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<b>Project:</b>	Ravensdown Awatoto Consent Application		
<b>Our reference:</b>	343853BA18	<b>Your reference:</b>	Ravensdown
<b>Prepared by:</b>	Simon Liddell, Nick Dempsey & Sven Exeter	<b>Date:</b>	3 March 2022
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<b>Subject:</b>	Ravensdown Review		

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## 1 Introduction

Ravensdown Limited Napier Works (“Ravensdown”) hold a range of resource consents including to discharge contaminants to air and stormwater and process water discharges from their site, and a water take consent, in Awatoto, Napier. Currently, stormwater and process water that is not reused on site is collected in a discharge pond and pumped into the Ravensdown and Awatoto Drain, with the ultimate receiving environment being the Tūtaekurī River and Waitangi Estuary.

Ravensdown initiated an assessment of alternative options for the treatment and discharge of the stormwater and process water from the site to review both the method of treatment and the receiving environment utilising a multi criteria decision analysis process (MCDA). In doing this a Technical Focus Group (TFG) made up of representatives from key stakeholder groups provided their feedback on each option with the following objective for the MCDA process:

*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.*

As a result of this MCDA process a discharge strategy was developed resulting in the proposed discharge of treated stormwater and process water to land with less frequent discharges to surface water.

Mott MacDonald New Zealand Limited (Mott MacDonald) has been engaged by Hawke’s Bay Regional Council (HBRC) to provide a review of the below documents with a focus on the stormwater treatment and land discharge components noting that the discharges to air are being reviewed by other consultants. Some planning documents have also been reviewed by Mott MacDonald for the purpose of s92 (RMA) and a detailed planning review is contained within the s42A (RMA) officer’s report. Mott MacDonald have reviewed the following documents:

- a. Ravensdown Napier Works AEE, 29 Nov 2021
- b. A4: Ravensdown Stormwater and Process Water Discharge - Land Discharge Effects And Management November 2021
- c. A5: Watertake Effects Assessment, November 2021
- d. A8: Economic Assessment, 22 November 2021

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- e. A9: Ravensdown Planning Assessment, 26 November 2021
- f. A10: Cultural Impact Assessment Ngati Parau, November 2021
- g. A11: Cultural Impact Assessment Kohupatiki Marae, November 2021
- h. R5: Water Discharges High Level Options Review, 25 November 2021
- i. R6: Water Discharge Strategy, November 2021
- j. M1: Source Control Management Plan, November 2021
- k. M2: Adaptive Management Plan, November 2021
- l. Part E: Ravensdown Consent Conditions 29 Nov 2021

The scope of the review is to provide:

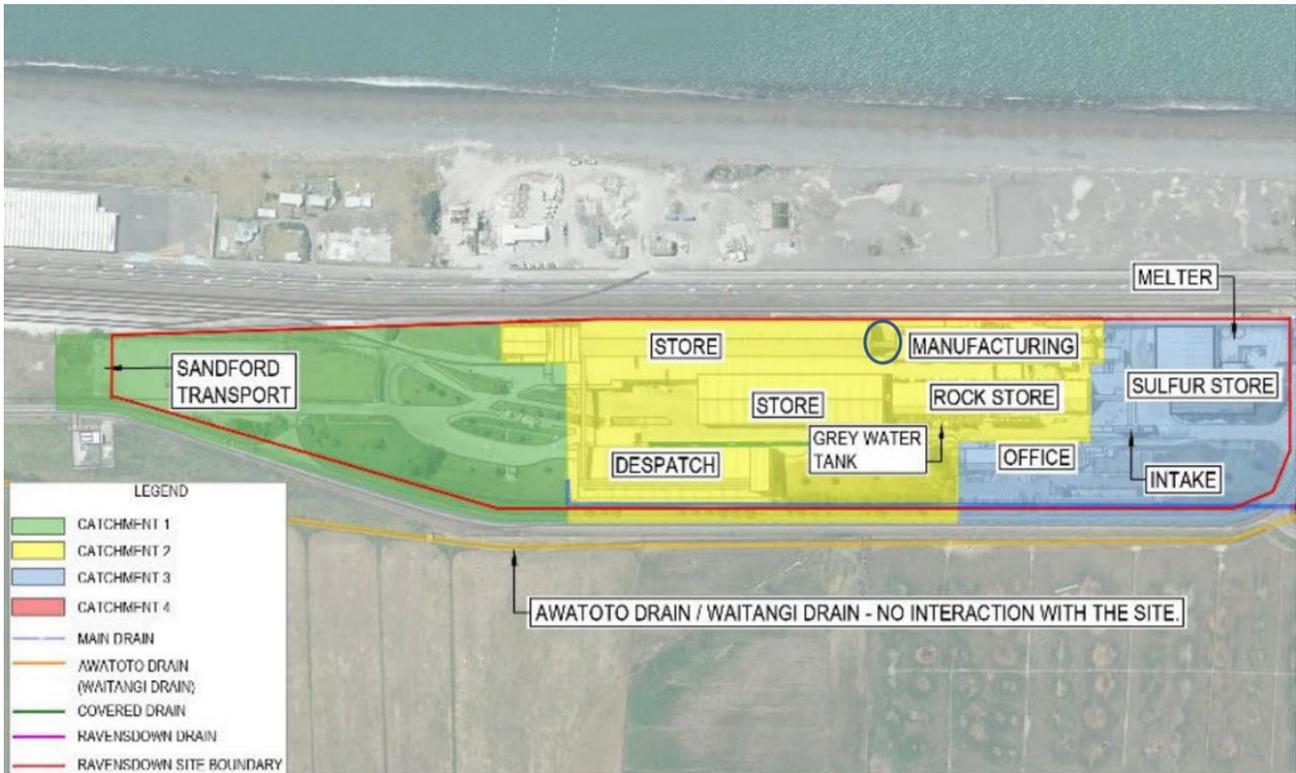
- a. Commentary on the reasonableness of the assessment given the scale of the activity and effects.
- b. Identify any key gaps in the assessment from a technical perspective with regard to Schedule IV of the Resource Management Act (RMA) and relevant industry guidelines and pose S92 (RMA) questions.

## 2 Site Visit

Mott MacDonald staff undertook site visits on 20 January 2022 (Nick Dempsey & Sven Exeter) accompanied by Andrew Torrens (Ravensdown) and Helen McCarthy (Ravensdown) and 07 February 2022 (Simon Liddell – land discharge site only). Points of note:

- The bulk storage area vehicle access and lanes and adjacent access areas (i.e. not storage per se) were coated in raw fertiliser material. At both of these areas, there was significant airborne fugitive dust. Mechanical mobile sweepers have had clogging issues and were not operating. There appeared to be a “wind tunnel” between the storage and manufacture buildings and dust was seen migrating towards State Highway 51 from the outdoor uncovered hardstand area adjacent to the bulk storage area (between Superstore 1 and the Manufacture Plant – refer to blue circle on below Figure 1). At this uncovered outdoor area is a surface channel drain that would appear to receive stormwater containing with phosphate rock dust. Andrew Torrens advised that this exposed outdoor area will be covered with a new roof and drainage system between the Superstore 1 and the Manufacture Plant buildings (refer to Figure 2 and Figure 3).
- A number of collapsed and removed roof sections were evident in the Manufacturing Building. Both providing exit points for fugitive dust, and entry points for rain which would compound caking, and run-off. See Figure 4.
- Many of the existing buildings did not have any guttering, such that rainfall would discharge onto the ground. When queried about this, Ravensdown noted that there had been issues with dust accumulation in the past clogging the drains, so many had been removed. This is a strong indicator of the level of fugitive dust emissions at the site. See Figure 5 Figure .
- It was noted that downpipes from the existing buildings all discharge directly onto the impervious hard standings in the area, ensuring that all dust accumulated in these areas is flushed into the stormwater system. See Figure 6.
- Andrew Torrens confirmed that the existing septic tanks (containing general amenities wastewater) are currently pumped out to trucks and the wastewater is disposed at the NCC municipal wastewater treatment plant. The future plan is for the amenities (cafeteria, showers, toilets and laboratory) wastewater to be piped to the NCC municipal wastewater treatment plant.
- A Royal Spoonbill / Kōtuku ngutupapa was observed adjacent to the Ravensdown site flying towards Waitangi Estuary and numerous pied stilt was observed in the lower Tūtaekurī River river-mouth area.
- Baseline condition of the land discharge site and perimeter drains observed to be consistent with description in the land discharge effect and management report (see Figure 7 and Figure 8).

Figure 1: Site Map with Stormwater Catchments



Source: Figure 17 - AEE, with Mott MacDonald annotation.

Figure 2: Site Visit Notes Map



Source: Napier City Council Online GIS with Mott MacDonald annotations

**Figure 3: Uncovered Dusty Area & Wind Tunnel**



Source: Mott MacDonald.

**Figure 4: Example of an open section of roof in the Manufacturing building**



Source: Mott MacDonald.

**Figure 5: Gutters discharging onto hard standing**



Source: Mott MacDonald.

**Figure 6: Buildings with no gutters installed discharging onto hard standing**



Source: Mott MacDonald.

**Figure 7: Awatoto drain on eastern perimeter (down groundwater hydraulic gradient) of land discharge site**



Source: Mott MacDonald.

**Figure 8: Pumping station on drain network approximately 200 m south of eastern canal**



Source: Mott MacDonald.

### 3 AEE

*“The capital cost of the proposed improvement works, including the HARP, is estimated to be in the order of \$10 million over 6 years and can only be supported on the basis of a gaining a long-term and future-proofed resource consent package for the Napier Works” (AEE, page 4). Note that this does not ensure the proposed outcome. The applicant is clear that they are not certain that the 2 stages will achieve TANK standards.*

*“Ravensdown holds a current water take permit from two existing on-site bores located within the Coastal Environment for use in the manufacture of sulphuric acid and fertilisers. This supplies drinking water, fire service supply, steam generation, dilution, cooling tower make-up and acid make-up” (AEE, page 4). The proposed consent conditions note that a backflow prevention device is to be installed and maintained but there is no commentary on the security of the existing bores.*

#### Further information request:

1. Please confirm if backflow prevention devices are already installed and maintained and provide commentary from a suitably qualified and experienced person on the risk of contaminants entering groundwater via the on-site bores, i.e.:
  - headworks are constructed and maintained to prevent any leakage and/or movement of water or contaminants between the ground surface and groundwater and that there are no openings through which contaminants might enter the well
  - gaps around any pipework and/or cables at the wellhead

*“The water balance model results are summarised in Table 12 below. The results show that 93% of the total volumetric inflows from the overall site are treated through the system (i.e., flow through the wetland) with the clarifier system treating 97% of inflows) from the manufacture catchment.” (AEE, Page 51).*

#### Further information request:

2. Please provide the data to support these statements about capture and bypasses.

The AEE (page 42) states solids from the clarifier will be landfilled if needed.

#### Further information request:

3. We note that this detail can be included in the future and could be part of consent conditions and that solids carry through may be minimal due to the treatment train (with a bioreactor and clarifier etc). How will contaminated sediment accumulation and wetland vegetation be managed at the Stage 2 wetland? Note that wetlands typically need vehicle access around the full perimeter for maintenance - will this be included?

Appendix A drawing 509619-0000-DRG-CC-1002-C label ‘PROPOSED IRRIGATION APPARATUS (BY OTHERS)’. As discussed on the site visit, we understand that “By Others” refers to the designer.

#### Further Information Request:

4. Please confirm what “By Other’s” means.

## 4 A4: Land Discharge Effects and Management

### Executive Summary

The body of the assessment has been substantially revised since our initial review of the draft report including the addition of relevant guideline criteria and a Conclusions section that better captures several salient points of the assessment that the Executive Summary. The Executive Summary does not capture these key revisions. The authors are reminded that statements in Executive Summary about the quantity of

contaminants being “quantitatively small” are meaningless in a regulatory environment. Contaminant concentrations should always be compared to the relevant government guidelines (which has been made in the body of the report).

**Further information request:**

5. The Executive Summary should be revised or an appropriate response (as per S92 RMA) to ensure clear summary statements are made about whether contaminant risks are likely to be present or absent based on a conceptual site model which requires there to be a linkage of source pathway and receptor relationship and where such a potential contaminant risk linkage has been identified, estimated concentrations of contaminants are then compared against national guidelines.
6. The Monitoring and Reporting section should be revised (or an appropriate response (as per S92 RMA)) to include a section on how baseline chemical analysis of the discharge water at Stage 1 and 2 will be used to adjust the proposed monitoring programme to match more closely the actual contaminants presence in the baseline samples.

**Section 3.2 Potential effects of estimated nutrient and other element applications to the forage block in the treated irrigation water**

This section is greatly improved from the draft. Table 6 provides estimates of concentration of metallic elements in mg/kg for Stage 1 and Stage 2 however Table 6 is missing a ‘Total’ row which showing the combined additions from the two stages. The ‘Total’ row would represent the maximum concentrations (assuming no loss) at the end of the 35 year consent period and is required to demonstrate a precautionary approach has been undertaken. Table 6 is also missing the heavy metals Pb and As and while these metals have been included in Table 7 these values provided are in kg/ha and therefore cannot be directly compared to the MfE soil contaminant guidelines (mg/kg) provided in Table 8 as had been done in the text. Note the report contains two Table 7s.

The MfE guidelines referred to in Table 7 Ministry for the Environment Soil contamination standards for health are not included in the reference section of the report and the footnote font size to that table is not legible. We are assumed this is the *Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health* (MfE, 2011). The MfE (2011) guidelines are relevant for the future use of the site for the types of land use describes at the end of the consent period and not for foliage consumed by stock off site (refer comment on following section, 4.3)

**Further information request:**

7. Please update Table 6 to include a total increased concentrations row and included the heavy metals Pb and As.
8. Please revise comparisons to MfE guidelines to be against new Table 6 totals row and include MfE Guidelines in references.
9. Please confirm the reference for the MfE guidelines used for Table 7.

**4.3 Foliage Sampling**

The foliage sampling for fluoride levels and comparison to ANZECC guidelines is acceptable. Foliage sampling for heavy metal contaminants of concern identified in Section 2.2 should also be undertaken and compared to relevant guidelines.

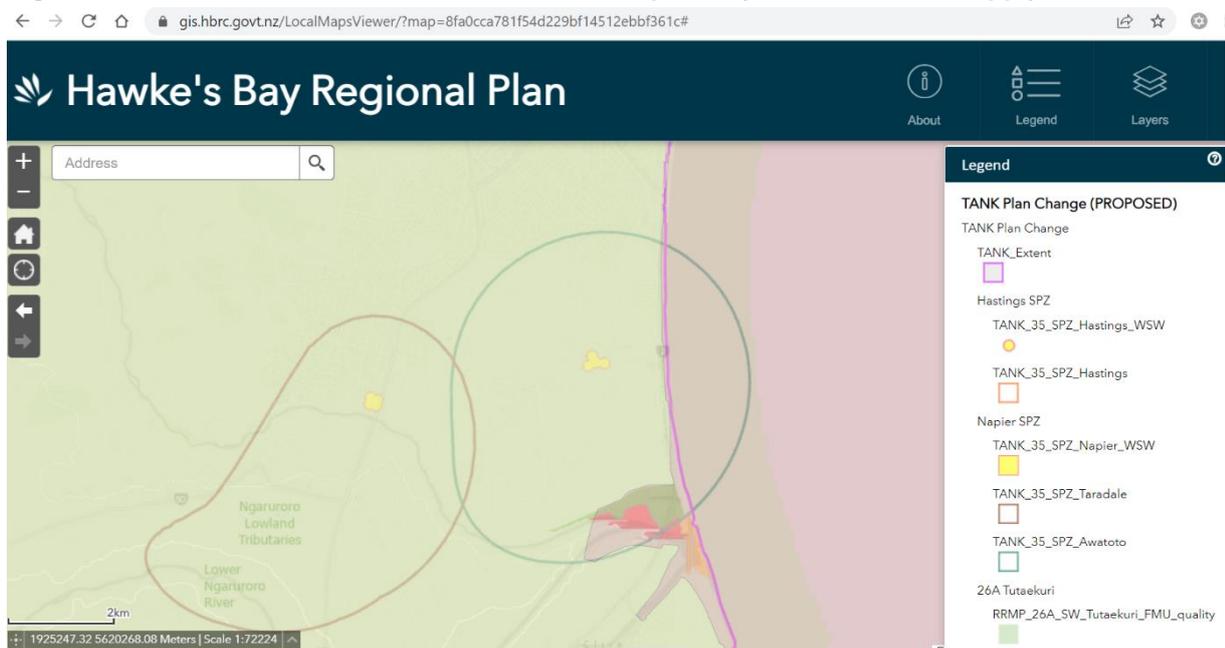
**Further information request:**

10. Please include sampling for all contaminants of concern and comparison to relevant guidelines for animal feed.

### Appendix 1 Section 3.2 Hydrogeology of the Heretaunga Plains and Awatoto Area

No map of the source protection zone with site location is included. Source protection zone (SPZ) map information is readily available from the HBRC web site (refer Figure 9 below).

Figure 9: TANK Taradale and Awatoto SPZ with Napier City Council Water Supply Wells



Further information request:

11. Provide a map of the SPZs with the full site boundary including the land discharge area. The names of the SPZs and distances from or if the site is included within a SPZ should be provided in the Appendix and where relevant in existing text that refer to the SPZ, notably the Executive Summary.

### 7.2 Recommended Monitoring Bores

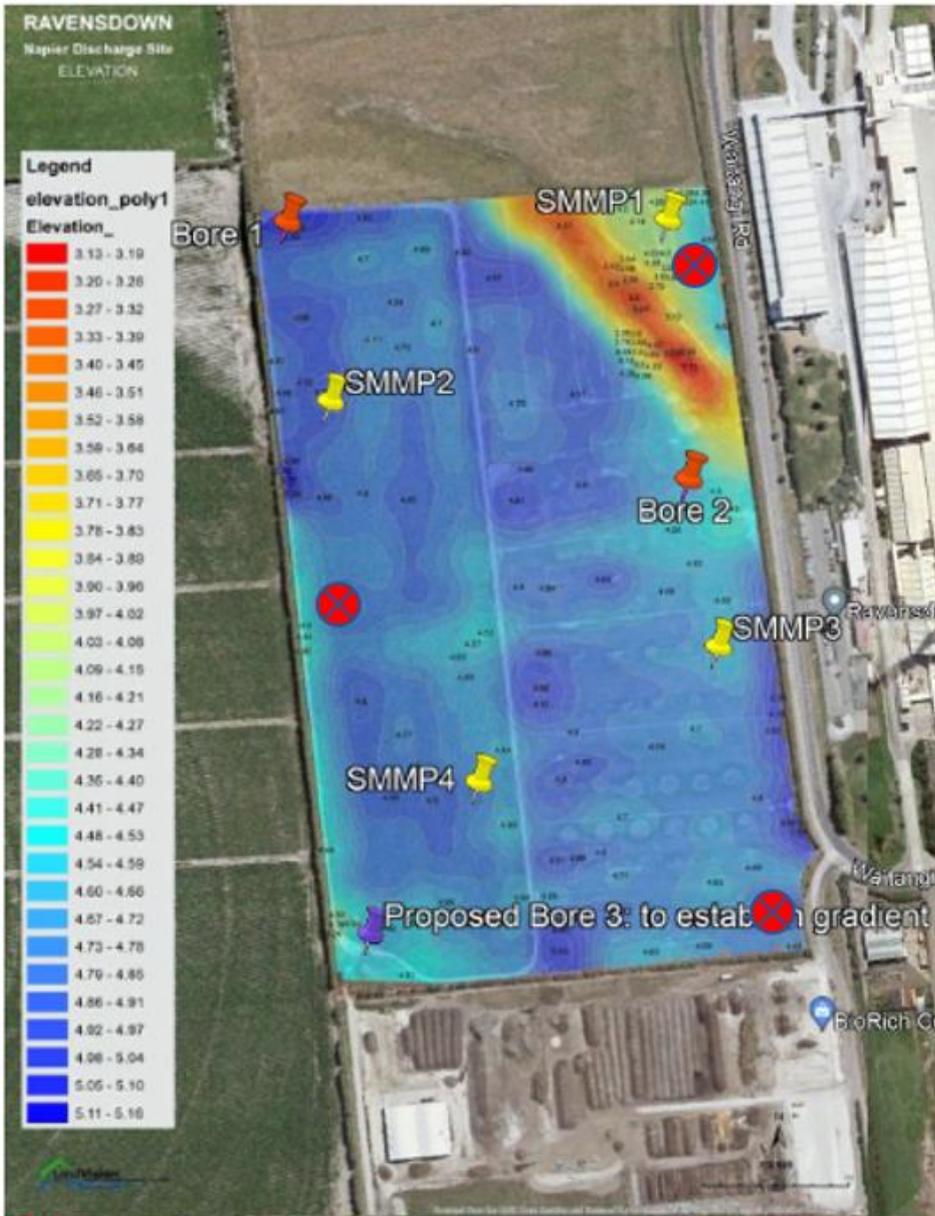
To measure water levels a monitoring well is required. All three bores will therefore be required be completed as monitoring wells. All three wells should therefore be monitored.

The potential for contaminants to migrate down hydraulic gradient (i.e. towards the sea) off the Ravensdown site is the primary concern for this consent, not the migration of contamination onto the Ravensdown site from the upstream site. Therefore, the greatest number of wells (two) should be on the downgradient location suitably set back from the canal to ensure that the sites groundwater conditions are primarily characterised.

Further information is request:

12. Please consider and provide commentary on the revised well locations (refer Figure 10 below with recommended locations) and increase the number of sampled monitoring wells to all three wells.

**Figure 10: Suggested Monitor Well Locations**



 Suggested relocation of three monitoring wells

*Figure 10: proposed soil moisture monitoring points(SMMP) and Proposed monitoring bores imposed on an elevation map of discharge site*

### Climate Change

We note the response to the draft review comment that the drains provide protection from sea level rise. In our subsequent review of the AEE we note that the Hawkes Bay Hazard Portal shows the site is outside of the Year 2065 and Year 2120 seal level rise hazard layers. While no cross reference is provided to this in the document, climate change is considered adequately covered in the AEE. No further information required.

## Health Risk Assessment

The human health risk assessment has been revised to include the land discharge site as part of the assessments scope. However, the same issue with the executive summary in this report not being updated to alignment with the revised assessment of the risks undertaken in the body of the report has been carried over.

### Further information request

13. The Health Risk Assessment should be revised or an appropriate response (as per S92 RMA) to ensure clear summary statements are made about whether contaminant risks are likely to be present or absent based on a conceptual site model which requires there to be a linkage of source pathway and receptor relationship and where such a potential contaminant risk linkage has been identified, estimated concentrations of contaminants are then compared against national guidelines.

## 5 A5: Watertake Effects Assessment

The current water take consent AUTH-116104-03 is for use in manufacturing of sulphuric acid and fertilisers at 200 Waitangi Road, Awatoto, Napier. The current consent allows a maximum volume of 21,000 m<sup>3</sup>/week and 1,092,000 m<sup>3</sup>/year to be abstracted from two 150mm diameter well Nos. 15986 and 15989 at a combined rate not to exceed 80 l/s. The application is for a lesser volume of up to 13,477 m<sup>3</sup> (at up to 80 l/s) from well numbers 15986 and 15989 for the following industrial uses:

- The manufacture of sulphuric acid and fertilisers;
- The treatment of stormwater and process water including sustaining constructed treatment wetlands and the maintenance of crop cover on the discharge to land area; and
- Sustain an artificial wetland within the Waitangi Regional Park.

The assessment has calculated the potential drawdown based on 24 hours per day pumping for 365 days per year at a rate of 34.63 l/s or 20,944 m<sup>3</sup>/week i.e. a conservative assessment. Drawdown, stream depletion and aquifer sustainability assessment is considered adequate however saltwater intrusion risk has not been provided.

### Further information request

14. Please provide saltwater intrusion risk assessment.

## 6 A8: Economic Assessment

The economic assessment provides an overview of the economic benefits and positive effects of the Ravensdown business operation but has not provided an assessment of the actual and potential adverse economic effects of the existing and proposed discharges. We note that the *Effects of emissions-to-air from the Ravensdown Napier Fertiliser Works on vegetation* (Plant and Food Research, 2021) report concludes that there are unlikely to be any adverse effects on economics from the air discharge i.e. crop damage. Note that the economic assessment is outside of the expertise of the authors therefore, if required, HBRC should engage an economics expert to undertake a review.

### Further information request

15. Please provide comments from an economics expert on the actual and potential adverse economic effects from the proposed activities, if any.

## 7 A9: Ravensdown Planning Assessment

### Archaeology

There are numerous archaeological and cultural sensitive sites at and near the site. The proposed archaeological consent conditions are noted Should some areas not be able to be used for stormwater treatment due to archaeological finds then alternative treatment options would need to be considered.

### Wastewater from septic tanks

Page 8: *“The Napier City Council (“NCC”) sewerage system does not extend to the Napier Works. Five onsite wastewater treatment devices (septic tanks) are used for the collection and treatment of wastewater from amenities (cafeteria, showers, toilets, laboratory).”*

It is understood from the site visit that the septic tanks are currently pumped out to trucks and the wastewater is disposed at the NCC municipal wastewater treatment plant. The future plan is for the amenities (cafeteria, showers, toilets and laboratory) wastewater to be piped to the NCC municipal wastewater treatment plant.

### Further information request

16. Please confirm that the above is correct along with the expected timeframe for start dates and completion of the pipe connection.

## 8 A10: Cultural Impact Assessment Ngāti Pārau

No further information is required. There are numerous recommendations that need to be reflected in consent conditions. This will be addressed in the s42a (RMA) officer's report.

## 9 A11: Cultural Impact Assessment Kohupatiki Marae

No further information is required. There are numerous recommendations that need to be reflected in consent conditions. This will be addressed in the s42a (RMA) officer's report.

## 10 R2: Manufacture Plant Process Report

### 5.2 Structural site improvements

This list does not appear to be complete, as some of the roof and roller door items discussed elsewhere are not included and in the Management Plans.

### Further information request

17. Please confirm which list of improvements is most current.

## 11 R5: Water Discharges High Level Options

Executive Summary: Source Control measures are mentioned however, these do not cover key aspects such as roller doors on buildings, covering all trafficable areas to reduce transfer to areas that can be wetted and run to drainage. Question raised above.

Executive Summary, assessment method: *“The MCDA process resulted in the “combination of options” receiving the highest score and it has therefore been developed as the preferred option. Further investigation on the feasibility of a discharge to land as part of this option has been progressed and is detailed in the following two reports “Project description-Ravensdown Napier stormwater and process water management” and “Ravensdown stormwater and process water discharge-land discharge effects and management”.*”

The use of an MCDA approach appears robust, with the project team evaluating eight criteria covering technical and financial aspects, and mana whenua evaluating mana whenua values, and the Technical Focus Group evaluating other stakeholder considerations/concerns. However, the options presented in the MCDA process are limited, and in some cases unnecessarily removed through fatal flaws.

Executive Summary, Conclusions: *“Overall, the highest scoring option in the MCDA process was a combination of options.”*

This combination of options remains ill defined, and changes considerably as the design evolves. As it contains within it many possible combinations of source separation, treatment and discharge location, it would have been advisable to define the permutations of that option and return them for assessment by the stakeholders to select a preferred option that was well defined and agreed to be the BPO.

#### Further information request

18. Why was the option not returned for assessment as the BPO after better definition (and a number of significant changes) was achieved in the design?

#### Historical Effluent Data

We note that the existing discharge monitoring data is summarised in Tables 1 and 2 of this report, and these values are extracted from the document: *“Ravensdown Napier discharge to the lower Tūtaekurī River and Waitangi Estuary: Water quality and ecology monitoring, 2019”*, Aquanet Consulting, December 2019.

#### Further information request

19. In order to understand the methods of data collection, and whether these include rainfall etc, please provide this report (if not already provided to HBRC).

#### Stormwater Solutions

The classification throughout the documents of the wastewater as “stormwater” oversimplifies and sanitises the classification of the waste stream, and also seems to have narrowed the proposed treatment solutions to stormwater solutions. In reality, the Manufacture Plant Process Report (R2) has highlighted that the discharge from the site includes a number of different sources, of which Stormwater is only one part:

- Truck wash water (including cleaning products),
- Process water from Manufacturing,
- Boiler water (numerous additives),
- Cooling Tower water bleed off (biocide and corrosion inhibitors),
- Storage Pool return water (biocide treated),
- Dilution water from bore source,
- Contaminated rainwater from roofs and hard standings around four catchments.

However, the Estuarine Ecology Assessment Report (A3) notes further details about some of the chemicals that are used at the site and therefore are included in the wastewater, including:

**Table 2. Information on process chemicals used at Ravensdown fertiliser manufacture plant at Napier. Source: Ravensdown.**

Formulation	Use	Area used
Cortrol OS7780	Water based dissolved oxygen scavenger / metal passivator	Boiler
Optisperse ADJ5150	Alkalinity builder	Boiler
Solus AP24	Internal boiler water treatment	Boiler
Steammate NA0880	Blend of neutralising amines	Boiler
Flogard MS6222	Water based corrosion inhibitor	Cooling system
Gengard GN8020	Deposit and fouling control agent	Cooling system
Inhibitor AZ8104	Water based corrosion inhibitor	Cooling system
Spectrus BD1500	Water based deposit control agent	Cooling system
Spectrus NX1100	Biocide	Cooling system
Road Film Remover	Fleet wash (Sandfords)	Sandfords truck wash
XT88	Replacement for Road Film Remover (Sandfords)	Sandfords truck wash

During the site visit, the following activities were also witnessed, which result in direct contamination of rainwater passing through the site:

- Catchment 1 hard standings are contaminated from the truck loading and levelling processes. Staff witnessed entering the outgoing vehicles to rake and flatten the product in the truck trailers – and then exiting onto the hard standings.
- Catchment 2 includes significant contamination of rainwater where it is collected on the roofs and hard standings, as dust and particles from the manufacturing and storage of product and raw materials. Water that is collected on roofs either discharges directly onto surrounding dust covered hard standings, or is collected in gutters and then discharged onto the dust covered hard standings.

#### Further Information Request

20. Given the sources of wastewater described above, the direct discharge of industrial products and adjuncts into the hard standings and drainage system, and the high base flow (below), why has this wastewater been classified and treated as stormwater?

21. Has the existing discharge from the site been tested for pollutant parameters outside of the current consent conditions, and in line with the known chemicals in the various waste streams (A3, Table 2)?

22. The Spectrus products (A3, Table 2) have been noted to have ecological effects that are potentially more than minor (A3). Have alternative products for this process and/or alternative treatment methods for this waste stream?

### Section 6 – Stormwater and process water treatment devices

The treatment processes that are presented in Section 6 appear to be limited and curtailed by the stormwater classification. The list of solutions is heavily focussed on stormwater treatment devices, and does not cover the full range of physical, chemical, and biological treatment solutions that could be considered.

For example, fluoride removal is a key concern for this combined wastewater stream, and known removal mechanisms for fluoride are:

- Lime softening – forming an insoluble precipitate, and co-precipitation with magnesium hydroxide;
- Alum coagulation (but requires very large amounts of alum to do so, potentially creating Opex and disposal issues);
- Adsorption with activated carbon;

- Adsorption with impregnated activated alumina;
- Reverse osmosis;
- Nano-filtration;
- Electrodialysis.

Of the above, only Alum Coagulation is mentioned in a roundabout way through the suggestion of a settling pond or clarifier.

Most of the solutions put forward (and in particular the examples provided) are stormwater treatment solutions, not industrial waste stream treatment solution. In section 6, the following is noted:

*“While there are numerous other water quality treatment devices, the selected devices are those that have a proven track record for removal of the given contaminants in a stormwater environment and are therefore the most appropriate for treatment of the stormwater and process water on site.”*

Again we would note that this is not a stormwater environment, and that only one of the proposed solutions (membrane filtration) is noted to remove all of the contaminants effectively, and only two of the proposed solutions are effective at removing fluoride (Table 15).

#### Further Information Request

23. Why were effective chemical and biological treatment systems commonly used in industrial treatment processes not considered?
24. Why was there no investigation of each waste stream (“up the pipe”) so that treatment solutions could be tailored to the contaminants, and potentially downsized and focussed on particular contaminants?

#### Section 7 Options Considered

Only two of the treatment options (wetland and membrane filter) that are discussed in section 6 are carried forward here.

#### Further information request

25. Please explain why the other the other 5 treatment solutions are not carried forward.

#### Section 7.1.1 Wastewater treatment plant

Whilst it is acknowledged that there will be flow fluctuations when rain events occur, this can be mitigated through attenuation ponds or managed through side stream treatment of peak (and therefore diluted) flows. It is also acknowledged that many typical biological treatment plant solutions (such as activated sludge and biofilters) may not be able to be maintained with a regular enough food source for biological processes.

#### Section 7.2 Treatment system sizing base calculations

In this section the following is stated:

*“Typical stormwater management in the Hawke’s Bay region allows for treatment volume for 90%-95% of all rainfall events. HBRC have simplified this metric to be equal to 1/3 of the 2-year 24-hour event, which corresponds to a depth of approximately 23mm for the site. However, given the industrial nature of the site, its associated contaminants and the lack of an observed first flush effect, it is expected that water quality treatment will need to be provided to a higher level. Thus, for the purposes of preliminary treatment sizing, it has been assumed that the first 25 mm of rainfall on the site will be fully handled by the treatment system, with accommodations made for partially treating up to 50-75mm of rainfall, with higher capture volumes targeted at the most critical catchments.”*

#### Further Information Request

26. Please provide the information that evidences a lack of first flush events. What information has been gathered on first flush events, and how key contaminant concentrations vary through events.

27. Please explain with evidence why a value of just 25mm rainfall has been assumed for full treatment.

In this section it is also noted that:

*“Using these values, the base weekly discharge (i.e. the average discharge without rain) was calculated to be approximately 2,000 m<sup>3</sup>/week and the effective runoff coefficient was calculated to be 0.45.”*

2,000m<sup>3</sup>/week equates to an average of 286m<sup>3</sup>/day (equivalent flow to a small town of ~1,500 people). The implication is that this dry weather flow is from the truck wash, process water, boiler water, cooling towers, storage pool return, and bore dilution water.

#### Further Information Request:

28. What information has been collected by the applicant on the flows from the individual waste stream and how the contaminants in these vary?

29. Has source separation and separate treatment been considered, and if not, why not?

30. Of the 2,000m<sup>3</sup>/week, how much is dilution water from the bore supply?

#### Section 7.3.2 Wetland treatment train (Option 1b)

It is noted that this option utilises four of the seven technologies discussed earlier in the report.

#### Further Information Request

31. Why was this combination of treatment processes selected, and not others?

32. In Table 17 the volume of treatment devices is noted. Is this the working volume (standing water that will be displaced with the arrival of new wastewater) or an empty volume in the treatment devices capable of accepting and attenuating flows?

#### Section 7.3.3 Membrane filter plant (Option 1c)

Membranes are very effective at removing small particles, but they are severely limited by flux rates, meaning that they do not handle peaking flows well, or if they are designed to do so then they need to be hugely oversized for typical flows. It is noted that a settling / attenuation pond is proposed ahead of membranes for this option.

#### Further Information Request

33. What level of storm event would be treated by the pond and membrane filter option before bypassing would occur?

Membranes filters also require that the membranes themselves are replaced every 5-15 years depending on the service requirements and throughputs.

#### Section 7.6 Combination of options

Noting that this option is not well defined, but seems to have been selected as the preferred solution as it could allow discharge to multiple receiving environments.

It is noted on page 40 that:

*“Prior to undertaking design of a split flow management strategy, the relative contaminant levels from different portions of the Site must first be established. As per recommendations from Aurecon, Ravensdown are implementing a site-wide sampling strategy to facilitate the identification of contaminant sources. Based on the site operations, it is likely that some of the more challenging contaminants (i.e. nutrients, dissolved heavy metals, and flouride) have similar origin areas – these areas may be able to be isolated and treated differently than the rest of the site’s stormwater.”*

#### Further Information Request

34. Please provide the outputs from the site-wide sampling, and how these have fed into the preferred solution developed in the Water Discharge Strategy (R6).
35. Please explain why separation of contamination sources was not carried out at an earlier stage and used in the build up of treatment options, rather than after the fact and only for one option. Knowing this information would greatly assist in the sizing, costing, and evaluation of each option.

## Section 8 Cost estimates

### Further Information Request

36. The price for the membrane filtration system (Option 1c) seems excessive, given that an entire biological treatment plant can be procured for a small town for this value. Please provide a more realistic price for this option, and confirm what assumptions were made when requesting the quotation.
37. Was a cost estimate for a membrane filtration system for the “Combination of options” (Option 4) produced, noting that this would be a much smaller flow and therefore units, focussed on the contaminants in the “high contaminant treatment” area (see Figure 19).
38. Please explain how costs for Option 4 were generated without site-wide contaminant survey information.

## Section 10.4 Preferred outcome

As noted above the cost of a membrane system is in question, especially given that this will provide the best environmental outcome in terms of contaminants capture.

It is noted in the report that:

*“The discharge to land options were also given a 0 score in the “consistency with planning framework” category based on the fact that the site is located in the Napier Source Protection Zone. In terms of the planning framework itself, this location does not make discharge to land prohibited. However, written feedback was received from NCC advising that they would not support a discharge to land option due to this Source Protection Zone.”*

And also:

*“Regarding the discharge to land options, the mana whenua parties preferred discharge to the marine environment as they considered that Tangaroa has a better ability to assimilate contaminants than Papatūānuku in this instance.”*

Despite these statements, land discharge has been pursued, and ocean outfall not pursued.

In addition, the preferred option is described as follows:

*“Based on the scoring, the preferred option was for a “combination of treatment options”, with the opportunity to discharge both to land and the Tūtaekurī River/Waitangi Estuary, and with the possibility of a future discharge to the marine environment (e.g. via the NCC outfall) if necessary to manage any stormwater and process water with elevated levels of particular contaminants and meet water quality expectations.”*

However the Option 4 described in Section 7.6.1 does not include land treatment, rather focusing on NCC outfall or membrane filter for high contaminant loadings, and a treatment train for low contaminant loadings (settling pond, wetland, bioretention basin, media filter). Land treatment is added in the conclusions without any prior mention, and clear statements (above) against from NCC and mana whenua.

### Further Information Request

39. Please explain what waste concerns were raised about the membrane option, and the high energy concerns. Was an assessment of the brine and power consumption for this option completed?

40. Why was land treatment added to Option 4 in the Preferred Outcome (Section 10.4) when this was not in the description of the option (Section 7.6), nor endorsed by NCC or mana whenua (Section 10.4)?

## 12 R6: Water Discharge Strategy

### Section 2: Existing stormwater and process water management

Minor depressions in the hard standing were observed along the western edge of Catchment 4: Acid plant south during the site visit. See Figure 11.

**Figure 11: Depressions at western edge of Acid Plant South**



#### Further Information Request

41. Please confirm if the minor depressions noted above are at the lower point of the catchment and intended to direct contaminated stormwater flows towards the Neutralising Pit.

42. Please confirm how bunded areas in the Acid Plant South catchment are drained and discharged to.

This section notes: *“The stormwater and process water that is not reused on site, ultimately discharges to the settling pond located at the southern end of the site.”*

#### Further Information Request

43. What data is available on the volumes of water that are reused on site?

### Section 5.1 Discharge strategy overview

This section states: *“Under the current site operations, dilution water is utilised to ensure compliance with existing water quality requirements. While the dilution water is effective in meeting these concentration-based guidelines, it does not provide for removal of any contaminant mass from the effluent.”*

#### Further Information Request

44. Will the proposed treatment and management strategy remove the need to dilute wastewater prior to discharge?

#### **Section 5.4 Sampling and monitoring programme**

This section highlights the importance of monitoring for an Adaptive Management Plan. Whilst it is important that monitoring is extensive for AMP, it does not mean that planning can be avoided for long term consents. The report lists four intentions for the sampling and monitoring programme, including:

- Identify localised contaminant sources,
- Assess the impact of operational changes,
- Monitoring compliance with consent conditions,
- Monitor for adverse effects.

#### **Further information request**

45. Why has sampling of contaminant sources not been undertaken prior to the option assessment work and application. As noted in the report, Adaptive Management Plans are appropriate where there are unknowns in a scheme, but this is only unknown because data has not been collected. Collection of source contaminant data is not an onerous task, and would be expected to demonstrate a suitable option evaluation and selection of BPO for a long term discharge consent.

46. Assessing the impact of operational changes should not be limited to treatment upgrades. Given the importance of source control for this scheme, sampling and monitoring should also include untreated waste streams to demonstrate improved source control over time. Please confirm if this is intended for the sampling and monitoring programme.

#### **Section 5.6 Process water management**

This section discusses process water from two parts of the site – the cooling towers and the acid plant. The report notes that *“Both of these flows will be rerouted to ensure the water is reused as much as possible, or treated appropriately.”*

#### **Further information request**

47. Where will this process water be reused?

48. How much has been calculated as reusable?

49. Will the inhibitors, fouling agents, and biocides used in the process water be detrimental to reuse opportunities?

50. The cooling system is mentioned above. Is there also discharge of process water from the boiler system?

51. Why is the discharge from the truck wash not covered in the process water group, when it is clearly not stormwater?

#### **Section 6.7 Membrane Filter Plant**

We note in Table 14 that the assessment states that a disadvantage of using a membrane filter is *“Extremely energy intensive, with a resulting high carbon footprint”*. Although a membrane filter is energy intensive, it is the source of the energy that determines the carbon footprint. If Ravensdown are utilising renewable energy from the grid and/or using onsite renewable energy, then this would be countered. Operational energy is just one component of a carbon footprint. For options to be comparable, a wholistic / life cycle carbon footprint assessment needs to be undertaken that factor in capital / embodied carbon, which for example will be very high in the construction of basins and wetlands.

#### **Further Information Request**

52. Please provide the carbon footprint assessment that was used in the MCDA or if one was not undertaken, please prepare a wholistic carbon assessment for all options in accordance with ISO 14067 & ISO 14044 or relevant guidelines.

## 13 M1: Source Control Management Plan

Ravensdown proposes to undertake actions as described in the *Ravensdown Napier Works Source Control Management Plan* ("SCMP") as per proposed consent condition 12 under Appendix 1 of the 'Discharge To Surface Water And Groundwater'<sup>1</sup>. The SCMP (Section 8) sets out objectives, opportunities, prioritised actions, monitoring and reporting and matters for review. Section 8 provides Site Improvement Action Schedule that includes the priority and timing for when the action is to be completed. It is unclear if the area between Superstore 1 and the Manufacture Plant (refer to Figure 1 and Figure 2 above) is covered under the action schedule so this needs to be clarified. Given that dust generated in this outdoor uncovered area is likely to be entering the stormwater system (and potentially migrating off-site towards State Highway 51) this is considered a high priority action.

Section 5. States that: "*Four aspects have been considered in prioritising the recommended improvements:*

- *The risk of contamination of stormwater, or fugitive airborne release.*
- *The resulting impact on water or air quality.*
- *The estimated cost of completion.*
- *The estimated time required for completion.*

*A granular high-medium-low rating has been applied to each action in order to assign a priority."*

It is noted that a "*a granular high-medium-low rating has been applied to each action in order to assign a priority*". The table of actions does not include any mention of these items other than "timing". Ideally for clarity, the action schedule and should include risk, cost estimate, impact of the change, and then prioritise on this basis.

As noted in the application, site improvements to source control are required, and an important part of ensuring that treatment of discharges is manageable, not to mention the financial impact of product losses. Given the importance of these improvements to the performance of the treatment system, many of which could be considered standard maintenance requirements, the consent conditions related to the SCMP should also include monitoring of the impact of improvements on the contaminant sources.

### Further information request

53. It is unclear if the area between Superstore 1 and the Manufacture Plant (refer to Figure 1 and Figure 2 above) is covered under the action schedule so this needs to be clarified. Please confirm that this area is covered in the action schedule.

54. Please include additional information in the action table that describes how the actions are prioritised, including for example; risk or discharge, cost, and impact of change.

## 14 M2: Adaptive Management Plan

Ravensdown proposes to discharge in accordance with the *Ravensdown Napier Works: Water Discharge Adaptive Management Plan, November 2021* as per proposed consent condition 2 under Appendix 1 of the 'Discharge To Surface Water And Groundwater Permits'. The plan is useful but perhaps the same outcomes could be achieved through consent conditions, certifications and reporting. If the plan is to be used as part of

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<sup>1</sup> We assume this means contaminants that may enter groundwater and not groundwater per se.

consent conditions, then the diagram on page 6 needs amending as it is incomplete and requires the following changes:

- additional labels - 'yes' / 'no' at the 'Targets met?' step
- a feedback loop / arrow i.e. if the targets are met then there needs to be an arrow linking to the 'Monitor discharge and environment' step.

For clarity and completeness, we also suggest amending Figure 1:

- adding north arrow
- adding 'Tūtaekurī Blind Arm' label

Source control measures should also be included in the adaptive management plan and reviewed and updated regularly given their importance to the treatment system and discharge.

In section 5, Monitoring and Reporting, sampling points "in" the treatment devices are mentioned. Given the importance of source control to the scheme, it should be made clear that these will also include influent to the treatment devices, which will measure the effectiveness of source control improvements. It will also be imperative to establish a baseline to improve from.

#### Further information request

55. Please amend diagram on page 6 and Figure 1 accordingly. This can be provided now or later as evidence.

56. Please add source control measures to Table 1.

57. Please include establishment of a source control baseline through monitoring in Year One of Table 1.

## 15 Consent Conditions

A high-level review of the proposed consent conditions has been undertaken in this section. A more detailed review of conditions will be undertaken after the S92 (RMA) information has been received.

**Table 15.1: HBRC Consent – Discharge to Air**

Clause	Ravensdown Proposed Condition	Suggested Change / Question
4	All bulk raw materials stored on site shall be kept inside a building.	This may need to be strengthened to include buildings with closing doors.
5	The consent holder shall ensure regular sweeping of yard and road areas using mechanical cleaning to minimise emissions of dust beyond the boundary of the site.	During the site visit we are advised by Andrew Torrens (Ravensdown) that the mechanical mobile sweepers have had clogging issues and were not operating. Please provide commentary on this issue, what will change going forward, and the proposed consent condition.

**Table 15.2: HBRC Consent – Discharge to Land**

Clause	Ravensdown Proposed Condition	Suggested Change
Activity Description	To discharge treated stormwater and process water and associated contaminants from a sulphuric acid and fertiliser manufacturing plant at Awatoto to land in circumstances where contaminants <u>will be absorbed by crops and soils and/or may enter shallow groundwater.</u>	This requires some clarification as it appears to contradict the response in initial queries in R8 Water Discharge Strategy, Section 5.7 Process Water and Stormwater Treatment, where the response is: <i>"Table 1 is intended to summarise treatment devices, i.e. those that are intended to materially reduce the mass of contaminants from the effluent. We have not included the land discharge system as we have not assessed it</i>

Clause	Ravensdown Proposed Condition	Suggested Change
		<i>as a treatment device but a discharge apparatus that functions independently of the treatment.”</i>
1	The activities authorised by this consent shall be undertaken generally in accordance <u>with the Assessment of Environmental Effects and associated management plans dated 30 November 2021</u> . If a conflict arises between any conditions of this consent and the application, the conditions of this consent will prevail.	Will need to be modified to include other post lodgement documentation as appropriate.
2	Advice Note: For the purposes of this consent “discharge” refers to stormwater, process water <u>and groundwater added to the stormwater system for the purpose of sustaining constructed wetland and stormwater device vegetation and non-commercial crops used in the treatment process.</u>	We understood from the AEE and Water Discharge Strategy that dilution of the discharge with groundwater would not occur until after the treatment processes as the treated wastewater enters the HARP. This will need clarification.
General		Given that this consent is for a discharge to land, and the following discharge to surface water and groundwater are the same treated wastewater source, consideration should be given to combining these into one set of consent conditions.

**Table 15.3: HBRC Consent – Discharge to Surface Water and Groundwater**

Clause	Ravensdown Proposed Condition	Suggested Change
1	The activities authorised by this consent shall be undertaken generally in accordance <u>with the Assessment of Environmental Effects and associated management plans dated 30 November 2021</u> . If a conflict arises between any conditions of this consent and the application, the conditions of this consent will prevail.	Will need to be modified to include other post lodgement documentation as appropriate.
2	The discharge into surface water from the site shall be in accordance with the <u>general conditions attached as Appendix 1</u> to this consent, and to either the Ravensdown Drain or to the Habitat Abundance Restoration Programme (HARP) wetland area at GPS Co-ordinates NZTM 2000 5613817 1937000.	Preference is to retain all conditions together rather than in separate documents.
2	Advice Note: For the purposes of this consent “discharge” refers to stormwater, process water <u>and groundwater added to the stormwater system for the purpose of sustaining constructed wetland and stormwater device vegetation and non-commercial crops used in the treatment process.</u>	We understood from the AEE and Water Discharge Strategy that dilution of the discharge with groundwater would not occur until after the treatment processes as the treated wastewater enters the HARP. This will need clarification.
<b>APPENDIX 1</b>		
2	Adaptive management plan process	Condition(s) required to define review and approval timing of AMP. Condition(s) required to define the Stages that are discussed in the AMP but referenced in the conditions (e.g. Stage 2 in Condition 4).
4	Following completion of the Stage 2 Stormwater System Improvements the site stormwater system shall have capacity to treat the first 75 millimetres of rainfall falling on the site.	Changes needed to refer to Treatment system and contaminated water rather than solely stormwater.

Clause	Ravensdown Proposed Condition	Suggested Change
12,	The consent holder shall undertake actions as described in the Ravensdown Napier Works Source Control Management Plan November 2021, to reduce the concentrations of contaminants entering stormwater at the site. The consent holder shall review the Source Control Management Plan action schedule for the purpose of updating the list of proposed site improvements, or responding to changes on the site such as the identification of any additional contaminant sources or changes identified as necessary to reduce inputs to the stormwater treatment system.	Add 'and load' after concentrations and change 'inputs' to 'contaminants'. Additional condition(s) required to define timing of reviews/revisions, require that actions are carried out as proposed, and report to Council on progress.
15	The consent holder shall ensure that: a) From the time of commencement of this consent the discharge (at the point of discharge) shall comply with the current discharge parameters in Table 1 in 95 percent of monitoring results in any 12-month period.	Additional condition(s) required to define how many samples are required, time period to be covered, and method of calculation for 95 <sup>th</sup> percentile.
15	Table 1 – Discharge water quality analytes and parameters	If the collection point for these contaminants includes dilution water upstream, then load based parameters will be required.
16	For the purposes of this consent, these discharge parameters have been calculated so that the discharge will meet the relevant water quality standards beyond the zone of reasonable mixing for the discharge. The zone of reasonable mixing shall be the Ravensdown Drain and 90 metres down the Awatoto Drain (GPS Co-ordinates NZTM 2000 1936918 east, 5613708 north).	Will the measurement point include dilution water?
17	Discharge monitoring	Review required for condition of samples over 1 week period. Some parameters may alter over this period.
17	Results shall be recorded on a mass per unit volume of discharge basis and the volume of discharge shall also be recorded. The records shall be forwarded to the Council at monthly intervals, along with an assessment of compliance against Table 1 of General Condition 15.	Condition(s) required to indicate requirements of flow meter, recording and reporting, and calibration requirements.
17 b)	Results shall be taken on a mass per unit volume of discharge basis and the volume of discharge taken shall also be recorded. The records shall be forwarded to the Council at six monthly intervals.	Add: ", along with an assessment of compliance against Table 1 of General Condition 15."
17 f)	In the event the values in General Condition 15 table 1 are exceeded the Consent Holder may have the sample re-tested to confirm that the exceedance was not due to a testing error. In these circumstances the exceedance only needs to be reported to the Consent Authority in accordance with General Condition 18 if the re-tested sample confirms the exceedance.	Clarification required to ensure that resampling is not permitted. Retesting of existing sample only.
18 j)	Adaptive Management Plan Reporting	Consent condition(s) required to define the timeframe by which all parameters must be met regardless.
New	Technology Review	Best practice technology review condition(s) required. Recommend 5-yearly review in line with other similar consents.

## 16 Recommendations

In summary, as detailed above, it is recommended that further information is sought on:

### AEE

1. Please confirm if backflow prevention devices are already installed and maintained and provide commentary from a suitably qualified and experienced person on the risk of contaminants entering groundwater via the on-site bores, i.e.:
  - headworks are constructed and maintained to prevent any leakage and/or movement of water or contaminants between the ground surface and groundwater and that there are no openings through which contaminants might enter the well
  - gaps around any pipework and/or cables at the wellhead
2. Please provide the data to support these statements about capture and bypasses.
3. We note that this detail can be included in the future and could be part of consent conditions and that solids carry through may be minimal due to the treatment train (with a bioreactor and clarifier etc). How will contaminated sediment accumulation and wetland vegetation be managed at the Stage 2 wetland? Note that wetlands typically need vehicle access around the full perimeter for maintenance - will this be included?
4. Appendix A, drawing 509619-0000-DRG-CC-1002-C label 'PROPOSED IRRIGATION APPARATUS (BY OTHERS)'. As discussed on the site visit, we understand that "By Others" refers to the designer. Please confirm what "By Other's" means.

#### **A4: Land Discharge Effects and Management**

5. The Executive Summary should be revised or an appropriate response (as per S92 RMA) to ensure clear summary statements are made about whether contaminant risks are likely to be present or absent based on a conceptual site model which requires there to be linkage of source pathway and receptor relationship and where such a potential contaminant risk linkage has been identified, estimated concentrations of contaminants are then compared against national guidelines.
6. The Monitoring and Reporting section should be revised (or an appropriate response (as per S92 RMA)) to include a section on how baseline chemical analysis of the discharge water at Stage 1 and 2 will be used to adjust the proposed monitoring programme to match more closely the actual contaminants presence in the baseline samples.
7. Please update Table 6 to include a total increased concentrations row and included the heavy metals Pb and As.
8. Please revise comparisons to MfE guidelines to be against new Table 6 totals row and include MfE Guidelines in references.
9. Please confirm the reference for the MfE guidelines used for Table 7.
10. Please include sampling for all contaminants of concern and comparison to relevant guidelines for animal feed.
11. Provide a map of the SPZs with the full site boundary including the land discharge area. The names of the SPZs and distances from or if the site is included within a SPZ should be provided in the Appendix and where relevant in existing text that refer to the SPZ, notably the Executive Summary.
12. Please consider and provide commentary on the revised well locations (refer Figure 10 below with recommended locations) and increase the number of sampled monitoring wells to all three wells.
13. The Health Risk Assessment should be revised or an appropriate response (as per S92 RMA) to ensure clear summary statements are made about whether contaminant risks are likely to be present or absent based on a conceptual site model which requires there to be linkage of source pathway and receptor relationship and where such a potential contaminant risk linkage has been identified, estimated concentrations of contaminants are then compared against national guidelines.

#### **A5: Watertake Effects Assessment**

14. Please provide saltwater intrusion risk assessment.

#### **A8: Economic Assessment**

15. Please provide comments from an economics expert on the actual and potential adverse economic effects from the proposed activities, if any.

#### **A9: Planning Assessment**

16. It is understood from the site visit that the septic tanks are currently pumped out to trucks and the wastewater is disposed at the NCC municipal wastewater treatment plant. The future plan is for the amenities (cafeteria, showers, toilets and laboratory) wastewater to be piped to the NCC municipal wastewater treatment plant. Please confirm that the above is correct along with the expected timeframe for start dates and completion of the pipe connection.

#### **R2: Manufacture Plant Process Report**

- 17.5.2 Structural site improvements. This list does not appear to be complete, as some of the roof and roller door items discussed elsewhere are not included and in the Management Plans. Please confirm which list of improvements is most current.

#### **R5: Water Discharges High Level Options**

18. Executive Summary, Conclusions: "Overall, the highest scoring option in the MCDA process was a combination of options." This combination of options remains ill defined, and changes considerably as the design evolves. As it contains within it many possible combinations of source separation, treatment and discharge location, it would have been advisable to define the permutations of that option and return them for assessment by the stakeholders to select a preferred option that was well defined and agreed to be the BPO. Why was the option not returned for assessment as the BPO after better definition (and a number of significant changes) was achieved in the design?
19. Please provide "*Ravensdown Napier discharge to the lower Tūtaekurī River and Waitangi Estuary: Water quality and ecology monitoring, 2019*", Aquanet Consulting, December 2019, (if not already provided to HBRC).
20. Given the sources of wastewater described above, the direct discharge of industrial products and adjuncts into the hard standings and drainage system, and the high base flow (below), why has this wastewater been classified and treated as stormwater?
21. Has the existing discharge from the site been tested for pollutant parameters outside of the current consent conditions, and in line with the known chemicals in the various waste streams (A3, Table 2)?
22. The Spectrus products (A3, Table 2) have been noted to have ecological effects that are potentially more than minor (A3). Have alternative products for this process and/or alternative treatment methods for this waste stream?
23. Why were effective chemical and biological treatment systems commonly used in industrial treatment processes not considered?
24. Why was there no investigation of each waste stream ("up the pipe") so that treatment solutions could be tailored to the contaminants, and potentially downsized and focussed on particular contaminants?
25. In regard to 'Section 7 Options Considered', please explain why the other the other 5 treatment solutions are not carried forward.
26. Please provide the information that evidences a lack of first flush events. What information has been gathered on first flush events, and how key contaminant concentrations vary through events.
27. Please explain with evidence why a value of just 25mm rainfall has been assumed for full treatment.
28. What information has been collected by the applicant on the flows from the individual waste stream and how the contaminants in these vary?
29. Has source separation and separate treatment been considered, and if not, why not?
30. Of the 2,000m<sup>3</sup>/week, how much is dilution water from the bore supply?

31. In regard to 'Section 7.3.2 Wetland treatment train (Option 1b)', why was this combination of treatment processes selected, and not others?
32. In Table 17 the volume of treatment devices is noted. Is this the working volume (standing water that will be displaced with the arrival of new wastewater) or an empty volume in the treatment devices capable of accepting and attenuating flows?
33. What level of storm event would be treated by the pond and membrane filter option before bypassing would occur?
34. Please provide the outputs from the site-wide sampling, and how these have fed into the preferred solution developed in the Water Discharge Strategy (R6).
35. Please explain why separation of contamination sources was not carried out at an earlier stage and used in the build up of treatment options, rather than after the fact and only for one option. Knowing this information would greatly assist in the sizing, costing, and evaluation of each option.
36. The price for the membrane filtration system (Option 1c) seems excessive, given that an entire biological treatment plant can be procured for a small town for this value. Please provide a more realistic price for this option, and confirm what assumptions were made when requesting the quotation.
37. Was a cost estimate for a membrane filtration system for the "Combination of options" (Option 4) produced, noting that this would be a much smaller flow and therefore units, focussed on the contaminants in the "high contaminant treatment" area (see Figure 19).
38. Please explain how costs for Option 4 were generated without site-wide contaminant survey information.
39. In regard to section 10.4, please explain what waste concerns were raised about the membrane option, and the high energy concerns. Was an assessment of the brine and power consumption for this option completed?
40. Why was land treatment added to Option 4 in the Preferred Outcome (Section 10.4) when this was not in the description of the option (Section 7.6), nor endorsed by NCC or mana whenua (Section 10.4)?

#### **R6: Water Discharge Strategy**

41. Please confirm if the minor depressions noted above are at the lower point of the catchment and intended to direct contaminated stormwater flows towards the Neutralising Pit.
42. Please confirm how bunded areas in the Acid Plant South catchment are drained and discharged to.
43. What data is available on the volumes of water that are reused on site?
44. Will the proposed treatment and management strategy remove the need to dilute wastewater prior to discharge?
45. Why has sampling of contaminant sources not been undertaken prior to the option assessment work and application. As noted in the report, Adaptive Management Plans are appropriate where there are unknowns in a scheme, but this is only unknown because data has not been collected. Collection of source contaminant data is not an onerous task, and would be expected to demonstrate a suitable option evaluation and selection of BPO for a long term discharge consent.
46. Assessing the impact of operational changes should not be limited to treatment upgrades. Given the importance of source control for this scheme, sampling and monitoring should also include untreated waste streams to demonstrate improved source control over time. Please confirm if this is intended for the sampling and monitoring programme.

Section 5.6 Process water management:

47. Where will this process water be reused?
48. How much has been calculated as reusable?
49. Will the inhibitors, fouling agents, and biocides used in the process water be detrimental to reuse opportunities?
50. The cooling system is mentioned above. Is there also discharge of process water from the boiler system?

- 51. Why is the discharge from the truck wash not covered in the process water group, when it is clearly not stormwater?
- 52. Please provide the carbon footprint assessment that was used in the MCDA or if one was not undertaken, please prepare a wholistic carbon assessment for all options in accordance with ISO 14067 & ISO 14044 or relevant guidelines.

### **M1: Source Control Management Plan**

- 53. It is unclear if the area between Superstore 1 and the Manufacture Plant (refer to Figure 1 and Figure 2 above) is covered under the action schedule so this needs to be clarified. Please confirm that this area is covered in the action schedule.
- 54. Please include additional information in the action table that describes how the actions are prioritised, including for example; risk or discharge, cost, and impact of change.

### **M2: Adaptive Management Plan**

- 55. Please amend diagram on page 6 and Figure 1 accordingly. This can be provided now or later as evidence.
- 56. Please add source control measures to Table 1.
- 57. Please include establishment of a source control baseline through monitoring in Year One of Table 1.

### **Consent Conditions**

We have also provided initial high-level commentary on the proposed consent conditions, and recommend that these are discussed at a later date once S92 responses have been received.