



PAPAIOEA
PALMERSTON
NORTH
CITY

PALMERSTON NORTH CITY COUNCIL

AGENDA

SUSTAINABILITY COMMITTEE

9:00 AM, WEDNESDAY 22 MAY 2024

COUNCIL CHAMBER, FIRST FLOOR
CIVIC ADMINISTRATION BUILDING
32 THE SQUARE, PALMERSTON NORTH

MEMBERS

Brent Barrett (Chair)
Kaydee Zabelin (Deputy Chair)
Grant Smith (The Mayor)

Roly Fitzgerald	Lorna Johnson
Patrick Handcock	Debi Marshall-Lobb
(ONZM)	
Leonie Hapeta	Karen Naylor

AGENDA ITEMS, IF NOT ATTACHED, CAN BE VIEWED AT

pncc.govt.nz | Civic Administration Building, 32 The Square
City Library | Ashhurst Community Library | Linton Library

Waid Crockett

Chief Executive | PALMERSTON NORTH CITY COUNCIL

Te Marae o Hine | 32 The Square
Private Bag 11034 | Palmerston North 4442 | New Zealand
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SUSTAINABILITY COMMITTEE MEETING

22 May 2024

ORDER OF BUSINESS

1. Karakia Timatanga

2. Apologies

3. Notification of Additional Items

Pursuant to Sections 46A(7) and 46A(7A) of the Local Government Official Information and Meetings Act 1987, to receive the Chairperson's explanation that specified item(s), which do not appear on the Agenda of this meeting and/or the meeting to be held with the public excluded, will be discussed.

Any additions in accordance with Section 46A(7) must be approved by resolution with an explanation as to why they cannot be delayed until a future meeting.

Any additions in accordance with Section 46A(7A) may be received or referred to a subsequent meeting for further discussion. No resolution, decision or recommendation can be made in respect of a minor item.

4. Declarations of Interest (if any)

Members are reminded of their duty to give a general notice of any interest of items to be considered on this agenda and the need to declare these interests.

5. Public Comment

To receive comments from members of the public on matters specified on this Agenda or, if time permits, on other Committee matters.

(NOTE: If the Committee wishes to consider or discuss any issue raised that is not specified on the Agenda, other than to receive the comment made or refer it to the Chief Executive, then a resolution will need to be made.)

6. Presentation - Ruahine Kiwi Project

Page 7

7. Confirmation of Minutes

Page 9

"That the minutes of the Sustainability Committee meeting of 13 March 2024 Part I Public be confirmed as a true and correct record."

8. Draft Food Security and Resilience Policy and resourcing considerations

Page 15

Memorandum, presented by Kate Harridge, Policy Analyst and Julie Macdonald, Strategy and Policy Manager.

9. Update on opportunities for native species re-introductions in the Turitea Reserve

Page 51

Memorandum, presented by Adam Jarvis, Principal Climate Change Advisor.

10. Sustainability Review 2024

Page 59

Memorandum, presented by Olivia Wix, Communications Manager.

11. Wastewater Treatment Plant - Nature Calls: Quarterly Update

Page 61

Memorandum, presented by Mike Monaghan, Group Manager - Three Waters.

12. Palmerston North to Feilding Shared Pathway Project

Page 165

Memorandum, presented by Glen O'Connor, Group Manager - Transport and Development and Michael Bridge, Service Manager - Active Transport.

13. Committee Work Schedule

Page 193

14. Karakia Whakamutunga

15. Exclusion of Public

To be moved:

"That the public be excluded from the following parts of the proceedings of this meeting listed in the table below.

The general subject of each matter to be considered while the public is excluded, the reason for passing this resolution in relation to each matter, and the specific grounds under Section 48(1) of the Local Government Official Information and Meetings Act 1987 for the passing of this resolution are as follows:

General subject of each matter to be considered		Reason for passing this resolution in relation to each matter	Ground(s) under Section 48(1) for passing this resolution

This resolution is made in reliance on Section 48(1)(a) of the Local Government Official Information and Meetings Act 1987 and the particular interest or interests protected by Section 6 or Section 7 of that Act which would be prejudiced by the holding of the whole or the relevant part of the proceedings of the meeting in public as stated in the above table.

Also that the persons listed below be permitted to remain after the public has been excluded for the reasons stated.

[Add Third Parties], because of their knowledge and ability to assist the meeting in speaking to their report/s [or other matters as specified] and answering questions, noting that such person/s will be present at the meeting only for the items that relate to their respective report/s [or matters as specified].

PRESENTATION

TO: Sustainability Committee

MEETING DATE: 22 May 2024

TITLE: Presentation - Ruahine Kiwi Project

RECOMMENDATION(S) TO SUSTAINABILITY COMMITTEE

1. That the Sustainability Committee receive the presentation for information.
-

SUMMARY

Stewart Harrex and Vicky Forgie will present an update on the Ruahine Kiwi Project, a project of Source to Sea.

ATTACHMENTS

Nil

PALMERSTON NORTH CITY COUNCIL

Minutes of the Sustainability Committee Meeting Part I Public, held in the Council Chamber, First Floor, Civic Administration Building, 32 The Square, Palmerston North on 13 March 2024, commencing at 9.06am

Members Present: Councillors Brent Barrett (in the Chair), Patrick Handcock, Lorna Johnson, Debi Marshall-Lobb and Karen Naylor.

Non Members: Councillors Mark Arnott, Rachel Bowen and Lew Findlay.

Apologies: The Mayor (Grant Smith) (Council business), Councillor Roly Fitzgerald, Councillor Leonie Hapeta, Councillor Karen Naylor (early departure), Councillor Kaydee Zabelin (late arrival).

Councillor Kaydee Zabelin entered the meeting at 9.26am during consideration of clause 3. She was not present for clauses 1 and 2.

Councillor Rachel Bowen left the meeting at 10.27am during consideration of clause 5. She entered the meeting again at 11.43am during consideration of clause 7. She was not present for clauses 5 and 6.

Councillor Karen Naylor was not present when the meeting resumed at 11.10am. She was not present for clauses 6 to 8 inclusive.

Karakia Timatanga

Councillor Brent Barrett opened the meeting with karakia.

1-24 Apologies

Moved Brent Barrett, seconded Patrick Handcock.

The COMMITTEE RESOLVED

1. That the Committee receive the apologies.

Clause 1-24 above was carried 8 votes to 0, the voting being as follows:

For:

Councillors Brent Barrett, Patrick Handcock, Lorna Johnson, Debi Marshall-Lobb, Karen Naylor, Mark Arnott, Rachel Bowen and Lew Findlay.

2-24 Confirmation of Minutes

Moved Brent Barrett, seconded Patrick Handcock.

The **COMMITTEE RESOLVED**

1. That the minutes of the Sustainability Committee meeting of 29 November 2023 Part I Public be confirmed as a true and correct record.

Clause 2-24 above was carried 8 votes to 0, the voting being as follows:

For:

Councillors Brent Barrett, Patrick Handcock, Lorna Johnson, Debi Marshall-Lobb, Karen Naylor, Mark Arnott, Rachel Bowen and Lew Findlay.

3-24

Annual Sector Lead Report: Environment Network Manawatū

Memorandum, presented by Amy Viles, Community Development Advisor, Rebecca Bell, ENM Co-Chairperson and Madz BatacheI, ENM Coordinator, as attached to these Minutes.

Rebecca acknowledged the outstanding work being undertaken by the team to achieve the goals of the organisation. Work has been done on updating their strategic framework over the last year, with the strategic action plan to be completed by the end of this financial year.

Challenges:

- Resourcing/capacity
- Difficult funding environment; eg. Ruahine Kiwi Project – coming to the end of a three year contract with Department of Conservation, needing to source alternative funding so project can continue and kiwis can be returned to the ranges by 2026
- Work in food resilience space – indications are government funding will be drying up pretty fast, still a huge amount of need/interest

Opportunities:

- Developing nationwide food waste prevention programme in collaboration with Zero Waste Network NZ and three other environment centres around the country
- After a successful pilot scheme through resource recovery fund (providing TerraCycle boxes for recycling hard to recycle products) questions were raised on how can the learnings be shared? How can they advocate for change on a wider scale?

Looking forward to Long-Term Plan process and hearing from Officers regarding the development of Food Policy.

Councillor Kaydee Zabelin entered the meeting at 9.26am.

Moved Brent Barrett, seconded Patrick Handcock.

The **COMMITTEE RESOLVED**

1. That the Committee receive the Annual Sector Lead Report:

Environment Network Manawātū (January-December 2023)
(Attachments 1, 2 and 3).

Clause 3-24 above was carried 9 votes to 0, the voting being as follows:

For:

Councillors Brent Barrett, Kaydee Zabelin, Patrick Handcock, Lorna Johnson, Debi Marshall-Lobb, Karen Naylor, Mark Arnott, Rachel Bowen and Lew Findlay.

4-24

Wastewater Treatment Plant - Nature Calls: Quarterly Update

Memorandum, presented by Mike Monaghan, Group Manager Three Waters and Anna Lewis, Project Manager – Wastewater Discharge Consent Programme.

Officers noted the following update to the report:

Section 6.2 – End of February financials = \$1,088,986 spent to date of \$913,000 budget.

Moved Brent Barrett, seconded Kaydee Zabelin.

The **COMMITTEE RESOLVED**

1. That the Committee receive the report titled 'Wastewater Treatment Plant – Nature Calls: Quarterly Update' presented to the Sustainability Committee on 13 March 2024.

Clause 4-24 above was carried 9 votes to 0, the voting being as follows:

For:

Councillors Brent Barrett, Kaydee Zabelin, Patrick Handcock, Lorna Johnson, Debi Marshall-Lobb, Karen Naylor, Mark Arnott, Rachel Bowen and Lew Findlay.

5-24

Draft Waste Management and Minimisation Plan - approval for consultation

Memorandum, presented by Peter Ridge, Senior Policy Analyst and Natasha Hickmott, Activities Manager – Resource Recovery and Sustainability Infrastructure.

Elected Members requested that the inclusion of a kerbside green waste collection service be investigated alongside the development of a city-wide food scraps collection service.

Councillor Rachel Bowen left the meeting at 10.27am.

Moved Brent Barrett, seconded Lorna Johnson.

The **COMMITTEE RESOLVED**

1. That the Committee approve the Statement of Proposal - Draft Waste Management and Minimisation Plan 2024 (Attachment 1), as amended, for public consultation concurrent with and linked to the draft 2024-34 Long-Term Plan consultation.
2. That action 3.6 in the draft WMMP be amended to read 'Develop a city-wide food scraps collection service and investigate the inclusion of a kerbside green waste collection service' and that the

corresponding action in the draft Resource Recovery Plan be amended accordingly prior to the consultation on the draft Long Term Plan.

Clause 5-24 above was carried 8 votes to 0, the voting being as follows:

For:

Councillors Brent Barrett, Kaydee Zabelin, Patrick Handcock, Lorna Johnson, Debi Marshall-Lobb, Karen Naylor, Mark Arnott and Lew Findlay.

The meeting adjourned at 10.50am.

The meeting resumed at 11.10am.

Councillor Karen Naylor was not present when the meeting resumed.

6-24 Update on the Low Carbon Fund 2023/24

Memorandum, presented by David Watson, Senior Climate Change Advisor and Adam Jarvis, Principal Climate Change Advisor.

Moved Brent Barrett, seconded Patrick Handcock.

The **COMMITTEE RESOLVED**

1. That the Committee receive the memorandum titled 'Update on the Low Carbon Fund 2023/24' presented to the Sustainability Committee on 13 March 2024.

Clause 6-24 above was carried 7 votes to 0, the voting being as follows:

For:

Councillors Brent Barrett, Kaydee Zabelin, Patrick Handcock, Lorna Johnson, Debi Marshall-Lobb, Mark Arnott and Lew Findlay.

7-24 Palmerston North City Council Carbon Neutral Feasibility Study Update

Memorandum, presented by Adam Jarvis, Principal Climate Change Advisor and David Watson, Senior Climate Change Advisor.

Councillor Rachel Bowen entered the meeting again at 11.43am.

Moved Brent Barrett, seconded Lorna Johnson.

The **COMMITTEE RECOMMENDS**

1. That as part of the process of finalising the 2024-34 Long-Term Plan, Council either reaffirm the existing corporate emissions reduction target or replace the existing corporate emissions reduction target with a different one.
2. That Council note that further Officer advice on the corporate emissions reduction target will be provided alongside deliberations on the 2024-34 Long-Term Plan.

Clause 7-24 above was carried 8 votes to 0, the voting being as follows:

For:

Councillors Brent Barrett, Kaydee Zabelin, Patrick Handcock, Lorna Johnson, Debi Marshall-Lobb, Mark Arnott, Rachel Bowen and Lew Findlay.

8-24 Committee Work Schedule

Moved Brent Barrett, seconded Patrick Handcock.

The **COMMITTEE RESOLVED**

1. That the Sustainability Committee receive its Work Schedule dated March 2024.

Clause 8-24 above was carried 8 votes to 0, the voting being as follows:

For:

Councillors Brent Barrett, Kaydee Zabelin, Patrick Handcock, Lorna Johnson, Debi Marshall-Lobb, Mark Arnot, Rachel Bowen and Lew Findlay.

Karakia Whakamutunga

Councillor Brent Barrett closed the meeting with karakia.

The meeting finished at 11.57am.

Confirmed 22 May 2024

Chair

MEMORANDUM

TO: Sustainability Committee

MEETING DATE: 22 May 2024

TITLE: Draft Food Security and Resilience Policy and resourcing considerations

PRESENTED BY: Kate Harridge, Policy Analyst and Julie Macdonald, Strategy and Policy Manager

APPROVED BY: David Murphy, Chief Planning Officer

RECOMMENDATION TO SUSTAINABILITY COMMITTEE

1. That the Committee refer the allocation of dedicated resources for delivery of the draft Food Security and Resilience Policy to the 2024-34 Long-Term Plan deliberations.

1. ISSUE

- 1.1 In September 2022 Council agreed to allocate \$20,000 to support the development of a food resilience policy in accordance with Council's Policy Framework. This funding enabled staff to undertake a research exercise and carry out analysis of the practicable options. The research and options analysis has been completed and Officers have identified that a policy is the appropriate response. A working draft of the Policy is included as Attachment 1 for the Committee to consider, to help understand the policy option and the implications for resourcing.
- 1.2 The issue of resourcing for the delivery of the policy remains unresolved. Through the drafting of the policy it has become apparent that without dedicated resourcing the policy may be ineffective in achieving the desired outcomes.
- 1.3 We recommend that Council consider allocating dedicated resources for the delivery of the draft Food Security and Resilience Policy, as part of the Long-Term Plan deliberations.
- 1.4 Subject to the Long-Term Plan deliberations, a draft policy can be presented to the Committee in August 2024 for approval for public consultation. Officers welcome feedback on the working draft of the policy in the interim.

2. BACKGROUND

- 2.1 On 18 May 2022, the Environmental Sustainability Committee resolved 'That the Chief Executive provides a short report to Environmental Sustainability

Committee advising a suitable process and resourcing required to establish a Food Resilience Policy for Council'.

- 2.2 This resolution followed a presentation from Dave Mollard and Madz BatacheI from Environment Network Manawatū on the recently developed 4412 Kai Resilience Strategy and the situational analysis that informed it. They advocated for Council to develop a Food Resilience Policy and take a leadership role in supporting economic, social and environmental wellbeing in the city.
- 2.3 On 21 September 2022, the Environmental Sustainability Committee received the memorandum titled '*Process and resourcing required to establish a Food Resilience Policy*' for information. Council resolved to provide \$20,000 in the 2023/24 Annual Budget for the development of a Food Resilience Policy.

3. PROCESS

- 3.1 We undertook early engagement with identified stakeholders to determine scope and clarify outcomes. This engagement assisted Officers in preparing the research report (Attachment 2) and is the basis for the draft Policy which we have prepared for the Committee to consider.
- 3.2 The research report:
- Defines food security and food resilience.
 - Analyses national and local data to understand the current state of food security and resilience in New Zealand and Palmerston North.
 - Explores the current involvement of central government and Council.
 - Provides a detailed analysis of early engagement responses and the subsequent options available to Council.
- 3.3 For the purposes of the draft Policy, we have defined the key terms as follows:
- **Food security** means having reliable access to sufficient, safe, nutritious, and culturally appropriate food. It includes not only the availability of food but also affordability, accessibility, and the ability to prepare and store food.
 - **Food resilience** refers to a system's capacity to provide sufficient food security even during shocks and disruptions. Achieving food resilience is crucial for ensuring long-term food security, especially during times of instability.
 - A **food system** is defined as a network of activities and organisations involved in growing, processing, manufacturing, transporting, storing, distributing and consuming food.
- 3.4 These terms do not have an official definition. Therefore, we have developed these definitions based on examples taken from the World Health Organisation, Food and Agriculture Organisation, Ministry of Health, and

Health Coalition Aotearoa. We think that these definitions will be more easily understood in the context of this draft Policy.

- 3.5 As part of the engagement process for the research report, we interviewed key stakeholders including Environment Network Manawātū, Te Tihi o Ruahine Whānau Ora Alliance and Tanenuiarangi Manawātū Incorporated – Rangitāne o Manawātū. We also participated in site tours arranged by Just Zilch and Salvation Army and had discussions with attendees of the Manawātū Food Action Network's end-of-year hui.
- 3.6 We also developed a survey that was sent to key stakeholder community groups as well as Elected Members. The purpose of this survey was to determine what Council's role should or could be to respond to city-wide food security and resilience issues.
- 3.7 A detailed analysis of the findings of this engagement process is in the research report (Attachment 2). A brief summary is provided in section 4.

4. SUMMARY OF RESEARCH FINDINGS

- 4.1 There are numerous challenges that contribute to food insecurity in our community. These include economic hardship, inadequate knowledge about food production, dependence on supermarkets, and housing instability.
- 4.2 While short-term measures like food handouts are beneficial, respondents generally felt long-term strategies focusing on education and systemic change are essential. Under-resourcing was identified as a significant barrier with respondents highlighting the need for funding and support.
- 4.3 Most respondents from the community survey believed Council should play a role in addressing city-wide food security and resilience. However, respondents identified resource constraints, bureaucratic inefficiencies, and limited funding and personnel as the main barriers and challenges hindering Council's effectiveness in addressing food security and building resilience in our city.
- 4.4 Survey respondents identified the need for strong collaboration and partnership between Council and community groups and businesses as the key to leveraging resources and bridging gaps in responding to food security and resilience issues.
- 4.5 Respondents also suggested that Council should be an 'enabler' rather than an 'implementer' of initiatives, by providing resources, expertise and ongoing support.
- 4.6 A more detailed analysis of the issues and points raised during the engagement process is in the research report (Attachment 2).

5. DISCUSSION

- 5.1 The report to the Environmental Sustainability Committee in September 2022 noted that staff had not yet undertaken any analysis to determine whether the development of a Food Security Policy is the most appropriate response to the issues raised.
- 5.2 Nevertheless, Council resolved during the 2023/24 Annual Budget round to allocate resources to a policy response. This memorandum, therefore, provides an analysis of possible responses, as well as a draft policy for consideration by the Committee.
- 5.3 Given that Council resolved to allocate resources to this work, community expectations are a major consideration in the analysis. Despite these raised expectations, Council still needs to consider the most appropriate way to respond to the issues of food insecurity discussed in the research report.
- 5.4 The attached research report notes that Council is only one player in a community-wide system that both creates and responds to food insecurity. Housing insecurity, cost of living pressures, employment challenges, education and skill levels, mental and physical health, dysfunctional family structures, intergenerational impacts, and other entrenched difficulties all contribute to food insecurity.
- 5.5 On balance, the creation of a policy provides Council with an opportunity to determine the roles it wants to play, and the level of resourcing for these roles. However, the question of resourcing remains a key issue to be resolved. The most appropriate way to address the question of resourcing is through the deliberations on the Long-Term Plan.
- 5.6 The exact nature of the resourcing that may be required is undetermined. The level of change and leadership that Council is seeking to achieve through the draft policy relates to the level of resourcing. It could include a full or part-time role within Council, internal funding to support actions, grant funding to support an external role, or another mode of resourcing. For example, implementation of the Play Policy is included within our contract with Sport Manawātū and Sport NZ contributes to the cost of a dedicated role within Council. Another example is the Auahi Kore Smokefree and Vapefree Policy, for which Council has set aside a \$5,000 budget for implementation by the Smokefree and Vapefree Policy Working Group.

6. DESCRIPTION OF OPTIONS

- 6.1 There are two options for the Committee to consider. Option 1 is to refer consideration of allocating dedicated resourcing for the delivery of the Policy to the Long-Term Plan deliberations on 29-30 May. Option 2 is to not resource the delivery of the Policy.
- 6.2 Option 1 does not commit Council to any specific level of resourcing for the draft Policy. The consideration of the level of resourcing will remain with

Council as part of the broader strategic considerations for funding within the Long-Term Plan.

- 6.3 Option 2 would confirm that the draft Policy does not have a dedicated resource component. Officers would take this into consideration during the finalisation of the draft Policy before it is presented to the Committee in August, for approval for consultation.

7. ANALYSIS OF OPTIONS

Option 1 – refer consideration of allocating dedicated resourcing for the delivery of the draft Food Security and Resilience Policy to the Long-Term Plan deliberations

- 7.1 This option would ensure that the question of resourcing for the delivery of the Policy is considered alongside the other strategic considerations for the Long-Term Plan.
- 7.2 A decision around resourcing will give Officers greater clarity around determining Council's role in promoting and achieving food security and resilience, to be included in the draft Policy.
- 7.3 Dedicated resourcing (and the nature of that resourcing) would enable Council to take a leadership role in supporting wellbeing in the city, as well as acting as a collaborator, connector, coordinator and promoter of food security and resilience, similar to the role of Council in other areas of the community such as youth, age-friendly, and play.

Option 2 – do not resource the draft Policy

- 7.4 Without dedicated resourcing to deliver the draft Policy once adopted, the Policy is unlikely to be as effective in achieving the desired outcomes.
- 7.5 A decision to not resource the delivery of the draft Policy will require staff to re-evaluate the scope of the draft Policy before it is presented to the Committee in August.
- 7.6 We recommend option 1 – that the Committee refer consideration of allocating dedicated resourcing for the delivery of the draft Food Security and Resilience Policy to the Long-Term Plan deliberations. This will allow Council to consider the resourcing of the draft Policy as part of its strategic plans for the next ten years.

8. NEXT STEPS

- 8.1 If the Committee recommends to Council that it consider resourcing the delivery of the draft Policy as part of its deliberations on the Long-Term Plan, then this would happen on 29-30 May. The nature of any resourcing would be a matter for Council to determine.
- 8.2 Staff will continue to revise the draft Policy. We will present a draft Policy to the Committee in August 2024 for approval for public consultation.

9. COMPLIANCE AND ADMINISTRATION

Does the Committee have delegated authority to decide?	Yes
Are the decisions significant?	No
If they are significant do they affect land or a body of water?	No
Can this decision only be made through a 10 Year Plan?	No
Does this decision require consultation through the Special Consultative procedure?	No
Is there funding in the current Annual Plan for these actions?	Yes
Are the recommendations inconsistent with any of Council's policies or plans?	No
The recommendations contribute to Goal 3: A Connected and Safe Community	
The recommendations contribute to the achievement of actions in the Connected Communities Plan, specifically the Community Development Chapter.	
The actions are:	
<ul style="list-style-type: none"> Identify opportunities for organisational improvements which align with the aspirations of for-purpose organisations. Build and maintain relationships with local communities of identity, interest and place to understand and support their strengths and aspirations. Provide advice, including governance support, funding expertise, and event and project support, to communities and for-purpose organisations. Provide support to community groups to increase freely-available crops in the city. Support and strengthen Māori community networks and agencies as they work to address issues of opportunity and concern. 	
Contribution to strategic direction and to social, economic, environmental and cultural well-being	<p>The recommendations also contribute to our (proposed) objectives for our community to have:</p> <ul style="list-style-type: none"> The support they want to live healthy lives (Goal 3). A healthy, thriving, ecosystem, including native biodiversity and food security (Goal 4). Access to relevant information and education to support more sustainable choices (Goal 4).

ATTACHMENTS

- Working Draft Food Security and Resilience Policy May 2024 [↓](#) 
- Research report: PN City Council's role in responding to city-wide food security and resilience issues [↓](#) 

Food security and resilience policy

Introduction

Food security means having reliable access to sufficient, safe, nutritious, and culturally appropriate food. It includes not only the availability of food but also affordability, accessibility, and the ability to prepare and store food.

Food resilience refers to a system's capacity to provide sufficient food security even during shocks and disruptions. Achieving food resilience is crucial for ensuring long-term food security, especially during times of instability.

A food system is defined as a network of activities and organisations involved in growing, processing, manufacturing, transporting, storing, distributing and consuming food.

Food security is a fundamental aspect of community wellbeing; ensuring access to healthy, nutritious and culturally appropriate food. Despite New Zealand's agricultural abundance, issues of food insecurity persist, particularly for lower-income individuals and families. It's estimated that more than 10,000 people in our city are food insecure.

Community leaders working to improve food security and resilience outcomes for whānau have advocated for Council to develop a Food Security and Resilience Policy and take a leadership role in supporting economic, social and environmental wellbeing in the city.

Strategic Context

Our (proposed) vision for our city is He iti rā, he iti pounamu - Small city benefits, big city ambition.

Four (proposed) goals sit beneath this vision, to describe the outcomes we want to achieve for our communities:

Whāinga 1: He tāone auaha, he tāone tiputipu

Goal 1: An innovative and growing city

Whāinga 2: He tāone whakaihiihi, tapatapahi ana

Goal 2: A creative and exciting city

Whāinga 3: He hāpori tūhonohono, he hāpori haumarū

Goal 3: A connected and safe community

Whāinga 4: He tāone toitū, he tāone manawaroa

Goal 4: A sustainable and resilient city

This policy contributes to our (proposed) objectives for our community to have:

- the support they want to live healthy lives (Goal 3)
- a healthy, thriving, ecosystem, including native biodiversity and food security (Goal 4)
- access to relevant information and education to support more sustainable choices (Goal 4)

Purpose and objectives

We want to be a city where every resident has access to nutritious and affordable food, and where the community is resilient in the face of food-related challenges. We also want to be part of building a sustainable and inclusive food system that enhances the wellbeing of all residents. The purpose of this policy is to inform and guide Council's actions in support of food security and resilience in our community.

Our objectives are to have:

1. Healthy outcomes for communities.
2. An engaged, connected and collaborative community.
3. Community-led educational opportunities that enable individuals to enhance their knowledge and upskill.
4. A resilient community with reliable access to food during times of adversity.
5. Healthy, nutritious, and culturally appropriate food that is produced, distributed and consumed locally.
6. Local food systems that are environmentally sustainable and socially equitable.
7. Public spaces that are utilised as community food hubs.
8. Community organisations that are supported and resourced to deliver food security and resilience initiatives.
9. Edible food waste diverted from landfill.

Principles

Partnership with Rangitāne o Manawatū – we will work in partnership with Rangitāne o Manawatū on projects and initiatives of agreed priority and embed a Whānau Ora approach in our work.¹

Equity – We acknowledge the inequitable opportunities and outcomes experienced by communities and will work to ensure access and opportunity for everyone.

Partnership – We will be relationship-centred in our actions, in recognition that many others also work to improve community wellbeing.

Collaboration – We will work alongside others towards our shared goals.

Guidelines

The Council will:

1. Embed the objectives of this policy in decision-making and implementation of community support and funding, resource recovery, housing, emergency management, vegetation, and the use of public space.
2. Advocate for food security and resilience to national and local decision-makers.
3. Support initiatives that promote increased food security and resilience.

¹ Oranga Papaioea City Strategy Partnership with Rangitāne o Manawatū.

Implementation, monitoring, and review

This policy provides a mandate for Council's involvement in actions that support food security and resilience. The extent to which the policy is implemented will depend on resourcing, and so we will develop an implementation plan following the adoption of the Long-Term Plan.

The outcomes of this policy will only be evident in high-level and slow-moving community wellbeing indicators. Our community wellbeing monitoring (see the City Dashboards) will track this high-level progress. However, the activities associated with the policy, and the progress towards implementing the guidelines, will be publicly reported through the Council Committee process annually. These could include, for example, how food security and resilience objectives have shaped advice to elected members, and the level of support provided to community initiatives.

A review of the policy will be considered after five years, or earlier if requested by Council.

RESEARCH REPORT

Palmerston North City Council's role in responding to
city-wide food security and resilience issues

May 2024

Contents

Executive summary	2
Background	2
Objectives	3
Definitions.....	3
Part 1: Current state analysis.....	4
National overview	4
Food insecurity in Palmerston North.....	5
Government initiatives	7
Current council role	8
Part 2: Early engagement.....	9
Part 3: Options analysis.....	18
Part 4: Recommendation	23
Conclusion.....	24
Resources informing this report	25

Executive summary

The purpose of this research report is to inform decisions about the role of the Palmerston North City Council (Council) in responding to food security and resilience issues in our local community.

Food security is a fundamental aspect of community well-being; ensuring access to healthy, nutritious, and culturally appropriate food. Despite New Zealand's agricultural abundance, issues of food insecurity persist, particularly for lower-income individuals and families.

However, it's important to note that food insecurity isn't just a symptom of income or financial situation. The complex tangle of food insecurity also includes mental and physical health, housing insecurity, employment challenges, education and skill levels, the policy environment, dysfunctional family structures, addiction, intergenerational impacts, and other entrenched difficulties. The current and rapidly escalating housing crisis and cost of living pressures are additional stressors on the current food system.

By analysing national and local data, the report provides insights into the challenges faced by the city and offers recommendations for Council's involvement. The report defines food security and food resilience, outlines the existing issues, reviews current initiatives, presents early engagement findings, provides a detailed analysis of options available to respond to the identified issue, and ultimately recommends developing a food security and resilience policy with additional resource to support to be considered through the 2024-34 Long-Term Plan deliberations.

The responses from initial engagement with identified stakeholders helped to determine scope, clarify what outcomes were sought, gain insights into the on-the-ground reality and perspectives, and assisted us in recommending the best response to what Council's role could be in responding to food security and resilience issues in the city.

For the purposes of clarity, food research and innovation are out of scope for this project as these are captured by the Manawatū Regional Food Strategy.

Background

On 18 May 2022, the Environmental Sustainability Committee resolved *'That the Chief Executive provides a short report to Environmental Sustainability Committee advising a suitable process and resourcing required to establish a Food Resilience Policy for Council'*.

This resolution followed a presentation from Dave Mollard and Madz Batache from Environment Network Manawatū on the recently developed 4412 Kai Resilience Strategy and the situational analysis that informed it. They advocated for Council to develop a Food Resilience Policy and take a leadership role in supporting economic, social and environmental wellbeing in the city.

On 21 September 2022, the Environmental Sustainability Committee received the memorandum titled *'Process and resourcing required to establish a Food Resilience Policy'* for information. This report noted that staff has not yet undertaken any analysis to determine whether the development of a Food Security Policy is the most appropriate response to the issues raised.

Nevertheless, the Council resolved during the 2023/24 Annual Budget round to allocate resources to a policy response and an investment of \$20,000 was subsequently allocated for the development of a Food Resilience Policy.

Given that Council resolved to allocate resources to this work, community expectations are a major consideration in informing this piece of work. However, despite these raised expectations, Council still needs to consider the most appropriate way to respond to the issues of food security discussed in this research report and determine the response that is most likely to achieve the desired outcomes. Therefore, this report provides an analysis of four possible responses:

1. Develop a food security and resilience policy and consider the resources allocated to this work through the Long-Term Plan deliberations.
2. Develop a food security and resilience policy to guide operations within existing resources.
3. Embed and emphasise food security and resilience initiatives in existing Council work programmes to demonstrate Council support, without developing a policy
4. Maintain the status quo for food security and resilience.

Objectives

The structure and objectives of this report are:

1. **Assess the current state:** Analyse national and local data to understand the current state of food security and resilience in New Zealand and Palmerston North.
2. **Early engagement:** Use the key themes emerging from early engagement with identified stakeholders to inform Council's response.
3. **Options analysis:** Explore various options for Council's response to food security and resilience issues, considering the pros and cons.
4. **Recommendations:** Provide a recommendation for Council on its role and actions to respond to food security and resilience issues in the city.

Definitions

For the purposes of this report, the key terms have been defined as follows:

- **Food security** means having reliable access to sufficient, safe, nutritious and culturally appropriate food. It includes not only the availability of food but also affordability, accessibility, and the ability to prepare and store food.
- **Food resilience** refers to a system's capacity to provide sufficient food security even during shocks and disruptions. Achieving food resilience is crucial for ensuring long-term food security, especially during times of instability.

- A **food system** is defined as a network of activities and organisations involved in growing, processing, manufacturing, transporting, storing, distributing and consuming food.

These terms do not have an official definition. Therefore, we have developed these definitions based on examples taken from the World Health Organisation, Food and Agriculture Organisation, Ministry of Health, and Health Coalition Aotearoa. These definitions are more easily understood in the context of this report.

Part 1: Current state analysis

National overview

Analysing national data provides a broader context for understanding the state of food security and resilience in New Zealand.

Figures from the 2022/23 New Zealand Health Survey state that one in five children (21.3%) lived in households where food ran out often or sometimes in the 12 months prior. This is an increase from the previous two years (14.4% in 2021/22 and 14.9% in 2020/21), but similar to other years since 2011/12. More than one in three Māori (35.1%) and Pacific (39.6%) children live in households where food ran out often or sometimes in the 12 months prior, compared to nearly one in six European/Other (18.0%) and one in eight Asian (12.3%) children. In 2022/23, 20.3% of children lived in households where, in the 12 months prior, they often or sometimes ate less because of lack of money. This is an increase from the previous two years, but similar to other years since 2011/12. Rates of each of these two food security indicators were higher in households where children were Māori, Pacific, disabled, or living in the most deprived neighbourhoods.

The population-based estimates of household food insecurity from the New Zealand Health Survey are important to measure progress towards the Government's programme to reduce child poverty in New Zealand. They are also relevant to the United Nations Sustainable Development Goals, which includes the goal to '*end hunger, achieve food security and improved nutrition, and promote sustainable agriculture*' by 2030. All children should have access to enough appropriate and healthy food to eat, no matter their ethnicity or living circumstances; to help ensure they have the best possible start in life.

According to the Salvation Army 2024 State of the Nation report, the rising cost of living has led to a higher need for hardship support. The total number of hardship payments made by Work and Income to households needing extra support was six percent higher in the year to December 2023, compared with the same time in 2022. More than half of the 602,000 grants made each quarter were for food assistance (336,000). The volume of food assistance provided by Salvation Army Community Ministries increased by more than 40% on the previous year, distributing around 92,000 food parcels.

The Program for International Student Achievement (PISA) 2022 results show New Zealand students' maths, science, and reading proficiency levels have dropped since 2018. The Public Health Communication Centre suggests that this is partially explained by the number of students coming to school hungry. For the first time, the PISA study included measures of food poverty. Of the 25 OECD countries who provided data on food poverty, New Zealand had the second highest rate of students who, in the previous thirty days, had missed a meal at least once a week because there was not enough money to buy food (14.1%). This was

well above the OECD average of 8.2% and was similar to rates of food poverty in Colombia and Chile. New Zealand had the third highest rate of students in severe food poverty, with 6.5% of students saying they missed meals more than four times per week. Only students in Chile (6.9%) and the United States (7%) had higher rates.

There is a growing body of research knowledge and policy development focused on food insecurity in New Zealand. For example, Christchurch City Council has had a Food Resilience Policy and Healthy Action Plan since 2014, Wellington City Council has a Sustainable Food Initiative, and food is identified as a key priority in Auckland City Council's Climate Action Plan.

There has been an increased public policy focus, particularly with the New Zealand Health Surveys, Growing Up in New Zealand research, and the Child Poverty Indicators all reporting on food security issues. However, there are significant gaps in the primary data sources used to measure and describe food insecurity, and huge COVID-19 related spikes in food insecurity. Much of the response to food insecurity continues to be short-term solutions and strategies which address immediate food needs and not systemic issues which have prolonged food insecurity in New Zealand.

The burden of food insecurity in Aotearoa falls unevenly; it is more likely to be experienced in Māori and Pacific households and among socioeconomically deprived people, a major equity issue for a food producing nation that earns billions from food and beverage exports every year.

Food waste constitutes a pressing challenge with significant implications for both food security and resilience. Every year, New Zealanders send over 157,000 tonnes of food waste to landfill. This substantial loss not only represents a squandering of resources but also contributes to environmental issues, accounting for about nine percent of New Zealand's biogenic methane emissions and four percent of our total greenhouse gas emissions. Every year, we waste \$3.2 billion worth of food or \$1,510 per household. In the context of food security, this wastage exacerbates issues of hunger and malnutrition by limiting the overall availability of food. Furthermore, it exposes vulnerabilities in the food supply chain, highlighting the importance of building resilience in the face of external shocks. The 'Love Food Hate Waste' programme has made an impact on household food waste through consumer empowerment but is no longer funded by central government. Addressing food waste in New Zealand is crucial for bolstering food security, reducing environmental impact, and creating a more robust and sustainable food system that can withstand challenges and uncertainties.

Food insecurity in Palmerston North

The following is only a mere snapshot of the food security and resilience activity that is undertaken in our city, and of the scale of food insecurity.

Environment Network Manawātū (ENM) was formed in 2000 with the aim of improving communication, coordination, and cooperation between environmental community groups. ENM is now the environment hub for the Manawātū region with the key purpose of facilitating and enabling communication, cooperation, and increasing collective action amongst its member groups and the wider community. ENM is Council's Sector Lead for the environment and receives funding support for this role.

The Manawātū Food Action Network (MFAN) is a collective of social service and environmental organisations (and other community stakeholders) working together to

increase collaboration, education and awareness around issues of food security, food resilience and food localisation. MFAN's scope of interests include food security, food sovereignty, food banks and sharing sites, food waste capture, harvest capture, food resilience, localising food, community gardens, community food education, crop swaps, seed banks and composting. MFAN seeks to foster and assist food resilience projects which are successful in increasing the mana and sovereignty of food-insecure communities.

Ora Konnect was formed in 2017 as a multi-organisational, collective impact to support the 4412-postcode community. Ora Konnect is an alliance of various organisations, supporting, creating and enhancing the relationships necessary to deliver connective services for whānau. Ora Konnect created the 4412 Kai Security Squad which led the development of the 2021/22 [4412 Kai Resilience Strategy and Situational Analysis](#) (KRS) which paints a localised picture of food security and resilience from one side of the city.

For the purpose of clarity, 4412 is the post code that overlaps with the neighbourhoods of Awapuni, Cloverlea, Highbury, Takaro, Westbrook and West End. These neighbourhoods were chosen as the focus of the KRS largely due to receiving high scores on the New Zealand Index of Deprivation 2018, but Ora Konnect recognises the limitations of this data in their study.

Key issues highlighted by the KRS include:

- Many 4412 households have insufficient funds to meet all of their basic needs.
- Money is only one of the many factors impacting food access.
- Approximately 10,000 people, one third of those living in 4412, face some degree of food insecurity.
- Nine free food providers serving 4412 residents collectively distribute food up to 3,600 times weekly, however there is evidence they do not meet full demand.
- Fresh produce, and healthy food more generally, is costly and challenging to access and use.
- Approximately half of 4412 residents live in rentals. Tenancy agreements and housing instability are barriers to growing food at home.
- Lack of food is not the primary issue that food insecure people face but is a stressor that takes energy away from overcoming the real challenges.
- Child poverty and food insecurity contribute to reduced outcomes for generations.

These issues are not exclusive to the 4412 postcode and food security and resilience issues are felt across the city.

The purpose of the KRS is to identify new strategic actions that can contribute to food security by enhancing food system resilience. In 2022, 100 projects categorised broadly as community development, education, food markets, food support, māra kai, and social enterprise initiatives were developed out of the KRS and prioritised for implementation. One of these projects is a 'PNCC Kai Resilience Policy' with the aim of making food resilience a function of Council and a desired output of more resources for communities.

Just Zilch is New Zealand's longest running free store guided by the purpose of rescuing food, serving the community, and caring for the planet. Just Zilch rescue food from local suppliers including supermarkets and cafes, the food is sorted and stacked by volunteers, and that food is then distributed to those in need. As of May 2024, Just Zilch have served more than 619,000 people from when they began in 2011. Just Zilch estimates that to date over 3.2 million kilograms of food has been distributed, 9.2 million meals have been provided, and 8.5

million kilograms of carbon emissions have been prevented. Just Zilch serve an average of 345 people every day and give away approximately \$85,000 worth of food each week.

The Salvation Army Community Ministries in Palmerston North operates a food bank/social supermarket on Mondays, Wednesdays and Fridays. They receive their food from the New Zealand Food Network, Foodstuffs, Fonterra, local producers, and supermarket and school donations to name a few. The Palmerston North branch distributed approximately 5,500 food parcels in 2023, roughly 100 people per week. Recipients are 'interviewed' in order to give context to their situation, such as how many people they're feeding in their household. This enables the Salvation Army to allocate 'points' to be 'spent' in the supermarket and allows them to offer holistic wraparound services such as counselling, social work, financial mentoring and budgeting. Providing food parcels is often a window into other challenges and hardships experiences by that person or their whānau.

Food waste is arguably the biggest contributor of rubbish to landfill in most households. In Palmerston North the average household using a bag for rubbish throws away 3.5kg of good a week. A household with a small wheelie bin throws away 3.76kg of food a week. And those using a large wheelie bin throw away 5.03kg.

Government initiatives

The Ka Ora, Ka Ako healthy school lunches programme was launched in 2020 to alleviate food insecurity, improve children's wellbeing and learning at school, and reduce financial hardship for families. However, challenges and gaps still exist, necessitating further intervention.

Currently, Ka Ora, Ka Ako provides free lunches to 236,000 learners across in 1013 schools and kura. Schools are selected based on the Equity Index; a measure of the socio-economic barriers faced by enrolled students. Nationally, 25% of schools with students facing the greatest socio-economic barriers are eligible to participate. As of April 2024, lunches are being provided to 22 Palmerston North Schools. However, research has shown that many children experiencing food insecurity attend schools that are not currently eligible to receive the lunches and it is likely that many young people in New Zealand continue to be hungry during their school day. Based on the benefits of Ka Ora, Ka Ako, health groups such as the Health Coalition Aotearoa are calling from the programme to be extended from 25% to 50% of schools in New Zealand.

Recent research from Massey University's School of Health Science showed the implementation of Ka Ora, Ka Ako at Dannevirke High School from 2021 was associated with improved student outcomes, reduced food insecurity, enhanced learning, behaviour and engagement, and led to stronger student-teacher and student-student relationships.

Budget 2024 provides \$478 million of funding for the programme and an extension of the eligibility to include 10,000 children in low equity, not-for-profit early childhood centres. However, the Government announced that an interim model will be put in place for 2025 and 2026 for years 7 and up while a full redesign of the programme is implemented, based on commercial experience, data and evidence. At this stage, the programme is funded until the end of 2026 but could face an uncertain future after that.

Since the COVID-19 pandemic started, the Ministry of Social Development has supported access to food through the Food Secure Communities programme. The programme supported the delivery of more than 671,000 food parcels to people in need during the response to COVID-19. The programme also supported communities to develop food security

plans and pilot projects which increase vulnerable communities' access to affordable, nutritious and culturally appropriate food. These projects are now being scaled up and are allowing communities to take the lead in becoming more resilient.

The Food Secure Communities programme has supported several Manawatū community groups and organisations to date. Papaioea Pasifika Community Trust were recipients of 'Putā Ora Food Security' funding. Te Tihi o Ruahine Whānau Ora Alliance were recipients of 'Food Secure Communities Implementation' funding. Salvation Army Manawatū, Palmerston North Methodist Social Services Luck Trust, Te Roopu Oranga o Highbury and Te Wakahuia Manawatū Trust received 'Community Food Response' funding. Te Tihi o Ruahine, Legacy Centre, St Vincent de Paul Palmerston North, Salvation Army Manawatū and Just Zilch received 'Community Food Transitions' grants.

Budget 2023 extended the Food Secure Communities programme for a further two years and provides \$24.8 million to move away from emergency response and toward empowering, sustainable, community-led solutions that align with ongoing cross-agency conversations about improving New Zealand's food system. However, due to the targeted nature of this funding, the Ministry of Social Development now conducts a closed procurement process to allocate it to the communities who need it most; and the programme faces an uncertain future for 2025/26 and beyond.

In 2023, the Government adopted a new Aotearoa New Zealand Waste Strategy Te Rautaki Para with the vision *"By 2050, Aotearoa New Zealand is a low-emissions, low-waste society built upon a circular economy... We cherish our inseparable connection with the natural environment and look after the planet's finite resources with care and responsibility"*.

A circular economy is one that focuses on reducing waste generation and redesigning or rethinking our approaches to minimise the amount of resources used to produce and package the things we buy and use. By producing less waste at the outset, the need to recycle or recover materials is similarly reduced. This can have a positive impact on emissions and generate cost savings through the life cycle of a product.

The Ministry for the Environment has the responsibility to implement Te Rautaki Para and is working to standardise and improve waste management, recognising food waste reduction as a key component of our climate change mitigation efforts in the Emission Reductions Plan.

At present, food scraps make up 22% of New Zealand's landfill emissions. Therefore, reducing food waste to landfill is an important way we can all contribute to reducing greenhouse gas emissions. Food scraps collection services will be available to households in all urban areas by 1 January 2030. These collections will make it easier for people who can't easily compost at home.

Current council role

Alongside the more general support for Environment Network Manawatū, Council supports various initiatives to bolster food security and resilience within the community.

Council supports community gardens and allotments, enabling residents to grow their own food. Council gives away 50m³ of compost every year for community and school gardens.

Council funds local organisations and businesses to implement educational programmes, workshops, run food banks, and events to raise awareness about sustainable food practices, nutrition and waste.

During COVID-19, Council partnered with Papaioea Food Security Network to establish an emergency response provision to be rolled out during future crises or natural disasters.

Council is required to develop a Waste Management and Minimisation Plan (WMMP) for Palmerston North under the Waste Minimisation Act 2008 and review it every six years. The WMMP sets out how the Council will ensure effective and efficient waste management, and minimise and manage waste in our city.

As of April 2024, the draft WMMP 2024 is out for consultation alongside the 2024-34 Long-Term Plan. One of the key actions in the draft WMMP is to develop a city-wide kerbside food scraps collection service. Council has until 2030 to introduce a kerbside food scraps collection. Council aims to have this service available in 2028/29, but the planning for this service will begin much sooner. There is an opportunity for education initiatives to drive behavioural change in the short term. Education about waste minimisation can be a powerful tool and the draft WMMP includes actions that use education and funding support to promote waste reduction, and to encourage the recovery, reduce and re-purpose of material that would otherwise be sent to landfill; aligning with Te Rautaki Para and the circular economy vision.

At present, 29.4% of the potentially divertible material in our waste is food scraps. Removing food scraps material from landfill and composting it instead will also contribute to emissions reduction goals and our outcomes under Goal 4 of the Oranga Papaioea City Strategy to become a sustainable and low-emissions city.

Council also offers an optional food waste and compostable items collections service for local businesses and schools with a focus on long-term sustainability and a strong commitment to service delivery. As of February 2024, Council has 55 commercial food waste customers.

Palmerston North City Council, Manawātū District Council and the Central Economic Development Agency have worked with stakeholders and partners across the agri-food landscape to produce the Manawātū Regional Food Strategy. The strategy establishes a collective vision for the region regarding the future of food and agriculture for the next 30 years and beyond.

Part 2: Early engagement

An extensive early engagement process informed this research report. This included interviewing key stakeholders including Environment Network Manawātū, Te Tihi o Ruahine Whānau Ora Alliance and Tanenuiarangi Manawātū Incorporated – Rangitāne o Manawātū; site tours with Just Zilch and the Salvation Army; and discussions with attendees of the Manawātū Food Action Network end-of-year hui.

Two surveys were circulated. The first was to key stakeholder community groups in the regional food space (referred to as the 'community' survey) in December 2023. The second was sent to elected members in January 2024.¹ Survey participants were asked twelve questions to determine what Council's role should or could be to respond to city-wide food security and resilience issues. The community survey received forty-six responses and the elected members survey received seven responses. The majority of responses are supportive

¹ Surveys were circulated in lieu of community and elected members workshops due to time constraints.

or supportive in part of Council taking a more active role in supporting community food security and resilience.

The responses are analysed below:

Q1 – How familiar are you with the concept of food security and its importance in ensuring community wellbeing and resilience?

Community survey: 35 respondents said 'very familiar', 9 respondents said 'somewhat familiar', and 1 respondent said 'not familiar'.

Elected members survey: 4 respondents said 'very familiar' and 3 respondents said 'somewhat familiar'.

Q2 – In your opinion, what are the primary challenges regarding food security and resilience that our community currently faces?

Community survey: 40 respondents answered this question. The key themes that emerged were:

- Financial constraints – many individuals and families face financial challenges that hinder their ability to afford healthy food. This includes low income, high cost of living, and limited resources to access nutritious food. Reliance on cheap and unhealthy food options contribute to health problems.
- Lack of knowledge and skills – there's a recurring mention of a lack of knowledge and skills related to growing food, cooking, and preserving it. There's a need for education campaigns on healthy eating, food sovereignty, and sustainable living practices; and a call for holistic, collaborative approaches that empower communities to become self-reliant.
- Housing insecurity – access to sufficient housing is crucial for establishing long-term solutions such as fruit and vegetable gardens. Housing insecurity can impede efforts to grow food.
- Systemic issues – many comments point to systemic issues such as income inequality, inadequate policy support, and the impact of capitalism on food access. These broader issues need to be addressed to effectively tackle food insecurity.
- Infrastructure and accessibility – issues related to transportation, availability of fresh produce in certain areas, and accessibility to community resources like gardens and food banks are highlighted as challenges.
- Short term solutions vs. long term solutions – While short-term solutions like food handouts and gardening initiatives are beneficial, they don't fully address the underlying issues of food insecurity. Long-term solutions focused on education, empowerment and systemic change are necessary.

Elected members survey: 6 respondents answered this question. The key themes that emerged were:

- Lack of awareness and education – there's a recognition for greater awareness and education regarding food production practices and food security issues. This includes educating the public on growing their own food.
- Impact of weather and price hikes – adverse and unreasonable weather conditions are highlighted as factors that impact growing seasons and food supply, leading to price hikes and shortages, particularly in fresh food.

- Reliance on supermarkets - there's an emphasis on promoting local food production and reducing reliance on supermarkets. The region's favourable conditions for growing food are noted, along with the importance of education and community initiatives to encourage more people to grow their own food and establish community gardens.
- Under resourcing – the need for resources to fund food security initiatives is highlighted. This includes funding, infrastructure, and other forms of support to facilitate community-led efforts in addressing food security challenges.
- Misaligned services and social inequity - there's a call for better alignment of services provided by NGOs to ensure equitable social capital investment across the city. Elected members are urged to have a comprehensive understanding of food security and social equity issues to address barriers to growth and prosperity.

Q3 – Do you think PNCC should play a role in addressing city-wide food security and resilience?

Community survey: 38 respondents said 'yes' and 2 respondents said 'no'.

Elected members survey: 7 respondents said 'yes'.

Q4 - What role do you think PNCC should play in addressing city-wide food security and resilience? Please rank the following potential PNCC roles in order of importance to you (0 being not important at all and 5 being the most important)

- Supporting community gardens and urban agriculture initiatives
- Collaborating with community organisations to provide resources for food-insecure populations
- Investing in educational programmes on sustainable agriculture and nutrition
- Supporting local food production and distribution
- Providing grants for food security and food resilience projects
- Diverting food waste to food rescue organisations instead of landfill

Community survey: 42 respondents answered this question. The results from the respondents can be tabulated as a weighted rank or average to compare the order of importance.

Based on the average, the order of importance is as follows:

1. Diverting food waste to food rescue organisations instead of landfill (4.44)
2. Collaborating with community organisations to provide resources for food-insecure populations (4.40)
3. Supporting community gardens and urban agriculture initiatives (4.38)
4. Providing grants for food security and resilience projects (4.19)
5. Investing in education programmes on sustainable agriculture and nutrition (3.95)
6. Supporting local food production and distribution (3.97)

10 respondents had 'other' ideas, including:

- Collaboration and coordination – there's a strong emphasis on the need for collaboration among various stakeholders, including relevant providers, community members, central government, and education institutions. Coordinated efforts are seen as essential for developing effective strategies and utilising available resources efficiently.
- Government engagement – collaboration with central government is highlighted as necessary for addressing food security issues comprehensively. This includes lobbying for national-level initiatives and support, particularly in areas such as soil protection.

- Education and capacity building – working with educational institutions to develop learning modules on food security and resilience is mentioned as a way to build knowledge and skills within the community.
- Policy support – strong policies that support community-based food production are seen as crucial for promoting food security at a small scale. This includes providing support for households to grow their own food and ensuring that policies align with the needs of the community.
- Resource management and rationalisation – there's a call for better management and rationalisation of available funding to ensure that support reaches those who need it most. This includes taking a lead coordination role in developing city-centric approaches to food security.
- Empowerment and sustainability – supporting community groups with a "hand up" rather than a "handout" is emphasised as a way to empower communities while respecting their tino rangatiratanga (autonomy). This approach aims to foster sustainability and self-reliance within communities.

Elected members survey: 7 respondents answered this question. The results from the respondents can be tabulated as a weighted rank or average to compare the order of importance. Based on the average, the order of importance is as follows:

1. Diverting food waste to food rescue organisations instead of landfill (4.57)
2. Supporting community gardens and urban agriculture initiatives (4.43)
3. Collaborating with community organisations to provide resources for food-insecure populations (4.33)
4. Providing grants for food security and resilience projects (3.86)
5. Supporting local food production and distribution (3.29)
6. Investing in education programmes on sustainable agriculture and nutrition (2.28)

4 respondents had 'other' ideas, including:

- Urban food belt strategy – there's a call for the creation of an urban food belt strategy that involves collaboration between businesses, communities, and individuals. The strategy should aim to establish a mix of private and public food infrastructure across the city, enhancing food supply and resilience.
- Support for collaboration and alignment – it's emphasised that Council should support strategic collaboration and alignment opportunities. This could include annual workshops or similar initiatives aimed at bringing together various stakeholders involved in food security efforts to foster coordination and cooperation.
- Pātaka kai in all areas – there's a suggestion to establish pātaka kai (community food pantries) in all areas. These would provide produce grown by individuals in the community, making it available to anyone who needs it. This decentralised approach to food distribution aims to increase accessibility to fresh produce.
- Balanced approach – while initiatives like community gardens and education are important for long-term sustainability, there's also a role for grant funding and other forms of support to address immediate needs. A balanced approach is seen as essential for effectively tackling the issue.

Q5 - Are there specific initiatives you think would be effective in improving food security and resilience for vulnerable populations?

Community survey: 29 respondents answered this question. The key themes that emerged were:

- Community engagement and consultation – there's a strong emphasis on engaging with communities and individuals to understand their needs and preferences regarding food security initiatives. This includes consulting community leaders and groups to co-create solutions that are relevant and effective.
- Education and skill development – providing education and ongoing opportunities for people to learn about growing food, cooking health meals, and food preservation is highlighted as essential for enhancing food security. This includes initiatives such as community gardens, mentoring programmes, and hands-on education in schools.
- Resource allocation and funding – calls for increased funding and support for organisations already working in the food security space, such as food banks and educational programmes. There's also a call for reallocating resources, such as vacant council-owned land, for food resilience purposes.
- Community empowerment and collaboration – encouraging community-led initiatives and micro-businesses, as well as supporting local food producers and backyard gardeners, are seen as ways to empower community and build food sovereignty. Collaboration among different stakeholders, including local government, community groups, and educational institutions, is emphasised as crucial for success.
- Accessibility and distribution – ensuring access to fresh produce for vulnerable populations, including the elderly and low-income families. Suggestions include purchasing surplus fruit from locals and distributing food to wider communities rather than central locations.
- Infrastructure and regulation – addressing barriers such as regulatory hurdles and lack of resources for community garden projects is mentioned. Suggestions include providing incentives for landlords to allow food gardens on rental properties and creating easily removable garden beds.
- Holistic approaches: Recognising the interconnectedness of various factors influencing food security, such as financial literacy, housing, and transportation to address underlying issues comprehensively.

Elected members survey: 5 respondents answered this question. The key themes that emerged were:

- Community empowerment and co-design – there is a strong emphasis on initiatives that are co-designed, led by, and empowering for communities. This approach actively involves community members in the planning, development, and implementation of initiatives aimed at addressing food security issues.
- Equitable social investment – there's a call for equitable social investment, particularly in high deprivation areas. The focus is on reaching whānau who may need support but may feel whakamā (embarrassed) to engage with support services. This suggests a need for culturally sensitive and inclusive approaches to ensure that support reaches those who need it most.
- Support for schools and education – there is support for initiatives that involve schools in growing kai for their communities. Additionally, there's a mention of community garden spaces and education programmes aimed at teaching community members how to grow their own food. This highlights the importance of education and skill-building in promoting food security at the community level.

Q6 - How important do you think it is for PNCC to allocate resources (funding, staff etc.) for initiatives targeting food security and resilience?

Community survey: 32 respondents said 'very important', 9 respondents said 'moderately important' and 1 respondent said 'slightly important'.

Elected members survey: 4 respondents said 'very important', 2 respondents said 'moderately important' and 1 respondent said 'slightly important'.

Q7 - In your view, what are the main barriers or challenges that hinder PNCC's effectiveness in addressing food security and building resilience in our city?

Community survey: 38 respondents answered this question. The key themes that emerged were:

- Resource constraints and bureaucracy – there's a common concern about limited resources, both in terms of funding and personnel, which hinders the effectiveness of initiatives aimed at addressing food insecurity. Bureaucratic hurdles and inefficiencies are mentioned as obstacles that slow down decision-making processes and impede progress.
- Collaboration and coordination – the need for collaboration and coordination among various stakeholders, including central government, community groups, and local councils is seen as crucial for addressing food insecurity.
- Community engagement and empowerment – there's a call for more meaningful engagement with communities to understand their needs and involve them in decision-making processes. Empowering communities to become self-sufficient and resilient is highlighted as essential for sustainable solutions.
- Financial constraints and funding allocation – limited funding and low funding pools, along with rigid criteria for funding, are identified as challenges.
- Systemic and structural issues – structural issues such as housing insecurity, income sufficiency, and the dominance of supermarket chains are recognised as underlying factors contributing to food insecurity. Addressing these systemic issues requires collaboration with central government and broader societal changes.
- Communication and trust – building trust between the community and Council is essential for effective collaboration and implementation of initiatives. Clear communication and transparency in decision-making processes are seen as vital for gaining community support.
- Long-term planning and sustainability – long-term planning and sustained funding for initiatives addressing food insecurity is important as short-term solutions may not effectively address the root causes of the problem.
- Education and awareness – improving education opportunities, especially for youth, and raising awareness about food poverty and nutrition are mentioned as important aspects of addressing food insecurity.
- Transport – transportation to access resources like food banks, markets and supermarkets, are highlighted as barriers for some individuals and communities.
- Cultural considerations – recognising and addressing cultural perspectives and needs, including those of migrant and indigenous communities, is important for developing inclusive and effective solutions to food insecurity.

Elected members survey: 6 respondents answered this question. The key themes that emerged were:

- Perception and responsibility – there is a perception that food security is an invisible problem, and there is a desire for others to take responsibility for addressing it. This

attitude may stem from starting at a relatively low base of awareness or concern about food security issues. Additionally, there may be a caution about empowering communities to address these issues independently.

- Council priorities and will – some feel that there is a lack of will within the Council to address food security adequately. There is a perception that there is a greater focus on food distribution and innovation in the industry rather than building actual food resilience for people. This suggests a disconnect between priorities and the perceived urgency of the issue.
- Mapping and alignment of NGO sector – there is a recognised need to map the NGO sector involved in addressing food security and then support alignment and equitable solutions among these organisations. This indicates a desire for better coordination and collaboration among NGOs to maximise their impact.
- Lack of funding from central government – the comments highlight a lack of funding from central government as a barrier to addressing food security effectively.
- Importance of community empowerment and education – there is a call for a clear plan that focuses on teaching and enabling communities to become self-sufficient in addressing food security. This involves providing resources for community gardens and implementing education programs to teach community members how to grow their own food. Empowering communities in this way can lead to sustainable solutions beyond just funding and staff resources.
- Budgetary constraints – budget constraints are mentioned as a challenge in addressing food security effectively.

Q8 - How important is collaboration between PNCC and community organisations or businesses in ensuring successful food security and resilience initiatives?

Community survey: 32 respondents said 'very important', 6 respondents said 'moderately important', 1 respondent said 'slightly important', 1 respondent said 'not important at all' and 1 respondent didn't know.

Elected members survey: 6 respondents said 'very important' and 1 respondent said 'slightly important'.

Q9 - In your opinion, what opportunities are there for collaboration between PNCC, community organisations or businesses to improve food security and resilience?

Community survey: 30 respondents answered this question. The key themes that emerged were:

- Collaboration and partnerships – there's a strong emphasis on the importance of collaboration among various stakeholders, including community organisations, Council, and food resilience groups like MFAN. Collaborative efforts are seen as crucial for bridging gaps, leveraging resources, and addressing food insecurity effectively.
- Community engagement and empowerment – engaging with communities and involving them in decision-making processes is highlighted as essential for identifying needs, developing solutions, and ensuring initiatives are relevant and impactful. Empowering communities to take ownership of initiatives is seen as key to their success.
- Resource allocation and support – there are calls for better allocation of resources, including funding and support from Council, for community initiatives aimed at improving food security and resilience.
- Waste reduction and food redistribution – addressing food waste through composting and redistributing surplus food to those in need is emphasised as an important aspect of

food security initiatives. Encouraging businesses to donate surplus food and providing incentives for diversion from landfill are suggested strategies.

- Leadership and coordination – there's a call for Council to take a leadership role in facilitating city-wide discussions, coordinating efforts among food resilience organisations, and providing guidance and support for community initiatives.
- Education and awareness – increasing awareness about food security issues and promoting initiatives to improve resilience are seen as important for garnering community support and participation. Educating businesses about opportunities for food donation and waste reduction is also highlighted.
- Opportunities for improvement and collaboration – many commenters express optimism about the potential for collaboration and opportunities for improvement in addressing food insecurity. They suggest initiatives such as community campaigns and grants aimed at supporting food resilience efforts.

Elected members survey: 6 respondents answered this question. The key themes that emerged were:

- Utilising public spaces for food production – there is a call to increase food production and harvesting in public spaces as a means of improving food security. This includes developing teams of local champions from businesses and other groups committed to ensuring food security for all community members. Additionally, there is a suggestion to establish recognition events and resources to foster and reward effective community-led approaches to boosting food security.
- Listening to existing leaders – acknowledgment is made of the many existing leaders in the food security space who are already doing innovative and impactful work. There is a call to listen to these leaders to understand where they most need support and to identify any perceived gaps in current efforts.
- Supporting sector collaboration – there is a suggestion to support and fund annual sector collaboration workshops to facilitate networking and collaboration among organisations working on food security initiatives. There is a call for commitment from the government to support these initiatives.
- Community-led education and support – the proposed approach involves multiple stakeholders playing roles in supporting community gardens and providing education programmes on how to grow food. This includes providing spaces and resources for community gardens, funding education programs, and encouraging businesses to contribute resources and divert food waste from landfill to support food banks.
- Need for staff and funding resources – there is a recognition of the need for staff and funding resources to support initiatives aimed at improving food security.

Q10 - Do you think there should be increased engagement and communication between PNCC and the community regarding food security and resilience initiatives?

Community survey: 22 respondents said 'yes, significantly more engagement is needed', 16 respondents said 'yes, somewhat more engagement is needed' and 3 respondents said 'no, the current level of engagement is adequate'.

Elected members survey: 3 respondents said 'yes, significantly more engagement is needed', 3 respondents said 'yes, somewhat more engagement is needed' and 1 respondent said 'no, the current level of engagement is adequate'.

Q11 - How important is it for PNCC to have a clear direction and commitment in place to address food security and resilience challenges?

Community survey: 34 respondents said 'very important', 4 respondents said 'moderately important' and 3 respondents said 'slightly important'.

Elected members survey: 5 respondents said 'very important', 1 respondent said 'moderately important' and 1 respondent said 'slightly important'.

Q12 - Please share any additional thoughts, suggestions, or comments you have regarding the role of PNCC in supporting city-wide food security and resilience.

Community survey: 26 respondents answered this question. The key themes that emerged were:

- Council support – there's recognition of the role Council can play in supporting community initiatives related to food security and resilience. This includes providing resources, expertise, and one-off or ongoing support to community projects. There's also an emphasis on Council acting as an enabler rather than the primary implementer of initiatives.
- Community-led initiatives – many comments stress the importance of community-led initiatives in responding to food security and resilience. Council is seen as a facilitator that can empower communities to take ownership of projects and initiatives, allowing for greater engagement and sustainability.
- Education and awareness – education on food utilisation and preservation is highlighted as essential alongside food growing and rescue efforts.
- Policy and planning – suggestions are made for Council to develop forward-looking policies that prioritise food security in the region. This includes supporting existing community groups, reducing barriers to accessing vacant Council-owned land, and ensuring that food resilience is considered in planning processes.
- Collaboration and coordination – comments stress the need for coordination and collaboration among various stakeholders involved in food security initiatives. Suggestions include sending elected members to volunteer in organisations to gain first-hand experience and insight into community needs.
- Long-term solutions and self-reliance – in addition to addressing immediate needs, there's a focus on helping communities become more self-reliant and sufficient in the long term. This includes providing support for initiatives that promote self-sufficiency and resilience, especially considering challenges such as inflation and housing costs.

Elected members survey: 5 respondents answered this question. The key themes that emerged were:

- Disaster readiness and recovery – there is a suggestion to view food security through a disaster-readiness and recovery lens, recognising the importance of ensuring food security not only in everyday circumstances but also during times of crisis. Additionally, there is emphasis on the reputational and tangible values to the region as a 'food basket' and exporter, highlighting the need for a track record in ensuring food security for everyone in the local community.
- Significant impact with small investment – there is a recognition that even a small investment in food security initiatives can yield significant, positively impactful results for people. It's noted that commercial food growers should feel supported and valued.

- Potential unseen work by Council staff – It's mentioned that there may be work that staff are already doing in the realm of food security, but it may not be visible to elected members. This suggests the importance of communication and transparency with Council regarding ongoing efforts related to food security.
- Shared responsibility and collaboration – while the city has a leadership role in responding to food security issues, it's noted that addressing these challenges is a shared responsibility involving various stakeholders such as NGO organisations, faith-based groups, community groups, and businesses, especially those involved in food. Collaboration and having a clear plan are seen as essential for making a real difference in improving food security.
- Supportive attitude – there is an expressed willingness to support food security initiatives and responding to issues within the community.

Part 3: Options analysis

This options analysis explores four distinct options as roles Council could take in responding to city-wide food security and resilience issues. This analysis determines the effectiveness and feasibility of each option by evaluating the pros and cons. However, only two options – Option 1 and Option 2 - respond to the resolution made by Council.

Option 1: Develop a food security and resilience policy and consider the resources allocated to this work through the Long-Term Plan deliberations

Pros	Cons
Establishes a comprehensive framework addressing various aspects of food security and resilience.	May require significant time and resources for drafting, consultation, and implementation.
Provides clear guidelines for actions and interventions.	Policy development process may face challenges such as conflicting priorities and balancing the interests and needs of various stakeholder groups.
Demonstrates a long-term commitment to addressing food security issues within the community.	Implementation and impact may not be immediately visible, requiring patience and ongoing support.
Sets the stage for collaboration with other government agencies and organisations to address food security.	Striking the right balance between flexibility and specificity may be challenging during policy drafting.
Encourages community involvement in policy development, ensuring diverse perspectives are considered.	Allocating additional resources can strain finances, especially if funds need to be diverted from other important area of Council or if the resourcing is not sustainable over time.
Enhances transparency and accountability, allowing the community to actively participate in decision-making.	

Allows for adjustments and revisions over time to accommodate changing circumstances and evolving priorities.	
Provides a basis for systematic monitoring and evaluation of the policy's effectiveness and impact.	
Additional resources can enhance the effectiveness of policy implementation by providing the necessary funding or personnel to achieve outcomes for efficiently.	
With additional resources, Council can broaden the scope of the policy. This allows for a more comprehensive response to the issue.	
Adequate resources enable faster progress towards policy objectives as barriers such as lack of funding or personnel are minimised.	

Option 1 Analysis

This option is recommended.

The Council resolution to allocate resources to developing a policy raised expectations amongst stakeholders that there would be a more significant role taken in the future. Despite these raised expectations, Council still needs to consider the most appropriate way to respond to the issues of food insecurity discussed in this report.

In light of the research and early engagement responses, developing a food security and resilience policy and considering the resources allocated to this work through the Long-Term Plan deliberations is the recommended option.

The community have asked for Council to play a role in addressing food insecurity; and a well-crafted policy with a strategic context, purpose, objectives, principles and guidelines demonstrates a commitment from Council in responding to city-wide food security and resilience issues. The community has asked for Council to take a leadership role in this space in our own functions and work programmes, but also act as an "enabler" rather than an "implementer" by providing resources, expertise and ongoing support.

The creation of a policy provides Council with an opportunity to determine the roles it wants to play and consultation on a draft policy provides stakeholders with an opportunity to share their views on the nature of this role.

However, the issue of resourcing remains a key issue to be resolved and the most appropriate way to address the question of resourcing is through the deliberations on the Long-Term Plan. Noting that without dedicated resourcing the policy may be ineffective.

The exact nature of the resourcing that may be required is undetermined. The level of change and leadership that Council is seeking to achieve through the draft policy relates to the level of resourcing. It could include a full or part-time role within Council, internal funding to support actions, grant funding to support an external role, or another mode of resourcing.

The outcomes of this policy will only be evident in high-level and slow-moving community wellbeing indicators. Our community wellbeing monitoring (see the City Dashboards) will track this high-level progress. However, the activities associated with the policy, and the progress towards implementing the guidelines, will be publicly reported through the Council Committee process annually. These could include, for example, how food security and resilience objectives have shaped advice to elected members, and the level of support provided to community initiatives.

A working draft has been developed and is provided to the Sustainability Committee in May 2024 for elected members to consider. This draft has been prepared in accordance with Council's policy framework. A decision around resourcing will give staff greater clarity around the scope of Council's role in the policy. The draft policy will be presented to Committee in August seeking approval for public consultation.

Option 2: Develop a food security and resilience policy to guide operations within existing resources

Pros	Cons
Establishes a comprehensive framework addressing various aspects of food security and resilience.	May require significant time and resources for drafting, consultation, and implementation.
Provides clear guidelines for actions and interventions.	Policy development process may face challenges such as conflicting priorities and balancing the interests and needs of various stakeholder groups.
Demonstrates a long-term commitment to addressing food security issues within the community.	Implementation and impact may not be immediately visible, requiring patience and ongoing support.
Sets the stage for collaboration with other government agencies and organisations to address food security.	Striking the right balance between flexibility and specificity may be challenging during policy drafting.
Encourages community involvement in policy development, ensuring diverse perspectives are considered.	Without additional resourcing, the scope of Council's role is minimised.
Enhances transparency and accountability, allowing the community to actively participate in decision-making.	A lack of additional resourcing to support the policy might imply a lack of commitment from Council, potentially eroding trust and confidence in the organisation by stakeholders.
Allows for adjustments and revisions over time to accommodate changing circumstances and evolving priorities.	Without allocated resources to bolster the policy, there might be insufficient capacity to undertake essential tasks such as community outreach, program management, and monitoring and evaluation.
Provides a basis for systematic monitoring and evaluation of the policy's effectiveness and impact.	If existing staff are tasked with implementing the policy in addition to their regular duties, they may become overburdened and unable to effectively carry out their responsibilities, leading to burnout and reduced productivity.

Developing the policy without additional resourcing reduces the direct financial burden on ratepayers.	Implementing a food security and resilience policy requires ongoing effort and resources, which could prove challenging to sustain without dedicated staff to advocate for and champion its implementation in the long-term.
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Option 2 analysis

This option is not recommended.

The Council resolution to allocate resources to developing a policy raised expectations amongst stakeholders that there would be a more significant role taken in the future. While the creation of a policy demonstrates a commitment to food security and resilience from Council, without dedicated resourcing to deliver the policy is unlikely to be effective in achieving the desired outcomes.

If elected members were to choose this option, staff would have to re-evaluate the scope of Council's role in the draft policy prior to presenting to Committee in August seeking approval for public consultation.

Option 3: Embed and emphasise food security and resilience initiatives in existing Council work programmes to demonstrate Council support, without developing a policy

Pros	Cons
Ensures that food security and resilience become integral parts of Council's operations and priorities	May result in food security and resilience receiving less attention or priority compared to standalone policies, potentially diluting their impact.
Leveraging existing structures and resources minimises the need for additional spending on policy development and implementation, making it a less costly approach.	Without dedicated focus and resources, food security and resilience initiatives may lack the necessary depth and attention needed to address complex challenges effectively.
Facilitates smoother implementation and coordination as it builds on established procedures and workflows.	Existing structures and processes may be resistant to incorporating new priorities, leading to inertia or opposition to embedding food security and resilience initiatives into existing work programmes.
Ensures alignment with the organisation's broader objectives and strategic priorities.	Without a standalone policy, there may be a lack of clear accountability for food security and resilience initiatives, making it challenging to track progress and ensure effective implementation.
There is the opportunity for continuous improvement through regular review and adjustment of initiatives based on feedback and performance data.	May result in fragmented approaches to food security and resilience, with efforts scattered across different departments or areas of responsibility.
	Difficulty in tracking and evaluating the impact of diverse initiatives may pose challenges for accountability.

Option 3 analysis

This option is not recommended.

Without a dedicated policy specifically responding to food security and resilience issues, there is a perceived lack of strategic direction and commitment from Council. Embedding initiatives into existing work programmes does not adequately prioritise or address the multifaceted nature of food security challenges, potentially leading to a piecemeal approach and missed opportunities.

While leveraging existing structures can be beneficial, without a dedicated policy there is limited guidance, accountability and oversight to ensure that food security initiatives receive the necessary resources, attention, and coordination across different units.

This option does not respond to the resolution made by Council.

Option 4: Maintain the status quo for food security and resilience

Pros	Cons
Maintains the existing state of affairs including the current funding structure, providing a level of continuity and stability in current practices.	Risks perpetuating and exacerbating existing issues related to food security and resilience.
Avoids potential disruptions and uncertainties associated with implementing new policies or initiatives.	Fails to address emerging challenges that may require proactive interventions.
Minimises the need for immediate resource allocation and financial investments in new programmes or initiatives.	Overlooks the potential benefits and returns that could result from strategic investments in food security.
Requires minimal adjustments to existing operational processes and systems, reducing the learning curve.	Ignores the opportunity for improvement and innovation in addressing food security and resilience challenges.
Provides a short-term sense of stability, especially for those accustomed to the current state of affairs.	May signal a lack of leadership and commitment to addressing important community issues, potentially eroding trust and confidence in the organisation.
Avoids potential risks associated with the implementation of new policies or programmes that may not be well-received.	Without a policy-driven approach, there may be a tendency to focus on short-term solutions rather than addressing underlying root causes and systematic issues contributing to food insecurity.
Acknowledges the current outcomes and conditions related to food security without actively seeking change.	Misses the chance to test and learn from innovative solutions that could address food security challenges.
	Makes it challenging to track progress and ensure effective implementation of initiatives.

Option 4 analysis

This option is not recommended.

The status quo lacks strategic focus and the direction needed to respond to the complex and evolving nature of food security issues effectively. Without a clear policy framework, Council efforts remain fragmented, reactive and largely ad-hoc, overlooking the opportunity for a proactive response and long-term planning. Without a policy to guide decision-making and resource allocation, there may be a lack of accountability and transparency in how food security initiatives are prioritised and implemented within the city.

While maintaining some aspects of current practices may be beneficial, it is essential to complement this approach with a robust policy to provide strategic direction, coordination, and accountability for city-wide food security and resilience efforts.

This option does not respond to the resolution made by Council.

Part 4: Recommendation

After a detailed analysis of the options, it is recommended that elected members endorse option 1. Developing a food security and resilience policy stands out as the most favourable option among the choices outlined above.

This option responds to the research and responses from early engagement recognising the urgency and complexity of addressing food security challenges in Palmerston North. A policy demonstrates a commitment from Council in responding to city-wide food security and resilience issues

Developing a policy provides a strategic, structured and coordinated response to building a resilient and sustainable food system, encompassing various aspects such as community engagement, local food production, environmental sustainability, and educational initiatives. It enables the city to set clear objectives and establish accountability measures.

This option also recommends that additional resource be considered through the Long-Term Plan deliberations, as it has become apparent through the drafting of the policy that without dedicated resourcing the policy may be less effective in achieving the desired outcomes.

Unlike maintaining the status quo or embedding food security and resilience initiatives into existing work programmes, adopting a policy signals a commitment to positive change rather than silently adapting. This approach aligns with best practices in community development - leveraging the collective efforts of local government, community groups, and residents to create a resilient and equitable food system for Palmerston North.

Conclusion

In conclusion, this report highlights the critical issue of food insecurity in Palmerston North and proposes a strategic approach for the Council to respond.

By developing and adopting a food security and resilience policy, Council can play a pivotal role in creating a sustainable, locally based, and equitable food system. The implementation and success of a food security and resilience policy will be dependent on resourcing and collaboration from various stakeholders, including Council staff, community organisations, government agencies, and residents to ensure a resilient and secure food future for Palmerston North. Addressing food security not only improves the overall wellbeing of the community but also contributes to the city's economic, social, and environmental objectives with community-driven solutions.

Thank you to the following groups and organisations (and all of the other individuals) who contributed to this report:

- Best Care Whakapai Hauora
- Bulls Food Pantry
- Central Economic Development Agency
- Environment Network Manawatū
- Future Living Skills
- Grandparents Raising Grandchildren
- Growing Gardens and Communities
- Horizons Regional Council
- Just Zilch
- Legacy Church
- Let's Grow Palmy
- Manawatū Food Action Network
- Massey University
- Niuvaka Trust
- Ora Konnect
- Palmerston North Girls High School
- Papaioea Pasifika Community Trust
- RECAP – The Society for the Resilience and Engagement of the Community of Ashurst and Pohangina
- Salvation Army
- SuperGrans Manawatū
- Tanenuiarangi Manawatū Incorporated – Rangitāne o Manawatū
- Te Tihi o Ruahine Whānau Ora Alliance
- Te Wakahuia Manawatū Trust
- Think Hauora
- Whatunga Tūao Volunteer Central

Resources informing this report

- [4412 Kai Resilience Strategy and Situational Analysis](#)
- [Christchurch City Council Food Resilience Policy](#)
- [Christchurch City Council Food Resilience Network Action Plan](#)
- [Edible Canterbury website](#)
- [Edible Wellington Snapshot](#)
- [Environment Network Manawatū website](#)
- [Food and Agriculture Organisation of the United Nations website](#)
- [Growing Up In New Zealand – Now We Are Twelve – Food Insecurity Snapshot](#)
- [Health Coalition Aotearoa website](#)
- [Horizons Regional Council Climate Action Plan](#)
- [‘Ka Tipu Ka Ora – ‘A Whanganui regenerative and Resilient Sustainable Food System’ report](#)
- [Kore Hiakai Zero Hunger Collective website](#)
- [Love Food Hate Waste website](#)
- [Manawatū Regional Food Strategy](#)
- [Ministry for the Environment Aotearoa New Zealand Waste Strategy](#)
- [Ministry for the Environment website](#)
- [Ministry of Education website](#)
- [Ministry of Health website](#)
- [Ministry of Social Development website](#)
- [New Zealand Food Network website](#)
- [New Zealand Health Survey](#)
- [Office of the Prime Minister’s Chief Science Advisor website](#)
- [Palmerston North City Council Community Gardens Guide](#)
- [Palmerston North City Council Draft Oranga Papaioea City Strategy](#)
- [Palmerston North City Council Draft Waste Management and Minimisation Strategy](#)
- [Palmerston North City Council Eco City Strategy](#)
- [Palmerston North City Council Environmental Sustainability Review](#)
- [Palmerston North City Council Support and Funding Policy](#)
- [Palmerston North City Council ‘What Really Matters’ report](#)
- [Palmerston North City Council Vegetation Framework](#)
- [Public Health Communication Centre website](#)
- [Regional Kai Network website](#)
- [Regional Public Health website](#)
- [Salvation Army ‘Food for Thought: Disrupting food insecurity in Aotearoa’ report](#)
- [Salvation Army 2023 State of the Nation report](#)
- [Salvation Army 2024 State of the Nation report](#)
- [Spira website](#)
- [Waste Management Institution on New Zealand \(WasteMINZ\) website](#)
- [Wellington City Council ‘Our City’s Food Future’ background report](#)
- [World Health Organisation website](#)

MEMORANDUM

TO: Sustainability Committee

MEETING DATE: 22 May 2024

TITLE: Update on opportunities for native species re-introductions in the Turitea Reserve

PRESENTED BY: Adam Jarvis, Principal Climate Change Advisor

APPROVED BY: David Murphy, Chief Planning Officer

RECOMMENDATION TO SUSTAINABILITY COMMITTEE

1. That the Committee receive the memorandum titled 'Update on opportunities for native species re-introductions in the Turitea Reserve' presented to the Sustainability Committee on 22 May 2024.
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1. ISSUE

This memorandum follows a previous memo titled '[Opportunities for native species reintroductions in the Turitea Reserve](#)' which was presented to the 7 June 2023 Sustainability Committee. The memo advised that further translocations would not be possible until after the recently reintroduced Toutouwai (North Island Robins) had successfully established themselves in the reserve. The Committee received this information and requested further information about costs and next steps, which are detailed below.

Six species have been identified as potential future translocation candidates: Kiwi, Pāteke, Kōkako, Kākā, Yellow-crowned Kākāriki, and Weka. While the advice regarding the need to focus on fully establishing Toutouwai in the reserve first remains unchanged, this memo provides high-level advice about the requirements and costs involved with the reintroduction of each of these species.

2. BACKGROUND

Council began predator control operations in the Turitea in 2003. The project has grown over time and now involves thousands of traps and bait stations across 40sqkm of Turitea Reserve and Hardings Park. The project has been highly successful, with a 10-15x growth in the population of key bird species like Tūi and Kererū.

2.1 Toutouwai – North Island Robin

Building on the success of the project, Council worked with Rangitāne, Massey University and numerous expert volunteers to reintroduce the locally extinct Toutouwai in 2021. These birds were generously provided by Bushy Park and Ngāa Rauru.

Unfortunately, the 2021/2022 breeding season coincided with a nationwide increase in rat numbers, brought on by a rare podocarp mast. Dispersion of released birds was also greater than expected, meaning many birds flew great distances from the release site, and were unable to contribute to growing the nascent population.

Council responded by significantly increasing rat control within the core breeding area where the Toutouwai population had established themselves. These efforts included a tenfold increase in rat monitoring frequency, the progressive installation of modern 'AT220' self-resetting traps, and a currently annual intensive manually-deployed rat poison operation. These efforts have enabled Council to maintain rat numbers at near-zero within the core Toutouwai area, and led to a significant increase in the bird's survival rates and breeding success. However, the disastrous first year means that these relative numbers are still small in absolute terms, and the Toutouwai population remains marginal and hence vulnerable to sudden environmental changes, disease, etc. Our permit allows for a follow-up release of 40 birds to supplement the Turitea population and improve its genetic diversity. This is currently scheduled for Autumn 2025.

2.2 General commentary on future translocations

Any future translocation process would begin with a species-specific assessment of the Turitea. This would be conducted by a species expert and determine the suitability of the habitat for the species under consideration, including what predator control changes (if any) would need to be made to give the species in question the best opportunity to thrive. As such, this assessment would form the basis of a future Department of Conservation permitting application and discussions with source-site mana whenua. This would cost up to \$10,000, depending on the species and expert availability, and could be covered within existing budgets. All other costs associated with these proposed translocations are currently unbudgeted.

Preliminary expert advice suggests there are six species that could potentially be reintroduced to the Turitea within the near future. Each has different biodiversity advantages and challenges, and hence differing translocation and ongoing costs. In all cases however, the costs are likely to be significantly higher than for the Toutouwai translocation, which was achieved entirely within existing budgets thanks to considerable trained-volunteer assistance, the relative abundance and ease of capturing Toutouwai, and the fortuitous availability of funding from MBIE for post-release monitoring in partnership with Massey.

Though costs can vary considerably depending on the location and logistical difficulties posed by the source site, Council should expect a baseline of \$40,000 for the physical translocation of these species, with additional species-specific costs

and requirements as discussed below. A table summary of estimated costs by species is provided in Attachment 1.

2.3 Kiwi

Given the recent success of Kiwi in the nearby and ecologically similar Ruahine Ranges, and the current lack of ground-browsing native species, Kiwi are perhaps the strongest preliminary contender for Council's next focus. Given their status as New Zealand's native bird, any translocation would likely generate considerable enthusiasm from the community.

Kiwi are most vulnerable to stoats, dogs, cats, and ferrets. Stoat and ferret numbers within the reserve are low, and dogs are essentially absent aside from those with contracted hunters. Kiwi aversion training would need to be conducted with any farm or household dogs on properties adjacent to the reserve. Thankfully, these are relatively few, though achieving full uptake would be easiest were Council to cover training fees, for a total cost of approximately \$1,000. Unfortunately, cat numbers have not been systematically monitored within the Turitea historically and are a potential concern for the viability of a Kiwi reintroduction that Council is currently working to assess formally.

Follow-up post-release monitoring standards are higher for Kiwi than Toutouwai, with radio tracking conducted monthly for the first three months, and quarterly thereafter for three years, for a potential cost of \$120,000 over three years.

2.4 Pāteke – Brown Teal Duck

The Turitea's dam sites are judged to be potentially highly suitable for a population of Pāteke. Palmerston North also has considerable historic association with Pāteke, given the contribution of the Victoria Esplanade to the breeding programme.

Pāteke have a similar set of predator vulnerabilities as Kiwi above, though with the additional complication of needing a much broader 'halo' than Kiwi given the tendency of the birds to fly considerable distances from their home nesting sites to ponds in surrounding farmland where they are vulnerable to ferrets, cats, farm dogs, and cars. Creating such a halo would be easier in the scenario where some of this work has already been done in service of protecting Kiwi or another species.

Post-release monitoring requirements are similar to Kiwi, though perhaps 50% more costly given the bird's tendency to spread over a wider range. Availability of birds for translocation is low, potentially meaning a long wait after approval until the Turitea reaches the front of the 'queue' for any translocation.

2.5 Kōkako

Informal advice from a member of the Kōkako recovery group suggests the Turitea, with its dense undergrowth (thanks to PN City Council's possum and deer control), could be an excellent habitat for Kōkako if the Turitea could continue to maintain the extremely low rat numbers that Council has been achieving since 2022. This has been done via annual high-intensity manually-deployed poison baiting in order to

provide the Toutouwai population the best-possible chances of survival. We hope to reduce our reliance on these operations over the next two years as we continue to roll out the latest generation of 'AT220' self-resetting traps which evidence suggests provide a much higher standard of rat control than traditional 'DOC200' manual traps, despite similar ongoing operations and maintenance costs. We expect to have sufficient evidence of whether Turitea rat numbers can be kept at levels suitable for Kōkako within current budgets by 2027.

Most costs will remain similar to Kiwi, however Kōkako are extremely difficult to capture in the wild. Consequently, translocation costs are likely to be significantly higher, perhaps as much as \$80,000.

2.6 Kākā

Kākā are periodically spotted in the Turitea and surrounds, likely having flown from Pūkaha or Southern Taranaki 'Project Kākā' areas, so clearly, the habitat is well suited to them. Establishing a population of Kākā in the Turitea would have mutual resilience benefits for all three populations.

Key predators for Kākā are stoats and cats, meaning similar concerns to Kiwi discussed above, but without the need for dog training on nearby farmland.

Best practice for Kākā translocation involves the construction of 'barn-sized' acclimatisation aviaries on site. Construction costs are likely to be \$200,000 or more, depending on the ease of construction at the chosen site. Part-time support staff would need to be contracted to help manage this process, though some synergies with Wildbase could be explored.

2.7 Yellow-Crowned Kākāriki

The tall, unbroken forest within the Turitea Reserve is likely to be a highly suitable habitat for yellow-crowned Kakariki, though these are highly vulnerable to mustelids and rats and would require similar control standards to those of Kōkako. Thus, permitting is unlikely to be possible prior to 2027 without a significant increase in funding for permanent control measures.

It is unknown to what extent Kākāriki would face competitive pressures from the well-established population of Eastern Rosellas in the Turitea. Department of Conservation may require a study of the Rosella population before permitting.

Preliminary advice is that the availability of these birds is highly limited. As with Pāteke, delays are likely.

2.8 Weka

An alternative ground-browsing species to Kiwi are the charismatic Weka. These birds have similar predator control requirements to Kiwi, including measures to limit the impact of nearby dogs. Weka are extremely curious and are commonly injured or killed in predator traps. The Turitea trap network has not been designed with Weka in mind, and would require adjustments before any translocation could occur.

(primarily raising the height of traps off the ground to put them out of reach of Weka), likely costing in the order of \$20,000.

Advice is that translocations tend to be more expensive than many other species due to the bird's nature and care requirements. Council should expect these costs to be as high as \$80,000.

3. NEXT STEPS

If Council wishes to proceed with further translocations, the following actions are recommended:

- Procure expert advice about the suitability of the Turitea Reserve for Kiwi and Weka in Spring 2024, and work with Rangitāne to discuss their requirements and desired involvement.
- Continue to improve stoat monitoring and action any expert/mana-whenua recommendations possible within existing budgets.
- Conduct the follow-up Toutouwai release as planned in Autumn 2025.
- Return to this committee with a report recommending proceeding with a particular species, detailing the translocation requirements, and seeking endorsement to begin the permitting and source mana-whenua engagement process.
- As required, provide detailed reporting to Council regarding funding requirements, potentially to be actioned through annual/long-term plan process as appropriate.

4. COMPLIANCE AND ADMINISTRATION

Does the Committee have delegated authority to decide?	Yes
Are the decisions significant?	No
If they are significant do they affect land or a body of water?	No
Can this decision only be made through a 10 Year Plan?	No
Does this decision require consultation through the Special Consultative procedure?	No
Is there funding in the current Annual Plan for these actions?	Yes
Are the recommendations inconsistent with any of Council's policies or plans?	No
The recommendations contribute to Goal 4: An Eco City	
The recommendations contribute to the achievement of action/actions in Environmental Sustainability	
The action is: Monitor Toutouwai reintroduction and develop a plan for further translocations	

Contribution to strategic direction and to social, economic, environmental and cultural well-being	Memo provides advice regarding future translocations. Species reintroduction improves environmental well-being by improving biodiversity outcomes at the Turitea Reserve.
--	---

ATTACHMENTS

1. Turitea Future Translocation Cost Estimate Summary [↓](#) 

Species	Investigation (budgeted)	Translocation	Post-release monitoring	Other Costs	Notes
Kiwi	\$10,000	\$40,000	\$120,000	\$1,000	Dog control
Pāteke	\$10,000	\$40,000	\$180,000		Limited availability
Kākā	\$10,000	\$40,000	\$120,000	\$300,000	Aviary Construction
Kōkako	\$10,000	\$80,000	\$120,000		Sustain rat numbers at current levels
Kākāriki	\$10,000	\$40,000	\$120,000		Limited availability, sustained low rat levels
Weka	\$10,000	\$80,000	\$120,000	\$20,000	Dog control

MEMORANDUM

TO: Sustainability Committee

MEETING DATE: 22 May 2024

TITLE: Sustainability Review 2024

PRESENTED BY: Olivia Wix, Communications Manager

APPROVED BY: Donna Baker, Acting Chief Executive Unit Manager

RECOMMENDATION TO SUSTAINABILITY COMMITTEE

1. That the Committee receive the Sustainability Review 2024, presented to the Sustainability Committee on 22 May 2024.
-

1. ISSUE

The Sustainability Review for 2024 is now complete. This is the third edition of the review. The first was completed in December 2020 and the second in May 2022.

2. BACKGROUND

The review demonstrates how Council is committed to improving our environmental footprint and highlights recent examples of what we've achieved since the last review.

It also provides an opportunity to highlight some businesses and/or organisations in our community that are making an impact in this space.

This review does contain some data, however due to how and when data is collected, some of it may not have changed since the last review.

Rangitāne and Environment Network Manawatū have reviewed the publication and provided feedback.

3. NEXT STEPS

The Sustainability Review 2024 will be published on the Council website and made available at our Customer Service Centre and libraries. The report will also be circulated to the organisations which feature in the review for their officers, customers, schools and stakeholders. Over the coming months we will be sharing some of the information and stories across our social media channels and in media interviews.

For the next edition, we'll look to work more closely with Environment Network Manawātū as our Sector lead in producing the report, and having a launch event.

4. COMPLIANCE AND ADMINISTRATION

Does the Committee have delegated authority to decide?	Yes
Are the decisions significant?	No
If they are significant do they affect land or a body of water?	No
Can this decision only be made through a 10 Year Plan?	No
Does this decision require consultation through the Special Consultative procedure?	No
Is there funding in the current Annual Plan for these actions?	No
Are the recommendations inconsistent with any of Council's policies or plans?	No
The recommendations contribute to Goal 4: An Eco City	
The recommendations contribute to the achievement of action/actions in Environmental Sustainability	
The action is: Prepare a biannual city sustainability report	
Contribution to strategic direction and to social, economic, environmental and cultural well-being	Reporting on Council's sustainability activities ensures that members of the community are aware of how Council is improving our environmental footprint.

ATTACHMENTS

1. Environmental Sustainability Review 2024 (attached separately) 

MEMORANDUM

TO: Sustainability Committee

MEETING DATE: 22 May 2024

TITLE: Wastewater Treatment Plant - Nature Calls: Quarterly Update

PRESENTED BY: Mike Monaghan, Group Manager - Three Waters

APPROVED BY: Chris Dyhrberg, Chief Infrastructure Officer

RECOMMENDATION(S) TO SUSTAINABILITY COMMITTEE

1. That the Committee receive the report titled 'Wastewater Treatment Plant – Nature Calls: Quarterly Update' presented to the Sustainability Committee on 22 May 2024.

1. ISSUE

- 1.1 The Nature Calls Project Team completed the concept design and development of the resource consent application to Horizons Regional Council (Horizons) in late 2022. This was the culmination of four years of work developing the Best Practicable Option (BPO), which comprises highly treated wastewater being discharged to the Manawatū River or to land.
- 1.2 Quarterly updates for the project were requested by Council. This report provides an update on the project for the period from January to March 2024.

2. BACKGROUND

Resource Consent Application submitted to Horizons for the Nature Calls Project

- 2.1 The Nature Calls Consent application was lodged with Horizons on 19 December 2022. The consent application programme was driven by the need to satisfy the requirements of Condition 23C of the existing discharge consent, which required an application to be lodged for the discharge consent for the Wastewater Treatment Plant (WWTP).
- 2.2 On 31 March 2023, Horizons informed Council that the consent application had been rejected under Section 88 of the RMA. Horizons cited in their correspondence to Council that the application did not include sufficient information. Council formally objected to this decision whilst continuing to work constructively with Horizons on the consent application on the matters deemed as incomplete to get the application accepted.

- 2.3 Council resubmitted the application to Horizons on 20 July 2023 and it was accepted on 1 August 2023. Following the receipt of the acceptance notification from Horizons, Council formally withdrew its objection to Horizons' original decision.
- 2.4 On 17 August 2023, Council received Horizons' request for further information regarding the consent application (also known as a Section 92 request for further information of the RMA). This request contained over 200 questions - additional information requests are not unusual to receive on consent applications, and extensive information requests are normal to receive on applications of this magnitude.
- 2.5 Due to the complexity and anticipated duration required to formulate answers to the Section 92 request, the Project Team advised Horizons that Council anticipated being able to respond to the Section 92 request on 26 June 2024.
- 2.6 The Project Team have scoped the work required to respond to these questions and are now developing the technical work to support these responses.

3. NATURE CALLS STEERING GROUP

- 3.1 The Nature Calls Steering Group was established in December 2023. The Terms of Reference (ToR) for this group have been finalised now with input from Elected Members and the Steering Group members. The final ToR were presented to and adopted by Council on 1 May 2024.
- 3.2 The Steering Group met on 24 April 2024. At this meeting, the group discussed the Manawatū Mixing Study and the Surface Water & Ecology Factual Report, which were pre-circulated to the Steering Group. The Steering Group will have a lunchtime session where the authors of these reports will discuss the findings in more detail. In addition, the group covered Section 92 response progress, how to manage bio-solids, the property strategy, and the ability to work with Fonterra regarding their Longburn WWTP. The cost of the project was also covered and areas where cost savings could be made.
- 3.3 Minutes from the first two Steering Group meetings are attached as Attachments 1 and 2.
- 3.4 The Steering Group will next meet on 18 June 2024.

4. IWI

Te Tūmatakahuki

- 4.1 Council have agreed a Memorandum of Agreement (MoA) with Te Tūmatakahuki for both parties to continue to work together on the project. This MoA is currently with Te Tūmatakahuki for signing.

Ngāti Whakare

- 4.2 Project staff met with Ngāti Whakare in March to discuss the project and the scope of work for a Cultural Impact Assessment to be developed by Ngāti Whakare.

5. SECTION 92 REQUEST FOR FURTHER INFORMATION WORKSTREAM

- 5.1 The Project Team has been working through the numerous additional information requests. Technical workstreams that are being finalised in this initial tranche include:

- Planning
- River discharge effects and monitoring
- Air quality
- Land application and groundwater
- Groundwater at the WWTP
- Diurnal pH Monitoring Report
- River Modelling Report

These are the final tranches of responses being developed by the Project Team to address the matters raised by Horizons.

River Monitoring - Summer flow monitoring and mixing study

- 5.2 The river mixing study was undertaken in the Manawatū River to provide an indication of how mixing occurs in low flow conditions. The testing occurred in three locations downstream of the current discharge location over several days.
- 5.3 The study concluded that to achieve the best mixing results at the downstream gravel bed, the currently proposed discharge location would need to move upstream by approximately 100 – 150 meters.
- 5.4 The final report was circulated to Iwi and Elected Members for their information. This report is attached as Attachment 3.

Stream testing within the area of interest

- 5.5 In February 2024, consultants carried out water testing and ecological testing on four streams within the Area of Interest (Aol). This work is required to support the consent application submitted to Horizons and was also requested by Horizons as part of the Section 92 additional information request.

- 5.6 The testing occurred in streams that were identified as streams that could be impacted by land application, and provides baseline information on their ecological health. These streams included Te Pora (Whiskey Creek), Bourkes Drain, Main Drain and Taonui Stream.
- 5.7 An invitation was extended to Iwi and Rangitāne staff, who then attended the site visits with the Project Team.
- 5.8 The Surface Water Quality and Ecological Values Report found that historic land use and flood protection works have impacted the major waterways intersecting the Aol. Poor aquatic habit and water quality were recorded at all sites, which are factors causing degradation of the aquatic communities recorded.
- 5.9 The final report was circulated to Iwi and Elected Members for their information. This report is attached as Attachment 4.

Biosolids strategy

- 5.10 Previous work identified that the Awapuni Landfill has limited capacity for future disposal of biosolids from the WWTP. Additional work has commenced on the Biosolids Strategy to determine opportunities for the use of biosolids going forward, with the focus on matters identified in the Biosolids Strategy Development Report that relate to:
 - current biosolids disposal; and
 - progressing future short and medium-term disposal options for biosolids from the treatment plant.
- 5.11 In addition to the work outlined above, strategic conversations are ongoing with other local entities in the region on biosolids disposal as this is a regional challenge for other councils.
- 5.12 The Project Team have completed work to determine whether there is capacity at the existing Awapuni Composting facility. This work has determined that the slopes of the existing landfill may be able to be extended to accommodate additional capacity. Discussions are occurring with the relevant Council staff to determine whether this is a viable option.

Land opportunities

- 5.13 The Project Team continues to investigate property to receive the land discharge, as this is a fundamental part of the consent application. A specific property team has been identified and meet regularly to progress this workstream. Since the update in March 2024, the team continues to work on the following:
 - Looking at suitability of land within the Aol;
 - MCA – has been developed to support site selection within the Aol. This work will support the Property Strategy;

- Initial discussions on detailed investigations that are required to address the further information received by Horizons.

Mangaone Stream flow monitoring

- 5.14 A flow monitoring station has been established to monitor flow levels from the Mangaone Stream. This was required to inform the model that has been developed on the Manawatū River. The monitoring station will also collect water quality data to assist and inform the model and develop baseline information on the Mangaone Stream.

6. BUDGET

- 6.1 The 2023/24 capital budget for the Nature Calls project is \$3,000,000. This will allow for the aforementioned work packages to continue throughout this financial year.
- 6.2 At the end of March 2024, \$1,373,536 has been spent, the bulk spent on Work Packages focusing on land application, Section 92 responses and monitoring and investigation works. Other areas of spend include the biosolids strategy and investigation work package and further work on adaptive management.

Post Lodgement RMA	\$765,792
Land Opportunities	\$142,471
Monitoring and Investigation	\$125,719
Iwi Engagement/ Wetlands	\$24,679
Biosolids Strategy and Investigation	\$41,467
Section 92 Responses	\$273,408

- 6.3 Work will continue at pace responding to Section 92 questions as we have a deadline of 26 June 2024.
- 6.4 Officers are currently reviewing the project estimates that have been submitted for the LTP consultation document. A number of workstreams have been identified to challenge and test current assumptions, and it is acknowledged that the current figure includes a high level of contingency, as detailed design cannot be costed at this stage.

7. NEXT STEPS

- 7.1 The Section 92 responses will be finalised in the next quarter.

- 7.2 We continue to connect and reach out to Iwi in relation to the project in anticipation of ongoing conversation and discussion relating to cultural impact.

8. COMPLIANCE AND ADMINISTRATION

Does the Committee have delegated authority to decide?	Yes
Are the decisions significant?	No
If they are significant do they affect land or a body of water?	No
Can this decision only be made through a 10 Year Plan?	No
Does this decision require consultation through the Special Consultative procedure?	No
Is there funding in the current Annual Plan for these actions?	Yes
Are the recommendations inconsistent with any of Council's policies or plans?	No
The recommendations contribute to Goal 4: An Eco City	
The recommendations contribute to the achievement of action/actions in Waters The action is: Lodge resource consent application for future discharge of Wastewater Treatment Plant	
Contribution to strategic direction and to social, economic, environmental and cultural well-being	Lodging for resource consent allows Council to continue to provide its wastewater services and allows for future-proofing of the city.

ATTACHMENTS

1. February 2024 Steering Group minutes [↓](#) 
2. April 2024 Steering Group minutes [↓](#) 
3. Manawatū River Mixing Study 2024 [↓](#) 
4. Surface Water and Ecology Factual Report [↓](#) 



Nature Call Steering Group

Tuesday 27th February

4-5pm

**Totara Road Wastewater Treatment Plant
Awapuni**

MINUTES

Attendees	Apologies
Mike Monaghan, Waid Crockett, Grant Smith, Brent Barrett, Vaughan Dennison, Danielle Harris, Whakatere Taiao, Gillian Anderson, Brett Munro, Amanda Linsley, Geoff Young, , Cathy Gee, Robert Ketu, Stewart Harrex, Phil Teal, Hayden Turoa, Peter Wells	Chris Dyhrberg, Kaydee Zabelin, Anna Lewis

Welcome and Apologies

Item	Action	Actioned by
Confirming Terms of Reference	Several additions from the last meeting: <ul style="list-style-type: none"> • Developing of principles The group agreed to work together to develop a set of principles to give effect to Te Mana o Te Wai. • Membership of the Steering Group • Secretary taking minutes and circulating to the Steering Group • Principles of the treaty of Waitangi acknowledged 	Mike to provide a risk register for distribution to the Steering Group

	<ul style="list-style-type: none"> Clarify the Representation of the public health service. Mid-Central District Health to be consulted. Risk register, identifying future risks. 	
Natures Call Operational Update	<p>The focus of the technical group is to answer horizons 205 questions. We are committed to working collaboratively and respectively to provide all the responses within that timeline of 26th June 2024.</p> <ul style="list-style-type: none"> Modelling works around ground water. River dye testing. Consultants released the dye at two separate locations: 1 downstream of the Mangione Stream, and 2 downstream of Longburn (near the proposed new discharge point). The purpose was to see how it dilutes and mixes with the river water, this will give a good indication of how the wastewater will do the same. This piece of work helps confirm modelling and determines if any changes to the proposal are Required. This is a requirement for the consent application. Developing strategy - Investigations into land area of 750 hectares. Early research and analysis on the soils in the Manawatu area has provided a good understanding of where the free draining soils lie. Social and economic. All the questions by Horizon and all answers by PNCC will be made available to the public. Federated farmers to be involved in the process. Funding and financing PNCC will be applying an extra levy to rate payers to pay for the WWTP. Operational level Responses to a series of operational questions will be answered by the end of May by consultants. The technical team will be reviewing the responses. 	<p>Mike to provide data showing evidence of this to the group.</p> <p>Mike to circulate the questions to the group.</p>

Confirm upcoming meetings and other site visits	<ul style="list-style-type: none"> • Another meeting to be scheduled on the 21st May • Look into PNCC sites / venues for future meetings 	Cathy to Organise Grant to investigate
General Business	<ul style="list-style-type: none"> • The terms of the current steering group will be for the period that the consent is being processed. The group need to determine over time whether the meetings will carry on after 1 July. • Waid keen to see items on the agenda are of value and that the group is steered in the right direction. Everyone's time is valuable. • Danielle would like to see a work programme 	Mike to provide to the group

Meeting Closed at 4.50pm

Next Meeting: Wednesday 24th April in the Missoula Room, CAB Building



Nature Call Steering Group

**Wednesday 24th April
4-5pm
Missoula Room, CAB Building**

MINUTES

Attendees	Apologies
Mike Monaghan, Waid Crockett, Grant Smith, Brent Barrett, Vaughan Dennison, Gillian Anderson, Brett Munro, Amanda Linsley, Geoff Young, Cathy Gee, Stewart Harrex, Phil Teal, Peter Wells, Chris Dyhrberg, Kaydee Zabelin	Danielle Harris, Anna Lewis, Hayden Turoa

Welcome and Apologies

Item	Action	Actioned by
Surface Water & Ecology Factual Report	<ul style="list-style-type: none"> The very detailed report is based on monitoring done in a number of streams in an area of interest. If we want a real deep drive, the specialist who wrote the report could attend a future meeting. 	<p>Mike to arrange.</p> <p>Questions? please filter them through to Mike asap.</p>
Manawatū River Mixing Study 2024	<ul style="list-style-type: none"> Traverse Ltd wrote the report providing some excellent information and recommendations. We have been recommended to move the 	

	<p>discharge location from Maxwells Line to the shingle area of the river. After completing the recent river dye testing, the report indicates we should go upstream by 100 metres. The logistics of building up stream would be tricky, extra engineering will need to be completed, by doing this we will end up with a long-term better result.</p>	
<p>Project Update 16 April 2024</p>	<ul style="list-style-type: none"> • Waters team are very busy categorising and working their way through the 205 questions from Horizon. All questions must be answered by 26th June, at this stage we are on target. • BioSolids - What can we use the biosolids for? Manawatu DC are having the same issues. A meeting scheduled with MDC to discuss / work through solutions and what is beneficial for the whole Manawātū region. • Property Strategy Continue to work on the property strategy to identify the best land of interest. What is going into the land? suitability of the land? drainage, slopes what can be grown on it? PNCC will take the cluster approach to identify clusters of land to purchase. If the right land comes up, will PNCC purchase? ELT & the Mayor is agreeable to this. If we purchase prior, it could possibly help with the consent process and could be an opportunity for PNCC to do something with the land productively to generate some revenue. • Fonterra - Discussions with Fonterra around the Longburn Plant feeding into the WWTP. Fonterra's standing policy is not grazing land that has human effluent discharged on it. • Fonterra is willing to have a land conversation that is mutually beneficial. • PNCC to start the process of what options might be possible. 	<p>Mike investigating a technical workshop</p>

	<ul style="list-style-type: none"> • Cost of project. Shocked by the numbers! Reviewing the methodology of the consultants. Whether they are doing a “one size fits all” approach. Can we save money and challenge the methodology. The Scope is comprehensive. Looking at Investigating overseas WWTP challenges, what they faced/ scope? 	
General Business	<ul style="list-style-type: none"> • Concerns from public health. Pulling together some principles. Adaptive management scope to be developed once consent is granted. 	

Meeting Closed at 5.05pm
Next Meeting: 18th June

Manawatū River Mixing Study: Mangaone Stream and Longburn

Prepared for:

Palmerston North City Council



Manawatū River Mixing Study: Mangaone Stream and Longburn

Prepared by:

K. D. Hamill

Prepared for:

Palmerston North City Council

Released by:

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Date: 10 April 2024

Status: Final

Reference: wk-1098

Cover Photo: A pulse of RWT dye in the Manawatū River at Longburn, released from the true right bank, 1910m downstream of the Mangaone Stream confluence on 12 February 2024.

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Acknowledgements

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- Graeme Curwin for field work boat safety and GIS support.
- Charl Naude for field work support.
- Alexander Robertson (PNCC) for drone aerial imagery.
- Palmerston North City Council for commissioning the work

Contents

1	Introduction	1
1.1	Background	1
2	Methods.....	2
2.1	General approach.....	2
2.2	Location.....	2
2.3	Qualitative assessment: Pulse release of dye	3
2.4	Quantitative assessment: Continuous dye release.....	5
3	Results	6
3.1	River Morphology	6
3.2	Manawatū River at Mangaone Stream	6
3.3	Manawatū River at Longburn, dye release at 1.8 km mark.....	9
3.4	Manawatū River at Longburn, dye release at 1.91 km mark.....	14
3.5	Manawatū River at Longburn, dye release at 2.05 km mark.....	17
4	Discussion	21
4.1	Mixing.....	21
4.2	Mixing at Longburn compared to the current discharge at Palmerston North.....	21
4.3	Reasonable mixing zone	21
4.4	Changes in mixing at higher flows	22
5	Conclusions	23
	References.....	24
	Appendix 1: Mixing at the current discharge location.....	25
	Mixing in the Manawatū River at Palmerston North	25
	Comparison of mixing with flow	25
	Appendix 2: One Plan definition of “reasonable mixing”	26
	Appendix 3: Manawatū River cross-sections	27

1 Introduction

1.1 Background

Palmerston North City Council (**PNCC**) discharge treated wastewater to the Manawatu River from the Tōtara Road Wastewater Treatment Plant (**WWTP**) (Discharge Permit 101829/2). It is proposing to upgrade its wastewater scheme to substantially improve the level of treatment, to shift the location of the river discharge location about 4.3km downstream of the current wastewater discharge structure, and to discharge to land of 75% of the average dry weather wastewater flow, when the Manawatū River is flowing at less than its half median flow.

An assessment of effects of the river discharge from the proposed upgraded wastewater scheme assumed that the new location for the river discharge would have broadly similar mixing characteristics as the current discharge location. In particular, the modelling assumed the discharge would be 67% mixed at the edge of the zone of reasonable mixing when the river is less than half median flow and 80% mixed at flows between half median and median (Aquanet Consulting 2022). A description of mixing of the current WWTP at the current discharge location is in **Appendix 1**.

PNCC commissioned River Lake Ltd to undertake a mixing study in the Manawatū River to better understand the mixing characteristics at the proposed new discharge location near Longburn. In addition, the study was to assess the mixing of the Mangaone Stream with the Manawatū River to better understand how the Mangaone Stream might influence water quality at monitoring sites upstream of the new discharge location. The study was originally planned to occur during 2022/23, but was delayed because the river flows were consistently too high¹.

This report describes mixing studies undertaken during a period of low river low in January and February 2024, including:

- Qualitative and quantitative assessment of mixing in the Manawatū River near the proposed discharge location Option C (as described in the new consent application).
- Qualitative assessment of mixing in the Manawatū River of the Mangaone Stream.

¹ To provide context, on average the Manawatū River at Teachers College has 82 days per year with flows less than half median flow, but from July 2022 to June 2023 there were only 9 days with flows less than half median flow. The only year on record with fewer days of low flow was 1952/53.

2 Methods

2.1 General approach

The mixing characteristics of the Manawatū River was assessed by releasing Rhodamine WT (**RWT**) dye into the river. For the qualitative assessment, a single bolus of RWT dye was released and the dispersion of the dye along the river was observed using imagery taken from a drone (unmanned aerial vehicle). For the quantitative assessment, RWT dye was slowly released into the river to achieve a steady state and the concentration of the dye was measured along cross-sections down the river using a fluorometer.

2.2 Location

The location of RWT dye releases in relation to the current discharge and the proposed discharge location C are shown in **Figure 2.1**. All dye releases were from the true right bank of the Manawatū River. For the purpose of this report, the location of dye releases is expressed as distance downstream of the Mangaone Stream confluence.

Proposed discharge location C is about 4.3 km downstream of the current discharge, 2km downstream of the Mangaone Stream and 0.5km downstream of the Fonterra discharge at Longburn. Safe access to this location is restricted by steep banks, fast, deep flows and debris on the banks (e.g. trees in water, concrete rubble with exposed rebar). To allow safe access, the dye releases from the Longburn site were initially undertaken (on 25th and 26th January 2024) from the downstream end of a gravel beach 1800m downstream of Mangaone Stream confluence - downstream of the rapids. A close inspection of the riverbank undertaken during this fieldwork, identified additional pockets of stream bank that could be safely accessed by river kayak during sufficiently low flows. Thus, subsequent pulse releases of RWT dye were undertaken on 12 February 2024 from sites 1910m and 2050m downstream of Mangaone Stream confluence. These locations are closer to the proposed discharge location Option C.

All dye releases at the Longburn sites (1800m, 1910m and 2050m) were from the true right bank (western side), but access to these sites was by kayaks crossing the river from the gravel beach on the true left side of the river (eastern side).

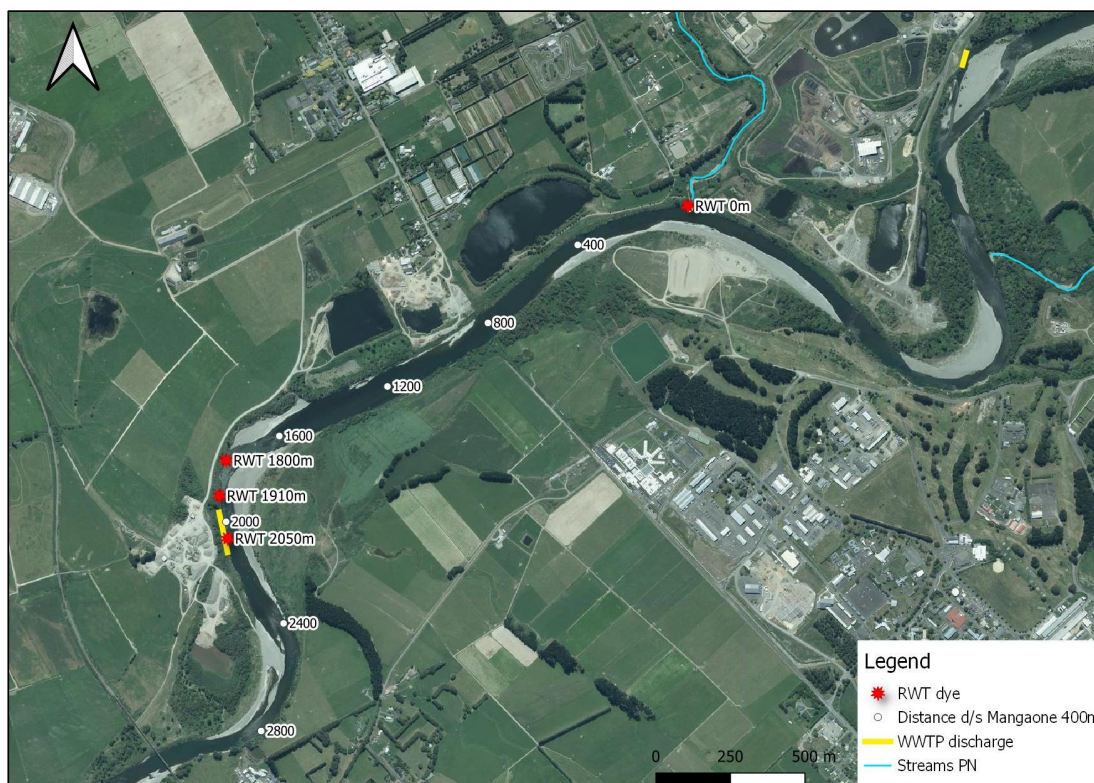


Figure 2.1: Location of RWT dye releases to the Manawatū River labelled as distance measured downstream of the Mangaone Stream confluence. The current WWTP discharge is about 2.3km upstream of Mangaone Stream confluence and the proposed discharge (Option C) is about 2km downstream.

2.3 Qualitative assessment: Pulse release of dye

2.3.1 Field observations

The qualitative assessments of mixing were undertaken by releasing a bolus of Rhodamine WT (**RWT**) dye into the river and observing the dispersion of the dye along the river using a drone to take aerial photographs and video images.

The pulse release of dye was undertaken at the following locations and times:

- Mangaone Stream confluence with the Manawatū River on 25 January 2024 (Manawatū River flow at 24.4 m³/s). The dye was release into the Mangaone Stream just upstream of the confluence with the Manawatū River.
- Manawatū at Longburn 1800m downstream of Mangaone Stream confluence on 25 January 2024 (Manawatū River flow at 24.4 m³/s).
- Manawatū at Longburn 1800m downstream of Mangaone Stream confluence on 26 January 2024 (Manawatū River flow at 22.5 m³/s). Surplus dye solution from the quantitative assessment was released as a bolus. A series of about 200 overlapping, vertical aerial photos

were taken along the river and merged into a composite, ortho-corrected aerial photo of the site².

- Manawatū River at Longburn 1910m downstream of Mangaone Stream confluence on 12 February 2024 (Manawatū River flow at 23.7 m³/s).
- Manawatū River at Longburn 2050m downstream of Mangaone Stream confluence on 12 February 2024 (Manawatū River flow at 23.7 m³/s).

The amount of dye released was estimated to ensure sufficient concentration to observe the dye after full mixing. Three pounds (1.36 kg) of RWT dye was used for the first dye release to the Manawatū River at Longburn on 26 January 2024. Subsequently, two pounds (0.91 kg) of RWT dye³ was used for the pulse release studies, which was sufficient when the Manawatū River was flowing between 22 m³/s and 24 m³/s.

2.3.2 Analysis

Aerial images were examined to delineate the extent of dye plume until the location where it was fully mixed across the river. Full mixing was determined when the aerial images showed a uniform dye colour extending across the river width to the true left bank (i.e. the opposite side to which the dye was released).

The location was identified where full mixing occurred. The linear extent of dye mixing across the river was identified for locations relevant to defining a reasonable mixing zone as defined in the One Plan (Appendix 2), i.e. 200m downstream of the dye release, and at the upstream end of the first gravel beach on the true right of the river (i.e. an area sensitive to periphyton growth from nutrient enrichment).

A bolus of dye released into a river moves rapidly in the fast-flowing water of the main river flow, but takes more time to mix within slow moving backwaters and in shallow water along the river edge. Conversely, dye within backwaters lingers for longer after the dye in the main flow has cleared. This time-lag for dye to mix in slow water was accounted for when delineating the dye plume by integrating the dye coverage from aerial images taken at different times. In particular, shallow water and backwaters on the true right bank that didn't have visible dye as the main plume went past, were still considered to be within the plume because the dye eventually mixed within these areas, albeit over a longer period of time. This time lag is a feature for pulses of dye but is not a characteristic of a continuous discharge - which achieves a steady state.

Mixing was approximated at fixed locations by calculated mixing through cross-sectional area of the water column. The percent of dye mixing through the cross-sectional area was calculated by graphing nearby river bed cross-sections, integrating the area below water level across the river width and across the width that the dye extended, and dividing the area below the dye by the total cross-sectional area. The cross-sections of the Manawatū River downstream of Palmerston North had been previously surveyed by Horizons Regional Council (**Appendix 3**). In some cases, a cross-section was not available in the exact location of interest, and the closest cross-section was used. In particular, the river cross-section from the 1.96 km mark was used as a proxy for cross-sections at the 2.1km and 2.2 km marks as the main channel remained close to the true right bank. The cross-sectional area mixing at c. 2.2 km was used to approximate mixing at the upstream end of the gravel beach at 2.23 km, because the river morphology at 2.2km more closely resembled the morphology at the cross-section site (1.96 km mark), i.e. deep water close to the right-bank.

² The extent of dye in this image is more spread-out than in the individual aerial photos because it incorporates images taken over a slightly longer period of time.

³ Bright Dyes Fluorescent FWT powder formulation with 20% as rhodamine.

Estimates of mixing through the river cross-sectional area do not account for water velocity, so will underestimate dilution where the main river flow was on the true right – the side on which dye was released. Thus, estimates of mixing between the 1.8 km and 2.25 km mark are likely to underestimate dilution.

2.4 Quantitative assessment: Continuous dye release

2.4.1 Field measurements

A quantitative assessment of mixing in the Manawatū River at Longburn (1800m downstream of Mangaone Stream) was undertaken on 26 January 2024, when the Manawatū River flow at Teachers College was 22.5 m³/s.

This involved a continuous release of RWT dye over about 1.5-hour period to achieve a steady state, and using a fluorometer to measure the dye concentration along multiple transects across the river width.

The dye was released from a 15-litre sealed reservoir modified to act as a Mariotte container so as to provide a constant head. The dye was mixed in batches and the reservoir refilled when the dye solution dropped to near the level of the air intake. The flow rate of dye was measured and checked using a rotameter. The dye was released at a rate of about 300mL/minute. The dye was released for about 45 minutes before measurements started, but there was some variability in the release rate during this period of stabilisation.

The RWT dye concentrations in the river were measured using a YSI EXO1 datalogger with total chlorophyll-*a* sensor. Measurements were made across the river width from a whitewater kayak, with a safety boat nearby. Data was logged at one second intervals with rapid averaging (about a three second average). The location of each measurement was measured using a GPS tracker taking measurements at one second intervals. Times on the meter and GPS tracker were synchronised, and the time stamp was used to match measurements with locations.

During the study the measured background concentrations in the river of total algae were about 0.15 RFU (range 0.11 – 0.22 RFU).

Vertical mixing is very rapid in shallow rivers like the Manawatū, so surface samples are adequate for determining depth average concentrations unless very close to the outfall/dye release (Rutherford et al 1997). This was confirmed by field observations.

2.4.2 Analysis

The dye concentration was expressed as a ratio of the fully mixed concentration (C/C_{mixed}). A ratio less than 1 denotes concentrations that are lower than the fully mixed concentration, a ratio greater than 1 denotes concentrations higher than the fully mixed concentration.

3 Results

3.1 River Morphology

3.1.1 Mangaone Stream to Longburn

The Mangaone Stream enters the Manawatū River from the true right, on the outside of a gently sweeping left hand bend. The main channel of the river hugs the true right for about 550m, after which the main channel shifts towards river left, to be mid-river by 750m and close to the left bank by 950m downstream of Mangaone. At 1.3km the riverbed cross-section is flatter, and at 1.5km downstream the river channel narrows before forming fast flowing rapids between about 1.6 and 1.77 km downstream of the Mangaone Stream (**Figure 2.1, Appendix 3**).

3.1.2 Longburn

About 1.6 km downstream of Mangaone the Manawatū River channel narrows and forms fast flowing rapids. At 1.8 km downstream of Mangaone the river and baseflow flow channel bends sharply to the left. Strong horizontal back-eddies and turbulent currents occur on the bend to promote rapid mixing. From about the 1.8km to 2.1km mark, the main river channel flows along the true right bank. After this the main channel shifts towards the true left, and flows along the true left bank from about 2.4 km to 2.9km mark. Over this reach the river takes a sweeping bend to the right, with swift, deep water flowing near overhanging willows until about the 2.6 km location (**Figure 2.1, Appendix 3**).

At about 3km downstream of Mangaone the main river channel starts to shift again towards the true right and is mostly flowing against the true right at the rail bridge, 3.15 km downstream of Mangaone Stream.

3.2 Manawatū River at Mangaone Stream

RWT dye was released to the Mangaone Stream at its confluence with the Manawatū River. Initially the dye from the Mangaone Stream stayed relatively close to the true right bank, and by 200m downstream extended across c. 44% (24m/55m) of the Manawatū River width. By 400m downstream that dye extended across c. 55% of the river width, corresponding to 75% mixed through the cross-sectional area.

Transverse mixing increased as the main flow channel moves across to the left side of the river at 550m downstream. The dye from Mangaone Stream extended across c. 95% (64m/67m) of the river width by 1150m downstream of the confluence, corresponding to 92% mixed through the cross-sectional area. The 3m edge without dye was shallow water and the lack of dye may have been a lag in the mixing (**Figure 3.1 to Figure 3.3**).

Gravel beaches previously used for aquatic macroinvertebrate monitoring are located at about 1450m to 1700m downstream of Mangaone Stream confluence. At low river flow, the water from the Mangaone Stream is expected to be fully mixed with the Manawatū River by the time it reaches these gravel beaches at Longburn.



Figure 3.1: Dye release from Mangaone Stream to Manawatū River (facing downstream) on 25 Jan 2024.

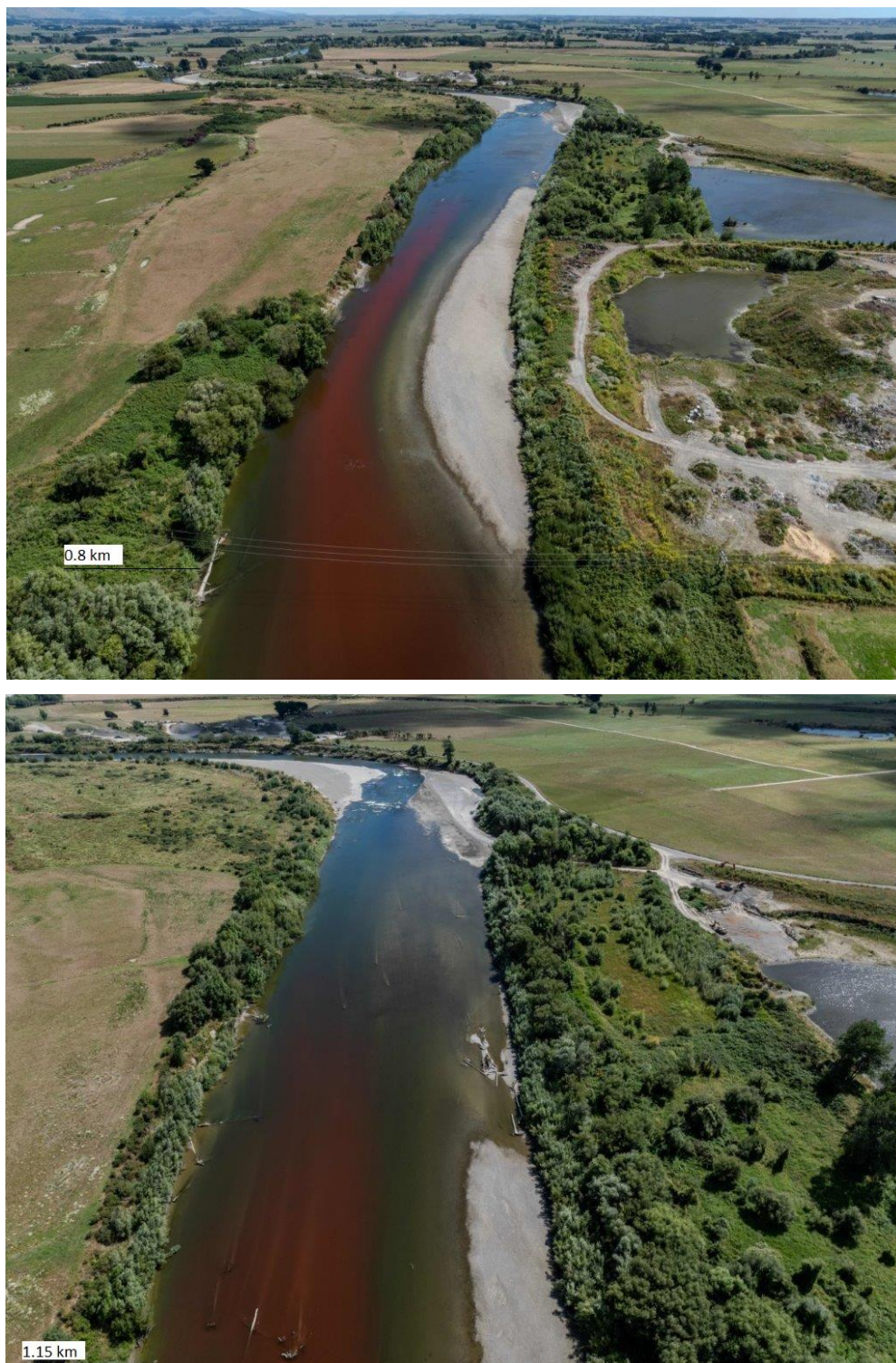


Figure 3.2: Dye release from Mangaone Stream to Manawatū River facing downstream and facing upstream (25 January 2024).

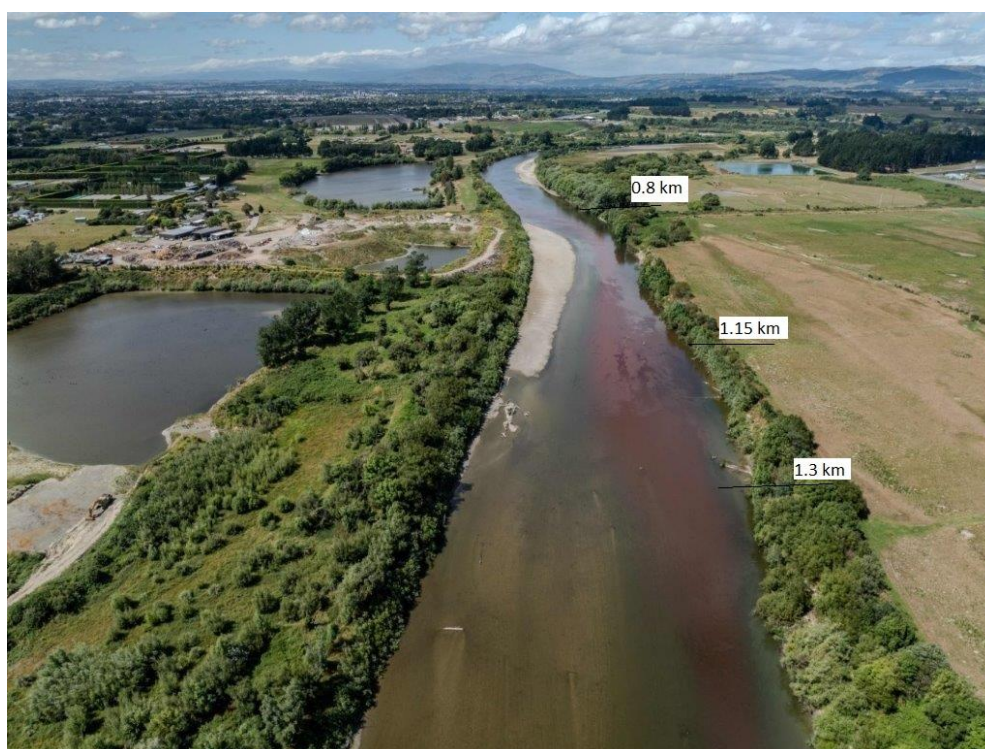


Figure 3.3: Dye release from Mangaone Stream to Manawatū River facing upstream (25 January 2024). By 1.15km downstream the dye extends 95% across the river; clear water on the true right (left side of this photo) is due to a delay in the dye pulse mixing within slow moving, shallow water.

3.3 Manawatū River at Longburn, dye release at 1.8 km mark

3.3.1 Pulse release of dye

RWT dye was released to the Manawatū River from the true right bank at the Longburn site, 1.8 km downstream of Mangaone Stream. The dye extended across nearly the full width of the river at 200m downstream of the release (2.0 km mark), and was fully mixed across the river by the top of the gravel beach at the 2.23 km mark (**Figure 3.4** to **Figure 3.6**). The dye took longer to mix in the slow, shallow water near gravel beaches and it lingered for longer in the slow-moving water after the main pulse of dye had passed.

There was rapid mixing in the first 60m (1.8 km to 1.86 km), this was due to the strong turbulent currents where the river takes a hard left turn near the 1.8 km mark. It was also due to a small promontory at about 1.86 km, that pushed the flow leftward, and caused horizontal back eddies and helical secondary currents that promote transverse mixing.

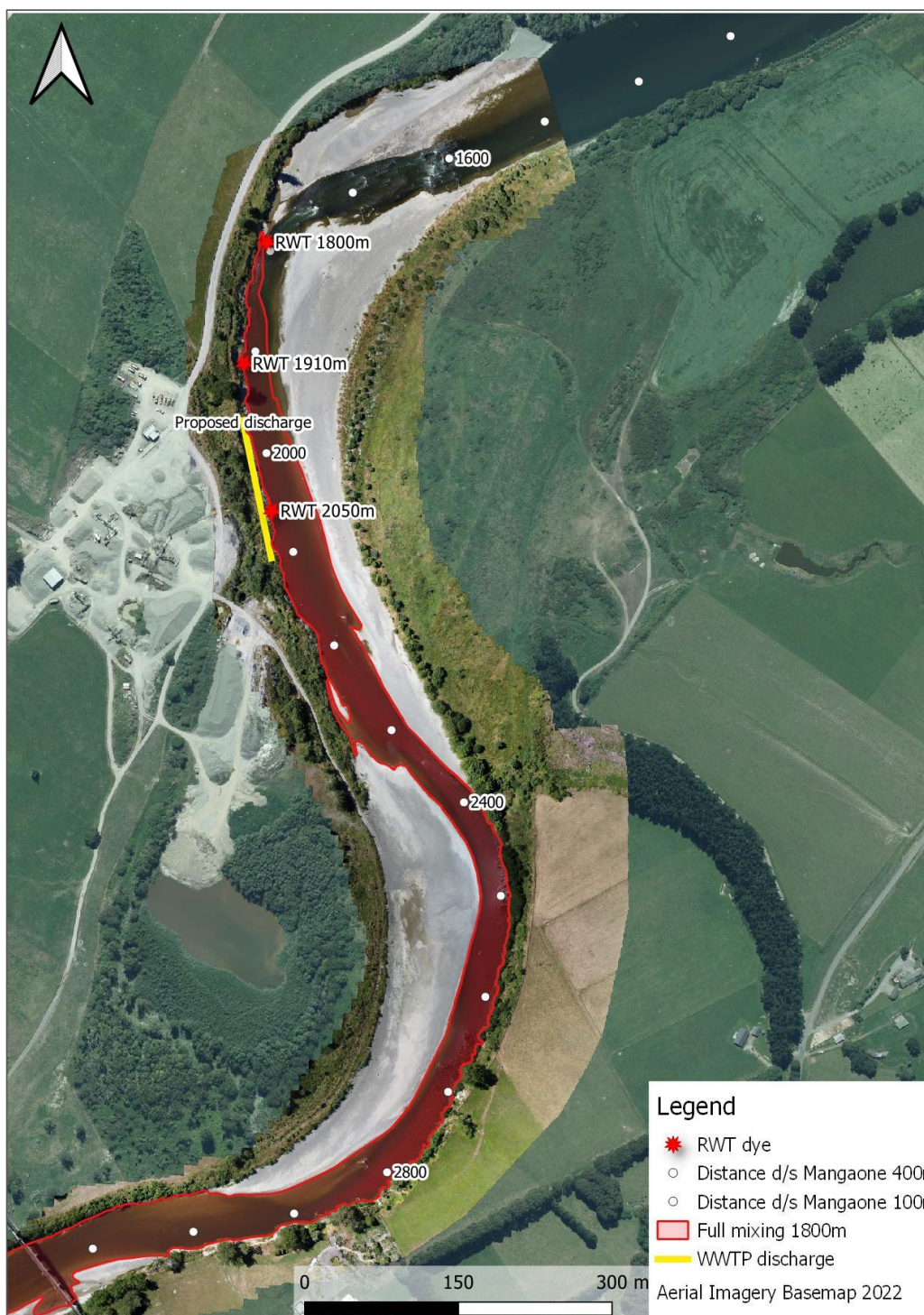


Figure 3.4: Mixing extent for dye released to the Manawatū River at Longburn at the 1.8 km mark. The image shows a dye release on 26 January 2024 when Manawatū River flows were $22.5 \text{ m}^3/\text{s}$. Full mixing occurred within 200m of the discharge.



Figure 3.5: Manawatū Longburn facing downstream after dye release from the location 1.8km downstream of Mangaone (25/1/2024). The top photo shows a small promontory at the 1.86km mark directing the current leftward. Both photos are taken within 5 minutes of the dye release.



Figure 3.6: Manawatū Longburn facing upstream after dye release from the 1.8km mark (25/1/2024). There is close to full mixing by 200m downstream of the dye release (2.0 km mark). Photos were taken about 15-minutes after the dye release.

3.3.2 Continuous release of dye

Continuous release of RTW dye to the Manawatū River at Longburn (1800m downstream of Mangaone Stream) was undertaken on 26 January 2024. The concentration of RTW dye was measured with a fluorometer at multiple profiles across the river width. The results support the observations from aerial photos but provide a more detailed understanding of dilution.

At 220m downstream (2.1km mark) the dye had extended the full width of the river. The dye concentrations on the true right of the river (including most of the river flow) were about 1.2 times fully mixed over a width of about 20m; the dye concentrations on the true left of the river 10m of river (with slower, shallower water) had dye concentrations about 0.7 time fully mixed. The occasional outlier readings should be interpreted with caution (**Figure 3.7**).

At 500m downstream of the discharge, near the top of the gravel beach, the dye was relatively evenly spread across the river width and C/C_{mixed} was close to 1 (indicating full mixing). The shallow water within about 2m of the true left still had slightly lower concentrations. The dye concentration in the shallow backwater on river right was highly variable, and this may be because the period of dye release before measurements began was not sufficiently long or stable to ensure all sections of the river had achieved steady state.

By 910m downstream of the discharge the main flow had shifted to the true left of the river; the dye was still relatively evenly spread across the river width, but there were slightly lower concentrations in the shallow water on the true right.

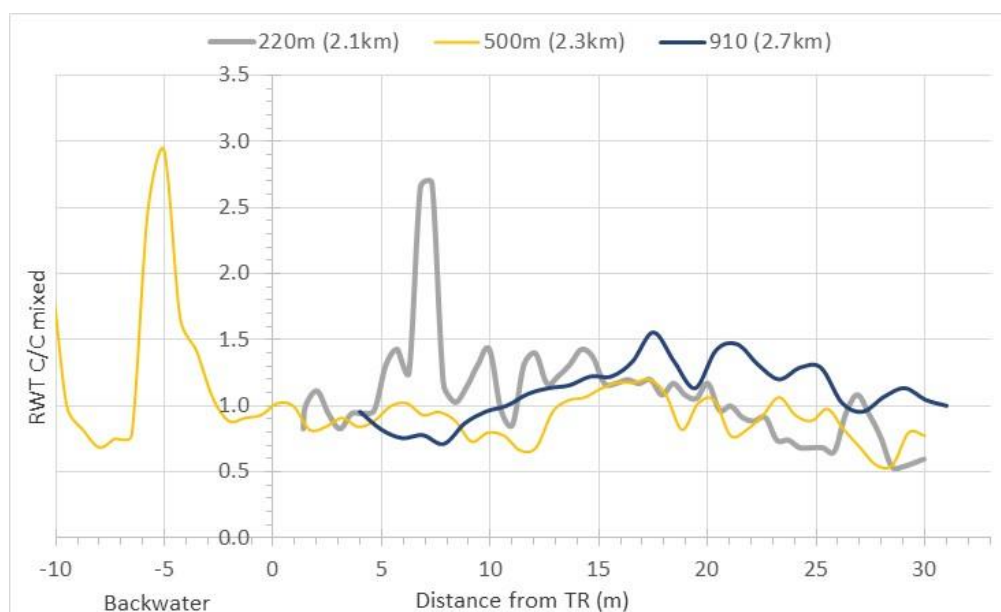


Figure 3.7: RWT dye concentrations across the Manawatū River during a continuous dye release from the 1.8km mark (26/1/2024).

3.4 Manawatū River at Longburn, dye release at 1.91 km mark

RWT dye was released to the Manawatū River from the true right bank at the Longburn site, 1.91 km downstream of Mangaone Stream. By 200m downstream of the dye release location (2.1 km mark), the dye extended 43% (21m/48m) across the river width, corresponding to 71% mixed through the river's cross-sectional area.

At the 2.2 km mark, the dye extended 56% (21.5m/38m) across the river width, corresponding to 79% mixed through the river's cross-sectional area. At the top of the gravel beach, at the 2.23 km mark, the dye extended 66% (29m/44m) across the river width.

The dye was fully mixed across the river after a log jam at the 2.5 km mark. This log jam on the true left bank caused horizontal back eddies, helical secondary currents that assisted mixing, but the dye was already close to fully mixed about upstream of this log jam. In the absence of the log jam the mixing would likely occur closer to about 2.3km – assisted by fast flows on the outside bend (**Figure 3.8 to Figure 3.10**).

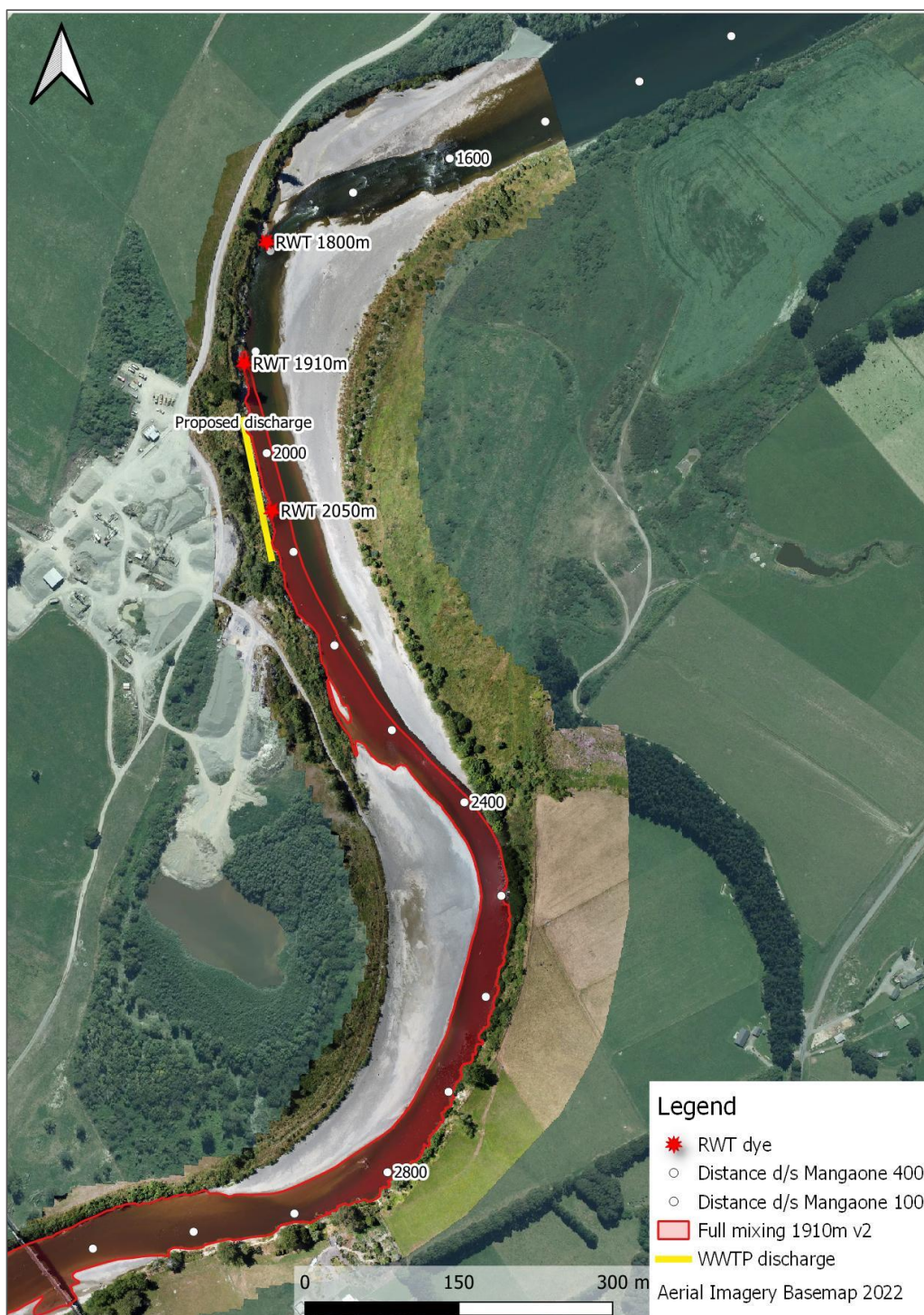


Figure 3.8: Mixing extent for dye released to the Manawatū River at Longburn at the 1.91 km mark. Full mixing occurred within 590m of the discharge.



Figure 3.9: Manawatū River at Longburn facing downstream after dye release on 12/2/2024 from the location 1.91km downstream of Mangaone.



Figure 3.10: Manawatū River at Longburn facing downstream. Dye released at 1.91km downstream of Mangaone on 12/2/2024 resulted in full mixing at the 2.5 km mark.

3.5 Manawatū River at Longburn, dye release at 2.05 km mark

RWT dye was released to the Manawatū River, from the true right bank at the Longburn site, 2.05 km downstream of Mangaone Stream. At the 2.2 km mark, the dye extended 35% (13.5m/38m) across the river width, corresponding to 59% mixed through the river's cross-sectional area.

By 200m downstream of the dye release location, at the top of the gravel beach (2.23 km mark), the dye extended 39% (17m/44) across the river width.

The dye was fully mixed across the river after a log jam at the 2.5 km mark. This log jam on the true left bank caused an eddy and turbulence that assisted mixing. In the absence of the log jam the mixing would likely occur closer to about 2.6km – assisted by fast flows on the outside bend (**Figure 3.11 to Figure 3.13**).

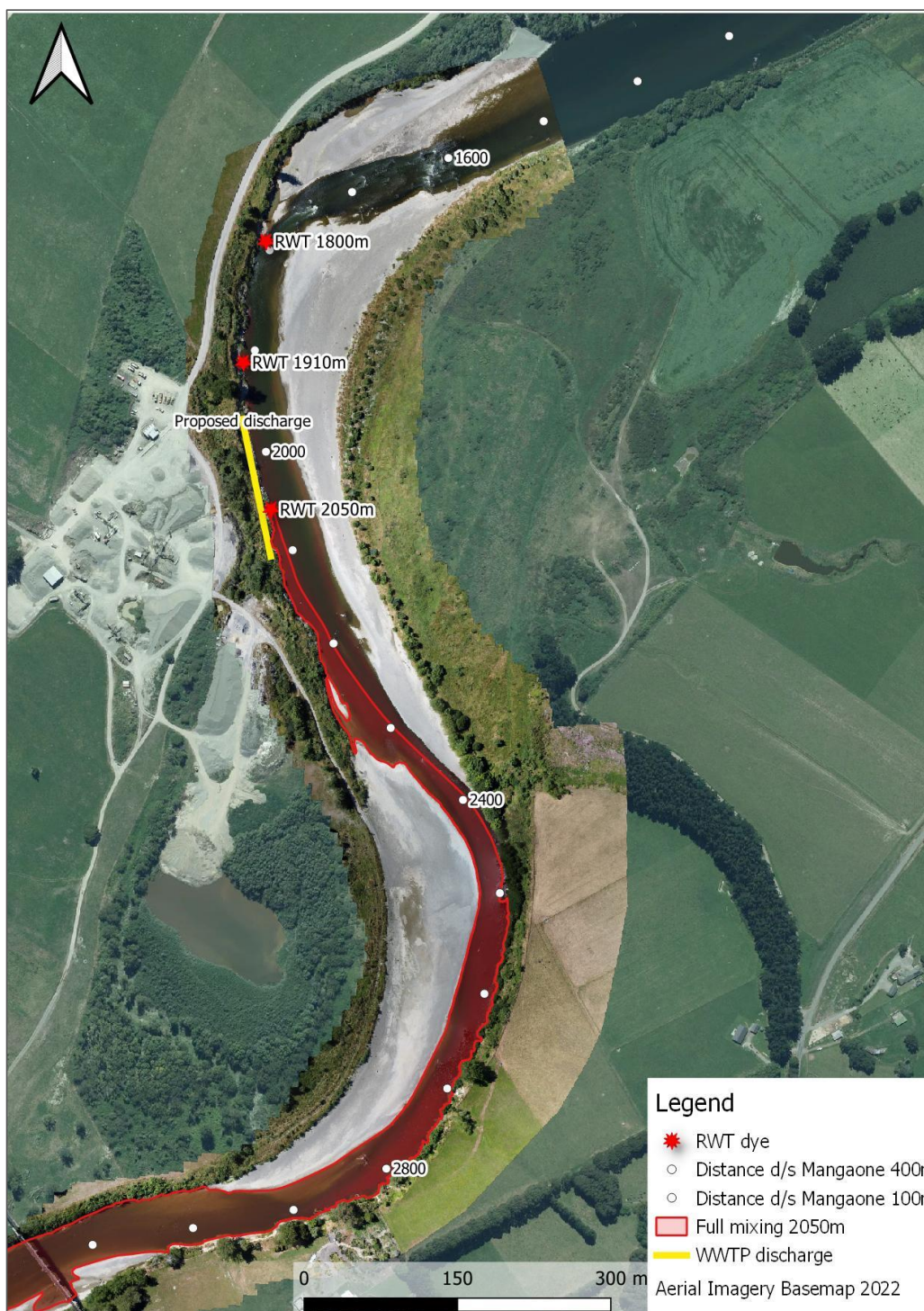


Figure 3.11: Mixing extent for dye released to the Manawatū River at Longburn at the 2.05 km mark. Full mixing occurred within 590m of the discharge.



Figure 3.12: Manawatū River at Longburn facing upstream towards the dye release site at the 2.05km mark (upper), and the location of full mixing at the 2.5 km mark (lower).



Figure 3.13: Manawatū River at Longburn facing downstream. Dye released at 2.05km downstream of Mangaone on 12/2/2024 resulted in full mixing at the 2.5 km mark.

4 Discussion

4.1 Mixing

The RWT dye releases to the Manawatū has helped characterise mixing during periods of low river flow. The Mangaone Stream enters the Manawatū River on a gentle outside bend. The river is relative straight and has a low gradient over this section, and the Mangaone Stream takes about 1.2 km to fully mix across the Manawatū River water.

Downstream of Longburn, the gradient of the Manawatū River is steeper and it has more bends that promote transverse mixing. There was particularly rapid mixing in the 60 m section from 1.8 km to 1.86 km due to strong turbulent currents where the river takes a hard left turn near the 1.8 km mark, and where fast water passes a small promontory at about 1.86 km that pushed the flow leftward. Dye released at the 1.8 km mark was nearly fully mixed across the river within 200m of the discharge. Fluorometer measurements during the continuous dye release found that at 200m mark, the shallow water margin along the true left had lower concentrations than within the main flow, but by 500m downstream (2.3 km mark) the dye concentration was relatively evenly spread across the river width.

Dye released at the 1.91 km mark was about 71% mixed within 200m (2.1 km mark), and 79% mixed through the river cross-section at 2.2 km mark - just upstream of the gravel beach.

Dye released at the 2.05 km mark was about 59% mixed through the river cross-section at the 2.2 km mark, which was about 170m downstream of the discharge and just upstream of the top of the gravel beach (2.23 km mark). The dye released from both the 1.91 km mark and 2.19 km mark was fully mixed by the 2.5km mark. The mixing at this location was enhanced by a log jam.

These estimates of mixing along the section of river between 1.8 km and 2.25 km will underestimate dilution from a continuous discharge because they do not account for faster river velocities within the main channel against the true right bank.

4.2 Mixing at Longburn compared to the current discharge at Palmerston North

The mixing of the current WWTP discharge with the Manawatū River at Palmerston North is described in Rutherford et al. (1997) and summarised in **Appendix 1**. Contaminants were just measurable on the true left bank at a distance of 850m downstream of the discharge. However, the wastewater was not fully mixed across the river until after the bend about 1.2 km to 1.4 km downstream of the discharge.

In contrast, this study found considerably faster mixing in the Manawatū River along the reach downstream of Longburn. Dye released from the 1.8 km mark was easily detected across the full width of the river at about 200m downstream and was fully mixed across the river by 500m downstream and quite likely sooner. Dye released from the 1.91 km mark and 2.05 km was easily detected across the full width of the river at about 600m and 280m downstream of the discharges respectively (although a log jam in the river assisted this mixing).

4.3 Reasonable mixing zone

For a discharge to the Manawatū River near Longburn, the One Plan definition of a reasonable mixing zone would be either *“200 metres from the point of discharge”*, or *“a distance for reasonable mixing determined as appropriate for a consent application where special circumstances apply”* (**Appendix 2**).

This report has assessed the extent of mixing at both these locations. The location most ecologically relevant for assessing “reasonable mixing” for the proposed discharge near Longburn is the upstream end of the gravel beach on river right, located at the 2.23 km mark during low river flow (e.g. 24 m³/s). At higher flows this beach starts at about the 2.33 km mark.

This gravel beach is a focus because it is the closest location on the true right where the habitat is suitable for extensive periphyton growth. While the proposed upgrade to the wastewater scheme will substantially improve the wastewater quality, the discharge may still have higher nutrient concentrations (e.g. nitrate) compared to upstream river water during periods of low flow. Higher nutrient concentrations increase the risk of periphyton growth, and this risk can be reduced with greater mixing/dilution to further reduce nutrient concentrations prior to the gravel beach.

4.4 Changes in mixing at higher flows

The water quality modelling undertaken for the AEE assumed that the discharge would be 67% mixed at the edge of the zone of reasonable mixing when the river is less than half median flow, and 80% mixed at flows between half median and median. This report assessed mixing in the Manawatū under low flow conditions, so it is pertinent to consider how the mixing rate might change at higher flows.

Rutherford et al. (1997) found that for the Manawatū River at Palmerston North, mixing in straight parts of the channel increased with flow (from 30 m³/s to >80 m³/s), while the mixing rate at bends either did not change with flow (on sharp bends) or decreased (on more gentle bends). At low flows the mixing at Palmerston North was considerably higher at bends than along the straight and uniform parts of the channel (as observed at Longburn), while at high flows there was no significant difference in mixing rate between straight parts of the channel and bends (**Appendix 1**).

The effect of flow on the mixing rate at bends and along straight parts of the Manawatū River will very likely be similar at Longburn as Rutherford et al (1997) found at Palmerston North. Assuming this is the case, an increase in river flows (from about 24 m³/s to 80 m³/s) is likely to result in the following changes to mixing in the Manawatū River downstream of Longburn:

- Negligible change in the mixing rate on the bend at 1.8 km,
- Considerable increase in mixing rate on the straight reach between about 1.81km and 2.4 km;
- A possible decrease in the mixing rate between about 2.55 km and 2.85 km, but still retaining similar mixing to the straight sections at high flows.
- Overall, for a discharge to the Manawatū River located between 1.8 km and 2.1 km, a higher river flow is likely to improve the rate of mixing.

Based on this analysis, it is reasonable to assume 67% mixing would be achieved before the gravel beach at both low flows and high flows, so long as the new discharge is located in the upstream third of the reach indicated by Option C. However, achieving 80% mixing before the gravel beach at flows greater than half-median, may require locating the discharge upstream of the 1.91 km mark.

Changes in mixing with flow is different from changes in dilution. Dilution refers to the relative contribution of a discharged contaminant to that in the river. For a constant discharge the amount of dilution increases with river flow. The water quality effects of the proposed WWTP discharge after dilution has been predicted using the Point SIM model (Aquanet Consulting 2022).

5 Conclusions

The mixing characteristics of the Manawatū River was assessed near the proposed new discharge location for the upgraded Tōtara Road Wastewater Treatment Plant. Rhodamine WT dye was released into the Mangaone Stream at its confluence with the Manawatū River, and at three locations on the Manawatū River near Longburn, near the proposed discharge location (Option C). The work was undertaken during low flow conditions (about 24 m³/s). All dye was released from the true right of the river and locations were expressed as distance downstream of Mangaone Stream confluence.

The work indicated that during periods of low flow (c. 24 m³/s):

- The Mangaone Stream was about 92% mixed with the Manawatū River by 1.15 km downstream of the confluence, and fully mixed with the Manawatū River before the gravel beaches at 1.45 km to 1.7 km downstream of Mangaone Stream confluence. These gravel beaches have previously been used for aquatic macroinvertebrate monitoring, and are likely to be suitable as upstream monitoring sites for the proposed discharge location.
- Dye released to the Manawatū River at Longburn from the 1.8 km mark had very rapid mixing within the first 60m (1.8 km to 1.86 km mark). By 200m the dye extended nearly the full width of the river but fluorometer measurements indicated that the main flow had concentrations about 1.2 times fully mixed. By 500m (at the next gravel beach downstream of the discharge) the dye was evenly mixed across the full river width.
- Dye released to the Manawatū River at Longburn from the 1.91 km mark was about 71% mixed within 200m (2.1 km mark), and over 79% mixed by the top of the gravel beach (2.23 km mark). The dye was fully mixed across the river at the 2.5 km mark.
- Dye released to the Manawatū River at Longburn from the 2.05 km mark was more than 59% mixed within 200 m and the top of the gravel beach (2.23 km mark). The dye was fully mixed across the river at the 2.5 km mark.

The water quality modelling undertaken for the AEE assumed that the discharge would be 67% mixed at the edge of the zone of reasonable mixing when the river is less than half median flow, and 80% mixed at flows between half-median and median. It is reasonable to assume 67% mixing would be achieved at both low flows and high flows, so long as the new discharge is located in the upstream third of the reach indicated by Option C. However, to have reasonable certainty of achieving 80% mixing before the gravel beach at flows greater than half-median, would likely require locating the discharge upstream of the 1.91 km mark.

There was more rapid mixing at the upstream end of the reach (closer to 1.8 km mark) than further down the reach. Locating the discharge between the 1.8 km and 1.9 km marks would considerably increase the amount of mixing achieved before the first gravel beach on river right, and reduce the nutrient concentrations at the upstream end of this gravel beach.

References

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Appendix 1: Mixing at the current discharge location

Mixing in the Manawatū River at Palmerston North

The Tōtara Road Wastewater Treatment Plant (**WWTP**) currently discharges to the Manawatū River via rock outfall 2.3km upstream of the Mangaone Stream confluence. Hamill (2013) used electrical conductivity as a tracer to calculate dilution factors as the treated wastewater from the WWTP progressively mixed with the Manawatū River. This found that during low flows, the treated wastewater was 60% to 90% mixed at 800m downstream of the discharge.

Similarly, Rutherford et al. (1997) found that at 900m downstream of the discharge (on the true right bank) the total ammonia concentrations were 1.6 times higher than when the discharge is fully mixed – suggesting the wastewater was about 67% mixed. Contaminants were just measurable on the true left bank at a distance of 850m downstream of the discharge. However, the wastewater is not fully mixed across the river until after the bend about 1.2 km to 1.4 km downstream of the discharge.

Initially, the treated wastewater mixes vertically and then transversely with the river water so that by 250m downstream of the discharge the wastewater plume extends about 30% of the river width, with maximum concentrations on the true right bank corresponding to the effluent being about 50% mixed. Mixing is rapid in the first 250m because the outfall is located on a bend where secondary currents are generated which accelerate traverse mixing.

The channel is fairly straight from 200-1200m downstream of the discharge and in this part the channel transverse mixing is moderately low. At 1200-1300m below the current outfall the river flow converges near the left bank into a narrow channel where the river bends sharply to the right. Strong horizontal back-eddies and secondary currents occur on the bend to promote rapid mixing. Full mixing occurs by about 1400m downstream of the discharge (Rutherford et al. 1997).

Comparison of mixing with flow

Rutherford et al. (1997) compared the effects of river flow on mixing rates in the Manawatū River at Palmerston North. They compared mixing at two different flows (30 m³/s and 80-100 m³/s) along river reaches with a 'straight uniform channel' compared to bends. At low flows the mixing was considerably higher at bends than in the straight and uniform parts of the channel. This was consistent with observations that at the bends the channel narrowed and deepened, the flow converged and strong secondary currents occurred.

On sharp bends there was no significant difference in mixing between the two flows, while on a gentle bend the mixing rate was less at the higher flow. In contrast, on the straight uniform part of the channel, the mixing rate was considerably higher at the higher flows. This was consistent with higher flows generating more turbulence and the maximum size of eddies increases with increasing depth.

At the high flows there was no significant difference in mixing rate between straight parts of the channel and bends. The mixing in straight parts of the channel increased with flow, while the mixing rate at bends either did not change with flow or decreased.

Appendix 2: One Plan definition of “reasonable mixing”

The Glossary in the Horizons Regional Council One Plan defines reasonable mixing as follows:

Reasonable mixing, in relation to the discharge of contaminants into surface water, means either:

- (a) a distance downstream of the discharge that is the least of:
 - i. the distance that equals seven times the width of the river at the point of discharge when the flow is at half the median flow, or
 - ii. 200 metres from the point of discharge or, for discharges to artificial watercourses including farm drainage canals, 200 metres from the point of discharge or the property boundary, whichever is the greater, or
 - iii. the point at which mixing of the particular contaminant concerned has occurred across the full width of the body of water in the river, or
- (b) a distance for reasonable mixing determined as appropriate for a consent application where special circumstances apply.

Appendix 3: Manawatū River cross-sections



Figure A1: Overview of Manawatu River cross-section measured by Horizons Regional Council (HRC)

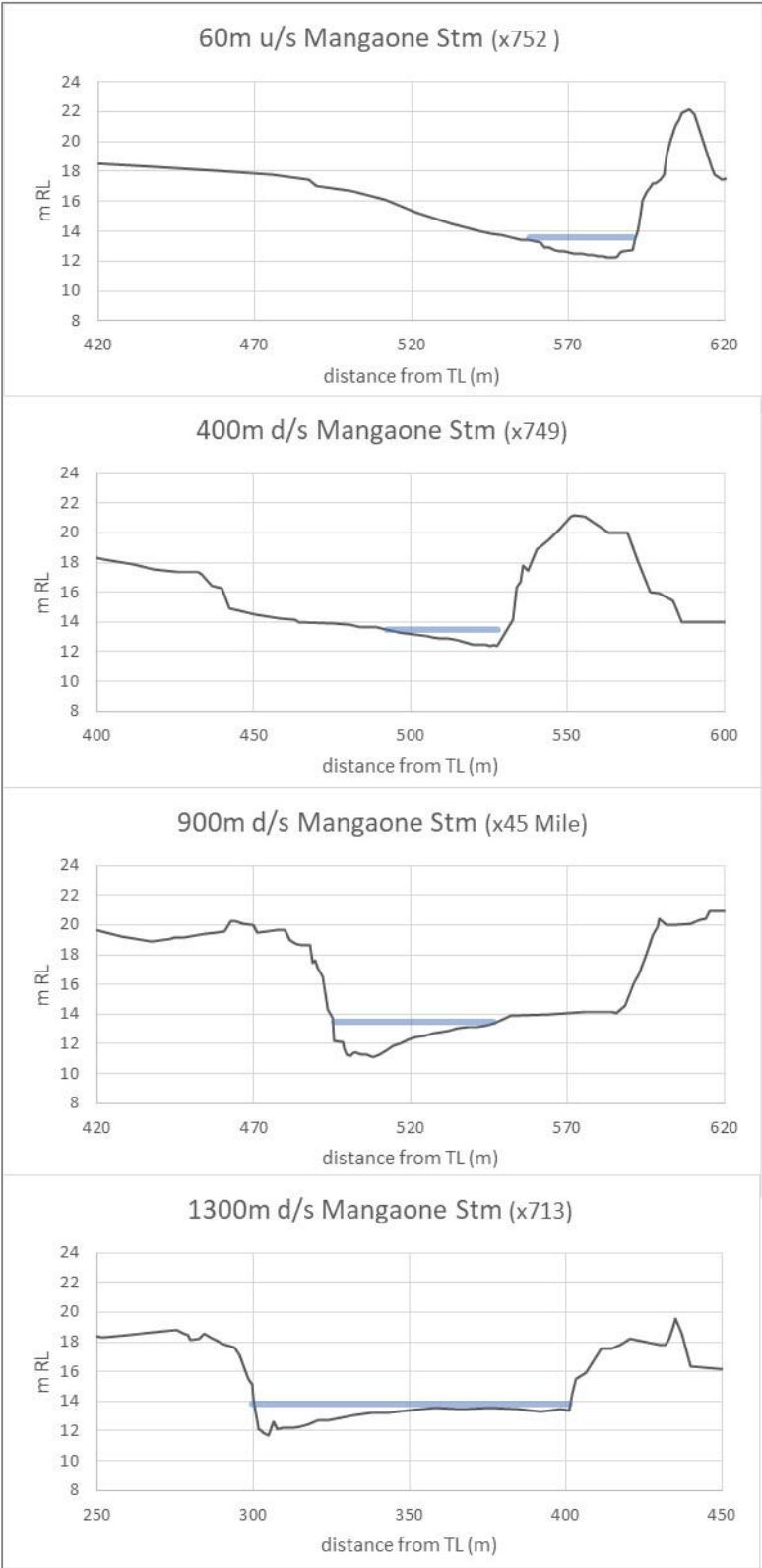


Figure A2: Manawatū River cross-section profiles between Mangaone Stream and Longburn (HRC).

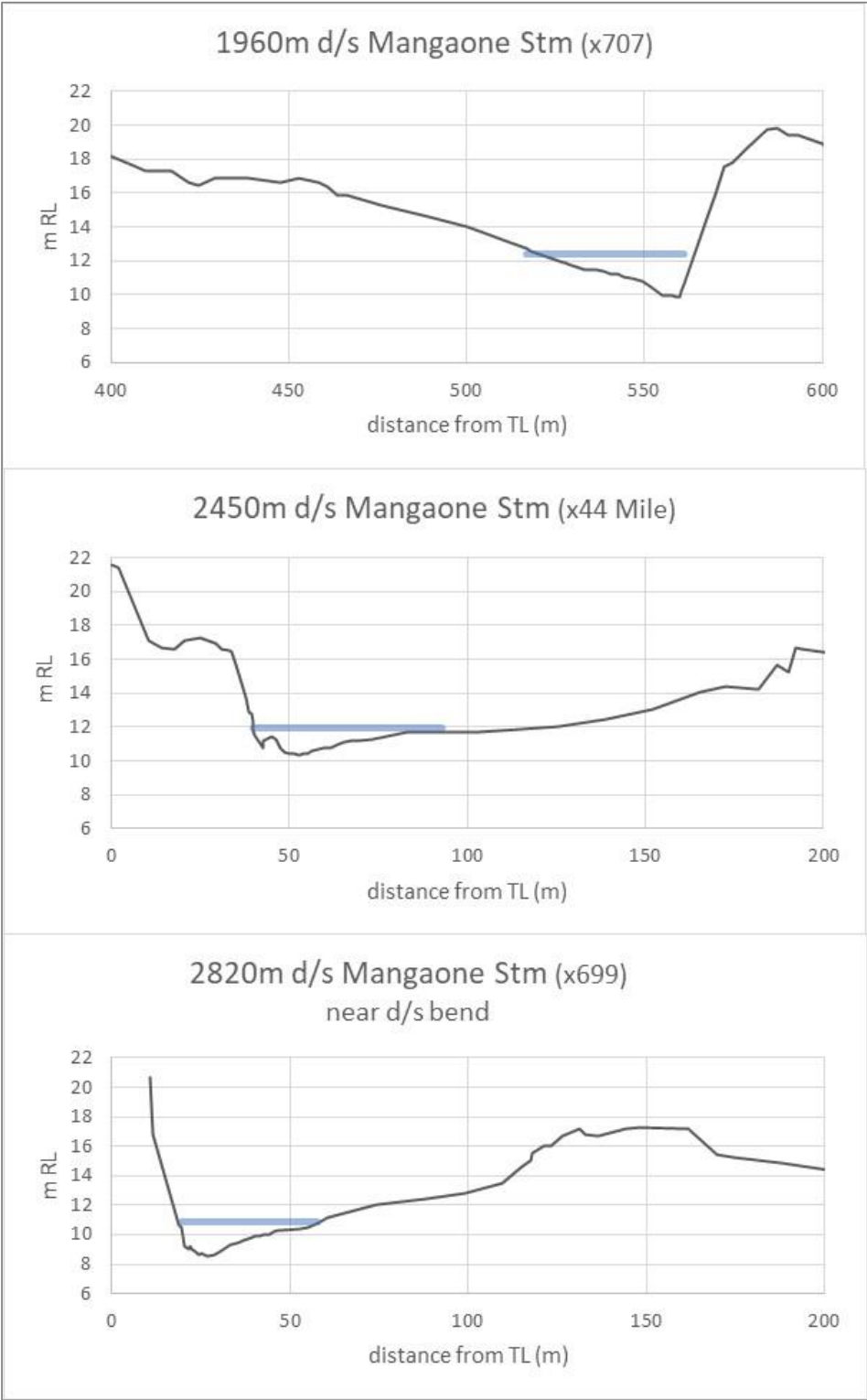


Figure A3: Manawatū River cross-section profiles between Longburn and the rail bridge (HRC).

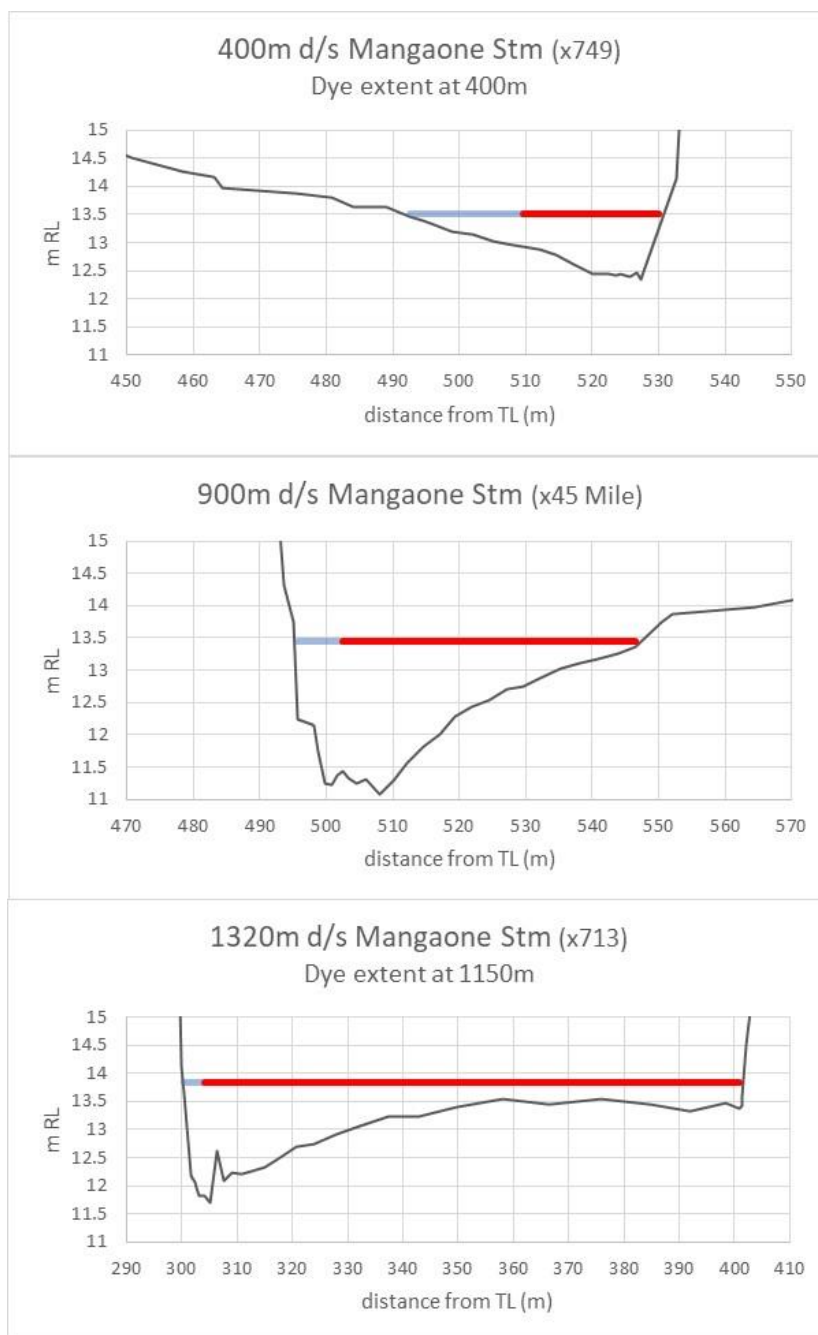


Figure A4: Manawatū River cross-section profiles used for estimating dye mixing by volume for the release from Mangaone Stream. The red line indicates the extent of dye across the river width (i.e. 51%, 85% and 95% width respectively for 400m, 900m and 1150m. The percent dye mixed by river volume was 75%, 79% and 92% respectively.

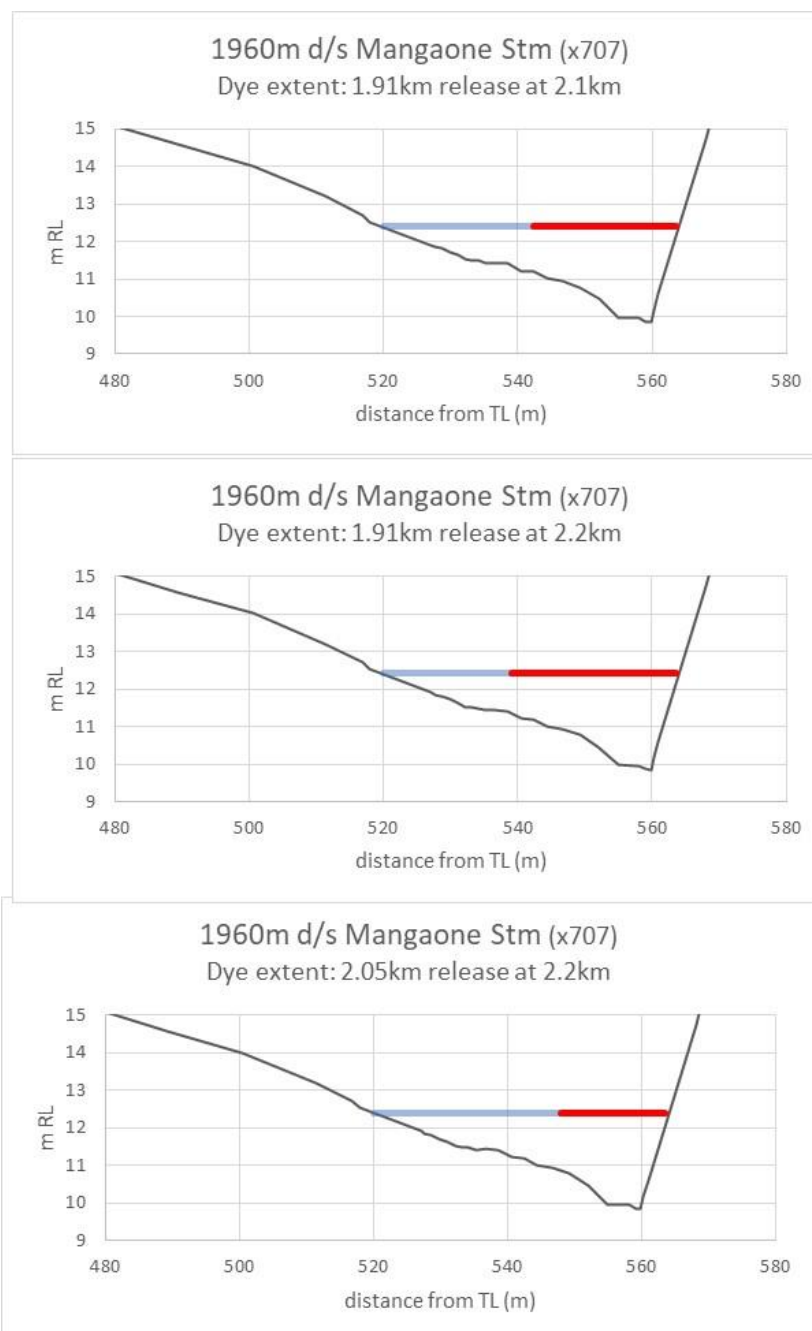


Figure A4: Manawatū River cross-section profiles used for estimating mixing by volume for releases from Longburn sites. The red line indicates the extent of dye across the river width (i.e. 43%, 56% and 35% width respectively for 1.91km release at 2.1km, 1.91km release at 2.2km and 2.05km release at 2.2km. The percent dye mixed by river volume was 71%, 79% and 58% respectively.

Palmerston North City Council Wastewater Discharge Consent Application: Surface Water Quality and Ecological Values

✦ Prepared for

Palmerston North City Council

✦ April 2024



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Quality Control Sheet

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Executive Summary

Pattle Delamore Partners Limited (PDP) were engaged by Stantec New Zealand (on behalf of Palmerston North City Council) to undertake ecological assessments of four waterways in the Manawātū District (Taonui Stream, Burkes Drain, Main Drain, and Whiskey Creek). The four waterways are situated within the Area of Interest (AOI) for a large-scale municipal wastewater irrigation proposal (Nature Calls; Resource Consent application APP-2001009340.05). The objective of the assessments was to provide additional information to Horizons Regional Council, regarding the ecological condition of the watercourses. This followed a request for further information under section 92(1) of the Resource Management Act 1991.

Two sites were located on private land (Burkes Drain and Taonui Stream). Due to limited access to these sites, a simplified assessment methodology was undertaken. The following were assessed on 7 and 8 February 2024:

- ✧ Rapid Habitat Assessments (Burkes Drain and Taonui Stream)
- ✧ Stream Ecological Valuation – Habitat Assessment Methodology (Whiskey Creek and Main Drain)
- ✧ surface water quality (all sites);
- ✧ macroinvertebrate communities (Whiskey Creek and Main Drain); and,
- ✧ fish communities (competed at all sites using eDNA).

The ecological condition of the assessment sites were symptomatic of the impacts of intensive agricultural land-use, which is dominant throughout the catchment. Ecological impacts are compounded by extensive flood protection works (e.g., channel straightening and steep stop-banks). Low to marginal habitat assessment scores and degraded surface water quality (including low dissolved oxygen and elevated bioavailable nutrient concentrations) were recorded from all sites. Total ammoniacal-nitrogen concentrations measured from the Main Drain and Whiskey Creek sites exceeded the NPS-FM 2020 national 'bottom-line'.

High macrophyte cover was recorded from all sites except for Taonui Stream. This was likely resultant of the open canopy, high nutrient concentrations, and uniform flows recorded from the assessment sites. Elevated macrophyte cover has likely contributed to the low dissolved oxygen recorded from the assessment sites (i.e., because of the microbial breakdown of plant material) and would be expected to be even lower outside of daylight hours (due to elevated plant respiration).

Macroinvertebrate community indices were expectedly low for both assessment sites (Main Drain and Whiskey Creek) indicating persistent organic pollution and poor ecosystem health. Likewise, a simplified fish community was recorded from all sites, including two introduced pest taxa (goldfish and gambusia) and four native taxa (longfin and shortfin eel, inanga, and common bully). Gambusia were observed in high abundances at all assessment sites.

Overall, the assessment results indicate that historic land use and flood protection works have impacted the major waterways intersecting the AOI. Poor aquatic habitat and water quality were recorded at all sites, both of which are major factors causing the degradation of the aquatic communities recorded.

Table of Contents

SECTION	PAGE
Executive Summary	ii
1.0 Introduction	1
2.0 Methods	2
2.1 Site Selection and Descriptions	2
2.2 Aquatic Habitat	5
2.3 Surface Water Quality	6
2.4 Macroinvertebrate Community	7
2.5 Freshwater Fish Community (eDNA)	7
2.6 Guideline Values and Standards	7
3.0 Results	10
3.1 Aquatic Habitat	10
3.2 Surface Water Quality	13
3.3 Macroinvertebrate Community	15
3.4 Freshwater Fish Community (eDNA)	16
4.0 Summary of Results	17
5.0 References	19

Table of Figures

Figure 1: Overview of ecological assessment sites	4
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Table of Tables

Table 1: Ecological assessment site details	3
Table 2: Relevant freshwater quality and ecology guideline values and standards	8
Table 3: Catchment and hydrological details	10
Table 4: Rapid Habitat Assessment results	11
Table 5: Stream Ecological Valuation habitat assessment results	12
Table 6: Surface water quality results	15
Table 7: Macroinvertebrate community results	16
Table 8: eDNA survey results – freshwater fish community	17

Appendices

Appendix A: Site Photographs

Appendix B: Surface Water Quality Results

Appendix C: Macroinvertebrate Results

Appendix D: Environmental DNA Results

1.0 Introduction

Palmerston North City Council (PNCC) received a request for additional information from Horizons Regional Council (HRC) under section 92(1) of the Resource Management Act for their Resource Consent application (APP-2001009340.05).

Relevant to this document was question 2:

“The application has provided a review of the water quality and ecological information available for surface waterbodies associated with the Area of Interest (AOI). There is no surface water quality data available for Main Drain, Burkes Drain or the Taonui Stream, which appear to be the main waterways likely to be impacted by leaching from the proposed land application of wastewater within the AOI. The proposal is (Sections 2.7.2 and 3.2.3 of AEE Part 2) to require ecological sampling and monthly surface water quality monitoring for at least 12 months in waterways within or adjacent to application areas prior to implementation of land application. Information from this baseline monitoring will be important for determine if there are any notable ecological values within these waterways. Please provide additional information of the quality of the values within these main waterways (Main Drain, Burkes Drain and the Taonui Stream) to understand the effects of the discharge on these waterways.”

PDP provided an initial memorandum to Stantec New Zealand outlining the investigative methodology required to enable a response to question 2 of the s92 request (Koning, 2023).

The purpose of this report is to outline the methodology used and interpret the results of the ecological assessment. It details the current state of the aquatic ecosystem health of the main waterways intercepting the Area of Interest (AOI) (Main Drain, Burkes Drain, Taonui Stream, and Whiskey Creek).

2.0 Methods

Ecological assessments were completed by a PDP ecologist on 7 & 8 February 2024. Assessments were completed under baseflow conditions, more than three-weeks following any major rainfall event that would have resulted in flood flows or major riverbed disturbance.

2.1 Site Selection and Descriptions

Assessment sites were targeted to sample surface water quality at Whiskey Creek, Main Drain, Burkes Drain and Taonui Stream. These were identified by HRC as the main waterways likely to be impacted by leaching from the proposed Land Application of treated wastewater within the AOI.

Taonui Stream is located in the upper catchment of Burkes Drain. Burkes Drain and Main Drain join to form Whiskey Creek, a tributary of the Manawatu River. Assessment site locations and details are presented in Table 1. Monitoring site locations are presented in Figure 1.

Each waterway passes through private land meaning access was limited by landowner approval. Approval was granted for access to Whiskey Creek at Rangiotu Road and Main Drain was accessible from the corner of Lockwood Road and Kairanga Bunnythorpe Road. Restricted access was also granted to Burkes Drain at Lockwood Road, and Taonui Stream was accessible within the public road reserve at the Rongotea Road bridge only.

All sites had suitable access to enable the undertaking of surface water quality and eDNA sampling. Bankside Rapid Habitat Assessments (RHA) were completed for the access-limited Burkes Drain and Taonui Stream sites. For the fully accessible Whiskey Creek and Main Drain sites, sampling reaches were established and additional reach-scale habitat assessments (Stream Ecological Valuation methodology), periphyton and macrophyte assessments, and macroinvertebrate surveys were completed (Table 1).

Table 1: Ecological assessment site details			
Waterway	Site Description	Coordinates (WGS84)	Reach Length (m)
Whiskey Creek	Whiskey Creek at Rangiotu Road pump station	-40.425584° 175.454999°	65
Burkes Drain	Burkes Drain at Lockwood Road	-40.375887° 175.475319°	NA
Main Drain	Main Drain at Lockwood Road	-40.369765° 175.499602°	60
Taonui Stream	Taonui Stream at Rongotea Road	-40.328945° 175.509397°	NA
Notes: 1. NA = 'not applicable'. Assessment reaches not established due to limited access.			



2.2 Aquatic Habitat

The Ministry for the Environment Data Service (<https://data.mfe.govt.nz>) was assessed to characterise catchment-scale habitat conditions for each watercourse. In-field aquatic habitat assessments were also completed. Difficult to access sites were assessed using the Rapid Habitat Assessment (RHA) protocol (Clapcott, 2015), whereas the Stream Ecological Valuation (SEV) methodology (Storey et al., 2011) was used at fully accessible sites (See Section 2.1). Photographs were taken at each site to support the interpretation of habitat assessment results (Appendix A).

2.2.1 Rapid Habitat Assessment

RHAs were completed over the visible extent of the stream from the bankside following an adaptation of the protocol in Clapcott (2015)¹. This was completed from a fixed point on Taonui Stream and across an unquantified yet accessible reach of Burkes Drain. Habitat quality was scored across ten characteristics relating to instream, stream bank, and riparian habitat. Each characteristic was scored out of ten with the sum of the scores adding to a maximum of 100².

2.2.2 Stream Ecological Valuation

SEV assessments were completed across the full reach length of assessment sites. The stream reach was divided into ten equidistant cross sections. At each transect:

- ✧ organic material and stream bed substrate composition were visually assessed at ten equally spaced points encompassing the full transect width;
- ✧ stream depth was measured at five equally spaced points encompassing the full transect width;
- ✧ a single measure of macrophyte cover and stream velocity were made; and,
- ✧ canopy shading and shading permanence (i.e., the proportion of deciduous compared to evergreen canopy) were visually assessed.

Qualitative reach-scale assessments were also completed for each site. These characterised floodplain, bankside and riparian, channel, and benthic habitat qualities.

¹ Clapcott (2015) specifies that Rapid Habitat Assessments are completed across a 20-times wetted width reach length.

² Total scores closer to 100 are indicative of 'optimum' aquatic habitat, while total scores closer to zero are indicative of highly degraded aquatic habitat.

2.3 Surface Water Quality

Spot sampling and in-situ water quality measurements were conducted at all assessment sites. The field methodology was guided by the National Environmental Monitoring Standards (NEMS) for river water quality monitoring (NEMS, 2019).

Spot water quality sampling was completed from the bank at all sites. Using a telescopic grab-arm, samples were collected from a flowing section of water. Where appropriate, sample bottles were rinsed three times before the sample was collected at a depth of approximately 20 cm (minimising the influence of surface scums floating on the water's surface). Water samples were chilled and delivered to Hill Laboratories at the end of each monitoring day.

Each grab sample was analysed for the following suite of parameters:

- ✧ nitrate nitrogen (nitrate-N)
- ✧ total ammoniacal nitrogen (TAN)
- ✧ dissolved inorganic nitrogen (DIN)
- ✧ dissolved reactive phosphorus (DRP)
- ✧ total phosphorus (TP)
- ✧ total sodium
- ✧ *Escherichia coli*

In-situ water quality measurements were completed using a calibrated YSI ProDSS water quality meter. The water quality meter was placed in a flowing section of water at the monitoring site. The following physicochemical parameters were measured:

- ✧ temperature
- ✧ dissolved oxygen (DO; mg/L and % saturation)
- ✧ conductivity
- ✧ pH
- ✧ turbidity

2.4 Macroinvertebrate Community

Macroinvertebrate sampling was completed in accordance with the semiquantitative C2 protocol for soft-bottomed waterways (Stark et al., 2001). Ten subsamples were collected from different habitat types (e.g., overhanging vegetation, macrophytes, and woody debris) over the full reach length (a total of approximately 3 m² of instream habitat). Subsamples were combined to form a single composite sample for each site.

Samples were preserved in a 70-80% isopropyl alcohol solution and packaged in accordance with the protocol recommended by Stark et al. (2001). They were delivered to Ecological Impact Assessments Limited (EcIA) for taxonomic processing using the semiquantitative P2 protocol (200 fixed count + scan for rare taxa) (Stark et al., 2001).

2.5 Freshwater Fish Community (eDNA)

Six replicate environmental DNA (eDNA) samples were collected from each assessment site, prior to any upstream disturbance. Samples were collected using the eDNA Syringe Mini Kit provided by Wilderlab Ltd. Given elevated turbidity was expected in stream waters, the larger 5 µm pore size filter was used (instead of the 1.2 µm pore size filter) to prevent filter clogging.

Samples were collected by passing 1 L of water through the filter using the syringes provided. If the filter became clogged before passing 1 L of water due to elevated turbidity, filtering ceased and the volume of water successfully passed through the filter was recorded. A preservative was injected into each filter immediately after sample collection.

Samples were sent via courier to the Wilderlab laboratory for analysis using the basic assay panel.

2.6 Guideline Values and Standards

Results were compared to the relevant guideline values and standards presented in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018), the National Policy Statement for Freshwater Management 2020 (NPS-FM 2020), and the Horizons Regional Council One Plan.

The ANZG Default Guideline Values (DGVs) and NPS-FM 2020 standards (national 'bottom-line' values), and Horizons Regional Council One Plan targets are detailed in Table 2.

Table 2: Relevant freshwater quality and ecology guideline values and standards

Parameter	ANZG (2018) DGV ¹	ANZG (2018) Toxicant DGV (Species Protection) ¹			NPS-FM 2020 'Bottom-Line'		Horizons One Plan Water Quality Targets	
		80%	90%	95%	Median	95 th Percentile	Region-Wide	Main Drain Sub-Area ²
Physicochemical Parameters								
Temperature (°C)							-	24
Dissolved Oxygen (%)	82-100	-	-	-	-	-	-	60
Electrical Conductivity (µS/cm)	86	-	-	-	-	-	-	
pH	7.27-7.8	-	-	-	-	-	-	7-8.5
Turbidity (NTU)	4.2	-	-	-	-	-	-	
Nutrient Parameters								
Total Nitrogen (mg/L)	0.281	-	-	-	-	-	-	-
Dissolved Inorganic Nitrogen (mg/L)							-	0.444
Total Ammoniacal-Nitrogen (mg/L)	0.017	-	-	-	-	-	-	0.400
Total Ammoniacal-Nitrogen (mg/L) (pH 8 converted)	-	2.30	1.43	0.90	0.24	0.40	-	-
Nitrate-Nitrogen (mg/L)	0.195	-	-	-	2.4	3.5	-	-
Total Phosphorus (mg/L)	0.023	-	-	-	-	-	-	-
Dissolved Reactive Phosphorus (mg/L)	0.007	-	-	-	-	-	-	0.015

Table 2: Relevant freshwater quality and ecology guideline values and standards

Parameter	ANZG (2018) DGV ¹	ANZG (2018) Toxicant DGV (Species Protection) ¹			NPS-FM 2020 'Bottom-Line'		Horizons One Plan Water Quality Targets	
		80%	90%	95%	Median	95 th Percentile	Region-Wide	Main Drain Sub-Area ²
Microbial								
Escherichia coli (n/100 mL)	-	-	-	-	-	-	260	-
Ecology								
Deposited Sediments (%)	-	-	-	-	-	-	-	25
MCI ³	-	-	-	-	90	-	-	100
QMCI ⁴	-	-	-	-	4.5	-	-	-

Notes:

- ANZG (2018) Default Guideline Values for sites characterised by the 'Warm-Dry Low-Elevation' River Environment Classification (REC).
- The Main Drain Sub-Area includes all assessment sites
- Macroinvertebrate Community Index (MCI) (Stark & Maxted, 2007)
- Quantitative Macroinvertebrate Community Index (QMCI) (Stark & Maxted, 2007); '-' Indicates 'no value'.

Notes:

1. ANZG (2018) Default Guideline Values for sites characterised by the 'Warm-Dry Low-Elevation' River Environment Classification (REC).
2. The Main Drain Sub-Area is includes all assessment sites
3. Macroinvertebrate Community Index (MCI) (Stark & Maxted, 2007)
4. Quantitative Macroinvertebrate Community Index (QMCI) (Stark & Maxted, 2007) '-' Indicates 'no value'

3.0 Results

3.1 Aquatic Habitat

Assessed waterways were situated within a single lowland, rural catchment consisting predominantly of agricultural land uses with high pasture cover (Table 3). Sites were distributed across the two main branches of the catchment. The western branch of the catchment included the Taonui Stream assessment site (mid-upper catchment) and the Burkes Drain assessment site (lower catchment). The eastern branch included the Main Drain assessment site (mid-upper catchment). Burkes Drain and Main Drain confluence to form Whiskey Creek, before the confluence of Whiskey Creek with the Manawatu River approximately 1 km downstream.

Table 3: Catchment and hydrological details				
Site Name	Site Description	Stream Order	Catchment Size at Assessment Site (km ²)	Dominant Catchment Land Use
Whiskey Creek	Whiskey Creek at Rangiotu Road pump station	5	151	Agriculture (Pasture)
Burkes Drain	Burkes Drain at Lockwood Road	4	47	
Main Drain	Main Drain at Lockwood Road	4	42	
Taonui Stream	Taonui Stream at Rongotea Road	3	17	
Notes: Data sourced from https://data.mfe.govt.nz/				

Site observations indicated that Burkes Drain, Main Drain, and Whiskey Creek are highly modified watercourses with extensive flood protection structures including stop banks and artificially straightened channels. Whiskey Creek included a dam and pump station immediately downstream from the assessment site.

Bankside rapid habitat assessments were conducted at both the Taonui Stream and Burkes Drain monitoring sites. Total scores differed between sites, ranging between 23 (Taonui Stream) and 42 (Burkes Drain) out of a total score of 100 (Table 4). Both sites scored poorly across most assessment parameters. Each had low quality riparian vegetation consisting of predominantly exotic grasses, homogeneous 'slow run' flow conditions, a low diversity of physical habitat suitable for macroinvertebrates and fish. They also contained a low abundance

of habitat suitable for sensitive macroinvertebrate taxa and high (>75%) fine sediment cover that exceeded the deposited sediment cover target presented in the Horizons Regional Council One Plan (<25% cover). Both sites did, however, have highly stable bank conditions and intact riparian buffer zones. The high cover of macrophytes at Burkes Drain provided an abundance of fish habitat.

Table 4: Rapid Habitat Assessment results		
Parameter	Taonui Stream	Burkes Drain
Deposited Sediment	1	1
Invertebrate Habitat Diversity	2	1
Invertebrate Habitat Abundance	1	1
Fish Cover Diversity	1	3
Fish Cover Abundance	3	10
Hydraulic Heterogeneity	1	1
Bank Erosion	10	10
Bank Vegetation	3	3
Riparian Width	5	8
Riparian Shade	5	4
Total	23	42
Notes: 1. Adapted from Clapcott (2015)		

More comprehensive reach-scale SEV habitat assessments were completed for the Main Drain and Whiskey Creek sites (Table 5). The Main Drain reach was a shallow water site (0.08-0.37 m depth) with poor/slow flow velocity. Canopy shading was variable throughout the reach and the water's surface had near complete cover from Canadian pondweed. Emergent macrophyte cover occupied between 5% and 80% of the channel width and submerged macrophytes occupied between 5% and 25% of the channel width throughout the reach. The stream bed substrate was dominated by fine sediments (mean cover: 95%), which exceeded the Horizons Regional Council One Plan target (<25% cover). Woody debris and leaf litter were present throughout the reach (mean cover: 9% and 18%, respectively).

The Whiskey Creek assessment reach was a straight, open canopy channel. Water flow was slow (0.16 m/s), restricted by thick macrophyte growths (mean surface reaching, emergent, and bankside cover: 77.3%; mean below surface cover: 4.8%) and potentially the dam structure located immediately

downstream. Stream bed substrate was dominated by fine sediment (mean cover: 65%), which exceeded the Horizons Regional Council One Plan target (<25% cover), with some gravel/cobble patches located throughout the reach.

Qualitative habitat assessment scores found that both sites had 'suboptimal' instream habitat quality. The Main Drain site received a 'suboptimal' score for aquatic habitat abundance, 'marginal' scores for channel shade and riparian vegetation integrity, and 'poor' scores for aquatic habitat diversity and hydrologic heterogeneity. The Whiskey Creek site received an 'optimal' score for aquatic habitat abundance but a 'marginal' score for aquatic habitat diversity. 'Poor' scores were recorded for hydrologic heterogeneity, channel shading, and riparian vegetation integrity.

Table 5: Stream Ecological Valuation habitat assessment results			
Habitat Parameter		Main Drain	Whiskey Creek
Depth (m)		0.23	0.61
Velocity (m/s)		No flow	0.16
Shade		Very Low-Moderate	No shade
Evergreen Riparian Vegetation (% cover)		20	0
Bed Substrate (% Cover)	Bedrock	0	0
	Boulder	0	0
	Cobble	4	8
	Gravel	1	27
	Silt and Sand	<u>95</u>	<u>65</u>
Wood Categories (% Cover)	Small	8	0
	Medium	1	0
	Large	0	0
Macrophytes (% Cover)	Surface Reaching, Emergent, and Bankside (% Cover)	33.5	77.3
	Below Surface (% Cover)	18.9	4.8
Leaf Litter (% Cover)		18	0
Physical Habitat Quality Score		6.8/20	7.0/20
Notes: <u>Underlined</u> values exceeded the Horizons Regional Council One Plan water quality targets. Table modified from Storey et al. (2011)			

3.2 Surface Water Quality

3.2.1 Spatial Patterns in Surface Water Quality

Of the western branch sites, Burkes Drain had notably higher water temperature and turbidity, and lower DO than the Taonui Stream site located further upstream (Table 6; Appendix B). Comparatively, a lower water temperature and higher DO, turbidity, and EC were recorded at the Main Drain site. Further downstream, Whiskey Creek had relatively low turbidity and EC.

Nutrient concentrations were variable across assessment sites (Table 6). Dissolved inorganic nitrogen (DIN) concentration at the Taonui Stream site (0.03 mg/L) was more than an order of magnitude lower than that at the downstream Burkes Drain site (0.44 mg/L). The DIN concentration measured from Main Drain (1.05 mg/L) was approximately two times greater than Burkes Drain. DIN measured at Whiskey Creek was 0.78 mg/L. DIN was composed almost entirely of TAN at all assessment sites with low nitrate-N concentrations recorded (e.g., not exceeding lower laboratory detection limits at the Taonui Stream or Whiskey Creek sites).

The DRP concentration measured at Taonui Stream (0.33 mg/L) was nearly four times that of the downstream Burkes Drain site (0.08 mg/L). Notably higher concentrations were measured from Main Drain (0.87 mg/L). DRP at Whiskey Creek (0.146 mg/L) was intermediate between the tributary watercourses (Main Drain and Burkes Drain), most closely representing Burkes Drain.

Counts of the faecal indicator bacteria, *E. coli*, were approximately five times higher at the Burkes Drain (250 n/100 mL) site compared to the upstream Taonui Stream site (55 n/100 mL). *E. coli* counts were highest at the Main Drain site (1,200 n/100 mL) whereas Whiskey Creek had a similar concentration recorded to that of Burkes Drain (290 n/100 mL).

3.2.2 Comparison with Water Quality Guideline Values and Standards

Except for the turbidity levels measured from Taonui Stream and Whiskey Creek, no measured water quality parameters were consistent with the ANZG (2018) DGVs³ (Table 6).

Nitrate-N concentrations were consistent with the NPS-FM 2020 A attribute band, indicating a lowest level of toxic impact to aquatic fauna (Table 6). In contrast, DRP concentrations were generally high and consistent with the most-degraded D attribute band at all sites. *E. coli* counts were consistent with the lowest E attribute band for the Main Drain and Whiskey Creek sites, attribute

³ While the ANZG (2018) DGVs do not strictly correspond with an expected level of ecosystem health, inconsistency with the ANZG (2018) DGVs indicates that none of the assessment sites represent 'reference' conditions (i.e., minimally impacted by human land use).

band D for the Burkes Drain site, and attribute bands A-C for the Taonui Stream site. TAN concentrations measured at the Main Drain and Whiskey Creek sites were consistent with attribute band C, which fall below the national bottom-line (i.e. it exceeds a concentration of 0.24 mg/L). TAN concentrations measured at the Taonui Stream and Burkes Drain sites were consistent with the A and B attribute bands, respectively.

The Horizons Regional Council One Plan Region-Wide Water Quality Target for *E. coli* was exceeded at the Main Drain and Whiskey Creeks sites (Table 6). Similarly, Sub-Area-specific targets for DO saturation and DRP were not met at any of the assessment sites, in particular DO saturation was extremely low across all sites. Targets for pH, DIN, and TAN were met only at the Taonui Stream site.

Table 6: Surface water quality results

Parameter	Taonui Stream	Burkes Drain	Main Drain	Whiskey Creek
<i>Physicochemical Surface Water Quality</i>				
Temperature (°C)	18.6	21.4	15.5	18.9
Dissolved Oxygen (%)	26.1	5.7	38.1	9.6
Dissolved Oxygen (mg/L)	2.44	0.51	3.79	0.89
Turbidity	2.39	7.00	8.76	2.93
Electric Conductivity (µS/cm)	481.7	481.1	530	382.0
pH	7.12	6.88	6.89	6.83
<i>Water Chemistry and Microbial Water Quality</i>				
Total Sodium (mg/L)	36	37	31	27
Dissolved Inorganic Nitrogen (mg/L)	0.026	<u>0.44</u>	<u>1.05</u>	<u>0.78</u>
Total Ammoniacal-Nitrogen (mg/L)	0.024	0.4	0.98	0.78
Total Ammoniacal-Nitrogen (mg/L) (pH 8 Converted)	0.0093	0.17	0.38	0.30
Nitrite-Nitrogen (mg/L)	< 0.002	0.037	0.012	< 0.002
Nitrate-Nitrogen (mg/L)	< 0.002	0.01	0.063	< 0.002
Total Oxidised Nitrogen (mg/L)	0.002	0.047	0.075	< 0.002
Dissolved Reactive Phosphorus (mg/L)	0.33	0.08	0.87	0.146
Total Phosphorus (mg/L)	0.43	0.4	1.67	0.39
<i>Escherichia coli</i> (mg/L)	55	250	<u>1200</u>	<u>290</u>
Notes: <ol style="list-style-type: none"> Bold values indicate exceedance of the ANZG (2018) Default Guideline Values for sites characterised by the Warm-Dry Low-Elevation River Environment Classification. <u>Shaded</u> values indicate exceedance of the NPS-FM (2020) national 'bottom-line'. <u>Underlined</u> values exceeded the Horizons Regional Council One Plan water quality targets No values exceeded the ANZG (2018) toxicant Default Guideline Value for 95% species protection. The NPS-FM 2020 attribute bands are designed to be compared with summary statistics (e.g., median or 95th percentile values) following frequent monitoring (e.g., monthly) over extended periods (e.g., 1-5 years). As result are presented for a one-off sampling event, comparisons to the NPS-FM 2020 attribute bands are indicative only and should be interpreted with caution. 				

3.3 Macroinvertebrate Community

Macroinvertebrate samples were collected from the Whiskey Creek and Main Drain assessment reaches (Table 2). Taxonomic richness was variable between the two assessment sites, with fewer taxa recorded from the Main Drain site (11) than the Whiskey Creek site (14). No pollution-sensitive

Ephemeroptera (mayflies), Plecoptera (stoneflies), or Trichoptera (caddisflies) taxa were recorded from either of the assessment sites⁴.

Macroinvertebrate Community Index (MCI) and Quantitative Macroinvertebrate Community Index (QMCI) scores varied minimally between assessment sites. The scores recorded from each were consistent with the 'poor' quality class. This is indicative of severe levels of organic pollution and poor ecosystem health (Stark & Maxted, 2007). Both the MCI and QMCI values were consistent with NPS-FM 2020 attribute band D, which falls below the national 'bottom-line'. The MCI scores recorded from both sites were also below the Horizons Regional Council One Plan target.

Table 7: Macroinvertebrate community results		
Community Metric	Whiskey Creek	Main Drain
Number of Taxa	14	11
% EPT	0.0	0.0
% EPT Taxa	0.0	0.0
MCI	<u>63</u>	<u>53</u>
QMCI	<u>2.2</u>	<u>2.7</u>
Notes:		
1. Macroinvertebrate community 'quality class' (Stark & Maxted, 2007): 'Excellent', 'Good', 'Fair', 'Poor'		
2. Shaded values indicate noncompliance with the NPSFM national 'bottom-line'.		
3. Underlined values indicate noncompliance with Horizons One Plan Water Quality Targets		

3.4 Freshwater Fish Community (eDNA)

Table 8 provides an overview of the freshwater fish detected from eDNA surveys completed at each site. A total of six freshwater fish taxa were detected, including four native species and two introduced species. Shortfin eels (*Anguilla australis*), īnanga (*Galaxias maculatus*), gambusia (*Gambusia affinis*), and goldfish (*Carassius auratus*) were detected from all assessment sites. Common bully (*Gobiomorphus cotidianus*) were detected from the Taonui Stream and Burkes Drain sites only, while longfin eel (*Anguilla dieffenbachii*) was only detected from Whiskey Creek.

Longfin eel and īnanga are classified with conservation status of 'At Risk – Declining' (Dunn et al., 2018) due to their nationally declining populations. Additionally, īnanga (i.e., whitebait) and tuna (shortfin and longfin eels) are taonga species, with traditional, recreational, and commercial fisheries values.

⁴ EPT taxa are generally sensitive to organic pollution, and their presence and abundance at a site can be indicative of both the level of persistent organic pollution and ecosystem health at a site.

Table 8: eDNA survey results – freshwater fish community						
Common Name	Species Name	Conservation Status ¹	Taonui stream	Main Drain	Burkes Drain	Whiskey Creek
Longfin eel	<i>Anguilla dieffenbachii</i>	At Risk - Declining	✗	✗	✗	✓
Shortfin eel	<i>Anguilla australis</i>	Not Threatened	✓	✓	✓	✓
Inanga	<i>Galaxias maculatus</i>	At Risk - Declining	✓	✓	✓	✓
Common bully	<i>Gobiomorphus cotidianus</i>	Not Threatened	✓	✗	✓	✗
Gambusia ("mosquitofish")	<i>Gambusia affinis</i>	Introduced	✓	✓	✓	✓
Goldfish	<i>Carassius auratus</i>	Introduced	✓	✓	✓	✓
Notes: 1. Conservation status derived from Dunn et al. (2018).						

4.0 Summary of Results

The ecological values of Taonui Stream, Burkes Drain, Main Drain, and Whiskey Creek were highly degraded. This is symptomatic of the high degree of stream modification, and habitat and water quality impacts associated with intensive agricultural land-uses and past flood protection works (e.g., channel straightening and steep stop-banks).

The key findings from the ecological assessments are presented below.

- ✧ The bankside and instream habitat conditions recorded from all sites were marginal to poor. Key factors influencing aquatic habitat quality were low quality riparian vegetation, homogeneous flows, and degraded physical habitat conditions⁵.
- ✧ Low dissolved oxygen and elevated plant available nutrients (e.g., dissolved nitrogen and phosphorus) were recorded from all sites. High TAN concentrations were recorded from the Main Drain and Whiskey Creek sites, which exceeded the NPS-FM 2020 national 'bottom-line'.

⁵ All sites are characterised by the 'Warm-Dry Low-Elevation Alluvial' River Environment Classification (REC), which is a naturally 'soft-bottomed' class. However, excessive fine sediment inputs may smother physical bed habitats such as woody debris.

- ✧ High macrophyte cover was recorded from all assessment sites except for Taonui Stream. This is likely the result of poor shading combined with the elevated bioavailable nutrient concentrations and uniform, slow flows (McDowell, Larned, & Houlbrooke, 2009). The high macrophyte cover recorded from these sites has likely contributed to the low DO recorded (i.e., associated with the microbial breakdown of plant material). It is expected that DO would fluctuate diurnally with even lower concentrations expected outside of daytime hours (McDowell, Larned, & Houlbrooke, 2009).
- ✧ Macroinvertebrate community indices were low at both the Main Drain and Whiskey Creek sites. This indicates persistent organic pollution and poor ecosystem health (Stark & Maxted, 2007). Pollution-sensitive EPT taxa were not recorded from either assessment site.
- ✧ Low-diversity fish communities were recorded from all sites, including two introduced taxa (goldfish and gambusia) and four native taxa (longfin and shortfin eel, inanga, and common bully). Gambusia, a highly invasive pest species, were observed in high abundances at all assessment sites.

5.0 References

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Appendix A: Site Photographs



Photograph 1: Whiskey Creek – Upstream view overlooking the assessment reach.



Photograph 2: Whiskey Creek – Downstream view of the pump station and the dam, downstream from the assessment reach



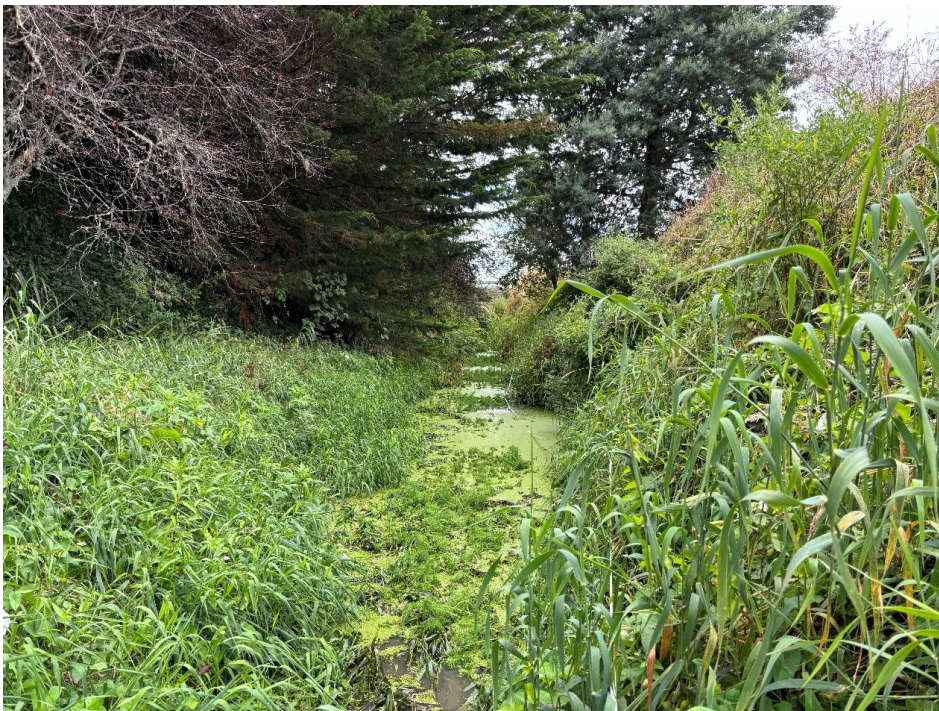
Photograph 3: Whiskey Creek – Instream structures below the Rangiotu Road bridge.



Photograph 4: Burkes Drain – View downstream from the assessment site.



Photograph 5: Main Drain- View downstream from the upstream extent of the assessment reach.



Photograph 6: Main Drain- View upstream from the downstream extent of the assessment reach.



Photograph 7: Main Drain – land drainage discharging to stream approximately 15 m upstream from the assessment reach.



Photograph 8: Taonui Stream – View upstream from assessment site.



Photograph 9: Taonui Stream – View downstream from assessment site.

Appendix B: Surface Water Quality Results

Certificate of Analysis

Page 1 of 2

Client:	Pattle Delamore Partners Limited	Lab No:	3462097	SUPv1
Contact:	Tim Green	Date Received:	09-Feb-2024	
	C/- Pattle Delamore Partners Limited	Date Reported:	16-Feb-2024	
	PO Box 389	Quote No:	129030	
	Christchurch 8140	Order No:		
		Client Reference:	A03109215	
		Submitted By:	Tim Green	

Sample Type: Aqueous			
Sample Name:		Site 3 08-Feb-2024 9:25 am	Site 4 08-Feb-2024 11:53 am
Lab Number:		3462097.1	3462097.2
Total Sodium	g/m ³	31.4 ± 1.9	36.4 ± 2.2
Dissolved Inorganic Nitrogen*	g/m ³	1.050 ± 0.037	0.026 ± 0.007
Total Ammoniacal-N	g/m ³	0.976 ± 0.036	0.0238 ± 0.0067
Nitrite-N	g/m ³	0.0117 ± 0.0021	< 0.002 ± 0.0014
Nitrate-N	g/m ³	0.0629 ± 0.0093	< 0.002 ± 0.0019
Nitrate-N + Nitrite-N	g/m ³	0.0746 ± 0.0091	0.0022 ± 0.0014
Dissolved Reactive Phosphorus	g/m ³	0.873 ± 0.045	0.335 ± 0.018
Total Phosphorus	g/m ³	1.67 ± 0.21	0.425 ± 0.052
Escherichia coli	cfu / 100mL	1,200 #1	55 #1

The reported uncertainty is an expanded uncertainty with a level of confidence of approximately 95 percent (i.e. two standard deviations, calculated using a coverage factor of 2). Reported uncertainties are calculated from the performance of typical matrices, and do not include variation due to sampling.

For further information on uncertainty of measurement at Hill Laboratories, refer to the technical note on our website: www.hill-laboratories.com/files/Intro_To_UOM.pdf, or contact the laboratory.

Analyst's Comments

#1 Statistically estimated count based on the theoretical countable range for the stated method.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-2
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) : Online Edition.	-	1-2
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.021 g/m ³	1-2
Dissolved Inorganic Nitrogen*	Calculation: NH ₄ -N + NO ₃ -N + NO ₂ -N. In-house calculation.	0.005 g/m ³	1-2
Total Ammoniacal-N	Phenol/hypochlorite colourimetry. Flow injection analyser. (NH ₄ -N = NH ₄ ⁺ -N + NH ₃ -N). APHA 4500-NH ₃ H (modified) : Online Edition.	0.010 g/m ³	1-2
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO ₂ I (modified) : Online Edition.	0.002 g/m ³	1-2
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - Nitrite-N. In-House.	0.0010 g/m ³	1-2
Nitrate-N + Nitrite-N	Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO ₃ I (modified) : Online Edition.	0.002 g/m ³	1-2
Dissolved Reactive Phosphorus	Filtered sample. Molybdenum blue colourimetry. Flow injection analyser. APHA 4500-P G (modified) : Online Edition.	0.004 g/m ³	1-2



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Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Total Phosphorus	Total phosphorus digestion, automated ascorbic acid colorimetry. Flow Injection Analyser. APHA 4500-P H (modified) : Online Edition.	0.002 g/m ³	1-2
Escherichia coli	Membrane filtration, Count on CCA agar, Incubated at 44.5°C for 21-24 hours. APHA 9222 I (modified) : Online Edition.	1 cfu / 100mL	1-2

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 10-Feb-2024 and 16-Feb-2024. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

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Graham Corban MSc Tech (Hons)
Client Services Manager - Environmental

Certificate of Analysis

Page 1 of 2

Client:	Pattle Delamore Partners Limited	Lab No:	3461022	SUPv1
Contact:	Tim Green	Date Received:	08-Feb-2024	
	C/- Pattle Delamore Partners Limited	Date Reported:	14-Feb-2024	
	PO Box 389	Quote No:	129030	
	Christchurch 8140	Order No:		
		Client Reference:	A03109215	
		Submitted By:	Tim Green	

Sample Type: Aqueous			
Sample Name:		Site 1 07-Feb-2024 11:34 am	Site 2 07-Feb-2024 4:00 pm
Lab Number:		3461022.1	3461022.2
Total Sodium	g/m ³	26.8 ± 1.7	36.9 ± 2.3
Dissolved Inorganic Nitrogen*	g/m ³	0.779 ± 0.069	0.445 ± 0.037
Total Ammoniacal-N	g/m ³	0.777 ± 0.069	0.398 ± 0.036
Nitrite-N	g/m ³	< 0.002 ± 0.0014	0.0368 ± 0.0054
Nitrate-N	g/m ³	< 0.002 ± 0.0019	0.0097 ± 0.0079
Nitrate-N + Nitrite-N	g/m ³	< 0.002 ± 0.0014	0.0465 ± 0.0058
Dissolved Reactive Phosphorus	g/m ³	0.1457 ± 0.0079	0.0797 ± 0.0049
Total Phosphorus	g/m ³	0.395 ± 0.048	0.398 ± 0.048
Escherichia coli	cfu / 100mL	290	250

The reported uncertainty is an expanded uncertainty with a level of confidence of approximately 95 percent (i.e. two standard deviations, calculated using a coverage factor of 2). Reported uncertainties are calculated from the performance of typical matrices, and do not include variation due to sampling.

For further information on uncertainty of measurement at Hill Laboratories, refer to the technical note on our website: www.hill-laboratories.com/files/Intro_To_UOM.pdf, or contact the laboratory.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Filtration, Unpreserved	Sample filtration through 0.45 µm membrane filter. Analysed at Hill Laboratories - Chemistry; Unit 1, 17 Print Place, Middleton, Christchurch.	-	1-2
Total Digestion	Nitric acid digestion. APHA 3030 E (modified) : Online Edition.	-	1-2
Total Sodium	Nitric acid digestion, ICP-MS, trace level. APHA 3125 B : Online Edition.	0.021 g/m ³	1-2
Dissolved Inorganic Nitrogen*		0.002 - 0.010 g/m ³	1-2
Dissolved Inorganic Nitrogen*	Calculation: NH ₄ -N + NO ₃ -N + NO ₂ -N. In-house calculation.	0.005 g/m ³	1-2
Total Ammoniacal-N	Filtered Sample from Christchurch. Phenol/hypochlorite colourimetry. Flow injection analyser. (NH ₄ -N = NH ₄ ⁺ -N + NH ₃ -N). APHA 4500-NH ₃ H (modified) : Online Edition.	0.010 g/m ³	1-2
Nitrite-N	Filtered sample from Christchurch. Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO ₃ I (modified) : Online Edition.	0.002 g/m ³	1-2
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - Nitrite-N. In-House.	0.0010 g/m ³	1-2
Nitrate-N + Nitrite-N	Filtered sample from Christchurch. Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO ₃ I (modified) : Online Edition.	0.002 g/m ³	1-2
Dissolved Reactive Phosphorus	Filtered sample from Christchurch. Molybdenum blue colourimetry. Flow injection analyser. APHA 4500-P G (modified) : Online Edition.	0.004 g/m ³	1-2



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Sample Type: Aqueous			
Test	Method Description	Default Detection Limit	Sample No
Total Phosphorus	Total phosphorus digestion, automated ascorbic acid colorimetry. Flow Injection Analyser. APHA 4500-P H (modified) : Online Edition.	0.002 g/m ³	1-2
Escherichia coli	Membrane filtration, count on CCA agar, incubated at 44.5°C for 21-24 hours. Analysed at Hill Laboratories - Microbiology; Unit 1, 17 Print Place, Middleton, Christchurch. APHA 9222 I (modified) : Online Edition.	1 cfu / 100mL	1-2

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 09-Feb-2024 and 14-Feb-2024. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

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Ara Heron BSc (Tech)
Client Services Manager - Environmental

Appendix C: Macroinvertebrate Results

Table C1: Macroinvertebrate results				
Taxa	MCI Score	SB-MCI Score	Abundance	
			Whiskey Creek	Main Drain
Damselfly Ischnura	0	3.1	3	-
Damselfly Xanthocnemis	5	1.2	7	2
Bug Microvelia	5	4.6	1	1
Bug Sigara	5	2.4	3	
Beetle Hydrophilidae	5	8	3	5
True Fly Chironomus	1	3.4	9	3
Crustacea Ostracoda	3	1.9	1	2
Crustacea Paracalliope	5	0	8	176
MITES (Acari)	5	5.2	2	-
SPIDERS Dolomedes	5	6.2	1	-
Mollusc Gyraulus	3	1.7	2	-
Mollusc Lymnaeidae	3	1.2	-	1
Mollusc Physella (Physa)	3	0.1	3	1
Mollusc Potamopyrgus	4	2.1	183	28
Mollusc Sphaeriidae	3	2.9	-	1
HIRUDINEA (Leeches)	3	1.2	2	2

Appendix D: Environmental DNA Results

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
<i>Anguilla australis</i>	Shortfin eel; tuna; hao; aopori; hikumutu	33086	43255	69752	39911
<i>Gambusia affinis</i>	Mosquitofish	27867	56811	3787	5725
<i>Potamothenix bavaricus</i>	Aquatic oligochaete worm	8787	16057	27425	26844
<i>Anas platyrhynchos</i>	Mallard duck; rakiraki	12202	34181	10641	9372
<i>Carassius auratus</i>	Goldfish; morihana	9879	160	106	10542
<i>Bos taurus</i>	Cattle; kau	13025	243	458	30
<i>Lumbriculus variegatus</i>	Blackworm	542	474	6144	879
<i>Galaxias maculatus</i>	Inanga; inanga	5836	47	469	801
<i>Rhopalosiphum nymphaeae</i>	Waterlily aphid	535	0	5866	36
<i>Bothrioneurum vejdoskyanum</i>	Worm	1701	33	2930	961
<i>Rotaria rotatoria</i>	Rotifer	60	152	5075	67
<i>Potamopyrgus antipodarum</i>	Mud Snail	313	49	4445	479
<i>Prostoma graecense</i>	Freshwater nemertean	16	0	5084	0
<i>Chaetogaster diaphanus</i>	Oligochaete worm	957	22	148	3944
<i>Tubifex tubifex</i>	Sludge worm	150	507	3979	21
<i>Branchiura sowerbyi</i>	Oligochaete worm	1191	0	0	2691
<i>Hydra vulgaris</i>	Hydra	8	0	3013	0

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
<i>Physella acuta</i>	Left handed sinistral snail	1618	331	244	792
<i>Porphyrio melanotus</i>	Pukeko; pūkeko	96	2119	726	0
<i>Limnodrilus hoffmeisteri</i>	Redworm	2287	21	444	0
<i>Chaetogaster diastrophus</i>	Oligochaete worm	216	24	2228	225
<i>Cyclotella cryptica</i>	Brackish-water diatom	37	259	0	1994
<i>Acanthocyclops robustus</i>	Copepod	1101	546	347	160
<i>Chironomus cloacalis</i>	Grey midge	294	5	7	1322
<i>Mustela erminea</i>	Stoat	0	0	0	1467
<i>Cochliopodium kieliense</i>	Amoeba	177	26	634	133
<i>Rattus norvegicus</i>	Norway Rat; pouhawaiki; pou o hawaiki; kaingarua; maungarua	0	110	23	703
<i>Nitzschia palea</i>	Diatom	106	684	0	8
<i>Aulodrilus pluriset</i>	Aquatic oligochaete worm	14	55	704	0
<i>Gonium pectorale</i>	Colonial alga	681	0	0	0
<i>Passer domesticus</i>	House sparrow; tiu	0	0	278	298
<i>Paratanytarsus grimmii</i>	Chironomid	386	6	0	113

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
<i>Prostoma eilhardi</i>	Freshwater ribbon worm	44	0	7	344
<i>Rattus rattus</i>	Black Rat; hinamoki; inamoki	0	0	389	0
<i>Arcella cf. vulgaris</i>	-	261	65	29	15
<i>Astrohydra japonica</i>	Hydra; huru moana	320	0	0	0
<i>Mesocyclops leuckarti</i>	Copepod	0	0	0	220
<i>Gobiomorphus cotidianus</i>	Common bully; tīpokopoko; toitoti	144	0	72	0
<i>Octolasion lacteum</i>	Worm	200	0	12	0
<i>Anguilla dieffenbachii</i>	Longfin eel; tuna; kūwharuwharu; reherehe; kirirua	0	0	0	201
<i>Eiseniella tetraedra</i>	Squaretail worm	51	0	28	119
<i>Nais christinae</i>	Sludgeworm	159	10	0	0
<i>Turdus philomelos</i>	Song thrush	154	0	0	0
<i>Poteroispumella lacustris</i>	Protist	0	93	49	11
<i>Vannella simplex</i>	Amoeba	0	94	41	15
uncultured <i>Pythium</i>	-	0	0	0	124
<i>Mus musculus</i>	House mouse	0	79	31	0
<i>Ilyodrilus templetoni</i>	Aquatic worm	0	25	85	0
<i>Columba livia</i>	Pigeon	107	0	0	0

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
Anas chlorotis or gracilis	Brown or grey teal; pāteke	82	0	0	0
Orthonychiurus folsomi	Springtail	0	0	77	0
Carduelis carduelis	Goldfinch	0	0	72	0
Paracyclops fimbriatus	Copepod	0	0	68	0
Epiphyas postvittana	Light brown apple moth	0	0	32	32
Phalacrocorax sulcirostris	Little Black Shag; kawau tūi	63	0	0	0
Culex quinquefasciatus	Southern house mosquito	5	0	48	0
Xanthocnemis zealandica	Red damselfly	5	0	0	43
Fringilla coelebs	Common chaffinch; pahirini	0	0	47	0
Chaetonotus gelidus	-	34	0	5	6
Ophiulus pilosus	Millipede	0	0	38	5
Octolasion cyaneum	Worm	0	0	37	0
Philodina megalotrocha	Rotifer	0	0	0	37
Corynoneura scutellata	Non-biting midge	16	0	19	0
Stenostomum cf. simplex AW-2018	Freshwater catenulid flatworm	0	0	0	35
Dysaphis aucupariae	Aphid	0	0	0	34
Lumbricus rubellus	Red earthworm	17	11	5	0

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
Naegleria sp.	-	0	16	12	0
Dero obtusa	Worm	0	0	27	0
Chydorus brevilabris	Water flea	14	10	0	0
Psychoda sp. BOLD:AAP4716	Drainfly; mothfly	9	0	13	0
Globulidrilus riparius	Worm	0	0	21	0
Psychodidae sp. BOLD:AAU4648	-	0	0	10	11
Gyraulus corinna	NZ freshwater snail	21	0	0	0
Ceratophysella aff. denticulata L3	Mushroom springtail	0	0	0	20
Cornu aspersum	Garden snail	0	0	0	19
Frankliniella intonsa	-	0	0	0	19
Lepidodermella squamata	Gastrotrich worm	17	0	0	0
Ablabesmyia sp. NZ08.Motel	-	0	0	0	17
Asplanchna sieboldii	Rotifer	6	9	0	0
Rhopalosiphum padi	Bird cherry-oat aphid	0	0	14	0
Wiseana umbraculata	Bog porina	0	0	13	0
Ablabesmyia monilis	-	0	0	0	12
Naupactus leucoloma	Broad-nosed weevil	0	0	0	11
Lasionemopoda hirsuta	-	0	0	11	0

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
Limnodrilus sp. BIOUG21865-F05	Worm	0	0	0	11
Sitobion fragariae	Blackberry-cereal aphid	0	0	10	0
Triplectides cephalotes	Caddisfly	10	0	0	0
Murchieona minuscula	Worm	0	0	10	0
Pinnularia grunowii	Diatom	0	0	0	9
Enchytraeidae sp. 1 RV-2016	-	0	0	8	0
Dero digitata	Worm	0	0	7	0
Trichopsocus sp. KY322	-	0	0	7	0
Pristina aequiseta	-	0	0	6	0
Oxysarcodexia varia	-	0	0	6	0
Scaptomyza flava	Turnip leafminer	0	0	6	0
Mayamaea permitis	Diatom	0	6	0	0
Smittia sp. 8ES	-	0	0	6	0
Tyrophagus curvipenis	Mite	0	0	0	6
Gomphonema parvulum	-	5	0	0	0
Deroceras reticulatum	Grey field slug; Grey garden slug	5	0	0	0
Limnodrilus udekemianus	Worm	5	0	0	0
Eukerria saltensis	Worm	5	0	0	0

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
Testudinella patina	-	0	0	5	0
Typhlodromus recki	-	0	0	5	0
Trioxys liui	-	5	0	0	0
Sigara	Waterboatmen	425	0	0	22404
Potamopyrgus	Mud snails	324	358	2759	808
Girardia	-	105	610	1099	209
Ilyodrilus	Worm	12	1194	638	0
Gobiomorphus	Bullies	1051	0	535	0
Prostoma	-	5	14	1016	0
Gobiomorphus cotidianus/basalis/dinae	Common/Cran/Dinahs bully; titikura	652	0	232	0
Cochliopodium	Amoeba	44	357	336	0
Anguilla	Eels	220	0	157	338
Chaetonotus	Gastrotrich	108	36	136	366
Vannella	Amoeba	31	249	108	135
Nitzschia	Pennate diatom	33	364	33	0
Simocephalus	-	359	0	27	0
Pinnularia	Freshwater diatom	0	369	14	0
Nais	Sludgeworm	30	175	143	14
Galaxias	Galaxiids	300	0	34	0
Dero	Worm	123	0	86	0
Tubifex	Worm	8	0	188	0
Culex	-	17	0	171	0
Pythium	Parasitic oomycete	0	0	115	0

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
Phytophthora	Water mold	0	0	104	8
Bothrioneurum	Worm	0	0	90	9
Philodina	Rotifer	64	10	0	0
Turdus	Thrush; manu pango	0	0	66	0
Limnodrilus	Worm	38	0	28	0
Lipaphis	-	0	0	65	0
Gonium	Green alga	50	0	0	0
Pieris	-	0	0	48	0
Porphyrio	Swamphens	0	0	48	0
Lecane	Rotifer	0	47	0	0
Limnophyes	Non-biting midge	0	6	35	0
Plumatella	Plumatella	37	0	0	0
Eucyclops	Copepod	12	9	15	0
Sitobion	-	0	0	30	0
Oxysarcodexia	-	5	0	24	0
Korotnevella	Amoeba	0	5	20	0
Pristina	Worm	0	10	13	0
Stenostomum	Freshwater catenulid flatworm	11	0	0	9
Sellaphora	Diatom	5	0	14	0
Paracalliope	Amphipod crustacean	0	0	17	0
Chamaedrilus	Worm	0	0	14	0
Tyrophagus	Bulb mites	0	0	5	7

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
Ectopsocus	Psocopteran fly	0	0	12	0
Compsopogon	Freshwater red alga	11	0	0	0
Kiefferulus	-	9	0	0	0
Micromus	-	0	0	0	9
Asplanchna	-	0	8	0	0
Naegleria	Amoeba	0	7	0	0
Clubiona	Leaf curling sac spiders	0	0	0	7
Sitona	-	0	0	6	0
Deleatidium	NZ mayfly	6	0	0	0
Phytophthium	-	0	0	6	0
Fistulifera	Diatom	0	0	0	6
Alboglossiphonia	Worm	0	0	0	5
Amischa	-	5	0	0	0
Arcitalitrus	Sandhopper	5	0	0	0
Eiseniella	Worm	5	0	0	0
Hydrozetidae	-	0	0	0	3453
Tubificinae	-	0	0	775	0
Chaetonotidae	-	173	493	0	0
Anatidae	Ducks/Geese/Swan	7	165	13	0
Helicoidea	-	20	0	91	0
Pythiaceae	Water moulds	0	0	0	110
Thripidae	True thrips	25	19	12	17
Naididae	Sludgeworms	0	0	14	0
Saprolegniaceae	-	0	0	0	11

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
Orthocladinae	-	0	0	0	11
Aphididae	Aphids	0	0	10	0
Aphidinae	-	0	0	10	0
Phytoseiidae	-	0	0	7	0
Coenagrionidae	Narrow-winged damselflies	0	0	7	0
Carabidae	Ground beetles	0	0	6	0
Cecidomyiidae	Gall midges	0	0	5	0
Cyclopidae	-	5	0	0	0
root	Unidentified	64273	43328	62828	52008
Metazoa	Metazoans	11986	3868	11292	28282
Lepidoptera	Butterflies and moths	21	48492	41	16
Actinopteri	-	6040	266	50	8200
Bacillariophyta	Diatoms	864	7176	7	0
Crustacea	Crustaceans	4743	175	214	168
Eurotatoria	-	632	617	265	1814
Otophysi	-	2100	0	0	0
Insecta	Insects	51	8	795	363
Arthropoda	Arthropods	21	0	119	545
Cypriniformes	Carps and others	0	0	0	525
Galaxiiformes	Galaxiids	200	117	0	0
Arcellinida	-	18	0	0	221
Rotifera	Rotifers	0	237	0	0
Oomycota	-	6	61	85	62
Mammalia	Mammals	111	40	5	0

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
Nemertea	Bootlace worms	0	0	10	122
Chordata	Chordates	15	48	26	25
Viridiplantae	Green plants	96	0	0	0
Aves	Birds	8	0	78	0
Discosea	-	23	9	38	5
Diptera	Flies	51	0	9	10
Trichoptera	Caddisflies	23	0	0	46
Araneae	Spiders	0	0	67	0
Eukaryota	Eucaryotes	0	0	54	0
Neoptera	Winged insects	0	0	38	9
Hemiptera	-	0	0	0	31
Sarcoptiformes	-	0	0	0	24
Boreoeutheria	Placental mammals	0	0	22	0
Clitellata	-	10	0	10	0
Arachnida	Arachnids	0	7	8	0
Cyclopoida	-	0	0	0	13
unclassified Ceratophysella	-	0	0	0	13
Florideophyceae	-	0	0	12	0
Artiodactyla	Hoofed Animals	12	0	0	0
unclassified Saccamoeba	-	0	0	0	12
Platyhelminthes	Flatworm	0	0	6	5
unclassified Naegleria	-	0	0	11	0

Table D1: Composite eDNA results

Scientific Name	Common Name	Whiskey Creek	Burkes Drain	Main Drain	Taonui
unclassified Eupodidae	-	0	0	10	0
Pythiales	-	8	0	0	0
Dothideomycetes	-	0	0	7	0
unclassified Anystidae	-	0	0	0	7
Saprolegniales	-	0	6	0	0
Hymenoptera	Hymenopterans	0	0	0	6
RTA clade	-	0	0	0	6
Brassicaceae	-	0	0	6	0
Protostomia	-	0	0	0	5
Hexanauplia	-	0	0	5	0
Philodinida	-	0	0	5	0
Cyclorhapha	-	0	0	5	0
Tubificida	-	0	0	0	5
Notes: '-' indicates no data.					

MEMORANDUM

TO: Sustainability Committee

MEETING DATE: 22 May 2024

TITLE: Palmerston North to Feilding Shared Pathway Project

PRESENTED BY: Glen O'Connor, Group Manager - Transport and Development
and Michael Bridge, Service Manager - Active Transport

APPROVED BY: Chris Dyhrberg, Chief Infrastructure Officer

RECOMMENDATION TO SUSTAINABILITY COMMITTEE

1. That the Committee receive the report titled 'Palmerston North to Feilding Shared Pathway Project' presented to the Sustainability Committee on 22 May 2024.

1. ISSUE

- 1.1 There are two shared pathway projects that have been included for staged delivery throughout the proposed 2024-34 Long Term Plan through Programme 2057 (City-wide Shared Pathways New and Link Improvements). The projects are:
 - Palmerston North to Feilding Pathway (PNFP), connecting Feilding, Bunnythorpe and Palmerston North; and
 - Manawatū River Pathway (MRP), which connects Ashhurst and Palmerston North, following the river edge alignment.
- 1.2 Because the questions raised that led to this paper being produced were specifically directed at the Palmerston North to Feilding pathway, this report focuses on that pathway, providing detail on the potential route and what is required in the different sections of the pathway. It also provides a cost breakdown for the project and provides value engineering and scope change opportunities that could be considered as part of the Long-Term Plan (LTP) deliberations.

2. BACKGROUND

- 2.1 Both pathways proposed within Programme 2057 link with existing and future shared pathways, trails, footpaths and cycleways, growing the connected local and regional network for walking and cycling. Linkages include the Mangaone Stream Pathway, Linton and Massey pathways, urban cycle network and Te Ahu a Turanga pathway to Woodville (anticipating NZTA Waka Kotahi completion by 2026).

- 2.2 The PNFP follows the existing national Te Araroa Trail alignment alongside the rail track.
- 2.3 For the purposes of this report, the PNFP refers only to the sections of pathway within Palmerston North City Council's boundary and does not include the section of pathway belonging to Manawātū District Council (MDC). Please refer to Attachment 1, which shows a high-level overview of the path route.

Strategic Context

- 2.4 Our shared pathways are key links to our regional and urban networks, providing safe, functional and attractive walking and cycling options for everyone, whether for commuting to work and school, recreational use, connecting with whanau, getting to the shops, health and well-being.
- 2.5 The PNFP aligns with Council's 2019 Urban Cycle Network Masterplan.
- 2.6 The PNFP has a business case, is a project within the Palmerston North Integrated Transport Initiative (endorsed by NZTA – Waka Kotahi) and features in the Regional Land Transport Plan.
- 2.7 The PNFP directly feeds into Council's Palmerston North Integrated Transport Initiative Transport Plan through 'Making it safer and easier for people to choose to walk, cycle or catch the bus'.

3. PALMERSTON NORTH TO FEILDING PATHWAY OVERVIEW

- 3.1 The PNFP is being delivered in partnership with MDC. MDC has completed most of their segment of the pathway between Feilding and the level crossing intersection of Waughs/Campbell Roads, north of Bunnythorpe at the council boundary.
- 3.2 Currently, some sections of this pathway route are narrow tracks, only suitable for tramping, and the Mangaone Stream and Jacks Creek crossings are often impassable following heavy rainfall.
- 3.3 The total distance of the Palmerston North to Feilding pathway is 12kms; MDC's portion is circa 4km, and Palmerston North's is circa double that at 8kms.
- 3.4 Both councils are seeking to provide a safe connection between where the pathway stops on MDC land and Tremaine Avenue.
- 3.5 The current scope will look to utilise quieter streets, paper roads, and KiwiRail land to achieve this in an efficient way. Please refer to Attachment 2 for designs of the different sections of the pathway.
- 3.6 From a practical construction standpoint, we are proposing to deliver the pathway progressively over the next 10 years, prioritising sections that will provide us connectivity as soon as possible.

- 3.7 There are several complexities that need to be worked through. A good example of this is navigating across the Waughs/Campbell Roads intersection through to Waughs Road.

Scope and Complexities

- 3.8 The pathway is 3m wide, which is the minimum NZTA – Waka Kotahi shared path standard, enabling people walking and cycling to use the space and pass safely. Strips of mown grass each side of both pathways provide additional space for passing and help address safety issues, such as sightlines.
- 3.9 The PNFP is designed as a sealed (AC/asphalt) pathway, which is consistent with the section already completed by MDC, as well as the business plan endorsed by NZTA – Waka Kotahi.
- 3.10 The PNFP will be mostly constructed within Council's formed and unformed road corridors. Some segments pass through KiwiRail land. Agreements are currently in place for the pathway to run inside KiwiRail land within the Bunnythorpe village, as well as a section near Tremaine Avenue.
- 3.11 As stated above, there are many complexities that we need to deal with, that MDC did not, which are summarised in the table below:

Complexity	PNCC Project Detail	MDC Project Detail
Terrain	There are some challenging sections with uneven terrain that require culverts, cut and fill and other engineered solutions, eg. section connecting Stoney Creek and Clevely Line	This portion is flat and straightforward and was able to follow the road corridor. We understand there were limited engineering challenges to overcome.
Paper Roads	We will be utilising the paper roads where possible instead of purchasing land. This allows us to proceed without having to acquire land in these sections. However, building on land with no existing infrastructure (currently being used by adjacent landowners) can be quite complex and will require negotiation with several individual landowners. This has an associated cost consequence.	This portion was able to follow the road corridor, therefore did not require property negotiation.

Complexity	PNCC Project Detail	MDC Project Detail
Level Crossings	The path crosses four level crossings, adding additional cost. This includes a proposal to construct a new, standalone level crossing in Bunnythorpe to Kiwirail.	The MDC path does not have level crossings.
Bridges	We are constructing two bridges over Mangaone and Jacks Creeks.	The MDC path did not have bridge construction.
Additional Value Adds	Our cost estimates for the LTP include landscape improvements (eg. planting, seating, and signage) as well as lighting.	MDC did not add any of these elements to their initial project. We expect this will need to be completed as a later stage.

3.12 The four level crossings are key contributors to the project and cost. Further detail on these is below.

- **Intersection of Waughs Road and Campbell Road, north of Bunnythorpe (section 1):** Currently, there is not any provision at this intersection for people walking and cycling to cross safely. We are engaging with KiwiRail on safety assessments of concept designs for shared pathway improvements at this level crossing. Separately, safety improvements to the wider intersection is included in the LTP through Council's Low Cost/Low Risk Programme.
- **Kairanga-Bunnythorpe Road, in Bunnythorpe (section 1):** Currently, there is sub-optimal provision at this intersection for people walking and cycling to cross safely. We are engaging with KiwiRail on safety assessments of concept designs for shared pathway improvements at this level crossing.
- **Midhurst Street:** Currently, there is no provision at this intersection for people walking and cycling to cross safely, noting that use of this level crossing will cease once the final section along the Midhurst paper road is completed in 2034/35.
- **Tremaine Avenue (near intersection of Midhurst Street):** Currently, there is provision at this intersection for people walking to cross safely. The plan is to improve provision at this level crossing for people walking as well as people on bikes.

4. FINANCIAL

- 4.1 Please refer to Attachment 3 for a financial overview of Programme 2057, and a breakdown of the current total project cost in the proposed 2024-34 LTP.

5. VALUE ENGINEERING AND SCOPE CHANGE OPPORTUNITIES

- 5.1 The bulk of the construction costs for the pathway project are driven by:
- Material and contractor costs;
 - Stormwater works, such as culverts;
 - Civil works, such as retaining walls, cut and fill;
 - Bridges and level crossings.
- 5.2 Officers have explored value engineering and scope change opportunities that could be considered to reduce the cost in the 10-year period and provide direction on a minimum viable product to establish a connected route.

Construction Materials

- 5.3 Council could consider replacing AC/asphalt with a limestone pathway. The difference in construction cost is minimal (saving approximately \$1M over the whole project), however, the maintenance cost for limestone is higher. Limestone pathways are less resilient, require more maintenance and they provide a lower level of service. Replacing limestone with AC/asphalt later also requires additional work to re-shape the limestone prior to laying the new material. A high-level estimate of the life expectancy, before significant renewal work would be required, is 20+ years for AC, vs 5 years for limestone.

Landscaping and Placemaking

- 5.4 Landscape designs for the entire corridor for both pathways will be developed before procurement and construction, ensuring a cohesive and consistent product throughout implementation.
- 5.5 Officers propose, however, to defer implementation of some elements across both pathway projects, to better ensure affordability and delivery of the minimum viable product:
- Landscaping, including vegetation planting – Officers propose to deliver the landscaping elements of both pathways incrementally and iteratively, subject to available funding.
 - Seating, shelter, lighting, and amenities – Officers propose to construct seating and other amenity elements over time, subject to available funding.

Minimum Viable Product

- 5.6 The core connected pathway (minimum viable product) would combine new pathway construction with existing quiet roads, providing a significantly safer route for people walking and cycling, away from busy 100km/h roads. During implementation, and until all sections are complete, users will be navigating a mix of facilities: some sections of new off-road shared pathway plus some sections of open, narrow, and quiet roads.
- 5.7 The PNFP has been designed in nine sections over approximately 8km.
- 5.8 Completing four of the nine sections will deliver the core connected pathway (minimum viable product) at a cost of \$13.2M (2023 engineer's estimate for construction, including 30% contingency). The four priority sections are as follows:
- Priority section 1 – Kairanga-Bunnythorpe Road to Waughs Road:
 - 470m, Engineers estimate \$4.8M.
 - Proposed to commence construction in year 1 of the LTP and continue into year 2.
 - This section will link Bunnythorpe to the existing pathway completed by MDC, at the council boundary. This section includes two bridges, over Mangaone Stream and Jacks Creek, plus two level crossings.
 - Priority section 2 – Stoney Creek Road to Clevely Line:
 - 620m, Engineers estimate \$2.1M.
 - Proposed to commence construction in year 2 of the LTP and continue into year 3.
 - This section extends the pathway from Bunnythorpe towards Palmerston North, and connects with residents along Sangsters Road.
 - Priority section 3 – Sangsters paper road:
 - 1.34km, Engineers estimate \$3.8M.
 - Proposed to commence construction in year 3 of the LTP and continue into year 4.
 - This section connects the formed Sangsters Road with Roberts Line.
 - Priority section 4 – Midhurst paper road:
 - 915m, engineers estimate \$2.5M.
 - Proposed to commence construction in year 4 of the LTP.

- 5.9 Constructing these four sections will complete the core connected pathway between Feilding, Bunnythorpe and Palmerston North.
- 5.10 Following completion of the four priority sections during the first four years of the LTP, construction of the balance of sections can then be undertaken in the future either as a programme of work or as individual projects.
- 5.11 Please refer to Attachment 3 for a comparison of the minimum viable product forecast to the current project costs in the proposed 2024-34 LTP.

6. NEXT STEPS




- 6.1 Providing the project is confirmed in the final 2024-34 LTP, construction of the first section of the project will commence in 2024/25 subject to NZTA – Waka Kotahi co-funding being confirmed.
- 6.2 Council will have a confirmed co-funding position for the first 3 years of the LTP in around August 2024. The co-funding position for the entire transport portfolio of programmes will be presented to Council after that point, providing the opportunity to make changes to the confirmed LTP position. If the shared pathway is not co-funded, Council would then need to decide whether to proceed with the project as proposed or to defer until co-funding was achieved.

7. COMPLIANCE AND ADMINISTRATION

Does the Committee have delegated authority to decide?	Yes
Are the decisions significant?	No
If they are significant do, they affect land or a body of water?	No
Can this decision only be made through a 10 Year Plan?	No
Does this decision require consultation through the Special Consultative procedure?	No
Is there funding in the current Annual Plan for these actions?	No
Are the recommendations inconsistent with any of Council's policies or plans?	No
The recommendations contribute to Goal 1: An Innovative and Growing City	
The recommendations contribute to the achievement of action/actions in Transport	
The action is: Prioritise active transport programmes that deliver on Council goals, the purpose of this plan, and the Government Policy Statement on Transport.	
Contribution to strategic direction and to social, economic, environmental, and cultural well-being	Our shared pathways are key links to our regional and urban networks, providing safe, functional and attractive walking and cycling options for everyone, whether for commuting to work and school, recreational use, connecting with whanau, getting to the shops, health and

	well-being.
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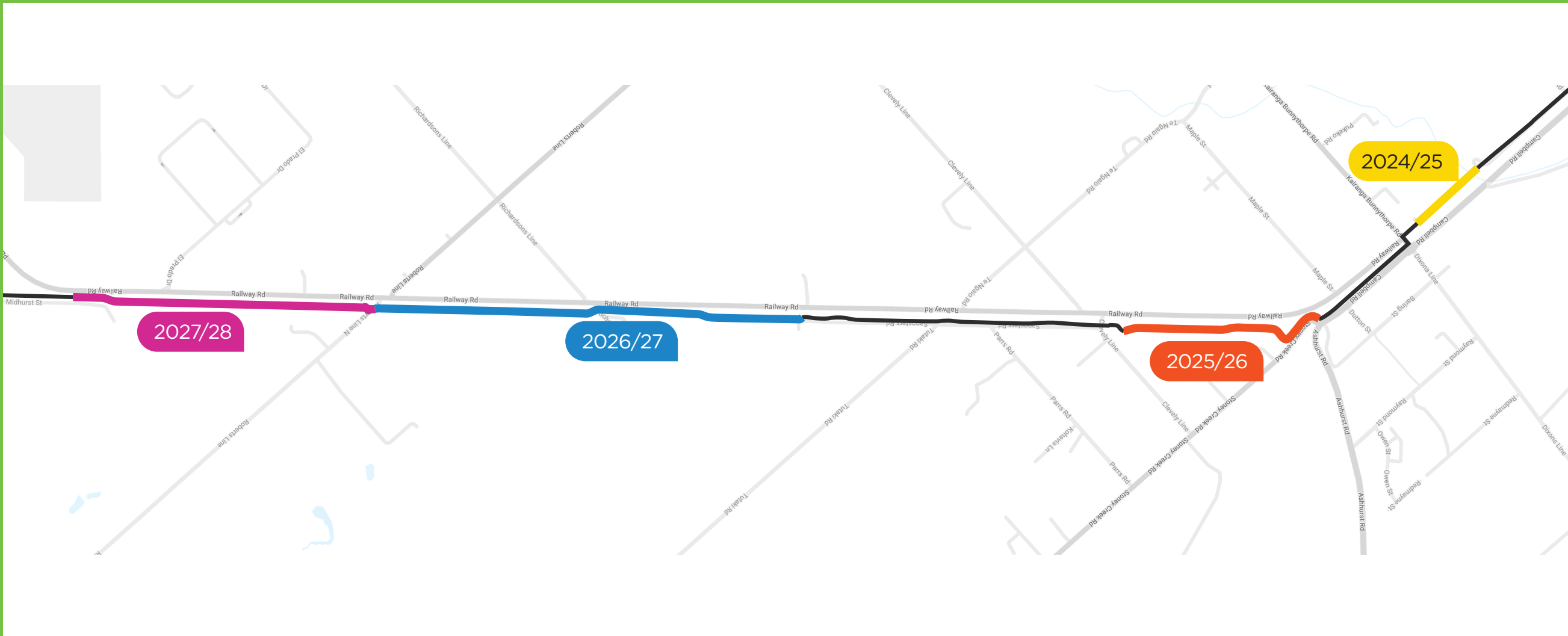
ATTACHMENTS

1. Palmerston North to Feilding Pathway Route [↓](#) 
2. Palmerston North to Feilding Pathway Concept Designs - Section by Section [↓](#) 
3. Palmerston North to Feilding Pathway Financial Overview [↓](#) 

Palmerston North to Feilding pathway

Priority sections

- 2024/25 linking Waughs Rd to Kairanga-Bunnythorpe Rd
- 2025/26 linking Bunnythorpe to Clevely Ln
- 2026/27 linking Sangsters Rd to Roberts Ln
- 2027/28 linking Roberts Ln to Midhurst Rd
- Sections already on quiet roads

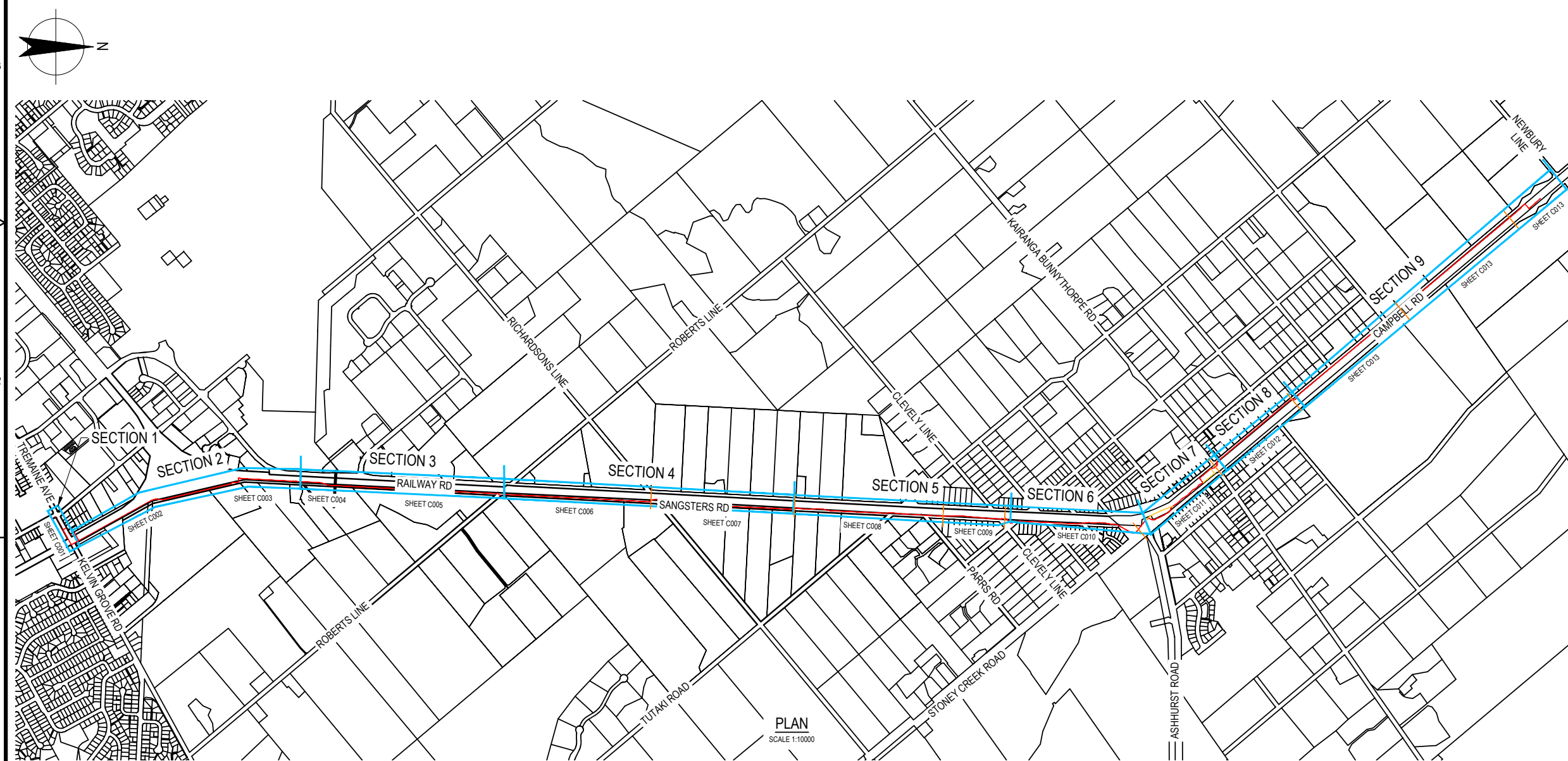


PALMERSTON NORTH CITY COUNCIL

PALMERSTON NORTH TO FEILDING SHARED PATHWAY

PROPERTIES AFFECTED BY SHARED PATHWAY

(N.I.M.T 139.95 - 146.8)



NOTES:

REV	AMENDMENTS	INITIAL	DATE
A	CONCEPT	AC	05/07/23

PALMY.

GHD

PROGRAMME PROJECT 12584744

JOB TITLE
PALMERSTON NORTH CITY COUNCIL
PALMERSTON NORTH TO FEILDING SHARED PATHWAY

DRAWING TITLE
PROPERTIES AFFECTED BY SHARED PATHWAY
COVER SHEET

	NAME	SIGNED	DATE
DESIGNED	K.MCTAMNEY	KM	03/08/23
DES. REVIEW	S.DODGE	SD	03/08/23
DRAWN	K.MCTAMNEY	KM	03/08/23
DRW. CHECK	S.DODGE	SD	03/08/23

APPROVED FOR TENDER

DATE	SIGNED

FOR CONSTRUCTION

DATE	SIGNED

CHIEF ENGINEER - APPROVED
STUART CARTWRIGHT
ACTIVITIES MANAGER - ACTIVE TRANSPORT
MICHAEL BRIDGE

SCALES A1 1:10000 A3 1:20000
PNCC No. 6369
CONSULTANT No. 12584744

DATE	DRAWING No.	REVISION
03/08/23	G001	A

All Data is from geosite.pncc.govt.nz and accumulated on the 20th of April 2023



NOTES:

REV	AMENDMENTS	INITIAL	DATE
B	CONCEPT	AC	04/08/23
A	CONCEPT	AC	05/07/23

PALMY.

GHD

PROGRAMMEPROJECT 12584744

JOB TITLE

PALMERSTON NORTH
CITY COUNCIL
PALMERSTON NORTH TO
FELDING SHARED PATHWAY

DRAWING TITLE

PROPERTIES AFFECTED
BY SHARED PATHWAY
SECTION 1

	NAME	SIGNED	DATE
DESIGNED	K. MCTAMNEY	K.M.	04/08/23
DES. REVIEW	S. DODGE	S.D.	04/08/23
DRAWN	K. MCTAMNEY	K.M.	04/08/23
DRW. CHECK	S. DODGE	S.D.	04/08/23

APPROVED

FOR TENDER

DATE	SIGNED

FOR CONSTRUCTION

DATE	SIGNED

CHIEF ENGINEER - APPROVED

STUART CARTWRIGHT

ACTIVITIES MANAGER - ACTIVE TRANSPORT

MICHAEL BRIDGE

SCALES A1 1:1000 A3 1:2000

PNCC No. 6369

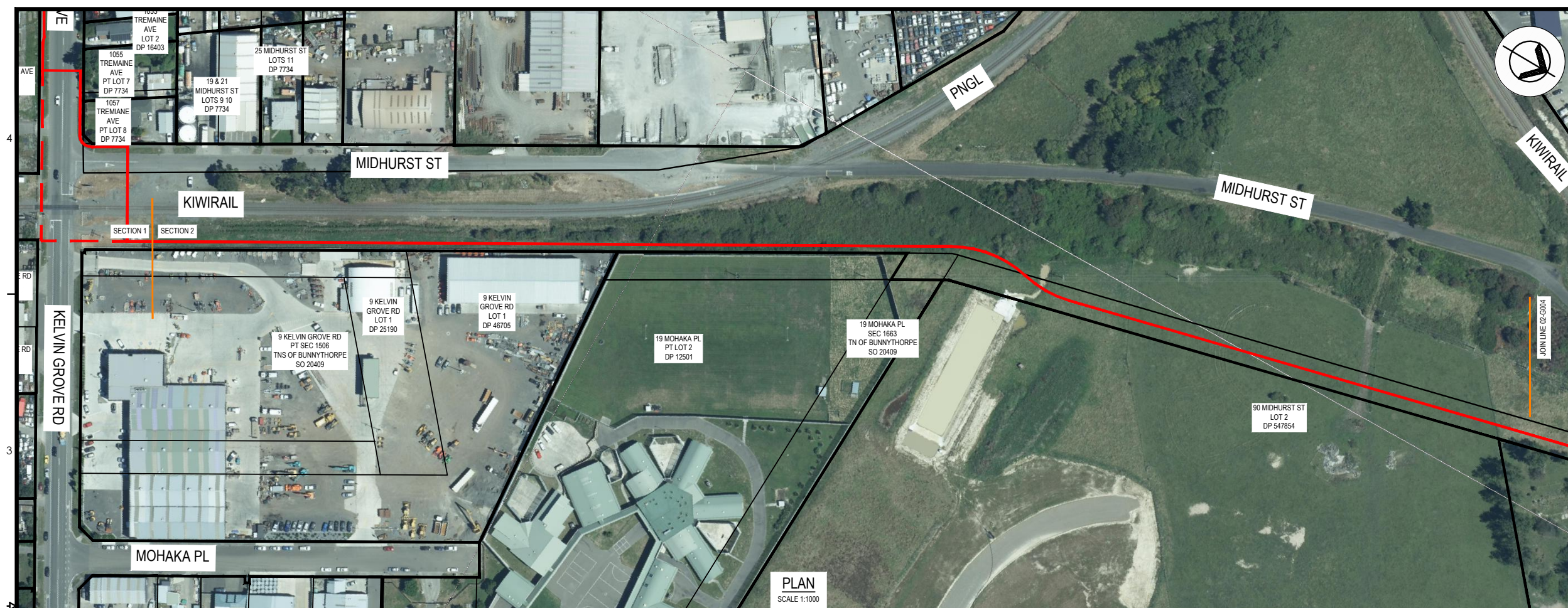
CONSULTANT No. 12584744

DATE	DRAWING No.	REVISION
04/08/23	01-G003	B

PROPERTY DESCRIPTION								
LOCATION	VALUATION NUMBER	LEGAL	CERTIFICATE OF TITLE	PROPERTY OWNER	ROAD FRONTAGE	AFFECTED BY PATHWAY	OCCUPYING PAPER ROAD	OCCUPYING KIWIRAIL
KIWIRAIL	9994 0 016 00	VARIOUS RAILWAY LAND IN PALMERSTON NORTH		KIWIRAIL	TREMAINE AVE/KELVIN GROVE ROAD	YES	N/A	N/A
7 SHELLEY STREET	14580 001 00	LOT 1 DP 77619			SHELLEY STREET	NO	NO	NO
1050 TREMAINE AVE	14580 001 01	LOT 2 DP 77619			SHELLEY STREET/TREMAINE AVE	NO	NO	NO
1053 TREMAINE AVE	14590 466 00	LOT 2 DP 16403			TREMAINE AVE	NO	NO	NO
1055 TREMAINE AVE	14590 467 00	PT LOT 7 DP 7734			TREMAINE AVE	YES	NO	NO
1057 TREMAINE AVE	14590 468 00	PT LOT 8 DP 7734			MIDHURST STREET	YES	NO	NO
19 MIDHURST STREET	14590 458 03	LOTS 9 10 DP 7734			MIDHURST ST/ARMSTRONG STREET	NO	NO	NO

FOR INFORMATION ONLY

All Data is from geosite.pncc.govt.nz and accumulated on the 20th of April 2023



NOTES:

REV	AMENDMENTS	INITIAL	DATE
B	CONCEPT	AC	04/08/23
A	CONCEPT	AC	05/07/23



PROGRAMME	PROJECT 1258474
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JOB TITLE

PALMERSTON NORTH
CITY COUNCIL
PALMERSTON NORTH TO
FEILDING SHARED PATHWAY

DRAWING TITLE
PROPERTIES AFFECTED
BY SHARED PATHWAY
SECTION 2
SHEET 1/2

	NAME	SIGNED	DATE
DESIGNED	K. MCTAMNEY	K.M.	04/08/23
DES. REVIEW	S. DODGE	S.D.	04/08/23
DRAWN	K. MCTAMNEY	K.M.	04/08/23
DRW. CHECK	S. DODGE	S.D.	04/08/23

APPROVED
FOR TENDER

DATE	SIGNED

FOR CONSTRUCTION	
DATE	SIGNED

CHIEF ENGINEER - APPROVED	

STUART CARTWRIGHT
ACTIVITIES MANAGER, ACTIVE TRANSPORT

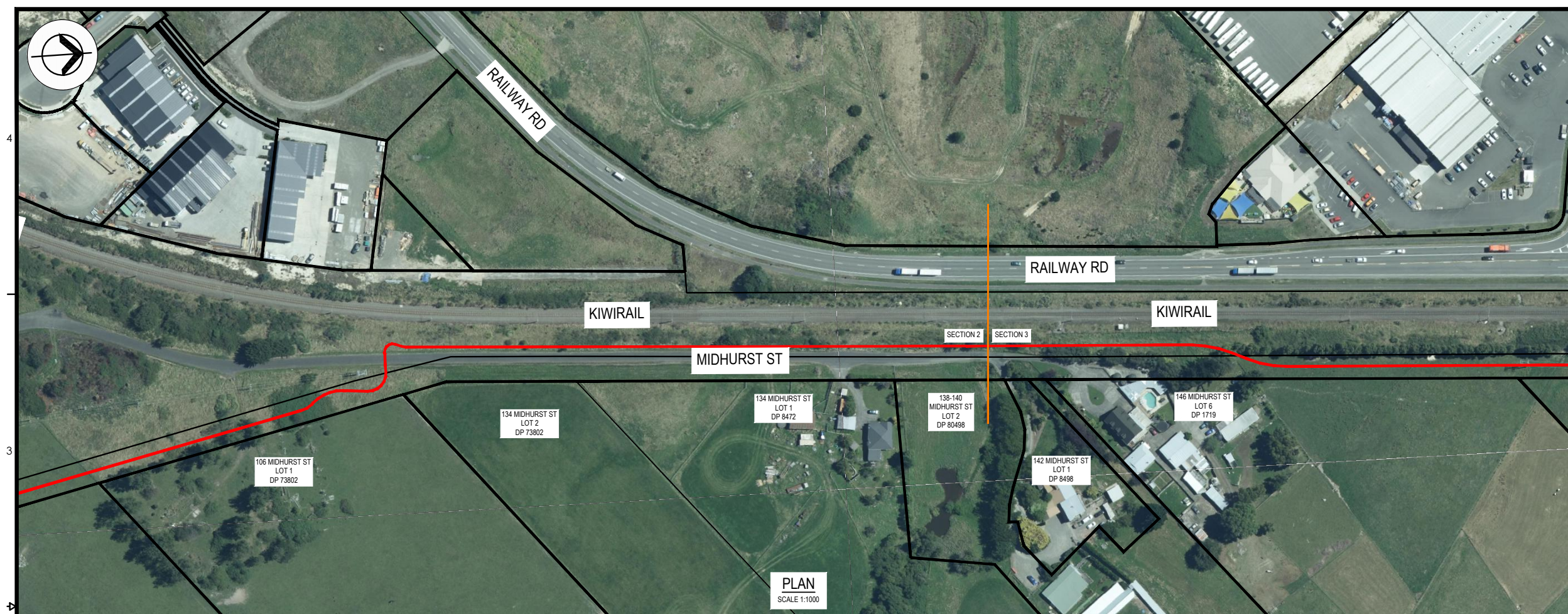
MICHAEL BRIDGE

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PNCC No.	6439	

CONSULTANT No. 12584744		
DATE	PROJECT	REVISION

DATE	DRAWING No.	REVISION
04/08/23	02-G003	B

PROPERTY DESCRIPTION								
LOCATION	VALUATION NUMBER	LEGAL	CERTIFICATE OF TITLE	PROPERTY OWNER	ROAD FRONTAGE	AFFECTED BY PATHWAY	OCCUPYING PAPER ROAD	OCCUPYING KIWIRAIL
KIWRIL	9994 0 016 00	VARIOUS RAILWAY LAND IN PALMERSTON NORTH		KIWRIL	TREMAINE AVE/KELVIN GROVE ROAD/MIDHURST STREET	YES	N/A	N/A
9 KELVIN GROVE ROAD	14590 477 00	PT SEC 1506 TNS OF BUNNYTHORPE			KELVIN GROVE ROAD	NO	NO	NO
9 KELVIN GROVE ROAD	14590 477 00	LOT 1 DP 25190			KELVIN GROVE ROAD	NO	NO	NO
9 KELVIN GROVE ROAD	14590 477 00	LOT 1 DP 46705			KELVIN GROVE ROAD	NO	NO	NO
19 MOHAKA PLACE	14590 480 00	PT LOT 2 DP 12501			MOHAKA PLACE	NO	YES	NO
19 MOHAKA PLACE	14590 480 00	SEC 1663 TN OF BUNNYTHORPE			MOHAKA PLACE	NO	YES	NO
90 MIDHURST STREET	14460 362 00	LOT 2 DP 547854			MOHAKA PLACE	NO	YES	YES



PROPERTY DESCRIPTION								
LOCATION	VALUATION NUMBER	LEGAL	CERTIFICATE OF TITLE	PROPERTY OWNER	ROAD FRONTAGE	AFFECTED BY PATHWAY	OCCUPYING PAPER ROAD	OCCUPYING KIWIRAIL
KWIRAIL	9990 016 00	VARIOUS RAILWAY LAND IN PALMERSTON NORTH		KIWRIL	N/A	YES	N/A	N/A
106 MIDHURST STREET	14460 363 00	LOT 1 DP 73802			MIDHURST STREET	NO	NO	NO
134 MIDHURST STREET	14460 364 00	LOT 2 DP 73802 BLK VII KAIRANGA D			MIDHURST STREET	NO	NO	NO
134 MIDHURST STREET	14460 364 00	LOT 1 DP 8472			MIDHURST STREET	NO	NO	NO
138-140 MIDHURST STREET	14460 365 01	LOT 2 DP 80498			MIDHURST STREET	NO	NO	NO

REV	AMENDMENTS	INITIAL	DATE
B	CONCEPT	AC	04/08/23
A	CONCEPT	AC	05/07/23

PROGRAMME	PROJECT 12584744
JOB TITLE	
PALMERSTON NORTH CITY COUNCIL PALMERSTON NORTH TO FEILDING SHARED PATHWAY	
DRAWING TITLE	
PROPERTIES AFFECTED BY SHARED PATHWAY SECTION 2 SHEET 2/2	

	NAME	SIGNED	DATE
DESIGNED	K. MCITAMNEY	K.M.	04/08/23
DES. REVIEW	S. DOIDGE	S.D.	04/08/23
DRAWN	K. MCITAMNEY	K.M.	04/08/23
DRW. CHECK	S. DOIDGE	S.D.	04/08/23

APPROVED
 FOR TENDER

DATE	SIGNED

FOR CONSTRUCTION

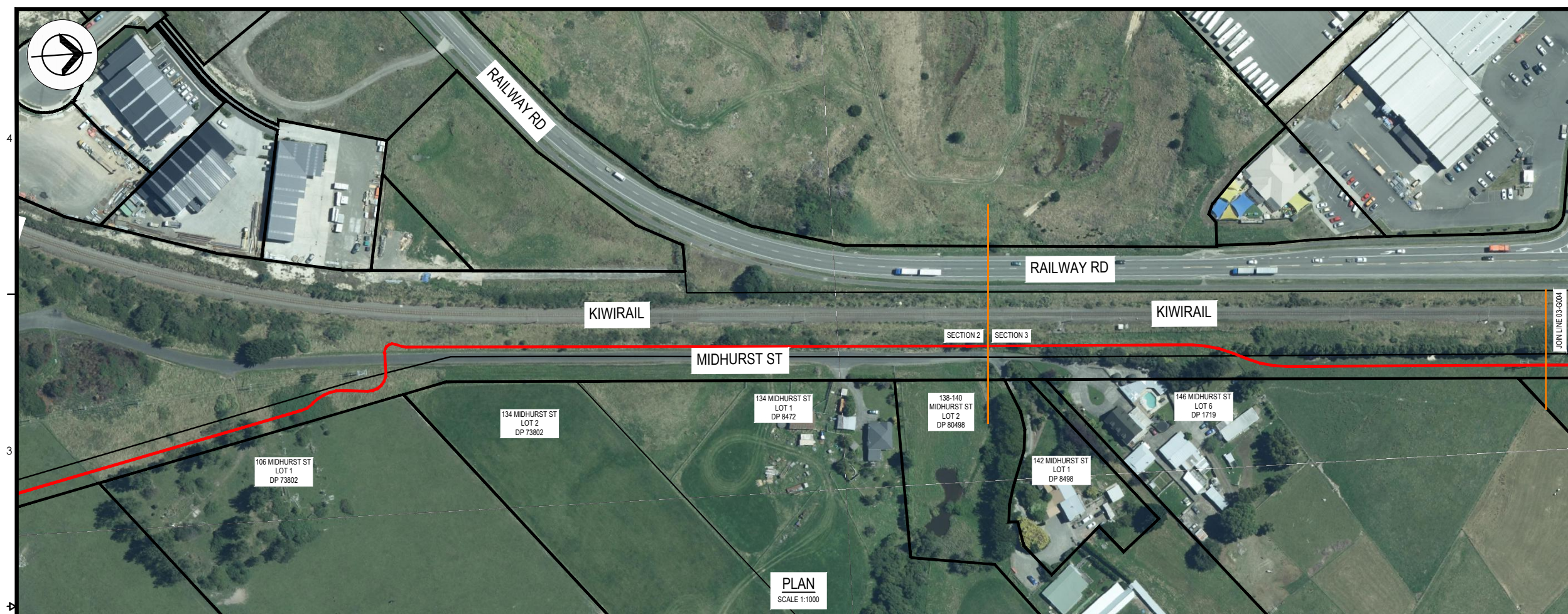
DATE	SIGNED

CHIEF ENGINEER - APPROVED
 STUART CARTWRIGHT

ACTIVITIES MANAGER - ACTIVE TRANSPORT
 MICHAEL BRIDGE

SCALES	A1 1:1000	A3 1:2000
PNCC No.	6439	
CONSULTANT No.	12584744	

DATE	DRAWING No.	REVISION
04/08/23	02-G004	B



PROPERTY DESCRIPTION								
LOCATION	VALUATION NUMBER	LEGAL	CERTIFICATE OF TITLE	PROPERTY OWNER	ROAD FRONTAGE	AFFECTED BY PATHWAY	OCCUPYING PAPER ROAD	OCCUPYING KIWIRAIL
KWIRAIL	9994.0 016 00	VARIOUS RAILWAY LAND IN PALMERSTON NORTH		KIWIRAIL	N/A	YES	N/A	N/A
138-14.0 MIDHURST STREET	14.460 365 01	LOT 2 DP 804.98			MIDHURST STREET	NO	NO	NO
14.2 MIDHURST STREET	14.460 365 01	LOT 1 DP 804.98			MIDHURST STREET	NO	NO	NO
14.6 MIDHURST STREET	14.460 366 00	LOT 6 DP 1719			MIDHURST STREET	YES	YES	NO

REV	AMENDMENTS	INITIAL	DATE
B	CONCEPT	AC	04/08/23
A	CONCEPT	AC	05/07/23

PROGRAMME	PROJECT 1258474
JOB TITLE	
PALMERSTON NORTH CITY COUNCIL PALMERSTON NORTH TO FELDING SHARED PATHWAY	
DRAWING TITLE	
PROPERTIES AFFECTED BY SHARED PATHWAY SECTION 3 SHEET 1/2	

	NAME	SIGNED	DATE
DESIGNED	K.MCTAMNEY	K.M.	04/08/23
DES. REVIEW	S.DOIDGE	S.D.	04/08/23
DRAWN	K.MCTAMNEY	K.M.	04/08/23
DRW. CHECK	S.DOIDGE	S.D.	04/08/23

APPROVED	
FOR TENDER	
DATE	SIGNED
FOR CONSTRUCTION	
DATE	SIGNED

CHIEF ENGINEER - APPROVED	
STUART CARTWRIGHT	
ACTIVITIES MANAGER - ACTIVE TRANSPORT	
MICHAEL BRIDGE	

SCALES A1 1:1000 PNCC No. 6440	A3 1:2000
CONSULTANT No. 12584744	

DATE	DRAWING No.	REVISION
04/08/23	03-G003	B



PROPERTY DESCRIPTION								
LOCATION	VALUATION NUMBER	LEGAL	CERTIFICATE OF TITLE	PROPERTY OWNER	ROAD FRONTAGE	AFFECTED BY PATHWAY	OCCUPYING PAPER ROAD	OCCUPYING KIWIRAIL
KIWI RAIL	9996 0 016 00	VARIOUS RAILWAY LAND IN PALMERSTON NORTH		KIWI RAIL	RAILWAY ROAD/PAPER ROAD	YES	N/A	N/A
282 RAILWAY ROAD	14460 328 00	LOT 1 DP 463477			RAILWAY ROAD	YES	YES	YES

REV	AMENDMENTS	INITIAL	DATE
B	CONCEPT	AC	04/08/23
A	CONCEPT	AC	05/07/23

PROGRAMME	PROJECT 12584744
JOB TITLE	
PALMERSTON NORTH CITY COUNCIL PALMERSTON NORTH TO FEILDING SHARED PATHWAY	
DRAWING TITLE	
PROPERTIES AFFECTED BY SHARED PATHWAY SECTION 3 SHEET 2/2	

	NAME	SIGNED	DATE
DESIGNED	K. MCTAMNEY	K.M.	04/08/23
DES. REVIEW	S. DOIDGE	S.D.	04/08/23
DRAWN	K. MCTAMNEY	K.M.	04/08/23
DRW. CHECK	S. DOIDGE	S.D.	04/08/23

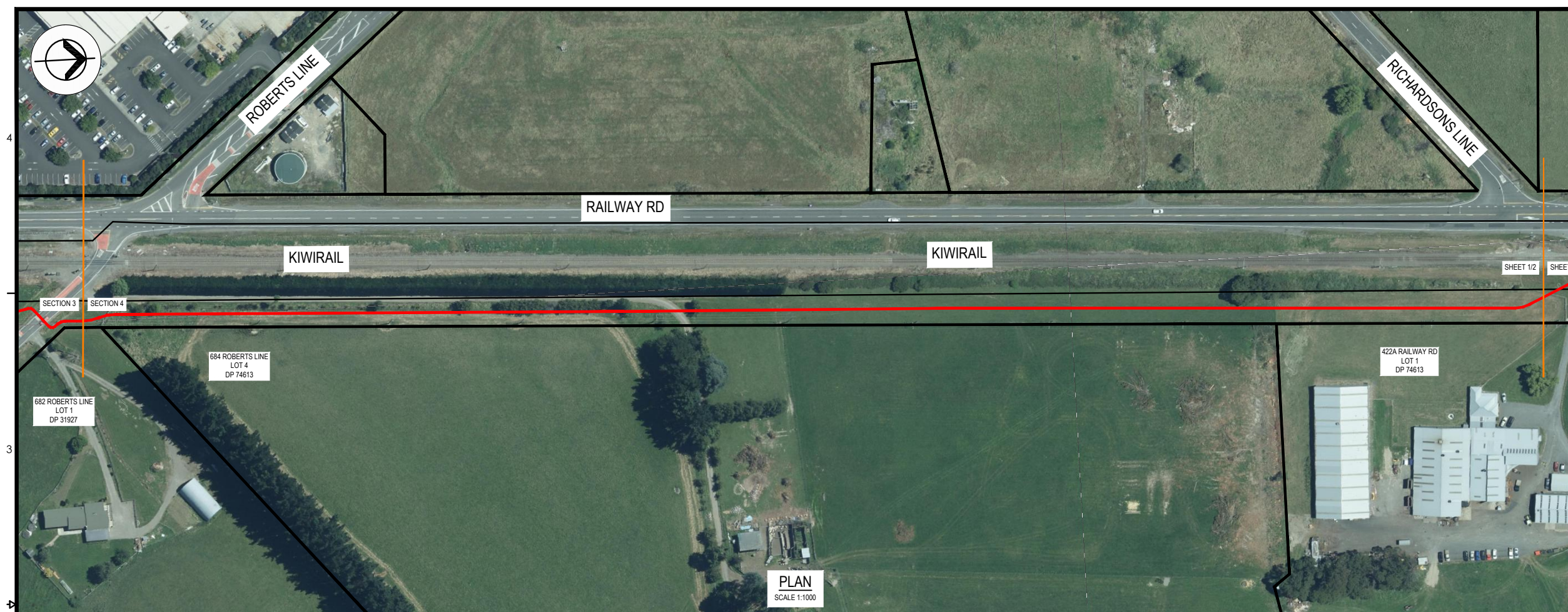
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FOR TENDER	
DATE	SIGNED
FOR CONSTRUCTION	
DATE	SIGNED

CHIEF ENGINEER - APPROVED	
STUART CARTWRIGHT	

ACTIVITIES MANAGER - ACTIVE TRANSPORT	
MICHAEL BRIDGE	

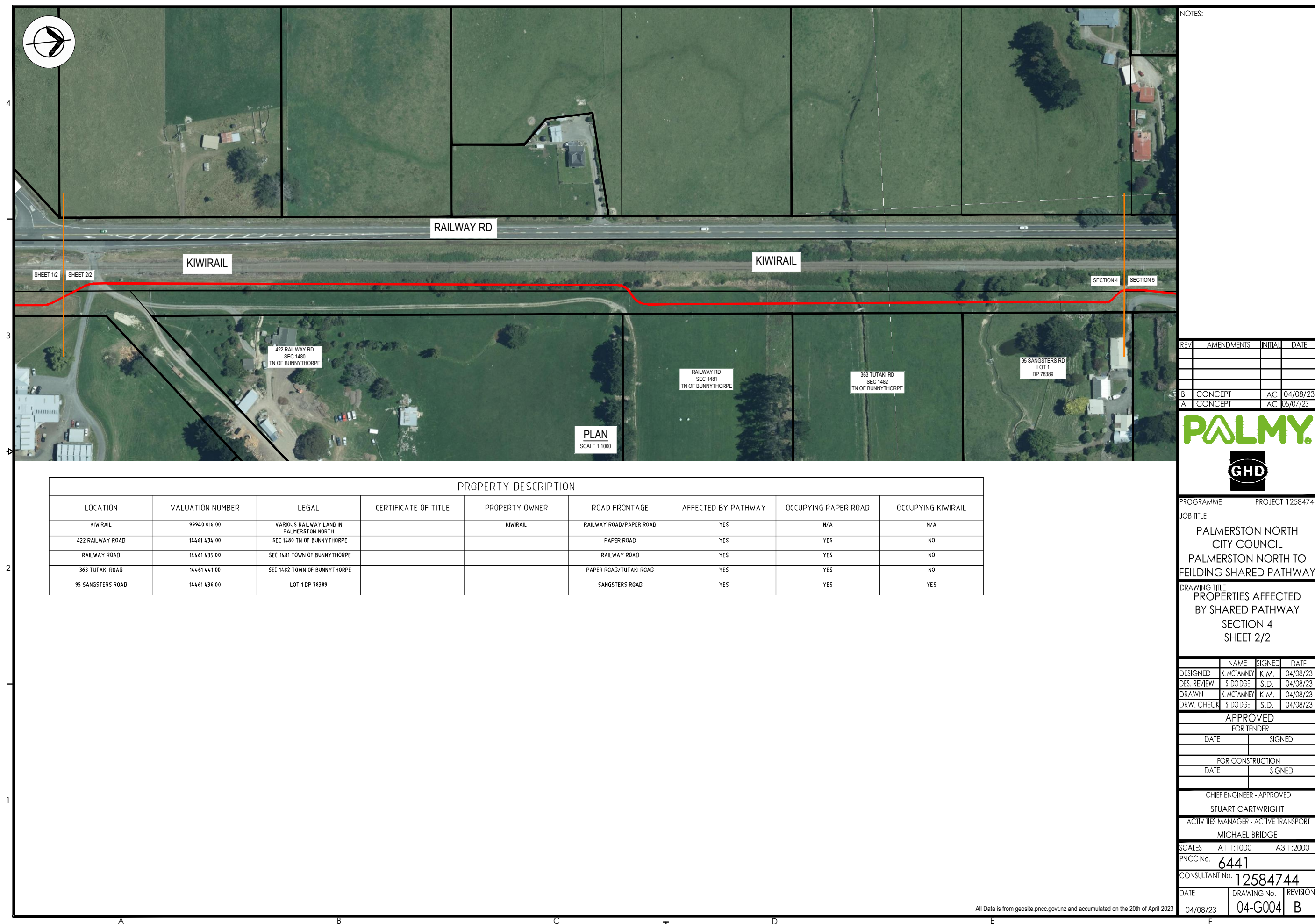
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PNCC No.	6440	
CONSULTANT No.	12584744	

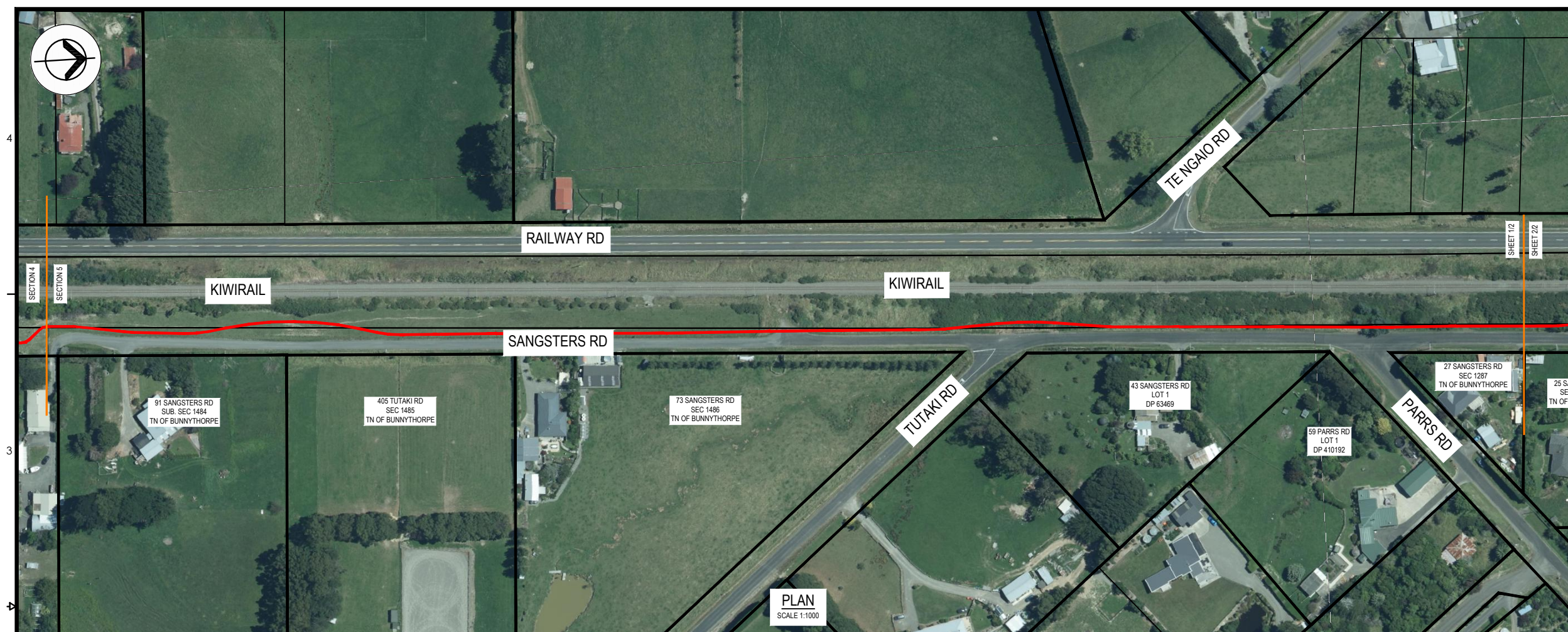
DATE	DRAWING No.	REVISION
04/08/23	03-G004	B





PROPERTY DESCRIPTION								
LOCATION	VALUATION NUMBER	LEGAL	CERTIFICATE OF TITLE	PROPERTY OWNER	ROAD FRONTAGE	AFFECTED BY PATHWAY	OCCUPYING PAPER ROAD	OCCUPYING KIWIRAIL
KIWIRAIL	9994 0 016 00	VARIOUS RAILWAY LAND IN PALMERSTON NORTH		KIWIRAIL	ROBERTS LINE/RAILWAY ROAD/PAPER ROAD	YES	N/A	N/A
682 ROBERTS LINE	14 461 4 12 00	LOT 1 DP 31927			ROBERTS LINE	YES	NO	NO
684 ROBERTS LINE	14 461 4 13 00	LOT 4 DP 74 613			PAPER ROAD/TUTAKI ROAD	YES	YES	YES
422A RAILWAY ROAD	14 461 4 33 00	LOT 1 DP 74 613			PAPER ROAD/RAILWAY ROAD	YES	YES	NO

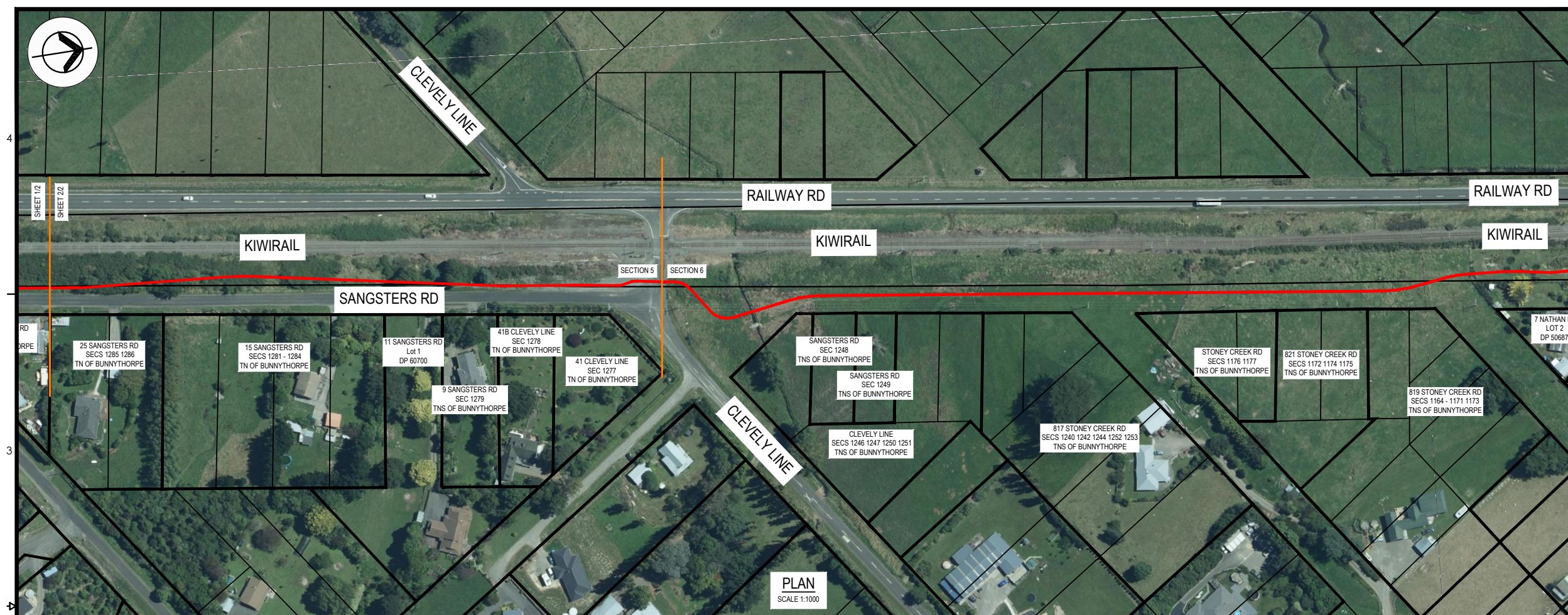
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REV.	AMENDMENTS	INITIAL	DATE
B	CONCEPT	AC	04/08/23
A	CONCEPT	AC	05/07/23
PROGRAMME		PROJECT 12584744	
JOB TITLE			
PALMERSTON NORTH CITY COUNCIL PALMERSTON NORTH TO FEILDING SHARED PATHWAY			
DRAWING TITLE			
PROPERTIES AFFECTED BY SHARED PATHWAY SECTION 4 SHEET 1/2			
	NAME	SIGNED	DATE
DESIGNED	K.MCTAMNEY	K.M.	04/08/23
DES. REVIEW	S.DOIDGE	S.D.	04/08/23
DRAWN	K.MCTAMNEY	K.M.	04/08/23
DRW. CHECK	S.DOIDGE	S.D.	04/08/23
APPROVED			
FOR TENDER			
DATE		SIGNED	
FOR CONSTRUCTION			
DATE		SIGNED	
CHIEF ENGINEER - APPROVED			
STUART CARTWRIGHT			
ACTIVITIES MANAGER - ACTIVE TRANSPORT			
MICHAEL BRIDGE			
SCALES	A1 1:1000		A3 1:2000
PNCC No.	6441		
CONSULTANT No.	12584744		
DATE	DRAWING No.	REVISION	
04/08/23	04-G003	B	







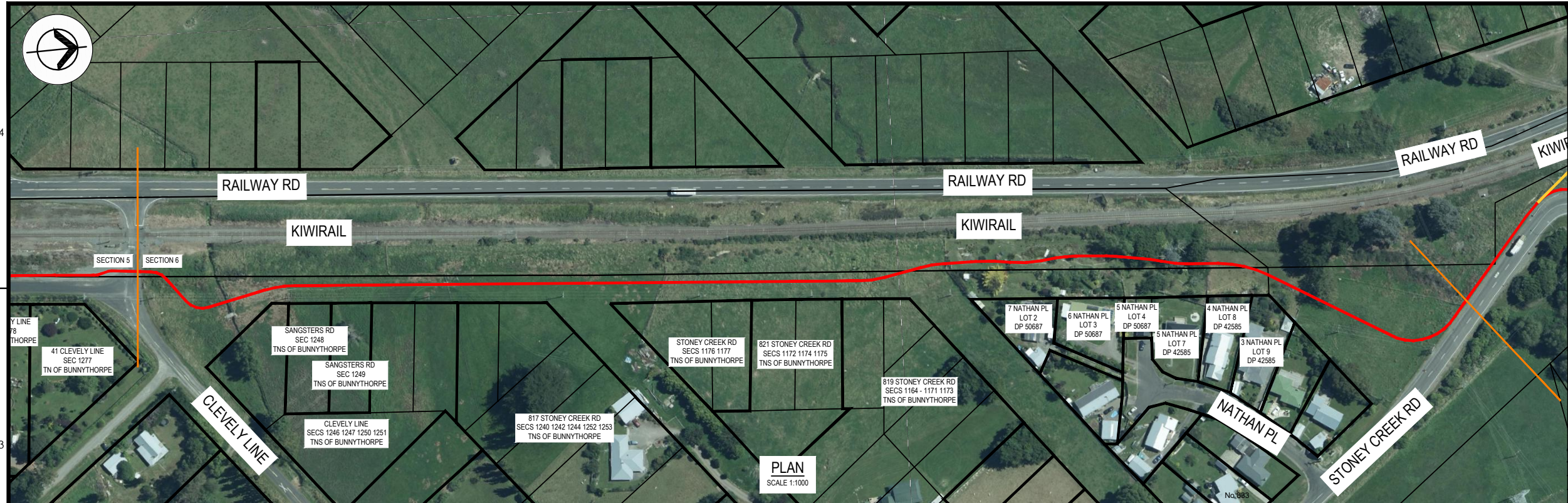
PROPERTY DESCRIPTION								
LOCATION	VALUATION NUMBER	LEGAL	CERTIFICATE OF TITLE	PROPERTY OWNER	ROAD FRONTAGE	AFFECTED BY PATHWAY	OCCUPYING PAPER ROAD	OCCUPYING KIWIRAIL
KWIRAIL(NMT)	99940 016 00	VARIOUS RAILWAY LAND IN PALMERSTON NORTH		KIWR/RAIL	RAILWAY ROAD/SANGSTERS ROAD	YES	N/A	N/A
91 SANGSTERS ROAD	14461 437 00	SUBN SEC 1484 TOWN OF BUNNYTHORPE			SANGSTERS ROAD	NO	YES	YES
405 TUTAKI ROAD	14461 438 00	SEC 1485 TOWN OF BUNNYTHORPE BLK VII KAIRANGA SD			TUTAKI ROAD	NO	YES	YES
73 SANGSTERS ROAD	14461 439 00	SEC 1486 TOWN OF BUNNYTHORPE BLK VII KAIRANGA SD			SANGSTERS ROAD/TUTAKI ROAD	NO	YES	YES
43 SANGSTERS ROAD	14461 528 00	LOT 1 DP 63469			SANGSTERS ROAD	NO	NO	NO
59 PARRS ROAD	14461 529 00	LOT 1 DP 410192			PARRS ROAD	NO	NO	NO
27 SANGSTERS ROAD	14461 550 00	SEC 1287 TOWN OF BUNNYTHORPE BLK VII KAIRANGA SD			PARRS ROAD	NO	NO	NO

NOTES:			
REV.	AMENDMENTS	INITIAL	DATE
B	CONCEPT	AC	04/08/23
A	CONCEPT	AC	05/07/23
 			
PROGRAMME		PROJECT 1258474	
JOB TITLE			
PALMERSTON NORTH CITY COUNCIL PALMERSTON NORTH TO FELDING SHARED PATHWAY			
DRAWING TITLE			
PROPERTIES AFFECTED BY SHARED PATHWAY SECTION 5 SHEET 1/2			
DESIGNED	NAME	SIGNED	DATE
DESIGNED	K.MCTAMNEY	K.M.	04/08/23
DES. REVIEW	S.DOIDGE	S.D.	04/08/23
DRAWN	K.MCTAMNEY	K.M.	04/08/23
DRW. CHECK	S.DOIDGE	S.D.	04/08/23
APPROVED			
FOR TENDER			
DATE		SIGNED	
FOR CONSTRUCTION			
DATE		SIGNED	
CHIEF ENGINEER - APPROVED			
STUART CARTWRIGHT			
ACTIVITIES MANAGER - ACTIVE TRANSPORT			
MICHAEL BRIDGE			
SCALES A1 1:1000		A3 1:2000	
PNCC No. 6442			
CONSULTANT No. 12584744			
DATE 04/08/23		DRAWING No. 05-G003	
		REVISION B	



PROPERTY DESCRIPTION								
LOCATION	VALUATION NUMBER	LEGAL	CERTIFICATE OF TITLE	PROPERTY OWNER	ROAD FRONTAGE	AFFECTED BY PATHWAY	OCCUPYING PAPER ROAD	OCCUPYING KIWIRAIL
KIWIRAIL	99940 016 00	VARIOUS RAILWAY LAND IN PALMERSTON NORTH		KIWIRAIL	RAILWAY ROAD/SANGSTERS ROAD/PAPER ROAD	YES	N/A	N/A
25 SANGSTERS ROAD	14461 551 00	SECS 1285 1286 TOWN OF BUNNYTHORPE			SANGSTERS ROAD	NO	NO	NO
15 SANGSTERS ROAD	14461 552 00	SECS 1281-1284 TOWN OF BUNNYTHORPE BLK VII KAIRANGA SD			SANGSTERS ROAD	NO	NO	NO
11 SANGSTERS ROAD	14461 553 00	LOT 1 DP 60700			SANGSTERS ROAD	NO	NO	NO
9 SANGSTERS ROAD	14461 554 00	SEC 1279 TOWNSHIP OF BUNNYTHORPE			SANGSTERS ROAD	NO	NO	NO
41B CLEVELY LINE	14461 555 00	SEC 1278 TOWN OF BUNNYTHORPE BLK VII KAIRANGA SD			SANGSTERS ROAD	NO	NO	NO
41 CLEVELY LINE	14461 556 00	SEC 1277 TOWN OF BUNNYTHORPE			CLEVELY LINE	NO	NO	NO

NOTES:			
REV	AMENDMENTS	INITIAL	DATE
B	CONCEPT	AC	04/08/23
A	CONCEPT	AC	05/07/23
 			
PROGRAMME		PROJECT 1258474	
JOB TITLE			
PALMERSTON NORTH CITY COUNCIL PALMERSTON NORTH TO FEILDING SHARED PATHWAY			
DRAWING TITLE			
PROPERTIES AFFECTED BY SHARED PATHWAY SECTION 5 SHEET 2/2			
	NAME	SIGNED	DATE
DESIGNED	K. MCITAMNEY	K.M.	04/08/23
DES. REVIEW	S. DOIDGE	S.D.	04/08/23
DRAWN	K. MCITAMNEY	K.M.	04/08/23
DRW. CHECK	S. DOIDGE	S.D.	04/08/23
APPROVED			
FOR TENDER			
DATE		SIGNED	
FOR CONSTRUCTION			
DATE		SIGNED	
CHIEF ENGINEER - APPROVED			
STUART CARTWRIGHT			
ACTIVITIES MANAGER - ACTIVE TRANSPORT			
MICHAEL BRIDGE			
SCALES	A1 1:1000		A3 1:2000
PNCC No.	6442		
CONSULTANT No.	12584744		
DATE	DRAWING No.	REVISION	
04/08/23	05-G004	B	



NOTES:

REV	AMENDMENTS	INITIAL	DATE
B	CONCEPT	AC	04/08/23
A	CONCEPT	AC	05/07/23

PROGRAMMEPROJECT 12584744

JOB TITLE

PALMERSTON NORTH
CITY COUNCIL
PALMERSTON NORTH TO
FEILDING SHARED PATHWAY

DRAWING TITLE

PROPERTIES AFFECTED
BY SHARED PATHWAY
SECTION 6

	NAME	SIGNED	DATE
DESIGNED	K. MCTAMNEY	K.M.	04/08/23
DES. REVIEW	S. DODGE	S.D.	04/08/23
DRAWN	K. MCTAMNEY	K.M.	04/08/23
DRW. CHECK	S. DODGE	S.D.	04/08/23

APPROVED

FOR TENDER

DATE	SIGNED

FOR CONSTRUCTION

DATE	SIGNED

CHIEF ENGINEER - APPROVED

STUART CARTWRIGHT

ACTIVITIES MANAGER - ACTIVE TRANSPORT

MICHAEL BRIDGE

SCALES A1 1:1000 A3 1:2000

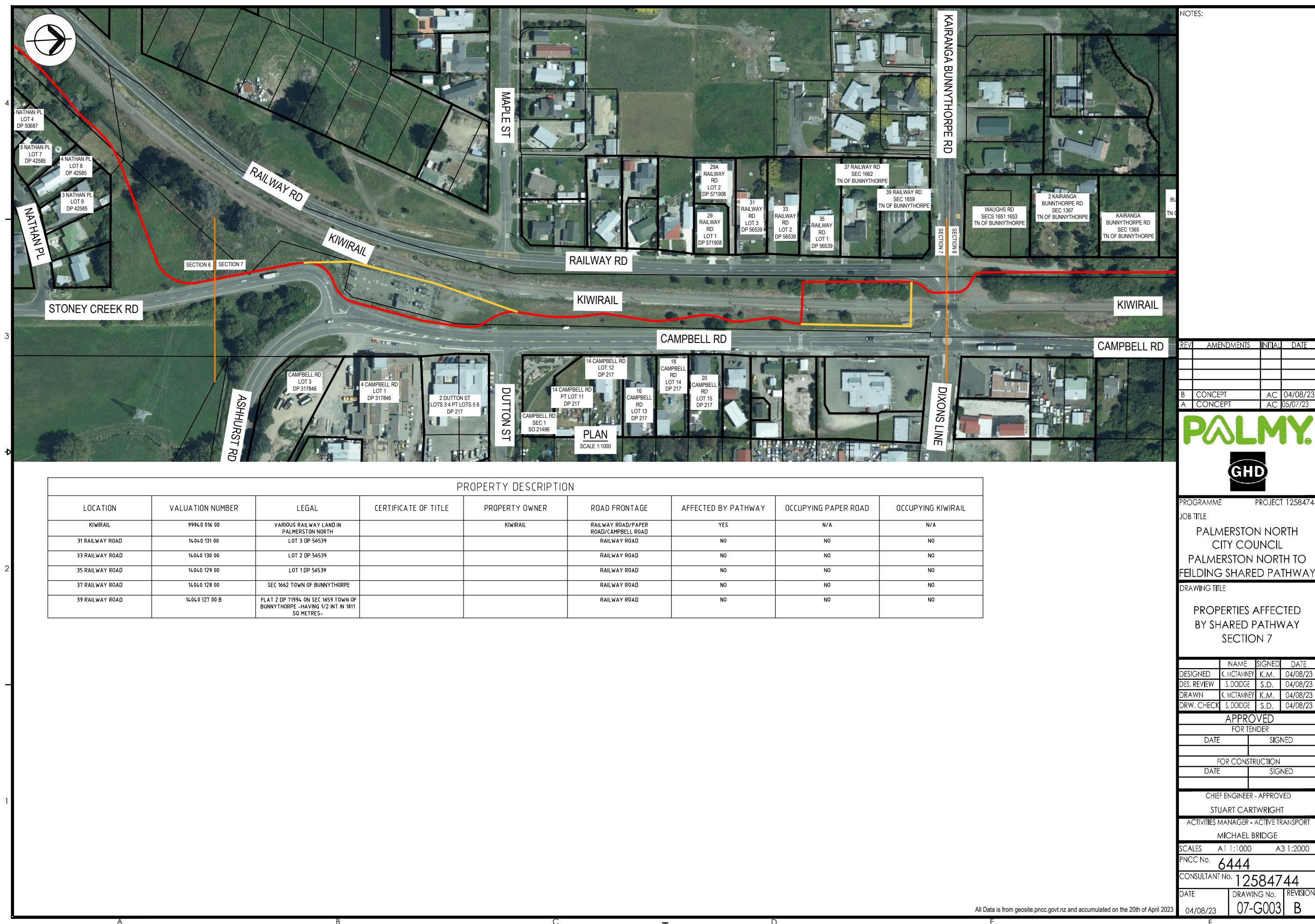
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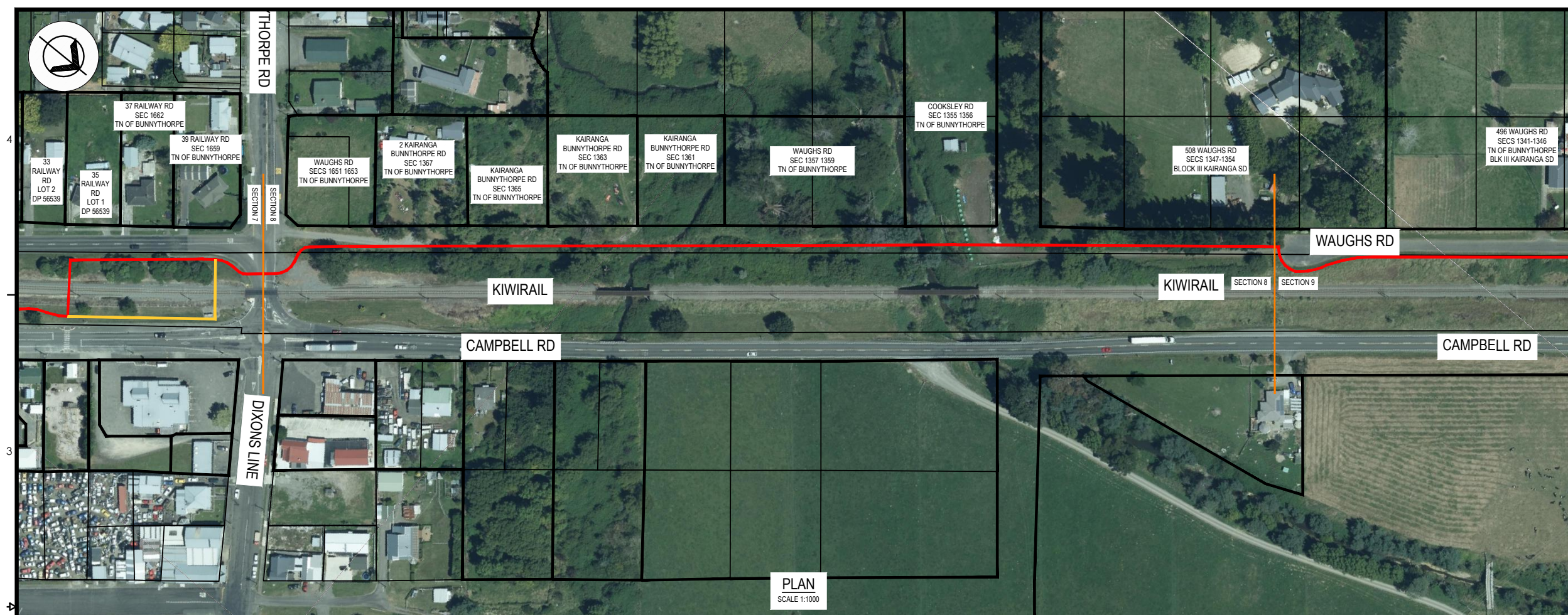
CONSULTANT No. 12584744

DATE	DRAWING No.	REVISION
04/08/23	06-G003	B

PROPERTY DESCRIPTION								
LOCATION	VALUATION NUMBER	LEGAL	CERTIFICATE OF TITLE	PROPERTY OWNER	ROAD FRONTAGE	AFFECTED BY PATHWAY	OCCUPYING PAPER ROAD	OCCUPYING KIWIRAIL
KIWIRAIL	99940 016 00	VARIOUS RAILWAY LAND IN PALMERSTON NORTH		KIWIRAIL	RAILWAY ROAD/PAPER ROAD/CAMPBELL ROAD	YES	N/A	N/A
CLEVELY LINE	14 04 0 193 00	SECS 1246 1247 1250 1251 TOWNSHIP OF BUNNYTHORPE			CLEVELY LINE	YES	YES	NO
SANGSTERS ROAD	14 04 0 194 00	SEC 1248 TOWNSHIP OF BUNNYTHORPE			CLEVELY LINE	YES	YES	NO
SANGSTERS ROAD	14 04 0 195 00	SEC 1249 TOWNSHIP OF BUNNYTHORPE			CLEVELY LINE	YES	YES	NO
817 STONEY CREEK ROAD	14 04 0 182 00	SECS 1238 1240 1242 1244 1252 1253 TOWNSHIP OF BUNNYTHORPE			STONEY CREEK ROAD	YES	YES	NO
STONEY CREEK ROAD	14 04 0 181 00	SECS 1174 1177 TOWNSHIP OF BUNNYTHORPE			STONEY CREEK ROAD	YES	YES	NO
821 STONEY CREEK ROAD	14 04 0 180 00	SECS 1172 1174 1175 TOWNSHIP OF BUNNYTHORPE			STONEY CREEK ROAD	YES	NO	NO
819 STONEY CREEK ROAD	14 04 0 178 00	SECS 1164 - 1171 1173 TOWNSHIP OF BUNNYTHORPE			STONEY CREEK ROAD	YES	NO	NO
7 NATHAN PLACE	14 04 0 166 00	LOT 2 DP 50687			NATHAN PLACE	YES	YES	YES
6 NATHAN PLACE	14 04 0 165 00	LOT 3 DP 50687			NATHAN PLACE	YES	YES	YES
5 NATHAN PLACE	14 04 0 164 00	LOT 4 DP 50687 LOT 7 DP 42585			NATHAN PLACE	YES	YES	YES
4 NATHAN PLACE	14 04 0 163 00	LOT 8 DP 42585			NATHAN PLACE	YES	NO	NO
3 NATHAN PLACE	14 04 0 162 00	LOT 9 DP 42585			NATHAN PLACE	YES	NO	NO



All Data is from geosite.pncc.govt.nz and accumulated on the 20th of April 2023





NOTES:

REV	AMENDMENTS	INITIAL	DATE
B	CONCEPT	AC	04/08/23
A	CONCEPT	AC	05/07/23

PROGRAMME	PROJECT 12584744
JOB TITLE	
PALMERSTON NORTH CITY COUNCIL	
PALMERSTON NORTH TO	
FEILDING SHARED PATHWAY	
DRAWING TITLE	
PROPERTIES AFFECTED BY SHARED PATHWAY SECTION 8	

	NAME	SIGNED	DATE
DESIGNED	K.MCTAMNEY	K.M.	04/08/23
DES. REVIEW	S.DOIDGE	S.D.	04/08/23
DRAWN	K.MCTAMNEY	K.M.	04/08/23
DRW. CHECK	S.DOIDGE	S.D.	04/08/23

APPROVED

FOR TENDER

DATE	SIGNED

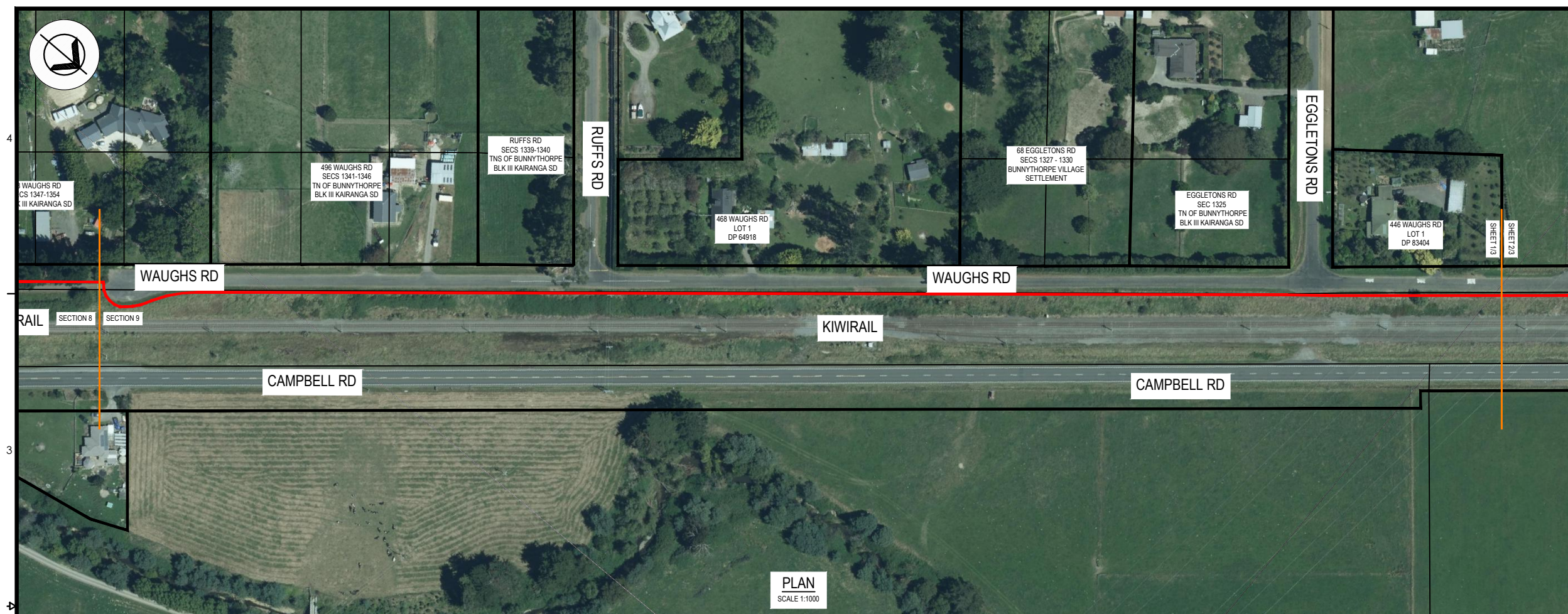
FOR CONSTRUCTION

DATE	SIGNED

CHIEF ENGINEER - APPROVED	
STUART CARTWRIGHT	
ACTIVITIES MANAGER - ACTIVE TRANSPORT	
MICHAEL BRIDGE	

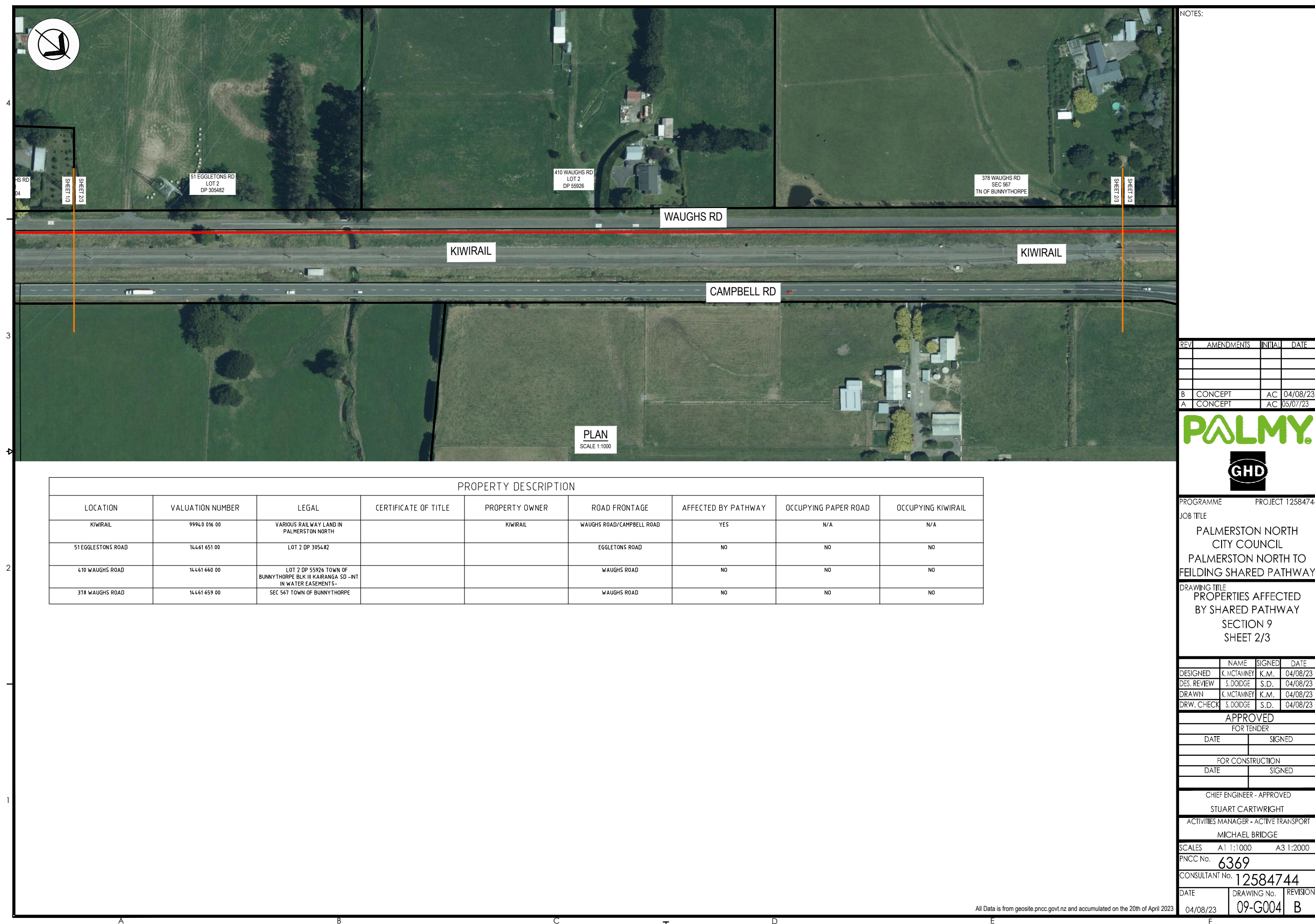
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CONSULTANT No.	12584744	

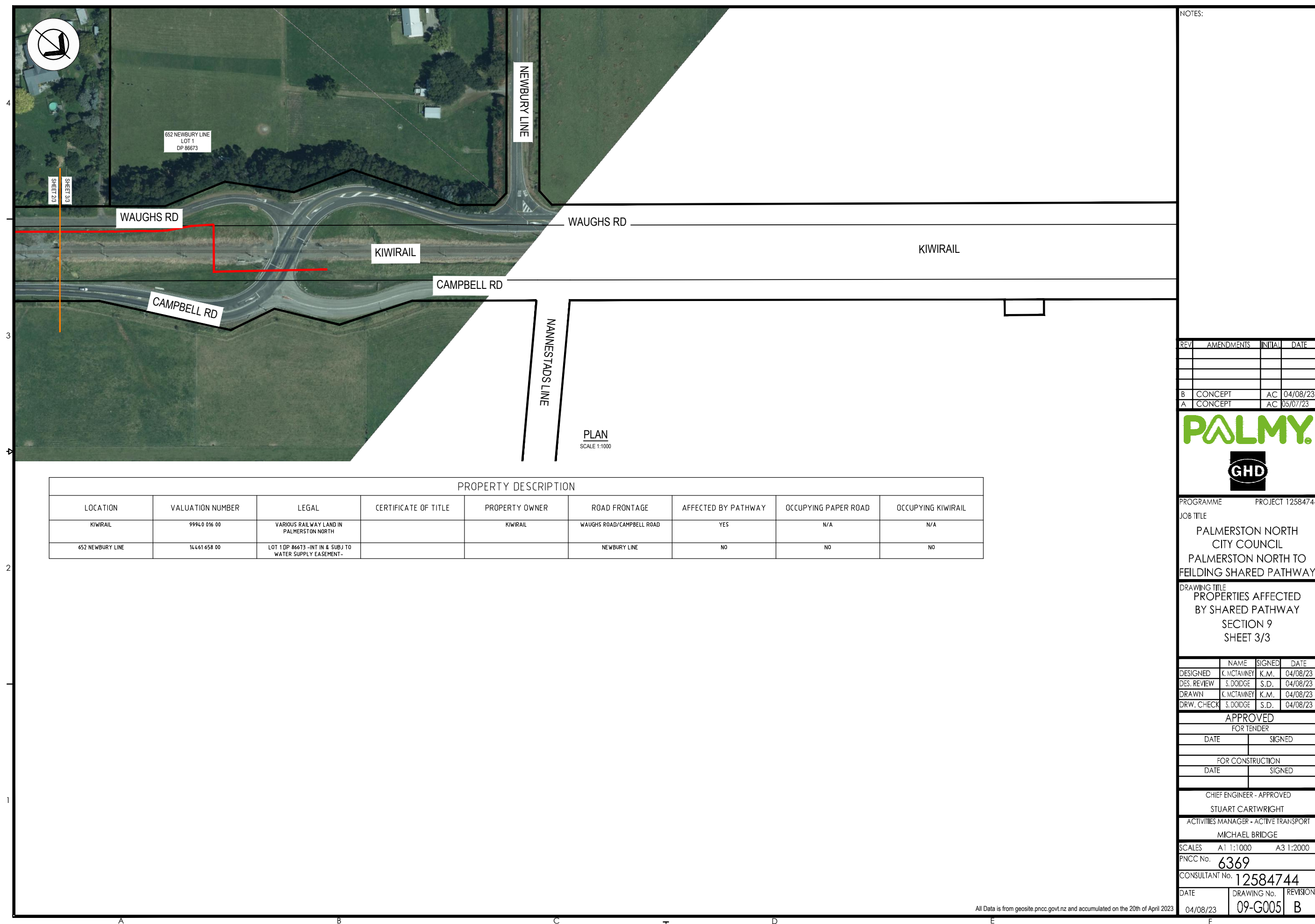
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04/08/23	08-G003	B



PROPERTY DESCRIPTION								
LOCATION	VALUATION NUMBER	LEGAL	CERTIFICATE OF TITLE	PROPERTY OWNER	ROAD FRONTAGE	AFFECTED BY PATHWAY	OCCUPYING PAPER ROAD	OCCUPYING KIWIRAIL
KIWIRAIL	99940 016 00	VARIOUS RAILWAY LAND IN PALMERSTON NORTH		KIWIRAIL	WAUGHS ROAD/CAMPBELL ROAD	YES	N/A	N/A
496 WAUGHS ROAD	14461 663 00	SECS 1341-1346 TOWN OF BUNNYTHORPE BLK III KAIRANGA SD			WAUGHS ROAD	NO	NO	NO
RUFFS ROAD	14461 630 00	SECS 1339 1340 TOWN OF BUNNYTHORPE BLK III KAIRANGA SD			WAUGHS ROAD	NO	NO	NO
468 WAUGHS ROAD	14461 662 00	LOT 1 DP 64 918			WAUGHS ROAD	NO	NO	NO
68 EGGLETONS ROAD	14461 648 00	SECS 1327-1330 TOWN OF BUNNYTHORPE VILLAGE SETTLEMENT			WAUGHS ROAD	NO	NO	NO
EGGLETONS ROAD	14461 650 00	SEC 1325 TOWN OF BUNNYTHORPE BLK III KAIRANGA SD			EGGLETONS ROAD	NO	NO	NO
446 WAUGHS ROAD	14461 661 00	LOT 1 DP 83404			WAUGHS ROAD	NO	NO	NO

NOTES:			
REV	AMENDMENTS	INITIAL	DATE
B	CONCEPT	AC	04/08/23
A	CONCEPT	AC	05/07/23
PROGRAMME		PROJECT 12584744	
JOB TITLE			
PALMERSTON NORTH CITY COUNCIL PALMERSTON NORTH TO FEILDING SHARED PATHWAY			
DRAWING TITLE			
PROPERTIES AFFECTED BY SHARED PATHWAY SECTION 9 SHEET 1/3			
	NAME	SIGNED	DATE
DESIGNED	K.MCTAMNEY	K.M.	04/08/23
DES. REVIEW	S.DOIDGE	S.D.	04/08/23
DRAWN	K.MCTAMNEY	K.M.	04/08/23
DRW. CHECK	S.DOIDGE	S.D.	04/08/23
APPROVED			
FOR TENDER			
DATE		SIGNED	
FOR CONSTRUCTION			
DATE		SIGNED	
CHIEF ENGINEER - APPROVED			
STUART CARTWRIGHT			
ACTIVITIES MANAGER - ACTIVE TRANSPORT			
MICHAEL BRIDGE			
SCALES	A1 1:1000		A3 1:2000
PNCC No.	6369		
CONSULTANT No.	12584744		
DATE	DRAWING No.	REVISION	
04/08/23	09-G003	B	





Palmerston North to Feilding Pathway Budgets (Uninflated)

Programme 2057 (City-wide Shared Pathways New and Link Improvements) Budget as proposed in 2024-34 LTP:

	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	TOTAL
	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	
Programme 2057	\$5M	\$5M	\$5M	\$5M	\$5M	\$5M	\$5M	\$5M	\$5M	\$5M	\$5M	\$50M

Currently Forecasted Project Budget for Palmerston North to Feilding Pathway:

	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	TOTAL
	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	
Construction (engineers estimate)	\$3.3M	\$3.3M	\$3.3M	\$3.3M					\$3.05M	\$5M	\$1.48M	\$22.73M
Section of the pathway being constructed	Waughs paper road (Kairanga-Bunnythorpe Rd to Waughs Rd)	Stoney Creek to Clevely (plus balance of the first section)	Sangsters paper road (plus balance of the second section)	Midhurst paper road (plus balance of the third section)					Bunnythorpe Village & Midhurst-Tremaine	Waughs & Sangsters roads	Balance of works	

*** Note: that the balance of the budget in Programme 2057 will be used for delivery of the Manawatu River Pathway.

Potential Revised Budget for Minimum Viable Product:

	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	TOTAL
	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	
Construction (engineers estimate)	\$3.3M	\$3.3M	\$3.3M	\$3.3M								\$13.2M
Section of the pathway being constructed	Waughs paper road (Kairanga-Bunnythorpe Rd to Waughs Rd)	Stoney Creek to Clevely (plus balance of the first section)	Sangsters paper road (plus balance of the second section)	Midhurst paper road (plus balance of the third section)								

COMMITTEE WORK SCHEDULE

TO: Sustainability Committee

MEETING DATE: 22 May 2024

TITLE: Committee Work Schedule

RECOMMENDATION TO SUSTAINABILITY COMMITTEE

1. That the Sustainability Committee receive its Work Schedule dated May 2024.

SUSTAINABILITY COMMITTEE WORK SCHEDULE – MAY 2024

Estimated Report Date	Subject	Officer Responsible	Current Position	Date of Instruction & Clause number
22 May 2024	Develop a City-Wide Food Resilience and Security Policy	Chief Planning Officer		Council 31 May 2023 Clause 88.10
22 May 2024	Environmental Sustainability Report 2023	CE Unit Manager		Terms of Reference of the Committee Last report presented May 2022
22 May 2024	Opportunities for native species re-introductions in the Turitea Reserve area—Update (incl projected funding requirements)	Chief Planning Officer		17 November 2021 Clause 38.21 7 June 2022 Clause 16.23 Last update presented Jun 2023
	Options to transition out of small vehicle fleet ownership and long-term lease, with a view to utilisation of a carshare or similar	Chief Planning Officer & Chief Infrastructure Officer	Moved to Strategy & Finance Committee work schedule	Council 29 Nov 2023 Clause 193.3-23

	services Financial Year 2027 onwards			
21 August 2024	Wastewater Discharge Consent Project - Quarterly Update	Chief Infrastructure Officer		<u>11 May 2022</u> <u>Clause 26-22</u>
21 August 2024	Manawatū-Whanganui Climate Joint Action Committee Update	Chief Planning Officer		Climate change plan ongoing Last report presented Aug 2023
16 October 2024	Citywide Emissions Inventory 2023 Annual Report	Chief Planning Officer		Climate change plan ongoing action #3 Last report presented Oct 23
16 October 2024	Low Carbon Roadmap - options to achieve the city-wide goal of 30% reduction in emissions by 2031	Chief Planning Officer		<u>30 March 2022</u> <u>Clause 6-22,</u> Climate change plan ongoing action #5
16 October 2024	PNCC Organisational Emissions Inventory 2023/24 Annual Report	Chief Planning Officer		Climate change plan ongoing action #1 Last report presented Oct 23
16 October 2024	Waste management and minimisation plan 2019 - annual progress update for 2023/24 FY	Chief Infrastructure Officer		<u>9 Sept 2020</u> <u>Clause 17-20</u> Last report presented Oct 23
16 October 2024	6 monthly update on the Low Carbon Fund FY2023/24	Chief Planning Officer		

2025	Annual Sector Lead Report: Environment Network Manawatū	Chief Customer Officer		Terms of Reference
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