



TE TUPU NGĀTAHI
SUPPORTING GROWTH

Pukekohe Transport Network Assessment of Arboricultural Effects

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Document Status

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Glossary of Defined Terms and Acronyms

Acronym/Term	Description
AC	Auckland Council
AEE	Assessment of Effects on the Environment report
AT	Auckland Transport
AUP:OP	Auckland Unitary Plan: Operative in Part
FUZ	Future Urban Zone
KiwiRail	KiwiRail Holdings Limited
NoR	Notice of Requirement
ONF	Outstanding Natural Features
RMA	Resource Management Act 1991
SEA	Significant Ecological Area
SH	State Highway
Te Tupu Ngātahi	Te Tupu Ngātahi Supporting Growth Alliance
ULDMP	Urban and Landscape Design Management Plan
WDC	Waikato District Council
WDP	Waikato District Plan
Waka Kotahi	Waka Kotahi New Zealand Transport Agency

Executive Summary

The Pukekohe Transport Network affects trees that are protected by District Plan provision of the Auckland Unitary Plan: Operative in Part (AUP:OP). Two groups of trees are within the road reserve adjacent to the designation boundary for NoR 5. Multiple groups of trees growing within or adjacent to the designation boundary for NoR 8 (AC) are within the Outstanding Natural Feature overlay – Pukekohe East Tuff Crater. A group of Norfolk Island pine trees and a standalone English oak at 60 Morgan Road are scheduled trees with root zones that extend into the designation boundary for NoR 8. One tree protected under the Waikato District Plan (Proposed) is also affected resulting from NoR 8 (WDC).

As part of construction management, a tree management plan is proposed to be developed to detail the impacts of the work on these protected trees prior to commencement of the construction works. The tree management plan will consider detailed design in relation to affected trees and determine the actual effects on them. The tree management plan will specify tree protection measures to avoid, remedy and mitigate effects of any pruning and works within the root zone of trees that are to be retained within and adjacent to the designation. The tree management plan will consider the effects of tree removal and specify replacement planting that is to be implemented as part of the UDLMP.

The greatest anticipated arboricultural effects of the proposed designations on protected trees will occur on the southern side of Pukekohe East Road, where tree removal is required within the ONF overlay. The planting of new street trees along the length of the transport corridor provides an opportunity for many qualities specimen trees to be planted, which will mitigate the loss of the existing trees.

Trees that are protected by Regional Plan provisions of the AUP:OP will be addressed during future consenting stage. As part of the proposed designation layout, the location of trees that are protected by Regional Plan provisions has been considered, with changes to accommodate trees in some locations.

1 Introduction

1.1 Purpose and scope of this Report

This arboricultural report forms part of the suite of technical reports prepared to support the Assessment of Effects on the Environment (AEE) for nine Notices of Requirement (NoRs) being sought by Waka Kotahi NZ Transport Agency (Waka Kotahi) and Auckland Transport (AT) for the Pukekohe Transport Network under the Resource Management Act 1991 (RMA).

This report considers the actual and potential effects associated with the construction, operation, and maintenance of the Pukekohe Transport Network on the existing and likely future environment as it relates to arboricultural effects and recommends measures that may be implemented to avoid, remedy and/or mitigate these effects.

The key matters addressed in this report are as follows:

- Identify and describe the protected trees and vegetation context of the Pukekohe Transport Network area;
- Identify and describe the actual and potential arboriculture effects of each Project corridor;
- Recommend measures as appropriate to avoid, remedy or mitigate actual and potential arboriculture effects (including any conditions/management plan required) for each Project corridor; and
- Present an overall conclusion of the level of actual and potential arboriculture effects for each Project corridor after recommended measures are implemented.

1.2 Report Structure

The report is structured as follows:

- Project overview with a summary of the Pukekohe Transport Network in section 2;
- Overview of the methodology used to undertake the assessment and identification of the assessment criteria and any relevant standards or guidelines in section 3;
- Identification and description of the existing and likely future arboricultural environment in section 4;
- Description of the actual and potential positive effects on trees and vegetation of the Project in section 5;
- Description of the actual and potential adverse arboricultural effects of construction of the Project, including recommended measures to avoid or mitigate potential adverse effects, in section 6;
- Description of the actual and potential adverse arboricultural effects of operation of the Project, including recommended measures to avoid or mitigate potential operation adverse effects in section 7; and
- Overall conclusion of the level of potential adverse arboricultural effects of the Project after recommended measures are implemented in section 8.

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 for the Pukekohe Transport Network Projects as a whole and each NoR and likely staging 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 arboricultural effects. As such, they are not repeated here, unless a description of an activity is necessary to understand the potential effects, then it has been included in this report for clarity.

2 Pukekohe Transport Network Overview

The Pukekohe Transport Network comprises eight transport projects through Pukekohe, Paerata and Drury. A concept design has been undertaken for the NoRs. The design will be further refined through future phases of the Project and will be undertaken within the scope of the designation conditions and future resource consent conditions. The detailed design of the Project will be undertaken prior to construction and reflected in the Outline Plan(s) which will be submitted to Council as set out in s176A of the RMA.

The Pukekohe Transport Network encompasses eight transport projects for the Pukekohe, Paerata and Drury West areas. AT has lodged six NoRs with Auckland Council and Waka Kotahi has lodged two NoRs with Auckland Council and one with Waikato District Council. The Pukekohe Transport Network includes provision for improved walking and cycling, public transport, and general traffic connections.

For the purposes of this assessment, Mill Road and Pukekohe East Road Upgrade (that includes works within Auckland Council and Waikato District Council) is referred to as one transport project, despite being submitted as two separate NoRs. The matters relevant to each jurisdictional area are addressed through this assessment.

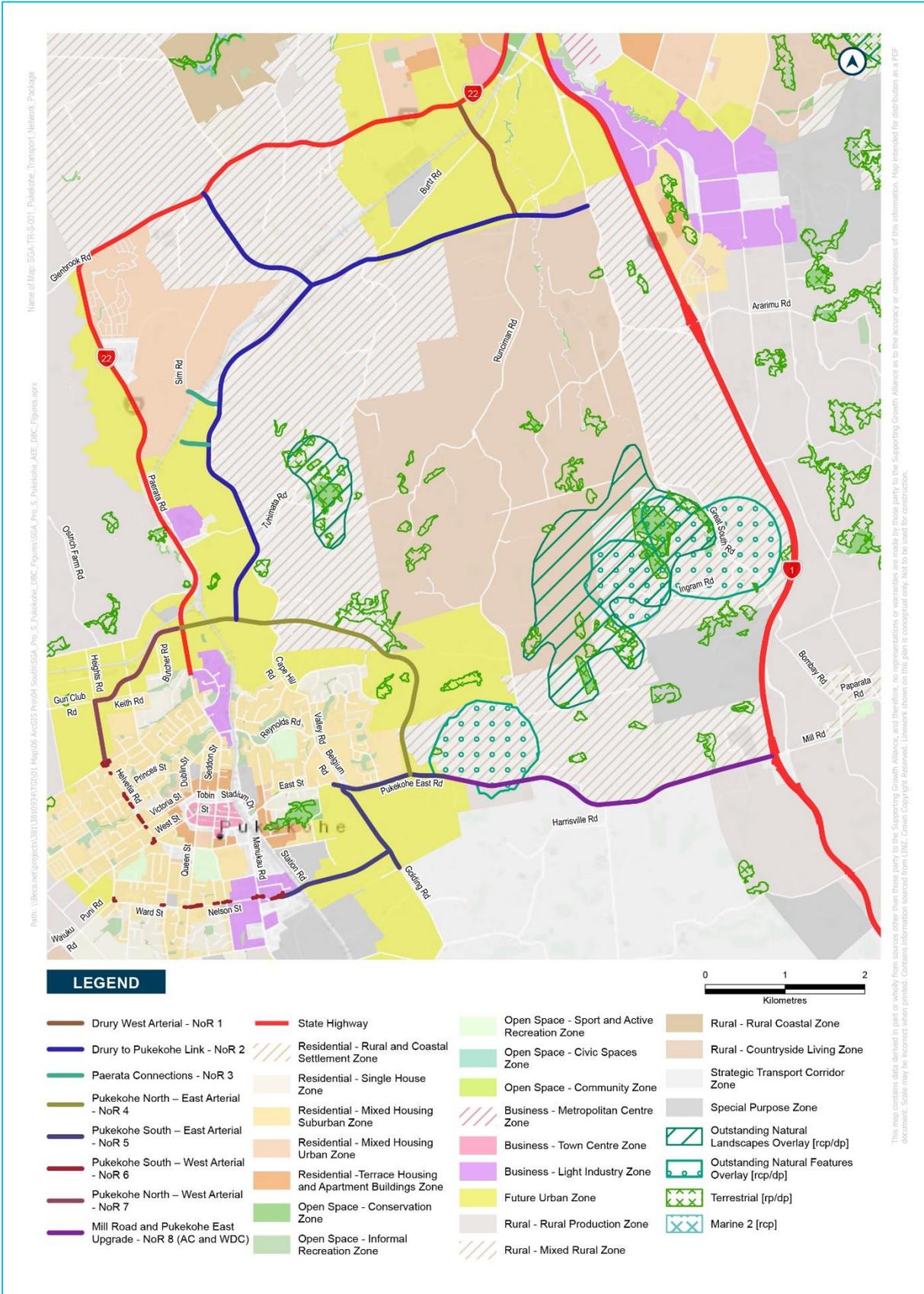


Figure 2-1: Pukekohe Transport Network

Table 2-1: Pukekohe Package Project Summary

NoR	Project	Requiring Authority	Description
1	Drury West Arterial	AT	<ul style="list-style-type: none"> NoR 1 is a 1.6km new transport corridor extending south from the intersection of SH22 and Jesmond Road to the proposed Drury to Pukekohe Link (NoR 2). It connects Drury West Town Centre, Drury West Rail Station and provides access to the strategic transport network including SH1 and SH22. It connects with Burt Road and to Runciman Road in the south. This new transport corridor improves local connectivity in Drury West and the wider area to centres, employment, and rail stations. Between SH22 and Burt Road, the proposed cross section is a four-lane arterial 30m wide. This includes two lanes for PT and walking and cycling facilities on both sides of the corridor. South of Burt Road a two-lane arterial with a 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on both sides of the corridor. Three new bridges are proposed over existing NIMT rail line, and two tributaries of the Ngakoroa Stream. Three new stormwater wetlands are proposed and new culverts and swales.
2	Drury-Pukekohe Link	Waka Kotahi	<p>NoR 2 provides a north south strategic corridor with two general traffic lanes proposed and active transport facilities on one side of the corridor. The total length of the NoR is 10.6km.</p> <p>NoR 2 is split into the following four segments.</p>
	South Drury Connection segment		<ul style="list-style-type: none"> South Drury Connection segment provides a new connection extending from Great South Road in the east at the proposed SH1 Drury South Interchange (a proposed Waka Kotahi SH1 project). The alignment is along the edge of the Future Urban Zone (FUZ) to Burt Road in the west. It provides a strategic connection improving local access in Drury West, provides resilience in the transport network supporting SH22 and SH1, provides direct connectivity to the proposed Drury South Interchange and supports the proposed strategic active modes corridor. A 24m wide cross section is proposed with two lanes for general traffic, with active transport facilities on one side of the corridor. Three new bridges are proposed over tributaries of the Ngakoroa Stream. Three stormwater wetlands are proposed and new culverts and swales.

NoR	Project	Requiring Authority	Description
	SH22 Connection segment		<ul style="list-style-type: none"> Connecting with the South Drury Connection and Drury-Paerata Link segments, this connection provides a strategic connection between State Highway 1 and State Highway 22. It improves access between Drury West and Paerata, provides resilience in the transport network supporting SH22 and SH1, provides direct connectivity to the proposed Drury South Interchange and supports the proposed strategic active modes corridor. It includes new transport corridor and a partial upgrade of Sim Road (north). A 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on one side of the corridor. Two new bridges are proposed over the Oria Creek and NIMT. Two stormwater wetlands are proposed and new culverts and swales.
	Drury-Paerata Link segment		<ul style="list-style-type: none"> Drury-Paerata Link segment is a new corridor connecting the segments of South Drury Connection, SH22 Connection and Paerata Arterial. This segment extends from an intersection with Burt Road in the north, to the Paerata Arterial segment in the south. It provides connectivity between Drury and Paerata providing a strategic connection between two areas of future urban development. A 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on one side of the corridor. Two bridges are proposed over tributaries of the Oira Creek. Three stormwater wetlands are proposed and new culverts and swales.
	Paerata Arterial segment		<ul style="list-style-type: none"> Paerata Arterial segment is located along the eastern edge of Paerata FUZ. It connects with Paerata Connections NoR 3 at the northern extent and to the proposed Pukekohe North-East Arterial NoR 4 at its southern extent. It includes an upgrade of part of Sim Road (south), Tuhimata Road and a new section of transport corridor. It increases connectivity to Paerata FUZ, Paerata Rail Station and Pukekohe Town Centre. A 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on one or both sides of the corridor. No bridges are proposed. Six stormwater wetlands are proposed wetlands (one shared with NoR 4 and one shared with NoR 3) and new culverts.

NoR	Project	Requiring Authority	Description
3	Paerata Connections	AT	<ul style="list-style-type: none"> The Paerata Connections provide two connections from the existing Sim Road (south) proposed to be upgraded by NoR 2 to the Paerata Rail Station and Paerata Rise development. The connections provide the primary east-west connections for all modes in Paerata. NoR 3 has includes two segments: <ul style="list-style-type: none"> Sim to Sim Connection segment provides a new connection of approximately 400m between the two extents of Sim Road over the railway (NIMT). Paerata Rail Station Connection segment provides a new transport corridor approximately 330m in length between the Paerata Rail Station (KiwiRail designation 6311 currently under construction) and NoR 2. A 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on both sides of the corridor. One bridge is proposed over the NIMT to connect the two extents of Sim Road for the Sim to Sim Connection segment. One new stormwater wetland is proposed that is shared with NoR 2 and a new culvert.
4	Pukekohe North-East Arterial	AT	<ul style="list-style-type: none"> The Pukekohe North-East Arterial is an approximately 4km new transport corridor from SH22 in the northwest connecting to Pukekohe East Road in the south-east. It connects the strategic corridors at SH22 (at the northern extent of the Pukekohe North-West Arterial NoR 7), the Drury to Pukekohe Link NoR 2 and Pukekohe East Road proposed to be upgraded by NoR 5 and NoR 8. Its primary function is for general traffic, freight, an active mode links between future neighbourhoods and alleviating traffic on existing roads at Cape Hill Road and Valley Road. A 24m wide cross section is proposed with 2 lanes for general traffic and active transport facilities proposed on both or one side of the corridor. Seven bridges are proposed over the Whangapouri Creek, the NIMT, and other unnamed streams and tributaries. Six new stormwater wetlands are proposed and new culverts.
5	Pukekohe South-East Arterial	AT	<ul style="list-style-type: none"> The Pukekohe South-East Arterial upgrades part of Pukekohe East Road, Golding Road and provides a new connection between Golding Road (from north of Royal Doulton Drive) and across Station Road and the NIMT to the existing industrial development on Crosbie Road to Svendsen Road. It is a primary east-west connection to assist in redirecting general traffic and freight away from the Pukekohe town centre to provide additional resilience to the wider network.

NoR	Project	Requiring Authority	Description
			<ul style="list-style-type: none"> • A 24m wide cross section is proposed with two lanes for general traffic with active transport facilities on the southern side of the corridor on Pukekohe East Road and on both sides for the remainder of the corridor. • One bridge is proposed crossing Station Road and the NIMT. • Five new stormwater wetlands are proposed and new and upgraded culverts.
6	Pukekohe South-West Upgrade	AT	<ul style="list-style-type: none"> • Pukekohe South-West Upgrade involves the re-allocation of road space within the existing road corridor for a bi-directional cycle way and footpath upgrade. The proposed designation is limited to specific intersections and driveways to safely accommodate active mode facilities. The existing road reserve is to be utilised where possible retaining a 20m wide cross section with 2 lane general traffic, walking on both sides and a bi-directional cycleway on one side of the corridor. • No bridges or stormwater wetlands are proposed.
7	Pukekohe North-West Arterial	AT	<ul style="list-style-type: none"> • Pukekohe North-West Arterial provides a connection between Helvetia Road in the southwest and SH22 in the northeast. It upgrades part of Helvetia Road, utilises part of Keith Road (a paper road), and forms a new connection between Beatty Road and Butcher Road to SH22 – connecting to the Pukekohe North-East Arterial NoR 4. • It provides an alternative connection for all modes travelling north to south in west Pukekohe assisting in redirection of general traffic away from the town centre and provides additional resilience to the wider network. A 24m wide cross section is proposed with two lanes for general traffic and active transport facilities on both sides of the corridor. • No bridges are proposed. • Two new stormwater wetlands are proposed and new and upgraded culverts.
8 (AC) And 8 (WD)	Mill Road and Pukekohe East Road Upgrade	Waka Kotahi	<ul style="list-style-type: none"> • NoR 8 upgrades Mill Road (Bombay) in the east and Pukekohe East Road in the west. • It provides an important strategic connection between Auckland and Waikato and from SH1 to Pukekohe urban areas for traffic and freight, with a major rural active mode connection. Harrisville Road plays a significant role in distributing traffic from further south into Waikato. • Mill Road is proposed to be upgraded to four lanes (2.1 kms) from SH1 in the east to Harrisville Road in the west. It has a 30m wide cross section with four lanes for general traffic, with walking and cycling on the southern side. • Pukekohe East Road is proposed to be upgraded (3.4 kms) for active transport facilities on the southern side from Harrisville Road in the east to NoR 5 in the west. • One new stormwater wetland is proposed, swales and new and upgraded culverts.

3 Assessment Methodology

3.1 Statutory context

3.1.1 Resource Management Act 1991

The Resource Management Act 1991 (RMA) requires District and Regional Councils to manage the use, development, and protection of natural and physical resources in a way that provides for the wellbeing of today's communities, while safeguarding the options of future generations. The protection of significant indigenous vegetation and significant habitats of indigenous fauna from inappropriate subdivision, use and development is identified as a matter of national importance (Section 6(c)).

3.1.2 Auckland Unitary Plan – District Plan rules

The AUP:OP contains a number of applicable provisions that confer protection to trees. This assessment has been limited to matters that would trigger a District Plan consent requirement, no regional resource consents are currently being sought. Any regional consent requirements in relation to removal or works proximate to such trees will be assessed through a future resource consent process.

District Plan matters include:

- Effects on protected trees, a 'protected tree' is a tree that requires resource consent for alteration (including pruning and works within the root zone) or removal. This includes:
 - Effects on 'notable trees', a scheduled notable tree is a specimen that is specifically listed in the AUP:OP, in Schedule 10 Notable Trees Schedule and is shown on planning maps;
 - Effects on 'notable trees', a scheduled notable tree is a specimen that is specifically listed in the WDP, in Schedule 2 Notable Trees Schedule (Proposed Plan) and Appendix 2 Inventory of Historic Buildings, Structures, Trees and Areas Operative Plan) as shown on planning maps;
 - Effects on trees in Outstanding Natural Feature (ONF), High Natural Character (HNC), Outstanding Natural Landscape (ONL) and Outstanding Natural Character (ONC) overlays;
 - Effects on trees in Roads, except where adjacent to rural zoned and Future Urban Zone (FUZ) land in respect of infrastructure projects; and
 - Effects on trees in Open Space zones.

3.1.3 AUP:OP Regional Plan and District Plan rules

The following tables set out the relevant rules that apply tree protection for the Pukekohe Transport Network under the District Plan (DP) and the Regional Plan (RP) sections of the AUP:OP.

AUP:OP Section	Reference	Rule	Where rule applies	Activity Status
RP	E26.3.3.1 (A76)	Vegetation alteration or removal	rural zones, coastal areas and riparian areas and SEA overlays	Permitted

AUP:OP Section	Reference	Rule	Where rule applies	Activity Status
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 (See note 1)	rural zones, coastal areas and riparian areas and SEA overlays	Restricted Discretionary
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	E26.3.3.1 (A76)	Vegetation alteration or removal	Outstanding Natural Features Overlay, Outstanding Natural Landscapes Overlay and Outstanding Natural Character and High Natural Character Overlay	Permitted
DP	E26.3.3.1 (A77)	Vegetation alteration or removal that does not comply with Standards E26.3.5.1 to E26.3.5.4 (See note 1)	Outstanding Natural Features Overlay, Outstanding Natural Landscapes Overlay and Outstanding Natural Character and High Natural Character Overlay	Restricted Discretionary
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 (A83)	Tree trimming or alteration	trees in roads and on open space zones	Permitted Activity
DP	E26.4.3.1 (A84)	Tree trimming or alteration that does not comply with Standard E26.4.5.1	trees in roads and open space zones	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	Restricted Discretionary
DP	E26.4.3.1 (A90)	Tree trimming, alteration or removal on roads adjoining rural zones and on roads adjoining the FUZ (See Note 2)	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

AUP:OP Section	Reference	Rule	Where rule applies	Activity Status
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 (See note 2)	trees in roads and on open space zones	Restricted Discretionary
DP	E26.4.3.1 (A93)	Tree trimming, alteration or removal not otherwise provided for	trees in roads and on open space zones	Discretionary Activity

Notes:

Standard E26.3.5.2 *Vegetation alteration or removal* states:

(1) Must not include trees over 6m in height, or 600mm in girth unless their removal is otherwise permitted by a rule in this Plan.

(3) Must not result in the removal of more than 50m² of vegetation within a coastal area or riparian area not identified as a significant ecological area.

(5) Must not result in the removal of more than 500m² of vegetation within the legal road or the formation width of the road in a rural zone.

(6) Must not result in the removal of more than 250m² of vegetation outside the legal road or the formation width of the road in a rural zone.

In relation to trees on roads, the apparent contradiction between clauses (A90) and (A92) of Activity Table E26.4.3.1 was queried with Auckland Council's Senior Regulatory Arborist, Gavin Donaldson in 2021. He provided the view that tree trimming, alteration, or removal of trees on roads adjoining rural zones and FUZs is a permitted activity, however, a tree owner approval would still be required.

3.1.4 Waikato District Plan (Franklin Section)

The Waikato District Plan provides guidance on the relevant standards to consider for NoR 8 (Mill Road and Pukekohe East Road Upgrade), which is partly in the Waikato Region and therefore NoR 8 is in the jurisdiction for both Waikato District Council and Auckland Council.

Both the Waikato District Plan (Franklin Section) (Operative) and the Waikato District Plan (Proposed) contain a number of applicable provisions regarding arboriculture, set out below.

WDP Section	Reference	Rule	Where rule applies	Activity Status
Waikato District Plan (Franklin Section) Operative Version	Vegetation Clearance	15.6.3.1 Notwithstanding anything to the contrary in this plan, the following activities shall be permitted activities in all zones: (i-xii)	Throughout the district	Permitted
Waikato District Plan (Franklin Section) Operative Version	Vegetation Clearance	15.6.3.2 The cutting, damaging or destroying of any individual indigenous tree or number of trees constituting indigenous bush, not provided for as a	Throughout the district	Restricted Discretionary

WDP Section	Reference	Rule	Where rule applies	Activity Status
		permitted activity in Rule 15.6.3.1 above.		
Waikato District Plan (Franklin Section) Operative Version	F Notable Trees	F Notable Trees	Throughout the district	Not relevant – no notable trees within designation
Waikato District Plan Proposed Version	Part 2 Chapter 21- Tree	Schedule 2 Notable Trees	Throughout the district	Not relevant – no notable trees within designation
Waikato District Plan Proposed Version	ECO-R16	Indigenous vegetation clearance outside a Significant Natural Area for any reason not specified in Standards ECO-R11 to ECO-R15	Throughout the district	Restricted Discretionary activity.
Waikato District Plan Proposed Version	Part 2 Chapter 3 All Infrastructure (AINF)	AINF-R9 Trimming, maintenance or removal of vegetation or trees associated with infrastructure.	Throughout the district	Permitted

3.1.5 Notice of Requirement

This assessment has been prepared to support the NoR process for the Pukekohe Transport Network. If confirmed, the designations will authorise the district plan land use components of the projects. 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.

To demonstrate the split between regional and district plan matters, protected trees (under either the regional or district provisions of the AUP:OP and Waikato District Plan (Franklin Section) have been listed in tables and plotted on site plans in the Appendices of this report. The tables and site plans assist to identify the potential arboricultural effects of the construction of the projects and whether these are regional, or district plan matters under the AUP:OP. As can be seen from the tree details provided, the majority of arboricultural matters are regulated by the regional provisions of the AUP:OP which will require authorisation in a future consenting process.

3.1.6 Future Regional Resource Consents

No regional resource consents are currently being sought for the proposed Pukekohe Transport Network. These will be sought at a later date, before construction commences. Although regional consents are not being sought at this time, arboricultural effects arising in respect of activities that require regional consents have been considered as part of this assessment to inform design, options assessment, and the proposed designation footprint. While arboricultural effects in respect of regional consent matters have been considered for these limited purposes, a detailed assessment of regional plan matters, and the mitigation required is not proposed to be undertaken at this NoR phase.

3.1.7 Existing and Future Environment Considerations

Currently, regional plan rules in the AUP:OP for rural areas protect trees that are 6m or greater in height or 600mm and greater in girth, according to E26.3.3.1 Activity table and applicable Standard E26.3.5.2 (1). As the underlying zoning of the land changes from rural to urban, the protection status of these trees will be lifted, as the rule applies to rural zones and there are no equivalent rules that protect such trees in the urban environment. Trees that meet the relevant specifications are “protected” to the extent that resource consent is required to authorise their removal.

Conversely, as the underlying zoning of the land changes from rural to urban, the protection status of trees within the road reserve also changes so that trees greater than 400mm in girth or 4 metres in height will require consent to remove under the relevant rules in E26.4.3.1 Activity Table.

3.2 Preparation for this Report

Work undertaken for this report commenced in January 2023. In summary, the preparation for this work has included:

- Reviews of and the project concept designs and Te Tupu Ngātahi GIS viewer and attendance at design review workshops;
- A review of the statutory setting of the Project and surrounding context;
- A review of the other GIS data such as overlays and aerial photography;
- A preliminary site visit on 26 January 2023 with the Project Team;
- A specialists’ workshop held on 22 March 2023 to discuss initial findings following the first site visit; and
- More detailed site visits undertaken between 7 March and 4 April 2023 to further understand the receiving environment.

Alongside the preparation of this assessment, the author has reviewed the following documents:

- Construction Method Statement;
- Revisions of concept design drawings;
- General Arrangement Layout Plans for the NoR designations;
- Other Technical Assessments:
 - Ecological Assessment;
 - Urban Design Assessment; and
 - Landscape and Visual Assessment.
- This assessment relates to arboriculture effects. Where other matters or expertise have been relied upon, these have been stated within the assessment.

3.3 Assessment Approach

3.3.1 Overview

Field work was undertaken to record details of trees that may be impacted by the transport designations and future construction work which form part of the Pukekohe Transport Network projects. This included trees within and adjacent to the designation boundary to provide a record of

the trees present in the existing environment. For the purpose of this assessment, trees were defined as any woody plant that is 4m or greater in height, or that may reach this dimension in the future.

Based on the data collected in the field the assessment considered the tree/s function and likely future stature and condition, over the next 10-20 years.

A review of other technical reports which relate to the effects of tree alteration and removal, including ecology impact were undertaken.

Mitigation measures were identified to avoid, remedy, or mitigate effects on trees where they are protected under the district plans, including:

- The use of tree management plans where construction work was likely to impact on trees or groups of trees;
- Replacement planting protocols that integrate with landscape planning within the transport corridors; and
- Identification of opportunities for tree planting along the corridor where trees are to be removed.

3.3.2 Desktop Assessment

A desktop assessment was carried out using aerial photography available on Auckland Council GeoMaps to locate properties and tree groups of interest and to get an overview of the landscape and land use character of the land within the NoR designations.

3.3.3 Field assessment

Field assessment included:

- Traversing the extent of the designations on foot or in a vehicle to survey the trees where access was permitted.
- Where possible, viewing trees from public vantage points where no property access was permitted.
- Details of all trees were collected and geo-referenced on a mobile device.
- Trees were recorded singularly, or in groups where logical groupings can be made based on species, configuration, age-class, or management type (e.g., bush areas, shelter belts).
- Information gathered on each tree or tree group included:
 - geolocation / coordinates
 - species or species list
 - size and age class
 - health and form classifiers
 - tree function
 - whether the tree/group is likely to improve, decline or remain the same condition within the next 10-20 years
- Details of trees and tree groups were entered in spreadsheet and uploaded to a GIS platform for generation of site plans.
- For the purposes of this report, trees have been numbered in the following format: N/T; where the N represents the applicable NoR and the T represents the unique number assigned to trees or tree group. For example, tree number 5/34 is within NoR 5 and is the 34th tree identified in that NoR.

4 Existing and Future Receiving Environment - Arboriculture

4.1 Existing and Future Environment – Relating to all NoRs

The proposed designations for the Pukekohe Transport Network traverse a variety of land use types:

- Large tracts of land between Pukekohe and Drury and adjacent to Mill Road and part of Pukekohe East Road are arable and currently used for farming or cropping, in the Mixed Rural, Countryside Living and FUZ;
- Large-format residential or lifestyle block properties in the Mixed Rural, Countryside Living and FUZ, between Pukekohe and Drury and adjacent to Pukekohe East Road and Golding Road;
- Commercial or light industrial land uses occur in many areas around the outskirts of Drury, Paerata and Pukekohe; and
- Existing urban areas in Pukekohe and Paerata.

Tree cover and vegetation types correlate strongly to the type of land use, where land used for farming activities generally have few trees and residential and lifestyle block types often have many trees. Several pockets of native forest have survived on rural land across the area and blocks of agroforestry and shelterbelt plantings are common.

Changes to land use that are reflected in the zoning of the land are likely to result in loss of many trees and tree groups in the near future, particularly within the FUZ. Urbanisation within this zone will result in a currently rural environment being replaced with an urban setting in the future and the associated loss of established planting. However, new trees will be planted in streets, private and public spaces as part of future developments.

4.2 Existing and Future Environment – Relating to Specific NoRs

4.2.1 NoR 1 – Drury West Arterial

The Drury West Arterial mainly crosses arable land and large format residential or lifestyle properties. Arable land between the Jesmond Road intersection and the Burt Road connection contains few trees. Between Burt Road and the connections to Runciman Road and the South Drury Arterial (NoR 2), arable land and lifestyle blocks contain tree groups planted for amenity and as shelter belts.

Land (excluding existing roads) within the extent of NoR 1 is zoned FUZ. The future environment for trees within this area is likely to be very different as the anticipated land use pattern change (urbanisation) is likely to result in removal of trees as the land is developed.

The property at 801 Runciman Road contains large groups of mature landscape trees planted in rows along farm roads and between paddocks. Based on aerial photographs the property at 600 Burt Road contains a large number of trees that are also affected by the designation. Two oak trees, one within 792 Runciman Road and one within the adjacent road reserve are significant specimens.

Field work has identified three standalone specimen trees, 25 groups of trees and five shelterbelt system within the Drury West Arterial designation. The groups of trees cover approximately 30,000 m² in total.

There are no trees in NoR 1 that are protected under relevant District Plan provisions of the AUP:OP.

4.2.2 NoR 2 – Drury to Pukekohe Link

The South Drury Connection segment crosses large format residential or lifestyle properties between Great South Road and Runciman Road, where many groups of trees planted for amenity and shelter exist. Between Runciman Road and Burt Road, larger properties of farmland contain trees and tree groups less frequently, with large portions of land containing no trees.

The properties at 1238 and 1242 Great South Road, 22 Ngakaroa Road and 792 Runciman Road contain groups of mature landscape trees. A group of oak trees planted along the stream bank on at 792 Runciman Road is significant specimens.

Field work has identified three standalone specimen trees, six groups of trees and one shelterbelt system within the NoR 2 proposed designation. The groups of trees represent approximately 40,000 m² of total canopy cover.

The SH22 Connection segment crosses arable and grazing land with sparse to non-existent tree cover over the majority of the land. Clusters of tree groups are present on smaller holdings around the Sim Road connection.

The property at 77 Sim Road contains the greatest concentration of amenity trees within the designation for the SH22 connection. Field work has identified six standalone trees, seven groups of trees and one shelterbelt. The tree groups represent approximately 12,000 m² of total canopy cover.

The Drury-Paerata Link segment crosses arable and pastoral farmland, and a cluster of small holdings or lifestyle blocks west of the Oira Stream (319 Sim Road). Large expanses of farmland contain sporadic groups of agro-forestry plantings. Smaller holdings contain many groups of amenity and shelter trees, including a high diversity of tree species.

The properties at 319E and 319D contain the greatest concentration and diversity of amenity trees within the Drury-Paerata Link segment. Field work has identified three standalone specimen trees, four shelterbelt/hedge systems and 19 groups of trees with a canopy cover of approximately 30,000 m².

The Paerata Arterial segment, which includes a partial upgrade of Sim Road affects a large contiguous shelter system that runs along the western side of Sim Road. The land beyond this is farmland and the land on the other side of Sim Road are smaller holdings comprised of lifestyle properties that contain a diverse range of trees and tree groups. The land around the connections of Tuhimata Road contains few trees. Around the connection of Cape Hill Road and Sim Road is a large native forest block fringed with mature pine trees. A large format residential property to the west contains amenity trees and a grove of native trees in a gully. Towards the connection with the North-East Arterial (NoR 4) the alignment crosses farmland with few trees.

Field work has identified eleven standalone trees, seven shelterbelt/hedges and 10 tree groups. The tree groups represent approximately 9,000 m² of tree canopy cover.

Land (excluding existing roads) within the extent of NoR 2 is zoned FUZ, Rural – Countryside Living Zone and Rural – Mixed Rural Zone. The future environment for trees within the FUZ is likely to be very different as the anticipated land use pattern change (urbanisation) is likely to result in removal of trees as the land is developed. Changes to the land and tree cover in Countryside Living and Mixed Rural zones is likely to be less prevalent.

There are no trees in NoR 2 that are protected under relevant District Plan provisions of the AUP:OP.

4.2.3 NoR 3 – Paerata Connections

The land within the designations for the Paerata Connections is mostly farmland containing no trees. Groups of trees and scrappy woodland is present near the rail corridor. Land (excluding the rail corridor) within the extent of NoR 3 is zoned FUZ, Rural – Mixed Rural Zone and Residential – Mixed Housing Urban.

The future environment for trees is unlikely to change, as there are currently few trees present. Residential development in the Residential – Mixed Housing Urban zone at Paerata Rise is likely to see the introduction of trees in an urban setting as the land is converted to urban development.

There are no trees in NoR 3 that are protected under relevant District Plan provisions of the AUP:OP.

4.2.4 NoR 4 – Pukekohe North-East Arterial

The Pukekohe North-East Arterial crosses large format residential or lifestyle blocks and larger portions of land used for farming and arable purposes. Between SH22 and the rail corridor there are several groups of amenity and shelter trees. Few trees are present on the arable farmland between the rail corridor and the Pukekohe East Road connection, with trees occasionally found associated with stream or wetlands, and in shelter systems. Groups of native trees that are spread across the land are mostly avoided by the alignment of the proposed designation. Lifestyle properties and farmland in the southern reach of the North-East Arterial contain a high density of tree groups planted for agro-forestry crops, shelter systems and amenity.

Field work has identified one standalone tree and nine tree groups within NoR4. The tree groups represent approximately 30,000 m² of tree canopy cover. This figure is only a portion of the total tree canopy cover over the designation, where trees have not been recorded due to access limitations.

Land (excluding existing roads) within the extent of NoR 4 is zoned FUZ and Rural – Mixed Rural Zone. The future environment for trees within the FUZ is likely to be very different as the anticipated land use pattern change (urbanisation) is likely to result in removal of trees as the land is developed. Changes to the land and tree cover in Mixed Rural zones is likely to be less prevalent.

There are no trees in NoR 4 that are protected under relevant District Plan provisions of the AUP:OP.

4.2.5 NoR 5 – Pukekohe South-East Arterial

The Pukekohe South-East Arterial includes parts of Pukekohe East Road and Golding Road and a new road alignment across large format residential and lifestyle properties. The connection to Svendsen Road crosses industrial development containing no trees of note. Farmland and lifestyle properties on Golding Road contain many mature totara trees and an array of amenity and shelter plantings. Between Golding Road and the rail corridor crossing the arable land and lifestyle properties contain a number of groups of trees comprising amenity and shelter plantings.

Land (excluding existing roads) within the extent of NoR 5 is mostly zoned FUZ. Small amounts of land on the northern side of Pukekohe East Road are zoned Business - Neighbourhood Centre Zone and Residential - Mixed Housing Suburban Zone.

The future environment for trees within the FUZ is likely to be very different as the anticipated land use pattern change (urbanisation) is likely to result in removal of trees as the land is developed. Changes to the land and tree cover in the Neighbour Centre and Mixed Housing Suburban zones is likely to also occur in the near future.

Field work has identified 13 standalone specimen trees, 11 hedge and shelter belt systems and 23 groups of trees within NoR 5. The tree groups represent approximately 11,000 m² of tree canopy cover.

Trees adjacent to NoR 5 that are protected under relevant District Plan provisions of the AUP:OP are:

- Tree group 5/41 - 24 puriri and pohutukawa growing in the road reserve of Pukekohe East Road beside the rear boundaries of 3-15 Ridge View Crescent.
- Tree group 5/42 - 6 pohutukawa and totara growing in the road reserve of Pukekohe East Road beside the rear boundary of 4 Stockmans Lane.

4.2.6 NoR 6 – Pukekohe South-West Upgrade

The Pukekohe South-West Upgrade includes parts of Nelson Street West, Ward Street, Puni Road, West Street and Helvetia Road. These residential streets contain a large number of street trees within grassed berms. Species noted include exotics (American sweet gum, honey locust, Queensland box, coast banksia, Melia, silver birch, common ash, flowering cherry, camellia, pin oak) and natives (karaka, titoki, rimu, rewarewa). A large number of trees from a wide array of species is also present on private and public land immediately adjacent to the road boundary. The proposed designation over portions of some properties on the corners of intersections to provide for an active mode upgrade along the Pukekohe South West upgrade affect privately-owned trees that are not protected by the AUP:OP.

Notable trees that are listed in the AUP:OP are present at 5-15 Nelson Street (2660, American Sweetgum, Rimu, Kahikatea) and 42 Nelson Street (2754, Tulip tree). None of these trees are impacted by the proposed designation.

Land (excluding existing roads) adjacent to the existing road corridors and within the extent of NoR 6 is zoned Business – General Business Zone, Business – Light Industry Zone, Residential – Mixed Housing Suburban Zone, Residential – Single House Zone, Open Space – Informal Recreation Zone, Open Space – Sport and Active Recreation Zone, FUZ, Special Purpose – Cemetery Zone. These zones and tree cover on them are unlikely to go through significant change, except where *ad hoc* housing developments and private tree removal occurs.

There are no trees in NoR 6 that are protected under relevant District Plan provisions of the AUP:OP.

4.2.7 NoR 7 – Pukekohe North-West Arterial

The Pukekohe North-West Arterial crosses portions of land that are currently used for arable, residential, and commercial purposes. Groups of trees include amenity plantings around residential properties and shelter systems. Standalone trees and groups of trees are sporadically located on farmland.

Field work has identified three standalone specimens, one shelter belt and 14 groups of trees that are potentially affected by the designation of the road construction corridor. The tree groups represent approximately 19,000 m² of tree canopy cover.

Land (excluding existing roads) within the extent of NoR 7 is zoned FUZ. The future environment for trees within the FUZ is likely to be very different as the anticipated land use pattern change (urbanisation) is likely to result in removal of trees as the land is developed.

There are no trees in NoR 7 that are protected under relevant District Plan provisions of the AUP:OP.

4.2.8 NoR 8 – Mill Road – Pukekohe East Road Upgrade

The Mill Road and Pukekohe East Road Upgrade includes the frontages of properties on both sides of the existing road corridor. These properties include large-format residential, lifestyle blocks, commercial or industrial sites, arable land, and farmland. Arable and farmland contains few and sporadic trees and tree groups, comprised of shelter systems and stream edge trees. Smaller holdings contain many and varied standalone and groups of trees planted for amenity, screening, and shelter. Notable trees that are listed in the AUP:OP are present at 60 Morgan Road (2785, English oak, Norfolk Island pine) and 200 Pukekohe East Road (2704, pin oak). These are not impacted by the proposed designation. An Outstanding Natural Feature (ONF) (ID169 – Pukekohe East tuff ring) lies to the north of Pukekohe East Road between Runciman Road and NoR 4. A number of trees are located within the ONF overlay and are therefore protected by the AUP:OP if vegetation alteration or removal cannot meet the permitted activity requirements.

Land (excluding existing roads) adjacent to the existing road corridors and within the extent of NoR 8 in the Auckland Region is mostly zoned Rural – Mixed Rural Zone and Rural – Rural Production. Small areas of Open Space – Conservation Zone and Open Space – Community Zone are also present. The portion of land to the south within the Waikato District is zoned Rural. These zones and tree cover on them are unlikely to go through significant change, except where *ad hoc* developments and tree removal occurs from time to time.

Field work has identified five standalone trees, eleven shelter/hedge systems and 52 groups of trees. The tree groups represent approximately 28,000 m² of tree canopy cover within NoR8.

Trees within and adjacent to NoR 8 are protected under the AUP:OP District Plan provisions where they are within the Pukekohe East Tuff Crater Outstanding Natural Feature (ONF) overlay or are listed as notable trees in Schedule 10. This includes:

- Tree group 8/9 - pine, redwood and totara growing in the front of 131 Pukekohe East Road, within the Outstanding Natural Feature (ONF) overlay
- Tree group 8/10 - *Banksia*, *Grevillea*, *Liquidambar* and *Liriodendron* growing in the front of 131 Pukekohe East Road, within the ONF overlay
- Tree group 8/13 - redwoods growing along the frontage of 133 Pukekohe East Road, within the ONF overlay
- Tree group 8/15 - Lawson cypress and English oak at 197A Pukekohe East Road, within the ONF overlay
- Tree group 8/52 - brush cherry and feijoa at 220 Pukekohe East Road, within the ONF overlay.
- Tree group 8/53 - London planes (x4) flanking the driveway at 218A Pukekohe East Road, within the ONF overlay
- Tree group 8/54 - puka, tarata and kohuhu at 216 Pukekohe East Road, within the ONF overlay

- Tree group 8/55 - Japanese cedar shelterbelt at 216 Pukekohe East Road, within the ONF overlay.
- Tree group 8/56 - *Photinia* at 200 Pukekohe East Road, with the ONF overlay
- Tree group 8/57 - Italian cypress, palms at 200 Pukekohe East Road, within the ONF overlay
- Tree group 8/58 - camellia and tarata at 196 Pukekohe East Road, within the ONF overlay
- Tree group 8/59 - *Melia* and kohuhu at 196 Pukekohe East Road, within the ONF overlay
- Tree group 8/60 - titoki, puka, pohutukawa, tarata, kohuhu and puriri at 190 Pukekohe East Road, within the ONF overlay
- Tree 8/22 - scheduled English oak, being listed as a notable tree (ID 2785) at 60 Morgan Road, Pukekohe
- Tree group 8/23 - scheduled Norfolk Island pine trees (x3), being listed as notable trees (ID 2785) at 60 Morgan Road, Pukekohe.
- Tree 8/71 - scheduled puriri, being listed as a notable tree (ID 2705) at 203 Mill Road, Bombay
- Tree 8/72 - scheduled redwood, being listed as a notable tree (ID 2686) at 165C Mill Road, Bombay.

One tree within NoR 8 (WDC) are protected under the Operative Waikato District Plan provisions where they meet the definition of Indigenous Vegetation, meaning ‘*vegetation that occurs naturally in New Zealand or arrived in New Zealand without human assistance. For the purposes of this plan, domestic or ornamental / landscaping planting or planted shelter belts comprising indigenous species are not included.*’ One tree that meets this definition has been identified within the designation boundary:

- Tree 8/47 - totara at 300 Pukekohe East Road.

5 Assessment of Positive Effects

5.1 Positive Effects – Relating to all NoRs

Construction of the new roads with road-side berms provides an opportunity for street trees to be established within the new environment. The establishment of street trees within the road corridor will provide opportunities for trees to exist over large portions of the road corridor where currently few exist in the existing environment.

Widening within the Pukekohe East Road and Mill Road corridor (NoR 8) provides an opportunity to introduce many new trees into an area where there are currently few trees. An improvement in the overall quality of trees and an increase in canopy cover will be positive impacts over much of NoR 8, due to the poor quality, type and sporadic distribution of trees that currently exist.

6 Assessment of Construction Effects

6.1 Construction Effects – Relating to all NoRs

Removal of trees is required to enable construction of the Pukekohe Transport Network. Loss of trees and tree canopy cover removes all of the benefits and ecosystem services that those trees provide. Tree loss can be remediated if adequate space and resources are provided for planting and establishment of large specimen trees within the road reserve created alongside the transport corridors.

Trees adjacent to the construction corridors could be harmed by movement of construction vehicles and machinery during construction and upgrading of the roading network. Physical damage to the trees or alteration to their growing environment could cause adverse effects on the health and safety of the trees unless they are adequately protected during the work. The magnitude of effects may be minimised if design of the road adequately allows for retention of mature specimen trees that are able to be accommodated adjacent to the road, subject to detailed assessment and tree management procedures at the time of design and construction.

Under the current AUP:OP rules, the majority of trees that are potentially affected by the road network construction and upgrade are not protected by District Plan provisions. The effects of the projects on those trees that are protected by Regional Plan provisions will be assessed during resource consent applications prior to construction.

6.2 Construction effects – Relating to Specific NoRs

6.2.1 NoR 5

Two identified groups of trees that are within Pukekohe East Road are protected trees according to District Plan provisions of the AUP:OP. These are tree groups 5/41 and 5/42, which contain native trees that are growing between the footpath and the private property boundaries on the northern side of Pukekohe East Road, adjacent to properties in the current urban environment.

The mature puriri (*Vitex lucens*) and totara (*Podocarpus totara*) and early-mature pohutukawa (*Metrosideros excelsa*) have root zones that overlap the designation boundary. As the widening of Pukekohe East Road for an active mode upgrade extends the southern side of the road, it can be anticipated that there will be no change to the kerb and footpath on the northern side. The potential for effects on these trees is therefore limited and actual effects are likely to be nil if the construction works are carried out according to standard tree protection protocols. To this end, tree protection would form part of a tree management plan, formulated with arboricultural input prior to construction.

One notable tree is present on the AUP:OP planning maps within the extent of this designation. This is listed in Schedule 10 – Notable Trees Schedule of the AUP:OP as: ID 2732 – Monterey pine, at 3 Pukekohe East Road. This tree no longer exists on the property.

6.2.2 NoR 8

The upgrade of Pukekohe East Road and Mill Road will result in loss of trees and potential effects on remaining trees within the ONF overlay. The magnitude of effects may be minimised if design and construction of the road allows for retention of mature specimen trees that are able to be

accommodated adjacent to the new upgraded road, subject to detailed assessment and tree management procedures at the time of design and construction. The proposed upgrade of Pukekohe East Road is for active mode facilities on the southern side of the existing road. Therefore, it is assumed that trees on the northern side of the road can be retained and protected through protocols set out in a tree management plan.

Tree group 8/9, containing – pine (*Pinus radiata*), redwood (*Sequoia sempervirens*) and totara in the front of 131 Pukekohe East Road are within the proposed designation. The pine tree is a highly visible specimen, while the redwood and totara blend into the hedgerow and are not stand-out trees. The proposed upgrade of Pukekohe East Road is for an active mode upgrade on the southern side of the road. The potential for effects on these trees is therefore limited and actual effects are likely to be nil if the construction works are carried out according to standard tree protection protocols. To this end, tree protection would form part of the construction management plan, formulated with arboricultural input prior to construction.

Tree group 8/10 contains – coast banksia (*Banksia integrifolia*), silky oak (*Grevillea robusta*), American sweet gum (*Liquidambar styraciflua*) and tulip tree (*Liriodendron tulipifera*) that are exotic specimen trees planted along the front of 131 Pukekohe East Road. The proposed upgrade of Pukekohe East Road is for an active mode upgrade on the southern side of the road. The potential for effects on these trees is therefore limited and actual effects are likely to be nil if the construction works are carried out according to standard tree protection protocols. To this end, tree protection would form part of the construction management plan, formulated with arboricultural input prior to construction.

Tree group 8/13 is a linear row of coast redwood growing along the frontage of 131 Pukekohe East Road. Planted along the fence line, these trees are adjacent to the designation boundary, within the ONF overlay. As the widening of Pukekohe East Road extends to the southern side of the road, it is anticipated that there will be little or nil change to the root zone of these trees, the potential for effects on these trees is therefore limited and actual effects are likely to be nil if the construction works are carried out according to standard tree protection protocols.

Tree group 8/15 contains Lawson cypress (*Chamaecyparis lawsoniana*) and English oak (*Quercus robur*) at 197A Pukekohe East Road within the ONF overlay. The Lawson cypress are poor quality trees with many showing signs of declining health and some being dead. No significant effects will come from removal of these trees.

The oak trees appear to be in good condition and have wide-spreading crowns that extend over the designation boundary. As the widening of Pukekohe East Road extends the southern side of the road, it is anticipated that there will be little change to the root zone of these oak trees. Accordingly, the potential for effects on these trees is limited and actual effects are likely to be nil if the construction works are carried out according to standard tree protection protocols. Pruning of branches that extend over the designation boundary is likely to be required, with potential for some impact on the health and appearance of the trees.

Tree group 8/52 is a linear planting of brush cherry (*Syzygium australe*) interspersed with feijoa along the front boundary of 220 Pukekohe East Road. Removal of these trees is required for the widening of the road.

Tree group 8/53 is the beginning of an avenue of London planes that flank the driveway at 218A Pukekohe East Road, within the ONF overlay. The two northernmost trees are likely to be affected by

road widening works, as they are positioned very close to the designation boundary. Removal of two of the many London plane trees will not significantly reduce the amenity values that the trees provide in this setting.

Tree group 8/54 contains puka (*Meryta sinclairii*), tarata and kohuhu at 216 Pukekohe East Road, within the ONF overlay. These trees are expected to be removed for road widening on the southern side of the road. The screening that these trees provide to the property is the most important function of these trees. The loss of these trees and the benefit they provide can be mitigated by replanting within the road reserve and within the property upon completion of construction.

Tree group 8/55 is a shelterbelt of Japanese cedar (*Cryptomeria japonica*), the northern end of which will be removed for widening of the road.

Tree group 8/56 is a row of *Photinia* along the front fenceline at 200 Pukekohe East Road within the ONF overlay. These trees, along with tree group 8/57, containing Italian cypress (*Cupressus sempervirens*) and various palms, will be removed to allow widening within the proposed designation. The amenity and screening that these trees provide to the property are the most important functions of these trees. The loss of these trees and the benefits they provide can be mitigated by replanting within the road reserve and within the property upon completion of the road construction.

Tree groups 8/58 and 8/59 contain camellia, tarata, kohuhu and one melia (*Melia azadarach*) specimen at 196 Pukekohe East Road within the ONF overlay. The removal of the smaller trees does not raise any significant concerns from an arboricultural perspective, provided that replanting occurs upon completion of construction. The melia tree is within the proposed designation and likely to be removed or affected by works within its root zone. The implementation of a tree management plan at the time of construction will determine the impacts of the works on this tree. If the tree is compromised by the proposed works, removal and replacement planting will occur. If the tree can be safely accommodated and preserved, then the standard tree protection protocols will apply.

Tree group 8/60 contains – titoki (*Alectryon excelsus*), puka, pohutukawa, tarata, kohuhu and puriri at 190 Pukekohe East Road, within the ONF overlay. Trees within the designation are likely to require removal for the earthworks required for construction. The loss of these trees and the benefits they provide can be mitigated by replanting within the road reserve upon completion of the road building.

Tree group 8/23 contains three Norfolk Island pine trees at 60 Morgan Road. Tree 8/22 is a standalone scheduled English oak at 60 Morgan Road. These trees are listed in Schedule 10 – Notable Tree Schedule as: 2785, English oak, Norfolk Island pine. The schedule lists just two notable trees, so it is unclear which of the three Norfolk Island pine trees is the scheduled item as all have similar characteristics and proportions. The scheduled notable trees are located outside of the proposed designation but have root zones that extend over the existing road boundary and designation boundary. Adverse effects on these trees could occur if the road design and construction processes are not conducted with arboricultural input. Because the widening of Pukekohe East Road extends the southern side of the road, it can be anticipated that there will be little change to the root zone of these trees, so the potential for effects on these trees is therefore limited and actual effects are likely to be nil if the construction works are carried out according to tree protection protocols that are produced when the road design is developed.

Tree 8/71 is a mature puriri that is a scheduled tree at 203 Mill Road, which is listed in Schedule 10 – Notable Tree Schedule as: 2705, puriri. This trunk of this tree appears to be within the designation, where road widening of Mill Road will substantially impact the root zone. The impact of earthworks

that are required to construct new road lanes and active mode transport routes is likely to result in a significant portion of the tree's roots being damaged and lost, unless alternative means of constructing the road and path are available. Removal of the scheduled puriri should be anticipated as a consequence of the proposed designation. However, the actual impact on this tree is subject to confirmation during detailed design, which should attempt to retain and protect this tree.

Tree 8/72 is a coast redwood that is a scheduled tree at 165C Mill Road, which is listed in Schedule 10 – Notable Tree Schedule as: 686, Redwood. This tree is part of a large group of trees that surround a proposed stormwater wetland. The redwood is part of a group of trees that are separated from the proposed stormwater wetland by an access road. The redwood could be retained and protected, provided that sufficient space is provided around the tree to accommodate a viable root zone. Detailed design for any work in and around the proposed stormwater wetland must take this tree into account.

Tree 8/47 is a solitary totara that is deemed to be a protected tree according to the Waikato District Plan, as it is indigenous vegetation. It is likely that this tree requires removal as part of the widening on the southern side of Pukekohe East Road.

6.2.3 All other NoRs

As there are no trees identified that are protected according to District Plan rules within or adjacent to the designations for these NoRs, there are no effects applicable to this assessment. Trees that are protected by Regional Plan rules will be assessed during a future consenting process.

6.3 Recommended Measures to Avoid, Remedy or Mitigate Construction Effects

For Pukekohe South East Arterial NoR 5 and Mill Road – Pukekohe East Road Upgrade NoR 8 that may affect trees protected by the district plan provision, the following measures to avoid, remedy or mitigate arboricultural effects during construction include:

A Tree Management Plan should be developed prior to construction to identify existing trees protected under the District Plan, confirm the construction methods, and impacts on each tree and detail methods for all work within the rootzone of trees that are to be retained. The Tree Management Plan should include:

- Confirmation that protected trees identified in Appendix A still exist;
- Advice on how the design and location of works can avoid, remedy, or mitigate effects on the existing trees;
- Recommended planting to replace trees that require removal;
- Establishing tree protection zones and specifying tree protection measures such as protective fencing, ground protection and physical protection of roots, trunks, and branches;
- Any biosecurity controls applicable to the removal and movement of trees and soil; and
- Detailing methods for all work within the rootzone of trees that are to be retained in line with appropriate arboricultural standards.

Replacement planting will be decided through planting details for the Project under the Urban and Landscape Design Management Plan (ULDMP) (or Landscape Management Plan for the Waikato NoR) proposed as a condition on the proposed designations. The ULDMP or Landscape

Management Plan should also include detail of methodologies to establish new trees within the road reserve, including creation of quality below ground environments, correct planting, and appropriate maintenance.

For the NoRs, the Tree Management Plan will be limited to the identification of trees protected under the District Plan, as trees protected under Regional Plan provisions will be addressed as part of a future resource consent process.

7 Assessment of Operational Effects

7.1 Operational effects – relating to all NoRs

Once the road network has been constructed, no further effects on trees is 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.

7.2 Recommended Measures to Avoid, Remedy or Mitigate Operational Effects

No mitigation is required.

8 Conclusion

Two groups of trees are within the road reserve adjacent to the designation boundary for NoR 5. Construction of the active mode upgrade on the southern side of the road will not affect these trees, subject to implementation of standard tree protection measures specified as part of a Tree Management Plan at the time of construction.

Fourteen groups of trees growing within or adjacent to the designation boundary for NoR 8 are within the Outstanding Natural Feature overlay – Pukekohe East Tuff Crater. Those trees on the northern side (tree groups 8/9, 8/10, 8/13 and 8/15) are unaffected, subject to implementation of standard tree protection measures specified as part of a Tree Management Plan at the time of construction. Removal of trees and tree groups on the southern side of Pukekohe East Road will have adverse effects due to the loss of the benefits of trees and canopy cover. These effects must be mitigated by replanting that is specified in the tree management plan and carried out as part of the UDLMP.

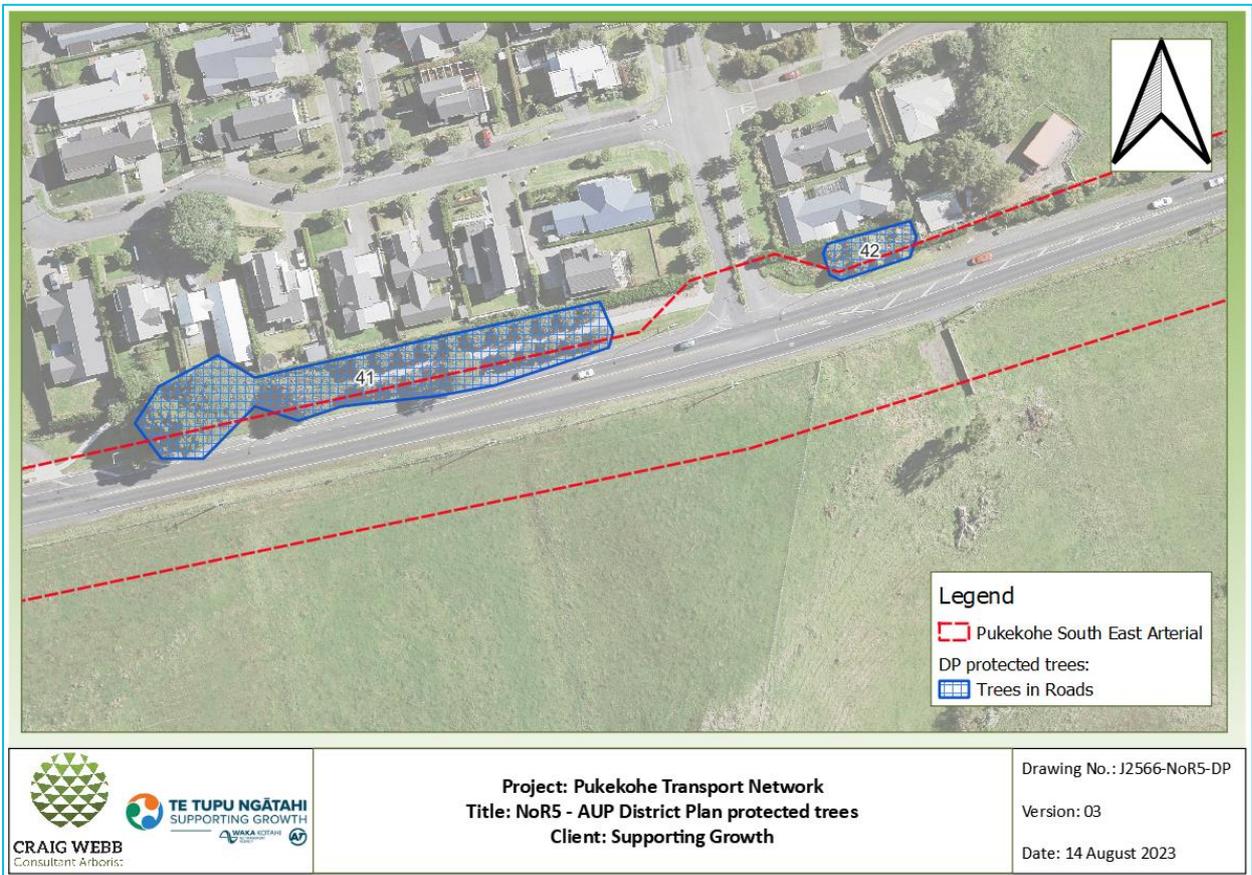
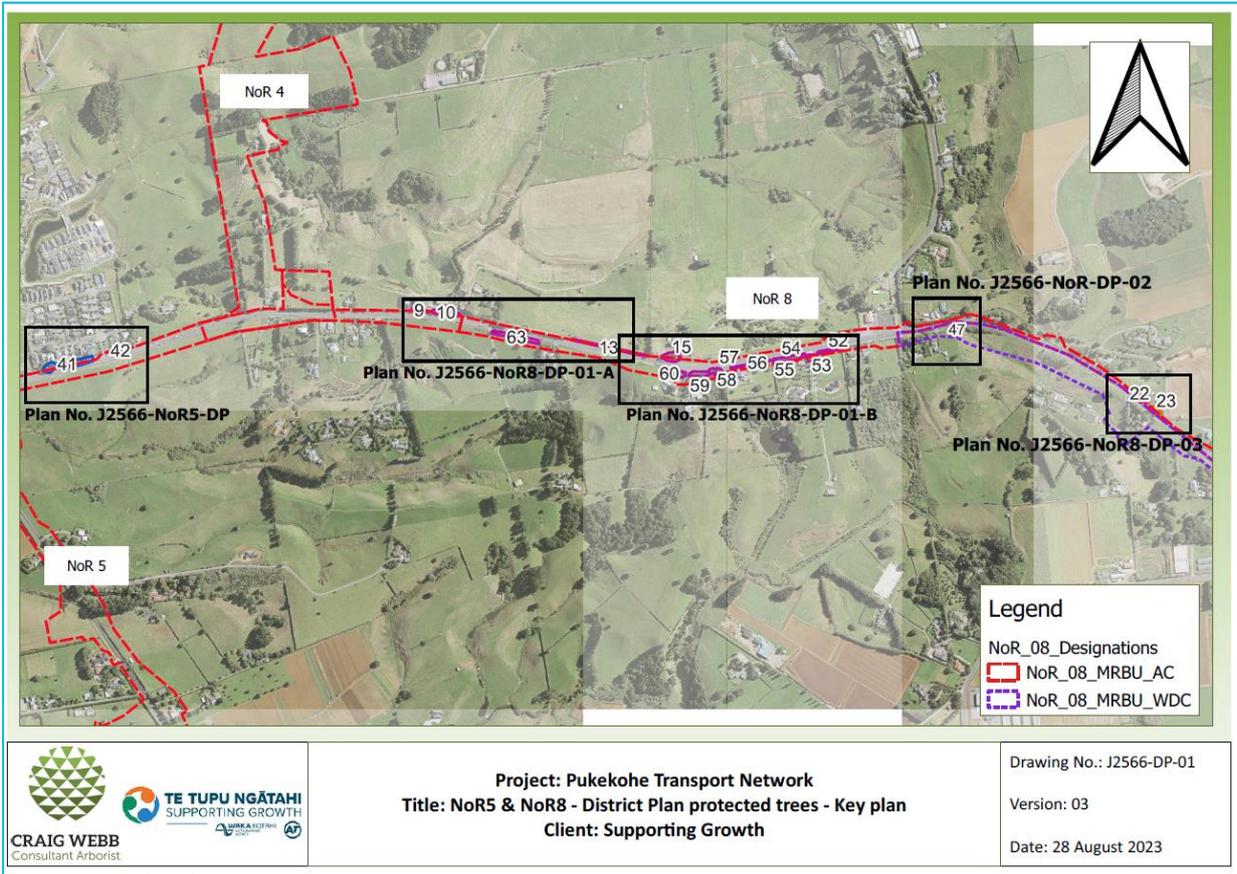
A group of Norfolk Island pine trees and a standalone English oak at 60 Morgan Road are scheduled trees with root zones that extend into the designation boundary for NoR 8. Construction of the active mode upgrade on the southern side of the road will not affect these trees, subject to implementation of standard tree protection measures specified as part of a Tree Management Plan at the time of construction.

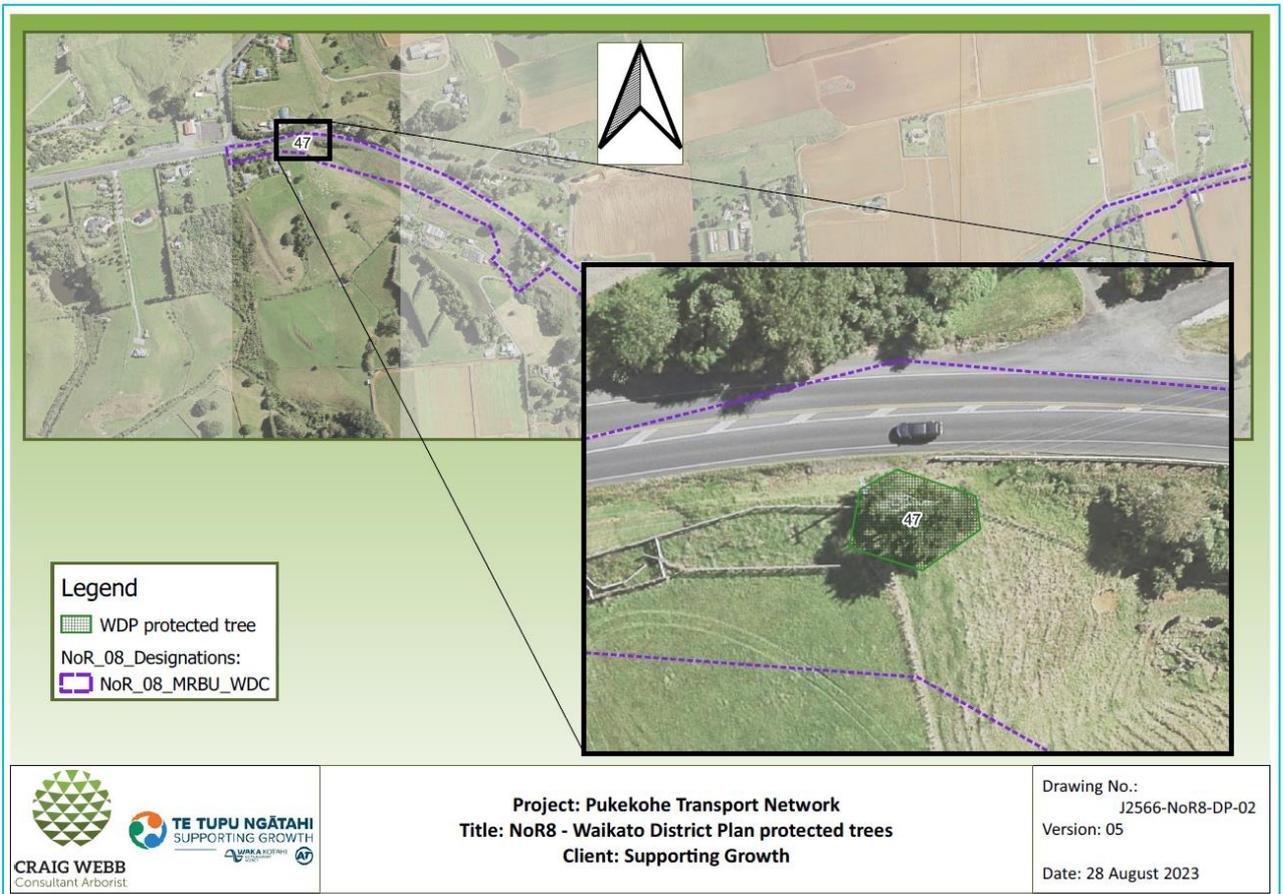
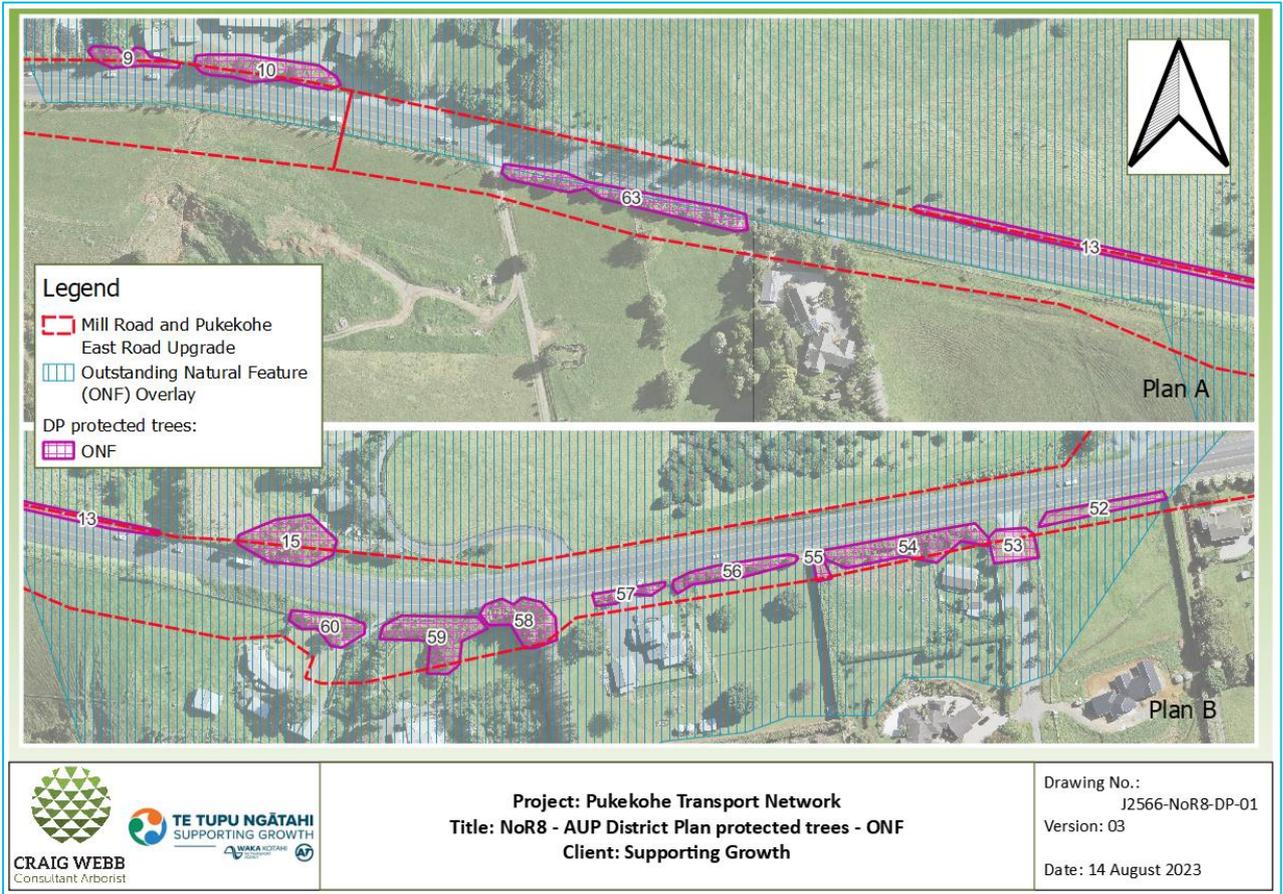


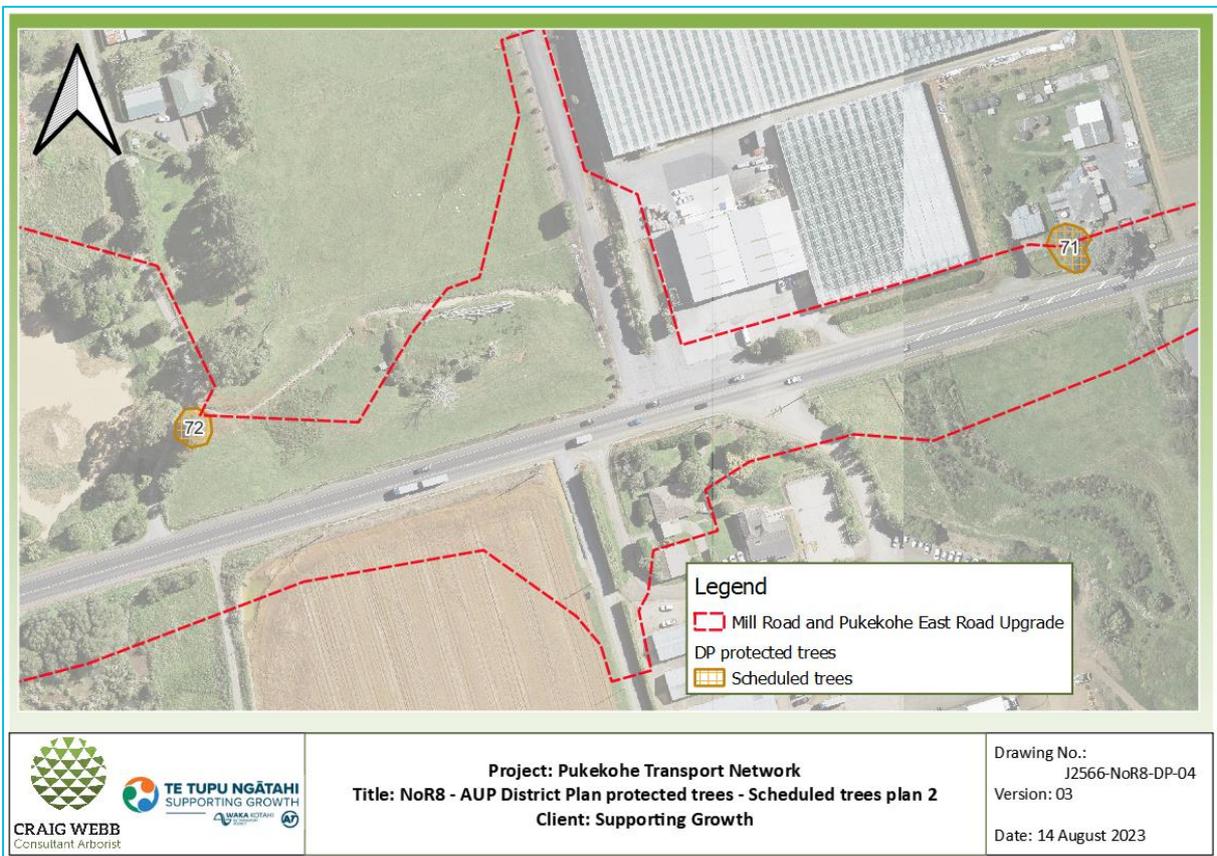
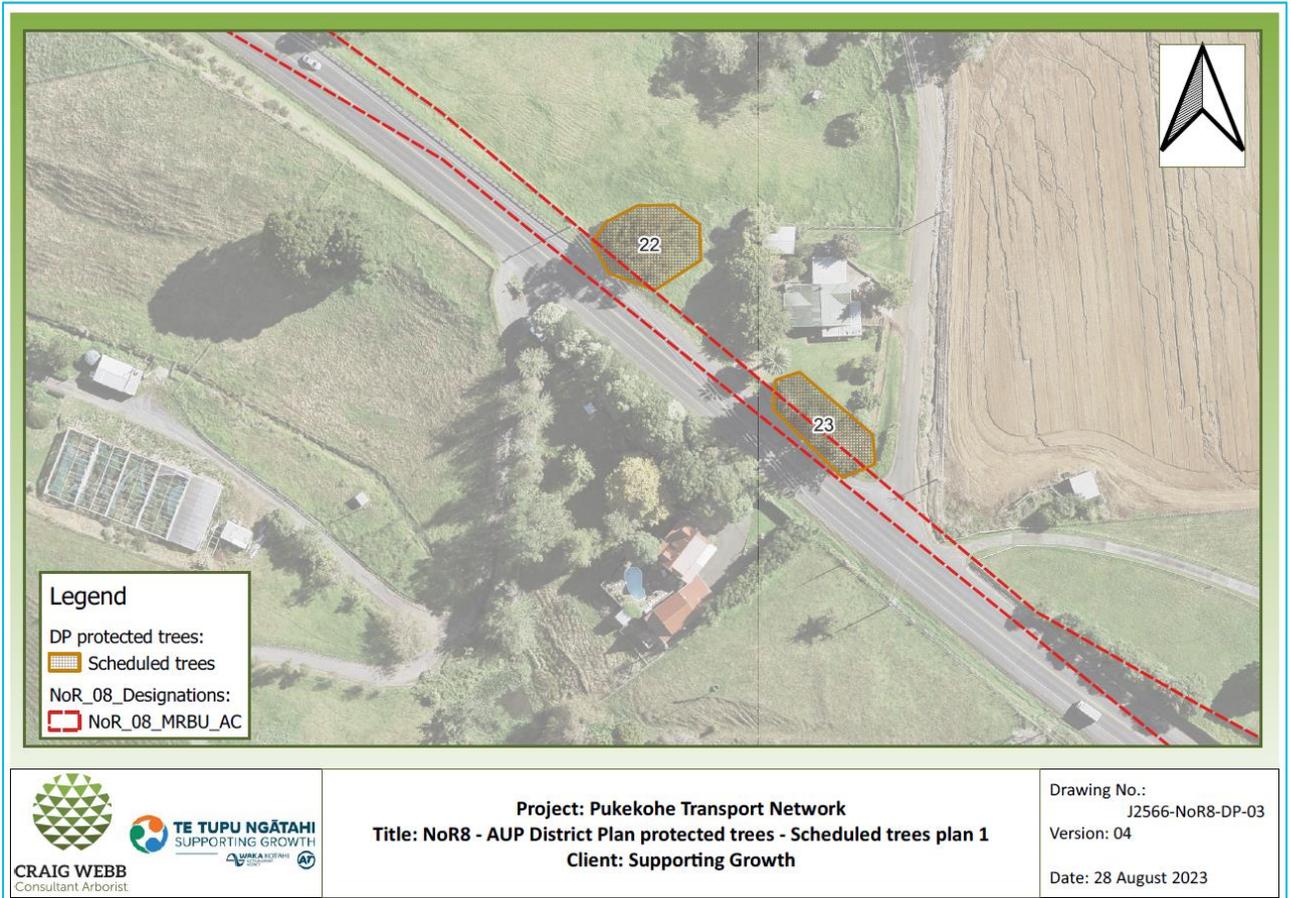
TE TUPU NGĀTAHI
SUPPORTING GROWTH

Appendix A

Tree Location Plans







Appendix B

Tree Detail Tables

Tree No.		Species		Age class	Values	Life expectancy	Applicable rules	Comments
		Common name	Botanical name					
5 /	41	pohutukawa, puriri	<i>Metrosideros excelsa</i> , <i>Vitex lucens</i>	Mature	Amenity, Native species, Wildlife habitat, Screening	Long (>20 years)	Trees in Roads	24 trees in group between road and residential properties
5 /	42	pohutukawa, totara	<i>Metrosideros excelsa</i> , <i>Podocarpus totara</i>	Early mature	Amenity, Native species, Screening	Long (>20 years)	Trees in Roads	8 trees in group between road and residential properties
8 /	9	privet, pine, totara, coast redwood	<i>Ligustrum lucidum</i> , <i>Pinus radiata</i> , <i>Podocarpus totara</i> , <i>Sequoia sempervirens</i>	Mature	Amenity, Screening	Long (>20 years)	ONF	Small group outside 131 Pukekohe East Road
8 /	10	coast banksia, silky oak, privet, American sweet gum, tulip tree	<i>Banksia integrifolia</i> , <i>Grevillea robusta</i> , <i>Ligustrum lucidum</i> , <i>Liquidambar styraciflua</i> , <i>Liriodendron tulipifera</i>	Mature	Amenity, Screening	Long (>20 years)	ONF	Group of about 15 trees outside 131 Pukekohe East Road
8 /	13	coast redwood	<i>Sequoia sempervirens</i>	Juvenile	Amenity	Long (>20 years)	ONF	Linear planting along fenceline
8 /	15	Lawson cypress, English oak	<i>Chamaecyparis lawsoniana</i> , <i>Quercus robur</i>	Mature	Amenity, Screening	Long (>20 years)	ONF	Oak trees overhang the designation boundary
8 /	22	English oak	<i>Quercus robur</i>	Mature	Amenity, Heritage	Long (>20 years)	Scheduled tree	Large specimen tree that overhangs the designation boundary

Tree No.		Species		Age class	Values	Life expectancy	Applicable rules	Comments
		Common name	Botanical name					
8 /	23	Norfolk Island pine	<i>Araucaria heterophylla</i>	Mature	Amenity, Heritage	Long (>20 years)	Scheduled tree group	Three large specimens with root zones extending into designation boundary
8/	47	totara	<i>Podocarpus totara</i>	Mature	Indigenous	Long (>20 years)	WDC	Solitary native tree inside designation
8 /	52	brush cherry, feijoa	<i>Syzygium australe</i> , <i>Feijoa sellowiana</i>	Mature	Amenity, Shelter	Long (>20 years)	ONF	Linear planting along fenceline at 220 Pukekohe East Road
8 /	53	London plane	<i>Platanus X acerifolia</i>	Mature	Amenity	Long (>20 years)	ONF	Avenue planting on driveway to 218A Pukekohe East Road
8 /	54	puka, tarata, kohuhu	<i>Meryta sinclairii</i> , <i>Pittosporum eugenioides</i> , <i>Pittosporum tenuifolium</i>	Mature	Amenity, Screening	Long (>20 years)	ONF	Dense screen along frontage of 216 Pukekohe East Road
8 /	55	Japanese cedar	<i>Cryptomeria japonica</i>	Mature	Shelter	Medium (10-20 years)	ONF	Topped shelterbelt
8 /	56	photinia	<i>Photinia glabra</i>	Mature	Amenity, Screening	Medium (10-20 years)	ONF	Linear planting along front fenceline at 200 Pukekohe East Road
8 /	57	Italian cypress, cabbage	<i>Cupressus sempervirens</i> , <i>Livistona australis</i> , <i>Butia capitata</i>	Mature	Amenity	Long (>20 years)	ONF	Various ornamentals in garden at 200

Tree No.	Species		Age class	Values	Life expectancy	Applicable rules	Comments	
	Common name	Botanical name						
		tree palm, jelly palm					Pukekohe East Road	
8 /	58	camellia, tarata	<i>Camellia japonica</i> , <i>Pittosporum eugenioides</i>	Mature	Amenity	Long (>20 years)	ONF	Gateway to 196 Pukekohe East Road
8 /	59	melia, kohuhu	<i>Melia azedarach</i> , <i>Pittosporum tenuifolium</i>	Mature	Amenity, screening	Long (>20 years)	ONF	Front fenceline and garden of 196 Pukekohe East Road
8 /	60	titoki, puka, pohutukawa, tarata, kohuhu, puriri	<i>Alectryon excelsus</i> , <i>Meryta sinclairii</i> , <i>Metrosideros excelsa</i> , <i>Pittosporum eugenioides</i> , <i>Pittosporum tenuifolium</i> , <i>Vitex lucens</i>	Mature	Amenity	Long (>20 years)	ONF	Front boundary of 190 Pukekohe East Road
8 /	71	puriri	<i>Vitex lucens</i>	Mature	Heritage, Amenity	Long (>20 years)	Scheduled tree	Front yard of 203 Mill Road, Bombay
8 /	72	Coast redwood	<i>Sequoia sempervirens</i>	Mature	Heritage	Long (>20 years)	Scheduled tree	Part of large group around proposed stormwater wetland at 165C Mill Road, Bombay