SH11 Paihia to Waitangi Shared Use Path

Preliminary Design Report

Waka Kotahi NZ Transport Agency

Reference: 511738-0000-REP-JJ-0001

Revision: 1

NZ TRANSPORT AGENCY
WAKA KOTAHI

Document control record

Document prepared by:

Aurecon New Zealand Limited
Level 3, Air New Zealand Building
185 Fanshawe Street,
Wynyard Quarter 1010
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
E auckland@aurecongroup.com
W aurecongroup.com

Document control						
Report title		Preliminary Design Report				
Document ID		511738-0000-REP-JJ-0001	**Project number**		**511738**	
File path						
Client		Waka Kotahi				
Client contact		Tim Elliott	**Client reference**			
Rev	**Date**	**Revision details/status**	**Author**	**Reviewer**	**Verifier** (if required)	**Approver**
0	02/07/2021	First Draft	Various.	P. Nalin	M. Francis	C. Kenworthy
1	24/01/2022	Preliminary Design Final	P. Nalin et al.	Various	Various	C. Kenworthy
Current revision		**1**				

Approval			
Author signature	Nalin	Approver signature	CKenworthy
Name	P. Nalin	Name	C. Kenworthy
Title	Senior Engineer, Roads	Title	Project Manager

Contents

Appendices

Figures

Tables

1 Project Description

1.1 Introduction and Background

Waka Kotahi NZ Transport Agency (Waka Kotahi) and its investment partner the Provincial Development Unit (PDU) are seeking to investigate a range of options to confirm preferred design features as part of a wider programme of work that will achieve key investment objectives along State Highway 11 (SH11). This work will form part of the wider Twin Coast Discovery Route (TCDR) Programme, which aims to upgrade sections of the 800km TCDR to support local communities, to accommodate the increasing number of people visiting the area, and to encourage others to do the same.

The TCDR Programme Business Case (PBC) identified a programme of investment in the area that included improvements to SH11. This Single-stage Business Case (SSBC) identifies the recommended improvements on sections of SH11 required to deliver the outcomes identified in the PBC, as well as outcomes tailored specifically to the study area.

1.2 Project Scope

A Shared Use Path (SUP) is proposed from Paihia Town Centre to Waitangi along the coastal edge. The installation of a SUP between Paihia and Waitangi will create a direct link between the two towns for active transport modes and provide an attractive cycle route and pedestrian walkway along the coast. Currently, the existing Pou Herenga Tai Twin Coast Cycle Trail (TCCT) links Kawakawa to Opua. This is proposed, under the Cycleways SSBC, to be extended from Opua to Paihia. Once this connection is completed, the SUP will form part of the TCCT and will support local trips and cycle journeys in the region.

Refer to the extent of work shown in Figure 1, along SH11 Marsden Road, connecting from the north of Nihonui Point to south of the roundabout with Te Karuwha Parade.

Figure 1: Project Extent of Paihia to Waitangi SUP

1.3 Purpose of Report

The purpose of the Preliminary Design Report is to provide the outline the proposed works to accommodate a SUP along SH11 within the project extents which have been developed based on the adopted design standards and principles in line with Waka Kotahi and other key stakeholders consultation. The design standards, parameters and assumptions that have been used to develop the preliminary design are contained in the technical note - 511738-0000-TEQ-CC-0001 Preliminary Design Philosophy Statement – Design Criteria attached in Appendix A.

1.4 Existing Site Description

1.4.1 Existing Site Description

SH11 (Marsden Road) is a key route for the Tai Tokerau's tourist economy. It provides access to Bay of Islands and acts as a gateway to Waitangi.

The existing cross section within the project extents consists of:

- A 1.5 – 2.0 m footpath on the northern side along the waterfront. There is an existing 3.0 – 3.5 m wide footpath / SUP along the park, guarded by safety fence which narrows down to a 1.5 m footpath on either side.
- Combination of angle and parallel parking exists on along the northern footpath.
- A 1.2 – 1.5 m wide footpath exists along the properties on the southern side of SH11.
- There is an existing zebra crossing outside the Waitomo Petrol Station.
- Existing traffic lanes ranging between 3.2 – 4.0 m wide.

1.4.2 Topography and Survey

A topographic survey was undertaken in June 2021 by WSP. The general layout of the site slopes in the westbound direction towards the roundabout.

2 Road Layout and Geometry

2.1 Design Philosophy

Refer to the technical note, 511738-0000-TEQ-00-0001 Preliminary Design Philosophy Statement – Design Criteria attached in Appendix A for the design philosophy adopted to provide a solution described in the sections below.

The proposed works are intended to create a safe, compliant and efficient environment to improve the overall function of project extents. The design will not exacerbate any existing design deficiencies and will attempt to improve or remove existing deficiencies, where practicable. It is noted that due to the existing geometry and physical constraints, improvements to meet current standards or desirable level of service will not always be possible and any increases in traffic volumes can exacerbate existing issues

As far as practicable, the geometry of existing roads and services has been retained, and it is noted that it is not the intention of this project to change the risk profile of associated infrastructure.

2.2 Design Standards

Refer to Section 4 of the technical note, 511738-0000-TEQ-00-0001 Preliminary Design Philosophy Statement – Design Criteria attached in Appendix A for the design criteria used to develop the proposed solution.

2.3 Design Criteria

Refer to Section 6 of the technical note, 511738-0000-TEQ-00-0001 Preliminary Design Philosophy Statement – Design Criteria attached in Appendix A for the design criteria used to develop the proposed solution.

2.4 Design Development

2.4.1 Existing SUP Geometry

The general design philosophy for the proposed SUP is that the desirable width will be achieved by removal of angled parking where possible. Where there are Pohutukawa Trees, the existing footpath edge will be retained dependent on arboriculture assessment. Where there is no parking available to utilise for SUP width, existing footpath will be widened towards the coastal edge. Due to the change in grade between the existing footpath and the beach, a balance of achievable SUP width without significant earthworks will be required to achieve the agreed programme and project costs. The northern footpath along Marsden Road ranges from 1.5 – 2.0 m wide. A section of the footpath is 3.0 m wide outside the Rotary Playground.

The existing cross fall of the footpath ranges from 0.5 – 2% either draining towards the carriageway or the beach. The intention of the proposed SUP is to follow the existing footpath grades as far as practicable unless General Cross Section

As per the design criteria in Section 6.3.2 of the technical note in Appendix A; following cross section and grades of the SUP is proposed:

Table 1 General Proposed Cross Section

Element	Value	Comments
SUP width	3.0 m	
General Traffic Lane	3.5 m minimum	Provision of parallel parking results in a lane width of 4.5 m from existing width of 5.2 m between CH530 – CH600
General traffic lane crossfall	No changes required	
Separated Path	2.5 (minimum) - 3.0 m	One-way separated path is proposed around the zebra crossing due to the existing Pohutukawa trees. Westbound path entering the zebra crossing is 3.0 m whereas the exit path is 2.5 m. This was the achievable width due to the placement of existing tree. No change to the existing footpath behind the trees is proposed. Refer to Section 2.4.11 for departure on existing footpath.
SUP buffer (for parallel parking)	0.8 m	Buffer zone between parallel parking and SUP
SUP crossfall	2 – 4%	Existing crossfall has been followed. Some sections of footpath such as between CH 220 – CH 280 is relatively flat where there is no kerb. The footpath and parking space drains to a V-dish channel. existing crossfall has been followed resulting in 1.5 – 2.0% crossfall in some sections. Refer to Section 2.4.11 for departure.
SUP longitudinal gradient	Existing longitudinal grades maintained	Existing grades have been followed as much as possible to minimise earthworks and effect drainage

2.4.2 Sight Distance

Based on the equation from Section 5.7.1 from the Austroads Guide to Road Design Part 6A, the required Stopping Sight Distance (SSD) (based on a design speed of 20km/h for the flat sections) on the path is 25m. For the worst-case scenario (3% downhill gradient), the required SSD is 27m. The design complies with these requirements.

2.4.3 Kerbing

Existing kerb and channel where the SUP is widened towards the beach is retained. Where widening into the carriageway to achieve the proposed SUP width is required, new kerb and channel is proposed is in accordance with Far North District Council Engineering Standards DNDC/S/3 Standard Kerb and Channel. Refer to drawings DRG-RR-0101 – 0104 for extents of new kerb and channel.

2.4.4 Trees

There are 21 Pohutukawa Trees within the project extents. To minimise consenting risks, protecting the trees has been adopted as the design philosophy of the proposed SUP. Minimum of 0.5 m from the tree diameter is maintained for any proposed SUP works. Where the trees are already at the boundary of the existing footpath (CH 560 – 600), SUP widening is achieved through widening into the carriageway. The proposed SUP pavement near the tree is shown in the typical cross section D in drawing DRG-RR-0302 and will follow the general construction methodology in consultation with the Arborist assessment:

- The existing concrete is to be removed and a permeable geotextile sheet is placed on existing basecourse.
- New basecourse is then placed on top of the sheet with the concrete footpath. Cutting into the existing roots is avoided.

To maintain minimum vertical clearance of 2.5 m and sight distance, regular maintenance of tree branches is proposed.

Refer to the arborist assessment report in Appendix G.

2.4.5 Parking

There are 89 number of angle parking spaces within the project extents. Provision of SUP required existing angled parking to be converted to parallel parking as shown in drawings DRG-RR-0101 – 0104 resulting in 31 number of parallel parking spaces. Due to the constrained width available between the existing Pohutukawa Trees and traffic lane, a 2.1 m wide parking space has been adopted with 0.8 m buffer between the SUP and general traffic lane for door opening zone. This is in accordance with MOTSAM Section 2.11 Parking, Figure 2.13. There is adequate parking space on side streets which has been identified for alternative parking to mitigate for the loss of parking. Refer to the Parking impacts assessment and capacity of surrounding carparks attached in Appendix C.

Conversion of angled parking to parallel parking results in removal of the existing wooden vehicle stoppers between CH 230 – 290. For safety reasons, Amardillo cycle lane separators (or similar) are proposed along the flushed buffer zone as shown in drawing DRG-RR-0102. This creates a physical separation between the SUP and parking and prevents vehicles from riding over the proposed SUP that is at the same level as the carriageway as existing.

2.4.6 Zebra Crossing

The existing zebra crossing has been upgraded with kerb buildout on either side creating a shared space for pedestrian and cyclists. Path users are allowed to use either direction; however, a separated path environment has been proposed due the location of Pohutukawa Trees where the existing path diverts behind the trees. To avoid removal of trees, one-way separated path has been proposed where the westbound SUP users are encouraged to use the proposed 3.0 m wide SUP in front of the tree and the eastbound SUP users are encouraged to use existing footpath behind the tree through line markings.

Due to constrained width, a separated path environment is proposed through line markings, however; it is expected path users will use the shortest route on desire line. It is the intention to discuss the arrangement during client review and road safety audit for an optimal solution in this situation.

2.4.7 Safety Fence

As per Austroads, Part 6A – Paths for Walking and Cycling Figure 5.10, a partial fence is required if the batter slope is 1/3 or steeper and the vertical drop is 0.25 to 2.0 m for a path less than 5.0 m wide. Hence, due to the existing embankment at the footpath approaching towards Nihonui Point, widening to achieve the minimum agreed SUP width results in a drop and a fill embankment of 1V:2V to tie into the existing embankment without significant earthworks. This requires provision of a safety fence with handrail for pedestrians and cyclists on the SUP. Refer to drawing DRG-RR_0301 for fence type.

2.4.8 Signage

Any new proposed signage for the SUP has been designed in accordance with standards outlined in Section 4 of the technical note attached in Appendix A.

SUP signage has been proposed at the start and end of the SUP.

2.4.9 Pavement Marking

Pavement markings have been designed in accordance with the standards outlined in Section 4 of the technical note attached in Appendix A.

The design of the road markings has been developed in accordance with applicable standards to ensure a safe and intuitive layout consistent with the surrounding road network.

Removal of redundant road marking shall be done to standard with hydro blasting, so no evidence of old marking exists.

Refer to the general arrangement plans DRG-RR-0101 - 0104 for further details on proposed pavement marking in Appendix B.

2.4.10 Roadside Furniture

Any roadside furniture affected by the proposed SUP will be relocated:

- Existing bollards between CH 340 – CH 400
- Existing footpath amenity lights owned by FNDC are removed and replaced with proposed SUP lighting.
- Any affected existing signage is relocated outside SUP in accordance with design standard referred in Section 6 of the technical note, 511738-0000-TEQ-00-0001 in Appendix A.

Refer to drawings DRG-RR-0101-0104 in Appendix B for affected roadside furniture.

2.4.11 Design Departures

Following design departures have been identified at the current stage of design. These departures may not be required post progression of design in the subsequent design stages and client comments:

- Following the existing footpath grades results in crossfall lower than 2% at some locations as per existing. Further geometric design development is required in subsequent design stage to assess improving the grades to fall between 2 – 4% as per standard.
- The existing footpath behind the zebra crossing is 1.5 m wide which is encouraged to use as a separated path for eastbound users. This width is less than the total width of 3.0 m required for one-way separated path (pedestrians and cyclists). Widening of this path has been avoided as it will require embankment regrading and fencing due to the existing slope towards the beach. However, the proposed improvements at the zebra crossing improves the current safety and facilities. In consultation with the client, no widening is required to the existing footpath. The proposed SUP buildout is to be used as a shared space rather than a separated path which is 2.5 m wide at it’s pinch point. This is the minimum required width for a SUP without departure. Hence, no departure is required for the SUP width criteria and existing footpath width.

No other design departures have been identified at the current stage of design.

2.4.12 Safety in Design

A Safety in Design workshop was conducted on 1st November 2021 in order to identify and assess the potential risks throughout the design, construction and operation of the project and to identify major hazards early for effective control.

This was achieved by including all disciplines within the workshop who informed the process when given design and operational considerations. A copy of the Safety in Design register and agreed outcomes is attached in Appendix H.

Key outcomes of the SiD workshop are summarised below:

- To minimise risk of effecting existing Pohutukawa trees through design as per arborist assessment and presence of an arborist on site during construction
- Review outcome of Road Safety Audit (when completed) and consider widening of pinch point through removal of car parking either side of the zebra crossing if deemed necessary by the safety audit team.
- Consider urban landscape design at the proposed kerb buildouts at the zebra crossing to encourage slow speed environment.

3 Street Lighting

3.1 Overview

This section identifies the key design criteria that has been adopted in the development of the Preliminary Design for the shared use path lighting. This includes the following items

1. Key Decisions that have been made or are pending
2. Design standards and criteria that have been used in the design
3. Existing lighting within the area
4. Proposed design solution

3.2 Key Decisions

The following table outlines decisions required to complete the lighting design for the shared use path.

Table 2 Key decisions for the lighting design of the SUP

Item	Description	Decision
Subcategory of Lighting	Determination of the subcategory of lighting as defined in AS/NZS 1158.	Aurecon's proposed subcategory of PP2 was submitted to Waka Kotahi with no exceptions taken.
Light pole type and colour	Confirmation of light pole to be used for dedicated shared use path lighting.	Pending input from Far North District Council (FNDC). Waka Kotahi recommends using local suppliers for ease of maintenance / replacement.
Consideration of existing lighting	Unknown details about the existing light fittings that serve the adjacent State Highway 11 and current footpath. Aurecon proposed to ignore any contribution from these to the Shared Use Path (SUP) lighting	Aurecon's proposed subcategory of PP2 was submitted to Waka Kotahi with no exceptions taken.

Existing light pole clashes with SUP	Existing light poles that serve both SH11 and the current footpath clash with the new SUP route. Aurecon's proposal was to relocate the lighting serving SH11 to behind the SUP and provided a longer outreach arm so that the light fitting is in the same position as currently. Lighting serving the footpath and clashing with the SUP will be removed.	Aurecon's proposed subcategory of PP2 was submitted to Waka Kotahi with no exceptions taken.
Maintenance of light fittings	The depreciation of light output from the new fittings is based on a five-year light fitting cleaning interval.	Pending, to be confirmed by FNDC.
Control of light fittings	The fittings are proposed to be controlled with a photocell on the electrical supply pillar.	Pending, to be confirmed by FNDC.

3.3 Design Criteria

The installation will be designed to comply with the requirements of:

Table 3 Compliance requirements for lighting design

Standard/ Guidelines	Description
AS/NZS 1158	Lighting for roads and public spaces
Part 3 Section 16 of FNDC Operative Plan	District-wide provisions for Signs and Lighting
AS 4282	Control of the obtrusive effects of outdoor lighting

Where there are differences in the standards the design will comply with the more prescriptive/stringent requirements.

The road lighting subcategory as defined by the AS/NZS 1158 series of standards is PP2. This is based on a "High" level of pedestrian/cyclist traffic and a "Medium" fear of crime. The subcategory was proposed by Aurecon to NZTA with no exceptions reported back. The road lighting calculations have been carried out using AGI32. Road lighting calculations have been carried out using AGI32.

3.3.1 Maintenance Factor Criteria

The maintenance factor was worked out based on a 5-year cleaning period which is the longest period available under the AS/NZS 1158 standard. The expected life of the fittings will be between 10-15 years, therefore interim cleaning will be required.

Light Source Lumen Depreciation (LLD): 0.95 based on 25 degrees ambient temperature and 50,000 hours until the lumen output drops below the proposed derating (0.95) and the luminaire requires replacement.

Luminaire Dirt Depreciation Factor (LDD): 0.86 based on Urban environment, 5-year cleaning interval.

3.4 Existing Lighting

Existing lighting around the proposed SUP area consists of road lighting serving State Highway 11's carriageway and amenity lighting for the waterfront footpath.

	
Existing lighting for SH11.	Existing amenity lighting along footpath.

The existing light fittings appear to be a Sylvania Roadster, however the wattage was not ascertainable from site visits, nor was the information available in FNDC or Waka Kotahi records. As a result, the lighting design for the SUP will exclude any contribution from these fittings as they cannot be verified through calculations without further information. By not taking the existing lighting into account, it doesn't limit future options for upgrading the roadway lighting.

A number of the amenity lights along the footpath clash with the new route of the SUP. These will need to be removed with cabling pulled back to the nearest fitting to make way for the SUP.

One of the light poles serving SH11 also clashes with the SUP. This fitting will be relocated to behind the SUP and installed with a longer outreach arm so that the light fitting maintains the same location and orientation as currently.

3.5 Proposed Design

3.5.1 Shared Use Path (SUP)

Shared Use Path lighting design along Marsden Road will be designed to comply with the illuminance based LTP's for lighting Sub-Category PP2 of AS/NZS 1158.3.1:2020. These parameters are shown below for reference.

	Lighting Technical Parameter

Lighting Subcategory	Average horizontal illuminance (E_h) Lx	Point Horizontal illuminance (E_{Ph}) Lx	Illuminance (horizontal) uniformity Cat P (U_{E2})	Point Vertical illuminance (E_{Pv}) Lx
PP2	7	1	5	.3

Extracted from AS/NZS 1158.3.1:2020

3.5.2 Spill Lighting and glare control

Potential glare and spill light from the lighting design has been assessed and mitigated in accordance to AS 4282 and Part 3 Section 16 of FNDC Operative Plan.

3.5.3 Road Lighting Controls

All new luminaires located on the road shall be equipped with an integral TMS compatible dimmable DALI Driver and a pre-wired 7 pin NEMA socket and Shorting Cap. FNDC to confirm luminaire control type.

3.5.4 Maintenance access to poles

The access for the maintenance of the poles for the installation can be done via Marsden road or the SUP.

3.5.5 New luminaries

New luminaires proposed to light the SUP are from ADLT's XSP range of light fittings.
Type L1 - ADLT XSP High Output Series

- Optic Type II Long (2LG)
- 29W; 3770 lumens
- 4000K
- NEMA 7 pin + DALI
- Black Finish

The type L1 light poles are proposed to be mounted on ADLT's proprietary PS Pole with a black finish as their design is more visually compatible with the light fitting. The black finish will also minimise the visual impact at night.

3.5.6 Electrical Supply and Control to Road Lighting

The utility supply in Paihia is operated and maintained by Top Energy. Any new electrical installations or alterations to existing will be coordinated with Top Energy and FNDC in the next design phase. All installations will be as per AS/NZS 3000 and Top Energy requirements.

The light fittings proposed will come with DALI control with a NEMA socket on the top of the fitting. The fittings are proposed to be controlled with a photocell on the electrical supply pillar. however final controls will be determined in conjunction with FNDC.

3.5.7 Safety in Design considerations

New light poles are mounted behind safety fences to eliminate risk of bikes clashing with poles.

4 Stormwater

4.1 Purpose of the Report

This stormwater assessment reviews the stormwater network requirements for the runoff from the proposed shared user path (SUP) and adjacent existing SH11 Marsden Road, which connects the Paihia waterfront development from the north of Nihonui point to the roundabout with Te Karuwha parade.

This preliminary assessment checks the existing stormwater network adequacy and capacity on Marsden Road following introduction of the proposed SUP on northern side, without consideration of stormwater treatment, flood pathways or volume attenuation requirements. Upstream and downstream runoff from outside of the project boundaries has also been excluded from this assessment.

This report identifies the existing stormwater network and hydrological environment within the project boundaries, provides recommendation for the stormwater reticulation layout to address any potential flooding and assess the effects of operation of the project's proposed stormwater network. It does not discuss the stormwater treatment requirements.

4.2 Existing Environment

4.2.1 Catchment Description

The SH11 Marsden Road project is situated 70km north of Whangarei and within the *River Catchments: Bay of Islands Coast* catchment area. **Figure 2** below shows the Northland Regional Council sub-catchments map for this area.

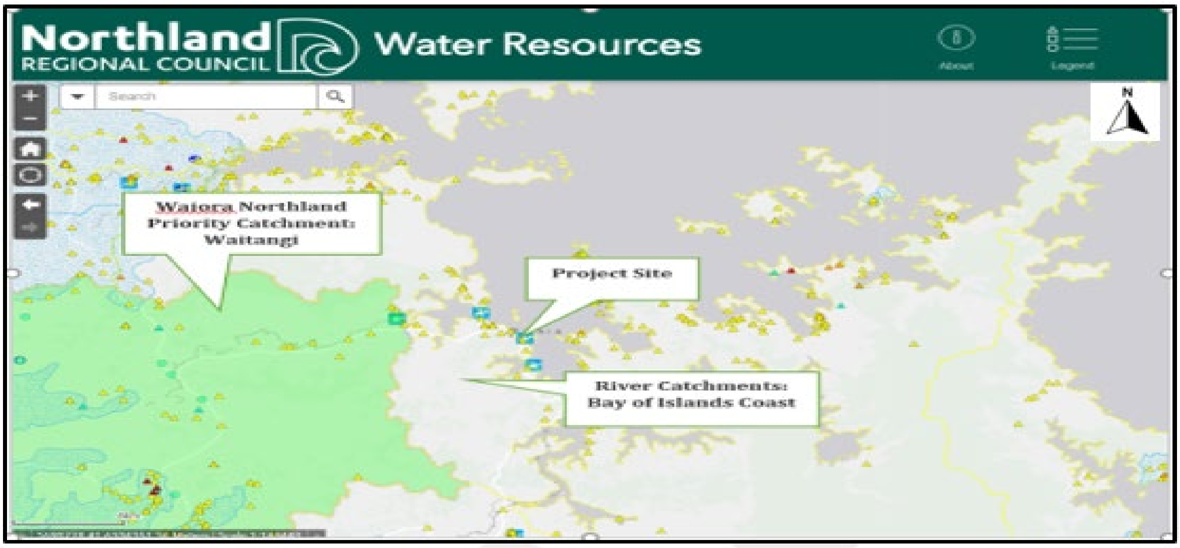


Figure 2: Sub catchment areas *(Source: Northland Councils Water Resources Map)*

4.2.2 Existing Stormwater Management

The existing primary stormwater network along SH11 Marsden Road typically consists of a pit and pipe network as shown in the FNDC GIS database. Pipeline sizes vary from 300mmØ to 900mmØ concrete pipes (source: council GIS). The existing network also includes catchpits, manholes and wingwalls. These pipes appear to collect stormwater runoff from the road and ultimately discharge stormwater into sea on the northern side of project

Figure 3 below provides an example of the existing pit and pipe network along Marsden Road. There is currently no known stormwater treatment devices for stormwater flows captured along Marsden Road.

Figure 3: Existing Pit and Pipe network in green *(Source: FNDC SW GIS Map)*

Existing flooding has been assessed by GHD *(source: FIDC (Flood modelling _GHD 2007))*. It shows no flooding on the project site during a 1% AEP storm event. In Figure 2-3, there is some flooding away from Marsden Road and in the private properties adjacent to the project.

Figure 4: 1% AEP Flood plain *(Source: FNDC (Flood modelling_GHD, 2007))*

4.3 Design Requirements

4.3.1 Relevant Standards and Documents

The stormwater assessment has been undertaken in accordance with the following design standards and guidance documents:

- Far North District Council Engineering Standards and Guidelines (2009) - section 4
- NZTA, P46 State Highway Stormwater Specification (2016)
- Code of Practice for Land Development and Subdivision: Chapter 4 – Stormwater
- New Zealand Standard 4404 (2010), Land Development and Subdivision Infrastructure
- New Zealand Building Code (January 2017), Verification Method for Clause E1 Surface Water

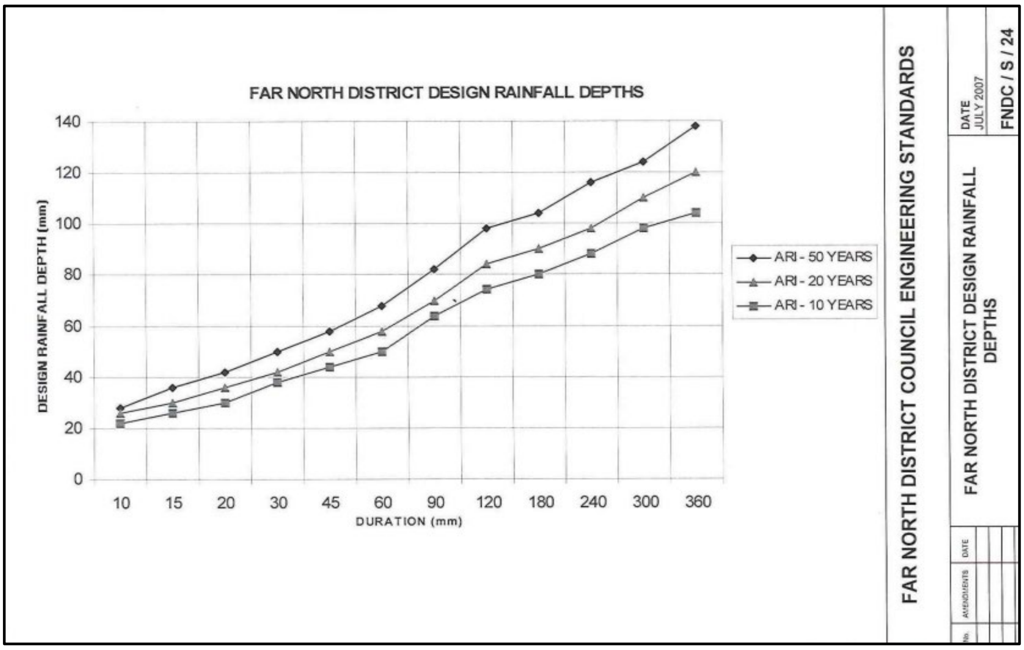
4.3.2 Assessment Philosophy

The assessment for the stormwater reticulation system has been in accordance with the Far North District Council Engineering Standards and Guidelines (section 4). The stormwater assessment has focused on providing a low impact design solution where practicable throughout the project.

4.3.3 Design Parameters

Hydrology (Rational)	10-year Storm
Rainfall Depth* (mm)	22
Rainfall Intensity* (mm/h)	132
Rainfall Intensity* (mm/h) with climate change factor	149.4

*Taken from 10min duration depth (FNDC Engineering Standards and Guidelines p76) given below



Runoff Properties	Coefficient
Rational ‘C’ – Impervious	0.95**
Rational ‘C’ – Pervious	0.35**

** Values taken from Waka Kotahi Stormwater Treatment Standard for State Highway Infrastructure Table 6-2

Runoff flow rates have been determined using the Rational Method with a time of concentration of 10mins.

4.4 Proposed Stormwater Design

This section provides an overview of the sub-catchments and the proposed stormwater network design for the project.

4.4.1 Proposed SUP and Road Layouts

There are two typical road corridor layouts in the project:

1. SUP and Road Carriageway
2. SUP with Parking and Road Carriageway

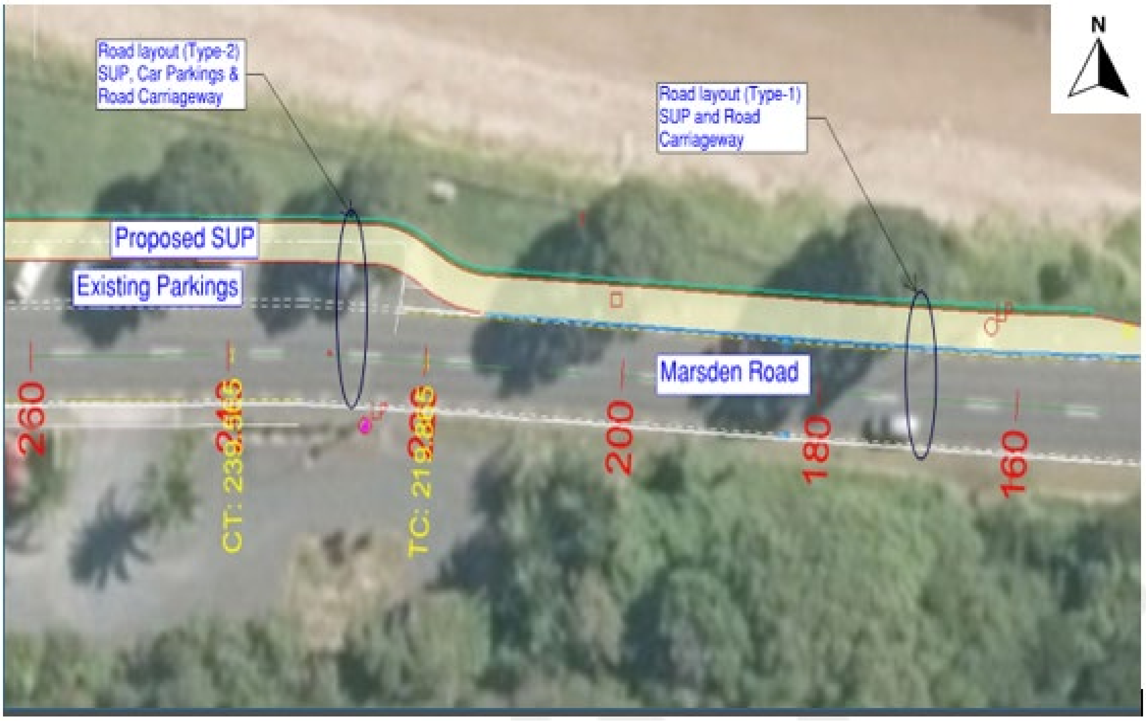


Figure 5: Proposed Road Layout (SUP, PARKING AND ROAD CARRIAGEWAY)

The road has a crown in the middle so it has been assumed that half of the road flows towards the SUP side. Similarly the SUP also has two different crossfall - in some locations the SUP falls away from road carriageway and in a few locations the SUP flows toward the road carriageway (See Catchment area map below).

4.4.2 Stormwater Catchments and Flow Calculations

A preliminary assessment has been carried out to identify and demarcate the catchment areas. This was undertaken using survey, and interpreting existing contours existing stormwater networks and overland flow paths from the *FNDC SW GIS Map.*

The project has been divided into two contributing stormwater catchments along Marsden Road:

a) West Catchment Area (CA= 0.272 ha)
b) East Catchment Area (CA= 0.112 ha)

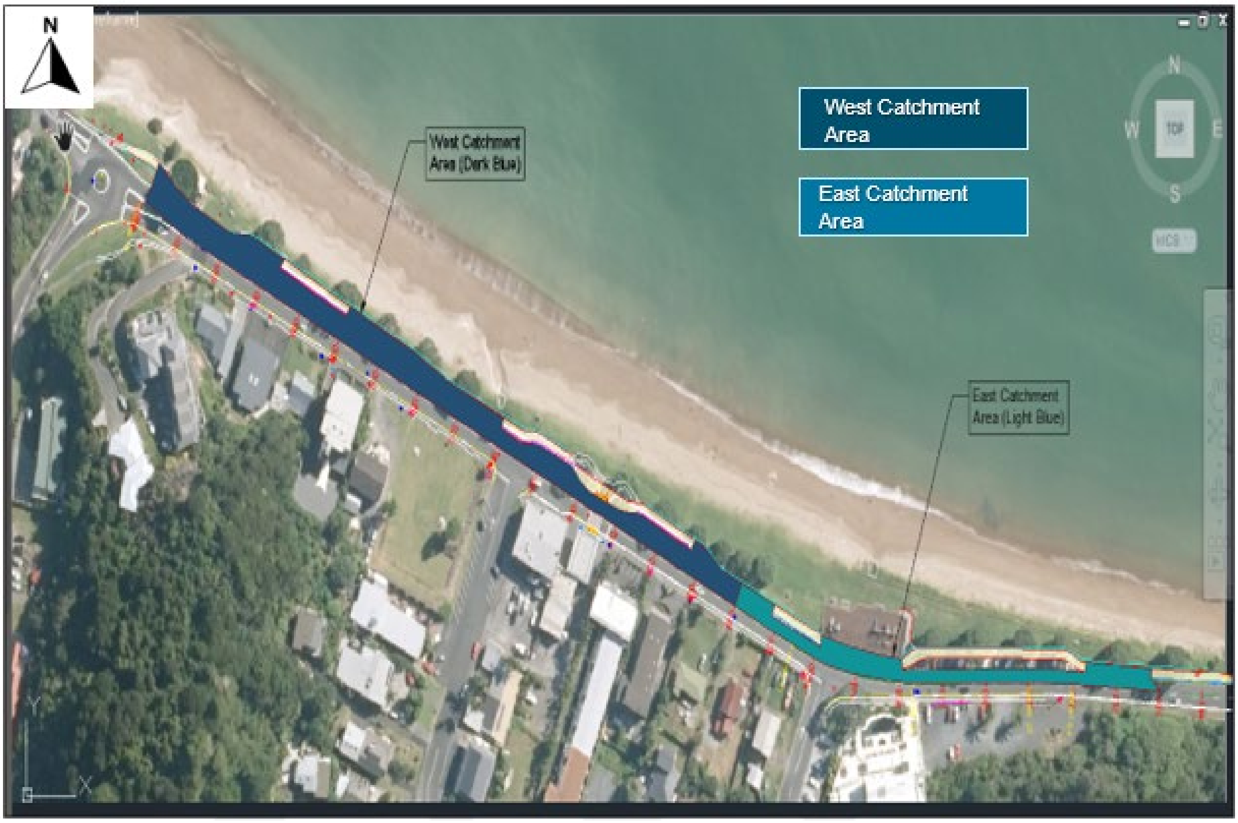


Figure 6: Catchment Area Map

The total area of the proposed stormwater catchments is 0.384ha (including the portion of the SUP that flows towards the road in a few locations). The SUP is assumed to consist of impervious area only i.e. road and SUP with no grass.

The rational method was used to calculate the indicative network drainage flows for the 10yr ARI event. Refer table below for summary of flows:

Catchment area - East	1121.749	m2			
	0.1121749	ha	CA length	195	m
Rational flows @ (2.781 CIA)	**44.283**	**l/s**	**Flows @ P2W Project (East CA)**		
	0.044	**m3/s**			
Numbers of CP Required	**3.0**	**no's**			
Existing CP's in CA	**1.0**	**no's**			
Recommendations :	**Need to provide Min. (2) CP in this CA**				
Catchment area - West	2725.163	m2			
	0.2725163	ha	CA length	296	m
Rational flows @ (2.781 CIA)	**107.543**	**l/s**	**Flows @ P2W Project (West CA)**		
	0.108	**m3/s**			
Numbers of CP Required	**6.0**	**no's**			
Existing CP's in CA	**0.0**	**no's**			
Recommendations :	**Need to provide Min. (6) CP's in this CA**				

Road and side parking zones will act as secondary flow paths for stormwater which ultimately discharge runoff into sea by going over the SUP.

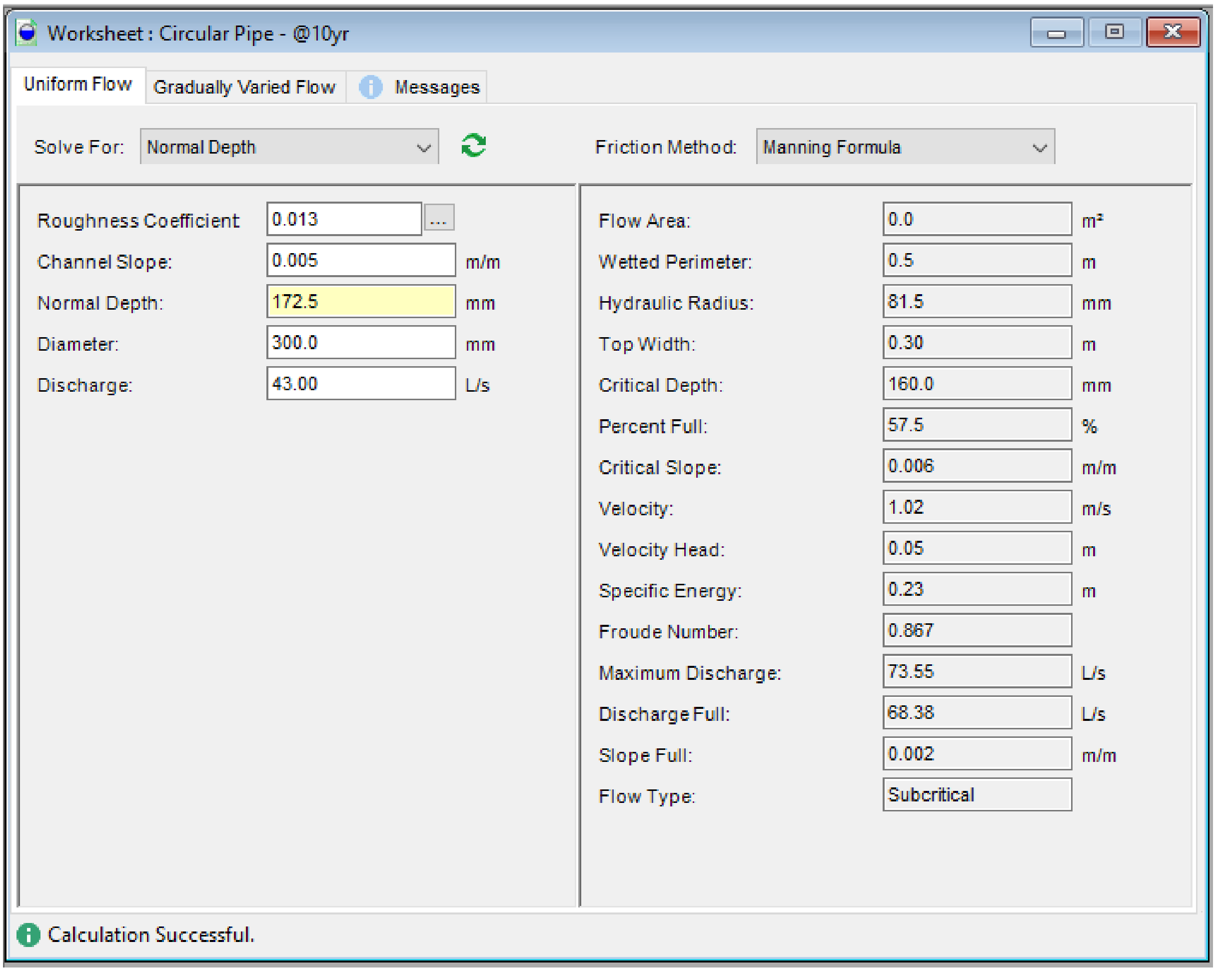
4.4.3 Stormwater Network Drainage Design

Following the Council (FNDC) standards and codes, the intent is to install a new drainage system, i.e. catchpits and pipes, to collect, convey and discharge the additional runoff into the existing stormwater pipelines where required due to the re-alignment of road kerbs and adding of SUP.

For this project, the drainage network will comply the following:

- Standard catchpit 460mm x 675mm, to have nominal inlet capacity of 20l/s installed on relatively flat gradient.

As per FNDC minimum pipe should be of 300mm in diameter for Stormwater. Flow master used to calculate the pipe sizes. Calculations shows that required pipe is far lesser than the 300mm. Therefore, minimum pipe size (300mm) will be used for the SW pipes. (See snip below for Flow master calculation).



Location of Stormwater Network

Assuming (need to confirm at next stage of design) the number of existing utilities under the walkways/ SUP, proposed stormwater catchpits are positioned at the low points on carriageway. All the catchpits are connected to nearest existing manholes. (See General arrangement drawings for proposed Stormwater network).

The proposed stormwater catchpits are not aligned directly under the wheel path of the traffic within the carriageway, to reduce continuous fatigue loading on stormwater network.

4.4.4 Stormwater Quality Management

No treatment devices are being proposed for this project as it only have SUP (Shared User path). It is assumed that clean stormwater discharging from the SUP, which requires no treatment due to cycle and pedestrian usage only.

4.4.5 Stormwater Quantity Management

Due to the proximity of this project to the coastal area, no attenuation is proposed/requirement for the project.

4.4.6 Safety in Design

The stormwater design has considered Safety in Design (SID) as follows:

- During design, the drainage team has worked with the roading design team to develop safe and user-friendly solutions to minimise surface water depths and flow velocities across the carriage way including cycle and pedestrian spaces;
- Minimising ponding water area;
- Providing safe and shallow stormwater catchpit depths;
- Considering construction suitability with regards to the position and connections of catchpits where it is safe to block one lane with traffic management for vehicular access: and
- Considering public interaction with the stormwater system. For example, the proposed stormwater catchpits are not aligned directly under the wheel path of the traffic within the carriageway.

4.5 Next Steps

Following items require assessment during design development:

- Confirmation of the position and sizing of the network drainage system, as well as the connection of the new system into the existing network.
- Stakeholder consultation for approval (local council, iwi, and Waka Kotahi).

5 Utilities

5.1 Available Information

The utility service plans have been collated from Before-U-Dig application lodged in May 2021.

Top Energy plans have been requested from the service provider directly.

Co-ordination for as-built records/CAD data from network utility operators and site investigation to confirm asset location is to be carried out in the subsequent stage of design.

5.2 Design Criteria

5.2.1 Assumptions and Considerations

Based on the data received from BeforeUDig, existing services were assessed. It is anticipated that the proposed works will not affect the existing utilities under the existing eastbound footpath and berm of Marsden Road. However, confirmation of existing cover depths is required as potential lowering maybe

required for any shallow assets. Affected service lids will be adjusted to new SUP level as stated in drawings DRG-RR-0101 – 0104.

5.2.2 Methods and Management of Utility Works

Network utility relocation works is to be managed in subsequent design stage so that the installation, design, operation, maintenance and upgrade will be in compliance with the relevant standards, code of practice or guidelines in order to avoid, remedy or mitigate potential adverse effects on the health and safety of people and on the surrounding environment.

5.3 Design Development

Refer to attached Utilities register in Appendix F for collated Before-U-Dig plans and potential assessed effects. Any utilities affected by works resulting in level changes are to be replaced with new to maintain existing minimum cover levels in accordance with the standards. Where possible, minimum covers and minimum clearance to the utility assets will be provided. However, where this cannot be achieved, diversion of services or installation of protective slabs will be considered as part of the future design process.

Co-ordination with the NUO's in subsequent design stage is required to confirm location of assets and assess further impacts.

6 Contaminated Land Assessment

6.1 Background

The site is referenced in Drawing *511738-0000-DRG-RR-0101*. A Contamination Assessment was conducted by Aurecon in 2019 (*504164-2000-REP-KF-1001*) as part of the State Highway 11 Single Stage Business Case (SSBC). The investigation was undertaken to provide a high-level assessment of the potential contamination issues that may impact on the intervention sites identified in the SSBC. The report included a general summary of the Paihia to Waitangi Shared User Pathway (SUP) project area and information gathered as part of that assessment has been included in this report where appropriate.

6.2 Northland Regional Council

Northland Regional Council (NRC) holds a database of sites that have, or have had in the past, an activity or industry that is detailed in the Hazardous Activities and Industries List (HAIL) (MfE, 2012). This database information was reviewed on 28 June 2021 and the findings are summarised as:

- HAIL F7 (Service Stations): Waitomo Petroleum Service Station at 140 Marsden Road; and
- HAIL F4 (Motor vehicle workshop): JKL Auto at 140 Marsden Road.

These HAIL activities occur on the land immediately adjacent to the proposed Shared User Pathway alignment and have been recorded on NRC database as verified HAIL sites with no known investigations previously undertaken to quantify the risk levels.

It was also noted on the NRC database that the historical shoreline has been modified, indicating that land reclamation has occurred along the coast. This is predominantly within the grassed areas east of Marsden Road, as this area is subject to flooding and coastal erosion. The 50-year coastal erosion hazard zone is marked on the NRC database on the western side of Marsden Road, indicating that further work will be required to prevent coastal erosion.

6.3 Historical Aerial Photography

A review of publicly available historical aerial photography, available from Retrolens and Google Earth (accessed 28 June 2021) was undertaken. A summary of the findings is presented in Table 5.

Table 4 Summary of Historical Aerial Imagery

Year and Source	Site	Adjacent Area	Photograph
1951 Retrolens	SH11 (Marsden Road) has already been constructed, as well as connected roads such as Davis Crescent. There appears to have been earthworks recently undertaken at Nihonui Point, including vegetation removal. Marsden Road curves to the south at the western end of the site boundary.	There are a number of residential dwellings present along Marsden Road.	
1968 Retrolens	The earthworks at Nihonui Point have been completed, with Marsden Road following the coastal boundary. The western end of Marsden Road now further extends to the west, towards Waitangi, and a T-intersection is present.	Additional residential dwellings have been constructed north of the site, beyond the new intersection.	
1979 Retrolens	The buildings at 140-142 Marsden Road have been replaced. Marsden Road appears to have been widened along the entire site length.	Minor earthworks are being undertaken at the northern end of the site, appearing to be for a residential development.	

1981 Retrolens	The resolution is low in this aerial image. No significant changes to the site are observed.	No significant changes to the surrounding area are observed.	
2004 Google Earth	The northern intersection, between Marsden Road and Te Karuwha Parade, has been modified to include a roundabout. The service station at 140 Marsden Road has been upgraded, with the rear of the property being covered in hardstanding and vehicles. This indicates the auto-repair shop is likely present at this time. A narrow, long building has been constructed immediately south of the service station.	Numerous residential dwellings in the surrounding area have been extended or rebuilt. Angled carparking has been constructed in some areas of the road.	
2020 Google Earth	No significant changes to the site are observed.	No significant changes to the surrounding area are observed.	
Summary	SH11 (Marsden Road) had been present prior to the first available aerial in 1951, with residential dwellings present to the south adjacent to it. SH11 was then further extended to Waitangi (west) in the 1960's and widened in the 1970's. A roundabout was constructed between 1980's to early 2000's, connecting Te Karuwha Parade to Marsden Road.	The area surrounding the proposed SUP alignment has historically consisted of residential dwellings, with commercial facilities constructed more recently.	

6.4 Site Walkover

A site walkover was conducted as part of the previous Contamination Assessment (*504164-2000-REP-KF-1001*). The walkover identified HAIL activities outside the current study area, including electrical transformers, an off-pier service station (Marine stop) and a helicopter pad, as well as the service station at 140 Marsden Road.

A review of historical Google Street View, dated 2010, shows the petrol station and vehicle workshop present at 140 Marsden Road under different branding with Shell Petrol and AA contractor signs visible. Additional signage changes to the Z Energy and ANTZ Automotive locations were observed in the 2013 Street View, before changing to the current property owners. The review did not identify any other potential HAIL activities along the proposed SUP alignment, however, it should be noted that the roading material may contain asphaltic compounds, including polycyclic aromatic hydrocarbons, and this could impact soil disposal options.

6.5 Summary

This high-level desktop assessment has identified that HAIL activities have occurred within the immediately adjacent area. Specifically, there is the potential for petroleum activities (service station at 140 Marsden Road) and land reclamation along the coastal boundary to have impacted the soil and shallow groundwater.

It is recommended that a preliminary site investigation (PSI) is conducted to understand the potential impact of the petroleum activity undertaken in the area including both the service station and the marine stop and associated underground pipework. Furthermore, it is recommended that a detailed site investigation (DSI) is also conducted to understand the type of filling historically undertaken in connection with the reclamation, and if the identified HAIL activities have impacted the soil and shallow groundwater.

Based on the findings of the DSI, a Contaminated Site Management Plan (CSMP) may be required to be implemented during the re-development works.

All additional environmental investigations, reporting and risk management planning activities should be undertaken by a Suitably Qualified Environmental Practitioner (SQEP) as required by the National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NES CS).

7 Next Steps

As part of the next design phase the following items are recommended to be undertaken in consultation with Waka Kotahi:

1. Undertake a Preliminary Design Stage Road Safety Audit and agree any amendments to the recommended design as a result of this process
2. Consultation with utility operators to confirm presence of utilities under the proposed SUP footprint and any relevant effects
3. Community engagement on the proposed layout and parking changes and alignment with FNDC Parking Management Strategy (once completed)
4. Recommendations from the SiD register attached in Appendix H is to be considered in subsequent design stage
5. Deliver Detailed Design and Outline Plan of Works and any associated consents.

Appendix A

Preliminary Design Philosophy Statement

Aurecon New Zealand Limited
Level 4, 139 Carlton Gore Road
Newmarket Auckland 1023
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
F +64 9 524 7815
E auckland@aurecongroup.com
W aurecongroup.com

Technical Note

Project	**SH11 Paihia to Waitangi SUP**	Reference No.	**511738-0000-TEQ-CC-0001**
To	**Warren Feek, Tim Elliot**	From	**Pieu Nalin**
Date	**14/05/2021**	Pages (including this page)	**9**
Subject	**Preliminary Design Philosophy Statement – Design Criteria**		

1 Project Description

A Shared Use Path (SUP) is proposed from Nihonui Point to Te Karuwha Parade along the coastal edge of Paihia. The installation of a SUP between Paihia and Waitangi will create a direct link between the two towns for active transport modes and provide an attractive cycle route and pedestrian walkway along the coast to accommodate the high number of tourists travelling to and from the town centre. Currently, the existing Pou Herenga Tai Twin Coast Cycle Trail (TCCT) links Kawakawa to Opua. This is to be extended from Opua to Paihia via Russell under the Northland Integrated Walking and Cycling Implementation Plan. The SH11 Single Stage Business Case (SSBC) proposed to extend this connection from Paihia and Waitangi. Once these connections are completed, the SUP will form part of the TCCT and will support the increase in cyclists expected in the region.

Refer to the extents of work shown in Figure 5-2, along SH11 Marsden Road, connecting the Paihia Waterfront Development design from the north of Nihonui point to south of the roundabout with Te Karuwha Parade.

Figure 1: Project Extent of Paihia to Waitangi SUP

2 Purpose

This technical note forms as an amendment to the SH11 – Single Stage Business Case Preliminary Design Philosophy Statement (PDPS), Reference: 504164-2000-REP-JJ-1040, Revision C, 2019-10-02. This technical note has been prepared to identify, present and agree design considerations, parameters, standards, key criteria and considerations that will be used to inform the preliminary design of the project.

As the design development is undertaken, the design report will be updated and any departures and changes as agreed with Waka Kotahi and FNDC will be presented in the design report.

3 Design Inputs and Assumptions

The preliminary design will be developed on the following key assumptions:

- Minimal modification to existing kerb alignment (reduced utilities and tree removal impact). Kerb alterations will be required where the SUP is achieved through widening of existing footpath into angled and parallel parking towards the carriageway.
- Fixed road corridor width (no property acquisition)
- It is anticipated that maintaining the existing footpath edge on the coastal side of Marsden Road is sufficient to maintain the health of the existing Pohutukawa trees. This will be confirmed as per the arboriculture assessment
- Some loss of parking along the beach front will be required to achieve desirable SUP widths
- Minimal changes to existing road geometry maybe required to accommodate sufficient parking widths. This will be in accordance with design standards outlined in Section 4.
- The proposed design will tie-into the existing footpath prior to the roundabout with Te Karuwha Parade and into the existing footpath prior to the bend at Nihnui Point as part of the project extents.
- No changes to the existing footpath along northbound lane of Marsden Road is proposed as part of this project scope

4 Design Standards

The relevant standards which have been referenced include:

- Far North District Council Engineering Standards & Guidelines 2009
- Austroads Guide to Road Design Part 6A, 2017
- Austroads Guide to Road Design Part 3, 2017
- Manual of Traffic Signs and Markings (MOTSAM) (NZ Transport Agency, 2010)
- Christchurch Cycle Design Guidelines, 2016
- Shared Space in Urban Environments Guidance Note, 2012

5 Design Philosophy

The design values adopted within this design philosophy are the intended desirable values for the ultimate design solution. However, it is likely that in some locations these values may not be feasible or practical to achieve. These situations will be highlighted and departures from standards will be applied for through the appropriate Departure Request process to the Waka Kotahi and Far North District Council (FNDC).

The proposed works are intended to create a safe, compliant and efficient road and improve the overall function of the adjoining road networks where affected. The design will not exacerbate any existing design deficiencies and will attempt to improve or remove existing deficiencies, where practicable. It is noted that due to the existing geometry and physical constraints, improvements to meet current standards or desirable level of service will not always be possible and any increases in traffic volumes can exacerbate existing issues

As far as practicable, the geometry of existing roads and services will be retained, and it is noted that it is not the intention of this project to change the risk profile of associated infrastructure.

The general design philosophy for the proposed SUP is that the desirable width will be achieved by removal of angled parking where possible. Where there are Pohutukawa Trees, the existing footpath edge will be retained dependent on arboriculture assessment. Where there is no parking available to utilise for SUP width, existing footpath will be widened towards the coastal edge. Due to the change in grade between the existing footpath and the beach, a balance of achievable SUP width without significant earthworks will be required to achieve the agreed programme and project costs.

6 Design Criteria

6.1 Road Classification

Table 1: Road Classification

Road Name	Road Classification		
	ONRC	**ONRC (AADT)**	**% Heavy Vehicles**
Marsden Road	Primary Collector	4780	6.3%
Te Karuwha Parade	Secondary Collector	1745	6%

As per the Northland Regional Council CityLink Bus Service Map, Marsden Road is a bus route.

As per Waka Kotahi's Twin Coast Discovery Route and Northland Journeys, Northland Integrated Cycling Implementation Plan Preliminary Design and Delivery document, 5 June 2019, Marsden Road is on the Te Araroa Trail as shown in the figure below:

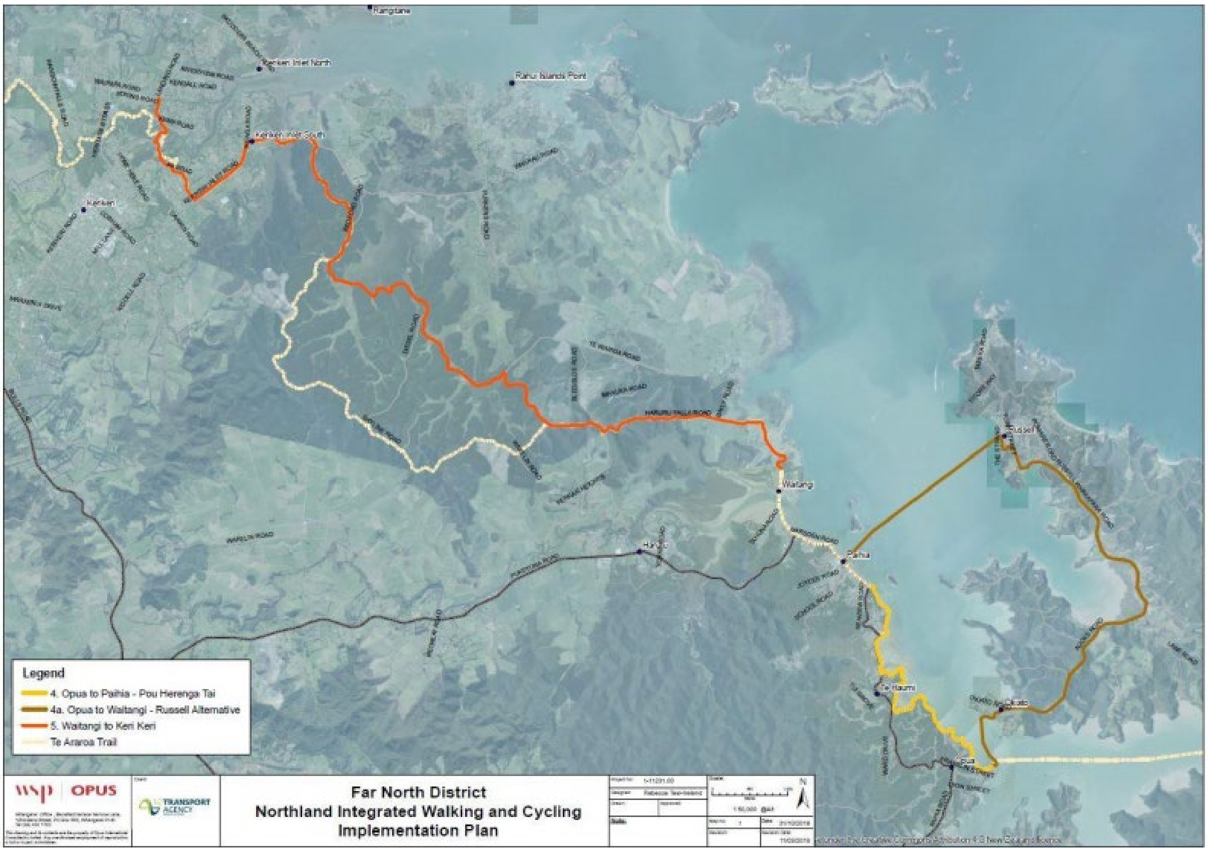


Figure 2: Northland Integrated Walking and Cycling Implementation Plan

As per the Twin Coast Cycle Trail – Pou Herenga Tai, Marsden Road is a missing gap in the cycle trail network.

6.2 Design Speed

The existing speed along Marsden Road is 50 km/hr. The design speed along Marsden Road is 60km/hr. This is the state highway posted speed of 50km/hr plus 10km/hr which will be used as a fair approximation for the design.

As per Austroads Guide to Road Design Part 6A, it is recommended that paths be designed for a speed of at least 30 km/h wherever possible and desirable given the purpose of the path, and in other cases for the anticipated operating speeds. However, it should be recognised that it may be necessary to adopt higher or lower design speeds in specific circumstances.

6.3 Typical Cross Section

6.3.1 General Lane widths and crossfall

Urban freeway widths as according to Austroads Guide to Road Design Part 3: Geometric Design.

Table 2: General lane width and crossfall criteria

Element	Value	Comments
Traffic Lane width	3.5	3.0 – 3.4 m for low speed roads with low truck volumes
Asphalt type pf pavement crossfall %	2.5 – 3.0	Although no change to existing carriageway geometry is proposed, where there is widening of footpath into the road (through removal of angled parking) the existing crossfall of the road will be tied into the SUP.
Portland cement concrete %	2.0 – 3.0	

6.3.2 Shared Use Path

Cross – Section

As per the concept design tech note 504164-2000-TEC-JJ-1024 a desirable 4.0 m wide SUP was suggested. Without significant changes to the corridor geometry, utilities and existing constraints such as trees and parking, this cannot be accommodated throughout the project extents.

According to Austroads Guide to Road Design Part 6A, 2017 a 2.5 – 3.0 m wide SUP is suggested for up to 900 two-way per peak hour cyclists and 100 two-way per peak hour pedestrians as per the figure below:

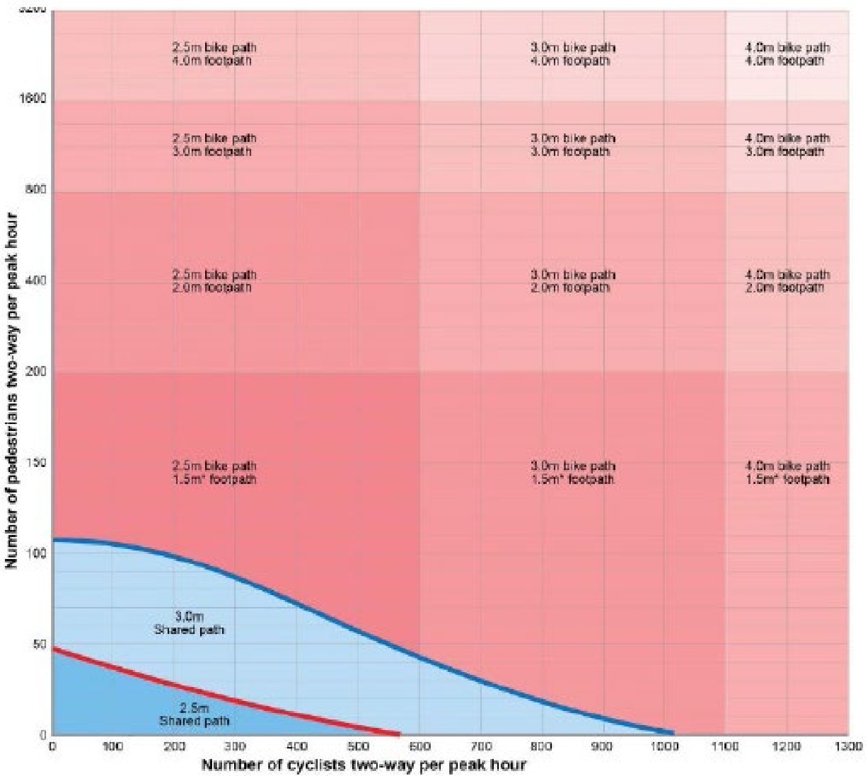


Figure 3: SUP width for a 50/50 directional split

According to Austroads Guide to Road Design Part 6A, 2017, the acceptable widths for a SUP are:

Table 3: SUP width criteria

	Suggested Path Width (m)		
	Local Access Path	**Regional Path**	**Recreational Path**
Desirable Minimum Width	2.5	3.0	3.5
Minimum Width – Typical Maximum	2.0 – 3.0	2.5 – 4.0	3.0 – 4.0

The lower boundary should only be adopted where cyclist volumes and operational speeds will remain low. The upper boundary may be required where the numbers of cyclists and pedestrians are very high or there is a high probability of conflict between users (e.g. people walking dogs, in-line skaters etc.).

A local access path is provided to connect a local area to a community facility, regional path is considered to be on the principal bicycle network and recreational path is considered for regular use.

Furthermore, according to Austroads Guide to Road Design Part 6A, 2017, Appendix A.2, 2.5 m are absolute minimum widths for paths having a predominant purpose of commuting and recreation respectively.

Hence, the designer suggests adopting a desirable width of 3.0 – 4.0 m wide SUP where feasible and a minimum of 2.5m wide SUP where there are constraints in terms of road geometry, protected trees and utilities.

SUP Crossfall

The crossfall of the proposed SUP will be guided by the existing footpath crossfall. Any alterations will be in accordance with the design requirements outlined below.

According to Austroads Guide to Road Design Part 6A, 2017, Section 5.6.1, water ponding on paths has a significant impact on the level of service provided to cyclists as spray leads to grit on both bicycle and rider and pedestrians, who may have to travel off the path to avoid the ponded water. On straight sections crowning of the pavement is preferable as it results in less accumulation of debris. On sealed surfaces a crossfall of 2–4% should be adequate to effectively dispose of surface water whereas unsealed surfaces may require 5% to prevent puddles of water from developing.

SUP longitudinal Gradient

Existing longitudinal gradient of the footpath and road will be followed.

SUP Clearance

As per Austroads Guide to Road Design Part 6A, 2017, Figure 5.7 a 2.5 m vertical clearance and 1.0 m (absolute minimum of 0.5 m) horizontal clearance envelope is suggested.

Bicycle Parking

Bicycle parking facilities maybe investigated in consultation with Waka Kotahi. Any new bicycle parking facility will be in accordance with AS 2890.3:2015

6.3.3 Separated Paths

Due to the existing placement of trees along the road corridor, there may be areas where separated path from a SUP may be required. This will be designed based on the following criteria as per Austroads Guide to Road Design Part 6A, 2017, Section 5.1.5

Table 4: Separated two-way path width

	Suggested Path Width (m)		
	Bicycle path	Pedestrian Path	Total
Desirable Minimum Width	2.5	2.0	4.5
Minimum Width – Typical Maximum	2.0 – 3.0	>=1.5	>=4.5

Table 5: Separated one-way path widths

	Suggested Path Width (m)		
	Bicycle path	Pedestrian Path	Total
Desirable Minimum Width	1.5	1.5	3.0
Minimum Width – Typical Maximum	1.2	>=1.2	>=2.4

A minimum width of 2.0m is required where passing within the cyclist path section occurs or where it is desirable that passing manoeuvres by cyclists outside of the pedestrian path section of the facility.

6.4 Parking

Roadside parking along SH11 (Marsden Road) and Te Karuwha Parade is provided for through a mixture of parallel and angled parking spaces along the coastal edge. With the widening of the SUP, existing angular parking spots and parallel parking spots will be affected. As per discussions with FNDC, it was identified that a parking policy document in line with the new National Parking Management Guidance is in its' draft stage. A separate parking assessment tech note will be issued.

The design of the affected parking spots will be undertaken in accordance with the Far North District Plan, Appendix 3D as per the table below:

Table 6: Manoeuvring and Parking Space Dimensions

Parking Angle	Width of Parking Space (m)	Kerb Overhang (m)	Depth of Parking Space (m)	Manoeuvring Spaces (m)
90° Casual Users	2.5	1.0	4.9	8.1
	2.6	1.0	4.9	7.1
	2.7	1.0	4.9	6.7
	>2.75	1.0	4.9	6.6
60°	2.5	1.0	5.2	4.1
	2.6	1.0	5.2	3.5
	2.7	1.0	5.2	3.3

Parking Angle	Width of Parking Space (m)	Kerb Overhang (m)	Depth of Parking Space (m)	Manoeuvring Spaces (m)
	>2.75	1.0	5.2	3.2
45°	2.5	0.8	4.9	2.7
	2.6	0.8	4.9	2.5
	2.7	0.8	4.9	2.4
	>2.7	0.8	4.9	2.3
30°	2.5	0.6	4.0	2.4
	2.6	0.6	4.0	2.4
	2.7	0.6	4.0	2.3
	>2.75	0.6	4.0	2.3
Parallel	5.9	0.4	2.5	3.6
	6.1	0.4	2.5	3.3
	6.3	0.4	2.5	3.0

6.5 Kerb and channel

All existing kerb and channel will be retained where possible.

In discussion with FNDC, it has been concluded that the council do not require additional stormwater treatment from the intended proposed SUP. Any changes to the existing stormwater network will be relocated and replaced like for like. Proposed kerbs will match existing or suit the road scenario.

6.6 Handrail

The design anticipates to not affect any existing fence or handrails along the project extents. However, during the design development if any such infrastructure is affected, a like to like replacement will be proposed.

6.7 Signage

Any new proposed signage will be in accordance with the standards outlined in Section 5.1.2. SUP signage will be located on the coastal side of the SUP. Traffic signs shall be located on the left-hand of traffic lane. The locations of signs and posts shall take into consideration potential obstructions of trees and amenities and minimum setbacks from kerbs.

Mounting heights shall comply with Waka Kotahi and FNDC requirements, where the clearance is defined as the vertical distance measured from the underside of the sign to the highest level of the surface of the carriageway.

6.8 Pavement Marking

Pavement markings will be designed in accordance with the standards outlined in Section 5.1.2.

The design of the road and SUP markings shall be developed in accordance with applicable standards to ensure a safe and intuitive layout consistent with the surrounding road network.

The line marking design shall tie into the existing markings at the limit of works. Removal of redundant road marking shall be done to standard, so no evidence of old marking exists.

6.9 Utilities

B4UDig plans with a desktop assessment will be issued following the submission of this document. In general, it is anticipated that minimal effect to existing utilities will be proposed. General management strategy is to protect existing utilities if under the proposed SUP. Any utilities requiring relocation (shallow cover depths or on-ground assets) will be highlighted in the B4UDig plans and are to be further assessed in subsequent design stages.

Approved by:

Title	Name	Position	Signature	Date
Author	Pieu Nalin	Senior Engineer	PNalin	14/05/2021
Reviewer	Martyn Francis	Associate		14/05/2021

Appendix B

Drawings

Drawing No. / Doc Code	Title
511738-0000-DRG-CC-0011	DRAWING INDEX
511738-0000-DRG-EE-0101	LIGHTING LAYOUT PLAN - SHEET 1
511738-0000-DRG-EE-0102	LIGHTING LAYOUT PLAN - SHEET 2
511738-0000-DRG-EE-0103	LIGHTING LAYOUT PLAN - SHEET 3
511738-0000-DRG-EE-0104	LIGHTING LAYOUT PLAN - SHEET 4
511738-0000-DRG-RR-0101	GENERAL ARRANGEMENT - SHEET 1 OF 4
511738-0000-DRG-RR-0102	GENERAL ARRANGEMENT - SHEET 2 OF 4
511738-0000-DRG-RR-0103	GENERAL ARRANGEMENT - SHEET 3 OF 4
511738-0000-DRG-RR-0104	GENERAL ARRANGEMENT - SHEET 4 OF 4
511738-0000-DRG-RR-0301	CROSS SECTIONS - SHEET 1
511738-0000-DRG-RR-0302	CROSS SECTIONS - SHEET 2

Plot Date: 2021-07-01 12:57:00 Office: Auckland Filename: pw:\\designshare.au.aurecon.info:PW_AUDC1_01\Documents\Projects\511xxx\511738 - SH11 Paihia to Waitangi Shared User Path\5 Deliver design\503 Drawing\511738-0000-DRG-CC-0011.dwg

aurecon
www.aurecongroup.com

CLIENT
WAKA KOTAHI NZ TRANSPORT AGENCY

REV	DATE	REVISION DETAILS	APPROVED
A	2021-07-02	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY

SCALE	SIZE
	A1

DRAWN: U. DORFLING
DESIGNED: P. NALIN
REVIEWED: M. FRANCIS

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED: C. KENWORTHY
DATE: 2021-07-02

PROJECT: SH11 PAIHIA TO WAITANGI SHARED USER PATH

TITLE: DRAWING INDEX

DRAWING No.	PROJECT No.	AREA	TYPE	DISC	NUMBER	REV
	511738	0000	DRG	CC	0011	A

EXISTING UPLIGHTS SHALL BE DISCONNECTED FROM THE UTILITY SUPPLY AND REMOVED WITH THE CIRCUIT PULLED BACK TO THE PREVIOUS ADJACENT FITTING.

NOTES:

1. ALL NEW TYPE L1 LIGHT FITTINGS SHALL BE SUPPLIED WITH PROPRIETARY BLACK SQUARE POLE. FOR COSTING PURPOSE THIS IS BASED ON THE PS SERIES CROWN-WELD STRAIGHT STEEL POLE FROM ADLT WITH 6m MOUNTING HEIGHT. ALL POLES SHALL BE BLACK IN COLOUR. POLES SHALL COME WITH PRE-DESIGNED FOUNDATION CAGES. LENGTH OF MOUNTING TENONS SHALL BE CONFIRMED IN THE NEXT PHASE BUT WILL GENERALLY BE DESIGNED SO THAT THE LIGHT FITTINGS ARE ALIGNED WITH THE START OF THE SHARED USE PATH (ZERO METRE OVERHANG).

2. DETAILS OF ELECTRICAL UTILITY CONNECTION TO NEW LIGHT FITTINGS SHALL BE CONFIRMED IN THE NEXT DESIGN PHASE IN COORDINATION WITH TOP ENERGY AND FAR NORTH DISTRICT COUNCIL.

3. ALL NEW LIGHT FITTINGS SHALL BE 4000K COLOUR TEMPERATURE UNLESS SPECIFICALLY STATED OTHERWISE.

Luminaire Schedule	
L1	ADLT XSP HIGH OUTPUT SERIES OPTIC TYPE II LONG (2LG) 29W; 3770 LUMENS 4000K CCT NEMA 7 PIN + DALI

Type L1 Fitting

Luminaire Location Summary

LumNo	Label	Mounting Height	Tilt
1	L1	6	0
2	L1	6	0
3	L1	6	0
4	L1	6	0
5	L1	6	0
6	L1	6	0
7	L1	6	0
8	L1	6	0
9	L1	6	0
10	L1	6	0
11	L1	6	0
12	L1	6	0
13	L1	6	0
14	L1	6	0
15	L1	6	0
16	L1	6	0
17	L1	6	0
18	L1	6	0
19	L1	6	0
20	EXTG-LP	8	0
21	L1	6	0
22	L1	6	0

2.5 0 5 10m
SCALE 1:250

aurecon
www.aurecongroup.com

CLIENT: WAKA KOTAHI NZ TRANSPORT AGENCY

REV	DATE	REVISION DETAILS	APPROVED
A	2021-07-02	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY

SCALE	SIZE
1:250	A1

DRAWN: J. LUM
DESIGNED: C. DAJI
REVIEWED: K.MILLER

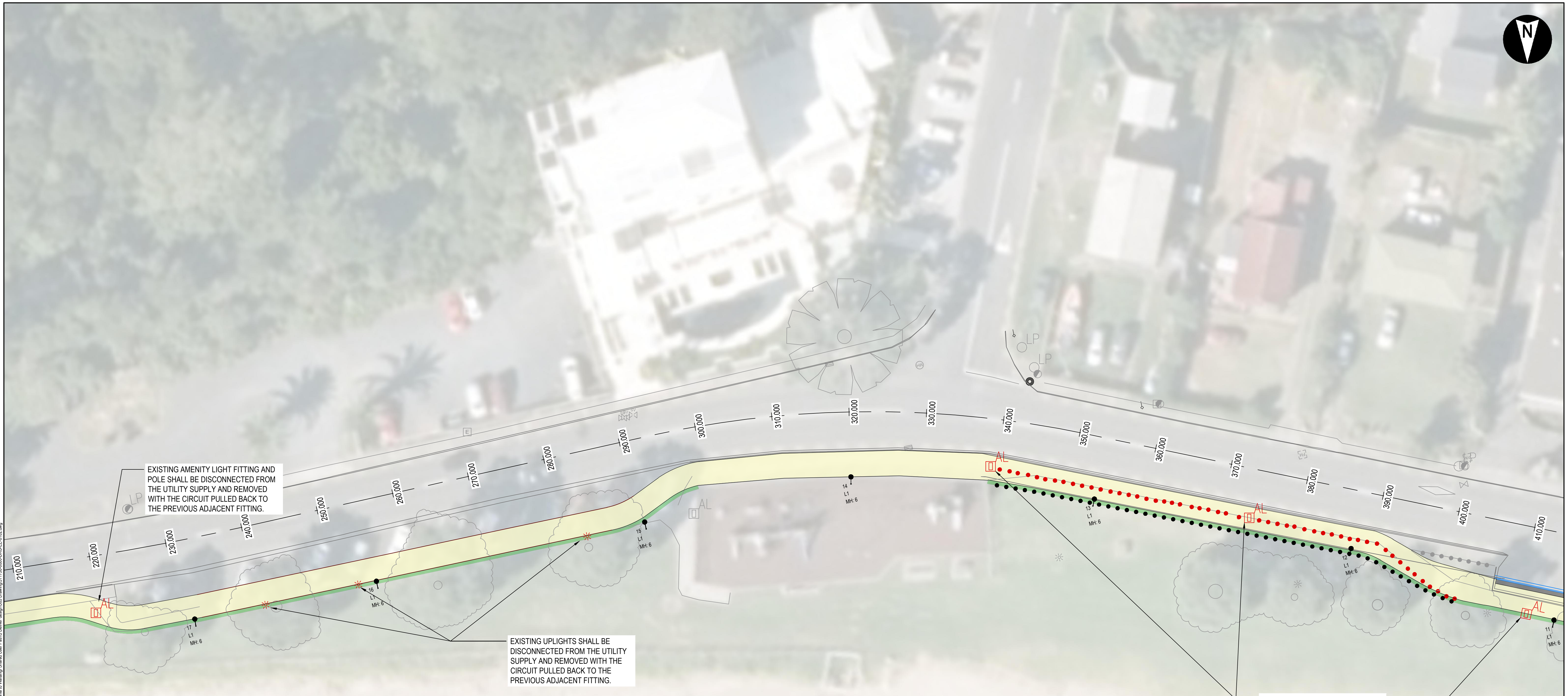
PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE 2021-07-02
C. KENWORTHY

PROJECT: SH11 PAIHIA TO WAITANGI SHARED USER PATH

TITLE: LIGHTING LAYOUT PLAN
SHEET 1

DRAWING No.	PROJECT No.	AREA	TYPE	DISC	NUMBER	REV
	511738	0000	DRG	EE	0101	A



NOTES:

1. ALL NEW TYPE L1 LIGHT FITTINGS SHALL BE SUPPLIED WITH PROPRIETARY BLACK SQUARE POLE. FOR COSTING PURPOSE THIS IS BASED ON THE PS SERIES CROWN-WELD STRAIGHT STEEL POLE FROM ADLT WITH 6m MOUNTING HEIGHT. ALL POLES SHALL BE BLACK IN COLOUR. POLES SHALL COME WITH PRE-DESIGNED FOUNDATION CAGES. LENGTH OF MOUNTING TENONS SHALL BE CONFIRMED IN THE NEXT PHASE BUT WILL GENERALLY BE DESIGNED SO THAT THE LIGHT FITTINGS ARE ALIGNED WITH THE START OF THE SHARED USE PATH (ZERO METRE OVERHANG).

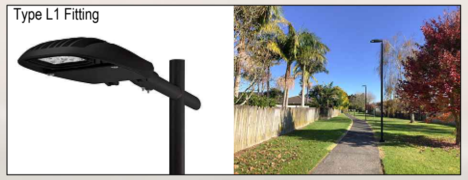
2. DETAILS OF ELECTRICAL UTILITY CONNECTION TO NEW LIGHT FITTINGS SHALL BE CONFIRMED IN THE NEXT DESIGN PHASE IN COORDINATION WITH TOP ENERGY AND FAR NORTH DISTRICT COUNCIL.

3. ALL NEW LIGHT FITTINGS SHALL BE 4000K COLOUR TEMPERATURE UNLESS SPECIFICALLY STATED OTHERWISE.

Luminaire Schedule

L1	ADLT XSP HIGH OUTPUT SERIES OPTIC TYPE II LONG (2LG) 29W; 3770 LUMENS 4000K CCT NEMA 7 PIN + DALI

Type L1 Fitting



Luminaire Location Summary

LumNo	Label	Mounting Height	Tilt
1	L1	6	0
2	L1	6	0
3	L1	6	0
4	L1	6	0
5	L1	6	0
6	L1	6	0
7	L1	6	0
8	L1	6	0
9	L1	6	0
10	L1	6	0
11	L1	6	0
12	L1	6	0
13	L1	6	0
14	L1	6	0
15	L1	6	0
16	L1	6	0
17	L1	6	0
18	L1	6	0
19	L1	6	0
20	EXTG-LP	8	0
21	L1	6	0
22	L1	6	0

aurecon
www.aurecongroup.com

CLIENT: WAKA KOTAHI NZ TRANSPORT AGENCY

REV	DATE	REVISION DETAILS	APPROVED
A	2021-07-02	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY

SCALE	SIZE
1:250	A1

DRAWN: C.DAJI
DESIGNED: C. DAJI
REVIEWED: K.MILLER

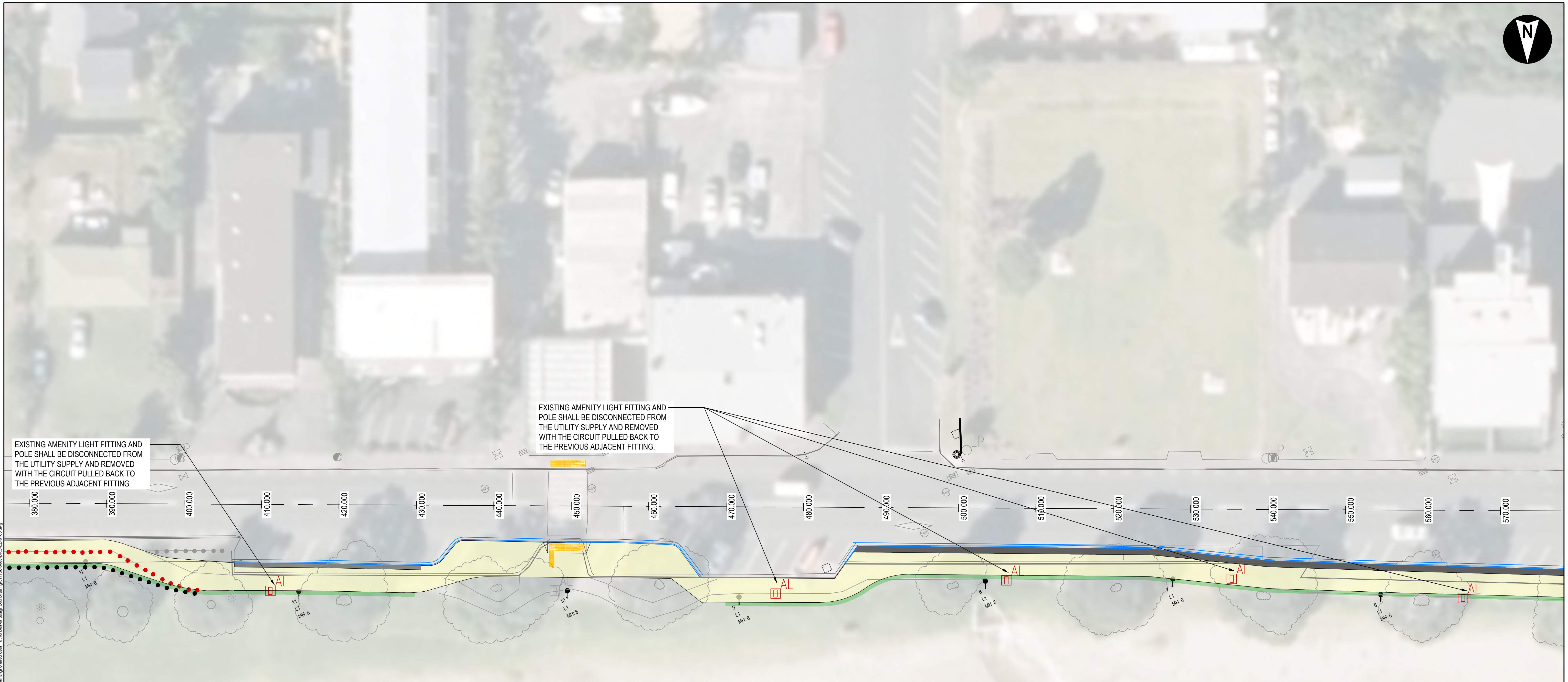
PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED: C. KENWORTHY
DATE: 2021-07-02

PROJECT: SH11 PAIHIA TO WAITANGI SHARED USER PATH

TITLE: LIGHTING LAYOUT PLAN
SHEET 2

DRAWING No.	PROJECT No.	AREA	TYPE	DISC	NUMBER	REV
	511738	0000	DRG	EE	0102	A



NOTES:

1. ALL NEW TYPE L1 LIGHT FITTINGS SHALL BE SUPPLIED WITH PROPRIETARY BLACK SQUARE POLE. FOR COSTING PURPOSE THIS IS BASED ON THE PS SERIES CROWN-WELD STRAIGHT STEEL POLE FROM ADLT WITH 6m MOUNTING HEIGHT. ALL POLES SHALL BE BLACK IN COLOUR. POLES SHALL COME WITH PRE-DESIGNED FOUNDATION CAGES. LENGTH OF MOUNTING TENONS SHALL BE CONFIRMED IN THE NEXT PHASE BUT WILL GENERALLY BE DESIGNED SO THAT THE LIGHT FITTINGS ARE ALIGNED WITH THE START OF THE SHARED USE PATH (ZERO METRE OVERHANG).

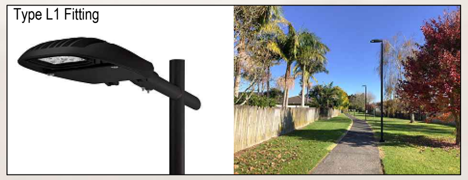
2. DETAILS OF ELECTRICAL UTILITY CONNECTION TO NEW LIGHT FITTINGS SHALL BE CONFIRMED IN THE NEXT DESIGN PHASE IN COORDINATION WITH TOP ENERGY AND FAR NORTH DISTRICT COUNCIL.

3. ALL NEW LIGHT FITTINGS SHALL BE 4000K COLOUR TEMPERATURE UNLESS SPECIFICALLY STATED OTHERWISE.

Luminaire Schedule

L1	ADLT XSP HIGH OUTPUT SERIES OPTIC TYPE II LONG (2LG) 29W; 3770 LUMENS 4000K CCT NEMA 7 PIN + DALI

Type L1 Fitting



Luminaire Location Summary

LumNo	Label	Mounting Height	Tilt
1	L1	6	0
2	L1	6	0
3	L1	6	0
4	L1	6	0
5	L1	6	0
6	L1	6	0
7	L1	6	0
8	L1	6	0
9	L1	6	0
10	L1	6	0
11	L1	6	0
12	L1	6	0
13	L1	6	0
14	L1	6	0
15	L1	6	0
16	L1	6	0
17	L1	6	0
18	L1	6	0
19	L1	6	0
20	EXTG-LP	8	0
21	L1	6	0
22	L1	6	0

2.5 0 5 10m
SCALE 1:250

aurecon
www.aurecongroup.com

CLIENT: WAKA KOTAHI NZ TRANSPORT AGENCY

REV	DATE	REVISION DETAILS	APPROVED
A	2021-07-02	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY

SCALE: 1:250 | SIZE: A1

DRAWN: C.DAJI
DESIGNED: C. DAJI
REVIEWED: K.MILLER

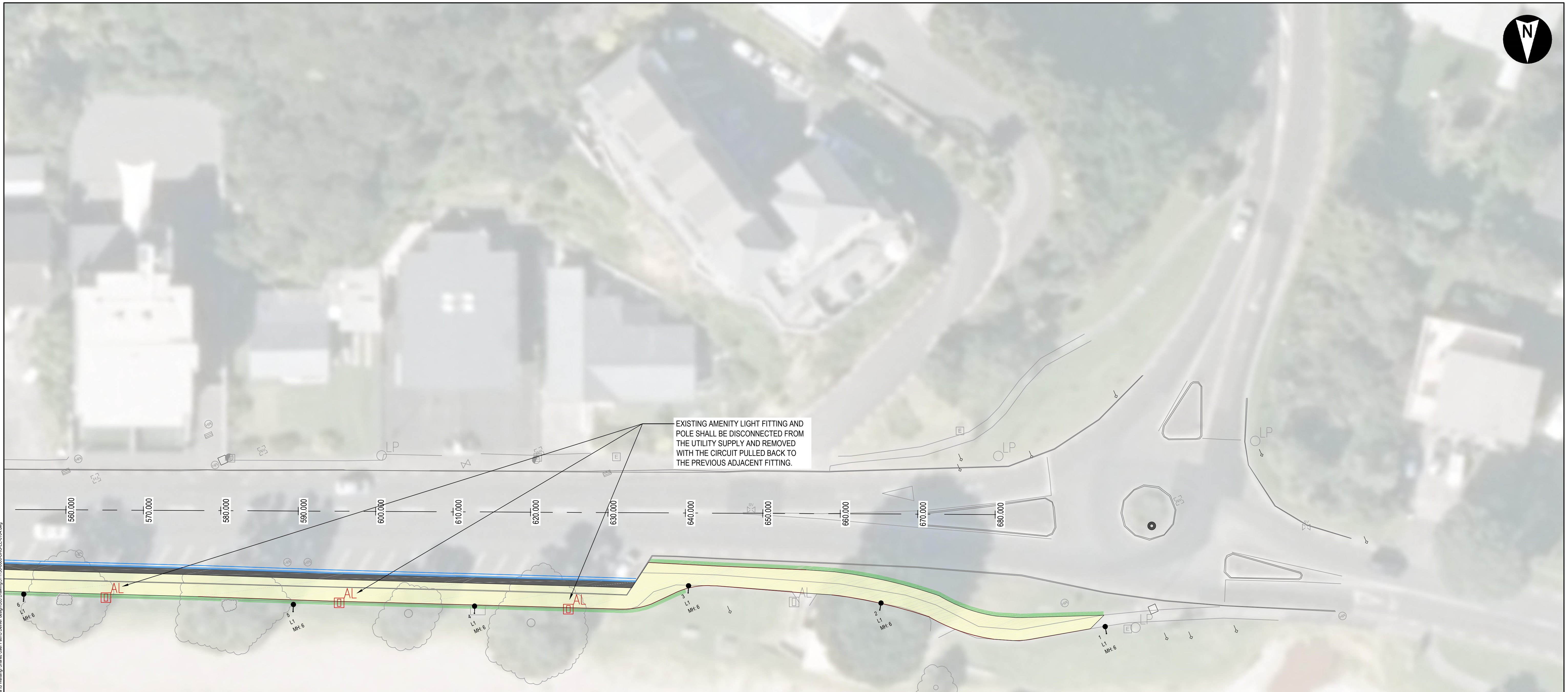
PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED: C. KENWORTHY
DATE: 2021-07-02

PROJECT: SH11 PAIHIA TO WAITANGI SHARED USER PATH

TITLE: LIGHTING LAYOUT PLAN SHEET 3

DRAWING No.: PROJECT No. 511738 – AREA 0000 – TYPE DRG – DISC EE – NUMBER 0103 – REV A



NOTES:

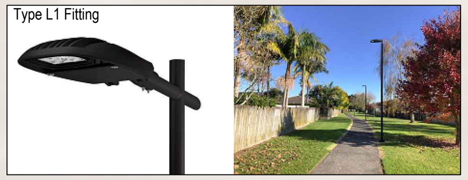
1. ALL NEW TYPE L1 LIGHT FITTINGS SHALL BE SUPPLIED WITH PROPRIETARY BLACK SQUARE POLE. FOR COSTING PURPOSE THIS IS BASED ON THE PS SERIES CROWN-WELD STRAIGHT STEEL POLE FROM ADLT WITH 6m MOUNTING HEIGHT. ALL POLES SHALL BE BLACK IN COLOUR. POLES SHALL COME WITH PRE-DESIGNED FOUNDATION CAGES. LENGTH OF MOUNTING TENONS SHALL BE CONFIRMED IN THE NEXT PHASE BUT WILL GENERALLY BE DESIGNED SO THAT THE LIGHT FITTINGS ARE ALIGNED WITH THE START OF THE SHARED USE PATH (ZERO METRE OVERHANG).

2. DETAILS OF ELECTRICAL UTILITY CONNECTION TO NEW LIGHT FITTINGS SHALL BE CONFIRMED IN THE NEXT DESIGN PHASE IN COORDINATION WITH TOP ENERGY AND FAR NORTH DISTRICT COUNCIL.

3. ALL NEW LIGHT FITTINGS SHALL BE 4000K COLOUR TEMPERATURE UNLESS SPECIFICALLY STATED OTHERWISE.

Luminaire Schedule	
L1	ADLT XSP HIGH OUTPUT SERIES OPTIC TYPE II LONG (2LG) 29W; 3770 LUMENS 4000K CCT NEMA 7 PIN + DALI

Type L1 Fitting



Luminaire Location Summary

LumNo	Label	Mounting Height	Tilt
1	L1	6	0
2	L1	6	0
3	L1	6	0
4	L1	6	0
5	L1	6	0
6	L1	6	0
7	L1	6	0
8	L1	6	0
9	L1	6	0
10	L1	6	0
11	L1	6	0
12	L1	6	0
13	L1	6	0
14	L1	6	0
15	L1	6	0
16	L1	6	0
17	L1	6	0
18	L1	6	0
19	L1	6	0
20	EXTG-LP	8	0
21	L1	6	0
22	L1	6	0

2.5 0 5 10m
SCALE 1:250

aurecon
www.aurecongroup.com

CLIENT
WAKA KOTAHI NZ TRANSPORT AGENCY

REV	DATE	REVISION DETAILS	APPROVED
A	2021-07-02	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY

SCALE	SIZE
1:250	A1

DRAWN: C.DAJI
DESIGNED: C. DAJI
REVIEWED: K.MILLER

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED: C. KENWORTHY
DATE: 2021-07-02

PROJECT: SH11 PAIHIA TO WAITANGI SHARED USER PATH

TITLE: LIGHTING LAYOUT PLAN SHEET 4

DRAWING No.

PROJECT No.	AREA	TYPE	DISC	NUMBER	REV
511738	0000	DRG	EE	0104	A

LEGEND

EXISTING FEATURES		
PROPERTY BOUNDARY	EXISTING BOLLARD	EXISTING SIGNAGE
EXISTING UPLIGHT / LIGHT POLE	EXISTING CATCHPIT	EXISTING STORMWATER PIPE
EXISTING KERB AND CHANNEL	EXISTING MANHOLE	
EXISTING TREE	EXISTING SERVICE BOX	
EXISTING AMENITY LIGHTING	EXISTING WATER METER	
EXISTING VALVES		

PROPOSED FEATURES		
STANDARD KERB AND CHANNEL	SHARED USE PATH BUFFER	AMENITY LIGHTING TO BE REMOVED
PRAM CROSSING	SHARED USE PATH (SUP)	BOLLARD TO BE RELOCATED
LIGHT POLE TO BE RELOCATED	NEW SUP LIGHTING	STORMWATER MANHOLE
UPLIGHT TO BE REMOVED	STORMWATER PIPE	
SUP BATTER WORKS	STORMWATER PIPE FLOW DIRECTION	
SAFETY FENCE	STORMWATER CATCHPIT	
	STORMWATER CATCHPIT MANHOLE	

NOTES

1. EXISTING LIGHTING INFRASTRUCTURE TO BE RELOCATED AS AFFECTED BY THE SHARED USE PATH (SUP). REFER TO DRAWINGS DRG-EE-0101 - 0104 FOR LIGHTING LAYOUT DETAILS.
2. EXISTING LINEMARKING AND COLOURED/TEXTURED SURFACING WITHIN PROJECT EXTENTS TO BE WATERBLASTED AND PROPOSED LINE MARKING APPLIED
3. REFER TO THE ARBORIST PLANS IN THE DESIGN REPORT FOR TREE REMOVAL AND PRUNING EXTENTS.
4. ALL KERB AND CHANNEL TO BE RETAINED UNLESS OTHERWISE STATED ON PLANS. NEW KERB AND CHANNEL TO BE CONSTRUCTED AS PER FNDC/S/3.
5. REFER TO TYPICAL CROSS SECTION DRAWINGS DRG-RR-0301-0302.
6. STORMWATER PIPE GRADES AND DEPTHS TO BE CONFIRMED IN NEXT DESIGN STAGE.
7. PROPOSED STORMWATER PIPES ARE RCRRJ CLASS 4 AND DIAMETER OF MANHOLE (Ø=1050MM), UNLESS OTHERWISE STATED.
8. CLEARANCE OF ALL UTILITIES MUST BE AS PER LOCAL COUNCIL STANDARDS.
9. STORMWATER WORK ASSOCIATED WITH CONNECTING TO LIVE COUNCIL MAINS MUST BE CARRIED OUT BY COUNCIL APPROVED CONTRACTORS.
10. WORK RELATED TO AC-PIPES MUST BE PERFORMED AS PER WORKSAFE CODE OF PRACTICE "MANAGEMENT AND REMOVAL OF ASBESTOS_ NOVEMBER 2016."
11. PROPOSED STORMWATER PIPE CONNECTIONS ARE BREAKING INTO EXISTING STORMWATER MANHOLES AS PER LOCAL COUNCIL STANDARDS/SPECIFICATIONS.

aurecon
www.aurecongroup.com

CLIENT
WAKA KOTAHI NZ TRANSPORT AGENCY

REV	DATE	REVISION DETAILS	APPROVED
B	2022-01-25	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY
A	2021-07-02	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY

SCALE	SIZE
1:250	A1

DRAWN: J. WARLICH-KOOLE
DESIGNED: P. NALIN
REVIEWED: M. FRANCIS

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED: C. KENWORTHY
DATE

PROJECT: SH11 PAIHIA TO WAITANGI SHARED USER PATH

TITLE: GENERAL ARRANGEMENT SHEET 1 OF 4

DRAWING No.	PROJECT No.	AREA	TYPE	DISC	NUMBER	REV
	511738	0000	DRG	RR	0101	B

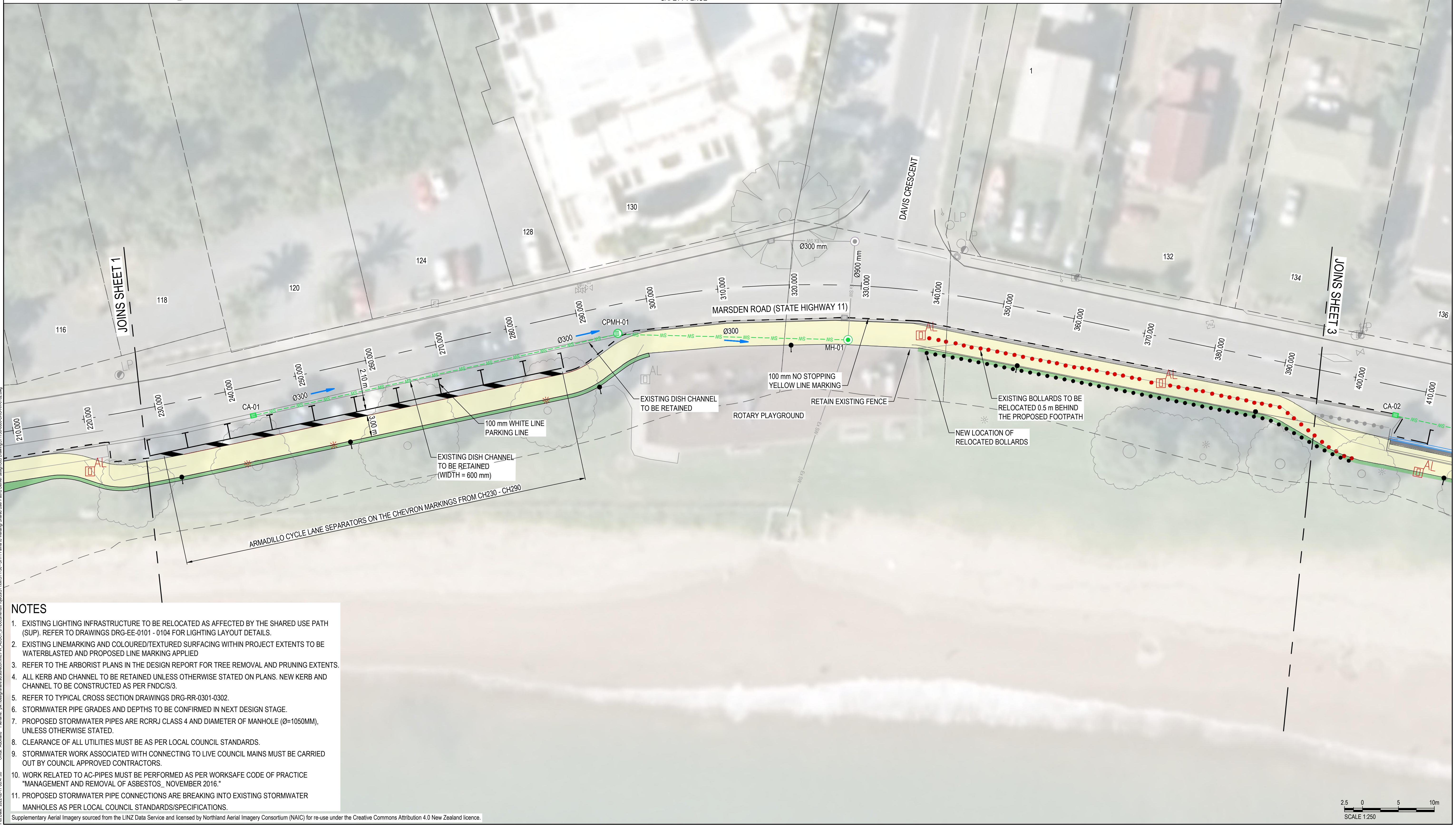
LEGEND

EXISTING FEATURES

- PROPERTY BOUNDARY
- EXISTING UPLIGHT / LIGHT POLE
- EXISTING KERB AND CHANNEL
- EXISTING TREE
- EXISTING AMENITY LIGHTING
- EXISTING BOLLARD
- EXISTING CATCHPIT
- EXISTING MANHOLE
- EXISTING SERVICE BOX
- EXISTING WATER METER
- EXISTING VALVES
- EXISTING SIGNAGE
- EXISTING STORMWATER PIPE

PROPOSED FEATURES

- STANDARD KERB AND CHANNEL
- PRAM CROSSING
- SHARED USE PATH BUFFER
- SHARED USE PATH (SUP)
- LIGHT POLE TO BE RELOCATED
- UPLIGHT TO BE REMOVED
- SUP BATTER WORKS
- SAFETY FENCE
- AMENITY LIGHTING TO BE REMOVED
- BOLLARD TO BE RELOCATED
- NEW SUP LIGHTING
- STORMWATER PIPE
- STORMWATER PIPE FLOW DIRECTION
- STORMWATER CATCHPIT
- STORMWATER CATCHPIT MANHOLE
- STORMWATER MANHOLE



NOTES

1. EXISTING LIGHTING INFRASTRUCTURE TO BE RELOCATED AS AFFECTED BY THE SHARED USE PATH (SUP). REFER TO DRAWINGS DRG-EE-0101 - 0104 FOR LIGHTING LAYOUT DETAILS.
2. EXISTING LINEMARKING AND COLOURED/TEXTURED SURFACING WITHIN PROJECT EXTENTS TO BE WATERBLASTED AND PROPOSED LINE MARKING APPLIED
3. REFER TO THE ARBORIST PLANS IN THE DESIGN REPORT FOR TREE REMOVAL AND PRUNING EXTENTS.
4. ALL KERB AND CHANNEL TO BE RETAINED UNLESS OTHERWISE STATED ON PLANS. NEW KERB AND CHANNEL TO BE CONSTRUCTED AS PER FNDC/S/3.
5. REFER TO TYPICAL CROSS SECTION DRAWINGS DRG-RR-0301-0302.
6. STORMWATER PIPE GRADES AND DEPTHS TO BE CONFIRMED IN NEXT DESIGN STAGE.
7. PROPOSED STORMWATER PIPES ARE RCRRJ CLASS 4 AND DIAMETER OF MANHOLE (Ø=1050MM), UNLESS OTHERWISE STATED.
8. CLEARANCE OF ALL UTILITIES MUST BE AS PER LOCAL COUNCIL STANDARDS.
9. STORMWATER WORK ASSOCIATED WITH CONNECTING TO LIVE COUNCIL MAINS MUST BE CARRIED OUT BY COUNCIL APPROVED CONTRACTORS.
10. WORK RELATED TO AC-PIPES MUST BE PERFORMED AS PER WORKSAFE CODE OF PRACTICE "MANAGEMENT AND REMOVAL OF ASBESTOS_ NOVEMBER 2016."
11. PROPOSED STORMWATER PIPE CONNECTIONS ARE BREAKING INTO EXISTING STORMWATER MANHOLES AS PER LOCAL COUNCIL STANDARDS/SPECIFICATIONS.

aurecon
www.aurecongroup.com

CLIENT: WAKA KOTAHI NZ TRANSPORT AGENCY

REV	DATE	REVISION DETAILS	APPROVED
B	2022-01-25	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY
A	2021-07-02	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY

SCALE	SIZE
1:250	A1

DRAWN: J. WARLICH-KOOLE
DESIGNED: P. NALIN
REVIEWED: M. FRANCIS

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED: C. KENWORTHY DATE

PROJECT: SH11 PAIHIA TO WAITANGI SHARED USER PATH

TITLE: GENERAL ARRANGEMENT SHEET 2 OF 4

DRAWING No.: PROJECT No. 511738 – AREA 0000 – TYPE DRG – DISC RR – NUMBER 0102 – REV B

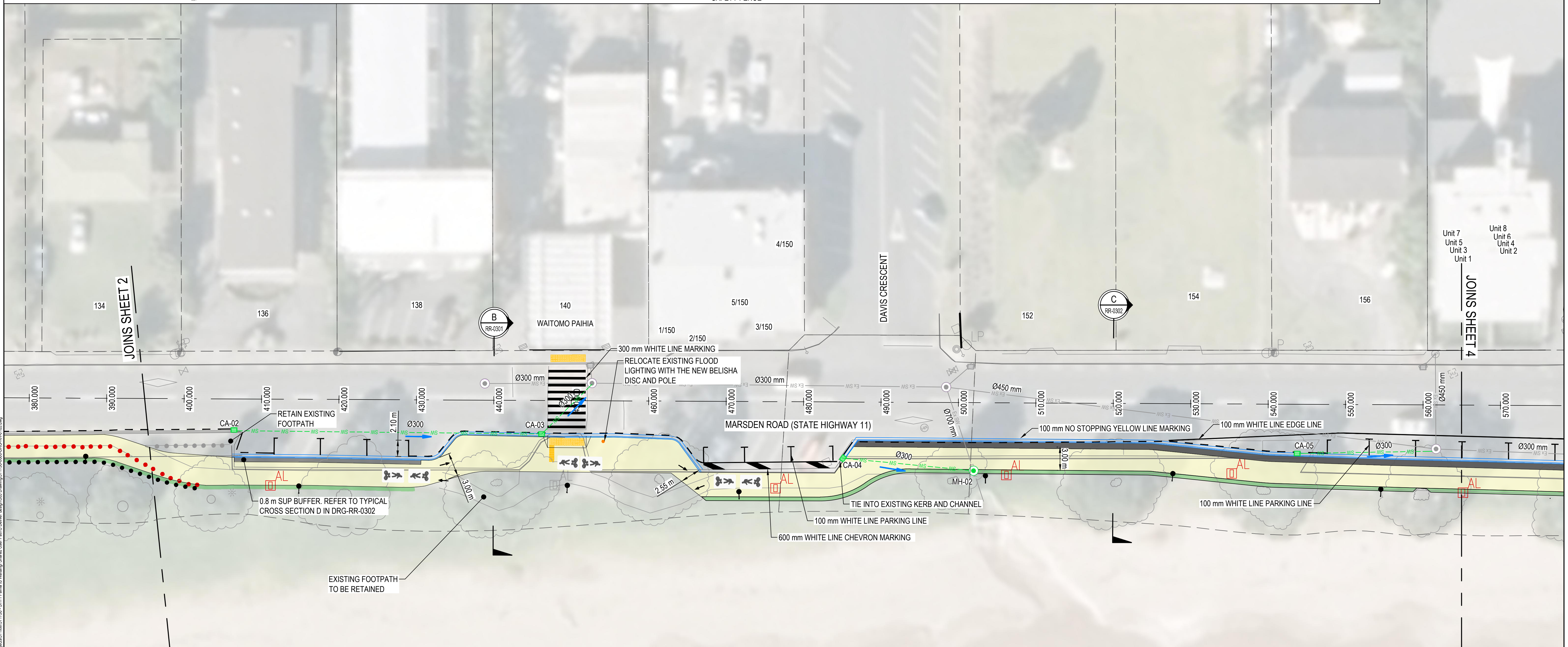
LEGEND

EXISTING FEATURES

- PROPERTY BOUNDARY
- EXISTING UPLIGHT / LIGHT POLE
- EXISTING KERB AND CHANNEL
- EXISTING TREE
- EXISTING AMENITY LIGHTING
- EXISTING BOLLARD
- EXISTING CATCHPIT
- EXISTING MANHOLE
- EXISTING SERVICE BOX
- EXISTING WATER METER
- EXISTING VALVES
- EXISTING SIGNAGE
- EXISTING STORMWATER PIPE

PROPOSED FEATURES

- STANDARD KERB AND CHANNEL
- PRAM CROSSING
- SHARED USE PATH BUFFER
- SHARED USE PATH (SUP)
- LIGHT POLE TO BE RELOCATED
- UPLIGHT TO BE REMOVED
- SUP BATTER WORKS
- SAFETY FENCE
- AMENITY LIGHTING TO BE REMOVED
- BOLLARD TO BE RELOCATED
- NEW SUP LIGHTING
- STORMWATER PIPE
- STORMWATER PIPE FLOW DIRECTION
- STORMWATER CATCHPIT
- STORMWATER CATCHPIT MANHOLE
- STORMWATER MANHOLE



NOTES

1. EXISTING LIGHTING INFRASTRUCTURE TO BE RELOCATED AS AFFECTED BY THE SHARED USE PATH (SUP). REFER TO DRAWINGS DRG-EE-0101 - 0104 FOR LIGHTING LAYOUT DETAILS.
2. EXISTING LINEMARKING AND COLOURED/TEXTURED SURFACING WITHIN PROJECT EXTENTS TO BE WATERBLASTED AND PROPOSED LINE MARKING APPLIED
3. REFER TO THE ARBORIST PLANS IN THE DESIGN REPORT FOR TREE REMOVAL AND PRUNING EXTENTS.
4. ALL KERB AND CHANNEL TO BE RETAINED UNLESS OTHERWISE STATED ON PLANS. NEW KERB AND CHANNEL TO BE CONSTRUCTED AS PER FNDC/S/3.
5. REFER TO TYPICAL CROSS SECTION DRAWINGS DRG-RR-0301-0302.
6. STORMWATER PIPE GRADES AND DEPTHS TO BE CONFIRMED IN NEXT DESIGN STAGE.
7. PROPOSED STORMWATER PIPES ARE RCRRJ CLASS 4 AND DIAMETER OF MANHOLE (Ø=1050MM), UNLESS OTHERWISE STATED.
8. CLEARANCE OF ALL UTILITIES MUST BE AS PER LOCAL COUNCIL STANDARDS.
9. STORMWATER WORK ASSOCIATED WITH CONNECTING TO LIVE COUNCIL MAINS MUST BE CARRIED OUT BY COUNCIL APPROVED CONTRACTORS.
10. WORK RELATED TO AC-PIPES MUST BE PERFORMED AS PER WORKSAFE CODE OF PRACTICE "MANAGEMENT AND REMOVAL OF ASBESTOS_ NOVEMBER 2016."
11. PROPOSED STORMWATER PIPE CONNECTIONS ARE BREAKING INTO EXISTING STORMWATER MANHOLES AS PER LOCAL COUNCIL STANDARDS/SPECIFICATIONS.

aurecon
www.aurecongroup.com

CLIENT: WAKA KOTAHI NZ TRANSPORT AGENCY

REV	DATE	REVISION DETAILS	APPROVED
B	2022-01-25	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY
A	2021-07-02	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY

SCALE	1:250
SIZE	A1
DRAWN	J. WARLICH-KOOLE
DESIGNED	P. NALIN
REVIEWED	M. FRANCIS

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED: C. KENWORTHY
DATE

PROJECT	SH11 PAIHIA TO WAITANGI SHARED USER PATH
TITLE	GENERAL ARRANGEMENT SHEET 3 OF 4
DRAWING No.	511738 – 0000 – DRG – RR – 0103 – B

PROJECT No.	AREA	TYPE	DISC	NUMBER	REV
511738	0000	DRG	RR	0103	B

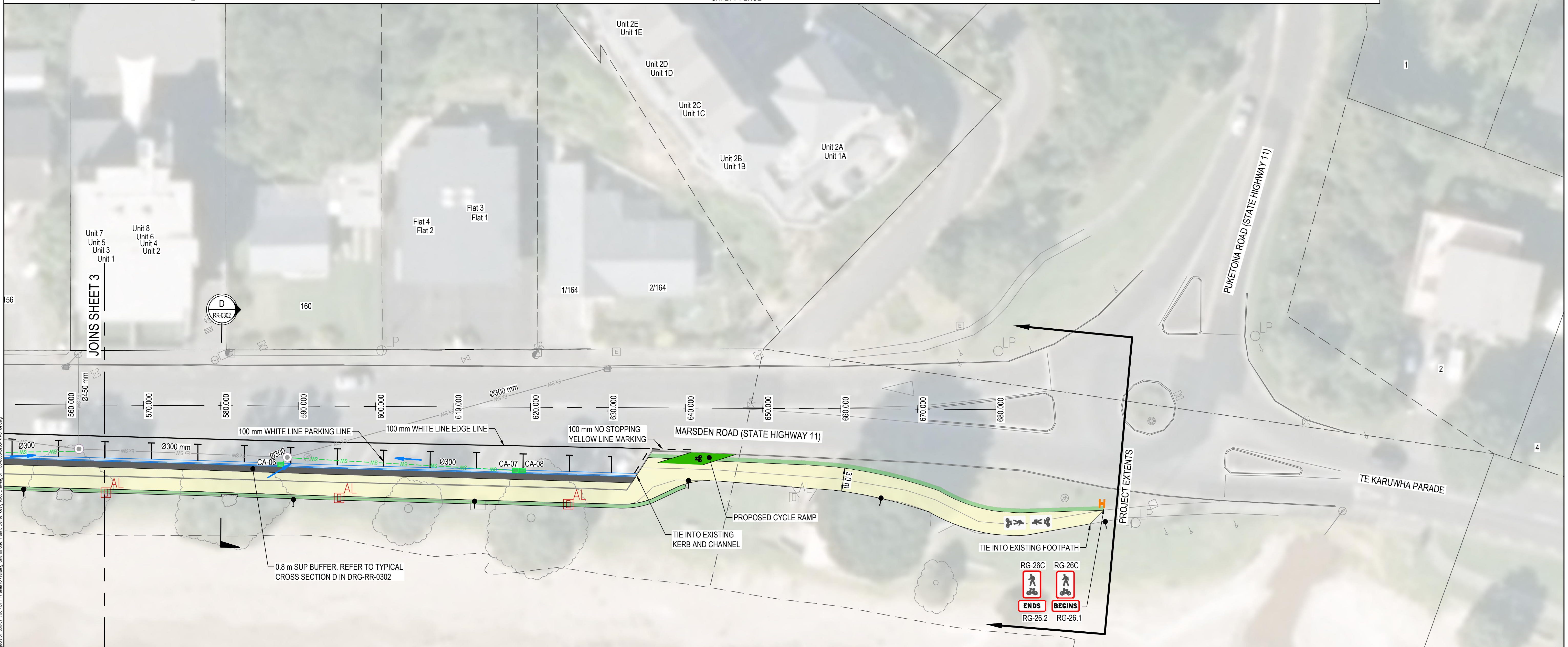
LEGEND

EXISTING FEATURES

- PROPERTY BOUNDARY
- EXISTING UPLIGHT / LIGHT POLE
- EXISTING KERB AND CHANNEL
- EXISTING TREE
- EXISTING AMENITY LIGHTING
- EXISTING BOLLARD
- EXISTING CATCHPIT
- EXISTING MANHOLE
- EXISTING SERVICE BOX
- EXISTING WATER METER
- EXISTING VALVES
- EXISTING SIGNAGE
- EXISTING STORMWATER PIPE

PROPOSED FEATURES

- STANDARD KERB AND CHANNEL
- PRAM CROSSING
- SHARED USE PATH BUFFER
- SHARED USE PATH (SUP)
- LIGHT POLE TO BE RELOCATED
- UPLIGHT TO BE REMOVED
- SUP BATTER WORKS
- SAFETY FENCE
- AMENITY LIGHTING TO BE REMOVED
- BOLLARD TO BE RELOCATED
- NEW SUP LIGHTING
- STORMWATER PIPE
- STORMWATER PIPE FLOW DIRECTION
- STORMWATER CATCHPIT
- STORMWATER CATCHPIT MANHOLE
- STORMWATER MANHOLE



NOTES

1. EXISTING LIGHTING INFRASTRUCTURE TO BE RELOCATED AS AFFECTED BY THE SHARED USE PATH (SUP). REFER TO DRAWINGS DRG-EE-0101 - 0104 FOR LIGHTING LAYOUT DETAILS.
2. EXISTING LINEMARKING AND COLOURED/TEXTURED SURFACING WITHIN PROJECT EXTENTS TO BE WATERBLASTED AND PROPOSED LINE MARKING APPLIED
3. REFER TO THE ARBORIST PLANS IN THE DESIGN REPORT FOR TREE REMOVAL AND PRUNING EXTENTS.
4. ALL KERB AND CHANNEL TO BE RETAINED UNLESS OTHERWISE STATED ON PLANS. NEW KERB AND CHANNEL TO BE CONSTRUCTED AS PER FNDC/S/3.
5. REFER TO TYPICAL CROSS SECTION DRAWINGS DRG-RR-0301-0302.
6. STORMWATER PIPE GRADES AND DEPTHS TO BE CONFIRMED IN NEXT DESIGN STAGE.
7. PROPOSED STORMWATER PIPES ARE RCRRJ CLASS 4 AND DIAMETER OF MANHOLE (Ø=1050MM), UNLESS OTHERWISE STATED.
8. CLEARANCE OF ALL UTILITIES MUST BE AS PER LOCAL COUNCIL STANDARDS.
9. STORMWATER WORK ASSOCIATED WITH CONNECTING TO LIVE COUNCIL MAINS MUST BE CARRIED OUT BY COUNCIL APPROVED CONTRACTORS.
10. WORK RELATED TO AC-PIPES MUST BE PERFORMED AS PER WORKSAFE CODE OF PRACTICE "MANAGEMENT AND REMOVAL OF ASBESTOS_ NOVEMBER 2016."
11. PROPOSED STORMWATER PIPE CONNECTIONS ARE BREAKING INTO EXISTING STORMWATER MANHOLES AS PER LOCAL COUNCIL STANDARDS/SPECIFICATIONS.

SCALE 1:250

aurecon
www.aurecongroup.com

CLIENT: WAKA KOTAHI NZ TRANSPORT AGENCY

REV	DATE	REVISION DETAILS	APPROVED
B	2022-01-25	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY
A	2021-07-02	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY

SCALE	1:250
SIZE	A1
DRAWN	J. WARLICH-KOOLE
DESIGNED	P. NALIN
REVIEWED	M. FRANCIS

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED: C. KENWORTHY
DATE

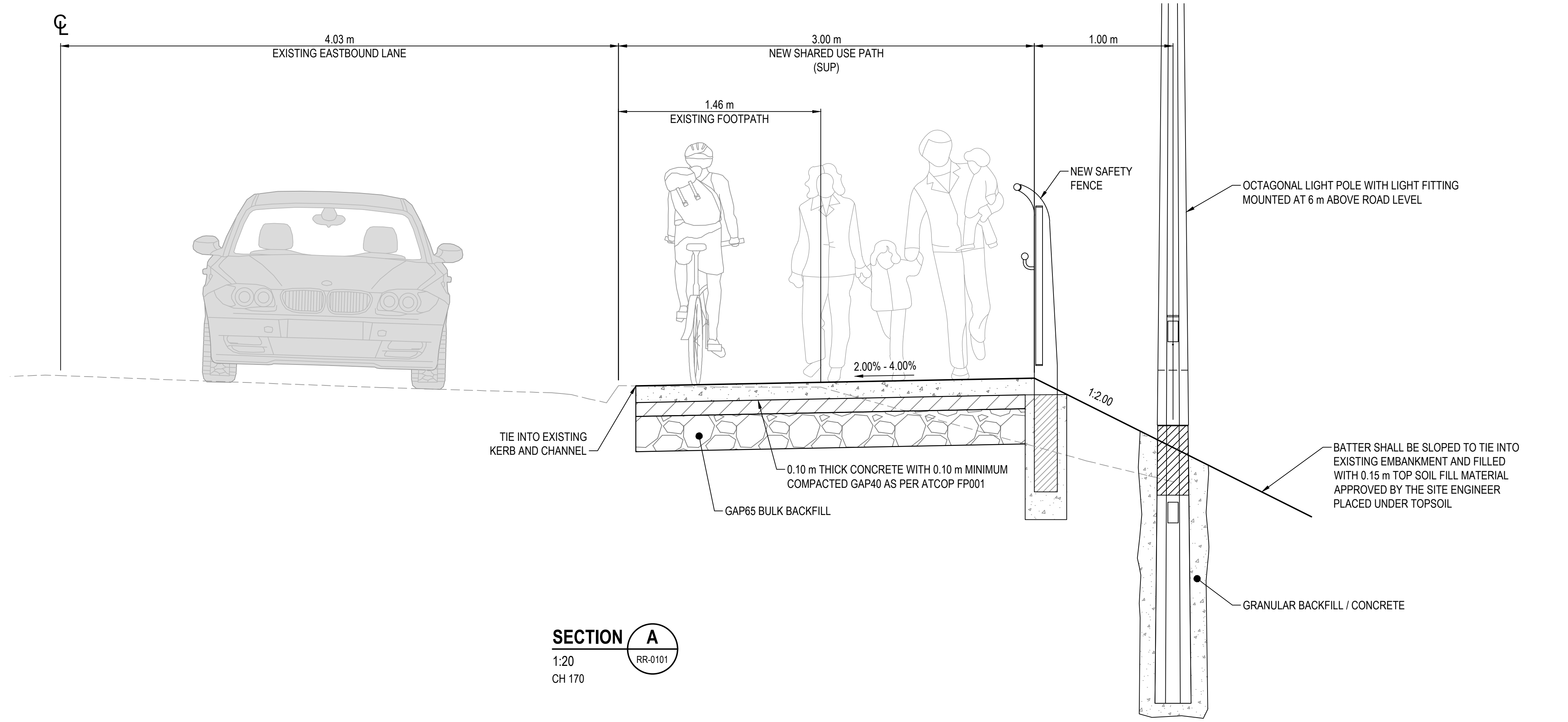
PROJECT: SH11 PAIHIA TO WAITANGI SHARED USER PATH

TITLE: GENERAL ARRANGEMENT SHEET 4 OF 4

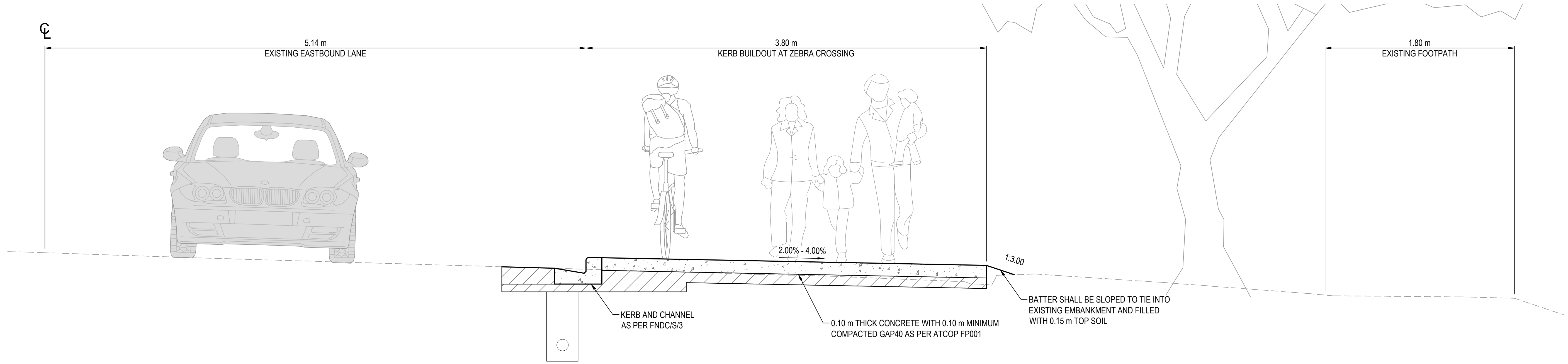
DRAWING No.	PROJECT No.	AREA	TYPE	DISC	NUMBER	REV
	511738	0000	DRG	RR	0104	B

LEGEND

EXISTING SURFACE	
DESIGN SURFACE	
CONTROL LINE	℄



SECTION A RR-0101
1:20
CH 170



NOTES

1. ALL FEATURES SHOWN INDICATIVELY ONLY.
2. ROADSIDE FEATURES - REFER TO 511738-000-DRG-RR-0101 SERIES.
3. STORMWATER - REFER TO 511738-000-DRG-RR-0101 SERIES.
4. LIGHTING - REFER TO 511738-000-DRG-EE-0101 SERIES.

SECTION B RR-0103
1:20
CH 440

0.2 0 0.4 0.8m
SCALE 1:20

aurecon
www.aurecongroup.com

CLIENT
WAKA KOTAHI NZ TRANSPORT AGENCY

REV	DATE	REVISION DETAILS	APPROVED
A	2021-07-02	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY

SCALE	1:20
SIZE	A1
DRAWN	J. WARLICH-KOOLE
DESIGNED	P. NALIN
REVIEWED	M. FRANCIS

PRELIMINARY
NOT FOR CONSTRUCTION

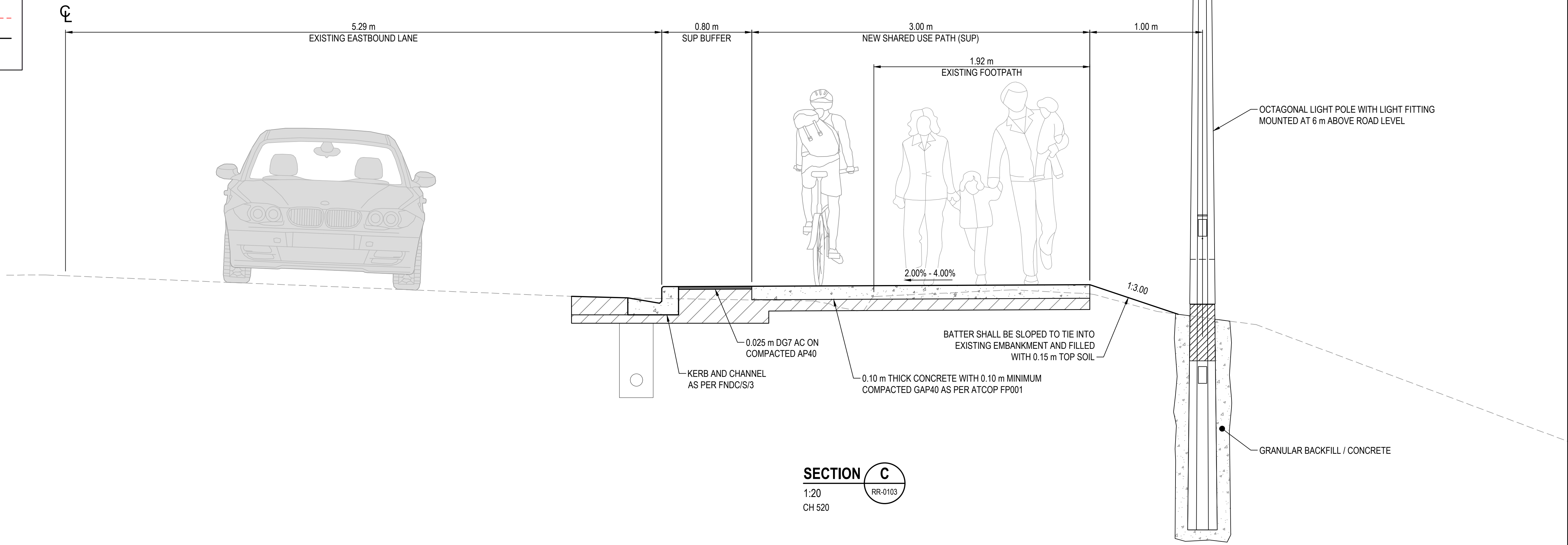
APPROVED
DATE 2021-07-02
C. KENWORTHY

PROJECT	SH11 PAIHIA TO WAITANGI SHARED USER PATH
TITLE	CROSS SECTIONS SHEET 1

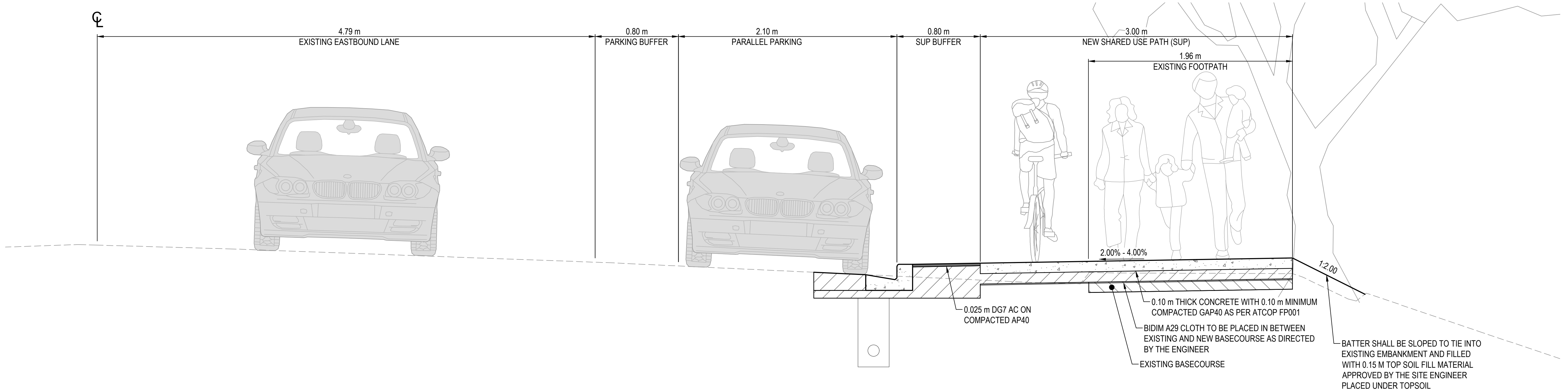
DRAWING No.	PROJECT No.	AREA	TYPE	DISC	NUMBER	REV
	511738	0000	DRG	RR	0301	A

LEGEND

EXISTING SURFACE	
DESIGN SURFACE	
CONTROL LINE	℄



SECTION C
1:20
CH 520
RR-0103



SECTION D
1:20
CH 580
RR-0104

NOTES

1. ALL FEATURES SHOWN INDICATIVELY ONLY.
2. ROADSIDE FEATURES - REFER TO 511738-000-DRG-RR-0101 SERIES.
3. STORMWATER - REFER TO 511738-000-DRG-RR-0101 SERIES.
4. LIGHTING - REFER TO 511738-000-DRG-EE-0101 SERIES.

0.2 0 0.4 0.8m
SCALE 1:20

Plot Date: 2021-07-01 12:57:00 Office: Auckland Filename: pw:\\designshare.au.aurecon.info:PW_AUDC1_01\Documents\Projects\511xxx\511738 - SH11 Paihia to Waitangi Shared User Path\5 Deliver design\503 Drawing\511738-0000-DRG-RR-0302.dwg

aurecon
www.aurecongroup.com

CLIENT: WAKA KOTAHI NZ TRANSPORT AGENCY

REV	DATE	REVISION DETAILS	APPROVED
A	2021-07-02	ISSUED FOR PRELIMINARY DESIGN	C. KENWORTHY

SCALE	1:20
SIZE	A1
DRAWN	J. WARLICH-KOOLE
DESIGNED	P. NALIN
REVIEWED	M. FRANCIS

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED
DATE 2021-07-02
C. KENWORTHY

PROJECT	SH11 PAIHIA TO WAITANGI SHARED USER PATH
TITLE	CROSS SECTIONS SHEET 2

DRAWING No.	PROJECT No.	AREA	TYPE	DISC	NUMBER	REV
	511738	0000	DRG	RR	0302	A

Appendix C

Parking Impacts Assessment and capacity of surrounding carparks

Aurecon New Zealand Limited
Level 3, Air New Zealand Building
185 Fanshawe Street,
Wynyard Quarter 1010

PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
E auckland@aurecongroup.com
W aurecongroup.com

Technical Note

To	**Warren Feek, Tim Elliot**	From	**Lupesina Koro**
Copy	**Pieu Nalin**	Reference	**511738**
Date	**2022-01-21**	Pages (including this page)	**3**
Subject	**Parking capacity impact assessment**		

1 Purpose

This parking assessment assesses the existing parking provision on State Highway 11 (SH11), Marsden Road between Nihonui point and Te Karuwha Parade, and the available capacity of the surrounding network, mainly the nearest local road, Davis Crescent, as shown in Figure 1. Parking capacity has been estimated using dimensions according to FNDC standards.

It is necessary to assess the carpark capacity of surrounding areas because the proposed design for the Paihia to Waitangi shared user path (SUP) will result in a reduction in car parking spaces. This assessment was completed outside of the peak season, when there are fewer visitors to the Bay of Islands therefore is primarily desktop based and a car park occupancy study was not undertaken Anecdotal evidence from prior engagement with stakeholders during the development of the SH11 SSBC suggested that parking demand can exceed existing supply in the summer months..

2 Existing situation

At present there are 89 parking spaces available on the eastbound (seaward) side of SH11 as outlined in red in Figure 1. There are no time restrictions on these spaces.

The road is marked no stopping at all times in the westboud direction with the exception of in front of the local shops which is marked P10 (8:00 – 17:00, 7 days). There is space for approximately 3 vehicles.

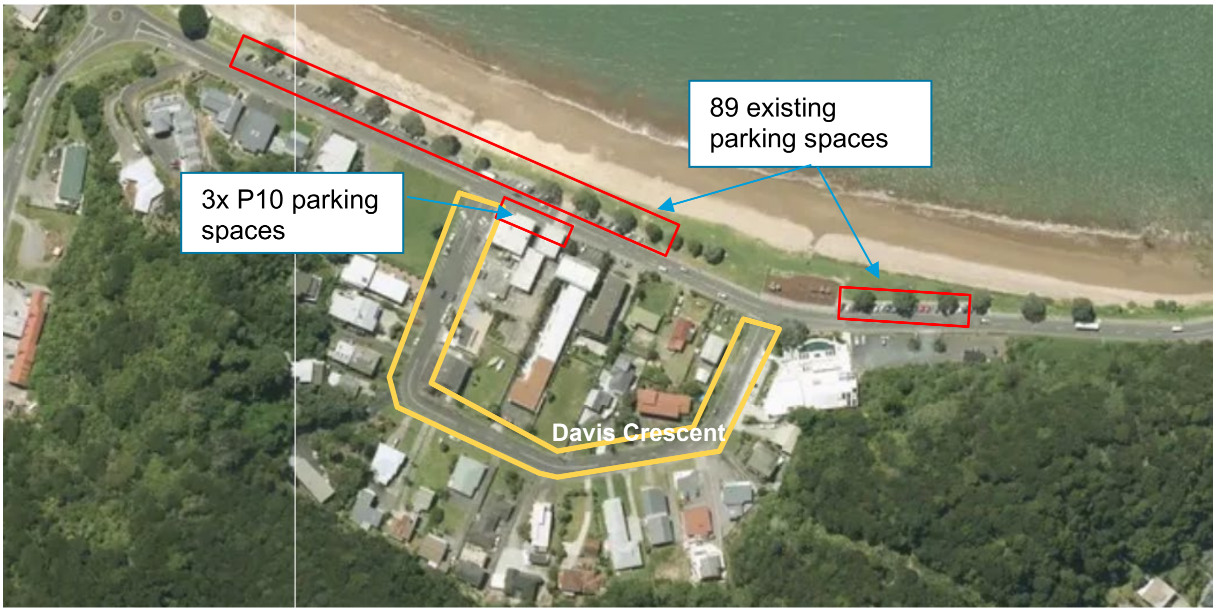


Figure 1: SH11 Marsden Road and Davis Crescent *(Source: https://data.linz.govt.nz/data/)*

The provision of parking along Davis Cresecent includes:

- 21 P30 angled parking spaces
- 12 perpendicular parking spaces (no time limit)
- On street kerb-side parking (estimated space for 40-50 vehicles)

Typically the land parcels around Davis Crescent are large in size and have off-street car parking facilities. The properties are a mixture of commercial and residential, as outlined in the Consenting Strategy, July 2021. There are 8 accommodation sites, a mixture of hotels and motels on both SH11 and Davis Crescent, and each of which have off-street parking facilities.

The following observations were made from various visits to the site:

- A number of the car parking spaces are occupied by freedom camping vehicles and motorhomes
- Vehicles with boat trailers commonly park for a short stay either across the westbound angle parks or in the P10 westbound spaces to purchase bait and supplies from the suprette.

The area is not listed on Far North District Council's responsible free camping sites[1] however as SH11, Marsden Road is designated a state highway, FNDC council officers cannot enforce parking controls on the state highway.

Figure 2: Existing parking on Davis Crescent

[1] https://www.fndc.govt.nz/Visiting-the-Far-North/Responsible-camping?BestBetMatch=freedom%20camping|28911163-c80a-4343-938d-d968e3ae9015|fc9462bd-8413-4be1-a1a5-6a79217d0b98|en-AU

3 Proposed

The preliminary design for the Paihia to Waitangi SUP includes reducing the 89 parks on SH11 to 31. A reduction of 65% (refer to section 2.4.5 of the Preliminary Deisgn Report). Based on this desktop assessment of Davis Crescent, there is latent capacity to absorb this loss in parking capacity on SH11, albeit slightly further (100m) away from the beach.

FNDC indicated that a car parking strategy for the area is due to commence and will be aligned with the National Parking Management Guidance, 2020 produced by Waka Kotahi. It is unknown if this will also consider parking on the state highways or only local roads managed by FNDC as the road controlling authority.

There are two additional sites which could be considered in future stages to provide additional parking capacity to supplement that removed for the SUP, if required. However, noting that these are both FNDC properties and therefore outside of Waka Kotahi control.

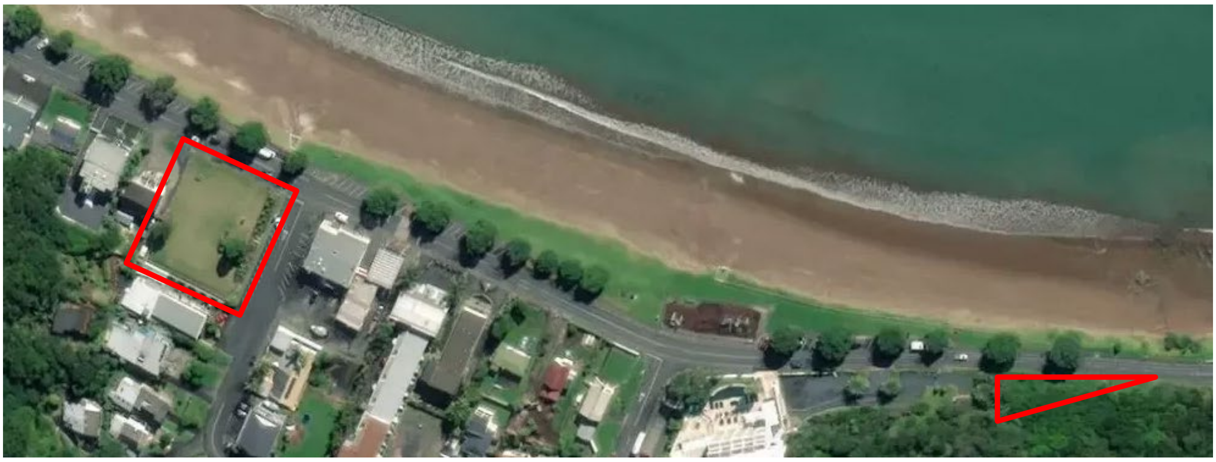


Figure 3: Additional parking provision sites

4 Next steps

Parking is important for visitors and locals alike and ensures people can access and enjoy the amenity of Te Tii beach. In future stages of the project the following should be considered:

1. Engagement with local businesses to understand the requirements for their staff and customers
2. Public engagement to gather community sentiment towards the shared user path and potential reduction in parking on SH11
3. Engagement with accommodation providers to understand how many parking spaces they have for their guests and if any require on-street parking for overflow purposes
4. Review of the existing time restrictions and management of the car parking spaces on Davis Crescent, do these meet the needs of the local community and visitors
5. Parking provision for larger vehicles such as motor homes and those towing boats.
6. Car park occupancy survey in high season to collect data on use and duration of stay.

Version	Date	Description	Author	Reviewer	Approver
0	2021-07-04	Draft	L. Koro	C. Kenworthy	C. Kenworthy
1	2022-01-21	FINAL	L. Koro	C. Kenworthy	C. Kenworthy

Appendix D

Lighting Calculations

A3

Luminaire Schedule

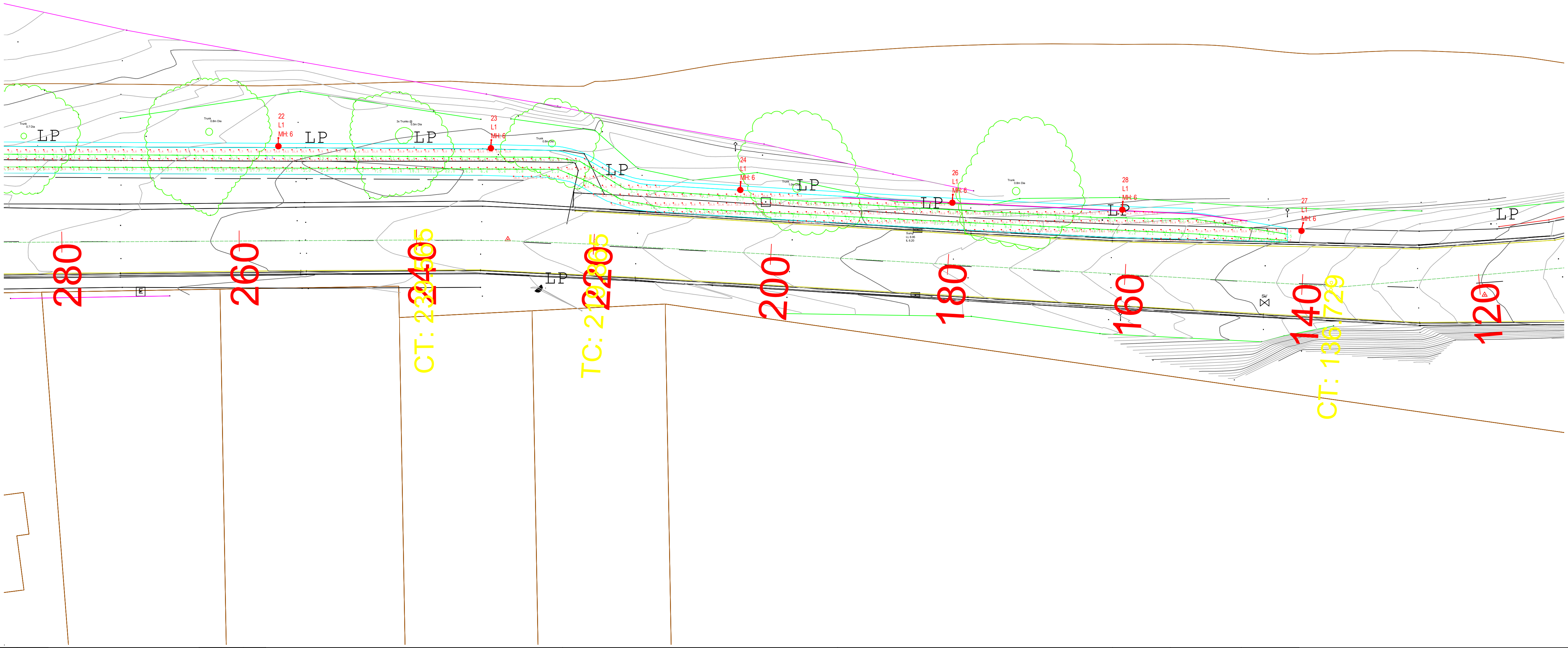
Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens
	21	L1	SINGLE	0.817	XSPD022LGH40K_24-#1	3346
	1	EXTG-LP	SINGLE	1.000	XSPD022LGH40K_24-#6	7436

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Max/Avg
SUP_Eh	Illuminance	Lux	9.94	20.7	1.4	2.08
SUP_Epv_3	Illuminance	Lux	8.21	30.2	0.3	3.68
SUP_Epv_4	Illuminance	Lux	8.89	30.1	0.3	3.39

Luminaire Location Summary

LumNo	Label	Mounting Height	Tilt
1	L1	6	0
2	L1	6	0
3	L1	6	0
4	L1	6	0
6	L1	6	0
8	L1	6	0
9	L1	6	0
10	L1	6	0
11	L1	6	0
12	L1	6	0
14	L1	6	0
15	L1	6	0
16	L1	6	0
18	L1	6	0
20	L1	6	0
22	L1	6	0
23	L1	6	0
24	L1	6	0
26	L1	6	0
27	L1	6	0
28	L1	6	0
29	EXTG-LP	8	0



No.	Date	Revision Details	By	Ver.	App.
A	02.07.21	PRELIMINARY DESIGN	CD	KM	CK

aurecon

Aurecon New Zealand Limited
139 Carlton Gore Road (PO Box 9762) Newmarket
Auckland New Zealand

Telephone: +64 9 520-6019
Facisimile: +64 9 524-7815
Email: auckland@ap.aurecongroup.com

Client: WAKA KOTAHI NZ TRANSPORT AGENCY

Project: SH11 PAIHIA TO WAITANGI SHARED USE PATH

	Signed	Date
Drawn CD		02.07.2021
Designed CD		02.07.2021
Verified KM		02.07.2021
Approved CK		02.07.2021

Drawing Title: SH11 PAIHIA TO WAITANGI SUP LIGHTING CALCULATIONS SHEET 1 OF 4

Aurecon Project No. 511738

Scale 1:500 @ A3

Drawing No. 511738-0000-CAL-EE-0001

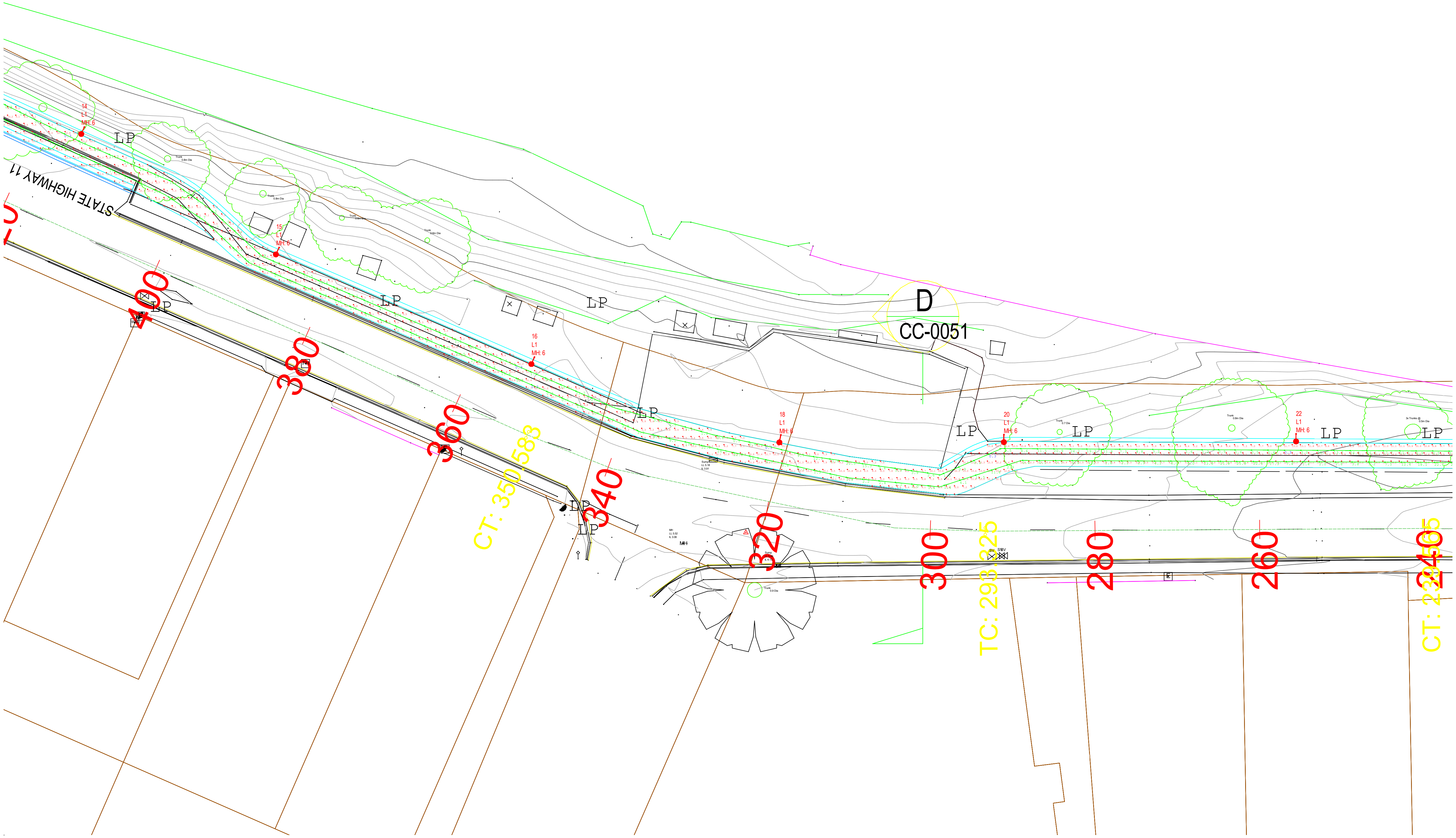
Rev. A

A3

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens
	21	L1	SINGLE	0.817	XSPD022LGH40K_24-#1	3346
	1	EXTG-LP	SINGLE	1.000	XSPD022LGH40K_24-#6	7436

Calculation Summary						
Label	CalcType	Units	Avg	Max	Min	Max/Avg
SUP_Eh	Illuminance	Lux	9.94	20.7	1.4	2.08
SUP_Epv_3	Illuminance	Lux	8.21	30.2	0.3	3.68
SUP_Epv_4	Illuminance	Lux	8.89	30.1	0.3	3.39

Luminaire Location Summary			
LumNo	Label	Mounting Height	Tilt
1	L1	6	0
2	L1	6	0
3	L1	6	0
4	L1	6	0
6	L1	6	0
8	L1	6	0
9	L1	6	0
10	L1	6	0
11	L1	6	0
12	L1	6	0
14	L1	6	0
15	L1	6	0
16	L1	6	0
18	L1	6	0
20	L1	6	0
22	L1	6	0
23	L1	6	0
24	L1	6	0
26	L1	6	0
27	L1	6	0
28	L1	6	0
29	EXTG-LP	8	0



A	02.07.21	PRELIMINARY DESIGN	CD	KM	CK
No.	Date	Revision Details	By	Ver.	App.

aurecon

Aurecon New Zealand Limited
139 Carlton Gore Road (PO Box 9762) Newmarket
Auckland New Zealand

Telephone: +64 9 520-6019
Facismile: +64 9 524-7815
Email: auckland@ap.aurecongroup.com

Client:

WAKA KOTAHI
NZ TRANSPORT
AGENCY

Project:

SH11 PAIHIA TO WAITANGI
SHARED USE PATH

Drawn CD	Signed	Date 02.07.2021
Designed CD	Signed	Date 02.07.2021
Verified KM	Signed	Date 02.07.2021
Approved CK	Signed	Date 02.07.2021

Drawing Title:

SH11 PAIHIA TO WAITANGI SUP
LIGHTING CALCULATIONS
SHEET 2 OF 4

Aurecon Project No.
511738

Scale
1:500 @ A3

Drawing No. 511738-0000-CAL-EE-0002

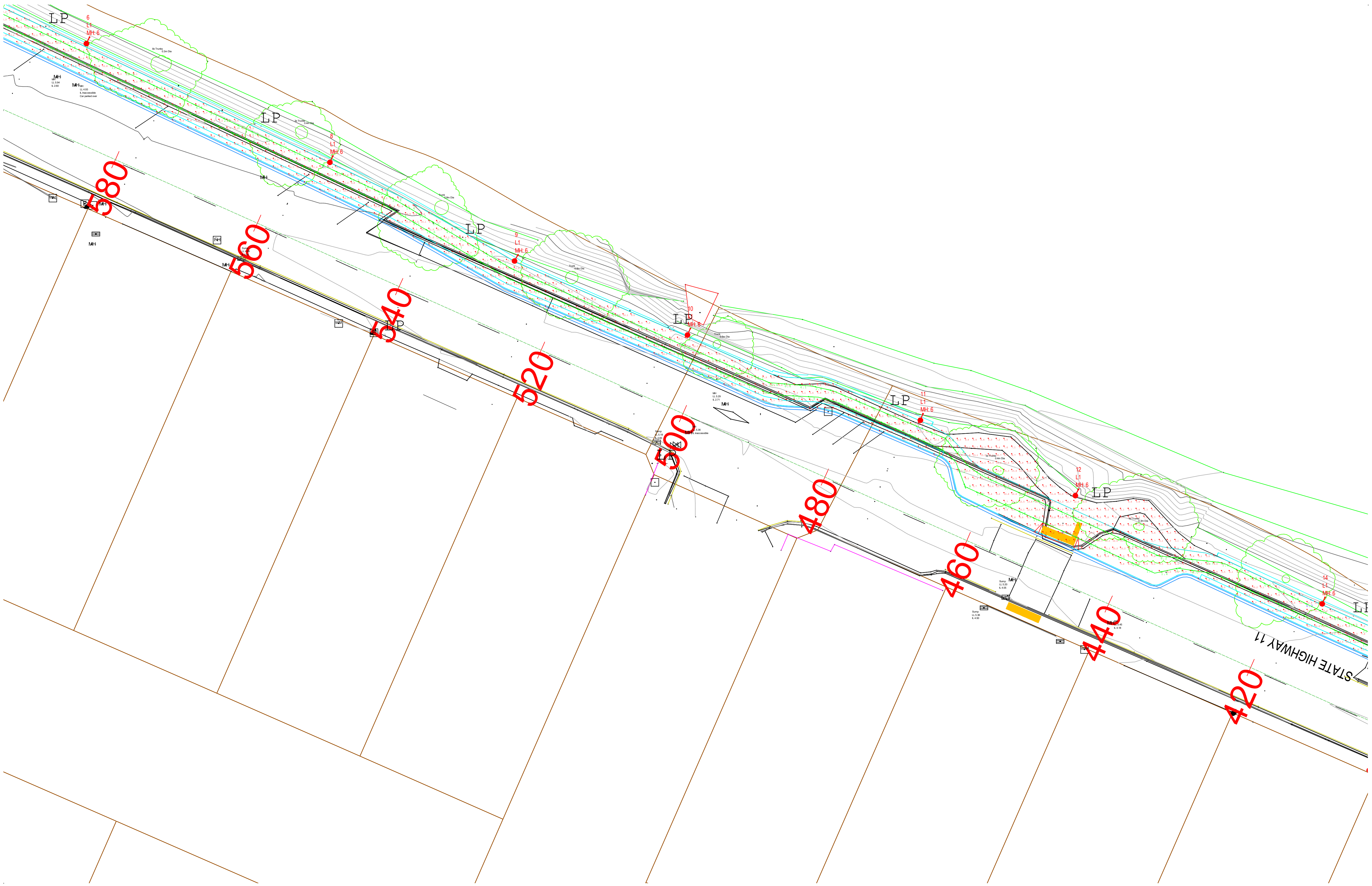
Rev. A

A3

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens
	21	L1	SINGLE	0.817	XSPD022LGH40K_24-#1	3346
	1	EXTG-LP	SINGLE	1.000	XSPD022LGH40K_24-#6	7436

Calculation Summary						
Label	CalcType	Units	Avg	Max	Min	Max/Avg
SUP_Eh	Illuminance	Lux	9.94	20.7	1.4	2.08
SUP_Epv_3	Illuminance	Lux	8.21	30.2	0.3	3.68
SUP_Epv_4	Illuminance	Lux	8.89	30.1	0.3	3.39

Luminaire Location Summary			
LumNo	Label	Mounting Height	Tilt
1	L1	6	0
2	L1	6	0
3	L1	6	0
4	L1	6	0
6	L1	6	0
8	L1	6	0
9	L1	6	0
10	L1	6	0
11	L1	6	0
12	L1	6	0
14	L1	6	0
15	L1	6	0
16	L1	6	0
18	L1	6	0
20	L1	6	0
22	L1	6	0
23	L1	6	0
24	L1	6	0
26	L1	6	0
27	L1	6	0
28	L1	6	0
29	EXTG-LP	8	0



No.	Date	Revision Details	By	Ver.	App.
A	02.07.21	PRELIMINARY DESIGN	CD	KM	CK

Aurecon New Zealand Limited
139 Carlton Gore Road (PO Box 9762) Newmarket
Auckland New Zealand

Telephone: +64 9 520-6019
Facismile: +64 9 524-7815
Email: auckland@ap.aurecongroup.com

Client: WAKA KOTAHI NZ TRANSPORT AGENCY

Project: SH11 PAIHIA TO WAITANGI SHARED USE PATH

Drawn CD	Signed	Date 02.07.2021
Designed CD	Signed	Date 02.07.2021
Verified KM	Signed	Date 02.07.2021
Approved CK	Signed	Date 02.07.2021

Drawing Title: SH11 PAIHIA TO WAITANGI SUP LIGHTING CALCULATIONS SHEET 3 OF 4

Aurecon Project No. 511738

Scale 1:500 @ A3

Drawing No. 511738-0000-CAL-EE-0003

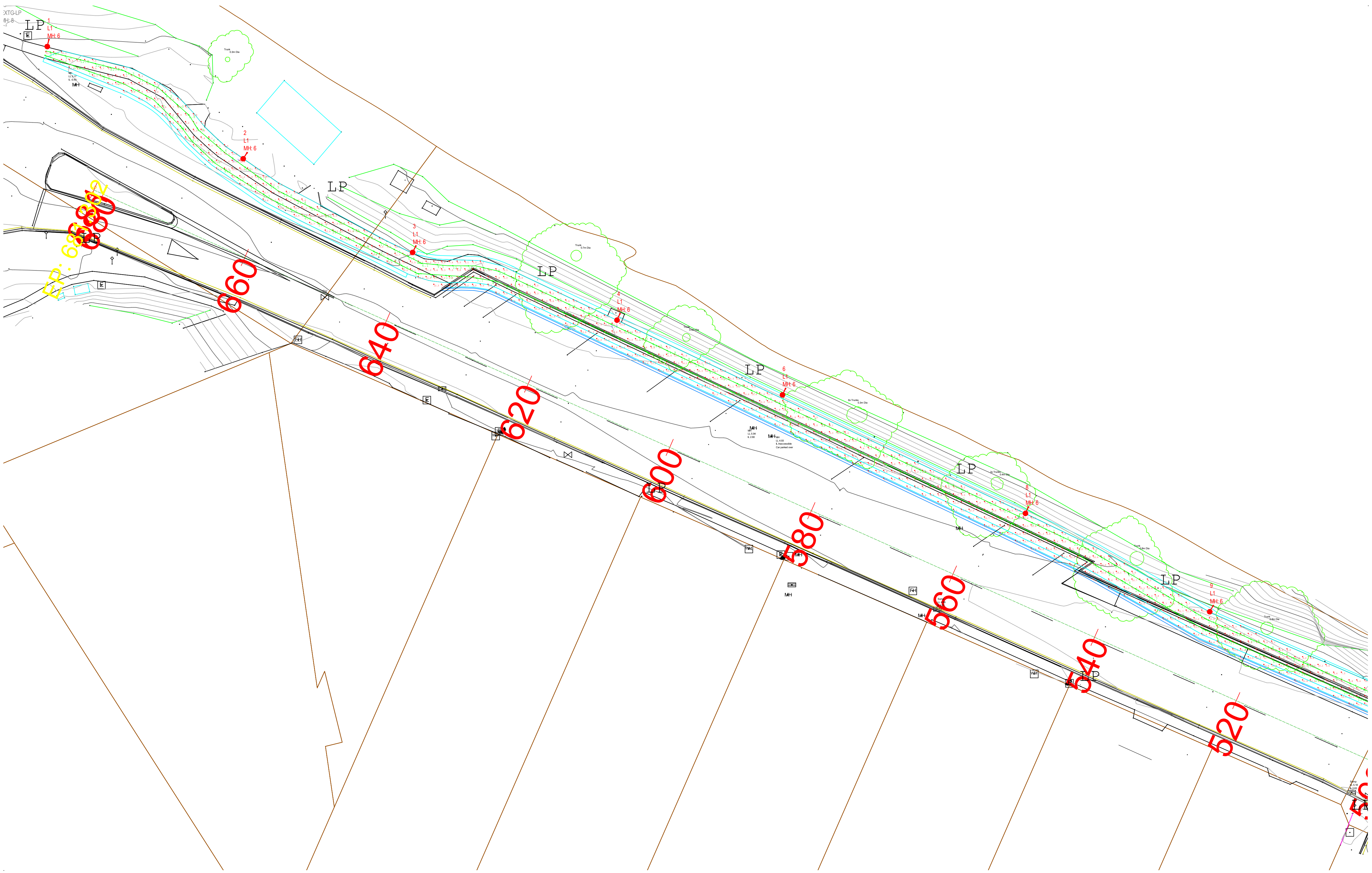
Rev. A

A3

Luminaire Schedule						
Symbol	Qty	Label	Arrangement	LLF	Description	Lum. Lumens
	21	L1	SINGLE	0.817	XSPD022LGH40K_24-#1	3346
	1	EXTG-LP	SINGLE	1.000	XSPD022LGH40K_24-#6	7436

Calculation Summary						
Label	CalcType	Units	Avg	Max	Min	Max/Avg
SUP_Eh	Illuminance	Lux	9.94	20.7	1.4	2.08
SUP_Epv_3	Illuminance	Lux	8.21	30.2	0.3	3.68
SUP_Epv_4	Illuminance	Lux	8.89	30.1	0.3	3.39

Luminaire Location Summary			
LumNo	Label	Mounting Height	Tilt
1	L1	6	0
2	L1	6	0
3	L1	6	0
4	L1	6	0
6	L1	6	0
8	L1	6	0
9	L1	6	0
10	L1	6	0
11	L1	6	0
12	L1	6	0
14	L1	6	0
15	L1	6	0
16	L1	6	0
18	L1	6	0
20	L1	6	0
22	L1	6	0
23	L1	6	0
24	L1	6	0
26	L1	6	0
27	L1	6	0
28	L1	6	0
29	EXTG-LP	8	0



No.	Date	Revision Details	By	Ver.	App.
A	02.07.21	PRELIMINARY DESIGN	CD	KM	CK

Aurecon New Zealand Limited
139 Carlton Gore Road (PO Box 9762) Newmarket
Auckland New Zealand
Telephone: +64 9 520-6019
Facismile: +64 9 524-7815
Email: auckland@ap.aurecongroup.com

Client: WAKA KOTAHI NZ TRANSPORT AGENCY

Project: SH11 PAIHIA TO WAITANGI SHARED USE PATH

		Signed	Date
Drawn	CD		02.07.2021
Designed	CD		02.07.2021
Verified	KM		02.07.2021
Approved	CK		02.07.2021

Drawing Title: SH11 PAIHIA TO WAITANGI SUP LIGHTING CALCULATIONS SHEET 4 OF 4

Aurecon Project No. 511738

Scale 1:500 @ A3

Drawing No. 511738-0000-CAL-EE-0004 Rev. A

Appendix E

Risk Register

SH11 Paihia to Waitangi SUP - Risk Register

Project/Contract:	Paihia to Waitangi Shared User Path: Prelim design	**Document Date:**	25 January 2022
Project/Contract ID:	NO 4424	**Supplier Lead:**	Cass Kenworthy / Aurecon
NZTA Office:	Whangarei	**RM Specialist:**	TBA / TBA
NZTA Lead:	Tim Elliott (NZTA)	**Risk Tolerance Threshold:**	10%

													Current Exposure – Semi-Quantitative			Treatment Strategy	Residual (Target) Exposure – Semi-Quantitative			
?	?		?	?			?	?	?	?	?	?	?	?	?	?	?	?	?	?
Rank	**RID**	**Category**	**Risk Title**	**Description/ Cause/ Consequence**	**Short / Long**	**Project**	**Risk Owner**	**Risk Owning Org**	**Date Raised**	**Risk Status**	**Phase**	**Established Controls**	**Consq.**	**Likelihood**	**Risk Score**	**Individual actions to be recorded in the Actions Register (Tab 4)**	**Consq.**	**Likelihood**	**Risk Score**	**Commentary & Closure Statement**
	1	Programme	Cannot complete design before funding runs out	Delay in receipt of survey data and Hapu hui date impacting programme - unable to deliver before the funding runs out, design left incomplete. Budget is lost at the end of the Financial Year with July 31st being the last day of the NLTP.			NZTA	Aurecon NZTA	27 May 2021	Closed	Pre Implementation	Forecast cost to complete, carry over funding obtained via project sponsor to allow continuation in July	Medium	Very Low	4				0	
11	2	Stakeholders	Interface with FNHL Project	There is a threat that the Waterfront Project and the SUP project are not seen as joined up, resulting in confusion in the community and reputational impacts			Tim Elliott	NTA / NZTA	1 June 2021	Live - Treat	Pre Implementation	Waka Kotahi attendance at steering group meetings. Maintain regular engagement touchpoints with FNDC / FNHL.	Low	Medium	10		Low	Very Low	2	NTA and Waka Kotahi should continue engagement with FNHL
8	3	Stakeholders	Hapu	There is a threat that engagement with Hapu could be stalled by previous tension points. There is also a risk that Hapu do not feel the relationship has continued since the SH11 engagements previously. The impact could be stalling of the project or hui while we rebuild trust			Elaina Moulds / Louisa Mutu	NZTA	1 June 2021	Live - Treat	Pre Implementation	Hui with hapu to re set the scene and spending time listening to how the thinking has progressed since previous engagements. Ask Hapu members how they would like to work together moving forward	Medium	Low	11	Waka Kotahi led engagment with Hapū partners. No wahi tapu sights were identified within the project scope.	Low	Low	6	Waka Kotahi to continue leading the relationship and engagment with Hapū in subsequent design / construction stages
	4	Design	Stormwater treatment requirements	FNDC expressed expectations of stormwater treatment as a nice to have is currently out of scope. There is a threat that FNDC could request the incorporation of treatment devices into the scope.			Cass Kenworthy	Aurecon	1 May 2021	Closed	Pre Implementation	Provisional sum to consider stormwater treatment design should this requirement materialise from engagement with Hapu. Design minimises additional impervious surface area	Low	Low	6		Very Low	Very Low	1	
3	5	Design	Stormwater requirements	There is a threat that Hapu expectations on stormwater may not be met. At the first hui they raised concerns on existing wastewater and stormwater capacity and further upgrade of infrastructure and increase in no. of users of facilities will exacerbate the situation.			Tim Elliott	NZTA	11 June 2021	Live - Parked	Pre Implementation	Additional stormwater connection (catchpit and network) has been proposed as part of the SUP design. Confirmation from NZTA required on way forward to review existing wastewater/stormwater capacity issues	Medium	Medium	15	Way forward on existing wastewater and stormwater capcity issues awaiting confirmation.	Low	Low	6	Parked
	6	Planning	Consenting strategy	The consenting strategy for the project is yet to be completed, there is a threat that a resource consent may be required which may impact cost and timeframe to deliver			Warren Feek	Aurecon NZTA	3 May 2021	Closed	Pre Implementation	Development of a consenting strategy including framework to obtain likely consents if required	Very Low	Low	3	OPW required as per consenting strategy and advice from Waka Kotahi	Very Low	Low	3	
1	7	Stakeholders	Loss of carparking	There is a threat that the design will result in a loss of carparks along the waterfront. This may not be palatable with the community or wider stakeholders			Elaina Moulds / Tim Elliott / Cass Kenworthy	NTA / NZTA	3 May 2021	Live - Treat	Pre Implementation	Established controls is to complete a parking assessment to assess capacity of surrounding network, liaise with FNDC on development of their parking implementation strategy and to undertake public engagement at a later stage on the design to gauge the public opinion.	High	Medium	19	Parking assessment completed.	Medium	Medium	15	Community and business engagement required at next design phase.
8	8	Programme	Utilities Investigation Risk	There is a threat of additional unknown utilities in the area and not identified from desktop investigations may result in additional construction costs if affected from the design			Pieu Nalin	Aurecon NZTA	24 June 2021	Draft	Pre Implementation	Stakeholder co-ordination and potholing in the subsequent design stage required to confirm existing utilities location, condition and any unknown utilities present that maybe affected by the design.	Medium	Low	11	Engagement with utility providers on design footprint in detatiled design phase	Medium	Low	11	
3	9	Stakeholders	Hapu	There is a threat that hapu may not support the project due to their concerns around other local matters such as the lack of upgraded infrastructure to cope with the increase in tourists or the lack of speed bumps applied on Te Karuwha Parade to stop speeding traffic This may result in lack of an integrated network; benefits not being realised.			Elaina Moulds / Louisa Mutu	NZTA	11 June 2021	Live - Treat	Pre Implementation	Hold hui with hapu members, request representatives to participate in the project from each hapu, pass on feedback to other authorities with which concerns may lie.	Medium	Medium	15	2x hui held with Hapū.	Low	Low	6	Hapū noted project focus should be on benefits for the local community rather than tourists
3	10	Stakeholders	Engagement with Public	There is a threat that the project may impact public engagement as the public receives mixed messages and / or are confused by what is proposed by NZTA vs FNHL waterfront development project This may result in lack of political / public support for the project, delays to the programme.			Elaina Moulds / Louisa Mutu	NZTA	3 May 2021	Live - Parked	Pre Implementation	Development of the Strategic Communications & Engagement Plan. Key messages for any public engagement will be determined ahead of any engagement taking place (provisional sum item if required)	Medium	Medium	15	Development of Engagement Strategy. Public engagement deferred to detailed design stage.	Low	Medium	10	
	11	Category	Cost	There is a threat that this project may cost more than $2M allowed for in the LCLR fund.			Jonathan Kennett	Aurecon NZTA	3 May 2021	Impacted	Pre Implementation	Completing the preliminary design is the main control to determine the project cost.	High	Medium	19	Preliminary csot estimate is slightly above $2M. Value engineering exercise to be undertaken by NTA to review assumptions, contingency allowances and rates.	High	Medium	19	
8	12	Design	Cost	A desktop study of existing ground condition assessment will be carried out. There is a threat of cost increase due to unknown geotechnical requirements (withought undertaking field ground condition testing) within the project extents especially in the section near the project tie in at Nihonui Point where concrete buildup will be required on the embankment			Tim Elliott	NZTA	24 June 2021	Draft	Pre Implementation	Geotech assessment of the ground condition in subsequent design stage to confirm stability	Medium	Low	11		Medium	Low	11	
	13	Design	Amenity Lighting & tree uplights	FNDC advised they do not have asset plans for these lights. Design progressing is based on assumption that SUP lighting will replace these amenity lights and the affected no. of amenity lights will be based on site walkover and aerial images. There is a threat that a change in council requirement further to this assumption may cause additional costs and programme risks.			Cyrus Daji / Pieu Nalin	Aurecon NZTA	24 June 2021	Closed	Pre Implementation	Development of design in consultation from FNDC and Waka Kotahi will be progressed. Any risks will be captured in the design report and next steps to be outlined for subsequent design stage.	Medium	Low	11	Captured in design report	Low	Low	6	
	14	Design	Programme and Cost	There is a further threat that existing amenity lighting along the footpath, tree uplights and bollards which have not been picked on survey. Design will assess affects based on site visit and desktop assessment.			Cyrus Daji / Pieu Nalin	Aurecon NZTA	24 June 2021	Closed	Pre Implementation	Request additional survey points captured	medium	Low	11		Very Low	Low	3	
3	15	Design	Cost and Consenting Risk	The design is based on assumption that no existing Pohutukawa Trees within the project extents will be affected and a minimum 0.5 m clearance is to be maintained from the proposed SUP. Trees at the boundary of existing footpath have roots under and treatment of SUP at such locations has been proposed in consultation with the arborist assessment. There is also a threat that there may be damage to roots during the construction of the SUP in the vicinity of the tree line.			Pieu Nalin / Gerard Mostert / Tim Elliott	NZTA	24 June 2021	Live - Treat	Pre Implementation	Arboricultural assessment to assess the potential impact of the design and construction and propose mitigations. Further design development to confirm grades of the SUP achievable at the critical tree locations	Medium	Medium	15	Trees preserved in design methodology Refer to arborists report.	Low	Low	6	

SH11 Paihia to Waitangi SUP - Risk Register

Project/Contract:	Paihia to Waitangi Shared User Path: Prelim design	**Document Date:**	25 January 2022
Project/Contract ID:	NO 4424	**Supplier Lead:**	Cass Kenworthy | Aurecon
NZTA Office:	Whangarei	**RM Specialist:**	TBA | TBA
NZTA Lead:	Tim Elliott (NZTA)	**Risk Tolerance Threshold:**	10%

													Current Exposure			Treatment Strategy	Residual (Target) Exposure			
													Semi-Quantitative				Semi-Quantitative			
?	?		?	?			?	?	?	?	?	?	?	?	?	?	?	?	?	?
Rank	**RID**	**Category**	**Risk Title**	**Description/ Cause/ Consequence**	**Short / Long**	**Project**	**Risk Owner**	**Risk Owning Org**	**Date Raised**	**Risk Status**	**Phase**	**Established Controls**	**Consq.**	**Likelihood**	**Risk Score**	**Individual actions to be recorded in the Actions Register (Tab 4)**	**Consq.**	**Likelihood**	**Risk Score**	**Commentary & Closure Statement**
3	16	Design	Urban Design	Lack of specialist urban or landscape design input or philosophy into Preliminary Design. This may result in added costs at a later stage. Initial scope was to continue the urban design palette that was being developed for the FNHL Paihia Waterfront Development for continuation of treatment. There is a threat that this may not be fit for purpose for the SUP project.			Tim Elliott	NZTA	28 June 2021	Live - Treat	Pre Implementation	Engagement with urban design. Hui with hapu members to understand what is important to them in the first instance. Urban design input will be incorporated into the next phase of design	Medium	Medium	15	Urban design input to be incorportaed at the next stage of design. This may also include a Maori Cultural Values Assessment	Low	Low	6	
2	17	Cost	Programme and Cost	There is a threat that the programme may be delayed by stakeholder engagement activities and potentail changes to scope which result from engagement. This would result in additional design and project management costs and would push out the project end-date.			Tim Elliott	NZTA	24 June 2021	Live - Treat	Pre Implementation	Weekly reporting, biweekly meetings, an agreed scope change process, inclusion of provisional sums within the contract to respond to additional stakeholder engagement activities. Ongoing communication	Medium	High	17	Flexibility allowed for in the programme, with ad-hoc support provided in form of change note 002 for any additional support beyond preliminary design phase.	Low	Low	6	
															0				0	
															0				0	

Risk Status	
Draft	2
Live - Treat	7
Live - Parked	2
Impacted	1
Closed	5
Rejected	0
Blank	2
TOTAL	**19**

Current Risk Score	
Extreme	0
High	8
Moderate	7
Low	2
Zero	2
TOTAL	**19**

Residual Risk Score	
Extreme	0
High	2
Moderate	10
Low	4
Zero	2
TOTAL	**18**

Appendix F

Utilities Register

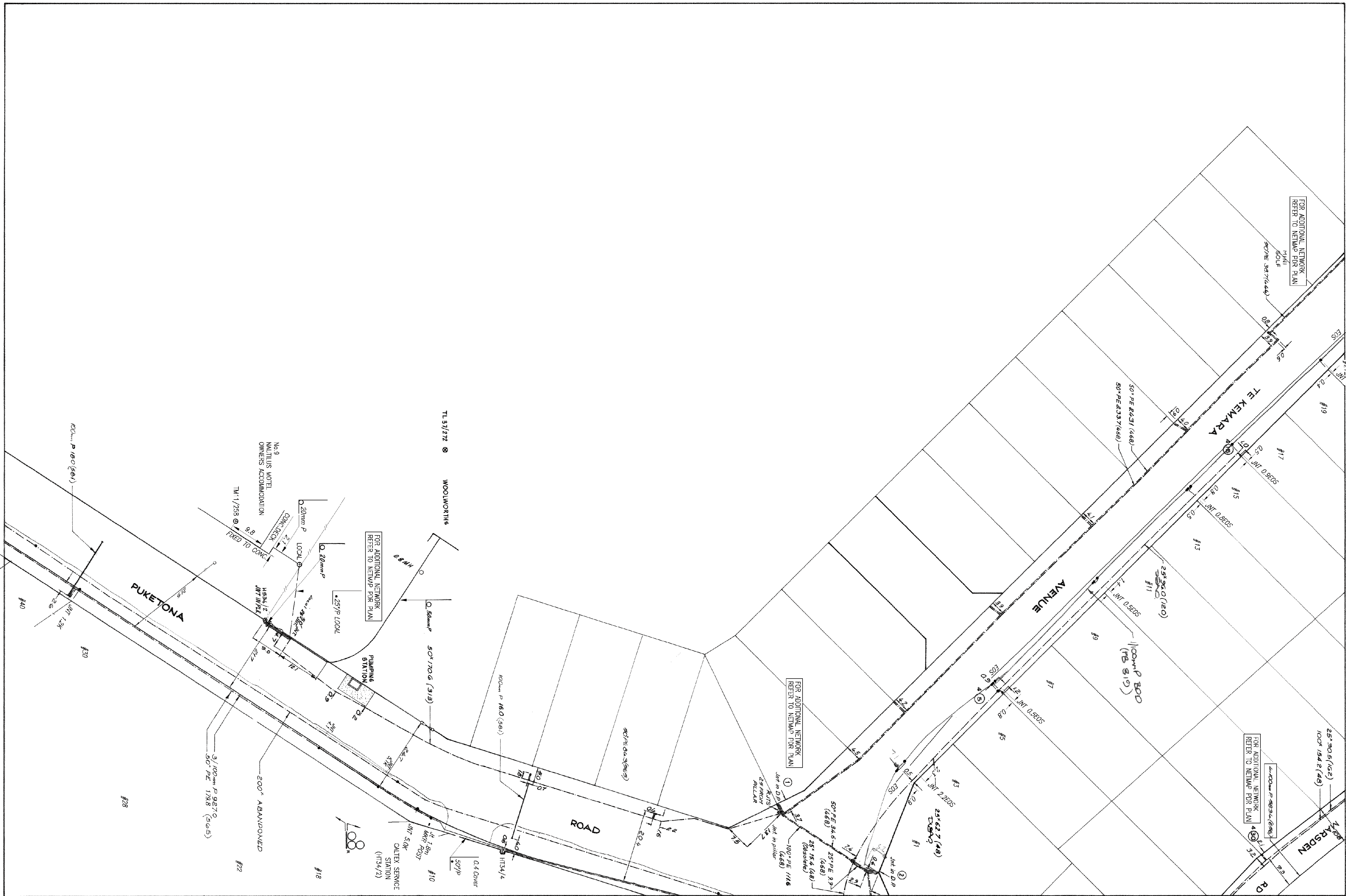
UTILITIES TRACKER

Utilities	Plans	Location	Effects
Chorus	Received	Chorus telephone ducts and service pit under the eastbound footpath/berm of Marsden Road	Minimal effects anticipated from widening of the existing footpath to a SUP. Protection maybe required during construction depending on the existing depth of the cables. Further investigations and co-ordination with stakeholder required in subsequent design stage to confirm location of asset and existing cover depths
		Chorus telephone ducts under the westbound footpath/berm of Marsden Road	No effect
LINZ	Received		NA
Water	Resourced from: https://fndc.maps.arcgis.com/apps/webappviewer/index.html?id=9b351ce681e34ec29443ae1a6468cc2c	Water network under the westbound footpath of Marsden Road	No effect
Wastewater	Resourced from: https://fndc.maps.arcgis.com/apps/webappviewer/index.html?id=9b351ce681e34ec29443ae1a6468cc2c	Wastewater network under Marsden Road carriageway with service covers at the roundabout with Te Karuwha Parade	No effect
Top Energy	Received	HV cable under the eastbound footpath/berm of Marsden Road	Widening of footpath to SUP may result in protection or lowering of ducts to maintain cover depths. Further investigations and co-ordination with stakeholder required to confirm location of asset and existing cover depths
		LV cables under the westbound footpath of Marsden Road	No effect
Footpath amenity lighting	FNDC advised they do not have any cabling plans for these as these are footpath amenity lights	Along the southbound footpath of Marsden Road	To be relocated/upgraded with SUP lighting as part of the design. Refer to lighting plans DRG-EE-0101 to 0104

Note:

This list is not exhaustive. Assets have been obtained from B4UDig website, Far North District Council GIS and Top Energy

Further co-ordination with relevant network utility operators is required to confirm location of assets and assess affects against design in subsequent design stage



		HQ33
HS35	HS34	HS33
HT35	HT34	

DEL.	CHKD.	DATE	ISS.	CHANGE	DEL.	CHKD.	DATE	ISS.	CHANGE
W.D.		9.4.81	A						
S.P.		4.9.85	B	TE KEMARA AVE. CABLING ADDED.					
B.B.		26.2.88	C	PUKETONA CABLING ADDED					
A.G.		17.1.89	D	UPDATED					
A.G.		13.2.90	E	DP & JNT ADDED PUKETONA RD.					
A.G.		15.5.90	F	R.JTS ADDED BY PILLAR CNR TE KAMARA AV.					
EL		26.4.91	7	HS34/2 EXTENDED					
PMH		30.7.01	8	TL37/272 ADDED GOODER H7/816					
KGH		14.7.03	9	50Pr OVERLAY PUKETONA RD (H7/79)					
EL		22.03.04	10	O/L PUKETONA RD GOODER H3/384					
DCL		11.02.05	11	ADDED FIBRE SYMBOL					
HG		3.4.07	12	TM11/258 ADDED 9 PUKETONA RD UGL H07/3/204					
VENTIA		12.02.21	13	NETMAP NOTE ADDED (PIH/FFPDB)					

DRAWN : W.D.
CHKD. :
APPD. :
DATE : 9·4·81

PAIHIA
UNDERGROUND TELEPHONE CABLE SYSTEM

CAUTION

POSITIONAL MEASUREMENTS ARE SUBJECT TO REASONABLE TOLERANCE. COVER AT INSTALLATION WAS: ROADWAY 0.50m, FOOTWAY 0.35m, UNLESS SHOWN OTHERWISE.
NOTE: COVER MAY HAVE CHANGED AND MUST BE CHECKED ON SITE.

ORIGINAL SCALE 1 : 500 | A1

NZPO DISTRICT ENGINEER WHANGAREI

NZMG REF : P05·500/157-34

NZPO DRG No : WR.147

HS34

UD 239

WARNING: Buried services are widespread and it should be assumed that they are present until it is proven otherwise.
Cables should be expected to be found at ANY depth. In most instances Chorus plans do NOT show house service feeds on private property.
Refer to cover letter provided with your request for additional information - use all plans provided in conjunction with each other
You are responsible for interpreting the information provided and should refer to Worksafe.govt.nz for the 'Guide for safety with underground services'
For assistance contact Chorus Network Protection on 0800 822 003 or if you suspect damage has occurred contact 0800 463 896 opt 2

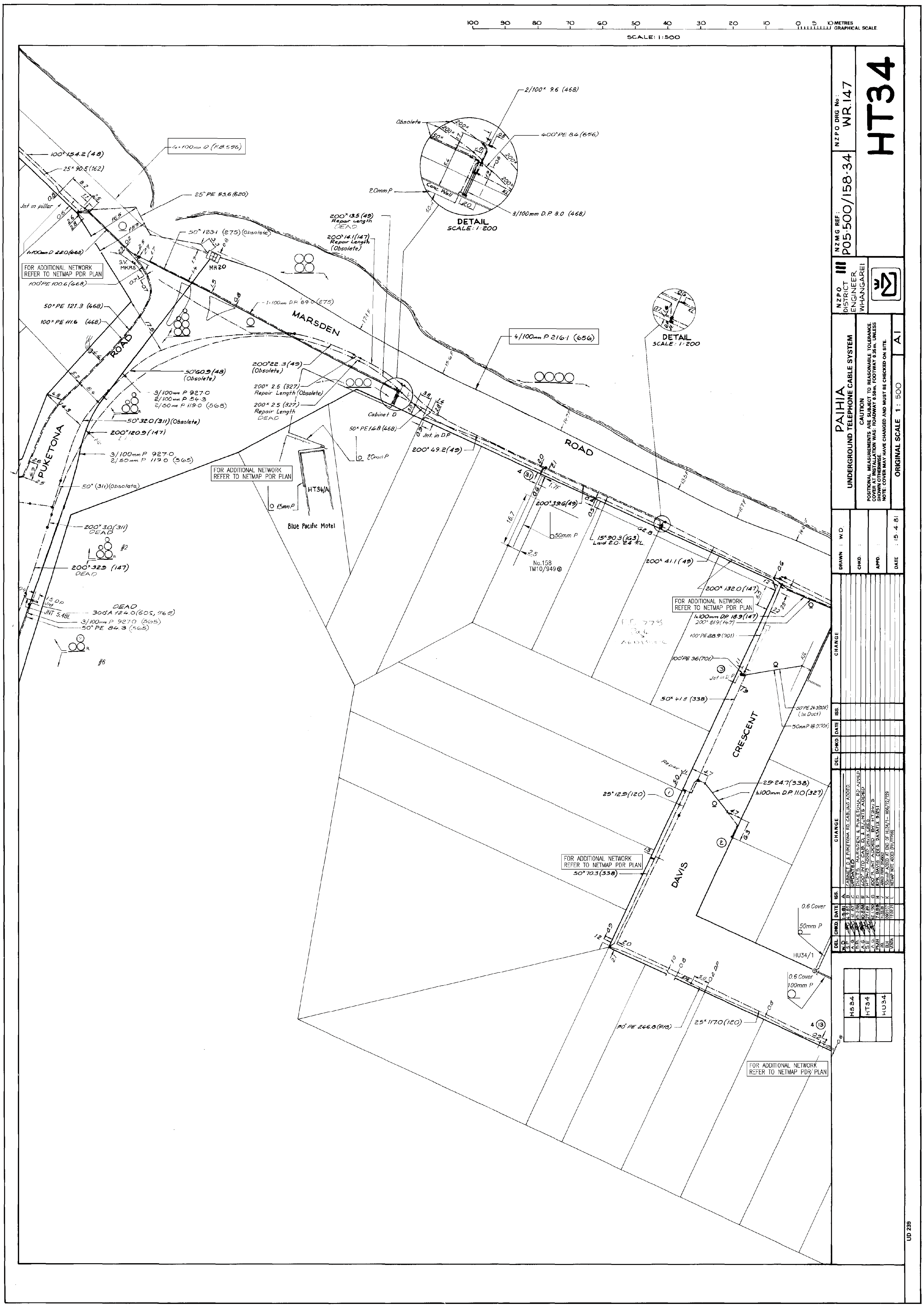
Plan Name	HS34
Plan ID	78625
Version	GG
Current at	04/05/2021

CHORUS

WARNING: Buried services are widespread and it should be assumed that they are present until it is proven otherwise.
Cables should be expected to be found at ANY depth. In most instances Chorus plans do NOT show house service feeds on private property.
Refer to cover letter provided with your request for additional information - use all plans provided in conjunction with each other
You are responsible for interpreting the information provided and should refer to Worksafe.govt.nz for the 'Guide for safety with underground services'
For assistance contact Chorus Network Protection on 0800 822 003 or if you suspect damage has occurred contact 0800 463 896 opt 2

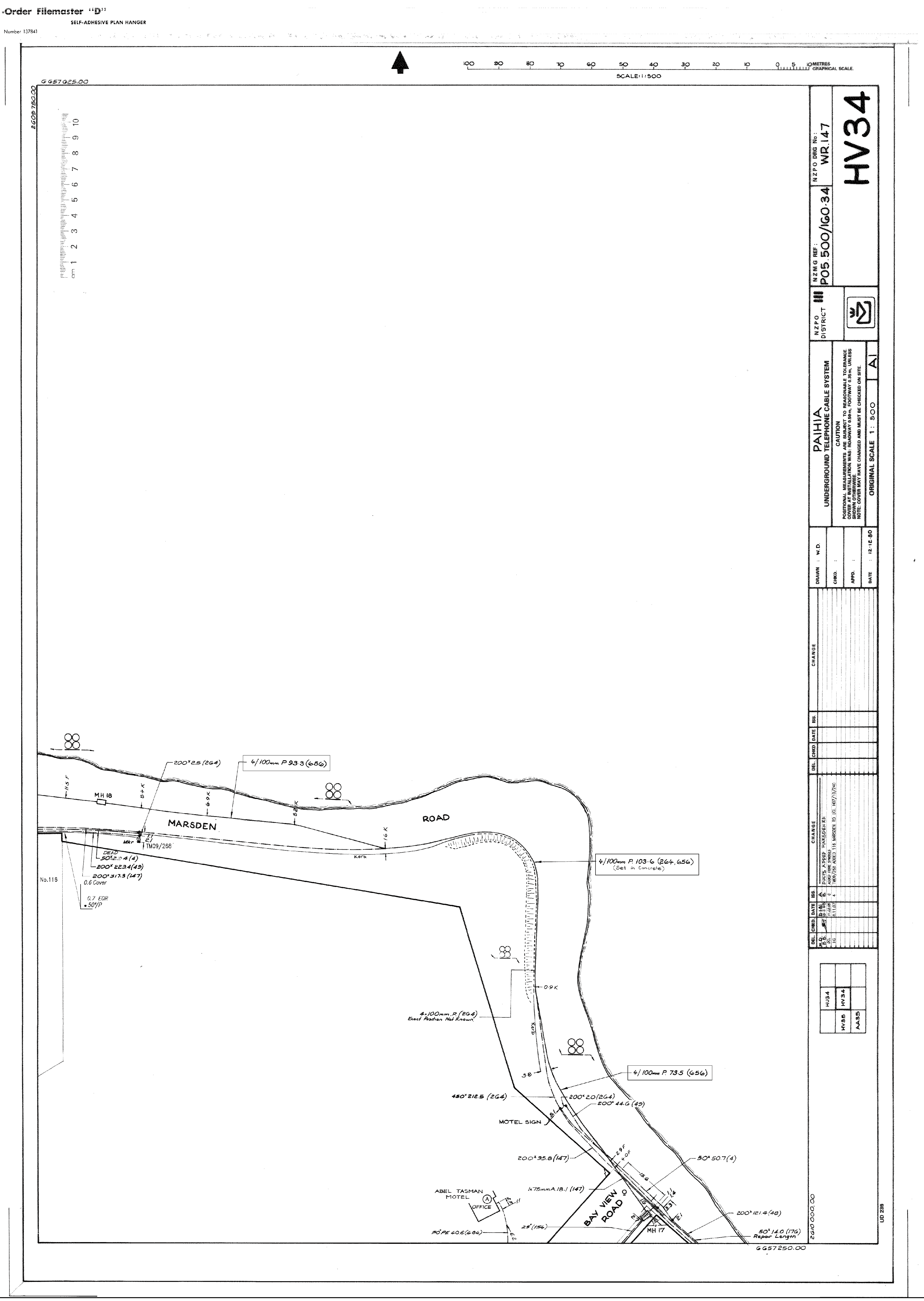
N

Plan Name	HT34
Plan ID	78660
Version	GH
Current at	04/05/2021



DEL.	CHKD.	DATE	ISS.	CHANGE
W.D.		1.5.81	A	
S.P.		4.9.85	B	CABINET D & PUKETONA RD. CABLING ADDED.
A.G.		12.87	C	UPDATED
B.B.		15.2.88	D	DUCTS MARSDEN & PUKETONA RD ADDED
A.G.		10.8.88	E	400° INTO CAB. D, & R/JNTS ADDED
S.E.		27.1.89	F	HT34/3 ADDED DAVIS CRES.
A.G.		12.1.90	G	100° R. JNT ADDED BY HT34/3
PMH		7.9.99	H	RPR DAVIS CRES. DATAFIX 9/251
DCL		11.02.05	J	ADDED FIBRE SYMBOLS
BLH		090107	K	50mmP ADDED AT END OF HU34/1– H06/12/129
VENTIA		12.02.21	L	NETMAP NOTE ADDED (PIH/FFP08)

CHORUS	WARNING: Buried services are widespread and it should be assumed that they are present until it is proven otherwise. Cables should be expected to be found at ANY depth. In most instances Chorus plans do NOT show house service feeds on private property. Refer to cover letter provided with your request for additional information - use all plans provided in conjunction with each other You are responsible for interpreting the information provided and should refer to Worksafe.govt.nz for the 'Guide for safety with underground services' For assistance contact Chorus Network Protection on 0800 822 003 or if you suspect damage has occurred contact 0800 463 896 opt 2	N	Plan Name Plan ID Version Current at	HV34 78776 GG 04/05/2021

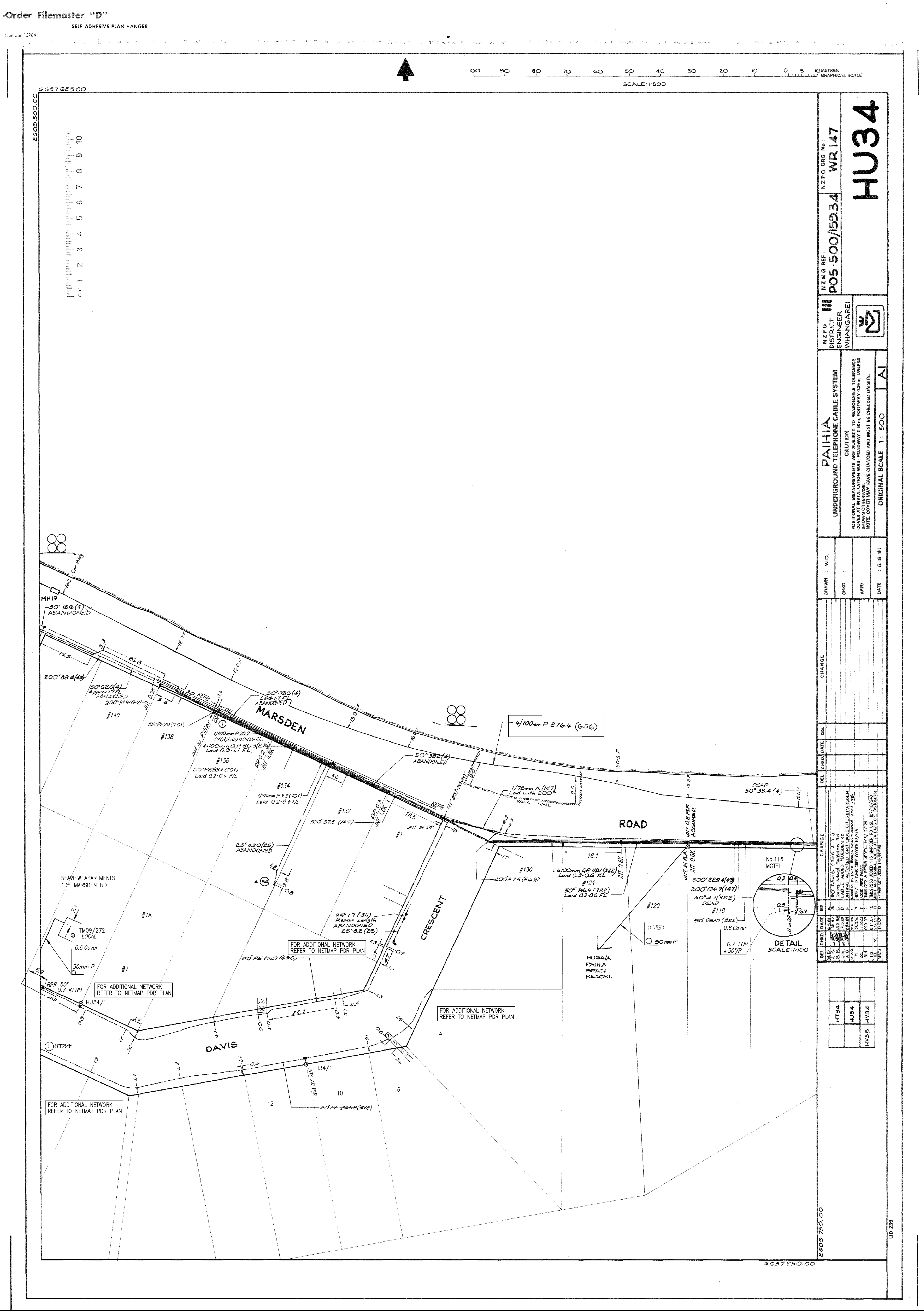


C H O R U S

WARNING: Buried services are widespread and it should be assumed that they are present until it is proven otherwise.
Cables should be expected to be found at ANY depth. In most instances Chorus plans do NOT show house service feeds on private property.
Refer to cover letter provided with your request for additional information - use all plans provided in conjunction with each other
You are responsible for interpreting the information provided and should refer to Worksafe.govt.nz for the 'Guide for safety with underground services'
For assistance contact Chorus Network Protection on 0800 822 003 or if you suspect damage has occurred contact 0800 463 896 opt 2

N

Plan Name	HU34
Plan ID	78790
Version	GI
Current at	04/05/2021

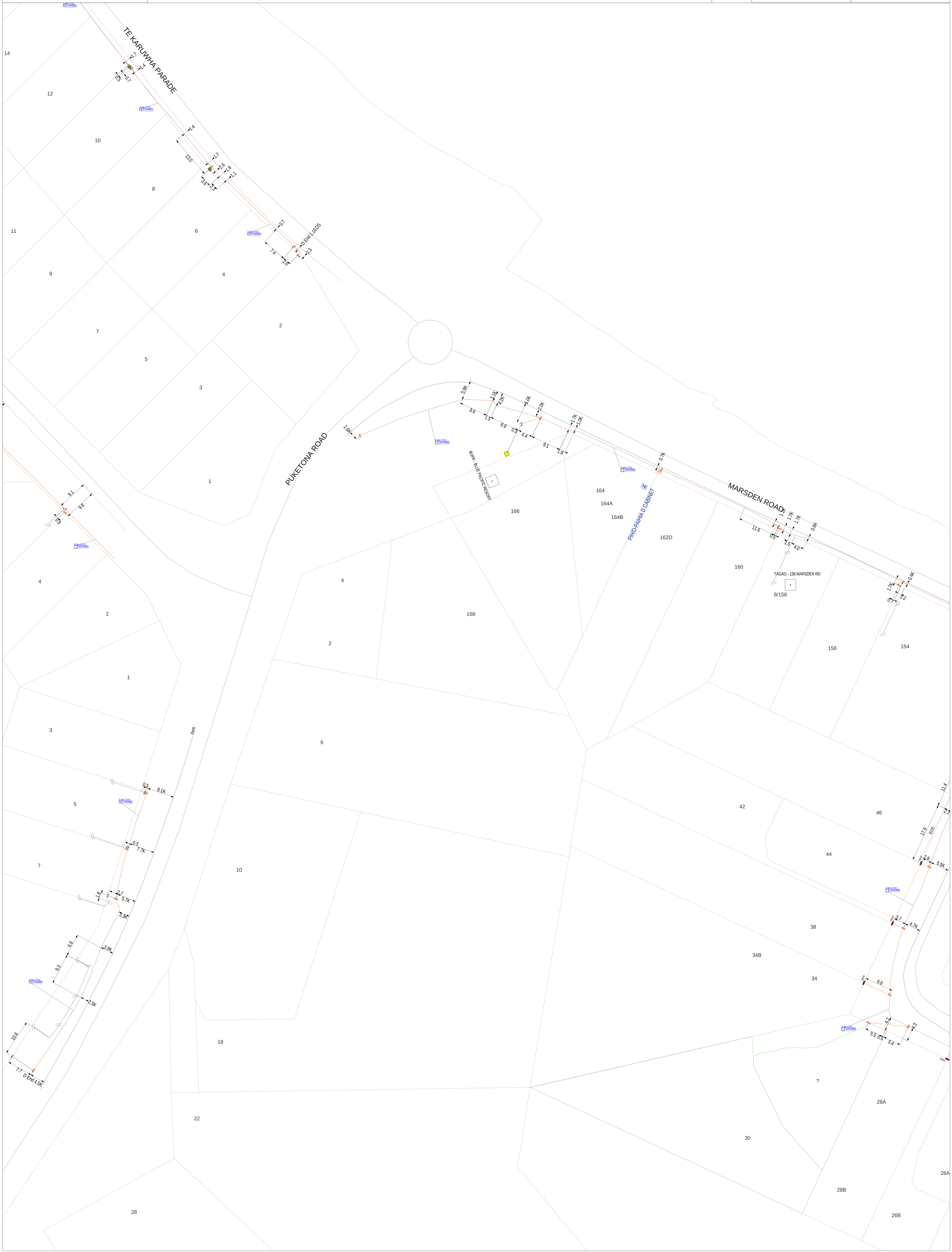


CHORUS

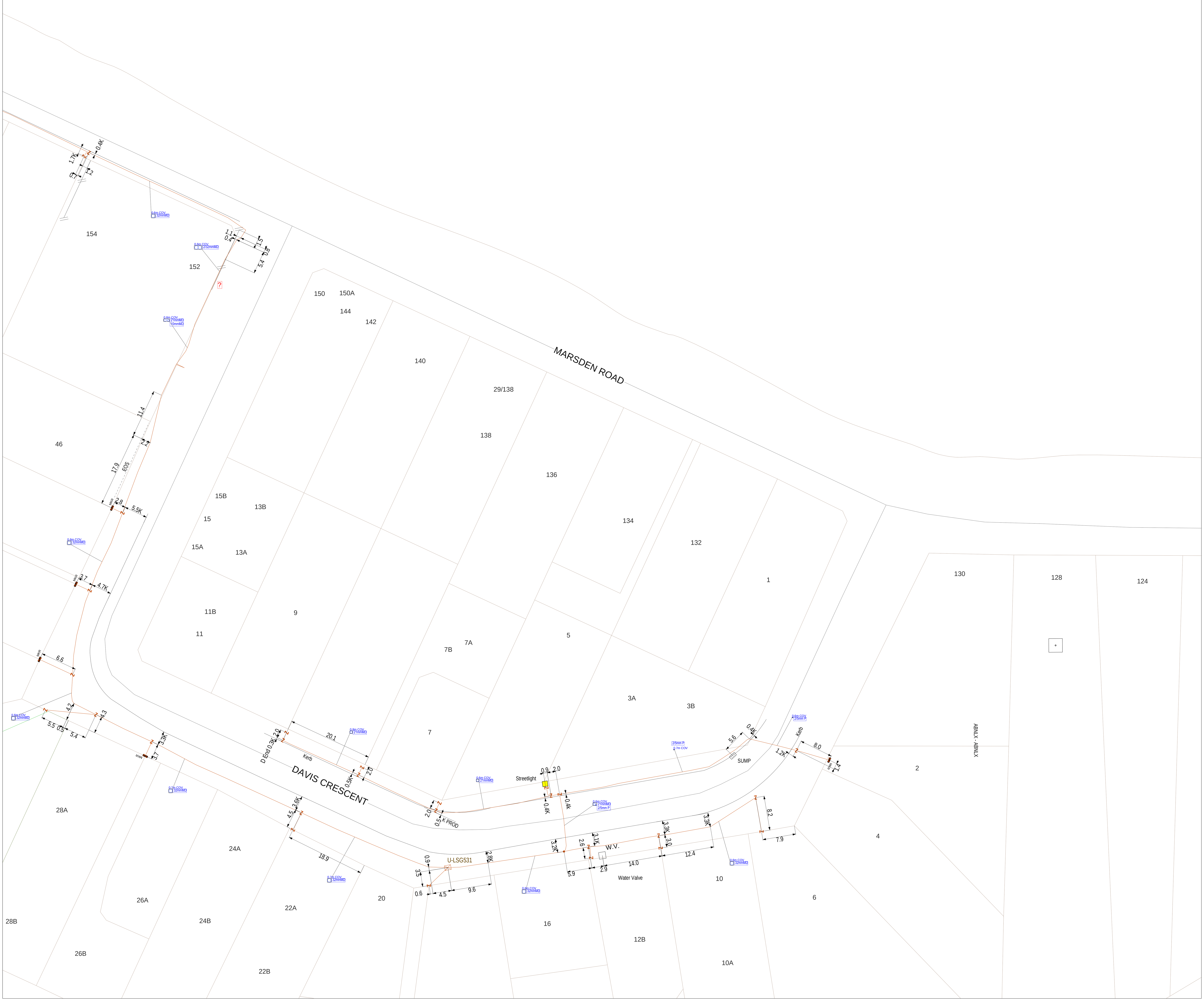
WARNING: Buried services are widespread and it should be assumed that they are present until it is proven otherwise.
Cables should be expected to be found at ANY depth.
In most instances Chorus plans do NOT show house service feeds on private property.
Refer to cover letter provided with your request for additional information use all plans provided in conjunction with each other.
You are responsible for interpreting the information provided and should refer to Worksafe.govt.nz for the 'Guide for safety with underground services'
For assistance contact Chorus Network Protection on 0800 822 003 or if you suspect damage has occurred contact 0800 463 896 opt 2

N

Plan Name	Gold
Plan ID	
Version	
Current at	04/05/2021



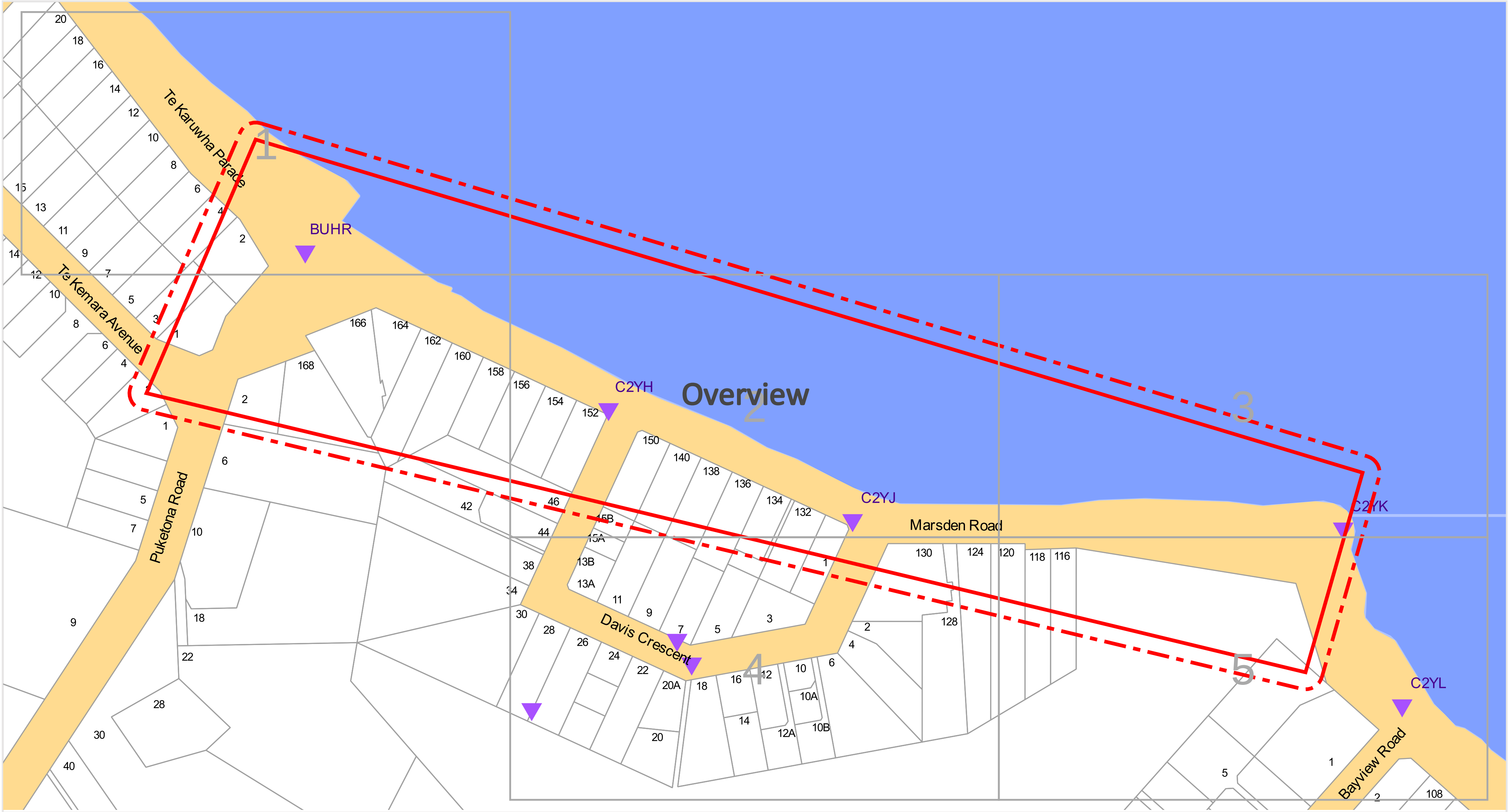
CHORUS	WARNING: Buried services are widespread and it should be assumed that they are present until it is proven otherwise. Cables should be expected to be found at ANY depth. In most instances Chorus plans do NOT show house service feeds on private property. Refer to cover letter provided with your request for additional information use all plans provided in conjunction with each other. You are responsible for interpreting the information provided and should refer to Worksafe.govt.nz for the 'Guide for safety with underground services' For assistance contact Chorus Network Protection on 0800 822 003 or if you suspect damage has occurred contact 0800 463 896 opt 2	N	**Plan Name**	**Gold**
			Plan ID	
			Version	
			Current at	**04/05/2021**



Land Information New Zealand
Toitū te whenua

Sequence No: 9328669
Job No: 1827482
Location: Marsden Road, Paihia, Northland 0200

beforeudig.co.nz

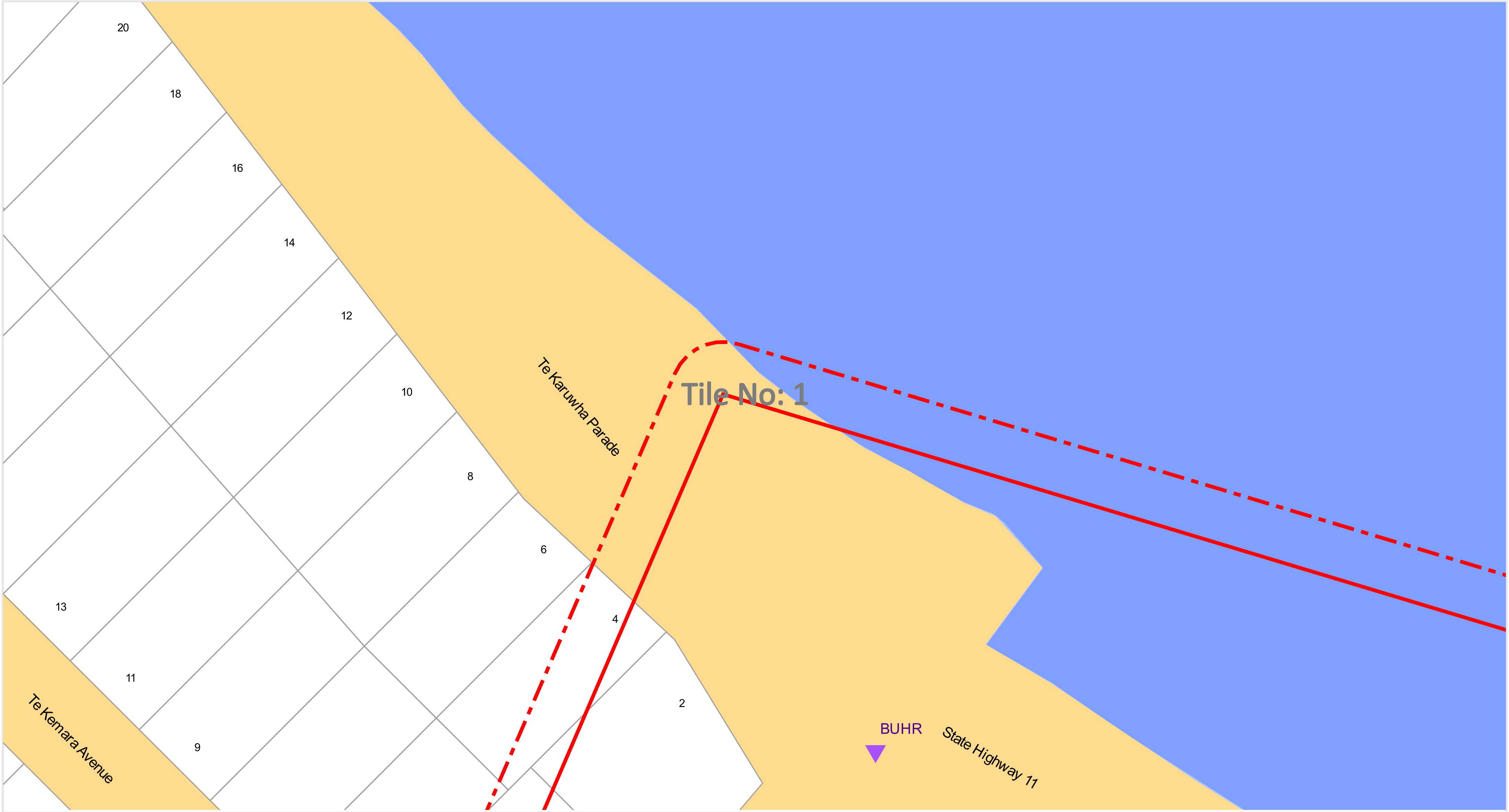


Scale: 1:3075

N

If any survey marks (inverted purple triangles) appear on this image and are at risk from your works please fill in the response form. If no marks are shown or affected, no further action is required.

Sequence No: 9328669
Job No: 1827482
Location: Marsden Road, Paihia, Northland 0200



Scale: 1:1000

N

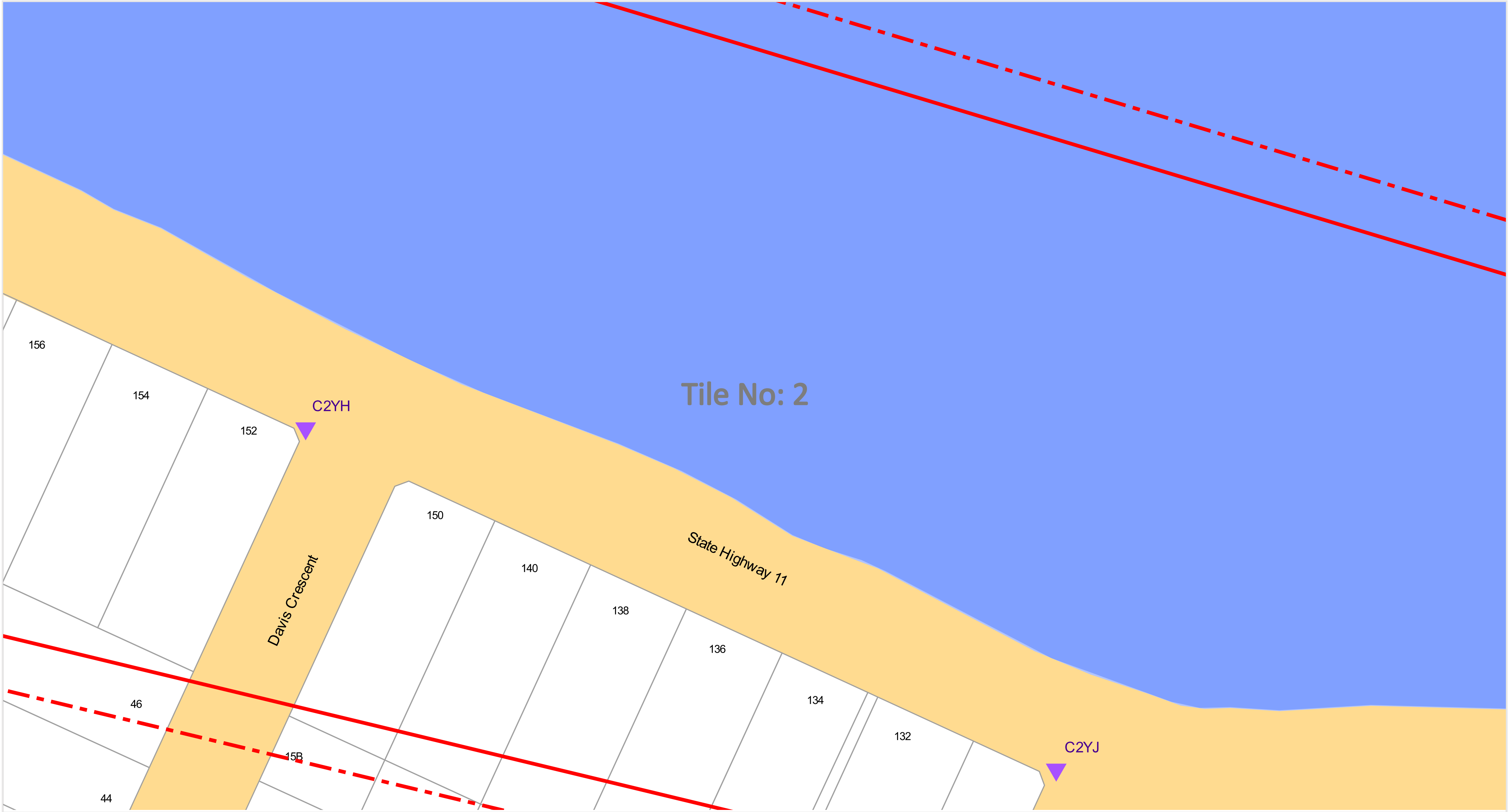
If any survey marks (inverted purple triangles) appear on this image and are at risk from your works please fill in the response form. If no marks are shown or affected, no further action is required.

DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither LINZ or PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms. Sourced from the LINZ Data Service https://data.linz.govt.nz/layer/50839 Crown Copyright Reserved.

Land Information New Zealand
Toitū te whenua

Sequence No: 9328669
Job No: 1827482
Location: Marsden Road, Paihia, Northland 0200

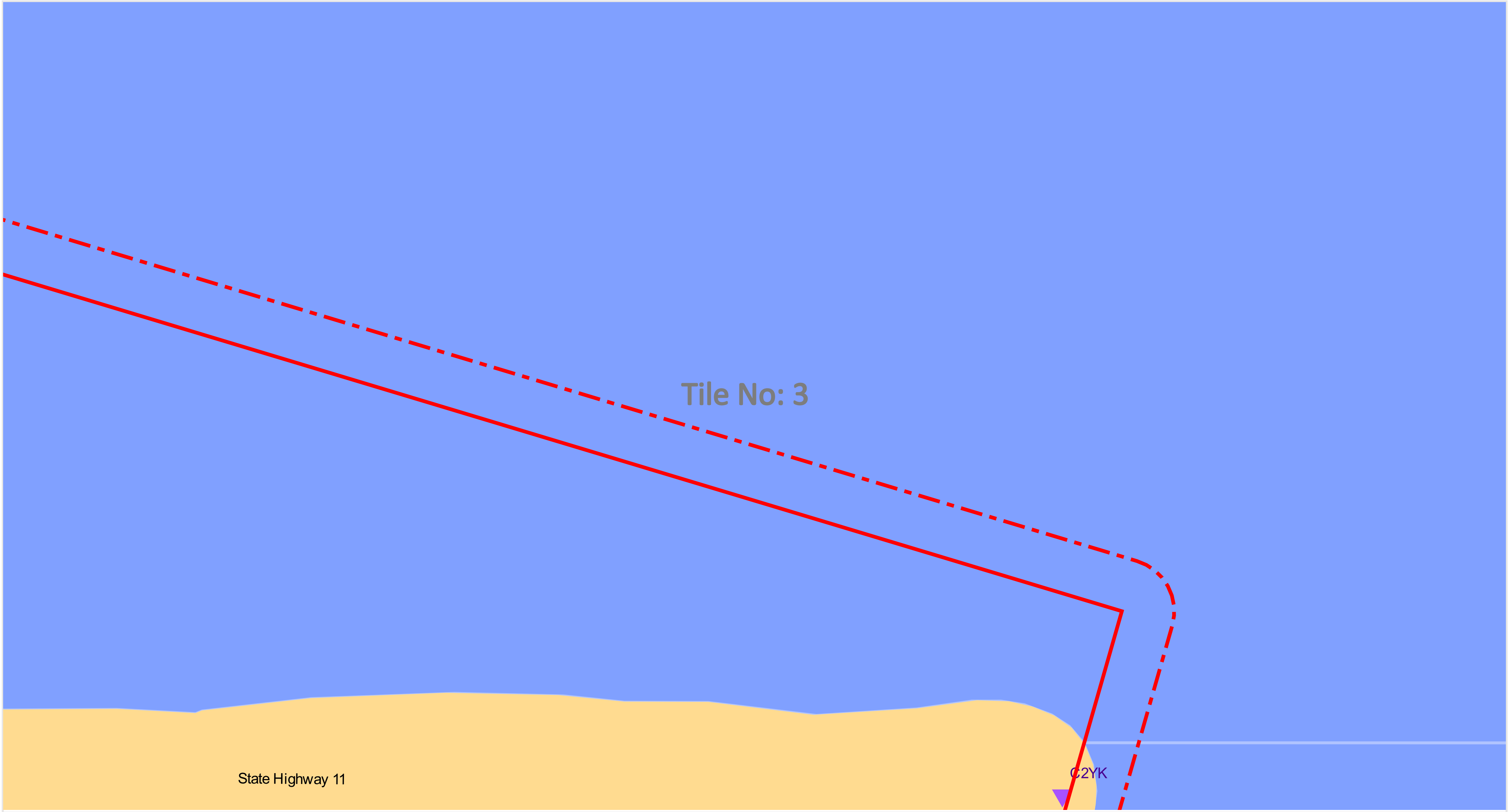
beforeudig.co.nz



Scale: 1:1000

N

If any survey marks (inverted purple triangles) appear on this image and are at risk from your works please fill in the response form. If no marks are shown or affected, no further action is required.



Scale: 1:1000

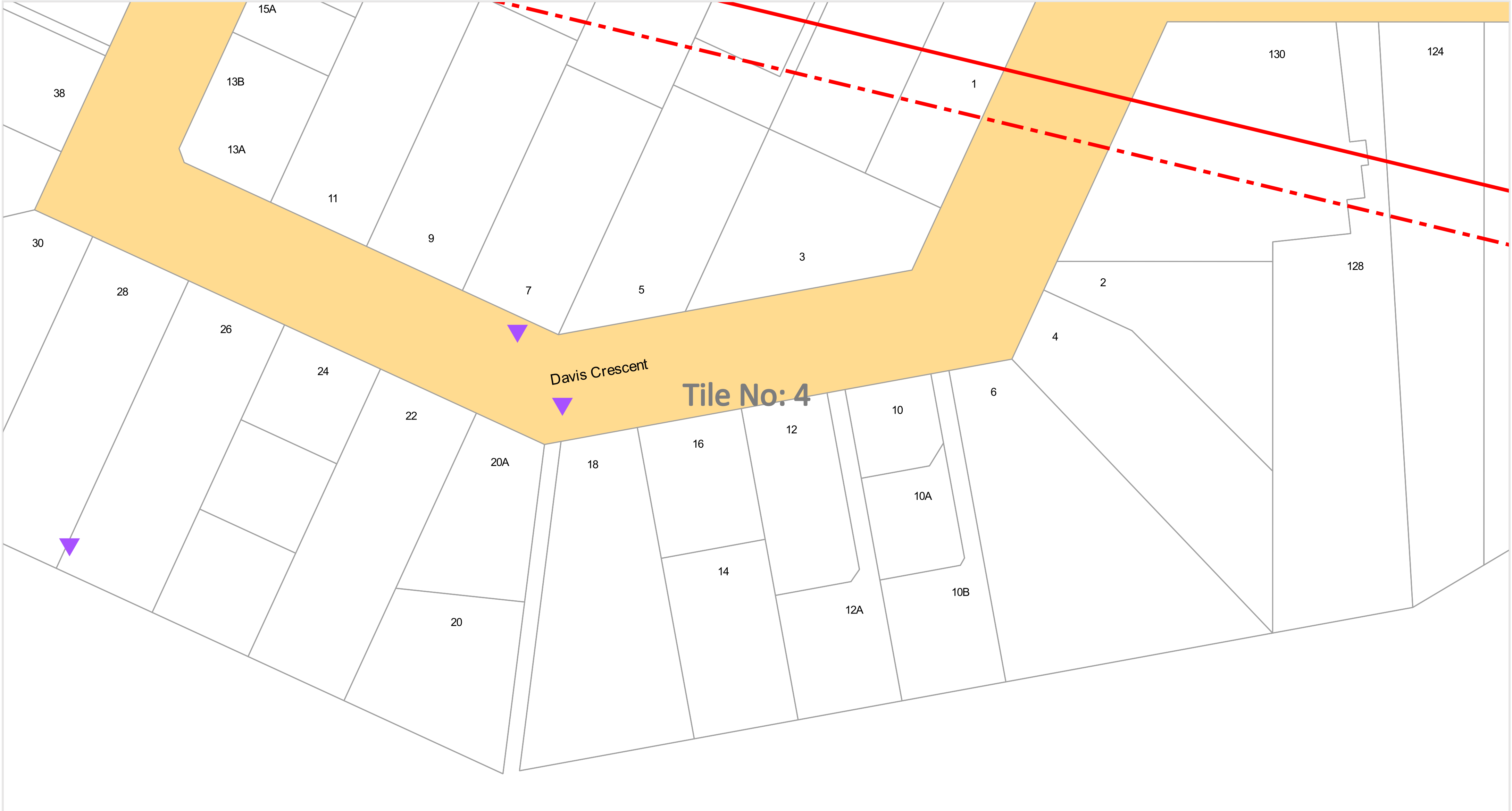
N

If any survey marks (inverted purple triangles) appear on this image and are at risk from your works please fill in the response form. If no marks are shown or affected, no further action is required.

Land Information New Zealand
Toitū te whenua

Sequence No: 9328669
Job No: 1827482
Location: Marsden Road, Paihia, Northland 0200

beforeudig.co.nz



Scale: 1:1000

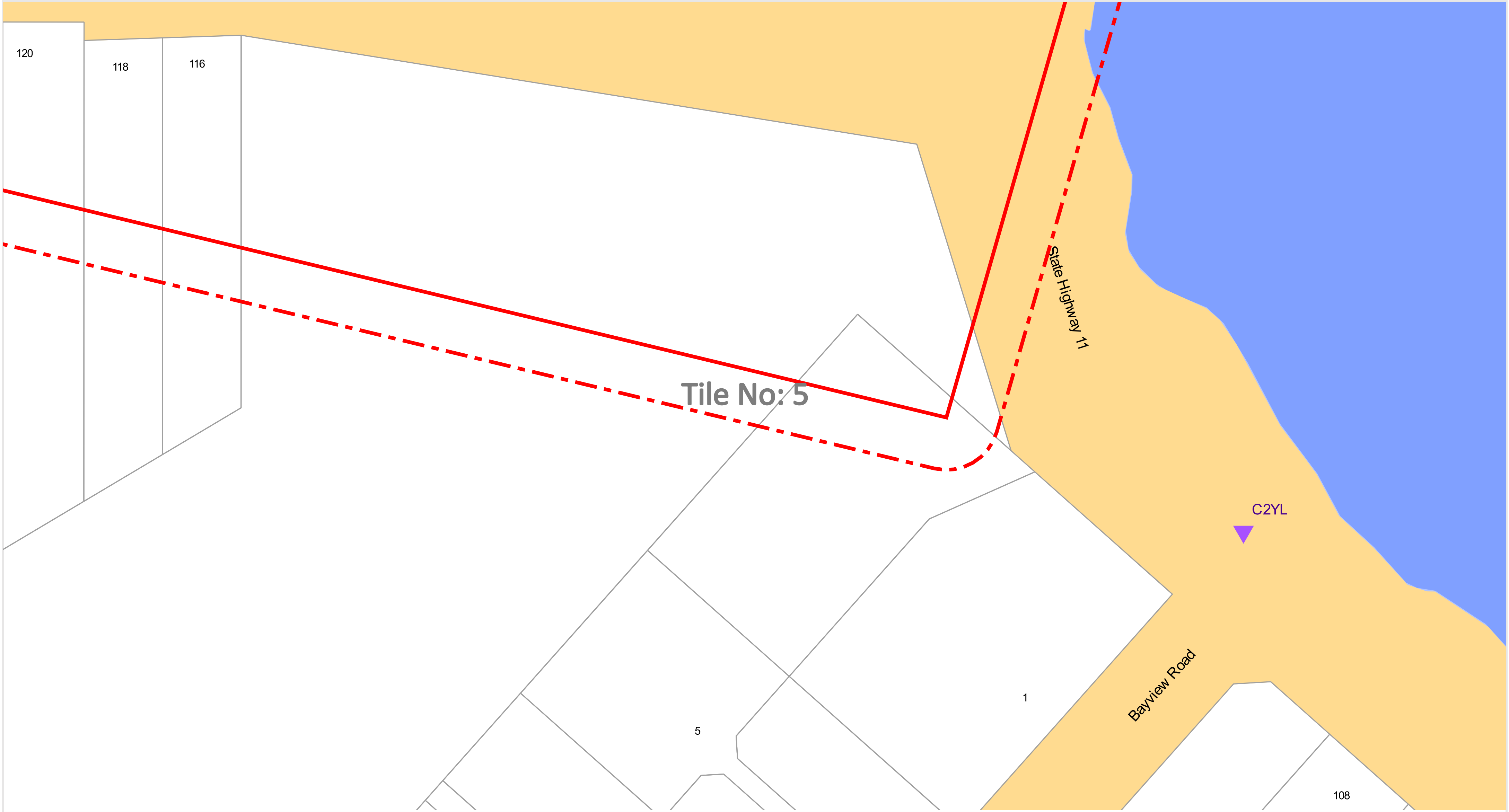
N

If any survey marks (inverted purple triangles) appear on this image and are at risk from your works please fill in the response form. If no marks are shown or affected, no further action is required.

Land Information New Zealand
Toitū te whenua

Sequence No: 9328669
Job No: 1827482
Location: Marsden Road, Paihia, Northland 0200

before u dig .co.nz



Scale: 1:1000

N

If any survey marks (inverted purple triangles) appear on this image and are at risk from your works please fill in the response form. If no marks are shown or affected, no further action is required.

N

Disclaimer:

The information contained in these plans is for design purposes only. These plans accurately reflect our records at the time of printing but may become inaccurate over time as network changes occur often. While Top Energy Ltd. endeavours to keep our information up to date and correct, we can make no representations or warranties of any kind express or implied, about the completeness or accuracy of the supplied plans or data. Any reliance you place on such information is therefore strictly at your own risk.

Before you undertake any works, an underground cable location is required. You can initiate a cable location request via our website; www.topenergy.co.nz/cablelocate.
When undertaking works, beware that you may encounter underground cables at ANY depth.
In no event will Top Energy Ltd. be liable for any loss or damage including without limitation, indirect or consequential loss or damage, or loss or damage whatsoever arising from the accuracy of these plans.

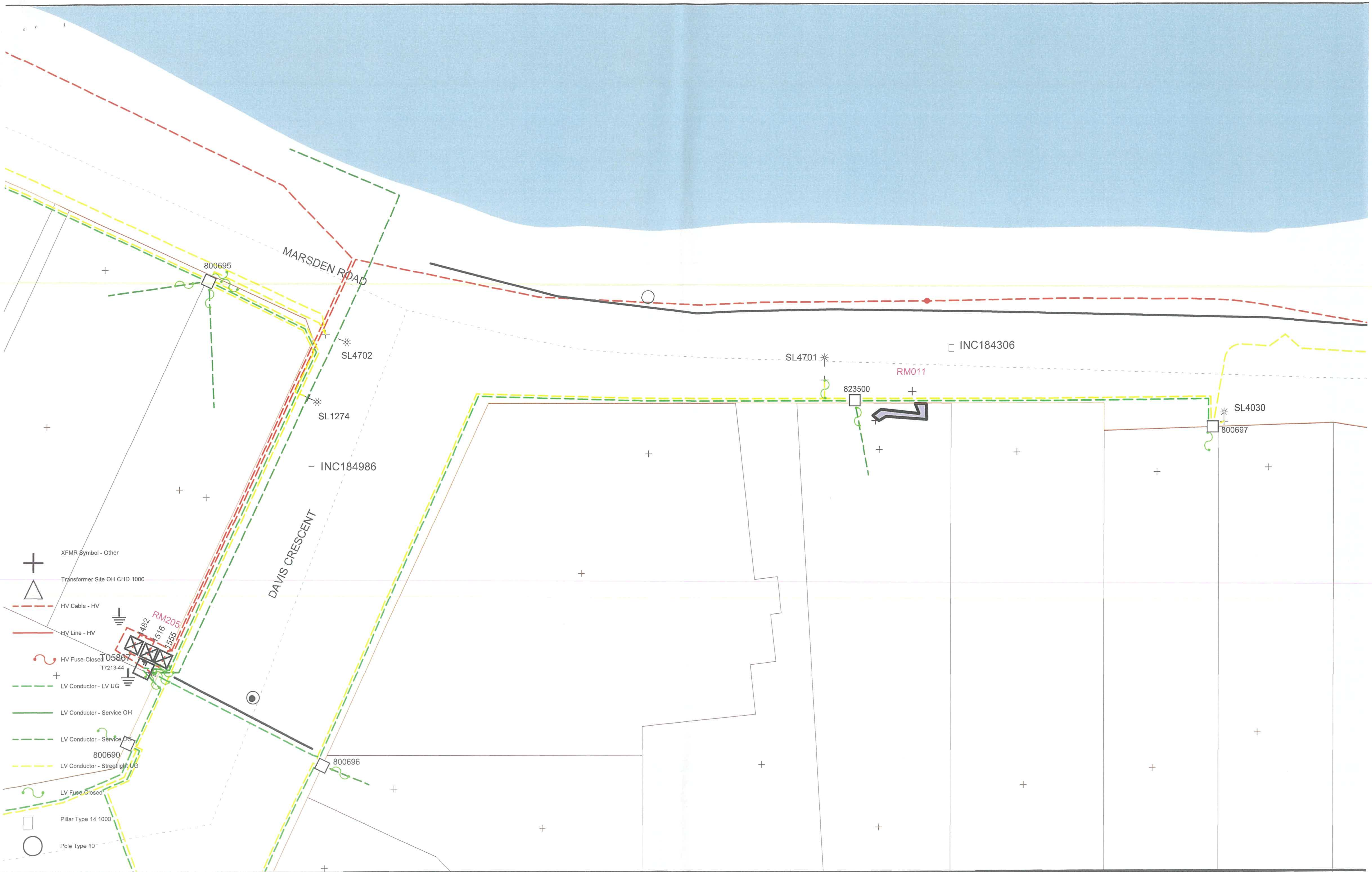
Site Address: 6 Te Karuwha Parade, Paihia

Issued to: Matthew Yang

signature:

Date: 11/05/2021

Prepared by: consents@topenergy.co.n



TOP ENERGY
Te Puna Hihiko

Disclaimer:
The information contained in these plans is for design purposes only. These plans accurately reflect our records at the time of printing but may become inaccurate over time as network changes occur often. While Top Energy Ltd. endeavours to keep our information up to date and correct, we can make no representations or warranties of any kind express or implied, about the completeness or accuracy of the supplied plans or data. Any reliance you place on such information is therefore strictly at your own risk.
Before you undertake any works, an underground cable location is required. You can initiate a cable location request via our website; www.topenergy.co.nz/cablelocate.
When undertaking works, beware that you may encounter underground cables at ANY depth.
In no event will Top Energy Ltd. be liable for any loss or damage including without limitation, indirect or consequential loss or damage, or loss or damage whatsoever arising from the accuracy of these plans.

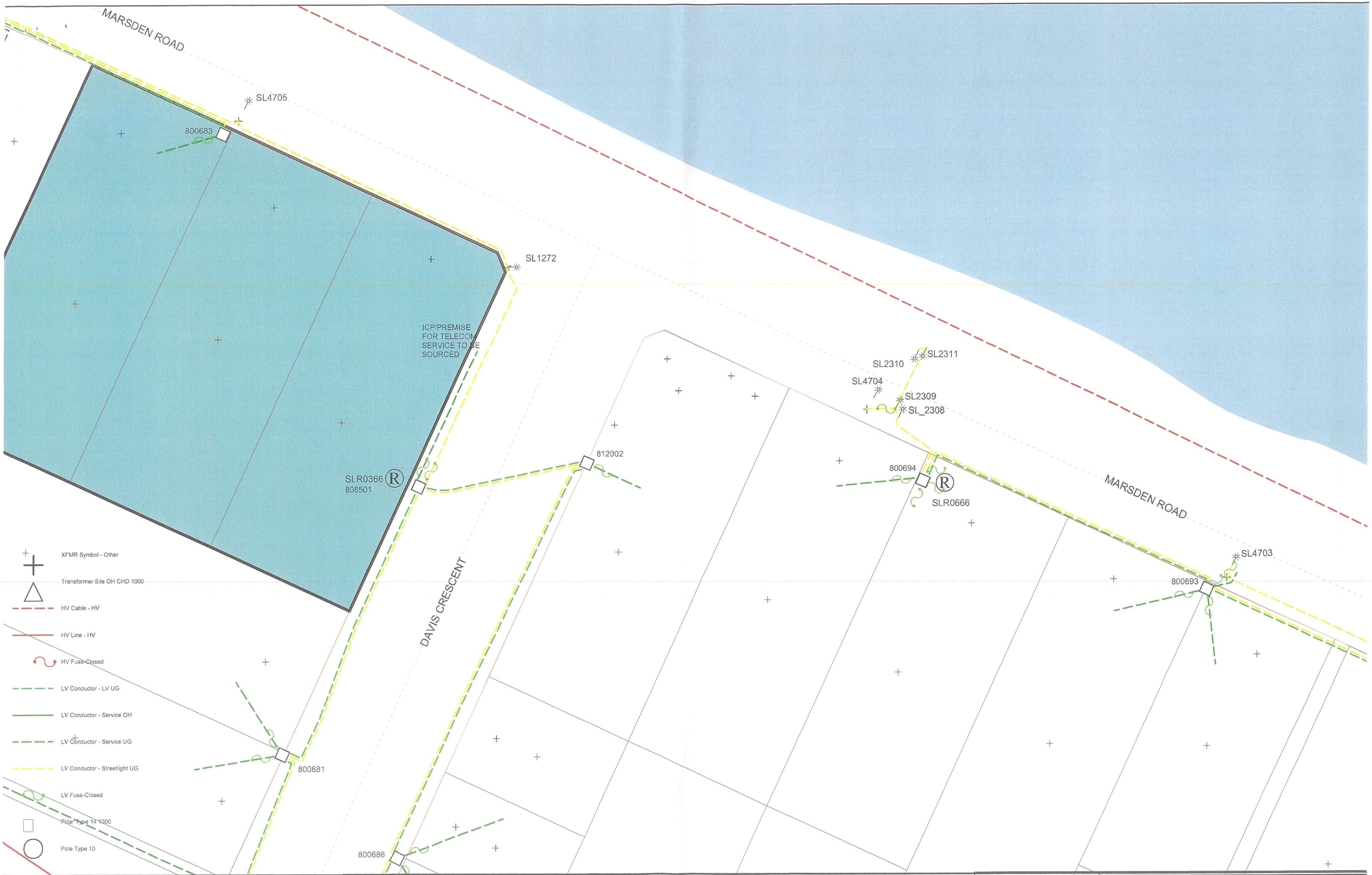
Site Address: Marsden Rd, Paihia - A

Issued to: Matthew Yang

signature:

Date: 11/05/2021

Prepared by: consents@topenergy.co.n



TOP ENERGY®
TePuna Hihiko

Disclaimer:

The information contained in these plans is for design purposes only. These plans accurately reflect our records at the time of printing but may become inaccurate over time as network changes occur often. While Top Energy Ltd. endeavours to keep our information up to date and correct, we can make no representations or warranties of any kind express or implied, about the completeness or accuracy of the supplied plans or data. Any reliance you place on such information is therefore strictly at your own risk.

Before you undertake any works, an underground cable location is required. You can initiate a cable location request via our website; www.topenergy.co.nz/cablelocate.
When undertaking works, beware that you may encounter underground cables at ANY depth.
In no event will Top Energy Ltd. be liable for any loss or damage including without limitation, indirect or consequential loss or damage, or loss or damage whatsoever arising from the accuracy of these plans.

Site Address: Marsden Rd, Paihia - B

Issued to:Matthew Yang

signature:

Date: 11/05/2021

Prepared by: consents@topenergy.co.n

TOP ENERGY® Te Puna Hihiko

Disclaimer:

The information contained in these plans is for design purposes only. These plans accurately reflect our records at the time of printing but may become inaccurate over time as network changes occur often. While Top Energy Ltd. endeavours to keep our information up to date and correct, we can make no representations or warranties of any kind express or implied, about the completeness or accuracy of the supplied plans or data. Any reliance you place on such information is therefore strictly at your own risk.

Before you undertake any works, an underground cable location is required. You can initiate a cable location request via our website; www.topenergy.co.nz/cablelocate.

When undertaking works, beware that you may encounter underground cables at ANY depth.

In no event will Top Energy Ltd. be liable for any loss or damage including without limitation, indirect or consequential loss or damage, or loss or damage whatsoever arising from the accuracy of these plans.

Site Address: Marsden Rd, Paihia - C

Issued to: Matthew Yang

signature:

Date: 11/05/2021

Prepared by: consents@topenergy.co.n

Appendix G

Arborist Assessment Report

PEERS BROWN MILLER LTD

ARBORICULTURAL & ENVIRONMENTAL CONSULTANTS

ARBORICULTURAL ASSESSMENT

Site:	Paihia to Waitangi SUP
Prepared for:	Aurecon NZ Ltd
Purpose:	Arboricultural assessment – construction of SUP adjacent to pohutukawa trees on the Paihia beachfront.
Author:	Gerard Mostert
Date:	1 July 2021

1. Introduction

Peers Brown Miller has been engaged by Aurecon NZ Ltd to provide an arborist's assessment of proposed shared use path (SUP) works adjacent to pohutukawa trees along the Paihia beachfront. It is intended that this assessment will assist the process of design and construction of the SUP.

Summary of the contents of this report:

- The trees in question are mostly healthy
- Saltwater intrusion will adversely affect these trees in the next few decades
- The path cannot be constructed too close to the trees as this is bad for tree health. Cuts adjacent to the trees should be avoided.
- The path cannot be constructed too close to the trees as root action will lift and crack the path in the short term.
- There needs to be scope for insets in the path where too close to trees.
- The conflicts with trees are limited in number.
- Tree protection will rely on proper supervision at path construction stage – there will need to be some flexibility to amend the design on site.

2. Situation

There is an existing concrete footpath along the Paihia beachfront which is about 1.5m wide. This path is close to the end of its service life, and is also too narrow to meet the reasonable engineering specifications of a SUP, which is intended to carry both bicycle and pedestrian traffic.

The existing path passes close to many of the pohutukawa trees, to the extent that the concrete is often in firm contact with their trunks.

Most of the trees are in good overall health. Pohutukawa trees are generally tolerant of root constraints as they often grow in rocky, dry or nutrient-poor coastal environments. They are also tolerant of salty environments, since they are frequently found just above the high tide mark, as is the case here.

Regardless of their saltwater tolerance there are signs that some trees are being adversely affected by saltwater intrusion. This shows up as stress response (epicormic) growth in the crowns, and also through direct undercutting or exposure of the roots by wave action on the seaward side of the trees. The existing path also shows signs of being undercut by wave action in places.

3. Reference materials

This report is based upon the following plans entitled:

- *SH11 Paihia to Waitangi – General Arrangement Sheets 1-4, Drawings 511738 0000 DRG RR 0101 – 0104* by Aurecon for Waka Kotahi.

- *SH11 Paihia to Waitangi – Cross Sections Sheet 1, Drawing 511738 0000 DRG RR 0301* by Aurecon for Waka Kotahi.

4. Method

I made a site visit on 11 June 2021 and inspected the trees in the company of Pieu Nalin, Senior Engineer, Aurecon Ltd. Pieu was able to brief me about the various engineering constraints of the proposal.

I took photographs of all the trees and made a brief assessment of their health. I measured the distance between the tree trunks and the nearest obstruction, which was in all cases the edge of the existing concrete footpath, unless there was no obstruction at all (for example, trees growing in open ground far away from the path).

This assessment focusses on the conflict between tree roots and the existing and proposed paths, so an estimate of tree size was sufficient in the context of the brief.

4.1 Deliverables

My site data is provided in three appendices:

- Appendix 1
  A set of marked-up site plans with the trees numbered for reference in this report.

- Appendix 2
  A set of numbered tree photographs with captions

- <u>Appendix 3</u>
  A table of tree data / constraints / comments.

5. Statutory Framework – Tree Protection

I have not commented on the statutory framework. I will address this if required for consenting purposes. This report is framed in purely arboricultural terms.

6. Arboricultural Assessment

The trees under discussion appear to be part of an even-aged planting. The trees are between 7 and 12 m in height and 8 and 15 m in crown spread. The trees have multiple trunks in all cases, as is typical of pohutukawa, and approximate aggregate girths between 1.5 and 4m.

As noted above, the trees stand on the crest of the bank above high tide mark and are susceptible to saltwater intrusion. Even under these difficult conditions the trees still appear to be in good overall health. Defects of overall health are limited to twiggy dieback in some trees, as well as some dense epicormic growth in the more stressed trees.

Many of the trees have restricted root run due to the path passing to the south of the tree trunks.

Collectively speaking, the trees have considerable amenity value and serve to frame the walkway along the beach. The species choice is also appropriate to the coastal environment.

7. Discussion

<u>7.1 Typical growth pattern of pohutukawa trees</u>
Pohutukawa trees are known to develop substantial roots, so a rootplate of between 10 and 20m radius is easily possible. Pohutukawa trees usually extend their roots on the landwards and uphill side of the tree, as an adaptation to growing on the coast. Water and nutrients are predominantly obtained on the landward side of the tree since the seaward environment is too salty to allow extensive root growth.

As a rule of thumb, about 95% of tree roots are found in the top metre of the soil profile, and 65% within the top 30cm of the soil. It is thus crucial to avoid soil disturbance, particularly close to the tree in the zone of rapid root taper (RRT).

7.2 The impact of path construction on tree health

I have assessed the impact of the existing and proposed paths on the health of the trees, and have made recommendations for their protection during SUP construction, as follows:

7.2.1 Proximity to the tree trunks

The existing path is in many places too close to the trunks of the trees to be sustainable, for the following reasons:

- Trees produce strong hydraulic forces as their roots swell (when water is available). This can happen quickly – pohutukawa has the capacity to imbibe large amounts of water. The roots swell rapidly – sometimes overnight – and can displace large structures and crack concrete.

Fig 1 – The buttress roots of this tree have lifted the concrete footpath (creating a trip hazard)

- The tree trunks are a practical overhead obstacle close to the path, i.e. it is possible to ride or walk into some of the trees because they intrude slightly into the path (similar to the trees along Tamaki Drive in Auckland).

- Cutting down (lowering grade) immediately adjacent to the tree often results in direct root damage and compromise tree health overall (See Fig 3 below).

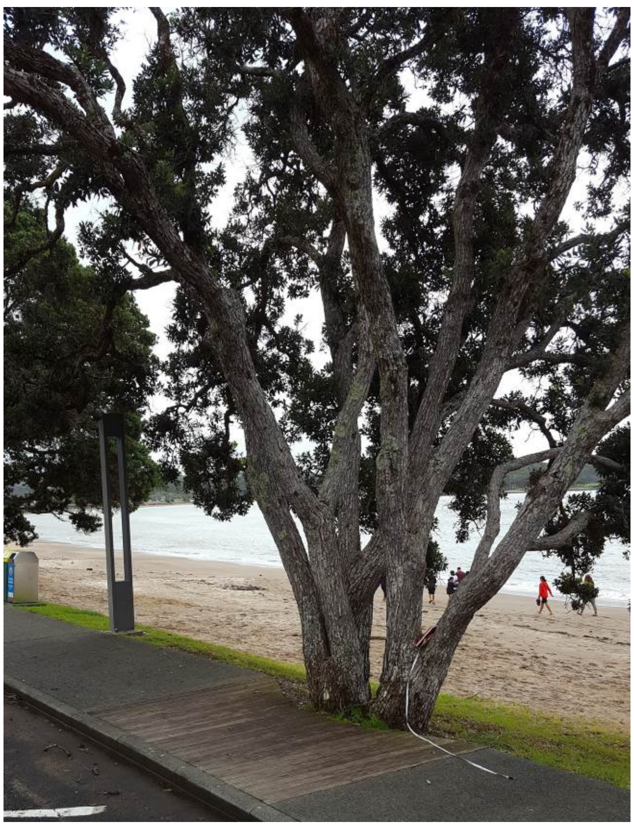


Fig 2 – Getting too close to the tree puts pedestrians – and particularly cyclists – at risk of an overhead impact with the trunk.

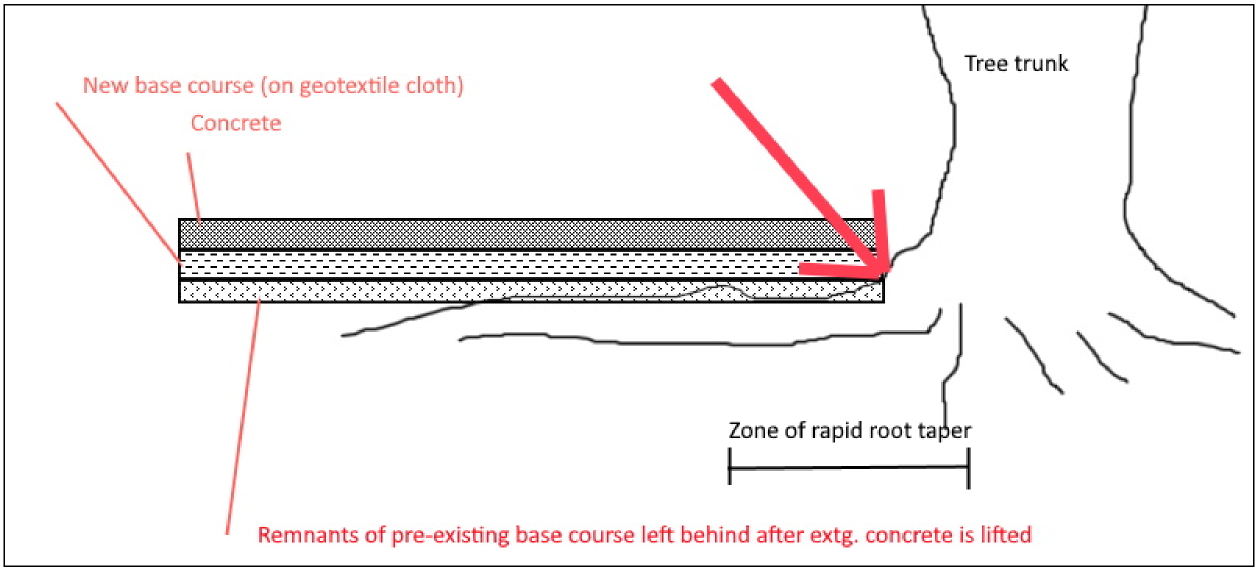
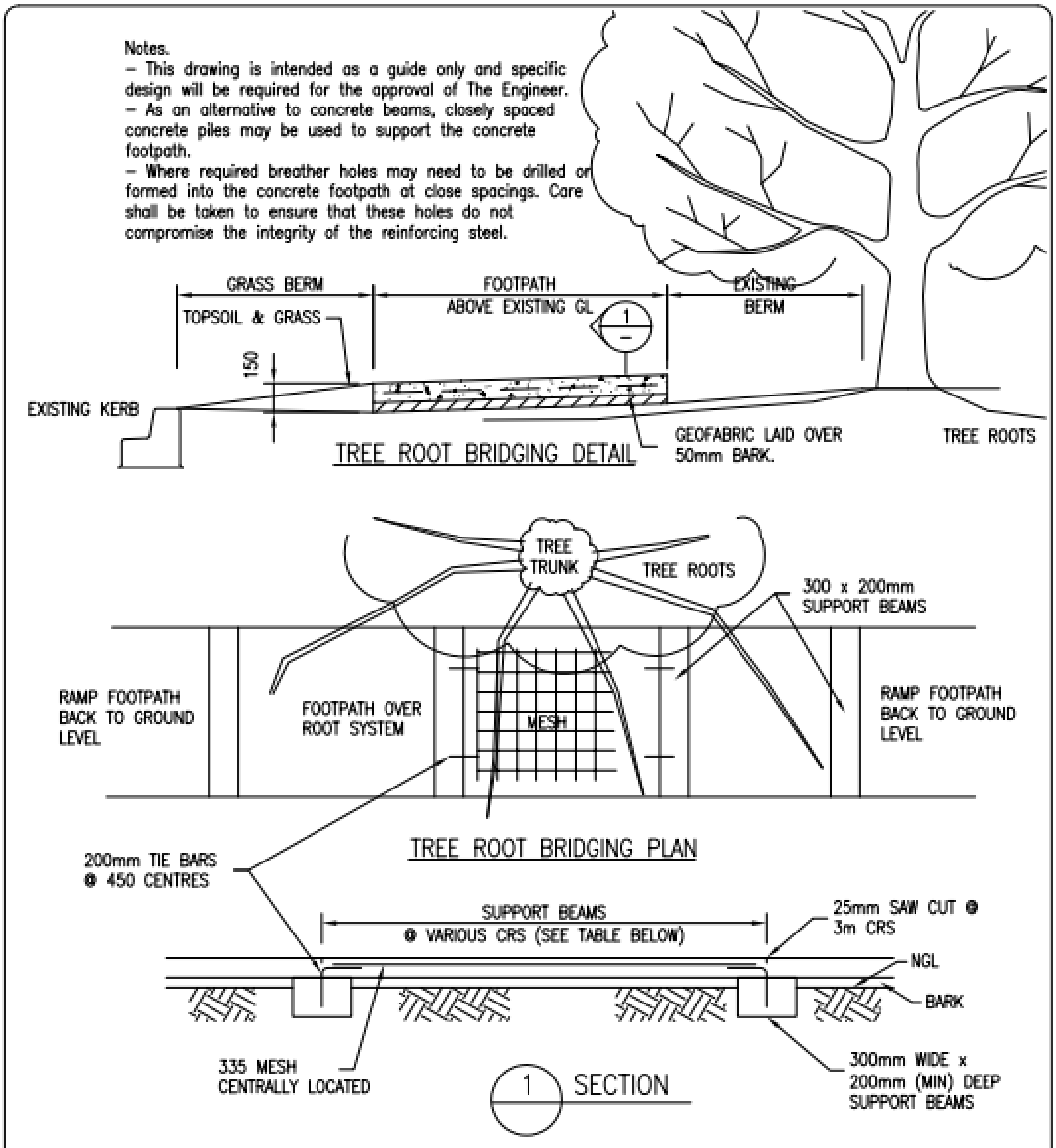


Fig 3 – Schematic of the relationship between a path and tree roots. The tree roots are relatively shallow and tend to invade the base course under paths. It is very important to avoid any significant cut in the vicinity of the red arrow, as this could cause direct damage to the roots. If the path is too close to the tree at this point, root action will lift the path.

7.2.2 Bridging

As an alternative to moving the path laterally away from the roots, it may in some instances be possible to bridge over the roots, i.e. to avoid the rootplate vertically rather than horizontally.



CONCRETE THICKNESS	SPAN	REINFORCING DETAILS
100 mm 20MPa	< 1500 mm	335 500MPa STEEL MESH
	1500 – 3000 mm	REQUIRES DESIGN

Fig 4 – Tree root bridging detail from Auckland Transport's Code of Practice 2008/0622.

8. Recommendations

It is recommended that the path edge is kept a minimum distance of 50cm (laterally) away from the tree trunks. This is less than ideal – further is better – but is a response to the existing conditions, where the width available is constrained by the road. Keeping away from the trunk and buttress roots will prevent the trees from lifting the path through direct root action, and also limits the impact of the path on the health of tree roots, allowing some air and water to permeate into the ground along the path edge. It also reduces the risk of overhead impact.

If this cannot be achieved, then a cutaway in the path edge can be used as a viable alternative (as was done previously, See Fig 3).

8.1 Site works

Regardless of the degree of design, it is difficult to predict exactly what will be found when the existing path is broken up and removed. Changes may need to be made on the spot to the details of the design in order to accommodate existing large roots, or to achieve the necessary grade.

Similarly to the general construction recommendations, roots can be retained by hand digging to remove loose organic material, covering the surface with geotextile cloth, laying gap / aggregate / crusher run to form a level surface, and casting the concrete in place on top.

9. Mitigation

To avoid disturbing the roots of the trees, the following construction method is recommended, where possible:

- Break up and remove the existing concrete, using a digger standing on the existing path and peeling it back. Machine movements on open ground should be avoided as this causes compaction.

- Lay geotextile cloth over the remaining basecourse and any exposed roots to reduce the possibility of root drying and concrete contamination.

- Place the new base course on top of the existing base course without disturbing the existing base course, and compact to specification.

- Haunch and cast the concrete surface on top of the existing base course.

- Keep the edge of the path closest to the tree at least 0.5m away from the trunk (for the reasons given in 7.2).

- Avoid digging down into the existing basecourse as this is likely to be full of roots. If this has to be done, it should be done by hand under arborist supervision.

- No cuts (i.e. no lowered grade) should be permitted below existing ground level adjacent to any tree on the treeward side of the path. The existing basecourse can be left in place after concrete removal and the path grade built up on top of that.

- All excavation within the rootplate / dripline of any pohutukawa tree should be directly supervised by a competent works arborist. The works arborist should specify the excavation method to be used to avoid damage to roots, which may include hand excavation or supervised machine excavation, or a combination of the two.

10. Summary and conclusion

This report covers the practical arboricultural assessment of works within the dripline / protected rootzone of pohutukawa trees adjacent to the Paihia to Waitangi SUP.

Twenty trees were surveyed. The trees are shown in the appendices below. The colours used below refer to Table 1.

Green category
Twelve trees are located sufficiently far from the existing / proposed path edge that works are likely to be successful without any significant damage to the trees.

Orange category
Four trees appear to have sufficient separation from the path edge for the works to be undertaken, but further exploration will be necessary during path construction as the situation is unclear.

Yellow category
Four trees require modifications to the path to achieve greater separation from the proposed path, either through the use of insets / cutaways, bridging, or redesign of the entire path.

With care and proper arboricultural supervision, the SUP can be constructed without significant adverse effects on the environment.

Gerard Mostert - Consultant
Peers Brown Miller Ltd
1 July 2021

Appendix 1 – Tree table

#	Distance from extg. path edge	Photo	Comment
1	2.5	Tree 1	Trunk base below grade. Sufficient separation from path edge. Fence posts will require hand excavation to miss tree roots.
2	3	Tree 2	Sufficient separation from trunk.
3	0	Tree 3	Requires additional lateral separation from trunk (v. close at present, has lifted path).
4	0	Tree 4	Requires additional lateral separation from trunk. Inset may be required.
5	2	Tree 5	Sufficient separation from path edge.
6	1.1	Tree 6	Sufficient separation from path edge.
7	>10	Tree 7	Sufficient separation from path edge.
8	>10	Tree 8	Sufficient separation from path edge.
9	>6	Tree 9	Sufficient separation from path edge.
10	1.3	Tree10	Sufficient separation from path edge.
11	0.4	Tree 11	Appears to have sufficient separation from path edge.
12	1/1	Tree 12	Sufficient separation from path edge.
13	0.1/1	Tree 13	Appears to have sufficient separation from path edge
14	0.5	Tree 14	Appears to have sufficient separation from path edge
15	0.6	Tree 15	Sufficient separation. Bridged – grate with fill under path. Replace with gabion basket or similar?
16	1.2	Tree 16	Appears to have sufficient separation from path edge
17	0	Tree 17	Will require inset in path edge
18	0	Tree 18	Will require inset in path edge
19	0.8	Tree 19	Sufficient separation.
20	>1	Tree 20	Sufficient separation.

Table 1 – Tree data. The distances from the path edge refer to the existing path. I have also referred to the proposed plans, so my comments reflect required changes to the proposed path. Colour-coding is as follows:

Sufficient separation, design appears adequate for tree protection
Appears to have sufficient separation, but will require excavation / kerb removal to check clearance
Requires specific intervention to protect the adjacent tree

Appendix 2 – Tree photographs

Tree 1


Tree 2

Tree 3

Tree 4

Tree 5

Tree 6

Trees 7, 8, 9 (from right to left)

Tree 10

Tree 11

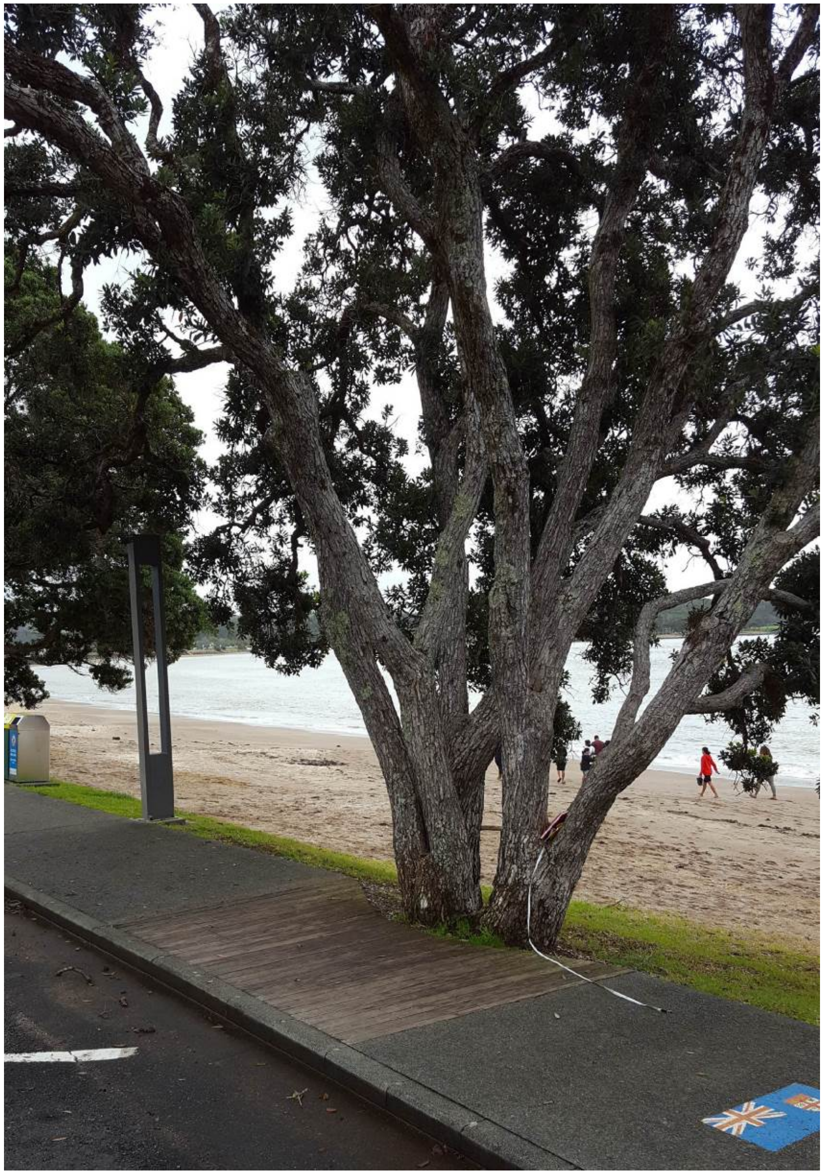
Tree 12

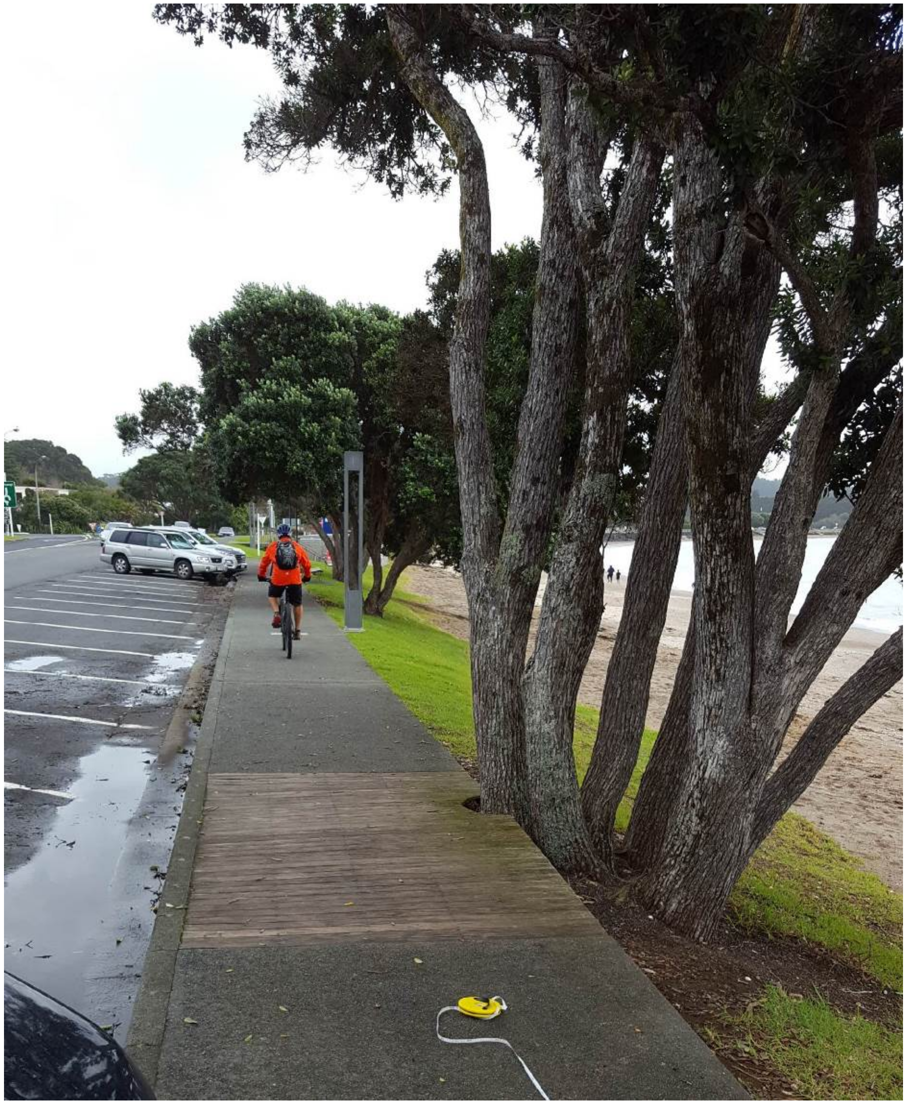
Tree 13

Tree 14

Tree 15

Tree 16

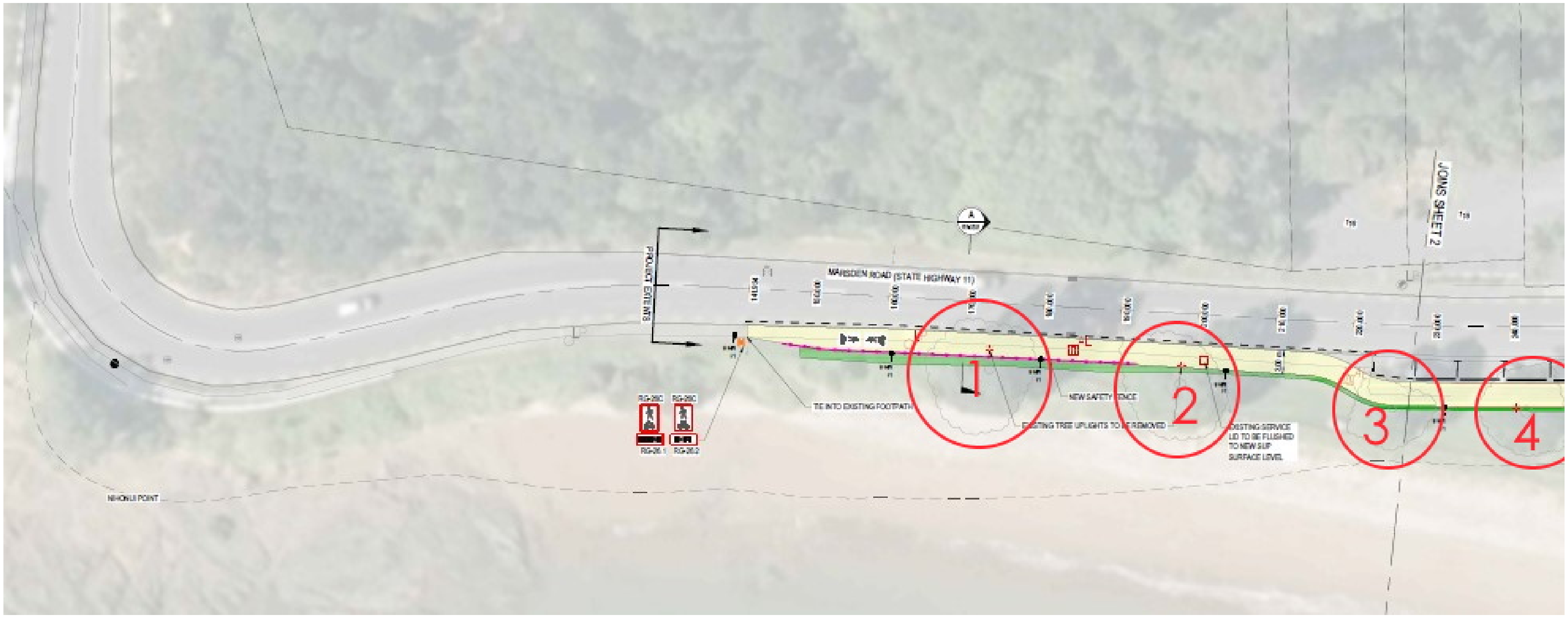

Tree 17


Tree 18

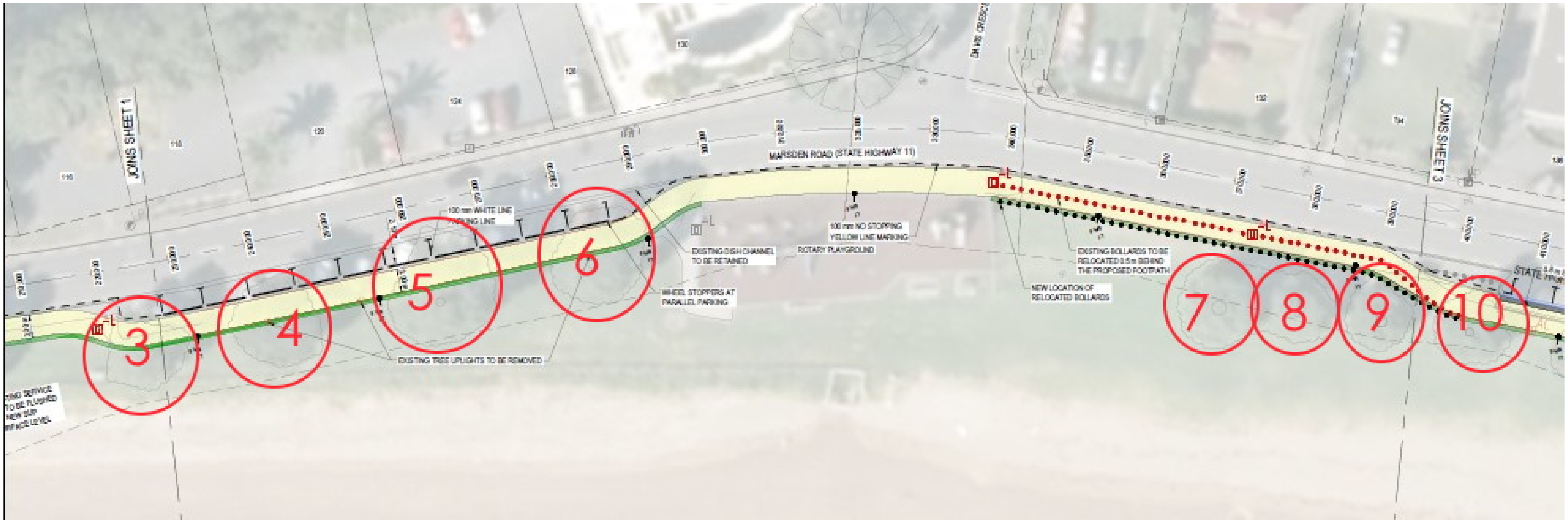
Tree 19

Tree 20

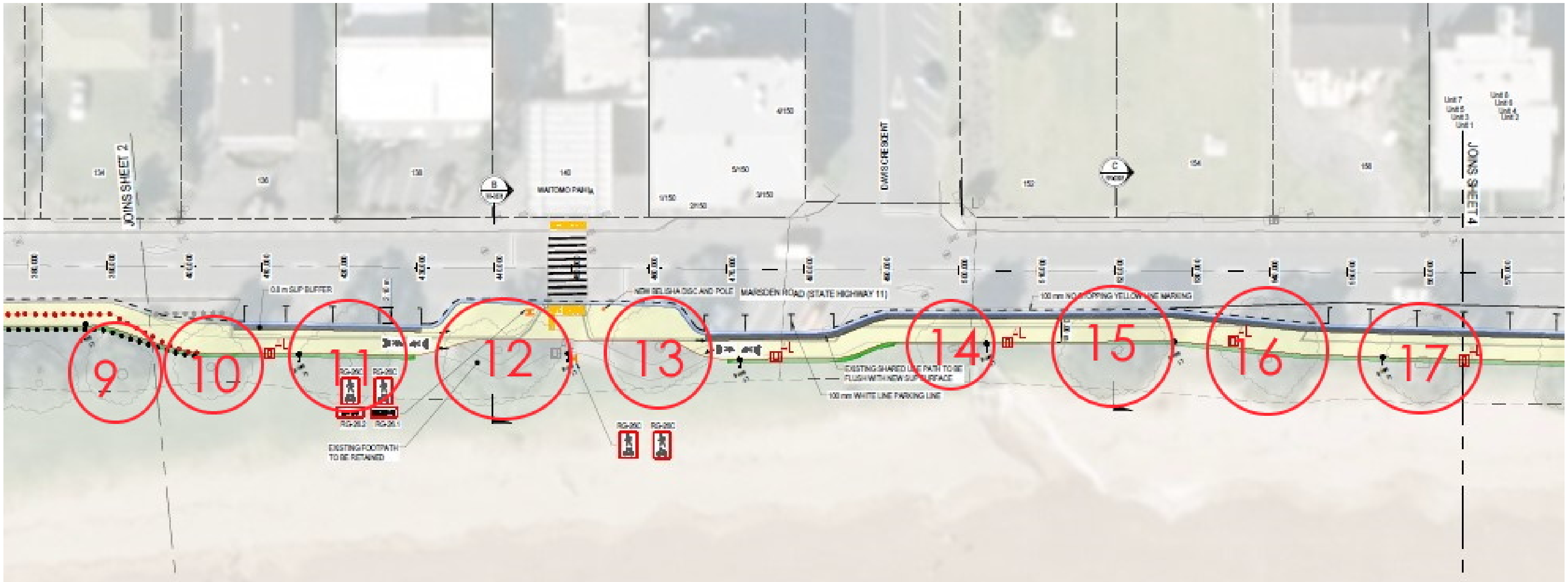
Appendix 3 – Tree plans (numbered as per report)



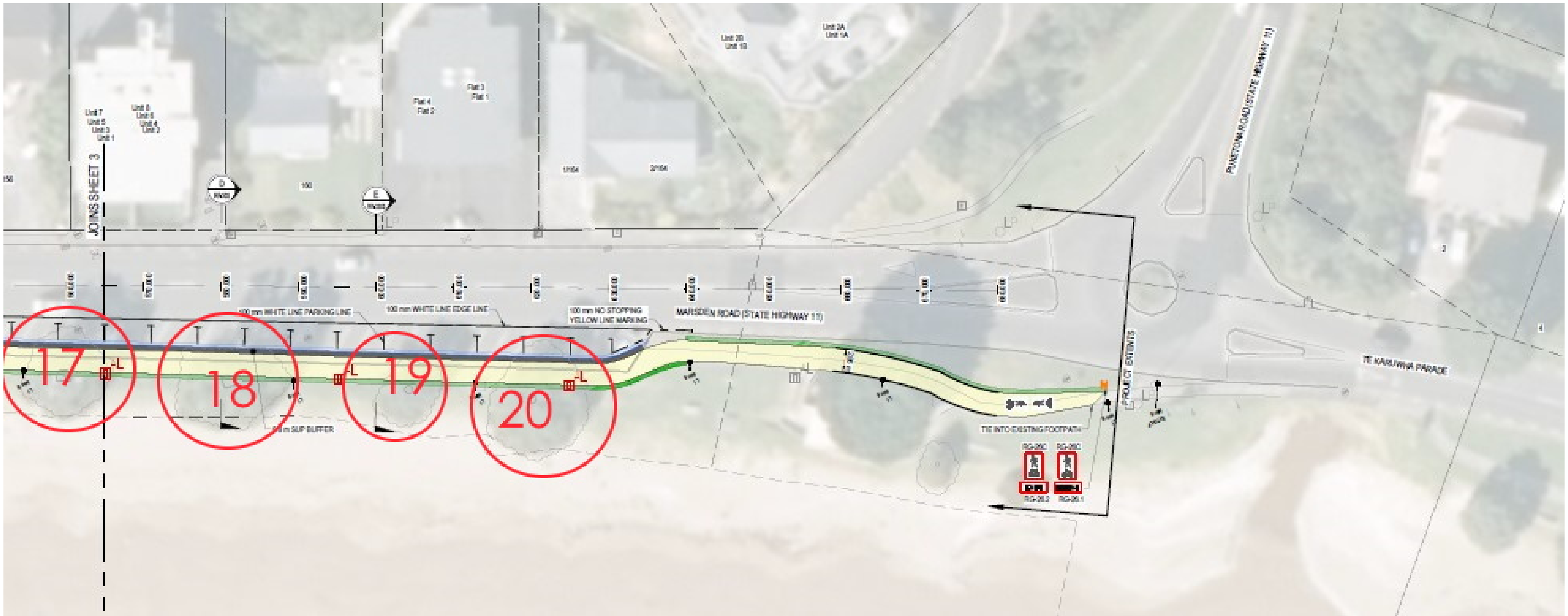
My mark-up of GA Sheet 0101



My mark-up of GA Sheet 0102



My mark-up of GA Sheet 0103



My mark-up of GA Sheet 0104

Appendix H

Safety in Design Register

aurecon

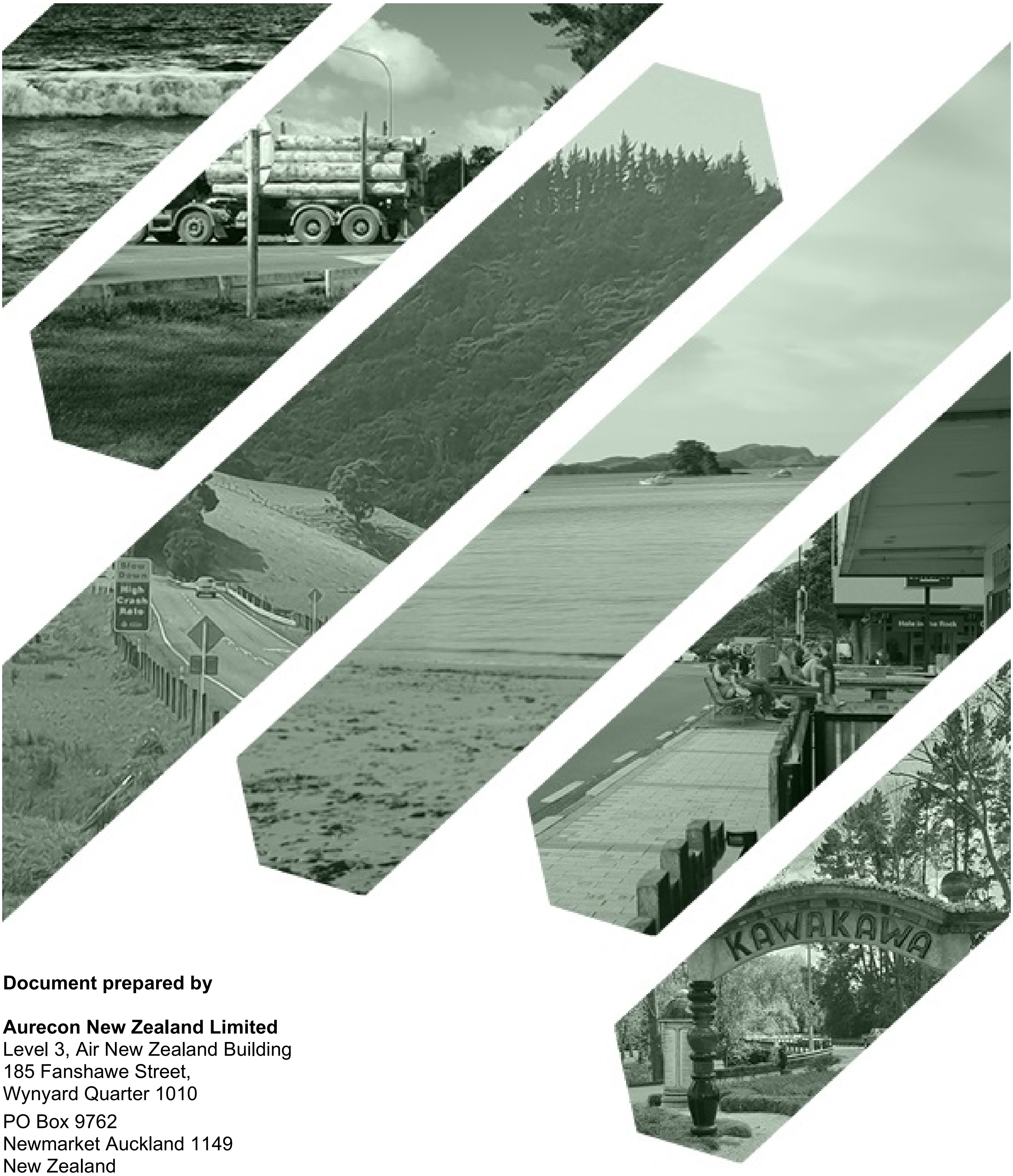
Safe Design Risk Register – 511738 SH11 P2W Safety in Design Workshop

IDENTIFY SAFE DESIGN RISK								ASSESSMENT SAFE DESIGN RISK - CURRENT EXPOSURE						IMPLEMENT SAFE DESIGN RISK TREATMENT	
ID	Risk Title	Event / Cause / Consequence	Persons Affected	Applicable Phases	Applicable Disciplines	Applicable WBSs	Inherent Consequence	(Risk Treatment) Current Control Measures	Consequence	Likelihood	Risk Level	Risk Owner	Evaluation	(Risk Treatment) Action Summary	Comments
1	Tree exposure, tree branch overhanging	Tree branches overhanging results in - reduced lateral clearance to the tree for cyclists and other SUP users - increase in potential head-on accidents with the trees and/or other users - Operating equipment under the tree canopy at risk of striking the tree - Insufficient visibility of the road features, signage and oncoming - Lower reliability of the SUP cyclists/pedestrians	Path Users Local Communities and IWI Constructors	Design Operations Construction	Roads & Highways Environmental		C - Moderate	The risk has been controlled to the current level by: - Root barrier protection designed: - Providing clear sightlines; - specifying removal of overhanging tree branches on the SUP in the design philosophy statement (DPS) - specifying Regular trimming and inspections of branch health in the DPS	D - Minor	3 - Possible	Medium	Designer	Tolerable	The risk will be actioned to an acceptable level by: - Offering to provide a site based engineering service during construction from the arborist - Highlighting the risk in the construction methodology statement - Discussing a proactive approach with local Council and confirming they understand the requirement to programme and fund maintenance	
2	Tree Root Damage	Damage to the tree roots along the road corridor due to construction activities resulting in death of trees	Local Communities and IWI Maintainers Constructors Demolishers	Maintenance Construction Demolition	Environmental		C - Moderate	The risk has been controlled to the current level through design: - Build on top of the existing basecourse - cutting only 50mm deep from existing ground levels in consultation with the arborist - Consider wooden boardwalk instead of concrete in next stage of design - Prepare arboricultural assessment report before construction - Ensure the presence of arborist on site during construction works - Specifying hand excavations when excavating near trees	D - Minor	3 - Possible	Medium	Contractor	Tolerable	The risk will be actioned to an acceptable level by: - Offering to provide a site based engineering service during construction; - Highlighting the risk in the construction methodology statement	
3	Tree Pruning	Pruning NZ native tree, such as Pohutukawa trees can cause temporary operational issues and legal issues: - temporary unaccessible to the closed path - might intrude the tree significance	Maintainers Path Users	Operations	Environmental		D - Minor	The risk has been controlled to the current level by: - Consultation with Arborist and specifying local Iwi and Council consultation to confirm tree significance (cultural, historic, archaeological)	D - Minor	2 - Unlikely	Low	Asset Owner	Acceptable	The risk will be actioned to an acceptable level by: - Offering to provide a site based engineering service from the arborist during construction to trim the rota where feasible	
4	Construction period coincide with the flowering season	Construction works period happen at the same time as pohutukawa flowering period can make surface finish poor.	Constructors	Construction	Roads & Highways		D - Minor	The risk has been controlled to the current level by: - Specifying to programme the construction process: heat for curing/cracking etc. wisely to avoid the flowering period	C - Moderate	2 - Unlikely	Medium	Contractor	Intolerable	The risk will be actioned to an acceptable level by: - Offering to provide a robust site based engineering service during construction; - Highlighting the risk in the construction methodology statement - Robust Traffic Management Plan	
5	Slippery Surface	Fallen leaves (wet from the rain) could cause accidents for cyclists in the SUP lane	Path Users Maintainers	Maintenance Design	Roads & Highways		D - Minor	The risk has been controlled to the current level by: - specifying regular maintenance and clearance of SUP - SUP surface to be specified to be a higher friction surface, such as brushed concrete or inserted pattern to be considered in the subsequent design stage	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - Discussing a proactive approach with local Council and confirming they understand the requirement to programme and fund maintenance	
6	Root heave	Overgrown tree roots - Damaging pavement - Uneven surface - Create trip hazard for SUP users	Maintainers Path Users	Design Maintenance	Environmental		C - Moderate	The risk has been controlled to the current level by specifying: - Build up the pavement edge with additional soil - Choose versatile pavement material for root growth - Retaining existing finish levels (no cut) - Bridging over the roots for SUP pavement	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - Offering to provide a site based engineering service from the arborist during construction to trim the rota where feasible	
7	Trees falling on live lanes	Damage to trees during construction resulting in trees falling - cause damage to the neighbouring property or moving/parked vehicle - cause delay to construction programme	Constructors Operators Workers Neighbours	Construction	Environmental		D - Minor	The risk has been controlled to the current level by: - Specifying presence of arborist at all times during construction around trees - Specifying hand excavations around trees	C - Moderate	2 - Unlikely	Medium	Contractor	Tolerable	The risk will be actioned to an acceptable level by: - Offering to provide a site based engineering service during construction; - Highlighting the risk in the construction methodology statement	
8	Tree leaves accumlation at catchpits	Tree seeds / leaves can block outfalls and catchpits and prevent efficient drainage causing water pooling; users to walk around puddles and run into the oncoming cyclist / pedestrian	Maintainers Path Users Workers	Design Maintenance	Stormwater		D - Minor	The risk has been controlled to the current level by specifying: - regular rubbish collection at catchpits - regular drainage inspection	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - Discussing a proactive approach with local Council and confirming they understand the requirement to programme and fund maintenance	
9	Uplifting of street lighting near tree roots	Community using the footpath at risk of injury from unstable light poles.	Path Users Maintainers	Design Maintenance	Electrical		D - Minor	The risk has been controlled to the current level by: - Keep streetlghts away from dripline to minimise risk of uplifting in design	D - Minor	2 - Unlikely	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - Discussing a proactive approach with local Council and confirming they understand the requirement to programme and fund maintenance	
10	Heavy storm action	Heavy storm action might lead to high water table and removal of ground subject, causing path instability or undermining	Path Users Maintainers	Design Maintenance	Stormwater		D - Minor	The risk has been controlled to the current level by: - Additional planting to provide nature based solutions to improve foreshore stability	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - Discussing a proactive approach with local Council and confirming they understand the requirement to programme and fund maintenance	
11	Tree roots growth	Growth of tree roots can intrude and damage the existing utilities nearby	Maintainers	Design	Utilities		D - Minor	The risk has been controlled to the current level by: - identification of existing utilities and maintaining standard clearance through BeforeUDig plans. -specifying detailed utility assessment and identification is carried out in subsequent design stages and prior to construction in consultation with the relevant network utility operators (NUOs) in the DPS	C - Moderate	3 - Possible	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - desktop assessment of utilities and ensuring no further damage is caused by current level of design. - further utility assessment to be carried out in subsequent design stage	
12	Raising level of pavement	Raising level of pavement creates hard edge from pavement onto grass and can cause trip hazards over the path edge.	Path Users	Design	Roads & Highways		C - Moderate	The risk has been controlled to the current level by: - Build up the pavement edge with additional soil and gradual slope which elimates the trip hazard and does not create a steep embankment. -provision of fence where the embankment is steep in approach to Nihinui Point	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk has been controlled to the current level by: - Build up the pavement edge with additional soil and gradual slope which elimates the trip hazard and does not create a steep embankment. -provision of fence where the embankment is steep in approach to Nihinui Point	
13	Pinch point at the crossing point	The narrowing pinch point section, created by buildout of the SUP at the zebra crossing and directed the SUP in front of the two trees can result in conflicts between users and crashes.	Path Users	Design	Roads & Highways		C - Moderate	The risk has been controlled to the current level by: - Clear lane assignment through arrow markings around the trees where path splits off -2.5 m wide is the minimum width SUP can be designed for without a departure and considered an acceptable width for a mobility user and pedestrian to cross by	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - consider removing 2x parking spaces to reduce pinch point in subsequent design stage - convert to accessibility parking or motorcycle parking / cycle parking	

aurecon

Safe Design Risk Register – 511738 SH11 P2W Safety in Design Workshop

IDENTIFY SAFE DESIGN RISK								ASSESSMENT SAFE DESIGN RISK - CURRENT EXPOSURE						IMPLEMENT SAFE DESIGN RISK TREATMENT	
ID	Risk Title	Event / Cause / Consequence	Persons Affected	Applicable Phases	Applicable Disciplines	Applicable WBSs	Inherent Consequence	(Risk Treatment) Current Control Measures	Consequence	Likelihood	Risk Level	Risk Owner	Evaluation	(Risk Treatment) Action Summary	Comments
14	Trees besides the crossing point	The crossing point of SUP at the zebra crossing is in front of the two trees, resulting in poor visibility for path user crossing to observe the road situation and on-road user to observe the crossing user.	Path Users On-road Users	Design	Roads & Highways		D - Minor	The risk has been controlled to the current level by: - specifying regular maintenance of tree branches to ensure visibility is achieved -maintaining existing footpath arrangement behind the tree and provision of SUP providing additional facility for the users	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - consider removing 2x parking spaces to reduce pinch point in subsequent design stage - convert to accessibility parking or motorcycle parking / cycle parking	
15	Work near live traffic lanes	Construction works to occur besides live carriageway - result in injury of personnel on site	Path Users Constructors	Construction	Roads & Highways		B - Major	The risk has been controlled to the current level by ensuring TTM and construction methodology is robust: - Stop-go TTM for work near live lane during construction stage - temporary removal of parking during construction to create safe working zone	D - Minor	4 - Likely	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - Offering to provide a robust site based engineering service during construction; - Highlighting the risk in the construction methodology statement - Robust Traffic Management Plan	
16	Dawn blessing during construction	People gathering near live lanes and construction site at dawn blessing	Path Users Constructors Local Communities and IWI	Construction	Roads & Highways		D - Minor	The risk has been controlled to the current level by: - On-site personnel to manage cyclists and pedestrians	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - Offering to provide a robust site based engineering service during construction; - Highlighting the risk in the construction methodology statement - Robust Traffic Management Plan	
17	Un-clear crossing access after hours within construction site	Un-clear crossing access after hours within construction site can result in path users enter the working zone without awaring, leading to injury or death	Path Users	Construction	Roads & Highways		B - Major	The risk has been controlled to the current level by: - ensuring appropriate construction methodology review - staging of lighting to ensure footpath access retained - Enclose the construction working area -Robust TTM ensuring alternative path is maintained at all times during construction	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - Offering to provide a robust site based engineering service during construction; - Highlighting the risk in the construction methodology statement - Robust Traffic Management Plan	
18	Footpath closure during construction	Footpath closure during construction can result in pedestrians walking on live traffic lane, which leads to car crash and injury.	Path Users	Construction	Roads & Highways		B - Major	The risk has been controlled to the current level by: - ensuring robust TTM during construction will be reviewed to maintain the footpath access on the opposite side only	B - Major	3 - Possible	Critical	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - Offering to provide a robust site based engineering service during construction; - Highlighting the risk in the construction methodology statement - Robust Traffic Management Plan	
19	Pullants run off from construction	Pullants or dirts run off from construction might go into beach and cause contamination.	Local Communities and IWI	Construction	Roads & Highways		D - Minor	The risk has been controlled to the current level by: - Construction methodology: regular environment check & assessment and put measurement in place	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - Offering to provide a robust site based engineering service during construction; - Highlighting the risk in the construction methodology statement - Robust Traffic Management Plan	
20	Pedestrian crossing on road during construction	Local users crossing to the service station / carparks on western side in Davis Cres on road during construction can lead to crash incident.	Path Users	Construction	Roads & Highways		C - Moderate	The risk has been controlled to the current level by: - Retain 1 pedestrian crossing during construction	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk will be actioned to an acceptable level by: - Offering to provide a robust site based engineering service during construction; - Highlighting the risk in the construction methodology statement - Robust Traffic Management Plan	
21	Proposed 2.5 m SUP on sharp angles	Proposed 2.5 m SUP at the zebra crossing occurs on sharp angle due to restricted available space which can create conflicts between the 2 directions of SUP and footpath users, with cyclists riding at speed.	Path Users	Design	Roads & Highways		C - Moderate	The risk has been controlled to the current level by: - providing appropriate signage and visuals through line marking - specifying urban landscape in the proposed buildout to encourage slower speed environment	B - Major	3 - Possible	Critical	Asset Owner	Tolerable	The risk has been controlled to the current level by: - providing appropriate signage and visuals through line marking -different surfacing for SUP to create visual difference to encourage lower speed environment consideration -specifying considering urban landscape in the proposed buildout to encourage lower speed environment	
22	Proposed Two-way SUP	The proposed Two-way SUP can create conflicts between the 2 directions of SUP and footpath users.	Path Users	Design	Roads & Highways		C - Moderate	The risk has been controlled to the current level by: - ensuring minimum 3.0 m wide SUP width maintained consistently - directional arrows and difference surface finishing around the zebra crossing to create visual difference and encourage slower speed environment where the pinch point occurs at the zebra crossing - provide signages	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk has been controlled to the current level by: - ensuring minimum 3.0 m wide SUP width maintained consistently - directional arrows and difference surface finishing around the zebra crossing to create visual difference and encourage slower speed environment where the pinch point occurs at the zebra crossing - provide signages	
23	No raised table on crossing	The absence of raised table can lower the awareness of vehicle driver to the present path users when they passing through the crossing point. They can hit the path users who's crossing.	Path Users	Design	Roads & Highways		C - Moderate	The risk has been controlled to the current level by: - specifying urban landscape in the buildout for visual speed reduction environment to be considered in next design stage - Removed car parks adjacent to the crossing to increase visibility -maintaining existing red colour surfacing at the crossing and providing sufficient lighting	B - Major	4 - Likely	Critical	Asset Owner	Tolerable	The risk has been controlled to the current level by: - urban landscape in the buildout for visual speed reduction environment - Removed car parks adjacent to the crossing to increase visibility -maintaining existing red colour surfacing at the crossing and providing sufficient lighting	
24	No bike parking near the dairy	Without bike parking facilities near the dairy, the parked bike might be easily stolen.	Path Users	Operations	Roads & Highways		D - Minor	The risk has been controlled to the current level by: - consider bike parking facilities in subsequent design stage	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable	The risk has been controlled to the current level by: - consider bike parking facilities in subsequent design stage	
25	Vehicle separators creating trip hazard	the proposed vehicle stoppers at the chevron marking along parallel parking may cause tripping hazard for vehicle passenger resulting in trips and falls and conflicts with the SUP users	Path Users	Operations	Roads & Highways		D - Minor	Consider removing the proposed separators and trial just with chevron marking based on driver awareness to park away from the chevrons and within the allocated parking bay in subsequent design stage	D - Minor	3 - Possible	Medium	Asset Owner	Tolerable		



Document prepared by

Aurecon New Zealand Limited
Level 3, Air New Zealand Building
185 Fanshawe Street,
Wynyard Quarter 1010
PO Box 9762
Newmarket Auckland 1149
New Zealand

T +64 9 520 6019
E auckland@aurecongroup.com
W aurecongroup.com

Aurecon offices are located in:
Angola, Australia, Botswana, China, Ghana, Hong Kong, Indonesia, Kenya, Lesotho, Macau, Mozambique, Namibia, New Zealand, Nigeria, Philippines, Qatar, Singapore, South Africa, Swaziland, Tanzania, Thailand, Uganda, United Arab Emirates, Vietnam.

aurecon
Bringing ideas to life