TE TUPU NGĀTAHI
SUPPORTING GROWTH

VOLUME 4

South Frequent Transit Network Assessment of Arboricultural Effects

October 2023

Version 1.0

WAKA KOTAHI NZ TRANSPORT AGENCY

New Zealand Government

Document Status

Responsibility	Name
Author	Craig Webb
Reviewer	Adriene Grafia
Approver	Liam Winter

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Glossary of Defined Terms and Acronyms

We note that 'Takaanini' (with double vowels is used throughout the Report Acknowledging the ongoing kōrero and guidance from Manawhenua on the cultural landscape. 'Takanini' is used where reference is made to a specific and existing named place (e.g., Takanini Road, Takanini Town Centre etc.). Manawhenua is also used throughout the Report as while gifting the programme name as Te Tupu Ngātahi, Manawhenua confirmed this was an appropriate spelling (capital 'M' and one word). Notwithstanding this, the term is spelled as two words in other fora and the proposed designation conditions – Mana Whenua.

Acronym/Term	Description
AEE	Assessment of Effects on the Environment
AS4970-2009	Australian Standard 4970-2009 Protection of Trees on Development Sites
AT	Auckland Transport
AUP:OP	The Auckland Unitary Plan: Operative in Part
FTN	Frequent Transit Network
FUZ	Future Urban Zone
GIS	Geographic Information System
MDRS	Medium Density Residential Standards
NIMT	North Island Main Trunk
NoR	Notice of Requirement
NoR 1	Notice of Requirement 1: Great South Road FTN Upgrade
NoR 2	Notice of Requirement 2: Great South Road Upgrade (Drury section)
NoR 3	Notice of Requirement 3: Takaanini FTN – Weymouth Road, Alfriston Road, and Great South Road Upgrades
NoR 4	Notice of Requirement 4: Takaanini FTN – Porchester Road and Popes Road Upgrades
NPS-UD	National Policy Statement on Urban Development
The Project	The Four NoRs proposed to authorise transport upgrades along key sections of roads which fall within the South FTN network (subject of this report / application).
RMA	Resource Management Act 1991
SH1	State Highway 1
South FTN	South Frequent Transit Network
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth
TMP	Tree Management Plan

Acronym/Term	Description
TOA	Tree Owner Approval
TPZ	Tree Protection Zone, as defined in AS4970-2009
UDLMP	Urban Design and Landscape Design Management Plan

Executive Summary

This This Assessment of Arboricultural Effects report (**Report**) has been prepared following site visits that were undertaken for the collection of suitable data to inform an Assessment of Arboricultural Effects for four Notices of Requirement (**NoR**) for the South Frequent Transit Network (**South FTN**). An arboricultural survey of trees within and immediately adjacent to the four NoR boundaries has been conducted. The trees and tree groups have been recorded in a schedule (Appendix A) and plotted on plans overlaid with aerial photographs (Appendix B).

In summary, sixty-four (64) individual trees and fifty-seven (57) groups of trees containing more than 500 total trees that are subject to Auckland Unitary Plan: Operative in Part (**AUP:OP**) District Plan controls are identified within or adjacent to the NoR boundaries for this Project. Of these trees identified, the Project is likely to require removal of 40 groups of trees containing approximately over 390 trees and approximately 49 individual trees that would trigger reason for consent under the District Plan provisions for their removal. A breakdown of the impacted trees is shown below.

Number of trees and potential impact	**NoR reference**				
	NoR 1	**NoR 2**	**NoR 3**	**NoR 4**	**All NoRs**
Individual Trees					
Total number of individual trees (within road reserve, open space zones or Notable Trees overlay)	36	0	18	10	64
Total number of individual trees with works within the Tree Protection Zone (within road reserve, open space zones or Notable Trees overlay)*	11	0	0	1	12
Total number of individual trees for removal (within road reserve, open space zones or Notable Trees overlay)*	23	0	18	8	49
Groups of Trees					
Total number of groups of trees (within road reserve, open space zones or Notable Trees overlay)	33	2	14	8	57
Total number of groups of trees with works within the Tree Protection Zone (within road reserve, open*	14	0	0	0	14

Number of trees and potential impact	NoR reference				
	NoR 1	NoR 2	NoR 3	NoR 4	All NoRs
space zones or Notable Trees overlay)					
Total number of groups of trees for removal (within road reserve, open space zones or Notable Trees overlay)*	17	2	13	8	40

** Note: excluding pest plant species within the road reserve, pest plant species within open space zones that are less than 4m in height or 400mm in girth, or those trees that are less than 4m in height or 400mm in girth within the road reserve or open space zones (as removal of these trees are a Permitted activity under the AUP:OP).*

Tree removal will result in adverse effects that are proportionate to the size and number of trees that are removed, due to the loss of tree canopy cover and the associated ecosystem services benefits. Ecosystem services provided by trees include stormwater attenuation, pollutant adsorption, shade and shelter, and temperature regulation. Trees also provide amenity benefits, cultural and community benefits and support healthy human well-being.

Where trees are unavoidably impacted by the Project and require removal, mitigation measures commensurate with the anticipated effects on the environment must be implemented, with the aim of avoiding, remedying, and mitigating the adverse effects arising from the loss of the trees and associated benefits. It is recommended that a Tree Management Plan (**TMP**) be developed where constructed work impacts on trees and groups of trees that are protected under the District Plan provisions. Replacement planting protocols are proposed to be developed further as part of the TMP where protected trees are to be removed and to guide arboricultural matters during the final design and construction process.

The TMP for each portion of the Project must also identify trees that are to be retained and protected and the specific design parameters and tree protection measures necessary to ensure effective preservation of the trees.

Opportunities for replanting within the berms of the proposed cross section and land that may no longer be required post-construction provides mitigation of effects arising from tree removal associated with the Project. The long-term outcome of comprehensive street tree planting will be more trees in the public realm and increased amenity value within the project areas.

Overall, the effects on trees protected by the District Plan provisions will be mitigated by replacement planting within the corridors and/or on adjacent land within the designation boundaries.

Summary of Assessment of Effects and Recommendations

Summary of Assessment of Effects and Recommendations

Effect	Assessment	Recommendation
Construction		
Tree removal to enable the Project	Potentially significant adverse effects in some areas due to the loss of the benefits that existing trees provide.	A verification assessment at the time of implementation is recommended to ensure there has been no material change in conditions. Any additional future tree removal, tree planting or mass planted vegetation should be assessed at that time. This Report provides a baseline survey. Development of a tree management plan to guide arboricultural matters through the detailed design and construction phases of the Project. The tree management plan will be the mechanism for determining how the Project can avoid, remedy, or mitigate effects on protected trees. This could include identifying opportunities for retaining protected trees and replacement tree planting standards for inclusion within the UDLMP. Replacement tree planting must aim to remediate the loss of ecosystem services provided by existing trees that are required to be removed. The specific tree locations and/or tree species of replacement planting is to be reviewed and input provided in order to achieve the best outcome in the long term.
Tree alteration	Adverse effects on the health, condition and / or stability of trees that are maintained within and adjacent to construction areas	Development of a tree management plan to guide arboricultural matters through the detailed design and construction phases of the Project. The tree management plan will set out tree protection measures that must be implemented during construction to avoid or minimise adverse effects on trees that are to be retained.
Operation		
None	Once the road network upgrade has been completed, no further effects on trees are anticipated. Ongoing maintenance of street trees and trees retained adjacent to the road corridor is a standard operational requirement that does not generate adverse environmental effects.	Nil

1 Introduction

1.1 Purpose and scope of this Report

This Report has been prepared to inform the Assessment of Effects on the Environment (**AEE**) for the Notice of Requirement (**NoR**) being sought by Auckland Transport (**AT**) for the South Frequent Transit Network (**South FTN**) under the Resource Management Act 1991 (**RMA**). Four NoRs are proposed to authorise transport upgrades along key sections of roads which fall within the South FTN. The transport upgrades authorised by the NoRs are referred to in this Report as the **Project**.

Specifically, this Report considers the actual and potential effects associated with the construction and operation of the Project on the existing and likely future environment as it relates to Assessment of Arboricultural effects and recommends measures that may be implemented to avoid, remedy and/or mitigate these effects.

This Report should be read alongside the AEE, which contains further details on the history and context of the Project. The AEE also contains a detailed description of works to be authorised within the NoR, and the typical construction methodologies that will be used to implement this work. These have been reviewed by the author of this Report and have been considered as part of this assessment of Assessment of Arboricultural effects. As such, they are not repeated here. Where a description of an activity is necessary to understand the potential effects, it has been included in this Report for clarity.

1.2 Report Structure

In order to provide a clear assessment of the NoRs, this Report follows as appropriate, the structure set out in the AEE. This Report contains an assessment of the actual and potential effects of the Project as a whole (the four NoRs) / localised areas within the wider extent. Where appropriate, measures to avoid, remedy or mitigate effects are recommended. The sections of this Report are arranged accordingly. Table 1-1 below provides an overview of the report structure and where the description of effects can be found in this Report.

The Report follows a nested structure:

- Part A covers assessment of the Project as a whole; and
- Part B covers assessment of each of the four proposed NoRs.

Table 1-1: Report Structure

Report Part #	Report Section #	Extent Assessed (Route and/or NoR)
A	4	Whole of Project
B	5.1	NoR 1 – Great South Road FTN Upgrade
	5.2	NoR 2 – Great South Road Upgrade (Drury section)
	5.3	NoR 3 – Takaanini FTN – Weymouth Road, Alfriston Road, and Great South Road Upgrades
	5.4	NoR 4 – Takaanini FTN – Porchester Road and Popes Road Upgrades

2 Project Description

2.1 Context – South FTN

As described further in the AEE, the South FTN is one of the transport works packages proposed for South Auckland between Manukau and Drury as part of Te Tupu Ngātahi Supporting Growth (**Te Tupu Ngātahi**) programme.[1] The South FTN is in turn part of a wider planned multi-modal transport network intended to support growth and enable mode shift in South Auckland.

The South FTN comprises a range of road upgrades including bus priority measures, new and upgraded active mode facilities, and intersection improvements along existing arterial road corridors in South Auckland. In particular, the proposed road upgrades provide for:

- Operation of high-quality FTN[2] bus services along Great South Road between Manukau and Drury (the Great South Road FTN route);
- Operation of high-quality FTN bus services along existing roads between Manurewa, Takaanini, and Papakura (the Takaanini FTN route); and
- Urbanisation of adjoining key connections to FTN routes – Popes Road West, and the Drury section of Great South Road between Waihoehoe Road and State Highway 1 (**SH1**).

The total extent of the South FTN network is shown in Figure 2-1.

2.2 The NoRs – proposed spatial extent

Of the full South FTN network extent shown in Figure 2-1, only a portion falls within the NoRs/Project (see Figure 2-2). This is because the proposed corridor upgrades do not always require additional land take, can be undertaken within the existing road reserve, and therefore do not require new designations.[3]

Accordingly, this assessment is focussed on the activities proposed to be authorised by the four NoRs. The NoRs seek generally to provide for road widening to accommodate bus priority measures, walking, and cycling facilities, key intersection upgrades, replacement of existing bridges and other associated works. These are described in more detail in Table 2-1, and the extents are shown in Figure 2-2.

Further detail on the proposed activities and works in each NoR are provided in the AEE.

Table 2-1: South FTN – Summary of NoRs

NoR reference	Project component	Description
NoR 1	Great South Road FTN Upgrade	• Road upgrades and transport upgrades providing for the Great South Road FTN route along Great South Road between Manukau and Drury. • NoR comprises eight separate areas along Great South Road (see Figure 2-1) providing for bus priority measures, walking and cycling facilities, key

[1] The Programme is a collaboration between Auckland Transport (**AT**) and Waka Kotahi NZ Transport Agency (**Waka Kotahi**) to investigate, plan, and undertake route protection for the strategic transport networks needed to support Auckland's growth over the next 30 years.
[2] FTN services are defined in AT's Regional Public Transport Plan (RPTP) as bus routes operating at least every 15 minutes between 7am-7pm, 7 days-a-week, often supported by priority measures such as bus or transit lanes.
[3] Some limited additional third-party land may be required in the future to provide for intersection upgrades between Takaanini and Ōpaheke. The relative cost-benefit assessment of these areas did not favour route protection at this time given the projected time scale for future urban growth in this area.

NoR reference	Project component	Description
		intersection upgrades, replacement of the existing Otūwairoa / Slippery Creek bridge, and stormwater management devices.
NoR 2	Great South Road Upgrade (Drury section)	• Road upgrades and transport upgrades providing for upgrade of a 520m section of Great South Road in Drury between Waihoehoe Road and the SH1 Drury Interchange. • NoR enables road widening to provide for four lanes, active mode facilities, replacement of the existing Hingaia Stream bridge, and stormwater management devices.
NoR 3	Weymouth Road, Alfriston Road, and Great South Road Upgrades	• Road upgrades and transport upgrades providing for the Takaanini FTN route along Weymouth and Alfriston Roads between Selwyn Road and Saralee Drive; and for an adjoining section of the Great South Road FTN route between Halver Road and Myers Road. • NoR enables road widening to accommodate bus priority measures, walking and cycling facilities, key intersection upgrades, replacement of existing bridges along Weymouth Road over the North Island Main Trunk (**NIMT**) and Alfriston Road over SH1, and stormwater management devices.
NoR 4	Takaanini FTN – Porchester Road and Popes Road Upgrades	• Road upgrades and transport upgrades providing for the Takaanini FTN route along Porchester Road generally between Alfriston Road and Walters Road; and for the urbanisation of Popes Road generally between Takanini School Road and Porchester Road. • NoRs provide for urbanisation of both corridors – two traffic lanes, walking and cycling facilities, key intersection upgrades, and stormwater management devices.

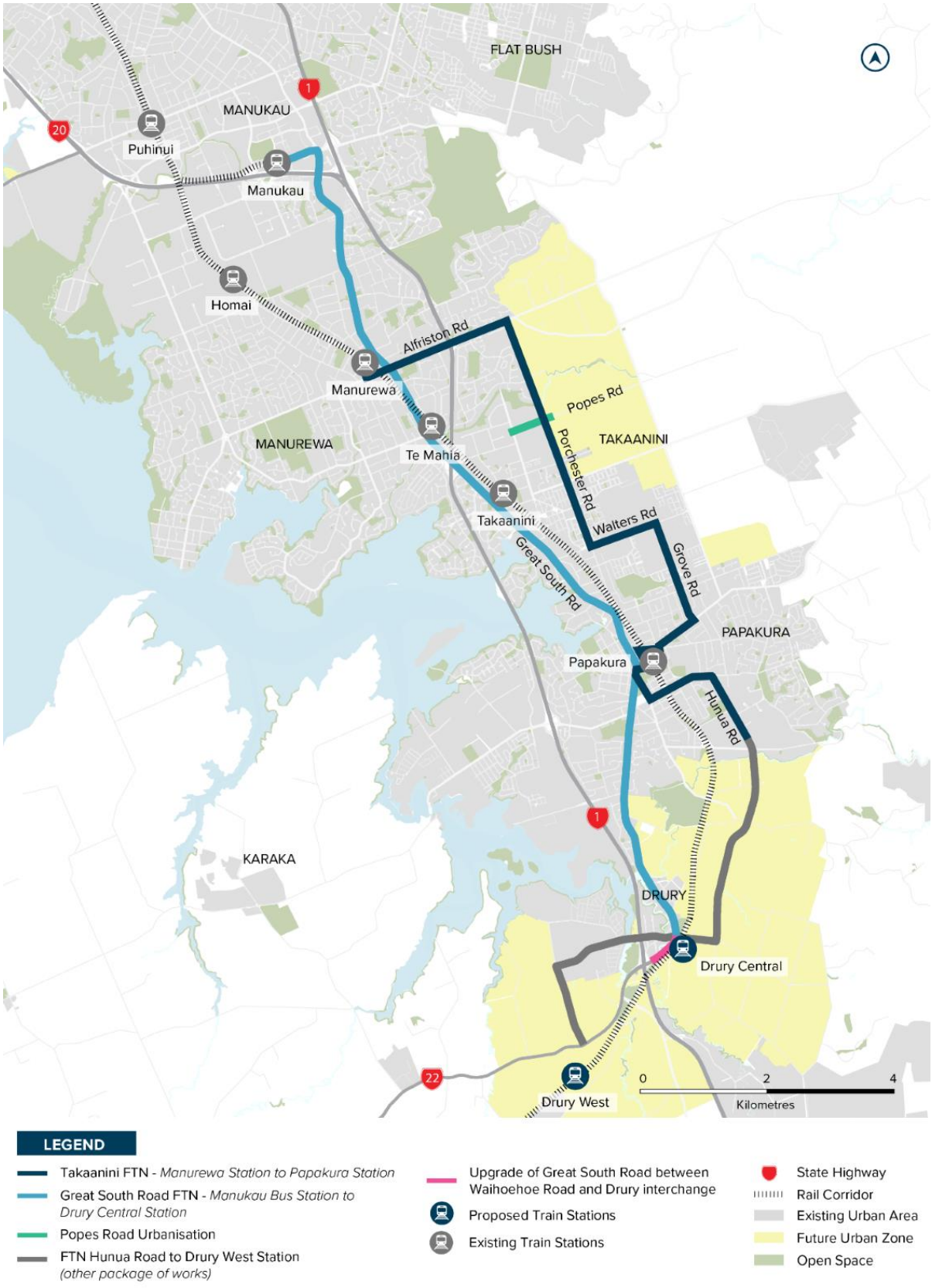

Figure 2-1: South FTN – overall Project extent

Figure 2-2: South FTN – proposed NoRs

3 Assessment methodology and parameters

3.1 Preparation for this Report

I attended a tour of the South FTN extent of works with the Project team and other technical experts on 17 July 2023 to review the locations of the proposed NoRs, during which I gained an overview of the Project and the potential impacts on trees along the route.

I conducted an arboricultural survey within the proposed NoR boundaries of the Project to record details of all pertinent trees within and adjacent to the NoR boundaries between 25 and 29 July 2023.

3.2 Methodology

I undertook the arboricultural survey in a standard arboricultural manner, to record details of all relevant trees that may be affected by the NoRs. This involved traversing the length of each NoR and visually assessing each tree or tree groups and taking measurements and photographs. Tree data was recorded on a mobile phone with a data logging application with georeferencing capabilities. The tree data was then uploaded to a Geographic Information System (**GIS**) canvas to enable mapping and further assessment of the trees in relation to NoR boundaries and the anticipated work within them.

Tree data recording included:

- Assigning a sequential number to each tree or tree group;
- Plotting the location of the tree based on geolocation and aerial photographs;
- Recording tree ownership;
- Identifying the number of trees in tree groups, or if a solitary tree;
- Recording tree species;
- Recording estimated tree height and crown spread;
- Measuring or estimating tree trunk diameter at standard height (1.4 m above the ground, or as per AS4970-2009);
- Identifying age class;
- Noting any tree structural, health, form or condition anomalies; and
- Adding general comments that may inform the assessment of effects.

Trees that may be subject to AUP:OP District Plan provisions (e.g., if scheduled (i.e., within the Notable Tree Overlay), within the road reserve or open space zones) were recorded. Where tree locations could be accurately determined to allow ownership to be confirmed, the protection status of each tree or tree group was determined. Where a tree / tree group could be subject to AUP:OP protection but ownership cannot be confirmed until a cadastral survey is undertaken (e.g., on the boundary of road reserve and private property), this was noted (refer to Appendix A) and the location that afforded the most stringent protection (e.g., road reserve/open space) was adopted for the purposes of assessment. While considered in the AUP:OP provisions, it is noted that the removal of trees in the following circumstances are Permitted activities and mitigation for their removal is not required:

- Trees in roads that are a pest species (Table E26.4.3.1 (A82), refer to Table 3-1 below);

- Trees in open space zones that are pest species and less than 4m in height and less than 400mm in girth (Table E26.4.3.1 (A82), refer to Table 3-1 below); and
- Trees in roads or in open space zones that are less than 4m in height and/or less than 400mm in girth (Table E26.4.3.1 (A91), refer to Table 3-1 below).

Those trees protected[4] through District Plan provisions are discussed in this Report in terms of an assessment of effects and potential mitigation measures to address these effects.

For individually recorded trees, tree trunk diameter records were used to calculate the tree protection zone (**TPZ**) according to AS4970-2009. These were plotted on the GIS canvas. For tree groups, the approximate extent of the combined crown of the group was plotted based on aerial photographs. The TPZ was used instead of the 'Protected Rootzone' as defined by the AUP:OP, because the TPZ based on trunk diameter gives a more accurate representation of the likely spread of roots than dimensions based on crown spread. The Auckland Council Community Facilities Urban Forest Specialist Team specify consideration of TPZ encroachment when considering tree owner approval (**TOA**) applications. The Auckland Council Community Facilities Urban Forest Specialist Team are delegated 'owner' of the majority of the trees identified within the NoR boundaries.

3.3 Statutory context

3.3.1 Notice of Requirement – District Plan requirements

This assessment has been prepared to support the AEE and NoR process. If confirmed, the designations will authorise the District Plan land use components of the Project. Accordingly, when assessing the actual or potential effects on the environment of allowing the requirement in terms of section 171 of the RMA, this assessment has been limited to matters that would trigger a District Plan consent requirement. Where regional consenting requirements are triggered, these will not be authorised by the designation, and will require further regional consents. As such, a detailed assessment of Regional Plan matters is not proposed to be undertaken as part of this NoR phase.

In order to demonstrate the split between Regional and District Plan matters, trees subject to controls (under the District provisions of the AUP:OP) have been listed in the table and plotted on site plans in the Appendices of this Report (refer to Appendix A and Appendix B). The tables and site plans assist to identify the trees that would trigger consent under the District provisions of the AUP:OP and the potential arboricultural effects of the construction of the Project.

Table 3-1 below sets out the relevant rules and provisions for the Project under the Regional Plan and District Plan jurisdiction of the AUP:OP.

Table 3-1: Rules and provisions relevant for the Project under the Regional Plan (RP) and District Plan (DP) (tree-related provisions)

AUP:OP jurisdiction	Reference	Rule	Where rule applies	Activity status
RP	E26.3.3.1 (A76)	Vegetation alteration or removal that complies with Standards E26.3.5.1 to E26.3.5.4	Rural zones, coastal areas and riparian	Permitted activity

[4] Protected trees in the context of this Report refers to trees that would trigger resource consent to remove them.

AUP:OP jurisdiction	Reference	Rule	Where rule applies	Activity status
			areas and SEA overlays	
RP	E26.3.3.1 (A77)	Vegetation alteration or removal that does not comply with Standards E26.3.5.1 to E26.3.5.4	Rural zones, coastal areas and riparian areas and SEA overlays	Restricted Discretionary activity
RP	E26.3.3.1 (A78)	Vegetation alteration or removal not otherwise provided for	Rural zones, coastal areas and riparian areas and SEA overlays	Discretionary activity
DP	E26.4.3 Activity Table	All activities (must) obtain the approval of the Tree Asset Manager	Trees in roads and on open space zones	Mandatory requirement
DP	E26.4.3.1 (A82)	Pest Plant removal	Trees in roads	Permitted Activity
		Pest Plant removal of any tree less than 4m in height and less than 400mm in girth	Trees on open space zones	Permitted Activity
DP	E26.4.3.1 (A83)	Tree trimming or alteration	Trees in roads and on open space zones and the Notable Tree overlay	Permitted Activity
DP	E26.4.3.1 (A84)	Tree trimming or alteration that does not comply with Standard E26.4.5.1 (Trees in streets and open space zones) or Standard E.26.4.5.3 (Notable Trees)	Trees in roads and on open space zones and the Notable Tree overlay	Restricted Discretionary Activity
DP	E26.4.3.1 (A87)	Works within the protected root zone that comply with Standard E26.4.5.2	Trees in roads and on open space zones	Permitted Activity
DP	E26.4.3.1 (A88)	Works within the protected root zone not otherwise provided for	Trees in roads and on open space zones and the Notable Tree overlay	Restricted Discretionary Activity
DP	E26.4.3.1 (A89)	Tree removal of Notable Trees	Notable Tree overlay	Discretionary

AUP:OP jurisdiction	Reference	Rule	Where rule applies	Activity status
DP	E26.4.3.1 (A90)	Tree trimming, alteration or removal on roads adjoining rural zones and on roads adjoining the Future Urban Zone	Trees in Roads	Permitted Activity
DP	E26.4.3.1 (A91)	Tree alteration or removal of any tree less than 4m in height and/or less than 400mm in girth	Trees in roads and on open space zones	Permitted Activity
DP	E26.4.3.1 (A92)	Tree alteration or removal of any tree greater than 4m in height and/or greater than 400mm in girth	Trees in roads and on open space zones	Restricted Discretionary Activity
DP	E26.4.3.1 (A93)	Tree trimming, alteration or removal not otherwise provided for	Trees in roads and on open space zones and the Notable Tree overlay	Discretionary Activity

3.3.2 Existing and future environment

The existing and anticipated future environment is further discussed in the accompanying AEE. In summary, the implementation timeframe for the Project has yet to be confirmed but is likely to be in approximately 10-15 years' time subject to funding availability. The assessment considers the effects of the Project at both the existing environment (as it exists today) and the likely future (planned) environment which consider potential urban development and intensification sought under PC78.

The Project will be constructed and will operate in the existing urban environment or planned environment (i.e. what can be built under the existing Auckland Unitary Plan: Operative in Part (**AUP:OP**) live zones):

a) **Existing environment:** The corridors are situated primarily within existing urban areas with live zoning including residential, commercial, and open space zones. There is some Future Urban Zone land in the wider area to the northeast/east. The existing activities within the area are generally reflective of the existing underlying zoning.
b) **Planned environment:** The planned environment is anticipated to remain urban and comprised of similar activities as the existing environment. The density of residential development is however anticipated to change and increase in future. In particular, this includes in the residential zones around Te Mahia and Takaanini stations, in line with the implementation of the National Policy Statement on Urban Development (**NPS-UD**) in the AUP:OP. The remaining residential areas will experience an uplift of density through the implementation of the Medium Density Residential Standards (**MDRS**) through the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021. Plan Change 78 (notified at the time of assessment) seeks to give effect to the NPS-UD and incorporate the MDRS into residential zoning. It is noted that there are some areas of existing

residential zoned land (particularly east of the NIMT) that have recently been intensified (i.e., new builds), as such are unlikely to change in the near future.

The likelihood and magnitude of land use change regarding the land use planning context has been identified in Table 3-2 below. This has been used to inform the assumptions made on the likely future environment.

Table 3-2: South FTN – existing and future environment

Table 3-2: South FTN – existing and future environment	Current AUP:OP Zoning	Likelihood of Change for the environment[5]	Magnitude of potential change	Likely Receiving Environment[6]
Residential[7]	Residential (Mixed Housing Suburban)	Low - Moderate[8]	Low - Moderate	Residential
	Residential (Mixed Housing Urban)	Low - Moderate[9]	Low - Moderate	Residential
	Residential (Mixed Housing Suburban and Urban) around train stations	Moderate	Moderate - High	Residential and Commercial/Retail[10]
Business	Business (Heavy Industry)	Low	Low	Business (Industrial)
	Business (Light Industry)	Low	Low	Business (Industrial)
	Business (Neighbourhood Centre)	Low	Low	Business (Neighbourhood Centre)
	Business (Town Centre)	Low	Low	Business (Town Centre)
Open Space	Informal Recreation	Low	Low	Informal Recreation
	Community	Low	Low	Community
Greenfield areas	Future Urban	Low - Moderate	High	Urban

The future environment as it relates to protected trees in roads, open space zones, or scheduled trees is unlikely to change, except where consented development related tree removal occurs on an *ad hoc* basis.

The future environment as it relates to protected trees on rural land or Future Urban Zone (**FUZ**) land is likely to change substantially as the land undergoes zoning changes in preparation for urbanisation. The protection status of trees on rural or FUZ land under the AUP:OP Regional Plan settings will be

[5] Based on AUP:OP zoning/policy direction.

[6] Based on AUP:OP zoning/policy direction.

[7] Based on the NPS-UD and MDRS, these residential areas are likely to experience increased density.

[8] There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

[9] There are areas of existing Residential Zone land that has recently been intensified (i.e. new build developments), as such is unlikely to change in the near future.

[10] Note that much of the commercial operations between Manuia Road and Taka Street occur on residentially zoned land.

lifted if / when the zoning changes to an urban zone. Conversely, trees in the road reserve adjacent to the FUZ zone will become protected according to activity Table E26.4.3.1 when the zoning changes to a zone other than a rural zone.

4 PART A: PROJECT-WIDE ASSESSMENT

This section assesses common or general arboricultural matters across the entire Project. This section also recommends measures to avoid, remedy, or mitigate actual or potential adverse effects identified as a result of the Project as a whole. NoR-specific matters or more localised matters are further discussed in Part B of this Report.

4.1 Positive effects

In many locations within the assessment area, tree canopy cover is sparse, or comprised of poor-quality trees. The Project provides an opportunity for a net increase in tree canopy cover and an improvement in the quality of trees within the public realm, through street tree planting within and adjacent to the transport corridor. It also holds the potential to improve existing street environment amenity.

The Auckland Council Urban Ngahere Strategy[11] identifies that South Auckland in general has the lowest tree canopy cover in Auckland's urban areas. The Project creates an opportunity to increase tree canopy cover in the public realm through tree planting in the road reserve. There may also be opportunities for replanting on land within the designation boundaries that may no longer been needed post-construction of the works.

Much of the existing road reserve of Great South Road, Alfriston Road and Porchester Road contains grass berms with no trees, or sporadic past tree planting. Popes Road contains no standout trees in the road reserve, with aging shelterbelts along property boundaries in many locations. Porchester Road and Popes Road also contain large amounts of undesirable plant species, including pest plants. The proposed road upgrades include provision for berms between transport modes (refer to the indicative cross sections in the AEE), which anticipate planting with street trees as part of the corridor improvements. Good quality street trees, established in correctly constructed planter pits, can create an improved environment through greater tree canopy cover in the long term.

4.2 Adverse construction effects

Tree removal will be necessary to enable construction of the transport corridors, through either widening of the carriageway into grass berms, or construction of active mode transport routes. The scale of arboricultural effects related to tree removal is directly correlated to the number and size of trees that must be removed. Arboricultural effects from tree removal are closely tied to the benefits that the trees provide, such as amenity value, and wider ecosystem services that trees supply such as shade, local avian habitat and amelioration of stormwater in urban environments. Ecosystem services are defined as the direct and indirect contributions of ecosystems to human well-being. For example stormwater attenuation, pollutant adsorption and regulating temperatures in urban centres. The social, health and amenity benefits of trees also make important contributions to the quality of life in built environments.

In some situations, construction may impact on trees that are ear-marked for retention within the road corridor. Impacts on trees can be a direct result of physical damage to crown and roots or indirect result of alteration to the growing conditions that the tree experiences. The scale of these

[11] Auckland Council (2019). Auckland's Urban Ngahere (Forest) Strategy.

arboricultural effects can range from negligible (e.g., loss of small diameter roots, minor trimming causing small and or short-term deficit) to significant (e.g., major root loss or alteration to growing environment causing major deficit, resulting in health decline, tree instability or death). In many cases these effects can be avoided through implementation of tree protection measures or minimised by ensuring arboricultural supervision and treatments. In all cases the design and construction methodology for the road corridor upgrades must include arboricultural input to allow existing trees to be adequately accommodated, where possible, and for the scale of construction related effects to minimised.

4.3 Recommended measures to avoid, remedy, or mitigate construction effects

All extant trees should be considered during the design and development of construction methodologies for road and active mode corridor upgrades, prior to the final designs of each portion of the Project being completed.

Removal of trees should be avoided wherever it is possible to safely accommodate them within the new road layout. Future detailed design stages should identify if there are any further opportunities to enable existing trees to remain, minimise alteration to them and their growing environment. Where possible, final construction methodology and works should be refined and modified accordingly. Opportunities to further reduce impact at detailed design stages may include for example localised realignment of works, reduction in pavement widths and/or construction of tree root bridging structures to minimise excavation in tree root protection zones.

Where protected trees cannot be accommodated, tree transplanting/relocation within the transport corridor or in locations that may no longer be required post-construction should be considered where reasonably feasible for trees that are of high value, good quality, and present benefits from their transplantation. For trees with this potential, transplantation viability (e.g., suitability, constraints, feasibility, and cost / benefit factors) should be considered as part of the TMP.

Where trees cannot be accommodated and transplantation is not a viable option, replacement planting must be carried out to remediate the effects from the loss of arboricultural value. Mitigation measures are recommended to take an outcomes-based approach that considers overall improvements to landscape systems and processes, natural character, and visual amenity. The environmental values of trees that must be removed must be evaluated and the replanting designed to replicate the benefits that the extant trees provide. Replacement planting protocols should be developed further as part of the TMP where protected trees are to be removed.

Planting of trees should also be considered as part of the Urban and Landscape Design Management Plan (**UDLMP**), which includes preparation of landscape plans for the Project. Tree planting may also be integrated with stormwater management systems, where green infrastructure such as planted swales, rain gardens or stormwater ponds are included in the design.

Arboricultural input into the development of the final design and construction methodologies for road corridor upgrade works is a crucial factor affecting the outcome in terms of the adverse effects on trees. Arboricultural input should be in the form of detailed design input, specification of tree-friendly construction methodologies, and development of a TMP.

All decisions relating to trees that are affected within the road corridor should be informed by a TMP that is devised during the detailed design stage of the Project to guide arboricultural management of tree matters.

4.4 Adverse operational effects

Once the road network upgrade has been completed, no further effects on trees are anticipated from transport corridor operation. Ongoing maintenance of street trees and trees retained adjacent to the road corridor is a standard operational requirement that does not generate adverse environmental effects.

4.5 Recommended measures to avoid, remedy, or mitigate operational effects

Nil

4.6 Summary of Project-Wide effects

Tree removal may substantially alter the environment in some locations, where trees are positioned within the road reserve, potentially resulting in significant adverse effects. Tree removal must be avoided, remediated, or mitigated through implementation of a tree management plan.

Tree alteration, including pruning and works within the root zone has the potential to cause adverse effects on trees that are retained. These effects must be avoided or minimised through implementation of tree protection measures as part of a tree management plan.

In all cases, arboricultural input into the development of the final design and construction methodologies for road corridor upgrade works is a crucial factor affecting the outcome in terms of the adverse effects on trees.

5 PART B: NOR LEVEL ASSESSMENT

5.1 NoR 1 – Great South Road FTN Upgrade

As outlined in the Project description (see Section 2), NoR 1 comprises a range of interventions providing for the Great South Road FTN route along Great South Road between Manukau and Drury. These include eight intersection upgrades, and the replacement of the Otūwairoa / Slippery Creek bridge. The wider corridor will provide for either three or four lanes in the midblock including bus lanes in one or both directions, and active mode facilities.

5.1.1 Positive effects

Scope for tree planting is available within the proposed designation boundaries along Great South Road and around the intersections. This includes berms, land that may no longer be required post-construction (i.e., land temporarily used as construction yards) and within open space zones. Opportunities for planting of trees could also form part of intersection markings, traffic calming measures and landmarks. The improvements in tree coverage and quality (i.e., native species) anticipated from works within NoR 1 can lead to a range of positive effects as discussed in Section 4.1 above.

5.1.2 Adverse construction effects

5.1.2.1 Great South Road / Browns Road / Orams Road

The southern approach to the intersection of Great South Road and Browns Road includes 17 trees or tree groups within or immediately adjacent to the NoR boundary. The potentially affected protected trees include:

- 13 street trees (Trees 1-5, 7-8, 10-15);
- 1 scheduled Norfolk Island pine tree (Tree 17);
- 2 street tree groups (Tree Group 9 and 16); and
- 1 tree group within Anderson Park which is an open space zone (Tree Group 6).

Street trees are represented by 13 mature queen palms (*Syagrus romanzoffiana*) planted in roadside berms. Although these are somewhat sporadically located along Great South Road, the queen palms have reached dimensions (up to approximately 9 metres) that create a highly visible, partial ‘tree avenue’ feature along the road reserve. Removal of these palms would result in loss of the amenity benefits they provide. Transplantation may be a viable option, as palms generally make easy transplant candidates.

A significant group (Group 6) of mostly native trees is within Anderson Park, at the corner of Grand Vue Road and Great South Road. The group contains pōhutukawa (*Metrosideros excelsa*), tōtara (*Podocarpus totara*) and karaka (*Corynocarpus laevigatus*) that form a continuous canopy along the frontage of Anderson Park on Great South Road. These are mature trees with substantial value and any tree removal here could have significant adverse environmental effects. The design avoids removal of trees and any works associated with upgrading facilities within the TPZ should be accordance with arboriculture best practice to minimise adverse effects on these trees.

Tree 17, one scheduled Norfolk Island pine (*Araucaria heterophylla*) at 18 Great South Road is located outside of the NoR boundary but has a TPZ that extends into the designation. Adverse effects on the health and stability of this tree could occur if uncontrolled work occurs within the TPZ. The design and construction methodology must be confirmed with arboricultural input and in accordance with the tree management plan process to minimise adverse effects on this tree.

One tōtara (Tree 3) and one pōhutukawa (Tree 13) are mature specimens with uncertain ownership that contribute to the existing environment, as good quality native trees that are highly visible to road users. One mixed tree group (Group 9) also appears to be within or partially within the road reserve. Effects on these trees must be considered during planning and implementation of the road corridor upgrade works.

5.1.2.2 Great South Road / Mahia Road

Two queen palms (Group 54) are recorded in the NoR boundaries at the northern approach to Mahia Road, where they continue the theme of street tree planting with more of the same species to the north (outside of the proposed designation). Removal of these mature palms would not create significant adverse effects in the overall context of the Project in this location, except minor loss of amenity value.

5.1.2.3 Great South Road / Taka Street / Walter Strevens Drive

Nine trees identified within the road reserve of Great South Road provide some tree canopy cover and associated benefits in the areas approaching the Taka Street and Walter Strevens Drive intersection. These trees are seven alder (*Alnus sp.* or *alnus cordata*) (Tree 56 and Groups 55, 59 and 60) and two stand-alone tulip trees (*Liriodendron tulipifera* – Trees 57 & 58). These trees are good quality specimens that provide amenity benefits in this predominantly commercial / industrial area. Removal of these established protected trees, would result in loss of the ecosystem services that the trees provide, including the amenity values provided by the trees.

5.1.2.4 Great South Road / Subway Road

No trees are identified within the NoR boundary. Scheduled trees at 67 Great South Road and in the road reserve of Subway Road are outside of the NoR boundary and are unlikely to be affected by works.

5.1.2.5 Great South Road / Wellington Street

The public open space at 57R Wood Street contains a significant tree resource, including groups (Groups 68 - 72) of mature native trees and exotic amenity trees. Group 70 contains a scheduled oak (*Quercus sp.*) tree and four mature tī kōuka (*Cordyline australis*). The oak is listed in Schedule 10 - Notable Trees Schedule of the AUP:OP, as ID2188 Oak (Memorial). Trees that are greater than 4m in height or greater than 400mm in [trunk] girth are protected trees in the open space zones, which includes all of the trees within the identified groups. The protected trees include kauri (*Agathis australis*), tītoki (*Alectron excelsus*), karaka, kahikatea (*Dacrycarpus dacrydioides*), rimu (*Dacrydium cupressinum*), European beech (*Fagus sylvatica*), kapuku (*Griselinia littoralis*), tōtara, rhododendron (*Rhododendron arborea*) and blue Arizona cypress (*Cypress arizonica* 'Glauca'). The indicative design avoids these trees and with limited works, such as footpath replacement, anticipated within the TPZ. Any works undertaken within the TPZ should be accordance with arboriculture best practice to minimise adverse effects on these trees.

A historic heritage extent of place overlay envelops trees that are on the corner of Great South Road and Wood Street (east). Trees within the overlay (Groups 68 and 69) may have heritage value from association with the historic heritage place, which is irreplaceable. The indicative design avoids these trees by keeping works to the extent of the existing pathway. Any works that may be required within the TPZ of these trees should also be undertaken in accordance with best arboriculture best practice to minimise adverse effects on these trees. Work within the NoR boundary could have substantial adverse effects on trees that are retained within the public park if the existing footpath is widened.

A wedge of public open space land at the intersection of Ōpaheke Road and Great South Road contains two individually identified trees (Trees 73 and 78) and a tree group (Group 74), including two scheduled Phoenix palms (*Phoenix canariensis*). The location has a historic heritage extent of place overlay that envelops Tree 78, a mature Italian cypress (*Cupressus sempervirens*). Tree 78 and tree group 74 containing the scheduled trees are outside of the NoR boundaries and not likely to be affected, assuming tree protection procedures are followed in accordance with a tree management plan produced prior to construction.

Tree 73 is a mature weeping elm (*Ulmus glabra* 'Camperdownii') that is inside the designation boundary, between the historic heritage overlay and the tree group to the south. This tree will require removal to facilitate the works, specifically the active modes pathway.

Three tulip trees (Group 75 and Tree 76) are street trees within Great South Road that are within the NoR boundary. These trees provide high amenity value and ecosystem services benefits, and their removal would result in adverse environmental effects proportionate to the size of the trees.

One European lime (*Tilia x europaea* – Tree 77) is located outside the designation boundary but works such as footpath replacement may be in the immediate vicinity. This tree is unlikely to be affected, assuming tree protection procedures are followed in accordance with a tree management plan produced prior to construction.

5.1.2.6 Great South Road / Beach Road

The cemetery and public open space at 298 Great South Road and 312 Great South Road, respectively, contain a significant tree resource, including:

- a large scheduled gum (Eucalyptus sp.) tree (Tree 81);
- a group of scheduled scarlet flowering gum (Corymbia ficifolia – erroneously listed as Eucalyptus phoenica in Schedule 10) trees (Group 79); and
- groups of mature tōtara and mixed native trees (Groups 80 and 82).

Tree removal here would have significant adverse effects, due to the amenity and ecosystem services benefits that the trees provide. Work within the NoR boundary could have substantial adverse effects on these trees, if carried out in an uncontrolled manner.

Two mature native scheduled trees, one rimu, one miro (*Prumnopitys ferruginea*) (Trees 86, 87) are growing within the traffic island at the intersection of Butterworth Avenue and Great South Road, where they are within the NoR boundary. Any alteration to the traffic island has the potential to cause adverse effects on the health and / or stability of these trees. The extent of works avoid alteration to these trees.

A number of trees within Kirks Bush (Trees/Groups 88-94), 377R Great South Road, are in close proximity to the NoR boundary and have crowns that extend over the road corridor. Alteration to the

paths and carriageway here has the potential to cause adverse effects on the health and / or stability of these trees if carried out in an uncontrolled manner. These trees form a continuous canopy and provide significant amenity and ecosystem services benefits.

A group of scheduled tōtara (Group 95) at 365-367 Great South Road are adjacent to the NoR boundary. The indicative design has limited works to the edge of the existing road reserve. Any works that may be required within the TPZ of these trees should be undertaken in accordance with best arboricultural best practice to minimise adverse effects on these trees.

5.1.2.7 GSR / Park Estate Road

Four tree groups (Groups 96, 97, 100 and101) and four single specimen trees (Trees 99, 102, 103 and 104) are identified within the road reserve of Great South Road at the approaches to Park Estate Road. Many of the groups of trees contain trees that are not individually significant, but that collectively add to the amenity and ecosystem services benefits. Larger and solitary specimens include a mature camphor laurel (*Cinnamomum camphora* – Tree 104) that is in poor health, a fine, early-mature rimu (Tree 103), one pōhutukawa (Tree 99) and three wonder trees (*Idesia polycarpa* - Group 100). Removal of trees would result in adverse effects proportionate to the size and number of affected trees.

5.1.2.8 Slippery Creek Bridge

Groups of trees (Trees 106-113) identified within the road reserve land around the Slippery Creek Bridge are likely to require removal to enable construction activities. This includes established groups of native trees and exotic ornamental specimens in park-like settings on road reserve land. Native species include putaputāwētā (*Carpodetus serratus*), karamu (*Coprosma robusta*), tī kōuka, kahikatea, kānuka (*Kunzea robusta*), mānuka (*Leptospermum scoparium*), karo (*Pittosporum crassifolium*) and kowhai (*Sophora tetraptera*), planted in dense groups above the riverbanks. The benefits of the native trees here include habitat and soil protection in the riparian margin. The environmental effects could be significant if all of the identified trees require removal or may be lessened if trees and tree groups can be accommodated outside of the construction zones.

5.1.3 Recommended measures to avoid, remedy, or mitigate construction effects

The recommended measures to avoid, remedy, or mitigate construction effects are discussed in the Project-wide section above (refer to Section 4.3).

5.1.4 Adverse operational effects

Once the road network upgrade has been completed, no further effects on trees are anticipated. Ongoing maintenance of street trees and trees retained adjacent to the road corridor is a standard operational requirement that does not generate adverse environmental effects.

5.1.5 Recommended measures to avoid, remedy, or mitigate operational effects

Nil

5.1.6 Summary of effects for NoR 1

A total of approximately 280 trees have been recorded within or adjacent to the NoR 1 boundary. The trees here include 36 single trees and 33 tree groups. Twenty-two protected single trees and 17 groups of trees comprised of at least 111 trees are likely to require removal for the Project. Tree removal could also affect the remaining eight protected single trees and 12 groups containing 86 trees, if the design and construction process cannot accommodate and safely retain these trees.

The potential effects at Great South Road / Wellington Street and Great South Road / Beach Road could be significant due to the number, size, quality, and age of trees that are possibly affected by alteration or removal. In other locations within NoR 1, adverse effects are low to moderate and able to be mitigated by implementation of the tree management plan and replanting in the new road corridor. A net gain in the urban forest is possible in many locations due to street tree planting in the new road layout.

5.2 NoR 2 – Great South Road Upgrade (Drury section)

As outlined in the Project description (see section 2), NoR 2 comprises a range of interventions providing for the upgrade of Great South Road in Drury between Waihoehoe Road and the SH1 Drury Interchange. These include road widening to provide four lanes, active mode facilities, and the replacement of the Hingaia Stream bridge.

5.2.1 Positive effects

Provision of berms within the road cross section of Great South Road, allows for tree planting in this area where currently there are no street trees.

5.2.2 Adverse construction effects

The willow trees (Tree Groups 115 and 116) that exist within the NoR boundary are of significant size and contribute some amenity and other ecosystem services to the otherwise stark industrial environment.

Willow trees within open space zoned land on the western bank and of the Hingaia Stream are likely to require removal to facilitate construction work, with adverse effects proportionate to the size and number of trees that require removal.

Willow trees on the eastern bank and riparian margin of the Hingaia Stream may require removal to facilitate construction work. Few of these trees (Group 116) are protected by the District Plan where they are within the road reserve of Great South Road. The remainder will require Regional Consent to be obtained closer to the time of construction due to them being in the riparian margin.

5.2.3 Recommended measures to avoid, remedy, or mitigate construction effects

The recommended measures to avoid, remedy, or mitigate construction effects are discussed in the Project-wide section above (refer to Section 4.3). Specific to this NoR, replanting to mitigate the effects of tree removal is recommended within the open space zone land. Replanting of the riparian margin should also be undertaken to mitigate removal of trees on the bank of the Hingaia Stream. It is noted that removal of riparian margin vegetation is subject to Regional Plan provisions and will also require consideration in the future regional consenting stage.

5.2.4 Adverse operational effects

Once the road network upgrade has been completed, no further effects on trees are anticipated. Ongoing maintenance of street trees and trees retained adjacent to the road corridor is a standard operational requirement that does not generate adverse environmental effects.

5.2.5 Recommended measures to avoid, remedy, or mitigate operational effects

Nil

5.2.6 Summary of effects for NoR 2

Overall, a net gain in the urban forest will result from establishing street trees in the new berms created in Great South Road. Adverse effects applicable to District Plan provisions of the AUP:OP relate to the removal of trees in the open space zone to the west of Hingaia Stream and few trees in the road reserve east of Hingaia Stream. Replacement planting is recommended to mitigate the effects of tree removal.

5.3 NoR 3 – Takaanini FTN – Weymouth Road, Alfriston Road, and Great South Road Upgrades

As outlined in the Project description (see section 2), NoR 3 comprises a range of interventions providing for the Takaanini FTN route along Weymouth and Alfriston Roads generally between Selwyn Road and Alfriston Park; as well as for the Great South Road FTN route between Alfriston Road and Myers Road. These interventions include road widening to provide for four lanes (general traffic and bus lanes in both directions), active mode facilities, eight intersection upgrades, stormwater treatment wetlands, and replacements of bridges over the NIMT and SH1.

5.3.1 Positive effects

An increase in the number of street trees and overall tree canopy cover in the future is possible with the provision of street tree planting in berms within the new road cross section.

5.3.2 Adverse construction effects

Thirty-two listings of trees and tree groups are potentially affected by works in this NoR. This includes 18 individual trees and 14 tree groups containing at least 150 trees. Twenty-eight (28) protected trees are identified as street trees within road reserves on Alfriston Road, including pōhutukawa and water gum (*Tristaniopsis laurina*). Tree removal will result in loss of the ecosystem services that the trees provide, to a degree that is proportionate to the size, and number of the trees that require removal.

A large and diverse group of trees (Tree 52) in the public park at Tadmore Park, 238R Great South Road, includes trees that are within and adjacent to the NoR boundary. This includes deciduous exotic trees such as oak (*Quercus spp.*), London plane (*Platanus X acerifolia*), and native tōtara and kowhai. Tree removal here would have significant adverse effects, due to the amenity and ecosystem services benefits that the trees provide. Work within the NoR boundary could have adverse effects on trees that are retained within the public park, however the extent and materiality of the batter slope that supports the transport corridor could be designed to minimise impacts on trees and allow tree retention where they are sufficiently distanced from the work.

A diverse group of trees (Group 34) in the road reserve outside Manurewa East School, 10 Scotts Road, includes trees that are within and adjacent to the NoR boundary. Tree removal here would have adverse effects, from loss of the amenity and other benefits that the trees provide. The trees here include poor quality Monterey cypress (*Cupressus macrocarpa*), tree privet (*Ligustrum lucidum*) and queen palms that add no significant benefit to the location. Small native trees, including tōtara, mapou (*Myrsine australis*) and tī kōuka could also be removed / replaced with no significant arboricultural consequences,

Tree alteration including pruning and works within the root zone has the potential to cause adverse effects on the health and / or stability of trees that are retained within and adjacent to works areas.

5.3.3 Recommended measures to avoid, remedy, or mitigate construction effects

The recommended measures to avoid, remedy, or mitigate construction effects are discussed in the Project-wide section above (refer to Section 4.3).

5.3.4 Adverse operational effects

Once the road network upgrade has been completed, no further effects on trees are anticipated. Ongoing maintenance of street trees and trees retained adjacent to the road corridor is a standard operational requirement that does not generate adverse environmental effects.

5.3.5 Recommended measures to avoid, remedy, or mitigate operational effects

Nil

5.3.6 Summary of effects for NoR 3

A total of 175 trees have been recorded within or adjacent to the NoR 3 boundary. The trees here include 18 single trees and 14 tree groups. Eighteen protected single trees and 14 groups of protected trees comprised of at least 150 trees are likely to require removal for the Project.

Removal of the trees within the NoR boundary will result in adverse effects proportionate to the size and number of trees that are removed. These effects can largely be mitigated by replacement tree planting in new road berms and where there is land within the designation boundaries that may no longer been needed post-construction of the works. Several important tree groups must be avoided to the greatest extent possible to avoid adverse arboricultural effects.

5.4 NoR 4 – Takaanini FTN - Porchester Road and Popes Road Upgrades

As outlined in the Project description (see section 2), NoR 4 comprises a range of interventions providing for the Takaanini FTN route along Porchester Road generally between Alfriston Road and Walters Road; and for the upgrade of Popes Road generally between Takanini School Road and east of Porchester Road. These interventions provide for the urbanisation of both corridors, with two traffic lanes, widening for active mode facilities, seven intersection upgrades, and stormwater treatment wetlands.

5.4.1 Positive effects

Urbanisation of the road corridor will allow for planting of street trees within new road berms along Popes Road and the eastern side of Porchester Road. A net increase in the number of street trees and in overall tree canopy cover in the long-term will occur from street tree planting as part of the Project.

5.4.2 Adverse construction effects

On the Western side of Porchester Road, zoning is Residential – Mixed Housing Suburban and Business – Light Industry zone, with small pockets of Special Purpose – School, Residential – Single House and Open Space – Informal Recreation zones. The eastern side of Porchester Road between Airfield Road and Berwyn Road is also Residential – Mixed Housing Suburban zoned. Trees in roads adjacent to these zones are protected by AUP:OP District Plan provisions.

Four trees, two pin oak (*Quercus palustris*) and two willow (*Salix sp.*) (Trees 117-120) growing in the road reserve land on the corner of Airfield Road and Porchester Road are within the NoR boundary and likely to require removal for road widening construction purposes. The large pin oak (Tree 117) is a quality tree with high arboricultural values based on its form, health and overall qualities. Removal of this tree will result in loss of important amenity and ecosystem services benefits that the tree provides. The willow trees and second, smaller pin oak are poor quality trees with reduced arboricultural merit that could be removed with no significant consequences.

Tree 121, one Japanese cedar (*Cryptomeria japonica*) street tree in Clarice Place is within the NoR boundary. The indicative design avoids removal of this tree but there may be some earthworks required within the TPZ which should be undertaken in accordance with arboriculture best practice to minimise adverse effects on the tree.

Groups of poplar and willow trees (Trees 118-124) at the western end of Popes Road appear to be in the road reserve on the northern side of road. If they are in the road reserve, they are protected trees, which would likely require removal as part of construction of the new transport corridors. As an agricultural shelter system, the protected trees provide a useful function. With future urbanisation in mind, these trees will become less suitable, due to the likelihood of stem and limb failure increasing as the trees age. The ecosystem services benefits provided by these trees will be lost with tree removal.

Outside the school at 460 Porchester Road, growing within the road reserve, is tree 127, a Norfolk Island pine (*Araucaria heterophylla*). Removal of this tree is anticipated to achieve the proposed active mode transport outcomes in this location. Removal should be avoided due to the benefits that this tree provides to the location. Loss of amenity values and ecosystem services benefits

proportionate to the size of the tree will result if the tree is removed. Future detailed design stages should identify if there are any further opportunities for this tree to be retained and minimise impact to it.

Pōhutukawa street trees are present outside 508 Porchester Road and in the road reserve of Alfriston Road, outside 7 and 8 Giani Court. Adverse effects on these trees will result from widening of the active mode transport route. Removal should be avoided due to the benefits that these trees provide. Future detailed design stages should identify if there are any further opportunities for these trees to be retained and minimise impact to them. If removal is unavoidable, the adverse effects will require mitigation in the form of new tree planting.

Tree alteration, including pruning and works within the root zone of trees has the potential to cause adverse effects on the health and / or stability of trees that are retained adjacent to construction works. If the Project design and construction methodology are completed with arboricultural input, in the form of a tree management plan, the effects on these trees can be minimised.

5.4.3 Recommended measures to avoid, remedy, or mitigate construction effects

The recommended measures to avoid, remedy, or mitigate construction effects are discussed in the Project-wide section above (refer to Section 4.3).

5.4.4 Adverse operational effects

Once the road network upgrade has been completed, no further effects on trees are anticipated. Ongoing maintenance of street trees and trees retained adjacent to the road corridor is a standard operational requirement that does not generate adverse environmental effects.

5.4.5 Recommended measures to avoid, remedy, or mitigate operational effects

Nil

5.4.6 Summary of effects for NoR 4

A total of approximately 132 trees have been recorded within or adjacent to the NoR 4 boundary. The trees here include 10 single trees and eight tree groups. Nine protected single trees and eight groups of trees comprised of 122 trees are likely to require removal for the Project.

Removal of the trees within the NoR boundary will result in adverse effects proportionate to the size and number of trees that are removed. These effects can largely be mitigated by replacement tree planting in new road berms, where a net gain in tree canopy cover in the public realm is expected in the long term. Several specimen trees and tree groups must be avoided to the greatest extent possible to avoid adverse arboricultural effects.

6 Conclusion

Sixty-four (64) individually listed trees and fifty-seven (57) groups of trees containing more than 500 total trees are identified within or adjacent to the NoR boundaries for this Project. The Project is likely to require removal of 40 groups of trees containing over 390 trees and approximately 49 of the protected individual trees that would trigger reason for consent under the District Plan provisions for their removal. Tree removal will result in adverse effects that are proportionate to the size and number of trees that are removed, due to the loss of tree canopy cover and the associated ecosystem services benefits.

Amenity values attributable to trees will also be lost when trees are removed. Larger trees' removal should be avoided wherever possible to reduce the impact of the Project on amenity values, due to the time that it takes for new trees to reach large stature. Successful retention of mature trees on development sites requires close attention to arboricultural tree preservation principles during design and construction of new infrastructure.

The removal of trees must be confirmed through implementation of a tree management plan developed to guide arboricultural matters during the final design and construction process. The tree management plan must detail mitigation planting to align with the UDLMP, so that quality environments containing good quality trees are created as part of the Project.

The tree management plan for each portion of the Project must also identify trees that are to be retained and protected and the specific design parameters and tree protection measures necessary to ensure effective preservation of the trees.

1 Appendix A – Tree Schedule

NoR 1

Schedule A1 – NoR1 single trees

tree number	tree species	common name	height (m)	dbh (mm)	tpz radius (m)	ownership	protection status	Assessment assumptions
1	*Syagrus romanzoffiana*	queen palm	15	400	4.8	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
2	*Syagrus romanzoffiana*	queen palm	12	350	4.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
3	*Podocarpus totara*	totara	10	640	7.7	Unclear at this stage – Potential to be Public - Road	Unclear – Trees in Roads (assumed)	Within footprint of works and likely construction requirements – remove Tree assumed as within road reserve for the purposes of assessment - Cadastral survey should be undertaken closer to the time of detailed design to confirm ownership.
4	*Syagrus romanzoffiana*	queen palm	12	300	3.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
5	*Syagrus romanzoffiana*	queen palm	9	350	4.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
7	*Syagrus romanzoffiana*	queen palm	9	300	3.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
8	*Syagrus romanzoffiana*	queen palm	8	300	3.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
10	*Syagrus romanzoffiana*	queen palm	8	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
11	*Syagrus romanzoffiana*	queen palm	8	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
12	*Syagrus romanzoffiana*	queen palm	8	350	4.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove

Schedule A1 – NoR1 single trees

13	*Metrosideros excelsa*	pōhutukawa	11	1200	14.4	Unclear at this stage - Potential to be Public - Road	Unclear - Trees in Roads (assumed)	Works and likely construction requirements within TPZ. Tree assumed as within road reserve for the purposes of assessment - Cadastral survey should be undertaken closer to the time of detailed design to confirm ownership.
14	*Syagrus romanzoffiana*	queen palm	8.5	300	3.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
15	*Syagrus romanzoffiana*	queen palm	10	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
17	*Araucaria heterophylla*	Norfolk Island pine	30	1300	15.6	Private	Scheduled – Notable Tree (AUP:OP ID 1664)	Outside designation boundary but footprint of works and likely construction requirements within TPZ.
56	*Alnus sp.*	alder	9	350	4.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
57	*Liriodendron tulipifera*	tulip tree	22	1000	12	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
58	*Liriodendron tulipifera*	tulip tree	25	1200	14.4	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ.
73	*Ulmus glabra* 'Camperdownii'	weeping elm	3.5	250	3	Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements - remove
76	*Liriodendron tulipifera*	tulip tree	16	850	10.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements - remove
77	*Tilia x europaea*	European lime	20	850	10.2	Public - Road	Trees in Roads	Outside of designation boundary but footprint of works and likely construction requirements within TPZ.
78	*Cupressus sempervirens*	Italian cypress	9	450	5.4	Public - Park	Trees in Open Space zones	Outside of designation boundary but footprint of works and likely construction requirements within TPZ.

Schedule A1 – NoR1 single trees

81	*Eucalyptus sp.*	Gum	28	1300	15.6	Public – Road	Trees in Roads, Scheduled – Notable Tree (AUP:OP ID 2189)	Footprint of works and likely construction requirements within TPZ.
83	*Phoenix canariensis*	Phoenix palm	22	900	10.8	Private	Scheduled – Notable Tree (AUP:OP ID: 2227)	Outside designation boundary but footprint of works and likely construction requirements within TPZ.
86	*Prumnopitys ferruginea*	miro	16	600	7.2	Public - Road	Trees in Roads, Scheduled – Notable Tree (AUP:OP ID 2190)	Within designation boundary but will not be impacted.
87	*Dacrydium cupressinum*	rimu	16	750	9	Public - Road	Trees in Roads, Scheduled – Notable Tree (AUP:OP ID 2190)	Within designation boundary but will not be impacted.
88	*Vitex lucens*	pūriri	12	250	3	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ. Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
89	*Metrosideros excelsa*	pōhutukawa	18	770	9.3	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ.

Schedule A1 – NoR1 single trees

								Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
90	*Metrosideros excelsa*	pōhutukawa	20	800	9.6	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ. Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
91	*Agathis australis*	kauri	22	700	8.4	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ. Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
99	*Metrosideros excelsa*	pōhutukawa	9	-	-	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
102	*Callistemon viminalis*	bottlebrush	6	-	-	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
103	*Dacrydium cupressinum*	rimu	11	440	5.3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
104	*Cinnamomum camphora*	camphor laurel	13	1130	13.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
109	*Liquidambar styraciflua*	American sweet gum	11	400	4.8	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
110	*Liquidambar styraciflua*	American sweet gum	7	210	2.5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
111	*Liquidambar styraciflua*	American sweet gum	13	380	4.6	Public - Road	Trees in Road.	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.

Schedule A2 – NoR1 tree groups

tree group number	approx number of trees	tree species	common name	approx max height (m)	ownership	protection status	Assessment assumptions
6	22	*Corynocarpus laevigatus, Dacrydium cupressinum, Metrosideros excelsa, Podocarpus totara, Syzygium smithii*	karaka, rimu, pōhutukawa, tōtara white monkey apple	18	Public - Park	Trees in Open Space zones	Footprint of works and likely construction requirements within TPZ.
9	9	*Ligustrum lucidum, Melia azedarach, Pittosporum eugenioides*	tree privet, melia, tarata	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
16	3	*Syagrus romanzoffiana*	queen palm	8	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
54	2	*Syagrus romanzoffiana*	queen palm	12	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
55	2	*Alnus cordata*	Italian alder	10	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
59	2	*Alnus cordata*	Italian alder	14	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
60	2	*Alnus cordata*	Italian alder	12	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
68	8	*Cordyline australis, Cupressus arizonica var. glabra, Rhododendron arborea*	tī kōuka, blue arizona cypress, rhododendron	20	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ

Schedule A2 – NoR1 tree groups

69	8	*Agathis australis, Alectryon excelsus, Corynocarpus laevigatus, Dacrycarpus dacrydioides, Dacrydium cupressinum, Fagus sylvatica, Griselinia littoralis, Podocarpus totara*	kauri, tītoki, karaka, kahikatea, rimu, European beech, kapuku, tōtara	25	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ
70	5	*Cordyline australis, Quercus robur*	tī kōuka, English oak	22	Public - Park	Trees in Open Space zones, Scheduled – Notable Tree (AUP:OP 2206)	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ
71	5	*Agathis australis, Alectryon excelsus, Dacrydium cupressinum, Podocarpus totara*	kauri, tītoki, rimu, tōtara	24	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ
72	5	*Podocarpus totara*	tōtara	18	Public - Park	Trees in Open Space zones	Outside of designation boundary, but footprint of works and likely construction requirements within TPZ
74	5	*Fagus sylvatica, Phoenix canariensis*	European beech, Phoenix palm	24	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ
75	2	*Liriodendron tulipifera*	tulip tree	16	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
79	8	*Corymbia ficifolia*	red flowering gum	25	Public - Park	Trees in Open Space zones, Scheduled – Notable Tree (AUP:OP ID 2209)	Outside designation boundary but footprint of works and likely construction requirements within TPZ

Schedule A2 – NoR1 tree groups

80	7	*Podocarpus totara*	tōtara	16	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ
82	10	*Agathis australis, Coprosma robusta, Pittosporum eugenioides, Podocarpus totara, Pseudopanax arboreus*	kauri, karamu, tarata, tōtara, houpara	18	Public - Park	Trees in Open Space zones	Portion within designation boundary: Within footprint of works and likely construction requirements – remove Portion outside of the designation boundary: Footprint of works and likely construction requirements within TPZ.
85	3	*Agathis australis, Prunus sp., Vitex lucens*	kauri, cherry, pūriri	14	Public - Road	Trees in Roads	Footprint of works and likely construction requirements within TPZ.
92	10	*Corynocarpus laevigatus, Dacrycarpus dacrydioides, Dysoxylum spectabile, Metrosideros excelsa*	karaka, kahikatea, kohekohe, pōhutukawa	15	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
93	30	*Agathis australis, Alectryon excelsus, Corynocarpus laevigatus, Dacrycarpus dacrydioides, Metrosideros excelsa, Myrsine australis, Podocarpus tōtara*	kauri, tītoki, karaka, kahikatea, pōhutukawa, mapou, tōtara	25	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
94	3	*Macadamia integrifolia, Metrosideros excelsa, Persea americana*	macadamia, pōhutukawa, avocado	18	Public - Park	Trees in Open Space zones	Outside designation boundary but footprint of works and likely construction requirements within TPZ Note - protected under the Regional Plan (RP) controls as vegetation within the Significant Ecological Area (SEA) overlay.
95	7	*Podocarpus totara*	tōtara	18	Private	Scheduled – Notable Tree	Outside designation boundary but footprint of works and likely construction requirements within TPZ

Schedule A2 – NoR1 tree groups

						(AUP:OP ID 2218)	
96	10	*Pittosporum eugenioides, Pittosporum tenuifolium, Podocarpus totara*	tarata, kōhūhū, tōtara	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
97	12	*Photinia glabra, Pseudopanax ferox, Vitex lucens*	red robin, horoeka, pūriri	4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
98	4	*Syzygium smithii*	white monkey apple	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
100	3	*Idesia polycarpa*	wonder tree	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
101	5	*Cordyline australis, Pittosporum tenuifolium, Yucca elephantipes*	tī kōuka, kōhūhū, yucca	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
105	3	*Syzygium smithii*	white monkey apple	14	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
106	-	*Leptospermum nitidum 'Copper Sheen'*	copper sheen	4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.
107	13	*Dodonaea viscosa, Ligustrum lucidum, Pittosporum crassifolium*	ake ake, tree privet, karo	5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.

Schedule A2 – NoR1 tree groups

							Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
108	-	*Carpodeus serratus, Coprosma robusta, Cordyline australis, Dacrycarpus dacrydioides, Kunzea robusta, Leptospermum scoparium, Pittosporum crassifolium, Sophora tetraptera*	putaputāwētā, karamu, tī kōuka, kahikatea, kānuka, mānuka, karo, kowhai	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.
112	2	*Leptospermum scoparium, Pittosporum crassifolium*	mānuka, karo	5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.
113	30	*Cordyline australis, Leptospermum scoparium*	tī kōuka, mānuka	4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.

NoR 2

Schedule A3 – NoR2 tree groups

tree group number	approx number of trees	tree species	common name	approx max height (m)	ownership	protection status	Assessment assumptions
115	4	*Salix sp.*	willow	15	Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.
116	4	*Salix sp.*	willow	15	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Note – Likely to be protected under the Regional Plan (RP) controls as vegetation within the Riparian area.

NoR 3

Schedule A4 – NoR3 single trees

tree number	tree species	common name	height (m)	dbh (mm)	tpz radius (m)	ownership	protection status	Assessment assumptions
20	*Tristaniopsis laurina*	water gum	7	200	2.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
22	*Tristaniopsis laurina*	water gum	7	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
25	*Tristaniopsis laurina*	water gum	8	200	2.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
27	*Podocarpus totara*	totara	16	650	7.8	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove

Schedule A4 – NoR3 single trees								
28	*Vitex lucens*	pūriri	5	180	2.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
29	*Tristaniopsis laurina*	water gum	6	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
30	*Tristaniopsis laurina*	water gum	5.5	200	2.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
31	*Tristaniopsis laurina*	water gum	7.5	200	2.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
32	*Tristaniopsis laurina*	water gum	8	280	3.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
33	*Tristaniopsis laurina*	water gum	7	300	3.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
35	*Tristaniopsis laurina*	water gum	6.5	200	2.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
36	*Tristaniopsis laurina*	water gum	7	220	2.6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
42	*Metrosideros excelsa*	pōhutukawa	4	150	2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
44	*Metrosideros excelsa*	pōhutukawa	5.5	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
45	*Metrosideros excelsa*	pōhutukawa	8	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
46	*Metrosideros excelsa*	pōhutukawa	6	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
47	*Metrosideros excelsa*	pōhutukawa	7	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
51	*Podocarpus totara*	tōtara	13	650	7.8	Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements – remove

Schedule A5 – NoR3 tree groups

tree group number	approx number of trees	tree species	common name	approx max height (m)	ownership	protection status	Assessment assumptions
18	3	*Quercus palustris*	pin oak	15	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
19	11	*Tristaniopsis laurina, Yucca elephantipes*	water gum, yucca	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
21	2	*Tristaniopsis laurina*	water gum	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
24	2	*Tristaniopsis laurina*	water gum	5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
34	22	*Cordyline australis, Cupressus macrocarpa, Eucalyptus sp., Ligustrum lucidum, Myrsine australis, Podocarpus totara, Syagrus romanzoffiana*	tī kōuka, Monterey cypress, gum, tree privet, māpou, tōtara, queen palm	18	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
38	25	*Coprosma robusta, Ligustrum lucidum, Myrsine australis*	karamu, tree privet, māpou	6	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
39	25	*Coprosma robusta, Eucalyptus sp., Ligustrum lucidum*	karamu, gum, tree privet	12	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.

Schedule A5 – NoR3 tree groups							
41	25	*Coprosma robusta, Ligustrum lucidum, Quercus robur*	karamu, tree privet, English oak	11	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Noted that the tree privet is a pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
43	6	*Metrosideros excelsa, Podocarpus totara, Sophora microphylla*	pōhutukawa, tōtara, kowhai		Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements – remove
48	-	*Cordyline australis*	tī kōuka	6	Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements – remove
49	2	*Podocarpus totara*	tōtara	9	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
50	6	*Syzygium smithii*	white monkey apple	4.5	Unclear at this stage – Potential to be Public - Road	Unclear – Trees in Roads (assumed)	Within footprint of works and likely construction requirements – remove Pest plant species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
52	20	*Cinnamomum camphora, Cordyline australis, Hibiscus sp., Kunzea ericoides, Libocedrus bidwillii, Myrsine australis, Platanus x acerifolia, Populus nigra, Quercus robur*	camphor laurel, tī kōuka, hibiscus, kānuka, kawaka, māpou, London plane, black poplar, English oak	30	Public - Park	Trees in Open Space zones	Within footprint of works and likely construction requirements – remove
53	6	*Metrosideros excelsa*	pōhutukawa	5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove

NoR 4

Schedule A6 – NoR4 single trees

tree number	tree species	common name	height (m)	dbh (mm)	tpz radius (m)	ownership	protection status	Assessment assumptions
63	*Ligustrum lucidum*	tree privet	4.5	0	0	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove Pest species and can be removed as a Permitted Activity under the AUP:OP. No further assessment required.
65	*Ulmus glabra 'Lutescens'*	golden elm	9	580	7	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
117	*Quercus palustris*	pin oak	13	750	9	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
118	*Salix sp.*	willow	18	1100	13.2	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
119	*Quercus palustris*	pin oak	7	320	3.8	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
120	*Salix sp*	willow	9	1000	12	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
121	*Cryptomeria japonica*	Japanese cedar	12	800	9.6	Public - Road	Trees in Roads	Footprint of works and likely construction requirements within TPZ
127	*Araucaria heterophylla*	Norfolk Island pine	17	450	5.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
132	*Metrosideros excelsa*	pōhutukawa	7	280	3.4	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
133	*Metrosideros excelsa*	pōhutukawa	6	250	3	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove

Schedule A7 – NoR4 tree groups

tree group number	approx number of trees	tree species	common name	approx max height (m)	ownership	protection status	Assessment assumptions
61	8	*Liquidambar styraciflua*	American sweet gum	11	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
62	9	*Liquidambar styraciflua*	American sweet gum	11	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
64	15	*Liquidambar styraciflua*	American sweet gum	13	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
122	13	*Populus nigra*	black poplar	25	Unclear at this stage – Potential to be Public Road	Unclear - Trees in Roads (assumed)	Within footprint of works and likely construction requirements – remove Tree assumed as within road reserve for the purposes of assessment - Cadastral survey should be undertaken closer to the time of detailed design to confirm ownership.
123	9	*Salix sp.*	willow	12	Unclear at this stage – Potential to be Public Road	Unclear - Trees in Roads (assumed)	Within footprint of works and likely construction requirements – remove
124	55	*Salix sp.*	willow	12	Unclear at this stage – Potential to be Public Road	Unclear- Trees in Roads (assumed)	Within footprint of works and likely construction requirements – remove
128	2	*Metrosideros excelsa*	pōhutukawa	5	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove
131	11	*Robinia pseudoacacia*	black locust	10	Public - Road	Trees in Roads	Within footprint of works and likely construction requirements – remove

2 Appendix B – Tree location plans