



**WAIMAKARIRI**  
DISTRICT COUNCIL

# **Council Agenda**

**Tuesday 7 September 2021**

**Commencing at 1.00pm**

**Conducted via Zoom due to National  
Covid-19 Lockdown restrictions**

***Members:***

Mayor Dan Gordon  
Councillor Neville Atkinson  
Councillor Kirstyn Barnett  
Councillor Al Blackie  
Councillor Robbie Brine  
Councillor Wendy Doody  
Councillor Niki Mealings  
Councillor Philip Redmond  
Councillor Sandra Stewart  
Councillor Joan Ward  
Councillor Paul Williams

The Mayor and Councillors

**WAIMAKARIRI DISTRICT COUNCIL**

A meeting of the **WAIMAKARIRI DISTRICT COUNCIL** will be held in **VIA ZOOM LINK**  
**DUE TO NATIONAL COVID-19 LOCKDOWN RESTRICTIONS** on **TUESDAY**  
**7 SEPTEMBER 2021** commencing at **1pm**.

Sarah Nichols  
GOVERNANCE MANAGER

**Recommendations in reports are not to be construed as  
Council policy until adopted by the Council**

**BUSINESS**

*Page No*

1. **APOLOGIES**

2. **CONFLICTS OF INTEREST**

*Conflicts of interest (if any) to be reported for minuting.*

3. **ACKNOWLEDGEMENTS**

4. **CONFIRMATION OF MINUTES**

4.1. **Minutes of meetings of the Waimakariri District Council held on 3 and 24 August 2021**

*RECOMMENDATION*

**THAT** the Council:

- (a) **Confirms**, as a true and correct record, the circulated minutes of a meeting of the Waimakariri District Council held on 3 August 2021.
- (b) **Confirms**, as a true and correct record, the circulated minutes of a meeting of the Waimakariri District Council held on 24 August 2021.

14 - 37

38 - 39

**MATTERS ARISING**

4.2. **Minutes of the public excluded meetings of the Waimakariri District Council held on 3 and 24 August 2021**

*(Refer to public excluded agenda)*

5. **DEPUTATIONS AND PRESENTATIONS**

6. **ADJOURNED BUSINESS**

There is no adjourned business.

7. **RECOVERY PROJECTS**

**COVID-19 RECOVERY PLANNING / SHOVEL READY PROJECTS**

7.1. **Oxford Wastewater Stimulus Projects Update – C Roxburgh (Water Asset Manager) and C Fahey (Water Operations Team Leader)**

40 - 177

*RECOMMENDATION*

**THAT** the Council:

- (a) **Receives** Report No. 210811131529.
- (b) **Notes** that initial investigations into inflow and infiltration (I&I) on the Oxford wastewater system have identified some areas to make minor improvements, and that overall the system is on average performing similar to typical threshold levels for wastewater systems in New Zealand.
- (c) **Notes** that the Master Plan for the Oxford Wastewater Treatment Plant (WWTP) is still being finalised, however is likely to identify a Membrane Aerated Biofilm Reactor (MABR) as the optimum upgrade method to meet achieve a renewal of the resource consent by 2031, taking into account future expected requirements, with a recommended budget figure of \$2.9 million, as well as identifying a need for further sampling to be undertaken in the coming years, and that a further report will be presented outlining these requirements and costs.
- (d) **Notes** that investigations into options to resolve high costs associated with sludge disposal at the Oxford WWTP have identified modifications to existing processes, following installation of new monitoring equipment as the recommended option.
- (e) **Approves** the reduction of the Inflow and Infiltration Investigations Stimulus Budget by \$164,000 and the creation of two new capital Stimulus budget for the Oxford scheme called Oxford WWTP Monitoring Upgrades to the value of \$164,000.
- (f) **Notes** that it has been forecast that with the additional monitoring equipment, and optimisation of the current sludge management processes (informed by this new equipment), operational savings in the order of \$85,000 to \$113,000 per year are forecast, which would result in ratings reductions of \$95 to \$127 per connection per year, but that these savings may take several years to realise, and these projections will be updated following the completion of initial trials that are underway currently.
- (g) **Notes** that some investigations and further analysis on the Oxford wastewater scheme is still ongoing, and that a further report will be brought to the Utilities and Roading Committee at the conclusion of the Stimulus funded works.
- (h) **Circulates** this report to the Oxford-Ohoka Community Board for their information.

## **29-30 MAY 2021 ADVERSE WEATHER EVENT RECOVERY**

Verbal update from Simon Hart (Recovery Manager)

### **7.2. May 2021 Flood Event and Emergency Works - Updated Costs – G Cleary** (Manager Utilities and Roading)

178 - 208

#### *RECOMMENDATION*

**THAT** the Council:

- (a) **Receives** Report No. 210817135255;
- (b) **Approves** budget of \$2.82 million in responding to the flood event and recovery from the flood damage as follows:

<b>Asset Area</b>	<b>Budget for Approval \$</b>
Water	Nil
Wastewater	Nil
Drainage	Nil
Roading (GL 10.270.588.2442)	2,640,000
River Flood Works	Nil
Greenspaces (GL 10.537.050.1688)	166,000
Property (GL 10.163.739.2570)	5,250
<b>TOTAL</b>	<b>\$2,811,250</b>

- (c) **Notes** that the Roading budget will be funded partially by Waka Kotahi (estimated \$1.589m subject to approval) and partially from general rates (estimated \$1.051m) which will be loan funded;
- (d) **Notes** that the Greenspace and Property budgets will be funded from general rates (estimate \$171,250) which will be loan funded;
- (e) **Notes** that the total rating impact from this additional budget, less the Waka Kotahi co-funding, is \$3.15 per ratepayer or 0.10%;
- (f) **Notes** that staff are continuing to work with Waka Kotahi, insurers and other external parties to secure funding for the works where available;
- (g) **Notes** that a separate report has been prepared covering the Mountain Road flooding affecting the Oxford Rural No.2 water supply, therefore that budget request is not covered within this report (refer report no. 210723120988);
- (h) **Circulates** this report to all Community Boards for information.

## 8. REPORTS

### 8.1. Canterbury Waste Joint Committee: Request Environment Canterbury to Re-join Canterbury Waste Joint Committee and Host Staff Resource – K Waghorn (Solid Waste Asset Manager)

209 - 229

#### *RECOMMENDATION*

**THAT** the Council:

- (a) **Receives** Report No. 210811131920.
- (b) **Approves**, subject to the conditions in 2(c), the Canterbury Waste Joint Committee recommendations to member Councils to:
  - i. Agree that a new staff position be created to progress waste minimisation and management initiatives across the region and improve regional collaboration.
  - ii. Agree that the budget for regional waste minimisation be increased from \$112,000 to \$192,000, to be adjusted annually for inflation.
  - iii. Agree that Environment Canterbury be invited to become a member of the Committee on the same terms and conditions as its previous membership.
- (c) **Notes** that the Waimakariri District Council approval is subject to Environment Canterbury re-joining the Canterbury Waste Joint Committee, and to hosting and funding overheads and other costs over and above the salary of the regional staff member.
- (d) **Notes** that the proposed increase in total CWJC funding would see the Waimakariri District Council's funding share increase from \$9,441.60 to \$19,287.05 in 2022/23.
- (e) **Notes** that that the budget allowance for Canterbury Waste Joint Committee funding in the 22/23 year is \$30,000, therefore the 2021-31 Long Term Plan budget allocation to fund the Canterbury Waste Joint Committee out of the Waste Minimisation Account is sufficient to cover the proposed level of funding.
- (f) **Notes** that the activities and projects in the Waste Minimisation Account are primarily funded by the waste disposal levy received from the Ministry for the Environment.
- (g) **Notes** that any further amendments to the regional waste minimisation budget and contributions from individual Councils will be brought back to the Council for approval.
- (h) **Notes** that Environment Canterbury withdrew from the Canterbury Waste Joint Committee in 2010/11 in order to focus on hazardous waste in combination with industrial pollution as a core activity.
- (i) **Notes** that staff from Environment Canterbury have continued to contribute time toward the regional staff group since 2011/12 and support this proposal, however and their appetite to re-join has not been canvassed with any ECan managers, the Chief Executive or Councillors.
- (j) **Notes** that the recruitment timeline for the staff position is dependent on receiving approval from all contributing Councils and whether or not Environment Canterbury agrees to re-join the CWJC and to host the staff position.

8.2. **Approval to Consult on the Waimakariri District Walking and Cycling Network Plan and Infrastructure Prioritisation Programme – Update – D Young (Senior Engineering Advisor) and A Mace-Cochrane (Graduate Engineer)**

230 - 266

*RECOMMENDATION*

THAT the Council:

- (a) **Receives** Report No. 210826138519;
- (b) **Approves** consultation being carried out on the Walking and Cycling Network Plan (Attachment ii), and the proposed infrastructure prioritisation programme shown in Attachment iii, noting that the recreational paths are for information only due to different funding requirements;
- (c) **Notes** that the proposed infrastructure prioritisation programme is based on the joint budget allocation, by Council and Waka Kotahi, of \$4,700,000 across ten years, with the amount varying from year to year;
- (d) **Notes** that pre-engagement will be carried out in October, with district-wide consultation occurring from the start of November to the start of December;
- (e) **Notes** that the results of the public consultation and final proposals will be presented to the Community Boards and then Council for approval;
- (f) **Notes** the plan and prioritisation of routes will be reviewed every three years.

8.3. **Hakarau Road – Proposed Partial Road Stopping – R Qu (Property Assets Advisor - Assets Planning, Acquisitions & Disposals) and D Young (Senior Engineering Advisor)**

267 - 300

*RECOMMENDATION*

**THAT** the Council:

- (a) **Receives** report No. 210811132101
- (b) **Receives** the Road Stopping application from Misura Surveying Solutions which has been prepared on behalf of Clampett Investments.
- (c) **Approves** the stopping of the road portions being Lot 203 and Lot 204 as per the proposal received.
- (d) **Authorises** the Chief Executive to sign the Private Development Agreement (Attachment ii Trim 210901140190), allowing for minor word changes and alterations.
- (e) **Approves** the disposal of the stopped road to Clampett Investments at no cost (noting the vesting to Council of an equivalent area by them as road with no compensation payable).
- (f) **Authorises** the Chief Executive and Property Manager to finalise the necessary legislative and process actions required to stop the road and then complete the transactions, at no cost to Council.

- (g) **Notes** that the Private Development Agreement address such matters as the road stopping and vesting, allocation of costs, the link strip along Smith St and the staging of the carparks, cycle parks and landscaping.
- (h) **Notes** that all costs associated with stopping the road, transferring it to the ownership of the neighbouring landowner and the vesting of equivalent are as road shall be covered at by Clampett Investments i.e. at no cost to the Council.
- (i) **Notes** that should the approved process referenced in recommendation (l) below be successful, Council will by public notice declare that portion of Hakarau Road identified in the application is stopped and that it will cease to be road.
- (j) **Notes** that the stopped road will be replaced by Lot 200 as per the proposal, therefore providing equivalent or better access.
- (k) **Notes** that there are two legitimate legislative options for processing the road stopping and that both have merit for different reasons, depending on the particular circumstances.
- (l) **Authorises** the Chief Executive and Property Manager utilise;
  - iv. **Section 342 and the** 10th Schedule of the Local Government Act 1974 (LGA) to process the road stopping
  - or
  - v. Section 116 of the Public Works Act 1981 (PWA) to process the road stopping.
- (m) **Acknowledges** that both the LGA and PGA processes may be subject to objection and / or rejection at which point staff would refer the matter back to the Council to determine.

8.4. Six Month E-Scooter Trial in the Waimakariri District – V Thompson (Business and Centres Advisor) and S Hart (Business and Centres Manager) on behalf of the Town Centre Strategies Implementation Programme Working Group

301 - 334

*RECOMMENDATION*

**THAT** the Council:

- (a) **Receives** Report No. 210819135927;
- (b) **Notes** that the Town Centres Strategies Implementation Programme Working Group was appointed by Council as the steering group for this project in October 2020. They have pre-approved Flamingo Scooters as the e-scooter share operator and endorsed a six month e-scooter trial plus the trial conditions outlined at clauses 4.3 to 4.4;
- (c) **Notes** that on 4 May 2021 Council approved 'in principle' a six month trial of up to 400 hire e-scooters in the Waimakariri district by Flamingo Scooters, noting that details of any trial parameters would be brought back to Council at a later date for consideration toward formal approval;
- (d) **Notes** that the Community Boards have supported the trial and any feedback has been addressed (where possible) in the trial conditions outlined in clauses 4.3 to 4.4;

- (e) **Notes** that pre-engagement was undertaken with the Waimakariri Access Group, Age-Friendly Waimakariri and the Youth Council and their feedback has been addressed (where possible) in the trial conditions outlined in clauses 4.3 to 4.4;
- (f) **Notes** the proposed trial period of six months from October/November 2021 to March/April 2022;
- (g) **Notes** that a maximum of 400 e-scooters will be distributed across the townships of Rangiora, Kaiapoi, Woodend and Pegasus;
- (h) **Notes** the proposed geo-fencing restrictions identifying the 'no-go', 'preferred parking', 'no parking', 'speed restriction' and 'special access' zones for the e-scooters outlined at clause 4.3.6;
- (i) **Notes** that some key safety considerations for the trial are identified at clause 4.4;
- (j) **Notes** that Flamingo Scooters will be responsible for covering the trial's infrastructure and operational costs and no significant financial contribution is required from Council;
- (k) **Notes** that at the conclusion of the trial, a full report will be brought back to the Community Boards and Council providing feedback including relevant qualitative and quantitative data related to e-scooter use and community perceptions;
- (l) **Notes** that the concluding trial report may include a staff recommendation to continue the e-scooter trial on a semi-permanent basis via the issuing of annual operating permits to commercial operator/s, but that any such recommendation will be subject to Community Board feedback and the approval of Council;
- (m) **Approves** the six month trial of up to 400 e-scooters in the Waimakariri District with Flamingo Scooters as the service provider.

## 9. MATTERS REFERRED FROM COMMITTEES/COMMUNITY BOARDS

- 9.1. Capital Works Programme Quarterly Report, June 2021 – G Cleary (Manager Utilities and Roding), D Young (Senior Engineering Advisor) and C Brown (Manager Community and Recreation)  
*(refer to attached copy of report no. 210726121798 to the Audit and Risk Committee meeting of 10 August 2021)*

335 - 345

### RECOMMENDATION

**THAT** the Council:

- (a) **Notes** that an arithmetic error in Report No. 210618098882 to Council in July to reallocate budget to the Roding Minor Safety Budget, resulted in a shortfall in budget of \$104,000 therefore a further reallocation of budget is required.
- (b) **Approves** the reallocation of \$50,960 from the Travel Demand Management Budget (PJ 101389.000.5135) to the Minor Safety budget (PJ 100185.000.5133) to cover **Council share** of the additional safety works.
- (c) **Approves** the Minor Safety budget for 2019/20 (PJ 100185.000.5133) being increased by \$104,000 to a total of \$1,082,750.



- (d) **Notes** that the Travel Demand Management Budget will decrease to \$393,040 and that the full budget will not be spent this year, but instead will be carried over to the 21/22 financial year.

- 9.2. **Approval to Consult on the Waimakariri District Cycle Network Plan and Infrastructure Prioritisation Programme – D Young (Senior Engineering Advisor) and A Mace-Cochrane (Graduate Engineer)**  
*(Report No. 210720118252 (attached for information) went to all the Community Boards at the August round of meetings with recommendations to Council.)*

346 - 374

*Refer to the report in Item 8.2 in this agenda, which includes acknowledgement of discussion with the Community Boards.*

- 9.3. **Heritage and Mahinga Kai Area – Establishment of Co-governance Arrangements – D Roxborough (Implementation Project Manager – District Regeneration)**  
*(refer to attached copy of report no. 210802126558 to the Mahi Tahī Joint Development Committee meeting of 24 August 2021)*

375 - 417

**RECOMMENDATION**

**THAT** the Council:

- (a) **Approves** the establishment of co-governance for the Heritage and Mahinga Kai Reserve development in the Kaiapoi South regeneration area through the existing Te Kōhaka o Tūhaitara Trust in accordance with the terms proposed within this report, to be implemented via addendum to existing agreement and Trust Deed (as required following legal review), and eventual establishment of a lease.
- (b) **Approves** the Terms of Reference, and membership of the proposed Joint Working Group including the following nominated representatives:
- i. Greg Byrnes, General Manager, Te Kōhaka o Tūhaitara Trust
  - ii. Kevin Dwyer, Landscape Architect, Waimakariri District Council
  - iii. Makarini Rupene, Pou matai ko (mahinga kai and cultural land management adviser), or alternate.
- (c) **Notes** that a further report will be brought to Council to approve the final terms of any lease agreement prior to issue, or any changes required to Trust Deed, in accordance with delegations policy.
- (d) **Notes** that a transfer of the existing remaining Regeneration Activity budgets (multi-year of \$1.74m total) for the Heritage and Mahinga Kai project to Te Kōhaka o Tūhaitara Trust will be required, for the purposes of implementation of the reserve development project, and that approval of terms for this will be sought in the further report to Council.
- (e) **Notes** that the Kaiapoi-Tuahiwi Community Board retain an interest in the reserve development and will be involved/consulted in key stakeholder design decision making by and through the WDC representative on the Joint Working Group.
- (f) **Notes** that whilst Council will retain ownership of the land; Te Kōhaka o Tūhaitara Trust will be responsible for implementation works, operational matters and associated costs, and will be submitting reports to Council on progress and seeking funding for ongoing operations costs beyond the project development phase, which are expected to be partly offset by commensurate reductions in Recreation activity budgets.

- (g) **Circulates** this report to the Kaiapoi-Tuahiwi Community Board.

## 10. **WELLBEING, HEALTH AND SAFETY**

- 10.1. **Wellbeing, Health and Safety Report August 2021 – J Harland (Chief Executive)** 418 - 430

### *RECOMMENDATION*

**THAT** the Council:

- (a) **Receives** Report No. 210825137874
- (b) **Notes** that there were no notifiable event this month. WDC is, so far as is reasonably practicable, compliant with the Person Conducting a Business or Undertaking (PCBU) duties of the Health and Safety at Work Act 2015.

## 11. **COMMITTEE MINUTES FOR INFORMATION**

- 11.1. Minutes of a meeting of the Audit and Risk Committee of 20 July 2021 431 - 437
- 11.2. Minutes of a meeting of the Audit and Risk Committee of 10 August 2021 438 - 444
- 11.3. Minutes of a meeting of the District Planning and Regulation Committee of 17 August 2021 445 - 454
- 11.4. Minutes of a meeting of the Community and Recreation Committee of 17 August 2021 455 - 464
- 11.5. Minutes of a meeting of the Canterbury Mayoral Forum of 20 August 2021 465 - 475

### *RECOMMENDATION*

**THAT** Items 11.1– 11.5 be received for information.

## 12. **COMMUNITY BOARD MINUTES FOR INFORMATION**

- 12.1. Minutes of an extraordinary meeting of the Kaiapoi-Tuahiwi Community Board meeting of 2 August 2021 476 - 480
- 12.2. Minutes of a meeting of the Oxford-Ohoka Community Board meeting of 4 August 2021 481 - 490
- 12.3. Minutes of a meeting of the Woodend-Sefton Community Board meeting of 9 August 2021 491 - 498
- 12.4. Minutes of a meeting of the Rangiora-Ashley Community Board meeting of 11 August 2021 499 - 509
- 12.5. Minutes of a meeting of the Kaiapoi-Tuahiwi Community Board meeting of 16 August 2021 510 - 519

### *RECOMMENDATION*

**THAT** Items 12.1– 12.5 be received for information.

13. **REPORTS FOR INFORMATION**

Nil.

14. **CORRESPONDENCE**

Nil.

15. **MAYOR'S DIARY**

15.1. **Mayor's Diary 24 July – 31 August 2021**

520 - 523

RECOMMENDATION

**THAT** the Council:

- (a) **Receives** report no 210901140683.

16. **COUNCIL PORTFOLIO UPDATES**

- 16.1. **Iwi Relationships – Mayor Dan Gordon**  
 16.2. **Greater Christchurch Partnership Update – Mayor Dan Gordon**  
 16.3. **Canterbury Water Management Strategy – Councillor Sandra Stewart**  
 16.4. **International Relationships – Deputy Mayor Neville Atkinson**  
 16.5. **Regeneration (Kaiapoi) – Councillor Al Blackie**  
 16.6. **Climate Change and Sustainability – Councillor Niki Mealings**  
 16.7. **Business, Promotion and Town Centres – Councillor Joan Ward**

17. **QUESTIONS**

*(under Standing Orders)*

18. **URGENT GENERAL BUSINESS**

*(under Standing Orders)*

19. **MATTERS TO BE CONSIDERED WITH THE PUBLIC EXCLUDED**

*Section 48, Local Government Official Information and Meetings Act 1987.*

RECOMMENDATION

**THAT** the public be excluded from the following parts of the proceedings of this meeting.

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:

Item No	Minutes/Report of	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 the passing of this resolution
19.1	Minutes of public excluded portion of Council meeting of 3 August 2021	Confirmation of minutes	Good reason to withhold exists under Section 7	Section 48(1)(a)
19.2	Minutes of public excluded portion of Extraordinary Council meeting of 24 August 2021	Confirmation of minutes	Good reason to withhold exists under Section 7	Section 48(1)(a)
<b>REPORTS</b>				
19.3	Report of T Tierney (Manager Planning and Regulation) on behalf of the Project Control Group for the District Plan Review	Waimakariri District Plan Review	Good reason to withhold exists under Section 7	Section 48(1)(a)
19.4	Report of M Bacon (District Plan Manager) and D Young (Senior Engineering Advisor)	Road acquisition and dedication	Good reason to withhold exists under Section 7	Section 48(1)(a)
19.5	Report of C Roxburgh (Water Asset Manager)	Future Water Servicing of Mountain Road and New Road Properties	Good reason to withhold exists under Section 7	Section 48(1)(a)
19.6	Report of J Acker (Property Officer, Contractor) and R Hawthorne (Property Manager)	Kairaki Beach Motor Camp Lease	Good reason to withhold exists under Section 7	Section 48(1)(a)
19.7	Report of J McBride (Roading and Transportation Mgr), K Straw (Civil Project Team Leader) and R Qu (Property Assets Advisor)	Belfast to Kaiapoi Cycleway – Part Purchase of Property	Good reason to withhold exists under Section 7	Section 48(1)(a)

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 relevant part of the proceedings of the meeting in public are as follows:

Item N°	Reason for protection of interests	LGOIMA Part 1, Section 7
19.1 – 19.7	Protection of privacy of natural persons; To carry out commercial activities without prejudice; Maintain legal professional privilege; Enable Council to continue with (commercial) negotiation without prejudice or disadvantage Prevent the disclose of information for improper gain or advantage	Section 7 2(a) Section 7 2(b)ii Section 7 (g) Section 7 2(i)  Section 7 (j)

**CLOSED MEETING**

*See Public Excluded Agenda.*

**OPEN MEETING**

20. **NEXT MEETING**

The next scheduled ordinary meeting of the Council will occur on Tuesday 5 October 2021, commencing at 1pm in the Upstairs Meeting Room, Ruataniwha Kaiapoi Civic Centre, 176 Williams Street, Kaiapoi.

**MINUTES OF A MEETING OF THE WAIMAKARIRI DISTRICT COUNCIL HELD IN THE FUNCTION ROOM, RANGIORA TOWN HALL, 303 HIGH STREET, RANGIORA, ON TUESDAY 3 AUGUST 2021, COMMENCING AT 1PM**

**PRESENT**

Mayor D Gordon (Chairperson), Deputy Mayor N Atkinson, Councillors K Barnett, R Brine, W Doody, N Mealings, P Redmond, S Stewart, J Ward and P Williams.

**IN ATTENDANCE**

J Harland (Chief Executive) (until 4.34pm), G Cleary (Manager Utilities and Roading), C Brown (Manager Community and Recreation), T Tierney (Manager Planning and Regulation), K Simpson (3 Waters Manager), D Roxborough (Implementation Project Manager – District Regeneration), S Hart (Business and Centres Manager), S Nichols (Governance Manager), E Stubbs (Governance Support Officer), M Kwant (Community Projects Officer), R Kerr (Delivery Manager Stimulus and Shovel Ready Programme), C Roxburgh (Water Asset Manager), K LaValley (Project Delivery Manager), A Smith (Governance Coordinator).

*Present for Item 5.2 Deputations:* T Ellis (Development Planning Manager).

**1. APOLOGIES**

Moved: Mayor Gordon      Seconded: Councillor Atkinson

An apology for absence was received and sustained from Councillor Blackie.

**CARRIED**

**2. CONFLICTS OF INTEREST**

There were no conflicts of interest recorded.

**3. ACKNOWLEDGEMENTS**

At the conclusion of the meeting, Mayor Gordon acknowledged the passing on this day of Vic Allen, from Oxford. Vic had been an active member of the Oxford community for many years, including being Chairperson of the Oxford Ward Advisory Group, a member of the Pearson Park Advisory Group, Oxford Promotions Action Committee and numerous other community groups in Oxford.

Mayor Gordon observed Vic Allen worked hard for his community to make it a better place. He achieved that. His contribution was extensive and that the community was the better for his involvement.

A moments silence was observed.

**4. CONFIRMATION OF MINUTES**

**4.1. Minutes of a meeting of the Waimakariri District Council held on 6 July 2021**

Moved: Councillor Mealings      Seconded: Councillor Williams

**THAT** the Council:

- (a) **Confirms**, as a true and correct record, the circulated minutes of the meeting of the Waimakariri District Council held on 6 July 2021.

**CARRIED**

## **MATTERS ARISING**

### **4.2. Minutes of the public excluded meeting of the Waimakariri District Council held on 6 July 2021**

*(Refer to public excluded minutes)*

*At this time, the Deputations relating to Item 5.2 Significant Natural Areas were taken. The minutes have been recorded in the order of the Agenda.*

## **5. DEPUTATIONS AND PRESENTATIONS**

### **5.1. Squadron Leader Tania Mackinnon, NZCF Unit Commander, Air Training Corp, Squadron 88**

Squadron Leader Tania MacKinnon provided background information on the Air Cadets, which are based at the Rangiora Airfield. Also present were Warrant Officer Hamish Cook and the Chairman of the Unit Support Committee, Buzz Harvey. The unit was formed in 2015 starting with 15 cadets, which has now grown to 70 members. Air Cadets from 13 to 20 year olds undertake a lot of training as part of a Unit, some which is focused around community service. In 2019 the Unit won the National RSA Community Services Trophy for service to the Waimakariri District, resulting from the Unit attending seven ANZAC Day parades, assisting at the airfield, working on the Ashley Gorge track and supporting numerous community events in the district.

Warrant Officer Cook advised he had been the Unit Warrant Officer since 2019 starting in the unit when it was first formed in 2015. He was the last remaining original cadet still in the service. As a Warrant Officer he oversaw all the standards and discipline in the Unit which included teamwork and leadership. He started in the Cadets originally because of an interest in Warbirds but had continued his involvement after seeing the positive impact of the Cadet Corp on individuals and the community. The five year anniversary was an important milestone for him and all the cadets as it was a celebration of what had been achieved over the past five years by the youth of the Waimakariri district.

B Harvey had been involved with the Unit from its inception. B Harvey was ex-military, having spent 30 years in the Air Force, 15 of these years were involved with the Air Training Corp. There are currently Air Training Corps throughout New Zealand; some Army and Navy based, with over half Air Force based. The speed at which the Rangiora Corp had reached the high standard and the successful outcome of the cadets attending training courses, had been noted nationally.

B Harvey provided some historic background on the significance of granting a Charter with a city or district. Very few Air Corp hold a Charter with their town/district which is an honour recognising the community links. This was typically honoured in modern times with a street parade and the Mayor inspecting the troops. This was a way of recognising community volunteers and for the community to acknowledge the work carried out by the Cadet Corp within the community. In the case of this request for a Charter, the Corp had elected to change its name from 'Rangiora' to 'Waimakariri' to better reflect the base of the Corp, and therefore would now be known as No 88 District of Waimakariri Squadron.

Councillor Williams asked Warrant Officer Cook what the future would hold for him in the Corp. Warrant Officer Cook advised that after the age of 20 he could become a commissioned officer and he also had a passion for the defence forces and would investigate the option of joining either the Army or the Navy.

Councillor Brine asked if it was proposed to have a street parade each year in addition to the ANZAC Day parade. Squadron Leader MacKinnon confirmed that it was proposed to be just the one occurrence on Sunday 12 October to celebrate five years. The cadets would march within the ANZAC Parades in future years. In the future there may be an option to hold a parade to mark the tenth year anniversary. B Harvey added that it might be possible to arrange parades in other towns within the district in future years, possibly with a police escort to keep costs down.

Councillor Barnett enquired if other cadet units around the country had Charters with their City or District Councils. B Harvey advised that there are 100 cadet units (with the Air Training Corp being the strongest in numbers) nationally and a number of units have Charters with their City or District Councils. The Rangiora group was the newest and there were some units that had been active for 70 years.

The significance of health and safety in relation to road safety matters was pointed out by Councillor Barnett and Squadron Leader MacKinnon confirmed that the unit had been advised of the requirements by Council staff.

Regarding the diversity of the group, it was noted there was a wide range of nationalities in the group with most of the senior cadets being female and of the 70 cadets currently involved, 30 of them were female.

Councillor Ward enquired if any of the cadets were learning to fly or getting involved in avionics and Squadron Leader MacKinnon advised that two had acquired their wings this year (flown solo), which was quite an achievement. There were already three who had signed up to the 2022 National Aviation School course.

Mayor Gordon thanked the speakers for presenting to the Council and for all the work they do for the community.

*Following this deputation, Item 8.1 in the agenda was considered. The minutes have been recorded as in the order in the Agenda.*

## 5.2. **Significant Natural Areas**

The following people were present to share their views on Significant Natural Areas (SNAs):

### Σ **Jamie McFadden**

Mr J McFadden provided a summary of his roles, both in the community and in his work, including being a Councillor on the Hurunui District Council, a member of Federated Farmers, and had been involved in the formation of a group called the Rural Advocacy Network of which he is the Chairperson. The Rural Advocacy Network had joined with Groundswell, which had recently held the national 'Howl of Protest' rally. J McFadden previously farmed a property with a significant amount of native bush, which was still farmed by family members. For the past 20 years J McFadden and his wife had run a business called Hurunui Natives, which predominately involved working with farmers for wetland restoration, environmental and riparian plantings and erosion control plantings. J McFadden was passionate about the environment and was concerned about the impact of imposing Significant Natural Areas (SNAs) on property owners nationally. SNAs refers to valuable areas of native bush. It was pointed out that the Hurunui District Council does not have SNA's included in its District Plan, as it was believed that SNAs do not achieve anything. J McFadden believed there was a better way of working with landowners to achieve biodiversity on private land. He spoke on the SNA surveys on private land that were being undertaken by Council staff, although acknowledged the staff were doing their job, but also noting that this survey information was then available to many other parties.



The information collected impacted not only on the SNAs but also wetlands and currently there was no compensation to farmers. J McFadden stated that one of the key issues with SNAs was that the rules could change at any time and also pointed out that other organisations (eg. Ecan), could impose its own SNA rules on properties on top of the District Council rules. The SNA turns biodiversity into a liability and some landowners were being penalised with potential impact on property values. J McFadden sought to halt the Waimakariri District Council process on mapping SNAs including the landscape mapping.

Councillor Barnett asked what would J McFadden like the Council to do now within its powers, noting that once the National Policy Statement was introduced, the Council would have no choice. J McFadden believed that the National Policy Statement would be introduced, however the Groundswell Group were intent on stopping it progressing. At the present time they would like to see the Council halt the SNA process and also raise the issue at Local Government forums, with local Members of Parliament and seek support of other Councils. Groundswell were keen to see local government as an ally in this matter.

#### Σ **Seamus Robertson**

Mr S Robertson's business was a leading North Canterbury exporter to several countries manufacturing advanced machinery. There had been significant compliance cost increases for exporters, in addition now had the imposition of SNAs from central government. With this covenant on his 37 acres, S Robertson believed that this effectively means the land had been illegally acquired, with no compensation to the landowner or the business. An SNA meant that the area was no longer on private land and via the Council, would come under government ownership thus being an illegal acquisition of private land.

S Robertson wished to expand his current business with another fitting shop located in synergy with the existing workshops, however there has been a suggested alternative location which would span an existing water race. This would mean a cost of approximately \$400,000 over ten years. Under the existing rules the business would not be able to locate the expansion of his business on the block designated as an SNA. With the expansion of his business, he would create more manufacturing jobs. S Robertson stressed that if the Council wanted to create advanced manufacturing employment in the country that would lead to export revenue for the country, he would like to see this takeover of land by central government stopped.

S Robertson noted that when Ngai Tahu took over Eyrewell Forest, it was permitted to bulldoze 5,000 acres of kanuka, however he would not be allowed to remove a 50square metre block from his own property, in order to expand the business which would then provide more employment for New Zealanders. On this basis, S Robertson suggested that there was something wrong with the way both Councils and central government were working. S Robertson was requesting to be allowed by the Council to expand his business and employ more staff, noting that the business currently employed four apprentices, 25 tradesman, two industrial electricians, one IT expert and three staff in megatronics. This illegal acquiring of private land was limiting his ability to expand his business and create wealth for the country, beyond the Waimakariri district.

Councillor Brine enquired if there was any other areas on the property that the kanuka could be relocated to. Mr Robertson advised that there was an unrealistically large area required to replace the kanuka at a 17 to one ratio, meaning that for every acre of kanuka removed, they would need to replant 17 acres and that would place a financial burden on the company. It was also pointed out that this area was originally beech forest, and the kanuka was scrub growing underneath.

Σ **Jonathan Austin**

Mr J Austin farmed 600 hectares in the Oxford area, which had been in his family's ownership since 1955. There were two hills on the property, View Hill and Budes Hill on which Matagouri, cabbage trees etc. were growing. No work had been done in these areas and they had not signed any documentation relating to the SNA. J Austin had been unaware of this situation, until a letter arrived from the Council about three months ago, which he found quite disturbing, as it highlighted management issues and what he should be doing with the land. J Austin supported the earlier comments of J McFadden and did not support having the SNAs identified on his property and would like these removed.

Following a question from Councillor Redmond, J Austin confirmed there appeared to be the two identified SNA sites on his property.

Mayor Gordon thanked the three deputations for sharing their views on Significant Natural Areas.

**6. ADJOURNED BUSINESS**

There was no adjourned business.

**7. RECOVERY PROJECTS**

**7.1 COVID-19 RECOVERY PLANNING / SHOVEL READY PROJECTS**

*Refer to Public Excluded agenda Item 19.3.*

**7.2 29-30 MAY 2021 ADVERSE WEATHER EVENT RECOVERY**

A verbal update on the flood event recovery since the last Council meeting in July 2021 was provided by S Hart (Recovery Manager). In a brief background he reminded the Council that there were 33 projects/tasks under five programmes in the recovery, which include:

- Σ Strategic Projects
- Σ Built Infrastructure
- Σ Social welfare
- Σ Communications
- Σ And other areas relating to the rural communities.

Approximately half of the 33 tasks were complete, with the remainder fitting in the business as usual areas. Regarding infrastructure, some of the main tasks ahead include:

- Σ Lees Valley infrastructure – good progress had been made, however there was ongoing strengthening work to be undertaken over the coming six months in this area, relating to rock protection, river work and slip stabilisation.
- Σ Smarts Road, Journeys End – a report would be presented to the Council as to the role that the Council in the provision of further flood protection work.
- Σ Coopers Creek – there was still some water infrastructure work occurring, though there were temporary solutions in place. A report would be submitted to the Council requesting a decision on permanent solutions and once decisions were made, looking to have the work completed in the next 12 months.

The Council was working closely with ECan on the impact on rivers, looking to repair the holes that had been caused by the flood and the work required at Waikuku.

The amount of work on social recovery had reduced and this work was now merging back into business as usual. However, contact with community members impacted by the floods was being maintained on an as required basis.

There had been 59 rural properties assessed, of which 34 were farm based commercial activities that were being supported by the Rural Support Trust to access the MPI \$4 million government funding and also the enhanced Taskforce Green Group. These funding grants were however not available for lifestyle block owners. There had been assessments of 25 lifestyle blocks and some had issues with fencing. There was a Mayoral Funding Grant available that had been made available to lifestyle block owners. This would however not cover the costs of recovery for some lifestyle block owners and the Council would therefore continue to advocate to the Government on their behalf for funding.

It was anticipated that a report would be submitted to the Council at its September 2021 meeting, which would include any learnings from the recovery from this event to be taken into account in any possible future events.

Councillor Barnett spoke on the impact of the flooding on rural roads and enquired if there was any work being done to restore the roads back to the standard they need to be. She specifically commented on school bus routes on gravel roads that had been negatively impacted. S Hart advised that the Roading Manager had a list of repair works that were required. J Harland confirmed that a report would be submitted to the Council on the current situation with rural roading issues.

The work of the Recovery Manager, and the Welfare Manager in assisting with the recovery was acknowledged by the Mayor, and also the help of the Deputy Mayor in assessing with the applications to the Mayoral Relief Fund.

**District Regeneration – Annual Progress Report to June 2021 – D Roxborough (Implementation Project Manager – District Regeneration)**

D Roxborough presented this report, providing the annual summary of the regeneration projects and also a summary of how the implementation of the Red Zone Recovery Plan was progressing. Budget spending was slightly behind, however the overall amount spent would be slightly under the budget. Overall the programme was about 12 months behind what was originally planned when the Recovery Plan was adopted in 2016.

However, many projects would be completed in the coming 12 months and others would be ongoing. Staff had been working on the establishment of the co-governance arrangements for the Heritage and Mahinga Kai areas. In the coming year, staff would be working on the Kaiapoi Community Hub. It was noted that matters were progressing with the Kaiapoi Croquet Club and other groups that would be relocating to the Kaiapoi Hub. More work would also be done on the scoping of works for the Rowing Precinct and matters at Murphy Park.

In conclusion, D Roxborough acknowledged that there had been some donations of outdoor furniture from community groups for the Regeneration area, such as picnic seats and tables.

Moved: Councillor Atkinson

Seconded: Councillor Brine

**THAT** the Council:

- (a) **Receives** report No. 210712113139.

- (b) **Circulates** this report to Land Information New Zealand, as agents on behalf of the Crown, for the purposes of monitoring the implementation of the Recovery Plan.
- (c) **Approves** the reallocation and carryover of \$50,000 of unspent net regeneration budget (from a total pool of \$595,000 net budget saving during the 2020/21 year) for the purposes of urgent remedial works to the Norman Kirk Park sports fields in the 2021/22 year, noting that this does not place any further demand on the Earthquake Recovery Loan or have any additional rates impact over what has been previously signalled.
- (d) **Circulates** this report to all the Community Boards.

**CARRIED**

Councillor Atkinson commented on many favourable comments he had received from the community on the improvements in the Regeneration area and extended his appreciation to the staff for their work in this area, and also to Councillor Blackie for his work, as Portfolio Holder.

## 8. REPORTS

### 8.1. Air Training Corps Association of NZ Incorp (Squadron 88) Charter – S Nichols (Governance Manager)

*Following their deputation, Tania Mackinnon, SQNLDR, NZCF Unit Commander, Warrant Officer Hamish Cook and Buzz Harvey (Chair of the Unit Support Committee) were present during consideration of this report.*

S Nichols was present for consideration of this report and took the report as read, believing that the information that had been provided by the deputation answered any queries. Costs associated with appropriate traffic management for the street parade was approximately \$1,500.

There were no questions.

Moved: Councillor Ward

Seconded: Councillor Williams

**THAT** the Council:

- (a) **Receives** Report No. 210719117188.
- (b) **Acknowledges** the Council relationship with Air Training Corps Association of New Zealand Incorporated, currently known as No.88 Squadron.
- (c) **Authorises** the Mayor of Waimakariri to formally sign the Charter on behalf of the Council.
- (d) **Notes** a Street Parade in Rangiora will occur at 1pm on Sunday 12 September 2021 followed by a Mayoral inspection of the cadets on the front lawn of the Council.

**CARRIED**

Councillor Ward supported this group and the positive work of the Air Training Corps and looked forward to the parade on 12 September 2021.

Councillor Williams, as a Council appointee to the Rangiora Airfield Advisory Group, had observed members of the Air Cadets at the airfield and was in support of this group and encourages more young people to join the group.

Councillor Brine noted that there was an impact on local businesses with road closures, and costs of holding a street parade, however, noted that this was a one off occasion, to mark the five year anniversary. He was supportive of the group activities with youth.

Councillor Barnett remarked on the impact of Health and Safety rules that need to be adhered during road closures. She was also in favour of supporting any groups that supported youth in the district and would very much like to encourage the Council to support any applications that come from any other youth groups in the future.

Councillor Doody commended the work that the members of the Air Training Corps did, including attending ANZAC Day services and particularly the work that the group had put into the Ashley Gorge track maintenance, and extended her gratitude.

Mayor Gordon added his support of this group and the recommendation. He acknowledged the support of Councillors Ward and Williams, as members of the Rangiora Airfield Advisory Group for their support of the Air Training Corp and believed this was a great opportunity for the Waimakariri District to show its support for this group.

**8.2. Representation Review Proposal 2022 - 2025 – S Nichols (Governance Manager) – on behalf of the Representation Review Working Party**

S Nichols and E Stubbs were present for consideration of this report on behalf of the Representation Review Working Party. The party included Councillors and Community Board members from each of the Boards and ward areas. The group had met several times since its formation, to look at the aspects of this representation review and what was required by the Local Government Commission. Following these discussions, liaising the Rūnanga, feedback from the Community Boards and looking at the population figures for each of the areas, the Working Party had concluded there was no need for any major change at this time. Therefore the Working Party recommend that the status quo be retained except for one minor amendment, relating to the representation in the Rangiora-Ashley Ward. There was currently five members of the Board from the urban area (Rangiora Subdivision) and three from the rural area (Ashley Subdivision). Because of the growth in the urban area and to keep within the population ratio balance that was required, it was proposed that the subdivision ratio be changed to a six and two ratio. It was thought to be important to retain the subdivision so there was continued representation from the rural areas.

It was recommended that there be a longer consultation period of six weeks rather than the standard four weeks. A hearing date was set for 12 October 2021, with recommendations the final proposal being submitted to the Council on 2 November 2021. The Council recommendation would be forwarded to the Local Government Commission who would make the final determination. There was however an appeal process for anyone who has submitted through the Council's consultation process. The outcome would be known by March/April 2022.

It was also thought to be beneficial, because of the population growth and the Future of Local Government Review, that there be a further representation review undertaken in the new term of the Council, which would be a three year turnaround instead of the required legislative review period of six years.

Moved: Councillor Williams

Seconded: Councillor Redmond

**THAT** the Council:

- (a) **Receives** Report No. 210719117191.

- (b) **Notes** the Council, in August 2020, approved the First Past the Post (FPP) voting system for the 2022 and 2025 local authority elections.
- (c) **Approves** for consultation three ward boundaries within the Waimakariri District being:
- i. Coastal – (Kaiapoi-Woodend Ward)
 

To the district's northern boundary the Kaiapoi-Woodend Ward follows the Rangiora Leithfield Road, to Bairds Road, Upper Sefton Road, Beatties Road, Lower Sefton Road and between MB 2440301 and 2440302 to the Ashley River/Rakahuri. To the south of the Ashley River/Rakahuri the Kaiapoi-Woodend Ward follows Smarts Road, Rangiora Woodend Road, the boundary between Lot 2 DP80275 and Lot 2 DP306045 to Northbrook Road, Boys Road to the Cam River. It then follows the Cam River to Youngs Road, Lineside Road to Fernside Road, and along Flaxton Road, Skewbridge Road, Island Road, (incorporating MB2454800), Butchers Road, part MB2456302 along the Kaiapoi River and Gardiners Road (part MB2456302) to Burgess Road, South Eyre Road and Harpers Road to the Waimakariri River.
  - ii. Central - Rangiora-Ashley Ward
 

From the south of the Ashley River/Rakahuri in the west along Bowicks Road, Ashley Road, Summerhill Road, Reids Road, Tippings Road, Howsons Road, Springbank Road, Tallotts Road, Oxford Road, Boundary Road, the Main Drain, Flaxton Road, Fernside Road, Lineside Road and Youngs Road. Follow the Cam River to Boys Road then Northbrook Road and along the boundary between Lot 2 DP80275 and Lot 2 DP306045 to Rangiora Woodend Road, and along Rangiora Woodend Road to Smarts Road to the Ashley River/Rakahuri. North of the Ashley River/Rakahuri in the west the Rangiora-Ashley Ward commences on the northern boundary at the Okuku River; thence across Mt Thomas to the Garry River at the boundary of mesh block 2438500 and to the confluence of the Ashley River/Rakahuri and the Garry River. The eastern boundary to the north of the Ashley River/Rakahuri follows between MB 2440301 and 2440302 to the Lower Sefton Road, Beatties Road, Upper Sefton Road, Bairds Road and Rangiora Leithfield Road to the district boundary.
  - iii. Western - Oxford-Ohoka Ward
 

North of the Ashley River/Rakahuri in the east the Oxford-Ohoka Ward commences on the northern boundary at the Okuku River; thence across Mt Thomas to the Garry River at the boundary of mesh block 2438500 and to the confluence of the Ashley River/Rakahuri and the Garry River. In the south-east from the Waimakariri River the Oxford-Ohoka Ward follows Harpers Road, Burgess Road to Gardiners Road, part MB2456302 along the Kaiapoi River, Butchers Road, Island Road, Skewbridge Road, the Main Drain, Boundary Road, Oxford Road, Tallotts Road, Springbank Road, Howsons Road, Tippings Road, Reids Road, Summerhill Road, Ashley Road and Bowicks Road to the Ashley River/Rakahuri. From this point to the confluence with the Garry River the Ashley River/Rakahuri forms the boundary between the Oxford-Ohoka Ward and the Rangiora-Ashley Ward. The Waimakariri River provides the southern boundary for the Oxford-Ohoka Ward and the District Boundary the western and northwestern boundary of this ward.

- (d) **Approves** for consultation subdivision boundaries within the Waimakariri District being:
- i. Rangiora-Ashley Ward subdivision boundary being the north side of the Ashley River to the ward boundaries then south on Lehmans Road, Fernside Road to the junction of Flaxton Road with Rangiora being the urban development strategy boundary.
  - ii. Oxford Subdivision to the West of the subdivision line and Ohoka-Swannanoa Subdivision to the East of the subdivision line in Oxford-Ohoka Ward north to south from the Rangiora-Ashley ward boundary; Earlys Road and Downs Road to the Waimakariri River.
- (e) **Approves** for consultation, areas of community boundaries within the Waimakariri District being: Kaiapoi-Woodend Ward community boundary being east to west; Rangiora-Woodend Road, Main North Road (SH1), Fullers Road, Jeffs Road, Lees Road to the coast.
- (f) **Approves** for consultation purposes, Ward names of:
- i. Kaiapoi-Woodend Ward
  - ii. Rangiora-Ashley Ward
  - ii. Oxford-Ohoka Ward
- (g) **Approves** for consultation purposes, Community Board names of:
- i. Kaiapoi-Tuahiwi Community Board located in the southern area of the Kaiapoi-Woodend Ward.
  - ii. Woodend-Sefton Community Board located in the northern area of the Kaiapoi-Woodend Ward.
  - iii. Rangiora-Ashley Community Board located in the Rangiora-Ashley Ward.
  - iii. Oxford-Ohoka Community Board located in the Oxford-Ohoka Ward.
- (h) **Approves** ten (10) Councillors and one Mayor be elected at the 2022 and 2025 Local Body Elections being the following:
- i. Mayor – at large (district wide)
  - ii. Four Councillors for the Kaiapoi-Woodend Ward
  - iii. Four Councillors for the Rangiora-Ashley Ward
  - iv. Two Councillors for the Oxford-Ohoka Ward
- (i) **Approves** for consultation purposes, Community Board members to be elected by registered ward electors as follows:
- i. Five (5) members of the Kaiapoi-Tuahiwi Community Board, noting the area of community south of the Rangiora-Woodend Road, as per map.
  - ii. Five (5) members of the Woodend-Sefton Community Board, noting the area of community north of the Rangiora-Woodend Road, as per map.
  - iii. Eight (8) members of the Rangiora-Ashley Community Board, noting a subdivision of **two** members for the Ashley subdivision and **six** members for the Rangiora subdivision.
  - iv. Six (6) members of the Oxford-Ohoka Community Board, noting a subdivision of three members from the Ohoka-Swannanoa Subdivision and three members from the Oxford Subdivision.
- (j) **Notes**, for consultation purposes, of the four elected Councillors of the Kaiapoi-Woodend ward, that two Councillors be appointed by the incoming Council (October 2022) to the Kaiapoi-Tuahiwi Community Board and two Councillors to the Woodend-Sefton Community Board.

- (k) **Approves** consultation timeframes, commencing Thursday 12 August 2021 and closing 5pm, Monday 27 September 2021 which complies with the Local Electoral Act 2001, section 19 and the associated proposed consultation documentation.
- (l) **Approves**, in principle, the consultation document (Trim 210727122614) subject to minor edits from the Governance Manager.
- (m) **Appoints** Mayor Gordon to chair the Representation Review Hearing Panel, which will consist of all of Council.
- (n) **Notes** the Hearing Panel will consider public submissions on Tuesday 12 October 2021, commencing at 9am in the Council Chambers. The Hearing Panel to recommend a final proposal to the Council meeting of 2 November 2021.
- (o) **Acknowledges** the input from the working party members for their contribution over the past six months.
- (p) **Notes** a copy of this report will be provided to all Community Boards for their information.

**CARRIED**

Councillor Redmond supported the status quo prevailing, noting that people were not always in support of having frequent changes to the ward boundaries.

Mayor Gordon thanked staff and members of the Representative Review Working Party for their work on this matter.

Councillor Barnett commented on the importance of having representation in the Rangiora-Ashley ward from the north side of the Ashley River as it was valuable to have feedback from that area.

**8.3. Appointment of Councillor to new Portfolios – C Brown (Manager Community and Recreation), and S Nichols (Governance Manager)**

C Brown and S Nichols presented this report seeking approval for the appointment of Councillor Blackie to two new portfolios. The Natural, Coastal and Marine Areas portfolio was a more detailed portfolio than had been provided before, and it was envisaged that the portfolio would be retained in future Council terms. The report was taken as read.

Councillor Brine sought clarification on the boundary line between Greenspace portfolio and the Natural, Coastal and Marine Areas portfolio. C Brown explained that there may be areas where there would be some cross over in roles, which may involve both Councillors with some issues. It was however pointed out that Councillor Blackie was a member of several groups who monitor the natural reserves, as well as the Northern Pegasus Bay Bylaw Implementation Group.

Moved: Councillor Brine

Seconded: Councillor Doody

THAT the Council:

- (a) **Receives** Report No.210624102636.
- (b) **Appoints** Councillor Al Blackie as Portfolio Holder of Waimakariri Arts and Culture.
- (c) **Appoints** Councillor Al Blackie as Portfolio Holder of Natural, Coastal and Marine Areas.



- (d) **Notes** that portfolios have been previously reviewed by the Mayor following discussion with individual Councillors during the term.

**CARRIED**

Councillor Brine and Councillor Doody both support the establishment of these two portfolios and noted that these were areas of interest for Councillor Blackie.

Mayor Gordon confirmed that these portfolios were developed in consultation with Councillor Blackie.

#### 8.4. **Elected Member Remuneration – S Nichols (Governance Manager)**

S Nichols commented that this was an annual report to advise the Council on the remuneration for elected members as set by the Remuneration Authority. There were slight increases this year, as there had been no increases in 2020. An increase in the Expenses Policy was implemented to cover increases relating to the use of electronic equipment and telephones, particularly since COVID-19. The Policy would be submitted to the Remuneration Authority to confirm that the Remuneration Authority's Determination and the Council's policies were aligned.

An amendment to the Elected Member Expenses Policy was also suggested, and it was agreed by all present that the signing-off of the Mayor's expenses would be undertaken by the Chairperson of the Audit and Risk Committee, with no need for the Chief Executive to also approve.

Following a question from Councillor Barnett, it was confirmed that the fortnightly allowance for phone/printer/computers was higher for Community Board members, as the Mayor and Councillors were provided with laptops to perform their functions.

Moved: Councillor Ward

Seconded: Councillor Brine

**THAT** the Council:

- (a) **Receives** Report No. 210719117192.
- (b) **Notes** the remuneration set by the Remuneration Authority for Waimakariri Councillors and Community Board members from 1 July 2021 to 30 June 2022 as follows:

Mayor	\$137,500
Deputy Mayor	\$58,994
Councillor (with portfolio and chairing responsibilities)	\$48,531
Kaiapoi-Tuahiwi Community Board Chair	\$17,742
Kaiapoi-Tuahiwi Community Board	\$8,871
Oxford-Ohoka Community Board Chair	\$16,715
Oxford-Ohoka Community Board	\$8,358
Rangiora-Ashley Community Board Chair	\$22,885
Rangiora-Ashley Community Board	\$11,443
Woodend-Sefton Community Board Chair	\$14,658
Woodend-Sefton Community Board	\$7,329

- (c) **Approves** the Elected Member Expenses Policy to 30 June 2022 (Trim 210723120513).
- (d) **Circulates** a copy of this report and the approved Expenses Policy to all Community Boards for their reference.

**CARRIED**

**8.5. 2021 Annual Monitoring Report – Northern Pegasus Bay Bylaw 2016 Implementation Plan – M Kwant (Community Projects Officer)**

M Kwant presented this report, informing the Council of the progress made with the Implementation Plan for the Northern Pegasus Bay Bylaw. It was noted that this report was from the period 2019 to December 2020. Many highlights had been achieved, noting:

- Σ The Kairaki carpark upgrade, which provided a good opportunity to promote the Bylaw rules and to provide a separate lane for those travelling onto the beach.
- Σ The prosecution of the driver who drove onto the estuary and got his vehicle stuck and subsequently, in attempts to rescue this car, other vehicles also got stuck.

Councillor Doody noted the comment on dog signage at the Ashley/Rakahuri estuary and this was clarified that dogs were prohibited on the estuary, however, they were allowed on the beach.

Moved: Councillor Mealings

Seconded: Councillor Atkinson

**THAT** the Council:

- (a) **Receives** report No. 210715115756.
- (b) **Acknowledges** the Northern Pegasus Bay Advisory Group for the ongoing progress made in achieving the Northern Pegasus Bay Bylaw 2016 Implementation Plan during its second and third years of operation.

**CARRIED**

**9. MATTERS REFERRED FROM COMMITTEES/COMMUNITY BOARDS**

*Item 9.2 was taken at this time but the minutes have been recorded in accordance with the Agenda order.*

**9.1. Enterprise North Canterbury Approved Statement of Intent beginning 1 July 2021, Approved Enterprise North Canterbury Business Plan 2020/21 and the draft Promotion of Waimakariri District Business Plan for 2021/22 – S Markham (Manager Strategic Projects)**

*(refer to report no. 210707110676 to the Audit and Risk Committee meeting of 20 July 2021)*

The report was taken as read. There were no questions.

Moved: Councillor Atkinson

Seconded: Mayor Gordon

**THAT** the Council:

- (a) **Receives** for information, the Approved Statement of Intent beginning 1 July 2021, Approved Enterprise North Canterbury's Business Plan and Promotion of Waimakariri District Business Plan for 2021/22.
- (b) **Acknowledges** the work carried out by Enterprise North Canterbury and thanks the Trustees and staff for their efforts.

**CARRIED**

9.2. **WhoW Aquaplay License to Occupy – C Brown (Manager Community and Recreation)**

*(refer to report no. 210723120834 to the Kaiapoi-Tuahiwi Community Board meeting of 2 August 2021)*

C Brown presented this report, which had been considered by the Kaiapoi-Tuahiwi Community Board on 2 August 2021. The leasing and licensing arranging proposal was over two different parcels of land and one of these pieces of land was car parking on regeneration land, which did not fall under the delegation of the Community Board. It was therefore the Council that was required to make the decision on whether they wanted to lease or licence. The Council also had to seek the agreement of LINZ, which had been received.

The Kaiapoi-Tuahiwi Community Board had made two changes to the recommendation. The first being related to recommendation (b)1. that a \$1 rent be charged for the first year and then a rent review should be undertaken every year thereafter, for as long as the Licence to Occupy was in operation. The second was in relation to providing showers and changing rooms as well as toilets which had already been specified.

C Brown advised that the WhoW Trust had established a company which would be used to deliver the Aquaplay Park. An explanation of the connection between the Trust and the shareholders in the company was provided. C Brown pointed out the benefits to Kaiapoi and the wider Waimakariri district of this facility being established.

Councillor Barnett noted the concerns of residents regarding the impact of the Aquaplay Park on the wildlife that were currently located on the lake. It was explained that Environmental Canterbury's (ECan) legislation pertaining to the possible impact on birdlife, whether that was native or otherwise, would need to be adhered to. ECan's conditions may require a resource consent though C Brown was unable to comment on what these conditions may be, at this time. Most of the concern was about the bird species around the lake, noting that a number of these were not native birds. An ecologist had already prepared a draft report and the WhoW consenting planner believed there was a pathway for the consent to be achieved, otherwise this project would not be proceeding.

Moved: Councillor Atkinson

Seconded: Councillor Ward

**THAT** the Council:

- (a) **Receives** Report No. 210723120834.
- (b) **Approves** a License to Occupy being issued to the WHoW Trust for a period three years for the area identified on the attached map Trim 210723120832 for use as a car park and access way to service the Aqua Play Park.
- (c) **Notes** that staff require Council approval rather than community Board due to the land in question being regeneration land rather than existing reserve land.
- (d) **Notes** that while permission is being obtained from both the Kaiapoi / Tuahiwi Community Board and the Council for separate land parcels the License to Occupy and associated conditions will be contained within the same document.
- (e) **Notes** that the car park can be left as a turf surface however the WHoW Trust will be responsible for ensuring the surface is maintained to an appropriate standard.

- (f) **Notes** that the License to Occupy is subject to the WhoW Trust obtaining resource consent from both Environment Canterbury and Waimakariri District Council and will be required to adhere to any consent conditions.

Councillor Atkinson noted that it was necessary for there to be a Licence to Occupy to be in place before a resource consent could be applied for. Councillor Atkinson did not believe that there was any concerns with the Trust and the formation of the limited liability company. He therefore supported the progressing of the project as the facility would be a benefit for the whole district.

Councillor Ward also believed this facility would be a real asset to the community and was supportive of this progressing.

#### **Amendment**

Moved: Councillor Redmond

Seconded: Councillor Williams

Recommendation (d) to read:

- (d) **Notes** that while permission is being obtained from both the Kaiapoi-Tuahiwi Community Board and the Council for separate land parcels, the License to Occupy and associated conditions will be contained within the same document. The licence shall make reference to the operating agreement between WHoW and Aqualand NZ Ltd and the provision of financial information from both entities to assess annual rental reviews.

**CARRIED**

Councillor Atkinson Against

Councillor Redmond stated that the proposed amendment would ensure that the financial performance of both entities would be considered when reviewing the rental and not just that of the charitable trust.

Councillor Brine was concerned that there may be a need for an arrangement between the Council, the Trust and newly formed Company. Councillor Brine suggested that if this was the case, he wished the matter to come back to the Council.

Councillor Atkinson believed that it was not necessary to have this information provided to the Council and understood why the two entities had been set up. There were already rent review clauses written into the Licence.

Following a question from Councillor Barnett, it was confirmed by the Chief Executive, that the financial reports of public limited liability companies were available to the public. J Harland commented that the original proposal being considered by the Council was from a Trust, and the operating company was only established last week. However, with the link between the company and the Trust, the Council may want to view information from both parties.

Councillor Stewart noted that at the Community Board meeting the previous night, it was confirmed that the financial information of the WhoW Trust would be made available annually. C Brown confirmed that if the proposed amendment failed, this would continue to be the case. There would be further negotiation on the setting of the commercial rent.

Councillor Williams supported the amendment, as it safeguarded all parties particularly the Trust.

Councillor Ward also supported the amendment as it would make the matter transparent and fair.

In reply Councillor Redmond concurred with J Harland's comments, and the proposed amendment would allow for all information to be available at the relevant time when a review was due. Councillor Redmond considered this amendment as providing clarification of the procedure.

The amendment then became the substantive motion.

**THAT** the Council:

- (a) **Receives** Report No. 210723120834.
- (b) **Approves** a License to Occupy being issued to the WHoW Trust for a period three years for the area identified on the attached map Trim 210723120832 for use as a car park and access way to service the Aqua Play Park.
- (c) **Notes** that staff require Council approval rather than community Board due to the land in question being regeneration land rather than existing reserve land.
- (d) **Notes** that while permission is being obtained from both the Kaiapoi-Tuahiwi Community Board and the Council for separate land parcels, the License to Occupy and associated conditions will be contained within the same document. The licence shall make reference to the operating agreement between WHoW and Aqualand NZ Ltd and the provision of financial information from both entities to assess annual rental reviews.
- (e) **Notes** that the car park can be left as a turf surface however the WHoW Trust will be responsible for ensuring the surface is maintained to an appropriate standard.
- (f) **Notes** that the License to Occupy is subject to the WhoW Trust obtaining resource consent from both Environment Canterbury and Waimakariri District Council and will be required to adhere to any consent conditions

**CARRIED**

Mayor Gordon noted this matter had been given due consideration by the Kaiapoi-Tuahiwi Community Board at its meeting the previous night, where a deputation spoke on their concerns regarding the impact of this proposal on birdlife. Mayor Gordon also noted that there were community members who were very much in support of the proposal. The resource consent process would provide the opportunity for all parties to be heard. Mayor Gordon believed this was an opportunity that would benefit the district and supported this matter progressing.

Councillor Redmond noted that the concerns of residents with this proposal mostly related to the impact on their neighbourhoods due to availability of parking and also the impact on birdlife. If the venture progresses through the resource consent stage, Councillor Redmond believed it would benefit both Kaiapoi and the wider district.

## **10. HEALTH AND SAFETY**

### **10.1. Health, Safety and Wellbeing Report July 2021 – J Harland (Chief Executive)**

J Harland presented this report, which was taken as read.

Councillor Williams noted that previously there had been information provided to the Council, as part of the Health and Safety reports, of any incidence involving contractors working for the Council. J Harland would follow this up.

Moved Councillor Atkinson

Seconded Councillor Williams

**THAT** the Council:

- (a) **Receives** Report No. 210723120443.
- (b) **Notes** that there were no notifiable event this month. WDC is, so far as is reasonably practicable, compliant with the Person Conducting a Business or Undertaking (PCBU) duties of the Health and Safety at Work Act 2015.

**CARRIED**

#### **11. COMMITTEE MINUTES FOR INFORMATION**

11.1. Minutes of a meeting of the Canterbury Mayoral Forum of 28 May 2021.

11.2. Minutes of a meeting of the Utilities and Roothing Committee of 20 July 2021.

Moved Councillor Barnett

Seconded Councillor Doody

**THAT** Items 11.1 to 11.2 be received for information.

**CARRIED**

#### **12. COMMUNITY BOARD MINUTES FOR INFORMATION**

12.1. Minutes of a meeting of the Oxford-Ohoka Community Board meeting of 7 July 2021.

12.2. Minutes of a meeting of the Rangiora-Ashley Community Board meeting of 14 July 2021.

12.3. Minutes of a meeting of the Woodend-Sefton Community Board meeting of 12 July 2021.

12.4. Minutes of a meeting of the Kaiapoi-Tuahiwi Community Board meeting of 19 July 2021.

Moved Councillor Brine

Seconded Councillor Mealings

**THAT** Items 12.1 to 12.4 be received for information.

**CARRIED**

#### **13. REPORT FOR INFORMATION FROM THE LAND AND WATER COMMITTEE MEETING OF 20 JULY 2021**

13.1. **Zone Implementation Programme Addendum Capital Works Programme – 2021-22 – S Allen (Water Environment Advisor)**

Moved Councillor Stewart

Seconded Councillor Doody

**THAT** Item 13.1 be received for information.

**CARRIED**

#### **14. CORRESPONDENCE**

Nil.

## 15. MAYOR'S DIARY

### 15.1. Mayor's Diary 30 June – 23 July 2021

Moved Councillor Atkinson                      Seconded Councillor Ward

**THAT** the Council:

- (a) **Receives** report no. 210728123386.

**CARRIED**

## 16. COUNCIL PORTFOLIO UPDATES

### 16.1. Iwi Relationships – Mayor Dan Gordon

Mayor Gordon advised that MR873 provisions were discussed in a briefing with the Mahi Tahi Joint Development Committee this morning. Further discussion needed to be held and it was hoped to have this resolved prior to the next Mahi Tahi Committee meeting. The recent drop-in sessions went well in Kaiapoi.

### 16.2. Greater Christchurch Partnership Update – Mayor Dan Gordon

Progress continued to be made with the GCP 2050 project. The Partnership was also looking at a series of options for Mass Rapid Transit, to go through to the next stage of investigation.

The Urban Growth Partnership was being taken to the Government for Cabinet approval which was an important development with the process.

Councillor Barnett spoke on the Housing Staging Report and Mayor Gordon would follow up regarding a future Council briefing.

### 16.3. Canterbury Water Management Strategy – Councillor Sandra Stewart

Plan Change 7 was scheduled for October 2021.

The National Policy Statement (NPS) on Biodiversity was due out by the end of this year. A salinity report on the Kaiapoi River was presented to the Water Zone Committee meeting yesterday, 2 August 2021, which confirmed the Waimakariri River flow temperature and the persistence of salt in the Kaiapoi River. The Plan for the Waimakariri River was up for review in 2022.

At a seminar held recently at Lincoln on braided rivers, it was advised that across Canterbury there were 12,000 hectares of land in the river margin that had undergone intensification of agriculture. Approximately 30% of this land was in public ownership and ECan was investigating what could be done to reduce this intensification of agriculture on this land across the region. The Ashley River had 400 hectares of river margins that had been intensified and there was 100 hectares of this land that had been intensified by neighbouring farmers, without any licence.

Regarding the 2020 Groundwater Study from Ecan, that looked at 422 wells across the region and reported on the contamination levels within the wells. Of these wells 34 of were in the Waimakariri District and 64% of them exceeded the nitrate levels required to meet requirements of the NPS Freshwater.

Michael Blackwell was re-elected as Chairperson of the Water Zone Committee and Arapata Rueben was elected as Deputy Chair. A new community member, Martha Jolly, was also welcomed to the committee.

Waimakariri Irrigation Ltd's business case for the storage facility was being finalised and would be put to the vote of its shareholders in October 2021.

16.4. **International Relationships – Deputy Mayor Neville Atkinson**

Councillor Atkinson noted there was nothing to report on this matter as it was between meetings of the Waimakariri Passchendaele Advisory Group.

16.5. **Regeneration (Kaiapoi) – Councillor Al Blackie**

Councillor Blackie was an apology from the meeting.

16.6. **Climate Change and Sustainability – Councillor Niki Mealings**

The Christchurch Coastal Hazards Working Group met on the 9 July and was presented with some preliminary maps and were looking at a framework for a consultation approach.

Staff Sustainability Champions group met recently and was investigating a possible ride share scheme for staff. There was still work to be done on the waste volume coming from the staff's three bins.

The elected members Sustainability Strategy Steering Group meet on 16 July, with invitations also having been sent out to representatives of Maahanui Kurataia and Enterprise North Canterbury.

16.7. **Business, Promotion and Town Centres – Councillor Joan Ward**

Progress was being made with the refurbished Council Chambers. It was hoped that the Chamber would be available for use by mid-September, though some of the planned technology installation would not be finalised until early in 2022.

Rangiora Promotions would be having a brainstorming meeting on Sunday.

Meetings with adjoining properties owners to the Rangiora Airfield regarding the development of the airfield were continuing.

17. **QUESTIONS**

*(under Standing Orders)*

There were no questions.

18. **URGENT GENERAL BUSINESS**

*(under Standing Orders)*

There was no urgent general business.

19. **MATTERS TO BE CONSIDERED WITH THE PUBLIC EXCLUDED**

*Section 48, Local Government Official Information and Meetings Act 1987*

Moved Councillor Atkinson

Seconded Councillor Mealings

**THAT** the public be excluded from the following parts of the proceedings of this meeting.

The general subject of each matter to be considered while the public was 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, were as follows:

Item No	Minutes/Report of	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 the passing of this resolution



19.1	Minutes of Council public excluded portion of Council meeting of 6 July 2021	Confirmation of minutes	Good reason to withhold exists under Section 7	Section 48(1)(a)
<b>REPORTS</b>				
19.2	Report of C Roxburgh (Water Asset Manager) and R Kerr (Delivery Manager Stimulus and Shovel Ready Programme)	Stimulus Programme: Budget and Scope Amendments	Good reason to withhold exists under Section 7	Section 48(1)(a)
19.3	Report of R Kerr (Delivery Manager Shovel Ready and Stimulus Programme) and K Simpson (3 Waters Manager)	Kaiapoi Stormwater & Flooding Improvements; Options or advancing works	Good reason to withhold exists under Section 7	Section 48(1)(a)
19.4	Report of K Simpson (3 Waters Manager)	Hellers Ltd Trade Waste Agreement	Good reason to withhold exists under Section 7	Section 48(1)(a)
19.5	Report of K LaValley (Project Delivery Manager)	Sewer Development Contributions	Good reason to withhold exists under Section 7	Section 48(1)(a)
19.6	Report of K LaValley (Project Delivery Manager)	Private Developer Agreement with LIME for Silverstream East	Good reason to withhold exists under Section 7	Section 48(1)(a)

This resolution was 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 relevant part of the proceedings of the meeting in public are as follows:

Item N°	Reason for protection of interests	Ref NZS 9202:2003 Appendix A
19.1 – 19.6	Protection of privacy of natural persons. To carry out commercial activities without prejudice	A2(a) A2(b)ii

**CARRIED**

**CLOSED MEETING**

*The meeting adjourned for a refreshment break at 3.26pm and reconvened at 3.45pm.*

*The Public Excluded section of the meeting occurred from 3.45pm to 4.42pm.*

**Resolution to resume in Open Meeting**

Moved: Mayor Gordon

Seconded: Councillor Atkinson

**Items 19.1 – Minutes of the public excluded portion of Council meetings of 6 July 2021**

Resolves that Items 19.1 remain public excluded.

**Item 19.2 - Stimulus Programme: Budget and Scope Amendments**

Resolves that the resolution be made public and the report remains public excluded to protect the commercial position of Council.

**Item 19.3 - Kaiapoi Stormwater and Flooding Improvements, Options for advancing works**

Resolves that this report and resolution remain public excluded in order to protect the privacy of natural persons and commercial confidentially until any sale of the property to Council is unconditional or any compensation process relating to s181 Local Government Act 2002 is complete.

**Item 19.4 - Hellers Ltd Trade Waste Agreement**

Resolves that the resolution be made public once adopted but that the contents of the report and attachments remain public excluded due to the commercial sensitivity of the financial information contained in the report and attachments.

**Item 19.5 - Sewer Development Contributions, River Road, Rangiora**

Resolves that the contents of the report and recommendations remain public excluded to protect the privacy of the property owners.

**Item 19.6 - Private Developer Agreement with LIME for Silverstream East**

Resolves that the resolution be made public but the contents of the report and attachments are to remain public excluded.

**CARRIED**

**OPEN MEETING**

19.2 **Stimulus Programme: Budget and Scope Amendments - C Roxburgh (Water Asset Manager) and R Kerr (Delivery Manager Stimulus and Shovel Ready and Stimulus Programme)**

Moved: Councillor Williams

Seconded: Councillor Ward

**THAT** the Council:

- (a) **Receives** Report No. 210718117166.
- (b) **Approves** the following amendments to the scope of the Three Waters Stimulus Programme under the Tuahiwi Wastewater upgrade project:
  - i. **Approves** the budget amendments set out in the table below, including:
    - 1. **Remove** Turiwhaia Road rising main replacement, noting that this is programmed for funding in 2023.24 in the Long Term Plan, with saving to the Stimulus programme of approximately \$365,000.00.
    - 2. **Remove** Pitama Drive wastewater main replacement, noting that the existing pipeline it has over 50 years remaining useful life, with saving to the Stimulus programme of approximately \$110,000.
    - 3. **Transfer** of \$125,000 from Waterways and Drainage Manager budget to the Tuahiwi Sewer upgrade project
    - 4. **Increase** the growth budget contribution for Loburn Lea Sewer upgrade of \$255,000.

Budget Name	Budget Type	PJ / GL	March 2021 Budget	Proposed Budget	Difference
Fernside Sewer Upgrade	LOS (Stimulus)	101671.000.5113	\$670,500	\$885,050	\$214,550
	Growth	101671.000.5115	\$125,000	\$125,000	\$0
Poyntzs Road Water Source Upgrade	LOS (Stimulus)	101670.000.5103	\$1,163,500	\$954,300	-\$209,200
	Growth	101670.000.5105	\$73,100	\$73,100	\$0
Loburn Lea Sewer Upgrade	LOS (Stimulus)	101672.000.5113	\$1,877,000	\$1,879,200	\$2,200
	Growth	101672.000.5115	\$1,215,000	\$1,470,000	\$255,000
Tuahiwi Water Extension Greens Road	LOS (Stimulus)	101673.000.5103	\$488,750	\$488,750	\$0
	Growth	101673.000.5105	\$166,250	\$166,250	\$0
Tuahiwi Water Extension Tuahiwi Road	Growth	101674.000.5105	\$133,000	\$133,000	\$0
Tuahiwi Sewer Extension Greens Road	Growth	101675.000.5115	\$140,000	\$140,000	\$0
	LOS (Stimulus)	101673.000.5113	\$136,000	\$136,000	\$0
Tuahiwi Sewer Extension Tuahiwi Road	Growth	101676.000.5115	\$128,000	\$128,000	\$0
Central Tuahiwi Sewer Upgrade	LOS (Stimulus)	101677.000.5113	\$2,170,500	\$2,291,000	\$120,500
West Eyreton and Summerhill Storage Upgrade	LOS (Stimulus)	101679.000.5103	\$140,500	\$140,500	\$0
Central Rangiora Capacity Upgrade Stage 5A	LOS (Stimulus)	101680.000.5113	\$246,000	\$232,000	-\$14,000
Ohoka Water Storage Upgrade	LOS (Stimulus)	101681.000.5103	\$186,000	\$186,000	\$0
Oxford Sewer Operational Improvements	OPEX (Stimulus)	101702.280.2543	\$79,000	\$79,000	\$0
Oxford Sewer I&I Investigations	OPEX (Stimulus)	101666.280.2543	\$300,000	\$300,000	\$0
Three Waters Reform Investigations	OPEX (Stimulus)	101667.280.2543	\$110,000	\$100,950	-\$9,050
Drainage and Waterways Manager	OPEX (Stimulus)	101697.280.2543	\$200,000	\$75,000	-\$125,000
Headworks Asset Data Management Improvements	OPEX (Stimulus)	101698.280.2543	\$240,000	\$261,000	\$21,000
Stimulus Programme Management	OPEX (Stimulus)	101665.280.2543	\$141,000	\$140,000	-\$1,000
Cust Headworks Upgrade	LOS (Stimulus)	101789.000.5103	\$220,900	\$220,900	\$0

Budget Name	Budget Type	PJ / GL	March 2021 Budget	Proposed Budget	Difference
<b>Total</b>			<b>\$10,350,000</b>	<b>\$10,605,000</b>	<b>\$255,000</b>

- (c) **Adopts** an increase in the number of properties projected to recover the Loburn Lea sewer development contribution from 100 to 125.
- (d) **Adopts** the resultant minor change in the Loburn Lea development contribution from the current figure of \$17,734 to an updated figure of \$17,165 based on the updated growth budget figure, updated number of connections the new system will serve, and the same proportional share of the cost of financing as with the current development contribution calculation.
- (e) **Direct** that the recommendations be made public but the report remain public excluded in accordance with section 48 of the Local Government Official Information and Meetings Act 1987 as it would unreasonably prejudice the commercial position of Council.

**CARRIED**

19.4 **Hellers Ltd Trade Waste Agreement - K Simpson (3 Waters Manager)**

Moved: Councillor Williams                      Seconded: Councillor Ward

**THAT** the Council:

- (a) **Receives** Report No. 210722119575.
- (b) **Approves** the following discounted rates for inclusion in the revision of the Hellers Ltd Trade Waste Agreement:
- ∑ \$0.68 /m3 for volume
  - ∑ \$0.45 /kg for BOD (Biological oxygen demand)
  - ∑ \$0.36 /kg for TSS (Total suspended solids).
- (c) **Notes** that these rates are effectively 21% higher than the previous rates, but 10% lower than the revised standard rates in the Long Term Plan.
- (d) **Notes** that staff consider that offering a discount is justified given that Hellers Ltd have implemented onsite improvements to reduce the concentration of contaminants in the discharge and also given the nature of the flow being discharged is predominantly at off-peak times.
- (e) **Notes** that the proposed term of the new agreement is for three (3) years after which the rates will be reassessed.
- (f) **Resolves** that the recommendations of this report be made public once adopted, but that the contents of the report and attachments remain public excluded due to the commercial sensitivity of the financial information contained in the report and attachments.

**CARRIED**

19.6 **Private Developer Agreement with LIME for Silverstream East – K LaValley (Project Development Manager)**

Moved: Councillor Brine                              Seconded: Councillor Ward

**THAT** the Council:

- (a) **Receives** Report No. 210720118728.

- (b) **Authorises** the Chief Executive to enter into the Private Developer Agreement (201014137255) with LIME for the provision and cost sharing of infrastructure relating to the development of west Kaiapoi.
- (c) **Authorises** the Chief Executive to make minor amendments to the Private Developer Agreement as required.
- (d) **Approves** the following budget changes to match the anticipated completion of the works:
  - Σ West Kaiapoi Supply Main Stage Renewal – bring forward \$111,000 from 2022/23 to 2021/22.
  - Σ West Kaiapoi Supply Main Growth – bring forward \$167,000 from 2022/23 to 2021/22.
- (e) **Notes** that there is budget available for the remaining works included in the Private Development Agreement.
- (f) **Resolves** to make the recommendations in this report publically available but the contents of the report to remain Public Excluded.

**CARRIED**

**20. NEXT MEETING**

The next scheduled ordinary meeting of the Council will occur on Tuesday 7 September 2021, commencing at 1pm in the Function Room, Rangiora Town Hall, 303 High Street, Rangiora.

There being no further business, the meeting closed at 4.44pm.

CONFIRMED

\_\_\_\_\_  
Chairperson  
Mayor Dan Gordon

\_\_\_\_\_  
Date

**MINUTES OF AN EXTRAORDINARY MEETING OF THE WAIMAKARIRI DISTRICT COUNCIL HELD VIA ZOOM, DUE TO NATION COVID-19 LOCKDOWN RESTRICTIONS ON TUESDAY 24 AUGUST 2021, COMMENCING AT 1PM**

**PRESENT**

Mayor D Gordon (Chairperson), Deputy Mayor N Atkinson, Councillors K Barnett, A Blackie, R Brine, W Doody, N Mealings, P Redmond, S Stewart, J Ward and P Williams.

**IN ATTENDANCE**

J Harland (Chief Executive), T Tierney (Manager Planning and Regulation), T Ellis (Development Planning Manager), A Smith (Governance Coordinator).

**1. APOLOGIES**

There were no apologies.

**2. CONFLICTS OF INTEREST**

There were no conflicts of interested recorded.

**3. MATTERS TO BE CONSIDERED WITH THE PUBLIC EXCLUDED**

*Section 48, Local Government Official Information and Meetings Act 1987*

Moved: Councillor Atkinson                      Seconded: Councillor Barnett

**THAT** the public be excluded from the following parts of the proceedings of this meeting.

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:

<b>Item No</b>	<b>Minutes/Report of</b>	<b>General subject of each matter to be considered</b>	<b>Reason for passing this resolution in relation to each matter</b>	<b>Ground(s) under section 48(1) for the passing of this resolution</b>
3.1	Report of J Harland (Chief Executive) on behalf of Mayor Gordon and Councillor Mealings	District Plan Review – Appointment of Commissioners/ Hearings Panel	Good reason to withhold exists under Section 7	Section 48(1)(a)

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 relevant part of the proceedings of the meeting in public are as follows:

Item N°	Reason for protection of interests	Ref NZS 9202:2003 Appendix A
3.1	Protection of privacy of natural persons.	A2(a)

**CARRIED**

**CLOSED MEETING**

*The public excluded portion of the meeting occurred from 1.01pm to 1.20pm.*

***Resolution to resume in Open Meeting***

Moved Councillor Barnett

Seconded Councillor Atkinson

**THAT** the open meeting resumes and the business discussed with the public excluded remains public excluded due to the sensitivity of the matters covered, until submissions on the notification of the Proposed District Plan have closed.

**CARRIED**

**OPEN MEETING**

**4. NEXT MEETING**

The next scheduled ordinary meeting of the Council will commence at 1pm on Tuesday 7 September 2021 in the Function Room, Rangiora Town Hall, 303 High Street, Rangiora, subject to National Covid-19 Lockdown Levels.

There being no further business, the meeting closed at 1.21pm.

CONFIRMED

\_\_\_\_\_  
Chairperson  
Mayor Dan Gordon

\_\_\_\_\_  
Date

**WAIMAKARIRI DISTRICT COUNCIL****REPORT FOR DECISION****FILE NO and TRIM NO:** SEW-03-09-05 / 210811131529**REPORT TO:** COUNCIL**DATE OF MEETING:** 7 September 2021**AUTHOR(S):** Colin Roxburgh, Water Asset Manager  
Caroline Fahey, Water Operations Team Leader**SUBJECT:** Oxford Wastewater Stimulus Projects Update**ENDORSED BY:**  
(for Reports to Council,  
Committees or Boards)  
Department Manager  
Chief Executive**1. SUMMARY**

- 1.1 This report is to:
- 1.1.1 Provide the Council with an update on the investigation works undertaken to date as part of the Stimulus programme on the Oxford wastewater system, and;
  - 1.1.2 Seek Council approval to reallocate budget from the reticulation network to the wastewater treatment plant, in order to proceed with the recommended next steps.
- 1.1. In November 2020, Council agreed the allocation of the Stimulus grant across three waters projects. This included allocation of \$300,000 to assess inflow and infiltration (I&I) within the reticulation network, and \$79,000 to assess any opportunities for operational improvements at the Oxford Wastewater Treatment Plant (WWTP).
- 1.2. At the time the budget was committed, the initial steps both within the reticulation network and at the WWTP involved investigation / options assessment works. It was intended that these initial investigations would assist in determining how to optimise the outputs from the full Stimulus allocation, with follow up steps.
- 1.3. After completion of the initial steps, the following conclusions can be drawn. These conclusions are used to determine the recommended next steps, also below:

**I&I Investigations**

- The purchase of loggers within the reticulation network, and private property inspections have identified limited opportunities to make significant reductions in inflow and infiltration with the budget available. This leaves approximately \$173,000 of the original \$300,000 allocation still available to be allocated.

**WWTP Operational Improvements**

- The works at the WWTP have identified numerous options to reduce ongoing operating costs associated with the collection and disposal of sludge from the WWTP. The total allocation for investigatory works has been exhausted, with \$92,000 either spent or committed out of the original allocation of \$79,000.



- The WWTP investigations have led to recommendations for capital improvements that could be made to reduce ongoing operating costs at the WWTP by a figure in the range of \$85,000 to \$113,000 per year, equating in a potential rates reduction in the order of \$95 to \$127 per connection per year (9 – 13% of the Oxford wastewater rate). It is noted that this may take several years to realise, as processes will need to be optimised over time.

#### Next Steps

- Based on the above, in order to maximise the benefit yielded from the Oxford wastewater allocation of the Stimulus budget, it is recommended that the \$164,000 of unallocated I&I investigations budget be redirected to a new capital budget to fund the proposed upgrades at the WWTP. This capital budget will fund flowmeters and other monitoring equipment to assist with optimising the management of sludge at the WWTP, and reduce ongoing operating costs, in accordance with the methodology set out in Aecom report 210810131216.
- The Master Plan prepared by GHD is still in draft format, as it is not yet considered to fully cover all elements needed to be considered for the plant long term. It is included at this stage for information of progress to date, but it is noted that the final completed Master Plan will be presented to the Utilities and Roading Committee at a later date, once complete.

#### Attachments:

- Draft GHD Master Plan (210810131225)
- GHD Dewatering Options Assessment (210810131229)
- Aecom Phase Two Report – Dewatering Options Assessment (210810131216)
- PDU I&I Assessment Oxford Wastewater (210706109622)

## **2. RECOMMENDATION**

**THAT** the Council:

- Receives** Report No. 210811131529.
- Notes** that initial investigations into inflow and infiltration (I&I) on the Oxford wastewater system have identified some areas to make minor improvements, and that overall the system is on average performing similar to typical threshold levels for wastewater systems in New Zealand.
- Notes** that the Master Plan for the Oxford Wastewater Treatment Plant (WWTP) is still being finalised, however is likely to identify a Membrane Aerated Biofilm Reactor (MABR) as the optimum upgrade method to meet achieve a renewal of the resource consent by 2031, taking into account future expected requirements, with a recommended budget figure of \$2.9 million, as well as identifying a need for further sampling to be undertaken in the coming years, and that a further report will be presented outlining these requirements and costs.
- Notes** that investigations into options to resolve high costs associated with sludge disposal at the Oxford WWTP have identified modifications to existing processes, following installation of new monitoring equipment as the recommended option.
- Approves** the reduction of the Inflow and Infiltration Investigations Stimulus Budget by \$164,000 and the creation of two new capital Stimulus budget for the Oxford scheme called Oxford WWTP Monitoring Upgrades to the value of \$164,000.
- Notes** that it has been forecast that with the additional monitoring equipment, and optimisation of the current sludge management processes (informed by this new equipment), operational savings in the order of \$85,000 to \$113,000 per year are forecast,

which would result in ratings reductions of \$95 to \$127 per connection per year, but that these savings may take several years to realise, and these projections will be updated following the completion of initial trials that are underway currently.

- (g) **Notes** that some investigations and further analysis on the Oxford wastewater scheme is still ongoing, and that a further report will be brought to the Utilities and Roading Committee at the conclusion of the Stimulus funded works.
- (h) **Circulates** this report to the Oxford-Ohoka Community Board for their information.

### 3. **BACKGROUND**

- 3.1. In November 2020, Council agreed the allocation of the Stimulus grant across three waters projects. This included allocation of \$300,000 to assess inflow and infiltration (I&I) within the reticulation network, and \$79,000 to assess any opportunities for operational improvements at the Oxford Wastewater Treatment Plant (WWTP).
- 3.2. The key drivers to the allocation of funding to the Oxford wastewater system are as below:
  - The wastewater treatment plant has achieved operational challenges at times, with a contributing factor being increased flows during rainfall events, due to inflow and infiltration (I&I) entering the system. This has led to overflows of the plant, or challenges operating the plant.
  - There are high operational costs at the WWTP, with a large contributing factor being high costs associated with carting and dumping of sludge produced at the plant. The sludge has a high liquid / low solids content, meaning that the cartage and dumping fees are largely covering the cost of dumping water rather than solids, due to ineffective solids / liquids separation of the sludge. This is currently costing in the order of \$170,000 per year, which presents an opportunity to reduce costs, and therefore rates, if a more efficient solution can be found.
  - To achieve a degree of equity across the district, with the three other wastewater schemes (Fernside, Loburn Lea and the Eastern Districts Sewer Scheme) also receiving an allocation of Stimulus funding.
- 3.3. Due to the time constraints with the Stimulus funding, with all expenditure required to be completed by the end of March 2022, the focus with the funding was to undertake assessments into improvements that could be made, but without necessarily committing to significant capital works. The reason being that in both the case of the reticulation investigations, and the WWTP investigations, the problem is required to first be investigated and understood, before options can be assessed, and funding committed to the implementation of solutions.
- 3.4. When tasks were derived however, there were not specific tasks identified to utilise the full funding allocation. The reason for this was so that there were some opportunities to identify simple solutions after the initial investigations phase that could be completed within the required timeframe and budget, while acknowledging there may also be some larger projects requiring further funding at a later date, to realise wider benefits.
- 3.5. This report sets out to provide an update on the work completed to date, and recommend a pathway to optimise the value to be received from the remaining unallocated budget.

### 4. **ISSUES AND OPTIONS**

- 4.1. The following table provides a summary of the works completed to date as part of the Oxford Wastewater Stimulus project. Two budgets were initially established, with sub-projects against each budget.

Table 1: Oxford Wastewater Stimulus Works Summary

	Item	Projected Cost	Description	Status
I&I Investigations	Network Sewer Level Monitors and Loggers	\$45,000	Loggers installed throughout network prior to May / June rain event. Successful in providing a clearer picture of the I&I throughout the network, as well as allowing for longer term monitoring and potential triggering more proactive responses during events.	Complete. Report on outcomes attached at scheme wide level, detailed report on sub-catchments to be submitted at conclusion of Stimulus funding period.
	Property Inspections and Smoke Testing	\$20,000	202 properties inspected for private sources of I&I. Approximately 60 (predominantly minor) issues identified following assessment. Results to be reviewed, then followed up with property owners via enforcement of the Wastewater Bylaw.	Inspections complete. Review of results required, then letters to be drafted and sent.
	Vented Manhole Sealing	\$8,000	Sealing tops of vented manholes in areas prone to flooding. This will reduce I&I for future events.	Manholes identified, installation to be completed in coming months.
	CCTV inspection of Network Mains to Assess Condition	\$35,000	Undertaking CCTV inspection of sewer mains throughout the network to gain understanding of condition, and prioritise renewals.	Sewer mains in process of being identified, and CCTV trades panel being established. Tendering proposed for September, award October 2021.
	PDU Analysis and Reporting	\$15,000	Overseeing installation of loggers, collection of data, analysis and reporting.	Ongoing throughout projects
	<b>Sub Total</b>	<b>\$123,000</b>	<b>\$173,000 of initial \$300,000 allocation not yet assigned.</b>	
WWTP Operational Improvements	Dewatering Stage 1 Investigation	\$17,000	Options assessment to optimise increasing solids content in sludge before carting and dumping, to minimise ongoing operational costs associated with sludge removal from the plant.	Assessment completed and attached (210810131229). Recommended option had a capital cost estimate of approximately \$800,000, and would take a number of years to achieve a reduction in rates. None of the options assessed are recommended to be proceeded with.
	Master Plan Preparation	\$26,000	Preparation of a Master Plan for the site taking into account growth on the scheme, and renewal of the	First draft of Master Plan completed (210810131225),

	Item	Projected Cost	Description	Status
			resource consent. To allow sound planning for the future, and ensure any upgrades completed in the short term are compatible with long term solutions.	feedback given, and final version still being prepared. Will be reported to the Utilities and Roading Committee at a later date. This will include recommendations for further treatment to facilitate consent renewal, and monitoring plan in the short term, with funding to be requested via next Annual Plan process.
	Purchase of moisture meter	\$5,000	Purchase of a moisture meter to allow monitoring of dry solids content of sludge, to allow dewatering process to be monitored and optimised.	Meter has been ordered.
	WAS/RAS Sludge Level, MLSS Monitoring Equipment Installation	\$34,000	Installation of monitoring equipment to allow live monitoring of sludge blanket level in the clarifier. This will allow visibility of plant performance, prevent future overflows, and allow further optimisation of sludge management processes.	Equipment installed and data being gathered.
	Dewatering Options Assessment – Stage 2	\$10,000	Review of initial assessment, identification of alternative lower cost options to achieve a reduction in operational costs without large upfront capital investment.	The report has been completed (210810131216). This identified opportunities to achieve improvements in sludge solids content, therefore reduction in cartage and dumping costs, with only marginal capital costs up front. Net present value (NPV) analysis completed and identified the installation of flow monitoring equipment, and changes to operational process as the preferred option.
	<b>Sub Total</b>	<b>\$92,000</b>	<b>\$13,000 over-spend of initial allocation of \$79,000</b>	
	<b>Total</b>	<b>\$215,000</b>	<b>\$164,000 not yet allocated out of total combined budget of \$379,000</b>	

- 4.2. The above table demonstrates that in total there is \$164,000 of budget not yet allocated. The progress to date is discussed further below, in order to determine the optimum benefit that can be realised from this remaining budget.

#### I&I Investigations

- 4.3. As noted above \$123,000 has been committed or spent in the reticulation network. This has consisted of, the purchase and installation of flow monitoring and data logging equipment throughout the reticulation network, property inspections and smoke testing of private laterals, sealing of some vented manholes, CCTV inspection of the reticulation network, and analysis and reporting on the above.
- 4.4. Aside from the sealing of the vented manholes, this has identified limited opportunities to significantly reduce I&I within the reticulation network, especially within the timeframes of the Stimulus grant availability.
- 4.5. There are expected to be some marginal improvements made via the follow up work with private property owners, and the vented manhole sealing. The CCTV inspection work could also identify mains for future renewal, which could allow further improvements to be made over time.
- 4.6. A key outcome from the work that has taken place has been gaining a much better understanding of the level of I&I in the network, how this is distributed throughout the network, and how this compares to other benchmark levels both within the district, as well as nationally. A high level overview of the scheme performance is documented in report 210706109622, which is attached to this report, with a summary of key findings given below.

- **Comparison with Waimakariri District Council Engineering Code of Practice:**
  - The approximate peak flow measured from the reticulation network is approximately 36 L/s, which is equivalent to the design flow for the system based on Engineering Code of Practice calculated peak flow, although actual peaking factor (6.7 – 8.9) is greater than ECoP figure of 5.
- **Comparison with Water New Zealand Inflow and Infiltration Control Manual V1:**
  - Dry weather groundwater infiltration levels are greater than the threshold value, with these giving a score of 27% using the specified measure, versus the threshold of 20%. This indicates a higher than normal level of groundwater entering the Oxford system during periods of dry weather.
  - Dry weather groundwater flows when measured in litres per person per day at 174 L/person/day are less than the Water NZ threshold value of 280 L/person/day.
  - The rainfall derived inflow and infiltration volume as a percentage of total rainfall volume was measured to be in the range of 2 – 12%, which is similar to the Water NZ threshold value of 10%, but less than the stated Water NZ typical value of 20%.
  - The peaking factor (ratio of peak flow to average flow) was measured in the range of 6.7 – 8.9, which is similar to the Water NZ threshold level of 8, but greater than the stated typical value of 5.

- **Conclusions from Water NZ Comparison**

- There are a number of measures that can be used to assess the I&I against either typical or recommended threshold levels. The Oxford system is greater than some levels, but less than others. On balance, it is considered that the levels of I&I in the Oxford system are similar to typical or threshold values for New Zealand wastewater systems. What this implies is that the system generally performs at the upper limit of what would be considered an acceptable level of I&I.
- The measure where there is the greatest exceedance by the Oxford system is the groundwater infiltration levels, during dry weather conditions. This suggests that there is a constant base flow entering the system during dry weather being the greatest point of difference for the Oxford system, while the increase in flows during rain events is more in line with typical levels that would be expected.

- **Comparison of Benchmark Levels with Kaiapoi Wastewater System**

- For a point of comparison, data from the Kaiapoi system was assessed against the same Water NZ threshold values as those Oxford was assessed against.
- Kaiapoi had higher levels of I&I than Oxford when assessed against each of the Water NZ threshold levels. While a more complete report will be brought to Council following more detailed analysis across all measures, as an indication Kaiapoi had an average peaking factor across two events of 16.6, while Oxford had a peaking factor of 8 for the same two events. This indicates that the proportion of I&I in the Kaiapoi system compared to average daily flow is about double that of Oxford, for the same events.

- **Conclusions from I&I Investigations**

- There were a number of predominantly minor issues identified on private property in Oxford, which will be reviewed and followed up with property owners, to provide some reduction in I&I levels originating from private property.
- There are some opportunities to seal vented manholes in areas prone to flooding, which is expected to provide some reduction in the amount of rainfall runoff that enters the wastewater system during rain events.
- When compared to threshold levels as defined by Water NZ, the Oxford system on balance has reasonably typical levels, similar to the threshold level at which intervention may be considered, but generally not exceeding this level.
- When compared to Kaiapoi as a comparative scheme in the district, the level of I&I in Oxford is generally much lower.
- The CCTV inspection work planned may present further opportunities to reduce I&I through relining or relaying mains, however this form of I&I remediation generally comes at a high cost for the level of benefit received. This will need to be considered in a comprehensive report at the conclusion of all the I&I works, at the conclusion of the Stimulus funded project.

- While there are opportunities for some improvements to be made to reduce the amount of I&I, the items that are able to be addressed are not expected to make significant and marked reductions in the total I&I, but rather incremental improvements. Given this, and taking into account the reasonable (but not exceptional) performance of the scheme against threshold values, the amount of further improvements that can be made in Oxford is considered to be marginal. In general, there is a diminishing rate of returns on investment in reducing I&I, the more that is found and resolved.

- 4.7. While some preliminary conclusions have been drawn above, there are still some investigative works underway, and some analysis still to be written up on some of the data collected. There will be a more comprehensive report at the conclusion of the Stimulus project into the full I&I investigations and next steps for the system. The purpose of the update in this report is to provide a preliminary overview of the initial findings, to help guide decision making with respect to the allocation of the remaining Stimulus budget for Oxford.

#### WWTP Operational Improvements

- 4.8. Approximately \$90,000 has been committed or spent as part of the operational improvements assessment at the WWTP. This has included the preparation of a master plan for the Oxford WWTP, to determine the best way to service the community in the long term, two investigations into options to optimise the dewatering processes at the WWTP to reduce ongoing operational costs, and the purchase of some monitoring equipment to assist with the proposed operational improvements. Key outcomes from this work are given below:

##### **Master Plan**

- GHD are in the process of undertaking an assessment looking into the Master Plan for the Oxford wastewater system, with particular reference to renewal of the resource consent in 2031. This Master Plan will be presented in full once complete, but some preliminary findings are presented below.

##### Resource Consent Renewal

- It is expected that this consent renewal will require a lower concentration of nutrient levels applied per hectare of land, either requiring more removal via treatment, more land to apply the discharge over, or a combination of the two.
- Five options for the future treatment process were long-listed, which was refined to a short-list of three options for Multi-Criteria Analysis (MCA). These options included:
  - Option 1: New clarifiers and process intensification with Membrane Aerated Biofilm Reactor (MABR).
  - Option 3: New clarifiers and additional effluent irrigation area.
  - Option 5: Conveyance to Rangiora WWTP.
- Option 5 was deemed not to be viable, with a capital cost of approximately \$25 million, relative to figures of approximately \$2.9 to \$3.1 million for Options 1 and 3 respectively. Following MCA, Option 1 (new clarifiers and process intensification with MABR) was recommended. Key reasons for this included:

- MABR will achieve a higher treated effluent quality, making it more adaptable not only for the next resource consent renewal, but also further consent renewals beyond this.
  - The operability of both Option 1 and 3 are similar, with some additional operational input of the MABR balanced against additional operation of a larger effluent irrigation system for Option 3.
  - There is a very large amount of land required for Option 1, which may have negative impacts on amenity value, or may limit the scheme for further expansions or more stringent consents, as the full amount of Council owned land would be exhausted for this option.
  - The capital cost was similar for both options so did not meaningfully differentiate between the two.
  - While the main focus of the Master Plan report was on treatment upgrades to ensure the resource consent can be renewed, there are other considerations given to the wider plant operation, to accommodate growth, and ensure other modifications are consistent with the wider master plan. These aspects will be given more consideration as part of the preparation of the new Long Term Plan.
- It is expected that Option 3 will be the recommended option from this stage of the Master Plan assessment, however this will be confirmed on final reporting of the completed Master Plan.

#### Additional Works (Years 1 – 10)

- The current draft of the Master Plan does not address all works that would be required in the coming 10 years, with the current focus on the consent renewal in 2031. It is expected that there will be further recommendations resulting from the final version that are not yet included. In particular, there is a need identified for additional wastewater quality monitoring data, to help inform future designs into the next stage of upgrades.

#### **Dewatering Options Assessment – Stage 1**

- GHD have undertaken a review of the waste activated sludge (WAS) disposal options. The current WAS system has no dewatering in place, resulting in sludge being removed at a very low dry solids percentage. This incurs significant costs for transport and disposal, in the order of \$140,000 to \$170,000 per year, making up about 50% of the overall costs of running the treatment plant. This high cost presents a significant opportunity to reduce costs and therefore rates, if efficiencies can be found.
- GHD undertook an options assessment, with 6 options considered to undertake dewatering, to reduce long term operating costs. The capital cost estimates ranged from \$0.8 million to \$1.5 million, and annual savings in the range of \$100,000 to \$45,000.
- The recommended option is the 'Containerised Monobelt'. This would consist of mechanical dewatering device that combines a gravity thickener with a filter press, housed in a 20 foot container. The sludge would enter the Monobelt where it is dewatered to achieve a sludge cake of 16 – 20% dry solids. This sludge cake



would be discharged to a conveyor which would move it to a sludge bin, for disposal by truck to landfill.

- The cost estimate for this option is \$0.8 million, and annual savings estimated at \$70,000 in initial years, increasing to \$123,000 per year by 2051.
- While the recommended option was shown to achieve a positive Net Present Value (NPV), this would take time to realise savings, as it would only be over time that the operational savings would exceed the additional capital repayments, and additional depreciation funding required. So while it could be argued that long term this option would be beneficial, in the short term it would only have marginal rating benefits. This marginal benefit in initial years would introduce a risk that if either there was capital cost escalation, or if full projected operational savings were not realised, it could result in a rating increase rather than decrease.
- Based on the only marginal benefits based on the GHD work, further advice was sought for alternatives, with a lower up-front capital investment required.

### **Dewatering Options Assessment – Stage 2**

- Following the GHD work, further conversations were held with operators, equipment suppliers, and Aecom to investigate alternatives with a lower capital out-lay, and a greater chance of providing a rating benefit both in the short term, and long term.
- The Aecom report (210810131216) is attached to this report, and can be read in full for complete documentation of this work, however a summary is provided below.
- A key focus of the Aecom report was how existing systems could be optimised to provide savings, rather than investing in significant new items of infrastructure, which was the focus of the GHD work.
- One item of work was recommended for all options is additional flow monitoring equipment, to complement other effluent quality monitoring equipment that has recently been installed or ordered (sludge blanket level monitor, and moisture meter). This equipment would assist operators' understanding of existing processes, given the limited data on how the plant operates, and therefore limiting their ability to make changes to optimise and improve the plant performance. This is seen as a necessary pre-cursor to other operational improvements.
- In addition to the flow monitoring recommended by Aecom, some recent overflows at the plant during large rain events have identified a need to be able to monitor and report on any overflow volume. Currently when the pond has overflowed, the lack of flow data has meant there has been no ability to confidently report on overflow volumes. This would require a flow monitoring system and chamber to be installed, with a total estimated cost of \$35,000
- The capital cost estimate of the recommended flow monitoring upgrades to facilitate both operational improvements and reporting on any overflows is summarised below:
  - Flow meter installations = \$ 80,000
  - Pond overflow measuring system = \$ 35,000

- Professional Fees (15%) = \$ 17,000
  - Contingency (20%) = \$ 30,000
  - Total Recommended Budget Allowance = \$ 162,000
- Three options were considered to optimise the sludge management processes. These are outlined below:
    - Option 1 – Operational Adjustments:
 

This option comprises operational changes to current management of the stored Waste Activated Sludge (WAS) to increase the percentage of dry solids (DS %).

Table 2: Summary of Proposed Operational Changes from Aecom Report

Item	Current Operation	Proposed Change
1	Weekly disposal of approximately 40 m <sup>3</sup> of sludge from the SHT.	Sludge disposal to occur every two weeks or more.
2	Limited opportunity for WAS settling in SHT and supernatant removal.	The increased retention time of sludge in SHT prior to disposal allows increased settling and supernatant removal.
3	No measurement of the concentration of dry solids in the WAS disposed of.	Regular dry solids testing to occur for a prolonged period of time (beyond the timeframe of this report). Testing results should inform operational practises to achieve a maximum level of dewatering without additional capital investment
4	No measured volume of WAS disposed of to the tank.	Volumes of WAS removed should be measured as discussed in Section 2.2.

While some trials are already underway to explore what gains may be able to be made, there is some uncertainty in the reductions in future operating costs that will be achieved. Cost implications of achieving either 0.5% DS and 1% DS have been modelled, to show both a realistic upper and lower limit of potential outcomes.

For no further capital investment (other than the installation of additional flow and water quality monitoring equipment which is common to all options), it is projected that annual operating costs could reduce by \$113,000 if 1% DS can be achieved, or \$85,000 if 0.5% DS can be achieved. These are forecast to achieve a rates reduction in the order of \$95 to \$127 per connection per year.

It is expected that these potential savings may take several years to be realised, as they rely on optimisation of operational processes which may take some time to fine tune. Therefore, it is noted that full savings may not be immediate, however this is still considered to reflect a realistic scale of savings that may be achieved over time.

- Option 2 – Henley Sludge Age Controller

This option looked at repurposing a 'Henley Sludge Age Controller Unit' from the Lyttelton WWTP, owned by CCC, which is to be abandoned. It has been assumed this could achieve a DS % of 2%. While there have been preliminary discussions about purchasing the unit for \$1, there

would be installation costs of transportation, replacement of electrical controls, the concrete pad foundation and tank supports, the pipework, pumps and installation and commissioning of the unit.

A total budget allowance of \$100,000 is provided, which is forecast to provide operational savings of \$115,000 per year, or a reduction in the annual sewer rate of \$120 per connection.

○ Option 3 – Retrofit Picket Fence Mixer into Sludge Holding Tank

This option involves retrofitting a 'picket fence thickener' (PFT) into the sludge holding tank. This device aids gravity settling, and is forecast to achieve a DS% of 2%. The capital cost is estimated at \$350,000, and it is forecast to reduce operational costs by \$117,000, resulting in a reduction in annual rates by \$93 per connection.

○ Option 4 – Monobelt

For comparison, the Monobelt option from the earlier GHD report was assessed alongside these alternative options. With a capital cost of \$800,000, and a forecast operational saving of \$82,000, this option is presented as achieving an annual rates reduction of \$20 per connection. It is noted that the Aecom assessment did not appear to take into account depreciation funding of the new infrastructure, which would reduce the rating benefit further, potentially causing a rating increase instead.

○ Conclusion

The recommended option from the Stage 2 assessment by Aecom is to proceed with Option 1, Operational Adjustments. The reasons being:

- This requires no capital outlay, and if it achieves the upper limit of DS% that has been assessed would provide the greatest reduction in rates, and optimum NPV, compared to all other options assessed.
- Proceeding with this option does not preclude an alternative option being progressed at a later date. As it does not include any capital investment upfront, there is also no risk of wasted investment.
- In addition to proceeding with Option 1, it is recommended that discussions be held with CCC regarding the potential purchase and storage of the Henley Unit. This would mean that it could be decided to proceed with this option at a later date, rather than have the unit be destroyed, and lose this potential future opportunity.

#### Conclusions and Recommendations

- 4.9. Taking into account the current commitments and budget, there is approximately \$160,000 of unallocated budget. Based on the original proposal, it was anticipated that the original investigation works would identify opportunities to invest this money within the reticulation network. As investigations have progressed, it has been determined that the greatest savings and improvements that can be made are at the treatment plant.

- 4.10. It is therefore proposed that this currently unallocated budget be redirected from the reticulation network, to the treatment plant. Analysis has suggested that through modifications to operational processes at the plant, assisted by additional monitoring equipment, savings at the plant could be achieved that may reduce Oxford wastewater rates by in the order of \$100 per connection per year (or 10%) in the coming years. Conversely, investment of this budget within the reticulation network, based on data received to date, would achieve only a very marginal reduction in I&I, and therefore no material reduction in the overall Oxford wastewater rates. It is noted that the operational savings may take several years to be fully realised, depending on the rate of improvement that can be made.
- 4.11. For all options considered at the Oxford WWTP, it is considered necessary to invest in additional flow monitoring equipment for the various waste streams throughout the plant. It is through understanding and control of these various waste streams, and through greater understanding of other treatment parameters such as the sludge level, and DS% being achieved, that improvements will be able to be made, and the system optimised.
- 4.12. For these reasons, it is recommended that the currently unallocated operational budget be re-assigned as capital budget to invest in additional monitoring equipment at the WWTP, to the value of \$164,000.
- 4.13. In the event that the flow monitoring equipment work turns out to be less than the \$164,000 allowance, it is proposed that any residual be utilised on replacement or rehabilitation of manholes within the reticulation network, as there is a list of manholes with defects that can be worked through. This will ensure that the Stimulus funding is fully utilised.
- 4.14. It is expected that the finalisation of the Master Plan will result in recommendations for additional influent quality monitoring, which will likely result in a budget recommendation for the coming year. This may offset operational savings from sludge management in the initial year, but will form part of the bigger picture of improving data surrounding the plant to ensure its performance can be optimised.
- 4.15. As noted earlier, at the conclusion of all investigatory works, following completion of the Stimulus programme, a comprehensive report will be brought back to the Utilities and Roding Committee summarising all the learnings from the work.

#### **Implications for Community Wellbeing**

- 4.16. There are not implications on community wellbeing by the issues and options that are the subject matter of this report.
- 4.17. The Management Team has reviewed this report and support the recommendations.

### **5. COMMUNITY VIEWS**

#### **5.1. Mana whenua**

Te Ngāi Tūāhuriri hapū are likely to be affected by, or have an interest in the subject matter of this report. It is understood that Te Ngāi Tūāhuriri are supportive of land based wastewater treatment, as opposed to discharge to the Ocean. While the Master Plan work considered the option of connecting to the Eastern Districts Sewer Scheme (and therefore converting this from a land based discharge, to an ocean discharge), the recommended option retains land based discharge, following a higher level of treatment.

#### **5.2. Groups and Organisations**

There are groups and organisations likely to be affected by, or to have an interest in the subject matter of this report. Environment Canterbury (ECan) will have an interest in the consent renewal strategy, and conversations will commence with ECan well in advance of the expiry date of the consent.

#### **5.3. Wider Community**

The wider community is likely to be affected by, or to have an interest in the subject matter of this report. Any changes in rates as a result of improvements made will be communicated with the community via the Annual Plan process, while the impacts of the longer term upgrades will be included as part of the next revision of the Long Term Plan.

## **6. OTHER IMPLICATIONS AND RISK MANAGEMENT**

### **6.1. Financial Implications**

There are financial implications of the decisions sought by this report. These are generally covered in the Issues and Options section. In short, the recommended Sludge Management Option is forecast to be able to achieve a rating reduction in the order of \$100 per connection per year, assuming the forecast DS% levels can be achieved.

Longer term, the impacts of the upgrades forecast to be required as part of the consent renewal process will be modelled in detail as part of the next Long Term Plan process.

### **6.2. Sustainability and Climate Change Impacts**

The recommendations in this report have sustainability and/or climate change impacts. One of the options considered for sludge management in the Stage 1 report (Geobags) would have had a high carbon footprint relative to the status quo, as this creates an anaerobic process that produces and releases methane. This option was not proceeded with however, and none of the other options considered were noted as having a significant differentiation in terms of carbon footprint.

### **6.3 Risk Management**

There are not any risks arising from the adoption/implementation of the recommendations in this report. The recommended option for sludge management improvements is the lowest risk, in that it requires minimal capital outlay, and only in the unlikely event that this proves unsuccessful would alternatives be considered.

#### **Health and Safety**

There are health and safety risks arising from the adoption/implementation of the recommendations in this report. With any change to operational processes, health and safety must be considered. With the proposed operational changes not introducing entirely new processes, but rather modifying existing, there are minimal new risks to consider. However, it was noted in the Aecom report that steps should be considered to manage the risk of increased odour and methane gas build-up as part of the changes to operations. This will be worked through in greater detail with Aecom as well as with the Water Operations Team, and Water Unit operators as part of transitioning to modifying the operating processes.

## **7. CONTEXT**

### **7.1. Consistency with Policy**

This matter is not a matter of significance in terms of the Council's Significance and Engagement Policy.

### **7.2. Authorising Legislation**

The Resource Management Act are relevant to the subject matter of this report, with respect to the consideration given to renewal of the resource consent for the discharge of the treated effluent.

### **7.3. Consistency with Community Outcomes**

The Council's community outcomes are relevant to the actions arising from recommendations in this report. The relevant outcome is core utility services are sustainable, resilient, affordable, and provided in a timely manner.

### **7.4. Authorising Delegations**

The Council has the delegation to amend budgets, as recommended in this report.



# Oxford WWTP Strategic Plan

## Long Term Options

Waimakariri District Council

02 July 2021

➔ **The Power of Commitment**



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# Executive summary

## Project background

The Oxford Wastewater Treatment Plant (WWTP) currently services approximately 880 properties in the town of Oxford. The WWTP uses an extended aeration activated sludge process in a concentric tank surrounding a circular clarifier. Treated effluent from the clarifier is sent to a concrete-lined pond where it is stored prior to UV disinfection, then discharged to land via two pivot irrigators.

Increases in flow and load to the plant as the population of Oxford increases, coupled with potential changes as part of a renewed resource consent, are expected to cause a number of process constraints at the plant. These include insufficient bioreactor volume, and undersized clarifier, nitrogen loading rates for irrigation and sludge management. The preferred approach for sludge management is outlined in GHD's 2021 report *Oxford WWTP Strategic Plan - WAS Improvement Review*.

## Options development and evaluation

Considering these constraints, this report provides a strategic plan for the long-term future of Oxford WWTP over the next 50 years. A long listing exercise identified five options for the future of the Oxford WWTP. Three of these options considered upgrades to the Oxford WWTP to increase capacity and/or meet consent, while the other two options considered consolidating Oxford's wastewater or effluent with that of nearby Rangiora. The following three options were taken forward for further evaluation after a shortlisting workshop with WDC:

- Option 1: New clarifiers and process intensification with MABR
- Option 3: New clarifiers and additional irrigation area
- Option 5: Conveyance to Rangiora WWTP

Further design of these options was completed to better understand the key infrastructure requirements, opportunities for staging, cost, and preliminary footprint requirements. A multicriteria analysis (MCA) of these options was then undertaken. Considering the requirement of WDC to only consider the option of conveyance to Rangiora further if the cost is similar to that of Options 1 and 3, Option 5 has been excluded from the MCA analysis.

The MCA analysis identified Option 1 as the most preferable long term option over Option 3:

- With an increased treatment capacity, the MABR will provide a higher treated effluent quality. This option will then be more adaptable to any future discharge consent conditions, and will have greater stability under future load conditions.
- Both options allow for similar phased construction of the irrigation area expansion, with the main WWTP infrastructure upgrades occurring in 2030.
- The operability of each option is similar, with additional plant control and maintenance for the MABR balanced against the additional operation of the irrigation system.
- The installation of the MABR in the existing reactor, and resulting effluent quality enhancement, reduces the footprint required for future irrigation. The major expansion of the irrigation area and the clearing of land for Option 3 is expected to cause a negative amenity impact. There is also a risk that there is insufficient land for Option 3 on WDC's existing site, and WDC will need to purchase additional land.
- With additional aeration requirements for the MABR, Option 1 will have a greater power consumption than Option 3, which may result in slightly higher greenhouse gas emissions. Further detailed evaluation is required to quantify the emissions for each option.
- The addition of two clarifiers for each option will prevent solids carryover during peak wet weather events.

## Recommendations

It is recommended that new clarifiers and an MABR retrofit of the existing reactor (Option 1) be adopted for the long-term solution at Oxford WWTP, and WDC plans to invest in this solution in the future. A further investigation should be conducted to prepare a concept design of the MABR retrofit and other ancillary upgrades that may be required.

In the short term, it is recommended that WDC install disc filters between the effluent holding basin and the UV reactor to reduce suspended solids in the effluent.

### **Next steps**

To efficiently implement the MABR retrofit option it is recommended that the following next steps be implemented in the immediate future over the next 18 months:

- Review the current plant sampling and monitoring plan
- Conduct an intensive influent sampling survey (6 to 9 months data) to be used for a detailed process review.
- Investigate and trial different disc filters to remove TSS spikes in the effluent.

The following steps are recommended to be completed over the next three years to inform the design of long term upgrades:

- Prepare a preliminary design of the tertiary filter addition and pipework modifications to refine cost estimates, followed by detailed design and installation.
- Conduct a detailed process review with a calibrated model to more accurately estimate the bioreactor's capacity.
- Prepare a concept design of the MABR retrofit, clarifiers and irrigation expansion, including potential ancillary upgrades which have been excluded from this study (e.g. inlet works and lift pumps).
- Conduct a condition assessment of the existing reactor structure.
- Determine the suitability of the existing land owned by WDC for expansion of the irrigation area (initial expansion and future stages if funding allows the latter). This should also include a detailed water and nitrogen balance to determine the extent of future irrigation area required.

# Contents

<b>1.</b>	<b>Introduction</b>	<b>1</b>
1.1	Purpose of this report	1
1.2	Scope and limitations	1
1.3	Assumptions	2
<b>2.</b>	<b>Background</b>	<b>3</b>
2.1	Existing WWTP process	3
2.2	Process constraints	4
2.3	Upgrade drivers	4
2.4	Basis of design	5
<b>3.</b>	<b>WWTP Upgrade Options Longlist</b>	<b>6</b>
3.1	Options overview	6
	Option 1 – New clarifiers and MABR	6
	Option 2 – Replace with a new technology	6
	Option 3 – New clarifiers only and additional irrigation	6
	Option 4 – Pump treated effluent to Rangiora WWTP for polishing	6
	Option 5 – Decommission Oxford WWTP and pump to Rangiora WWTP	6
3.2	Shortlisting of Options	6
<b>4.</b>	<b>Shortlisted options evaluation</b>	<b>9</b>
4.1	Upgrade timing and other works	9
4.2	Estimation of land application nitrogen loading rate reduction	9
4.3	Option 1: New clarifiers and process intensification with MABR	10
4.4	Option 3: New clarifiers and irrigation area	13
4.5	Option 5: Conveyance to Rangiora WWTP	14
4.6	Cost estimate	16
4.7	MCA evaluation	17
<b>5.</b>	<b>Recommendations and next steps</b>	<b>20</b>
5.1	Recommendations	20
5.2	Next steps	20

## Table index

Table 1	Drivers for an upgrade to the Oxford WWTP	4
Table 2	Projected flows and loads for the Oxford WWTP	5
Table 3	Irrigation Staging – Option 1 (Indicative areas)	10
Table 4	Irrigation Staging – Option 3 (Indicative)	13
Table 5	Optioneering for conveyance from Oxford to Rangiora WWTP	15
Table 6	Cost Estimates	16

## Figure index

Figure 1	Oxford WWTP aerial view	3
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Figure 2	WWTP Upgrade Options Longlist	8
Figure 3	Example Arkal Filter (photo from Deeco)	9
Figure 4	Proposed Site Layout – Option 1 (Indicative)	11
Figure 5	Example of an MABR module being installed (photo from Oxymem)	12
Figure 6	Additional area required for irrigation for Option 1 (indicative)	12
Figure 7	Oxford WWTP Irrigation Area - 470 Woodstock Road (indicative)	14
Figure 8	Oxford WWTP to Rangiora pipe pathway	15
Table 7	MCA scoring for Oxford WWTP long term options	19

## Appendices

Appendix A	Basis of Design and Process Pinch Points Memo
Appendix B	Nitrogen Leaching Memo
Appendix C	Cost Estimates

# 1. Introduction

Oxford Wastewater Treatment Plant (WWTP), owned and operated by Waimakariri District Council (WDC), services approximately 880 properties in the town of Oxford. The WWTP design is based on a Modified Ludzak-Ettinger activated sludge process.

WDC has engaged GHD to complete a strategic plan for Oxford WWTP. As part of this strategic plan, an investigation of long-term options for the plant has been completed. The plant currently has treatment capacity issues and the population of Oxford is forecast to increase by 37% over the next 50 years.

## 1.1 Purpose of this report

The purpose of this report is to provide a strategic plan for the long-term future of Oxford WWTP. In particular, this report was undertaken to evaluate options that enable Oxford's wastewater servicing to meet the demands of extra population growth and more stringent discharge standards over the next 50 years.

## 1.2 Scope and limitations

*This report: has been prepared by GHD for Waimakariri District Council and may only be used and relied on by Waimakariri District Council for the purpose agreed between GHD and Waimakariri District Council as set out in section 1.1 of this report.*

*GHD otherwise disclaims responsibility to any person other than Waimakariri District Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.3 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.*

*GHD has prepared this report on the basis of information provided by Waimakariri District Council and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.*

*GHD has prepared the preliminary cost estimate set out in section 4.6 of this report ("Cost Estimate") using information reasonably available to the GHD employee(s) who prepared this report; and based on assumptions and judgments made by GHD.*

*The Cost Estimate has been prepared for the purpose of a comparing strategic options and must not be used for any other purpose.*

*The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant or guarantee that the [works/project] can or will be undertaken at a cost which is the same or less than the Cost Estimate.*

*Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be*

*greater than the planning estimate, and any funding would not be adequate. The confidence level considered to be most appropriate for planning purposes will vary depending on the conservatism of the user and the nature of the project. The user should therefore select appropriate confidence levels to suit their particular risk profile.*

*The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.*

*Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.*

*Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.*

### **1.3 Assumptions**

The following assumptions were made for this report:

- Projected wastewater flows are based on information provided by WDC
- In the absence of influent wastewater data, wastewater characteristics of typical domestic wastewater have been assumed.
- The irrigation area requirements provided are based on high level nitrogen modelling and are indicative only. Further modelling work is required to accurately quantify nitrogen leaching rates and crop nitrogen uptake.
- Minimal works needed to refurbish the concrete structure
- The suitability of WDC's existing land for expansion of the irrigation system was not undertaken. A detailed investigation including fieldwork is required to confirm the suitability of the for future irrigation expansion.

Further assumptions for the cost estimate are outlined in section 4.6.

## 2. Background

### 2.1 Existing WWTP process

The Oxford WWTP currently services approximately 880 properties in the town of Oxford. Two small pump stations service parts of the network, with the combined flow conveyed by gravity to the plant. The treatment plant was commissioned in 1999 based on a Modified Ludzak-Ettinger activated sludge process. Since then the plant has undergone a number of upgrades.

The treatment plant utilises an extended aeration activated sludge process in a concentric tank surrounding a circular clarifier. The 16m diameter tank is a partially buried reinforced concrete structure, with aeration and anoxic zones in the outer ring, and a 6 m diameter circular clarifier with conical base located at the centre. RAS from the clarifier is removed via a gravity draw-off pipe and returned to the inlet pump well, with a portion drawn off to a buried sludge storage tank (approx. 80 m<sup>3</sup> storage) from where it is tankered off site. Treated effluent from the clarifier is stored on site in a PE lined pond, from where it undergoes UV disinfection before being pumped offsite for irrigation.

An upgrade in 2014 added a holding pond at the head of the plant to store increasing volumes of wastewater received during wet weather events. This has helped to reduce the hydraulic loading on the plant in extreme events.

The layout of Oxford WWTP is shown in Figure 1.



Figure 1 Oxford WWTP aerial view

## 2.2 Process constraints

GHD has previously prepared a memorandum outlining the process constraints at the Oxford WWTP (refer Appendix A). These key process constraints relevant to the long term strategy are summarised below, with additional details provided in Appendix A:

### Bioreactor

The bioreactor is 675m<sup>3</sup> in volume and the aeration system was recently upgraded with blowers and diffused aeration. High level capacity estimation was undertaken as part of this review. Based on a sludge age of 15 days, the bioreactor would reach its capacity before Year 2030. However, the bioreactor can potentially be optimised (e.g. running at a slightly lower sludge age), and capacity may be stretched beyond 2030. A calibration process model e.g. BioWin will be needed to simulate the process response under a range of operation scenarios.

### Clarifier

The clarifier is undersized, with solids carry over occurring at flow rates greater than approximately 12 L/s. This is approximately one third of the current PWWF. Solids carry over will worsen in the future as flows and loads increase over time. A high-level analysis of the clarifier suggests that its surface area should be 2 to 3 times larger to accommodate the projected flows and loads.

### Sludge disposal

There is no dedicated thickening or dewatering as part of the sludge handling process. WAS is pumped to the sludge holding tank, where some thickening occurs during settling. The estimated weekly sludge disposal volume is 80 m<sup>3</sup> at 1% DS. Due to the disposal of unthickened sludge, sludge disposal accounts for close to 50% of OPEX.

### Irrigation Field Nitrogen loading rate

As per the WWTP's consent condition, the maximum nitrogen loading rate for effluent irrigation is 200 kg/ha/y. Based on the median effluent TN concentration of 10.4mg/L and current flows of 553m<sup>3</sup>/d, the estimated current nitrogen loading rate is 140 kg/ha/y and within the consent conditions. If the effluent TN concentration remains at its current median of 10 mg/L, the nitrogen loading rate is expected to exceed the permitted rate sometime from 2031/32 to 2040/41.

### Effluent volume

The maximum consented daily effluent volume for the WWTP is 1,382 m<sup>3</sup>/d, and the total annual effluent volume is 228,125 m<sup>3</sup> (average of 625 m<sup>3</sup>/d). Based on the projected flows, the annual effluent volume consent condition is expected to be exceeded sometime from 2024/25 to 2030/31.

## 2.3 Upgrade drivers

In addition to the constraints outlined above, the following table outlines key drivers to be considered during the development of a long term solution.

Table 1 Drivers for an upgrade to the Oxford WWTP

Driver	Description
Growth	The number of network connections in Oxford is forecast to increase by 37% over the next 50 years. Long term planning for Oxford WWTP will need to accommodate this increase in population.
Plant capacity	Analysis of the plant capacity has identified that there is inadequate capacity for the forecast flows and loads to 2051-2071. The clarifier has been identified as being undersized.
Sludge management	The current WAS system has no dewatering in place resulting significant sludge transport and disposal costs. WAS management upgrade options are discussed in the separate WAS Improvement Review (GHD,2021).



Driver	Description
Effluent quality and consent renewal	The plant will need to continue to meet its effluent quality standards to remain compliant with its discharge consent. Furthermore, the current discharge consent expires in 2031. The upgrades required to the plant prior to and beyond the re-consenting process will need to be taken into consideration.
Greenhouse gas emissions	WDC plans to implement greenhouse gas emission monitoring across their treatment facilities, and avoid the increase of greenhouse gas emissions.
Ease of operation	The management of biosolids and high flows at the Oxford WWTP require more operator intervention than typically required at a WWTP. Reduction in operator intervention is desired.
Ageing infrastructure	This is not considered a major driver, with the main reactor constructed approximately 25 years ago.

## 2.4 Basis of design

The basis of design for the Oxford WWTP is presented in Table 2. Flow projections were provided by WDC and were crossed checked against the estimated usage per EP. The projected PWWF to ADWF of 5.3 to 5.5 is considered reasonable. With no major trade waste customers in the catchment, loads are based on typical domestic wastewater characteristics per EP (volume and load from nearby truck washing facility TBC).

Table 2 Projected flows and loads for the Oxford WWTP

Parameter	Unit	2019/20	2021/22 to 2023/24	2024/25 to 2030/31	2031/32 to 2040/41	2041/42 to 2050/51	2051/52 to 2070/71
Connections	No.	889	985	1118	1296	1451	1729
EP	No.	2200	2438	2767	3207	3591	4279
<b>Flows</b>							
ADWF	m <sup>3</sup> /d	553	618	708	828	953	1120
PWWF	m <sup>3</sup> /d	3056	3379	3829	4429	4954	5890
PWWF	L/s	35	39	44	51	57	68
PWWF:ADWF	-	5.5	5.5	5.4	5.3	5.2	5.3
<b>Loads</b>							
BOD <sup>1</sup>	kg/d	154	171	194	225	251	300
COD <sup>2</sup>	kg/d	354	392	445	516	578	689
TN <sup>3</sup>	kg/d	31	34	39	45	50	60
AmmN <sup>4</sup>	kg/d	22	24	28	32	36	43
TP <sup>5</sup>	kg/d	7	8	9	11	12	14
TSS <sup>6</sup>	kg/d	209	232	263	305	341	406

**Notes:** (1) BOD = 70 g/ED/d  
(2) COD = 161 g/ED/d  
(3) TN = 14 g/ED/d

(4) AmmN = 10 g/ED/d  
(5) TP = 3.3 g/ED/d  
(6) TSS = 95 g/ED/d

## 3. WWTP Upgrade Options Longlist

### 3.1 Options overview

Based on the constraints and drivers described in section 2, a longlist of five options for the future of the Oxford WWTP was developed. Three of these options considered upgrades to the Oxford WWTP to increase capacity and/or meet consent, while the other two options considered consolidating Oxford's wastewater or effluent with that of nearby Rangiora. The five longlisted options have been summarised below:

#### Option 1 – New clarifiers and MABR

Two new clarifiers would be constructed to provide additional clarification capacity. Membrane Aerated Biofilm Reactors (MABR) would be installed in the anoxic zones of the current reactor to provide biological process intensification which increases the nitrification capacity.

Approximately double the current 15 ha irrigation area would be required for discharge of the future flows, with the assumption of no reduction of nitrogen loading rate on land application site (200kgN/ha/year).

#### Option 2 – Replace with a new technology

This option would involve repurposing the existing reactor and clarifier with a different treatment technology such as a Membrane Bioreactor (MBR) or sequencing batch reactor (SBR) which are able to achieve high quality effluent. These types of treatment processes do not need a clarifier and are relatively compact.

To account for future flows, the irrigation area would need to be increased to approximately 30 ha.

#### Option 3 – New clarifiers only and additional irrigation

The current bioreactor would be kept in its current configuration and two new clarifiers would be constructed to increase clarification and reduce solids carryover. As the plants' biological treatment capacity will remain unchanged, future increase of flows and loads from a larger population in Oxford will result in increasing nutrient loads in the treated effluent.

To counteract this, an irrigation area expansion to approximately 82 ha would be required to maintain the current irrigation nitrogen loading rate of 200kgN/ha/year.

#### Option 4 – Pump treated effluent to Rangiora WWTP for polishing

Oxford WWTP would continue to be operated in its current configuration. As flows and loads increase over time the effluent quality will deteriorate due to the treatment capacity limitations at the plant. The treated effluent would be pumped 36 km to the Rangiora WWTP ponds for further polishing prior to discharge.

#### Option 5 – Decommission Oxford WWTP and pump to Rangiora WWTP

Oxford WWTP would be decommissioned. The raw wastewater would be pumped from the current WWTP site via a new pipe to Rangiora WWTP for treatment in the pond based process.

### 3.2 Shortlisting of Options

A meeting was held on 20 May 2021 with GHD and WDC representatives to discuss the longlist options. The longlist of options that had been evaluated against key WDC objectives is shown in Figure 2. From the longlist options, it is proposed that Options 1, 3 and 5 are further investigated.

The following points were noted in the meeting:

- WDC generally agrees with GHD recommendation for options 1, 3 and 5 for further investigation.

- GHD noted the area west of the existing reactor-clarifier is at much lower elevation and easy construction area is very limited within the site footprint.
- The reduction of permitted nitrogen application rate on land when consent is renewed in 2030 could result in higher land area requirements. WDC confirmed that there is approximately 87 ha available (majority is forestry; timing of felling will need to be considered for land use availability). WDC may have the current nitrogen leaching rate estimates from the recent consent variation application, which could be useful for correlating future nitrogen leaching rate (typically requiring an environmental investigation to complete the nitrogen mass balance around the irrigation fields).
- Conveyance to Rangiora (Option 5) will be examined closely if the cost is similar to that of Option 1 and Option 3.
- GHD indicated that Membrane Aerated Biofilm Reactor (MABR) is a potential technology for Option 1 to reduce the requirement for additional reactor volume.
- GHD highlighted additional monitoring and studies (e.g. asset condition assessment, process sampling and modelling) will be necessary if WDC wishes to defer major capital expenditure (e.g. new clarifiers)
- WDC prefer to upgrade or sweat assets prior to 2031 consent renewal to avoid spending on items in the short term which become redundant in the medium term.

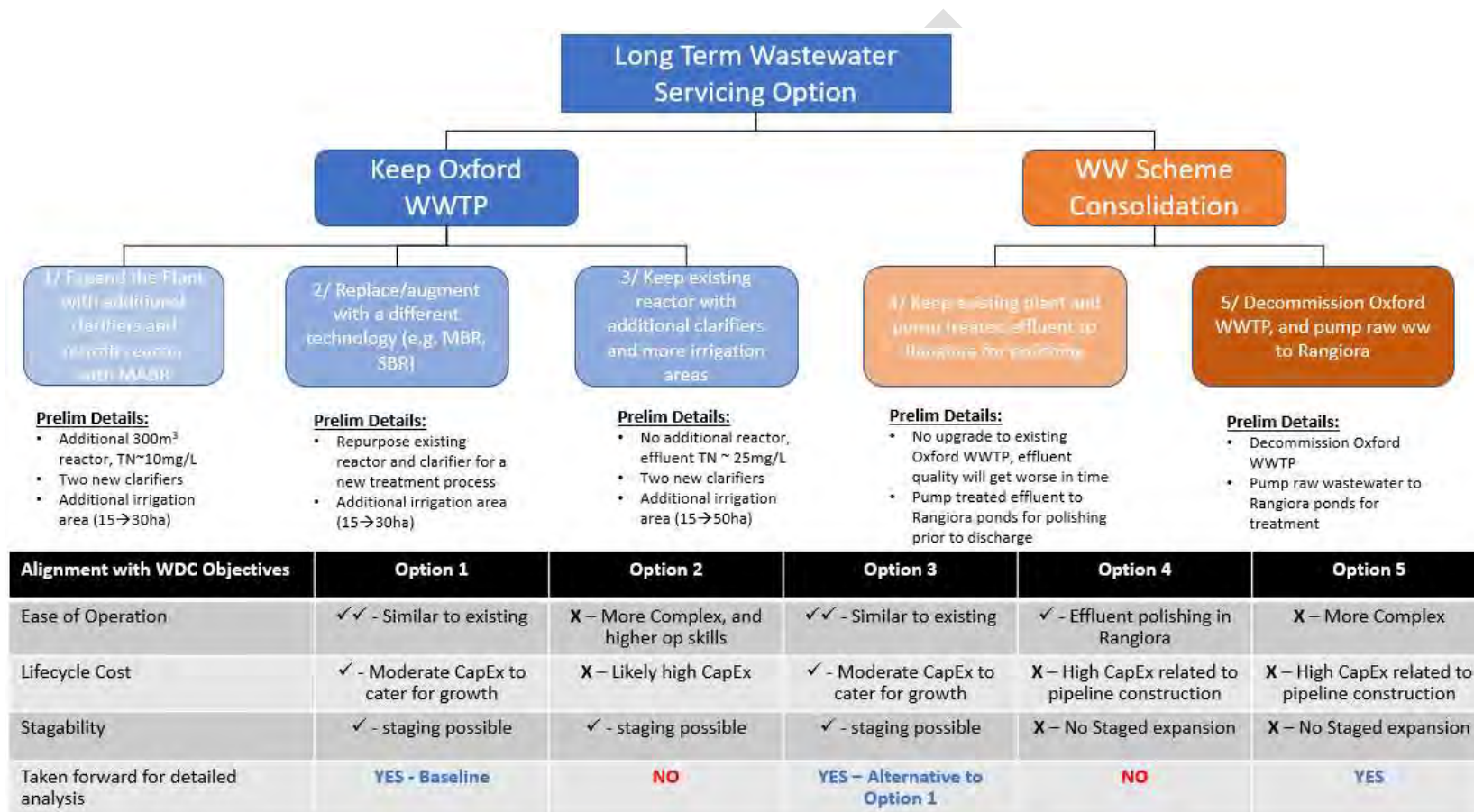


Figure 2 WWTP Upgrade Options Longlist

## 4. Shortlisted Options Evaluation

### 4.1 Upgrade timing and other works

WDC has advised that any upgrade to the Oxford WWTP would likely occur around 2030, based on projected investment budgets. Therefore, it has been assumed that the upgrade options evaluated below will not be built until 2030. However, to address the existing issue of suspended solids in the final effluent, which can reduce the effectiveness of UV disinfection and cause blockages to irrigation equipment, tertiary filtration has been considered for all options outlined below. This would include the installation of disc filters between the effluent basin and UV disinfection. An image of these filters is shown in Figure 3. Based on the headloss through the filters, additional pumping may be required to transfer the treated effluent to the irrigation area.



Figure 3 Example Arkal Filter (photo from Deeco)

In addition to the recommended tertiary filtration, as described in GHD's 2021 report *Oxford WWTP Strategic Plan - WAS Improvement Review*, a containerised Monobelt filter press has been identified as the preferred sludge handling improvement strategy. These works are assumed to occur regardless of the preferred option, and are not considered further in this report.

### 4.2 Estimation of land application nitrogen loading rate reduction

GHD has undertaken a preliminary assessment of the Land Water Regional Plan (LWRP) Plan Change 7 and the associated possible impact on the land application nitrogen reduction. They are summarised in two technical memos in Appendix B. These two assessments are intended to provide an indicative estimate of land area required for future treated effluent land-application.

Key outcomes from the indicative assessments:

- The LWRP Plan Change 7 indicated a proposed staged reduction in proposed nitrate targets for non-dairy sources of 5% by January 2030 and 10% by January 2040.
- This GHD report has assumed a minimum 10% reduction of nitrogen leaching in the land application with the baseline of 2021-24 flows and loads.

- Based on the assumed relationship between nitrogen loading rates and leaching rates interpolated from the past nitrogen model work commissioned by WDC, the estimated irrigation area required for Option 1 and Option 3 would be in the order of 38 and 82 hectares respectively. It should be noted that the estimated irrigation area was increased between the long list (Section 3) and the shortlisting (this section) to account for future reduction of nitrogen application rates.

Nonetheless, the above are indicative irrigation area requirements, which should be confirmed and refined by further nitrogen modelling work to accurately quantify nitrogen leaching rates and plant uptakes. In addition, further consideration should be given to account for ongoing reviews and tightening of water and environmental regulations/standards.

### 4.3 Option 1: New clarifiers and process intensification with MABR

Space constraints and varying ground surface levels at the Oxford WWTP site means that there is little space readily available for additional bioreactors which would increase the treatment capacity of the plant. Option 1 considers process intensification options to increase the treatment capacity of the current reactor without constructing a new reactor (and associated infrastructure). Of the wastewater process intensification technology on the market, Membrane Aerated Biofilm Reactors (MABR) has been identified as being suitable for Oxford WWTP.

#### Process description

The current Oxford WWTP reactor would be retrofitted with six MABR modules installed in its anoxic zones. The MABR process aims to improve the efficiency of the existing biological nutrient removal process and uses a gas permeable membrane to deliver oxygen to a nitrifying biofilm that is attached to the surface of the membrane while denitrification occurs in the bulk anoxic liquid. The MABR modules could be installed without taking the reactor offline, subject to further design development in future. An example installation is shown in Figure 5.

As the current clarifier is undersized and unable to manage the projected PWWF, two new clarifiers would be constructed as part of the upgrade. The construction of two clarifiers provides redundancy and allows for one clarifier to be taken offline if required for maintenance. The clarifiers will each be 10 m in diameter giving a total clarification area of 160 m<sup>2</sup>.

Figure 4 shows the site layout for Option 1, with the new clarifiers located to the north of the existing reactor. The existing clarifier in the reactor will be converted into additional bioreactor volume, further enhancing overall treatment performance.

The intensification process through the MABR installation aims to maintain the effluent TN less than or equal to 10 mg/L. Considering this nitrogen concentration and the increase in projected flows, the irrigation area will need to be increased from 15 ha to 38 ha over the next 50 years to achieve gradual reduction of nitrogen leaching rate. The property currently used for irrigation of the treated effluent has space to expand the irrigation area to this size, as shown in Figure 6.

The irrigation expansion will be staged according to flow requirements. The proposed irrigation expansion stages are shown in Table 3.

Table 3 Irrigation Staging – Option 1 (Indicative)

Irrigation Stage	Year	Additional Irrigation Area (ha)	Total irrigation area (ha)
1	2024	7.5	22.5
2	2035	7.5	30
3	2050	8	38

#### Key infrastructure

The following key infrastructure is required for Option 1

- Effluent disc filters and pipe modifications - install between 2022 to 2024

- 6 no. MABR modules (retrofitted into the existing reactor's anoxic zone) and associated accessories - install in 2030
- 2 no. clarifiers – install in 2030
- Expanded irrigation area with new irrigation equipment – refer Table 3 for installation timing



Figure 4 Proposed Site Layout – Option 1 (Indicative)



Figure 5 Example of an MABR module being installed (photo from Oxymem)



Figure 6 Additional area required for irrigation for Option 1 (indicative)



## 4.4 Option 3: New clarifiers and irrigation area

Option 3 considers maintaining the existing reactor, the construction of two new clarifiers, and expanding the existing irrigation area. The new clarifiers would improve the plant ability to manage increasing PWWF and reduce the likelihood of solids carryover into the effluent. However, without additional bioreactor volume to account for future load increases, the plant will be unable to maintain its current nitrogen reduction. As a result, it is expected that the TN concentration in the effluent will increase to approximately 20 mg/L over the next 50 years.

### Process description

Two new clarifiers would be constructed as part of the upgrade. The construction of two clarifiers provides redundancy and allows for one clarifier to be taken offline if required for maintenance. The clarifiers will each be 10 m in diameter giving a total clarification area of 160 m<sup>2</sup>. These clarifiers would be located as per the clarifiers in option 1 (refer Figure 4).

The effluent is currently discharged offsite at 470 Woodstock Road (owned by WDC) via two pivot irrigators, with a combined irrigation area of 15 ha. The current discharge consent expires in 2031 and it is anticipated that the TN leaching for irrigation will reduce by 10% in the next consenting round. To achieve this reduction, an irrigation area expansion from 15 ha to approximately 82 ha will be required.

The irrigation expansion will be staged according to flow requirements. The proposed irrigation expansion stages are shown in Table 4. As the 470 Woodstock Road property has a total area of 89.7 ha, most of this land would need to be adapted for irrigation (as shown in Figure 7). As most of the remaining unirrigated area on this property is currently in forestry, the timing of the timber felling will need to be taken into consideration for land use availability. In addition, as an assessment of the land's suitability for irrigation has not been undertaken, it is possible that some of the areas are less suitable for spray irrigation, and there is a risk that additional land purchase may ultimately be necessary.

Table 4 Irrigation Staging – Option 3 (Indicative)

Irrigation Stage	Year	Additional Irrigation Area (ha)	Total Irrigation Area (ha)
1	2024	5	20
2	2030	22	42
3	2040	26	68
4	2050	14	82

### Key infrastructure

The following key infrastructure is required for Option 3:

- Effluent disc filters and pipe modifications - install between 2022 to 2024
- 2 no. clarifiers – install in 2030
- Expanded irrigation area with new irrigation equipment – refer Table 4 for installation timing



Figure 7 Oxford WWTP Irrigation Area - 470 Woodstock Road (indicative)

## 4.5 Option 5: Conveyance to Rangiora WWTP

Conveyance to Rangiora WWTP would involve decommissioning Oxford WWTP and pumping the raw wastewater approximately 36 km to Rangiora.

The proposed pipeline pathway is shown in Figure 8, which includes two minor river crossings and a 215 m elevation drop over the course of the 36 km. The pipe would typically be installed within the berm of the main road between Oxford and Rangiora.

If the pipeline were to be a pressure pipeline, due to the continuous fall in grade the pipeline would naturally drain whenever pumping stopped. This would mean that the pipeline would either have to be designed to drain, which is not good practice, or have additional control valves installed to stop flow, which adds significant complexity. Due to the overall length, a high pumping head would be required to overcome friction losses in the pipes.

Alternatively, a gravity main could be installed. This provides better hydraulics, however typically requires manholes every 120 m along the length of the main, if configured as a 'standard' reticulation-type pipeline. A solution would be to combine these options with a combined pressure-falling main; this utilises the natural hydraulic grade as the driving force, with only a few access structures at key locations along the main.

Some of the risks associated with reticulating the Oxford wastewater to Rangiora are the potential residence time and the scouring velocities of the pipe, which are related to pipe diameter and flow within the pipe. These factors were considered for a variety of pipe sizes for both pressure and gravity reticulation strategies as part of a high level optioneering process.

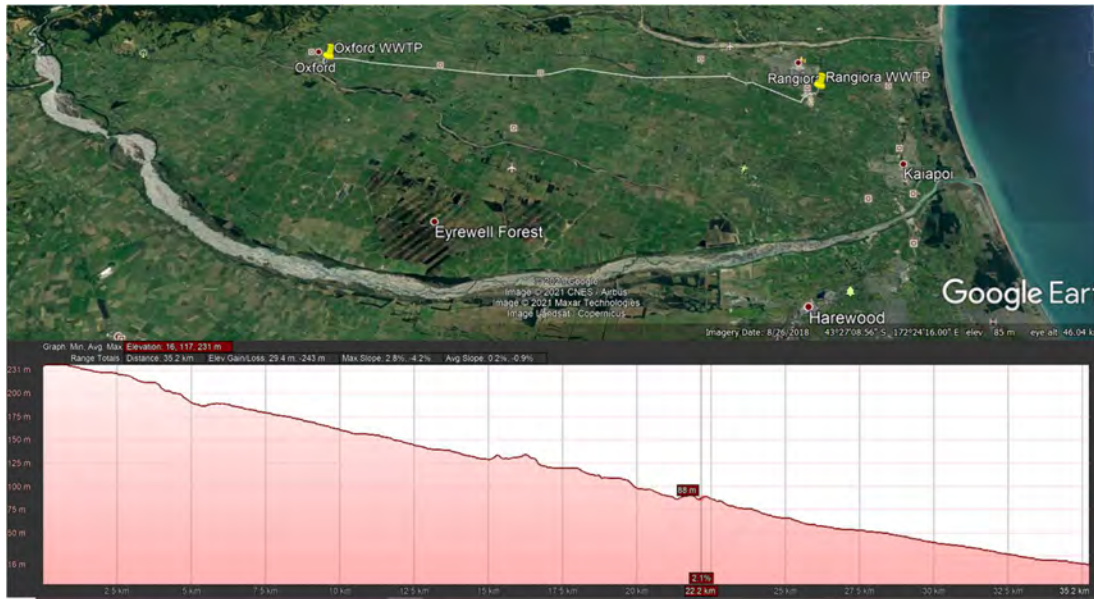


Figure 8 Oxford WWTP to Rangiora pipe pathway

For the pressure main, pipe sizes were restricted by the resulting friction losses which increased outside of normal pumping limits, resulting in larger diameter pipes than the gravity pipeline. Reducing the pressure main diameter would result in the need for interstage pumping along the route, which adds to the operational asset base, and increases overall complexity. The gravity mains were designed to maintain a flow depth between 20% and 80%.

The results of the assessment of different pipe sizes for gravity and pressure pipes are shown in Table 5. From these options, the best reticulation option was determined to be a gravity DN315 main (highlighted in green), which resulted in a maximum residence time of 14 hrs during ADWF. Whilst this is still high, and may require the addition of odour mitigation strategies (chemical dosing), it is a manageable level.

This optioneering was based on the predicted forecast flowrates provided and potentially a smaller pipeline could be used if future flows of 65 L/s are unlikely.

Table 5 Optioneering for conveyance from Oxford to Rangiora WWTP

Description		Pipe Size	Pressure/ Gravity	Flowrate [L/s]	Velocity [m/s]	Residence time [hr]	Depth of flow	Headloss [m]
Gravity Pipeline 1	Design ADWF	280	Gravity	6.50	0.75	13.48	25%	
	Design PWWF			34.28	1.16	8.67	63%	
	Future PWWF			50.74	1.19	8.43	91%	
Gravity Pipeline 2	Design ADWF	315	Gravity	6.27	0.73	13.79	21%	
	Design PWWF			34.66	1.17	8.59	52%	
	Future PWWF			63.42	1.31	7.66	80%	
Gravity Pipeline 3	Design ADWF	355	Gravity	6.31	0.72	13.96	18%	
	Design PWWF			35.73	1.18	8.54	44%	
	Future PWWF			64.53	1.36	7.40	63%	
Pressure Pipeline 1	Design ADWF	315	Pressure	5.50	0.10	103.03		3.81
	Design PWWF			35.00	0.62	16.19		146.45

Description		Pipe Size	Pressure/ Gravity	Flowrate [L/s]	Velocity [m/s]	Residence time [hr]	Depth of flow	Headloss [m]
	Future PWWF			65.00	1.16	8.72		502.40
Pressure Pipeline 2	Design ADWF	355	Pressure	5.50	0.08	130.87		2.02
	Design PWWF			35.00	0.49	20.57		76.99
	Future PWWF			65.00	0.91	11.07		263.81
Pressure Pipeline 3	Design ADWF	400	Pressure	5.50	0.06	166.22		1.08
	Design PWWF			35.00	0.39	26.12		40.56
	Future PWWF			65.00	0.72	14.06		138.78

### Key infrastructure

The following key infrastructure is required for Option 5:

- Effluent disc filters and pipe modifications - install between 2022 to 2024
- Pipeline to Rangiora (including odour control) – construct in 2030

## 4.6 Cost estimate

Order of estimate capital costs for each option were developed and are presented in Table 6. The capital NPC accounts for the staged construction of each option. More detailed cost estimates for each option are shown in Appendix C.

As noted in section 4.1, it has been assumed that all works will occur in 2030 or later, with the exception of tertiary filtration (i.e. disc filters to reduce effluent suspended solids), which is common for all options. The cost of the disc filters, modifications to the pipework and upgraded pumping is approximately \$290,000, and has been shown separately in Table 6

The operating cost for options 1 and 3 is assumed to be similar to the current operating cost of the plant, less any reduction in operating cost due to upgrades to the sludge handling system to reduce sludge disposal costs. The major difference between options 1 and 3 is additional maintenance and aeration costs associated with the MABR. As the irrigation area increases over time, the operating costs for option 3 will increase as more irrigation equipment is purchased and labour is required to manage irrigation.

The operating cost for Option 5 is expected to be in the order of several hundred thousand dollars per year, which includes pipeline maintenance and trade waste fees.

Table 6 Cost Estimates

Item	Option 1: MABR	Option 3: Clarifiers + Irrigation Expansion	Option 5: Conveyance to Rangiora WWTP
Tertiary Filtration Capital Cost (current)	\$0.29M		
Upgrade Works Capital Cost ( NPC of future investment)	\$2.9M	\$3.1M	\$24.9M
Relative OPEX	Similar to existing operating cost and Option 3 with additional cost for MABR aeration and maintenance.	Similar to existing operating cost and Option 1, increasing over time with irrigation expansion.	In the order of several hundred thousand dollars per year, starting low and increasing over time as the pipeline ages

### Assumptions

- Cost estimates are intended for the purpose of options comparison, and would require further design development to define the scope and extent of the upgrades. Hence, we recommend a concept/preliminary design to be undertaken closer to the time to confirm the above cost estimates.
- Accuracy of the cost estimates would be in the order of +30/-10%, and upper estimates (i.e. add 30% provision) should be used if the figure is used as a placeholder for budgetary planning.
- NPC overall discount rate of 5.7%, allowing for inflation of 2% p.a. and discount rate of 3.7%
- Site power and water services are assumed to be adequate for new infrastructure.
- Costs for upgrades to the solids handling system are not included in the estimates above.
- Indicative CAPEX based on the following rates:
  - Contractor P&G: 8%
  - Contractor's Onsite Overhead: 15%
  - Contractor's Offsite Overhead: 10%
  - Professional fees related to design, tendering and construction monitoring: 15 to 18%

## 4.7 MCA evaluation

To determine the preferred upgrade option a multi criteria assessment (MCA) was completed. The options were scored based on a range of qualitative criteria, as well as the quantitative NPC outlined in Table 6.

Option 1 was given a score of zero for all criteria, with other options given raw scores relative to Option 1. Weighted scores were then calculated based on the pre-developed criteria weightings.

Option 5 offers a number of benefits relative to Options 1 and 3, namely:

- No discharge consents at Oxford for WDC to manage
- Reduced operation requirements as there is no WWTP to manage and operate
- Potential to sell or re-use the land currently being irrigated at Oxford
- Potential lower operating cost as Rangiora is a pond system

However, the capital cost for Option 5 is an order of magnitude greater than Options 1 and 3, and there is a risk of odour and septicity along the pipeline.

***Considering the requirement of WDC to only consider the option of conveyance to Rangiora if the cost is similar to that of options 1 and 3, Option 5 has been excluded from the MCA analysis.***

The final MCA scores are shown in Table 7, with Option 1 being the most favourable option. Comparing Option 1 to Option 3, the following key points are noted:

- With an increased treatment capacity, the MABR will provide a higher treated effluent quality. This option will then be more adaptable to any future discharge consent conditions, and will have greater stability under future load conditions.
- Both options allow for similar phased construction of the irrigation area expansion, with the main WWTP infrastructure upgrades occurring in 2030.
- The operability of each option is similar, with additional plant control and maintenance for the MABR balanced against the additional operation of the irrigation system.
- The installation of the MABR in the existing reactor reduces the footprint required for future irrigation. The major expansion of the irrigation area and the clearing of land for Option 3 is expected to cause a negative amenity impact. There is also a risk that there is insufficient land for Option 3 on WDC's existing site, and WDC will need to purchase additional land.
- With additional aeration requirements for the MABR, Option 1 will have a greater power consumption than Option 3, which may result in slightly higher greenhouse gas emissions. Further detailed evaluation is required to quantify the emissions for each option.
- The addition of two clarifiers for each option will prevent solids carryover during peak wet weather events.

Based on the multi criteria assessment, Option 1 of the MABR retrofit has the highest weighted score and is recommended as the preferred future upgrade option.

DRAFT

Table 7 MCA scoring for Oxford WWTP long term options

No.	Category	Criteria	Weighting (%)	Option 1 – MABR + New Clarifiers		Option 3 – Irrigation Expansion + New Clarifiers	
				Score	Weighted Score	Score	Weighted Score
1.1	Reliability	Treated effluent quality	5%	0	0	-1	-0.05
2.1	Future Proofing	Phased construction	7.5%	0	0	0	0
2.2		Adaptable to future discharge consent conditions	7.5%	0	0	-1	-0.075
3.1	Operability	Ease of operation	7.5%	0	0	-1	-0.075
3.2		Process Safety	7.5%	0	0	0	0
4.1	Constructability	Ease of implementation	10%	0	0	-1	-0.1
5.1	Social & environmental impact	Amenity impacts	5%	0	0	-1	-0.05
5.2		GHG emissions	5%	0	0	1	0.05
6.1	Resilience	Process stability under high flow	7.5%	0	0	0	0
		Process stability under future load conditions	7.5%	0	0	-1	-0.075
7.1	Financial	Indicative capital cost	15%	0	0	-1	-0.15
7.2		Relative operating cost	15%	0	0	0	0
Total Option Score				0		Total Option Score	-0.525
Rank				1		Rank	2

Score	Description
-2	Much worse
-1	Moderately worse
0	Same as Option 1
1	Moderately better
2	Much better

## 5. Recommendations and next steps

### 5.1 Recommendations

Based on the MCA evaluation in Section 4.7, it is recommended that new clarifiers and an MABR retrofit of the existing reactor (Option 1) be adopted for the long-term solution at Oxford WWTP, and WDC plans to invest in this solution in the future. A further investigation should be conducted to prepare a concept design of the MABR retrofit and other ancillary upgrades that may be required.

In the short term, it is recommended that WDC install disc filters between the effluent holding basin and the UV reactor to reduce suspended solids in the effluent. This will likely encompass pipe re-routing and pump upgrades.

As described in GHD's 2021 report *Oxford WWTP Strategic Plan - WAS Improvement Review*, a containerised Monobelt filter press has been identified as the preferred sludge handling improvement strategy.

### 5.2 Next steps

#### Short term

To efficiently implement the MABR retrofit option it is recommended that the following next steps be implemented in the immediate future over the next 18 months:

- Review the current plant sampling and monitoring plan
- Conduct an intensive influent sampling survey (6 to 9 months data) to be used for a detailed process review
- Investigate and trial different disc filters to remove TSS spikes in the effluent

#### Medium term

The following steps are recommended to be completed over the next three years to inform the design of long term upgrades:

- Prepare a preliminary design of the tertiary filter addition and pipework modifications to refine cost estimates, followed by detailed design and installation.
- Conduct a detailed process review with a calibrated model to more accurately estimate the bioreactor's capacity
- Prepare a concept design of the MABR retrofit, clarifiers and irrigation expansion, including potential ancillary upgrades which have been excluded from this study (e.g. inlet works and lift pumps).
- Conduct a condition assessment of the existing reactor structure
- Determine the suitability of the existing land owned by WDC for expansion of the irrigation area (initial expansion and future stages if funding allows the latter). This should also include a detailed water and nitrogen balance to determine the extent of future irrigation area required.



# Appendices

# Appendix A

**Basis of Design and Process Pinch Points  
Memo**



# Memorandum

03 March 2021

To Waimakariri District Council

Copy to

From Ben Asquith Tel +61 3 86878511

Reviewed by Ian Ho

Subject Basis of Design and Process Pinch Points Job no. 12546001

## 1 Introduction

Waimakariri District Council (WDC) has engaged GHD to complete a strategic review of the Oxford WWTP, which currently services approximately 890 properties connected to the sewer reticulation network of Oxford. This memorandum sets out the basis of design for the strategic review, and provides a review of process pinch points.

## 2 Basis of Design

The basis of design for the Oxford WWTP is presented in Table 1. Flow projections were provided by WDC and were cross checked against the estimated usage per EP. The projected PWWF to ADWF of 5.3 to 5.5 is considered reasonable.

With no major trade waste customers in the catchment, loads are based on typical domestic wastewater characteristics per EP (volume and load from nearby truck washing facility TBC).

## 3 Process constraints

Process constraints at the Oxford WWTP have been identified based on current and projected flows and loads. These also consider previous reports provided by WDC and information provide during the kick-off meeting. A detailed list of process constraints is provided in Table 2, including which processes are currently constrained, and those that will reach pinch points over the project horizon. These are briefly summarised here:

### *Inlet works*

There are known performance issues with the step screen, and there is no dedicated grit removal which may cause a build up of grit within the bioreactor. The 2009 MWH and 2014 Opus report quoted different hydraulic capacity figures of 30 and 80L/s respectively.

Moreover, we understand that from the WDC operation team that the step screen is near its end of asset life.

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## Memorandum

### ***Bioreactor***

The bioreactor has 675m<sup>3</sup> in volume and the aeration system was recently upgraded with blowers and diffused aeration. High level capacity estimation was undertaken as part of this review. Based on a sludge age of 15 days, the bioreactor would reach its capacity before Year 2030. However, the bioreactor can potentially be optimised (e.g. running at a slightly lower sludge age), and capacity may be stretched beyond 2030. A calibration process model e.g. BioWin will be needed to simulate the process response under a range of operation scenarios.

### ***Clarifier***

The clarifier is undersized, with solids carry over occurring at flow rates greater than approximately 12 L/s. This is approximately one third of the current PWWF. Solids carry over will worsen in the future as flows and loads increase over time. A high-level analysis of the clarifier suggests that its surface area should be 2 to 3 times larger to accommodate the projected flows and loads.

### ***Sludge disposal***

There is no dedicated thickening or dewatering as part of the sludge handling process. WAS is pumped to the sludge holding tank, where some thickening occurs during settling. The estimated weekly sludge disposal volume is 80 m<sup>3</sup> at 1% DS. Due to the disposal of unthickened sludge, sludge disposal accounts for close to 50% of OPEX.

### ***Irrigation Field Nitrogen loading rate***

As per the WWTP's consent condition, the maximum nitrogen loading rate for effluent irrigation is 200 kg/ha/y. Based on the median effluent TN concentration of 10.4mg/L and current flows of 553m<sup>3</sup>/d, the estimated current nitrogen loading rate is 140 kg/ha/y and within the consent conditions. If the effluent TN concentration remains at its current median of 10 mg/L, the nitrogen loading rate is expected to exceed the permitted rate sometime from 2031/32 to 2040/41.

### ***Effluent volume***

The maximum consented daily effluent volume for the WWTP is 1,382 m<sup>3</sup>/d, and the total annual effluent volume is 228,125 m<sup>3</sup> (average of 625 m<sup>3</sup>/d). Based on the projected flows, the annual effluent volume consent condition is expected to be exceeded sometime from 2024/25 to 2030/31.

### ***Flow monitoring***

With only two flow meters in the plant combined with two holding basins, there are no detailed records of flows through the reactor tank, clarifier, wet weather holding pond and sludge wasting.

### ***Addendum 1 Sludge Management Improvement Long List Options High Level Comparison Table (In progress)***

### ***Addendum 2 – WWTP Long term Options Comparison Table (Not attached)***



## Memorandum

If you have questions, please don't hesitate to contact Iain Partington or Ian Ho.

Regards

**Ben Asquith**

Senior Process Engineer

DRAFT

**Table 1 Projected flows and loads for the Oxford WWTP**

Parameter	Unit	2019/20	2021/22 to 2023/24	2024/25 to 2030/31	2031/32 to 2040/41	2041/42 to 2050/51	2051/52 to 2070/71
Connections	No.	889	985	1118	1296	1451	1729
EP	No.	2200	2438	2767	3207	3591	4279
<b>Flows</b>							
ADWF	m3/d	553	618	708	828	953	1120
PWWF	m3/d	3056	3379	3829	4429	4954	5890
PWWF	L/s	35	39	44	51	57	68
PWWF:ADWF	-	5.5	5.5	5.4	5.3	5.2	5.3
<b>Loads</b>							
BOD <sup>1</sup>	kg/d	154	171	194	225	251	300
COD <sup>2</sup>	kg/d	354	392	445	516	578	689
TN <sup>3</sup>	kg/d	31	34	39	45	50	60
AmmN <sup>4</sup>	kg/d	22	24	28	32	36	43
TP <sup>5</sup>	kg/d	7	8	9	11	12	14
TSS <sup>6</sup>	kg/d	209	232	263	305	341	406

**Notes:** (1) BOD = 70 g/ED/d  
(2) COD = 161 g/ED/d  
(3) TN = 14 g/ED/d  
(4) AmmN = 10 g/ED/d  
(5) TP = 3.3 g/ED/d  
(6) TSS = 95 g/ED/d

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**Table 2 Oxford WWTP current and project process capacity summary with constraints highlighted in bold**

<b>Process</b>	<b>Current status</b>	<b>Projections</b>
Inlet works	<b>Existing step screen is understood to have insufficient capacity and performance issues. Screen unit is near end of asset life.</b> <b>There is no grit removal</b>	Screen requires replacement.
Wet weather holding pond	In 2014, a holding pond was constructed, and the design intention was to improve treatment plant to handle wet weather flows. <b>WDC has advised that it is difficult to empty and remove accumulated solids. No data has been provided on solids build up.</b>	
Aeration basin	Current operating conditions are unknown. Effluent results indicate that the aeration basin, with its aerobic and anoxic zones, is able to achieve organic removal, nitrification/denitrification and some phosphorous removal.	Based on a sludge age of 15 days and a maximum mixed liquor concentration of 3,500 mg/L, the aeration basin is expected to have sufficient capacity until 2024/25. If sludge age is reduced to 10 days (more operation attention needed or more land area for irrigation), it may extend close to 2050. <b>Process modelling recommended if WDC decides to sweat the asset.</b>
Aeration system	The aeration system has recently been upgraded. Only one of the three blowers is currently in use (duty/standby/standby)	TBC – insufficient data on aeration system to determine future suitability.

Process	Current status	Projections
Clarifier	<b>Solids carry over in the clarifier occurs at flows greater than approximately 12 L/s (anecdotal). This is approximately one third of the current PWWF. While the holding basin buffers some flow, the solids carryover occurs during some wet weather events.</b>	Solids carry over will worsen in the future as flows and loads increase over time.  A high-level analysis of the clarifier's surface overflow rate and solids loading rate suggests that the surface area of the clarifier should be 2 to 3 times larger to accommodate the projected flows and loads.
Sludge handling	There is no dedicated thickening or dewatering as part of the sludge handling process. WAS is pumped to the sludge holding tank, where some thickening occurs during settling. The estimated weekly sludge disposal volume is 80 m <sup>3</sup> at 1% DS.  <b>Due to the disposal of unthickened sludge, sludge disposal accounts for approximately 50% of OPEX. The introduction of some sludge thickening or dewatering process would reduce this cost.</b>	Projected weekly sludge volumes for disposal (assuming 1.1% DS): <ul style="list-style-type: none"> <li>• 2021/22 to 2023/24: 82 m<sup>3</sup>/wk</li> <li>• 2024/25 to 2030/31: 103 m<sup>3</sup>/wk</li> <li>• 2031/32 to 2040/41: 116 m<sup>3</sup>/wk</li> <li>• 2041/42 to 2050/51: 133 m<sup>3</sup>/wk</li> <li>• 2051/52 to 2070/71: 159 m<sup>3</sup>/wk</li> </ul>
Consent conditions = disinfection  Maximum effluent faecal coliform = 500 org/100 mL	No data is available	N/A no data is available
Consent conditions – nitrogen loading:  Maximum nitrogen loading rate = 200 kg/ha/y	Based on median effluent TN, the current nitrogen loading rate is 140 kg/ha/y	Projected annual nitrogen loading rates: <ul style="list-style-type: none"> <li>• 2021/22 to 2023/24: 155 kg/ha/y</li> <li>• 2024/25 to 2030/31: 180 kg/ha/y</li> <li>• <b>2031/32 to 2040/41: 210 kg/ha/y</b></li> <li>• <b>2041/42 to 2050/51: 240 kg/ha/y</b></li> <li>• <b>2051/52 to 2070/71: 283 kg/ha/y</b></li> </ul>

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Process	Current status	Projections
Consent conditions - effluent volume Maximum effluent volume = 1,382 m <sup>3</sup> /d Annual effluent volume = 228.125 ML/y	Based on current flows and the use of the holding basins, the plant is able to meet consent conditions for effluent volume.	<p><b><i>The annual effluent volume consent condition is expected to be exceeded sometime from 2024/25 to 2030/31.</i></b></p> <p>Depending on the volume of wastewater retained in the holding basins and the number of days the plant is able to discharge via irrigation, the plant may begin to exceed the maximum effluent volume sometime beyond 2050.</p>
Asset condition	No asset condition assessment has been completed as part of this review.	<p><b><i>The original plant was constructed in 1997 and therefore is well within the expected design life. However, the strategic plan horizon of 50 years means that some elements will require renewal in that period.</i></b></p>
Flow monitoring	<p><b><i>With only two flow meters in the plant combined with two holding basins, there are no detailed records of flows through the reactor tank and clarifier.</i></b></p>	<p><b><i>Additional flowmeters and process instrumentation to improve resilience and reduce operator's involvement through automation.</i></b></p>

# **Appendix B**

## **Nitrogen Leaching Memo**



31 May 2021

<b>To</b>	Ian Ho		
<b>Copy to</b>	Andrew McMaster		
<b>From</b>	Sean Mooney	<b>Tel</b>	03-363 0840
<b>Subject</b>	Oxford Wastewater Treatment Plant – LWRP Plan Change 7	<b>Project no.</b>	12546001

Dear Ian,

The Oxford Wastewater Treatment Plant (Oxford WWTP) is located 46 High Street, Oxford, the site is owned and managed by the Waimakariri District Council (WDC). The Oxford WWTP is an urban gravity reticulation scheme that collects sewage from the rural-urban settlement of Oxford, following treatment the wastewater is discharge to land via spray irrigation at 470 Woodstock Road, Oxford.

WDC holds resource consent CRC184787 which authorises the discharge of up to 1,382 cubic metres per day of treated effluent, the consent was authorised in September 1996 and expires in August 2031

GHD Limited (GHD) has been engaged to undertake a strategic review of the Oxford wastewater treatment and treated effluent discharge options. As part of this assessment, it has been requested to identify any current and proposed planning rules and policies that may influence future consenting limits.

## Regional Rules

The site is currently subject to the regional plan provisions within the Waimakariri River Regional Plan (WRRP) and the Land and Water Regional Plan (LWRP). However, Environment Canterbury has proposed plan changes to both of these regional plans which will place the location under the management of the LWRP. Plan Change 2 (PC2) to the WRRP proposes to remove from this plan.

The key planning zones that are associated with the site are:

- Semi-confined or unconfined aquifer system;
- Nitrate Priority Area: Waimakariri;
  - Nitrate priority sub-area A
- Groundwater Allocation zone: Eyre River
- Waimakariri Freshwater Management Unit: Northern Waimakariri Tributaries.

Under the LWRP<sup>1</sup>, the discharge of contaminants to land associated with a community wastewater treatment system is managed under Rule 5.84 as a discretionary activity.

**Rule 5.84** - *The use of land for a community wastewater treatment system and the discharge of sewage sludge, bio-solids and treated sewage effluent from a community wastewater treatment system and the discharge of sewage sludge and bio-solids from an on-site wastewater treatment system into or onto land, or into or onto land in circumstances where a contaminant may enter water are discretionary activities.*

There are no sub-regional rules proposed within Plan Change 7 that will provide further restrictions to a community wastewater discharge. The proposed new rules with the sub-regional chapter are related to the cumulative reduction of nutrient discharges from Farming activities, however, there is several proposed new

<sup>1</sup> There are no proposed changes to this Rule under Plan Change 7.

objectives and policies that have been proposed that relate to nutrient management reductions within this Chapter that should be considered for any future resource consent application.

### Proposed sub-regional policies

The two main sub-regional policies that need to be considered are Policy 8.4.4 and 8.4.25.

**Policy 8.4.4** *Management of freshwater in the Waimakariri sub-region is achieved through the establishment of two Freshwater Management Units and improvements in freshwater attained through setting of, and managing to, water quality and quantity limits for each area.*

The proposed water quality limits and targets for groundwater are set out in Table 8-8 of Plan Change 7. The site is located within the Eyre Groundwater Allocation catchment with the proposed associated limits being:

- Nitrate Nitrogen - Annual average concentration: 4.1 mg/L;
- E. Coli – 95% of samples < 1 organism / 100 millilitres.
- Other contaminants - <50% Maximum Acceptable Value of Health Significance as listed in NZ Drinking-water standards.

**Policy 8.4.25** *Nitrate-nitrogen limits for the Waimakariri sub-region are achieved, and potential future impacts on the nitrate-nitrogen concentrations of waterbodies outside the Waimakariri Sub-region are managed by:*

- a. *further restricting, relative to the region-wide rules, the area of land used for a farming activity as a permitted activity, and the area of winter grazing that may occur as a permitted activity; and*
- b. *requiring within the Nitrate Priority Area, further reductions in nitrogen loss from farming activities (including farming activities managed by an irrigation scheme or principal water supplier) in accordance with Table 8-9, provided that any further stage of reduction required is greater than 3 kg of nitrogen per hectare per year for dairy, or 1 kg of nitrogen per hectare per year for all other farming activities.*

While this policy is focused on the cumulative management of farming activities within Waimakariri, it does give guidance on what the proposed cumulative percentage reductions are expected for the farming industry and should be considered for any future non-farming discharges within the zone when assessing cumulative effects on the nutrient load for the zone.

The site is located within Nitrate priority sub-area A, under Table 8-9, the following reductions are proposed.

**Table 1:** *Nitrate Priority Area Staged Reductions in Nitrogen Loss for Farming Activities, Farming Enterprises and Irrigation Schemes: Sub-area A*

Farming type	By 1 January 2030	By 1 January 2040	Beyond 1 January 2040
Dairy	15%	30%	-
All other	5%	10%	-

### Associated technical reports of nutrient losses in Waimakariri

As part of the Plan Change 7 process, Environment Canterbury has released a number of technical documents associated with Nutrient Management within Waimakariri and its modelled effects on groundwater quality within the region. These reports also include discussions on the loading on industrial and community wastewater discharges in the nutrient load for the zone.

The following technical reports may provide further background information on nutrient loading and limits within the Waimakariri Zone:

- *Kreleger, A. and Etheridge, Z, 2019: Waimakariri land and water solutions programme Nitrate Management Options and Solutions Assessment. Environment Canterbury Report No. R19/68.*
- *Lilburne L., Mojsilovic O., North H. and Robson, M. 2019. Preparation of land use and nitrogen-loss data for the Waimakariri Zone limit-setting process. Landcare Research. May 2019.*
- *Loe, B and Clark, C, 2017: Waimakariri Zone - Estimating nitrogen and phosphorus contributions to water from consented and permitted discharges in three Nutrient Allocation Zones.*
- *Etheridge, Z and Whalen, M, May 2019: Waimakariri Land and Water Solutions Programme – Technical Assessment Overview. Environment Canterbury Report No. R19/73.*

## Summary

Plan Change 7 of the LWRP has been developed to respond to emerging resource management issues within the Region including a staged reduction in nutrient losses from farming activities.

While the proposed rules do not contain a requirement for a community wastewater discharge to have a staged reduction in nitrogen losses, the associated policies and objectives do provide guidance on expected reductions within the wider catchment.

Based on these policies it would be advised to design for a nutrient loss reduction of at least 10% and so that the activity will be unlikely to contribute to the local groundwater quality environment exceeding the limits set out in Table 8-8.

Regards



**Sean Mooney**  
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# Memorandum

Internal use only

11 June 2021

<b>To</b>	Ben Asquith and Andrew McMaster		
<b>Copy to</b>	Iain Partington		
<b>From</b>	Ian Ho	<b>Tel</b>	09 373 8389
<b>Subject</b>	Oxford WWTP – Nitrogen Loading Rate	<b>Project no.</b>	12546001

This internal memo outlines a broad-brush estimate of future nitrogen application rate, based on the following two sources of information:

- GHD Memo “Oxford WWTP LWRP Plan Change 7” by Sean Mooney (31<sup>st</sup> May 2021)
- PDP, Wastewater Memo (22<sup>nd</sup> July 2019), supplied by WDC

## LWRP Plan Change Memo Outline

The Oxford WWTP LWRP Plan Change 7 memo identified that the proposed plan change has set desired groundwater quality (Policy 8.4.4) and desired reduction of nitrate load (Policy 8.4.25). It was noted that the staged reduction proposed targets for non-dairy sources is 5% by January 2030 and 10% by January 2040.

As highlighted in this internal memo, *“While the proposed rules do not contain a requirement for a community wastewater discharge to have a staged reduction in nitrogen losses, the associated policies and objectives do provide guidance on expected reductions within the wider catchment. Based on these policies it would be advised to design for a nutrient loss reduction of at least 10% and so that the activity will be unlikely to contribute to the local groundwater quality environment exceeding the limits set out in Table 8-8.”*

## PDP Memo “Wastewater Model”

This PDP memo was used to support the AEE for consent condition variation back in 2019. A model was developed as part of the AEE application to estimate potential nutrient leaching to groundwater for the Oxford WWTP irrigation of treated effluent to land.

The model considered the scenarios of existing (2013-2018 data), consented baseline (i.e. 200kg/ha/year) and varied consent conditions. Effluent TN concentration of 10.3mg/L (as N) was assumed in the model for the purpose of generating following outputs:

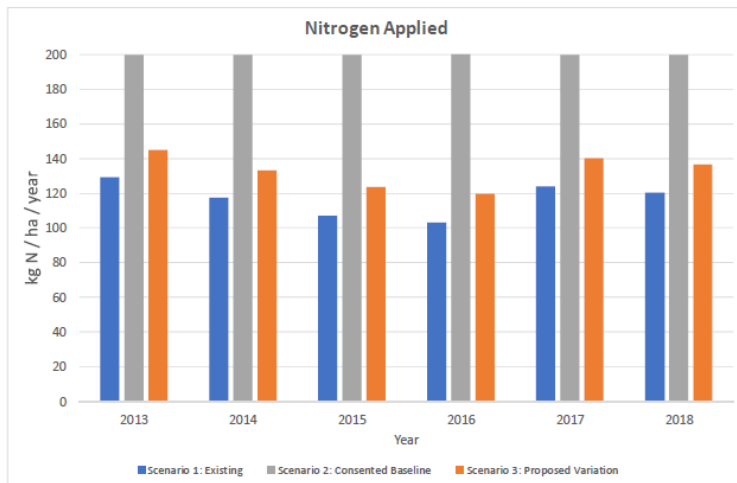


Figure 3: Nitrogen loading applied to soil

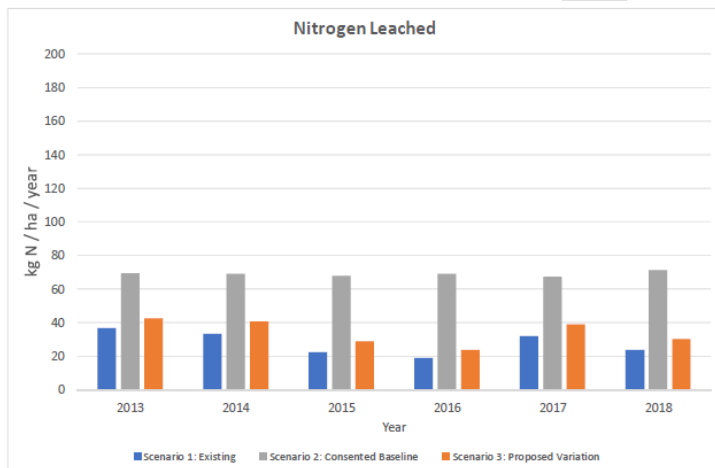


Figure 4: Potential nitrogen leached to groundwater

Using the model's nitrogen application and leaching rates, the existing land application nitrogen removal rates were estimated.

Table 1 Observed relationship between nitrogen application rates and leaching rates (as modelled by PDP)

	Nitrogen loading rate (kg/ha/yr)	Nitrogen leaching rate (kg/ha/yr)	Nitrogen removed (kg/ha/yr)
Consented Loading Rate	200	70	130
Scenario 2 Average	140	40	100
Scenario 1 Average	120	30	90
Scenario 1 Minimum	100	20	80
2013-18 Scenario 1	100-130	18-38	91

The PDP report didn't provide detailed justifications of higher nitrogen removal rates when the land parcel is subjected to higher rates. As such, an "average" nitrogen removal rate might be more suitable for us to estimate the required land area under the two long term options.

## Estimated Nitrogen Removal Rates and Irrigation Land Area Required

The Oxford WWTP's growth forecast is significant, from 2,438 people currently (2021-2024) to potentially 4,279 people by 2051-52 to 2070/71.

The two long term options have assumed:

- Option 1: *Intensify existing reactors to maintain Effluent TN ~ 10 mg/L on average*
- Option 3: *No provision of additional reactors or process intensification, effluent TN expects to rise to 20 mg/L in the future*

Table 2 Rough Estimate of Future Nitrogen Plant Loading and Irrigation Area required

	2021/22 to 2023/24	2024/25 to 2030/31	2041/42 to 2050/51	2050/52 to 2070/71
Connected EP	2,438	2,767	3,591	4,279
Average Flow (m <sup>3</sup> /d)	618	708	953	1,120
<b>Option 1 – Plant Effluent TN of 10 mg/L (on average)</b>				
Land area	15 (current)	20	30	38
Hydraulic application rate (mm/d) on average	4.1	3.5	3.2	2.9
N Loading rate (kg/ha/year)	150	129	116	108
N removed (kg/ha/year)	91	91	91	91
N leaching rate (kg/ha/year)	59	38	25	17
N Load leached (kg/year)	891 (baseline)	764 (14%↓)	748 (16%↓)	630 (16%↓)
<b>Option 3 – Plant Effluent TN of 20 mg/L (on average)</b>				
Land area	15 (current)	20	68	82
Hydraulic application rate (mm/d) on average	4.1	3.5	1.4	1.4
N Loading rate (kg/ha/year)	150	129	102	100
N removed (kg/ha/year)	91	91	91	91
N leaching rate (kg/ha/year)	59	38	11	9
N Load leached (kg/year)	891 (baseline)	764 (14%↓)	769 (14%↓)	714 (14%↓)


Limitations of the above irrigation land area estimates:


- a. The above estimation intends to provide rough indication of the land area needed based on limited information available. Further modelling on leaching rates and quantity of nitrogen removed by soil and plant uptakes requires precise and detailed data before confirming the expansion of irrigation area.
- b. The baseline year was assumed to be 2021/22 loading rate, which likely differs from ECan basis.
- c. The above estimation assumed a flat/constant nitrogen removal rate for the land application system, which may over-estimate the land area needed, particularly for Option 2.
- d. The above estimation has shown high degree of sensitivity towards plant flows, effluent TN concentration levels and land area.




# Appendix C

## Cost Estimates

		Client: Waimakariri District Council	Job Number: 12546001					
		Job: Oxford WWTP Long Term Options	Calcs By: Andrew McMaster / Ben Asquith					
		Subject: CapEx - Option 1	Checked By: Ian Ho					
				Discount Rate	3.7%			
				Inflation rate	2.0%			
				NPV discount rate	5.77%			
<b>UPGRADE OPTION 1 - MABR + New Clarifiers</b>								
	Qty	Unit	Rate	Total	Year installed	Time Period	Net Capital Cost	Comments
<b>WWTP UPGRADE</b>								
Clarifier Earthworks - Excavation	850	m3	\$ 10	\$ 10,000	2030	9	\$ 7,000	Assumes light soil only (no rock)
Clarifier Earthworks - Disposal	850	m3	\$ 20	\$ 20,000	2030	9	\$ 13,000	Assumes light soil only (no rock) and disposal within 10km of WWTP
Clarifier (Civil)	1	Item	\$ 310,000	\$ 310,000	2030	9	\$ 188,000	Estimate based on GHD cost database
Clarifier (Mechanical)	1	Item	\$ 140,000	\$ 140,000	2030	9	\$ 85,000	Estimate based on GHD cost database
Clarifier installation & commissioning	30%	of clarifier cost	\$ 450,000	\$ 135,000	2030	9	\$ 82,000	Estimate based on GHD cost database
RAS Pump Station	1	Item	\$ 75,000	\$ 75,000	2030	9	\$ 46,000	Nominal allowance
Yard pipework and pumping	1	Item	\$ 50,000	\$ 50,000	2030	9	\$ 31,000	Nominal allowance
Conversion of inner clarifier as anoxic	1	Item	\$ 50,000	\$ 50,000	2030	9	\$ 31,000	Nominal allowance
MABR - modules, blowers, air compressors	1	Item	\$ 630,000	\$ 630,000	2030	9	\$ 381,000	Based on quote from supplier
Air flow instrumentation (MABR)	1	Item	\$ 10,000	\$ 10,000	2030	9	\$ 7,000	Based on quote from supplier
Valves (MABR)	2	Item	\$ 18,000	\$ 36,000	2030	9	\$ 22,000	Nominated estimates from MABR supplier, to confirm by concept design
MABR Blower Stand/Roof Cover	1	Item	\$ 20,000	\$ 20,000	2030	9	\$ 13,000	Nominal allowance
Air piping from blowers to MABR	1	Item	\$ 30,000	\$ 30,000	2030	9	\$ 19,000	Nominal allowance
Control Panel (MABR)	1	Item	\$ 150,000	\$ 150,000	2030	9	\$ 91,000	Nominated estimates from MABR supplier
Electrical site work (MABR)	1	Item	\$ 30,000	\$ 30,000	2030	9	\$ 19,000	Nominated estimates from MABR supplier, to confirm by concept design
SCADA	1	Item	\$ 25,000	\$ 25,000	2030	9	\$ 16,000	Nominated estimates from MABR supplier, to confirm by concept design
MABR installation & commissioning	1	Item	\$ 55,000	\$ 55,000	2030	9	\$ 34,000	Nominated estimates from MABR supplier
							\$ -	
<b>IRRIGATION UPGRADES</b>								
Irrigation Land Preparation Stage 1	7.5	ha	\$ 10,000	\$ 75,000	2024	3	\$ 64,000	Nominal allowance based on \$10000/ha
Linear Irrigator	1	Item	\$ 245,000	\$ 245,000	2024	3	\$ 208,000	Nominal allowance based on \$35000/ha
Irrigation Land Preparation Stage 2	7.5	ha	\$ 10,000.0	\$ 75,000	2035	14	\$ 35,000	Nominal allowance based on \$10000/ha
Linear Irrigator	1	Item	\$ 245,000	\$ 245,000	2035	14	\$ 112,000	Nominal allowance based on \$35000/ha
Irrigation Land Preparation Stage 3	8	ha	\$ 10,000.0	\$ 80,000	2050	29	\$ 16,000	Nominal allowance based on \$10000/ha
Linear Irrigator	1	Item	\$ 245,000	\$ 245,000	2050	29	\$ 49,000	Nominal allowance based on \$35000/ha
							\$ -	
			<b>Direct Cost Sub Total (at net present cost)</b>	<b>\$ 1,570,000</b>				
P&G Contractors Risk	8%		Direct Cost Sub Total	\$ 126,000				
On Site Overheads	15%		On Work Cost	\$ 236,000				
Off Site Overheads and Profit	10%		On Work Cost + Site O/H	\$ 194,000				
Design, Tender and CM	15%		On Contract value	\$ 319,000				
Capital Cost Estimates			<b>Direct and Indirect Cost Sub Total</b>	<b>\$ 2,445,000</b>				
Contingency	20%		%	\$ 489,000				
			<b>Total</b>	<b>\$ 2,940,000</b>				

		Client: Waimakariri District Council	Job Number: 12546001						
		Job: Oxford WWTP Long Term Options	Calcs By: Andrew McMaster / Ben Asquith						
		Subject: CapEx - Option 3	Checked By: Ian Ho						
		Commented:							
							Discount Rate	3.7%	
							Inflation rate	2.0%	
							NPV discount rate	5.77%	
<b>UPGRADE OPTION 3 - Irrigation Expansion + New Clarifiers</b>									
	Qty	Unit	Rate	Total	Year installed	Time Period	Net Capital Cost	Comments	
<b>WWTP UPGRADE</b>									
Clarifier Earthworks - Excavation	850	m3	\$ 10	\$ 10,000		2030	9 \$ 7,000.00	Assumes light soil only (no rock)	
Clarifier Earthworks - Disposal	850	m3	\$ 20	\$ 20,000		2030	9 \$ 13,000.00	Assumes light soil only (no rock) and disposal within 10km of WWTP	
Clarifier (Civil)	1		\$ 310,000	\$ 310,000		2030	9 \$ 188,000.00	Estimate based on GHD cost database	
Clarifier (Mechanical)	1		\$ 140,000	\$ 140,000		2030	9 \$ 85,000.00	Estimate based on GHD cost database	
Clarifier installation & commissioning	30%	of clarifier cost	\$ 450,000	\$ 135,000		2030	9 \$ 82,000.00	Estimate based on GHD cost database	
RAS Pump Station	1	Item	\$ 75,000	\$ 75,000		2030	9 \$ 46,000.00	Estimate based on GHD cost database	
Yard pipework and pumping	1	Item	\$ 50,000	\$ 50,000		2030	9 \$ 31,000.00	Nominal allowance	
<b>IRRIGATION UPGRADES</b>									
Irrigation Land Preparation Stage 1	5	ha	\$ 10,000	\$ 50,000		2024	3 \$ 43,000.00	Nominal allowance based on \$10000/ha	
Travelling Irrigators	1	Item	\$ 245,000	\$ 245,000		2024	3 \$ 208,000.00	Nominal allowance based on \$35000/ha	
Irrigation Land Preparation Stage 2	22	ha	\$ 10,000	\$ 220,000		2030	9 \$ 133,000.00	Nominal allowance based on \$10000/ha	
Travelling Irrigators	3	Item	\$ 245,000	\$ 735,000		2030	9 \$ 444,000.00	Nominal allowance based on \$35000/ha	
Irrigation Land Preparation Stage 3	26	ha	\$ 10,000	\$ 260,000		2040	19 \$ 90,000.00	Nominal allowance based on \$10000/ha	
Travelling Irrigators	3	Item	\$ 245,000	\$ 735,000		2040	19 \$ 253,000.00	Nominal allowance based on \$35000/ha	
Irrigation Land Preparation Stage 4	14	ha	\$ 10,000	\$ 140,000		2050	29 \$ 28,000.00	Nominal allowance based on \$10000/ha	
Travelling Irrigators	2	Item	\$ 245,000	\$ 490,000		2050	29 \$ 97,000.00	Nominal allowance based on \$35000/ha	
				<b>Direct Cost Sub Total (at net present cost)</b>	\$	<b>1,655,000</b>			
P&G Contractors Risk				8%	Direct Cost Sub Total	\$	133,000		
On Site Overheads				15%	On Work Cost	\$	249,000	\$ 75,700.00	
Off Site Overheads and Profit				10%	On Work Cost + Site O/H	\$	204,000		
Design, Tender and CM				15%	On Contract value	\$	337,000		
Capital Cost Estimates				<b>Direct and Indirect Cost Sub Total</b>					\$ <b>2,578,000</b>
Contingency				20%	%	\$	516,000		
				<b>Total</b>	\$	<b>3,100,000</b>			

		Client: Waimakariri District Council	Job Number: 12546001					
		Job: Oxford WWTP Long Term Options	Calcs By: Andrew McMaster / Ben Asquith					
		Subject: CapEx - Option 5	Checked By: Ian Ho					
Commented:								
		Discount Rate	3.7%					
		Inflation rate	2.0%					
		NPV discount rate	5.77%					
<b>UPGRADE OPTION 5 - Convey Raw WW to Rangiora WWTP</b>								
	Qty	Unit	Rate	Total	Year installed	Time Period	Net Capital Cost	Comments
<b>WW Conveyance</b>								
	DN3125 Gravity Pipeline	36270	m	\$ 600	\$ 22,000,000	2030	9 \$	14,000,000
	Odour Control System	5	Item	\$ 55,000	\$ 275,000	2030	9 \$	170,000 Packaged GAC units assumed
	Access structures	10	Ea	\$ 50,000	\$ 500,000	2030	9 \$	310,000
				<b>Direct Cost Sub Total</b>	<b>\$ 14,500,000</b>			
	P&G Contractors Risk	8%		Direct Cost Sub Total	\$ 1,200,000			
	On Site Overheads	15%		On Work Cost	\$ 2,200,000			
	Off Site Overheads and Profit	10%		On Work Cost + Site O/H	\$ 1,800,000		\$	145,000.00
	Design, Tender and CM	5%		On Contract value	\$ 1,000,000			
	Capital Cost Estimates			<b>Direct and Indirect Cost Sub Total</b>	<b>\$ 20,700,000</b>			
	Contingency	20%		%	\$ 4,150,000			
				<b>Total</b>	<b>\$ 24,850,000</b>			

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# **Waimakariri District Council**

## Oxford WWTP Strategic Plan WAS Improvement Review

May 2021





## Table of contents

1.	Introduction.....	1
1.1	Background.....	1
1.2	Purpose of this report.....	1
1.3	Scope and limitations.....	1
2.	Basis of Design .....	3
2.1	Projected flows and loads.....	3
2.2	Existing solids handling process.....	3
3.	Sludge management options .....	5
3.1	Sludge management upgrade drivers.....	5
3.2	Options overview .....	6
3.3	Mechanical dewatering .....	6
3.4	Mechanical thickening.....	7
3.5	Geobag dewatering.....	8
3.6	Cost estimate .....	11
4.	Options comparison and recommendations .....	14
4.1	Options comparison.....	14
4.2	Recommendations and next steps .....	16

## Table index

Table 1	Oxford WWTP Influent Flow Forecast (2021 - 2071) .....	3
Table 2	Cost estimates .....	12
Table 3	Options comparison.....	15

## Figure index

Figure 1	WAS solids forecast.....	4
Figure 2	Decanter centrifuge example .....	7
Figure 3	Gravity belt thickener with enclosure for odour control.....	8
Figure 4	Geobag example.....	10

## Appendices

- Appendix A – Basis of Design and Process Pinch Points memo
- Appendix B – Site layouts
- Appendix C – Cost estimates



# 1. Introduction

## 1.1 Background

The Oxford WWTP owned and operated by Waimakariri District Council (WDC), currently services approximately 880 properties connected to the sewer reticulation network of Oxford. Two small pump stations service parts of the network, with the combined flow conveyed by gravity to the plant. The treatment plant, based on a Modified Ludzak-Ettinger activated sludge process, was commissioned in 1999, and has undergone a number of upgrades since that time.

WDC have engaged GHD to complete a strategic plan for the Oxford WWTP. As part of this strategic plan, a review of the waste activated sludge (WAS) disposal options is to be completed. The current WAS system has no dewatering in place. This results in the sludge being removed at a very low dry solids percentage, incurring significant costs for transport and disposal. These costs are advised as 47% of the overall treatment plant operational costs.

## 1.2 Purpose of this report

This report reviews options for improving the solids handling process at Oxford WWTP to aid WDC in determining the best option for implementation at the plant.

## 1.3 Scope and limitations

*This report: has been prepared by GHD for Waimakariri District Council and may only be used and relied on by Waimakariri District Council for the purpose agreed between GHD and the Waimakariri District Council as set out in section 1.2 of this report.*

*GHD otherwise disclaims responsibility to any person other than Waimakariri District Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.*

*GHD has prepared this report on the basis of information provided by Waimakariri District Council and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.*

*GHD has prepared the indicative cost estimate set out in section 3.6 of this report ("Cost Estimate") using information reasonably available to the GHD employee(s) who prepared this report; and based on assumptions and judgments made by GHD.*

*The Cost Estimate has been prepared for the purpose of a high level cost comparison between options and must not be used for any other purpose.*

*The Cost Estimate is indicative estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant*

*or guarantee that the works can or will be undertaken at a cost which is the same or less than the Cost Estimate.*

*Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be greater than the planning estimate, and any funding would not be adequate. The confidence level considered to be most appropriate for planning purposes will vary depending on the conservatism of the user and the nature of the project. The user should therefore select appropriate confidence levels to suit their particular risk profile.*

## 2. Basis of Design

### 2.1 Projected flows and loads

A summary of the basis of design for the Oxford WWTP WAS improvement review is shown below. A full basis of design can be found in the Oxford WWTP Basis of Design and Process Pinch Points memo, which was reviewed with WDC at a workshop on 10<sup>th</sup> March 2021 (Appendix A).

The influent flow forecast from 2020 to 2071 is shown in Table 1 below. The population and flows are expected to approximately double over the next 50 years. These flows and loads exclude the trade waste discharge from the neighbouring stock truck wash, which is assumed to be negligible.

**Table 1 Oxford WWTP Influent Flow Forecast (2021 - 2071)**

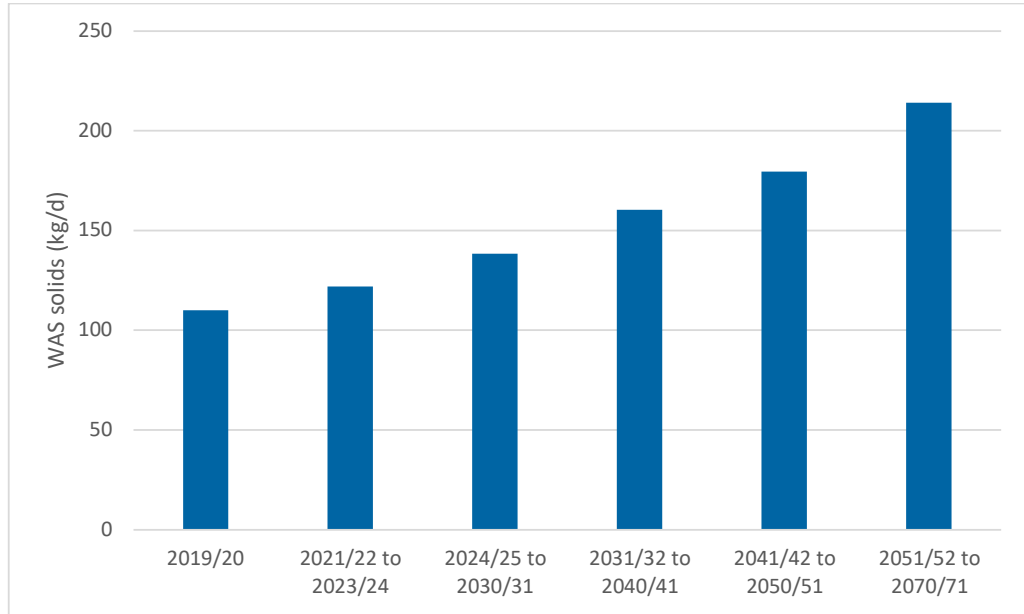
Parameter	Unit	2019/20	2021/22 to 2023/24	2024/25 to 2030/31	2031/32 to 2040/41	2041/42 to 2050/51	2051/52 to 2070/71
Connections	No.	889	985	1118	1296	1451	1729
EP	No.	2200	2438	2767	3207	3591	4279
ADWF	m <sup>3</sup> /d	553	618	708	828	953	1120
PWWF	m <sup>3</sup> /d	3056	3379	3829	4429	4954	5890
PWWF	L/s	35	39	44	51	57	68
PWWF:ADWF	-	5.5	5.5	5.4	5.3	5.2	5.3

### 2.2 Existing solids handling process

The activated sludge process at the Oxford WWTP consists of a circular reactor with an effective volume of 675 m<sup>3</sup>. The plant is operated in a Modified Lutzac-Ettinger (MLE) configuration, with waste activated sludge (WAS) removed from the process from a 6 m diameter clarifier at the centre of the reactor.

The forecasted future WAS volume is shown in Figure 1, considering the projected flows and loads in Table 1 and maintaining current operating practices in the reactor and sludge holding tank (including an assumed MLSS of 3500 mg/L and a 15 day sludge age). It is estimated that the activated sludge plant currently produces 110 kg/d of WAS which is transferred from the reactor to the sludge holding tank. Like the flows and loads, under the current operating regime the WAS volume is expected to approximately double over the next 50 years.

The sludge holding tank is aerated to maintain aerobic conditions, with a short settling period prior to decanting of supernatant. This process allows for some thickening of the WAS, however there is no dedicated thickening or dewatering process as part of the solids handling process to significantly reduce the volume of water that is carted from site with the sludge. As a result, it is estimated that 80 m<sup>3</sup> of 1% WAS is tankered from the site each week.



**Figure 1 WAS solids forecast**

## 3. Sludge management options

### 3.1 Sludge management upgrade drivers

Due to the low solids concentration and high volume of the waste sludge, sludge disposal accounts for close to 50% of OPEX. A dedicated thickening or dewatering process is recommended to reduce the volume of sludge carted from site and hence lower the operating cost of the plant.

The key driver for an upgrade to the sludge handling system is to reduce the cost associated with sludge disposal, primarily through a reduction in the moisture content of the sludge. In addition to this driver, key selection criteria for the upgrade include low capital and operating costs, minimised potential for odour emissions from site and ease of operation.

### 3.2 General Discussion of Sludge Dewatering Technology

There are various mechanical dewatering technologies that could be employed at Oxford WWTP including using a centrifuge, belt filter press, rotary screw press and pressurized geobag plants. These options are able to dewater to 16%DS but have differences in terms of power requirements, robustness with dealing with differing influent sludge quality, operator requirements, and maximum loading rates.

Dewatering Options	Advantages	Disadvantages
Centrifuge	<ul style="list-style-type: none"> <li>Proven and most common for sludge dewatering</li> <li>Can achieve &gt;20%DS, less volume for sludge transport</li> <li>Higher capital cost</li> </ul>	<ul style="list-style-type: none"> <li>High power consumption</li> <li>Noise</li> <li>Operator input to centrifuge speed and polymer dosage</li> </ul>
Belt Filter Press	<ul style="list-style-type: none"> <li>Relative stable performance</li> <li>Larger footprint than centrifuge</li> <li>Low in energy and noise</li> </ul>	<ul style="list-style-type: none"> <li>Achieve about 16-20%DS dewatered cake</li> </ul>
Screw Press	<ul style="list-style-type: none"> <li>Relatively compact</li> <li>Low in energy use and noise</li> </ul>	<ul style="list-style-type: none"> <li>Achieve about 16-20%DS dewatered cake, more variable than centrifuges</li> <li>Performance may drop if sludge feed quality is variable</li> <li>Polymer dose is critical to optimal dewatering</li> </ul>
Pressurised Sludge Bag Plants (e.g. Tejnobag-Drainad®)	<ul style="list-style-type: none"> <li>Suitable for very small schemes, or locations where labour cost is low</li> <li>Lower energy use than centrifuge</li> </ul>	<ul style="list-style-type: none"> <li>The unit is too small for Oxford WWTP<sup>#</sup></li> <li>High manual input required to mount and dismount sludge bags.</li> </ul>

<sup>#</sup> - The local supplier for Teknobag-Drainad® type geobag dewatering plant commented that whilst the Drainad unit has a much lower capital cost than the other mechanical dewatering options, the sludge production at Oxford WWTP is at the top limit of the largest 12 bags units, and all 12 bags will be filled and need replacement every day, requiring significant of operator input. The supplier instead recommended MonoBelt®, a combined gravity thickener and belt filter press unit.

A small Henley Sludge Age Controller device available from Christchurch City Council has also been suggested as a potential sludge thickening or dewatering option. However, it is believed that this device will not have sufficient capacity for sludge volume at Oxford WWTP.

### 3.3 Options overview

A long list of options was discussed with WDC on 10<sup>th</sup> March 2021. These included:

- Mechanical dewatering
- Mechanical thickening
- Geobags
- Sludge lagoon

Of these options, the sludge lagoon was discarded from future consideration due to the potential odour risk and large footprint. The other three options, mechanical dewatering, mechanical thickening and geobags were nominated for further development.

Additionally, following discussion with WDC, an option for a containerised unit was evaluated as a lower cost alternative to equipment housed in a permanent building.

The sections below consider the infrastructure requirements, layout and costs for the four options.

To allow for greater operational flexibility, it has been assumed that the existing sludge holding tank will remain in operation, although for each option WAS could bypass the sludge holding tank and be pumped directly to each thickening or dewatering process.

### 3.4 Mechanical dewatering

Mechanical dewatering involves using mechanical equipment to separate solid matter from water in the sludge resulting in a high solids content stream called 'cake' and a liquid stream. There is a wide range of mechanical dewatering systems available for this type of application as explained in Section 3.2.

For the purpose of this report, a decanter centrifuge dewatering will be investigated for the mechanical dewatering option. Pre-thickening has not been allowed as single stage dewatering is becoming more common in treatment plant size similar to Oxford WWTP.

Decanter centrifuges work by feeding a continuous flow of sludge into a rotating bowl where it separates into a dense cake containing the solids and a liquid stream called the 'centrate'.

Note that a belt filter press or rotary screw press would also be suitable for the Oxford WWTP. Final technology selection will be influenced by price and performance guarantees relating to the dewatered cake solids concentration, polymer dosing requirements, washwater demands, etc. received during tendering.

As centrifuges are enclosed systems, odour issues are primarily associated with dried sludge sitting in the load out area prior to removal. Odour extraction can be provided for the centrifuge and sludge bins to minimise this risk.

#### *Process description*

The decanter centrifuge would be housed in a new building containing the centrifuge, a polymer dosing system, conveyor system for dried solids and a truck loading area. Sludge from the sludge holding tank would be pumped and dosed with polymer to promote flocculation and improve the solid/liquid separation. The sludge would then pass through the centrifuge, producing a cake of 18 to 22% DS.



The sludge cake would be discharged from the bowl by a screw feeder onto a conveyor belt and transported to a bin in the truck loading area for later removal. Centrate would be returned to the inlet of the WWTP.

Depending on the final throughput capacity of the centrifuge, the centrifuge would initially require to be operated for one to two days per week for up to eight hours per day. This would increase to three days per week by 2051/52 (note that operator attendance is not always required during operation).



**Figure 2 Decanter centrifuge example (Source: Vendor)**

#### **3.4.1 Alternative Mechanical Dewatering - Teknobag-Drainad®**

A potential alternative to the centrifuge is a Teknobag-Drainad® dewatering system. This plant uses a pressurised geotextile bag to achieve a solids content of 16 – 20 %DS. The WAS is conditioned with a polymer emulsion before being pumped into the geotextile bag. Compressed air is then employed to force the water out of the bag to achieve dewatering. The bags (approximately 80 to 100 kg each) then have to be manually removed using a specialised trolley.

Filtrate from the plant is returned to the inlet of the WWTP.

For the final design sludge flow of 22 m<sup>3</sup>/day, the supplier indicated that this volume will be the absolute maximum that the largest 12 bag unit can handle. All 12 bags will need to be changed on a daily basis, requiring a significant amount of operator input. During earlier stages, reduced operational input is required.

The Teknobag-Drainad® plant can be installed as a standalone unit or as a containerised package. Housing the unit in a building would be preferable due to the significant amount of operator handling and space required for sludge bag storage.



**Figure 3 Teknobag-Drainad® Plant (Source: Vendor)**

### **3.5 Mechanical thickening**

Mechanical thickening also uses mechanical equipment to separate solid matter and water. However, compared to mechanical dewatering methods, mechanical thickening produce solids

streams with a lower solids content and therefore a greater volume of sludge. Examples of mechanical thickening equipment include gravity belt thickeners and rotary drum thickening. For this report, gravity belt thickening has been assumed as the preferred method of mechanical thickening.

Gravity belt thickeners (GBT) consist of a porous belt that moves over rollers. The sludge is dosed with polymer to promote flocculation prior to being fed into the GBT. As the sludge moves along the belt, a series of plow blades ridge and furrow the sludge to improve solid-water separation. Thickened sludge drops into a collector vessel, while water (filtrate) drains through the belt and is collected in a sump. A continuous supply of water is required for high pressure cleaning of the belt to prevent clogging of the belt's pores.

GBTs are open systems with potential for odour. This can be managed via an enclosure over the GBT or housing the unit indoors. Odour extraction can also be provided for the sludge holding tank to minimise the odour risk.

#### **Process description**

The gravity belt thickener (GBT) would be housed in a new building containing the GBT, a polymer dosing system, thickened sludge holding tank and a truck loading area. Sludge from the existing solids holding tank would be pumped to the solids handling area and dosed with polymer. The sludge would then pass through the GBT, producing a thickened sludge with a solids concentration of 4 to 6% DS. The thickened sludge would be stored in a thickened sludge tank prior to collection for transport to another wastewater facility for further processing.

Bromley WWTP has anaerobic digestors upstream of a thermal drying system, and Pines WWTP has an aerobic digester followed by a solar drying process. Under this arrangement, WDC would need to come to agreement with either Christchurch City Council (Bromley WWTP) or Selwyn District Council (Pines).

Filtrate from the thickener would be returned to the inlet of the WWTP.

Similar to the centrifuge option, depending on the throughput of the preferred GBT model the unit would operate for 1 to 2 days per week.



**Figure 4 Gravity belt thickener with enclosure for odour control (Source: Vendor)**

### **3.6 Geobag dewatering**

Geobag dewatering involves the use of porous geotextile filter bags called 'geobags' to separate the solid matter and water in the sludge. Sludge is pumped into the bags and free water drains through small perforations. The sludge would be dosed with polymer upstream of the geobags to assist with flocculation to enable effective solid/liquid separation. If polymer is

not provided, the perforations in the bag rapidly block and water is unable to pass through the bag walls.

When the bags are full (i.e. they reach their solids loading capacity) they are taken offline to facilitate dewatering under their own weight. Once dry, the bags are cut open and the sludge is removed with an excavator.

The risk of odour from the filled/partially filled geobags is uncertain, but when the geobags are opened so that sludge can be removed there is a high risk of increased odour emissions from the site. Odour generated during the sludge removal process would be restricted to the several days per year that the dewatered sludge is removed from site.

Two geobag options are outlined below with varying storage requirements.

### 3.6.1 Geobag Option 1

This option would involve establishing a concrete pad area on-site for continuous geobag dewatering. Sludge would be pumped from the existing sludge holding tank and dosed with polymer before entering the geobags. Multiple geobags would be installed and operated on a rotating basis to ensure that the sludge has time to settle and dewater. The filtrate would drain to a pump station which would pump it back to the plant inlet. This pump station would be sized to manage the runoff generated from stormwater events.

Full geobags will be taken offline to allow further dewatering. Once dry, the geobags would be cut open and the sludge would be removed by an excavator before further onsite mechanical dewatering by a contractor to reduce the volume transported to landfill for disposal. This would occur on an annual basis.

The effectiveness of the geobag dewatering process depends on climatic conditions, drying time and the effectiveness of polymer dosing. For the purpose of this report, an estimated solids concentration of 20% DS has been assumed for the dewatered sludge after additional onsite dewatering. To maximise the DS% in the final sludge, solids removal from site should occur at the end of summer.

Initially three 20 m long geobags would be required to manage the annual sludge production from the WWTP. A fourth geobag would be required after 10 to 20 years to manage the projected increase in solids, i.e. 4 bags in rotation.



**Figure 5 Geobag example (Source: Internet)**

### 3.6.2 Geobag Process Option 2

The second geobag option considers no secondary dewatering once the bag is opened, reducing overall OPEX costs, and would involve establishing an HDPE lined area for continuous dewatering of the geobags (assuming a lined area is cheaper than a concrete area). As with option 1, multiple geobags will be filled with polymer dosed sludge on a rotating basis with filtrate being pumped back to the plant inlet via a pump station. However, for option 2, once full the geobags will be left onsite for at least three years to allow further dewatering of the sludge. For the purposes of this report, it has been assumed that the sludge will dewater to 20 %DS during the storage period. However, it should be noted that there is limited practice of long term storage and dewatering of WAS, thus there is a degree of uncertainty whether 18 to 20%DS can be achieved.

Similar to Option 1, three 20 m long geobags would be required per year to manage the sludge production from the WWTP. This means by the fourth year, the facility will have a total of 12 bags, 3 of which are in use, and the remaining 9 are in extended storage mode for gravity dewatering and aging. The space required will be in excess of 90 m by 30m, very likely causing significant space constraint to the site.

### 3.7 Containerised Monobelt®

A Monobelt® is a mechanical dewatering device that combines a gravity belt thickener with a filter press. A 20 foot containerised plant can be supplied which contains a Monobelt®, polymer emulsion preparation, pumps and sludge conveyor. This removes the requirement for a permanent building over the plant.

Site ancillaries required would include an upgraded internal access road and turning area, an area to house the container unit and ancillary plant, potable water supply, power mains, communications, inflow and outflow pipework, safety shower, chemical bunds, and skip bins.

Sludge from the current solids holding tank would be pumped to the container where it is dosed with polymer. The sludge then enters the Monobelt® where it is dewatered to achieve a sludge cake of 16 – 20 %DS. The sludge cake would be discharged to a conveyor which moves it to a sludge bin for storage prior to removal by truck to landfill. The filtrate will be pumped to the inlet of the plant.

The vendor advised the containerised Monobelt® would operate at 6 m<sup>3</sup>/hr, which equates to 1 – 3 days per week run time at Oxford WWTP.



**Figure 6 Containerised Monobelt Plant**

From discussions with a current user of a Monobelt®, they have observed that the Monobelt is easier to use than a centrifuge with less operator input required. While their Monobelt dewatered sludge %DS varies with load, they are able to fine tune the settings.

### 3.8 Cost estimate

CAPEX, OPEX and NPVs for each of the six options above are presented in Table 2. These are compared against the base case, which assumes no sludge thickening or dewatering and maintaining the existing sludge disposal. A breakdown of costs for each option is presented in Appendix C.

The cost estimates in Table 2 show that all options provide an opportunity for a reduction in OPEX compared to the current operating regime (base case), with mechanical dewatering options and geobags reducing the operating cost by more than 50%.

While the operating costs for the mechanical dewatering options and geobags are similar, the lower capital cost of geobag option 2 yields the lowest NPV over a thirty year period. The reduced CAPEX associated with not requiring a dewatering building for the containerised Monobelt means that it achieves the second lowest NPV.

**Table 2 Cost estimates**

Item	Base Case (Status quo)	Mechanical Dewatering	Mechanical Thickening	Geobag Option 1	Geobag Option 2	Teknobag-Drainad®	Containerised Monobelt
CAPEX	-	\$1.5 M	\$1.0 M	\$0.9 M	\$0.7 M	\$0.9 M	\$0.8 M
OPEX							
• 2021/22 – 2023/24	\$171,000	\$104,000	\$126,000	\$115,000	\$69,000	\$114,000	\$102,000
• 2024/25 – 2030/31	\$228,000	\$133,000	\$163,000	\$148,000	\$133,000	\$141,000	\$130,000
• 2031/32 – 2040/41	\$295,000	\$167,000	\$207,000	\$189,000	\$169,000	\$181,000	\$164,000
• 2041/42 – 2050/51	\$352,000	\$227,000	\$284,000	\$256,000	\$228,000	\$239,000	\$223,000
NPV (2021/22 – 2051/52)	\$5.5 M	\$4.8 M	\$5.1 M	\$4.6 M	\$3.9 M	\$4.5 M	\$4.0 M

**Cost estimate assumptions**

- Final sludge % DS:
  - Base case – 1%DS (status quo)
  - Mechanical dewatering, Teknobag-Drainad®, Monobelt – 20%DS
  - Mechanical thickening – 4%DS (for ease of transport)
  - Geobags – 20%DS (after additional dewatering onsite, or longer term gravity dewatering)
- NPV discount rate = 3.7%
- Inflation rate = 2% p.a
- Electricity cost = 17.16 cents/kWh
- Polymer cost = \$9/kg

- Polymer dose rates:
  - Mechanical dewatering, Teknobag-Drainad®, Monobelt = 15 kg/tonne DS
  - Mechanical thickening = 5 kg/tonne DS
  - Geobags = 10 kg/tonne DS
- Dewatered sludge disposal to Kate Valley landfill (gate fee) = \$217/wet tonne
  - Base charge of \$167/wet tonne
  - Additional proposed future landfill tax levy of \$50/wet tonne<sup>1</sup>.
- Transport cost to Kate Valley landfill = \$426/5m<sup>3</sup> skip
- Thickened sludge disposal to Bromley WWTP = \$262/wet tonne
- Transport cost to Bromley WWTP = \$408/10m<sup>3</sup> septic tanker delivery
- Contractor mobilisation rate for onsite geobag dewatering and trucking for FY2021/22 = \$15,000
- Contractor rate for additional onsite dewatering to 20%DS after geobag drying is \$200/dry tonne of sludge (recent rate for pond dredging and mechanical dewatering is \$550/dry tonne)
- Pumping power for pumping sludge and centrate assumed to be similar for all options and is therefore excluded.
- Construction of all CAPEX to occur in FY 2021/22
- Site power upgrades or service water system are assumed to be adequate for new items
- Indicative CAPEX based on the following rates:
  - Contractor P&G: 8%
  - Contractor's Onsite Overhead: 15%
  - Contractor's Offsite Overhead: 10%
  - Professional fees related to design, tendering and construction monitoring: 15 to 18%

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<sup>1</sup> <https://www.beehive.govt.nz/release/government-steps-action-waste-funds-recycling-infrastructure-and-expands-levy-scheme>

## 4. Options comparison and recommendations

### 4.1 Options comparison

A comparison of all options is shown in Table 3.

The key driver for an upgrade to the sludge handling system is to reduce the cost associated with sludge disposal, primarily through a reduction in the moisture content of the sludge. In addition to this driver, key selection criteria for the upgrade include low capital and operating costs, minimised potential for odour emissions from site and ease of operation.

Both the mechanical dewatering options and geobag Option 1 have similar annual operating costs, with the difference in NPV largely due to the greater capital costs associated with the costs of the mechanical dewatering units. Geobag Option 2 removes secondary dewatering and therefore reduces overall OPEX.

The mechanical thickening option has the highest NPV, largely due to the lower %DS in the thickened sludge compared to geobags and mechanical dewatering. This sludge cannot be disposed of at landfill, and must be sent to another WWTP for stabilisation and dewatering. However, this option has a lower capital cost, low greenhouse gas emissions and is potentially more suitable to integrate into a region-wide biosolids management plan (e.g. Bromley or Pines WWTPs acting as a regional biosolids processing facility).

Whilst the geobag option 2 yields lower NPV than the other options, the major drawbacks include the very large footprint required, increased potential for odour generation and greenhouse gas emissions due to the generation of methane from stockpiled biosolids. In addition, the three year storage may not achieve the minimum dryness required by the landfill, hence requiring further dewatering prior to disposal. In both geobag options, a long term contract with a contractor will be necessary to provide ongoing geobag replacement and (potentially) onsite additional dewatering on behalf of WDC.

The containerised Monobelt® yields the second lowest NPV with the advantage that the plant is compact and requires minimal civil works on site. OPEX costs are also the lowest out of the mechanical options. It also offers the advantage of relocating this containerised plant to another site in the future. This installation option could also be considered for alternative dewatering and thickening plant.

To illustrate the options, indicative plant layout locations have been included in Appendix B.



**Table 3 Options comparison**

Parameter	Mechanical dewatering	Mechanical thickening	Geobag Option 1	Geobag Option 2	Teknobag-Drainad®	Containerised Monobelt
Indicative CAPEX	\$1.5 M	\$1.0 M	\$0.86 M	\$0.7 M	\$0.92 M	\$0.8 M
Indicative NPV	\$4.8 M	\$5.1 M	\$4.6 M	\$3.9 M	\$4.5 M	\$4.0 M
Key infrastructure requirements	<ul style="list-style-type: none"> <li>Centrifuge (or belt filter press/rotary screw press)</li> <li>Sludge conveyor</li> <li>Polymer dosing system</li> <li>Odour treatment</li> <li>Dewatering building (approx. 8m x 12m)</li> <li>Gantry crane</li> <li>Truck loading area</li> </ul>	<ul style="list-style-type: none"> <li>Gravity belt thickener or rotary drum thickener</li> <li>Polymer dosing system</li> <li>Thickened sludge holding tank</li> <li>Odour treatment</li> <li>Dewatering building (approx. 8m x 12m)</li> <li>Truck loading area</li> </ul>	<ul style="list-style-type: none"> <li>Geobags (medium term storage)</li> <li>Polymer dosing system</li> <li>Concrete geobag area (approx. 20m x 40m) with drainage and stormwater diversion</li> <li>Truck loading area</li> </ul>	<ul style="list-style-type: none"> <li>Geobags (long term storage)</li> <li>Polymer dosing system</li> <li>HDPE geobag area (approx. 30m x 90 m) with drainage and stormwater diversion</li> <li>Truck loading area</li> </ul>	<ul style="list-style-type: none"> <li>Teknobag-Drainad®</li> <li>Dewatering building (approx. 8m x 12m)</li> <li>Gantry crane</li> <li>Truck loading area</li> </ul>	<ul style="list-style-type: none"> <li>Containerised Monobelt (including polymer dosing equipment)</li> <li>Truck loading area</li> <li>Site ancillaries</li> <li>Odour treatment (provisional)</li> </ul>
Cake % dry solids	20%	4 %	20% (after additional onsite dewatering)	20% (may require additional dewatering)	20%	20%
Key advantages	<ul style="list-style-type: none"> <li>Highest % DS, lowest landfill and transport costs</li> </ul>	<ul style="list-style-type: none"> <li>Low capital cost</li> <li>Simple mechanical operation and low maintenance requirements</li> <li>Potential integration into future regional biosolids management</li> </ul>	<ul style="list-style-type: none"> <li>Highest % DS, lowest landfill and transport costs</li> <li>Simple operation and low maintenance requirements</li> </ul>	<ul style="list-style-type: none"> <li>Lowest capital cost of all options</li> <li>Lowest NPV of all options</li> <li>Simple operation and low maintenance requirements</li> </ul>	<ul style="list-style-type: none"> <li>Highest % DS, lowest landfill and transport costs</li> </ul>	<ul style="list-style-type: none"> <li>Highest % DS, lowest landfill and transport costs</li> <li>Lowest NPV</li> <li>Small footprint</li> </ul>
Key disadvantages	<ul style="list-style-type: none"> <li>Highest capital cost of all options</li> <li>Greatest ongoing maintenance requirements</li> </ul>	<ul style="list-style-type: none"> <li>High operating cost due to low DS% relative to other options</li> <li>Highest NPV of all options</li> <li>Requires an agreement with other council for sludge disposal</li> <li>Requires constant water supply for belt flushing</li> </ul>	<ul style="list-style-type: none"> <li>Large footprint</li> <li>Increased potential for odour compared to other options</li> <li>Geobag dewatering performance not consistent, and will require additional onsite dewatering by a contractor prior to disposal (costing allowed for)</li> </ul>	<ul style="list-style-type: none"> <li>Large footprint, causing significant site constraint for future plant expansion</li> <li>Increased potential for odour compared to other options</li> <li>High potential for damage to the HDPE liner</li> <li>May require further dewatering (cost not allowed for)</li> </ul>	<ul style="list-style-type: none"> <li>High operator input required</li> </ul>	<ul style="list-style-type: none"> <li>Less space for operators to work out of the elements</li> </ul>
Odour	Odour associated with sludge sitting in the load out area. This can be managed via odour extraction and treatment.	GBTs are open systems with potential for odour. This can be managed via an enclosure over the GBT or housing the unit indoors.	Potential for odour from geobags, increased likelihood during solids disposal	Potential for odour from geobags, increased likelihood during solids disposal	Potential for odour from geotextile bags	Odour associated with sludge sitting in the load out area. This can be managed via odour extraction and treatment.
Order of magnitude greenhouse gas emissions (Scope 1 and Scope 2)	Medium – due to power consumption associated with centrifuge operation	Low - due to low power consumption and low odour/GHG release potential	<b>Highest</b> of the options – due to possible methane generation from geobags as biosolids degrade and dry.	<b>Highest</b> of the options – due to possible methane generation from geobags as biosolids degrade and dry.	Low - due to low power consumption and low odour/GHG release potential	Low - due to low power consumption and low odour/GHG release potential

## 4.2 Recommendations and next steps

A high-level multi-criteria evaluation was conducted to identify the preferred sludge improvement options. The MCA broad criteria are as follows:

- **Cost (25%):** *Capital Cost and Life cycle cost*
- **Site Integration (15%):** *Process integration and not constraining future plant expansion*
- **Ease of Operation (25%):** *Performance Reliability, Operator Input and Process Safety*
- **Risks (20%):** *Construction Delay, Cost escalation risks during construction, operation and ongoing contracts (e.g. sludge transfer and sludge removal contracts)*
- **Relative Greenhouse gas emission (15%)**

**Table 4 Options MCA Summary Table**

Rank	Options	MCA Scores	Remarks/Comments
1	Containerised MonoBelt	6 / 10	<i>Best NPV and relatively simple to operate</i>
2	Mechanical Thickening	2.5 / 10	<i>Better than baseline in terms of CapEx and power consumption (Scope 2 emission)</i>
3	Mechanical Dewatering (Baseline)	0 / 10	<i>Baseline option – highest CapEx</i>
4	Geobag Option 1	-0.5 / 10	<i>One of the low CapEx options, but concerns over performance reliability, ongoing sludge management cost and greenhouse gas emission.</i>
5	Drainad	-2 / 10	<i>Not preferred because of very high operating input related to bag unloading daily</i>
6	Geobag Option 2	-3 / 10	<i>Similar to Option 4, and potential fatal flaws for not achieving cake dryness after 3 years storage and constraining future plant expansion</i>

From the qualitative comparison (Table 3) and the MCA evaluation (Table 4), the Containerised MonoBelt option appears to be the leading option.

The next steps for implementing the MonoBelt option will involve:

1. Develop a preliminary design to quantify the site ancillary requirements, and consider the merits of other containerised dewatering technologies
2. Prepare procurement documentation (tender schedule and specification) for MonoBelt®
3. Commence engineering design for the site ancillary upgrades to accommodate MonoBelt® unit on site



# Appendices

## **Appendix A** – Basis of Design and Process Pinch Points memo



# Memorandum

03 March 2021

To Waimakariri District Council

Copy to

From Ben Asquith Tel +61 3 86878511

Reviewed by Ian Ho

Subject Basis of Design and Process Pinch Points Job no. 12546001

## 1 Introduction

Waimakariri District Council (WDC) has engaged GHD to complete a strategic review of the Oxford WWTP, which currently services approximately 890 properties connected to the sewer reticulation network of Oxford. This memorandum sets out the basis of design for the strategic review, and provides a review of process pinch points.

## 2 Basis of Design

The basis of design for the Oxford WWTP is presented in Table 1. Flow projections were provided by WDC and were cross checked against the estimated usage per EP. The projected PWWF to ADWF of 5.3 to 5.5 is considered reasonable.

With no major trade waste customers in the catchment, loads are based on typical domestic wastewater characteristics per EP (volume and load from nearby truck washing facility TBC).

## 3 Process constraints

Process constraints at the Oxford WWTP have been identified based on current and projected flows and loads. These also consider previous reports provided by WDC and information provide during the kick-off meeting. A detailed list of process constraints is provided in Table 2, including which processes are currently constrained, and those that will reach pinch points over the project horizon. These are briefly summarised here:

### *Inlet works*

There are known performance issues with the step screen, and there is no dedicated grit removal which may cause a build up of grit within the bioreactor. The 2009 MWH and 2014 Opus report quoted different hydraulic capacity figures of 30 and 80L/s respectively.

Moreover, we understand that from the WDC operation team that the step screen is near its end of asset life.

12546001-38816-6/12546001-MEM\_Info Review and BoD.docx

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## Memorandum

### ***Bioreactor***

The bioreactor has 675m<sup>3</sup> in volume and the aeration system was recently upgraded with blowers and diffused aeration. High level capacity estimation was undertaken as part of this review. Based on a sludge age of 15 days, the bioreactor would reach its capacity before Year 2030. However, the bioreactor can potentially be optimised (e.g. running at a slightly lower sludge age), and capacity may be stretched beyond 2030. A calibration process model e.g. BioWin will be needed to simulate the process response under a range of operation scenarios.

### ***Clarifier***

The clarifier is undersized, with solids carry over occurring at flow rates greater than approximately 12 L/s. This is approximately one third of the current PWWF. Solids carry over will worsen in the future as flows and loads increase over time. A high-level analysis of the clarifier suggests that its surface area should be 2 to 3 times larger to accommodate the projected flows and loads.

### ***Sludge disposal***

There is no dedicated thickening or dewatering as part of the sludge handling process. WAS is pumped to the sludge holding tank, where some thickening occurs during settling. The estimated weekly sludge disposal volume is 80 m<sup>3</sup> at 1% DS. Due to the disposal of unthickened sludge, sludge disposal accounts for close to 50% of OPEX.

### ***Irrigation Field Nitrogen loading rate***

As per the WWTP's consent condition, the maximum nitrogen loading rate for effluent irrigation is 200 kg/ha/y. Based on the median effluent TN concentration of 10.4mg/L and current flows of 553m<sup>3</sup>/d, the estimated current nitrogen loading rate is 140 kg/ha/y and within the consent conditions. If the effluent TN concentration remains at its current median of 10 mg/L, the nitrogen loading rate is expected to exceed the permitted rate sometime from 2031/32 to 2040/41.

### ***Effluent volume***

The maximum consented daily effluent volume for the WWTP is 1,382 m<sup>3</sup>/d, and the total annual effluent volume is 228,125 m<sup>3</sup> (average of 625 m<sup>3</sup>/d). Based on the projected flows, the annual effluent volume consent condition is expected to be exceeded sometime from 2024/25 to 2030/31.

### ***Flow monitoring***

With only two flow meters in the plant combined with two holding basins, there are no detailed records of flows through the reactor tank, clarifier, wet weather holding pond and sludge wasting.

### ***Addendum 1 Sludge Management Improvement Long List Options High Level Comparison Table (In progress)***

### ***Addendum 2 – WWTP Long term Options Comparison Table (Not attached)***



## Memorandum

If you have questions, please don't hesitate to contact Iain Partington or Ian Ho.

Regards

**Ben Asquith**

Senior Process Engineer



**Table 1 Projected flows and loads for the Oxford WWTP**

Parameter	Unit	2019/20	2021/22 to 2023/24	2024/25 to 2030/31	2031/32 to 2040/41	2041/42 to 2050/51	2051/52 to 2070/71
Connections	No.	889	985	1118	1296	1451	1729
EP	No.	2200	2438	2767	3207	3591	4279
<b>Flows</b>							
ADWF	m3/d	553	618	708	828	953	1120
PWWF	m3/d	3056	3379	3829	4429	4954	5890
PWWF	L/s	35	39	44	51	57	68
PWWF:ADWF	-	5.5	5.5	5.4	5.3	5.2	5.3
<b>Loads</b>							
BOD <sup>1</sup>	kg/d	154	171	194	225	251	300
COD <sup>2</sup>	kg/d	354	392	445	516	578	689
TN <sup>3</sup>	kg/d	31	34	39	45	50	60
AmmN <sup>4</sup>	kg/d	22	24	28	32	36	43
TP <sup>5</sup>	kg/d	7	8	9	11	12	14
TSS <sup>6</sup>	kg/d	209	232	263	305	341	406

**Notes:** (1) BOD = 70 g/ED/d  
(2) COD = 161 g/ED/d  
(3) TN = 14 g/ED/d  
(4) AmmN = 10 g/ED/d  
(5) TP = 3.3 g/ED/d  
(6) TSS = 95 g/ED/d

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**Table 2 Oxford WWTP current and project process capacity summary with constraints highlighted in bold**

<b>Process</b>	<b>Current status</b>	<b>Projections</b>
Inlet works	<b>Existing step screen is understood to have insufficient capacity and performance issues. Screen unit is near end of asset life.</b> <b>There is no grit removal</b>	Screen requires replacement.
Wet weather holding pond	In 2014, a holding pond was constructed, and the design intention was to improve treatment plant to handle wet weather flows. <b>WDC has advised that it is difficult to empty and remove accumulated solids. No data has been provided on solids build up.</b>	
Aeration basin	Current operating conditions are unknown. Effluent results indicate that the aeration basin, with its aerobic and anoxic zones, is able to achieve organic removal, nitrification/denitrification and some phosphorous removal.	Based on a sludge age of 15 days and a maximum mixed liquor concentration of 3,500 mg/L, the aeration basin is expected to have sufficient capacity until 2024/25. If sludge age is reduced to 10 days (more operation attention needed or more land area for irrigation), it may extend close to 2050. <b>Process modelling recommended if WDC decides to sweat the asset.</b>
Aeration system	The aeration system has recently been upgraded. Only one of the three blowers is currently in use (duty/standby/standby)	TBC – insufficient data on aeration system to determine future suitability.

Process	Current status	Projections
Clarifier	<b>Solids carry over in the clarifier occurs at flows greater than approximately 12 L/s (anecdotal). This is approximately one third of the current PWWF. While the holding basin buffers some flow, the solids carryover occurs during some wet weather events.</b>	Solids carry over will worsen in the future as flows and loads increase over time.  A high-level analysis of the clarifier's surface overflow rate and solids loading rate suggests that the surface area of the clarifier should be 2 to 3 times larger to accommodate the projected flows and loads.
Sludge handling	There is no dedicated thickening or dewatering as part of the sludge handling process. WAS is pumped to the sludge holding tank, where some thickening occurs during settling. The estimated weekly sludge disposal volume is 80 m <sup>3</sup> at 1% DS.  <b>Due to the disposal of unthickened sludge, sludge disposal accounts for approximately 50% of OPEX. The introduction of some sludge thickening or dewatering process would reduce this cost.</b>	Projected weekly sludge volumes for disposal (assuming 1.1% DS): <ul style="list-style-type: none"> <li>• 2021/22 to 2023/24: 82 m<sup>3</sup>/wk</li> <li>• 2024/25 to 2030/31: 103 m<sup>3</sup>/wk</li> <li>• 2031/32 to 2040/41: 116 m<sup>3</sup>/wk</li> <li>• 2041/42 to 2050/51: 133 m<sup>3</sup>/wk</li> <li>• 2051/52 to 2070/71: 159 m<sup>3</sup>/wk</li> </ul>
Consent conditions = disinfection  Maximum effluent faecal coliform = 500 org/100 mL	No data is available	N/A no data is available
Consent conditions – nitrogen loading:  Maximum nitrogen loading rate = 200 kg/ha/y	Based on median effluent TN, the current nitrogen loading rate is 140 kg/ha/y	Projected annual nitrogen loading rates: <ul style="list-style-type: none"> <li>• 2021/22 to 2023/24: 155 kg/ha/y</li> <li>• 2024/25 to 2030/31: 180 kg/ha/y</li> <li>• <b>2031/32 to 2040/41: 210 kg/ha/y</b></li> <li>• <b>2041/42 to 2050/51: 240 kg/ha/y</b></li> <li>• <b>2051/52 to 2070/71: 283 kg/ha/y</b></li> </ul>

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Process	Current status	Projections
Consent conditions - effluent volume Maximum effluent volume = 1,382 m <sup>3</sup> /d Annual effluent volume = 228.125 ML/y	Based on current flows and the use of the holding basins, the plant is able to meet consent conditions for effluent volume.	<p><b><i>The annual effluent volume consent condition is expected to be exceeded sometime from 2024/25 to 2030/31.</i></b></p> <p>Depending on the volume of wastewater retained in the holding basins and the number of days the plant is able to discharge via irrigation, the plant may begin to exceed the maximum effluent volume sometime beyond 2050.</p>
Asset condition	No asset condition assessment has been completed as part of this review.	<p><b><i>The original plant was constructed in 1997 and therefore is well within the expected design life. However, the strategic plan horizon of 50 years means that some elements will require renewal in that period.</i></b></p>
Flow monitoring	<p><b><i>With only two flow meters in the plant combined with two holding basins, there are no detailed records of flows through the reactor tank and clarifier.</i></b></p>	<p><b><i>Additional flowmeters and process instrumentation to improve resilience and reduce operator's involvement through automation.</i></b></p>

## **Appendix B – Site layouts**

**Geobag Option 1 – Indicative Layout**



**Geobag Option 2 – Indicative Layout**



Dewatering/Thickening Option – Indicative Layout





**Containerised Monobelt Option – Indicative Layout**



## **Appendix C – Cost estimates**



Client: Waimakariri District Council  
 Job: Oxford WWTP WAS Improvement Review  
 Subject: CapEx - Centrifuge

Job Number: 12546001  
 Calcs By: Andrew McMaster  
 Checked By: Ben Asquith & Ian Ho  
 Commented:

UPGRADE OPTION 1 - Centrifuge					
	Qty	Unit	Rate	Total	Comments
<b>WAS PROCESSING</b>					
Concrete Plinth for Building	1	Item	\$ 25,000	\$ 25,000	
Centrifuge	1	Item	\$ 211,246	\$ 212,000	Past quote
Sludge Conveyor	1	Item	\$ 18,000	\$ 18,000	Past quote
Pumps and Piping	1	Item	\$ 32,400	\$ 33,000	
Polymer Plant and Dosing	1	no.	\$ 29,500	\$ 30,000	Past quote
Sludge Building - 8m x 12m	100	m2	\$ 1,700	\$ 170,000	Garage type, space for 2nd unit (future)
Odour bed and extraction fan	1	no.	\$ 80,000	\$ 80,000	
Internal Gantry	1	Item	\$ 50,000	\$ 50,000	
Centrate Pump Station	1	Item	\$ 30,000	\$ 30,000	
M&E Installation	30%	item	\$ 453,000	\$ 136,000	
			<b>Direct Cost Sub Total</b>	<b>\$ 785,000</b>	
P&G Contractors Risk	8%	Direct Cost Sub Total		\$ 62,800	
On Site Overheads	15%	On Work Cost		\$ 117,750	
Off Site Overheads and Profit	10%	On Work Cost + Site O/H		\$ 96,555	
Design, Tender and CM	18%	On Contract value		\$ 191,179	
Capital Cost Estimates			<b>Direct and Indirect Cost Sub Total</b>	<b>\$ 1,253,284</b>	
Contingency	20%	%		\$ 250,657	
			<b>Total</b>	<b>\$ 1,503,941</b>	



Client: Waimakariri District Council  
 Job: Oxford WWTP WAS Improvement Review  
 Subject: CapEx - Gravity Belt Thickener

Job Number: 12546001  
 Calcs By: Andrew McMaster  
 Checked By: Ben Asquith and Ian Ho  
 Commented:


UPGRADE OPTION 2 - Gravity Belt Thickener					
	Qty	Unit	Rate	Total	Comments
<b>WAS PROCESSING</b>					
Concrete Plinth for Building	1	Item	\$ 25,000	\$ 25,000	
Gravity Belt Thickener	1	Item	\$ 59,000	\$ 59,000	Past quote
Pumps and Piping	1	Item	\$ 32,400	\$ 33,000	
Polymer Plant and Dosing	1	no.	\$ 29,500	\$ 30,000	Past quote for Emulsion Poly
Sludge Building - 10m x 12m	100	m2	\$ 1,500	\$ 150,000	Garage type, space for 2nd unit (future)
Internal Gantry	0	Item	\$ 50,000	\$ -	No gantry allowed
Odour bed and extraction fan	1	No.	\$ 80,000	\$ 80,000	
Filtrate Pump Station	1	Item	\$ 30,000	\$ 30,000	
TWAS Holding Tank and Pump	1	Item	\$ 30,000	\$ 30,000	
M&E Installation	30%	item	\$ 232,000	\$ 70,000	
			<b>Direct Cost Sub Total</b>	<b>\$ 510,000</b>	
P&G Contractors Risk	8%	Direct Cost Sub Total		\$ 40,800	
On Site Overheads	15%	On Work Cost		\$ 76,500	
Off Site Overheads and Profit	10%	On Work Cost + Site O/H		\$ 62,730	
Design, Tender and CM	18%	On Contract value		\$ 124,205	
Capital Cost Estimates		<b>Direct and Indirect Cost Sub Total</b>		<b>\$ 814,235</b>	
Contingency	20%	%		\$ 162,847	
			<b>Total</b>	<b>\$ 977,082</b>	



Client: Waimakariri District Council  
 Job: Oxford WWTP WAS Improvement Review  
 Subject: CapEx - Geobag

Job Number: 12546001  
 Calcs By: Andrew McMaster  
 Checked By: Ian Ho  
 Commented:

UPGRADE OPTION 3 - Geobags					
	Qty	Unit	Rate	Total	Comments
<b>WAS PROCESSING</b>					
Vegetation Removal and earthworks	1	Unit	\$ 20,000	\$ 20,000	
Concrete basin for geobags	800	m2	\$ 250	\$ 200,000	
Drain	1	Unit		incl above	
Pits	1	unit	\$ 15,000	\$ 15,000	
Drainage and pump station	1	unit	\$ 30,000	\$ 30,000	
Stormwater	1	unit	\$ 20,000	\$ 20,000	
Feed Pumps and Piping	1	Item	\$ 32,400	\$ 33,000	
Polymer plant and dosing	1	unt	\$ 29,500	\$ 30,000	Past quote for Emulsion Poly
Shed for Poly Plant & Storage	50	m2	\$ 1,500	\$ 75,000	Garage type
M&E Installation	30%	item	\$ 93,000	\$ 28,000	
			<b>Direct Cost Sub Total</b>	<b>\$ 455,000</b>	
P&G Contractors Risk	8%	Direct Cost Sub Total		\$ 36,400	
On Site Overheads	15%	On Work Cost		\$ 68,250	
Off Site Overheads and Profit	10%	On Work Cost + Site O/H		\$ 55,965	
Design, Tender and CM	15%	On Contract value		\$ 92,342	
Capital Cost Estimates		<b>Direct and Indirect Cost Sub Total</b>		<b>\$ 707,957</b>	
Contingency	20%	%		\$ 141,591	
			<b>Total</b>	<b>\$ 849,549</b>	

		Client: Waimakariri District Council	Job Number: 12546001			
		Job: Oxford WWTP WAS Improvement Review	Calcs By: Andrew McMaster			
		Subject: CapEx - Geobag	Checked By: Ian Ho			
			Commented:			
<b>UPGRADE OPTION 3 - Larger Geobags</b>						
		Qty	Unit	Rate	Total	Comments
<b>WAS PROCESSING</b>						
	Vegetation Removal and earthworks	1	Unit	\$ 20,000	\$ 20,000	
	HDPE liner for geobag basin	3300	m2	\$ 38	\$ 125,400	Assumes final flow requires 4 new 220 m3 bags a year with two years storage time
	Pits	1	unit	\$ 15,000	\$ 15,000	
	Drainage and pump station	1	unit	\$ 30,000	\$ 30,000	
	Stormwater	1	unit	\$ 20,000	\$ 20,000	
	Feed Pumps and Piping	1	Item	\$ 32,400	\$ 33,000	
	Polymer plant and dosing	1	unt	\$ 29,500	\$ 30,000	Past quote for Emulsion Poly
	Shed for Poly Plant & Storage	50	m2	\$ 1,500	\$ 75,000	Garage type
	M&E Installation	30%	item	\$ 93,000	\$ 28,000	
				<b>Direct Cost Sub Total</b>	<b>\$ 380,000</b>	
	P&G Contractors Risk	8%		Direct Cost Sub Total	\$ 30,400	
	On Site Overheads	15%		On Work Cost	\$ 57,000	
	Off Site Overheads and Profit	10%		On Work Cost + Site O/H	\$ 46,740	
	Design, Tender and CM	15%		On Contract value	\$ 77,121	
	Capital Cost Estimates			<b>Direct and Indirect Cost Sub Total</b>	<b>\$ 591,261</b>	
	Contingency	20%		%	\$ 118,252	
				<b>Total</b>	<b>\$ 709,513</b>	



Client: Waimakariri District Council  
 Job: Oxford WWTP WAS Improvement Review  
 Subject: CapEx - Draimad System

Job Number: 12546001  
 Calcs By: Andrew McMaster  
 Checked By:  
 Commented:

UPGRADE OPTION 4 - Draimad						
	Qty	Unit	Rate	Total	Comments	
<b>WAS PROCESSING</b>						
Concrete Plinth for Building	1	Item	\$ 25,000	\$ 25,000		
12 Bag Draimad Plant	1	Item	\$ 55,000	\$ 55,000	Brickhouse quote, add 10%	
Pumps and Piping	1	Item	\$ 32,400	\$ 33,000		
Odour bed and extraction fan	1	no.	\$ 80,000	\$ 80,000	Ventilation is required for bag storage	
Sludge Building	80	m2	\$ 1,500	\$ 120,000	Smaller building	
Internal Gantry	1	Item	\$ 50,000	\$ 50,000		
Filtrate Pump Station	1	Item	\$ 30,000	\$ 30,000		
M&E Installation	35%	item	\$ 248,000	\$ 87,000	M&E percentage increased	
			<b>Direct Cost Sub Total</b>	<b>\$ 480,000</b>		
P&G Contractors Risk	8%	Direct Cost Sub Total		\$ 38,400		
On Site Overheads	15%	On Work Cost		\$ 72,000		
Off Site Overheads and Profit	10%	On Work Cost + Site O/H		\$ 59,040		
Design, Tender and CM	18%	On Contract value		\$ 116,899		
Capital Cost Estimates			<b>Direct and Indirect Cost Sub Total</b>	<b>\$ 766,339</b>		
Contingency	20%		%	\$ 153,268		
			<b>Total</b>	<b>\$ 919,607</b>		



Client: Waimakariri District Council  
 Job: Oxford WWTP WAS Improvement Review  
 Subject: CapEx - Containerised monobelt

Job Number: 12546001  
 Calcs By: Andrew McMaster  
 Checked By: Ian Ho  
 Commented:

UPGRADE OPTION 5 - Containerised Monobelt					
	Qty	Unit	Rate	Total	Comments
<b>WAS PROCESSING</b>					
Concrete Plinth for Container Plant	1	Item	\$ 25,000	\$ 25,000	
Containerised Monobelt Plant	1	Item	\$ 240,000	\$ 240,000	Brickhouse quote
Sludge Conveyor	1	Item	\$ 18,000	\$ 18,000	Past quote. Assumed that there is an additional conveyor required to transfer sludge to bins.
Pumps and Piping	1	Item	\$ 32,400	\$ 33,000	
Odour bed and extraction fan		no.	\$ 80,000	\$ -	
IBC Bund	1	no.	\$ 5,000	\$ 5,000	
Filtrate Pump Station	1	Item	\$ 30,000	\$ 30,000	
M&E Installation	20%	item	\$ 326,000	\$ 66,000	% reduced
			<b>Direct Cost Sub Total</b>	<b>\$ 420,000</b>	
P&G Contactors Risk	8%		Direct Cost Sub Total	\$ 33,600	
On Site Overheads	15%		On Work Cost	\$ 63,000	
Off Site Overheads and Profit	10%		On Work Cost + Site O/H	\$ 51,660	
Design, Tender and CM	15%		On Contract value	\$ 85,239	Lower design %
Capital Cost Estimates			<b>Direct and Indirect Cost Sub Total</b>	<b>\$ 653,499</b>	
Contingency	20%		%	\$ 130,700	
			<b>Total</b>	<b>\$ 784,199</b>	





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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	A McMaster B Asquith	I Ho I Partington		M Dasler		9/04/21
B	A McMaster	I Ho I Partington		M Dasler		12/05/21

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Prepared for  
Waimakariri District Council  
ABN: N/A



# Oxford WWTP Sludge Thickening

20-Aug-2021  
Waimakariri Operational Support

AECOM

Waimakariri Operational Support  
Oxford WWTP Sludge Thickening

## Oxford WWTP Sludge Thickening

Client: Waimakariri District Council

ABN: N/A

Prepared by

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20-Aug-2021

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Waimakariri Operational Support  
Oxford WWTP Sludge Thickening

## Quality Information

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Date 20-Aug-2021

Prepared by Gavin Hutchison and Eliza Cowey

Reviewed by Brooke Mackley

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Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	23-Jun-2021	For Client Review	Gavin Hutchison Water Team Lead	
B	20-Aug-2021	Final Issue	Gavin Hutchison Water Team Lead	

## Table of Contents

Abbreviations and Terms	5
1.0 Introduction	6
1.1 Background	6
1.2 Scope	6
2.0 Sludge Flowmeters	6
2.1 Existing Sludge System Description	6
2.1.1 RAS Monitoring Options	7
2.1.2 WAS Monitoring Options	7
2.2 Flowmeter Options	8
2.2.1 Justification for Additional Flowmeters	8
2.2.2 Flowmeter Locations	9
3.0 Sludge Thickening	12
3.1 Option Descriptions	12
3.1.1 Operational Adjustments	12
3.1.2 MonoBelt	13
3.1.3 Henley Sludge Age Controller Unit	13
3.1.4 Retrofit Picket Fence Mixer into Sludge Holding Tank	14
3.2 Options Assessment	15
3.2.1 Risks	15
3.2.2 Other Considerations	15
3.2.3 NPV Analysis	15
4.0 Recommendations	18
Appendix A	
Oxford WWTP Process Schematic	A
Appendix B	
Calculations	B

### List of Tables

Table 1	RAS and WAS Flowmeter Proposed	10
Table 2	Current Operation versus Operational Changes Proposed for Sludge Thickening	12
Table 3	NPV Analysis Parameters	15
Table 4	Options Comparison	17

### List of Figures

Figure 1	RAS Streams Highlighted, WDC's "MLE Process Schematic, Plan 2390"	7
Figure 2	WAS Streams Highlighted, WDC's "MLE Process Schematic, Plan 2390"	8
Figure 3	Process Flow Diagram: Proposed Flowmeter Locations	11
Figure 4	Picket Fence Thickener Example	14

## Abbreviations and Terms

AECOM	AECOM New Zealand Limited
DS	Dry Solids
FM	Flowmeter
MLSS	Mixed Liquor Suspended Solids
NPV	Net Present Value
P&ID	Piping and Instrumentation Diagram
PFT	Picket Fence Thickener
RAS	Recycle Activated Sludge
SCADA	Supervisory Control and Data Acquisition
SHT	Sludge Holding Tank
WAS	Waste Activated Sludge
WDC	Waimakariri District Council
WWTP	Wastewater Treatment Plant



## 1.0 Introduction

### 1.1 Background

Waimakariri District Council (WDC) operate an activated sludge Wastewater Treatment Plant (WWTP) servicing Oxford. The plant currently disposes of Waste Activated Sludge (WAS) with no dewatering. High costs of sludge disposal overwhelm the plant's operational costs, burdening the rated population (approximately 892 properties<sup>1</sup>).

A report was prepared by GHD in May 2021 to advise WDC on sludge management options ("Oxford WWTP Strategic Plan WAS Improvement Review", referred to as the GHD Report subsequently). The proposed options exceeded WDC's available budget. The GHD Report primary recommendation comprised of a containerised MonoBelt system to achieve approximately 20% dry solids (DS). This is discussed further in Section 3.

AECOM has been engaged to investigate pragmatic and feasible, economic solutions for sludge management at the Oxford WWTP. This report provides commentary on the GHD Report recommendation and explores alternate sludge management options.

### 1.2 Scope

As per the "Oxford WWTP Dewatering Review Proposal" signed 11<sup>th</sup> June 2021, the scope of this report comprises:

- Refine the cost estimate provided from GHD study for the 'Monobelt' option based on application at the Oxford WWTP.
- Undertake an assessment of the option to relocate 'Henley Sludge Age Controller' from the Lyttleton WWTP (when decommissioned).
- Assess options for increasing the solids content of the WAS through improvements of the existing plant and/or low investment options.
- Identification of anomalies requiring further investigation.
- Complete a NPV analysis of the revised Monobelt option, and any alternative 'pragmatic' options identified as part of this study.
- Identify and report on any risks, issues, or opportunities with any proposed alternative options.
- Provided an estimated timeframe for implementation of each option.
- Provide options to improve sludge metering (item added 24<sup>th</sup> June 2021).

Following a site meeting on the 24<sup>th</sup> June 2021, the following changes were made to the scope:

- The scope for the Monobelt option review would be reduced to providing commentary on the cost estimate, not a refinement of costs.
- An assessment of options for improved sludge monitoring through flow measurements was added.

## 2.0 Sludge Flowmeters

### 2.1 Existing Sludge System Description

The Oxford WWTP has two existing flowmeters: one prior to the inlet step screen, and one post effluent holding pond. There is no quantification of sludge flows. Neither quantities of recycled activated sludge (RAS) which is returned to the biological reactors, nor WAS removed from site can be measured. The amount of sludge transported off site relies on the contractor provided volumes to be billed.

---

<sup>1</sup> Refer WDC's Activity Management Plan 2021 Oxford Wastewater Scheme, Table 2.

For an overview of the system, Appendix A shows WDC's "MLE Process Schematic, Plan 2390", note this has a number of errors.

**2.1.1 RAS Monitoring Options**

This section outlines background to inform options to provide improved monitoring of the RAS flowrates. The RAS returns to the Anoxic chamber via four streams:

1. Recycled from the Aerobic chamber. This is via a bespoke cut-out structure in the wall at the end of the Aerobic chamber. This flow cannot be metered.
2. Sludge pumped from the base of the clarifier, to the Anoxic zone.
3. Sludge gravity fed from the base of the clarifier to an above ground pump chamber. RAS is pumped back to the Anoxic Zone via a 50 mm pressure main. This pump line also has a WAS dump valve operated on a timer (WAS stream 1), this line discharges to the Sludge Holding Tank (SHT).
4. If the RAS pump flow is less than the inflow to the splitter chamber, the excess spills into the inlet pump station and returned to the head of the plant via a v-notch weir.

Figure 1 below highlights the four RAS streams. Note the P&ID has a number of errors.

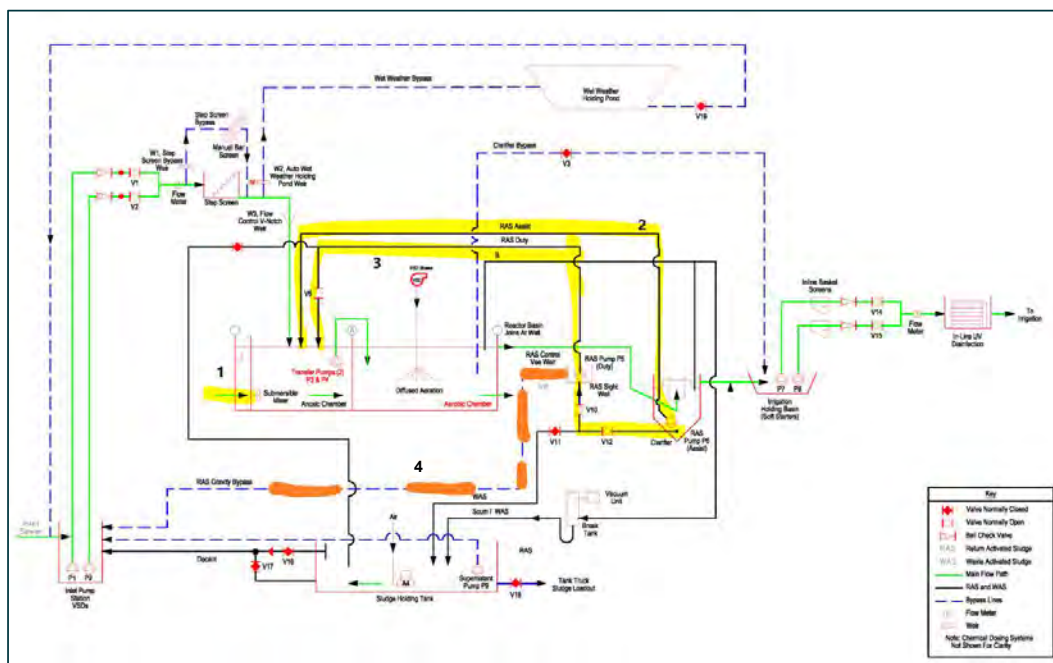


Figure 1 RAS Streams Highlighted, WDC's "MLE Process Schematic, Plan 2390"

**2.1.2 WAS Monitoring Options**

This section outlines background to inform options to improve monitoring of the WAS flowrates. The WAS stream is from the following three sources:

1. Sludge gravity fed from the base of the clarifier passes to an above-ground pump chamber (the RAS Sight Well). The pumped flow primarily passes to the Anoxic Zone (refer RAS stream 3). However, there is a valve controlled via SCADA that dumps WAS to the SHT.
2. Sludge is wasted from the Aerobic chamber via a scum offtake. This sludge is driven via a vacuum unit and a break tank. Note this flow is proportionally small.
3. Biomass is wasted directly to the SHT by a valve dump line located at the end of the Aerobic Chamber. This is controlled via SCADA on a timer.

Figure 2 below shows the three streams comprising WAS. Note the P&ID has a number of errors.

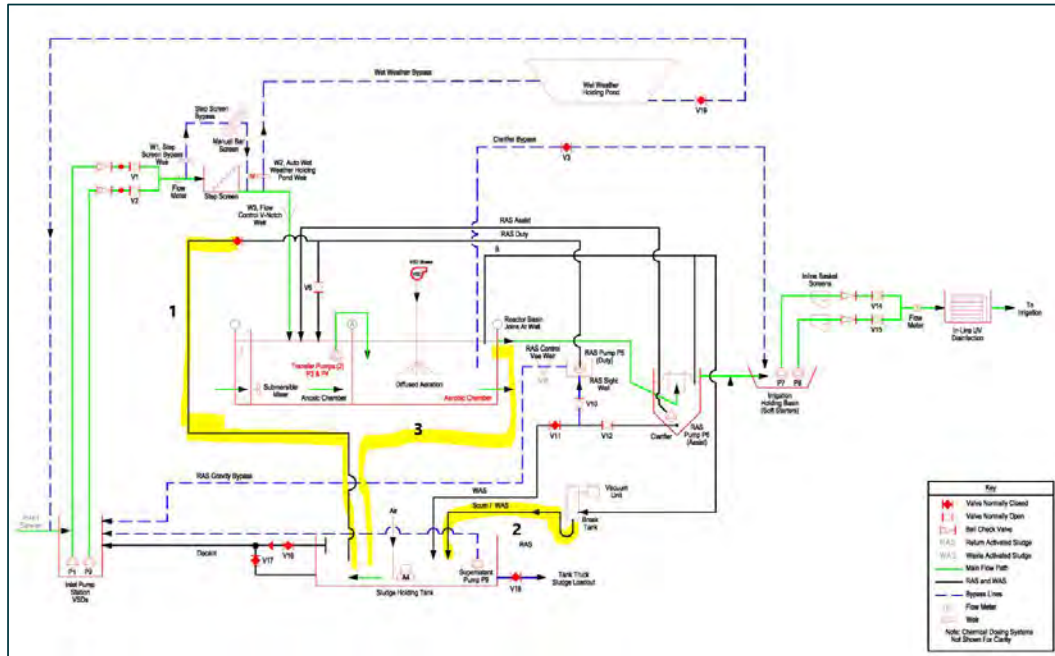


Figure 2 WAS Streams Highlighted, WDC's "MLE Process Schematic, Plan 2390"

## 2.2 Flowmeter Options

### 2.2.1 Justification for Additional Flowmeters

Considering the many existing sludge paths, quantifying these flows would provide the following benefits:

- Plant Inlet Flow**  
 Currently there is no quantification of inlet flows to the reactor. The flow control through the plant at high flows is estimated from pump operation and trial and error setting weir levels. Metering of flow to the reactor will assist management of incoming flows and inform understanding of plant performance with actual loadings.
- Waste Measurement.**  
 Current operation relies on sludge disposal costs measured per truckload by the removal service. Exact quantification of the WAS volume will assist understanding of plant operation and the accuracy of charges associated with sludge disposal.
- RAS Flows**  
 RAS flows should be proportional to plant inflows to retain healthy microbiota through the biological reactor (anoxic and aerobic chambers). Total RAS is comprised of four streams (refer to Section 2.1.1). RAS stream 1 is recycled via a cut-out in the wall between the end of the Aerobic chamber and the beginning of the Anoxic chamber, which cannot be metered. This means that the overall RAS cannot be fully quantified. RAS stream 4 is recommended to be abandoned (refer Section 2.2.2), therefore not monitored. The only advantage of metering the two pumped RAS streams is to monitor pump performance.  
  
 Any future plant upgrades should look at consolidating the RAS streams to provide better process control.
- WAS Flows and Control**  
 WAS is currently controlled via setting timers on streams 1 and 3 (refer Section 2.1.2).

The control of WAS discharge is one of the key process controls the operators can utilise to manage the mixed liquor suspended solids (MLSS) in the reactor. This is key to maintaining a high-quality effluent discharge and the settleability of sludge.

The existing process is essentially batch dumping WAS, where it is preferable to constantly discharge. However, the plant currently performs satisfactorily in terms of the quality of treated effluent.

Whilst batch dumping of WAS via valve actuation on timer typically achieves compliance for nitrate discharge, and a low solids carryover for UV performance, it has at times varied. As loadings at the plant increase in the future, the need for better process control will become more important.

The main reasons for the installation of additional flow meters for WAS streams are as follows:

- Allows for a more consistent quality of effluent.
- Allows better process control, therefore better-quality effluent.
- **System Failures Identification.**  
Where general blockages or faults occur within the sludge system, there are no flowmeters to identify the source. Due to the diverse range of sludge paths available, the plant will still operate to some extent despite irregularities. This increases operational cost due to the complexity and time required to identify and resolve issues.

### 2.2.2 Flowmeter Locations

To comprehensively quantify all flows across the plant, seven flowmeters are required in addition to the existing two.

There are seven sludge streams within the plant conveying RAS and WAS, however two streams are impractical to measure (refer Section 2.1 for descriptions):

- RAS stream 1 cannot be measured due to the bespoke cut-out return structure.
- RAS stream 4 is recommended to be abandoned by raising the v-notch weir, alternatively installing a plate to blank the overflow for use in emergencies. Because this chamber is gravity fed, the level will not exceed that of the clarifier.

Therefore, a total of two meters would be required on the pumped RAS lines to measure pump performance, and three meters would be required to measure the WAS into the SHT.

Additional flowmeters for consideration include:

- Inflow to the aeration basin. The existing flowmeter on the inlet is prior to the holding pond offtake, requiring a flowmeter upstream of the anoxic chamber inlet. This would require modifications to the pipeline between the inlet screen chamber and discharge to the anoxic zone to keep the pipe full for the flow meter.
- WAS removed from the SHT by truck. To account for the supernatant removed from the SHT, this is not totalled by the flowmeters on lines into the SHT.

A total of seven new flowmeters are therefore required to fully quantify the instantaneous sludge flows, as listed in Table 1.

**Table 1 RAS and WAS Flowmeter Proposed**

Ref.	Measuring	Flow path		Cost <sup>2</sup> and Meter size <sup>3</sup>	Priority
		From	To		
FM 1	INFLOW	INLET SCREENS	ANOXIC CHAMBER	\$15,000 DN150	2
FM 2	RAS (2)	CLARIFIER VIA PUMP NO. 2	ANOXIC CHAMBER	\$7,000 50 mm	4
FM 3	RAS (3)	CLARIFIER VIA RAS SIGHT WELL	ANOXIC CHAMBER	\$7,000 50 mm	
FM 4	WAS (1)	CLARIFIER VIA RAS SIGHT WELL	SLUDGE HOLDING TANK	\$7,000 to high 50 mm	3
FM 5	WAS (3)	AEROBIC CHAMBER	SLUDGE HOLDING TANK	\$10,000 150 mm (TBC)	
FM 6	WAS (2)	AEROBIC CHAMBER	SLUDGE HOLDING TANK	\$7,000 50 mm	5
FM 7	WAS (TOTAL)	SLUDGE HOLDING TANK OUTLET	TRUCK FOR REMOVAL	\$8,000 DN100	1

It is not a priority for WDC to install all these meters. AECOM have recommended an order of priority as follows:

- Flowmeter 7 to ensure accurate understanding and charges for sludge removal.
- Flowmeter 1 to inform real flow into the plant accounting for diversion of wet weather flows to the holding pond.
- Flowmeters 4 and 5 are of similar importance and are all required for reasons outlined in Section 2.2.1.
- Flowmeter 6 is of low priority due to the proportionally small flow.

WDC should confirm:

- Which flowmeter type will provide their operations best value, and are suitable for sludge.
- Valving arrangements to facilitate flowmeter maintenance.
- Prior to confirming the number of meters, WDC should confirm with Nairn Electrical there is sufficient capacity to bring the data back to SCADA.

Flowmeter locations are shown schematically in Figure 3.

<sup>2</sup> Cost includes purchase and installation of the meter.

<sup>3</sup> WDC to confirm diameters.

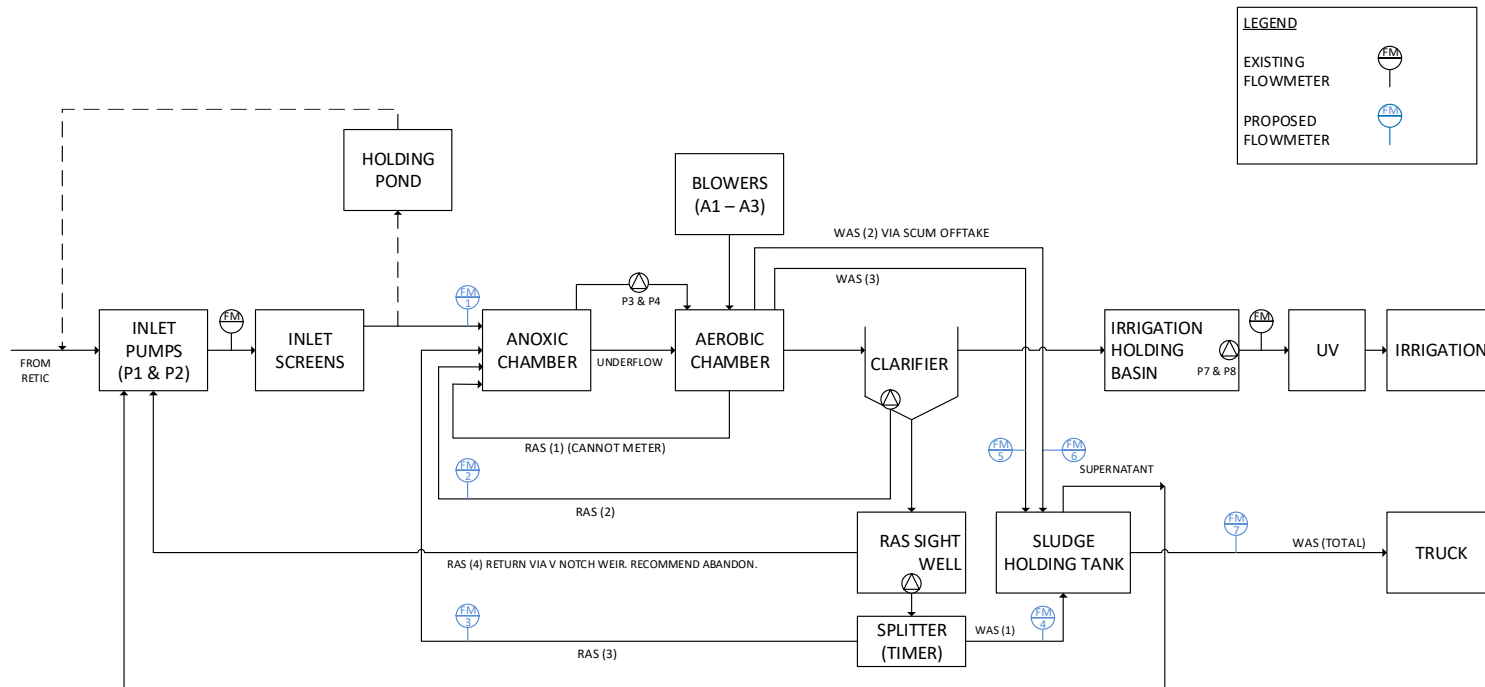


Figure 3 Process Flow Diagram: Proposed Flowmeter Locations

## 3.0 Sludge Thickening

This section reviews four options for the thickening of the WAS prior to removal from site. The ultimate goal is reduction in operational costs to positively impact Oxford rate payers. The options assessed are as follows:

- Site Operational Adjustments
- Henley Sludge Age Controller Unit
- Retrofit Picket Fence controller
- Monobelt thickener (recommend by GHD, included for comparison)

### 3.1 Option Descriptions

#### 3.1.1 Operational Adjustments

This option comprises operational changes to the current management of the stored WAS to increase the percentage of dry solids (% DS).

Current operation involves sludge transported from site twice weekly, removing approximately 40 m<sup>3</sup> per week<sup>4</sup>. A blower in the sludge tank was originally installed to run periodically to provide oxygen to the sludge. The current operation (and has been for many years) is to run the blower prior to the tankers arrival to mix the sludge.

The current process results in dilute sludge removed from site, as low as 0.2% DS.

WDC operational staff have begun to make changes to the management of stored WAS. This involves less frequent sludge removal from site to allow more time for thickening by gravity. This facilitates increased removal of supernatant pumped from the top of the sludge holding tank (which is returned to the inlet works).

No capital works are required for this option. Operational changes proposed are outlined in Table 2.

**Table 2 Current Operation versus Operational Changes Proposed for Sludge Thickening**

Item	Current Operation	Proposed Change
1	Weekly disposal of approximately 40 m <sup>3</sup> of sludge from the SHT.	Sludge disposal to occur every two weeks or more.
2	Limited opportunity for WAS settling in SHT and supernatant removal.	The increased retention time of sludge in SHT prior to disposal allows increased settling and supernatant removal.
3	No measurement of the concentration of dry solids in the WAS disposed of.	Regular dry solids testing to occur for a prolonged period of time (beyond the timeframe of this report). Testing results should inform operational practises to achieve a maximum level of dewatering without additional capital investment
4	No measured volume of WAS disposed of to the tank.	Volumes of WAS removed should be measured as discussed in Section 2.2.

Testing over a significant time period is required to confidently comment on the efficiency of changes in operation. These results are not yet available at the time of this report, therefore the analysis here reports on a range of potential outcomes. It is also recommended the operators undertake benchtop testing of the settleability of the sludge. This has the advantages of providing the operators a better understanding how the sludge settles overtime.

<sup>4</sup> The GHD Report stated there is currently 80 m<sup>3</sup> being removed from site each week. On review of invoices from Leeches Drainage Ltd the amount is only 40 m<sup>3</sup>.

Note that the GHD Report assumed 1% DS in the WAS under current operation. However, WAS transported off site is expected to be as low as 0.2% DS. It is feasible that the new operational parameters may come closer to achieving 1% DS.

The process used in this option, is allowing sludge to settle and compact, before being withdrawn from the bottom of the tank. Conventional sludge thickening includes a mechanism to slowly stir the sludge gently, thereby opening up channels for water to escape and promote densification. Conventional equipment (e.g. picket fence thickener discussed in Section 3.1.4) can achieve 2.5% DS of WAS. With no agitation and only relying on time and gravity the results are expected to be in the range of 0.3 - 1% DS. For the purpose of the NPV analysis two scenarios were considered: thickened sludge at 0.5% and 1.0%.

Consideration should be given to the risk of a build-up of gases inside the tank, particularly hydrogen sulphide and methane. An assessment of the likelihood of explosive atmospheres is not included in the scope of this report. It is recommended at minimum a review of the sludge tank area should be undertaken in line with AS/NZS 60079.10.1.2009. It would be expected the inside of the tank would be classed Zone 1<sup>5</sup>, with the outside of the tank classed as Zone 2<sup>6</sup> (at a 0.5m depth extending 3.0m from the tank). A risk assessment should be undertaken for each zone and mitigation measures put in place such as only allowing the use of intrinsically safe devices in areas classed Zone 1.

### 3.1.2 MonoBelt

The GHD review recommended the Technofangi Monobelt (supplied from Brickhouse). Essentially this is a containerised gravity belt thickener and filter press dosed with polymer to achieve sludge with 16 – 20% DS. Refer to the GHD Report for more information regarding the MonoBelt option.

The extent of dewatering provided by this option is much greater than the others explored in this report, with up to 20% DS achieved. It is important to note that for the Monobelt to operate optimally the sludge feed needs a minimum of 0.5% DS, and ideally 1% DS. At 1% DS the typical output will meet the 16 - 20% reported. The current sludge dry solid content is significantly less than this. If the trials described in Section 2.1 do not result in thickening the sludge, the operational costs will increase and there may need to be a requirement to undertake pre-thickening.

For the purpose of the NPV we have assumed the Monobelt achieves 16% DS.

The cost estimate provided by GHD appears to be conservative. There are options to reduce the CAPEX cost, particularly in the positioning of the Monobelt container at the Oxford WWTP. Locating the plant in the vicinity of the current inlet screen would minimise the amount of infrastructure required. However, due to the risk of potential pre-thickening required or a lower % DS achieved (increasing operating costs), the GHD estimate of \$800,000 has been used in the NPV assessment.

### 3.1.3 Henley Sludge Age Controller Unit

The Lyttleton WWTP, owned by Christchurch City Council (CCC) is scheduled to be decommissioned. There is an operational unit referred to as the Henley Sludge Age Controller. This unit thickens the WAS prior to removal from site. There have been discussions with CCC determining that the unit could be transferred to WDC for a nominal \$1. This has not been officially agreed, and if WDC were to proceed, further discussions would be required and a formal agreement put in place for the transfer.

The Henley unit is a stainless steel, conical tank used to encourage sludge settling. The operational manual suggests sludge can be thickened to 7% DS<sup>7</sup>. This is higher than what would be expected through gravity thickening of activated sludge. For the purpose of this analysis the maximum sludge concentration from the Henley unit has been assumed to be 2.0% DS<sup>8</sup>

The Henley unit could be placed onsite next to the SHT, where WAS could be pumped up to the unit. Supernatant would gravitate from the top of the unit to the reactor. Thickened sludge could periodically be discharged by gravity to the existing SHT awaiting removal from site.

<sup>5</sup> Zone 1 is an area in which an explosive gas atmosphere is likely to occur in normal operation occasionally

<sup>6</sup> Zone 2 is an area in which an explosive gas atmosphere is not likely to occur in normal operation but, if it does occur, it will exist for a short period only

<sup>7</sup> Discussions with CCC staff

<sup>8</sup> Wastewater Engineering, Metcalf & Eddy Third Edition references 2.5%DS is achievable. For the purpose of this analysis we have assumed 2.0%DS



The following works are required to install a commissioned Henley sludge age controller:

- Transportation of the Henley unit from Lyttleton to Oxford WWTP.
- Replacement of all electrical and controls on the Henley unit.
- Concrete pad foundation and tank supports.
- Pipework interception of the two WAS lines to a new manhole structure and pump, to pump WAS to Henley Unit.
- Gravity pipeline from Henley Unit to SHT and reactor.
- Installation of Henley Unit and commissioning.

It is estimated a budget of \$100,000 would be required to install and commission the Henley unit. Note this assumes CCC do not charge WDC for the asset transfer.

### 3.1.4 Retrofit Picket Fence Mixer into Sludge Holding Tank

An option that was developed in a meeting between WDC staff and AECOM was retrofitting a picket fence thickener (PFT) inside the Sludge holding tank. This is a device used to aid gravity settling. This comprises a typically circular tank with a central column, driving rotating arms with vertical rods. These 'pickets' facilitate the escape of trapped gas and the breaking down of buoyant flocs; the result is sludge driven to settle faster. Figure 4 below shows a typical PFT.

Typically, these systems operate on a constant flow in and out of the tank. For Oxford it would be operated in a batchwise system. This may result in retention times greater than two weeks, which may increase the risk of odours. Consideration also needs to be given to the risk of a build-up of gases inside the tank, particularly hydrogen sulphide and methane (refer to Section 3.1.1 regarding discussion on hazardous zones).

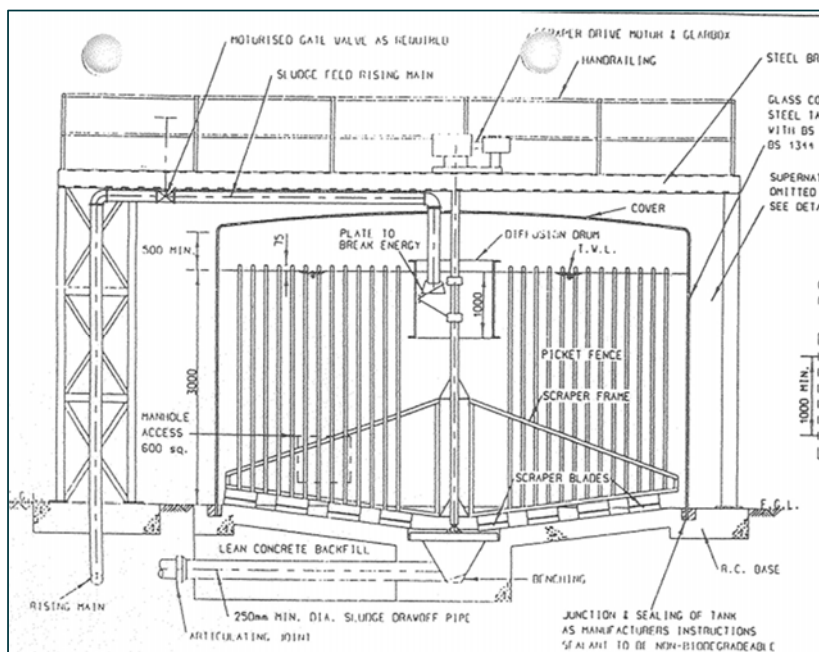


Figure 4 Picket Fence Thickener Example

Retrofitting a PFT into the SHT would require the following works:

- Fabrication of the central column support, arms, pickets, scrapers, access.
- Purchase and installation of the mixer.

- Internal tank modifications including increasing the slope of the base to guide sludge towards the central offtake.
- Modifications to the sludge inlet pipework
- Gas detection equipment and analysis to ensure safety of operation and maintenance works occurring above the tank (e.g. maintenance on the mixer).
- An intermediate sludge storage tank to facilitate plant operates during retrofit works.

For the purpose of assessing this option we have assumed dewatering achieved would be 2.0% DS. If Council was to proceed with option, it is strongly recommended that a pilot trial is undertaken.

## 3.2 Options Assessment

### 3.2.1 Risks

For the options requiring no capital investment, the risk is not achieving the predicted % DS. However, the consequence is low, at worst case there will minimum improvement in the % DS with only a minor reduction in operational costs. If this was to occur, Council could then consider implementing an alternative option.

For the options requiring capital investment, the consequence of not achieving the desired % DS is more significant. Before any capital investment, it is recommended Council undertake testing and trialling to confirm the business case for investment. This is crucial to provide certainty that the return on investment will be realised.

### 3.2.2 Other Considerations

The cost of sludge management is reflected in the volume of sludge disposed. Once the weekly volume of sludge removed from site has been confirmed following any changes to the plant, it is recommended Council negotiates a disposal rate of sludge at the CCC Bromley WWTP. CCC have indicated they would provide a rate that would be less than the standard disposal rate. Following confirmation of a disposal rate from CCC the contract for the removal of sludge from the Oxford WWTP could be tendered.

### 3.2.3 NPV Analysis

The key driver for changing the current sludge management process is to reduce annual operational costs.

The options were costed and the relative NPV of each were compared, as well as the impact to ratepayers. Parameters used in this analysis are shown in Table 3, with the outcomes displayed in Table 4.

Table 3 NPV Analysis Parameters

Item	Value	Unit	Comment
Rated Connections	892	#	Asset management plan
Volume of existing sludge	40	m <sup>3</sup> / week	Refer RF email 16/07/21
Concentration dry solids	0.2%		Assumed, Metcalf and Eddie confirmation
Density dry sludge	1.4	kg/m <sup>3</sup>	
Current disposal sludge cost	\$68.00	/ m <sup>3</sup>	Refer RF email 16/07/21
Transport to Kate Valley	\$85.20	/ m <sup>3</sup>	As per GHD report, 5 m <sup>3</sup> skip basis
Disposal to Kate Valley	\$217.00	wet tonne	As per GHD report
Polymer cost	\$9.00	/ kg	As per GHD report
Polymer requirements (MonoBelt)	5	kg / tonne DS	As per GHD report

AECOM

Waimakariri Operational Support  
Oxford WWTP Sludge Thickening

16

Item	Value	Unit	Comment
Electricity cost	\$0.1716	/ kWh	As per GHD report
Operator Hourly Rate	\$83.00		Provided by WDC
Interest on debt	3.7%		Provided by WDC
Asset Life	25	yrs	Assumed

Table 4 Options Comparison

Parameter	Base case (0.25% DS)	Operational (0.5% DS) <sup>9</sup>	Operational (1%DS)	Henley Sludge Age Controller (2.0%)	Picket Fence Thickener (2.0% DS)	Monobelt (20% DS)
CAPEX	\$0	\$0	\$0	\$100,000	\$350,000	\$800,000
OPEX (year 1)	\$142,000	\$57,000	\$29,000	\$27,713	\$30,800	\$63,600
NPV	-\$3,335,895	-\$1,334,358	-\$667,179	-\$753,616	-\$1,076,465	-\$2,299,387
Rates Impact Year One <sup>10</sup>	N/C	-\$95	-\$127	-\$120	-\$96	-\$24
Pro's	<ul style="list-style-type: none"> <li>Known results</li> <li>Less risk as the costs are known</li> </ul>	<ul style="list-style-type: none"> <li>Reduced OPEX</li> <li>No CAPEX required</li> </ul>	<ul style="list-style-type: none"> <li>Lowest NPV</li> <li>Greatest impact to sewer rate</li> </ul>	<ul style="list-style-type: none"> <li>Low CAPEX</li> <li>Low OPEX</li> <li>In use at existing activated sludge plant</li> <li>Small footprint</li> </ul>	<ul style="list-style-type: none"> <li>Low OPEX</li> <li>Proven technology</li> </ul>	<ul style="list-style-type: none"> <li>Highest %DS</li> <li>Small footprint</li> </ul>
Con's	<ul style="list-style-type: none"> <li>Highest Operating costs</li> <li>Inefficient, significant volumes of water removed from site</li> </ul>	<ul style="list-style-type: none"> <li>Possible increase risk in hazardous areas</li> <li>Risk review of hazardous areas required (in regard to areas with built-up methane gases) recommended</li> <li>Unknown performance of gravity thickening performance</li> <li>Possible increase in odours<sup>11</sup></li> </ul>	<ul style="list-style-type: none"> <li>Reaching 1% DS may not be achievable</li> </ul>	<ul style="list-style-type: none"> <li>The %DS produced needs to be confirmed. It could produce higher or lower solids</li> </ul>	<ul style="list-style-type: none"> <li>Retrofitting existing plant can have unknown costs</li> <li>The %DS produced needs to be confirmed by pilot trial. It could produce higher or lower solids</li> <li>For optimal performance the sludge feed in and out of the PFT is normally reasonably constant</li> </ul>	<ul style="list-style-type: none"> <li>Requires operator input and training</li> <li>Requires the sludge to be of a consistent %DS</li> <li>Requires %DC 0.5%DS minimum, 1%DS preferred</li> <li>May require pre-thickening of the sludge</li> </ul>

<sup>9</sup> OPEX includes for power, chemical, labour and annual depreciation costs. It excludes debt repayments.

<sup>10</sup> Based on 892 rated connections. For options requiring capital expenditure an allowance has been made for the repayment of the loan over a 20-year period at 5% interest rate.

<sup>11</sup> The sludge holding tank is currently odorous, but this does not cross the plant boundary. Whilst there may be an increase in odour this does not necessary equate to a non-compliance of the air Oxford WWTP discharge consent

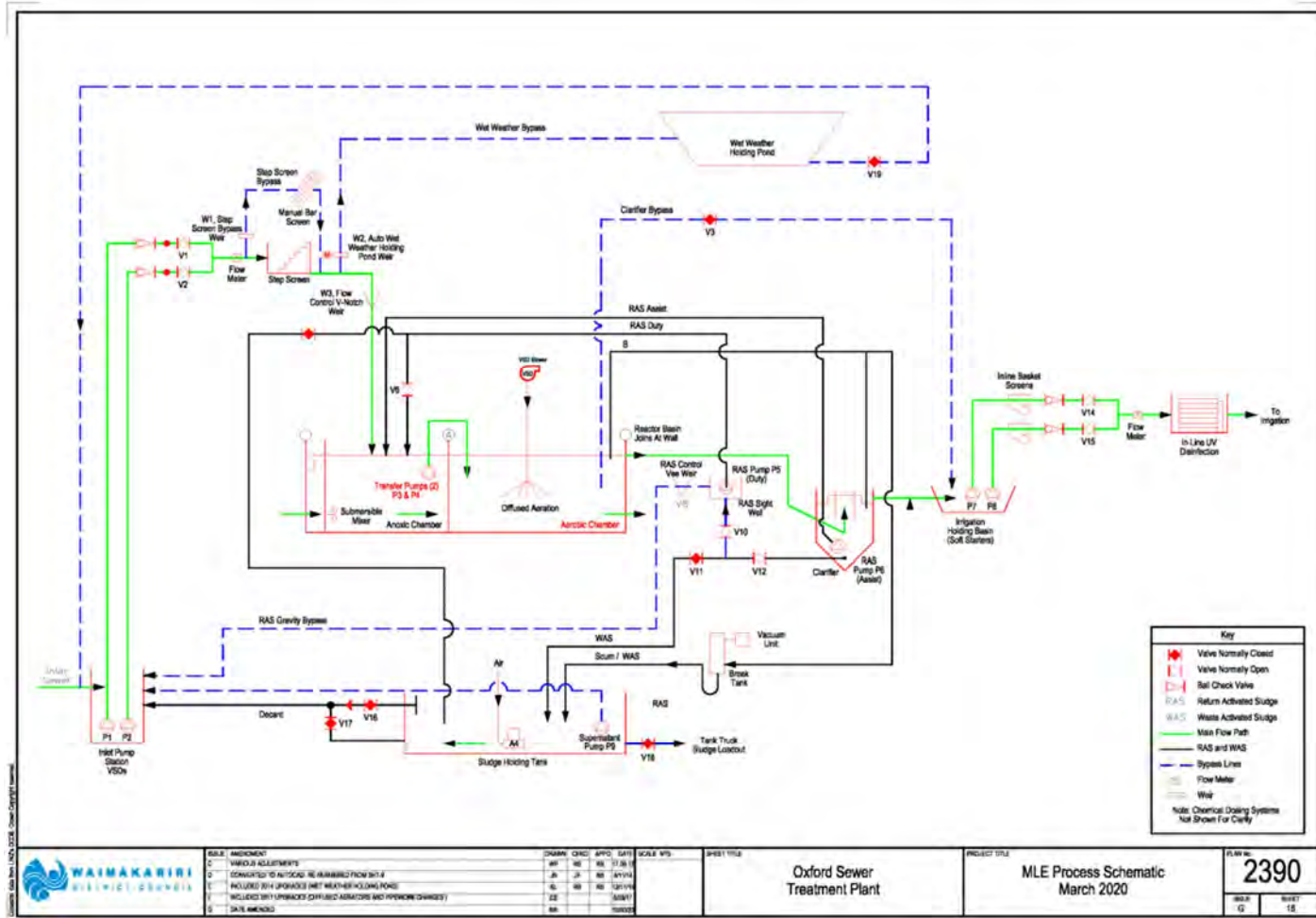
## 4.0 Recommendations

It is recommended WDC undertake the following:

- Carry out operational changes to increase the % DS and monitor regularly. This should be documented to identify the optimum % DS that can be achieved.
- Carry out bench-top analysis to determine gravity sludge settling rates. This may inform consideration of further testing using polymer dosing to achieve a higher % DS. Polymer could be used in conjunction with any options explored here. This would introduce various risks including inadequate mixing, potential uncontrolled recycle may harm biological processes, and increased hazards on site for operators.
- Undertake a review to classify the area around the sludge holding tank in line with AS/NZS 60079.10.1.2009. Following the review install appropriate signage to manage any risks.
- Undertake assessment of the Henley Sludge Age Controller now in parallel to conducting operational changes. This mitigates the risk of impact to program if the operational changes are not successful.
- If the % DS achieved through operational changes do not result in approximately 1% DS, Council should assess the option of procuring the Henley sludge age controller from the Lyttleton WWTP. If >2% DS from the Henley is deemed achievable, then Council should progress with this option.
- Negotiate a rate for the disposal of WAS at the Christchurch City Council Bromley WWTP.
- Install up to seven flowmeters in the order of priority outlined in Table 1, in conjunction with confirmation of existing SCADA capacity.
- RAS stream between the Sight Well and the Inlet Pump Station (RAS stream 4) is recommended to be abandoned by raising the existing v-notch weir, alternatively installing a plate to blank the overflow for use in emergencies.

# Appendix A

## Oxford WWTP Process Schematic



Oxford Wastewater Scheme Activity Management Plan, WDC, July 2021, Figure 2.

# Appendix B

## Calculations



**Project** Waimakariri Operational Support - Oxford WWTP Sludge Thickening  
**Project Number** 60662236  
**Sheet Purpose** Sludge Thickening Options - Annual Costs

Item	Value	Unit	Comment
Rated Connection	892	#	Asset management plan
Volume of existing sludge ( $V_{EX}$ )	40	m <sup>3</sup> / week	Refer RF email 16/07/21
Concentration dry solids ( $C_{EX}$ )	0.2%		Assumed, Metcalf and Eddie confirmation
Density dry sludge	1.4	kg/m <sup>3</sup>	
Current disposal sludge cost	\$ 68.00	/ m <sup>3</sup>	Refer RF email 16/07/21
Transport to Kate Valley	\$ 85.20	/ m <sup>3</sup>	As per GHD report, 5 m <sup>3</sup> skip basis
Disposal to Kate Valley	\$ 217.00	wet tonne	As per GHD report
Polymer cost	\$ 9.00	/ kg	As per GHD report
Polymer requirements (MonoBelt)	\$	kg / tonne DS	As per GHD report
Electricity cost	\$ 0.1716	/ kWh	As per GHD report
Operator Hourly Rate	\$		Assumed
Interest on debt	3.7%		Assumed
Asset Life	25	yrs	Assumed

$$V_{NEW} = \frac{C_{EX}}{C_{NEW}} V_{EX}$$

Sludge Thickening Option	Proposed dry solids concentration $C_{NEW}$	Disposal Volume ( $m^3$ / week) $V_{NEW}$	Sludge disposal (\$ / week)	Polymer cost (\$ / week)	Electricity Cost (\$ / week)	Labour (\$/week)	Depreciation over asset lifetime	Annual Cost	Proportion of existing cost	Impact to Ratepayers					
										Monthly Debt Cost, Year 1	Annual Debt Cost, Year 1	Year 1 Payment (debt + OPEX)	Cost of OPEX to Ratepayer, Year 1	Rate Payer Annual Savings	Rate Payer Annual % Savings
Existing, no action	0.2%	40	\$ 2,720	\$ -	\$ -	\$ -	\$ -	\$ 141,440	100%	\$ -	\$ -	\$ 141,440.00	\$ 158.57	\$ -	0%
Increased retention time in SHT, lower bound	0.5%	16	\$ 1,088	\$ -	\$ -	\$ -	\$ -	\$ 56,576	40%	\$ -	\$ -	\$ 56,576.00	\$ 63.43	\$ 95.14	60%
Increased retention time in SHT, upper bound	1.0%	8	\$ 544	\$ -	\$ -	\$ -	\$ -	\$ 28,288	20%	\$ -	\$ -	\$ 28,288.00	\$ 31.71	\$ 126.85	80%
MonoBelt	16%	0.5	\$ 151	\$ 5.04	\$ 36.04	\$ 415.00	\$ 615.38	\$ 63,573	45%	-\$ 4,722.32	-\$ 56,667.79	-\$ 120,240.94	-\$ 134.80	\$ 23.77	15%
Henley Unit	2.0%	4	\$ 272	\$ -	\$ 18.02	\$ 166.00	\$ 76.92	\$ 27,713	20%	-\$ 590.29	-\$ 7,083.47	-\$ 34,796.41	-\$ 39.01	\$ 119.56	75%
Pickett Fence Mixer	2.0%	4	\$ 272	\$ -	\$ 9.61	\$ 41.50	\$ 269.23	\$ 30,802	22%	-\$ 2,066.01	-\$ 24,792.16	-\$ 55,593.86	-\$ 62.32	\$ 96.24	61%

**Project** Waimakariri Operational  
 Support - Oxford WWTP  
**Project Number** 60662236  
**Sheet Purpose** Sludge Thickening  
 Costing Options

Expand grouped  
cells for yearly  
NPV breakdown

**Discount Rate** 3.7%  
**Inflation** 2%

Option	CAPEX	OPEX		NPV
			2021	
0 No change	\$ -	-\$ 141,440	-\$	3,335,895
1a Operational Changes 0.5%DS	\$ -	-\$ 56,576	-\$	1,334,358
1b Operational Changes 1%DS	\$ -	-\$ 28,288	-\$	667,179
2 MonoBelt	\$ 800,000	-\$ 63,573	-\$	2,299,387
3 Henley Unit	\$ 100,000	-\$ 27,713	-\$	753,616
4 Pickett Fence Retrofit	\$ 350,000	-\$ 30,802	-\$	1,076,465

**WAIMAKARIRI DISTRICT COUNCIL****MEMO**

**FILE NO AND TRIM NO:** SEW-03-09-05 / 210706109622

**DATE:** 6<sup>th</sup> July 2021

**MEMO TO:** Colin Roxburgh, Water Asset Manager

**FROM:** Jordan Cathcart, Project Engineer

**SUBJECT:** Initial Benchmarking - Oxford Wastewater Inflow and Infiltration

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**Introduction / Background**

The Oxford wastewater network experiences inflow and infiltration during times of high groundwater and wet weather. Investigations and minor works have been undertaken over the last 10 years to observe and reduce I&I in the network (190906125260[v01]). The works undertaken have included:

- Manhole inspections
  - o Identified several major issues with construction quality
  - o Residual issues – there are still known locations of poor quality workmanship that would be of high risk of I&I.
- Repairs to manholes with high I&I (approximately 8)
  - o Some general improvement in daily flow volumes following works, however difficult to determine the extent of improvement
- Construction of a holding pond to attenuate wet weather flows into the wastewater treatment plant (WWTP)
- House to house inspections and smoke testing to identify illegal connections
  - o Minor issues found
- CCTV inspections of gravity mains
- Installation of BlokAid level sensors in manholes throughout the network

Whilst the repairs have removed localised infiltration where identified there has not been an assessment of the effectiveness in reduction of flows. This is very difficult without more detailed network monitoring.

The purpose of this memo is to provide an indicative benchmark of the current level of I&I within the system. This can help determine if the focus for improvement of the performance of the network should be on the gravity pipes or the WWTP.

If the WWTP is considered to be the limiting factor, then work would be more efficient to be carried out to improve the operational capacity. If the I&I exceeds commonly accepted threshold levels, then further remedial works to the gravity network could be of value.

**Current System**

The WWTP has a maximum treatment capacity of 16 l/s, and typically operates at ~12 l/s. When inflows exceed this capacity a split chamber directs flow to the holding pond via a weir. The maximum capacity of the inlet pumps are 36 l/s.

The current peak wet weather flows (PWWF) from the gravity network using the Engineering Code of Practice (ECoP) is also calculated to be 36 l/s.

The current treatment capacity of the WWTP of 16 l/s is well below ECoP PWWF and WWF experienced in the network. However, this is offset by the holding pond to attenuate flows and direct the wastewater back through treatment once flows have subsided. The inlet pump capacity 36 l/s (treatment + holding pond) appears to be sized appropriately for ECoP.

Using the system performance analysis modelling work undertaken in 2019 (190822117309) the inlet pump flow for a 5 year, 72 or 96 hour duration is required to be 54 l/s to prevent flooded manholes due to the backing up of the treatment plant. This indicated that the current system has less than the required 5 year level of service.

For this reason the limiting factor is considered to be the treatment plant inlet pump capacity, however, the recorded inflow from the gravity network is assessed further to determine if there opportunity to reduce the impact on the WWTP.

### Rainfall Analysis

Recent rainfall events have been assessed against key performance indicators (KPIs) specified in the WaterNZ Inflow and Infiltration Control Manual V1.

Rainfall event characteristics

30<sup>th</sup> May 2021 (>100 year, 48-72 hour event)

- Inflow exceeded the 36l/s pump capacity
- Full holding pond + spillage of holding pond due to long duration

20<sup>th</sup> June 2021 (9 month, 12 hour event)

- Inflow didn't exceed 36l/s pump capacity
- Partially full holding pond

1<sup>st</sup> June 2019 (16 year, 24 hour event)

- Short operation of pumps at 36l/s
- Partially full holding pond

Table 1 compares the current I&I levels from recent events to KPI threshold levels specified in the I&I control manual. The results indicate that:

Dry weather groundwater infiltration (GWI) is above threshold levels

- This is supported by the 2014 report (140502044949[v2]) identifying a correlation between ground water level and I&I
- May be overestimated due to the averaged inflow data not showing the true low flow.

Peaking factor (SWI) is approximately at the threshold level

- Difficult to determine the peak of the I&I for large events due to the inlet pump capacity at the WWTP 'flattening' the peak flow.
- For this reason the SWI may be underestimated.

Volume of I&I experienced in network (RDII) is lower than the threshold, however increases above threshold when the ground water level is elevated

- The location of the flow meter means that the total volume is overestimated if the holding pond is utilised (double counting)
- For this reason the RDII volume % may be less in reality

Table 1 Oxford Wastewater KPI Threshold Comparisons

KPI	Typical Value	Threshold Value	Rainfall Events			Comment
			20-Jun-21	30-May-21	1-Jun-19	
ARI		N/A	9 mth, 12 hr	>100 yr, 72 hr	16 yr, 24 hr	
<b>Dry Weather (Groundwater) Infiltration</b>						
GWI <sub>1</sub>	<20%	20%	<b>27%</b>	<b>27%</b>	<b>27%</b>	Higher than threshold - may be due to averaged inflow data
GWI <sub>2</sub>	170 - 270	280 l/p/d	174 l/p/d	174 l/p/d	174 l/p/d	OK
<b>Rainfall Derived Inflow and Infiltration Volume</b>						
RDII <sub>1</sub>	<20%	10%	<b>12%</b>	6%	2%	Lower than threshold unless already high GW. May be overestimated due to double counting of holding pond volume
<b>Peak Wet Weather Flows (PWWF) – Peaking Factor</b>						
SWI <sub>1</sub>	<5	8	7.11	<b>8.89</b>	6.67	May be underestimated due to inlet flow capacity

Several of these KPIs have significant uncertainty regarding the assumptions made and should be treated as a general guideline only.

## Conclusion

Future rainfall events will continue to be assessed against the KPI threshold values using the BlokAid loggers and SCADA data to develop a more substantial trend in the level of I&I for the gravity network.

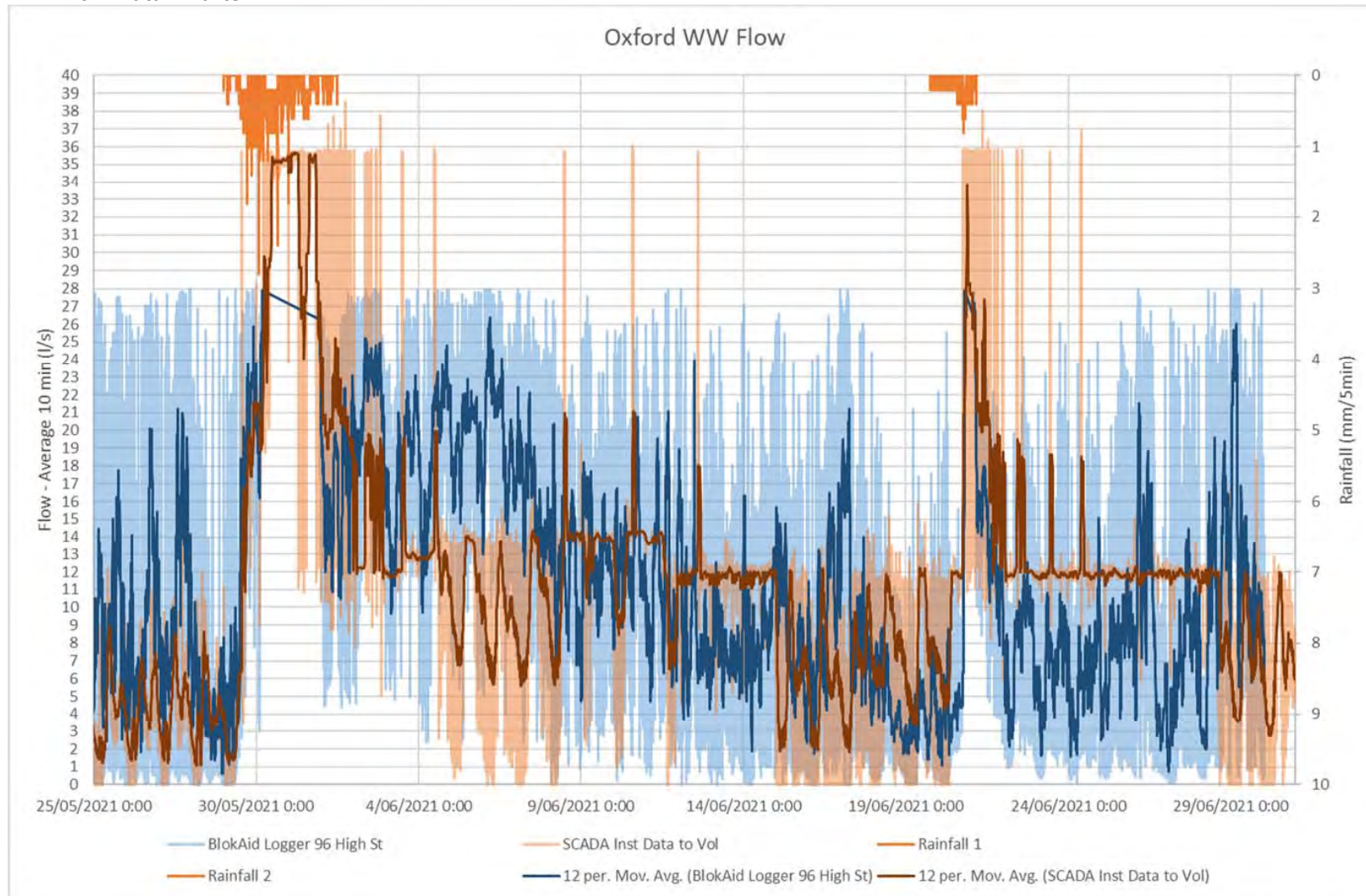
The results from the rainfall events assessed indicate that the KPI parameters are within the general magnitude of the threshold values and therefore can be considered inconclusive as a primary driver to whether additional work should be carried out. It is also important to note there is uncertainty within the assumptions and data used.

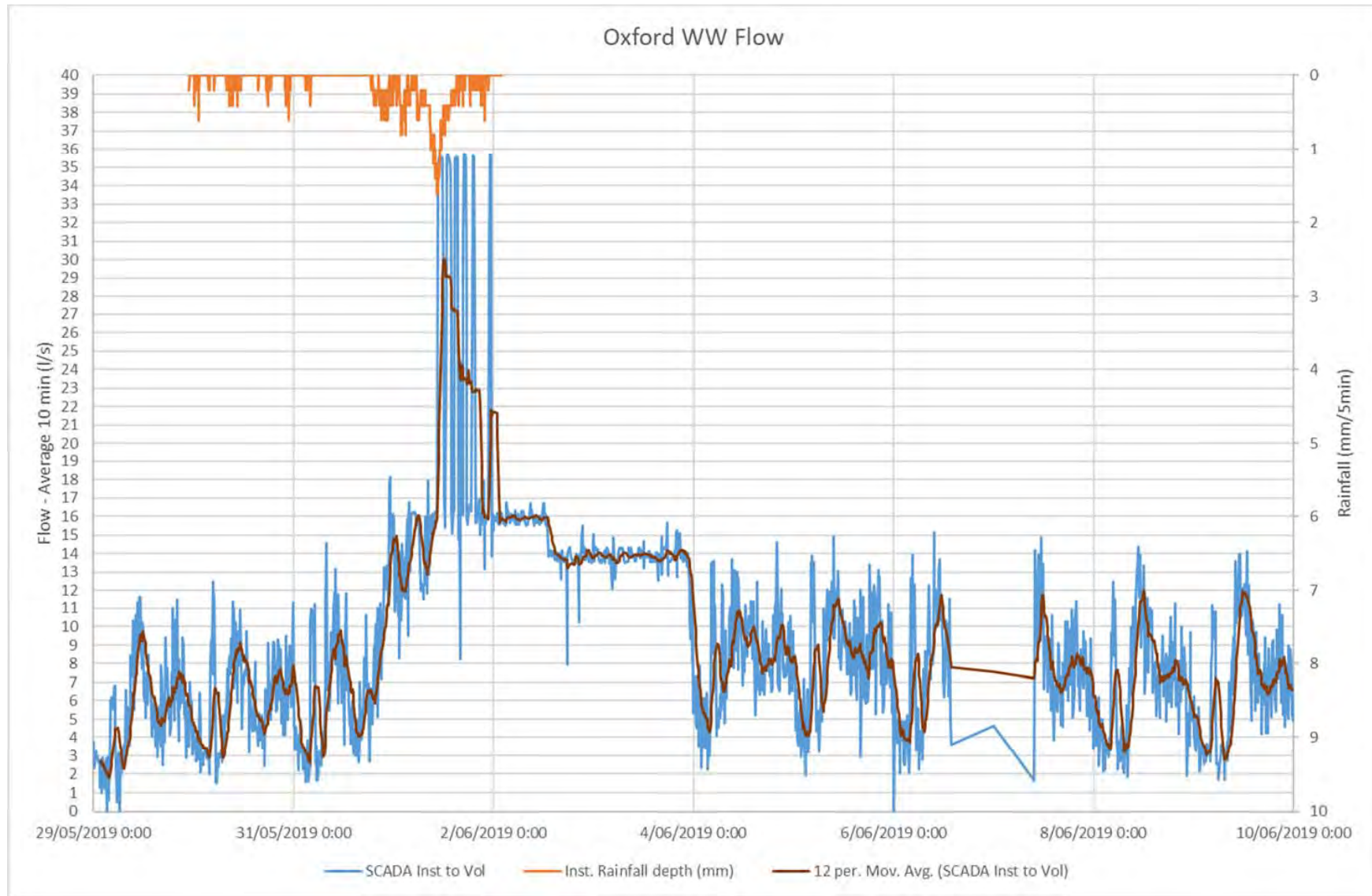
If remedial works are to be carried out in the network a trial of the key areas already identified from CCTV, smoke testing and manhole inspections is recommended, and the KPI value reassessed following work to determine the effectiveness of the solution. Examples of works could include removal of direct stormwater connections, removal of manhole vents and repair of poor quality manholes.

I&I remedial works would likely be most cost effective to focus on the SWI threshold, representing the fast response inflow into the WWTP. This would reduce the risk of the inlet pumps being overwhelmed and backing up in the network as well as decrease the overall volume of RDII. GWI is generally more difficult to locate and expensive to remedy, so should be considered secondary until more information is gathered.

Further investigation could use targeted CCTV directed from the BlokAid logger data that has identified areas of uncharacteristically high water level during rainfall.

## Appendix A: Flow Data Charts





## Appendix B: KPI Calculation

I&I Control Manual Vol 1. Section 6	Table 6-1 and 6-2		
	Key Performance Indicator	Typical Range	Threshold Value
<b>Dry Weather (Groundwater) Infiltration</b>	GW1 <sub>1</sub>	< 20%	20%
<i>GW1 1 = GW1 (80% of minimum flow) / ADWF</i>	GW1 <sub>2</sub>	170 - 270 l/p/d	280 l/p/d
Returns %	RDII <sub>1</sub>	< 20%	10%
	SWI <sub>1</sub>	< 5	8
<i>GW1 2 = ADWF (measured) / Population (theoretical)</i>			
<i>Returns l/person/day</i>			
<b>RDII Volume</b>			
<i>RDII1 = Volume of RDII (measured) / Rainfall Volume (measured)</i>			
Returns %			
<b>Peak Wet Weather Flows (PWWF)</b>			
<i>SWI 1 = PWWF (measured) / ADWF (measured)</i>			

20th June 2021

Calculation Inputs	Units	Value	Note
Minimum Flow	l/s	1.5	Inst moving av
ADWF	l/s	4.5	Flow Data Analysis/inst moving av
ADWF	l/day	388800	18/06/2021
PWWF	l/s	32	Max Flow Recorded - may be higher
Average Dry Weather Volume	m3	3110.4	For rainfall duration
Wet Weather Volume	m3	9923.2	For rainfall duration + time to drain holding pond?
Rainfall Depth	m	0.0474	Measured
Catchment Area	m <sup>2</sup>	1182378	From model div 2 for excess area
Population	people	2230	

30<sup>th</sup> May 2021

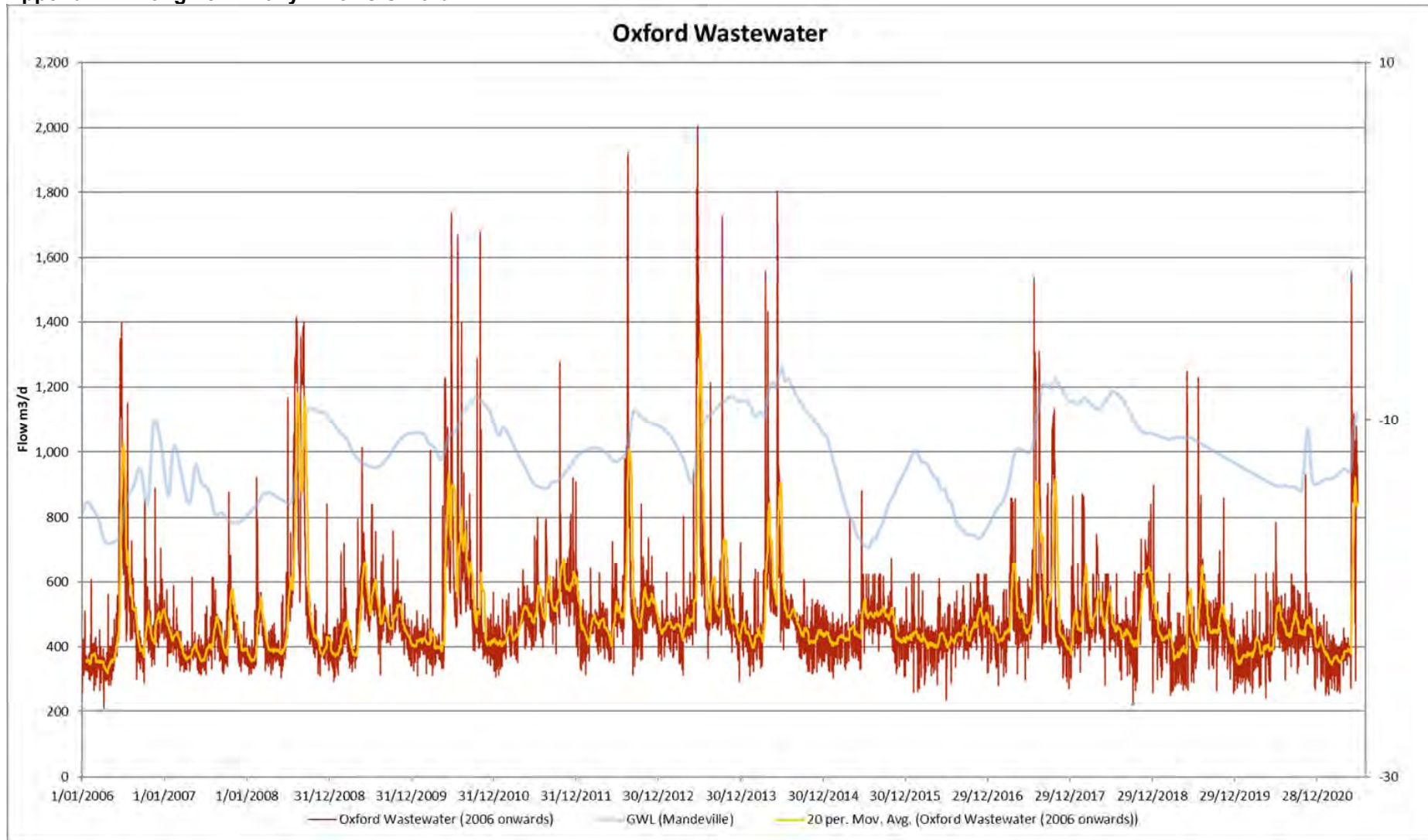
Calculation Inputs	Units	Value	Note
Minimum Flow	l/s	1.5	Inst moving av
ADWF	l/s	4.5	Flow Data Analysis/inst moving av
ADWF	l/day	388800	18/06/2021
PWWF	l/s	40	Max Flow Recorded - may be higher
Average Dry Weather Volume	m3	5832	For rainfall duration
Wet Weather Volume	m3	22310.1	For rainfall duration + time to drain holding pond?
Rainfall Depth	m	0.229	Measured
Catchment Area	m <sup>2</sup>	1182378	From model div 2 for excess area
Population	people	2230	

1<sup>st</sup> June 2019

Calculation Inputs	Units	Value	Note
Minimum Flow	l/s	1.5	Inst.
ADWF	l/s	4.5	Flow Data Analysis/inst moving av
ADWF	l/day	388800	18/06/2021
PWWF	l/s	30	Max Flow Recorded - may be higher
Average Dry Weather Volume	m3	1360.8	For rainfall duration
Wet Weather Volume	m3	4123.15	For rainfall duration + time to drain holding pond?
Rainfall Depth	m	0.121	Measured
Catchment Area	m <sup>2</sup>	1182378	From model div 2 for excess area
Population	people	2230	



Appendix C: Long Term Daily Inflows Oxford



**WAIMAKARIRI DISTRICT COUNCIL****REPORT FOR DECISION****FILE NO and TRIM NO:** RDG-22-01, DRA-16-03 / 210817135255**REPORT TO:** COUNCIL**DATE OF MEETING:** 7 September 2021**AUTHOR(S):** Gerard Cleary – Manager, Utilities & Roading**SUBJECT:** May 2021 Flood Event and Emergency Works - Updated Costs**ENDORSED BY:**  
(for Reports to Council,  
Committees or Boards)

  
Department Manager


  
Chief Executive
**1. SUMMARY**

- 1.1 In July 2021 Council considered a report on the May flood event and approved un-budgeted expenditure of \$3.5 million to respond and repair damaged infrastructure. This further report is to provide an update and to confirm budgets for completing these repair works, as well as advise of the rating impact.
- 1.2 The rainfall event which occurred over the weekend of 29<sup>th</sup> to 31<sup>st</sup> May resulted in sustained damage to Roading and 3 Waters infrastructure in the district. A Canterbury wide State of Emergency was issued on 30<sup>th</sup> May.
- 1.3 The highest rainfall quantities in the Waimakariri District were recorded around the foothills of Oxford and Okuku, with coastal areas showing lower-level rainfall levels. Coastal areas however were affected by swollen river levels and high tides, causing backflow of flood water into lower lying areas.
- 1.4 Work has been continuing since the flood event to address issues in the network and to restore infrastructure. This has included repairing underground services, roads, bridges, culverts, slips and washouts from overland flow, and in some locations this work is still ongoing.
- 1.5 The updated estimate to complete the Emergency Works repairs is **\$2.82 million**.
- 1.6 Attachments:
- i. Report - May 2021 Flood Event and Emergency Works Update (TRIM no. 210625103046)

## 2. **RECOMMENDATION**

THAT the Council:

- (a) **Receives** Report No. 210817135255;
- (b) **Approves** budget of \$2.82 million in responding to the flood event and recovery from the flood damage as follows:

<b>Asset Area</b>	<b>Budget for Approval \$</b>
Water	Nil
Wastewater	Nil
Drainage	Nil
Roading (GL 10.270.588.2442)	2,640,000
River Flood Works	Nil
Greenspaces (GL 10.537.050.1688)	166,000
Property (GL 10.163.739.2570)	5,250
<b>TOTAL</b>	<b>\$2,811,250</b>

- (c) **Notes** that the Roothing budget will be funded partially by Waka Kotahi (estimated \$1.589m subject to approval) and partially from general rates (estimated \$1.051m) which will be loan funded;
- (d) **Notes** that the Greenspace and Property budgets will be funded from general rates (estimate \$171,250) which will be loan funded;
- (e) **Notes** that the total rating impact from this additional budget, less the Waka Kotahi co-funding, is \$3.15 per ratepayer or 0.10%;
- (f) **Notes** that staff are continuing to work with Waka Kotahi, insurers and other external parties to secure funding for the works where available;
- (g) **Notes** that a separate report has been prepared covering the Mountain Road flooding affecting the Oxford Rural No.2 water supply, therefore that budget request is not covered within this report (refer report no. 210723120988);
- (h) **Circulates** this report to all Community Boards for information.

## 3. **BACKGROUND**

- 3.1. The flood event in May was caused by significant rainfall over a three-day period which resulted in damage to Council's infrastructure assets as outlined in the report presented to Council in July 2021 (refer to Attachment i).
- 3.2. Since this time work has continued to address damage and undertake repairs.
- 3.3. While good progress has been made however it is noted that in some locations this work is still ongoing and is likely to continue in the short term.

3.4. **Roading**

3.5. Work has been continuing to address damage to infrastructure as below:

- Lees Valley – Repairs to slips, replacement of bridge approaches, scour protection at bridges and river training as outline in Section 3.5 below.
- Horsford Downs Rd – Repair of two bridge approaches completed.
- Harewood Rd Bridge – Repair of scour damage at the abutment completed.
- Ashley Bridge – Repair of scour damage at the abutment not yet undertaken.
- Okuku River Bridge - Repair of scour damage at the abutment not yet undertaken.
- Poyntzs Rd Bridge – Repair of scour damage at the abutment not yet undertaken.
- Steffans Rd Bridge - Repair of scour damage at the abutment completed.
- Makerikeri Rd Bridge - Repair of scour damage at the abutment completed.
- Coopers Creek Bridge - Repair of scour damage at the abutment.
- Island Rd Bridge - Repair of scour damage at the abutment completed.
- Road scour and culvert wash outs repaired in various locations completed.
- Repair of river fords on the Eyre River yet to be completed.

3.6. All fords have remained closed across the district since the floods due to both ongoing rain and damage sustained in the fords. Flows in the river have not reduced enough to allow for the fords to reopen to date. This is reflective of on-going rain which has occurred around the district.

3.7. It is also noted that the floods deposited a significant amount of shingle into the Eyre River particularly, which Environment Canterbury (ECan) have been working to move within the river bed. As such work to repair damage around the fords is being undertaken in conjunction with this ECan work and is likely to continue into September.

3.8. Post flood inspections have been completed on all larger bridges and debris removed from the upstream side of bridges where requires.

3.9. Grading is underway on unsealed roads and there are currently three graders operating on the network to address issues with damage and potholing due to ongoing wet weather and saturated pavements.

3.10. Cost estimates have been updated as the full extent of damage has been assessed and Rooding Flood Emergency Works costs have been charged to GL 10.270.588.2442

3.11. Lees Valley and Okuku Pass Rd

3.12. The road access into Lees Valley was severed in numerous places during the flooding event. In particular all access to the valley was cut off at a very large slip approximately 5km from Ashley Gorge Road, at three bridges throughout the valley, and at a ford washout on Okuku Pass Road.

3.13. At the time of the previous report only two of the three slips had been identified and as such there has been additional cost to restore access to Lees Valley and repair the third slip. The total estimated costs including repair of three slips, bridge approach reinstatement, river training and professional fees is \$1.42 million.

3.14. Since the previous report to the Council, there has been a significant amount of work carried out on the Lees Valley Road, firstly to get it open to traffic, and secondly to restore its resilience and condition to the original level. The works that have been completed to date includes:

- 3.14.1. Installing a Mechanically Stabilised Earth (MSE) wall at approximately 4km from Ashley Gorge Road. This was installed where scour over the road had undermined the carriageway to approximately halfway across. The wall is effectively backfill wrapped in geogrid, with several ground anchors to provide longer term stability. Due to the speed that was required, and the lack of a stable base, this was the most appropriate option.
  - 3.14.2. Cutting a new road above a major slip, at approximately 5km from Ashley Gorge Road. This was the most significant outage for the road. The solution involved cutting a new road up and over the adjacent ridge, with properly designed banks, benches, and drainage swales. The end result is a road of similar quality and level of service to the old road, which is far enough away from the head of the slip to provide some resilience.
  - 3.14.3. Installing a new piled wall, which is also supported by ground anchors at approximately 14.8km from Ashley Gorge Road. This was installed where scour over the road had undermined the carriageway to approximately halfway across. The solution chosen included timber lagging between steel piles, all anchored into the native ground with ground anchors. This was chosen as there were very poor foundation conditions with the steep downhill slope. As we had more time to plan, a more robust solution with a longer design life was chosen.
  - 3.14.4. Installing two new larger and longer culverts, to increase capacity in areas where previous events have caused flooding and scour issues. Both culverts were also in locations where the repair works had resulted in a very tight bend, which would make it difficult for truck and trailer movements. In one instance, the implications of overtopping are now considerably greater, due to the presence of the upgraded piled wall noted above. In addition, there were two other instances where existing culverts had new lengths added to ensure an appropriate turning circle.
  - 3.14.5. For the full length of the road, the contractors have carried out debris removal from slips, repair works on the water tables, grading and metalling. This has been for the purpose of restoring the road to the previous standard.
  - 3.14.6. At several bridges, the contractors have carried out extensive river retraining and approach protection. This has included clearing out the flow paths, reinstating river channels where they have moved, rebuilding gravel approach protection, and some realignment of vegetation protection. This work has been for the purpose of reinstating the previous level of resilience. In particular this work has taken place at Top Ashley, Whistler, Five Gullies and Gillespie's bridges.
  - 3.14.7. In addition to the Lees Valley Road, works have occurred on both the Council and the Hurunui District Council's section of Okuku Pass Road. This work has included general tidying of the full length, with a more significant repair required at the Chinatown Ford.
- 3.15. The works that are still planned include
- 3.15.1. Gabions - the southern (near side) approach at Whistler Bridge is very exposed to ongoing river scour, and was previously protected by gabions. These have now completely washed away, leaving about 50m of roadway very susceptible to even small river freshes. The Council's professional services consultants and the contractor have been working to design an appropriately robust solution. This work is planned in the immediate future.
  - 3.15.2. Rock work - the abutments at both ends of Whistler Bridge, and at Five Gullies Bridge are exposed through lack of robust rock protection. These abutments need re-shaping and rebuilding with rock armouring. This work is planned in the immediate future.

- 3.15.3. Willow walls - there are several sites along the road where small under-slips have affected the resilience of the road, without directly affecting the ability of vehicles to pass. These sites are not critical for the road to be open, but it is important that these are protected from further scour. A relatively modest expenditure of between \$10,000 and \$20,000 per site would avoid costs many times larger if these slips worsened. This work is proposed for the early spring.
- 3.16. Okuku River (Riverside Rd & Inglis Rd)
- 3.17. The Okuku River broke out of its flow path at the bend in the river near 44 Inglis Road cutting a new flow path to the south across private property and both Riverside Road and Inglis Road before re-joining the main river downstream of 450 Riverside Road.
- 3.18. The residents in the vicinity of the flooding were evacuated from their residences.
- 3.19. The extent of the flooding was assessed and discussed with ECan staff. Emergency works were undertaken by Ecan to divert the river and Council agreed to contribute \$15,000 towards the cost of the works.
- 3.20. Since this time ECan have sourced additional funding towards willow removal, and this work will be programmed in as resources become available.
- 3.21. Staff have also met with Ecan staff to discuss what options are available to residents for longer term protection. These options are currently being developed by ECan staff and will be presented to residents via a letter. The residents will provide advice back to ECan who will then include any additional rating provisions, preferably in time to be included the next Annual Plan.
- 3.22. Council staff have separately met with the residents on a number of occasions to discuss other issues. The Council carried out Rapid Impact Assessments as part of the recovery, and based on this, some additional contributions to assist with damage recovery have been agreed. Staff are still working with residents in the area to finalise any additional recipients of these contributions.
- 3.23. Pines Kairaki - Beach Road
- 3.24. At the time of the flooding, the flap gate became stuck open which caused an issue for several days. This has since been remedied, with no further issues.
- 3.25. ECan have budgeted a significant upgrade to the headwall structure, as it is acknowledged that the current arrangement has a number of deficiencies. This was originally intended in the 2020/21 financial year, but was delayed due to their Shovel-Ready funding work taking priority. However, it is now back on the ECan programme, to be completed in 2021/22.
- 3.26. It is worth noting that the upstream headwall of the culvert is badly cracked, and so it will be prudent for the Council to carry out upgrade works at the same time. The extent of this, and the cost has not yet been determined however there is an allowance to undertake this work within the current Roding Bridge Component Renewal budget.
- 3.27. A meeting is planned with ECan and WDC staff for the 30 August 2021 to discuss and coordinate the proposed modifications to the culvert, flapgate and stopbank at Kairaki Creek / Beach Road.
- 3.28. The cost to block off the outlet pipe and deploy a large capacity temporary pump during the May 2021 was \$36,000. This work was organised by WDC on behalf of Ecan. ECan

have confirmed that they will cover the cost of this work, although WDC has not yet invoiced them for this work.

3.29. Smarts Road

3.30. Since the flood event, the Council has been approached by residents of Smarts Road and Feathers Road about overland flooding that caused an issue on their properties. A meeting was held with the residents, and attended by the Mayor and staff.

3.31. As a result of this a small investigation project has been set up, to understand the issues and options. This work is now underway. The intention is that the staff will bring a report to the Council for a decision in time so that any budgetary implications can be included in the Annual Plan.

3.32. Urban Stormwater

3.33. Temporary pumps were deployed to Dudley Drain, Feldwick Drain and McIntosh Drain in advance of this event. The cost to deploy and operate these pumps during the event was \$20,000, which was funded from existing budgets.

3.34. During the event additional pumps were deployed to Kiln Place and Cridland Street West, Kaiapoi and Swindells Road and the Waikuku Beach campground in Waikuku Beach. Additional support was also obtained from OnGrade to assist with checking grills, sumps and flapgates during the event as maintenance staff were stretched. The total additional unbudgeted cost for the urban stormwater response was \$40,000. This however can be covered by the Kaiapoi drainage maintenance account which was 85% spent in 2020/21.

3.35. Kiln Place

3.36. Observations during the event indicated that the Kiln Place issue may have been related to the stormwater pipeline through Blue Skies holding water. Subsequent investigation work, undertaken as urgent work, identified a significant blockage at the downstream end under the railway line which has now been removed. This required substantial work including uncovering manholes, pumping down the system, CCTV inspection and removing the blockage.

3.37. The total cost to undertake this work was \$138,000, of which \$54,000 has been charged to the Kiln Place Drainage Upgrade project for the replacement of the access culvert at the outlet of the stormwater system through Blue Skies, and the remaining \$84,000 has been charged to the Kaiapoi Urban pipelines maintenance GL. This budget was overspent in 2020/21, however the total Kaiapoi drainage maintenance budget was underspent at 85%. It is anticipated that the remaining costs in 2021/22 can be adsorbed within the overall Kaiapoi drainage maintenance budget, similar to last year.

3.38. It is however intended to approach Kiwirail about contributing to the costs associated with removing the blockage from the pipe under the railway line, which is considered to be a Kiwirail asset that they are responsible for maintaining. This potential could offset the additional costs against the Kaiapoi drainage budget by approximately \$20,000.

3.39. Further Investigations

3.40. Council received a total of 192 drainage related service requests for the event on the 30<sup>th</sup> & 31<sup>st</sup> May 2021 and a further 53 service requests for the event on 20<sup>th</sup> June 2021. Each of these requests have been responded to, but will be assessed to determine if any further maintenance or investigation is warranted.

- 3.41. The following areas have already been identified for further investigation. It is noted additional localised areas will be added to the list as the service requests are worked through.

Kaiapoi

- Kiln Place – Blue Skies Pipeline Investigation (underway)
- Cridland Street West – Pipeline condition and capacity assessment

Waikuku Beach

- Waikuku Beach Campground – Extension of stopbank (led by ECan)
- Swindells Road – Pipeline condition and capacity assessment
- Collins Drive – Flapgate issue
- Waikuku Beach Road – Flooding assessment
- Kiwi Ave Reserve – Pipeline condition and capacity assessment
- Waikuku Beach Domain – Drainage assessment

Oxford

- Church Street / Burnett Street – Drain capacity assessment
- Pearsons Drain (Bay Road & Burnett Street) – Drain capacity assessment

- 3.42. A community meeting was held with the residents of Kiln Place the 11 June 2021 and a community meeting was held for Waikuku Beach residents on 6 July 2021. A dedicated webpage has been set up (refer <https://www.waimakariri.govt.nz/services/water-services/stormwater/drainage-works>).

- 3.43. A further report will be brought to the Utilities & Roading Committee on the full assessment of service requests and the outcome of the proposed additional investigation work. This will include any additional budget implications for any further upgrading work identified as part of the investigation work.

3.44. **Rural Land Drainage**

- 3.45. Generally, the drains in the rural drainage areas of the district functioned well. The following repair works have been required as a result of the event:

- Ohoka Stream – Tree Removal
- Waikuku Stream – Tree Removal (x2) and bank repairs
- Deep Creek – Drop structure repairs and debris removal from flood gates
- Mounsey Stream – Tree removal and bank repairs

- 3.46. Most of the repair work was undertaken from existing operational budgets (estimated to be about \$25,000). The Mounsey Stream bank repairs work have now been scoped and are estimated to cost approximately \$15,000, which is less than the previous initial estimate of \$50,000. These works will be charged against the Oxford Rural Drainage annual drain maintenance account which has an annual budget of \$23,000. It is expected that this account will be over budget for the year, however the account balance on the Oxford Rural drainage scheme is in surplus by about \$90,000, therefore the account can absorb these additional costs.

3.47. **Stockwater**

- 3.48. The syphon under the Eyre River on the Main Race (MR8) near Warrens Road, scoured out and washed away during the event. This syphon comprises of twin 1,500mm Aluflo culverts about 150m in length. The old stockwater syphon was re-activated to provide continuity of stockwater flows.



- 3.49. A section of the water race system adjacent to the Eyre River between Carleton Road and Steffens Road (Race R7) suffered bank damage and washed out. This section is currently isolated, with a few downstream properties not receiving stockwater.
- 3.50. The damaged syphons and bank collapse will be replaced by Waimakariri Irrigation Limited. As these works are for irrigation purposes, they have confirmed that they will not be seeking any contribution from Council for the repair.
- 3.51. It is noted that both these repairs are taking Waimakariri Irrigation Ltd longer to implement than first anticipated due to the continuation of high river flows and delays with the supply of materials into New Zealand.

3.52. **Wastewater**

- 3.53. Given the nature of the event the wastewater reticulation system generally performed well. The total cost of our wastewater response, which predominantly involved deploying sucker trucks, cost approximately \$15,000 and was funded from existing operational budgets.

3.54. **Water**

- 3.55. The following key points can be made about impacts on the water supply system:

Source Water Quality

- 3.56. There were impacts upon the raw water quality on the Garrymere scheme, beyond the design limits of the treatment system. This contributed to the treatment plant not meeting protozoal compliance for the recently completed 2020/21 compliance year. Once the surrounding water quality returned to normal levels, the turbidity of the raw water reduced back to normal levels, and the plant has been operating within design limits since this time.
- 3.57. Additional flushing and sampling were undertaken on the scheme, with the value of work being charged by the Water Unit to the code that was set up being \$2,415.20, which was charged to GL10.321.684.2480

Waikuku Beach Campground Flooding

- 3.58. As reported previously, there was minor electrical damage at the Campground water headworks at Waikuku beach. This has since been repaired.
- 3.59. The value of this repair work was \$1,700, charged to GL10.305.684.2480

Oxford Rural No.2 - Coopers Creek

- 3.60. There was a substantial amount of infrastructure damaged surrounding the Coopers Creek headworks, and connection across to Mountain Road. Staff have undertaken an options assessment, and recommended that this headworks be abandoned, and the Mountain Road properties connected to the Oxford Rural No.1 water supply.
- 3.61. There were some immediate works undertaken to repair damage, and install a replacement pipe beneath Coopers Creek at Mountain Road. The value of this work is approximately \$20,000. As the majority of these costs were attributed to renewing a section of pipe that was previously fixed to a bridge, with a new section beneath the stream (following damage to the bridge), it is proposed that the costs associated with this be transferred to the Oxford Rural No.2 pipeline renewals budget, which can accommodate these costs.

- 3.62. The reason that the Oxford Rural No.2 pipeline renewals budget can accommodate these costs, and the Bush Road pipe renewal costs (see below) is that a budget had been established to renew pipe between Mountain Road and Coopers Creek this financial year. Given the change in long term strategy for this area as a result of the flood damage, the planned renewal is no longer required, hence the proposal to use existing renewals budget to cover these unplanned renewals.
- 3.63. For the long-term strategy for infrastructure in this area, the full options assessment, recommendations, justifications, and budget request are covered separately in report No. 210723120988.

Oxford Rural No.2 - Bush Road Pipe Exposed

- 3.64. On Bush Road, a 200mm diameter PVC main was found exposed in the base of the drain, due to scour in the surrounding area. This section of pipe was recently replaced at a lower depth with greater cover, and in high density PE. The full cost has not come through yet, but this is expected to be approximately \$30,000.
- 3.65. While this has been charged to a flood related GL currently, as this is a capital renewal, it is proposed that these charges be transferred to the Oxford Rural No.2 Pipeline Renewals budget for the current financial year, which has sufficient allowance to accommodate these costs.

Oxford Rural No. 2 - Mill Road Pipe Leak

- 3.66. Following the initial rain event, it was noticed that the flow on the Gammans Creek part of the Oxford Rural No.2 system had increased from a flow of around 2 L/s to about 12 L/s, which was at the upper limit of what the pumps could keep up with, and was putting the scheme at risk of not being able to maintain pressure.
- 3.67. This leak was since located and repaired, at a total cost of approximately \$8,000. This was charged to GL10.315.684.2480.

3.68. **Solid Waste**

- 3.69. Solid Waste services and facilities were not greatly impacted by the flood events and there have been no further issues due to the flood event.

3.70. **Property Facilities**

- 3.71. There has been minor flooding and leak damage in some of the Council Buildings. The cost of this is expected to be covered from existing maintenance budgets and insurance.
- 3.72. There was a cost of \$5,250 to pump out flood water at the Waikuku Beach Campground. This water originated from an overflow at the end of the Ashley River stopbank. This was unbudgeted expenditure. In addition, rent relief has been sought by the lessee of the campground for lost revenue. This request is currently being processed but contains commercially sensitive information. The Council loss was also unbudgeted but will be accounted for within the existing operational budgets.

3.73. **Recreation and Community Facilities**

- 3.74. Flood damage was experienced at a number of Greenspace facilities across the district, including Ashley Gorge Campground, Cust Community Hall, Murphy Park and Askeaton Park. The Kaiapoi South and Kaiapoi East regeneration areas were also inundated with flood water.

- 3.75. The Recreation account had a budget of \$5,000 for storm related damage. The total unbudgeted expenditure for the Community and Recreation area related to the flooding event is \$158,300. Of this a total of \$8,300 can be accommodated for utilising existing budget provision leaving a total of \$150,000 of unbudgeted expenditure from the flood event.
- 3.76. Council staff are working alongside ECan in regards to the installation of the stopbank at Waikuku, this will see the need for Greenspace to put \$16,000 towards the sealing of the top of this as part of the road network through the car park asset we have in this area. This is also unbudgeted expenditure.
- 3.77. Therefore total Greenspaces unbudgeted expenditure is \$166,000.

#### **4. ISSUES AND OPTIONS**

- 4.1. Due to the nature of these events, there is no ability to plan in advance for infrastructure that may need to be replaced or repaired. As such staff often need to make informed decision in a very short timeframe regarding reinstatement of infrastructure but are aware of the need to make sound decisions regarding the best whole of life costs for either repairing or reinstating these assets.
- 4.2. Where there are specific decisions which require Council input or for a decision to be made, this will be reported through to Council.

##### **Implications for Community Wellbeing**

There are implications on community wellbeing by the issues and options that are the subject matter of this report.

Safe and reliable Roding and 3 Waters infrastructure is critical for wellbeing. 3 Waters infrastructure includes adequate drinking water and drainage for health and Roding infrastructure is require to provide safe egress and enable residents to access goods and services within the community.

- 4.3. The Management Team has reviewed this report and support the recommendations.

#### **5. COMMUNITY VIEWS**

##### **5.1. Mana whenua**

Te Ngāi Tūāhuriri hapū are likely to be affected by, or have an interest in the subject matter of this report as it relates to impacts on waterways and rivers. Staff will update the Runanga at the executive meetings and where relevant on specific projects or consents engage with MKT.

##### **5.2. Groups and Organisations**

A number of the issues in this report cross over with Environment Canterbury in terms of consenting, or in relation to rivers and natural waterways assets and services they maintain. Staff from ECAN and WDC are working to proactively coordinate where necessary.

- 5.3. There are some drainage related issues that also relate to water races and irrigation races. Where this is the case staff are coordinating with Waimakariri Irrigation Limited.

##### **5.4. Wider Community**

The wider community is likely to be affected by, or to have an interest in the subject matter of this report, as the wider community has been impacted by the recent flood event.

## 6. OTHER IMPLICATIONS AND RISK MANAGEMENT

### 6.1. Financial Implications

There are financial implications of this report.

The updated cost estimate for the works associated with recovery from the flood is summarised below.

It is noted that a small portion of the costs will come from existing budgets, however, the large majority of this spend has previously been noted as unbudgeted.

Asset Area	Previously Approved Unbudgeted Expenditure (\$)	Updated Budget for Approval (\$)	Difference (\$) <sup>1</sup>	Anticipated Funding by Other Source (Total) \$	Total Funding by Council \$
<b>Water</b>					
Garrymere Flood Response <sup>4</sup>	5,000	0	-5,000		0
Oxford Rural No.2 Flood Response and Repair Works <sup>3</sup>	400,000	0	-400,000		0
Waikuku Beach Flood Repair Works <sup>4</sup>	5,000	0	-5,000		0
<b>Total for Water</b>	<b>410,000</b>	<b>0</b>	<b>-410,000</b>		<b>0</b>
<b>Wastewater<sup>4</sup></b>					
General Response	15,000	0	-15,000		0
<b>Total for Wastewater</b>	<b>15,000</b>	<b>0</b>	<b>-15,000</b>		<b>0</b>
<b>Drainage<sup>4</sup></b>					
Kaiapoi Urban Flood Response	20,000	0	-20,000		0
Kaiapoi Urban Flood Response and Repairs	95,000	0	-95,000		0
Pines / Kairaki Flood Response	36,000	0	-36,000		0
Waikuku Beach Flood Response	5,000	0	-5,000		0
Rural Land Drainage Repairs	24,000	0	-24,000		0
Oxford Rural Flood Repair Works	50,000	0	-50,000		0
<b>Total for Drainage</b>	<b>230,000</b>	<b>0</b>	<b>-230,000</b>		<b>0</b>
<b>Roading (GL 10.270.588.2442)</b>					
Flood response	110,000	111,000	1,000	56,610	54,390
Lees Valley general & slip repairs (includes land purchase \$50k), bridge	900,000	1,420,000	520,000	966,857	453,143

approaches and river training					
Other bridge repairs and scour repairs (excluding Lees Valley bridges)	660,000	546,000	-114,000	278,460	267,540
Okuku Pass repairs	0	50,000	50,000	25,500	24,500
Culvert, Washouts, Fords & General Repairs	550,000	347,000	-203,000	176,970	170,030
Unsealed Road Repairs	100,000	166,000	66,000	84,660	81,340
<b>Total for Roading</b>	<b>2,320,000</b>	<b>2,640,000</b>	<b>320,000</b>	<b>1,589,057</b>	<b>1,050,943</b>
<b>River Flood Works<sup>4</sup></b>					
Okuku River	15,000	0	-15,000		0
<b>Total for River Flood Works</b>	<b>15,000</b>	<b>0</b>	<b>-15,000</b>		<b>0</b>
<b>Greenspaces</b>					
Reserves	148,000	145,000	-3,000		145,000
Community Facilities	10,300	5,000	-5,300		5,000
Contribution to ECan works	0	16,000			16,000
<b>Total for Greenspaces</b>	<b>158,300</b>	<b>166,000</b>	<b>-8,300</b>		<b>166,000</b>
<b>Property</b>					
Waikuku Beach Campground	5,250	5,250	0		5,250
<b>Total for Property</b>	<b>5,250</b>	<b>5,250</b>	<b>0</b>		<b>5,250</b>
Contingency	345,450	0	-345,450	0	0
<b>GRAND TOTAL</b>	<b>\$3,499,000</b>	<b>\$2,795,250</b>	<b>\$703,750</b>	<b>\$1,589,057</b>	<b>\$1,206,193</b>

1. Difference between original budget approved in July 2021 and the updated estimate as at August 2021.

2. This is assuming that Waka Kotahi co-funding of 51% will be granted, meaning Council share is the remaining 49% of the Roading works.

3. Request for budget is covered in separate report - Report to Council - Options Assessment for Mountain Road Area of Oxford Rural 2 Water Supply (210723120988).

4. Work covered from existing operational budgets.

6.2. Council's insurers have been advised of the flood event and staff will work with them to determine if there is to be any claimable costs from damage to 3 Waters assets. It is currently not expected that the LAPP threshold for Government funding (60% share) will be triggered for this event. The only likely insurance claim would be for the washout of the access bridge and inlet works to the Coopers Creek headworks site, as covered in the separate report on the Mountain Road options assessment.

6.3. Roading assets are not insured however Emergency Flood events do attract Waka Kotahi co-funding. Work category 141 enables funding from the National Land Transport Fund

(NLTF) in response to a defined, major, short-duration natural event (a qualifying event) that has reduced or will reduce customer levels of transport service significantly below those that existed prior to the event and results in unforeseen, significant expenditure.

- 6.4. The usual funding assistance rate (FAR) that applies to emergency works for qualifying events within each financial year is:
- the approved organisation's normal FAR. This covers cumulative claims for total costs of emergency works **up to 10%** of the approved organisation's total cost of its maintenance programme for the year (as approved when the National Land Transport Programme (NLTP) was adopted), or
  - the approved organisation's normal FAR plus 20% to a maximum of 95%. This is for the part of the cumulative claims of total costs of emergency works that **exceeds 10%** of the approved organisation's total cost of its approved maintenance programme for the year.

This has been taken into account when calculating co-funding from Waka Kotahi in the table above.

- 6.5. The flood response associated works to date have been claimed in the 2021/22 year. This means that the increase to the higher 20%FAR will occur subject to approval. Co-funding by Waka Kotahi is estimated at \$1.589m (subject to approval) and the Funding Assistance Rate increases to 71% for Emergency Response over \$1.138m but excludes any works undertaken for resilience.
- 6.6. The flood response work is to be funded from general rates (estimate be \$1,206,193) which will be debt funded in 2021/22 and then loan funded with the charge being on the 2022/23 rate. The rating impact from this additional budget, less the estimated Waka Kotahi co-funding, is \$3.15 per ratepayer or 0.10%. This does not include the residual book value of any assets which needs to be written off due to replacement or renewal.

6.7. **Sustainability and Climate Change Impacts**

The frequency and severity of flood events is likely to increase due to the impacts of climate change.

6.3 **Risk Management**

There are risks arising from the adoption/implementation of the recommendations in this report.

A risk-based approach has needed to be adopted around the management of the Lees Valley slips and this will also be the case when assessing and agreeing repairs for the Okuku Pass Rd slips as well as bridge approach repairs. In these cases, the best whole of life cost needs to be considered when agreeing the extent of repair and there is a residual risk of ongoing repairs being required due to further rainfall events.

6.8. **Health and Safety**

There are health and safety risks arising from the adoption/implementation of the recommendations in this report.

Physical works will be undertaken to repair flood damage and as per standard process for any physical works, the contractor will be required to provide a Site Specific Health & Safety Plan for approval prior to work commencing on site.

The work around the Lees Valley slips in particular is a higher risk activity due to the steep terrain and geological constraints. This has been discussed in detail with the contractor who is very experienced in this type of work, a Site Specific Safety Plan has been submitted and a site briefing including Council staff has been undertaken prior to the physical works commencing on site.

## 7. **CONTEXT**

### 7.1. **Consistency with Policy**

This matter is not a matter of significance in terms of the Council's Significance and Engagement Policy.

### 7.2. **Authorising Legislation**

The Land Transport Management Act is the relevant legislation in relation to Roading activities.

### 7.3. **Consistency with Community Outcomes**

The Council's community outcomes are relevant to the actions arising from recommendations in this report.

This report considers the following outcomes:

#### ***There is a safe environment for all***

- Harm to people from natural and man-made hazards is minimised.
- Our district has the capacity and resilience to quickly recover from natural disasters and adapt to the effects of climate change.
- Crime, injury and harm from road crashes, gambling, and alcohol abuse are minimised.

#### ***Transport is accessible, convenient, reliable and sustainable***

- The standard of our District's roads is keeping pace with increasing traffic numbers.
- Communities in our District are well linked with each other and Christchurch is readily accessible by a range of transport modes.

#### ***Core utility services are sustainable, resilient, affordable; and provided in a timely manner***

- Harm to the environment from sewage and stormwater discharges is minimised
- Council sewerage and water supply schemes, and drainage and waste collection services are provided to a high standard
- Waste recycling and re-use of solid waste is encouraged and residues are managed so that they minimise harm to the environment

### 7.4. **Authorising Delegations**

Council has the authority to receive this report.

Relevant staff have delegation to authorise unbudgeted emergency works where needed. Future reports will seek approval for unbudgeted expenditure.

**WAIMAKARIRI DISTRICT COUNCIL****REPORT FOR DECISION****FILE NO and TRIM NO:** RDG-22-01, DRA-16-03 / 210625103046**REPORT TO:** COUNCIL**DATE OF MEETING:** 6 July 2021**AUTHOR(S):** Gerard Cleary – Manager, Utilities & Roading**SUBJECT:** May 2021 Flood Event and Emergency Works Update**ENDORSED BY:**  
(for Reports to Council,  
Committees or Boards)  
\_\_\_\_\_  
Department Manager  
\_\_\_\_\_  
Chief Executive**1. SUMMARY**

- 1.1 This report is to provide an overview of the May 2021 flood event and associated emergency works which are either in progress or planned. The report also seeks approval of unbudgeted expenditure of \$3.5 million to respond to and recover Council's infrastructure services impacted by this flood.
- 1.2 The rainfall event which occurred over the weekend of 29<sup>th</sup> to 31<sup>st</sup> May resulted in sustained damage to Roading and 3 Waters infrastructure in the district. A Canterbury wide State of Emergency was issued on 30<sup>th</sup> May.
- 1.3 The highest rainfall quantities were recorded around the foothills of Oxford and Okuku, with coastal areas showing lower-level rainfall levels. Coastal areas however were affected by swollen river levels and high tides, causing backflow of flood water into lower lying areas.
- 1.4 Areas along the Ashley and Eyre Rivers were evacuated due to concerns that rivers would breach their stopbanks, and a number of areas around the district were isolated during and post flood event with residents' access or services cut off.
- 1.5 Work has been underway since the flood event to identify all issues in the network and restore infrastructure. This has included repairing underground services, roads, bridges, culverts, slips and washouts from overland flow.
- 1.6 In some areas the work required to repair infrastructure is substantial and as such is ongoing.

**Attachments:**

- i. Attachment i - May 2021 flood - Lees Valley - large slip - before repair (210624102638)
- ii. Attachment ii - May 2021 flood Lees Valley Whistler Bridge (210624102641)
- iii. Attachment iii - May 2021 flood - Lees Valley - large slip - initial repair (210624102642)
- iv. Attachment iv - May 2021 flood - Lees Valley - typical washout (210624102644)
- v. Attachment v - May 2021 flood - Lees Valley - first small slip - before repair (210624102645)
- vi. Attachment vi - May 2021 flood - Lees Valley - large slip during repair (210624102652)
- vii. Attachment vii - May 2021 flood - Lees Valley - Repair of first small slip (210624102658)
- viii. Attachment viii - May 2021 flood - Lees Valley Rd - Second small slip - before repair (210624102660)
- ix. Attachment ix - May 2021 flood - Okuku River breakout - showing breakout location (210625102924)
- x. Attachment x - May 2021 flood - Okuku river breakout - general effect (210625102927)



- xi. Attachment xi - May 2021 flood - Okuku River breakout - house flooding (210625102932)
- xii. Attachment xii - May 2021 flooding - Okuku River breakout - section flooding (210625102940)
- xiii. Attachment xiii - May 2021 flood - Pines Beach flooding - Dunns Ave 1 (210625102955)
- xiv. Attachment xiv - May 2021 flood - Pines Beach flooding - Dunns Ave flooding 2 (210625102957)
- xv. Attachment xv - May 2021 flood - Pines Beach flooding - Beach Rd culvert before repair (210625102959)
- xvi. Attachment xvi - May 2021 flood - Pines Beach flooding - Beach Rd culvert with digger (210625102963)
- xvii. Attachment xvii - May 2021 flood - Pines Beach flooding - Beach Rd culvert being repaired (210625102965)
- xviii. Attachment xviii May 2021 flood Event Debrief - Powerpoint Utilities and Roading (210625103001)

## 2. **RECOMMENDATION**

**THAT** the Council:

- (a) **Receives** Report No. 210625103046;
- (b) **Approves** the unbudgeted expenditure to date on infrastructure services in responding to the flood event and estimated total unbudgeted expenditure of up to \$3.5 million for responding to and recovering from the flood damage;
- (c) **Notes** that staff will bring a further report to the August Council meeting to give an update and refined cost estimate and rating implications;
- (d) **Notes** that staff will work with Waka Kotahi, insurers and other external parties to seek funding for the works where available;
- (e) **Circulates** this report to all Community Boards for information.

## 3. **BACKGROUND**

- 3.1 The flooding event was caused by significant rainfall over the 29<sup>th</sup>-31<sup>st</sup> May 2021 and resulted in damaged to Council's infrastructure assets as outlined in this report.
- 3.2 The rainfall was higher in the western parts of the district (refer Table 1 below) and was a longer duration event which had more of an impact on river flows, and infrastructure next to rivers, rather than our urban systems.

*Table 1 – Rainfall Depths 29<sup>th</sup>-31<sup>st</sup> May 2021*

<b>Rainfall Totals</b>				
	<b>29 May (mm)</b>	<b>30 May (mm)</b>	<b>31 May (mm)</b>	<b>Total (mm)</b>
<b>Oxford</b>	6	122.8	37.8	227.6
<b>Rangiora</b>	44.8	99.8	31.4	176
<b>Mandeville</b>	37	72.4	19.4	128.8
<b>Kaiapoi</b>	29.8	78.2	22.6	130.6
<b>Woodend</b>	36	71.2	34.8	142
<b>Summerhill</b>	54.5	105.2	30.8	190.6

- 3.3 The highest rainfall quantities were recorded around the foothills of Oxford and Okuku, with coastal areas showing lower-level rainfall levels. Coastal areas however were affected by swollen river levels and high tides, causing backflow of flood water into lower lying areas.
- 3.4 The rainfall that occurred was estimated to be a in the order of a 17 year event in the eastern part of the district and over a 100-year event in the western part of the district over a 48-hour period. The return period of the flooding that occurred is, however, dependent on more factors rather than just rainfall, including:
- Preceding rainfall – catchment wetness / soil moisture deficit
  - Groundwater levels
  - Catchment and sub catchment size and shape
  - River levels
  - Tides and storm surge
  - Storm direction and duration
  - Blockage risk - leaf fall (wind & hail), culverts, bank slips
  - Asset maintenance – sumps, grills, flap gates, pump stations, drains and culverts
- 3.5 The infrastructure damage that was caused as a result of the flooding is outlined in the following sections.

### 3.6 **Roading**

During the recent flood event, inundation of roads occurred in a large number of areas across the district, resulting in damage to road surfaces both sealed and unsealed, scour around stormwater culverts and bridge abutment, and in some locations bridge abutments were completely washed away.

The following areas were affected:

- Lees Valley – Substantial damage as outline in Section 3.2 below.
- Horsford Downs Rd – Wash out of two bridge approaches
- Harewood Rd Bridge – Scour damage at the abutment
- Ashley Bridge - Scour damage at the abutment
- Okuku River Bridge - Scour damage at the abutment
- Poyntz Rd Bridge – Scour damage at the abutment
- Steffans Rd Bridge - Scour damage at the abutment
- Makerikeri Rd Bridge - Scour damage at the abutment
- Coopers Creek Bridge - Scour damage at the abutment
- Island Rd Bridge - Scour damage at the abutment
- New Road, Taaffes Glen Rd, Ashley Gorge Rd, Glentui Bush Rd, Island Rd View Hill, Woodside Rd, Mounseys Rd, Wrights Rd – Road scour and culverts washed out.

As well as this we had a large number of roads that were closed due to flood flow. These included:

- Lees Valley Rd
- Okuku Pass Rd
- Woodside Rd
- Woodstock Rd
- Harman Gorge Rd
- Taaffes Glen Rd
- New Rd
- Wrights Rd
- Tippings Road
- Patersons Road (Cust)
- Kennedys Hill Road
- Island Rd, View Hill

- Welchs Rd
- Swamp Rd
- Mairaki Road
- Inglis Rd
- Riverside Rd
- Steffens Rd
- Terrace Rd
- Depot Rd
- Courtenay Drive
- Waikuku Beach Rd
- Perhams Rd
- Beach Rd at Pines / Kairaki
- South Eyre Rd at bridge
- Harewood Rd at bridge

All fords were closed during the event and have remained closed across the district since this time due to both ongoing rain and damage sustained in the fords.

The following actions have been underway post flooding:

- Post flood inspections of all larger bridges
- Debris removal on upstream side of bridges
- Grading is underway on unseal roads along with metalling to address scour
- Repair to wash outs, scour and culvert damage to allow roads to reopen
- Reinstatement of bridge approaches sufficient to allow road reopening
- Ford repairs
- Slip repairs

Future and ongoing works will include:

- Continued repair to bridge approaches
- Scour repair, river training and rock protection at affected bridges
- Repairing damaged culverts
- Ford reinstatement
- Maintenance metalling on unsealed roads
- Seal repairs on damaged sealed roads

### 3.7 **Lees Valley, Okuku Pass Rd**

- 3.8. The road access into Lees Valley was severed in numerous places during the flooding event. In particular all access to the valley was cut off at a very large slip approximately 5km from Ashley Gorge Rd, at three bridges throughout the valley, and at a ford washout on Okuku Pass Rd.
- 3.9. The full length of the road was flown on the Wednesday 2<sup>nd</sup> June to allow staff to undertaken a high-level assessment of condition and assisted in highlighting the major issues.
- 3.10. A full meeting with engineers and contractors was held on Friday 4<sup>th</sup> June at the large slip, and due to the size of the slip and difficult terrain a decision was made to bypass the slip rather than try to stabilise it, or span it. This bypass involved cutting a new track up and over the adjacent bridge and has been done in two stages. Stage one involved forming a 4WD only track over the ridge and the second stage has been improvements to allow future access for standard vehicles and trucks.

- 3.11. Prior to beginning the work, agreement was reached with the landowner, and both the Council and ECan compliance teams, that the work could proceed as generally proposed, on the understanding that we would discuss retrospective approval after the event.
- 3.12. Work began on the bypass road on Friday 4<sup>th</sup> June, and was finally open to 4WD only traffic by Friday 18<sup>th</sup> June. The road has remained closed to the general public but has been opened for people living and working in the valley.
- 3.13. However, work has also been required to repair both the first small slip and the second small slip. The repair of the former has meant that access has not been available for any traffic for the majority of this time. The repair of the latter is intended to be carried out starting on Monday 28<sup>th</sup> June, and again this will cut off access for at least a week.
- 3.14. In the meantime, work has begun on restoring the three bridge approaches.
- 3.15. In addition, the Okuku Pass Rd (which provides access to Lees Valley from the northern end) was also damaged with a number of washouts. A portion of this road is administered by Hurunui District Council, and as such staff have been liaising with HDC as to immediate repairs. HDC be giving consideration to any longer-term improvements which may be required along their section of road.
- 3.16. The current intention is to have all vehicle access restored by Monday 5<sup>th</sup> July; however, this may be optimistic. A verbal update will be provided at the Council meeting.
- 3.17. **Okuku River (Riverside Rd & Inglis Rd)**
- 3.18. The Okuku River broke out of its flow path at the bend in the river near 44 Inglis Road cutting a new flow path to the south across private property and both Riverside Road and Inglis Road before re-joining the main river downstream of 450 Riverside Road.
- 3.19. The residents in the vicinity of the flooding were evacuated from their residences.
- 3.20. Staff deployed a drone on Tuesday afternoon to assess the extents of the flooding and to get an understanding of what happened and begin to assess the on-going risk to the properties. The drone footage was shared with both Environment Canterbury staff and the river engineer engaged by Council to provide advice on the risk to properties (see attachments ix) to xii).
- 3.21. At the request of the river engineer, additional drone footage was obtained once the floodwaters had receded.
- 3.22. The report commissioned by staff concluded that there was on-going risk due to erosion at 44 Inglis Road, but low risk to the remaining properties once the waters had receded. This report was provided to all residents in the area.
- 3.23. Staff from Environment Canterbury initiated emergency works to divert the river back to the previous flow path to reduce the risk to properties from another event (including more minor weather events). Two channels and banks were created to retrain the river back to the previous flow path.
- 3.24. Council contributed \$10,000 (half the costs) to the works performed by Environment Canterbury as this work benefited protection of roading assets.
- 3.25. Council's road maintenance contractor re-graded both Riverview Road and Inglis Road after the flood water had receded.

- 3.26. With the rain that occurred over the weekend of 19<sup>th</sup> / 20<sup>th</sup> June, the upstream channel and bank failed but the 2<sup>nd</sup> channel and bank held preventing properties from getting flooded again with the rain event.
- 3.27. Once water levels drop, Environment Canterbury will look to reinstate the first channel and bank with a further \$5,000 contribution to costs from Council.
- 3.28. Staff have been regularly updating residents in the area of developments and have undertaken water testing at the affected properties as their private bores were submerged by the flood waters. Test results are being provided back to the residents and to date one test result has come back with elevated levels of E. coli. These property owners have advised that they are not currently using water at the property and are staying elsewhere while repairs are made.
- 3.29. At the request of residents, staff are also enquiring into whether or not there is any possibility that the land would be determined to no longer be suitable for residential use ('red zoned') and have undertaken to meet with residents again once an outcome or process for making a determination are known.
- 3.30. Staff will also be meeting with Environment Canterbury staff to discuss what options are available to residents for longer term protection. These options will then be presented to residents. It is likely that these options will be led by the regional council, however, if any options involved Council, further reporting will be brought forward.
- 3.31. **Pines Kairaki**
- 3.32. After the flood event over the weekend, it became clear that there was an issue with ongoing flooding to lower portions of Pines Beach. (Attachments xiii and xiv) Floodwaters were not getting away as expected, and in fact were increasing. It became clear that there was a problem with the flood gate on the Beach Rd culvert which crosses Kairaki Stream. This culvert has two pipes (owned by the Council) each with a separate flood gate (owned by ECan). One of these gates had become jammed open, while the other continued to operate as normal. At that time, due to the very high-water levels, it was not possible to identify the problem (Attachment xv).
- 3.33. Because of the uncertainty around the cause of the flap gate issue and the risk from flooding at high tide, a number of residents were requested to evacuate. As information became clearer about the extent and the risk, this number was reduced over subsequent days.
- 3.34. In order to try to keep up with the inwards flow, a digger was positioned at the culvert to hold a steel plate against the upstream inlet during high tides, and a large 12' pump installed (Attachment xvi). This successfully prevented any further flooding issues during the high tides.
- 3.35. Over the following 2 days and as the water level in the Waimakariri River dropped, more of the flood gate was exposed. This allowed a closer inspection of the issue. Finally on the Wednesday, Ecan were able to identify the issue and restore the flap gate to normal operation (Attachment xvii).
- 3.36. The problem was caused by a short stub welded to the top of the gate to stop it 'over-opening'. This stub is intended to butt against the headwall when the gate was being pushed wide open to prevent it opening to greater than horizontal. In this instance the stub had been ground down in the past to prevent other issues, and therefore it popped into the culvert pipe when the gate was over-extended, and then jammed the gate partially open when it tried to return to vertical. Once identified, this was remedied by crow-bar, and the

problem fixed. In order to ensure the problem was fixed the issue was monitored over the next few high tides.

- 3.37. Unfortunately, the issue arose again at the more recent high tide. However, it was quickly remedied, and the problem has been temporarily resolved by putting a large concrete block just downstream to stop over-extending.
- 3.38. ECan have already budgeted a significant upgrade to the headwall structure, as it is acknowledged that the current arrangement has a number of deficiencies. This was originally intended in the 20/21 financial year, but was delayed due to the shovel-ready funding. However, it is now back on the ECan programme, to be completed in 21/22.
- 3.39. The cost to block off the outlet pipe and deploy a large capacity temporary pump was \$36,000. Environment Canterbury have indicated that they are open to discuss cost sharing for this work.
- 3.40. **Urban Stormwater**
- 3.41. Temporary pumps were deployed to Dudley Drain, Feldwick Drain and McIntosh Drain in advance of this event. The cost to deploy and operate these pumps during the event was \$20,000, which is funded from existing budgets.
- 3.42. During the event additional pumps were deployed to Kiln Place and Cridland Street West, Kaiapoi and Swindells Road and the Waikuku Beach campground in Waikuku Beach. Additional support was also obtained from Ongrade to assist with checking grills, sumps and flapgates during the event as maintenance staff were stretched. The total additional unbudgeted cost for the urban stormwater response is \$40,000.
- 3.43. Observations during the event indicated that the Kiln Place issue may have been related to the stormwater pipeline through Blue Skies holding water. Subsequent investigation work, undertaken as urgent work, has identified a significant blockage at the downstream end under the railway line which has now been removed. This required substantial work including uncovering manholes, pumping down the system, CCTV inspection and removing the blockage. The total cost to undertake this work is still to be confirmed but is estimated to be in the order of \$60,000 to \$80,000. This work is not currently budgeted for.
- 3.44. Council received a total of 192 drainage related service requests for the event on the 30<sup>th</sup> & 31<sup>st</sup> May 2021 and a further 53 service requests for the event on 20<sup>th</sup> June 2021. Each of these requests have been responded to, but will be assessed to determine if any further maintenance or investigation is warranted.
- 3.45. The following areas have already been identified for further investigation. It is noted additional localised areas will be added to the list as the service requests are worked through.

**Kaiapoi**

- Kiln Place – Blue Skies Pipeline Investigation (underway)
- Cridland Street West – Pipeline condition and capacity assessment

**Waikuku Beach**

- Waikuku Beach Campground – Extension of stopbank (led by Environment Canterbury)
- Swindells Road – Pipeline condition and capacity assessment
- Collins Drive – Flapgate issue
- Waikuku Beach Road – Flooding assessment
- Kiwi Ave Reserve – Pipeline condition and capacity assessment

Oxford

- Church Street / Burnett Street – Drain capacity assessment
- Pearsons Drain (Bay Road & Burnett Street) – Drain capacity assessment

3.46. A further report will be brought to the Utilities & Roading Committee on the full assessment of service requests and the proposed additional investigation work.

3.47. It is noted that a community meeting has been held with the residents of Kiln Place and a community meeting is planned for Waikuku Beach residents on 6 July 2021.

3.48. **Rural Land Drainage**

3.49. Generally, the drains in the rural drainage areas of the district functioned well. The following repair works have been required as a result of the event:

- Ohoka Stream – Tree Removal
- Waikuku Stream – Tree Removal (x2) and bank repairs
- Deep Creek – Drop structure repairs and debris removal from flood gates
- Mounsey Stream – Tree removal and bank repairs

3.50. Most of the repair work will be undertaken from existing operational budgets (estimated to be about \$25,000). However, the Mounsey Stream bank repairs work is more substantial and will require additional budget. Initial estimates are in the order of \$50,000, which is double the Oxford Rural Drainage annual drain maintenance budget.

3.51. **Stockwater**

3.52. The syphon under the Eyre River on the Main Race (MR8) near Warrens Road, scoured out and washed away during the event. This syphon comprises of twin 1,500mm Aluflo culverts about 150m in length. The old stockwater syphon was re-activated to provide continuity of stockwater flows.

3.53. A section of the water race system adjacent to the Eyre River between Carleton Road and Steffens Road (Race R7) suffered bank damage and washed out. This section is currently isolated, with a few downstream properties not receiving stockwater.

3.54. The damaged syphons and bank collapse will be replaced by Waimakariri Irrigation Limited. As these works are for irrigation purposes, they have confirmed that they will not be seeking any contribution from Council for the repair.

3.55. **Wastewater**

3.56. Given the nature of the event the wastewater reticulation system generally performed well. Sucker trucks were deployed to the following locations to keep the level sewers down:

- Ohoka Road, Kaiapoi
- Cridland Street West, Kaiapoi
- Chapman Place PS, Kaiapoi
- Kairaki PS, Kairaki/Pines
- Rotten Row, Waikuku Beach.

3.57. The Ohoka Road and Chapman Place PS areas will benefit from the Kaiapoi Stormwater and Flooding Improvements project. The Cridland Street West area was partially related to stones in the syphon under the Cam River which has been addressed, although this is a catchment of focus as part of the Kaiapoi Wastewater Network. Further investigation is required at the Kairaki PS where inflow was observed in the vicinity of the Kairaki

campground. The issue at Rotten Row in Wakikuku Beach was predominantly due to the Ashley River overflow into the Waikuku Beach campground which also flowed into and overloaded the sewer system.

- 3.58. The long duration of the event meant that the holding pond at the Oxford wastewater treatment plant was overloaded and spilt into the onsite pit. Environment Canterbury have been advised of this overflow and a follow up factual report will be provided, covering the duration of overflow, estimated volume and clean up undertaken.
- 3.59. The total cost of our wastewater response is estimated to be \$15,000 and will be funded from existing operational budgets.

3.60. **Water**

- 3.61. The following key points can be made about impacts on the water supply system:

Source Water Quality

- 3.62. There are no longer any surface water intakes as part of the Council's primary public water supply sources, therefore impacts to source water were not as great as they would have been had some of the surface water takes still be in use.
- 3.63. The raw water quality on most schemes therefore had minimal impact from the event. The key exception was the Garrymere supply, which although a groundwater source, has its shallowest screen at only 2.5m below ground level. This scheme experienced higher than expected turbidity levels, which were greater than what the treatment system was designed to cope with. This meant a precautionary boil water notice was put in place for approximately a week, while the turbidity levels were greater than the Drinking-water Standards limit of 2 NTU for the treatment system. Frequent sampling for E. coli was taken during the event on the Garrymere system, and no E. coli was detected in the treated water.
- 3.64. The extra sampling and operational work at the Garrymere headworks is estimated at \$5,000.
- 3.65. This was considered to be an extreme event, and is not expected to be a regularly recurring event for the system. Even so, there are steps that can be taken to minimise the risk of recurrence going forward. In particular, within the Long Term Plan period there is provision for a backup well for this scheme. It is intended that this well is not screened as shallow as the current well, which would reduce the likelihood further of detrimental impacts of events of this nature on the raw water quality.

Waikuku Beach Campground Flooding

- 3.66. There is a backup water supply source for the Waikuku Beach scheme at the campground site. Due to the significant flooding in this area, the station was partly inundated with water, although the water level remained below the height of the electrical cabinets and pump motors. There was only minor damage which has since been repaired, and the station is still functional. The well was tested, and no E. coli or total coliforms were detected, despite the bore being in a below ground chamber which was inundated with water.
- 3.67. The minor repair works and associated testing of equipment is estimated at \$5,000.



### Oxford Rural No.2 Infrastructure Damage

- 3.68. There are a number of pipes that cross drains and creeks, in particular within the Oxford Rural No.2 scheme. There are also pipes on hills that were susceptible to ground movement / slippages during the very wet event. This led to three key issues:

#### Coopers Creek

- 3.69. Coopers Creek used to be the primary headworks for the Oxford Urban and Rural No.2 water supplies, until the Domain Road headworks was established in 2010. Since this time it was the primary headworks just for the Oxford Rural No.2 part of the network, and in 2018 when the Oxford Rural No.2 scheme was joined to share the Domain Road source, was relegated to an emergency backup site.
- 3.70. Despite being a backup headworks, the tanks above the Coopers Creek intake still perform a function of providing gravity flow to about 15 houses west of the headworks, and some storage for the scheme, and water quality monitoring equipment.
- 3.71. There is a bridge that gives access to this headworks site, which has a 40mm alkethene pipe fixed to it. The ground around the bridge washed out, and the bridge suffered structural damage meaning that it is in need of replacement. The pipe is still fixed to the bridge, however is suspended in the area where the bank has washed out, and is at risk of complete failure. It is proposed to replace this section of pipe that is suspended across flowing water with a new pipe sleeve about 1.5m below the stream bed. This will reduce the risk in the immediate term, although active consideration is still being given to bank stabilisation and bridge replacement works.
- 3.72. At the Coopers Creek intake, which is downstream of the access bridge, there was a weir that was used to slow the water around the intake, and maintain adequate supply in times of low flow in Coopers Creek. This weir washed out completely, and options to reinstate this are also being considered. There are records that this weir washed out in 2010 as well, and was replaced with boulders following this.
- 3.73. There was an outage for the 15 properties following rain on the night of Sunday 20 June. This was caused by a water lateral and toby box on the eastern side of Coopers Creek, immediately next to the bridge that suffered the damage being washed out. This was due to further scour of this area. Due to the time taken to repair this main, especially with the limited access to this side of the river, properties were without water for about 24 hours. Property owners were notified by phone, and the Drinking Water Assessor informed, as is required for outages greater than 8 hours. This toby box and damaged lateral have now been repaired.
- 3.74. The total value of work required to reinstate pipes, the bridge, stabilisation of banks, and the weir is estimated at \$360,000, although advice is being sought in a number of areas before a definitive cost can be determined for this.
- 3.75. A further report will be brought to Council on the future long term strategy for this infrastructure to confirm what should be reinstated.

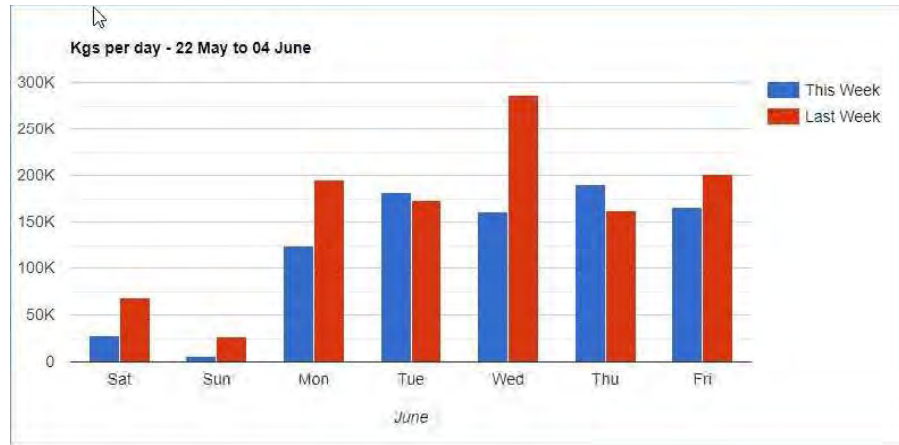
#### Bush Road Pipe Exposed

- 3.76. On Bush Road, a 200mm diameter PVC main was found exposed in the base of the drain, due to scour in the surrounding area. This presents a significant risk of complete failure in a future event, as more gravel and tree branches are highly likely to wash down the stream given the amount of loose material upstream, which could damage the pipe, given it has no protection currently. The Water Unit are working to replace this section of pipe at a

greater depth beneath the existing base of the stream, as conditions allow. The cost to install a lowered pipe at this location is estimated at \$20,000 to \$30,000.

#### Mill Road Pipe Leak

- 3.77. Following the initial rain event, it was noticed that the flow on the Gammans Creek part of the Oxford Rural No.2 system had increased from a flow of around 2 L/s to about 12 L/s, which was at the upper limit of what the pumps could keep up with, and was putting the scheme at risk of not being able to maintain pressure.
- 3.78. Given the timing of the event, and the very high flows in the creeks, drains and streams in the area, it was assumed that this large leak had been caused by the ground surrounding a pipe being washed out, and damage incurred.
- 3.79. Staff inspected drain crossings, and worked their way through the system assessing flows, to narrow down the area where the leak was. Eventually, a leaking 150mm diameter pipe was found on a hill in between Mill Road and Bay Road. This was caused by the surrounding ground slumping, due to saturation.
- 3.80. Once the leak was located, it was repaired by the Water Unit, and flows on the system returned to normal.
- 3.81. During the days taken to locate and fix this leak, scheme members had been asked to conserve water as there was a risk that the leak could have failed catastrophically before it was located, which would have meant residents would have had to rely on their tank water until the leak could be located and repaired. Thankfully, this did not eventuate and the leak was found before it completely failed.
- 3.82. The cost of finding and repairing this leak is estimated at \$10,000.
- 3.83. **Solid Waste:**
- 3.84. Solid Waste services and facilities were not greatly impacted by the flood events. Kerbside collections and most scheduled bin deliveries were undertaken on the Monday in the Woodend and northern rural areas, including into Waikuku Beach. Where vehicle access was not possible the contractor advised they would return on the following day to complete collections, if requested.
- 3.85. Southbrook RRP was within the second potential Ashley River flood evacuation zone during the first event. Staff discussed contingencies with the operations contractor to ensure Council collections, and commercial and public customers, would still be able to dispose of their waste materials in the event the site was closed.
- 3.86. There was minor flooding on the Southbrook site during the event, but the majority of operational areas were not impacted, with some minor flooding in the green-waste disposal area. The facilities operators did not advise Council staff of any flooding issues occurring at the Oxford transfer station site, which was is open on Friday and Sunday afternoons.
- 3.87. There was an impact on usage of Southbrook RRP during the May rainfall event. As shown in the below table, there was a substantial decrease in incoming tonnages from 29 to 31 May compared to the same three days during the previous week, and there has been a 'lag' in tonnages returning to more normal levels.



**Table Showing Incoming Weight of Materials into Southbrook RRP 2 May to 4 June 2021**

3.88. **Property Facilities:**

3.89. There has been minor flooding and leak damage in some of the Council Buildings. The cost of this is expected to be covered from existing maintenance budgets and insurance.

3.90. There was a cost of \$5,250 to pump out flood water at the Waikuku Beach Campground. This water originated from an overflow at the end of the Ashley River stopbank. This was unbudgeted expenditure.

3.91. **Recreation and Community Facilities:**

3.92. Flood damage was experienced at a number of Greenspace facilities across the District, including Ashley Gorge Campground, Cust Community Hall, Murphy Park and Askeaton Park. The Kaiapoi South and Kaiapoi East regeneration areas were also inundated with flood water.

3.93. Additionally a number of localised flooding issues have been identified, for example the Waikuku Beach Central Area reserve (near flying fox). This area has been identified before as requiring further investigation into long term solutions. This will be worked on with the community to determine what the best option is. At this stage no funding has been spent on the investigation or any implementation. Staff will report back to Council at a future date once the investigation and community consultation has been completed.

3.94. The most affected reserve in the district was Ashley Gorge. The lower terrace was significantly damaged with park furniture being swept away and a large amount of river silt being deposited. The total cost to date of the remediation of this reserve has come to \$128,000. This has included the removal of the silt and debris from the site and the reinstatement of all of the playground safety surface and park furniture. This includes 7 picnic tables and their concrete bases as well as two double refuse bins.

3.95. Other Park related clean up and remediation costs total approximately \$20,000. The largest costs can be attributed to the clean-up and replacement of bark safety surface in playgrounds across the district. Other smaller projects include debris removal from Kairaki Beach Car Park and replacement of crusher dusts on paths which had been washed away.

3.96. Currently the Recreation account has a budget of \$5,000 for storm related damage. This means that there is currently a total of \$143,000 of unbudgeted expenditure related to the storm damage in the recreation area.

- 3.97. A number of community facilities leaked as a result of the persistent rain. These include Fernside Hall, Cust Community Centre, Rangiora Library, Rangiora Town Hall, Rangiora Toy Library, Oxford Jaycee and Dudley pavilion. The total cost to repair the damage to the buildings is \$10,300. There are some maintenance budgets within each community facility budget which can be used for unplanned works. Taking these into account it is estimated that the unbudgeted work would amount to \$7,000.
- 3.98. The total expected expenditure for the Community and Recreation area related to the flooding event is \$158,300. Of this a total of \$8,300 can be paid for utilising existing budget provision leaving a total of \$150,000 of unbudgeted expenditure.

#### **4. ISSUES AND OPTIONS**

- 4.1. Due to the nature of these events, there is no ability to be able to plan in advance for infrastructure that may need to be replaced or repaired. As such staff often need to make informed decision in a very short timeframe regarding reinstatement of infrastructure but are aware of the need to make sound decisions regarding the best whole of life costs for either repairing or reinstating these assets.
- 4.2. Where there are specific decisions which require Council input or for a decision to be made, this will be reported through to Council.

##### **Implications for Community Wellbeing**

There are implications on community wellbeing by the issues and options that are the subject matter of this report.

Safe and reliable Roding and 3 Waters infrastructure is critical for wellbeing. 3 Waters infrastructure includes adequate drinking water and drainage for health and Roding infrastructure is require to provide safe egress and enable residents to access goods and services within the community.

- 4.3. The Management Team has reviewed this report and support the recommendations.

#### **5. COMMUNITY VIEWS**

##### **5.1. Mana whenua**

Te Ngāi Tūāhuriri hapū are likely to be affected by, or have an interest in the subject matter of this report as it relates to impacts on waterways and rivers. Staff will update the Runanga at the executive meetings and where relevant on specific projects or consents engage with MKT.

##### **5.2. Groups and Organisations**

A number of the issues in this report cross over with Environment Canterbury in terms of consenting, or in relation to rivers and natural waterways assets and services they maintain. Staff from ECAN and WDC are working to proactively coordinate where necessary.

- 5.3. There are some drainage related issues that also relate to water races and irrigation races. Where this is the case staff are coordinating with Waimakariri Irrigation Limited.

##### **5.4. Wider Community**

The wider community is likely to be affected by, or to have an interest in the subject matter of this report, as the wider community has been impacted by the recent flood event.

## 6. OTHER IMPLICATIONS AND RISK MANAGEMENT

### 6.1. Financial Implications

There are financial implications of this report.

A high-level estimate of the costs associated with the flood are summarised below. It is noted that some of the costs will come from existing budgets, however, the large majority of this spend it unbudgeted.

<b>Asset Area</b>	<b>Cost Estimate (\$)</b>	<b>Unbudgeted Council Expenditure (\$)</b>	<b>Budgeted or Anticipated Funding by Other Source (\$)</b> *
<b>Water</b>			
Garrymere Flood Response	5,000	5,000	0
Oxford Rural No.2 Flood Response and Repair Works	400,000	400,000	0
Waikuku Beach Flood Repair Works	5,000	5,000	0
<b>Total for Water</b>	<b>410,000</b>	<b>410,000</b>	<b>0</b>
<b>Wastewater</b>			
General Response	15,000	0	15,000
<b>Total for Wastewater</b>	<b>15,000</b>	<b>0</b>	<b>15,000</b>
<b>Drainage</b>			
Kaiapoi Urban Flood Response	20,000	20,000	0
Kaiapoi Urban Flood Response and Repairs	95,000	95,000	0
Pines / Kairaki Flood Response	36,000	0	36,000
Waikuku Beach Flood Response	5,000	5,000	0
Rural Land Drainage Repairs	24,000	0	24,000
Oxford Rural Flood Repair Works	50,000	50,000	0
<b>Total for Drainage</b>	<b>230,000</b>	<b>170,000</b>	<b>60,000</b>
<b>Roading</b>			
Flood response	110,000	53,900	56,100
Lees Valley (includes Lees Valley bridges)	900,000	441,000	459,000
Bridge Repairs including bridge approaches (excluding Lees Valley bridges)	660,000	323,400	336,600

Culvert & Washout repairs	550,000	269,500	280,500
Unsealed Road Repairs	100,000	49,000	51,000
<b>Total for Roding</b>	<b>2,320,000</b>	<b>1,136,800*</b>	<b>1,183,200</b>
<b>River Flood Works</b>			
Okuku River	15,000	15,000	0
<b>Total for River Flood Works</b>	<b>15,000</b>	<b>15,000</b>	<b>0</b>
<b>Greenspaces</b>			
Reserves	148,000	143,000	5,000
Community Facilities	10,300	7,000	3,300
<b>Total for Greenspaces</b>	<b>158,300</b>	<b>150,000</b>	<b>8,300</b>
<b>Property</b>			
Waikuku Beach Campground	5,250	5,250	0
<b>Total for Property</b>	<b>5,250</b>	<b>5,250</b>	<b>0</b>
Contingency (10%)	345,450	345,450	0
<b>GRAND TOTAL</b>	<b>\$3,499,000</b>	<b>\$2,232,500</b>	<b>\$1,266,500</b>

\* Anticipated funding by other source relates to potential co-funding by Waka Kotahi, Insurance claims or budget has previously been allocated and can be utilised.

\*\* This is assuming that Waka Kotahi co-funding of 51% will be granted, meaning Council share is the remaining 49% of the Roding works.

Council's insurers have been advised of the flood event and staff will work with them to determine if there is to be any claimable costs from damage to 3 Waters assets. It is currently not expected that the LAPP threshold for Government funding (60% share) will be triggered for this event.

While no specific budget is being sought at this time, it is noted that the estimated costs of the clean-up from this flood event is in the order of \$ 3.5 million and the full costs are not likely to be clear for another 4 to 8 weeks. Further detailed information on costs and any details as they relate to budgets will be provided to Council in a future report.

Roding assets are not insured however Emergency Flood events do attract Waka Kotahi co-funding. Work category 141 enables funding from the National Land Transport Fund (NLTF) in response to a defined, major, short-duration natural event (a qualifying event) that has reduced or will reduce customer levels of transport service significantly below those that existed prior to the event and results in unforeseen, significant expenditure.

Events that qualify for NLTF funding as emergency works will:

- be of unusually large magnitude or severity for the particular area in which they occur (as a guide, they would be expected to have an annual return period greater than 1 in 10 years)

- originate from natural, short duration triggering events, including very high intensity rainfall, severe wind, severe drought in government declared drought areas or seismic events
- have reduced, or will reduce within a 12 month period, levels of transport service significantly below those that existed prior to the event
- involve a total cost of \$100,000 or more per event per approved organisation or Waka Kotahi NZ Transport Agency (state highways) region
- be clearly defined, named and described, with a separate funding application required for each event.

The usual funding assistance rate (FAR) that applies to emergency works for qualifying events within each financial year is:

- the approved organisation's normal FAR. This covers cumulative claims for total costs of emergency works **up to 10%** of the approved organisation's total cost of its maintenance programme for the year (as approved when the National Land Transport Programme (NLTP) was adopted), or
- the approved organisation's normal FAR plus 20% to a maximum of 95%. This is for the part of the cumulative claims of total costs of emergency works that **exceeds 10%** of the approved organisation's total cost of its approved maintenance programme for the year.

As the flood response and associated works will straddle two financial years, the allowance for 10% over the approved organisation's total cost of its maintenance programme for the year will reset at the 1st July, and not be cumulative over two financial years. This means that the increase to will not eventuate in 2020/21 and as this resets in 2021/22 it is unlikely to reach the trigger point for increase to 20%FAR.

Initial discussions on the claiming has been undertaken with the Waka Kotahi Investment Advisor who has advised that this cannot be treated as one event for claiming purposes. This will be explored further at a regional level as this disadvantages Councils when an event occurs near the end of a financial year.

## 6.2. **Sustainability and Climate Change Impacts**

The frequency and severity of flood events is likely to increase due to the impacts of climate change.

## 6.3 **Risk Management**

There are risks arising from the adoption/implementation of the recommendations in this report.

A risk-based approach has needed to be adopted around the management of the Lees Valley slips and this will also be the case when assessing and agreeing repairs for the Okuku Pass Rd slips as well as bridge approach repairs. In these cases, the best whole of life cost needs to be considered when agreeing the extent of repair and there is a residual risk of ongoing repairs being required due to further rainfall events.

## 6.3. **Health and Safety**

There are health and safety risks arising from the adoption/implementation of the recommendations in this report.

Physical works will be undertaken to repair flood damage and as per standard process for any physical works, the contractor will be required to provide a Site Specific Health & Safety Plan for approval prior to work commencing on site.

The work around the Lees Valley slips in particular is a higher risk activity due to the steep terrain and geological constraints. This has been discussed in detail with the contractor who is very experienced in this type of work, a Site Specific Safety Plan has been

submitted and a site briefing including Council staff has been undertaken prior to the physical works commencing on site.

## 7. **CONTEXT**

### 7.1. **Consistency with Policy**

This matter is not a matter of significance in terms of the Council's Significance and Engagement Policy.

### 7.2. **Authorising Legislation**

The Land Transport Management Act is the relevant legislation in relation to Rooding activities.

### 7.3. **Consistency with Community Outcomes**

The Council's community outcomes are relevant to the actions arising from recommendations in this report.

This report considers the following outcomes:

#### ***There is a safe environment for all***

- Harm to people from natural and man-made hazards is minimised.
- Our district has the capacity and resilience to quickly recover from natural disasters and adapt to the effects of climate change.
- Crime, injury and harm from road crashes, gambling, and alcohol abuse are minimised.

#### ***Transport is accessible, convenient, reliable and sustainable***

- The standard of our District's roads is keeping pace with increasing traffic numbers.
- Communities in our District are well linked with each other and Christchurch is readily accessible by a range of transport modes.

#### ***Core utility services are sustainable, resilient, affordable; and provided in a timely manner***

- Harm to the environment from sewage and stormwater discharges is minimised
- Council sewerage and water supply schemes, and drainage and waste collection services are provided to a high standard
- Waste recycling and re-use of solid waste is encouraged and residues are managed so that they minimise harm to the environment

### 7.4. **Authorising Delegations**

Council has the authority to receive this report.

Relevant staff have delegation to authorise unbudgeted emergency works where needed. Future reports will seek approval for unbudgeted expenditure.



**WAIMAKARIRI DISTRICT COUNCIL****REPORT FOR DECISION****FILE NO and TRIM NO:** EXT-26 / 210811131920**REPORT TO:** COUNCIL**DATE OF MEETING:** 7 September 2021**AUTHOR(S):** Kitty Waghorn, Solid Waste Asset Manager**SUBJECT:** Canterbury Waste Joint Committee: Request Environment Canterbury to Re-join CWJC and Host Staff Resource**ENDORSED BY:**  
(for Reports to Council,  
Committees or Boards)  
Department Manager  
Chief Executive**1. SUMMARY**

- 1.1 This report is to seek approval from this Council to support the following recommendation from the Canterbury Waste Joint Committee's meeting on 2 September 2021 *that the Council:*
- (a) *Agree that a new staff position be created to progress waste minimisation and management initiatives across the region and improve regional collaboration.*
  - (b) *Agree that the budget for regional waste minimisation be increased from \$112,000 to \$192,000, to be adjusted annually for inflation.*
  - (c) *Agree that Environment Canterbury be invited to become a member of the Committee on the same terms and conditions as its previous membership.*
- 1.2 The Canterbury Waste Joint Committee (CWJC) – which was formed in 2006 – is a joint committee under the Local Government Act 2002 with delegated authority to deal with all matters relating to regional waste minimisation initiatives across the region, in order to reduce the volumes of solid waste sent for disposal.
- 1.3 ECan withdrew from active participation with the Canterbury Waste Joint Committee (CWJC) and withdrew its shared funding of \$37,500 p.a. for regional waste initiatives as from 1 July 2011. The withdrawal came as they were looking for more efficiencies in their operation, and they would focus on hazardous waste in combination with industrial pollution as a core activity, moving away from other forms of waste. This reduced the available funding from \$150,000 to \$112,000, and the CWJC Constituting Agreement was amended in June 2011 to reflect those changes.
- 1.4 At their meeting on 2 August 2021, the CWJC considered a report from the joint staff group that recommended the creation of a new regional staff position to progress waste minimisation and management initiatives across the region, changing contributing Councils' funding budgets in proportion to levy increases and population changes, and inviting ECan to re-join the joint committee. The Committee approved the recommendations as shown in 1.1 above.
- 1.5 In terms of the Committee's Constituting Agreement, any proposed change to the agreement, such as the proposed increase in the annual budget from \$112,000 to \$192,000, population changes used in the funding formula, using a portion of this budget to fund a staff position, and inviting more Councils to join the CWJC needs to individually be approved by all member Councils. Only after all member Councils have formally approved the proposed changes, can the matter proceed. The staff position and budget changes are dependent on the outcomes of this invitation.

- 1.6 **Table 1.1** shows the indicative contributions from each Council, based on a \$10/t increase in levy funding and on latest population figures. This table would need to be updated should Environment Canterbury agree to become a member of the Committee and contribute towards funding projects, or alternatively if ECan did not agree to rejoin the Committee and the remaining member Councils were to fund all of the costs associated with employing the staff member rather than just funding the salary.

<b>Councils</b>	<b>Current Contribution</b>	<b>Proposed Contribution</b>	<b>Proposed Increase</b>
Christchurch	\$74,816.00	\$117,659.92	\$42,843.92
<b>Waimakariri</b>	<b>\$9,441.60</b>	<b>\$19,287.05</b>	<b>\$9,845.45</b>
Hurunui	\$2,195.20	\$3,964.72	\$1,769.52
Selwyn	\$7,851.20	\$20,777.54	\$12,926.34
Ashburton	\$5,835.20	\$10,552.73	\$4,717.53
Kaikōura	\$750.40	\$1,257.98	\$507.58
Waimate	\$1,489.60	\$2,456.34	\$966.74
Mackenzie	\$795.20	\$1,615.70	\$820.50
Timaru	\$8,825.60	\$14,428.02	\$5,602.42
<b>TOTAL</b>	<b>\$112,000.00</b>	<b>\$192,000.00</b>	<b>\$80,000.00</b>

**Table 1.1: Estimated Impact of the Proposed Increase in Funding for Regional Projects in 22/23.**

- 1.7 There is a \$30,000 budget allowance in the 22/23 year of the WDC's LTP, which is more than sufficient to fund the proposed increase to CWJC funding. If ECan choose not re-join the CWJC, the regional funding for the additional staff resources would need to be re-calculated. The WDC's \$30,000 budget allowance is likely to be sufficient to provide additional funding for this purpose.

Attachments:

- i. Unconfirmed minutes from CWJC meeting of 2 September 2021 (210823136834)
- ii. Staff report to CWJC: Regional Waste Minimisation Coordination in Canterbury (210823136842)
- iii. Detailed Funding Calculations (210823136848)
- iv. Long Term Plan Budgets to Fund CWJC (210823136849)

## **2. RECOMMENDATION**

**THAT** the Council:

- (a) **Receives** Report No. 210811131920.
- (b) **Approves**, subject to the conditions in 2(c), the Canterbury Waste Joint Committee recommendations to member Councils to:
  - i. Agree that a new staff position be created to progress waste minimisation and management initiatives across the region and improve regional collaboration.
  - ii. Agree that the budget for regional waste minimisation be increased from \$112,000 to \$192,000, to be adjusted annually for inflation.
  - iii. Agree that Environment Canterbury be invited to become a member of the Committee on the same terms and conditions as its previous membership.

- (c) **Notes** that the Waimakariri District Council approval is subject to Environment Canterbury re-joining the Canterbury Waste Joint Committee, and to hosting and funding overheads and other costs over and above the salary of the regional staff member.
- (d) **Notes** that the proposed increase in total CWJC funding would see the Waimakariri District Council's funding share increase from \$9,441.60 to \$19,287.05 in 2022/23.
- (e) **Notes** that that the budget allowance for Canterbury Waste Joint Committee funding in the 22/23 year is \$30,000, therefore the 2021-31 Long Term Plan budget allocation to fund the Canterbury Waste Joint Committee out of the Waste Minimisation Account is sufficient to cover the proposed level of funding.
- (f) **Notes** that the activities and projects in the Waste Minimisation Account are primarily funded by the waste disposal levy received from the Ministry for the Environment.
- (g) **Notes** that any further amendments to the regional waste minimisation budget and contributions from individual Councils will be brought back to the Council for approval.
- (h) **Notes** that Environment Canterbury withdrew from the Canterbury Waste Joint Committee in 2010/11 in order to focus on hazardous waste in combination with industrial pollution as a core activity.
- (i) **Notes** that staff from Environment Canterbury have continued to contribute time toward the regional staff group since 2011/12 and support this proposal, however and their appetite to re-join has not been canvassed with any ECan managers, the Chief Executive or Councillors.
- (j) **Notes** that the recruitment timeline for the staff position is dependent on receiving approval from all contributing Councils and whether or not Environment Canterbury agrees to re-join the CWJC and to host the staff position.

### 3. **BACKGROUND**

- 3.1 In 2005, councils that were members of the Canterbury Joint Standing Committee and Canterbury Waste Subcommittee resolved to replace these two committees with a Canterbury Waste Joint Committee (CWJC) that included Environment Canterbury (ECan) in addition to the 8 District Councils and Christchurch City Council. A Constituting Agreement for the new committee was prepared and endorsed by all participating Councils, and the CWJC came into effect on 1 July 2006.
- 3.2 The CWJC is a joint committee under the Local Government Act 2002 with delegated authority to deal with all matters relating to regional waste minimisation initiatives across the region, in order to reduce the volumes of solid waste sent for disposal. Regionally coordinated waste minimisation initiatives are undertaken in addition to those that territorial authorities are achieving in terms of their own Waste Management and Minimisation Plans.
- 3.3 The CWJC is separate to the Canterbury Regional Landfill Joint Committee (CRLJC), which has delegated authority from its member Councils to deal with all matters relating to the participation in the joint landfill venture for the purposes of owning and operating the Canterbury Regional Landfill at Kate Valley and associated transport and collection systems (transfer stations to the landfill only). The CRLJC members consist of Ashburton District, Christchurch City, Hurunui District, Selwyn District and Waimakariri District Councils.
- 3.4 On 9 August 2010 Commissioner Tom Lambie advised the CWJC about Environment Canterbury's proposal to withdraw from the CWJC. A letter and report had been sent by Environment Canterbury concerning its future participation in this committee and in the Hazardous Waste subcommittee.
- 3.5 Commissioner Tom Lambie explained that Environment Canterbury were looking for more efficiencies in their operation and that the intent was to focus on hazardous waste in

combination with industrial pollution as a core activity, moving away from other forms of waste. He assured the Committee that the programmes set up under the Regional Hazardous Waste Strategy were in place until 2012 and that they would not “drop off the agenda”.

- 3.6 Committee members commented on the proposal, with some expressing concern that Environment Canterbury would no longer be involved as a voting member. Commissioner Lambie agreed to feed back these concerns.
- 3.7 On 26 August 2010 ECan formally confirmed that decision, and resolved that Environment Canterbury:
- (a) *Removes itself from the Canterbury Hazardous Waste Subcommittee and any current and future responsibility for servicing the subcommittee, including any subsequent changes to Project Levels of Service and Funding;*
  - (b) *Approves the change in status of Environment Canterbury on the Canterbury Waste Joint Committee from member to observer, and notes that as an act of good faith will contribute the agreed contribution for the 2010/11 financial year;*
  - (c) *Requests staff work with the territorial authorities to ensure agreed work programmes are delivered.*
- 3.8 Overall funding was reduced from \$150,000 to the current \$112,000 per annum. The CWJC Constituting Agreement was amended to reflect this change, all Canterbury Councils ratified the changes, and the amended document was signed in June 2011. Since July 2011, staff from Environment Canterbury have continued to contribute to and support the regional waste staff group that reports to the CWJC.
- 3.9 The current membership of the CWJC is Ashburton, Hurunui, Kaikōura, Mackenzie, Selwyn, Timaru, Waimakariri and Waimati District Councils and Christchurch City Council (CCC). The Committee is formed of Council representatives from each Council: one from each district, and 3 from the CCC who have to vote as a block. One of the CCC Councillors acts as Chair (currently Cr. Chen), and the Deputy Chair is selected from the District Council representatives (currently Cr. Brine).
- 3.10 At their meeting on 2 August 2021, the CWJC considered a report from staff that recommended *That the Canterbury Waste Joint Committee (CWJC):*
- (a) *Recommends to member Councils that a new staff position be created to progress waste minimisation and management initiatives across the region and improve regional collaboration.*
  - (b) *Recommends to member Councils that the budget for regional waste minimisation be increased from \$112,000 to \$192,000, to be adjusted annually for inflation.*
  - (c) *Recommends to member Councils that Environment Canterbury be invited to become a member of the Committee on the same terms and conditions as its previous membership.*
- 3.11 The above recommendations were passed, and the CWJC has recommended that their member Councils:
- a) *Agree that a new staff position be created to progress waste minimisation and management initiatives across the region and improve regional collaboration.*
  - b) *Agree that the budget for regional waste minimisation be increased from \$112,000 to \$192,000, to be adjusted annually for inflation.*
  - c) *Agree that Environment Canterbury be invited to become a member of the Committee on the same terms and conditions as its previous membership.*

- 3.12 The draft public minutes from the CWJC meeting are appended in *Attachment i* and the staff report is appended in *Attachment ii*.

#### 4. **ISSUES AND OPTIONS**

- 4.1. In accordance with the Constituting Agreement, all member councils need to support the resolution before any actions can be taken.
- 4.2. There are regional collaboration opportunities that are not being taken up as staff of the territorial authorities are fully committed with business-as-usual tasks and their own projects. It is recommended that the Joint Committee fund a shared services position to progress waste minimisation and management initiatives that benefit all funding members.
- 4.3. All territorial authorities prepare waste management and minimisation plans, and there is support amongst staff for closer cooperation between Councils to align their waste plans, including the possibility of joint plans. Environment Canterbury could contribute towards that process.
- 4.4. It is also suggested that Environment Canterbury be invited to re-join the Committee and be approached to host this position within their Contaminated Land and Waste Team. This position would work closely with the Senior Science Advisor Hazardous Substances and Waste to drive progress in a number of areas across the region.
- 4.5. The staff from each Territorial Authority, with the support of Environment Canterbury, would like to work as a collective force for good to:
- 4.5.1. Attract high-quality applications and optimise funding from the Committee.
  - 4.5.2. Administer the application process and provide reporting to the Committee.
  - 4.5.3. Identify and implement more consistent regulations and standards across the region.
  - 4.5.4. Contribute toward the development of regional waste minimisation action plans and programmes.
  - 4.5.5. Facilitate the sharing of resources, knowledge, communications and education materials that influence behaviour change within the region.
  - 4.5.6. Progress initiatives that address illegal dumping, litter and stockpiling practices.
  - 4.5.7. Investigate ideas and potential projects that could become a future regional waste minimisation grant bid.
  - 4.5.8. Identify opportunities to provide Canterbury-specific feedback into waste-related government consultation.
  - 4.5.9. Identify successful initiatives from other regions in New Zealand that could be implemented in Canterbury.
- 4.6. The proposed staff position would be a two year fixed term role, with the option to consider extending the position. The budget for the role would come from the increased waste disposal levies that each Council receives from 1 July 2021 (refer to Table 4.1). It is suggested that in lieu of financial contributions ECan could host this position within their Contaminated Land and Waste Team, as it is a regional position and it would strengthen the working relationships between ECan and the other Councils.
- 4.7. Recruitment for this position could commence in late 2021 with the expectation of the role commencing early in 2022, however this may be influenced on ECan's decision. There is sufficient budget available in the 21/22 year to fund the staff role for a portion of the year.

- 4.8. **Table 4.1** shows the indicative contributions from each Council for the 2022/23 year onwards, based on the changes in population figures between 2021 and 2020, and allowing for the \$10/tonne increase in levy funding.

<b>Councils</b>	<b>Current Contribution</b> 2010 population	<b>Proposed Contribution</b> 2020 population	<b>Proposed Increase</b>	<b>Proposed Increase</b>
Christchurch	\$74,816.00	\$117,659.92	\$42,843.92	57.3%
<b>Waimakariri</b>	<b>\$9,441.60</b>	<b>\$19,287.05</b>	<b>\$9,845.45</b>	<b>104.3%</b>
Hurunui	\$2,195.20	\$3,964.72	\$1,769.52	80.6%
Selwyn	\$7,851.20	\$20,777.54	\$12,926.34	164.6%
Ashburton	\$5,835.20	\$10,552.73	\$4,717.53	80.8%
Kaikōura	\$750.40	\$1,257.98	\$507.58	67.6%
Waimate	\$1,489.60	\$2,456.34	\$966.74	64.9%
Mackenzie	\$795.20	\$1,615.70	\$820.50	103.2%
Timaru	\$8,825.60	\$14,428.02	\$5,602.42	63.5%
<b>TOTAL</b>	<b>\$112,000.00</b>	<b>\$192,000.00</b>	<b>\$80,000.00</b>	<b>71.4%</b>

**Table 4.1: Estimated Impact of the Proposed Increase in Funding for Regional Projects in 22/23.**

- 4.9. These increases are based on adding the estimated salary for the new staff position to existing budgets, and re-calculating the budget split based on changes in population over the last 10 years.
- 4.10. Staff note that there is still uncertainty whether Environment Canterbury would accept the invitation to re-join the CWJC and to host the proposed staff position. Whether or not they accept and agree to provide additional funding, the regional staff group would prepare a new funding model for CWJC to consider for recommendation to their member Councils for approval, as part of the amendments to the Constituting Agreement.
- 4.11. It was anticipated that there would be additional costs associated with an increased level of activity by the CWJC to explore opportunities for investing in regional waste diversion infrastructure, and looking at other investments that would divert more waste from landfill. WDC has approved an increased in the budget allowance for CWJC in the Waste Minimisation Account as from the current year, increasing from \$11,900 in 20/21 to \$20,000 in 21/22, to \$30,000 in 22/23 and increasing in proportion with landfill levy increases to \$60,000 in 24/25.
- 4.12. This increased budget is funded by our 'share' of the increased Landfill Levy. There is sufficient budget allocated for the proposed increase in funding. The financial implications for Waimakariri District from this increase in funding are discussed in more detail in Section 6 below.
- 4.13. The following options are discussed below: support the CWJC recommendation in full, not support the CWJC recommendation, or only support a portion of the CWJC recommendation.
- 4.14. Option 1: Support the CWJC Recommendation in Full.

Supporting this resolution will enable the CWJC Chair to extend an invitation to ECan to re-join the CWJC and to host the regional staff resource as their funding share, and for the staff position description to be finalised pending ECan's decision on funding regional initiatives and on hosting the proposed staff position.

This would better allow regional collaboration opportunities to be taken up and overseen as outlined in 4.3 and 4.5 above.

Staff note that the proposed level of funding is dependent on the outcome of the approach to ECan which, while having support at a staff level, is uncertain. Staff propose to provide further information to the CWJC and this Council, once the outcome of the invitation is known.

This is the recommended option.

4.15. Option 2: Do not Support the CWJC Recommendation (Status Quo).

There have been benefits to all Councils from regional waste minimisation activities that are funded out of the funding pool. This has included development of the Canterbury Hazardous Waste Strategy and funding household hazardous waste infrastructure for all Canterbury Councils, funding research & development projects within Canterbury, and funding waste minimisation projects across the region that have been proposed by Council staff, community groups and businesses.

Current staffing resources and workloads are impacting on the time that individual staff have to undertake work to reduce waste on a regional level on behalf of the CWJC. There is currently insufficient staff resource to prepare a regional action plan or an infrastructure investment plan to further the CWJS's aims to reduce waste going to landfill in the Canterbury region.

Regional funding levels are currently insufficient to employ a staff resource in addition to providing funding for waste minimisation projects. Inviting ECan to re-join the CWJC and to cover the costs for hosting the regional staff resource as their funding share, is considered to be appropriate at this point in time as it would be beneficial to that Council as well as the current CWJC Council-members.

This is not recommended.

4.16. Option 3: Support Only a Portion of the CWJC Recommendation.

All member Councils have to support the specific recommendation that has come from the CWJC in its entirety to proceed with any of the proposed actions. This option would result in a delay in the approach to ECan, or to commencing recruitment in order to fill the proposed staff position, even if either of these actions were supported.

This is not recommended.

**Implications for Community Wellbeing**

There are not implications on community wellbeing by the issues and options that are the subject matter of this report.

4.17. The Management Team has reviewed this report and support the recommendations.

**5. COMMUNITY VIEWS**

5.1. **Mana whenua**

Te Ngāi Tūāhuriri hapū are not likely to be affected by, or have an interest in the subject matter of this report.

## 5.2. Groups and Organisations

There are groups and organisations likely to be affected by, or to have an interest in the subject matter of this report. Local groups and organisations have the opportunity to seek funding from the CWCJ for projects that will divert materials from landfill. Increasing the amount of funding for the staff resource will ensure that the funding pool remains intact for these groups and organisations in future years.

## 5.3. Wider Community

The wider community is not likely to be affected by, or to have an interest in the subject matter of this report.

## 6. OTHER IMPLICATIONS AND RISK MANAGEMENT

### 6.1. Financial Implications

There are financial implications of the decisions sought by this report.

**Table 6.1** shows that the WDC's contribution would increase from \$9,441.60 p.a. to \$19,287.05 in the 22/23 year, and that this would be inflation-adjusted thereafter. A table showing the detailed calculations is appended in *Attachment iii*.

Councils	Current Contribution 2010 population	Proposed Contribution 2020 population	Proposed Increase (\$)	Proposed Increase (%)
Christchurch	\$74,816.00	\$117,659.92	\$42,843.92	57.3%
<b>Waimakariri</b>	<b>\$9,441.60</b>	<b>\$19,287.05</b>	<b>\$9,845.45</b>	<b>104.3%</b>
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<b>TOTAL</b>	<b>\$112,000.00</b>	<b>\$192,000.00</b>	<b>\$80,000.00</b>	<b>71.4%</b>

**Table 6.1: Estimated Impact of the Proposed Increase in Funding for Regional Projects in 22/23.**

These increases are based on adding the estimated salary for the new staff position to existing budgets, and re-calculating the budget split based on changes in population over the last 10 years. They assume that ECan will agree to re-join the CWJC and that the overhead costs for hosting and resourcing the staff position would be entirely funded by ECan in lieu of a financial contribution towards the CWCJ.

This Council has approved a budget allowance of \$20,000 for CWJC funding in the 21/22 year, and this allowance will be increased in proportion to the proposed increases in the landfill levy as shown in **Table 6.2**.



Year	2021/22	2022/23	2023/24	2024/25	2025/26	2030/31
Landfill Levy	\$20	\$30	\$50	\$60	\$60	\$60
Est. Levy Income (\$000)	\$383	\$596	\$963	\$1,158	\$1,176	\$1,273
Canty Waste Sub committee Budget (\$)	\$20,000	\$30,000	\$50,000	\$60,000	\$60,000	\$60,000
Proposed CWJC Funding Increase <sup>1</sup> (\$)	\$9,442	\$19,287	\$19,577	\$19,910	\$30,308	\$22,909
<i>Potential CWJC Funding Increase<sup>2</sup> (\$)</i>	\$9,442	\$23,400	\$23,800	\$24,200	\$24,700	\$27,800

**Table 6.2: Budget Allowances and Forecast CWJC Funding Increases**

Note 1: There is sufficient budget available for WDC to fund their portion of this proposed increase in CWJC budgets in the 22/23 year. Note that our funding would need to be adjusted for inflation in order to match proposed inflation adjustments to the funding call for the CWJC. There is also sufficient budget over the LTP period to fund additional operational or capital costs, should this be called on.

Note 2: If ECan did not re-join the CWJC, and the regional staff position was to be hosted by another Council, the additional resourcing costs (office space, equipment, overheads, etc.) would have to be funded by an additional increase in CWJC funds. WDC staff estimate that the costs for this could be in the region of \$40,000 p.a. and would result in a 21% increase in the funding call. Our \$30,000 budgetary allowance in 22/23 would be sufficient to fund the increase to our proportional share. Note that these costs/budgets have not been provided by the regional staff group, but have been calculated by WDC staff as a comparison of costs in the event that ECan did not re-join the CWJC.

The actual costs for operations are invoiced at the end of each financial year, therefore any under-spend of the regional budget would result in a cost-saving to each Council. These unspent funds cannot be carried over, as they funded out of operational budgets.

A regional approach to waste minimisation and diversion is important, and would result in more consistent regulations and standards across the region, and contribute toward the development of regional waste minimisation action plans and programmes. Projects coordinated through the CWJC could leverage additional government funding, particularly in relation to construction of regional infrastructure that will divert waste in Canterbury or in the wider South Island.

## 6.2. Sustainability and Climate Change Impacts

The recommendations in this report do have sustainability and/or climate change impacts. A regional staff resource would facilitate the sharing of resources, knowledge, communications and education materials that influence behaviour change within the region, and would progress initiatives that address illegal dumping, litter and stockpiling practices across the region.

Individual Councils' Waste Management & Minimisation Plans have been and will continue to be used to develop action plans to reduce the amount of waste going to landfill and improve resource efficiency. By providing a regional overview of these WMMPs, the staff-member could ensure that there is consistency between these action plans, and support these through a regional Waste Minimisation Action Plan.

## 6.3 Risk Management

There are risks arising from the adoption/implementation of the recommendations in this report.

ECan may not agree to re-join the CWJC. In this case, the Joint Committee and member Councils would need to consider a different level of funding for the staff position. Hosting costs are estimated to be up to an additional \$80,000. This Council has sufficient budget

available to fund the estimated 40-45% increase in funding that this would necessitate in the 22/23 year.

ECan may agree to re-join the CWJC but at a lower level of funding. ECan could opt to provide 25% of total funding (approximately \$68,000, based on the \$192,000 funding currently proposed from the 9 member Councils) as was previously the case. As per the previous risk, the Joint Committee and member Councils would need to consider a different level of funding to ensure the remainder of the costs associated with hosting staff position are covered. This would be lower than the above increase and could be accommodated within our own current LTP budgets.

The recruitment may not be successful in the short term. Existing staff would continue to manage the regional projects as they have been doing in the past, and would endeavour to work together to prepare an action and investment plan. A consultant could be called on to provide assistance on some of the work-plan, however this would be less cost-effective than having a staff member undertake the same level of work.

### 6.3 Health and Safety

There are health and safety risks arising from the adoption/implementation of the recommendations in this report. The employer of the staff member would be responsible for that individual's health, safety and wellbeing.

## 7. CONTEXT

### 7.1. Consistency with Policy

This matter is not a matter of significance in terms of the Council's Significance and Engagement Policy.

### 7.2. Authorising Legislation

Waste Minimisation Act:

S42 requires Councils to promote effective and efficient waste management and minimisation within its district

S43(1) requires Councils to adopt a waste management and minimisation plan to give effect to S42, and under S43(1)(c) state how the plan is to be funded

### 7.3. Consistency with Community Outcomes

The Council's community outcomes are relevant to the actions arising from recommendations in this report.

#### ***There is a healthy and sustainable environment for all***

- Harm to the environment from the impacts of land use, use of water resources and air emissions is minimised
- Low carbon, climate-resilient development in the district is promoted to be compatible with a 1.5 degree C national and global carbon budget
- People are actively encouraged to participate in improving the health and sustainability of our environment

#### ***Core utility services are sustainable, low emissions, resilient, affordable; and provided in a timely manner***

- Waste recycling and re-use of solid waste is encouraged and residues are managed so that they minimise harm to the environment
- Renewable energy technologies and their efficient use is encouraged
- Climate change considerations are incorporated into all infrastructure decision-making processes
- Good procurement practice and effective long-term planning ensures services are affordable and value for money for the community
- Infrastructure services are managed in a way that reduces emissions over time

7.4. **Authorising Delegations**

In accordance with the Constituting Agreement, all member councils need to support the resolution before any actions can be taken.

This Council has the delegated authority to consider the recommendations in this report.

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## Canterbury Waste Joint Committee

### OPEN MINUTES

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**Date:** Monday 2 August 2021  
**Time:** 12 noon  
**Venue:** Council Chambers, Civic Offices,  
53 Hereford Street, Christchurch

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#### Present

Chairperson Councillor Jimmy Chen - Christchurch City Council  
Deputy Chairperson Councillor Robbie Brine - Waimakariri District Council  
Members Councillor Stuart Barwood - Mackenzie District Council  
Councillor Liz McMillan - Ashburton District Council  
Councillor Sam MacDonald - Christchurch City Council  
Councillor Phil Mauger - Christchurch City Council  
Councillor Grant Miller - Selwyn District Council  
Councillor Derrick Millton - Kaikoura District Council  
Councillor Miriam Morton - Waimate District Council  
Councillor Michael Ward - Hurunui District Council

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Petrea Downey  
Committee Advisor  
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petrea.downey@ccc.govt.nz  
[www.ccc.govt.nz](http://www.ccc.govt.nz)

**Karakia Timatanga:** Given by Councillor Chen.

The agenda was dealt with in the following order.

## 1. Apologies Ngā Whakapāha

### Joint Committee Resolved CJWC/2021/00001

That the apologies received from Councillor O'Reilly for absence and for early departure from Councillors MacDonald and Mauger, be accepted.

Councillor Chen/Councillor Mauger

**Carried**

## 2. Declarations of Interest Ngā Whakapuaki Aronga

There were no declarations of interest recorded.

## 3. Confirmation of Previous Minutes Te Whakaāe o te hui o mua

### Joint Committee Resolved CJWC/2021/00002

That the minutes of the Canterbury Waste Joint Committee meeting held on Monday, 30 November 2020 be confirmed.

Councillor Chen/Councillor Miller

**Carried**

## 4. Report Back on 2020/21 Funded Projects

### Joint Committee Resolved CJWC/2021/00003

**Officer recommendation accepted without change**

#### Part C

That the Canterbury Waste Joint Committee receive the information.

Councillor Chen/Councillor Morton

**Carried**

Councillor MacDonald left the meeting at 12.16pm during discussion on item 5.

## **5. Regional Waste Minimisation Coordination in Canterbury**

### **Joint Committee Resolved CJWC/2021/00004**

#### **Officer recommendation accepted without change**

#### **Part C**

That the Canterbury Waste Joint Committee (CWJC):

1. Recommends to member Councils that a new staff position be created to progress waste minimisation and management initiatives across the region and improve regional collaboration.
2. Recommends to member Councils that the budget for regional waste minimisation be increased from \$112,000 to \$192,000, to be adjusted annually for inflation.
3. Recommends to member Councils that Environment Canterbury be invited to become a member of the Committee on the same terms and conditions as its previous membership.

Councillor Chen/Councillor Barwood

**Carried**

#### **Joint Committee Recommendation to Council**

#### **Part A**

That the Council:

1. Agree that a new staff position be created to progress waste minimisation and management initiatives across the region and improve regional collaboration.
2. Agree that the budget for regional waste minimisation be increased from \$112,000 to \$192,000, to be adjusted annually for inflation.
3. Agree that Environment Canterbury be invited to become a member of the Committee on the same terms and conditions as its previous membership.

## **6. Resolution to Exclude the Public**

### **Joint Committee Resolved CJWC/2021/00005**

#### **Part C**

That at 12.26pm the resolution to exclude the public set out on pages 29 to 30 of the agenda be adopted.

Councillor Brine/Councillor Millton

**Carried**

**The public were re-admitted to the meeting at 1.23pm.**

**Karakia Whakamutunga:** Given by Councillor Chen.

Meeting concluded at 1.24pm.

**CONFIRMED THIS (day to be confirmed) DAY OF AUGUST 2022**

**COUNCILLOR JIMMY CHEN  
CHAIRPERSON**

Unconfirmed

## 5. Regional Waste Minimisation Coordination in Canterbury

Reference Te Tohutoro: 21/942006

Report of Te Pou Matua: Zed Potgieter, Senior Resource Advisor

General Manager Jane Davis, General Manager Infrastructure, Planning and  
 Pouwhakarae: Regulatory Services

### 1. Purpose of Report Te Pūtake Pūrongo

- 1.1 To provide information and gain support from the Committee for a new Shared Services staff position and to consider inviting Environment Canterbury to become a member of the Committee.

### 2. Officer Recommendations Ngā Tūtohu

That the Canterbury Waste Joint Committee (CWJC):

1. Recommends to member Councils that a new staff position be created to progress waste minimisation and management initiatives across the region and improve regional collaboration.
2. Recommends to member Councils that the budget for regional waste minimisation be increased from \$112,000 to \$192,000, to be adjusted annually for inflation.
3. Recommends to member Councils that Environment Canterbury be invited to become a member of the Committee on the same terms and conditions as its previous membership.

### 3. Background

- 3.1 There are regional collaboration opportunities that are not being taken up as staff of the territorial authorities are fully committed with business-as-usual tasks and their own projects. It is recommended that the Joint Committee fund a shared services position to progress waste minimisation and management initiatives that benefit all funding members.
- 3.2 It is suggested that Environment Canterbury be invited to re-join the Committee and be approached to host this position within their Contaminated Land and Waste Team. This position would work closely with the Senior Science Advisor Hazardous Substances and Waste to drive progress in a number of areas.
- 3.3 The first area of improvement would be to the Committee processes, in particular, the initial assessment of projects against the funding criteria, monitoring of funded projects, reporting back to the Committee and accountability for delivering the intended outcomes. The staff from each Territorial Authority, with the support of Environment Canterbury, would like to work as a collective force for good to:
  - Attract high-quality applications and optimise funding from the Committee.
  - Administer the application process and provide reporting to the Committee.
  - Identify and implement more consistent regulations, standards and level of service across the region.
  - Contribute to the development and implementation of regional action plans and programmes in accordance with the needs and commitments of the Canterbury Territorial Authorities as guided by the Committee's Staff Group.



- Facilitate the sharing of resources, knowledge, communications and education materials that influence behaviour change within the region.
  - Progress initiatives that address illegal dumping, litter and stockpiling practices.
  - Investigate ideas and potential projects that could become a future regional waste minimisation grant bid.
  - Identify opportunities to provide Canterbury-specific feedback into waste-related government consultation.
  - Identify successful initiatives from other regions in New Zealand that could be implemented in Canterbury.
- 3.4 A draft job description is included (Attachment 1). The initiatives and projects which staff would like to see this position progress would be agreed and documented in a regional action plan, forming the work programme for this position. Initial ideas for coordination and collaboration include:
- Facilitating the development of a regional action plan or strategy which may lead to a future regional Waste Management and Minimisation Plan.
  - Improving consistency in waste-related bylaws and agreeing on standard text to be inserted in each bylaw.
  - Working to pilot initiatives and act as a conduit between the commercial solution providers and rural communities to reduce waste disposal to farm rubbish pits.
  - Implementation of the waste hierarchy, as well as, assessing initiatives for climate change resilience and decarbonisation.
  - Working with industry to transfer the small battery collection scheme to retailers and embed the scheme within the future regulated product stewardship scheme.
  - Assessing the impacts of regulated product stewardship for our region and the changes to the waste disposal levy including stockpiling, litter and fly-tipping.
  - Assessing recycling, reuse and repair infrastructure required to support keeping materials in circulation and avoid landfilling.
- 3.5 Environment Canterbury staff have continued over the years to assist the Staff Group of the Committee with specialist advice on hazardous waste, agricultural waste and general waste advice as needed. Should the proposed Shared Resources position, as recommended in this report eventuate, then the close working relationship between staff of the nine member councils and Environment Canterbury would be strengthened.
- 3.6 A possible scenario set out below in the table is for each Council (based on current membership) to contribute to the salary (up to \$80,000) based on their respective rating base as per the current Joint Committee allocations. This contribution is in addition to the current funding pool of \$112,000, increasing the fund to \$192,000. The details of the increase in contribution from each council is outlined in Table 1 below. The start date for this position would at the earliest be half-way through the financial year so 50% (depending on start date) of the funds outlined in Table 1 will be required for 2021/22 year.
- 3.7 The proposal is for the commitment to be for two years and the position to be a fixed term role, with the option to consider extending the position. The budget for this role would come from the increased waste disposal levies that each Council receive from 1 July 2021. Recruitment for this position could commence in late 2021 with the expectation of the role commencing early in 2022.

- 3.8 The costs below are indicative only, and would need to be updated should Environment Canterbury be invited and should it decide to become a member of the Committee.

<b>Councils</b>	<b>Current Contribution</b>	<b>Proposed Contribution</b>	<b>Proposed Increase</b>
<i>Christchurch</i>	\$74,816.00	\$117,659.92	\$42,843.92
<i>Waimakariri</i>	\$9,441.60	\$19,287.05	\$9,845.45
<i>Hurunui</i>	\$2,195.20	\$3,964.72	\$1,769.52
<i>Selwyn</i>	\$7,851.20	\$20,777.54	\$12,926.34
<i>Ashburton</i>	\$5,835.20	\$10,552.73	\$4,717.53
<i>Kaikōura</i>	\$750.40	\$1,257.98	\$507.58
<i>Waimate</i>	\$1,489.60	\$2,456.34	\$966.74
<i>Mackenzie</i>	\$795.20	\$1,615.70	\$820.50
<i>Timaru</i>	\$8,825.60	\$14,428.02	\$5,602.42
<b>TOTAL</b>	<b>\$112,000.00</b>	<b>\$192,000.00</b>	<b>\$80,000.00</b>



**Table 1.** The impact of the increase in funding per contributing Council.

- 3.9 In terms of the Committee's Constituting Agreement, any proposed change to the agreement, such as the proposed increase in the annual budget from \$112,000 to \$192,000, plus using funding to fund a staff position, needs to first get support from the Committee, and then needs to individually be approved by all member Councils. Only after all member Councils have formally approved the proposed changes, could the matter proceed.

#### **Invitation to Environment Canterbury to Join the Committee**

- 3.10 Environment Canterbury had been a full participating member of the Committee in the 2000s and voluntarily withdrew due to focussing on other priorities. During that time Environment Canterbury contributed 25% of the funding made available for regional waste minimisation projects.
- 3.11 It is recommended that the Committee consider inviting Environment Canterbury to become a member of the Committee, join the territorial authorities at the table, participate in decision making and contribute funding. The conditions to the proposal to Environment Canterbury to join the Committee will need to be discussed and could be on the same basis as its previous membership.
- 3.12 All territorial authorities prepare waste management and minimisation plans, and there is support amongst staff for closer cooperation between Councils to align their waste plans, including the possibility of joint plans. Environment Canterbury could contribute towards that process.
- 3.13 Should the Committee decide to recommend to member councils to establish the shared services position and to invite Environment Canterbury, each member council of the Committee will need to individually support such a step before a formal invitation can be actioned.

## Attachments Ngā Tāpirihanga

No.	Title	Page
A  	Draft Shared Services Advertisement and Job Description text	25

## Confirmation of Statutory Compliance Te Whakatūrutanga ā-Ture

Compliance with Statutory Decision-making Requirements (ss 76 - 81 Local Government Act 2002).

(a) This report contains:

- (i) sufficient information about all reasonably practicable options identified and assessed in terms of their advantages and disadvantages; and
- (ii) adequate consideration of the views and preferences of affected and interested persons bearing in mind any proposed or previous community engagement.

(b) The information reflects the level of significance of the matters covered by the report, as determined in accordance with the Council's significance and engagement policy.

## Signatories Ngā Kaiwaitohu

<b>Author</b>	Zefanja Potgieter - Senior Resource Advisor
<b>Approved By</b>	Ross Trotter - Manager Resource Recovery Helen Beaumont - Head of Three Waters & Waste Jane Davis - General Manager Infrastructure, Planning & Regulatory Services Dawn Baxendale - Chief Executive

## Detailed calculations for funding amendments, based on population changes and additional budget requirement

Councils	Current			Proposed			Funding Increase	Percentage Increase
	Estimated Population <sup>1</sup>	Population and Funding	Contribution <sup>3</sup>	Estimated Population <sup>2</sup>	Population and Funding	Contribution <sup>4</sup>		
Christchurch	376,700	66.80%	\$74,816.00	394,700	61.28%	\$117,659.92	\$42,843.92	57.3%
Waimakariri	47,600	8.43%	\$9,441.60	64,700	10.05%	\$19,287.05	\$9,845.45	104.3%
Hurunui	11,100	1.96%	\$2,195.20	13,300	2.06%	\$3,964.72	\$1,769.52	80.6%
Selwyn	39,600	7.01%	\$7,851.20	69,700	10.82%	\$20,777.54	\$12,926.34	164.6%
Ashburton	29,400	5.21%	\$5,835.20	35,400	5.50%	\$10,552.73	\$4,717.53	80.8%
Kaikoura	3,800	0.67%	\$750.40	4,220	0.66%	\$1,257.98	\$507.58	67.6%
Waimate	7,550	1.33%	\$1,489.60	8,240	1.28%	\$2,456.34	\$966.74	64.9%
Mackenzie	4,010	0.71%	\$795.20	5,420	0.84%	\$1,615.70	\$820.50	103.2%
Timaru	44,400	7.88%	\$8,825.60	48,400	7.51%	\$14,428.02	\$5,602.42	63.5%
<b>TOTAL</b>	<b>564,160</b>	<b>100%</b>	<b>\$112,000.00</b>	<b>644,080</b>	<b>100%</b>	<b>\$192,000.00</b>	<b>\$80,000.00</b>	<b>71.4%</b>

<sup>1</sup> 2010 Statistics New Zealand Subnational Estimates, data from the current constituting agreement

<sup>2</sup> 2020 Statistics New Zealand Subnational Estimates, data from [www.statistics.govt.nz](http://www.statistics.govt.nz)

<sup>3</sup> Current fund total \$112,000

<sup>4</sup> Proposed fund total \$192,000

**Waste Minimisation Account: Budget Allowances for CWJC Funding over LTP Period 2021/22 to 2030/31**

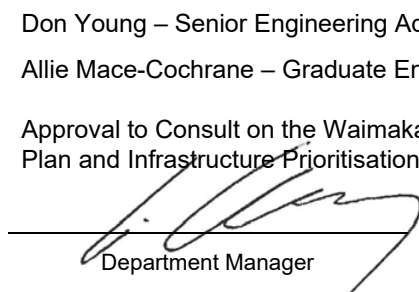
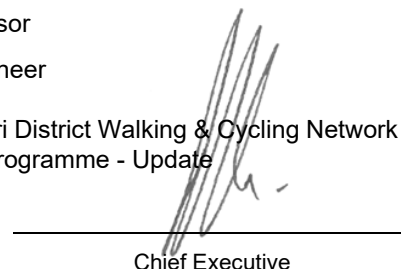
	Annual Plan Budget 20/21	Long Term Plan Budget 21/22	2 22/23	3 23/24	4 24/25	5 25/26	6 26/27	7 27/28	8 28/29	9 29/30	10 30/31
Landfill Levy \$/tonne	\$10	\$20	\$30	\$50	\$60	\$60	\$60	\$60	\$60	\$60	\$60
Estimated Landfill Levy Income	\$239,690	\$382,690	\$595,530	\$962,590	\$1,157,960	\$1,176,550	\$1,180,450	\$1,190,800	\$1,201,150	\$1,250,410	\$1,273,140
Canty Waste Sub committee	\$11,900	\$20,000	\$30,000	\$50,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000	\$60,000
Proposed CWJC Budget Increase <sup>1</sup>	\$9,442	\$9,442	\$19,287	\$19,577	\$19,910	\$20,308	\$20,754	\$21,231	\$21,741	\$22,306	\$22,909
Possible Budget Increase <sup>2</sup>	\$9,442	\$9,442	\$23,400	\$23,800	\$24,200	\$24,700	\$25,200	\$25,800	\$26,400	\$27,100	\$27,800

<sup>1</sup> Proposed CWJC Fund Total Including Inflation Adjustments

\$192,000	\$194,888	\$198,206	\$202,163	\$206,606	\$211,350	\$216,431	\$222,056	\$228,056
\$232,000	\$235,489	\$239,499	\$244,280	\$249,649	\$255,381	\$261,521	\$268,318	\$275,568

<sup>2</sup> Possible fund total if Ecan do not host staff member

(Estimated additional \$40,000 resourcing costs)

**WAIMAKARIRI DISTRICT COUNCIL****REPORT FOR DECISION****FILE NO and TRIM NO:** RDG-32-86/210826138519**REPORT TO:** COUNCIL**DATE OF MEETING:** 7<sup>th</sup> September 2021**AUTHOR(S):** Don Young – Senior Engineering Advisor  
Allie Mace-Cochrane – Graduate Engineer**SUBJECT:** Approval to Consult on the Waimakariri District Walking & Cycling Network Plan and Infrastructure Prioritisation Programme - Update**ENDORSED BY:**  
(for Reports to Council,  
Committees or Boards)  
\_\_\_\_\_  
Department Manager  
\_\_\_\_\_  
Chief Executive**1. SUMMARY**

- 1.1 The purpose of this report is to update Council on feedback received from the Community Boards, and subsequently seek approval to consult on the Waimakariri District Walking & Cycling Network Plan and associated prioritisation programme.
- 1.2 The report shown in Attachment i was presented to all of the Community Boards in August. Feedback was received during these meetings from two Community Boards; Oxford-Ohoka and Woodend-Sefton.
- 1.3 The recommended option is to approve public consultation on all of the proposed routes and prioritisations. This will enable engagement with both the public and key stakeholders to get their opinions on the proposed plan.

**Attachments:**

- i. Community Board Report – Approval to Consult on the Waimakariri District Cycle Network Plan and Infrastructure Prioritisation Programme (TRIM No. 210720118252v1)
- ii. Proposed Network Plan (TRIM No. 210722119967)
- iii. Option 1 - Prioritisation Programme (TRIM No. 210721119442)
- iv. Oxford-Ohoka Community Board Memo – Feedback on the Council's Cycle Network Plan Memo (TRIM No. 210720118263)

**2. RECOMMENDATION****THAT** the Council:

- (a) **Receives** Report No. 210826138519;
- (b) **Approves** consultation being carried out on the Walking and Cycling Network Plan (Attachment ii), and the proposed infrastructure prioritisation programme shown in Attachment iii, noting that the recreational paths are for information only due to different funding requirements;
- (c) **Notes** that the proposed infrastructure prioritisation programme is based on the joint budget allocation, by Council and Waka Kotahi, of \$4,700,000 across ten years, with the amount varying from year to year;
- (d) **Notes** that pre-engagement will be carried out in October, with district-wide consultation occurring from the start of November to the start of December;

- (e) **Notes** that the results of the public consultation and final proposals will be presented to the Community Boards and then Council for approval;
- (f) **Notes** the plan and prioritisation of routes will be reviewed every three years.

### 3. **BACKGROUND**

- 3.1 Refer to Attachment i for background details on the Waimakariri District Walking & Cycling Network Plan. This report was presented to all of the Community Boards during their August meetings.

### 4. **ISSUES AND OPTIONS**

- 4.1. The Oxford-Ohoka and Woodend-Sefton Community Boards provided feedback during the presentation of the report shown in Attachment i. It was requested that Council be updated on this feedback.

#### 4.2. Oxford-Ohoka Community Board feedback:

- Section 4.2 in Attachment i should be updated, as a memo (Refer to Attachment iv) was sent to staff from the Oxford-Ohoka Community Board on the 27<sup>th</sup> July 2021 and staff also met with Jim Gerard (Rangiora-Ashley Community Board Chair) on that day. *Staff comment: Whilst Section 4.2 was mistakenly not updated, comments from both the memo and meeting were included and covered within that report.*
- Refer to the network plan as the 'Walking & Cycling Network Plan' rather than the 'Cycle Network Plan'. *Staff comment: Will reference as the Walking and Cycling Network Plan.*
- There is desire from the board to have more links around rural schools. *Staff comment: During development of the network plan, staff have included more links around rural schools, whilst also ensuring there are sufficient links within townships. A comment section will be provided within the consultation material, enabling members of the public to comment on whether there is desire for more links to be included.*
- There was concern around the high-level rates provided as estimates for the infrastructure. *Staff comment: As explained in Attachment i, the rates used were based on a per metre rate from facilities which have been constructed throughout the district and also include an additional 20% for P&G costs. This is intended to provide a high-level cost estimate. When facilities are programmed to be constructed, a more detailed cost estimation will occur and if a project is determined to be less than estimated, this funding will be directed elsewhere in that Ward Area.*
- Although the Board wishes that the Tram Road link remains the priority for the Ward Area, they would like the same priority to be given to the High Street/Harewood Road link. They did suggest performing the Tram Road and the High Street/Harewood Road links as a package of works. *Staff comment: If the more detailed cost estimate on Tram Road were to come in under budget, then funding could be directed to the Harewood/High Street link. However, at this stage this link will remain programmed in years four to six, noting that this is also subject to feedback received during consultation.*

#### 4.3. Woodend-Sefton Community Board feedback:

- The first bullet point in Section 4.3.2 in Attachment i was confusing. It should be amended as shown below. *Staff comment: It should be amended as shown below.*

*'A link between Pegasus and Woodend, on the eastern side of State Highway 1, has now been included in the Network Plan and subsequently the prioritisation programme. This link has been included within years seven to ten as there is uncertainty surrounding the work being completed by Waka Kotahi along State Highway 1 and the potential for the Woodend Bypass in the future. This link is also relatively high-cost due to the requirement for a small pedestrian footbridge and piping of a substantial drain, and therefore it would be unsuitable for Council to fund this project if Waka Kotahi were then going to construct the bypass, resulting in this infrastructure being removed. If Waka Kotahi were to advance their works, then Council Staff would look to bring this budget forward and implement infrastructure which best fits around Waka Kotahi's proposals.'*

- The Board highlighted that thought would be required around wayfinding signage as the network plan is implemented. In particular, whether it was worth signposting areas where there may be greater safety concern, even if the entire route has not been built yet (i.e., on high traffic volume corridors). *Staff comment: Staff have been considering wayfinding signage as part of the network plan development and will ensure that this is implemented alongside infrastructure development. Staff will also go through and identify potential higher safety risk areas, in which signage would be beneficial, even if the full link is not constructed.*

#### 4.4. The Council has the following options available to them:

##### 4.4.1. Option One: Recommend Approval to Consult on the Current Walking & Cycling Network Plan and Prioritised Routes

This option involves recommending the approval of this report and authorisation granted to staff to undertake consultation on all of the proposed routes and prioritisations, once approved by Council.

This is the recommended option because staff have made amendments, based on the Community Boards feedback, to the prioritisation programme at a level which best fits with the budget currently provided by Council, noting that in some instances additional budget may potentially need to be asked for.

##### 4.4.2. Option Two: Recommend Approval to Consult for an Amended Walking & Cycling Network Plan and Prioritised Routes

This option recommends approving an amended scope to the proposed Walking & Cycling Network Plan and subsequent facility prioritisation outlined in this report, and authorising staff to undertake consultation, once approved by Council.

This is not the recommended option because staff have best allocated the network, based on feedback received by the Boards, somewhat within Council's yearly walking and cycling infrastructure budget. If additional links or higher cost links are to be added into, or shifted within the prioritisation programme, either additional budget will need to be allocated by Council, or links within the ward area and/or across the network will need to be removed from the prioritisation programme. There are also very few routes in the prioritisation programme which would be suitable for an initial lower level of service.



4.4.3. Option Three: Recommend Declining Consultation for the Proposed Walking & Cycling Network Plan and Prioritisations

This option recommends declining this report and asking staff to re-evaluate the Walking & Cycling Network Plan and prioritisation programme.

This is not the recommended option because staff completed briefings with the Boards asking for feedback on the Walking & Cycling Network Plan and prioritisation programme, and have since incorporated this feedback into both where possible. Declining consultation at this stage would also cause delays to this plan development and may push it outside of the 2021/2022 financial year.

- 4.5. There are implications on community wellbeing by the issues and options that are the subject matter of this report.

The addition of cycleways and shared paths provides infrastructure which encourages a greater uptake of walking and cycling, both for commuters and recreation. An uptake in walking and cycling also contributes to improved health and wellbeing of members within the community. Further to this, including infrastructure which caters for a wide range of skill levels encourages less confident cyclists, who may have otherwise chosen to travel via motor vehicle, to use the provided facilities.

- 4.6. The Management Team has reviewed this report and support the recommendations.

## 5. **COMMUNITY VIEWS**

### 5.1. **Mana whenua**

Te Ngāi Tūāhuriri hapū are likely to be affected by, or have an interest in the subject matter of this report.

There was a request from iwi to include a cycling link through Tuahiwi, which would join with the Rangiora to Woodend shared path. This has been included within the Walking & Cycling Network Plan, and also includes an additional length which connects to the Arohatia te awa path along the banks of the Cam River.

Once approval is received from Council, consultation documentation will be made available to Te Ngāi Tūāhuriri.

### 5.2. **Groups and Organisations**

There are groups and organisations likely to be affected by, or to have an interest in the subject matter of this report.

Once approval is received from Council, consultation documentation will be made available to the key stakeholders.

### 5.3. **Wider Community**

The wider community is likely to be affected by, or to have an interest in the subject matter of this report.

The Waimakariri Walking and Cycling Strategy 2017-2022 was developed following consultation with the public. The Walking & Cycling Network Plan has been developed based on this strategy and provides the public further opportunity to provide feedback on routes throughout the network.

Public consultation for this project includes three different phases; pre-engagement, engagement, and targeted engagement, noting that this consultation period will begin once approval has been granted by Council.

The pre-engagement phase is intended to socialise the idea of the Walking & Cycling Network Plan to the public.

During the engagement phase, staff will be asking the public for feedback on the route recommendations and prioritisation. This will be done through mapping tools, videos, visual displays, online tools, and information/drop-in sessions. There will also be an opportunity for the public to provide feedback on the level of investment from Council.

Once the plan is adopted, targeted consultation will occur as the prioritisation programme is fulfilled. This will include consultation with affected residents during the design phase, specifically detailing what the infrastructure will look like, the added amenity to the area, and the subsequent impacts to residents. The communication will continue during the construction phase to ensure residents remain up to date on any design changes or problems incurred.

## **6. OTHER IMPLICATIONS AND RISK MANAGEMENT**

### **6.1. Financial Implications**

There are financial implications of the decisions sought by this report.

There is \$50,000 allocated within PJ 101229.00.5135 for the Professional Fees associated with internal staff time and consultation documents within the 2021/2022 financial year. This is included within the \$4,700,000 allocated for the next ten years in the Long-Term Plan to implement this project from 2022/2023.

### **6.2. Sustainability and Climate Change Impacts**

The recommendations in this report do have sustainability and/or climate change impacts.

Creating a safe and accessible walking and cycling network, which comes with improving infrastructure, increases the uptake of these activities for both recreational and commuter users. This results in a subsequent decrease in the number of people using single occupancy vehicles, particularly for shorter trips. This comes with many benefits, including the reduction of greenhouse gas emissions.

### **6.3 Risk Management**

There are risks arising from the adoption/implementation of the recommendations in this report.

The recommendations in this report do carry the risk that the proposed network plan does not meet the expectations of the community. Further to this, the infrastructure may not be able to be delivered in the time frames expected and additional investment may be required to deliver the programme of works.

There is also risk that consultation may be delayed due to a COVID-19 outbreak.

### **6.3 Health and Safety**

There are health and safety risks arising from the adoption/implementation of the recommendations in this report.

These risks are associated with the potential for changes in alert level for COVID-19. If this were to occur, staff involved with consultation will follow guidelines prescribed by the New Zealand Government. This may require alternative methods of consultation to be sought or consultation to be delayed for a period of time. This will be managed as it occurs.

## **7. CONTEXT**

### **7.1. Consistency with Policy**

This matter is not a matter of significance in terms of the Council's Significance and Engagement Policy.

## 7.2. Authorising Legislation

The Land Transport Management Act is the relevant legislation for this matter.

## 7.3. Consistency with Community Outcomes

The Council's community outcomes are relevant to the actions arising from recommendations in this report.

### ***Public spaces and facilities are plentiful, accessible and high quality, and reflect cultural identity***

- There are wide-ranging opportunities for people to enjoy the outdoors
- The accessibility of community and recreation facilities meets the changing needs of our community

### ***Core utility services are sustainable, resilient, affordable; and provided in a timely manner***

- Climate change considerations are incorporated into all infrastructure decision-making processes

### ***There is a strong sense of community within our District***

- There are wide-ranging opportunities for people of different ages, abilities and cultures to participate in community life, and recreational and cultural activities.

### ***There are wide ranging opportunities for people to contribute to the decision making that affects our District***

- The Council takes account of the views across the community including mana whenua

### ***Transport is accessible, convenient, reliable and sustainable***

- The standard of our District's transportation system is keeping pace with increasing traffic numbers
- Communities in our District are well linked with each other and Christchurch is readily accessible by a range of transport modes

## 7.4. Authorising Delegations

The Community Boards are responsible for considering any matters of interest or concern within their ward area and making a recommendation to Council.

The decision-making rests with Council, as this is a significant issue which will set the framework for the Cycle Network in the future.

**WAIMAKARIRI DISTRICT COUNCIL****REPORT FOR DECISION**

**FILE NO and TRIM NO:** RDG-32-86 / 210720118252

**REPORT TO:** All Community Boards

**DATE OF MEETING:** 4<sup>th</sup> August 2021 (Oxford-Ohoka)  
9<sup>th</sup> August (Woodend-Sefton)  
11<sup>th</sup> August (Rangiora-Ashley)  
16<sup>th</sup> August (Kaiapoi-Tuahiwi)

**AUTHOR(S):** Don Young – Senior Engineering Advisor  
Allie Mace-Cochrane – Graduate Engineer

**SUBJECT:** Approval to Consult on the Waimakariri District Cycle Network Plan and Infrastructure Prioritisation Programme

**ENDORSED BY:**  
(for Reports to Council, Committees or Boards)

	Department Manager	Chief Executive
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**1. SUMMARY**

- 1.1 The purpose of this report is to seek approval from the Community Boards to consult on the Waimakariri District Cycle Network Plan and associated infrastructure prioritisation programme.
- 1.2 The reason for developing the Waimakariri Cycle Network Plan is to deliver upon the actions which have been agreed and endorsed in the Waimakariri Walking & Cycling Strategy 2017-2022. This strategy has a vision that “Waimakariri residents choose to walk and cycle, and that the environment is friendly, safe and accessible for walkers and cyclists”.
- 1.3 The Cycle Network Plan is intended to provide a future network where individuals of different abilities are catered for and are subsequently more inclined to use active modes. It is also intended to provide direction for Council to implement cycle infrastructure in future years and ensures there is an underlying connected network for the basis of decision making.
- 1.4 In recent years, the Waimakariri District has seen a greater uptake of cycling due to the development of the Passchendaele Path and Rangiora to Woodend Path, amongst other cycle infrastructure. Recently, the Christchurch Northern Corridor (CNC) has been developed, improving accessibility to Christchurch and the Waimakariri District for a far greater range of cycling abilities and has been complimented with the opening of the path connecting the CNC to Kaiapoi. Once the Kaiapoi Town link is finished, there will be a complete link formed between Rangiora and Christchurch.
- 1.5 All Boards were briefed during their respective July meetings on the Cycle Network Plan and subsequent prioritisation programme. The key concerns and recommendations made by the Boards are noted in Section 4.

- 1.6. The recommended option is to approve public consultation on all of the proposed cycle routes and prioritisations. This will enable engagement with both the public and key stakeholders to get their opinions on the proposed plan.

Attachments:

- i. Proposed Network Plan (TRIM No. 210722119967)
- ii. Option 1 – Prioritisation Table (TRIM No. 210721119442)

## 2. **RECOMMENDATION**

**THAT** the Community Board:

- (a) **Receives** Report No. 210720118252;

And

**RECOMMENDS** that the Council:

- (b) **Approves** consultation being carried out on the Cycle Network Plan (Attachment i) and proposed infrastructure prioritisation programme shown in Attachment ii, and as per Section 4.4.1, noting that the recreational paths are for information only due to different funding requirements;
- (c) **Notes** that the proposed infrastructure prioritisation programme is based on the joint budget allocation, by Council and Waka Kotahi, of \$4,700,000 across ten years, with the amount varying from year to year;
- (d) **Notes** that pre-engagement will be carried out in October, with district-wide consultation occurring from the start of November to the start of December;
- (e) **Notes** that the results of the public consultation and final proposals will be presented to the Community Boards and then Council for approval;
- (f) **Notes** that the plan and prioritisation routes will be reviewed every three years;
- (g) **Circulates** this report to the Utilities & Roading Committee and Community & Recreation Committee for their information, noting that the decision was requested from Council rather than the Utilities & Roading Committee to ensure timeframes are met.

## 3. **BACKGROUND**

- 3.1 The Waimakariri District Council have committed to improving multi-modal transport options throughout the District. The intention is to provide safe and accessible facilities which encourage active movements within the community.
- 3.2 The Cycle Network Plan has been derived to deliver upon the actions which were agreed and endorsed in the Waimakariri Walking and Cycling Strategy 2017-2022. The vision of this strategy is “Waimakariri residents choose to walk and cycle, and that the environment is friendly, safe and accessible for walkers and cyclists”. Overall, the aim of the strategy is to encourage walking and cycling, both for recreational and commuter travel. This policy was developed with alignment to Regional Transport Plans and other national/regional policy documents.
- 3.3 Intra-district cycling has been increasing with the addition of the Passchendaele Path, Rangiora to Woodend Path, and other rural paths. These facilities cater for a far greater range of cyclist levels as they provide improved comfort and safety, compared to cycling alongside motor vehicles. With the recent addition of the Christchurch Northern Corridor Path, and subsequently the Main North Road and Kaiapoi Town cycleways, it can be expected that there will be an increase in inter-district trips. These paths provide significantly improved connections between Christchurch City and the Waimakariri District. Furthermore, the introduction of electric bikes, more commonly known as E-bikes, has

made both of these areas more accessible for a wider range of users travelling either way. These routes are now seen as commuter routes for many during the weekdays and more recreational users on the weekend. It is therefore paramount that further facilities are planned for in the District to cater for the increased levels of cyclists.

- 3.4 Further to this, Waka Kotahi has been working on Great Rides throughout New Zealand, which specifically look to connect urban centres for touring cyclists. In 2018, the Waimakariri District Mayor, in conjunction with other mayors, signed a Memorandum of Understanding to encourage the development of this cohesive network. The Hurunui Heartland Ride was developed from this, with approval recently being granted to extend the Kaikoura to Amberley Ride through to Christchurch. This will therefore extend a pre-approved alignment (Marshmans Road, Fawcetts Road, Cones Road, Ashley Street, Ivory Street, Victoria Street, Percival Street, Passchendaele Path, Kaiapoi Town cycleway, and the Main North Road shared path) through Waimakariri, further increasing cyclist numbers throughout the District.
- 3.5 The culmination of all these factors requires far greater planning to be put into the cycle network within the district. The Cycle Network Plan is intended to provide a connected and cohesive network, which will inform decisions around the provision of infrastructure in the future.
- 3.6 The walking aspect of this plan has greater focus on pedestrian movements across roads rather than along. This is generated from the fact that most urban centres have a substantial footpath network but often lack infrastructure to access across roads. In rural areas, including rural towns, there may be no adequate footpath structure and therefore rural shared paths have a greater feature in these areas. Pedestrian refuge islands will be implemented alongside the majority of the cycle network developments within the urban centres.
- 3.7 The basis of the Cycle Network Plan is on a grading systems used by Waka Kotahi. This system aligns with the New Zealand Government's cycle training grades and reflects the type of user which can be expected on parts of the network. The grading system is detailed as follows:
  - Grade 1: Novice Cyclists
  - Grade 2: Basic Competence Cyclists
  - Grade 3: Advanced Cyclists
- 3.8 Associated facility types, which can be expected for each grade of cyclist, are shown in Figures 1 to 6.
  - a. Figure 1 shows a facility which could be expected for a Grade 1 cyclist, noting that retrofitting this facility into an urban area, with increased density of driveway accesses, comes with many safety concerns and is therefore not recommended.
  - b. Figures 2 to 4 show facilities which would correlate to a Grade 2 cyclist.
  - c. Figures 5 and 6 show facilities which would correlate to a Grade 3 cyclist.



**Figure 1.** Rural shared path on Rangiora Woodend Road.



**Figure 2.** Neighbourhood greenway in Christchurch.



**Figure 3.** On-road lane with traffic buffer in Christchurch.



**Figure 4.** Rural shared path on North Eyre Road.





**Figure 5.** On-road cycle lane on Ivory Street.



**Figure 6.** Shoulder widening.

- 3.9 The Cycle Network Plan and associated network construction priorities will be reviewed every three years, in conjunction with the Waka Kotahi funding and Council's Long Term Plan cycle, to ensure that the needs of the community will be best met.
- 3.10 Currently, \$4,700,000 is budgeted for walking and cycling infrastructure within the District across ten years, noting that this is co-funded with Waka Kotahi with a 51% subsidy and that the yearly value varies each year. There is a focus of this funding towards commuter routes and connections to key destinations, particularly in urban areas.
- 3.11 Strictly recreational paths are shown on the maps in Attachment i for information only, as these are funded through differing budgets from the joint Council and Waka Kotahi budget. The reason for including these is to show connections between recreational trails were considered as part of the Cycle Network Plan.
- 3.12 The Walking and Cycling Working Group was re-established in late 2020 to provide community input into the updating of the Waimakariri District Council's Walking & Cycling Strategy Action Plan. This includes:
- a. Identification of issue relating to walking & cycling
  - b. Contributing to decision relating to the prioritisation of projects

- c. Discussing related issues with appropriate stakeholders
- d. Making recommendations to the Utilities & Roading Committee.

3.13 The Walking and Cycling Working Group consists of the following representatives:

- Walking advocate
- Cycling advocate
- Representative of Waimakariri Access Group
- Representative from the Age Friendly Advisory Group
- Two Council representatives
- One representative from each Community Board
- Youth Council Representative
- School Representative
- New Zealand Police representative
- Staff representatives from Road Safety, Policy & Strategy, Greenspaces & Communications
- Enterprise North Canterbury representative
- ECan representative
- Oxford Promotions Action Committee representative
- Kaiapoi Promotions Association representative
- Rangiora Promotions Association representative

3.14. This group was provided with the draft Network Plan and asked to provide feedback, priorities, and ideas for the Cycle Network Plan via the “Bang the Table” platform.

3.15. Staff then met again with the Working Group in June 2021 to provide the proposed Network Plan and the prioritisation programme staff had developed based on the Working Groups feedback, before taking the presentation to all Boards as a workshop at each meeting in July 2021.

3.16. The workshop presented to each Community Board included maps that demonstrated the overall goal of the District-wide Network Plan, as well as a prioritised list of sites to be achieved within the first 10 years of the programme.

3.17. The prioritisation of the network was based off four key questions highlighted below, in which a route required one ‘yes’ answer to be added to the short-list.

- Is it a critical link?
- Does it close a gap in the existing network?
- Does it extend the existing network to a key destination?
- Does it address a key issue?

From here, staff assigned potential facility types and developed six per metre rates for different facility types based on figures from relevant construction projects (e.g., Kaiapoi Town cycleway).

#### **4. ISSUES AND OPTIONS**

4.1. Each of the community boards provided feedback during their respective workshops, and were encouraged to submit feedback following the workshops directly to staff for inclusion within this report.

- 4.2. None of the community boards submitted feedback following the workshops, however, a summary of feedback from the workshops themselves is outlined for each community board below:

#### 4.2.1. Oxford-Ohoka Community Board Feedback

- Dangers of forcing horses closer to the live lane with the implementation of the rural shared (walking & cycling) path.
- The priority given to the High Street/Harewood Road circuit was too far in the future.
- It was requested that a section of Bradleys Road, from Hallfield Drive to Main Drain Road, was reinstated on the Network Plan.
- The ambitious nature of the overall Cycle Network Plan, and concerns that this would take too long to deliver. They felt that the Network Plan should be showing only realistically achievable projects.
- The lack of clarity around which side of the road infrastructure will be located on.
- The cost of the Tram Road facility.

#### 4.2.2. Woodend-Sefton Community Board Feedback

- There was significant concern that a link, on the eastern side of State Highway 1 between Pegasus and Woodend did not exist on the plan and that this had not been seen as a priority. It was suggested that this should have the greatest priority of any link in the Board's ward area.
- The importance of access to high schools, as a large proportion of the Community is zoned for Kaiapoi High School and there was no safe route for them currently.
- Look at providing a lower level of service on some routes and improving these in the future to allow for more of the network to be completed sooner.
- Ensuring the developer of the Rangiora North-East development provides a path which connects Kippenberger Avenue to the Mainpower Stadium Sports Facility.
- Consideration of reducing priority in other areas of the district to enable the major routes to be developed.

#### 4.2.3. Rangiora-Ashley Community Board Feedback

- There was significant concern that the remainder of the north-south Grade 2 route along King Street did not feature in the ten year Prioritisation Programme.
- The Grade 3 shown on Percival Street, Ivory Street & Ashley Street may be more challenging than we had anticipated, with specific mention of the "S" bend between Lilybrook shopping centre, and Ivory Street. The Board shared significant concern about directing cyclists along this route.
- The Earlys Rd unsealed path extension can be terminated at Springbank Rd
- The proposed Grade 3 facility on Mill Road is unnecessary. Although Mill Rd is a high speed environment, there are very few vehicles which use it. This funding would be better spend on cycle facilities within the main road through Cust Village.

#### 4.2.4. Kaiapoi-Tuahiwi Community Board Feedback

- Include recreational linkages between Tuahiwi Road and Arohatia te awa.
- A consensus that the prioritisation programme provided for the briefing best fitted the network.

- Look at providing a lower level of service on some routes and improving these in the future to allow for more of the network to be completed sooner.

4.3. Council Staff have reviewed the feedback made by the Boards and provide the following commentary below.

#### 4.3.1. Oxford-Ohoka Community Board Feedback

- It is perceived that the number of horses using these paths would be relatively low; therefore, staff will allow use of these rural pathways by horses. If this use were to become of concern to the community, in terms of maintenance, etc., staff will review alternative options.
- The Board can recommend to Council that the High Street and Harewood Road circuit be moved to year one to three in the Priority Programme; however, noting that this will result in the Tram Road link being pushed back to year four to six in the programme.
- The Cycle Network Plan is intended to be ambitious, as its use is to provide direction for cycle infrastructure development across the District for years to come. What is designated in the plan is aspirational for Council, but without this direction, cycle infrastructure development may occur on an ad-hoc basis rather than as a result of an informed decision.
- Of further note, with the request of a lower speed environment down Main Street, and if there is a favourable response for this during consultation, staff will look to bring forward the budget for cycle infrastructure along this stretch.
- Current thoughts by staff are that the facilities will be provided on the western side of High Street and the northern side of Harewood Road; therefore, avoiding any need to cross sides. At this stage, generic facility types have been considered for the facilities; however, these will be considered in greater detail during the design phase. At this stage the Cycle Network Plan is intended to be a high-level direction for the Districts cycle infrastructure in the future, and details pertaining to sides of roads and exact facilities are not necessarily decided.
- The costs proposed for each potential facility have been based of a generic rate for a similar facility that has been implemented. Exact costs will be determined during the detailed design phase.
- Staff have not yet spoken to the A&P committee regarding a path through the A&P land. It is noted that this needs to take place prior to any public consultation.

#### 4.3.2. Woodend-Sefton Community Board Feedback

- A link between Pegasus and Woodend has now been included in the Network Plan and prioritised in the ten year programme. This link has received a low priority in the ten year programme due to the uncertainties surrounding the work being completed by Waka Kotahi along State Highway 1 and the potential for the Woodend Bypass in the future. This link is also relatively high-cost, due to the requirement for a small pedestrian footbridge and piping of a substantial drain, and therefore it would be unsuitable for Council to fund this project if Waka Kotahi were then going to construct the bypass, resulting in this infrastructure being removed. If Waka Kotahi were to advance their works, then Council Staff would look to bring this budget forward and implement infrastructure which best fits around Waka Kotahi's proposal.
- Staff have been working with individuals who develop the Outline Development Plan maps to ensure cycle linkages are included within these and that the Cycle Network Plan routes are also shown.

- Once detailed design is completed for each link, staff will investigate options to stage the works, meaning that an initial lower level of service may be provided, with this being upgraded in the future. This will be reviewed on a case-by-case basis for each link.

#### 4.3.3. Rangiora-Ashley Community Board Feedback

- The intersection at the Lilybrook shops has been reviewed and an altered high level estimate for this route has been included within the Prioritisation Programme.
- The intention of the inclusion of work on the Ashley/Ivory/Percival route within the programme is not to direct cyclists down here, but instead make it safe for the cyclists that do use it. Currently, there are cycle lanes along some of this route, with substantial gaps in-between, making it unsafe for cyclists in these areas. Staff believe that this discrepancy needs remedying in the near future due to safety concerns.
- Staff are in agreement with the Board that the King St / Enverton Dr / River Road link is an important part of the north/south cycle network through Rangiora. However the issue is when this can be afforded, given other priorities.
- The Board can recommend to Council that the remainder of the Rangiora Town link is moved into the priority programme; however, noting that this will remove funding from other routes within this Board's ward area and subsequently other parts of the district due to the high cost of this path. Otherwise, staff will look to prioritise this route as soon as funding becomes available. A further option may be to look at a lower level of service initially along King Street, noting that there will be some areas which would need to be upgraded once funding became available (i.e., the stretch of King Street between Queen Street and High Street due to its narrow nature).

#### 4.3.4. Kaiapoi-Tuahiwi Community Board Feedback

- The missing linkages have been included within the Cycle Network Plan Maps.

#### 4.4. The Board has the following options available to them:

##### 4.4.1. Option One: Recommend Approval to Consult on the Current Cycle Network Plan and Prioritised Routes

This option involves recommending the approval of this report and authorisation granted to staff to undertake consultation on all of the proposed routes and prioritisations, once approved by Council.

This is the recommended option because staff have made amendments, based on the Community Boards feedback, prioritisation programme at a level which best fits with the budget currently provided by Council, noting that in some instances additional budget may potentially need to be asked for.

##### 4.4.2. Option Two: Recommend Approval to Consult for an Amended Cycle Network Plan and Prioritised Routes

This option recommends approving an amended scope to the proposed Cycle Network Plan and subsequent facility prioritisation outlined in this report, and authorising staff to undertake consultation, once approved by Council.

This is not the recommended option because staff have best allocated the network, based on feedback received by the Boards, somewhat within Council's yearly walking and cycling infrastructure budget. If additional links or higher cost links are to be added into, or shifted within the Prioritisation Programme, either additional budget will need to be allocated by Council, or links within the ward area and/or across the network will need to be removed from the Prioritisation

Programme. There are also very few routes in the Prioritisation Programme which would be suitable for an initial lower level of service.

4.4.3. Option Three: Recommend Declining Consultation for the Proposed Cycle Network Plan and Prioritisations

This option recommends declining this report and asking staff to re-evaluate the Cycle Network Plan and Prioritisation Programme.

This is not the recommended option because staff completed briefings with the Boards asking for feedback on the Cycle Network Plan and Prioritisation Programme, and have since incorporated this feedback into both where possible. Declining consultation at this stage would also cause delays to this plan development and may push it outside of the 2021/2022 financial year.

- 4.5. There are implications on community wellbeing by the issues and options that are the subject matter of this report.

The addition of cycleways and shared paths provides infrastructure which encourages a greater uptake of walking and cycling, both for commuters and recreation. An uptake in walking and cycling also contributes to improved health and wellbeing of members within the community. Further to this, including infrastructure which caters for a wide range of skill levels encourages less confident cyclists, who may have otherwise chosen to travel via motor vehicle, to use the provided facilities.

- 4.6. The Management Team has reviewed this report and support the recommendations.

## 5. COMMUNITY VIEWS

### 5.1. **Mana whenua**

Te Ngāi Tūāhuriri hapū are likely to be affected by, or have an interest in the subject matter of this report.

There was a request from iwi to include a cycling link through Tuahiwi, which would join with the Rangiora to Woodend shared path. This has been included within the Cycle Network Plan and also includes an additional length which links to the Arohatia te awa path along the banks of the Cam River.

Once approval is received from Council, consultation documentation will be made available to Te Ngāi Tūāhuriri.

### 5.2. **Groups and Organisations**

There are groups and organisations likely to be affected by, or to have an interest in the subject matter of this report.

Once approval is received from Council, consultation documentation will be made available to the key stakeholders.

### 5.3. **Wider Community**

The wider community is likely to be affected by, or to have an interest in the subject matter of this report.

The Waimakariri Walking and Cycling Strategy 2017-2022 was developed following consultation with the public. The Cycle Network Plan has been developed based on this strategy and provides the public further opportunity to provide feedback on routes throughout the network.

Public consultation for this project includes three different phases; pre-engagement, engagement, and targeted engagement, noting that this consultation period will begin once approval from Council has been granted.

The pre-engagement phase is intended to socialise the idea of the cycle network plan to the public.

During the engagement phase, staff will be asking the public for feedback on the route recommendations and prioritisation. This will be done through mapping tools, videos, visual displays, online tools, and information/drop-in sessions. There will also be an opportunity for the public to provide feedback on the level of investment from Council.

Once the plan is adopted, targeted consultation will occur as the prioritisation programme is fulfilled. This will include consultation with affected residents during the design phase specifically detailing what the cycle infrastructure will look like, the added amenity to the area, and the subsequent impacts to residents. The communication will continue during the construction phase to ensure residents remain up to date on any design changes or problems incurred.

## **6. OTHER IMPLICATIONS AND RISK MANAGEMENT**

### **6.1. Financial Implications**

There are financial implications of the decisions sought by this report.

There is \$50,000 allocated within PJ 101229.000.5135 for the Professional Fees associated with internal staff time and consultation documents within the 2021 / 2022 year. This is included within the \$4,700,000 allocated for the next ten years in the Long Term Plan to implement this project from 2022/2023.

### **6.2. Sustainability and Climate Change Impacts**

The recommendations in this report do have sustainability and/or climate change impacts.

Creating a safe and accessible cycle network, which comes with improving infrastructure, increases the uptake of cycling for both recreational and commuter cyclists. This results in a subsequent decrease in the number of people using single occupancy vehicles, particularly for shorter trips. This comes with many benefits, including the reduction of greenhouse gas emissions.

### **6.3 Risk Management**

The recommendations in this report do carry the risk that the proposed Cycle Network Plan does not meet the expectations of the community. Further to this, the infrastructure may not be able to be delivered in the time frames expected and additional investment may be required to deliver the programme of works.

### **6.3. Health and Safety**

There are health and safety risks arising from the adoption/implementation of the recommendations in this report.

These risks are associated with the potential for changes in alert level for COVID-19. If this were to occur, staff involved with consultation will follow guidelines prescribed by the New Zealand Government. This may require alternative methods of consultation to be sought or consultation to be delayed for a period of time. This will be managed as it occurs.

## **7. CONTEXT**

### **7.1. Consistency with Policy**

This matter is not a matter of significance in terms of the Council's Significance and Engagement Policy.

## 7.2. Authorising Legislation

Section 52 of the Local Government Act 2002 outlines the role of the Community Board and is therefore the relevant authorising legislation.

## 7.3. Consistency with Community Outcomes

The Council's community outcomes are relevant to the actions arising from recommendations in this report.

### ***Public spaces and facilities are plentiful, accessible and high quality, and reflect cultural identity***

- There are wide-ranging opportunities for people to enjoy the outdoors
- The accessibility of community and recreation facilities meets the changing needs of our community

### ***Core utility services are sustainable, resilient, affordable; and provided in a timely manner***

- Climate change considerations are incorporated into all infrastructure decision-making processes

### ***There is a strong sense of community within our District***

- There are wide-ranging opportunities for people of different ages, abilities and cultures to participate in community life, and recreational and cultural activities.

### ***There are wide ranging opportunities for people to contribute to the decision making that affects our District***

- The Council takes account of the views across the community including mana whenua

### ***Transport is accessible, convenient, reliable and sustainable***

- The standard of our District's transportation system is keeping pace with increasing traffic numbers
- Communities in our District are well linked with each other and Christchurch is readily accessible by a range of transport modes

## 7.4. Authorising Delegations

The Community Boards are responsible for considering any matters of interest or concern within their ward area and making a recommendation to Council.

The decision making rests with Council as this is a significant issue which will set the framework for the Cycle Network in the future.



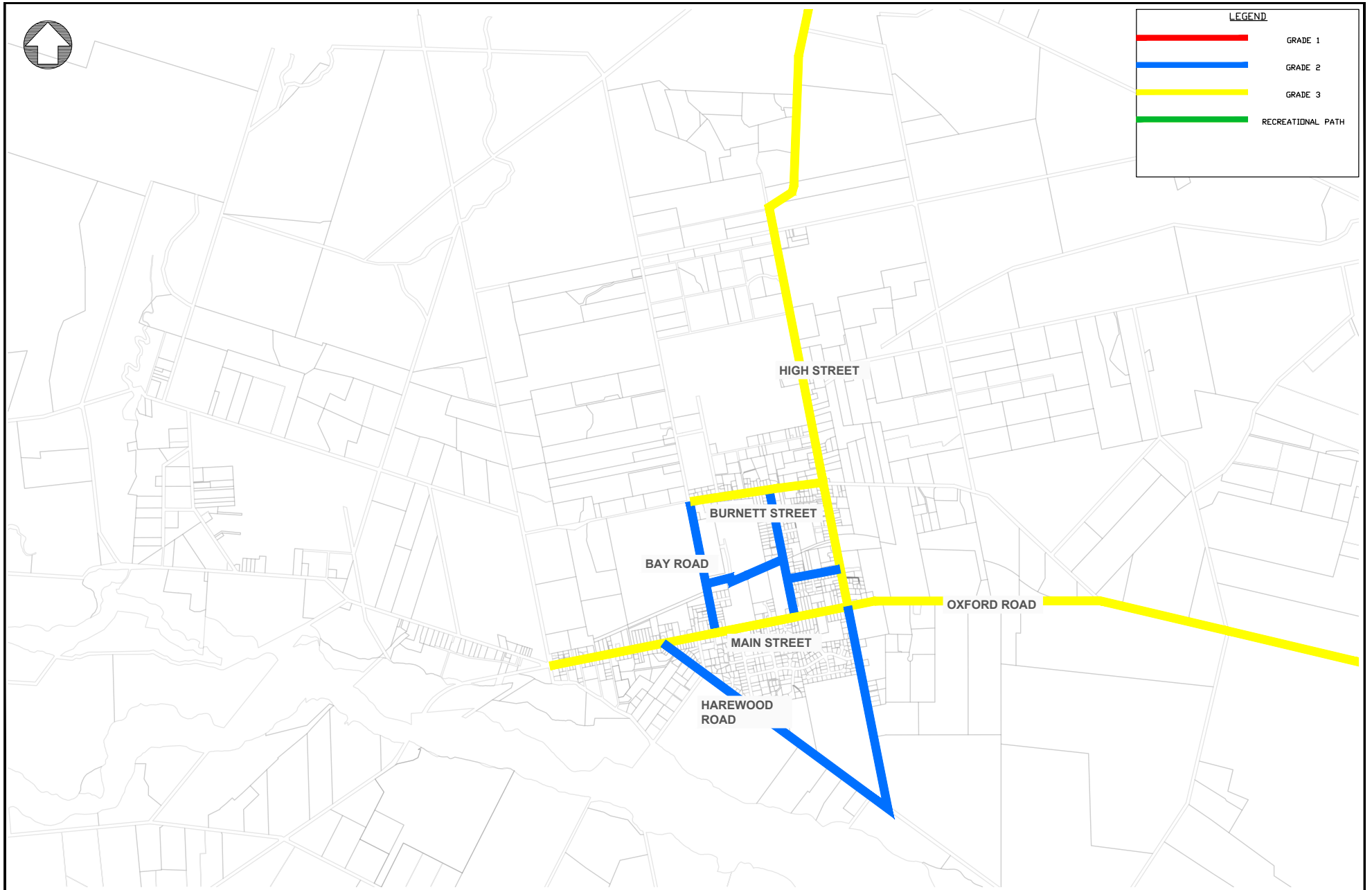
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### Proposed District Network Plan

These maps show the overall district network plan, and includes all current facilities, plus required infrastructure to complete the network plan)

Each route is graded into three categories, described in the table below:

	Treatment Options <u>Urban Areas</u>	Treatment Options <u>Rural Areas</u>
<b>Grade 1</b> This grade is the highest level of comfort, and is suitable to Novice users. There is little conflict with motor vehicles along the route. These are typically “arterial” cycle routes, and are installed as critical links between our main towns.	<ul style="list-style-type: none"> <li>• Generally not applicable to retro-fit within urban streets</li> </ul>	<ul style="list-style-type: none"> <li>• 2.5m or greater (3.0m desirable) shared path with an asphalt surface</li> </ul>
<b>Grade 2</b> This grade is suitable for users with basic competence skills. Users will be riding on the road adjacent to live traffic, although there will additional measures in place to protect the vulnerable users.	<ul style="list-style-type: none"> <li>• Separated cycle path</li> <li>• Neighbourhood Greenways</li> <li>• On Road cycle lane with traffic buffers and intersection improvements</li> </ul>	<ul style="list-style-type: none"> <li>• Unsealed shared path (less than 2.5m wide)</li> </ul>
<b>Grade 3</b> This grade is suitable for users with advanced skills and confidence to mix with traffic.	<ul style="list-style-type: none"> <li>• On-road cycle lanes</li> </ul>	<ul style="list-style-type: none"> <li>• Sealed shoulder widening</li> </ul>
<b>Recreational Trails</b> These trails are aimed at leisure users, and may be considered an “off-road” trail (ie suitable for mountain biking)	Trails shown in the network plan are existing recreational trails only. Potential recreation trails are not included within this programme.	



REV	REVISION DETAILS	DRN	CHK	APP	DATE
A	FOR COMMUNITY BOARD	AMC	KS	---	JUL 2021

SURVEYED	DRAWN	PROJECT No
	MB	PD001583
DRAWING CHKD		CON No
DESIGNED		SCALE (A3) NOT TO SCALE
DESIGNED CHKD		DATUM ORIGIN
APPROVED		HORIZONTAL NZTM GD2000
		VERTICAL



PROJECT
WALKING AND CYCLING NETWORK PLAN

SHEET TITLE
OXFORD (PROPOSED NETWORK PLAN)

FOR INFORMATION	
NOT FOR CONSTRUCTION	
DRAWING	4221
SHEET	REVISION
01	A



**LEGEND**

	GRADE 1
	GRADE 2
	GRADE 3
	RECREATIONAL PATH

REV	REVISION DETAILS	DRN	CHK	APP	DATE
A	FOR COMMUNITY BOARD	AMC	KS	---	JUL 2021

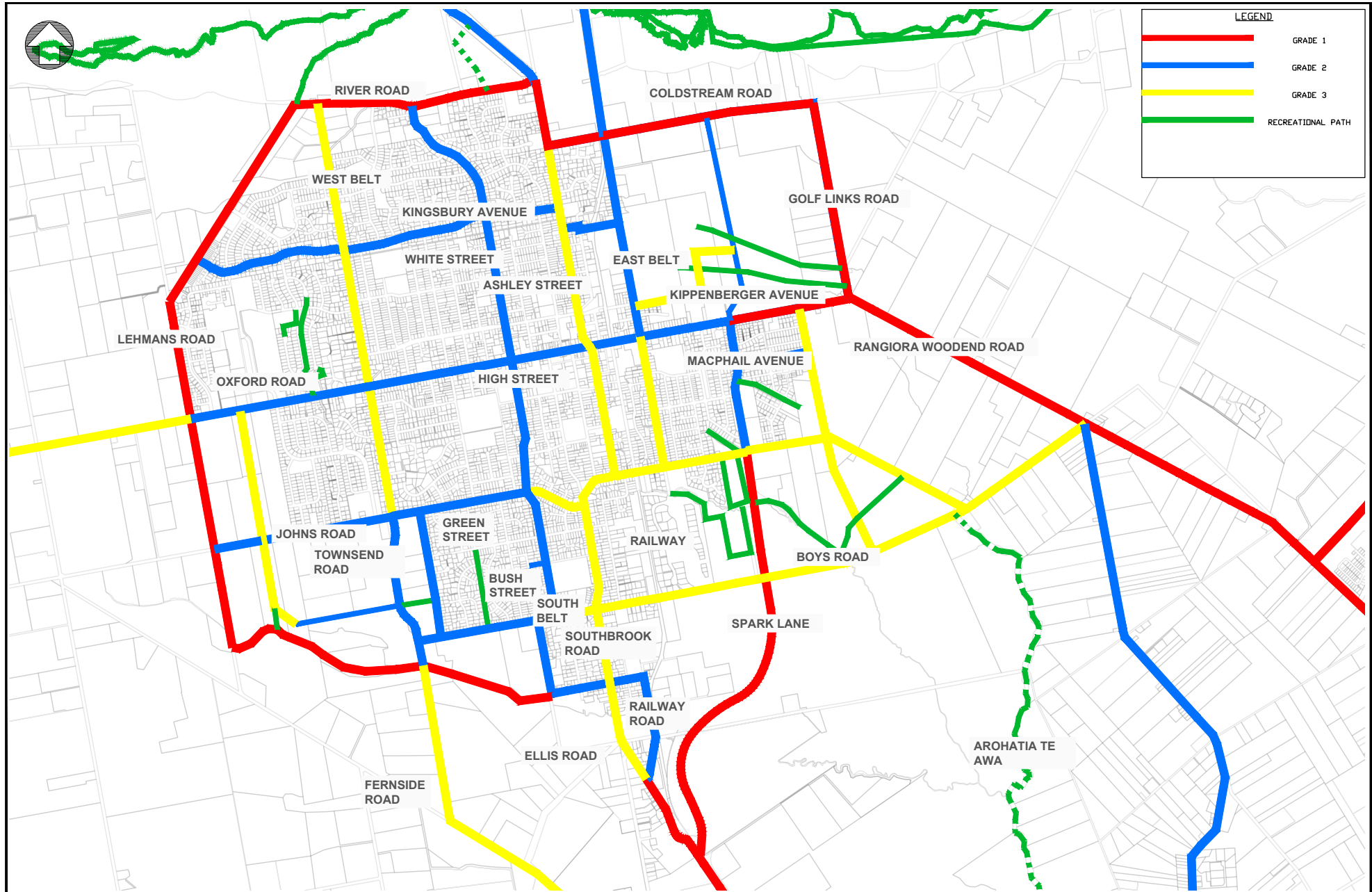
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DESIGNED CHKD		DATUM ORIGIN
APPROVED		HORIZONTAL NZTM GD2000
		VERTICAL



PROJECT	WALKING AND CYCLING NETWORK PLAN
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SHEET TITLE	CUST (PROPOSED NETWORK PLAN)
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<b>FOR INFORMATION</b> NOT FOR CONSTRUCTION	
DRAWING	4221
SHEET	REVISION
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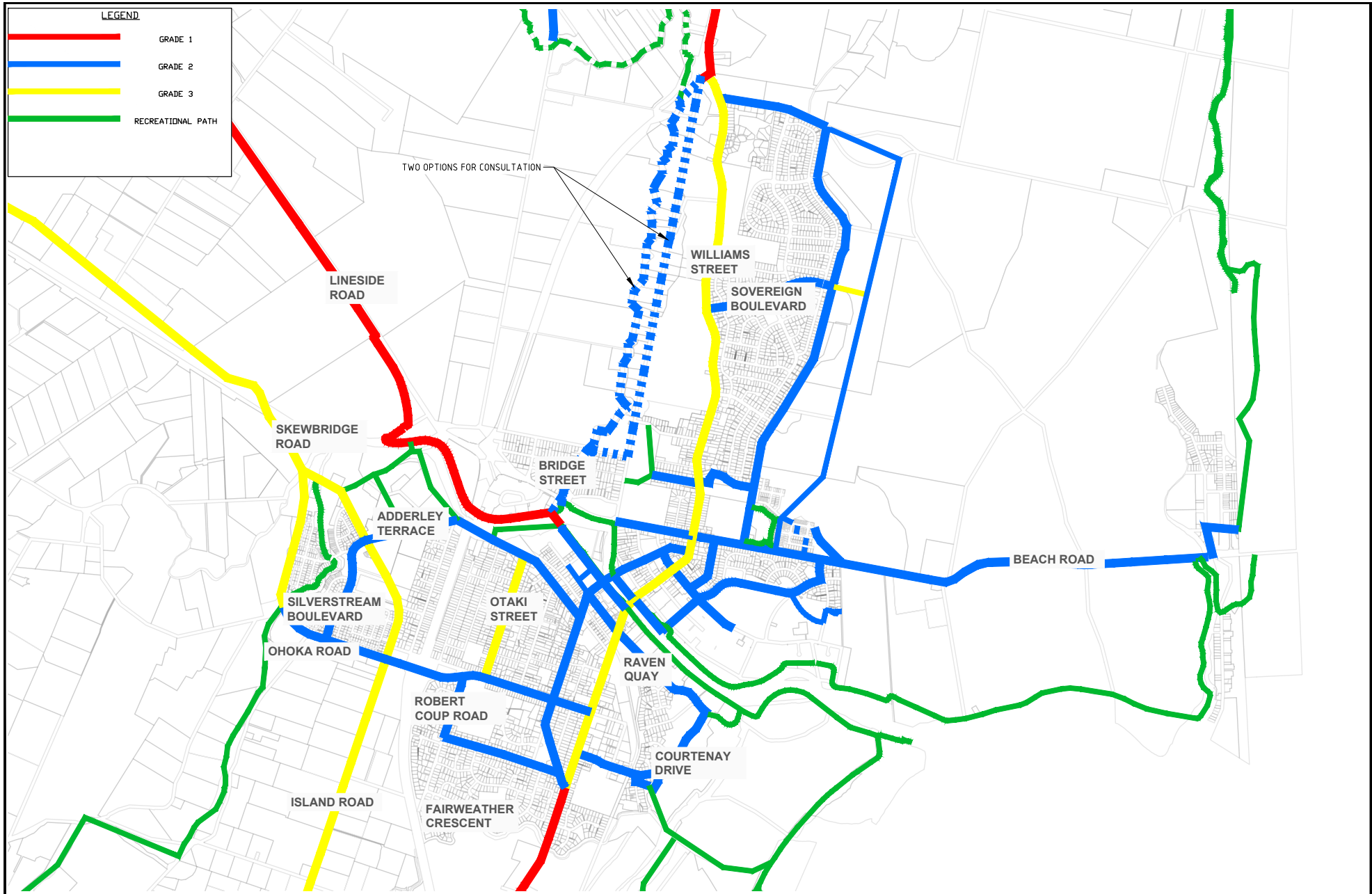
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 DATUM ORIGIN  
 HORIZONTAL NZTM GD2000  
 VERTICAL

PROJECT  
 WALKING AND CYCLING NETWORK PLAN

SHEET TITLE  
 RANGIORA  
 (PROPOSED NETWORK PLAN)

FOR INFORMATION	
NOT FOR CONSTRUCTION	
DRAWING	4221
SHEET	03
REVISION	A



REV	REVISION DETAILS	DRN	CHK	APP	DATE
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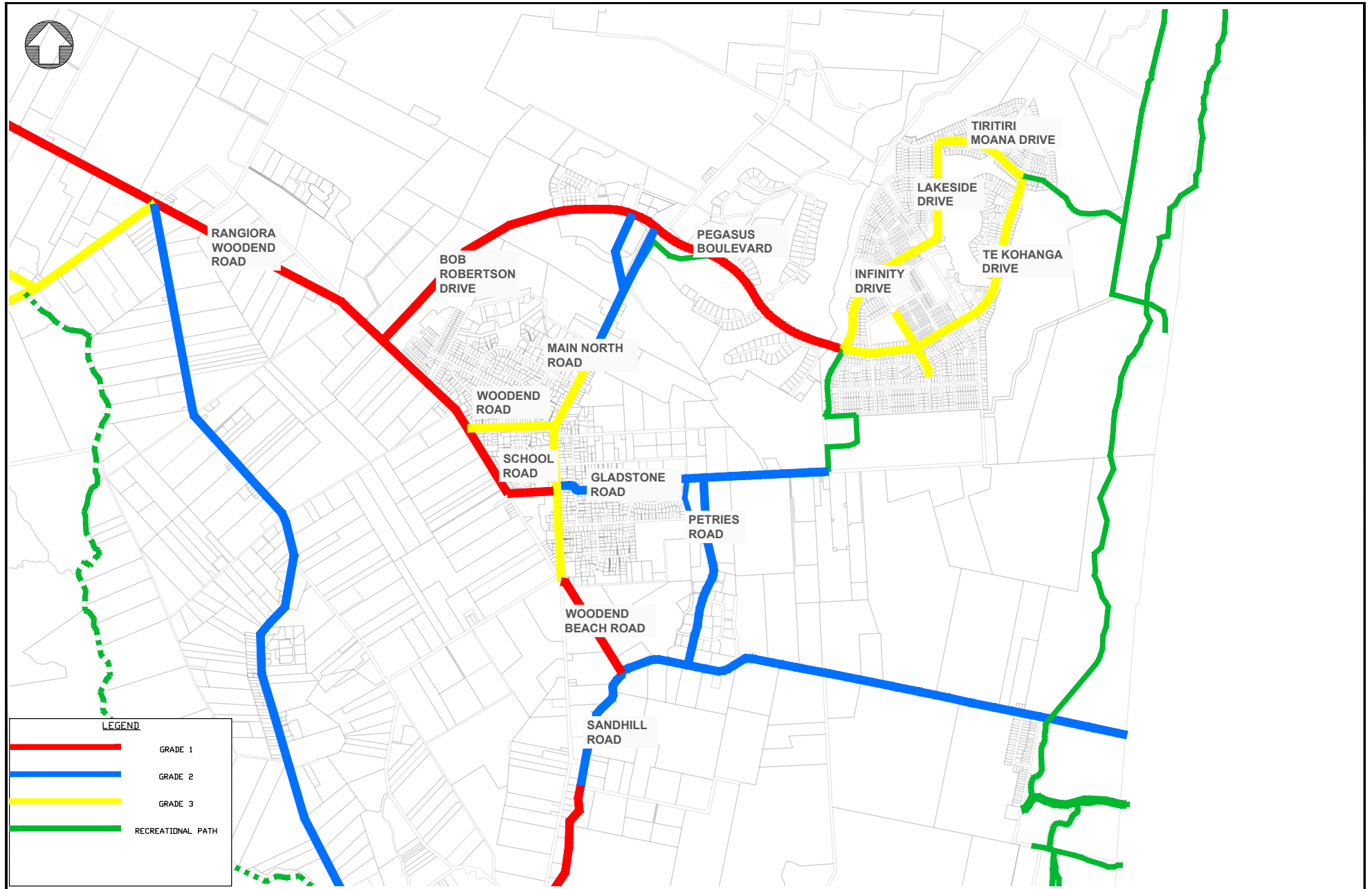
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**WAIMAKARIRI**  
DISTRICT COUNCIL

PROJECT  
 WALKING AND CYCLING NETWORK PLAN

SHEET TITLE  
 KAIAPOI  
 (PROPOSED NETWORK PLAN)

FOR INFORMATION	
NOT FOR CONSTRUCTION	
DRAWING	4221
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LEGEND	
	GRADE 1
	GRADE 2
	GRADE 3
	RECREATIONAL PATH

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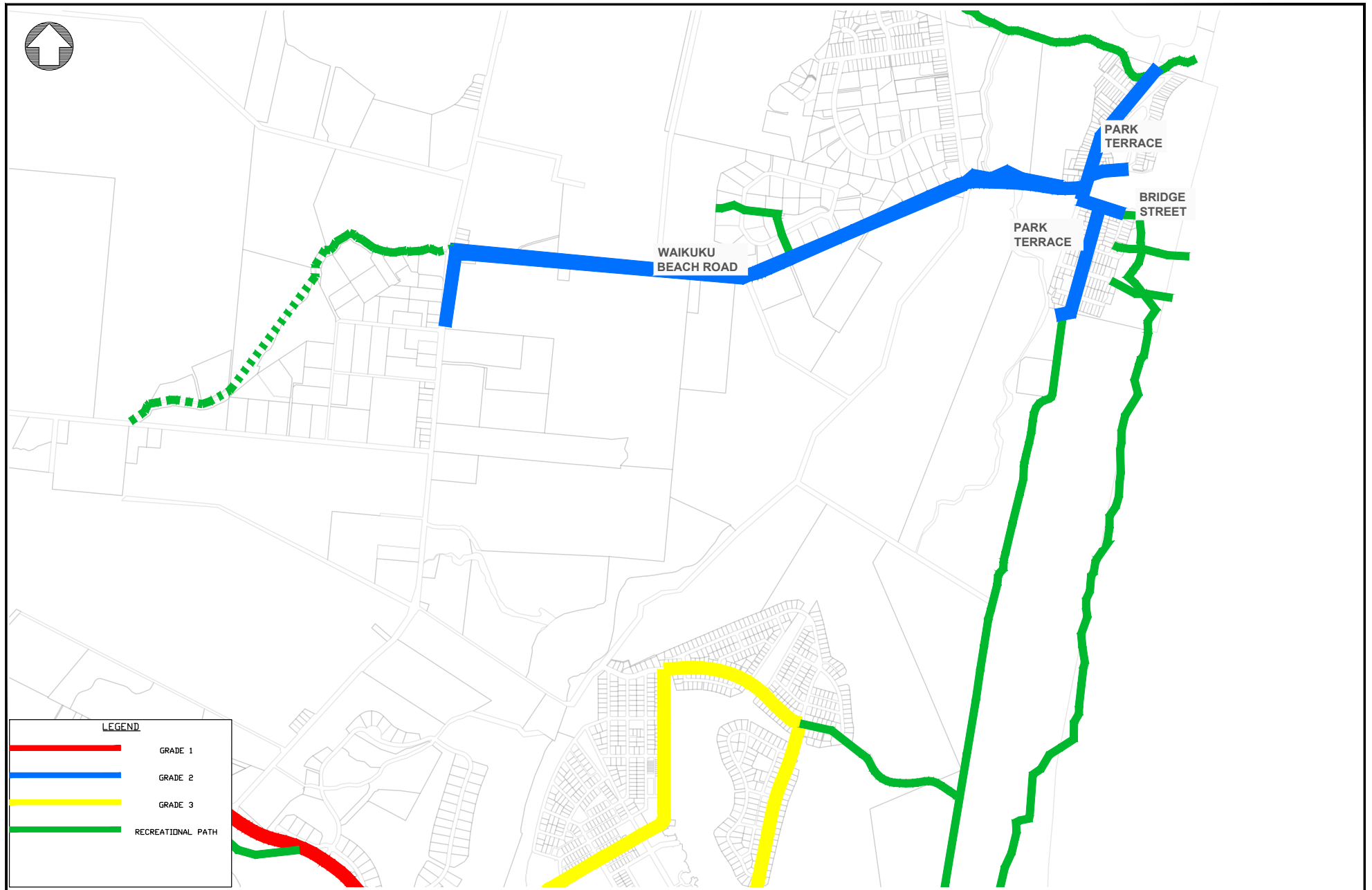
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PROJECT
WALKING AND CYCLING NETWORK PLAN

SHEET TITLE
WOODEND/PEGASUS (PROPOSED NETWORK PLAN)

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LEGEND	
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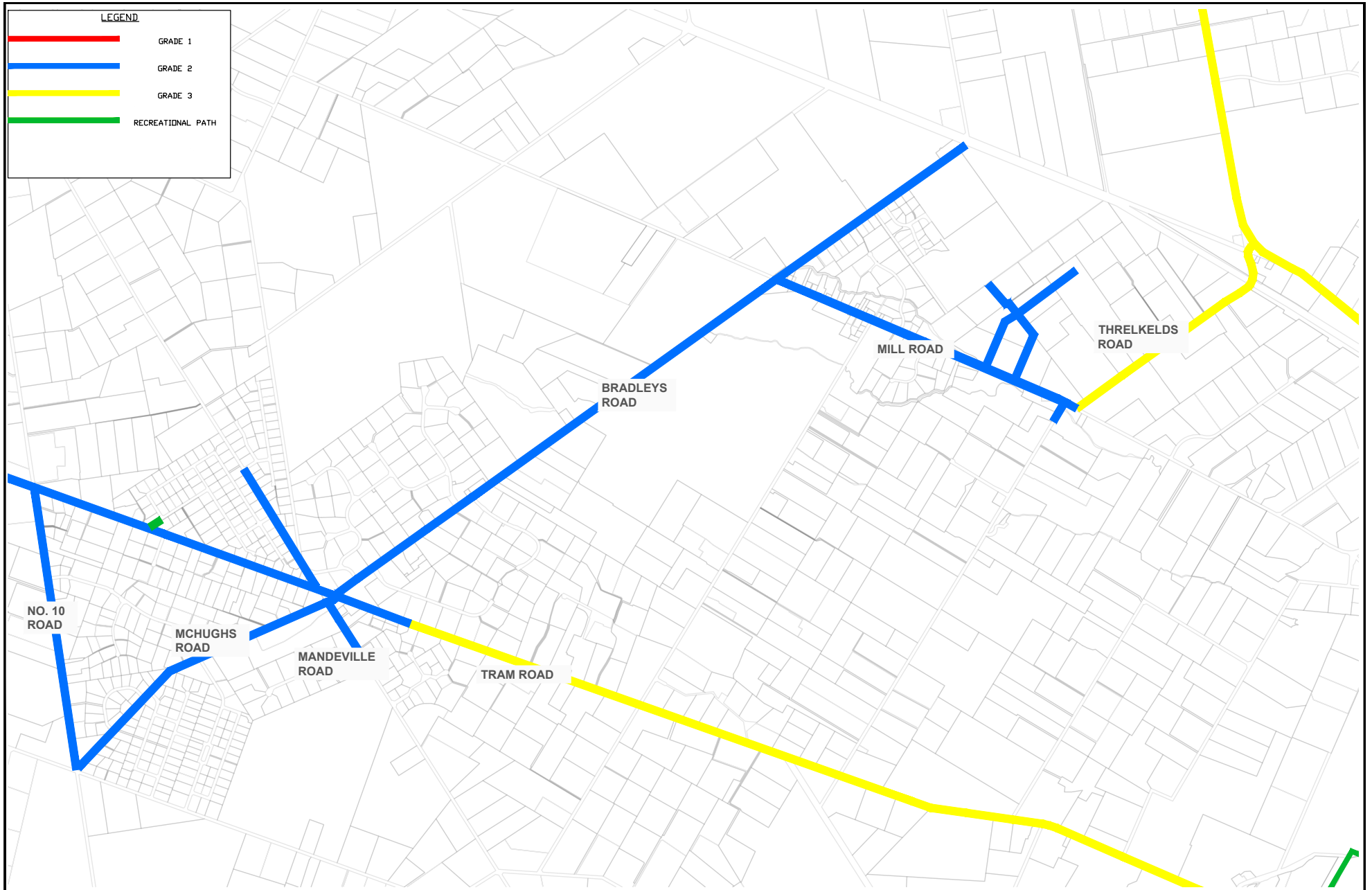
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PROJECT
WALKING AND CYCLING NETWORK PLAN

SHEET TITLE
WAIKUKU BEACH (PROPOSED NETWORK PLAN)

FOR INFORMATION	
NOT FOR CONSTRUCTION	
DRAWING	4221
SHEET	REVISION
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REV	REVISION DETAILS	DRN	CHK	APP	DATE
A	FOR COMMUNITY BOARD	AMC	KS	---	JUL 2021

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DRAWING CHKD		CON No
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DESIGNED CHKD		DATUM ORIGIN
APPROVED		HORIZONTAL NZTM GD2000
		VERTICAL



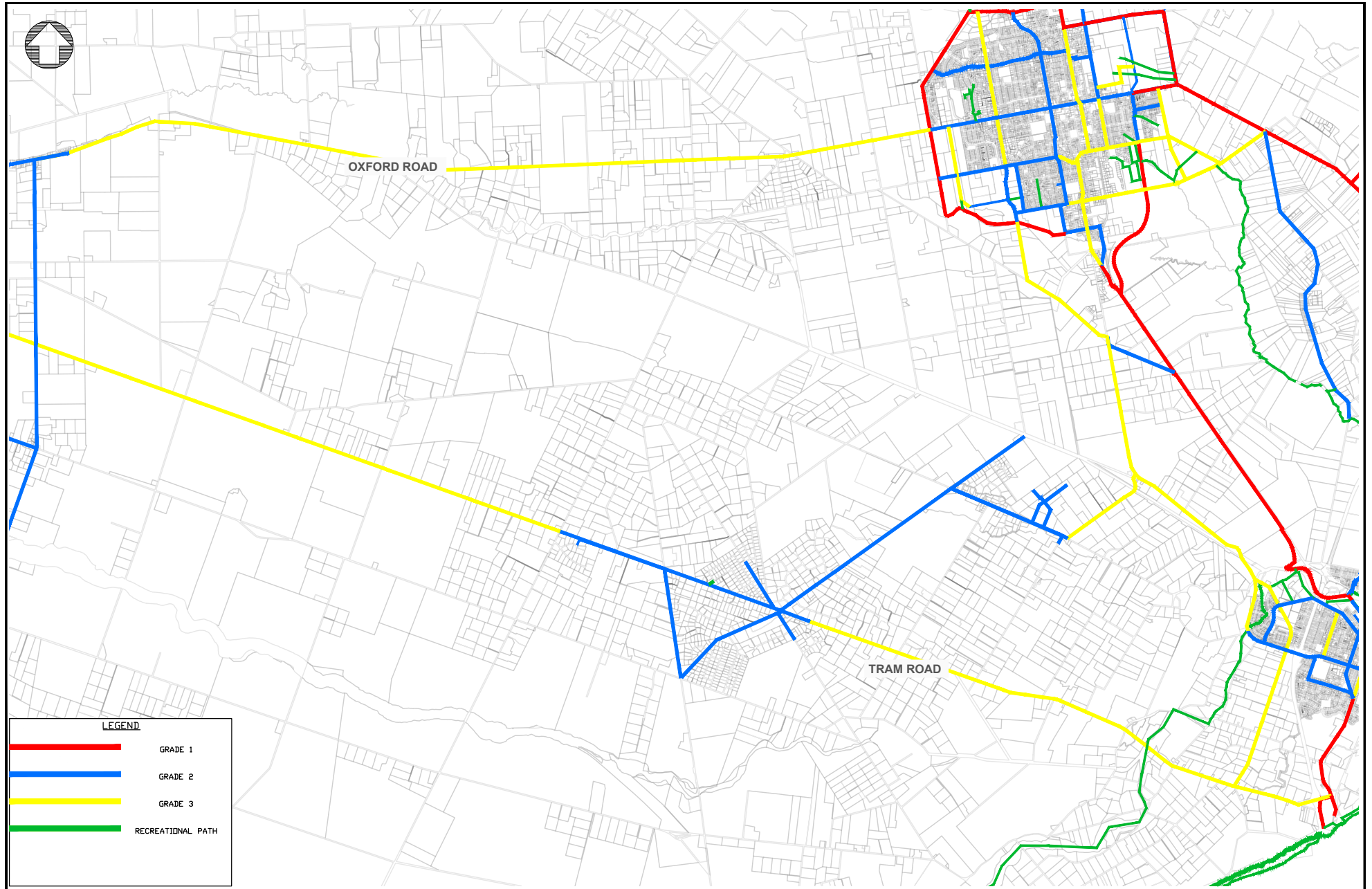
PROJECT
WALKING AND CYCLING NETWORK PLAN

SHEET TITLE
OHOKA/MANDEVILLE (PROPOSED NETWORK PLAN)

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LEGEND	
	GRADE 1
	GRADE 2
	GRADE 3
	RECREATIONAL PATH

REV	REVISION DETAILS	DRN	CHK	APP	DATE
A	FOR COMMUNITY BOARD	AMC	KS	---	JUL 2021

SURVEYED	PROJECT No
DRAWN MB	PD001583
DRAWING CHKD	CON No
DESIGNED	SCALE (A3) NOT TO SCALE
DESIGNED CHKD	DATUM ORIGIN
APPROVED	HORIZONTAL NZTM GD2000
	VERTICAL

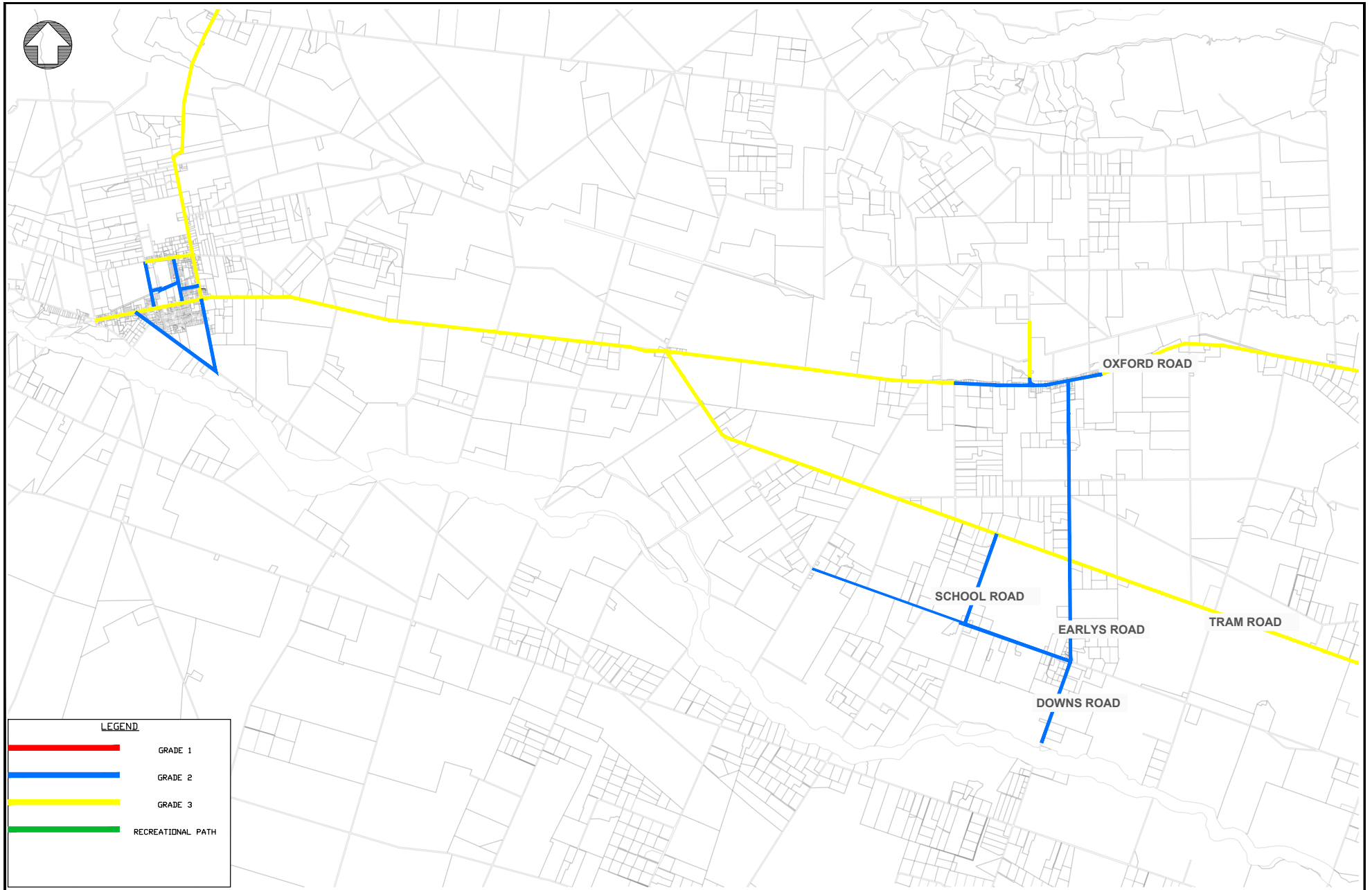


PROJECT
WALKING AND CYCLING NETWORK PLAN

SHEET TITLE
TRAM/OXFORD RD TO EARLYS RD (PROPOSED NETWORK PLAN)

FOR INFORMATION NOT FOR CONSTRUCTION	
DRAWING	4221
SHEET	REVISION
08	A

PLOT DATE: 23/07/2021 FILE: S:\PDP\JOB\SP000150-1583\PD001583 WALKING & CYCLING PROGRAMME 2019-2020\13 - CYCLEWAY NETWORK GIS\00 - GIS DATA\CAD EXPORTS OF CYCLEWAY NETWORK PLAN\NETWORK PLAN\CYCLE NETWORK PLAN - 09-07-21.DWG



**LEGEND**

- GRADE 1
- GRADE 2
- GRADE 3
- RECREATIONAL PATH

REV	REVISION DETAILS	DRN	CHK	APP	DATE
A	FOR COMMUNITY BOARD	AMC	KS	---	JUL 2021

SURVEYED	DRAWN	PROJECT No
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DRAWING CHKD		CON No
DESIGNED		SCALE (A3) NOT TO SCALE
DESIGNED CHKD		DATUM ORIGIN
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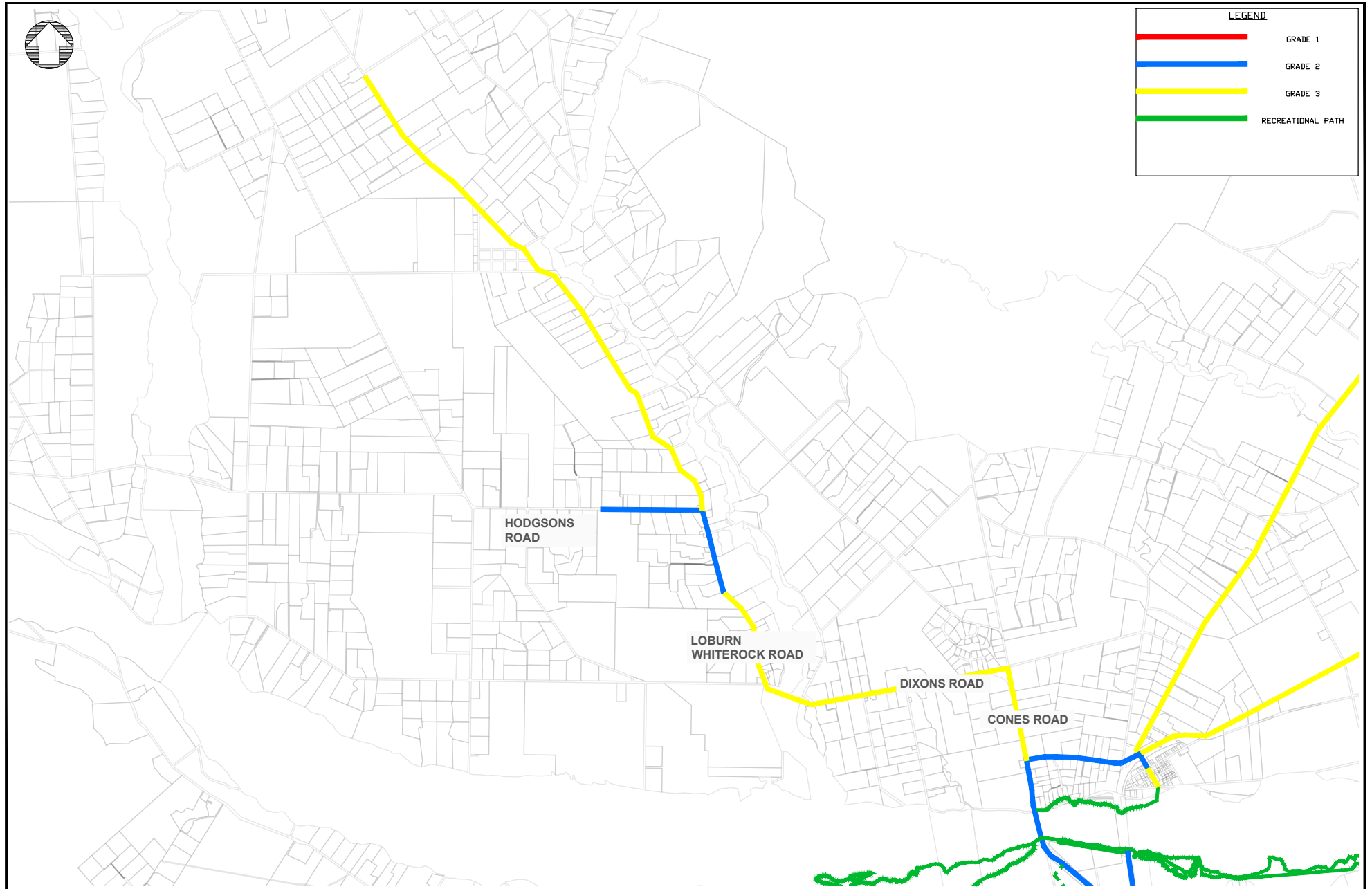


PROJECT	WALKING AND CYCLING NETWORK PLAN
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SHEET TITLE	TRAM/OXFORD RD TO OXFORD (PROPOSED NETWORK PLAN)
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<b>FOR INFORMATION</b>	
NOT FOR CONSTRUCTION	
DRAWING	4221
SHEET	REVISION
09	A

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REV	REVISION DETAILS	DRN	CHK	APP	DATE
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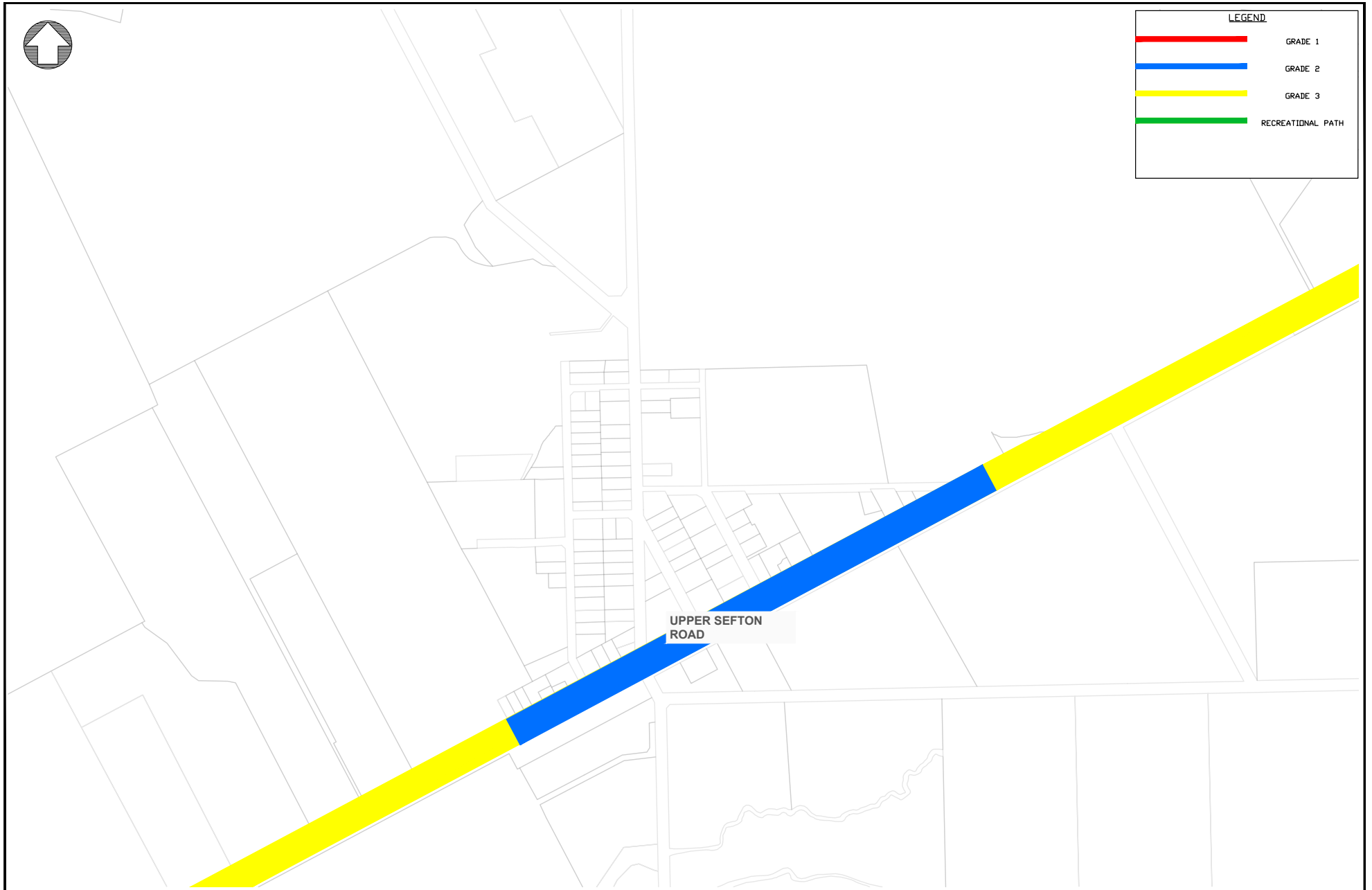
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DESIGNED		SCALE (A3) NOT TO SCALE
DESIGNED CHKD		DATUM ORIGIN
APPROVED		HORIZONTAL NZTM GD2000
		VERTICAL



PROJECT	WALKING AND CYCLING NETWORK PLAN
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SHEET TITLE	LOBURN (PROPOSED NETWORK PLAN)
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<b>FOR INFORMATION</b>	
DRAWING NOT FOR CONSTRUCTION	
4221	
SHEET	REVISION
10	A



REV	REVISION DETAILS	DRN	CHK	APP	DATE
A	FOR COMMUNITY BOARD	AMC	KS	---	JUL 2021

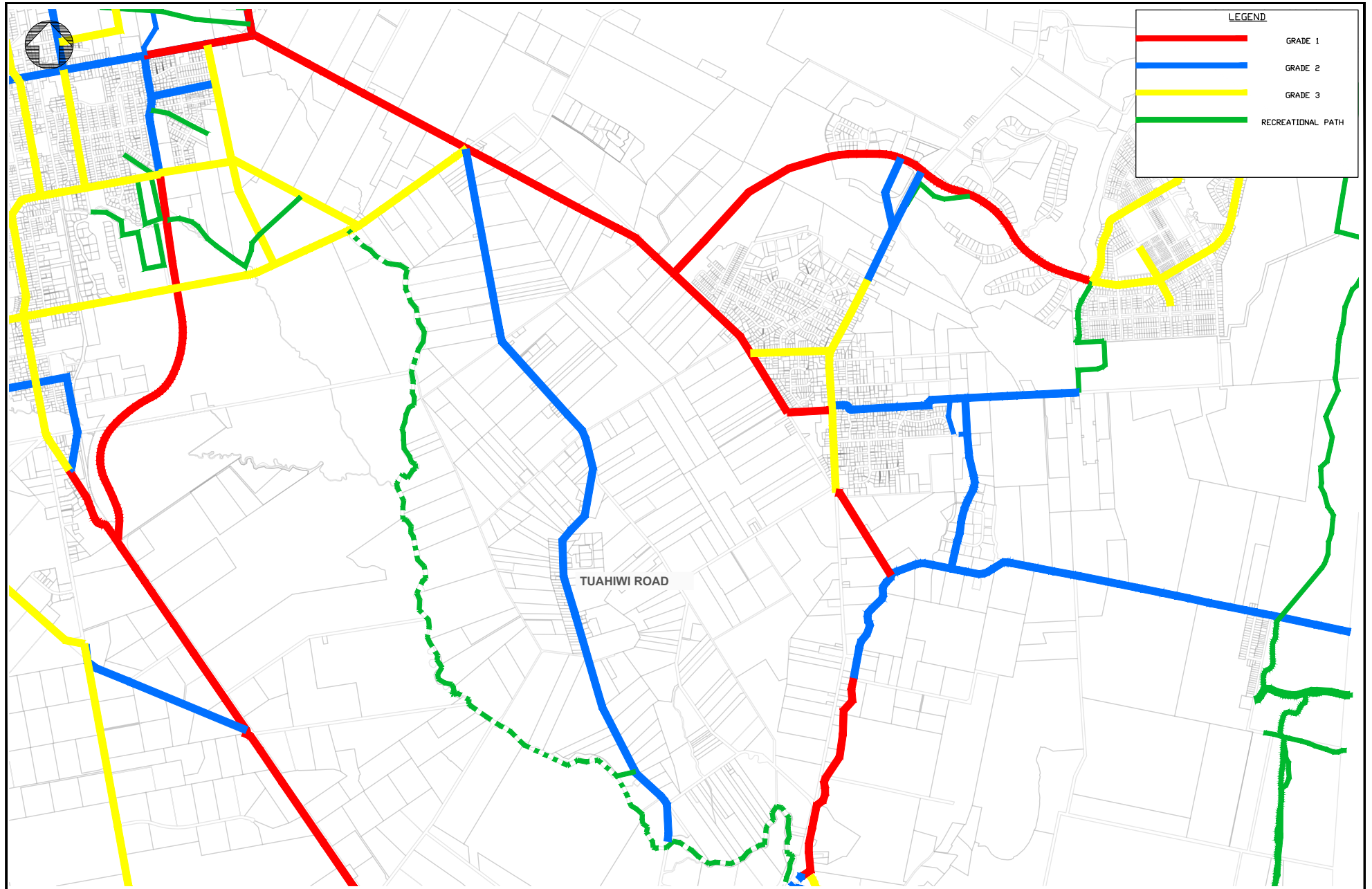
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DRAWN	MB	CON No	
DRAWING CHKD		SCALE (A3) NOT TO SCALE	
DESIGNED		DATUM ORIGIN	
DESIGNED CHKD		HORIZONTAL NZTM GD2000	
APPROVED		VERTICAL	



PROJECT
WALKING AND CYCLING NETWORK PLAN

SHEET TITLE
SEFTON (PROPOSED NETWORK PLAN)

FOR INFORMATION NOT FOR CONSTRUCTION	
DRAWING	4221
SHEET	REVISION
11	A



REV	REVISION DETAILS	DRN	CHK	APP	DATE
A	FOR COMMUNITY BOARD	AMC	KS	---	JUL 2021

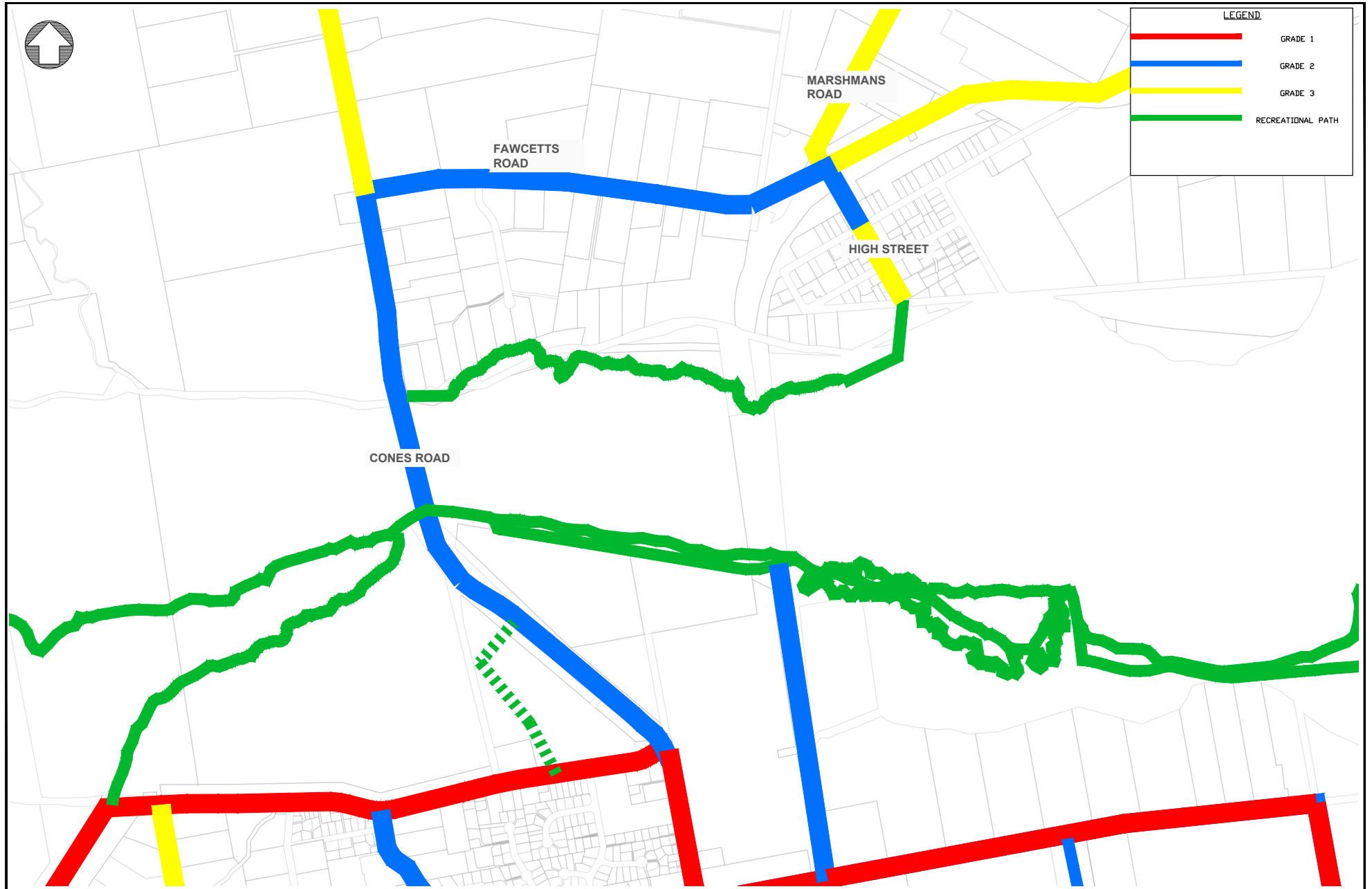
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DRAWING CHKD		CON No
DESIGNED		SCALE (A3) NOT TO SCALE
DESIGNED CHKD		DATUM ORIGIN
APPROVED		HORIZONTAL NZTM GD2000
		VERTICAL



PROJECT	WALKING AND CYCLING NETWORK PLAN
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SHEET TITLE	TUAHIWI (PROPOSED NETWORK PLAN)
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<b>FOR INFORMATION</b>	
NOT FOR CONSTRUCTION	
DRAWING	4221
SHEET	REVISION
12	A



LEGEND	
<span style="color: red;">—</span>	GRADE 1
<span style="color: blue;">—</span>	GRADE 2
<span style="color: yellow;">—</span>	GRADE 3
<span style="color: green;">—</span>	RECREATIONAL PATH

REV	REVISION DETAILS	DRN	CHK	APP	DATE
A	FOR COMMUNITY BOARD	AMC	KS	---	JUL 2021

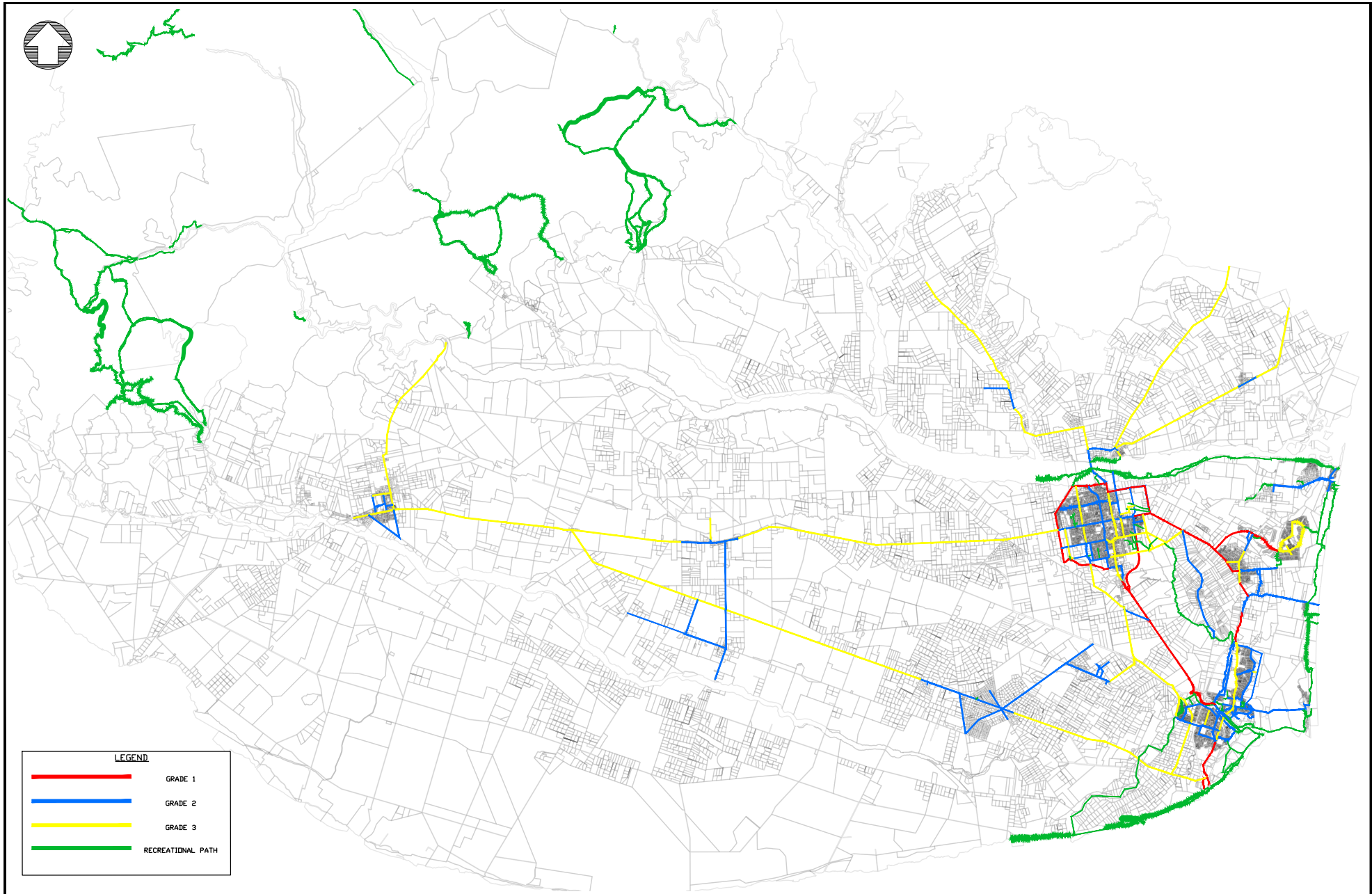
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DRAWING CHKD	CON No
DESIGNED	SCALE (A3) NOT TO SCALE
DESIGNED CHKD	DATUM ORIGIN
APPROVED	HORIZONTAL NZTM GD2000
	VERTICAL



PROJECT
WALKING AND CYCLING NETWORK PLAN

SHEET TITLE
ASHLEY (PROPOSED NETWORK PLAN)

FOR INFORMATION	
NOT FOR CONSTRUCTION	
DRAWING	4221
SHEET	REVISION
13	A



LEGEND	
	GRADE 1
	GRADE 2
	GRADE 3
	RECREATIONAL PATH

REV	REVISION DETAILS	DRN	CHK	APP	DATE
A	FOR COMMUNITY BOARD	AMC	KS	---	JUL 2021

SURVEYED	DRAWN	PROJECT No
	MB	PD001583
DRAWING CHKD		CON No
DESIGNED		SCALE (A3) NOT TO SCALE
DESIGNED CHKD		DATUM ORIGIN
APPROVED		HORIZONTAL NZTM GD2000
		VERTICAL



PROJECT
WALKING AND CYCLING NETWORK PLAN

SHEET TITLE
DISTRICT WIDE (PROPOSED NETWORK PLAN)

FOR INFORMATION	
NOT FOR CONSTRUCTION	
DRAWING	4221
SHEET	REVISION
14	A

Table 1. Prioritisation for Option One.

	Link	High-Level Estimate
Priority 1 (Year 1-3)	Tram Road (Mandeville to Swannanoa School path)	\$290,000
	Ashley Street/Ivory Street/Percival Street	\$490,000
	Railway Road/Torlesse Street/Coronation Street/Ellis Road	\$950,000
<b>TOTAL</b>		<b>\$1,730,000</b>
Priority 2 (Year 4-6)	Harewood Road (High Street to Main Street)	\$100,000
	High Street (Main Street to Harewood Road)	\$160,000
	Earlys Road (end of current facility to Springbank Road)	\$40,000
	Mandeville Road (McHughs Road to Mandeville Sports Ground)	\$70,000
	Tuahiwi Road (urban limits)	\$30,000
	Williams Street North	\$420,000
	Sandhill Road (Williams Street to Woodend Beach Road)	\$700,000
<b>TOTAL</b>		<b>\$1,520,000</b>
Priority 3 (Year 7-10)	Main Street (urban limits)	\$250,000
	Cust Road (Mill Road to east of Earlys Road)	\$400,000
	Old North Road/Ranfurly Street/Walker Street	\$950,000
	Woodend to Pegasus (SH1)	\$450,000
<b>TOTAL</b>		<b>\$2,050,000</b>



**WAIMAKARIRI DISTRICT COUNCIL****MEMO**

**TRIM NO:** 210720118263

**DATE:** 27 July 2021

**MEMO TO:** Don Young (Senior Engineering Advisor) and  
Allie Mace-Cochrane (Graduate Engineer)

**FROM:** Oxford-Ohoka Community Board

**SUBJECT:** Feedback on the Council's Cycle Network Plan

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At the Oxford-Ohoka Community Board meeting held on 7 July 2021, the Board was requested to provide feedback on the Council's proposed Cycle Network Plan. The following feedback was received from members:

- The Board is concerned about the lack of information accompanying the Cycle Network Plan which were tabled at the Board workshop. It is particular unclear from the provided maps on what side of the identified roads, streets the cycleway/shared paths would be developed.
- Sheet No.01

*High Street to Harewood Road and Harewood Road to Main Street.*

This location is now used extensively by pedestrians/walkers, especially High Street/Harewood Road/Park Avenue. Assuming that the shared path will be on the same side as the houses (zoned Residential), will the existing asphalt footpath be extended to the end of the zone (No.89)? Alternatively, if the shared path is developed on the cemetery side, will pedestrians /cyclists be expected to cross at the busy intersection?

This Grade 2 pathway goes through a Rural zoned area, and an area (from Burnt Hill Road to Park Avenue) which is zoned Residential on one side of the road and Rural on the other. Again, it is unclear on which side of the road the pathway will be. If the shared path is located on the southern side of Harewood Road, then the Council will need to consider an asphalt path from Burnt Hill Road to Park Avenue. The Board asked for a new footpath to be laid along Harewood Road in its submission to the 2021/31 Long Term Plan, however, this currently falls outside of the four year plan.

If Council plans to develop the shared path on the northern side of Harewood Road, then the Council will be compelling walkers/cyclists to cross over a busy rural road at the end of High Street onto Harewood Road with a 100km/h speed limit.

*Bay Road to Burnett Street*

Is Council staff aware that some of the proposed route encompasses part of Oxford A&P land, and have the Council been liaising with the Oxford A& P on this matter?

- Sheet 06

#### *Tram Road*

The Board wishes Tram Road to remain the Council's main priority. However, consideration has to be given to horse riders as they are often seen along this area along with cyclists and walkers.

The Board support the extension of the existing path on Tram Road from No.10 through to the Mandeville shops. However, the Board has expressed a concern regarding the approximate cost that is associated with this path, assuming it is an unsealed, unboxed path.

- Semi-rural Areas

Serious consideration needs to be given about the paving infrastructure that is provided for semi-rural residence, such as the Mandeville/Swannanoa area. Infrastructure should be developed so that semi-rural residents have alternative options that using motor vehicles to take their children to facilities and schools. Further development in these areas will inevitably occur, and the demand for such infrastructure will become increasingly necessary.

Due to aforementioned uncertainties, the Board believes that more information should be provided on what exactly is planned. Clarity should also be provided on which areas will be considered 'Urban areas' and which will be 'Rural areas' with regard to the propose Treatment Options.

To enable the Board to answer any questions that community members may have, it will be appreciated if the Board could be briefed on precisely what the Council will be consulting the public on. The Board also wishes clarity on how the Cycle Network Plan will be incorporated in the Council's Walking and Cycling Network Plan that is being developed in conjunction with the Walking and Cycling Group on which the Board is represented. It should be noted that not all the paths proposed are solely for cycles, e.g. the section down Tram Road could be used by runners, walkers and cyclists, potentially even horse riders if this was allowed.