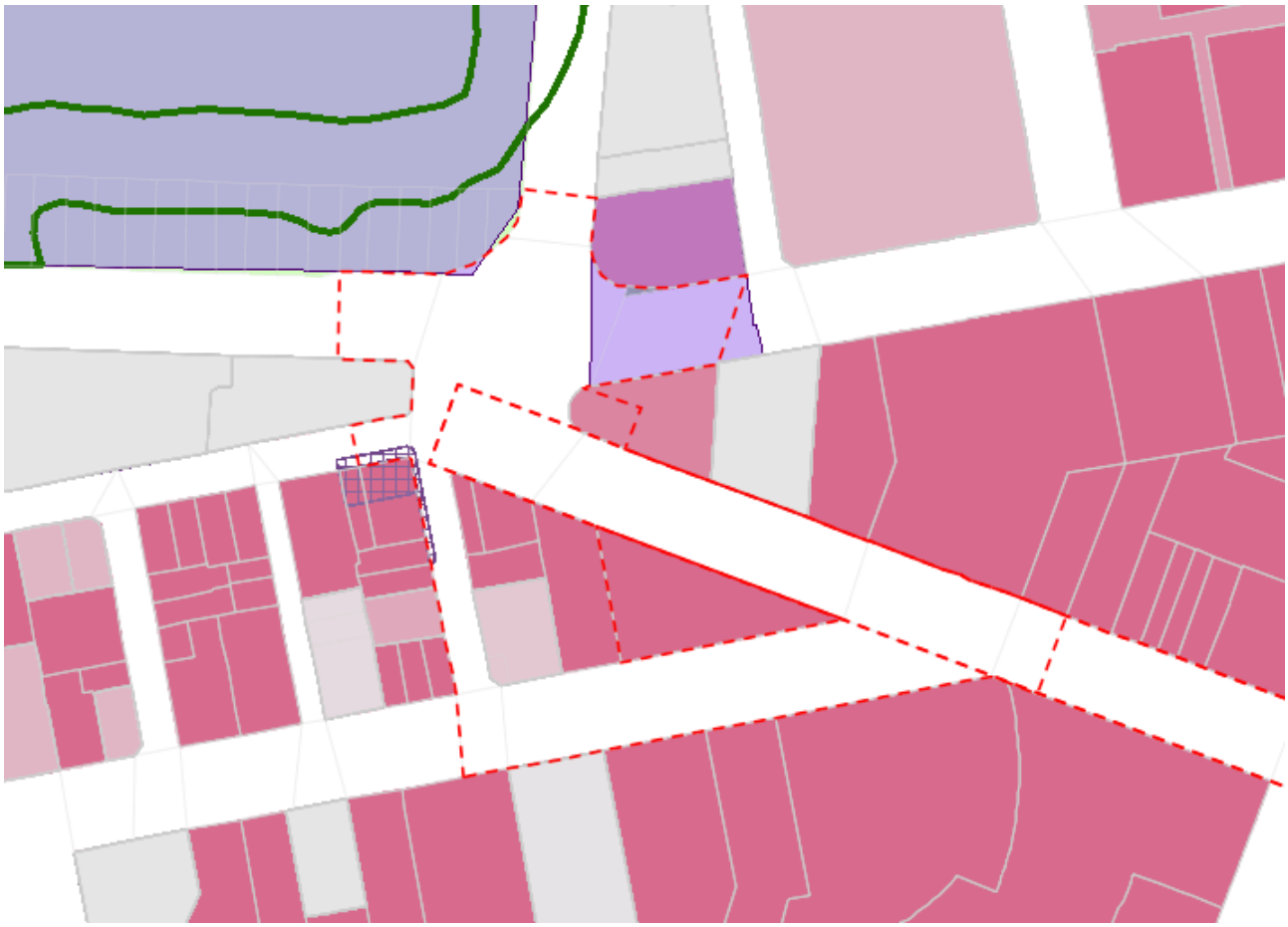

Figure 3 AUP layers and zoning of Vernon Street shaft

Table 3 Vernon Road shaft NoR statutory environment

Name	Description	Comment
Current Zoning	Road	
	Business – City Centre Zone	
Precincts	N/a	N/a
Controls	Arterial Roads – Wellesley Street	
	Macroinvertebrate Community Index – Urban	
Overlays	Natural Heritage: Regionally significant Volcanic Viewshafts and Height Sensitive Areas Overlay, E10, Mount Eden, Viewshaft	
Designations	Designation 6736, State Highway 1, and State Highway 16: Central Motorway Junction, Auckland Council, NZTA/Waka Kotahi	
Regional Plan Controls and Overlays	N/a	N/a
Zoning within 800 m catchment	• Business – City Centre Zone; • Road corridor; • Open Space – Active Sport and Recreation Zone.	
Anticipated future zoning in 800 m catchment	•	

Other relevant considerations		

Figure x, and table x identify the Burton Street Shaft relevant statutory considerations within the shafts NoR footprint

Figure 4 AUP layers and zoning of Burton Street shaft

Table 4 Burton Street NoR statutory environment

Name	Description	Comment
Current Zoning	Road	
	Business – Mixed Use Zone	
Precincts	N/a	N/a
Controls	Height Variation Control – Newton, 21m	
	Centre Fringe Office Control	
	Macroinvertebrate Community Index – Urban	
Overlays	Natural Heritage: Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay – E10, Mount Eden, Viewshafts.	
	Arterial Road – SH1	
Designations	Designation 6736, State Highway 1 and State Highway 16: Central Motorway Junction, Auckland Council, NZTA/Waka Kotahi	
Regional Plan Controls and Overlays	N/a	N/a
Zoning within 800 m catchment	• Business – Mixed Use • Road	

	•	
Anticipated future zoning in 800 m catchment	•	
Other relevant considerations		

Figure x, and table x identify the New North Road Shaft relevant statutory considerations within the shafts NoR footprint

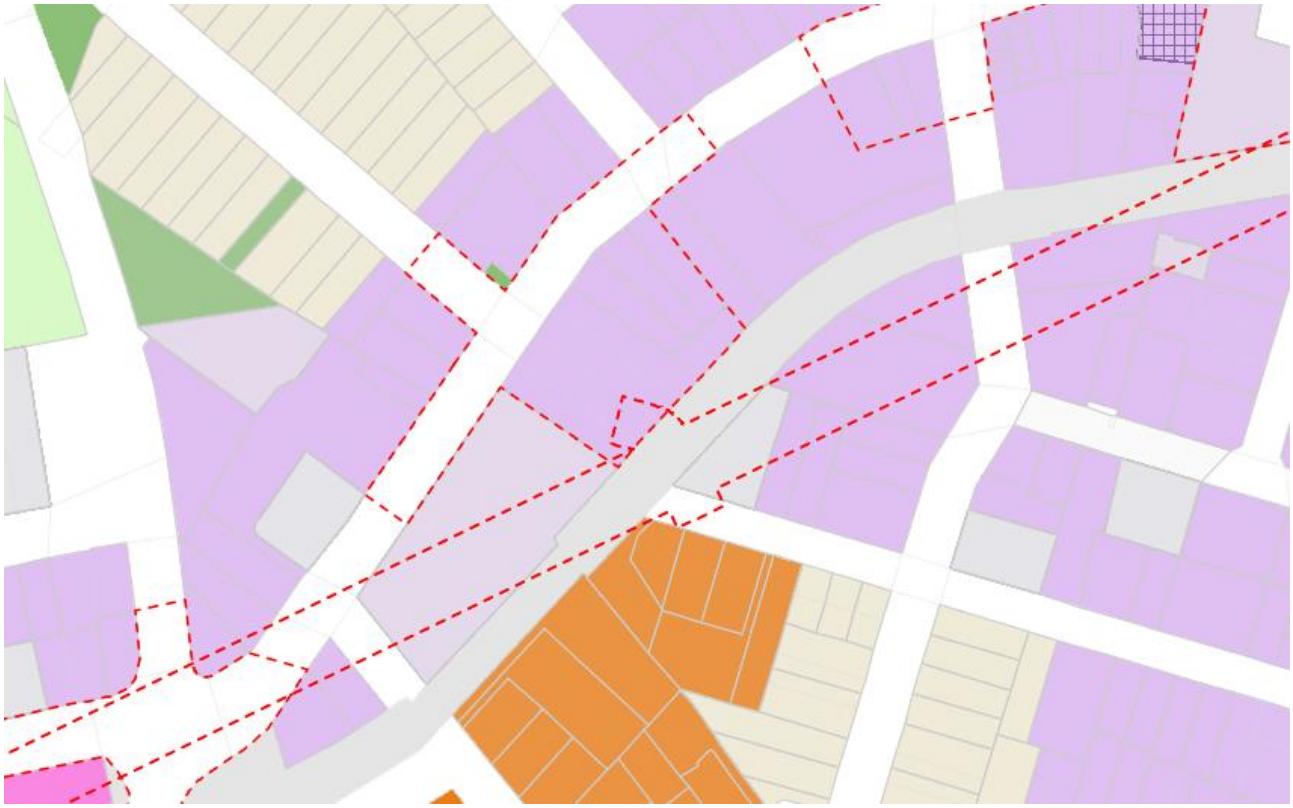

Figure 5 AUP layers and zoning New North Road
Table 5 New North Road Shaft NoR statutory environment

Name	Description	Comment
Current Zoning	Business – Mixed Use Zone	
	Road	
Precincts	N/a	N/a
Controls	Height Variation Control – Newton, 21m	
	Macroinvertebrate Community Index	
Overlays	Natural Resources: Quality Sensitive Aquifer Management Areas Overlay – Western Springs Volcanic Aquifer	
	Built Environment: Identified Growth Corridor Overlay	
	Arterial Road	
Designations	Designation 6300, North Auckland Railway Line from Portage Road, Otahuhu to Ross Road, Topuri, KiwiRail	
Regional Plan Controls and Overlays	N/a	N/a

Zoning within 800 m catchment	•	
Anticipated future zoning in 800 m catchment	•	
Other relevant considerations		

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operation phases of the Project as they relate to the three vent shafts.
This builds on the technical assessments included in Volume 3 and the Design and Construction Report in Appendix XX. Section X outlines the indicative methodology used for these technical assessments.

1. Traffic and transport

The Assessment of Transport Effects, included in Appendix xx of Volume 3, assesses the actual and potential effects of the construction and operations phases of the Project as they relate to effects on the traffic and transport. This section focuses on the transport effects specific to the vent shafts in their three separate locations. Further discussion on the route-wide transport effects is considered in Section xx.

1. Vernon Street Shafts

Key transport features within and adjacent to the Vernon Street shafts include:

Vernon Street Shaft

- **Public transport:** There are bus stops located along Victoria Street West, Wellesley Street West and Halsey Street. The closest train stations are located at the Britomart Train Station, at 1.3km to the north-east of the subject site.
- **Walking:** Victoria Park and the surrounding pathways on Victoria Street West form a dedicated shared path, with associated public amenities, including public toilets and a children's playground.
- **Cycling:** There is a protected cycleway along Victoria Street West (the Victoria Street Cycleway)
- **Roading network:** Wellesley Street West, Victoria Street West and Halsey Street are all classified as Arterial Roads within the AUP. The surrounding road network is all 30km/h speed limited.
- **Parking:** There are multiple parking locations located to the west of the site, off Sale Street, at the junction of Union Street, as well as within Victoria Park Marker to the north-west of the site.

1. Positive effects

In addition to the route-wide positive effects in Section xx, the Vernon Street Shafts will provide:

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Sectionxx. The proposed works at the Vernon Street Shafts will potentially result in the following adverse construction effects:

- **Public transport (bus):** Two-way bus movement will be maintained through and prioritised above the road diversions along Halsey Street and Victoria Street West to Wellesley Street West.
- **Public Transport (heavy rail):** N/a
- **Roading network:** It is anticipated that the construction will require a temporary closure of Wellesley Street West. Further, some traffic lanes will be open in stages whilst the cut and cover continues along Wellesley Street West,
- **Walking**: Through the cut and cover, adit and shaft excavation, may result in temporary effects on pedestrians along Wellesley Street West having to be redirected to the other side of the road.
- **Cycling:** Cyclists will be required to adhere to any road closures/traffic diversions through different stages of the construction of the shaft.

- **Private vehicles:** There is potential for the need to close the Halsey Street, Wellesley Street West and Victoria Street West intersection for periods during construction, which may result in detours (however, it is noted that by this time, Wellesley Street to the east, between Mayoral Drive and Queen Street will be limited to bus and local access only).
- **Parking:** Some carparks along Wellesley Street West in the vicinity of the shaft site will be temporarily removed during construction.
- **Emergency services:** Emergency vehicles travelling to and around the immediate vicinity of the site may experience delays relating to construction traffic
- **Freight:** Any freight that travels along Wellesley Street West, Halsey Street, Sale Street, Victoria Street West and Vernon Street will experience potential delays resulting from increased traffic congestion and road closures alike those private vehicles.

3. Construction mitigation

Mitigation of traffic and transport effects common to the whole Project is discussed in Sectionxx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP). In addition, for mitigation of construction traffic and transport effects specific to the Vernon Street Shafts, the Assessment of Transport Effects recommends the following for inclusion in a CTMP:

- **Public transport (bus):** Any partial closure of Wellesley Street West will retain two-way bus movements throughout construction.
- **Public transport (heavy rail):** N/a
- **Walking:** Any active mode transport will be retained through construction along Wellesley Street West, Vernon Street, Sale Street and Victoria Street West.
- **Cycling:** N/a
- **Roading network:** All construction access will be from Wellesley Street West
- **Private vehicles:** N/a
- **Parking and loading:** N/a
- **Emergency services:** N/a

4. Operational effects

There are no adverse operational effects on transport from Kingsland Station NoR. Following construction at the station the existing road layout will be reinstated.

2. Burton Street Shafts

Key transport features within and adjacent to the Burton Street shafts include:

Vernon Street Shaft

- **Public transport (bus):**
- **Public transport (heavy rail):** the closest train station is located in Grafton, 680m to the east of the proposed shaft location.
- **Walking:** There are footpaths on both sides of Carlton Gore Road, and the Grafton Road overbridge across State Highway 1. Burton Street changes to a single, narrow footpath on the southern side after the Madeira Place intersection
- **Cycling:** The Grafton Gully Cycleway is an off-road cycleway that runs parallel to Grafton Road, on the north eastern side of SH16. There are unbuffered cycle lanes on Grafton Road between Wellesley Street East, and the Grafton Bridge/Park Road. There is no cycleway that extends across the SH1 overbridge toward Burton Street.
- **Roading network:** Grafton Road is an arterial road.
- **Parking and loading:** There is an existing parking facility located on Burton Street, and there are several on-street carparks.

5. Positive effects

In addition to the route-wide positive effects in Section xx, the Burton Street Shafts will provide:

-

6. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section xx. The proposed works at the Burton Street Shafts will potentially result in the following adverse construction effects:

- **Public transport (bus):** N/a
- **Public transport (heavy rail):** N/a
- **Roading network:** The diversion island on Burton Street will need to be reconfigured to allow for construction traffic into and out of Burton Street.

- **Walking:** Burton Street has limited pedestrian connectivity, and functionality that provides for connection for local residents and businesses. This will be retained throughout construction.
- **Cycling:** N/a
- **Private vehicles:** Increased heavy traffic movements at the site will see a marginal increase in travel times by general traffic during construction
- **Parking and loading:** The construction traffic will implement and utilise a loading bay along Burton Street to operate as a laydown area and for concrete pumping.
- **Emergency services:** Emergency vehicles travelling to and around the immediate vicinity of the site may experience delays relating to construction traffic.

7. Construction mitigation

Mitigation of traffic and transport effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP). In addition, for mitigation of construction traffic and transport effects specific to the Burton Street Shafts, the Assessment of Transport Effects recommends the following for inclusion in a CTMP:

- **Public transport:** There are no bus routes along Burton Street, therefore any construction works will not be affected.
- **Walking:** No walking facilities are anticipated to be affected during construction.
- **Cycling**: No cycling facilities are anticipated to be affected during construction.
- **Roading network:** General construction traffic movements will be managed to/from the site from SH1/SH16 along Grafton Road and carried out at a time when the Universities station is not under construction.
- **Parking: I**t is considered that there is adequate alternative parking locations around Grafton, that no mitigation is required for the loss of parking spaces.
- **Emergency services** Provision for emergency services in and around the construction site will be made, this will be discussed with emergency service providers prior to construction being undertaken.

8. Operational effects

There are no adverse operational effects on transport from the Burton Road shaft. Following construction at the station the existing road layout will be reinstated

3. New North Road Shafts

Key transport features within and adjacent to the New North Road shafts include:

Vernon Street Shaft

- **Public transport:**
- **Walking:**
- **Cycling:**
- **Roading network:**
- **Parking:**

9. Positive effects

In addition to the route-wide positive effects in Section xx, the New North Road Shafts will provide:

10. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Sectionxx. The proposed works at the New North Road Shafts will potentially result in the following adverse construction effects:

- **Public transport**
- **Walking**
- **Cycling**
- **Private vehicles**
- **Parking**
- **Emergency services**

11. Construction mitigation

Mitigation of traffic and transport effects common to the whole Project is discussed in Sectionxx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP). In addition, for mitigation of construction traffic and transport effects specific to the New North

Road Shafts, the Assessment of Transport Effects recommends the following for inclusion in a CTMP:

- **Public transport**
- **Walking**
- **Cycling**
- **Private vehicles**
- **Parking**
- **Emergency services**

12. Operational effects

TBC on the operational effects.

4. Conclusion on traffic and transport effects

Based on the assessments above, the Assessment of Transport Effects in Volume 3, Appendix xx and the proposed mitigation, the actual and potential traffic effects associated with the Project will be appropriately managed.

5. Urban design, landscape and visual

The Assessment of Landscape and Visual Effects, included in Appendix xx of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the (natural and urban) landscape (including visual effects). This section focusses on the landscape and visual effects specific to the shaft locations along the Project alignment. Further discussion on the route-wide landscape and visual effects is considered in Section xx.

1. Vernon Street Shaft

The natural landscape of the Vernon Street shaft consists of the bottom of the valley opening to Victoria Park, which was once the foreshore of Freemans Bay. The area consists of reclaimed land, and an old landfill (Victoria Park).

The urban form of the Vernon Street shaft location consists of a converging intersection with six streets that is a predominantly developed area with multi-level commercial and mixed use developments in a grid block structure.

1. Positive effects

In addition to the route-wide positive effects outlined in Section xx, this shaft will provide:

- The location of the shaft has been chosen strategically to enable future development to have frontage on parts of Vernon Street, Wellesley Street West and Sale Street;
- The proposed shaft building will integrate with surrounding buildings as it will appear as another commercial type premise.

2. Construction effects

The construction works within the Vernon Street shaft will involve typical construction activity and will not result in any additional effects on the landscape and urban environment than those discussed in Section xx.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

-

2. Burton Street shaft

The natural landscape of the Burton Street shaft consists of the convergence of the Khyber Pass Road, Symonds Street and Grafton Road ridges converge. There are surrounding areas that are extensively revegetated and in weedy vegetation (along the motorway corridor)between the site and both the motorway and Grafton Road that provides a level of screening and buffering.

The urban landscape consists predominantly of the edge of the motorway corridor. Burton Street is a dead end road that has a range of on street and paid parking facilities, as well as medium density commercial and residential developments.

1. Positive effects

There are no additional positive effects relevant to this NoR, above those discussed in Section XX.

2. Construction effects

The construction works within the Burton Street shaft will involve typical construction activity and will not result in any additional effects on the landscape and urban environment than those discussed in Section xx.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

3. New North Road shaft

The natural landscape at the New North Road shaft site sits at the edge of Eden Terrace and Mount Eden. It falls near the watershed of the Waiorea/Motions Creek catchment, but is not located near any natural streams.

The urban environment consists of light industrial buildings and forecourt vehicle parking providing for showrooms, warehouse retailing and vehicle servicing. The area has experienced a high level of intensification and redevelopment.

1. Positive effects

In addition to the route-wide positive effects outlined in Section xx, this shaft will provide:

- An opportunity for the integration of future development on the front part of the site to reinstate spatial definition and activate the street frontage.

2. Construction effects

The construction works within the New North Road shaft will involve typical construction activity and will not result in any additional effects on the landscape and urban environment than those discussed in Section xx.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

4. Conclusion of urban design, landscape and visual effects

Based on the assessment above, the Landscape and Visual Assessment in Volume 3, Appendix xx and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

6. Social

[ASSESSMENT OF POTENTIAL ADVERSE SOCIAL IMPACT EFFECTS TO BE PROVIDED]

7. Cultural

[ASSESSMENT OF CULTURAL EFFECTS TO BE PROVIDED]

8. Built heritage

The Built Heritage Assessment, included in Appendix xx of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the shafts.

1. Vernon Street shafts

9. Archaeology

The Assessment of Archaeological Effects, included in Appendix xx of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to the shafts. Further discussion on the route-wide effects on archaeology is considered in Section xx.

1. Vernon Street shafts

In pre-European history in the Auckland City Centre the Vernon Street shaft was considered foreshore and a prominent Māori settlement for collecting cockles and drying of fish and sharks.
In the 19th Century the area to the north was identified as land for reclamation land for settlement and this began in 1873, continuing in to the mid-20th century. The surrounding area was subject to a wide range of industrial and commercial activities, whilst the subject shaft site has always been considered road reserve.
There are two sites that have been identified as heritage features within 200m of the Vernon Street shaft site, as shown in Figure x. These features consist of:

- Hardinge to Patteson Street Reclaimation (R11/3169)
- Lamp stands (CHI item 2632, Scheduled extent 1920).

2. Burton Street shaft

Pre-European history the location of the Burton Street shaft was located at the head of Waipārūrū / Grafton Gully. Māori settlement was focused on both sides of the gully.
Throughout the 19th and 20th Century the Grafton Gully did not experience the level of development that other gullys around Auckland experienced, this was predominantly due to the landscape. There are no survey plans that show any structures on the Burton Street shaft location prior to 1900. By the 1940's several structures were established, however these have been demolished.
No known archaeology within the Burton Street shaft has been identified as such no further assessment of archaeology is required with respect to the Burton Street shaft. .

3. New North Road shaft

Pre-European Māori in Eden Terrace provided settlements to hapu under the mana of Waiohua, before Ngāti Whātua established claim to the area. With the volcanic cones providing occupation spot for defence and the surrounding soils for cultivation.
In 19th and 20th Century settlements the subject area was identified as location of the new Mount Albert Bowling Club area that was established in 1901 and in place till it was redeveloped in 1956 in to the existing Alsco building.
No known archaeology within the New North Road shaft has been identified as such no further assessment of archaeology is required with respect to the New North Road shaft. .

10. Arboriculture

11. Open Space

[ASSESSMENT OF POTENTIAL ADVERSE OPEN SPACE EFFECTS TO BE PROVIDED]

12. Flooding

The Hydrological Assessment, included in Appendix xx of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to flooding and hydrology. This section focuses on the hydrology and flooding effects specific to the shafts. Further discussion on the route-wide hydrological effects is considered in Section xx.

1. Vernon Street shaft

The Vernon Street shaft is located within the Freemans Bay stormwater catchment.
There are no overland flow paths, flood plains or watercourses within the Vernon Street shaft location.

2. Burton Street shaft

The Burton Street shaft is within the Stanley stormwater catchment, the key hydrological features, inclusive of flooding are listed below and shown in Figure xx:

- Overland flow path that runs through the Burton Street shaft site.

3. New North Road shaft

The New North Road shaft is located in the Motions stormwater catchment. The key hydrological features, inclusive of flooding are listed below and shown in Figure xx below:

- Flood plain covering the northern side of the area of the New North Road shaft location;
- One overland flow path through the New North Road shaft location;
- Two flood prone areas adjacent to the New North Road shaft location.

13. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phase of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to the shafts. Further discussion on the route-wide construction noise and vibration effects is considered in Section XX.

1. Vernon Street shaft

2. Burton Street shaft

3. New North Road shaft

1. Notice of Requirements

1. Surface Alignment #1 NoRX

This section:

- Describes NoR 11 – Stoddard Road to Manukau Harbour Alignment (section 1.2)
- Summarises the existing and receiving environment (section 1.3)
- Assesses effects and outlines mitigation (section 1.4)

2. NoR description

The Surface Rail (Wesley to Manukau Harbour) NoR 11 currently runs from approximately 64 Stoddard Road to the Manukau Harbour, where the alignment will cross the harbour directly adjacent to the SH20 bridge. Figure 1 shows an overview of the proposed NoR boundary.

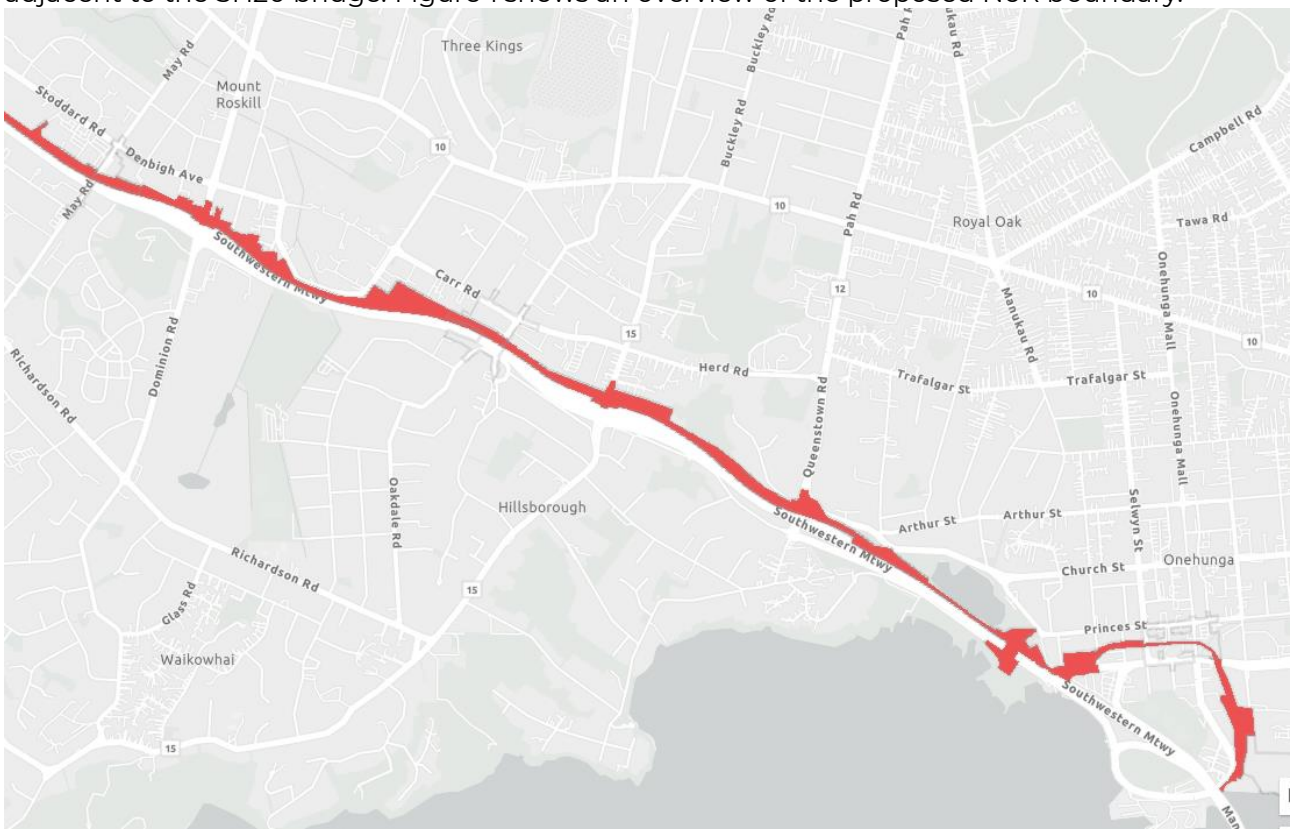

Figure 1 Stoddard Road to Manukau Harbour Alignment NoR Plan

For ease of description, the alignment has been split in to XX sections. The following sections identify each section and description:

- Starting point of Stoddard Road to Puketepapa (inclusive) (Figure 2)
- Puketepapa to Hayr Road (inclusive) (Figure 3)
- Hayr Road to Onehunga (inclusive) (Figure 4)
- Onehunga to the Manukau Harbour (Figure 5)

The first section of the surface alignment begins at XXX and ends at the current Puketepapa Station (NoR 12). Figure 2 shows this section of the alignment.

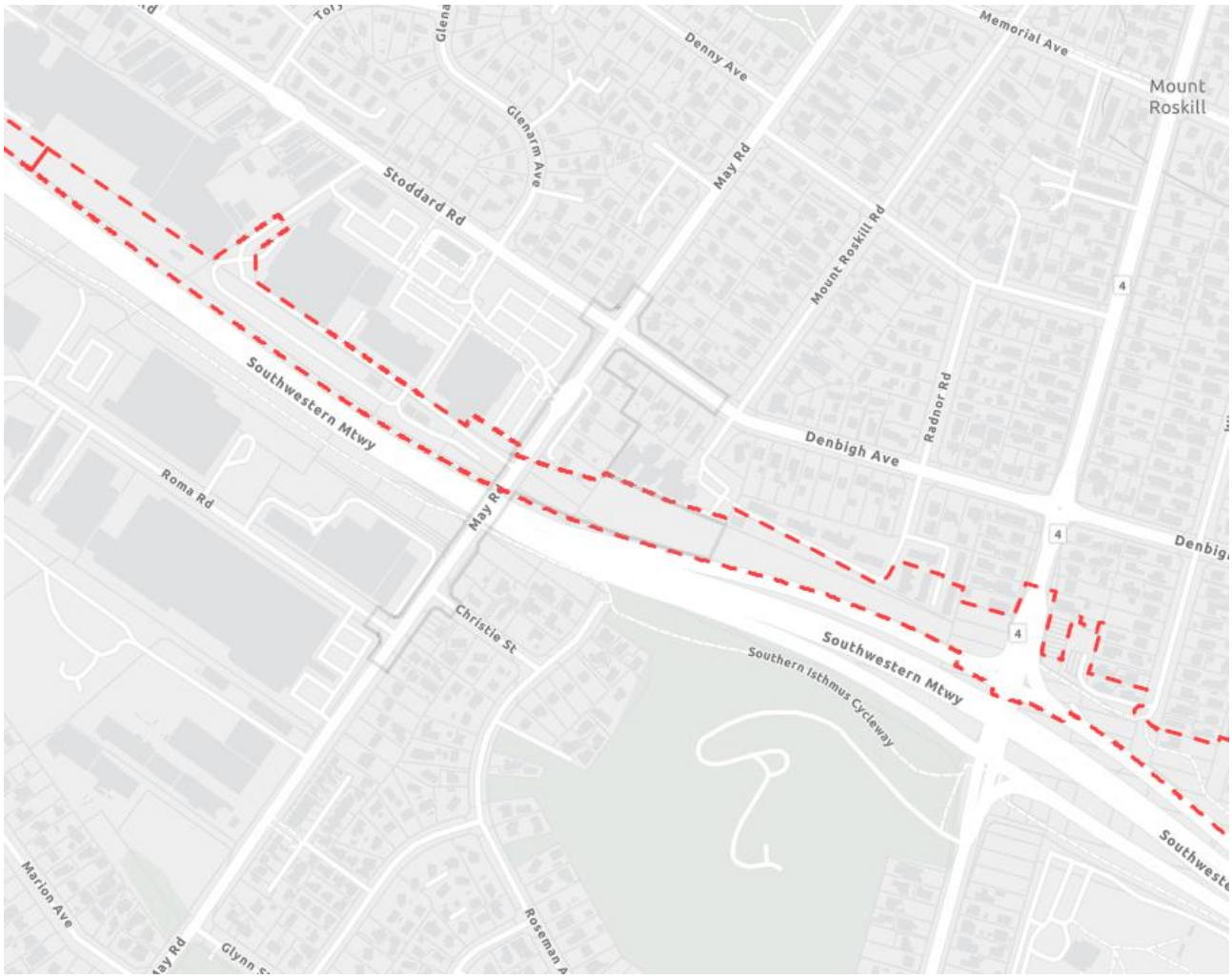

Figure 2 Stoddard Road to Puketepapa section of alignment

The second section of the surface rail alignment begins at the western boundary or Puketepapa Station (NoR 12) and ends at Hayr Road Station (NoR12). Figure 3 shows this section of the alignment.

Figure 3 Puketepapa to Hayr Road section of alignment

The third section of the surface alignment begins at the western boundary of Hayr Road Station (NoR 13) and ends at Onehunga Station (NoR 14). Figure 4 shows this section of the alignment.

Figure 4 Hayr Road to Onehunga section of alignment

The final section of the surface alignment begins at the western boundary of Onehunga Station (NoR 14) an ends at the proposed Manukau Harbour Crossing (inclusive of the Depot section of alignment NoR 15). Figure 5 shows this section of the alignment.

Figure 5 Onehunga to Manukau Harbour section of alignment

The alignment from XX to the Manukau Harbour Crossing will be surface rail and will be a variety of alignment type ranging from at grade, trench and surface. Table 1 below describes the alignment as it relates to each of these sections and these are shown on Drawings XXX to XXX.

	XX to Puketepapa	Puketepapa (inclusive) to Hayr Road	Hayr Road (inclusive) to Onehunga	Onehunga (inclusive) to Manukau Harbour
Alignment type	• At grade • Trench up to Puketepapa Station	• Trenching through Puketepapa Station • At grade past Dominion Road up to approximately Hayr Road Station (NoR X) • Trenched up to Hayr Road Station	• Trench through Hayr Road station until past Hillsborough Road • Raise to viaduct within vegetation area up until Onehunga	• Viaduct

1. Construction methodology

Construction works for the Stoddard Road to the Manukau harbour includes three different types of alignment being at grade, trenched and viaducts. The typical construction methodology for each of these components is included in Sections 1.4.1 to 1.4.3 below.

1. Site preparation

Prior to works commencing initial site preparation will be undertaken. This will typically include:

- Installation of noise, vibration and/or settlement monitoring equipment (as required).
- Relocation or protection of utilities.
- Demolition and site clearance
- Establishment of offices, amenities, laydown areas, dewatering and sediment control systems

2. Duration and timing of works

The works are anticipated to generally be undertaken between 7 am – 6 pm, Monday to Saturday. Some night works will be required during construction which may involve closure of SH20. Where these works are required, relevant impacted parties (i.e. Waka Kotahi and local residents) will be notified and co-ordinated with.

3. Site access

The site access for the alignment will typically be via the SH20 shoulder, the station sites, and adjacent side streets where suitable.

4. Alignment construction

1. At grade (surface) alignments

The construction of the at-grade alignments will typically involve the following:

- Earthworks: clearance of land (inclusive of vegetation), excavation or filling of terrain dependant on the cut/fill balance required at each section, compaction of soil or rock to create a level and stable track foundation
- Track slab: precast concrete slabs will generally be laid along the alignment using a modular construction system. Where this is not possible, concrete slabs may be poured on site.
- Rail alignment and levelling: once track components are in place the rails are aligned and levelled to ensure smooth and safe rail operations
- Signalling and communication: signals , switches and other communication devices to operate train control systems will be installed
- Electrification: overhead catenary masts will be installed with overhead wires to supply power to trains

2. Trenched alignments

The proposed trenched alignments of range between 5 – 13 m. Earthworks for these sections will generally follow the following cut and cover construction methodology. This will involve:

- Excavation of trenched areas
- Where basalt is encountered, limited blasting may occur
- Propping, where required, across the excavation width
- Cover with roading alignment where required.

Additionally, where trenching is to occur within the KiwiRail designation (Designation XX), the trenches will be constructed to a size that may accommodate for this.

3. Viaduct alignments

The viaduct sections of the alignment will be founded on piled foundations. These piles will be generally constructed using the following method:

- Excavation with the bored piling rig;
- Reinforcing cages dropped into piled holes
- Concrete poured in place.
- Where basalt is present the following methods may be used:
    - Localised areas of blasting or breaking;
    - Down-the-Hole hammer piling

Viaduct piers will be based on a typical span of 30 m (with a maximum of 35 m). these will be constructed The construction of these will include:

- Reinforced concrete piers and headstocks will be constructed in-situ with approximately 2 m diameter piers (maximum pier height of 10 m
- Mobile cranes or a self-launching gantry will lift the precast viaduct beams
- In-situ concrete topping placed to the viduct deck and edge barriers installed

3. Existing environment

This section sets out the existing and receiving environment for XXX to Manuhau Harbour section of surface alignment (NoR 11). It builds on the assumptions outlined in Section XX. Tables X to X describe the surrounding area and features and relevant statutory considerations respectively for each section of the alignment.

Any property directly affected by this NoR is listed in Appendix X to NoRX Form 18.

1. Notice of Requirements

1. Introduction

This section:

- Describes NoR 12 – Puketāpapa/Mt Roskill Station (section 13.12.2)
- Summarises the existing and receiving environment (section 13.12.3)
- Assesses effects and outlines mitigation (section 13.12.4)

2. Puketāpapa/Mt Roskill Station NoR description

The Puketāpapa/Mt Roskill NoR is proposed to be an above ground station, and is located adjacent to the May Road overbridge and north of State Highway 20 ("SH20"). The proposed station footprint is situated within residential properties and alongside the SH20 corridor. The Puketāpapa/Mt Roskill maunga is located to the southeast of the NoR.

Figure 1~~Figure 1~~ shows the Puketāpapa/Mt Roskill Station and NoR boundary. Figure 2 shows the NoR boundary on aerial imagery (outlined in red). Table 1~~Table 1~~ summarises the Puketāpapa/Mt Roskill Station NoR's permanent features and temporary construction works.

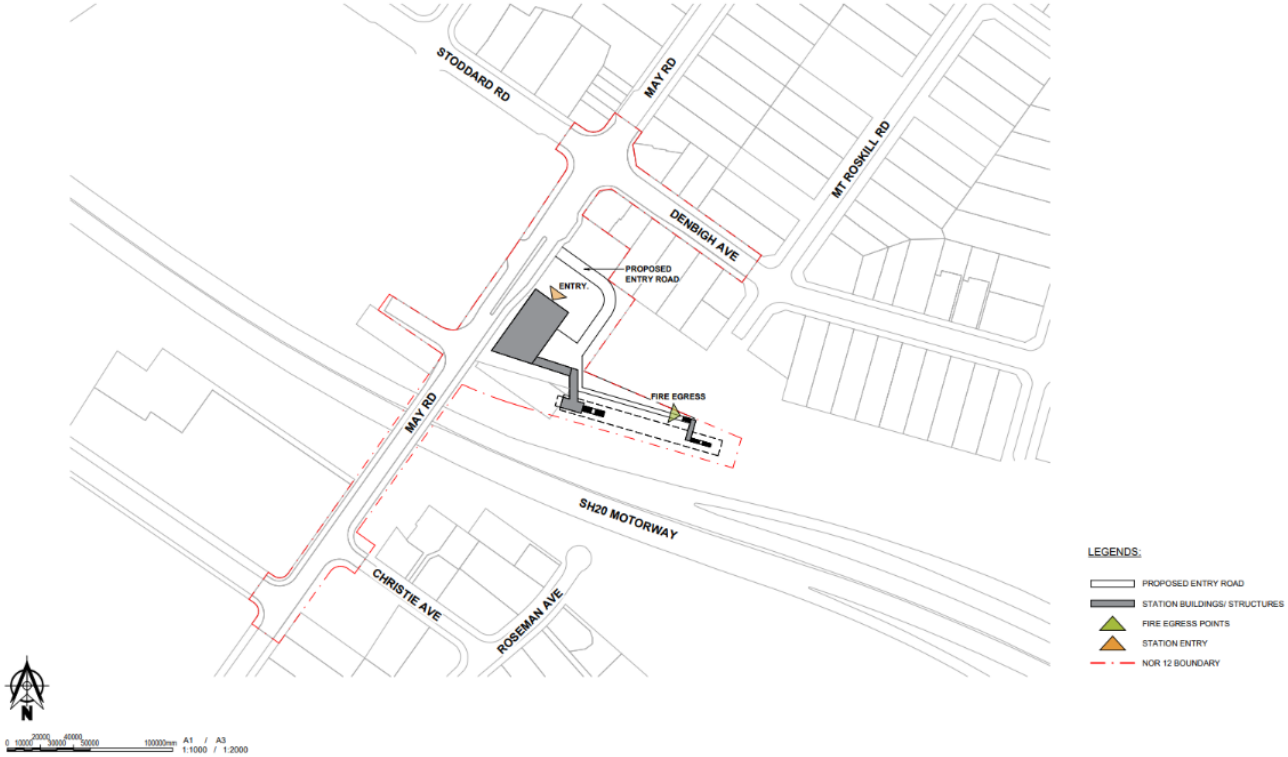

Figure 1: Puketāpapa/Mt Roskill Station location plan

Figure 2: Puketāpapa/Mt Roskill NoR boundary on aerial imagery

Table 1: Puketāpapa /Mt Roskill Station NoR XX description

Permanent Features	
Station	• Station is located at-grade on the north-east of the May Road Bridge and north of SH20. • The primary station entrance is situated at the station forecourt off May Road. • There is a staff entrance located at the eastern rear end of the station. • The station building is connected to an island platform via an overbridge towards the south-east.
Platforms	• Aboveground island platform located parallel to northern portion of SH20. • Platform connects to station via an overbridge on the northern end of the platform • Access to the platform is provided via vertical transport such as stairs, lifts and cycling ramps. • Fire egress point located on eastern end of the platform.
Public Realm	• Station entrance plaza located directly north of the Station and facing May Road, which provides opportunities for outdoor seating and increased tree canopy coverage.
Road and Streetscape	• Potential bus stops along May Road and Denbigh Road • Potential increase in tree canopy coverage along May Road, Stoddard Road and Denbigh Avenue.
Parking and Loading	• Cycle parking, bus bays and kiss and ride bays north of station forecourt. • Maintenance and refuse bay ~~(1 total)~~ to be provided and shared.
Other new infrastructure	• New cycle lane connection from Station to shared path along May Road.

Anticipated Patronage	• Low
Anticipated Construction Works	
Construction Methodology	Refer AEE Section 6 and DCR Section XX for more detail. At a high level, the construction activities will include: • Station construction zone to be used as a central hub for constructing the adjacent sections of rail corridor; • Undertake modifications to May Road bridge. A full closure of SH20 could be required which means there may be nightworks; • Reconstruct Citrus Grove bridge to New World supermarket; • Construct new station platform and~~&~~ structures; and • Streetscapes upgrades.
Access to the site	• Primary access for heavy vehicles provided via the SH20 shoulder. Access from the local roads such as May Road and Denbigh Avenue will also be provided.
~~Other~~	• ~~N/A~~

3. Description of the environment

This section sets out the existing and receiving environment for the Puketāpapa/Mt Roskill Station NoR. It applies the parameters and assumptions outlined in Section XX. Table 2 describes the surrounding area and features. Any property directly affected by this NoR is listed in NoR XX Form 18.

Table 2: Existing environment description

Feature	Description
Current land use	The land use towards the east of May Road, including part of the proposed station footprint consist of low-density residential dwellings. Land-use towards the west of May Road and north of SH20 consist of commercial and retail uses. Industrial development is located south of SH20 and surrounding Roma Road. There is a retirement village and hospital to the east of the proposed station location.
~~Phsyical~~Physical	
Transport	• SH20 runs horizontally south of the Puketāpapa/Mt Roskill station footprint. • Stoddard Road and Denbigh Avenue are classified as arterials and May Road is classified as a primary collector road. • Pedestrian footpaths and bus services are located along May Road, Denbigh Avenue and Stoddard Road. • Shared use paths parallel to SH20 and Dominion Road north of SH20.
Infrastructure	• Distribution substation located north of NoR footprint; • Overhead powerlines above May Road • Vector and Chorus infrastructure within the NoR footprint • Local watermain, wastewater and stormwater infrastructure within subsurface around station.
Community Facilities and Key Attractions	• Gracedale Retirement Village and Hospital (partially within NoR extent) • Educational facilities: Mount Roskill Intermediate, Mount Roskill Grammar School (approx. 1.5km to east), Mount Roskill Primary School (approx. 500m to east), Wesley Intermediate School (approx. 500m to west), Little Pearls Educare Centre (approx. 100m to west). • Sport and recreation facilities: Keith Hay Park (approx. 1km to east), Eden Roskill Softball Club (approx. 500m to north-west), Lovelock Track (approx. 700m to west), Akarana Golf Club (approx. 600m east), Mount Roskill War Memorial Park (approx. 200m to north), Mount Roskill Grammar Turf (approx. 500m to east). • Nearest local centre is the Mount Roskill commercial/shopping centre located directly west of May Road.

	• Religious and cultural facilities: Agape International Ministries Church (approx. 500m to north-east), Free Wesleyan Church of Tonga (approx. 400m to west), Mt Roskill Baptist Church (approx. 600m to north), Congregational Church of Samoa (approx. 550m to east), Church of Christ NZ (approx. 600m to north-east), The Church of Pentecost New Zealand (approx.. 2.5km to north).
Sensitive noise receivers	• Gracedale Retirement Village and Hospital – 68 Mount Roskill Road • Residential dwellings along May Road/Denbigh Road not yet identified in CNV report
Historic heritage	• Special Character Area Overlay – 70 May Road
Archaeology	• Puketāpapa / Mount Roskill (R11/19)
Cultural	TBC
Natural	
Topography	• The site is generally flat, with the exception of May Road which is bridge over SH20.
Geology	• TBC
Catchment	• The site is located entirely within the Oakley stormwater catchment.
Flooding and hydrology	• There are overland flowpaths and floodplain areas located along SH20 to the south of the station.
Trees and vegetation	• The site has a limited number of trees. Two small street trees are present along Denbeigh Avenue, and there are a row of native trees near the vehicle access to 74-80 May Road. Native tree are present along the Southwestern Motorway, reaching towards the edge of May Road. Sporadic trees scattered around the large grassed area between the motorway and the retirement village.

Table 3: Puketāpapa / Mt Roskill Station NoR outlined in red - AUP Statutory layers (Source: Auckland Council, GeoMaps)

Figure X and Table 3 identify the relevant statutory considerations within the Puketāpapa/Mt Roskill Station NoR footprint.

Figure 3: XXXX

Name	Description	Comment
Current NoR zoning	Strategic Transport Corridor Zone	Applies the properties directly adjoining the SH20 corridor.
	Road	Applies to all local roads within the NoR boundary.
	Residential – Mixed Housing Urban Zone	Applies to properties adjoining local roads.
	Residential – Single House Zone	Applies to properties adjoining local roads.
	Business – General Business Zone	Applies to portion of 53 May Road within the NoR boundary.
Precincts	NA	NA
Overlays	Natural Resources: Quality-Sensitive Aquifer Management Areas Overlay – Auckland Isthmus Volcanic	Applies to the entire NoR area.
	Natural Heritage: Regionally Significant Volcanic Viewshafts And Height Sensitive Areas Overlay – R1, Mount Roskill, Viewshafts	Applies to southern portion of the NoR, including part of the station footprint.
	Natural Heritage: Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay – R2, Mount Roskill, Viewshafts	Applies to small extent of eastern portion of the NoR.

	Natural Heritage: Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay – Mount Roskill, Height Sensitive Areas	Applies to majority of NoR, excluding May Road south of SH20 and Denbigh Avenue.
	Historic Heritage and Special Character: Special Character Areas Overlay Residential and Business – Mt Roskill, Residential Isthmus B	Applies to group of properties along May Road, Denbigh Avenue and Mount Roskill Road.
Controls	Macroinvertebrate Community Index – Urban	Applies to the entire NoR area.
Designations	Airspace Restriction Designation – ID 1102, Protection of aeronautical functions – obstacle limitation surfaces, Auckland International Airport Ltd	Applies to the entire NoR area.
	Designation 6303 – Avondale Southdown Railway Line, Designations, KiwiRail	Applies to northern portion of the Strategic Transport Corridor/SH20.
	Designation 6731 – Extension of State Highway 20 from Hillsborough Road to Maioro Street: To undertake maintenance, operation, use and improvement to the State Highway network, Designations, New Zealand Transport Agency	Applies to the Strategic Transport Corridor/SH20 and part of May Road north the motorway.
	Designation 6729 – State Highway 20 and Railway – Mt Roskill, Designations, New Zealand Transport Agency	Applies to the Strategic Transport Corridor/SH20 and excludes May Road.
Zoning within 800m catchment	• Strategic Transport Corridor Zone • Residential – Mixed Housing Urban Zone • Residential – Single Housing Zone • Business – Mixed Use Zone • Business – General Business Zone • Open Space – Conservation Zone	
Anticipated future zoning within 800m catchment (construction, operation)	• Strategic Transport Corridor Zone • Residential – Terrace Housing and Apartment Building Zone	

	• Residential – Single House Zone • Open Space – Conservation	
Other relevant considerations	N/A	N/A

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operation phases of the Project as they relate to the Puketāpapa/Mt Roskill Station NoR.

This builds on the technical assessments included in Volume 3 and the Design and Construction Report in Appendix XX. Section XX outlines the indicative construction methodology used for these assessments.

1. Traffic and Transport

The Assessment of Transport Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project. This section focuses on the transport effects specific to Puketāpapa/Mt Roskill Station NoR. Further discussion on the route-wide transport effects is considered in Section XX.

The Puketāpapa/Mt Roskill Station footprint is located north of SH20, which runs horizontally through the middle of the NoR area. Stoddard Road and Denbigh Avenue are classified as arterials, while May Road is considered a primary collector road. Pedestrian footpaths and bus services are available along May Road, Denbigh Avenue, and Stoddard Road. Furthermore, there are shared use paths that run parallel to SH20 and Dominion Road, specifically to the north of SH20.

Key transport features within and adjacent to the Puketāpapa/Mt Roskill Station NoR include:

- **Public transport**: Numerous bus stops and routes on May Road, Stoddard Road/Denbigh Avenue, and Dominion Road. This includes ~~10~~ ten bus stops within a 400-met~~e~~re distance from the station. Although there are currently no bus priority lanes in the area, future bus route changes are expected after the implementation of the City Rail Link, including additional peak-hour bus routes. There is no existing rail network or train station nearby;
- **Walking**: Existing footpaths serving the residential and retail areas, although pedestrian connectivity over May Road is limited, with signalised pedestrian crossings only available at the May Road/Stoddard Road/Denbigh Avenue intersection and the May Road/Richardson Road intersection. There is no connection from May Road to the Southern Isthmus Cycleway shared path.
- **Cycling**: No on-road cycle lanes but features nearby shared paths, such as the Southern Isthmus Cycleway and Oakley Creek shared path.
- **Roading network**: Dominion Road is classified as a primary arterial roads under the Strategic Future connect. Weekday traffic and peak hour traffic movements along Dominion Road is 17,130 and 1,415 respectively. May Road and Denbigh Road are not classified.
- **Parking**: Parking within the vicinity contains public on-road parking and private car parking facilities.

The Puketāpapa/Mt Roskill Station will form part of the future light rail network, improving connectivity along the alignment.

1. Positive Effects

In addition to the route-wide positive effects outlined in Section XX, Puketāpapa/Mt Roskill station will provide:

- An increased walkable catchment to public transport around Puketāpapa/Mt Roskill Station, including a potential bus interchange precinct near local roads; and
- Provision for improved connections with existing public transport at the site, including in bus stops.

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section XX. The proposed works at the Puketāpapa/Mt Roskill Station NoR will potentially result in the following adverse construction traffic effects:

- **Public transport (bus services)**: Buses may experience delays due to bridge modifications on May Road and increased construction vehicles.
- **Cycling**: Ce~~e~~yclists may need to navigate a potentially congested local network and be mindful of increased truck traffic.
- **Private vehicles**: Traffic delays on local roads due to increased construction vehicle traffic, leading to disruptions and longer travel times
- **Emergency services**: Road closures, particularly those occurring at night on SH20, may affect the ability of emergency service providers to travel and respond promptly.
- **Freight**: Temporary closure of the access ramp from May Road bridge will disrupt vehicle access to multiple businesses, including New World Mt Roskill Supermarket, The Warehouse, Snap Fitness, Coffee Club, ANZ, Burger Fuel, and the Mad Butcher.

3. Construction m~~M~~itigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP). In addition, for mitigation of traffic and transport effects specific to the Puketāpapa/Mt Roskill Station NoR the Assessment of Transport Effects recommends the following for inclusion in a CTMP:

- **Walking**: Active mode trips on May Road will enabled during the construction period.
- **Roading network**: Direct access to the site from SH20 and traffic movements along the May Road Bridge will be maintained. ~~Adequate~~Adequate notice could be given to relevant stakeholders if normal traffic flow ~~can not~~cannot be maintained. Access to New World Mount Roskill Supermarket and ~~neighboring~~neighbouring businesses should be maintained.
- **Cycling**: Active mode trips on May Road will enabled during the construction period.

4. Operational effects

There are no adverse operational effects on transport from Puketāpapa/Mt Roskill Station NoR. Following construction at the station the existing road layout will be reinstated and bus routes on May Road, Stoddard Road and Denbigh Avenue will be replaced.

5. Conclusion of traffic and transport effects

Based on the assessment above and the proposed mitigation, the Assessment of Transport Effects in Volume 3 Appendix XX and the proposed mitigation, the actual and potential traffic and transport effects associated with the Project will be appropriately managed.

2. Landscape and Visual

The Assessment of Landscape and Visual Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the (natural and urban) landscape (including visual effects). This section focuses on the landscape and visual effects specific to the Puketāpapa/Mt Roskill Station NoR. Further discussion on the route-wide landscape and visual effects is considered in Section XX.
The urban form within Puketāpapa/Mt Roskill Station NoR is dominated by SH20, which is located directly south of the proposed station building. Additionally, the May Road bridge, which is slightly elevated above the station towards the west. Local roads and residential properties along May Road, Stoddard Road, and Denbigh Avenue also form key elements to the urban form.
With regard to natural landscape, the Puketāpapa/Mt Roskill Station NoR is located at the toe of Puketāpapa/Pukewīwī/Mount Roskill and borders the middle basin of Te Auaunga/Oakley Creek.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, this station will provide:

- The proposed plaza directly north of the proposed station building will provide a high-quality public realm space.

2. Construction effects

There is the potential for adverse visual adverse effects within the Puketāpapa/Mt Roskill Station NoR ~~will adverse visual amenity effects~~ associated with typical construction activity, including property demolition, construction sites, and construction activity. Construction activities will

primarily in a depression beneath the May Road bridge, essentially buffering potential visual effects for most receivers, with the exception vehicles along SH20.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

The works within Puketāpapa/Mt Roskill Station NoR will result in a change in the urban form and natural landscape. These changes involve:

- Removal of residential properties on May Road (70, 74, 76, 78, 80 May Road), parts of the Gracedale Retirement Village (20 Denbigh Avenue), and part of the New World Mt Roskill supermarket site.

5. Permanent infrastructure mitigation measures

Mitigation of landscape and visual effects common to the whole Project is discussed in Section XX and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG ~~and CULDMP~~.

The location of the station building alongside the motorway and May Road overbridge effectively buffers potential adverse landscape and visual effects. In addition, for mitigation of landscape and visual effects specific to Puketāpapa/Mt Roskill Station, the Assessment of Landscape and Visual Effects recommends the following matters be recognised when undertaking the design of the Station:

- Design requirements to support the station's legibility as an ALR station from the surrounding road network.
- Design requirements to support access to the station with careful consideration of pedestrians and cyclists (e.g. wide footpaths, pedestrian crossings, cycling connections).
- Design requirements which recognise the cultural context of Puketāpapa and provides a frontage to May Road.

6. Conclusion of landscape and visual effects

Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Cultural

[TBC on cultural reporting]

4. Built Heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the enabling works, construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the Puketāpapa/Mt Roskill Station NoR .

The Puketāpapa/Mt Roskill Station NoR partially intersects ~~the~~ a ~~key~~ historic heritage feature listed below and shown in Figure 4 below:

- Special Character Area (SCA) Isthmus B Overlay – 70 May Road

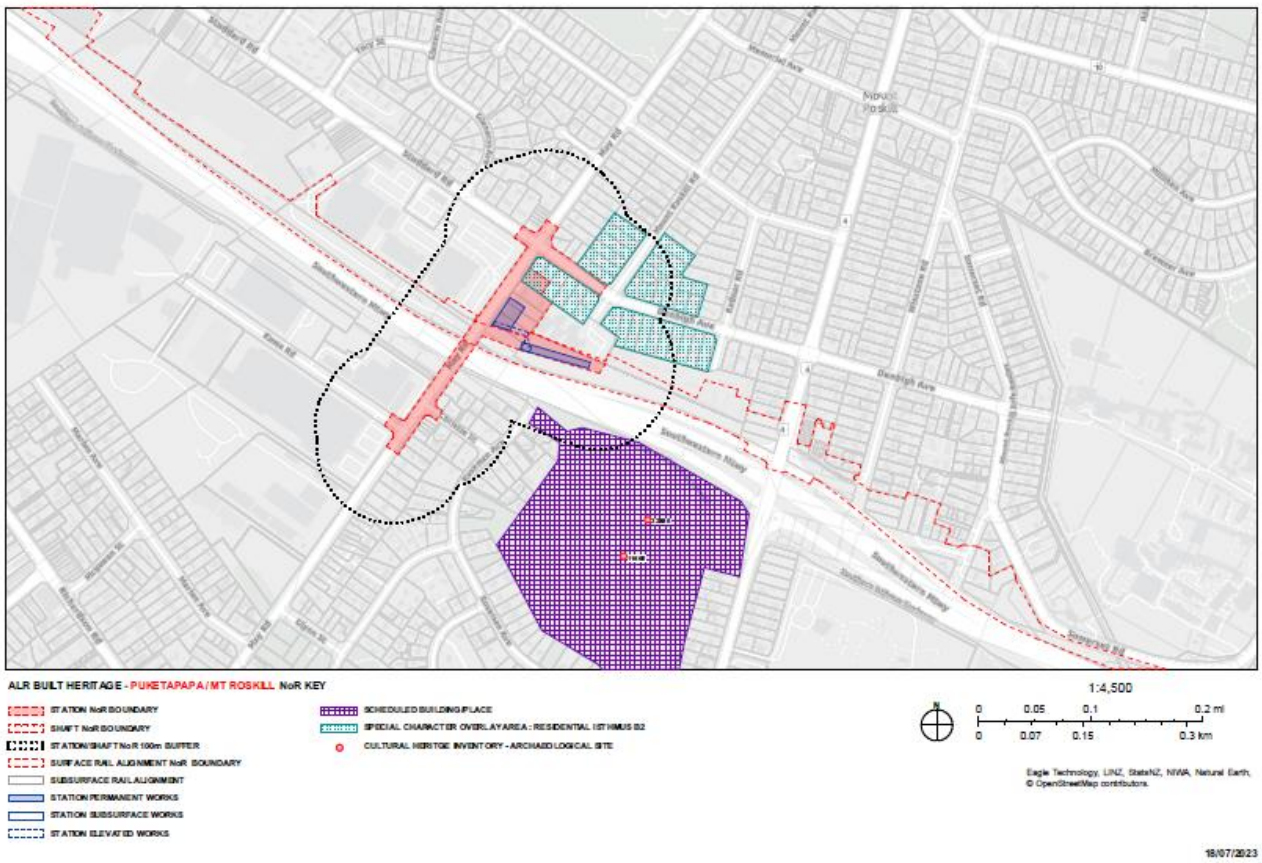

Figure ~~44~~ Historic heritage within Puketāpapa/Mt Roskill NoR

1. Positive effects

Section 10.1.X of this AEE outlines route wide positive effects. There are no positive built heritage effects relevant to this NoR.

2. Construction effects

The heritage building at 70 May Road will need to be removed for the construction of the station forecourt and allow for operation and maintenance of ALR assets. The construction works at Puketāpapa/Mt Roskill Station may also result in adverse built heritage effects on adjoining buildings under the SCA Isthmus B Overlay as follows:

- Reduction in amenity and aesthetic experience may diminish historic heritage values, such as aesthetic and historical context.
- Presence of construction works can indirectly impact other values, like social values and historical associations, by lowering visitor rates and inhibiting the ability to appreciate historical connections.
- Potential risk of accidental physical damage, including vehicle or plant movement and the accumulation of dust in downpipes.

3. Construction Mitigation measures

Mitigation of built heritage effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a ~~Historic Heritage Management Plan (H~~ABHMP~~)~~. In addition, for mitigation of built heritage effects specific to the Puketāpapa/Mt Roskill Station NoR the Built Heritage Assessment recommends the following for inclusion in a HHMP:

- Relocating to the building at 70 May Road to an alternative site if practicable; and
- Storing archival photographs of the building at 70 May Road prior to removal

4. Operational effects

There will be no operational effects on historic heritage, as all impacts will occur during construction.

5. Conclusion of historic heritage effects

Based on the assessment above, the Built Heritage Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on Built Heritage associated with the Project will be appropriately managed.

5. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to the Puketāpapa / Mount Roskill Station NoR. Further discussion on the route-wide archaeology effects is considered in Section XX.

The modern suburbs of Mount Albert and Mount Roskill are surrounded by maunga, including Puketāpapa / Mount Roskill, Ōwairaka / Mount Albert, and Te Tatua-a-Riukiuta / Three Kings. These maunga were sites of extensive pā construction. Ōwairaka means 'the place of Wairaka' and is also associated with Wairaka Spring and Stream. Puketāpapa / Mount Roskill is a volcanic cone pā with pits and terraces indicating its significance as a settlement. Te Auaunga / Oakley Creek served as a source of various resources. The area around Mount Roskill Grammar was once a lake that gradually turned into a swamp. Te Tatua-a-Riukiuta / Three Kings is named after a Māori priest and was historically used for gardening. Stonefield complexes in these areas have been destroyed due to urban development.

European settlement occurred in the 1840s, and the swamp and creeks were used by European settlers to keep geese and as a water source for cattle. The Crown's acquisition of land in 1841 encompassed Puketāpapa / Mount Roskill. This was followed by the establishment of various developments, including the development of road infrastructure, prominent estates and educational institutions. Until the 1930s, the suburb predominantly retained its rural character, characterised by the presence of enduring settler farmhouses. Industrial expansion occured in the 1950s, with the establishment of manufacturing facilities along with May Road. The land of NoR XX exchanged owners several times, in which a substantial dwelling, the Winstone Homestead, was constructed and later demolished in the 1990s to accommodate the Akarana Golf Course carpark.

Puketāpapa / Mount Roskill (R11/19) ~~There~~ is ~~one~~only ~~key~~ archaeological feature identified within 200 m of the Puketāpapa / Mount Roskill Station NoR ~~are~~as shown in Figure XX below. The feature is outside of the NoR footprint. ~~with the features within the boundary being:~~

- ~~Puketāpapa / Mount Roskill (R11/19)~~

Limited archaeological surveys or investigations have been conducted near the NoR and in the wider Mount Roskill area. Investigations for infrastructure projects in the vicinity of the NoR include an archaeological site related to wooden artifacts in the drained swamp west of Puketāpapa / Mount Roskill (R11/19) and several sites around the reserve and Dominion Road, but none of significant archaeological or heritage interest within the NoR.

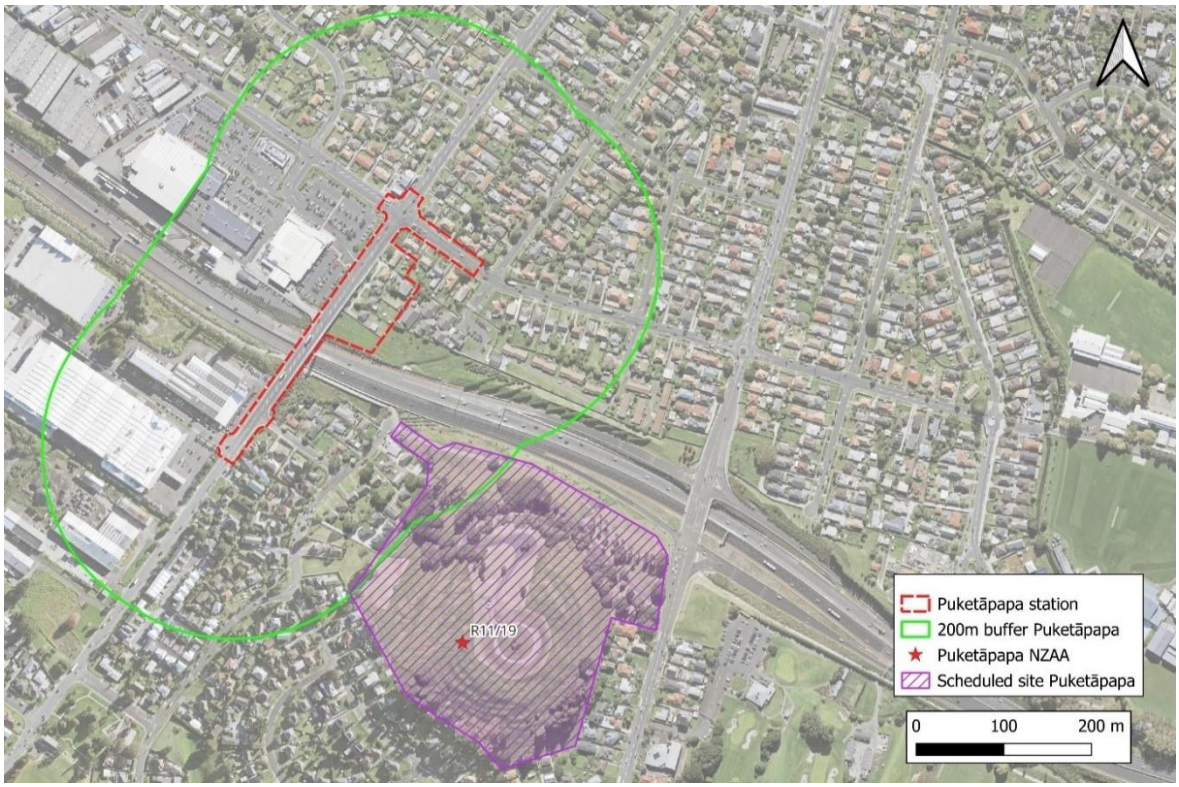

Figure 5 Archaeology within 200m of the Puketāpapa / Mount Roskill Station NoR

1. Positive Effects

There are no positive effects in regards to archaeology as by its very nature construction requires disturbance of the ground in which archaeological remains may be present. However, management processes can be established to enable the recording of archaeological material found during construction of a project, providing valuable insight into the history of a site.

2. Construction Effects

While one scheduled archaeological site, Puketāpapa/Mount Roskill (R11/19), is identified within 200m outside of the NoR, it ~~and~~ will not be subject to any physical work therefore, there will be no effects on this feature.

The construction works within the Puketāpapa/Mount Roskill Station NoR will not result in any additional construction effects on archaeology than those set out in the route-wide effects included in Section XX.

3. Construction mitigation measures

Mitigation of archaeological effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Historic Heritage Management Plan (HHMP) and Archaeological Authority. There are no specific archaeological effects that require mitigation with respect to the Puketāpapa/Mount Roskill Station NoR.

In addition, an Authority to Modify Permit will be sought from Heritage New Zealand Pouhere Toanga.

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during the construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on archaeology associated with the Project will be less than minor.

6. Arboriculture

The Arboriculture Assessment, included as Appendix XX in Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on arboriculture. This section focuses on the arboricultural effects specific to the Puketāpapa/Mt

Roskill Station NoR. Further discussion on the route-wide arboricultural effects is considered in Section XX.
Trees required for removal within the Puketāpapa/Mt Roskill Station NoR are limited to trees within roads and residential properties. This includes a group of trees within 74 – 80 May Road, consisting of dacrycarpus dacrydioides, metrosideros excelsa, prumnopitys taxifolia, sophora tetraptera, vitex lucens species for the construction of the station . Two groups of podocarpus totara will need to be removed for the construction of the platforms.

1. Positive effects

There are no positive effects in regard to arboriculture as the trees are required to be removed for the construction and establishment of Puketāpapa/Mt Roskill Station.

2. Construction effects

The construction works at Puketāpapa/Mt Roskill Station will result in the loss of a trees along local roads and residential properties. The trees to be removed provide little contribution to the ecological and amenity value of the environment, and the overall impact is relatively small.

3. Construction mitigation measures

Mitigation of arboricultural effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Tree Management Plan (TMP). There are no specific arboricultural effects that require mitigation with respect to the Puketāpapa/Mt Roskill Station NoR.

4. Operational effects

There are no operational effects on arboriculture. The potential for adverse effects on arboriculture will occur only during the construction of the Project.

5. Conclusion of arboricultural effects

Based on the assessment above, the Arboricultural Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on arboriculture associated with the Project will be appropriately managed.

7. Open Space

An Open Space Assessment has been undertaken and included as Appendix XX in Volume XX. There is no open space identified within the Puketāpapa/Mt Roskill Station NoR boundary and therefore no assessment is required

8. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to hydrology and flooding. This section focuses on the hydrology and flooding effects specific to the Puketāpapa/Mt Roskill Station NoR . Further discussion on the route-wide hydrological effects is considered in Section XX.
The Puketāpapa/Mt Roskill Station NoR is located within the XX Stormwater catchment. The key hydrological features, inclusive of flooding are listed below and shown in Figure XX below:

- Flood plain intersects with the south-eastern corner of the proposed station platform;
- Single overland flow path from the local catchment and runs to the Flood Plain in the south-eastern corner of the site. The flowrate in the overland flowpath is reported in GeoMaps to be 0.47m3/s in the 1% AEP + CC flood event.
- Flood Prone Areas located in similar location as the overland flowpath and south of the proposed station footprint.

Figure ~~67~~ Hydrology within the Puketāpapa/Mt Roskill StationNoR

1. **Positive effects**

In addition to the route-wide positive effects outlined in Section XX, this station will provide :

- Implementation of WSUDs (Water Sensitive Urban Design) within the station site reduces peak flowrates, benefiting flood-prone areas downstream.
- Flood attenuation tanks or tanks for non-potable water reuse help control peak flowrates leaving the site, particularly in identified floodplains.

It is noted that opportunities to quantify the flood reduction benefits will be assessed during the design phase.

2. **Construction effects**

[TBC following the report. Will need to assess the impact of the permanent infrastructure within flood plain and overland flow path]

3. **Operational effects**

[TBC following the report. Will need to assess the impact of the permanent infrastructure within flood plain and overland flow path]

4. **Mitigation measures**

[TBC]

5. **Conclusion of hydrological and flooding effects**

[TBC]..

9. Construction Noise and Vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phase of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to the Puketāpapa/Mt Roskill Station NoR. Further discussion on the route-wide construction noise and vibration effects is considered in Section XX.

The existing noise environment consists of mainly ambient traffic noise from SH20 and surrounding local roads. The sensitive receivers are listed within Table 2 of this NoR, however those of particular note within the Puketāpapa/Mt Roskill Station NoR include the following:

- Gracedale Retirement Village and Hospital – 68 Mount Roskill Road

The sensitive receivers are also shown in Figure 8 below. There are no notable receivers in this location.

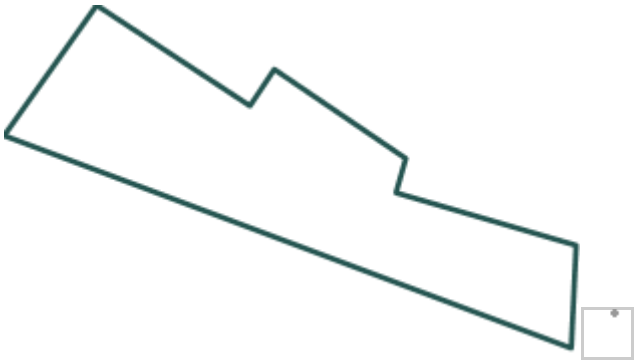

Figure 7~~8~~ Sensitive receivers within Puketāpapa/Mt Roskill Station NoR

1. **Positive effects**

Section 10.1.X of this AEE outlines route wide positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. **Construction noise effects**

The construction works at Puketapapa Mt Roskill Station will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the Suburban Worksite construction noise standards as applicable in this location.

Based on the noise modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts general compliance with Project noise standards. Intermittent infringements of the Suburban Worksite noise standards at perimeters of the work site during the day may occur. These infringements could reach up to 5 decibels, typically one to three hours at a time. The nature of these effects ranges from people moving to quieter outdoor areas to disrupted but acceptable communication indoors.

Project noise standards for night time hours are less than day time standards. Infringement of the night-time noise standards is predicted up to 5 decibels, typically one to three hours at a time over two nights. This is likely to be associated with the combined Project works and works associated with the modification of the May Road bridge over SH20. These effects are acceptable if windows are closed and unlikely to cause sleep disturbance.

~~During construction, various plant and machinery works will be carried out. These works will take place both during daytime and night-time. The construction works at Puketāpapa/Mt Roskill Station will potentially result in the following adverse effects, including:~~

- ~~Construction noise during daytime will be similar to that of a small-scale commercial construction project. Proposed earthworks are anticipated to generate~~

~~the loudest construction noise during daytime. It is predicted that there will be brief infringements to recommended suburban noise standards at ground floor receivers.~~

- ~~Construction noise during night-time will be generated from craning bridge components along the May Road bridge using a 300T rig. Infringements to recommended noise standards are expected to be between 5 – 10 decibels.~~

3. **Construction noise mitigation measures**

Mitigation of construction noise effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved via a Schedule to the CNVMP. No additional noise measures are required at Puketapapa Mt Roskill Station.~~Mitigation of construction noise effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required. In addition, for mitigation of construction noise effects specific to the Puketāpapa/Mt Roskill NoR the Construction Noise and Vibration Assessment recommends the following for inclusion in a CNVMP:~~

~~For daytime works, communication with receivers within 50m of the work site so they are aware of the work; and~~

~~For the night-time works, communication to receivers within 150m of the work area so they are aware of the work.~~

4. **Construction vibration effects**

The construction works at Dominion Junction Station NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted potential infringement of the Project vibration standards in this location using compaction activity as the highest vibration generating activity given the sustained vibration produced, usually over a period of days while fill is compacted.

The effects of construction vibration take two forms:

1. Potential for building damage; and
2. Potential for loss of amenity.

The Construction Noise and Vibration Assessment predicts potential infringement of the Project vibration standards related to building damage at 3 and 5 Denbigh Avenue, and Gracedale H Retirement Village~~all receivers~~ during station construction.~~Construction vibration from compaction will be generated due to the use of a 6-8T roller. Vibration activity is predicted to infringe the cosmetic building damage vibration limits.~~

5. **Construction vibration mitigation measures**

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction vibration standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation to the Project vibration standards can only be achieved via a Schedule to the CNVMP. No additional measures are required at Puketapapa Mt Roskill Station. The recommendations of the Construction Noise and Vibration Assessment with respect to 3 and 5 Denbigh Avenue, and Gracedale H Retirement Village~~all receivers~~ are captured by the framework for a CNVMP.

6. **Conclusion of construction noise and vibration effects**

Based on the assessment above, the Construction Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

10. Operational Noise and Vibration

[ASSESSMENT OF POTENTIAL OPERATIONAL NOISE AND VIBRATION EFFECTS TO BE PROVIDED]

11. Blasting Noise and Vibration

There is no blasting during construction in NoR 12, meaning no blasting effects have been identified.

12. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project as related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blast Management Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of structural damage to buildings and structures.

This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to the Puketāpapa/Mt Roskill Station NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.

Buildings adjacent to the Puketapapa Mt Roskill Station NoR generally are comprised of a mix of shallow founded low rise commercial and residential buildings.

The buildings identified as sensitive to settlement by the Settlement and Structures Assessment are the Gracedale Hospital buildings. These buildings are shown in Figure XX below.

Figure 89 Sensitive structures within the Puketāpapa/Mt Roskill Station NoR

1. Positive effects

There are no positive effects on buildings or structures with respect to vibration and settlement.

2. Construction vibration induced effects

Vibration induced building damage common to the entire Project area is discussed in Section XX. The Structures and Settlement Assessment has identified that all buildings within the NoR footprint will be acquired and demolished. ~~In general, s~~Surrounding buildings fall outside the vibration threshold setback distances and as such the potential for damage to these surrounding buildings is Negligible.

3. Mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX, in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CVNMP and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Settlement effects common to the entire Project area are discussed in Section XX. The construction activities related to the trench excavation and retaining wall for the station building and platform will potentially result in adverse settlement effects on the Gracedale Hospital. The settlement is predicted to extend beyond the depth of the excavation, but the impact on the hospital buildings is expected to ~~be~~ range from Slight at the eastern end to Negligible ~~minimal~~. Potential damage includes superficial cracking in the exterior cladding, joints in plasterboard linings, ground supported floor slabs, and occasional sticking of windows or doors.

Settlement effects associated with the station building excavation, access bridges and rail platform will not extend any notable distance from the works and are expected to have a Negligible effect on surrounding buildings.

5. Construction settlement ~~M~~mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx in the form of a Settlement Management Plan (SMP), recommended in condition XX provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.~~Mitigation of settlement effects common to the whole Project is discussed in Section XX. In addition, for mitigation of building damage related to settlement at the Puketāpapa/Mt Roskill Station NoR a Settlement Management Plan is~~

~~recommended, to provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation.~~

6. **Operational settlement and vibration induced effects**

There are no settlement induced effects associated with the operation of the Project. The potential for settlement effects will occur only during the construction of the Project. Vibration effects on building, resulting from the operation of the Project is addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section XX.

7. **Conclusion of settlement and structure effects**

Based on the assessment above, the Settlement and Structures Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on buildings will be appropriately managed.

13. Volcanology

The Assessment of Volcanology Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project.

Brief summary of volcanology environment

This section focusses on the volcanology effects specific to XX Station.

1. **Positive effects**

In addition to the route-wide positive effects outlined in Section XX, this station will provide:

- XXX
- XXX
- XXX

2. **Construction effects**

The construction works at XXX Station will potentially result in the following adverse effects, including:

- XXX
- XXX
- XXX

3. **Operational effects**

There are no adverse operational effects anticipated as any impact on volcanic features will occur during construction.

4. **Mitigation**

For mitigation of these effects, the Assessment of XX Effects recommends:

- XXX
- XXX
- XXX

This will be captured through the preparation of XXX Management Plan to manage any actual and potential adverse effects.

5. **Conclusion of landscape and visual effects**

Based on the assessment above and the proposed mitigation, the effects will be XXX (appropriately avoided/remedied/ mitigated etc. Add detail if needed.)

5. Conclusion

Overall, effects from NoR X will be (make an overall conclusion of effects based on the feedback above, drawing together key conclusions across disciplines. EG “appropriately managed and mitigated, with [any specifics]”)

6. ·Conclusion

Overall, effects from NoR 11 will be (make an overall conclusion of effects based on the feedback above, drawing together key conclusions across disciplines. EG “appropriately managed and mitigated, with [any specifics]”)

1. Notice of Requirements

1. NoR 14 – Hayr Road Station NoR

This section:

- Describes Hayr Road Station NoR 14 (Section X.2)
- Summarises the existing and receiving environment (Section X.3)
- Assesses effects and outlines mitigation (Section X.4)

2. NoR description

The Hayr Road Station NoR is located at the intersection between Hayr Road and Carr Road. The proposed platform will run parallel to the State Highway 20/Southwestern Motorway (SH20) corridor and perpendicular to Hayr Road. The NoR footprint will include existing industrial and commercial properties along Carr and Hayr Roads to the intersection with Melrose Road, and Crown owned land, surrounding SH20.

Hayr Road Station is proposed to be an at grade, fully segregated station, with an island platform that runs parallel to SH20. It is anticipated to be a 'moderate' patronage station. The primary function of the station is to serve as an interchange and transfer node for bus services and is proposed to service residents of Hillsborough and Royal Oak.

Figure X shows the proposed NoR 14 boundary and its surrounds. Table XX summarises the Hayr Road Station's permanent features and temporary construction works.

Figure 11: Hayr Road Station NoR plan

Figure 12: Hayr Road Station NoR boundary on aerial imagery

Table 11: Hayr Road Station NoR description

Permanent features	
Station	• At-grade station parallel to SH20 and perpendicular to Hayr Road; • The primary entrance to the station is proposed off Carr Road; • An active mode bridge provides access to the station from the southern side of SH20.
Platforms	• Island platform arrangement, with rail alignment on either side of the platform; • Platform accessible from both northern and southern directions, connected by an active mode overbridge from Melrose Road and accessible by stairs, lifts and walking/cycling ramps;
Public realm	• Station forecourt adjacent to Carr Road providing cycling storage, bus bays, kiss and ride bays and public realm; • Upgrade Carr Road to provide intermodal facilities, active modes and connect with on-street bus facilities.
Road and streetscape	• New SH20 overbridge that provides for active modes of transport connecting Melrose Road with the station; • Road widening and footpath upgrades around the Carr Road and Hayr Road intersections; • Active modal upgrades along Carr Road.
Parking and loading	• Provision for kiss and ride bays at the station entrance off Carr Road; • Provision for secure short- and long-term cycle storage at the station entrance;
Other new infrastructure	• New active modes bridge over SH20 connecting the station to Melrose Road.
Anticipated patronage	• Moderate patronage.
Anticipated construction works	
Construction methodology and staging	Refer to AEE Section 6 and the Design and Constructability Report. At a high level the construction activities will include: • Demolition, site clearance, utilities relocation/protection; • Establish site offices and amenities; • Station construction zone to be used as a central hub for constructing the adjacent sections of rail corridor; • Undertake modifications to Hayr Road Bridge; • Existing bridge design to be reviewed to establish if staging can maintain traffic movements during this activity; • Construct new footbridge across SH20; • Construct new station platform and structures; • Streetscapes upgrades. NB: The permanent works boundary and adjacent corridor provide enough space for the construction of the station.
Access to the site	• Primary access to the site from Carr Road • An active mode bridge provides access to the station precinct from the southern side of the motorway.

3. Description of the environment

This section sets out the existing and receiving environment for the Hayr Road NoR. It applies the parameters on the assumptions outlined in Section 10.1.3

Tables X and X describe the surrounding area and features. Any property directly affected by this NoR is listed in NoR 14 Form 18 Appendix X.

Table 12: Existing environment description

Feature	Description
Current land use	The land use at Hayr Road is split between commercial, retail and residential typology.
Physical Environment	
Transport	• Hayr Road is an arterial road which provides access over SH20 in an east-west direction. • SH20 runs directly to the south of the station location. • Suburban and local roads (Carr Road) • Existing walking footpaths on the local roads, as well as on both sides of the Hayr Road overbridge. • Bus stops located on Hayr Road servicing routes 27, 29, 68 and 285. • Keith Hay footbridge
Infrastructure	• KiwiRail designation to the south of the site; • Vector electricity – distribution substation and 11kV multiple lines along Hayr and Carr Road; • Vector electricity 22kV laid adjacent to SH20; • Chorus – multiple lines along Carr Road.
Community facilities and key attractions	• Mt Roskill Library; • Ranfurly Village Library; • Three Kings Library; • Keith Hay Park; • Te Tātua a Riukiuta/Big King Volcano; • New World Mount Roskill.
Sensitive noise receivers	N/a
Historic heritage	N/a
Archaeology	XXXXXXXX
Natural Environment	
Topography	• Flat and slightly rolling land to the east of SH20.
Catchment	• Oakley Stormwater Catchment
Flooding & hydrology	• Flood plain and floor prone area across the eastern side of the proposed station; • Four overland flow paths converging on the site from north and east; • Ponding located on the site and to the west.
Trees and vegetation	*All trees and any vegetation.*
Terrestrial ecology	Habitat for skink and birds adjacent to the NoR boundary to the east and west.

Figure 3: Hayr Road NoR zoning and overlays map in AUP with red line showing NoR footprint

Table 13: Hayr Road NoR statutory environment

AUP Zoning Figure		
Name	Description	Comment
Current zoning	Road	Applies to all the roads within the NoR boundary
	Strategic Transport Corridor Zone	Applies to the SH20 corridor and the Hayr Road on ramp
	Business – Light Industry Zone	All properties within NoR boundary
Precincts	N/A	
Overlays	Arterial Roads	Applies to SH20
	Macroinvertebrate Community Index - Urban	Applies to entire NoR boundary
Designations	Airspace Restriction Designations, ID-1102, Protection of aeronautical functions – obstacle limitation surfaces, Auckland International Airport Ltd Designation 6303, Avondale Southdown Railway Line, KiwiRail Designation 6731, Extension of SH20 from Hillsborough Road to Maioro Street, NZTA/Waka Kotahi	All properties within NoR boundary SH20 runs along the southern boundary of the station
	Designations - 6732, State Highway 20 - Hillsborough to Mt Roskill, Designations, New Zealand Transport Agency	Applies to the Hayr Road off and on-ramp
	Designations - 6729, State Highway 20 and Railway - Mt Roskill, Designations, New Zealand Transport Agency	Applies to the SH20 corridor

Zoning within 800m catchment	Residential – Mixed Housing Urban Zone Residential – Mixed Housing Suburban Zone Business – Neighbourhood Centre Index	Multiple zones within 800m catchment from proposed station, with increased density.
Anticipated future zoning within 800m catchment (construction, operation)	Business – Light Industry Business – Neighbourhood Centre Residential – THAB Residential – Mixed Housing Urban Residential – Mixed Housing Suburban	Refer Section 10.1.X for reasoning and analysis.

4. Assessment of effects on the environment

This section assesses the actual and potential effects of the construction and operation phases of the Project as they relate to Hayr Road Station NoR.

This builds on the technical assessment included in Volume 3 and the Design and Construction Report in Appendix X. Section XX outlines the indicative construction methodology used for these assessments.

1. Traffic and transport

The Assessment of Transport Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the traffic and transport. This section focuses on the transport effects specific to the Hayr Road Station NoR. Further discussion on the route-wide transport effects is considered in Section XX.

Key transport features within and adjacent to the Hayr Station NoR include:

- **Public transport:** The closest public transport network is Mount Albert Road. There are several bus routes running along Hayr Road, Carr Road and Hillsborough Road but no bus priority lanes.
- **Walking:** Due to the industrial nature of the surrounding environment there are poor pedestrian / walking facilities. There are two raised pedestrian crossings are located between Frost Road, Hayr Road and Carr Road, with footpaths on both sides of the Hayr Road SH20 overbridge.
- **Cycling:** A regional cycle route runs parallel to SH20, however Hayr Road is not connected to the Southern Isthmus Cycleway shared path. There are no cycle lanes provided on Carr Road and Hayr Road.
- **Roading network**: The proposed station is located adjacent to SH20 and Mount Albert Road which is classified as a primary arterial general traffic route.
- **Parking:** There is on street and off-street parking available on the roads surrounding the station due to the industrial nature of the area.

The Hayr Road Station will form part of the future light rail network, improving connectivity along the alignment.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, Hayr Road Station will provide:

- Improved access to active mode travel within the vicinity, by connecting the station with surrounding cycle routes;
- Providing better pedestrian access across SH20 to maximise the accessibility from surrounding areas that is separate to road traffic;
- Integrating a predominantly residential area into the wider regional public transport network that currently has little accessibility.

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section XX:

The proposed works at the Hayr Road Station NoR will potentially result in the following adverse construction traffic effects.

- **Public transport (heavy rail):** N/a
- **Public transport (bus):** Potential for existing bus services to experience limited delays due to the increase in construction traffic around the site.

- **Cycling:** The construction of the new footbridge across SH20 connecting the shared-use cycleway at Melrose Road will directly effect the cycleway. This will result in a detour in the cycleway due to cranes and result in redirection on local roads and around the construction site. Cycle connectivity will be retained through construction.
- **Walking:** There may be impacts on pedestrian accessibility through construction due to the closure of Hayr Road, which will result in no access across Hayr Road and the adjacent SH20 overbridge.
- **Private vehicles:** Minor delays due to construction traffic are anticipated, and the construction of the new footbridge over SH20 will result in nightwork closures of SH20 during installation.
- **Emergency services:** As with the general traffic, emergency vehicles travelling to and around the immediate vicinity of the site may experience delays relating to construction traffic.
- **Freight:** The proposed Hayr Road bridge upgrades will affect freight in the same way that it will affect other modes of transport, predominantly as Carr Road has been identified as an over dimension route.

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP). In addition, for mitigation of construction traffic and transport effects specific to the Hayr Road Station NoR the Assessment of Transport Effects recommends the following for opportunities for inclusion in the CTMP in relation to Hayr Road Station:

- **Public transport (bus services):** N/a
- **Public transport (heavy rail):** N/a
- **Walking:** The new footbridge over SH20 should be constructed at an early stage of construction;
- **Cycling:** N/a
- **Roading network:** The existing number of eastbound traffic lanes on SH20 is generally being maintained, wherever practicable, although short term (overnight) lane closures may be required;
- **Emergency services:** N/a

4. Operational effects

There are no adverse operational effects on transport from Hayr Road Station NoR. Following construction at the station the existing road layout will be reinstated.

5. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3 Appendix XX and the proposed mitigation, the actual and potential traffic and transport effects associated with the Project will be appropriately managed.

2. Urban design, landscape and visual

The Assessment of Landscape and Visual Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the (natural and urban) landscape (including visual effects). This section focuses on the landscape and visual effects specific to the Hayr Road Station NoR. Further discussion on the route-wide landscape and visual effects is considered in Section XX.

The urban form within the Hayr Road Station NoR comprises of predominantly residential and commercial land use adjacent to SH20, resembling development surrounding car-based suburban development.

The natural landscape within the Hayr Road Station NoR pertains to the upper basin of Te Auaunga / Oakley Creek and was largely an area of farmland before it was subdivided for urbanisation. SH20 intersects the urban structure dividing the suburb in to north and southern parts, with Keith Hay footbridge providing pedestrian access through to Mount Roskill Grammar School from the residential developments south of SH20. There is no local centre within proximity to the proposed station.

1. Positive effects

In addition to the route wide positive effects outlined in Section xx, this station will provide:

- This station will highlight the presence of public transport and contribute to an area lacking in built landmarks.

2. Construction effects

The construction works within the Hayr Road Station NoR will involve typical construction activity. The LVA identifies the following potential adverse effects:

- Potential for disruption effects on the amenity for people through few alternative road crossings of the SH20 transport corridor to Hayr Road; and
- Poor visual amenity through demolition, construction site and construction activities.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

The works within Hayr Road Station NoR will result in a change in the urban form and natural landscape. These changes involve:

- Urban landscape changes that are limited by the location adjacent to SH20 and the surrounding industrial area.

5. Permanent infrastructure mitigation measures

Mitigation of landscape and visual effects common to the whole Project is discussed in Section xx and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to the Hayr Road Station NoR the Assessment of Landscape and Visual Effects recommends the following matters be recognised when undertaking the design of the station:

- Design requirements to support the stations legibility;
- Design requirements to support access to the station; and
- Design requirement to respond to the Hayr Road context.

6. Conclusion of landscape and visual effects

Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Social

[ASSESSMENT OF THE POTENTIAL ADVERSE SOCIAL IMPACT EFFECTS TO BE PROVIDED]

4. Cultural

Information to be provided.

5. Built heritage

The Assessment of Historic Heritage, included in Appendix xx of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project.

There is no built heritage within a 100m boundary of the NoR boundary. Accordingly, no further assessment of built heritage is required with respect to the Hayr Road Station NoR.

6. Archaeology

An Assessment of Archaeological Effects has been undertaken and included as Appendix XX in Volume 3. No known archaeology has been identified. within the Hayr Road Station NoR boundary.

Accordingly, no further assessment of archaeology is required with respect to the Hayr Road Station NoR.

7. Arboriculture

An Arboriculture Assessment has been undertaken and included as Appendix xx in Volume xx. Arboriculture within the Hayr Road Station NoR noundary is limited to trees within properties and not protected by the AUP as such, no further assessment of arboriculture has been undertaken with respect to Hayr Road Station.

1. Positive Effects

The Project may provide as opportunity to introduce more tree canopy cover with increased diversity into the environment in this location, through planting in streets and station plaza areas.

8. Open Space

[ASSESSMENT OF POTENTIAL ADVERSE OPEN SPACE EFFECTS TO BE PROVIDED]

9. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to hydrology and flooding. This section focuses on the hydrology and flooding effects specific to the Hayr Road Station NoR. Further discussion on the route-wide hydrological effects is considered in Section XX.

The Hayr Road Station NoR is located within the Oakley Stormwater Catchment. The key hydrological features, inclusive of flooding are listed below and shown in Figure xx below:

- Flood plain covers the majority of the site;
- Four overland flow paths converge on the site from the north to the east, contributing to onsite ponding;
- Flood prone area located to the east of the site.

Figure 4: Hydrology within the Hayr Road Station

1. Positive effects

There are no positive effects in relation to flooding at the site.

2. Construction effects

[TBC following the report. Will need to assess the impact of constructing infrastructure within flood plain and overland flow path]

3. Operational effects

[TBC following the report. Will need to assess the impact of the permanent infrastructure within flood plain and overland flow path]

4. Mitigation measures

[TBC]

5. Summary of hydrology and flooding effects

[TBC]

10. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phase of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to the Hayr Road Station NoR. Further discussion on the route-wide construction noise and vibration effects is considered in Section XX.

The existing noise environment consists of mainly ambient traffic noise from SH20 and surrounding local roads. The sensitive receivers are listed.....

There are no identified sensitive receivers surrounding the Hayr Road Station.

1. Positive effects

Section X of this AEE outlines route wide positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. Construction noise effects

The construction works at Hayr Road Station will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the Suburban Worksite construction noise standards as applicable in this location.

Based on the noise modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts representative infringement of the Project noise standards may occur, typical of construction activities on a small scale construction site. These infringements could reach up to 5 decibels, typically one to three hours at a time. The nature of these effects ranges from people

moving to quieter outdoor areas to disrupted but acceptable concentration and communication indoors.
Project noise standards for night time hours are less than day time standards. Infringement of the night-time noise standards is predicted up to 5 decibels, typically one to three hours at a time over two nights, similar to night time road works. This is likely to be associated with the Project works to crane in a bridge over SH20. These effects are acceptable if windows are closed and unlikely to cause sleep disturbance.

3. Construction noise mitigation measures

Mitigation of construction noise effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved via a Schedule to the CNVMP. No additional noise measures are required at Hayr Road Station

4. Construction vibration effects

The construction works at Dominion Junction Station NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted potential infringement of the Project vibration standards in this location using compaction activity as the highest vibration generating activity given the sustained vibration produced, usually over a period of days while fill is compacted.
The effects of construction vibration take two forms:

1. Potential for building damage; and
2. Potential for loss of amenity.

The Construction Noise and Vibration Assessment predicts potential infringement of the Project vibration standards related to building damage at 4B-4D, 6, 37A, 26-28, 34, 2/39, 39 45, 47, 49, 1/49, 55, 61-63 Carr Road, 2 Clinker Street, and 62A Hayr Road.

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction vibration standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation to the Project vibration standards can only be achieved via a Schedule to the CNVMP. No additional measures are required at Hayr Road Station. The recommendations of the Construction Noise and Vibration Assessment with respect to 4B-4D, 6, 37A, 26-28, 34, 2/39, 39 45, 47, 49, 1/49, 55, 61-63 Carr Road, 2 Clinker Street, and 62A Hayr Road are captured by the framework for a CNVMP.

6. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Appendix XX of Volume 3 and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

11. Operational Noise and Vibration

[ASSESSMENT OF POTENTIAL OPERATIONAL NOISE AND VIBRATION EFFECTS TO BE PROVIDED]

12. Blasting Noise and Vibration

A Blasting and Vibration Assessment has been undertaken and included as Appendix XX in Volume XX. There is no blasting required at the Hayr Road Station NoR. Accordingly, no further no assessment of blasting effects is required.

13. Settlement and structures

The Settlement and Structures Assessment, included in Appendix x of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise

and Vibration Assessment (Appendix xx), the Built Heritage Assessment (Appendix xx) and the Blasting Noise and Vibration Assessment (Appendix xx) to provide preliminary assessment of the potential risk of structural damage to buildings and structures.
This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to the Hayr Road Station NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structure is considered in Section xx.
Buildings adjacent to the Hayr Road Station NoR generally are comprised of a mix of shallow founded low rise commercial and residential buildings.
The buildings identified as sensitive to settlement by the Settlement and Structures Assessment are located at 34 Carr Road. These buildings are shown in Figure XX below.

1. Positive effects

There are no positive effects on buildings or structures with respect to vibration and settlement.

2. Construction vibration induced effects

Vibration induced building damage common to the entire Project area is discussed in Section XX. The Structures and Settlement Assessment has identified that all buildings within the NoR footprint will be acquired and demolished. One building at 34 Carr Road falls within the vibration threshold setback distance. Other surrounding buildings fall outside the vibration threshold setback distances and as such the potential for damage to these surrounding buildings is Negligible.

3. **Mitigation measures**

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX, in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CVNMP and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Settlement effects which apply to the entire Project area are discussed in Section XX. The construction activities related to the excavation of foundations for the station building, bridge and platform will have Negligible effect on surrounding buildings.
Excavation induced settlements associated with construction of the road underpass trenches and retaining walls are predicted to extend several times the excavation depth behind the associated retaining walls, impacting the building at 34 Carr Road, placing the building in the Slight damage category. Potential damage includes superficial cracking in the exterior cladding, joints in plasterboard linings, ground supported floor slabs, and occasional sticking of windows or doors.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx in the form of a Settlement Management Plan (SMP), recommended in condition XX provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. **Operational settlement and vibration induced effects**

There are no settlement induced effects associated with the operation of the Project. The potential for settlement effects will occur only during the construction of the Project.
Vibration effects on building, resulting from the operation of the Project is addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section XX.

7. Conclusion of settlement and structure effects

Based on the assessment above, the Settlement and Structures Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on buildings will be appropriately managed.

14. Geological heritage

A Volcanology Assessment has been undertaken and included as Appendix XX in Volume XX.
There are no geological heritage features identified within the Hayr Road Station NoR and therefore no assessment is required.

1. Onehunga Station NoR 14

1. Introduction

This section:
Describes NoR 14 – Onehunga Station (section 10.15.2);
Summarises the existing and receiving environment (section 10.15.3);
Assesses effects and outlines mitigation (section 10.15.4).

2. Onehunga Station NoR description

The Onehunga Station NoR is proposed to be a mid-block elevated station. It will run through a midblock between Princes Street and Neilson Street and Selwyn Street and Onehunga Mall. Figure 1 shows the proposed Onehunga Station NoR boundary and its surrounds. The NoR boundary will include existing commercial, residential and open space properties. It will also require the acquisition of a Category B site under the Heritage New Zealand Pouhere Taonga (HNZPT) list (Onehunga Bowling Green).

Figure 11: Onehunga Station NoR plan

Figure 12: Onehunga Station NoR boundary on aerial imagery

Table 11: Onehunga Station NoR description

Permanent features	
Station	Elevated station typology with side platform arrangement; Two entrances to the station, via Onehunga Mall and O'Rorke Street with ticketing and gate lines.
Platforms	Side platform arrangement with one line running through the middle of the station building; Platform accessible from two entrances; Primary access is from O'Rorke Street by escalators and lifts that land at the eastern end of the platform;
Public realm	New pedestrian station forecourt fronting Onehunga Mall; Upgrades to the surrounding streets to support the station connectivity with active transport modes; Retention of the green/recreation space at the original bowling green site.
Road and streetscape	Upgrade of O'Rorke Street to provide pedestrian connections; Street upgrades to provide for active transport modes and safety; Road enhancements to connect with bus services;
Parking and loading	Provision of cycle parks; provision of vehicle loading bay provided for maintenance/ emergency vehicles; Provision of a number of bus layover bays; Provision of kiss and ride bays on Onehunga Mall and on O'Rorke Street;
Other new infrastructure	Bus layover facilities proposed for existing Park'n'Ride space (109-111 Onehunga Mall).
Anticipated patronage	High patronage
Other	A number of bus routes, with an off-street interchange proposed at O'Rorke Street and Onehunga Mall; High interchange demand.
Anticipated construction works	
Construction methodology and staging	Refer to AEE Section 6 and DCR. At a high level the construction activities will include: • Demolition, site clearance, utility relocation/protection; • Establish site offices, amenities, dewatering and sediment control systems; • Install monitoring to neighbouring buildings if required; • Install pile foundations and pile caps; • Construct in-situ viaduct piers and headstocks; • Lift in precast viaduct beams using mobile cranes; • In—situ topping to viaduct deck and install edge barriers; • Station fitout and tracks installation; Streetscape reinstatement and upgrades to local roads to enhance pedestrian access to the station.
Access to the site	Primary entrance to the site is off O'Rorke Street to the west, and Onehunga Mall from the east.

3. Description of the environment

This section sets out the nature of the environment for the Onehunga Station NoR 14. It applies the parameters on the assumptions outlined in Section XX.

Tables 1.2 and 1.3 describe the surrounding area and features. Any property directly affected by this NoR 14 is listed in Appendix X to NoR 14 Form 18.

Table 12: Existing environment description

Feature	Description
Current land use	Commercial and industrial land use in and surrounding areas of the proposed station; Community Open Space, a Category A Historic Heritage Building (Carnegie Library) within close proximity to the station location;
Physical Environment	
Transport	Key arterial Neilson Street providing access from SH20 to Onehunga Centre; Suburban and local roads (Selwyn Street, Princes Street) Onehunga Mall providing a north-south directional transport route to One Tree Hill; Existing walking footpaths on both sides of local roads; Existing Onehunga train station located to the east of the proposed Onehunga Station NoR, and adjacent Park'n'Ride at the existing Onehunga Station; Bus stops located on Onehunga Mall servicing routes 36, 38, 309 N10 and RBO;
Infrastructure	Transpower and Vector infrastructure is located on Neilson, Selwyn and Princes Street; Telecommunications and gas infrastructure assets are located on the western side of Onehunga Mall; Stormwater assets are located on the eastern side of Selwyn Street
Community facilities and key attractions	Education facilities: St Joseph's School (Onehunga), Onehunga Primary School, Golden Grove School, Onehunga Kindergarten Sport and recreation facilities: Te Hopua ā Rangi / Gloucester Park, Onehunga Bay Reserve, Waikaraka Park; Nearest town centre: Onehunga Town Centre directly to the north-east along Onehunga Mall; Religious and cultural facilities: Christian Congregational Church of Samoa, New Hope Fellowship, Church in Auckland, Bethsaida Worship Centre, St Peters Anglican Church, Catholic Church of the Assumption, Our Lady of the Assumption Parish and Te Puea Memorial Marae located south of the SH20/Manukau Harbour crossing.
Sensitive noise and vibration receivers	No sensitive noise receivers identified within close proximity to the NoR location.
Historic heritage	Carnegie Library (former) – 55 Princes Street, Onehunga. This is a Category 1 Building under HNZPT list; Onehunga RSA Association Bowling Club – 59 Princes Street, Onehunga. This is a Category B Building under the AUP. Onehunga Post Office (former) – 120 Onehunga Mall, Onehunga. This is a Category B Building under the HNZPT list; Kemps Building – 137 Onehunga Mall, Onehunga. This is a Category B Building under the AUP; Automatic telephone exchange and garage (former) – 60 Princes Street, Onehunga. This site is a Category B Building under the AUP. Onehunga Special Character Area – Business, Onehunga
Archaeology	No archaeology identified within close proximity to the NoR location.
Cultural	*If no information received, note no responses from Te Tiriri team.*
Natural Environment	

Topography	The site is generally flat in typography with gentle sloping from the north-west corner to the southeast corner of the surrounding environment.
Flooding and hydrology	Overland flow paths on eastern and western corners of proposed Onehunga Station NOR footprint.
Trees and vegetation	Street Trees
Terrestrial ecology	None applicable

Table 13: Onehunga Station NoR statutory environment

Name	**Description**	**Comment**
Current NoR zoning	Business – Town Centre Zone	All properties within the block/NoR boundary, excluding those identified as Open Space.
	Open Space - Community Zone	59 Princes Street, Onehunga
	Road	All roads within the NoR boundary
	Business – Light Industry Zone	Applies to 44 – 46 Galway Street
Precincts	N/A	N/A
Overlays	High-Use Aquifer Management Areas – Onehunga Volcanic Aquifer;	All properties within NoR boundary
	Quality-Sensitive Aquifer Management Areas Overlay – Onehunga Volcanic Aquifer	All properties within NoR boundary
	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place – 2611, Onehunga Returned Services Association Bowling Club	Rear/59 Princes Street, Onehunga
	Historic Heritage and Special Character: Historic Heritage Overlay Extent of Place – 1817, Carnegie Library (former)	59 Princes Street, Onehunga
	Historic Heritage Overlay Extent of Place [rcp/dp] - 2601, Automatic-telephone exchange and garage (former)	Applies to small area of road in front of 60 Princes Street
	Historic Heritage and Special Character: Special Character Areas Overlay Residential and Business – Business Onehunga	59 Princes Street, Onehunga
	Sites and Places of Significance to Mana Whenua Overlay	Applies to Princes Street and Onehunga Mall intersection, XXX, XXX, XXX
	Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay – O11, One Tree Hill, Viewshafts	57 Princes Street, Onehunga 122C Onehunga Mall, Onehunga 108-110 Onehunga Mall, Onehunga 104 Onehunga Mall, Onehunga 102 Onehunga Mall, Onehunga
	National Grid Corridor Overlay – National Grid Yard Compromised	53B Princes Street, Onehunga
	National Grid Corridor Overlay – National Grid Subdivision Corridor	102 Onehunga Mall, Onehunga 38 Neilson Street, Onehunga 53B Princes Street, Onehunga 34B Neilson Street, Onehunga 15-19 Selwyn Street, Onehunga
	National Grid Corridor Overlay – National Grid Subdivision Corridor	102 Onehunga Mall, Onehunga 38 Neilson Street, Onehunga 53B Princes Street, Onehunga 34B Neilson Street, Onehunga

		15-19 Selwyn Street, Onehunga
Controls	Building Frontage Control – General Commercial Frontage	All properties within NoR footprint
	Height Variation Control – Onehunga, 27m	All properties within NoR footprint
	Macroinvertebrate Community Index – Urban	All properties within NoR footprint
Designations	Airspace Restriction Designation – ID1102, Protection of Aeronautical Functions – obstacle limitation surface, Auckland International Airport Limited.	All properties within NoR footprint
Zoning within 800m catchment	Business – Mixed Use Zone; Business – Light Industry Zone; Business – Heavy Industry Zone; Business – Town Centre Zone; Residential – Terrace Housing and Apartment Building Zone; Residential – Mixed Housing Urban Zone; Residential – Single House Zone; Open Space – Informal Recreation Zone; Open Space – Sport and Active Recreation Zone; Coastal – General Coastal Marine Area;	All of these zones are currently within 800 m of the Onehunga NoR
Anticipated future zoning within 800m catchment (construction, operation)	Business – Light Industry Zone Business – Heavy Industrial Zone	Refer Section 10 for analysis.

4. Assessment of effects on the environment

This section assesses specific effects relating to the Onehunga Station NoR 14.
This builds on the technical assessment included in Volume 3 and the Design and Construction Report in Appendix XX.. Section XX outlines the indicative methodology used for these assessments.

1. Traffic and transport

The Assessment of Transport Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operational phases of the Project as they relate to effects on traffic and transport. This section focuses on the transport effects specific to the Onehunga Station NoR. Further discussion on the route-wide transport effects is considered in Section xx.
Key transport features within and adjacent to the Onehunga Station NoR include:

- **Public transport**: The existing Onehunga train station, servicing the southern line is located directly east across Onehunga Mall. There are also existing bus routes, including 36, 38 and 309 lines to the east, 309x to the west, 309, 68 670 and 30 to the north and 670 and 743 further along Church Street to the east. There are no dedicated bus priority lanes around the area of the proposed Onehunga Station.
- **Walking**: There are pedestrian footpaths on all surrounding streets, however there are no midblock pedestrian crossings.
- **Cycling**: There are no on road cycle lanes provided within the immediate vicinity, there is an off-road shared path along SH20 toward Mangere Bridge and Waikaraka Cycleway.
- **Roading networks**: The proposed Onehunga Station location is bound by Neilson Street, Onehunga Mall and Selwyn Street, which are all classified as arterial roads under the Auckland Unitary Plan (Operative in Part). Princes Street to the north of the proposed NoR site, is a local road and considered a major cycle and micro-mobility route. SH20 is located along Neilson Street to the west of the station location.

- **Parking**: Parking within the vicinity is mixed on-road and private car parking facilities.
- **Loading**: N/a
- **Freight**: Neilson Street and Onehunga Mall are both arterial roads, which are used by heavy vehicles infrequently.

The Onehunga Station will form part of the future light rail network, improving connectivity along the alignment.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, Onehunga Station NoR will provide:

- A high interchange area with the proposed station and surrounding bus stops (12 existing);
- A high-quality connection to Onehunga town centre, with more active transport modes through pedestrian crossings and footpath upgrades on Princes Street and Onehunga Mall;
- Improved active mode connections to the southwest through Nga Hau Mangere Bridge and Waikaraka Cycleway.

2. Construction effects

The proposed works at Onehunga Station will potentially result in the following adverse construction effects. Construction traffic effects which apply to the entire Project area, are discussed in Section xx:

- **Public transport:** No train lines will be affected by the construction stage of this project. The impact that construction will have on buses is through the potential in delay of services due to construction traffic, and potential for detours and relocation of bus stops.
- **Cycling:** No cycling facilities will be affected by the construction phase of the Onehunga Station NoR. However, any on-road cyclists may be subject to increased congestion on the roads, and presence of heavy trucks.
- **Walking:** There is potential for the existing footpaths within the vicinity of the station location to be realigned (temporarily) to allow for construction access and safety.
- **Private vehicles:** The presence of heavy vehicle traffic is likely to affect the way that the current road environment functions within this area.
- **Emergency services:** There may be a risk of any emergency services needing to access the surrounding area being affected by delay times, and congestion within the area of construction.

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP). In addition, for mitigation of traffic and transport effects specific to the Onehunga Station NoR the Assessment of Transport Effects recommends the following opportunities for inclusion in the CTMP for Onehunga Statrion:

- **Roading network:** The period of peak truck movements as a result of the Onehunga Station construction will be offset from those associated with the Onehunga Depot in order to not have an overwhelming construction traffic effect; Construction traffic entering into the site, will be off O'Rorke Street, Onehunga Mall, Selwyn Street and Princes Street and the routing of trucks will be generally from SH20 Neilson Street and Onehunga Road on/off ramps in order to reduce the impact within the local road network.

4. Operational effects

There are no adverse operational effects on transport from Onehunga Station NoR. Following construction at the station the existing road layout will be reinstated.

5. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3, Appendix x and the proposed mitigation, the actual and potential traffic and transport effects associated with the Project will be appropriately managed.

2. Landscape and visual

The Assessment of Landscape and Visual Effects, included in Appendix xx of Volume 3 assesses the actual and potential effects on the construction and operation phases of the Project as they relate to effects on the (natural and urban) landscape (including visual effects). The section focuses on the landscape and visual effects specific to the Onehunga Station NoR 14. Further discussion on the route-wide landscape and visual effects is considered in Section xx.

The urban form within the Onehunga Station is located within a mid-block platform between Princes Street and Neilson Street spanning an east-west direction. The Onehunga Station NoR includes the southern portion of the town centre, which forms a more industrial form and activity mix. There is little enhancement in walkability and pedestrian amenity that contributes to an overall lack of connection with this area and the town centre.

The natural landscape within the Onehunga Station NoR is characterised by a varying typography that reflects a volcanic lava spur, with the sides falling away on either side. Further to the south is the Te Hōpua ā Rangi tuff crater which was bisected by SH20.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, this station will provide:

- A more permeable block structure that is pedestrian focused, providing a north-south connection along O'Rorke Street, this will support a more pedestrian friendly area within the station location;
- Support activation of Onehunga Mall by providing a plaza and public space that addresses the street, with an elevated station platform;
- A more prominent presence of the station location, by being elevated as well as integrating the existing Onehunga Rail line into the main street of Onehunga town centre, providing better connectivity;
- Supporting development in line with the Eke Panuku masterplan of the Onehunga town centre, better connecting the main street in with Te Hōpua-ā-rangi and Onehunga Wharf.

2. Construction effects

The construction works within the Onehunga Station NoR will involve typical construction activity and will not result in any additional effects than those discussed in Section XX.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

The works within Onehunga Station NoR will result in a change in the urban form and natural landscape. These changes and effects include:

- The elevated and curving viaduct alignment may be dominating and appear as utilitarian;
- The proposed viaduct may contribute to an untidy street scape and dominance of transport infrastructure within the surrounding environment;
- The loss of a block of continuous street frontage;
- Restructuring of the urban block structure may cause the retained buildings to have blank or unattractive rear/side visuals;
- The loss of a Category B AUP heritage place – RSA Bowling Green; and
- A visually prominent viaduct mid-block station has the potential to impede on surrounding buildings privacy and overlooking, particularly at 34 Neilson Street.

5. Conclusion of landscape and visual effects

Mitigation of landscape and visual effects common to the whole Project is discussed in Section xx and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to the Onehunga Station NoR the Assessment of Landscape and Visual Effects recommends the following matters be recognised when undertaking the design of the station:

- Design requirements to support the stations legibility.
- Design requirements to support access to the station;
- Station frontage and activity aligned to provide outlook and activation to the forecourt and across adjacent transport interchange; and

- Design requirements to respond to the Onehunga context.

Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Social

ASSESSMENT OF POTENTIAL SOCIAL IMPACT EFFECTS TO BE PROVIDED

4. Cultural

[TBC based on mana whenua feedback]

5. Built heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the Onehunga Station NoR. .

There are two key historic heritage features located within the Onehunga Station NoR; Carnegie Library (former) and the (former) Post Office. There is also a Special Character Area Overlay Business : Onehunga under the AUP that applies over a portion of the NoR footprint.

There are a further range of historic heritage features within the wider environment, however these are not identified to be affected by the proposed Project.

The key historic features within Onehunga are listed below and shown in Figure xx below: (include map locating identified heritage features)

- Carnegie Library (former);
- Onehunga RSA Assn Bowling Club
- Post Office (former)
- Automatic-telephone exchange and garage (former)
- Special Character Areas Overlay – Business: Onehunga

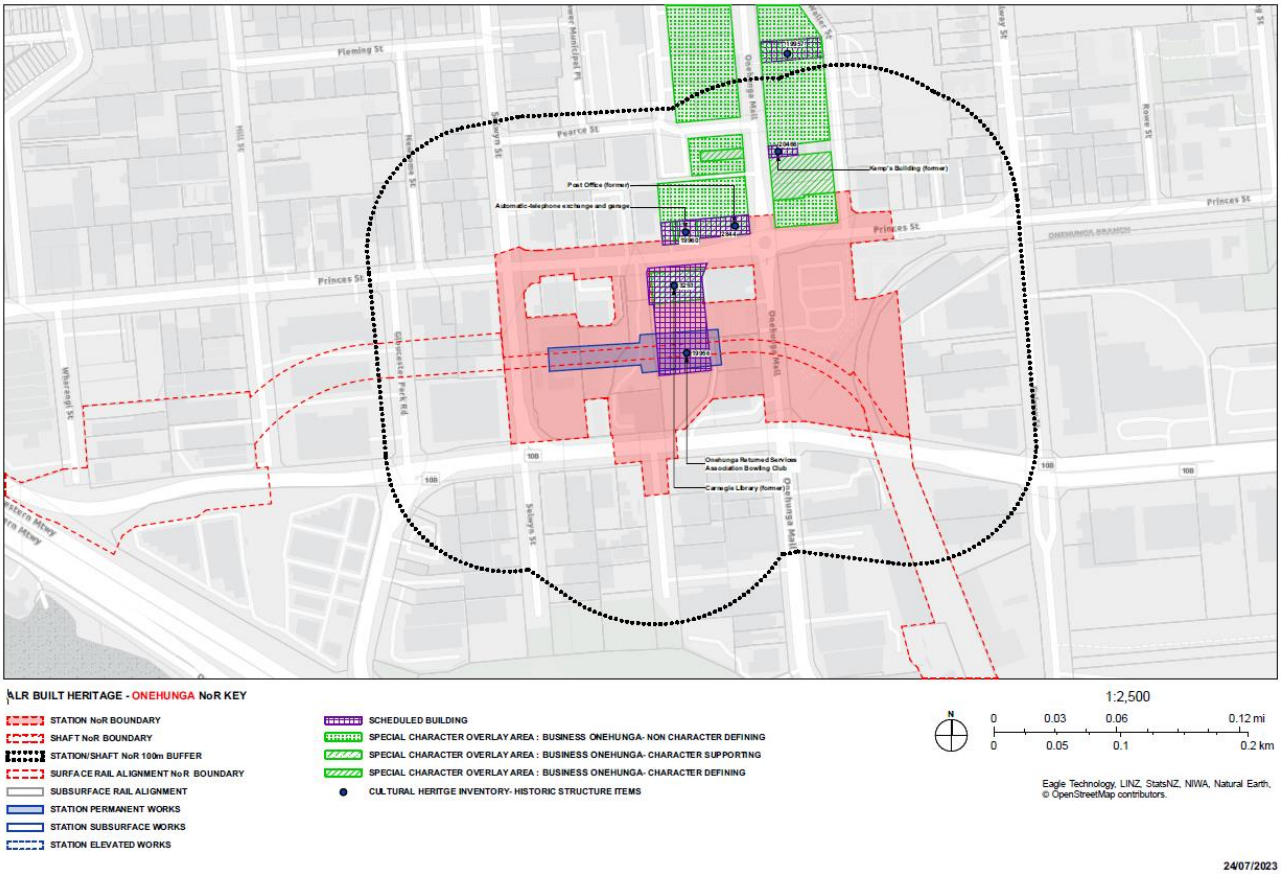

Figure 13: Historic heritage within Onehunga Station NoR

1. Positive effects

Positive effects are not generated during the enabling and construction phases, but there is potential for indirect 'uplift' of Built Heritage Places within the Study Area as an outcome of the development and increased opportunity for visitors, students etc to visit the area.

2. Construction effects

Most of the identified built heritage and historical character buildings within the NoR Study Area are located in the 100m buffer outside of both the NoR boundary and the construction footprint. These places are subject only to low level risks such as cosmetic damage from vibration. Considering the anticipated future environment, any changes to the broader, operational setting for sites are not likely to be significant. Generic minor effects for all sites would be avoided or mitigated through development of an historic heritage management plan, or through reference to other relevant management plans.

The construction works at Onehunga Station will potentially result in the following effects:

- RSA Bowling Green and Clubhouse site is most affected by development of the ALR station and transport network. It is within the construction footprint of the NOR 14 and will potentially be highly impacted by development of both the station, the rail alignment, and the proposed bus transfer hub The bowling green within the Onehunga RSA Bowling Club will not be retained through the Station development, resulting in the loss of a large portion of the building, the heritage bluestone wall along the O'Rourke Street redevelopment(which will only partially be retained) and the bowling green function will cease. This will result in moderate to high impacts on the historical association and context values of the site.
- Potential construction effects on the Carnegie Library (to be retained) include those effects that are generally anticipated through enabling and construction works, for example; dust, accidental damage, utilities and vulnerable features.

3. Construction mitigation measures

Mitigation of built heritage effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Historic Heritage Management Plan (HHMP). In addition, for mitigation of built heritage effects specific to the Onehunga Station NoR the Built Heritage Assessment recommends the following for inclusion in a HHMP:

- Detailed design to integrate the bowling club bluestone wall into the new landscaping scheme;
- Provision for a publicly accessible interpretation material describing the Māori traditions and subsequent historical development of the site;
- Provisioning in the landscape design for alternative community activities (e.g. pétanque, table tennis) that maintain similar connection to the place;
- The temporary relocation of the walls of the present bowling green and rock walls from the site to a storage centre for future reinstatement post-construction, in their original locations. This will be achieved through the implementation of a site specific Heritage Construction Management Plan.; and
- Further archaeological examination of the site during construction (excavation and removal) of the perimeter wall is also required.

4. Operational effects

The operational effects associated with the development of Onehunga Station, will potentially result in the following permanent effects;

- Visual impacts over the Carnegie Library that may result in the modification of a heritage setting with the station as a backdrop, as well as potential cumulative and permanent residual effects.

5. Operational mitigation measures

For mitigation of these effects, the Assessment of Historic Heritage Effects recommends:

- The Carnegie Library to be risk managed and confirm if the building is to be sensitive to construction vibration through the CNVMO and SMP.
- Mitigation of effects to the Onehunga RSA Bowling Club through the following methods:
- Detailed design to integrate bowling club wall into new landscaping scheme
- Provide for publicly accessible interpretation marital describing the Māori traditions and subsequent historical development of the site

- Provision in landscape design for alternative community activities (e.g. pétanque, table tennis) that maintain similar connection to the place.
- This will be addressed in a site-specific Heritage Construction Management Plan and site specific de-construction method for wall removal in sections. to manage any actual or potential adverse effects.

6. Conclusion of historic heritage effects

Based on the assessment above, the Built Heritage Assessment in Volume 3, Appendix xx and the proposed mitigation, the actual and potential effects on built heritage associated with the Project will be appropriately managed.

6. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to the Onehunga Station NoR. Further discussion on the route-wide archaeology effects is considered in Section xx.

In pre-European history Onehunga was an important location for Māori, housing fertile gardens, fisheries, freshwater springs and portages of the area. Onehunga Beach and Te Hopua a Rangi were commonly used as Tauranga (waka landing locations) and the Onehunga papakāinga was one of the largest in the district.

In the mid 1800s land around Onehunga was subject of one of the post-war Fencible settlements. Furthermore, in 1858 the Onehunga Wharf was constructed in stone, with another following in 1859 for Waihoihoi Coal Co.

Much of the land around Onehunga has been subject of reclamation where land was formed for industrial development, a motorway and drainage system upgrades.

The subject NoR site was initially set aside as land for military parade for the Fencible settlement but was later granted as Town District for Onehunga. Houses were begun to be built and by 1891 a house and stables were established, followed by a further 8 houses on the western side of the block. By 1900 the stables were demolished, and commercial buildings were established on Queen Street (now known as Onehunga Mall). The bottom right corner was subject as reclamation in the 1950;' and then subsequently taken with the site to the east under the Public Works Act in 1885 for the site of the Onehunga Branch Railway. It is currently still utilised as a park and Onehunga train station.

There are 13 identified heritage items within 200m of the Onehunga Station NoR as shown in Figure x, all but one site is directly related to archaeology. The feature is identified as Onehunga Station (R11/2742). The remaining identified heritage items are assessed in Section XX.

The site is known as 'Onehunga Station'' and is located directly adjacent to the east of the proposed Onehunga Station NoR. It was part of the first railway lines to be constructed on the Auckland Metro Railway Network in 1873 connecting the Onehunga Wharf with Auckland City. The Site Record Form (SRF) notes that the station is in good condition, and there is no pre-1900 features remaining at the site. The old building has been relocated for use elsewhere in Onehunga. It has been identified that associated sub-surface features may exist within the Onehunga Station NoR.

There is also potential for previously unrecorded archaeological sites associated with pre-European Māori land use and 19th century occupation to be encountered during the works.

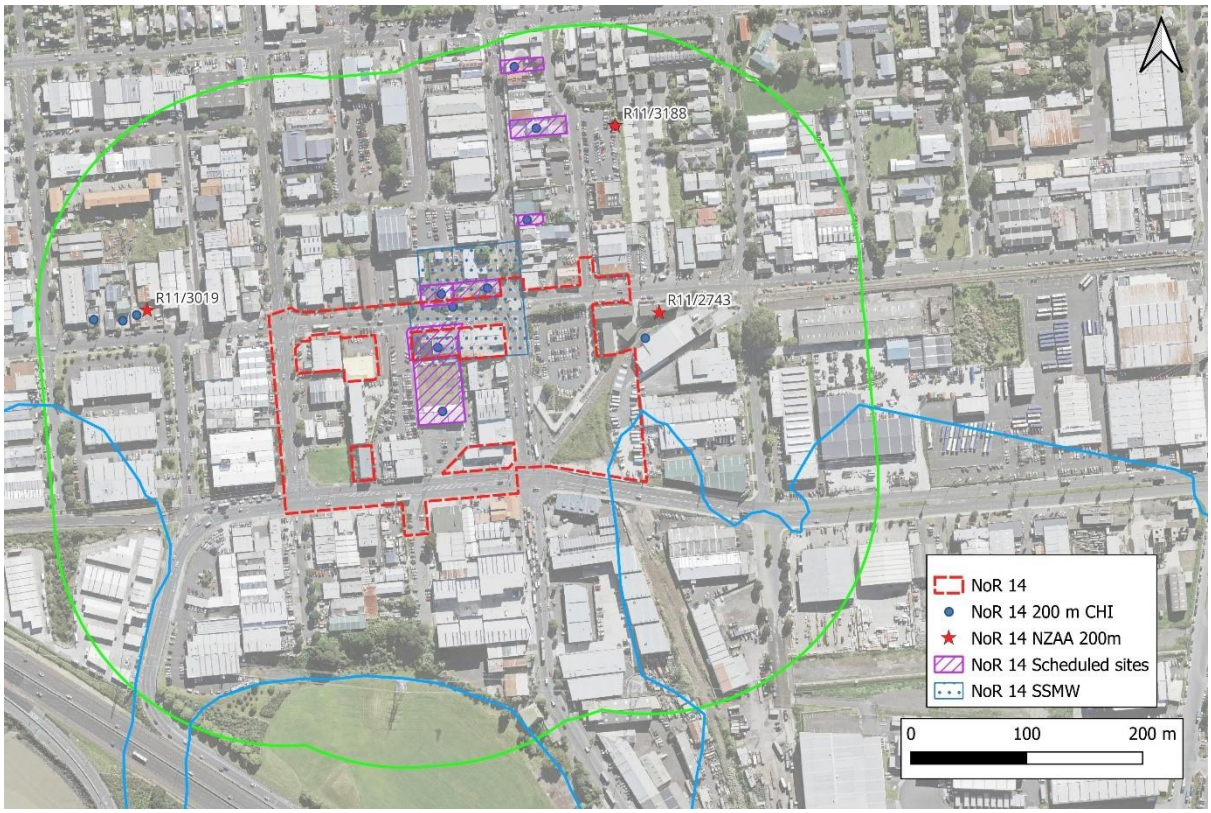

Figure 14: Archaeology within Onehunga Station NoR 200m buffer.

1. Positive effects

There are no positive effects in regard to the impact of the Project on archaeology as by its very nature construction requires disturbance of the ground which archaeological remains may be present. However, management processes can be established to enable the recording of archaeological material found during construction of the Project, providing valuable insight in to the history of the Project.

2. Construction effects

While one scheduled archaeological site, Onehunga Station (R11/2742), is identified within the Onehunga Station NoR, this is adjacent to the heavy rail tracks, and will not be subject to any physical works. It is also important to note that Onehunga Station will be an elevated viaduct structure, and therefore less-significant earthworks will be required for the establishment.
The construction works within the Onehunga Station NoR will not result in any additional construction effects on archaeology than those set out in the route-wide effects included in Section xx.

3. Construction mitigation measures

Mitigation of archaeological effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Historic Heritage Management Plan (HHMP), inclusive of accidental discovery of archaeological features. There are no specific archaeological effects that require mitigation with respect to Onehunga Station NoR.
In addition, an Authority to Modify Permit will be sought from Heritage New Zealand Pouhere Taonga. .

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during the construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Volume 3 Appendix xx and the proposed mitigation, the actual and potential effects on archaeology associated with the Project will be appropriately managed.

7. Arboriculture

An Arboriculture Assessment has been undertaken and included as Appendix XX in Volume XX. Arboriculture within the Onehunga Station NoR boundary is limited to street trees located within roads identified within the NoR footprint..

8. Open space

[ASSESSMENT OF POTENTIAL OPEN SPACE EFFECTS TO BE PROVIDED]

9. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to hydrology and flooding. This section focuses on the hydrology and flooding effects specific to Onehunga Station NoR. Further discussion on the route-wide hydrology and flooding effects is considered in Section x.

The Onehunga Station NoR is located within the Royal Oak Stormwater Catchment. The key hydrological features, inclusive of flooding are listed below and shown in Figure XX below:

One flood plain covering the north-western corner of the proposed Onehunga NoR Station.

- Two overland flow paths at the site: one flowing west across Selwyn Street and continues west, and one across the south-eastern corner and continues to flow south.

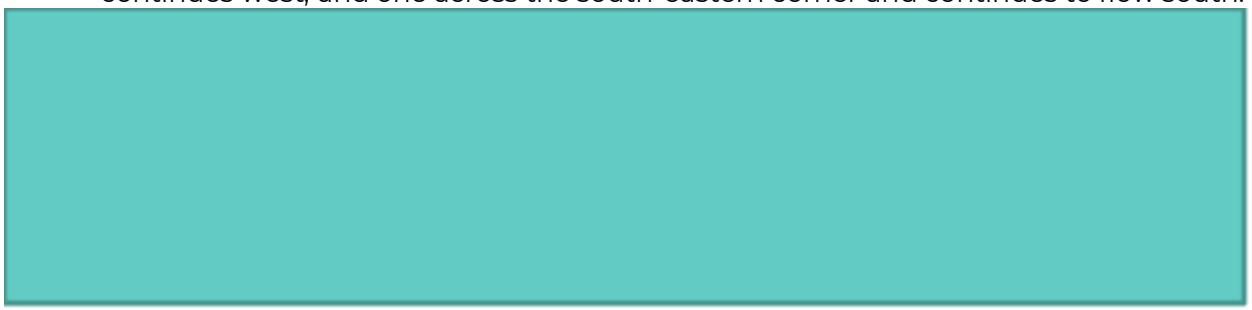

Figure 15: Hydrology within XX NoR

1. Positive effects

There are no positive effects in relation to flooding at the site.

2. Construction effects

[TBC following the report. Will need to assess the impact of constructing infrastructure within flood plain and overland flow path]

3. Operational effects

[TBC following the report. Will need to assess the impact of the permanent infrastructure within flood plain and overland flow path]

4. Mitigation measures

[TBC].

5. Conclusion of hydrological and flooding effects

Based on the assessment above and the proposed mitigation, the effects will be XXX (follow RMA wording i.e. less than minor…)

10. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phases of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to the Onehunga Station NoR 14. Further discussion on the route-wide construction noise and vibration effects is considered in Section xx.

The existing noise environment consists of traffic noise typical of a suburban acoustic environment.

The sensitive receivers are listed within Table xx of this NoR, however those with particular note within Onehunga Station NoR include the following:

- 49 Princes Street (Repco Onehunga);
- 104-106 Onehunga Mall (Parkinson and Bouskill Headstones Onehunga);
- Bluestone Wall;
- 55 Princes Street (Carnegie Library)

These sensitive receivers are also shown in Figure xx below.

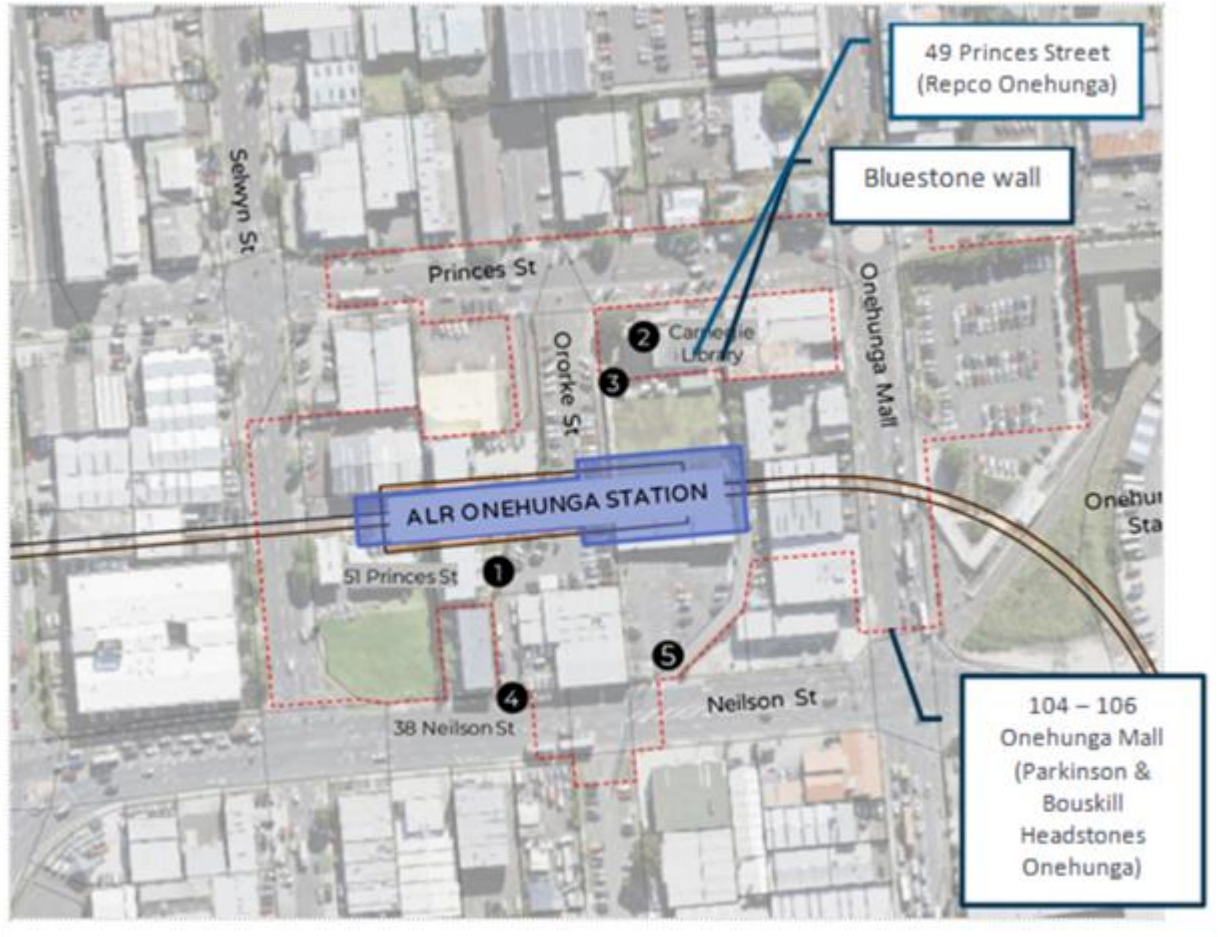

Figure 16 Sensitive receivers within Onehunga Station NoR

1. Positive effects

There are no positive construction noise and vibration effects relevant to the Onehunga Station NoR.

2. Construction noise effects

The construction works at Dominion Junction Station will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the Suburban Worksite construction noise standards as applicable in this location.

Based on the noise modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts infringements of the Project noise standards during the day may occur. These infringements could range between 5-10 decibels, typically one to three hours at a time. The nature of these effects ranges from being uncomfortable to passers-by to unacceptable indoor levels where occupants seek respite away from the noise.

3. Construction noise mitigation measures

Mitigation of the construction noise effects common to the whole Project is discussed in Section xx. This mitigation takes the form of preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved via a Schedule to the CNVMP. No additional noise measures are required at Onehunga Station.

4. Construction vibration effects

The construction works at Onehunga Station NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted potential infringement of the Project vibration standards in this location using compaction activity as the highest vibration generating activity given the sustained vibration produced, usually over a period of days while fill is compacted.

The effects of construction vibration take two forms:
Potential for building damage; and
Potential for loss of amenity.
The Construction Noise and Vibration Assessment predicts potential infringement of the Project vibration standards related to building damage at sites adjacent to the works area during station construction. There is a higher risk of damage at the Carnegie Library, receiver No XX.

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction vibration standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project vibration standards can only be achieved only via a Schedule to the CNVMP. The Construction Noise and Vibration Assessment recommends the following with respect to receiver No XX Carnegie Library:

- Identify the location of the decorative orbs.
- Identify existing measures to mitigate environmental vibration within the receiving building and its vibration sensitive features.
- Monitoring of the decorative orbs.

6. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Volume 3, Appendix xx and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

11. Operational noise and vibration

[ASSESSMENT OF POTENTIAL OPERATIONAL NOISE AND VIBRATION EFFECTS TO BE PROVIDED]

12. Blasting overpressure and vibration

[Construction activities requiring blasting to be undertaken are not anticipated at Onehunga Station NoR]

13. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blasting Noise and Vibration Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of structural damage to buildings and structures.
This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to the Onehunga Station NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.
The surrounding built environment comprises a mix of shallow founded low-rise domestic dwellings, commercial and industrial buildings.
All buildings identified as being subject to vibration or settlement effects in the Onehunga Station NoR will be acquired and demolished.

1. Positive effects

Section X of this AEE outlines route wide positive effects. However, the Structures and Settlement Assessment does not identify any additional positive effects specific to Onehunga Station NoR.

2. Construction vibration induced effects

Vibration induced building damage common to the entire Project area is discussed in Section XX. The Structures and Settlement Assessment has concluded that buildings adjacent to the

NoR fall outside the vibration setback thresholds and as such the potential for damage is Negligible.

3. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX, in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CVNMP and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Settlement effects common to the entire Project area are discussed in Section XX. At Onehunga Station excavations will generally be limited to that required for construction of the viaduct foundations. Any resulting settlement will be local to the works, not extending any significant distance. The Structures Assessment concludes the effect on surrounding buildings will be Negligible.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx in the form of a Settlement Management Plan (SMP), recommended in condition XX provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. Operational settlement and vibration induced effects

There are no settlement induced effects associated with the operation of the Project. The potential for settlement effects will occur only during the construction of the Project. Vibration effects on building, resulting from the operation of the Project is addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section xx.

7. Conclusion of settlement and structure effects

Based on the assessment above, the Settlement and Structures Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on buildings with will be appropriately managed.

14. Geological heritage

The Assessment of Volcanology Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project.
There are no volcanology implications subject to Onehunga Station NoR.

1. Notice of Requirements

1. NoR 12 – Depot NoR

This section:

- Describes Depot NoR 12 (section 10.16.2)
- Summarises the existing and receiving environment (section 10.16.3)
- Assesses effects and outlines mitigation (section 10.164)

2. NoR description

The Depot is proposed to be the sole location at which trains for the ALR line will be inspected, maintained, and overhauled. The Depot will also accommodate most of the train stabling capacity. The Depot is also envisaged as being the operational and administrative headquarters of the rail operator. As such, the Depot is intended to accommodate management and rail operation staff only and is not intended for patronage use. The proposed Depot NoR will be located on existing industrial properties bordered by Victoria Street, Alfred Street and Galway Street in Onehunga.

Figure 1 shows the Depot and NoR footprint. Figure 2 shows the NoR footprint on aerial imagery (outlined in red). Table 1 summarises the Depot NoR's permanent features and temporary construction works.

Figure 1: Depot NoR 12 location plan

Figure 2: Depot NoR footprint on aerial imagery

Table 1: Depot NoR description

Permanent features	
Station	N/A
Platforms	N/A
Public realm	• Enhancement of canopy coverage and planting of native foliage on Neilson Street's existing road. • Proposed bioswale infrastructure along north of Neilson Street. • Coastal remediation and increase of canopy coverage and green spaces between Waikaraka Park / Cemetery and Alfred Street. • Provisions for green stormwater reservoirs integrated into the urban streetscape.
Road and streetscape	• Improved access to Waikaraka Cycleway • Improved pedestrian walkways on Alfred Street and Victoria Street
Parking and loading	• Car parking spaces provided for Depot employees, contractors, visitors, and road bound operational vehicles • Provision for bike parking, mobility hub and EV charging infrastructure • Access Road and manoeuvring areas
Other new infrastructure	• Stabling track at 100m maximum length • Test track • Maintenance tracks at 100m maximum length • Reception road • Outdoor storage area • Infrastructure maintenance building • Administration building

	• Intake and traction substation • Storage facility
Anticipated patronage	N/A – Depot not intended for passenger use
Other	• Potential provision for end-of-trip facilities for Depot staff • Anticipated operational traffic is likely to reflect the car parking spaces provided for light rail drivers and Depot staff.
Anticipated construction works	
Construction staging	Refer to AEE Section 6 and DCR Section X for more detail. At a high level the construction activities at Depot NoR will include: • Demolition, site clearance, utilities relocation/protection. Establish site offices, amenities, dewatering & sediment control systems. Install monitoring to neighbouring buildings if required. • Strip topsoil/unsuitable material. • Construct retaining walls and cut/fill site to desired level. • Construct connections to main line viaduct. • Install depot buildings & rail systems. *Note: this is indicative and could be subject to change to align with site constraints and public and stakeholder engagement.*
Access to the site	• Victoria Street and Alfred Street
Other	• Construction traffic estimated to be: ○ Long term peak (more than one week duration): up to 330 trucks per day. ○ Short-term peak (one day duration): 50 trucks per day.

3. Description of the environment

This section sets out the nature of the environment for the Depot NoR. It applies the assumptions outlined in Section 10.1.3.

Table 2 describe the surrounding area and features. Any property directly affected by this NoR is listed in Appendix X to NoR 12 Form 18.

Table 2: Existing environment description

Feature	Description
Current land use	• Industrial and storage businesses such as Visy Recycling, the Urban Quarry, Onehunga Community Recycling Centre and Mata Gas. • Waikaraka Park and Cemetery adjacent on eastern border • Manukau Foreshore Walkway adjacent on southern border
Physical Environment	
Transport	• Existing private vehicle traffic volumes on a weekday along Victoria Street is 3,715 vehicles per day. • Existing private vehicle traffic volumes on a weekday along Onehunga Harbour Road is 22,060 vehicles per day. • Victoria Street extending off Neilson Street from the north and loops within site as a cul-de-sac. • SH20 located approx. 170m west of site, connecting to Māngere Bridge. • Nga Hau Māngere Bridge for recreational walking and cycling starting from Onehunga Wharf connecting into Coronation Road • Industrial and freight roads (Galway Street, Alfred Street, Neilson Street, Onehunga Mall Street)

	• No walking and cycling paths along Victoria Street and Galway Street • Narrow footpath on both sides along Neilson Street • Existing Onehunga Train Station located approx. 650m north-west of site • Recreational walking trails along Manukau Foreshore coastline
Infrastructure	• Transport overhead line at the top northern NoR boundary between Victoria Street and Alfred Street • Vector electricity lines near 1 Victoria Street on NoR footprint • Chorus and Vodafone lines adjacent on west of NoR footprint • Water transmission line adjacent to Galway Street • Local water pipe network adjacent to NoR footprint along Victoria Street • Sewer transmission line approx. 450m west of NoR footprint • Local sewer pipe adjacent NoR footprint along Victoria Street discharging to Neilson Street • Stormwater pipe east-west aligned across NoR site, discharging to south of site • Pressure gas pipe located near Victoria / Neilson Street intersection
Community facilities and key attractions	• Education facilities: OneSchool Global NZ, Multilingual Kids Home-Based ECE Services • Sport and recreational facilities: Te Hopua ā Rangi/Gloucester Park, Manukau Foreshore Walkway / Waikaraka Cycleway, Old Māngere Bridge Heritage Garden, Waikaraka Park, Waikaraka Family Speedway • Cultural and community facilities: Christian Congregational Church of Samoa, Waikaraka Cemetery • Nearest local centre is Onehunga Mall Street around Onehunga Library and Dress Smart Mall
Sensitive noise receivers	• *[pending confirmed receivers from CNVA]*
Built heritage	• Category B Waikaraka Cemetery on the east of Alfred Street
Archaeology	• Original shoreline extends into northern and eastern portions of NoR, potential for some archaeological remains remaining beneath the reclamation • 1 Historic Structure approx. 340m west of NoR between Onehunga Mall and Gloucester Park, recorded on AC Cultural Heritage Inventory • 1 Historic Botanical Site approx. 340m north-east of NoR at corner of Neilson / Alfred Street, recorded on AC Cultural Heritage Inventory
Cultural	• 2 Sites and Places of Significance to Mana Whenua west of NoR at Te Hopua ā Rangi/Gloucester Park near Onehunga Harbour
Natural Environment	
Topography	• Slopes downwards from west to east of NoR • Gradual northern slope downwards from west of NoR towards Neilson Street • Steep downwards slope from southern NoR footprint towards coastline
Geology	• XX

	• Potential presence of contaminated soils as the site was previously a landfill for industrial waste. A Preliminary Site Investigation will be undertaken to confirm this at a later stage as part of Regional Consent applications.
Catchment	• Located within Onehunga Stormwater catchment
Ecology	• Banded kokopu and native fish species recorded within Te Papa Reserve at watercourse • Threatened aquatic moss species at Bycroft Reserve
Flooding and hydrology	• Two flood plains, one on southern side and other in south-eastern corner of NoR footprint. • Two overland flow paths • Two flood prone areas contiguous with the two flood plains • At risk of 100-year ARI surface water flooding
Trees and vegetation	• Vegetation on the western portion of NoR • Row of trees along boundary of 19 Galway Street (north of NoR) • Vegetation patch in middle along Victoria Street • Large, vegetated area at the southern portion of NoR, connecting to the vegetated strip along southern NoR boundary towards coastline
Terrestrial Ecology	• Native revegetation; located alongside the Manukau Foreshore Walkway. Includes pōhutukawa (Threatened – Nationally Vulnerable). • Exotic-dominated treeland; located adjacent to Onehunga Harbour Road. • Exotic shrubland; exotic shrubland is dominated by exotic shrubs 2 to 5 m in height including woolly nightshade, brush wattle and pampas. • Grassland; located alongside the Manukau Foreshore Walkway.

Error! Reference source not found. and Table 3 identify the relevant statutory considerations within the Depot NoR footprint.

Figure 3: Depot NoR zoning and overlays in the AUP

Table 3: Depot NoR footprint outlined in red – AUP Statutory layers (Source: Auckland Council GeoMaps)

Depot NoR	Description	Comment
Current NoR zoning	Business – Heavy Industry	Victoria Street properties and Alfred Street properties on west side
	Open Space – Informal Recreation	Manukau Foreshore Walkway adjacent on south of site along coast
	Coastal – General Coastal Marine	General surrounds
Precincts	NA	NA
Overlays		
	Natural Heritage: Regionally Significant Volcanic Viewshafts and Height Sensitive Area [rcp/dp] – O11, One Tree Hill, Viewshafts	Western portion of site
	Infrastructure: National Grid Corridor Overlay – National Grid Yard Compromised	Galway Street, extending to Victoria Street and Alfred Street

	Infrastructure: National Grid Corridor Overlay – National Grid Subdivision Corridor	Galway Street, extending to Victoria Street and Alfred Street
Controls	Coastal Inundation 1% AEP Plus 1m Control – 1m sea level rise	Portion of 4 Alfred Street, extending to the coastline on the south and around the site
	Macroinvertebrate Community Index – Exotic	Small portion on the south-western corner of the site and vegetated area bordering the coastline
	Macroinvertebrate Community Index – Urban	
Designations	Designation 9102, East Tamaki to Taupaki Gas Pipeline, First Gas Ltd	Underground, east-west alignment extending from Southwestern Motorway, along the coastline south of the site, then towards Waikaraka Cemetery
	Designation 6774, East West Link, Waka Kotahi	Designation extends into eastern and southern portions of site.
	Airspace Restriction Designations – ID 1102, Protection of aeronautical functions – obstacle limitation surfaces, Auckland International Airport Ltd	Proposed works will not affect Airspace Restriction Designation.
Regional Plan Controls and Overlays	Natural Resources: Quality-Sensitive Aquifer Management Areas Overlay [rp]	General surrounds
	Natural Resources: High-Use Aquifer Management Area [rp] – Onehunga Volcanic Aquifer	General surrounds
Zoning within 800m catchment	• Business – Heavy Industry • Business – Light Industry • Business – Mixed Use • Business – Town Centre • Open Space – Sport and Active Recreation • Open Space – Informal Recreation • Open Space – Conservation • Open Space – Community • Special Purpose – Waikaraka Cemetery • Residential – Terrace Housing and Apartment Building • Coastal – General Coastal Marine • Coastal – Minor Port	• Multiple zones within 800m catchment from proposed NoR, primarily industrial and business zones with several parks and reserves. • Coastal zones along southern boundary of NoR and further in the south-western direction near Onehunga Wharf • Waikaraka Cemetery is zones as Special Purpose

	• Coastal – Coastal Transition	
Anticipated future zoning within 800m catchment	As above, but with the following changes: • Business – Town Centre; increased heights • Business – Mixed Use; increased heights	Refer Section 10 for analysis.
Other relevant considerations	Plan Change 78 – Intensification, Multiple Layers	Across general surrounds of site
	Future Coastal Hazards Plan Change, Multiple Layers	Across general surrounds of site with some exception
	Seeking changes to zones or management layers, East West Link – Multiple Appeals	Designation extends into eastern and southern portions of site.

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operational phases of the Project as they relate to Depot NoR.

This builds on the technical assessment included in Volume 3 and the Design and Construction Report in Appendix X. Section XX outlines the indicative construction methodology used for these assessments.

1. Traffic and transport

The Assessment of Transport Effects, included in Appendix X of Volume 3 assesses any actual and potential traffic effects of the construction and operational phases of the Project as they relate to effects on traffic and transport. This section focuses on the transport effects specific to the Depot NoR. Further discussion on the route-wide transport effects is considered in Section XX.

The proposed Depot NoR will be located on existing industrial properties along the southern end of Victoria Street, which extends into an accessway towards the direction of the coastline. The eastern NoR boundary is bordered by Alfred Street, with Waikaraka Cemetery on the immediate east. Neilson Street runs east-west approximately 240 m north of the north-eastern NoR boundary. Galway Street intersects with Neilson Street and extends into a private accessway located approximately 205 m north of the north-western NoR boundary.

Key transport features within and adjacent to the Depot NoR include:

- **Public transport (bus services)**: No bus services are in the vicinity of the NoR.
- **Public transport (heavy rail):** The nearest train station is the existing Onehunga Train Station located approximately 800 m from the NoR.
- **Roading network:** Neilson Street, Victoria Street Alfred Street borders the NoR site. Neilson Street connects to the SH20 on- and off-ramp. High proportion of traffic volumes along Neilson Street and Onehunga Harbour Road, including freight vehicles.
- **Walking:** Walking facilities are limited around Neilson Street, Victoria Street, Galway Street and Alfred Street, with poor pedestrian crossing facilities and unseparated footpaths.
- **Cycling:** Cycle routes include those on Onehunga Mall, Waikaraka Cycleway and the Nga Hau Māngere Bridge (shared path).
- **Private vehicles:** Depot is only intended for non-passengers such as management and operational staff of the ALR rather than the general public. It is anticipated for 40-50 daily vehicle trips to the Depot, which is less than the existing daily vehicle volumes.
- **Parking:** Parking within the vicinity is mixed on-road and private car parking facilities.
- **Loading:** XXX
- **Emergency Services:** XXX

1. Positive effects

Section X of this AEE outlines route wide positive effects. However, there are no positive traffic and transport effects relevant to this NoR.

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section XX. The proposed works at the Depot NoR will potentially result in the following adverse construction traffic effects:

- **Public transport (bus services):** Train services or bus services would likely be unaffected during construction, given there are no train or bus services in the immediate vicinity of the Depot NoR.
- **Walking:** Existing footpaths on Neilson Street and Victoria Street may require some temporary realignment during the active mode upgrades and when the Neilson Street / Victoria Street intersection is being signalised. Alfred Street will be closed for public access during construction. The Manukau Foreshore Walkway / Waikaraka Cycleway may also be partially closed or narrowed during construction of the retaining wall, and some detours may be required.
- **Cycling:** There are no on-road cycle facilities affected by the construction, although cyclists will be required to navigate the local network that may be congested during construction. The Manukau Foreshore Walkway / Waikaraka Cycleway may also be partially closed or narrowed during construction of the retaining wall, and some detours may be required. Alfred Street will be closed for public access during construction.
- **Private vehicles:** Some additional delays are to be anticipated at the Neilson Street / Victoria Street and Neilson Street / Alfred Street intersections to allow for truck construction site access. Alfred Street will be closed for public access during construction.
- **Emergency Services:** May experience delays on Neilson Street if bound for locations near the Depot NoR construction site due to potential congestion.
- **Freight:** Minimal effect on freight routes as none of the construction access arrangements will obscure these routes. Any effect would be limited to time delay associated with an increase in construction vehicle trips in the area.

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP). The Assessment of Transport Effects recommends the following opportunities for inclusion in the CTMP in relation to the Depot:

- **Public transport (bus services):** None specific to Depot NoR. Refer to route-wide section (Section XX).
- **Public transport (heavy rail):** None specific to Depot NoR. Refer to route-wide section (Section XX).
- **Roading network:** Routing of trucks associated with construction will generally be via the SH20 Neilson Street / Onehunga Harbour Road on/off ramps. Periods of peak truck movements associated with the Depot should be offset from those associated with the Onehunga Station.
- **Walking:** None specific to Depot NoR. Refer to route-wide section (Section XX).
- **Cycling:** None specific to Depot NoR. Refer to route-wide section (Section XX).
- **Private vehicles:** None specific to Depot NoR. Refer to route-wide section (Section XX).
- **Parking:** None specific to Depot NoR. Refer to route-wide section (Section XX).
- **Loading:** None specific to Depot NoR. Refer to route-wide section (Section XX).
- **Emergency Services:** Provision for emergency services in and around the construction site will be made, this will be discussed with emergency service providers prior to construction being undertaken.
- **Freight:** Routing of trucks associated with construction will generally be via the SH20 Neilson Street / Onehunga Harbour Road on/off ramps. Periods of peak truck movements associated with the Depot should be offset from those associated with the Onehunga Station.

4. Operational effects

There are no adverse operational effects on transport from Depot NoR. Following construction at the station, the existing road layout will be reinstated. The exception is the southern end of Alfred Street which will no longer function as a vehicle access.

5. Operational mitigation measures

For mitigation of these effects, the Assessment of Transport Effects recommends:

- **Public transport (bus services):** None specific to Depot NoR. Refer to route-wide section (Section XX).
- **Public transport (heavy rail):** None specific to Depot NoR. Refer to route-wide section (Section XX).
- **Roading network:** Consideration for signalised intersection at Neilston Street / Victoria Street.
- **Walking:** Walking and cycling access to Manukau Foreshore Walkway / Waikaraka Cycleway provided via Alfred Street.
- **Cycling:** Walking and cycling access to Manukau Foreshore Walkway / Waikaraka Cycleway provided via Alfred Street.
- **Private vehicles:** None specific to Depot NoR. Refer to route-wide section (Section XX).
- **Parking:** Depot car park entrance will be located on Victoria Street.
- **Loading:** None specific to Depot NoR. Refer to route-wide section (Section XX).
- **Emergency Services:** One emergency vehicle parking required to serve the Depot.
- **Freight:** Routing of trucks associated with construction will generally be via the SH20 Neilson Street / Onehunga Harbour Road on/off ramps. Periods of peak truck movements associated with the Depot should be offset from those associated with the Onehunga Station.

6. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3 and Appendix XX and the proposed mitigation, the actual and potential traffic and transport effects will be appropriately managed.

2. Urban design, landscape and visual

The Assessment of Landscape and Visual Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the (natural and urban) landscape (including visual effects). This section focuses on the landscape and visual effects specific to the Depot NoR. Further discussion on the route-wide landscape and visual effects is considered in Section XX.

The urban form within the Depot NoR is characterised by several of adjoining large-scale industrial shed buildings and a mix of open yard activities that is accessed from Victoria Street. The urban form immediately surrounding the NoR is similar to the industrial buildings and open yard activities. T he overhead SH20 corridor located approximately 240 m west of the NoR is a visually prominent structure in the area.

The natural landscape within and surrounding the Depot NoR is characterised by the former circular shoreline of Te Hopua-ā-Rangi and Waikaraka Cemetery from lava flows and tidal inlets. The vicinity of the coastal environment and the Manukau Harbour makes the location of the Depot NoR distinctive.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, the Depot will provide:

- Opportunities to bring positive amenity values to the existing industrial environment such as through architectural elements.

2. Construction effects

The construction works within the Depot NoR will involve typical construction activities. The LVA identifies the follow potential effects:

- Adverse visual effects for passers-by and visitors to the Waikaraka Cemetery, Manukau Foreshore Walkway / Waikaraka Cycleway and Manukau Harbour from the presence of construction machinery and equipment.
- Demolition of eight residential units at 2 Alfred Street facing the Manukau Harbour.

The construction of the Depot NoR will likely be experienced in conjunction with that of the new bridge and potentially that of the East-West Link.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

The works within Depot NoR will result in a change to the urban form and natural landscape. These changes involve:

- Visibility of operational trains that will be arriving and departing from the Depot;
- Adverse visual amenity effects for locals, passers-by and visitors associated with the high perimeter fences along the boundary of the Depot, particularly being located by the coast and adjacent to the Manukau Foreshore Walkway.
- Change of human scale along Alfred Street with the raised Depot building that abuts the western edge of the Alfred Street road corridor.
- Adverse visual amenity effects from the Māngere Bridge and Nga Hau Māngere Bridge onlooking the Depot, given the prominent location on the edge of the Manukau Harbour.
- Adverse visual amenity effects for visitors of Waikaraka Cemetery, particularly in relation to the leachate management area at the south-eastern corner adjacent to Alfred Street.

5. Permanent infrastructure mitigation measures

Mitigation of landscape and visual effects common to the whole Project is discussed in Section XX and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to the Depot NoR, the Assessment of Landscape and Visual Effects identifies the following opportunities for inclusion in the CULDG when undertaking the design of the Depot:

- Opportunities for site rehabilitation and restoration of natural character of the site to include replanting of indigenous coastal forest on the scarp and perimeter of the site platform;
- Attention to architectural design and aesthetic qualities in the configuration of the site and associated buildings and structures including train sheds;
- Attention to architectural design of the boundary wall and perimeter fencing treatments to Alfred Street on the east;
- Landscape buffer opportunity between main eastern wall of Depot building and Alfred Street adjacent to Waikaraka Cemetery.
- Landscape buffer opportunity between existing vegetation within the Manukau Foreshore reserve;
- Reinstatement of the Manukau Foreshore Walkway for public access.

6. Conclusion of urban design, landscape and visual effects

Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Social

[ASSESSMENT OF POTENTIAL ADVERSE SOCIAL IMPACT EFFECTS TO BE PROVIDED]

4. Cultural

[TBC cultural report]

5. Built Heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the Depot NoR. No known built heritage exists within the Depot NoR footprint. However, the Waikaraka Cemetery (ID 1755) is a scheduled 'Historic Heritage and Special Character' item identified within the 100 m buffer of the Depot NoR footprint, immediately on the east of the Depot NoR footprint. This is shown in below:

Figure 4: Built heritage within Depot NoR 100m buffer

1. Positive effects

There are no positive effects in regard to the impact of the Project on built heritage as by its very nature, construction requires disturbance of the ground which may induce effects such as damage from vibration and ground settlement on built heritage features.

2. Construction effects

The construction works within the Depot NoR will not result in any additional construction effects on built heritage than those set out in the route-wide effects included in Section XX.

3. Operational effects

There are no operational effects on built heritage. The potential for adverse effects on built heritage will occur only during the construction of the Project.

4. Conclusion of built heritage effects

Based on the assessment above, the Built Heritage Assessment in Volume X Appendix XX and the proposed mitigation, the actual and potential adverse effects on built heritage associated with the Project will be appropriately managed.

6. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to the Depot NoR. Further discussion on the route-wide archaeology effects is considered in Section XX.

The Depot is located within an industrial area in Onehunga, with strong pre-European Māori historic occupation and settlement records particularly given its location near the harbour and Te Hopua a Rangi Tuff ring for fisheries and agricultural purposes.

The majority of the existing Depot site was not part of the original shoreline. The shoreline was reclaimed in the 1960s, with the only portion of original shoreline in the easternmost portion of the NoR footprint. This portion within the NoR footprint has been historically subject to various land uses and activities, primarily for recreational or industrial purposes. It was originally used as a rifle range in the late 1880s, but transitioned as a landfill for night soils in the early 1900s. It was then used as tennis courts and became known as the Waikaraka Landing.

There are no archaeological features within the Depot NoR footprint. The key archaeological features in the 200 m buffer of the Depot NoR footprint are listed below and shown in Figure 5 below:

- Waikaraka Park and Cemetery
- Shadrick Building (ref. 1995.1)

Figure 5 Archaeology around Depot NoR

1. Positive effects

No positive effects on archaeology have been identified as by its very nature construction requires disturbance of the ground in which archaeological remains may be present. However, management processes can be established to enable the recording of archaeological material found during construction of a project, providing valuable insight into the history of a site.

2. Construction effects

The construction works within the Depot NoR will not result in any additional construction effects than those set out in the route-wide effects included in Section XX.

3. Construction mitigation measures

Mitigation of archaeological effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Historic Heritage Management Plan HHMP, inclusive of accidental discovery of archaeological features, specified in proposed Condition XX of the draft condition set in Appendix XX.

Any earthworks within the identified non-reclaimed portion in the NoR (Figure 6) should be monitored by an archaeologist at least 4 weeks prior to commencement of works.

In addition, Authority to Modify or Destroy the whole or any part of both a recorded site and unrecorded archaeological sites will be sought from Heritage New Zealand Pouhere Toanga under s44 of the Heritage New Zealand Pouhere Taonga Act 2014.

Figure 6 Area recommended for archaeological monitoring during earthworks

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during the construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential adverse effects on archaeology associated with the Project will be appropriately managed.

7. Arboriculture

The Arboricultural Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on arboriculture. This section focuses on the arboricultural effects specific to the Depot NoR. Further discussion on the route-wide arboricultural effects is considered in Section XX.

The Depot NoR is currently occupied by industrial activities, with patches of vegetation and trees scattered across the NoR footprint A sloping vegetated embankment comprising mostly of exotic pest plants is located within the coastal margin between the built land and the Manukau Foreshore Walkway. Mature pōhutukawa trees are planted in the road reserve of Victoria Street. Some patches of vegetation and trees are also observed within the private properties. There are no scheduled trees identified within the NoR footprint, however there are a range of trees in roads and open space identified within the NoR footprint.

The following trees in roads and open space have been identified within the Depot NoR extents:

- Native plants on coastal margin on south of Manukau Foreshore Walkway, including Sydney golden wattle, manawa taupata, tī kōuka, pampas grass, pōhutukawa, ngaio, brush wattle, whararikī, karo and woolly nightshade (marked as '1' on Figure 7).
- Pōhutukawa trees along coastal margin / Manukau Foreshore Walkway and Victoria Street (marked as '2', '5' and '6' on Figure 7).
- Native plants at 2 Alfred Street, including taupata, tī kōuka, pohuehue, whararikī and karo (marked as '3' on Figure 7).

Figure 7: Arboricultural features within Depot NoR

1. Positive effects

There are no positive effects in regard to arboriculture as the trees are required to be removed for the construction and establishment of the Depot.

2. Construction effects

Arboricultural effects which apply to the entire Project area are discussed in Section XX. Establishment of a retaining structure along the southern embankment of the site will require removal of vegetation located to the north of the Manukau Foreshore Walkway (identified as '4' in Figure 7 . There are four generally protected pōhutukawa street trees along Victoria Street that may be impacted during construction.

3. Construction mitigation measures

Mitigation of arboricultural effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Tree Management Plan (TMP) specified in proposed condition XX of the draft condition set in Appendix XX. There are no specific arboricultural effects that require mitigation with respect to the Depot NoR.

Removal of the poor-quality vegetation that is present on the embankment at the southern edge of the depot site provides an opportunity for new native trees to be planted. Replanting can aim to remediate the loss of ecological services and amenity values that current trees provide, by establishing native specimen trees and planting.

4. Operational effects

There are no operational effects on arboriculture. The potential for adverse effects on arboriculture will occur only during the construction of the Project.

5. Conclusion of arboricultural effects

Based on the assessment above, the Arboricultural Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential adverse effects on arboriculture associated with the Project will be appropriately managed.

8. Open space

[ASSESSMENT OF POTENTIAL ADVERSE OPEN SPACE EFFECTS TO BE PROVIDED]

9. Flooding

[TBC hydrology report to complete this section[

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to hydrology and flooding. This section focuses on the hydrology and flooding effects specific to the Depot NoR. Further discussion on the route-wide hydrological effects is considered in Section XX.

The Depot NoR is located on gently sloped land that has been reclaimed from the Manukau Harbour and is an internal ridge within the wider Onehunga Stormwater catchment, specifically within the One Tree Hill Stormwater catchment. Due to the shaping of the reclaimed land, the Depot NoR area is slightly elevated above the surrounding land and there is no contributing upstream catchment.

The key hydrological features, inclusive of flooding are listed below and shown in Figure 8:

- Two flood plains, one on southern portion (37 Victoria Street) and south-eastern corner (4 Alfred Street) of the Depot NoR.
- Two overland flow paths, one flowing north along Victoria Street and the other flowing east then south in the south-eastern corner of the NoR footprint before discharging to the Manukau Harbour.
- Two flood prone areas contiguous with the two flood plains.

Figure 8 Hydrology within Depot NoR

1. Positive effects

There are no positive effects in relation to flooding at the site.

2. Construction effects

Flooding effects which apply to the entire Project area are discussed in Section XX.

3. Construction mitigation measures

Mitigation of flooding effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Construction Environmental Management Plan (CEMP), specified in proposed Condition XX of the draft condition set in Appendix XX. There are no specific flooding effects that require mitigation with respect to the Depot NoR.

4. Operational effects

[TBC following the report. Will need to assess the impact of the permanent infrastructure within flood plain and overland flow path].

5. Operational phase mitigation measures

Mitigation of flooding effects common to the whole Project is discussed in Section XX and will be achieved through the ongoing design of the Project in accordance with Auckland Council specifications and potentially a Stormwater Management Plan in subsequent stages of design.

6. Conclusion of hydrological and flooding effects

Based on the assessment above, the Hydrological Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential adverse effects on flooding will be appropriately managed.

10. Construction Noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phase of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to the Depot NoR. Further discussion on the route-wide construction noise and vibration effects is considered in Section X.

The existing noise environment consists of traffic noise typical of a motorway interface environment.

The receivers to noise and vibration surrounding the Depot NoR are predominantly industrial and commercial receivers. There are no notable or sensitive receivers surrounding the Depot NoR.

1. Positive effects

Section X of this AEE outlines route wide positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. Construction noise effects

The construction works at the Depot NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the Suburban Worksite construction noise standards as applicable in this location.

Based on the noise and vibration modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment predicts that there may be potential infringements of the Suburban Worksite noise standards at ground floor receivers. These infringements could range up to 5 decibels, typically one to three hours at a time. The nature of these effects ranges from people relocating to quieter outdoor areas to acceptable indoor levels but concentration and communication may be affected.

3. Construction noise mitigation measures

Mitigation of construction noise effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed Condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved via a Schedule to the CNVMP.

4. Construction vibration effects

The construction works at the Depot NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted the potential infringement of the vibration standards in this location using compaction activity given the sustained vibration produced, usually over a period of days while fill is compacted.

The effects of construction vibration take two forms:

- Potential for building damage; and
- Potential for loss of amenity.

The Construction Noise and Vibration Assessment predicts potential infringement of the Project vibration standards related to building damage at 1 Victoria Street during station construction

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction and vibration standards are specified in proposed Condition XX and the framework for a CNVMP in proposed Condition XX of the draft condition set in Appendix XX. Variation from the Project vibration standards can only be achieved via a Schedule to the CNVMP. No additional noise measures are required at the Depot.

6. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

11. Operational noise and vibration

The Operational Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the operational phase of the Project as they relate to operational noise and vibration. Further discussion on the route-wide operational noise and vibration effects is considered in Section XX.

The operation of the Depot is anticipated to be 24 hours per day, seven days per week. The Depot is envisaged to comprise a range of activities with the potential to generate significant levels of noise to the surrounding environment. Noise sources includes rolling stock, compressors, dust extractor, hand tools, forklift, Heating, ventilation, and air conditioning (HVAC) systems, heavy freight vehicles for delivery, wash facility water pump, substation transformer, private vehicles. Vibration levels from these activities are expected to be negligible.

1. Positive effects

Section X of this AEE outlines route wide positive effects. However, there are no positive operational noise and vibration effects relevant to this NoR.

2. Operational noise effects

The Operational Noise and Vibration Assessment has identified the AUP Business Light Industry and Business Heavy Industry zones operational noise standards as applicable in this location. The operational activities at the Depot are similar to those envisaged in the surrounding Business Light Industry and Business Heavy Industry zones.
Based on the noise modelling undertaken for the site, there may potentially be exceedance of the night-time noise levels at Waikaraka Cemetery, subject to the Depot activities which occur at night.

3. Operational noise mitigation measures

Mitigation of operational noise effects common to the whole Project is discussed in Section XX. The operational noise standards are specified in proposed Condition XX of the draft condition set in Appendix XX.
Specifically, the Operational Noise and Vibration Assessment recommends the following mitigation measures at the Depot:

- Site layout design and material selection considerations to locate and contain main sources of noise furthest from eastern boundary (adjacent Waikaraka Cemetery).
- Noise barriers along the south and east facing site boundaries to reduce Depot noise within Waikaraka Cemetery.
- Selection of low-noise plant and noise attenuation devices, such as dust extractors and air compressors.
- Enclosing fixed noise generating plant within buildings, such as compressors.
- Using localised screening where noise cannot be minimised at the source.

4. Operational vibration effects

Operational vibration effects has not been assessed, as vibration levels from operational activities at the Depot are expected to be negligible.

5. Operational mitigation measures

Mitigation of operational vibration effects common to the whole Project is discussed in Section XX. The operational vibration standards are specified in proposed Condition XX of the draft condition set in Appendix XX.
There are no additional specific mitigation measures required at the Depot.

6. Conclusion of operational noise and vibration

Based on the assessment above, the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential operational noise and vibration effects associated with the Project will be appropriately managed.

12. Blasting overpressure and vibration

The Blast Management Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of blasting during the construction phase of the Project as they relate to blasting noise and vibration. This section focuses on the blasting vibration and overpressure effects specific to the Depot NoR.
Construction activities requiring blasting to be undertaken are not anticipated at Depot NoR.

13. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project as related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blasting Noise and Vibration Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of damage to buildings and structures.
This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to the Depot NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.

The existing low-rise industrial buildings within the Depot NoR footprint are founded on shallow foundations.
The Settlement and Structures Assessment does not identify any buildings to be sensitive to vibration and settlement within the Depot NoR footprint. All buildings within the NoR footprint will be demolished. All other surrounding buildings fall outside the setback distances and unlikely to be impacted by vibration and settlement.

1. Positive effects

There are no positive effects on structures relevant to this NoR.

2. Construction vibration induced effects

Vibration induced building damage common to the entire Project area is discussed in Section XX. The Structures and Settlement Assessment has concluded that vibration effects associated with construction of the new depot buildings, viaduct structure and stabling facilities will be minimal, with vibration levels likely imperceptible to all building receivers beyond the NoR boundary.
The proposed site retaining walls are anticipated to be of a sufficient distance from adjacent buildings that the adopted vibration limits are unlikely to be exceeded and as such the potential for damage is Negligible.

3. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX, in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CNVMP and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Settlement effects common to the entire Project area are discussed in Section XX. At the Depot excavations will generally be limited to that required for construction of foundations for buildings and rail viaduct. Settlement effects are not expected to extend any notable distance and as such the effect on surrounding buildings will be Negligible. Similarly settlement associated with retaining wall construction will have Negligible effects on surrounding buildings.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx in the form of a Settlement Management Plan (SMP), recommended in condition XX provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. Operational settlement and vibration induced effects

There are no settlement induced effects associated with the operational of the Project. The potential for settlement effects will occur only during the construction of the Project.
Vibration effects on building, resulting from the operation of the Project is addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section xx.

7. Conclusion of settlement and structure effects

Based on the assessment above, the Settlement and Structures Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on buildings with will be appropriately managed.

14. Geological Heritage

The Assessment of Volcanology, included in Appendix XX of Volume 3, assesses the actual and potential effects on volcanic features during the construction phase of the Project as they relate to construction activities in proximity to these features.
There are no relevant volcanoes in Depot NoR, meaning no volcanic effects have been identified.

5. Conclusion

Overall, effects from the Depot NoR will be appropriately managed and mitigated. During the construction phase, management plans relevant to this NoR will be prepared to manage any actual and potential adverse effects that may occur, such as the Construction Traffic Management Plan, Stakeholder Consultation and Engagement Plan, Historic Heritage

Management Plan, Tree Management Plan, Construction Noise and Vibration Management Plan and a Settlement Management Plan.
Once the Depot is operational, mitigation measures mitigation measures have been recommended to manage any actual and potential adverse effects, such as through detailed design, CULDMP and the Outline Plan process.
The Depot will be the operational and administrative headquarters of the rail operator and is a vital component of the functions and operations of the Project.

1. Notice of Requirements

1. Surface Rail Alignment #2 NoR 16

This section:

- Describes NoR 19 – South side of Manakau Harbour to Te Ararata Alignment (Section 1.2)
- Summarises the existing and receiving environment (Section 1.3)
- Assesses potential effects and outlines proposed mitigation (Section 1.4)

2. NoR description

The Surface Rail (Manakau Harbour to Te Ararata) NoR 16 currently starts from the southern side of the Manakau Harbour Crossing, extends along State Highway 20 and ends at the NoR boundary for the Te Ararata Station (NoR 18).

Figure 1 shows the full extent of the Surface Rail #2 Alignment and NoR boundary. **Figure 2** shows the NoR boundary on aerial imagery.

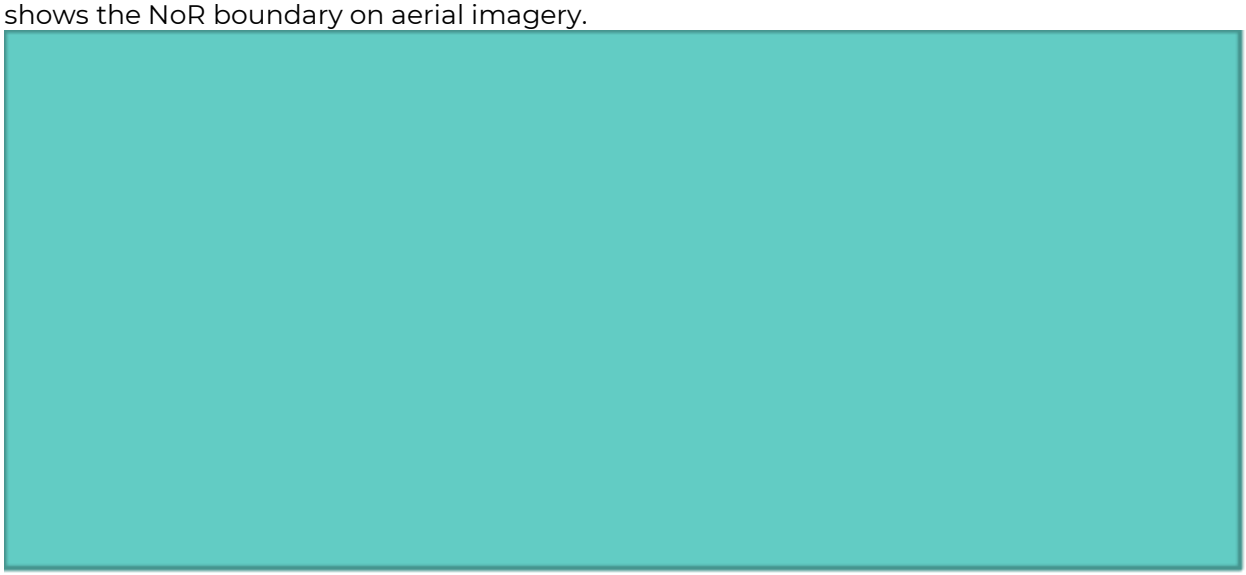

Figure 1 Surface Rail Alignment #2 NoR plan

Figure 1 Surface Rail Alignment #2 NoR boundary on aerial imagery

For ease of description, the alignment has been split into two sections, as described below:

- South of Manakau Harbour Crossing to Mangere Bridge Station NoR
- South of Mangere Bridge Station NoR to north of Te Ararata Station NoR

The following sections summarise the permanent features and temporary construction works, existing environment and the AUP statutory environment for the two sections of the NoR 16 Surface Alignment listed above.

1. Manakau Harbour Crossing to Mangere Bridge Station NoR

1. NoR Description

This section of surface alignment starts at the south of the Manakau Harbour Crossing (Kiwi Esplanade) and ends at the south of 34 Miro Road which borders the NoR boundary of the proposed Mangere Bridge Station (NoR 17). Figure 3 below shows this section of the alignment and Table 1 summarises the permanent features and temporary construction works.

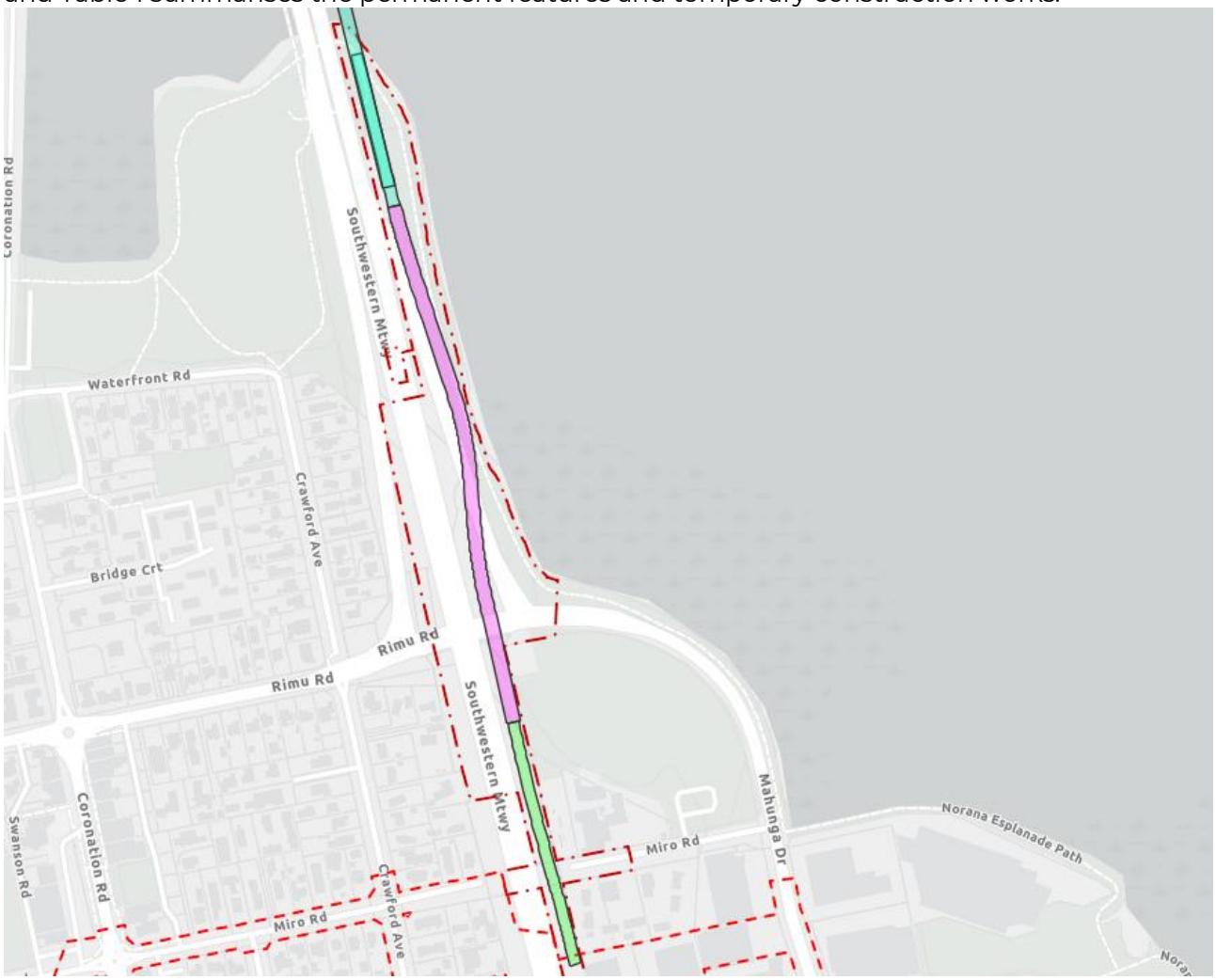

Figure 3 Manakau Harbour Crossing to Mangere Bridge Station section of alignment

Table 1 Manakau Harbour Crossing to Mangere Bridge alignment description

Permanent features	
Rail Type	• Surface Rail
Alignment Type	• At grade
Other	
Anticipated construction works	
Construction methodology and staging	Refer to AEE Section 6 and DCR. At a high level the construction activities will include: • Summary in bullets
Access to the site	• Summary in bullets
	•

2. Description of the Environment

This section sets out the existing and receiving environment for this section of the alignment. It applies the parameters on the assumptions outlined in Section XX.

Table 2 describes the surrounding area and features. Any property directly affected by this NoR is listed in NoR 16 Form 18 at Appendix XX.

Table 1 Existing environment description

Feature	Description
Current land use	*General description of surrounding environment. Be brief. Include parks and open space here (rather than under infrastructure)*
Physical	
Transport	• This portion of the alignment will run parallel to State Highway 20
Infrastructure	*Summarise utilities or any key infrastructure. Anything transport related (e.g. walking/cycling bridge) goes in row above.*
Community facilities and key attractions	*For most areas, should be sufficient to list relevant facilities in bullets (use the social report to help you). Include churches here, not under "cultural"*
Sensitive noise receivers	*List out any notable receivers that are particularly sensitive to noise/vibration effects*
Historic heritage	*If no information, note nothing relevant in this location. Go into relevant details where needed.*
Archaeology	
Cultural	*If no information received, note no responses from Te Tiriri team.*
Natural	
Topography	*General description of immediate area around the NOR*
Geology	*EG basalt. Use the volcanology report for assistance. If no info, check with Miriam or Stephen then delete this row.*
Catchment	*Include stormwater catchment (from freshwater report) for each area.*
Flooding & hydrology	*Flooding, overland flow paths, etc.*
Trees and vegetation	*All trees and any vegetation.*
Other	Include rivers/ wetlands if relevant to area.

Figure 4 and Table 3 identify the relevant statutory considerations within this section of the NoR alignment.

Figure 4 Manakau Harbour Crossing to Mangere Bridge Surface Alignment zoning within the AUP

Table 4 Manakau Harbour Crossing to Mangere Bridge Surface Alignment AUP statutory environment

Name	Description	Comment
Current Zoning	Road	Applies to NoR
	Strategic Transport Corridor Zone	Applies to NoR
Precincts	N/A	
Controls	Arterial Road	Applies to State Highway 20
	Coastal Inundation 1 per cent AEP Plus 1m Control – 1m sea level rise	Applies to the northern portion of the alignment (north of 24 Crawford Road)
	Macroinvertebrate Community Index – Urban	Applies to the whole alignment
Overlays	Infrastructure: National Grid Corridor Overlay – National Grid Yard Uncompromised	Applies to the northern portion of the alignment (within Kiwi Esplanade to the east of State Highway 20)
	Infrastructure: National Grid Corridor Overlay – National Grid Subdivision Corridor	Applies to the northern portion of the alignment (within Kiwi Esplanade)
Designations	Designations – 6709, State Highway 20: To undertake maintenance, operation, use and improvement to the State Highway network, Designations – New Zealand Transport Agency	Applies to the whole alignment
	Airspace Restriction Designations – ID 1102, Protection of aeronautical functions – obstacle limitation surfaces, Auckland International Airport Limited.	Applies to the whole alignment

Regional Plan Controls and Overlays	Natural Resources: Quality-Sensitive Aquifer Management Areas Overlay – Auckland Isthmus Volcanic	Applies to southern portion of alignment only (south of 10 Crawford Avenue)
	Natural Heritage: Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay – O11, One Tree Hill, Viewshafts	Applies to the northern portion of the alignment only (north of Rimu Road)
	Natural Heritage: Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay – Mangere Mountain, Height Sensitive Areas	Applies to the southern portion of the alignment (south of Rimu Road)
Zoning within 800m catchment	• Maori – Special Purpose Zone • Residential – Mixed Housing Urban • Residential – Mixed Housing Suburban • Business Mixed Use Zone • Business – Light Industry Zone • Business – Local Centre Zone • Open Space – Informal Recreation Zone	Residential properties are located to the west of State Highway 20. Mixed of business zones either side of State Highway 20
Anticipated future zoning within 800m catchment (construction, operation)		Refer Section 10.1.X for reasoning and analysis.
Other relevant considerations		

1. Notice of Requirements

1. NoR 17 - Māngere Bridge Station NoR

This section:

- Describes NoR 17 - Māngere Bridge Station (section 1.2)
- Summarises the existing and receiving environment (section 1.3)
- Assesses potential effects and outlines proposed mitigation (section 1.4)

2. NoR Description

The Māngere Bridge Station NoR will span SH20, covering several Light Industry zoned sites on the east of SH20, and residential sites zoned for Business Mixed-Use on the western side. The NoR footprint also includes portions of Miro Road, Mahunga Drive, and Hastie Avenue to enable associated streetscape enhancements.

The bulk of the Māngere Bridge Station NoR footprint is concentrated on the western side of SH20, and the location of the future at-grade station and platform structures is on the eastern side, adjacent to the motorway corridor and perpendicular to Miro Road. The NoR footprint is located directly to the south of the Te Puea Memorial Marae and associated Maori Purpose Zone, and the footprint does not extend into this zone.

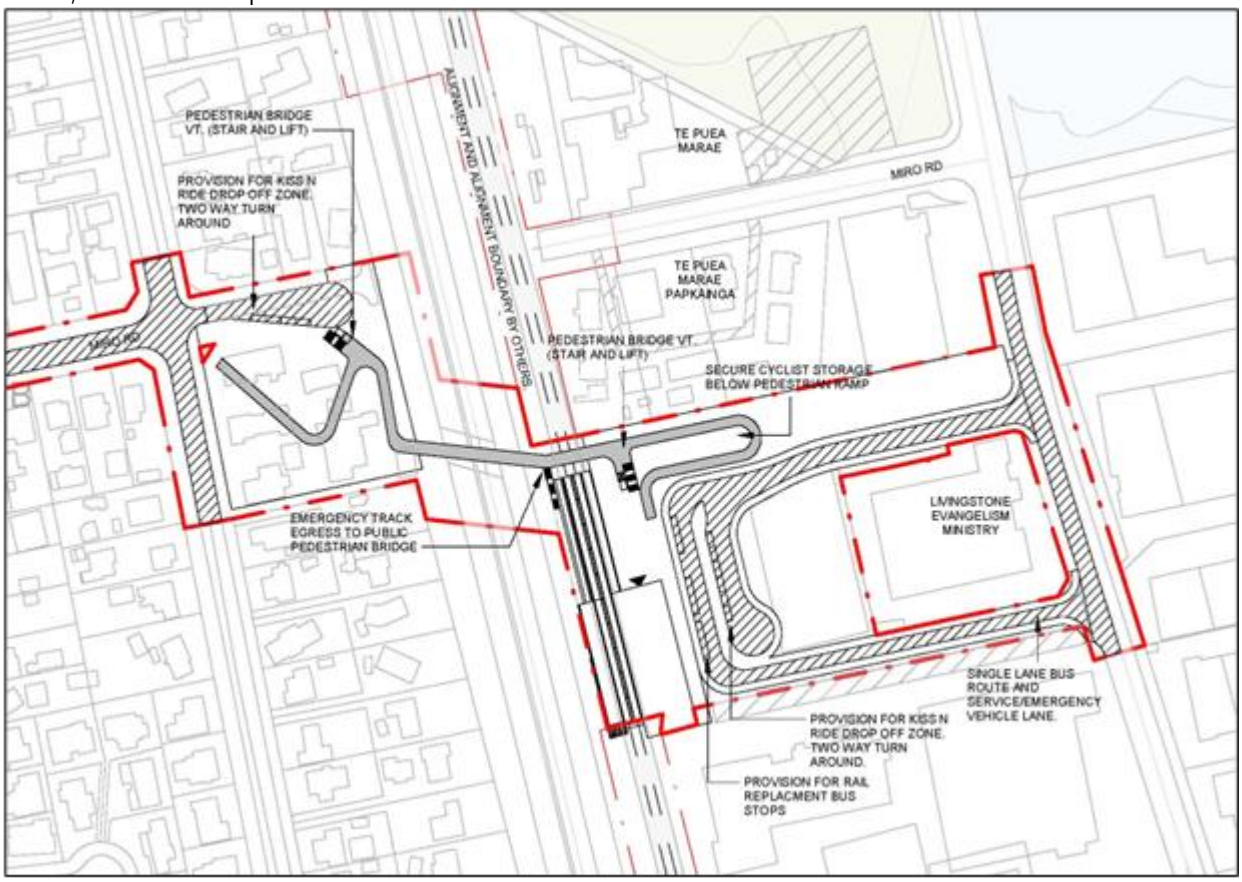

Figure 1: Māngere Bridge Station location plan

Figure 1 and Figure 2 below show the proposed NoR footprint and it's surrounds. Table 1 summarises the Māngere Bridge Station's permanent features and temporary construction works.

Figure 2: Māngere Bridge Station NoR footprint on aerial imagery

Table 1: Māngere Bridge Station NoR description

Permanent features	
Station	• At grade segregated station and platform structures, adjacent to SH20 and perpendicular to Miro Road. • Station entrances to the east and west of SH20. • The eastern station site will house the primary station building, ticketing facilities and public amenities. • The western side provides access to the station and public amenities.
Platforms	• At grade side platforms with trenched rail alignment. • Western platform accessed at northern end via underpass.
Public realm	• Landscape and public realm improvements around Mahunga Drive and Miro Road, associated with eastern and western station entrances respectively. • Preservation of maunga views towards the west.
Road and streetscape	• New one-way connection roads providing access from Mahunga Drive to eastern station site. • Provision of new bus stops for scheduled and rail replacement buses at the eastern entrance. • Associated streetscape enhancements as identified in the NoR footprint and improved active transport connections.
Parking and loading	• New loading bay for maintenance/emergency vehicles. • New long and short-term bicycle parking. • New kiss-and-ride bays with accessible kerbs. • New bus bays at eastern station site.
Other new infrastructure	• Eastern and western entrances connected by a new station bridge across SH20 accessed by lift, stairs, and ramp. • Bridge will be publicly accessible for pedestrians and cyclists.

Anticipated patronage	• Low patronage. Forecasting anticipates a 2041 morning peak of 550 people (290 boarding and 260 alighting).
Other	• Hastie Avenue pedestrian bridge will be demolished and removed. • Removal of existing motorway sign gantry located within the footprint of proposed station bridge. • New underground stormwater attenuation ponds (one east and one west) and associated pump infrastructure within the NoR footprint. • Station operation will require provision of bus access to the east of Mahunga Drive.
Anticipated construction works	
Construction methodology	Refer to AEE Section 6 and DCR Section 5.18.4 for more detail. At a high level the construction activities will include: • Initial site preparation, including site clearance, utility relocation, and installation of noise/vibration/settlement monitoring as required. A deconstruction approach rather than demolition will be applied wherever possible. • Construction of the new pedestrian bridge across SH20. Installation of precast bridge spans during nightworks, requiring motorway closure. Following this, the Hastie Avenue pedestrian bridge will be demolished and removed. • Construction of the new station platforms and structures on the eastern site. • Associated streetscape upgrades, including construction of east and west station entrances and associated access.
Access to the site	• Primary construction access from eastern SH20 shoulder and neighbouring side streets. • Following construction of the new station access road, construction access will be available from Mahunga Drive. • Hastie Avenue pedestrian bridge will be temporarily maintained during construction to retain access across SH20 for as long as possible until the new station bridge has been constructed.

3. Description of the environment

This section sets out the existing and receiving environment for the Māngere Bridge Station NoR. It applies the parameters on the assumptions outlined in Section 10.1.3.

Table 2 and Table 3 describe the surrounding area and features (the existing environment) and relevant statutory considerations respectively. Any property directly affected by this NoR is listed in Appendix X to NoR 17 and Form 18.

Table 2: Existing environment description

Feature	Description
Current land use	• Industrial buildings and warehousing on east of SH20. • Western side of SH20 is zoned for Business Mixed-Use but contains detached residential housing. • Streetscape sections within the NoR footprint adjacent to lower density residential zones, and business local centre at the Coronation Road intersection. • Isolated Hastie Avenue intersections surrounded by residential land use, and a school.
Physical	

Transport	Strategic transport functions: • SH20 motorway corridor. • Māngere Bridge onramp/offramp and Mahunga Drive are Arterial Roads. • Mahunga Drive and Coronation Road are major cycle routes. • SH20 and Mahunga Drive are part of the freight network. • Rimu and Coronation Roads are part of the Frequent Transit Network. Walking and cycling: • No prioritised pedestrian crossings on Mahunga Drive. • No on-road cycle lanes provided on Mahunga Drive or Crawford Avenue. Unbuffered cycle lane between Rimu Road and Miro Road over SH20. • Wider area well-connected to cycle path network. • Off-road shared walking/cycling path from Onehunga accessible from Mahunga Drive. Connectivity across SH20: • Existing walking/cycling bridge across SH20 at Hastie Avenue to the south of the station site. • Pedestrian and vehicle access across SH20 via Rimu Road bridge to the north. Public transport: • Several bus stops located nearby but no priority bus lanes. • No nearby passenger rail connections.
Infrastructure	• Three Waters infrastructure located within the NoR footprint. • A telecommunication line runs under SH20 through the motorway corridor. • Transpower overhead transmission lines located approximately 190m to the north-east of the indicative Station footprint.
Community facilities and key attractions	• Te Puea Memorial Marae, located on Miro Road approximately 80m north of the proposed station. • Te Paa Harakeke Kohanga Reo Preschool, located on Miro Road directly adjacent to the boundary of the indicative Station footprint. • Ma'aola Livingstone Evangelism Ministry Church, located directly adjacent to the indicative station footprint and surrounded by (but not included within) the NoR footprint. Access to this Church will be maintained throughout construction.
Sensitive noise and vibration receivers	• The Te Puea Memorial Marae. • The Te Paa Harakeke Kohanga Reo Preschool. • The Ma'aola Livingstone Evangelism Ministry Church. • Residential receivers in nearby standalone dwellings.
Historic heritage	• No sites with formal protection have been identified within or in proximity to the NoR footprint.

	• One site on the Auckland Council CHI inventory (with no formal protection) located within a 100m buffer of the NoR footprint. • The eastern extent of the Te Pane A Mataaho/ Māngere Mountain Historic Reserve (identified on the Schedule of Historic Heritage under the AUP) also extends into this buffer.
Archaeology	• Several archaeological sites were identified within 200m of the NoR, but many have been destroyed, modified or obscured by construction of SH20 or urban development. • Te Pane o Mataaaho / Māngere Mountain is located approximately 480m to the south-west of the indicative station footprint of the NoR . The mountain is an archaeological site of exceptional significance and listed as a Category B Historic Reserve in the AUP.
Cultural	• The Te Pane o Mataaaho / Māngere Mountain reserve is a site of significance to Mana Whenua under the AUP. • [Need further information from Te Tiriti Partnerships team]
Natural	
Topography	• The eastern side of SH20 is generally flat, with a change in elevation of approximately 5m from north to south. • The western side is generally level but slopes up towards the foothills of the Māngere Mountain to the west. Elevation changes approximately 20m from north to south.
Geology	• The station site lies on the basalt lava flows and overlying ash which form the eastern part of the Te Pane o Mataaaho / Māngere Volcano.
Catchment	• Located within the Māngere Inlet stormwater catchment, with an estimated catchment size of approximately 1,800 Ha. • The overall area of the contributed upstream catchment is approximately 3.1 Ha of industrial land.
Flooding & hydrology	• There are no watercourses at the station site. • One flood plain is present, impacting approximately 30% of the north-eastern corner of the NoR footprint. • A Flood Prone Area also exists with a water level above 3.48m RL in the 1% AEP + CC flood event. • Overland flow paths to the north-east flow through the station site.
Trees and vegetation	• There are no notable trees within the NoR footprint. • Various protected street trees are present in residential roads on the western side of SH20. • Existing vegetation is present within SH20 motorway corridor. • Section 21.3.1 of the Arboricultural Assessment of Effects provides a full list of trees identified within and adjacent to the NoR.
Terrestrial ecology	• No recorded significant terrestrial ecological areas within or in proximity to the NoR. • Low to moderate ecological values for vegetation, which includes native revegetation, street trees and shrubs, residential habitat, and open grassland.

	• Low to high ecological values for native birds, including red-billed gulls and black-billed gulls which may roost in vegetation within the NoR.
Te Ararata Creek	• Te Ararata Creek is located approximately 600m south of the Māngere Bridge Station. • There are no known freshwater ecological values within the Māngere Bridge Station NoR.

Figure 3 and Table 3 identify the relevant statutory considerations within the Māngere Bridge Station NoR footprint.

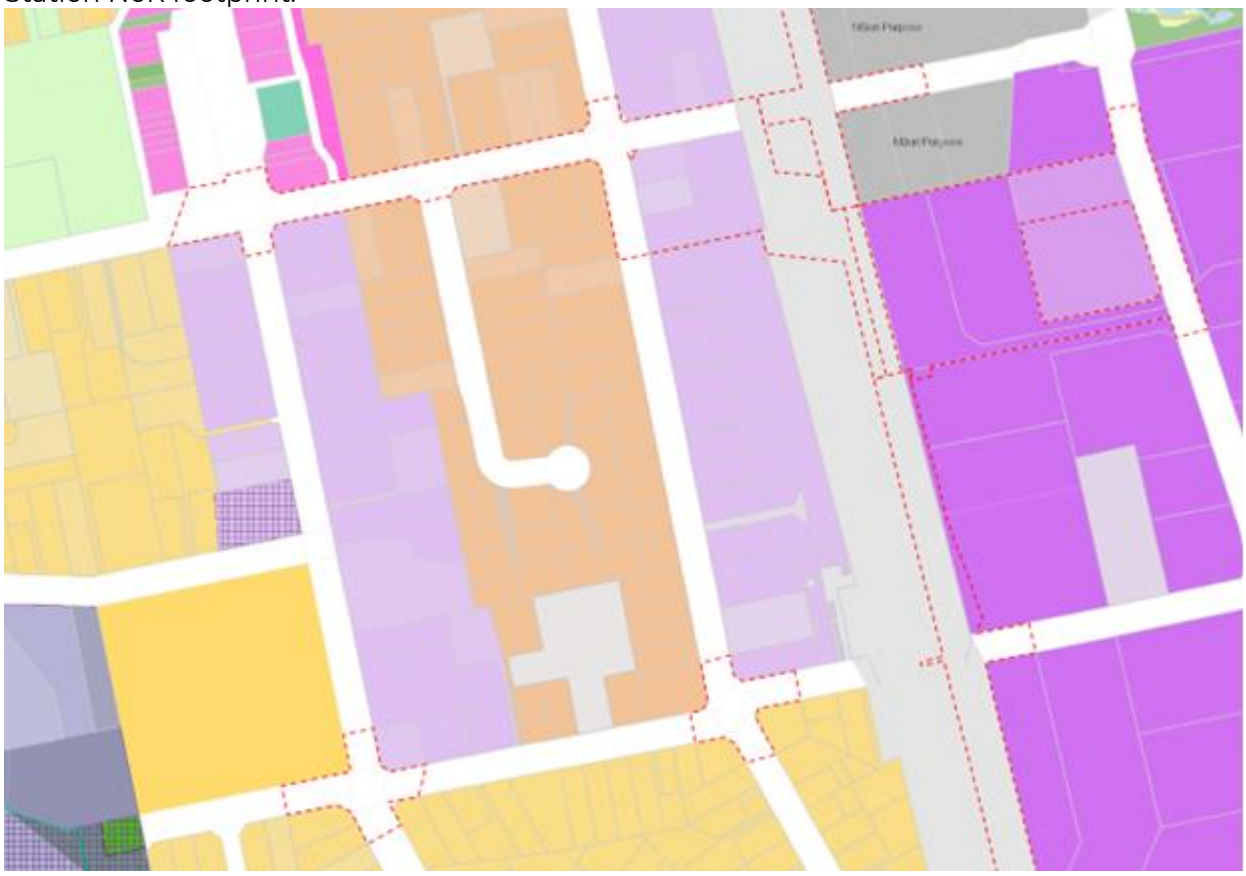

Figure 3: Māngere Bridge NoR zoning and overlays in the AUP

Table 3: Māngere Bridge Station NoR statutory environment

Name	Description	Comment
Current NoR zoning	Business – Light Industry	Applies to properties to the immediate east of SH20 including 9/9a Mahunga Drive and a partial section of 5 Mahunga Drive.
	Business – Mixed Use	Applies to properties to the immediate west of SH20 including 2/18 Miro Road, 20 miro Road, 22 Miro Road, 42 Crawford Avenue, 44/44A/44B Crawford Avenue, and 46/46A Crawford Avenue.
	Road	Legal roads within the NoR footprint.
	Strategic Transport Corridor Zone	The SH20 Motorway Corridor.
Precincts	N/A	N/A
Controls	Strategic Transport Corridor Zone	The SH20 Motorway Corridor.
	Controls: Arterial Roads	Applies to SH20 and Mahunga Drive

	Controls: Coastal Inundation 1 per cent AEP Plus 1m Control	Applies to the north-eastern portion of the NoR footprint, located around 5 Mahunga Drive.
	Controls: Macroinvertebrate Community Index – Urban	Impacts the entire NoR footprint.
Overlays	Regionally Significant Volcanic Viewshafts and Height Sensitive Areas Overlay - Mangere Mountain, Height Sensitive Areas	Covers the majority of the -NoR footprint and sets out a maximum 9m height limit as per Chapter D14 of the AUP.
	XX	
	Regionally Significant Volcanic Viewshafts And Height Sensitive Areas Overlay [rcp/dp] - M5, Mount Mangere, Viewshafts	Applies to area of NoR at intersection of Coronation Road and Miro Road
Regional Plan Controls and Overlays	Quality-Sensitive Aquifer Management Areas Overlay.	Impacts the entire NoR footprint.
Designations	Airspace Designation 1102- Auckland International Airport Ltd. Obstacle Limitation, Runway Protection and Ground Light Restriction.	The proposed works will not affect the airspace designation.
	Designation 6709- New Zealand Transport Agency. Manukau Harbour Crossing to Māngere (State Highway 20).	The NoR crosses the existing SH20 designation.
Zoning within 800m catchment	• Business – Light Industry • Business – Local Centre Zone • Business – Mixed Use • Coastal – Coastal Transition Zone • Coastal – General Coastal Marine Zone • Open Space - Civic Spaces Zone • Open Space - Community Zone • Open Space - Conservation Zone • Open Space - Informal Recreation Zone • Open Space - Sport and Active Recreation Zone • Residential – Mixed Housing Urban • Residential – Mixed Housing Suburban • Residential - Single House Zone • Road	• Business Local Centre Zone in small cluster along northern end of Coronation Road. • Coastal Transition Zone in pockets along northern and eastern coastal edges of peninsula. • Open Space Zones scattered on western side of SH20 and concentrated around Māngere Mountain. Conservation Zone and Informal Recreation Zone around coastal edge of peninsula. • Residential Zones generally located on western side of SH20 motorway corridor, except for the Single House Zone to the east. • Special Purpose Marae Zone located to the east of SH20 motorway corridor and immediately adjacent to the Manukau Harbour.

	• Special purpose (Marae) • Strategic Transport Corridor Zone	
Anticipated future zoning within 800m catchment from station	• All residential zones within an 800m catchment of the station intensified to Residential – Terrace Housing and Apartment Building Zone. • Building heights increased for land zoned as Business – Local Centre. • Otherwise zoning as above, no other changes anticipated.	Refer Section 10.1.X for reasoning and analysis.

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operation phases of the Project as they relate to the Māngere Bridge Station NoR.

This builds on the technical assessments included in Volume 3 and the Design and Construction Report in Appendix XX. Section XX outlines the indicative construction methodology used for these assessments.

1. Traffic and transport

The Assessment of Transport Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the traffic and transport. This section focuses on the transport effects specific to the Māngere Bridge Station NoR. Further discussion on the route wide transport effects is considered in Section XX.

Key transport features within and adjacent to the Māngere Bridge Station NoR include:

- **Public transport:** Current bus routes do not travel down Mahunga Drive but several bus stops are located in the nearby area. There are no current bus priority lanes in the surrounding area. There is no existing heavy rail in the area.
- **Walking:** Walking facilities in the area are standard with minimum provisions. Existing connectivity between the eastern and western sides of SH20 near the station site is unsubstantial, with the nearest crossings at the Hastie Avenue footbridge to the south or Rimu Road overpass to the north. There are no prioritised pedestrian crossings in the vicinity of the NoR footprint.
- **Cycling:** Both Mahunga Drive and Coronation Road are identified as a major cycle routes, but do not provide on-road cycle lanes. An offroad shared walking/cycling path from Onehunga runs along the peninsula coast and is accessible from Mahunga Drive.
- **General vehicles:** The SH20 corridor which bisects Māngere Bridge Station is part of the motorway network and experiences an average weekday traffic volume of 94,190, approximately 8% of which are heavy vehicles. Mahunga Drive and the motorway on and offramps are identified as arterial roads under the AUP servicing approximately 19,060 vehicles daily, including a high level of heavy vehicles. Crawford Avenue is a secondary collector road with approximately 1,690 vehicles daily. Rimu and Coronation Roads are part of the Frequent Transit Network.
- **Parking:** N/a.

1. Positive effects

The Māngere Bridge Station will form part of the future light rail network, improving connectivity along the alignment. In addition to this and the common positive effects outlined in Section XX, Māngere Bridge Station will provide:

- New pedestrian crossings across Mahunga Drive and Crawford Avenue, improving walkability.
- A new active mode connection across SH20, linking the station site to Miro Road and the Māngere Bridge township. This will extend the walkable catchment around the station further to the west of SH20.

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section XX. The proposed works at the Māngere Bridge Station NoR will potentially result in the following adverse construction effects:

- **Public transport (bus services):** Refer to common effects section (Section xxx)
- **Walking:** The demolition and removal of the Hastie Avenue footbridge set out in Table 1 has the potential to impact pedestrian connectivity across SH20 and will necessitate a temporary detour route until the new station footbridge is open for use.
- **Cycling:** Refer to common effects section (Section xxx)
- **Roading network:** Temporary closure of SH20 will be required to install the proposed station bridge deck across the motorway corridor. To avoid any reduction in traffic lanes this should be managed by nightworks where possible.
- **Parking:** Refer to common effects section (Section xxx)
- **Emergency services:** As with the general traffic, emergency services travelling to and around the immediate vicinity of the site may be delayed by increased construction traffic, which may not be possible to bypass without alternative routes.
- **Freight:** The construction access arrangements do not affect any over dimension or overweight routes.
- **Construction access:** The primary construction access will be via the SH20 motorway shoulder. This will result in disruptions on SH20 such as reduced speed limits and localised narrowing of lane and shoulder widths. Up to 40 truck deliveries per day are anticipated at any one site access point, resulting in increased construction traffic on roads surrounding the station site.

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP) as specified in proposed condition XX of the draft condition set in Appendix XX. The Assessment of Transport Effects identifies the following opportunities for inclusion in the CTMP in relation to Māngere Bridge Station:

- **Public transport (bus services):** Construction effects will be mitigated through the management of general construction traffic. Any lane changes on SH20 will not impact bus services as there are no bus priority lanes in the motorway corridor.
- **Walking:** The Hastie Avenue pedestrian bridge will be temporarily maintained during construction for as long as possible, to minimise the duration of any disruption to pedestrian connectivity across SH20. The opportunity for the new station overbridge to be operational prior to demolition works commencing at the Hastie Avenue footbridge will be investigated.
- **Cycling:** No formal cycle facilities will be impacted during construction, therefore, no mitigation is proposed.
- **Road network:** When full closures of SH20 are required to enable construction, this will be carried out as nightworks so to reduce the impact on users of the road network. A temporary reduction of SH20 shoulder widths will also be implemented. Regarding construction traffic, all truck loading and waiting space will be provided on site, and construction vehicles will follow the routes set out in Section 21.3 of the Assessment of Transport Effects
- **Emergency services:** An agreement of alternative routes for emergency access to locations in proximity to the site, following engagement with emergency service providers.

4. Operational effects

There are no adverse operational effects on transport from Kingsland Station NoR. Following construction at the station the existing road layout will be reinstated.

5. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3 Appendix XX and the proposed mitigation, the actual and potential traffic and transport effects associated with the Project will be appropriately managed.

2. Landscape and visual

The Assessment of Landscape and Visual Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the (natural and urban) landscape (including visual effects). This section focuses on the landscape and visual effects specific to the Māngere Bridge NoR. Further discussion on the route wide landscape and visual effects is considered in Section XX.

Generally, the Assessment of Landscape and Visual Effects highlights the following landscape and visual features of the wider Māngere Bridge area:

- A grid-like pattern of roads, due to early land layouts for farming and later car-based subdivision. Coronation Road provides the low density "Māngere Village" shopping centre. Severance of the suburb by the SH20 motorway corridor has resulted in a contrasting industrial character on the eastern coast compared to the largely residential west.
- A strong sense of place as a township and distinct identify from Māngere to the south, largely deriving from the natural setting of the Manukau Harbour, dominant Māngere Mountain volcanic cone, and human history.

The station site and its surrounds are characterised by:

- To the west there is a cluster of residential developments of typical character to the neighbourhood, on landed zoned for Business Mixed-Use.
- To the east there are industrial properties between the Ma'aola Livingstone Evangelism Ministry Church Property and SH20.
- To the north is the Te Puea Memorial Marae kohanga reo and papakainga housing, alongside further industrial property.
- To the south is further industrial and warehousing properties and the existing Hastie Avenue footbridge which provides a pedestrian connection over SH20.

The Assessment of Landscape and Visual Effects makes the following assumptions based on the indicative design of the Māngere Bridge Station:

- The primary station structure and platforms will be located to the east of SH20, behind the existing Ma'aola Livingstone Evangelism Ministry Church which will be retained. This eastern entrance will be access via a new loop roadway from Mahunga Drive.
- A secondary station entrance will be located on the western side of SH20 near the the intersection of Miro Street and Crawford Avenue. This will be connected to the eastern side with a new walking and cycling shared bridge.

The real-world future environment for this station will change over time in accordance with the NPS-UD, resulting in an increase of nearby residential density concentrated primarily on the western side of SH20.

1. Positive effects

In addition to the route wide positive effects outlined in Section XX, this station will provide:

- The station entrances and new bridge over SH20 will improve legibility and wayfinding in the surrounding urban environment by providing new landmarks which highlight the transport connection to the Māngere Bridge Town Centre.
- As a result of further pedestrian activation, more walkable and vibrant neighbourhood streets will be supported on either side of the SH20 motorway corridor which at present severs the existing community.

2. Construction effects

The construction works within the Māngere Bridge Station NoR will involve typical construction activity. The LVA identifies the follow potential effects:

- Adverse effects on the natural landscape will be largely avoided, as revegetation removed along the motorway corridor will be replaced or offset, and any associated earthworks will be minor. The station site is separated from the natural harbour environment by existing development.

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

The works within Māngere Bridge Station NoR will result in a change in the urban form and natural landscape. These changes involve:

- A new overbridge across SH20 providing station access which is expected to infringe the 9m height standard of the Height Sensitive Areas Overlay around Te Pane-o-Mataoho / Māngere Mountain to a minor extent. However, this structure is not located within a portion of the NoR footprint impacted by Volcanic Viewshafts and thus will not infringe these.

Such infringement would result in adverse effects upon views of the maunga, but it is expected that it can be avoided through design refinements at the detailed design stage. Aside from this, no adverse effects upon the wider urban form are expected. The NoR footprint is located in an area already severed by the SH20 corridor and will itself be in keeping with the transport corridor and surrounding suburban setting.

5. Permanent infrastructure mitigation measures

Mitigation of landscape and visual effects common to the whole Project is discussed in Section xx and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to the Māngere Bridge Station NoR the Assessment of Landscape and Visual Effects identifies the following opportunities for inclusion in the CULDG when undertaking the design of the station:

- Inclusion of design principles to support station legibility, including:
  - Equal prominence of eastern and western station entrances.
  - Identifiable architecture and sufficient station height for visibility from the west.
  - Station entrance road from Mahunga Drive designed to maximise wayfinding.
- CPTED principles supporting station accessibility including wide footpaths, good lighting, and clear sightlines to both the east and west of SH20.
- Alignment and configuration of the station frontage providing activation alongside passive surveillance outlook.
- Response to the context of Māngere Bridge through distinctive architecture and design, which both celebrates the locality and recognises the likelihood of becoming landmarks.

6. Conclusion of landscape and visual effects

Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Social

[Assessment of potential adverse social impacts effects to be provided].

4. Cultural

[TBC on cultural reporting]

5. Built heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to the Māngere Bridge NoR.

There are no Built Heritage sites identified within the NoR footprint. However, three sites recorded on the Cultural Heritage Inventory are located within a 100m buffer of the NoR footprint. These features are located near the intersection between Hastie Avenue and Coronation & Domain Roads where future streetscape upgrades are proposed. Additionally, the eastern extent of the Te Pane A Mataaho/ Māngere Mountain Historic Reserve (identified on the Schedule of Historic Heritage under the AUP) also extends approximately 34m into this buffer.

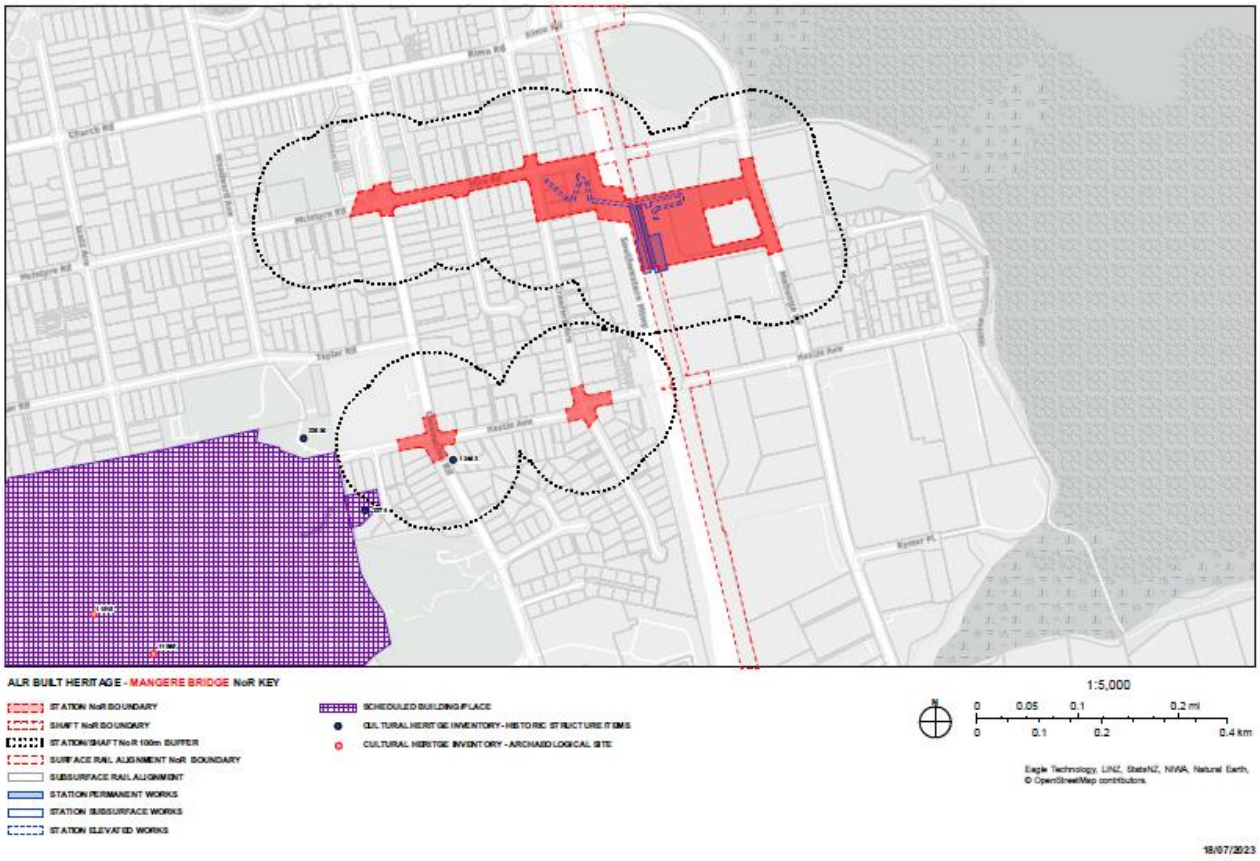

Figure 4: Identified built heritage places within NoR boundary and buffer

1. Positive effects

Section X of this AEE outlines common positive effects. There are no positive built heritage effects relevant to this NoR.

2. Construction effects

In addition to those set out in the common effects included in Section XX, the construction works at Māngere Bridge Station will potentially result in the following adverse effects on built heritage:

- A Minor to Negligible risk of cosmetic building damage from vibration.
- Minor risks of dust and noise nuisance.

The Built Heritage Assessment identifies that none of the heritage features identified are at any significant risk of adverse effect from the Project.

3. Construction mitigation measures

Mitigation of built heritage effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Historic Heritage Management Plan (HHMP). There are no specific built heritage effects that require mitigation with respect to the Māngere Bridge Station NoR.

4. Operational effects

There are no operational effects on built heritage. The potential for adverse effects on built heritage will occur only during the construction of the Project. Accordingly, no mitigation of operational effects is proposed.

6. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to the Māngere Bridge NoR. Further discussion on the route wide archaeology effects is considered in Section XX.

Early Māori occupation in the wider Māngere Bridge area was primarily focussed on horticultural land-use, and the Manukau Harbour provided strategic value and marine resources. Many Māori were driven from the area due to raids and land confiscations throughout the 19th century, but the area remained largely rural until the rise of housing development the later 20th century. Reclamation was undertaken throughout the 1960s in northern and western sections of the coastline, which may have obscured previously unrecorded coastal archaeological sites.

Many of the key archaeological features within 200m of the Māngere Bridge Station NoR shown in Figure 5 have been destroyed, modified, or obscured. Accordingly, the Assessment of Archaeological Effects considers that only Te Pane o Mataaaho / Māngere Mountain is within the scope of the following effects assessment. Located approximately 480m to the south-west of Māngere Bridge Station, the mountain was home to an extensive pā (R11/26 NZAA SRS) with gardening areas which would have supported large populations and is considered as an archaeological site of exceptional significance. The Assessment of Archaeological Effects provides further detail on the archaeological value of the site.

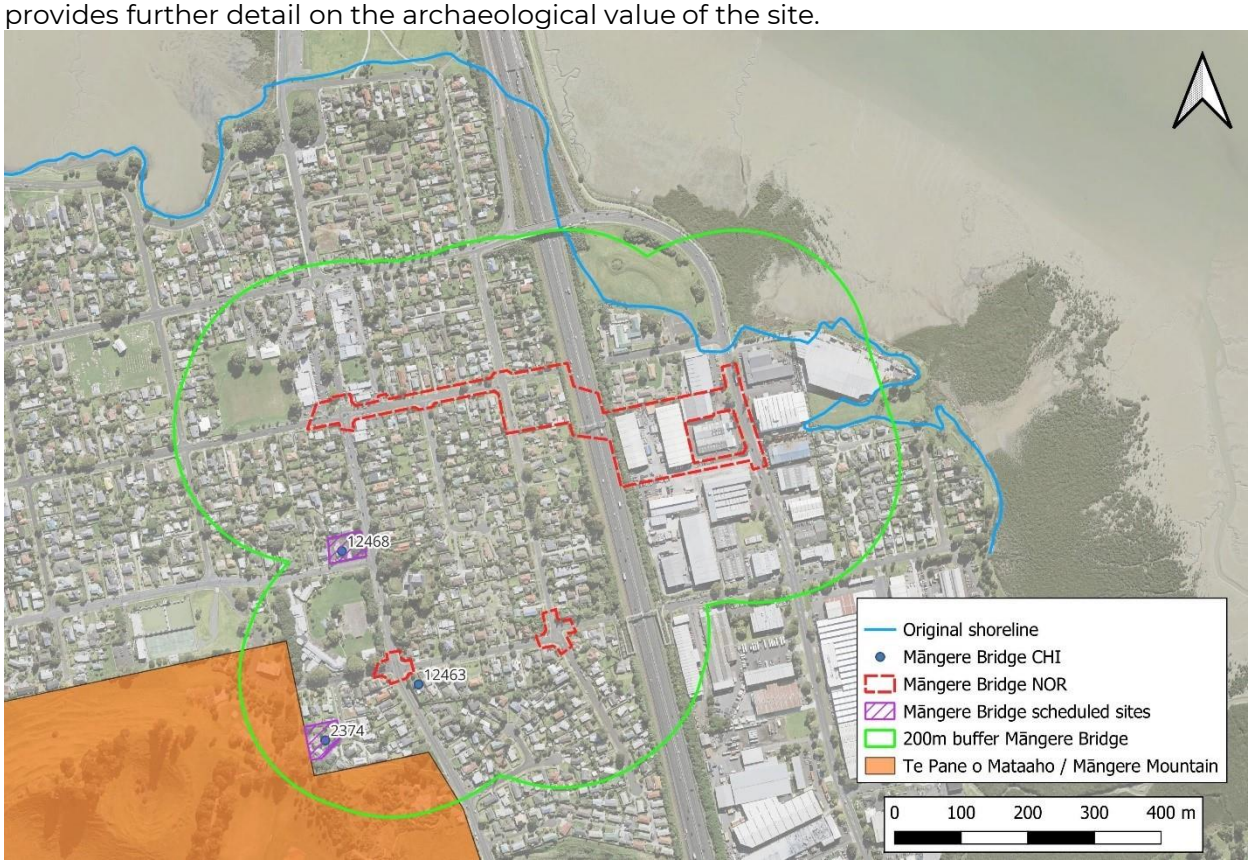

Figure 5 Archaeology around the Māngere Bridge Station NoR

Although the scheduled extent of the site is outside of the NoR footprint, there is reasonable cause to suspect that unrecorded pre-1900 archaeological sites associated with the mountain may be within it:

- The eastern side of SH20 is industrial and covered with pavement. It is assumed that any archaeological features in this area have been destroyed.
- The western side contains detached dwellings from the 1960s (approx.), surrounded by lawns which may not have been heavily modified. It is possible that pre-1900 subsurface archaeological features such as midden or oven sites may exist in this area.

1. Positive effects

No positive effects on archaeology have been identified as by its very nature construction requires disturbance of the ground in which archaeological remains may be present. However, management processes can be established to enable the recording of archaeological material found during construction of a project, providing valuable insight into the history of a site.

2. Construction effects

The construction works within the Māngere Bridge Station NoR will not result in any additional construction effects than those set out in the common effects included in Section XX.

3. Construction mitigation measures

- Mitigation of archaeological effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Historic Heritage Management Plan (HHMP), inclusive of accidental discovery of archaeological features. There are no specific archaeological effects that require mitigation with respect to the Māngere Bridge Station NoR.

In addition, an Authority to Modify Permit will be sought from Heritage New Zealand Pouhere Toanga.

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during the construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Volume 3 Appendix XX and implementation of the proposed mitigation, the actual and potential effects on archaeology associated with the Project will be appropriately managed.

7. Arboriculture

The Arboriculture Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on arboriculture. This section focuses on the arboricultural effects specific to the Māngere Bridge Station NoR. Further discussion on the route wide arboricultural effects is considered in Section XX.

The following trees have been identified within the Māngere Bridge Station NoR extents:

- Linear groups of (primarily native) trees are located within the SH20 motorway corridor and form a continuous canopy cover between the motorway shoulder and adjacent properties to the east. These trees have a prominent contribution to the amenity of the transport corridor.
- Various exotic and native street trees to both the east (Mahunga Drive) and west (Miro Road) of SH20.
- No notable trees listed in the AUP Schedule of Notable Trees have been identified.

The Tree Schedules attached in Appendix B of the Arboricultural Assessment of Effects lists all trees identified within and adjacent to NoR and their associated level of protection.

1. Positive effects

Section X of this AEE outlines common positive effects. There are no positive effects in regards to arboriculture as the trees are required to be removed for the construction and establishment of Māngere Bridge Station.

2. Construction effects

The construction works at Māngere Bridge Station will potentially result in the following effects:

- Removal of some of the established native tree groups located in the motorway corridor, required to enable construction of the proposed new station overbridge across SH20.
- Street trees on Miro Road may be impacted by proposed road network upgrades and active mode improvements, but could be avoided, protected and worked around subject to design and construction methodology.

3. Construction mitigation measures

Mitigation of arboricultural effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Tree Management Plan (TMP).

Where street trees are proposed to be removed, replanting shall be undertaken and aim to remediate the loss of ecological services and amenity values that any removed trees provide, by establishing large grade trees in properly constructed planter pits in grass berms or station plaza areas.

4. Operational effects

There are no operational effects on arboriculture. The potential for adverse effects on arboriculture will occur only during the construction of the Project.

5. Conclusion of arboricultural effects

Based on the assessment above, the Arboricultural Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on arboriculture associated with the Project will be appropriately managed.

8. Open space

[Assessment of potential adverse open space impacts effects to be provided].

9. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to hydrology and flooding. This section focuses on the hydrology and flooding effects specific to the Māngere Bridge Station NoR. Further discussion on the route wide hydrological effects is considered in Section XX.

The Māngere Bridge Station NoR is located on gentle graded land sloping to the north and east and is within the Māngere Inlet stormwater catchment. The key hydrological features, inclusive of flooding are listed and shown in Figure 6 below:

- A two Flood Plains impacts the NoR footprint, in the north-eastern corner of the indicative Station footprint and on the western side of SH20.
- Two Flood Prone Areas also impact the footprint, in similar locations to the Flood Plains identified. The eastern Flood Prone Area has a water level above 3.48m RL in the event of a 1% AEP (plus climate change) flood. The western has a water level above 5.79m in this event.
- Three overland flow paths are identified within the NoR footprint to the north-east.
- No watercourses are identified within the NoR footprint.

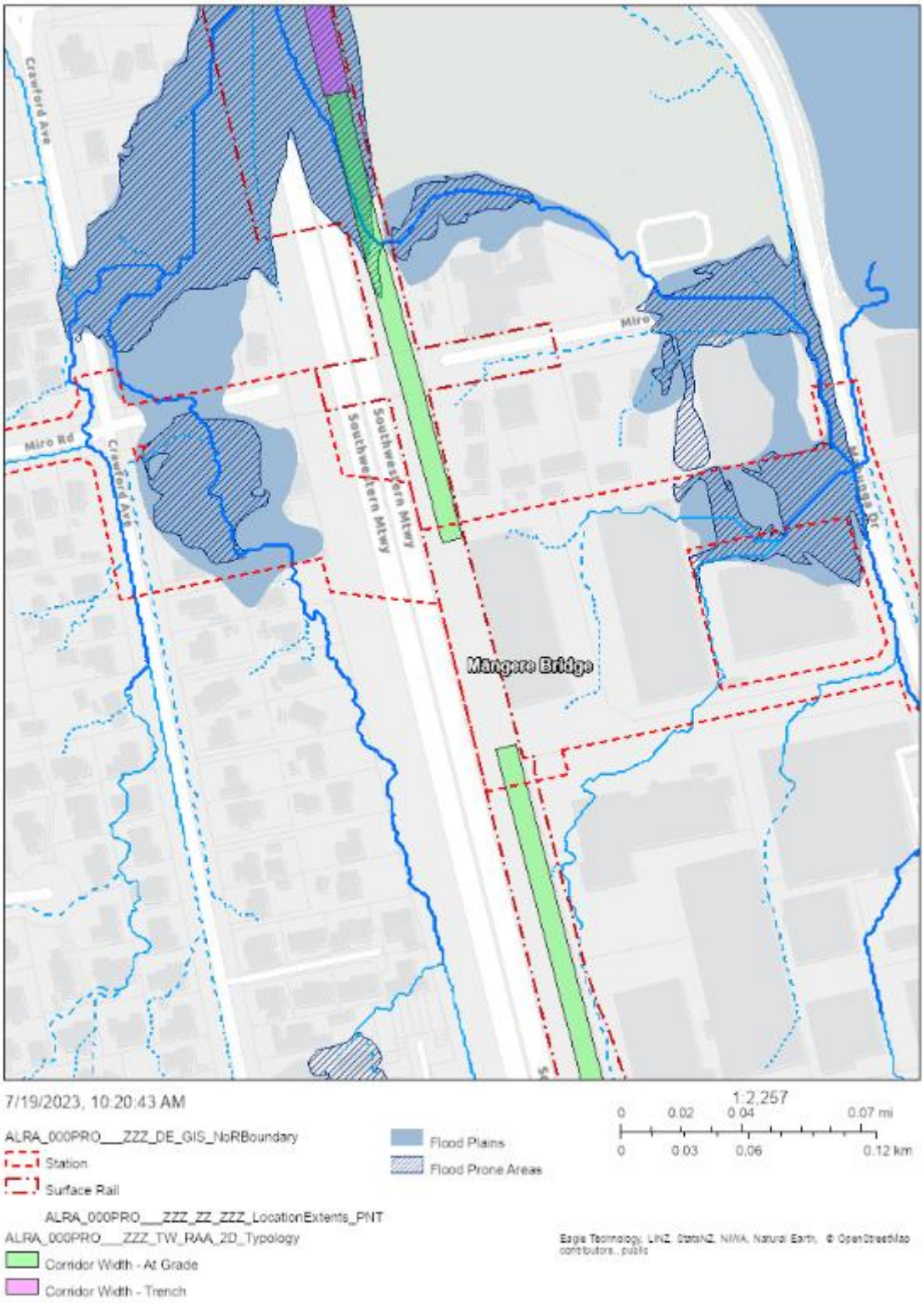

Figure 6: Flooding at the Māngere Bridge Station NoR

1. Positive effects

In addition to the positive effects outlined in section X, the Project will provide:

- An opportunity to improve management of the flood plain and overland flow path which cross the site and separate these features from station users through design.

2. Construction effects

The Hydrological Assessment notes that given the NoR footprint is already highly developed, any adverse effects on flooding or stormwater quality can be managed through design and the recommended mitigation measures.

3. Operational effects

As above, the Hydrological Assessment anticipates that there will be no operational effects in regard to hydrology and flooding.

4. Mitigation measures

In order to manage the level of effects, the Hydrological Assessment recommends:

- The installation of underground stormwater storage to reduce peak outfall flow discharge rates and minimise burden on the local drainage infrastructure. Space for approximately 9,000m^3 of storage has been identified within the NoR footprint, and pumped drainage is preferred to empty this facility. This feature will be developed further during the detailed design process including consideration of soakage disposal.
- The incorporation of WSUD and sustainable drainage into the station design where possible to enable the management and containment of surface water at its source. These design features may include:
  - Capture and storage of roof runoff water within the NoR footprint.
  - The installation of flood attenuation features such as raingardens and permeable paving.

5. Conclusion of hydrological and flooding effects

Based on the assessment above and the proposed mitigation, the effects will be appropriately mitigated.

10. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phase of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to the Māngere Bridge Station NoR. Further discussion on the common construction noise and vibration effects is considered in Section XX.

The NoR footprint is located immediately adjacent to SH20, meaning the acoustic environment is dominated by traffic noise typical of such a motorway interface.

The sensitive receivers are listed within Table 2 of this NoR, however those of particular note within the Māngere Bridge Station NoR include the following:

- The Te Puea Memorial Marae, which also has residential uses (identified as 1 below).
- The Te Paa Harakeke Kohanga Reo Preschool (identified as 2 below).
- The Ma'aola Livingstone Evangelism Ministry Church (identified as 3 below).
- Various industrial receivers (identified as 4 below).
- Residential receivers in nearby single-story standalone dwellings (identified as 5 below).

These sensitive receivers are also shown in Figure 7 below. There are no notable receivers in this location. The NoR footprint is located immediately adjacent to SH20, meaning the acoustic environment is dominated by traffic noise typical of such a motorway interface.

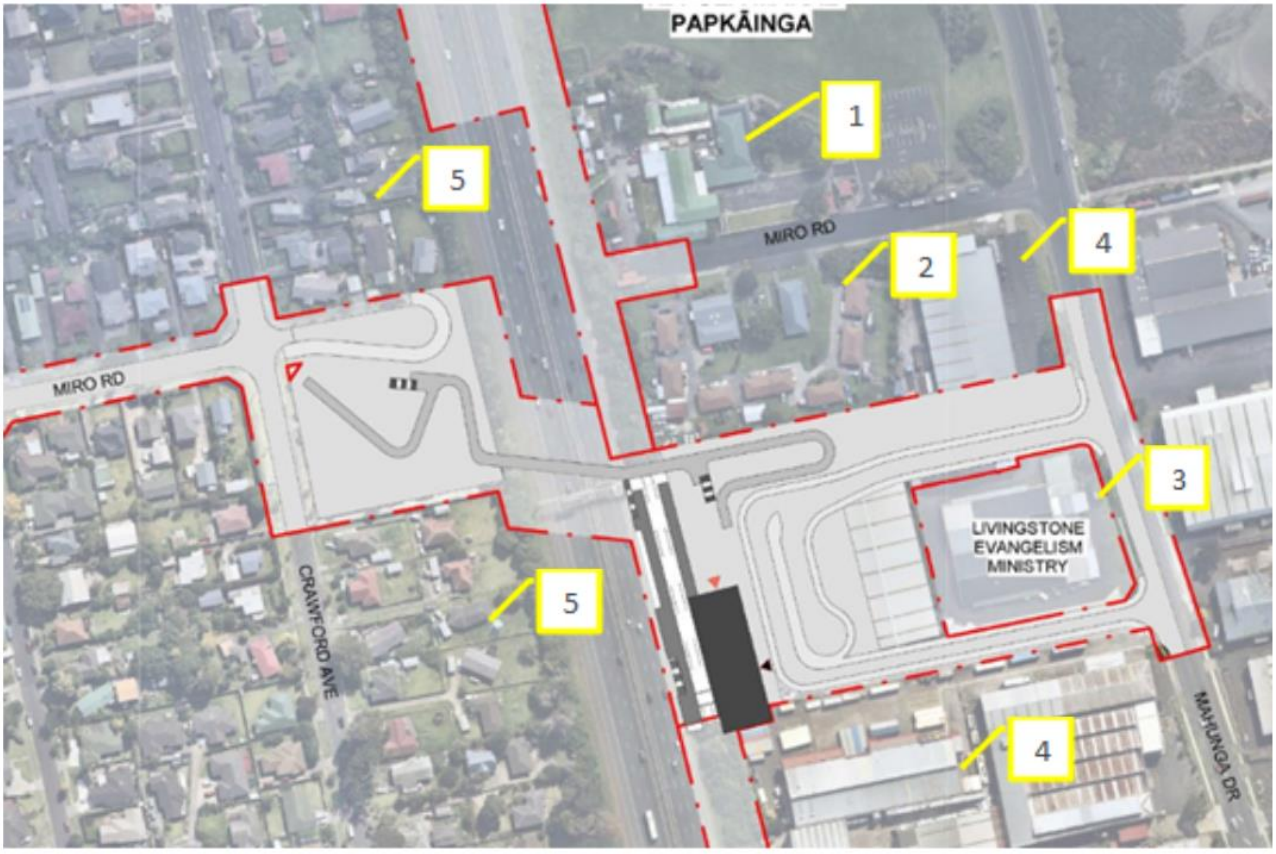

Figure 7: Nearby sensitive receivers within Māngere Bridge Station NoR.

1. Positive effects

Section X of this AEE outlines common positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. Construction noise effects

The construction works at Māngere Bridge Station will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the Suburban Worksite construction noise standards as applicable in this location.

Based on the noise and vibration modelling undertaken for the site, it has been identified that there will be an infringement of the Suburban Worksite standards predicted at ground floor receivers where high noise generating activities are undertaken at the site perimeter, including when best practice CNVMP are implemented. These infringements could range up to 5 decibels, typically one to three hours at a time. The nature of these effects ranges from people relocating to quieter outdoor areas to acceptable indoor levels but communication may be affected.

Regarding night-time construction noise the craning of components for the proposed station bridge across SH20 (undertaken during nightworks) is predicted to infringe the Suburban Worksite noise standards by 5 decibels.

The effect of these infringements will be similar in scale to typical night-time road works and will occur intermittently for 1-3 hours in a night. Works will be carried out on no more than two nights in a row.

Based on night-time noise predictions, the effect may disturb sleep for most if windows are left open. Anticipated noise levels are typically acceptable for a modern building with closed windows. However, anticipated noise would be similar in level and character to the existing noise environment of SH20.

3. Construction noise mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section xx. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed condition XX of the draft condition set in Appendix XX. Variation from the Project

noise standards can only be achieved via a Schedule to the CNVMP. No additional noise measures are required at Mangere Bridge Station.

4. Construction vibration effects

The construction works at Māngere Bridge Station NoR will be involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted potential infringement of the Project vibration standards in this location using compaction activity as the highest vibration generating activity given the sustained vibration produced, usually over a period of days while fill is compacted.

The effects of construction vibration take two forms:

- Potential for building damage; and
- Potential for loss of amenity.

The Construction Noise and Vibration Assessment predicts potential infringement of the Project vibration standards related to building damage at 27, 29, 31, 46B, and 48 Crawford Avenue, and 3 and 7 Mahunga Drive during station construction.

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction vibration standards are specified in proposed condition XX and the framework for a CNVMP in proposed condition XX of the draft condition set in Appendix XX. Variation to the Project vibration standards can only be achieved via a Schedule to the CNVMP. No additional measures are required at Mangere Bridge Station. The recommendations of the Construction Noise and Vibration Assessment with respect to 27, 29, 31, 46B, and 48 Crawford Avenue, and 3 and 7 Mahunga Drive are captured by the framework for a CNVMP.

6. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

11. Operational noise and vibration

[Assessment of potential adverse operational noise and vibration impacts effects to be provided.]

12. Blasting overpressure and vibration

No blasting works are proposed in order to construct the Māngere Bridge Station. Accordingly, we have concluded that there will be no blasting effects during the construction of the Māngere Bridge Station.

13. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blasting Noise and Vibration Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of structural damage to buildings and structures.

This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to the Māngere Bridge Station NoR. Further discussion on the common effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.

The existing built environment in proximity to the station consists of shallow founded low rise domestic, commercial, and industrial buildings. The Māngere Bridge Station and platforms are to be founded at grade and are anticipated to comprise shallow founded footings or piles dependant on ground conditions. The proposed station overbridge will be constructed with piled foundations.

1. Positive effects

There are no positive effects on buildings or structures with respect to vibration and settlement.

2. Construction vibration induced effects

Vibration induced building effects common to the entire Project area is discussed in Section XX. Surrounding buildings fall outside the vibration threshold setback distances and as such the potential for damage to these surrounding buildings is Negligible. The Structures and Settlement Assessment has identified:-

that all buildings within the damage setback threshold for vibration effects are within the NoR footprint, and will be acquired and demolished to allow for station construction.

3. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX, in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CNVMP and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Mitigation of construction vibration effects common to the whole Project is discussed in Section xx. Settlement associated with the excavation of foundations for construction of buildings and the station bridge is not expected to extend any notable distance from the actual works and will be contained within the NoR footprint. Anticipated adverse effects from settlement on buildings outside the NoR are Negligible.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx in the form of a Settlement Management Plan (SMP), recommended in condition XX provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. Operational settlement and vibration induced effects

There are no settlement induced effects associated with the operation of the Project. The potential for settlement effects will occur only during the construction of the Project. Vibration effects on buildings resulting from the operation of the Project is addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section xx.

7. Conclusion of settlement and structure effects

Based on the assessment above, the Settlement and Structures Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on buildings with will be appropriately managed.

14. Geological Heritage

The Assessment of Geological Heritage effects, included in Appendix XX of Volume 3, assesses the actual and potential effects on volcanic features during the construction phase of the Project as they relate to construction activities in proximity to these features. This section focuses on the volcanic features in the vicinity of the Māngere Bridge Station NoR. Further discussion on the common effects on geological heritage is considered in Section XX.

As per Table 2 above, the Assessment of Geological Heritage effects identifies the presence of a basalt lava flow field and overlying ash from Te Pane o Mataaaho / Māngere Volcano to the east which impact the NoR footprint and indicative station footprint.

1. Positive effects

Section X of this AEE outlines common positive effects. However, the Assessment of Geological Heritage Effects does not identify any positive effects specific to the Māngere Bridge Station NoR.

2. Construction effects

The Assessment of Geological Heritage Effects notes that the site is subaerial and in proximity to the existing transport corridor (SH20), and so does not anticipate any Geological Heritage implications for the Māngere Bridge Station. Accordingly, there will be no construction effects on Geological Heritage.

3. Operational effects

There will be no operational effects on Geological Heritage.

4. Mitigation measures

No mitigation measures have been identified within the Assessment of Geological Heritage Effects.

5. Conclusion of geological heritage effects

Based on the assessment above and the proposed mitigation, the effects will be appropriately managed.

15. Conclusion

[Standard text to come from exemplar. Some text drafted below]

Overall, effects from the Māngere Bridge Station NoR will be appropriately managed and mitigated. During the construction phase, management plans relevant to this NoR will be prepared to manage and actual and potential adverse effects which arise. These include the CTMP, SCEP, HHMP, TMP and CNVMP.

Once the Māngere Bridge Station is operational, mitigation measures have been proposed to manage any actual or potential effects, such as the provision of cycle storage, 'kiss and ride' drop-off bays, underground stormwater attenuation ponds, and the attenuation of other WSUD and sustainable drainage.

The Māngere Bridge Station will be transformative for the wider Māngere Bridge and Māngere area, and is expected to improve access to employment, education, and other facilities for residents in these communities, while providing connection to other communities across Auckland.

1. Notice of Requirement

1. NoR 18 – Te Ararata Station NoR

This section:

- Describes NoR 18 – Te Ararata Station (section 1.2)
- Summarises the existing and receiving environment (section 1.3)
- Assesses potential effects and outlines mitigation (section 1.4)

2. NoR description

The Te Aratata Station NoR is located on the existing residential properties centred around Fatafehi Place, which is immediately on the east of the State Highway 20 / Southwestern Motorway (SH20) corridor. Te Ararata Station is proposed to be an at-grade station adjacent to the east of SH20. It is anticipated to be a low-medium patronage station.

Figure 1 shows Te Ararata Station and NoR boundary (outlined in red). Figure 2 shows the proposed Te Ararata Station NoR footprint and its surrounds. The NoR footprint will include existing residential properties at Fatafehi Place, extending to Hall Avenue / Elmdon Street on the west of SH20, the existing overhead SH20 footbridge, and Hall Avenue on the east of SH20. Table 1 summarises the Te Ararata Station NoR's permanent features and temporary construction works.

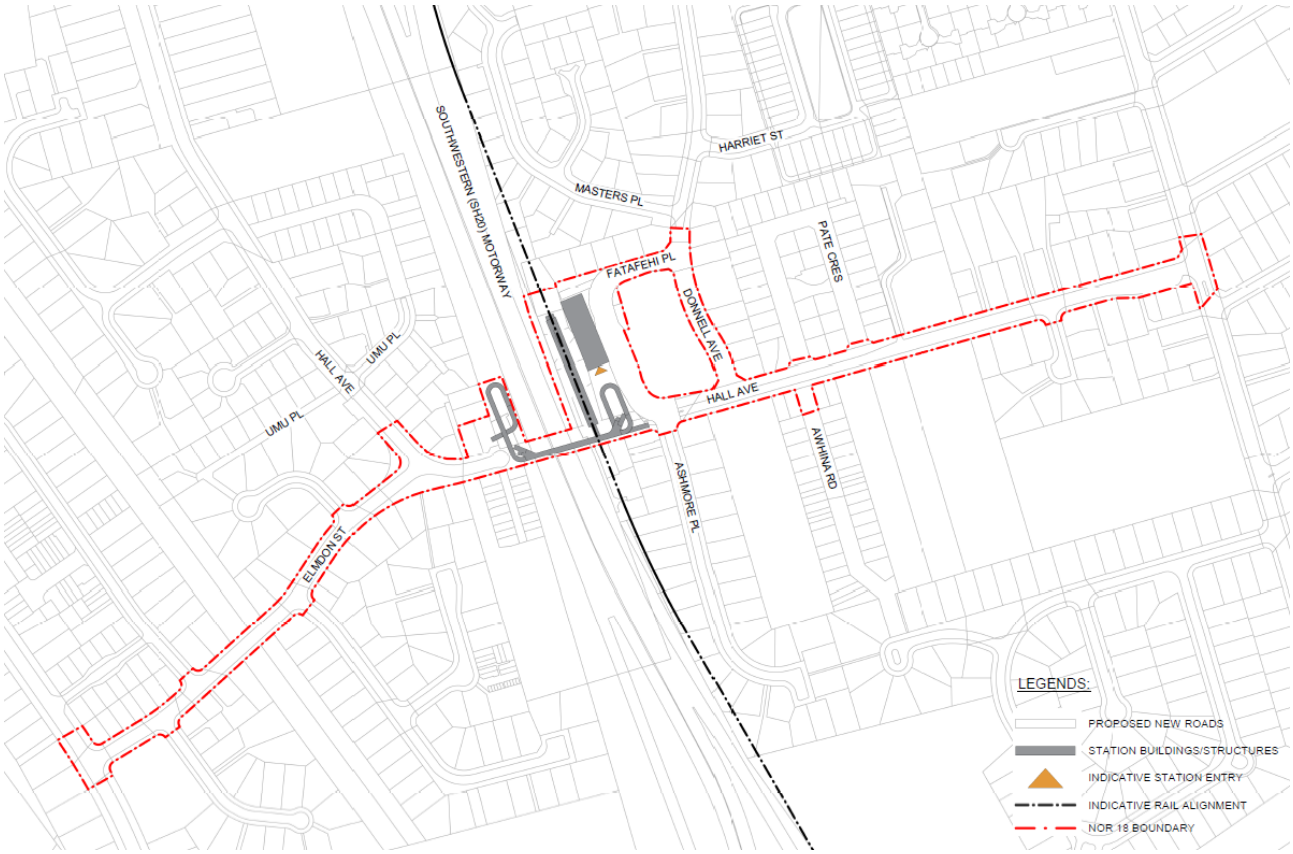

Figure 1: Te Ararata Station NoR location plan

Figure 2: Te Ararata Station NoR footprint on aerial imagery of existing environment

Table 1: Te Ararata Station NoR description

Permanent features	
Station	• At-grade station parallel to SH20 and perpendicular to Hall Avenue • Primary station entrance will be provided from the Station building on Fatafehi Place, equipped with gate lines and ticketing infrastructure • The Station building is connected to the northern end of the island platform via an underpass
Platforms	• Island platform arrangement, with rail alignment on either side of the platform • Platform accessible from two entrances • Primary access to platform is on northern end of platform, connected to the Station via underpass and accessible by lifts and stairs (East Gateway) • Secondary access to platform is on southern end of platform, connected to the overhead SH20 footbridge at Hall Avenue (West Gateway)
Public realm	• East gateway provides generous forecourt adjacent to Station, with opportunities for public amenities i.e. retail kiosks and open spaces • West Gateway opportunities to connect with Elmdon Street and Bader Drive through parks, community garden, playgrounds etc • Upgrade Hall Avenue streetscape and landscaping
Road and streetscape	• New station walking and cycling bridge connecting Hall Avenue on the east and west of SH20 • New station road connecting Fatafehi Place and Hall Avenue • Road enhancements to connect with bus services • Walking and cycling improvements along Hall Avenue and Elmdon Street
Parking and loading	• Provision for accessible 'Kiss and Ride' bays at both east and west gateways

	• Provision for secure cycle storage beneath new station bridge
Other new infrastructure	• New station bridge over SH20 connecting Hall Avenue on the east and west of SH20
Anticipated patronage	• Low-medium patronage
Other	• Provision for bus access / interchange to station via Hall Avenue. • No bus route across SH20 at Hall Avenue, this access would be used by rail replacement services
Anticipated construction works	
Construction methodology and staging	Refer to AEE Section 6 and DCR Section X for more detail. At a high level the construction activities will include: • Demolition, site clearance, utilities relocation/protection. Establish site offices and amenities; • Station construction zone to be used as a central hub for construction of the adjacent sections of rail corridor; • Construct new overhead SH20 footbridge adjacent to the existing bridge to maintain pedestrian access across the motorway. New footbridge will be made operational prior to closure of existing footbridge. Bridge spans can be installed under nightworks motorway closure; • Construct new station platform and structures; and • Streetscape upgrades. *Note: this is indicative and could be subject to change to align with site constraints and public and stakeholder engagement.*
Access to the site	• Construction access will be via Fatafehi Place. • Construction will be staged to maintain access to Walmsley Road and SH20. • A new Station bridge will be constructed adjacent to existing SH20 overhead footbridge to maintain pedestrian access across SH20. New Station bridge will be made operational prior to closure of existing footbridge.
Other	• Construction traffic XXX

3. Description of the environment

This section sets out the existing and receiving environment for the Te Ararata Station NoR. applies the parameters on the assumptions outlined in Section 10.1.3.
Table 2 describes the surrounding area and features. Any property directly affected by this NoR is listed in Appendix X to NoR 18 Form 18.

Table 2: Existing environment description

Feature	Description
Current land use	• Low-density residential dwellings on eastern and western sides of proposed Station • Residentially zoned private greenspace owned by Methodist Church (encircled in NoR footprint but does not include it) • SH20 motorway, overhead footbridge and road reserves • Industrial land uses along Mahunga Drive and Favona Road approx. 1 km northwest of the proposed Station
Transport	• Key arterial SH20 connecting Auckland Airport to wider Auckland region • Suburban residential streets (Hall Avenue, Elmdon Street, Ashmore Place, Bader Drive, Donnell Avenue, Hinau Road) • Existing walking footpaths on both sides of residential streets

	• West of SH20, walking connections mainly via Hall Avenue and Elmdon Street • East of SH20, walking connections mainly via Hall Avenue and Donnell Avenue • Overhead SH20 footbridge at Hall Avenue • Cycle routes: shared path "regional cycle route" parallel to SH20 and Hinau Road dedicated cycleway • Bus services and bus routes along Robertson Road (east), Favona Road (north), McKenzie Road (west) and Bader Drive (west). • No existing train stations close to the proposed NoR.
Infrastructure	• Gas main on northern side of SH20 with service connections • Transmission watermain pipe over the SH20 overhead footbridge • Sewer services adjacent to SH20 serving much of the community between Robertson Road and SH20. • Overhead powerlines above SH20 and multiple telecommunication ducts
Community facilities and key attractions	• Education facilities: Sir Keith Park School, Koru School, Te Kura Kaupapa Māori o Māngere School and Māngere College • Sport and recreational facilities: Donnell Park, Tilberg Park, Moyle Park and Māngere Centre Park • Nearest local centre is Māngere Town Centre approx. 1.3 km south of the proposed Station • Kingdom Hall of Jehovan's Witnesses, Christlife Assembly of God Samoan Church, O Le Ekalesia a lesu Keriso o le Au Paia o Aso e Gata Ai Christian Church and Māngere Samoan AOG
Sensitive noise receivers	• To be completed – check page 18
Built heritage	There are no built heritage features or material identified within the NoR footprint.
Archaeology	The following archaeological site is recorded within the NoR boundary: • Pre-1900 homestead curtilage at corner Donnell Avenue and Fatafehi Place (R11/3461)
Cultural	• [Need further information from Te Tiriti Partnerships team]
Topography	• Flat topography, as is the topography of the surrounding residential land • Landform gradually slopes downwards at Te Ararata Creek Reserve in the north-western direction
Geology	• To be completed
Catchment	• Located within the Māngere Inlet stormwater catchment
Flooding and hydrology	• Located within Māngere Inlet Stormwater catchment • No flood plains or flood prone areas are noted at proposed NoR footprint • One overland flow path traversing 92 Hall Avenue and 19 Fatafehi Place and flowing onto the road of Fatafehi Place • Flooding catchment present to south of Hall Avenue and on Donnell Avenue.
Trees and vegetation	• Seven mature street trees along northern side of Hall Avenue • Seven early-mature pōhutukawa street trees along Donnell Avenue • Six juvenile silk street trees on Fatafehi Place

	• Titoki trees present on northern side of Elmdon Street, more recently planted street trees at intersection of Elmdon Street and Hall Avenue • Row of Mexican fan palm trees, one pūriri tree and two pōhutukawa trees at entrance of overhead SH20 footbridge / Hall Avenue • Groups of native trees run parallel along both sides of SH20
Terrestrial Ecology	• Native revegetation • Exotic dominated tree land • Street trees

Figure 3 and Table 3 identifies the relevant statutory considerations within the Te Ararata Station NoR footprint.

Figure 3: Te Ararata Station NoR zoning and overlays in the AUP

Table 3: Te Ararata Station NoR statutory environment

Te Ararata Station NoR	Description	Comment
Current NoR zoning	Residential – Mixed Housing Suburban	Applies to Fatafehi Place properties and Hall Avenue properties (east of SH20)
	Residential – Mixed Housing Urban	Applies to Elmdon Street properties
	Strategic Transport Corridor Zone	Applies to State Highway 20 / Southwestern Motorway (SH20)
	Road	Applies to all the roads within the NoR footprint
Precincts	N/A	N/A
Overlays	Natural Heritage: Regionally Significant Volcanic Viewshafts and Height Sensitive Area [rcp/dp] – M4, Mount Māngere	Applies to Elmdon Street properties between Hall Avenue and Bader Drive, located approx. 1.4 km from Māngere Mountain
Controls	Arterial Roads	Applies to SH20 as an 'Arterial Road'
	Macroinvertebrate Community Index – Urban	Applies to the entire NoR footprint
	Coastal Inundation 1 per cent AEP Plus 1 m Control	Applies to the reserve area under Elmdon Street
Designations	Waka Kotahi Designation – 6708, State Highway 20: To undertake maintenance, operation, use and	Applies to the SH20 Waka Kotahi Designation adjacent to the west of the NoR.

	improvement to the State Highway network.	
	Airspace Restriction Designations - ID 1102, Protection of aeronautical functions - obstacle limitation surfaces, Auckland International Airport Ltd	Applies to the entire NoR footprint. Proposed works will not affect Airspace Restriction Designation.
Zoning within 800m catchment from Station	• Residential – Mixed Housing Suburban Zone • Residential – Mixed Housing Urban Zone • Residential – Terrace Housing and Apartment Building Zone • Business – Local Centre Zone • Open Space – Sport and Active Recreation Zone • Open Space – Conservation Zone • Open Space – Informal Recreation Zone • Water (Māngere (Hinau Street) Pump Station) • Coastal – Coastal Transition Zone • Coastal – General Coastal Marine Zone • Special Purpose – School Zone	• Multiple zones within 800m catchment from proposed Station, with increased density and several parks and reserves. • Areas near Te Ararata Creek Reserve are also zoned for conservation and water purposes. • There are coastal zones further north along Te Ararata Creek.
Anticipated future zoning within 800m catchment (construction, operation)	As above, with the following changes: • Residential – Mixed Housing Suburban/ Urban within 800m rezoned to Residential – Terrace Housing and Apartments • Business – Local Centre Zone retained with increased heights	Refer Section 10 for analysis.
Other relevant considerations	N/A	N/A

4. Assessment of effects on the environment

This section assesses actual and potential effects of the construction and operational phases of the Project as they relate to Te Ararata Station NoR.

This builds on the technical assessment included in Volume 3 and the Design and Construction Report in Appendix X. Section XX outlines the indicative construction methodology used for these assessments.

1. Traffic and transport

The Assessment of Transport Effects, included in Appendix X of Volume 3 assesses any actual and potential traffic effects of the construction and operational phases of the Project as they relate to effects on traffic and transport. This section focuses on the transport effects specific to the Te Ararata Station NoR. Further discussion on the route-wide transport effects is considered in Section XX.

Key transport features within and adjacent to the Te Ararata Station NoR include:

- **Public transport (bus services):** Bus services along Robertson Road, Favona Road, McKenzie Road and Bader Drive. No bus routes servicing the immediate vicinity of the NoR.

- **Public transport (heavy rail):** No existing train stations exist in the vicinity of the Te Ararata Station.
- **Roading network:** Adjacent to the SH20 motorway corridor, which is a regionally significant arterial connecting Auckland Airport to the wider Auckland region. Surrounding street network are primarily residential streets (Elmdon Street, Ashmore Place, Bader Drive, Donnell Avenue, Hinau Road).
- **Walking:** Existing pedestrian volume is reflective of a typical residential cul-de-sac area. Overhead walking and cycling footbridge above SH20 connecting the two ends of Hall Avenue. Walking footpaths on both sides of surrounding residential streets.
- **Cycling:** Overhead walking and cycling footbridge above SH20 and a regional cycle route alongside SH20. No other cycle facilities in the immediate vicinity of the NoR.
- **Private vehicles:** Daily traffic movements along Hall Avenue and Donnell Avenue range between 1,963 and 4,350, reflective of the cul-de-sac character. Further away from the NoR, daily traffic movements along Robertston Road, Walmsley Road and Bader Drive range between 15,420 and 26,330.
- **Parking:** Parking within the vicinity is mixed on-road and private car parking facilities.
- **Loading:** N/a.
- **Freight:** Walmsley Road is classified as a strategic Level 1B freight route.

Te Ararata Station will form part of the future light rail network, improving connectivity along the alignment. Specifically, to Te Ararata Station, there are some provisions under the Future Connect Strategic Transport Network in the vicinity of the proposed Te Ararata Station, which includes Rapid Transit Networks (RTN) proposed for SH20 and Bader Drive.

1. Positive effects

In addition to the route-wide positive effects outlined in Section X, the Te Ararata Station will provide:

- Improve walking and cycling facilities along Hall Avenue connecting to Robertson Road, and Elmdon Street connecting to Bader Drive. This includes street furniture and streetscape amenities and onward connections to existing east and west foreshore routes.
- Additional bus services along Bader Drive, Donnell / Hall Avenue and Walmsley / Robertson Road and likely to be located closer to the ALR alignment for improved connecting services.
- Opportunities for pick-up and drop-off points with incorporated mobility impaired access, and parking management measures within 500 m of the proposed station.
- Introduction of a new public transport hub in the Te Ararata area, specifically a train station as there is currently none in the vicinity. This will enhance connectivity and enable access to education and employment opportunities for the local communities to the rest of Auckland.
- Improve east-west connectivity between Favona and Māngere communities.

2. Construction effects

Construction traffic effects which apply to the entire Project area are discussed in Section XX. The proposed works at Te Ararata Station NoR will potentially result in the following adverse construction traffic effects:

- **Public transport (bus services):** Construction works are not anticipated to generate adverse effects on nearby bus services.
- **Public transport (heavy rail):** Refer to route-wide effects section (Section XX). No existing train stations exist in the vicinity of the NoR, therefore no effects expected on heavy rail.
- **Roading network:** Increase in heavy vehicle traffic in the local road network.
- **Walking:** Pedestrians will be largely unaffected by the construction phase. The existing SH20 overhead footbridge will be retained throughout the construction of the Station and the new station bridge. The existing footbridge will be closed once the new station bridge is complete and operational.

- **Cycling**: There are no cycle facilities affected by the construction, although cyclists will be required to share the road with an increased number of heavy vehicles in the area.
- **Private vehicles:** Potential increases in delay at the main intersection points along the construction routes, including for emergency services.
- **Parking:** A minimal number of on-street parking will be affected by the construction access along Hall Avenue and Fatafehi Place.
- **Loading:** N/a
- **Emergency Services:** Emergency services bound for locations close to the construction site may be delayed at certain intersections, unable to bypass queued traffic.
- **Freight:** Refer to route-wide effects section (Section XX).

3. Construction mitigation measures

Mitigation of traffic and transport effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Construction Traffic Management Plan (CTMP). The Assessment of Transport Effects recommends the following opportunities for inclusion in the CTMP in relation to Te Ararata Station:

- **Public transport (bus services):** None specific to Te Ararata Station. Refer to route-wide section (Section XX).
- **Public transport (heavy rail):** None specific to Te Ararata Station. Refer to route-wide section (Section XX).
- **Roading network:** Existing number of traffic lanes on SH20 is generally to be maintained, although short-term (overnight) lane closures may be required for the overhead footbridge. Temporary reduction in traffic lanes and shoulder widths may be required southbound on SH20.
- **Walking:** Completion of new overhead footbridge above SH20 before removal of existing overhead footbridge.
- **Cycling:** Completion of new overhead footbridge above SH20 before removal of existing overhead footbridge.
- **Private vehicles:** None specific to Te Ararata Station. Refer to route-wide section (Section XX).
- **Parking:** None specific to Te Ararata Station. Refer to route-wide section (Section XX).
- **Loading:** None specific to Te Ararata Station. Refer to route-wide section (Section XX).
- **Emergency Services:** Provision for emergency services in and around the construction site will be made, this will be discussed with emergency service providers prior to construction being undertaken.
- **Freight:** None specific to Te Ararata Station. Refer to route-wide section (Section XX).

4. Operational effects

There are no adverse operational effects on transport from Te Ararata Station NoR.
Once the Te Ararata Station is complete, it will improve access and connectivity in the local area and unlock access to employment, education and other amenities for these communities to the wider Auckland region.

5. Conclusion of traffic and transport effects

Based on the assessment above, the Assessment of Transport Effects in Volume 3 and Appendix XX and the proposed mitigation, the actual and potential traffic and transport effects will be appropriately managed.

2. Urban design, landscape and visual

The Assessment of Landscape and Visual Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on the (natural and urban) landscape (including visual effects). This section focuses on the landscape and visual effects specific to Te Ararata Station NoR. Further discussion on the route-wide landscape and visual effects is considered in Section XX.

The urban form within and surrounding Te Ararata Station NoR is characterised by the SH20 motorway as a dominant transport infrastructure that traverses between the suburban areas of Favona and Māngere. Residential buildings are generally low density comprising single or double-storey dwellings arranged in large, subdivided blocks and cul-de-sacs.
The natural landscape within and surrounding Te Ararata Station NoR is anchored by the landmark of Te Pane o Mataaho / Māngere Mountain located approximately 1.4 km to the north-west of the NoR. Te Ararata Creek is the nearest open watercourse located approximately 350 m to the west of the NoR.

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, this station will provide:

- Potential for the Station and new overhead footbridge to become a landmark in the area that enhances the local identity and connects the Favona and Māngere communities currently severed by SH20.
- Station and new overhead footbridge to generate pedestrian movement on feeder streets in the vicinity.

2. Construction effects

The construction works at Te Ararata Station NoR will involve typical construction activities. Specifically at Te Ararata Station NoR, the LVA identifies the follow potential adverse effects:

- Direct adverse visual amenity effects on the nineteen residential properties within the proposed NoR footprint;

3. Construction mitigation measures

Management of construction effects are generally addressed through the mitigation measures as set out in Section XX, inclusive of the suite of management plans to be prepared to manage general construction effects.

4. Permanent infrastructure

The works within Te Ararata Station NoR will result in a change in the urban form and natural landscape. These changes include:

- XX

5. Conclusion of urban design, landscape and visual effects

Mitigation of landscape and visual effects common to the whole Project is discussed in Section XX and will be achieved through the ongoing design of the Project in accordance with the UEF principles, line-wide and station and place-wide requirements, quality benchmarks and the CULDG. In addition, for mitigation of landscape and visual effects specific to the Te Ararata NoR the Assessment of Landscape and Visual Effects identifies the following opportunities for inclusion in the CULDG when undertaking the design of the station:

- Footpath width and street lighting considerations along Hall Avenue and Elmdon Street;
- Fencing and buffer planting between Station facilities and surrounding residential properties.

Based on the assessment above, the Landscape and Visual Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential landscape and visual effects associated with the Project will be appropriately managed.

3. Social

[ASSESSMENT OF POTENTIAL ADVERSE SOCIAL IMPACT EFFECTS TO BE PROVIDED]

4. Cultural

[TBC on cultural reporting]

5. Built Heritage

The Built Heritage Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to built heritage effects. This section focuses on the built heritage effects specific to Te Ararata Station NoR.
No known built heritage within Te Ararata Station NoR footprint has been identified. As such, no further assessment of built heritage is required with respect to Te Aratata Station NoR.

6. Archaeology

The Assessment of Archaeological Effects, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on archaeology. This section focuses on the archaeological effects specific to Te Ararata Station NoR. Further discussion on the route-wide archaeology effects is considered in Section XX.

There has historically been a strong Māori presence in the area focusing on traditional horticultural practices. As such, many natural landmarks are archaeologically significant, particularly Te Pane o Mataaho / Māngere Mountain located approximately 1.4 km north-west of the NoR.

The key archaeological feature within the Te Ararata Station NoR is the curtilage associated with a 19th century homestead noted at the current intersection of Donnell Avenue and Fatafehi Place (ArchSite reference: R11/3461). Remnants of the row of trees are still present in the green space at 98 Hall Avenue. This is shown in Figure 4 below.

As identified in the Assessment of Archaeological Effects, the main archaeological values of this site are historical and social in context. Although it was likely one of the first European structures in the area, the homestead has been demolished and its historical values are no longer legible.

Figure 4: Archaeology within Te Ararata Station NoR

1. Positive effects

There are no positive effects in regard to the impact of the Project on archaeology as by its very nature construction requires disturbance of the ground in which archaeological remains may be present. However, management processes can be established to enable the recording of archaeological material found during construction of a project, providing valuable insight into the history of a site.

2. Construction effects

While one scheduled archaeological site is present within the Te Ararata Station NoR footprint, this site no longer pertains the same historical values as the historic structure has been demolished. The site does not warrant any special protections or scheduling and any loss of heritage values can be mitigated.

The construction works within the Te Ararata Station NoR will not result in any additional construction effects on archaeology than those set out in the route-wide effects included in Section XX.

3. Construction mitigation measures

Mitigation of archaeological effects common to the whole Project is discussed in Section xx. This mitigation takes the form of a Historic Heritage Management Plan (HHMP), inclusive of accidental discovery of archaeological features. There are no specific archaeological effects that require mitigation with respect to Te Ararata Station NoR.
In addition, an Authority to Modify the whole or any part of the recorded site (Homestead Curtilate R11/3561) and unrecorded archaeological sites will be sought from Heritage New Zealand Pouhere Toanga under section 44 of the Heritage New Zealand Pouhere Taonga Act 2014. This will be managed separately from this NoR process.

4. Operational effects

There are no operational effects on archaeology. The potential for adverse effects on archaeology will occur only during the construction of the Project.

5. Conclusion of archaeological effects

Based on the assessment above, the Archaeological Assessment in Appendix XX of Volume 3 and the proposed mitigation, the actual and potential adverse effects on archaeology associated with the Project will be appropriately managed.

7. Arboriculture

The Arboricultural Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to effects on arboriculture. This section focuses on the arboricultural effects specific to Te Aratata Station NoR. Further discussion on the route-wide arboricultural effects is considered in Section XX.
On the eastern side of SH20, there are seven mature Illawarra flame street trees along the northern side of Hall Avenue. Donnell Avenue contains some early-mature pōhutukawa street trees. Fatafehi Place contains six juvenile silk trees. On the western side of the SH20, a strip of vegetation runs along the Te Ararata Creek Reserve. The western end of Elmdon Street contains tītoki trees. At the end of the SH20 overhead footbridge adjacent Hall Avenue, there are a row of Mexican fan palm trees and two pōhutukawa trees. There are no scheduled trees identified within the NoR footprint, however there are a range of trees in roads identified within the NoR footprint.
The following trees in roads have been identified within Te Ararata Station extents:

- Illawarra flame trees located along Hall Avenue (east of SH20);
- Pōhutukawa trees along roadside berms of Donnell Avenue;
- Silk trees along roadside berms of Fatafehi Place;
- Mexican fan palm trees at eastern end of Hall Avenue adjacent to SH20 overhead footbridge;
- Pūriri tree adjacent to cul-de-sac at eastern end of Hall Avenue (west of SH20); and
- Michelia tree in roadside berm of Hall Avenue (west of SH20).

1. Positive effects

There are no positive effects in regard to arboriculture as the trees are required to be removed for the construction and establishment of the Te Ararata Station.

2. Construction effects

Some trees in roads are required to be removed or modified during construction. The following construction effects on arboriculture are expected:

- Removal of three established native trees to enable the construction of the new SH20 overhead footbridge.
- Removal of 5 large fan palm trees at Hall Avenue at the western entrance of the existing SH20 overhead footbridge, which will result in adverse amenity effects.
- Several street trees may be impacted by pruning in order to facilitate movement of large construction vehicles, which may impact the amenity and ecological values of the trees.
- Other existing street trees along Hall Avenue and Elmdon Road may also be impacted depending on final design and construction methodology.

3. Construction mitigation measures

Mitigation of arboricultural effects common to the whole Project is discussed in Section XX. This mitigation takes the form of a Tree Management Plan (TMP), specified in proposed Condition XX of the draft condition set in Appendix X. Where street trees are proposed to be removed, replanting shall be undertaken and aim to remediate the loss of ecological services and

amenity values that any removed trees provide, by establishing large grade trees in properly constructed planter pits in grass berms or station plaza areas.

4. Operational effects

There are no operational effects on arboriculture. The potential for adverse effects on arboriculture will occur only during the construction of the Project.

5. Conclusion of arboricultural effects

Based on the assessment above, the Arboricultural Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential effects on arboriculture associated with the Project will be appropriately managed.

7. Open space

An Open Space Assessment has been undertaken and included as Appendix XX of Volume 3. There is no open space identified within Te Ararata Station NoR footprint and therefore no assessment of effects on open space is required.

8. Flooding

The Hydrological Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction and operation phases of the Project as they relate to hydrology and flooding. This section focuses on the hydrology and flooding effects specific to Te Ararata Station NoR. Further discussion on the route-wide hydrological effects is considered in Section XX.

The Te Ararata Station NoR is located on flat land at a localised high point within the Māngere Inlet Stormwater Catchment. The key hydrological features, inclusive of flooding are listed below and shown in Figure 5:

- One overland flow path within the NoR, traversing 92 Hall Avenue and 19 Fatafehi Place which flows onto the road of Fatafehi Place.
- Flood prone area present to south of Hall Avenue.
- Flood prone area present to southern portion of Donnell Avenue.
- Flood prone area present along Elmdon Street and Hall Avenue on the western side of SH20.

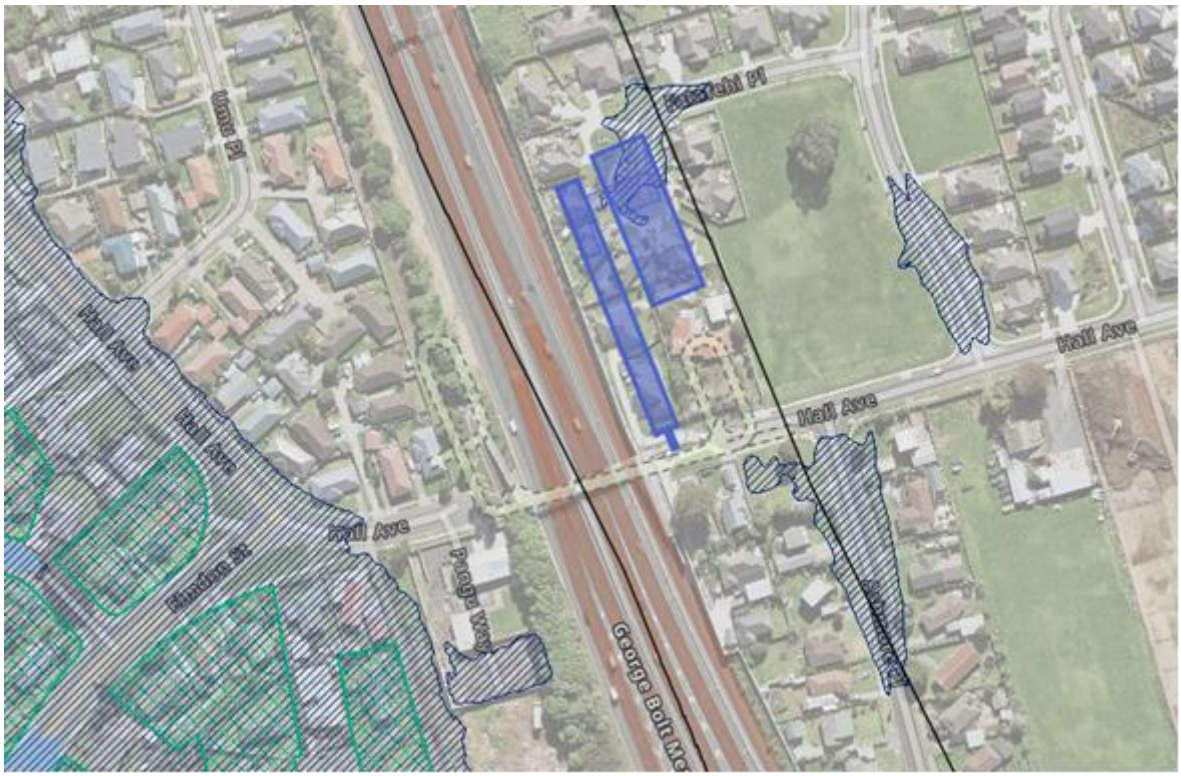

Figure 5: Hydrology within Te Ararata Station NoR

1. Positive effects

In addition to the route-wide positive effects outlined in Section XX, this station will provide:

- Opportunity to establish an underground stormwater storage tank beneath the Station.
- O pportunities to improve the management of the flood plain and the overland flow path that crosses the NoR site, likely to separate the flooding and overland flow from station users as part of the design.
- Currently no water quality treatment devices at the Te Ararata Station NoR location. Opportunities to implement water sensitive urban design (WSUD) and water quality treatment devices will reduce contaminants leaving the site.

2. Construction effects

[TBC following the report. Will need to assess the impact of constructing infrastructure within flood plain and overland flow path].

3. Operational effects

[TBC following the report. Will need to assess the impact of the permanent infrastructure within flood plain and overland flow path].

4. Operational phase mitigation measures

[TBC]

5. Conclusion of hydrological and flooding effects

Based on the assessment above and the proposed mitigation, the effects will be appropriately managed.

9. Construction noise and vibration

The Construction Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the construction phase of the Project as they relate to construction noise and vibration. This section focuses on the construction noise and vibration effects specific to Te Ararata Station NoR. Further discussion on the route-wide construction noise and vibration effects is considered in Section X.

The receivers to noise and vibration surrounding the Station are primarily residential with a mix of single-storey and double-storey dwellings. There are no notable or sensitive receivers surrounding Te Ararata Station NoR. The sensitive receivers are within the Te Ararata Station NoR include the following:

- Residential properties at 64, 66, 70, 72 Hall Avenue / entrance of SH20 overhead footbridge;
- Residential properties at 5, 7, 9 Fatafehi Place;
- Residential properties at 1-17 and 2-18 Pangu Way; and
- 11 Umu Place.

These sensitive construction noise and vibration receivers are shown in Figure 6 below. There are no notable receivers in this location.

Figure 6: Potential sensitive receivers surrounding Te Ararata Station NoR

1. Positive effects

Section X of this AEE outlines route wide positive effects. There are no positive construction noise and vibration effects relevant to this NoR.

2. Construction noise effects

The construction works at Te Ararata Station NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has identified the Suburban Worksite construction noise standards as applicable in this location.
Based on the noise and vibration modelling undertaken for the site, applying the highest noise generating activities likely to be undertaken at the site, the Construction Noise and Vibration Assessment it has identified that there may be potential infringements of the Suburban Worksite noise standards at ground floor receivers. These infringements could range up to 5 decibels, typically one to three hours at a time. The nature of these effects ranges from people moving to quieter outdoor areas to disrupted but acceptable communication indoors.
Project noise standards for night time hours are less than day time standards. Infringement of the night-time noise standards is predicted up to 5 decibels, typically one to three hours at a time over two nights. This is likely to be associated with the combined Project works and works associated with the construction of the bridge over SH20. These effects are acceptable if windows are closed and unlikely to cause sleep disturbance.

3. Construction noise mitigation measures

Mitigation of construction noise effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project noise standards as a trigger to initiate the appropriate management technique. The construction noise standards are specified in proposed Condition XX of the draft condition set in Appendix XX. Variation from the Project noise standards can only be achieved via a Schedule to the CNVMP. No additional noise measures are required at Te Ararata Station
Specifically at Te Ararata Station NoR, the Construction Noise and Vibration Assessment recommends the following:

- Noise wall on the eastern side of SH20 prior to any work commencing. Although it is intended to mitigate motorway noise, it will provide benefits during construction by mitigating potential construction noise impacts.

4. Construction vibration effects

The construction works at Te Ararata Station NoR will involve typical plant and machinery works. The Construction Noise and Vibration Assessment has predicted potential infringement of the vibration standards using compaction activity as the highest vibration generating activity given the sustained vibration produced, usually over a period of days while fill is compacted. Some residential properties at the western entrance of the SH20 overhead footbridge and Fatafehi Place and Donnell Avenue have been identified as potentially impacted by vibration for short periods of time.
The effects of construction vibration take two forms:

- Potential for building damage; and
- Potential for loss of amenity.

The Construction Noise and Vibration Assessment predicts potential infringement of the Project vibration standards related to building damage at some residential receivers immediately bordering the construction works within the NoR footprint, specifically:

- 5, 7, 9 Fatafehi Place
- 1-17, 2-18 Pangu Way
- 64, 66, 70, 72 Hall Avenue
- 11 Umu Place

5. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section XX. This mitigation takes the form of the preparation and implementation of a best practice CNVMP, and Schedules if required, using the Project vibration standards as a trigger to initiate the appropriate management technique. The construction and vibration standards are specified in proposed Condition XX and the framework for a CNVMP in proposed Condition XX of the draft condition set in Appendix XX. Variation from the Project vibration standards can only be achieved via a Schedule to the CNVMP. No additional measures are required at Te Ararata Station. The recommendations of the Construction Noise and Vibration Assessment with respect to 5, 7, 9 Fatafehi Place, 1-17, 2-18 Pangu Way, 64, 66, 70, 72 Hall Avenue, and 11 Umu Place are captured by the framework for a CNVMP.

10. Conclusion of construction noise and vibration effects

Based on the assessment above, the Construction Noise and Vibration Assessment in Appendix XX of Volume 3 and the proposed mitigation, the actual and potential construction noise and vibration effects associated with the Project will be managed appropriately.

11. Operational noise and vibration

The Operational Noise and Vibration Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of the operational phase of the Project as they relate to operational noise and vibration. Further discussion on the route-wide operational noise and vibration effects is considered in Section XX.

The existing noise environment at this location is primarily dominated by traffic noise from SH20. The future noise environment is expected to remain dominated by noise from SH20. Sensitive receivers surrounding this NoR include single storey residential dwellings on all sides of the NoR footprint.

1. Positive effects

Section X of this AEE outlines route wide positive effects. However, there are no positive operational noise and vibration effects relevant to this NoR.

2. Operational noise effects

The Operational Noise and Vibration Assessment has identified the AUP Residential – Mixed Housing Suburban and Mixed Housing Urban operational noise standards are appliable in this location.

Noise arising from this Station will comply with the relevant standards subject to appropriate design. On this basis, no adverse noise effects are anticipated as a result of the operation of the Station.

3. Operational noise mitigation measures

Mitigation of operational noise effects common to the whole Project is discussed in Section XX. The operational noise standards are specified in proposed Condition XX of the draft condition set in Appendix XX. There are no specific operational noise effects that require mitigation with respect to the Te Ararata Station NoR.

4. Operational mitigation measures

Mitigation of operational vibration effects common to the whole Project is discussed in Section XX. The operational vibration standards are specified in proposed Condition XX of the draft condition set in Appendix XX.

There are no additional specific mitigation measures required at the Te Ararata Station NoR.

5. Conclusion of operational noise and vibration

Based on the assessment above, the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and the proposed mitigation, the actual and potential operational noise and vibration effects associated with the Project will be appropriately managed.

12. Blasting overpressure and vibration

The Blast Management Assessment, included in Appendix XX of Volume 3, assesses the actual and potential effects of blasting during the construction phase of the Project as they relate to blasting noise and vibration.

Construction activities requiring blasting to be undertaken are not anticipated at Te Ararata Station NoR. There will be no blasting effects relevant to this NoR.

13. Settlement and structures

The Settlement and Structures Assessment, included in Appendix XX of Volume 3, assesses the actual and potential risk of damage to buildings and structures during the construction phase of the Project as related to construction vibration and ground settlement and movement. The Settlement and Structures Assessment has drawn on the findings of the Construction Noise and Vibration Assessment (Appendix XX), the Built Heritage Assessment (Appendix XX) and the Blasting Noise and Vibration Assessment (Appendix XX) to provide a preliminary assessment of the potential risk of damage to buildings and structures.

This section focuses on the potential risk to buildings and structures from construction vibration and ground settlement and movement specific to Te Ararata Station NoR. Further discussion on the route-wide effects from construction vibration and ground settlement and movement on buildings and structures is considered in Section XX.

The existing low-density residential properties within the Te Ararata Station NoR footprint are founded on shallow foundations. The Settlement and Structures Assessment does not identify any buildings to be sensitive to vibration and settlement within the Te Ararata Station NoR footprint. All buildings within the NoR footprint will be demolished. All other surrounding buildings fall outside the setback distances and unlikely to be impacted by vibration and settlement.

1. Positive effects

There are no positive effects on buildings or structures with respect to vibration and settlement relevant to this NoR.

2. Construction vibration induced effects

Vibration induced building damage common to the entire Project area is discussed in Section XX. The Structures and Settlement Assessment has concluded that buildings adjacent to the NoR fall outside the vibration setback thresholds and as such the potential for damage to these surrounding buildings is Negligible.

3. Construction vibration mitigation measures

Mitigation of construction vibration effects common to the whole Project is discussed in Section xx, in particular the undertaking of pre-construction building surveys. The Construction Noise and Vibration Assessment recommends vibration standards to manage the potential for building damage from the Project construction. These standards, combined with the preparation and implementation of a CVNMP and Schedules if required, are considered appropriate methods for managing the effects of construction vibration on buildings.

4. Construction settlement induced effects

Settlement effects common to the entire Project area are discussed in Section XX.
Settlement associated with building and bridge foundation excavations on the site are not expected to extend any notable distance from the actual works. The Settlement and Structures Assessment has concluded the associated settlement effects will be Negligible.

5. Construction settlement mitigation measures

Mitigation of settlement effects common to the whole Project is discussed in Section xx in the form of a Settlement Management Plan (SMP), recommended in condition XX provide a framework for the monitoring and management of excavation induced settlement effects associated with construction excavation. The SMP will include consideration of construction methods to limit ground deformation.

6. Operational settlement and structure effects

There are no settlement induced effects associated with the operational of the Project. The potential for settlement effects will occur only during the construction of the Project.
Vibration effects on building, resulting from the operation of the Project is addressed in the Operational Noise and Vibration Assessment in Volume 3 Appendix XX and Section xx.

7. Conclusion of effects on buildings

Based on the assessment above, the Settlement and Structures Assessment in Appendix XX in Volume 3 and the proposed mitigation, the actual and potential effects on buildings with will be appropriately managed.

14. Geological heritage

The Assessment of Volcanology, included in Appendix XX of Volume 3, assesses the actual and potential effects on volcanic features during the construction phase of the Project as they relate to construction activities in proximity to these features.
There are no relevant volcanoes in Te Ararata Station NoR, meaning no volcanic effects have been identified.

5. Conclusion

Overall, effects from Te Ararata Station NoR will be appropriately managed and mitigated. During the construction phase, management plans relevant to this NoR will be prepared to manage any actual and potential adverse effects that may occur, such as the Construction Traffic Management Plan, Stakeholder Consultation and Engagement Plan, Historic Heritage Management Plan, Tree Management Plan, Construction Noise and Vibration Management Plan and a Settlement Management Plan.
Once Te Ararata Station is operational, mitigation measures have been recommended to manage any actual and potential adverse effects, such as through detailed design, CULDMP and the Outline Plan process.

The Te Ararata Station will be transformative for the Favona and Māngere area and will unlock access to employment, education and other facilities for the Favona and Māngere communities and connect these communities to the wider Auckland region.

11. Summary of Key Proposed Mitigation

This section summarises the mitigation proposed for the Project in order to avoid, remedy, or mitigate potential adverse effects (as identified in Section 10)

As described in Section 7, the Project has taken proactive measures to avoid adverse effects wherever practical, while also generating positive effects, as part of the assessment of alternatives processes (including the constraints led design process). Where it has not been possible to avoid potential adverse environmental effects, an integrated approach to mitigation has been adopted, which has been refined through consultation and workshops with mana whenua, technical specialists, stakeholders, and the wider ALR Alliance. This process established the proposed NoR draft conditions (attached as Appendix X), which require construction methods, monitoring requirements, the preparation and implementation of management plans and longer-term operational requirements, based on the recommendations of technical assessments supporting the NoRs.

1. Management plan framework

A comprehensive suite of management plans is proposed within the draft NoR conditions to address potential adverse effects on the environment as a result of the Project. Management plans will support Outline Plans prepared for each Stage of Work. The proposed management plan framework is illustrated in Figure 11.1 below.

Figure 11.1: Proposed Management Plan Framework {version dated 19 July}

2. Summary of proposed designation conditions

The requirements of section 108 of the RMA have been generally applied to the proposed draft NoR conditions attached in Appendix X. The condition set includes general conditions, which pertain to administrative matters that are essential for the implementation of the Project. Subsequent conditions address the management of actual and potential effects on the environment from the Project, which are summarised in Table X. Certain conditions may be repeated within the table where they provide mitigation to more than one matter to be addressed.

Table 1 Summary of Mitigation

Matter	Designation Condition
Transport	• Construction Traffic Management Plan (CTMP)
Urban Design/Landscape and Visual/Open Space	• Cultural, Urban and Landscape Design Guidelines (CULDG) • Cultural, Urban and Landscape Design Master Plan (CULDMP) • Land Use Integration Management Plan (LIMP)
Mana Whenua Partnership	• Mana Whenua Partnership Forum • Cultural Monitoring Plan • Stakeholder and Communication Engagement Management Plan (SECMP) • Cultural, Urban and Landscape Design Guidelines (CULDG) • Cultural, Urban and Landscape Design Master Plan (CULDMP) • Historic Heritage Management Plan (HHMP)
Social	• Project Information

	• Stakeholder and Communication and Engagement Management Plan (SCEMP) • Complaints Register
Historic Heritage	• Historic Heritage Management Plan (HHMP)
Archaeology	• Historic Heritage Management Plan (HHMP)
Aboriculture	• Tree Management Plan (TMP) • Cultural, Urban and Landscape Design Guidelines (CULDG) • Cultural, Urban and Landscape Design Master Plan (CULDMP)
Hydrology and Flooding	• Flood Hazard • Construction Environmental Management Plan (CEMP)
Construction Noise and Vibration	• Construction Noise Standards • Construction Vibration Standards • Construction Noise and Vibration Management Plan (CNVMP) • Schedule to a CNVMP
Blasting Overpressure and Vibration	• Blasting Management Plan • Blasting Overpressure and Vibration • Schedule to a CNVMP
Operational Noise and Vibration	• Operational Rail (rolling stock) - Noise Levels • Operational Rail – Ground Borne Noise Levels • Operational Rail – Vibration Levels – Human Comfort • Operational Rail Mitigation Identification – Sensitive Noise and Vibration Receivers • Operational Rail Mitigation Identification – Notable Noise and Vibration Receivers • Stations, Depot and Other Surface Infrastructure – Noise Levels • Stations, Depot and Other Surface Infrastructure – Vibration Levels
Settlements and structures	• Settlement Management Plan (SMP) • Historic Heritage Management Plan (HHMP)
Network Utilities	• Network Utility Operators (section 176 approval) • Network Utility Management Plan (NUMP)
Property	• Designation Review

3. Conclusion

The draft NoR conditions have been developed to mitigate actual and potential effects identified in section 10 of this AEE. The draft condition set will continue to develop with further iterations anticipated to address matters raised through submissions.

7. Part 2 of the RMA

Section 5: Purpose

The purpose of the RMA is to promote the sustainable management of natural and physical resources.[15]

The Project meets the purpose of the Act as:

- It will enable people and communities within and travelling through Auckland to provide for their social, economic and cultural well-being by increasing transport choice and connections across the city and promoting a compact urban form and well-functioning urban environment; and
- It has been designed to avoid, remedy, manage, and mitigate potential adverse effects on the environment.

Section 6: Matters of National Importance

Section 6 of the RMA sets out the matters of national importance which people exercising RMA functions and powers must recognise and provide for when managing the use, development and protection of natural and physical resources.

Table 3 sets out how the Project provides for these matters.

Table 3: How ALR aligns with RMA Matters of National Importance

S6 Matters of National Importance		Assessment
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	Potential impacts on the natural character of the coastal environment and CMA, as well as wetlands and rivers along the route, will be assessed and managed through a future consenting process. However, it is noted that the Project Alignment purposefully avoids (and thus protects) wetlands, lakes, rivers and their margins to the greatest extent possible. For example, the current route minimises disruption to Oakley's Creek and Te Ararata Creek through the use of elevated structures, and has ensured no structures will be in the CMA at Te Tauranga (Onehunga) Lagoon.
b	the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development	The Project Alignment has been designed to avoid (and thus protect) outstanding natural features and landscapes such as Te Hopua ā Rangi (Gloucester Park).
c	the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna	The Project Alignment has been designed to avoid (and thus protect) terrestrial significant ecology areas identified in the AUP.
d	the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers	The NoR footprints for the stations deliberately avoid nearby rivers (such as Oakley Creek), maintaining public access to these locations. Most effects relating to the maintenance and enhancement of public access to the CMA will be assessed and managed through a future consenting process. However, it is noted that the design process has ensured the Project can avoid structures in the CMA at Te Tauranga (Onehunga) Lagoon.

e	the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga	ALRL has partnered with mana whenua who have territorial affiliations across the Project Alignment. 11 of 15 mana whenua groups have actively contributed to the project and its design. ALRL have also engaged with matawaka to seek their views. Overall the Project Alignment has been designed to avoid Māori sites of significance and known waahi tapu sites, as well as Māori land and known lava caves where practicable, with any potential adverse effects addressed in individual NoR chapters. A more detailed cultural values assessment will be provided as part of Package 2.
f	the protection of historic heritage from inappropriate subdivision, use, and development	The Project's route and stations have been designed to avoid (and thus protect) identified historic heritage sites to the greatest extent possible. This has included designing stations and the Project Alignment to fit around/under existing heritage buildings and assessing the potential structural impact of construction effects on identified heritage buildings
g	the protection of protected customary rights	The Project Alignment was designed to be consistent with mapped sites identified as part of Treaty Settlement legislation. This application will not impact upon any known protected customary rights.
h	the management of significant risks from natural hazards	The Project ensures flooding will be managed to an acceptable level by setting standards (that include consideration of climate change) that the detailed design must demonstrated in outline plans.

Section 7: Other matters

Section 7 of the RMA sets out other matters which people exercising RMA functions and powers must have particular regard to when managing the use, development and protection of natural and physical resources.

Table 4 sets out how the project provides for these matters.

Table 4: How ALR aligns with "Other Matters" set out in the RMA

S7 Other Matters		Assessment
a aa	Kaitiakitanga and the ethic of stewardship	ALRL has partnered with mana whenua groups who have territorial interests in the Project Alignment or NoR boundaries. Eleven groups have actively participated in the NoR phase of the project and will be able to remain involved in future (for consenting, detailed design, submission of outline plans etc.) allowing them to continue to exercise kaitiakitanga and the ethic of stewardship.
b	the efficient use and development of natural and physical resources	The thorough optioneering process undertaken for the Project Alignment and station NoR footprints means the project inherently provides for efficient use and development of natural and physical resources, connecting into other transport networks and areas with significant urban development potential.
ba	The efficiency of the end use of energy	This matter is not relevant to the project.
c	the maintenance and enhancement of amenity values	Maintaining and enhancing amenity has been considered throughout the Project consent design. The Landscape and Visual report provides more information on these values, identifying

		opportunities for enhancing urban spaces and principles to be followed in future design stages to manage potential adverse effects.
d	Intrinsic value of ecosystems	The project recognises the intrinsic value of ecosystems. The works avoid terrestrial significant ecological areas where possible, retain trees where practicable, and identify opportunities for planting and trees along the route (particularly around stations).
f	the maintenance and enhancement of the quality of the environment	The project has sought to maintain and enhance the quality of the environment in many ways. For example, the CNVMP will help mitigate potential adverse noise and vibration effects throughout construction, while the development of cultural, urban and landscape master plan will help ensure enhancements to the urban environment and a quality urban form are enduring.
G	any finite characteristics of natural and physical resources	This matter is not relevant to the project.
H	the protection of the habitat of trout and salmon	This matter is not relevant to the project.
I	the effects of climate change	The Project will provide a new rapid transit system, significantly improving Auckland's public transport. It will also support active modes of transport through streetscape upgrades and provision of cycle parking in and around station precincts. This will support a reduction in Auckland's transport related greenhouse gas emissions by promoting mode switches to public transport and active modes from private vehicles. Project condition X also ensures the likely effects of climate change are considered in flood modelling submitted with further outline plans.
j	the benefits to be derived from the use and development of renewable energy.	This matter is not relevant to the project.

Section 8: Treaty of Waitangi

Section 8 requires people exercising functions and powers under the RMA to take into account the principles of Te Tiriti o Waitangi / the Treaty of Waitangi. These principles relate to matters such as partnership, Māori autonomy and the guarantee of tino rangatiratanga, equal treatment, active protection, and equity.

These principles have been fundamental to the development of the Project. This includes, but is not limited to:

- ALRL partnering with mana whenua who have interests in the ALR project area, with 11 mana whenua groups actively involved in the project (principle of partnership);
- The appointment of three mana whenua sponsors of the project who hold decision-making roles (principle of Māori autonomy);
- ALRL engaging with mataawaka and Māori within Auckland, along with other stakeholders (principle of equal treatment);
- The Project Alignment avoiding negative impacts on known sites of significance for mana whenua, Māori land, Marae and Maunga

(including viewshafts, lava caves, and puna). Mana whenua will be involved in the development of the cultural, urban and landscape guidelines and master plan and will have opportunities to provide input on ways to incorporate mana whenua history and culture, for example in relation to the design and naming of stations; (principle of active protection) and

- One of Ngā Putanga Māori Outcomes for the project is to improve access to employment and education for Māori (principle of equity).

Section 8 matters underpin the partnership that ALRL has established and continues to maintain with its mana whenua partners (described in further detail at [section 2]. This has assisted ALRL to identify potential constraints and opportunities from a mana whenua perspective and work to address these to better achieve the Project objectives and provide positive outcomes for Māori. ALRL is committed to working in partnership with mana whenua partners through the post-lodgement phase of the Project to enable mana whenua feedback to continue to be meaningfully reflected in the Project design up until notification. ALRL will also support the development of a Mana Whenua Cultural Values Report.

8. Lapse Dates

Section 184(1) of the RMA confirms that a designation will lapse five years after being included in a district plan, unless:

a. it has been given effect to;

b. a territorial authority determines that substantial progress/effort has been made towards giving effect to the designation within 3 months of the designation lapsing; or

c. a different lapse period was sought.

ALRL seeks a lapse period of 20 rather than 5 years of the NoRs in this application. Specify any exceptions here if we have them.

For the Project, an extended lapse period is considered necessary because:

1. The size and complexity of the Auckland Light Rail project means a longer lapse date is necessary to deliver the Project in full. This includes:

- **a.** Undertaking detailed design
- **b.** Obtaining the necessary resource consents
- **c.** Land acquisition under the Public Works Act
- **d.** Securing necessary funding
- **e.** Project staging (which includes obtaining and managing the necessary equipment and personnel from overseas)

2. It provides property owners, businesses and the community certainty on where transport routes will be located (i.e. within the designation boundaries) and within what timeframe (the end lapse date).

3. It allows for better integration with the NPS-UD, as it provides certainty on proposed station locations (and therefore on the locations of walkable catchments) needed for future plan changes.

ALR Ltd note that:

1. It is common for large infrastructure projects to have longer lapse periods. This recognises the potential for staged release of delivery

funding, the substantial lead in time for design processes, further consultation, and the staging of construction.

2. An extended lapse period does not mean that the designation will not be given effect to until the end of the lapse period sought. A lapse period is a limit and not a target.

9. Section 177 – Matters for Consideration

Where the Project Alignment overlaps with an existing designation, ALRL will need to obtain written consent from the requiring authority responsible for the earlier designation under section 177(1)(a) of the RMA.
This will be done once detailed design is complete, prior to construction.

10. Conclusion

This chapter shows that the 18 NoRs within this application are appropriate, given the Project:

- Will have significant positive effects
- Will appropriately manage any actual and potential adverse effects
- Is largely consistent with relevant NPS, NZCPS and AUP provisions – particularly those focused on transport, infrastructure and urban development
- Has robustly considered alternative sites, routes and methods of undertaking the work poss add extra detail from s7
- Has shown the designation is necessary for achieving ALRL's objectives, and
- Has shown that the Project either gives effect to or is largely consistent with a range of other plans, strategies and legislation, and
- Has demonstrated why an extended lapse date is necessary.

It is therefore appropriate to confirm these NoRs with a 20 year lapse date.

13. Conclusion

Auckland is growing rapidly, with the city expected to reach a population of 2.3 million by 2048. Auckland Light Rail is a key infrastructure project that will help provide for this growth by significantly improving public transport and creating opportunities for new and denser urban forms around the stations.

This application covers Package 1 of the Project, seeking 17 NoRs including the tunnel and surface alignment, stations, shafts and a rail depot on land from Auckland central city to Te Ararata Station near Fatafehi Place. The 17 NoRs will allow for the construction, operation and maintenance of the above infrastructure. Later Packages will include additional NoRs to extend the project to the proposed Waitemata Harbour Crossing in the north and Auckland International Airport in the south, along with the resource consents required for any regional or NES matters required by Package 1 and additional NoRs. Package 2 of the ALR Project is planned for the fourth quarter of 2023.

ALRL's objective is to provide a rapid transit service that is is reliable, frequent, affordable, and safe for all transport users; unlocks significant urban development potential; integrates with the existing and planned public transport network; contributes to mode shift by improving travel choice and access to key destinations along the corridor; and can be delivered in a staged manner. The Project will achieve these objectives as it will construct a light rail service separated from general traffic (enabling a reliable, frequent and safe service); enable more 6 storey development around stations within a walkable catchment following a plan change; integrate stations with heavy rail stations and bus interchanges, and include future proofing for future projects; create an attractive public transport service that links key destinations, and allow for staged construction within a 20 year period.

The robust consideration of alternatives along with the constraints-led design process and the comprehensive mitigation measures described within the application have ensured many adverse effects on the environment have been avoided, while other potential adverse effects will be suitably managed and mitigated. The project will also have many positive effects, both at a project-wide level and for individual NoRs. Overall, the effects of the Project are considered reasonable in the context of the existing and likely receiving environment and proposed conditions, and should lead to significant improvements to Auckland's public transport network.

Furthermore, the Project clearly meets necessary statutory requirements. It is consistent with relevant national direction such as the NPSUD, NPSET, NPSIB, and NZCPS. The Project is also broadly consistent with AUP provisions, particularly those relating to transport and urban form. The proposed works meet ALRL's objective, and has incorporated a robust consideration of alternatives. The Project also meets the purpose of the RMA as it will enable people and communities to provide for their social, economic and cultural well-being through providing significant benefits and increasing transport choice and connections across the city, while avoiding, mitigation and managing potential adverse effects on the environment.

Note while the application sets out previous consultation and engagement undertaken for the Project and shows how the actual and potential effects of the proposal can be suitably managed, ALRL requests this application be publicly notified under s168A(1A)(b) due to the scale of the project and the level of public interest.