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**RAVENSDOWN RESOURCE CONSENT RENEWAL PROJECT**  
**TECHNICAL FOCUS GROUP**  
**MEETING 3 MINUTES - FINAL<sup>1</sup>**

**DATE** Friday 16 July 2021  
**TIME** 8:30am - 12:00 pm  
**VENUE** Ravensdown Ltd, Awatoto, LNI Upstairs Meeting Room and Video Conference

**IN ATTENDANCE**

Andrew Torrens - Ravensdown	Aki Paipper - Kohupātiki Marae
Helen Hurring - Ravensdown	Margie McGuire - Kohupātiki Marae
Stephen Daysh - Mitchell Daysh	Chad Tareha - Ngāti Pārau Hapū
Anita Anderson - Mitchell Daysh	Jenny Mauger - Kahungunu ki Te Matau a Māui
Jamie Thompson - Ravensdown	Shade Smith - Ngati Kahungunu Iwi Inc
Marlane Harmer - Ravensdown	Sam Robinson - Ravensdown Customer
Anna Lindgren - Aurecon	Senitra Nathan-Marsh - DOC
Helen Caley - Aurecon	Reynold Ball - HBDHB
David Delagarza - Aurecon	Fred Sugden - Taradale High School
Malcom Miller - HBRC	Madison Milley - Taradale High School
Tania Diack - HBRC	Elliot Morell - Taradale High School
Shane Kelly (Coast and Catchment) - HBRC Technical Advisor (linked via teams)	Nigel Halpin - BioRich
Andrew Curtis (PDP) - HBRC Technical Advisor (linked via teams)	Tom Kay - Forest & Bird (linked via teams)
Andrew Gass - NCC	

**APOLOGIES**

Matthew Brady - DOC	Ami Coughlan - Fish and Game
Kyle Christensen (Kyle Christensen Consulting) - HBRC Technical Advisor	Bruce Wills - Ravensdown (Director)
Bridget Wilton - Horticulture Ltd	

**1. Introductions and Karakia**

- The Aurecon team advising Ravensdown introduced themselves to the group.
  - Anna Lindgren - Associate, Water
  - David Delagarza - Lead Engineer, Water

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<sup>1</sup> Confirmed at TFG Meeting 4, 27 August 2021.

- Helen Caley - Manager, Environment and Planning

## 2. Draft Minutes - TFG Meeting 2, 18 May 2021

- The minutes of the second meeting of the TFG, dated 18 May 2021, were confirmed as a true and correct record of the meeting.

***Moved - Chad Tareha***

***Seconded - Jamie Thompson***

***Carried unanimously***

- The meeting minutes will be finalised and attached to the minutes of Meeting 3 (Attachment 1) and added to the project website.

## 3. Introduction to Multi Criteria Decision Making Framework

- “Banana’s” video - <https://www.youtube.com/watch?v=7OoKJHvsUbo> (to 2min 35sec)
- Stephen provided a definition a Multi Criteria Analysis (MCDA) and noted that its purpose is to “serve as an aid to thinking and decision making, but not to take the decision”.
- Stephen summarised the scoring process as follows:
  - Ravensdown and their technical advisors have developed a range of potential feasible options to manage the process water and stormwater from the site discharging to three receiving environments (ocean, estuary and land). Each option is scored against 10 different criteria under four categories (Technical, Consenting and Environmental, Financial and Stakeholder). The criteria are weighted depending on their relative importance.
  - The options were being presented to the TFG and the group were invited to share their views and ideas on each and come to a collective agreement (where possible) to provide a score for each option against the “Stakeholder” criterion.
  - The Mana Whenua representatives on the TFG had scored the Mana Whenua criterion at a separate meeting and the Ravensdown Project Team and Technical Team have scored the other criteria.
  - The representatives from HBRC and their technical advisors would be observing the scoring process only, as they are the regulators for the resource consent process.
  - Ravensdown would make the final decision as to the option they would progress through the resource consent application process, but after considering all the advice and views gained through the MCDA exercise.
  - The Project Team will complete a Discharge Strategy and Project Description for the chosen options which would then be subject to expert assessment of effects studies.
  - An assessment of the Environmental Effects will be completed with the application which will be lodged with the HBRC by the end of November 2021.
  - The TFG will be updated through the pre-application processes.

## 4. Agree Objective

- The following objective for the MCDA process was presented and agreed to by the members of the TFG.

*To establish the most sustainable long-term solution for the treatment and discharge of stormwater and process water from the Ravensdown Napier Works to enable the continued operation of the site.*

## 5. Agree Weighting

*See Meeting 3 Agenda -Attachment 2 and Introductory Presentation (project website).*

- Stephen explained the rationale for the weighting of the criteria. While all criteria are important, many are not all necessarily of the same weight for decision making. A weighting of 1 is for criteria considered of lower importance, and 3 is for criteria considered higher importance. The weighting is used in the calculation of the final scores for the options.
- The TFG was asked for feedback on the proposed weighting presented and all agreed that the weighting developed for each criterion was appropriate.

## 6. Presentation of alternatives options developed under s105 of the RMA - Anna Lindgren, David Delagarza, Helen Caley (Aurecon)

*See Aurecon Presentation (project website).*

- The Aurecon team presented the options available to Ravensdown for the management, treatment and discharge of the site process water and stormwater, considering the three receiving environments - ocean, estuary and land.
- It was noted any discharge to land in the vicinity of the site would need to consider the Napier Source Protection Zone for the Napier city drinking water. Napier City Council have provided feedback that they would not support any discharge to land in this area. Stephen explained that a discharge to land in the source protection zone is not prohibited under the current TANK plan, however there would be a need to provide a high standard of proof to demonstrate the level of effects from any discharge and any risk to drinking water.
- Aurecon explained the various treatment devices being investigated:
  - Settling Pond - for removal of suspended solids. Generally, the first step in any treatment process.
  - Wetland - relies on natural processes for removal of many contaminants. Quite high removal of many nutrients, removal of some metals and some suspended or dissolved contaminants.
  - Bioretention Basin and Bioreactor - biological processes for enhanced removal of phosphorus and ammoniacal nitrates. Require a continuous flow of water to maintain a healthy environment which is challenging when the system is relying on stormwater.
  - Filter Media - water is passed through a media and contaminants either absorb onto the media or create an ion exchange process. Examples of media used in other situations include rocks or oyster shells. The media needs to target the particular element requiring removal.
  - Clarifier - an enhanced settling pond with an additional chemical dosing process where a flocculation or precipitation chemical is added. Potential for a high removal of dissolved reactive phosphorus.
  - Membrane Filter Plant – Effective for filtration of suspended particles however an additional process is required for dissolved contaminants. Very energy intensive process. Results in two wastewater streams - a very clean water, and a highly concentrated contaminated water stream that needs further management.
- Aurecon also noted that systems are generally designed to capture the 90<sup>th</sup> or 95<sup>th</sup> percentile storm events.
- All options would follow appropriate source control to manage and reduce the likelihood of contaminants entering stormwater across the site. This will be included in the discharge strategy for the chosen option.

## 7. Scoring of Stakeholder criteria

*See attached final Matrix.*

- Stephen introduced the Stakeholder criteria and explained that the group should provide their thoughts on each option and come to an agreement on a score between 1 (unfavourable) and 5 (preferred). Comments were recorded in the matrix. Stephen then led the group through the scoring of the “Stakeholder” criteria for each option.

## 8. Explanation of Mana Whenua criteria scores

- Stephen explained that the project team met with the TFG Mana Whenua representatives on 14 July to score the “Mana Whenua Values” criteria for each option.
- Jenny summarised the Mana Whenua scoring and advised that they were aligned with the TFG’s discussions at this meeting, noting that a discharge to Tangaroa was their highest rated option as it provided for mixing with Tāwhirimātea and Tamanuiterā. The second highest rated option was a combination with the higher risk areas discharging to Tangaroa or Papatūānuku and the lower risk areas with the highest quality of water to the Waitangi Estuary.
- Shade noted that they have an obligation as kaitiaki and that enhancement and restoration was equally important.
- Margie provided the group a historical account of the land and rivers.

**Agreed Action 1:** Helen H and Anita to follow up with Margie and discuss producing a map of the area based on Margie’s description.

## 9. Final Ranking of Options

*See attached final Matrix.*

- Helen C displayed the overall ranking of the options following the scoring process. The top scoring option was the “Combination of Options” with a final score of 82.

## 10. Next meeting

- The next TFG meeting will be to present the discharge strategy for the resource consent application.

Meeting Closed at 11:54am

Minutes prepared by Helen Hurring and Anita Anderson

**Attachment 1: FINAL Minutes, TFG Meeting 2, 18 May 2021**

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**RAVENSDOWN RESOURCE CONSENT RENEWAL PROJECT****TECHNICAL FOCUS GROUP****MEETING 2 MINUTES - FINAL<sup>1</sup>**

**DATE** Tuesday 18 May 2021  
**TIME** 12:00pm - 4:00pm  
**VENUE** Kohupatiki Marae, Kohupatiki Road, Clive

**IN ATTENDANCE**

Andrew Torrens - Ravensdown	Aki Paipper - Kohupātiki Marae
Helen Hurring - Ravensdown	Margi McGuire - Kohupātiki Marae
Stephen Daysh - Mitchell Daysh	Taylor Materoa - Kohupātiki Marae
Anita Anderson - Mitchell Daysh	Nigel Halpin - BioRich
Jamie Thompson - Ravensdown	Sam Robinson - Ravensdown Customer
Marlane Harmer - Ravensdown	Matthew Brady - DOC
Ngaire Phillips - Streamlined Environmental	Senitra Nathan-Marsh - DOC
Richard Chilton - Tonkin+Taylor	Reynold Ball - HBDHB
Francesca Kelly - Environmental Medicine Ltd (linked via teams)	Tom Kay - Forest & Bird (linked via teams) (part of meeting)
Jack Blunden - HBRC	Fred Sugden - Taradale High School
Malcom Miller - HBRC	Madison Milley - Taradale High School
Tania Diack - HBRC	Elliot Morell - Taradale High School
Shane Kelly (Coast and Catchment) - HBRC Technical Advisor (linked via teams)	Shade Smith - Ngāti Kahungunu Iwi Inc (part of meeting)
Kyle Christensen (Kyle Christensen Consulting) - HBRC Technical Advisor (linked via teams)	Jenny Mauger - Kahungunu ki Te Matau a Māui, Gazetted Customary Fisheries Rohe Moana

**APOLOGIES**

Andrew Curtis (PDP) - HBRC Technical Advisor	Chad Tareha - Ngāti Pārau Hapū (Present for Powhiri)
Tania Eden - Te Taiwhenua o Te Whanganui-a- Orutū	Ami Coughlan - Fish and Game
Bruce Wills - Ravensdown (Director)	

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<sup>1</sup> Confirmed at TFG Meeting 3, 16 July 2021.

## 1. Powhiri and Lunch

The (Technical Focus Group) TFG members were welcomed onto Kohupatiki Marae.

## 2. Karakia, Opening and Introductions

- The following members attending the meeting for the first time introduced themselves to the group.
  - Jenny Mauger - Kahungunu ki Te Matau a Māui, Co-Chair Gazetted Customary Fisheries Rohe Moana. Attending to support the mana whenua hapū. Jenny provided a background to her experience and family history in the area.
  - Madison Milley - Taradale High School student. Attending to gain knowledge from the process.
  - Elliot Morell - Taradale High School student. Attending to see the process and learn and absorb knowledge.
  - Fred Sugden - Taradale High School student. Here to learn and understand how this discharge affects our waterways.
  - Kyle Christensen - HBRC Technical Advisor for stormwater and river engineering.

## 3. Draft Minutes - TFG Meeting 1 15 April 2021

- Stephen asked the group for any comments or questions on the draft minutes of Meeting 1 and addressed each of the meeting action as follows:
  1. TFG representation
    - Horticulture representative (Jamie) - Danielle Adsett from NZ Apple and Pears was unable to come. In discussion with Bostock NZ regarding attendance.
    - HBRC Asset Management Team (Tania) – Kyle Christensen attending.
    - Shade Smith and NKII - (Stephen, Margi). Shade was hoping to attend TFG2 after he has finished at another meeting.
    - Taradale High School representative (Andrew) – three students attending - Fred, Madie and Elliot.
  2. Webpage - Ravensdown is working on getting the website ready to go live in the next week. Will include TFG meeting minutes.
  3. TFG Terms of Reference - finalised. Will be added to the website.
  4. Consent compliance - Webpage to include HBRC Compliance Monitoring Reports.
  5. Presentation on Ravensdown's research projects – not being presented at TFG Meeting 2 due to time constraints. Jamie noted that there is a Horticulture Field Day in early June and invited TFG members to attend.
- The minutes of first meeting of the TFG, dated 15 April 2021, were confirmed as a true and correct record of the meeting.
  - Moved - Malcolm Miller***
  - Seconded - Matt Brady***
  - Carried unanimously***
- The meeting minutes will be finalised and attached to the minutes of meeting two (Attachment 1) and added to the project website.

**Agreed Action 1: Helen to send the TFG members an invitation to the Horticulture Field Day**

#### 4. Presentation - Aki Paipper, Kohupātiki Marae

*See the project website for a copy of the presentation.*

- Aki provided the group background to the Ngāti Hori and Kohupātiki Marae whanau's historical connection to the lower Karamu Stream and Waitangi Estuary, outlining concerns about the degradation of the waterway, the work that has been done to improve the state of the catchment through Operation Patiki<sup>2</sup> and their involvement in processes such as the TANK Plan Change process.

#### 5. Presentation - Dr Ngaire Phillips, Streamlined Environmental Ltd

*See the project website for a copy of the presentation.*

- Ngaire summarised the baseline monitoring and investigations being undertaken by Ravensdown on the current stormwater and process water discharge to the Awatoto Drain (and the ultimate receiving environment of the Tūtaekūri River and Waitangi Estuary).
- It was confirmed that Ngaire's work to date did not look forward to what the replacement discharge permit would involve. This will be determined in consultation with the TFG after technical advice. Ngaire will then progress a detailed assessment of ecological and water quality effects based on the chosen discharge strategy.
- TFG members asked questions and provided comment on the following matters. *These will be considered by Ravensdown and the technical team in the preparation of the baseline and future assessment reports.*
  - Current consent compliance and consent limits.
  - Location of the current discharge relative to upstream and downstream sampling sites, the monitoring programme, and flow of the surrounding drains.
  - Historical overflows from the Ravensdown stormwater.
  - Origin of fluoride in the process.
  - Dispersion of the dye used in the the dye study.
- Stephen noted that the baseline assessment will be used in the consideration of the discharge strategy for the new consent which Ravensdown will ask for feedback on from the TFG members at the next meeting.

#### 6. Presentation - Richard Chilton, Tonkin + Taylor

*See the project website for a copy of the presentation.*

- Richard provided an overview of the current discharges to air from the Napier works and responded to questions and comments from the TFG members.
- The same process of determining the new air discharge strategy as discussed previously will be applied to the air discharge but recognising that there is only one possible receiving environment and plant the air discharge relates to.
- TFG members asked questions and provided comment on the following matters. *These will be considered by Ravensdown and the technical team in the preparation of the baseline and future assessment reports.*

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<sup>2</sup> Also see the Ngati Hori Freshwater Management Plan <https://www.hbrc.govt.nz/assets/Document-Library/Publications/Tangata-Whenua/Ngati-Hori-Freshwater-Resources-Management-Plan.pdf>



- Ability to shut plant down if discharge conditions are unsuitable.
- Monitoring programme and sampling equipment.
- Odour (SO<sub>2</sub>).
- Fugitive emissions from the site.
- Human health effects.
- Modelling methodology.
- Discharge from the proposed single 50m stack.

#### **7. Presentation - Dr Francesca Kelly, Environmental Medicine Limited**

*See the project website for a copy of the presentation.*

- Francesca provided an overview of environmental health effects assessment of the current discharges to air and water from the Napier works.
- TFG members asked questions and provided comment on the following matters. *These will be considered by Ravensdown and the technical team in the finalisation of the baseline and future assessment reports.*
  - Concentration of fluoride in food, water and other products (e.g., toothpaste) vs ambient fluoride associated with the Ravensdown discharge.
  - Accumulation of metals and other contaminants in fish and harvested food.

#### **8. Next meeting**

- Stephen noted the technical team are currently reviewing the discharge options for the site and that these will be presented to the TFG at the next meeting in late June and enable discussion and input by the TFG members before a final discharge strategy is settled on.

#### **9. Final Questions and Comments**

- Andrew noted that Ravensdown is committed to an open and honest process for the resource consent renewal project and that presentations show that there are a lot of aspects that Ravensdown are doing well with, while improvements are necessary in other areas. Ravensdown accepts the need for improvement, which has included the recent significant investment in new emission control equipment to improve the air discharge from the plant. The team is also looking at the options for the water discharge and how it can be improved as well as potential enhancements to the receiving environment.
- Any questions related to the meetings presentations can be emailed to Helen at [helen.hurring@ravensdown.co.nz](mailto:helen.hurring@ravensdown.co.nz). Helen will pass these on to the relevant expert.

Meeting Closed at 4:00 pm.

Minutes prepared by Helen Hurring and Anita Anderson

**Attachment 2: Options Assessment Matrix**

RAVENSDOWN STORMWATER AND PROCESS WATER DISCHARGE OPTIONS ASSESSMENT MATRIX

DEVELOPED BY CORE PROJECT AND TECHNICAL TEAM <sup>1</sup> - 6 MAY 2021, with updates to options and scoring to reflect discussions with NCC, and updated costings 13 July 2021, and mana whenua and Technical Focus Group feedback on 14 and 16 July respectively.

CRITERIA												
		Technical			Consenting & Environmental			Financial <sup>2</sup>		Stakeholder <sup>3</sup>		
RECEIVING ENVIRONMENT	OPTION	Land/Storage requirement	Safety in design	System / technological complexity and reliability	Consistency with regional / national planning framework (RMA or NCC permits for trade waste / stormwater)	Ability to meet receiving environment limits / guidelines	Future-proof (climate / other unpredictability)	Capital cost	Operational costs	Mana Whenua Values	Other Stakeholder Considerations / Concerns	Total score
<b>Criteria Weighting</b> 1 = Lower importance 3 = Higher importance		1	2	2	3	3	2	2	2	3	3	
Tūtaekurī / Waitangi Estuary	<b>Status quo</b>	5 No additional land requirement.	4 Some of the manual processes require work with caustic chemicals, outside of normal business hours and potential exposure to flooding hazards.  Eliminates construction risk.	4 Currently well understood methods, but some manual inputs needed  Minor improvements to the settling pond, including lining, or adding flocculation could enhance ecological outcome. Treatment ability / outcome are well understood	0 Limited detectable ecological and water quality effects downstream of the mixing zone boundary.  Dialogue with Mana Whenua Hapu has indicated that the status quo discharge is unacceptable from a cultural values perspective.	0 Based on the current discharge, some new receiving environment standards in the regional plan and other planning instruments (e.g. NES, NPSFM, TANK) would not be met.	2 The existing settling pond is unlined and subject to potential inflows and groundwater discharges due to rising groundwater due to sea level rise.  Developing public sentiment and associated policy is moving toward a higher standard of environmental outcomes.	5 Cost = Low  No capital cost associated with status quo  Potential cost with liner installation	4 Cost = Medium-Low  Minimal maintenance is required long term – especially around the aging infrastructure and manual processes	0 Indication from mana whenua hapu is that the status quo is unacceptable and won't be supported.	1 Some think zero score. Others think no science to suggest it should be a zero score, but should score low and shouldn't continue, particularly for a 35 year consent duration. There are other inputs into the receiving environment and Ravensdown shouldn't necessarily be held to a higher standard than other contributors.	46
	<b>Wetland Treatment train</b> Assume a settling pond, constructed wetland, infiltration basin and media filter would form the treatment train prior to discharge to the estuary. Potential for enhancing habitat values in riparian areas of wetland around discharge area.	3 Land would needed for settling pond, wetland basins, infiltration basins	3 Issues with potential deep water, stormwater pits, pipes, pumps, high maintenance requirements carry inherent risks  Significant construction activities involved  Risk associated with handling potential contaminated soils (if area around current pond is used)	1 Combinations of treatment devices, likely requiring adaptive management – this implies long term monitoring and modifying the function of the system.  There are some targeted phosphate removal devices (adsorbent and precipitant) that may achieve high levels of phosphorous removal  Green infrastructure cannot provide 100% removal rate (cannot guarantee a certain water discharge quality on a consistent basis)	4 Would require an assessment of effects relating to ecology and water quality and groundwater aspects.  Needs to be tested with Mana Whenua hapu regarding acceptability of final discharge to the estuary after treatment though land-based systems.	3 Depends on whether targets are mass or concentration based	3 Depends on option selected, but potentially changes in groundwater regime, vegetated systems affected by climate change, etc	1 Cost = High-Medium  Costs variable depending on construction methodology  Note: costings are only indicative at this stage	2 Cost = High-Medium  Note: costings are only indicative at this stage	2 Estuary is not always flushing - sometimes blocked / closed. Restoration / enhancement of environment as well is preferred.	3 Still going into the Waitangi Estuary which has high ecological values, but provides treatment. Potential to create additional habitat with constructed wetland. Ability to provide some continuous improvement. Water quality of discharge would need to be suitable for the receiving environment standards.	59

Criteria Score	0 Not Acceptable / Fatal Flaw	1 Lowest Score	2	3	4	5 Highest Score
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RAVENSDOWN STORMWATER AND PROCESS WATER DISCHARGE OPTIONS ASSESSMENT MATRIX

DEVELOPED BY CORE PROJECT AND TECHNICAL TEAM <sup>1</sup> - 6 MAY 2021, with updates to options and scoring to reflect discussions with NCC, and updated costings 13 July 2021, and mana whenua and Technical Focus Group feedback on 14 and 16 July respectively.

CRITERIA												
	Technical				Consenting & Environmental			Financial <sup>2</sup>		Stakeholder <sup>3</sup>		
RECEIVING ENVIRONMENT	OPTION	Land/Storage requirement	Safety in design	System / technological complexity and reliability	Consistency with regional / national planning framework (RMA or NCC permits for trade waste / stormwater)	Ability to meet receiving environment limits / guidelines	Future-proof (climate / other unpredictability)	Capital cost	Operational costs	Mana Whenua Values	Other Stakeholder Considerations / Concerns	Total score
<b>Criteria Weighting</b> 1 = Lower importance 3 = Higher importance		1	2	2	3	3	2	2	2	3	3	
	<b>Membrane filter</b>	4 Could allow for significant water reuse on site (e.g. in cooling towers, acid processes, etc.) May need holding / attenuation ponds to accommodate lower treatment rates	4 Well understood risks, high pressure flow	3 Inherent challenges with operating a filter plant, however technology is well known and treatment ability highly reliable May have potential for treating only highly-contaminated portions of the site. Need to manage highly contaminated waste discharge.	5 Would need an assessment of effects.	5	2 Very high energy requirements. High energy use implies significant carbon discharge	0 Cost = High Note: costings are only indicative at this stage	1 Cost = High Note: costings are only indicative at this stage	1 Concern about high energy usage and carbon footprint, and also contaminated waste stream that will need to be managed.	1 Trading one problem for another - issues with adding CO2, and high cost, and contaminated waste stream to be managed.	60

Criteria Score	0 Not Acceptable / Fatal Flaw	1 Lowest Score	2	3	4	5 Highest Score
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**RAVENSDOWN STORMWATER AND PROCESS WATER DISCHARGE OPTIONS ASSESSMENT MATRIX**  
 DEVELOPED BY CORE PROJECT AND TECHNICAL TEAM <sup>1</sup> - 6 MAY 2021, with updates to options and scoring to reflect discussions with NCC, and updated costings 13 July 2021, and mana whenua and Technical Focus Group feedback on 14 and 16 July respectively.

CRITERIA												
RECEIVING ENVIRONMENT	OPTION	Technical			Consenting & Environmental			Financial <sup>2</sup>		Stakeholder <sup>3</sup>		Total score
		Land/Storage requirement	Safety in design	System / technological complexity and reliability	Consistency with regional / national planning framework (RMA or NCC permits for trade waste / stormwater)	Ability to meet receiving environment limits / guidelines	Future-proof (climate / other unpredictability)	Capital cost	Operational costs	Mana Whenua Values	Other Stakeholder Considerations / Concerns	
<b>Criteria Weighting</b> 1 = Lower importance 3 = Higher importance		1	2	2	3	3	2	2	2	3	3	
Marine Water (ocean)	<b>Discharge via NCC wastewater infrastructure (sea outfall pipe)</b>	1	4	3	2	5	1	4	3	3	3	70
		<p>Attenuation ponds will likely be needed to meet metered discharge requirements.</p> <ul style="list-style-type: none"> <li>This technique is used at the Ravensdown Hornby site (max 4 L/s as agreed with CCC – NCC have indicated 2 L/s would likely be required).</li> <li>Potential for treatment to be combined with attenuation.</li> <li>This might be anything from a shipping container sized media filter to a large wetland.</li> </ul> <p>Would require land / right of way easements to accommodate pipe.</p> <p>Ravensdown does have land holdings to facilitate attenuation / treatment options.</p> <p>May need a Papatuanuku Channel per the existing NCC wastewater discharge consent.</p>	<p>Potential issues with deep water / pump out pits, etc.</p> <p>Inherent risks with long pipeline construction and maintenance.</p> <p>Risks seem to be manageable based on past experience, this can be facilitated through standard engineering design.</p>	<p>Likely some level of automation required to manage flows and discharges from the site. This would be very similar to the system constructed at Ravensdown Hornby.</p> <p>Potential complexity around interfacing with NCC systems. Could be managed through fail-safes.</p> <p>Depends on whether discharge is via NCC treatment plant or not, but treatment reliability highly dependent on the consent limits and whether discharge under the existing NCC consent is possible.</p> <p>Potential challenge with treating DRP.</p> <p>Need to consider combined effects of additional contaminant discharge.</p>	<p>Working assumption following discussion with NCC is that NCC may not approve discharge under the existing discharge permit and Ravensdown would require its own separate discharge permit for discharge to the marine environment.</p> <p>This option would require integration of complex consenting and effects matters as between NCC and Ravensdown.</p> <p>Consideration would need to be given to unconsented discharges due to a pipeline or pump failure. This could be managed through ensuring construction methodology consistent with sewer lines.</p> <p>Experience shows that ocean discharge solutions are complex to consent and effects need to be shown to be minor and ideally input from Mana Whenua hapu on any treatment methods to limit cultural effects will be important.</p> <p>Consideration of the need for a resource consent for attenuation ponds and flood discharges.</p> <p>Discharge below treatment plant effluent may require change of consent conditions (to be confirmed via check of consent and with NCC).</p>	<p>Existing site sampling data indicates site discharge meets limits in the discharge consent for domestic and industrial wastewater into Hawke Bay.</p> <p>Analysis would be required to ensure that the relative contribution from Ravensdown allow for NCC to meet limits in their discharge permits and receiving environment limits.</p> <p>Greater dilution afforded by the open coastal environment, which is positive in terms of environmental effects.</p>	<p>NCC discharge strategy/location may change when existing resource consent comes up for renewal (2037, or earlier due to the need to upgrade the infrastructure) – beyond Ravensdown’s control.</p> <p>May require treatment strategies beyond what is currently envisioned.</p> <p>This option ties Ravensdown to the duration and conditions associated with the existing and / or new discharge permits that NCC will hold. This situation may provide long term unknown constraints on the plant.</p> <p>The NCC outfall pipe is located in a highly turbulent marine environment and has recently been compromised, with leaking wastewater (requiring industries to cease / reduce discharge temporarily). The integrity of any updated pipeline will be a risk.</p> <p>This option would require strong partnership between NCC and Ravensdown.</p>	<p>Cost = Medium</p> <p><b>Note: costings are only indicative at this stage.</b></p> <p>Includes:</p> <ul style="list-style-type: none"> <li>Treatment.</li> <li>Cost of the pipeline.</li> <li>Cost of the connection.</li> </ul> <p>Any applicable development contributions - would require a bespoke DC agreement to be negotiated between Ravensdown and NCC on the basis that Ravensdown would pay the capital and operating costs for the infrastructure. There is also the potential to need to contribute to infrastructure replacement and re-consenting costs as part of the re-consenting of the NCC outfall.</p> <p>Flows would not contribute to added inflow to the treatment plant.</p>	<p>Cost = Medium</p> <p><b>Note: costings are only indicative at this stage.</b></p> <p>Depends on fees required by NCC for ongoing discharges to their system.</p> <p>Costs associated with treatment, dependent on the treatment option chosen.</p> <p>Ongoing pump costs and pipeline maintenance – subject to discussions with NCC over the ownership of the pipeline.</p>	<p>Initial understanding with NCC consent was that wastewater from industrial sites would be treated on individual sites but appears that may not be the case - good to have this process and clearly understand what the discharge will consist of. Want pre-treatment to an acceptable level regardless of receiving environment.</p> <p>Discharge to ocean preferable to discharge onto land within NCC drinking water source zone.</p> <p>Need for onsite treatment acknowledged, with redundancy built in to provide for climate change.</p>	<p>Out of Ravensdown's control - relying on others to manage their discharge. Concern about lack of capacity in NCC network - attenuation would need to be provided on site. Options to provide treatment on site to ensure discharge is of appropriate standard.</p> <p>There is a risk to being reliant on NCC's infrastructure - especially with climate change and other changes in the area.</p> <p>Has efficiency with assisting NCC with constructing their outfall rather than constructing their own.</p>	

<b>Criteria Score</b>	0 Not Acceptable / Fatal Flaw	1 Lowest Score	2	3	4	5 Highest Score
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**RAVENSDOWN STORMWATER AND PROCESS WATER DISCHARGE OPTIONS ASSESSMENT MATRIX**  
 DEVELOPED BY CORE PROJECT AND TECHNICAL TEAM <sup>1</sup> - 6 MAY 2021, with updates to options and scoring to reflect discussions with NCC, and updated costings 13 July 2021, and mana whenua and Technical Focus Group feedback on 14 and 16 July respectively.

CRITERIA												
RECEIVING ENVIRONMENT	OPTION	Technical			Consenting & Environmental			Financial <sup>2</sup>		Stakeholder <sup>3</sup>		Total score
		Land/Storage requirement	Safety in design	System / technological complexity and reliability	Consistency with regional / national planning framework (RMA or NCC permits for trade waste / stormwater)	Ability to meet receiving environment limits / guidelines	Future-proof (climate / other unpredictability)	Capital cost	Operational costs	Mana Whenua Values	Other Stakeholder Considerations / Concerns	
<b>Criteria Weighting</b> 1 = Lower importance 3 = Higher importance		1	2	2	3	3	2	2	2	3	3	
	<b>Ravensdown site-specific sea outfall</b>	3 Would likely require some attenuation, however smaller than the trade waste option. Assume there would be no/minimal volume constraints. Land area possibly required for treatment, varying from small filter to large wetland. Would require land / right of way easements to accommodate pipe and an easement with Waka Kotahi across the state highway. Ravensdown does have land holdings to facilitate attenuation / treatment options if Winstone site is acquired (across the state highway), treatment could occur on the seaward side of the highway as part of a land restoration project. This would also require an agreement with HBRC / DOC to cross the foreshore area. MACA legislation would require an agreement with Mana Whenua who are assigned the foreshore and seabed land rights (currently working through a high court process in relation to Hawke Bay).	2 Underwater construction and maintenance of ocean outfall pipelines carries risk.	3 Depends on method of pre-treatment (assuming some is required), but likely a previously used and understood treatment method. Requires engineering a new structure in a high energy marine environment Significant difficulty in constructing an underwater pipeline across the foreshore and surf zone. The working assumption is that given the flows and volumes, a shorter pipeline than the existing NCC outfall (1.5km) could be facilitated. Additional attenuation may allow for reduced flowrates and a shorter pipeline. Less ability to utilise dilution (from NCC wastewater / stormwater) existing outflows to manage receiving environment effects, especially in the mixing zone.	3 Would require a full assessment of effects on water quality and ecology. There is recent existing data from the Pan Pac and Napier Port consent processes (alongside ecological assessments, environment court findings, and mitigation and monitoring schemes). Experience shows that ocean discharge solutions are complex to consent and effects need to be shown to be minor and ideally input from Mana Whenua hapu on any treatment methods to limit cultural effects will be important.	4 Depends on consent requirements – would likely require some level of treatment prior to discharge. Significantly greater dilution afforded by open coastal environment when compared with estuarine discharges. There is recent existing data from the PanPac and Napier Port consent processes (alongside ecological assessments, environment court findings, and mitigation and monitoring schemes)	2 Likely complexities with maintaining structure in the high energy coastal environment, especially with climate change. Sea level rise will be a significant consideration. Coastal area in the vicinity of Ravensdown has been accreting – design would need to facilitate long term accretion potential. Long term uncertainty in the erosion / accretion potential of the coastal environment. Does not rely on third party consent holder (NCC) who will have to be responsible for the long term management of Ravensdown's discharge inputs. Consent would not be coupled to the consent renewal period of the NCC discharge permits, enabling Ravensdown to seek a long term consent (up to 35 years, as allowed by the RMA). An additional factor is that the NCC discharge has to be renewed on or before 2037 and there is a possibility that the ocean discharge will not continue to be authorised.	2 Cost = High <b>Note: costings are only indicative at this stage.</b> Land side infrastructure would be very similar to the trade waste option, however the construction of the undersea pipeline would carry significant cost.	2 Cost = High-Medium <b>Note: costings are only indicative at this stage.</b> Significant cost associated with the maintenance of underwater structure.	4 Direct discharge with control over discharge is preferable to discharging via NCC outfall - provides more opportunity for Ravensdown to work in partnership with mana whenua for continuous improvement and separate from the complexity of working with NCC. Discharge into the ocean preferable ecologically - provide better dilution and lower effects to benthic ecology - acknowledge that discharging contaminants to water is not agreeable culturally. Need to minimise effects and enhance the environment - not acceptable to walk away from estuary which has been damaged and begin same discharge to a different environment. Preference would be to treat the discharge highly before discharge. Preference for an approach of promoting abundance rather than simply reducing the effects.	2 Ravensdown have more control over their own discharge - some people view as being better than the NCC outfall option. Very costly option. Potential for outfall blockage due to intermittent flow and proximity to high energy shore. Outfall area can limit fishing to protect pipe, so this provides some protection to the environment, and can add some biodiversity (hard structure for organisms to settle on) - ability to create environmental enhancement by creating artificial reef / habitat for mussels etc. Mussels were historically abundant in Hawke Bay.	64

Criteria Score	0 Not Acceptable / Fatal Flaw	1 Lowest Score	2	3	4	5 Highest Score
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RAVENSDOWN STORMWATER AND PROCESS WATER DISCHARGE OPTIONS ASSESSMENT MATRIX

DEVELOPED BY CORE PROJECT AND TECHNICAL TEAM <sup>1</sup> - 6 MAY 2021, with updates to options and scoring to reflect discussions with NCC, and updated costings 13 July 2021, and mana whenua and Technical Focus Group feedback on 14 and 16 July respectively.

CRITERIA												
RECEIVING ENVIRONMENT												
OPTION	Technical			Consenting & Environmental			Financial <sup>2</sup>		Stakeholder <sup>3</sup>		Total score	
	Land/Storage requirement	Safety in design	System / technological complexity and reliability	Consistency with regional / national planning framework (RMA or NCC permits for trade waste / stormwater)	Ability to meet receiving environment limits / guidelines	Future-proof (climate / other unpredictability)	Capital cost	Operational costs	Mana Whenua Values	Other Stakeholder Considerations / Concerns		
<b>Criteria Weighting</b> 1 = Lower importance 3 = Higher importance												
	1	2	2	3	3	2	2	2	3	3		
Land discharge	<p><b>Pre-treatment+ spray or border dyke irrigation</b></p> <p>Spray irrigation has a high land requirement – use of land for spray irrigation would limit future potential use of the land</p> <p>At a 5mm/day application rate, approximately 40ha of land would be required to facilitate all stormwater and process water.</p> <p>Using border dyke irrigation could result in lower land requirements</p> <p>Spray irrigation timing would be dependent on groundwater levels</p>	<p>Potential issues with accumulation of contaminants in soil and vegetation</p> <p>Potential issues with deep water / pump out pits, etc.</p> <p>Potential for contamination of deep aquifers, however upward pressure and silts would likely restrict this</p>	<p>Would likely require pre-treatment, this would be the most complex component.</p> <p>Spray irrigation is a previously used and understood discharge method</p> <p>May result in surface discharges during high rainfall Groundwater mounding would be a potential issue</p>	<p>Issues with discharging into Napier City drinking water source protection zone.</p> <p>Needs to consider potential changes to the hydrology – both groundwater and surface water interactions and effects on wetland habitats.</p>	<p>Could be a viable solution in concert with another treatment option to reduce volumes requiring treatment and discharge to ocean / estuary.</p> <p>Depends on what groundwater guideline values are, level of treatment provided, existing contaminant concentrations in groundwater</p> <p>Fluoride and heavy metals not removed by pre-treatment would accumulate in soils and this may limit the applicability of this option – need advice from plant and public health experts to determine the fate of these contaminants in the environment.</p>	<p>3</p> <p>Depends on option selected, but potentially changes in groundwater regime, vegetated systems affected by climate change, etc</p> <p>Rising sea levels would result in higher groundwater levels, restricting the applicability of this option in the future</p> <p>May not be sustainable in the long term due to accumulation of contaminants in the soils.</p>	<p>3</p> <p>Cost = Medium</p> <p><b>Note: costings are only indicative, no costing undertaken</b></p>	<p>3</p> <p>Cost = Medium</p> <p><b>Note: costings are only indicative at this stage</b></p>	<p>2</p> <p>Concern about potential to affect water used for drinking. Concern about potential for accumulation of contaminants in land, although this would depend on level of treatment and contaminant concentrations. Using Papatuanuku for treatment is generally preferable to discharge into water. Would be a preferable option if it were outside the source protection zone. Tangaroa has a better ability to assimilate this discharge rather than Papatuanuku. Tangaroa is assisted by Tawhirimatea (wind) and Tamanuitera (sun). Despite these views, mana whenua would like further information about a land based proposal to provide a certain solution given the potential for climate change risks (e.g. sea level rise, coastal inundation).</p>	<p>3</p> <p>Concern about ability to find additional area for irrigation if needed. Preferable to discharge into the river. Most councils prefer land based discharge over discharges into surface water so could merit a higher score, however the sensitivity of the source protection zone is noted. Potential for discharge onto land outside source protection zone was discussed, but this would be some distance away. Flood management area and potential for sea level and groundwater level rise with climate change also a consideration. Land discharge is a preferred option and should be fully investigated. Potential to use plants for contaminant uptake could be considered.</p>	62	

Criteria Score	0 Not Acceptable / Fatal Flaw	1 Lowest Score	2	3	4	5 Highest Score
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**RAVENSDOWN STORMWATER AND PROCESS WATER DISCHARGE OPTIONS ASSESSMENT MATRIX**  
DEVELOPED BY CORE PROJECT AND TECHNICAL TEAM <sup>1</sup> - 6 MAY 2021, with updates to options and scoring to reflect discussions with NCC, and updated costings 13 July 2021, and mana whenua and Technical Focus Group feedback on 14 and 16 July respectively.

CRITERIA												
		Technical			Consenting & Environmental			Financial <sup>2</sup>		Stakeholder <sup>3</sup>		
RECEIVING ENVIRONMENT	OPTION	Land/Storage requirement	Safety in design	System / technological complexity and reliability	Consistency with regional / national planning framework (RMA or NCC permits for trade waste / stormwater)	Ability to meet receiving environment limits / guidelines	Future-proof (climate / other unpredictability)	Capital cost	Operational costs	Mana Whenua Values	Other Stakeholder Considerations / Concerns	Total score
<b>Criteria Weighting</b> 1 = Lower importance 3 = Higher importance		1	2	2	3	3	2	2	2	3	3	
	<b>Pre-treatment + soakage/ rapid infiltration</b>  Assume pre-treatment provided	4 Low surface footprint – can build over the top of soakpits	4 Potential deep excavation during construction.  Potential risk of subsidence	4 Likely to be restricted by high groundwater levels observed on site – groundwater mounding would be a potential issue  If shallow groundwater is already saline, discharging fluoride may be more acceptable. Depends on method of pre-treatment, but likely a previously used and understood treatment method	0 Issues with discharging into Napier City drinking water source protection zone.  Needs to consider potential changes to the hydrology – both groundwater and surface water interactions and effects on wetland habitats	4 Depends on what groundwater guideline values are, level of treatment provided, existing contaminant concentrations in groundwater  Unknown what restrictions there may be on the groundwater and surface water receiving environment	3 Depends on option selected, but potentially changes in groundwater regime, vegetated systems affected by climate change, etc  Rising sea levels would result in higher groundwater levels, restricting the applicability of this option in the future	3 Cost = Medium  <b>Note: costings are only indicative, no costing undertaken</b>	4 Cost = Medium-Low  <b>Note: costings are only indicative at this stage</b>	2 Concern about potential to affect water used for drinking. Concern about potential for accumulation of contaminants in land, although this would depend on level of treatment and contaminant concentrations. Using Papatuanuku for treatment is generally preferable to discharge into water.	2 Concern about contaminants potentially entering groundwater. Most councils prefer land based discharge over discharges into surface water so could merit a higher score, however the sensitivity of the source protection zone is noted. Potential for discharge onto land outside source protection zone was discussed, but this would be some distance away. Flood management area and potential for sea level and groundwater level rise with climate change also a consideration.	64

Criteria Score	0 Not Acceptable / Fatal Flaw	1 Lowest Score	2	3	4	5 Highest Score
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RAVENSDOWN STORMWATER AND PROCESS WATER DISCHARGE OPTIONS ASSESSMENT MATRIX

DEVELOPED BY CORE PROJECT AND TECHNICAL TEAM <sup>1</sup> - 6 MAY 2021, with updates to options and scoring to reflect discussions with NCC, and updated costings 13 July 2021, and mana whenua and Technical Focus Group feedback on 14 and 16 July respectively.

CRITERIA												
		Technical			Consenting & Environmental			Financial <sup>2</sup>		Stakeholder <sup>3</sup>		
RECEIVING ENVIRONMENT	OPTION	Land/Storage requirement	Safety in design	System / technological complexity and reliability	Consistency with regional / national planning framework (RMA or NCC permits for trade waste / stormwater)	Ability to meet receiving environment limits / guidelines	Future-proof (climate / other unpredictability)	Capital cost	Operational costs	Mana Whenua Values	Other Stakeholder Considerations / Concerns	Total score
<b>Criteria Weighting</b> 1 = Lower importance 3 = Higher importance		1	2	2	3	3	2	2	2	3	3	
Combination of options	Split flow to NCC stormwater and/or trade waste infrastructure and treatment train	3 Will depend on specific options chosen	3 Similar to options above with excavations required	2 Allows more contaminated catchments / hard to treat contaminants to be removed from treatment train, however will need more than one system, and consideration of which catchment to send to each	4 Depends on options selected and how catchments/ contaminants are to be managed, but may be able to deal with concerns about water quality and contaminant discharge to particular environments  Experience shows that ocean discharge solutions are complex to consent and effects need to be shown to be minor and ideally input from Mana Whenua hapu on any treatment methods to limit cultural effects will be important.	4 Depends on options selected and how catchments/ contaminants are to be managed, but may be able to deal with concerns about water quality and contaminant discharge to particular environments	3 Depends on option selected, but potentially changes in groundwater regime, vegetated systems affected by climate change, etc	3 Cost = Medium-high, variable depending on the construction methodology  <b>Note: costings are only indicative at this stage</b>	3 Cost = Medium  <b>Note: costings are only indicative at this stage</b>	4 Understanding is that the higher risk areas would discharge to Tangaroa or Papatuanuku, and lower risk areas would discharge to the Waitangi Estuary. This combination option is seen as sensible from a sustainability and cultural perspective as it is responsive and sensitive to the respective parts of the site.	5 Able to take the best parts of all of the other options. Better dilution is likely available in the estuary in winter. Cleaner portion could discharge to estuary at times, and to land at times depending on soil moisture.	82

Notes:

1 Core Project Team

Ravensdown - Andrew Torrens, Helen Hurring  
Mitchell Daysh Ltd - Stephen Daysh

Technical Team:

Aurecon - David Delagarza, Anna Lindgren, Helen Caley  
Streamlined Environmental - Ngaire Phillips  
PDP - Neil Thomas

2 Costs Range = High=1, High-Medium=2, Medium=3, Medium-Low=4, Low=5

3 Scoring undertaken by Mana Whenua / TFG.

Criteria Score	0 Not Acceptable / Fatal Flaw	1 Lowest Score	2	3	4	5 Highest Score
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