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Our Ref: Ohura Water Take S92 – RFI Response

24 November 2021

Horizons Regional Council
Private Bag 11025
Manawatu Mail Centre
PALMERSTON NORTH 4442

Attention: **Fiona Morton**
Senior Consultant Planner

Dear Fiona

RESOURCE CONSENT APPLICATION NO. APP-2001009379.01 OHURA MUNICIPAL WATER ABSTRACTION

Please find **attached** a table and associated attachments providing our response to the request for further information on the above consent applications.

I trust the attached satisfies your request, however, should you have any follow up questions please contact myself or Deborah Kissick on deborah@traverse.co.nz or 02102651357.

Yours sincerely

Stuart Watson
ACTING ENVIRONMENTAL MANAGER

Attachment One:
Table 1: Response to s.92 request for further information

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Horizons Information Request / Comment		RDC response
Water Quantity		
1	*The application and current consent both indicate two take points (Taranui Street and Hihi Street) however only information about one, Taranui Street, is included in the application.* *i) Does RDC currently use both sites? And do they intend to going forward?* *ii) What is the volume split between the two sites? Are they both used at once or is it an either or? What governs what site they use at any given time?* *iii) What flow information is available from Hihi Street?* *Does it have a relationship to the flow information for Taranui Street?*	The Hihi Street abstraction site was identified for the purpose of emergency use should the Mangaparare Stream be in high flood and unable to be sufficiently treated and used. RDC confirm this site has not been used in over ten years, there is no longer infrastructure in place to abstract and supply the WTP.
2	*Please provide a diagram and explanation of how the flow metering is set up in terms of the two take locations, measuring device locations, outflows and inflows. At present it is unclear where the water use data is recorded and if the second take location is included.*	As above, RDC confirm there is only one intake. Appendix 1 includes the schematic from SCADA.
3	*Please provide a more detailed breakdown regarding how the system is operated day to day. Currently it appears that the plant is only used during the day and turned off at night. The application seeks 15m3/hour over 24 hours but if it is only being used for 10 – 12 hours then abstracting this volume is not possible at that that hourly rate.*	Currently the WTP runs on reservoir demand/set points as a result of limited ability at the current plant to store water. The current reservoir is only 286m³ and operates between 75 and 95%. This creates run times and requires that abstraction is timed with demand to ensure there is always sufficient supply available to meet demand as it occurs.

Horizons Information Request / Comment		RDC response
		A larger reservoir (500 m^3) is being proposed which will allow for more prolonged run times as there will be greater buffer. This would also result in longer downtimes between plant runs.
4	*It has been identified that when abstraction commences and ceases, spikes in the rate of take occur. Has the new pump rectified this situation?*	A new pump and associated pipework has been installed but intermittent spikes do still occur. Because the pump is at the WTP rather than the intake, it operates as a vacuum and therefore air is possible in the line. These spikes in flow rate are often only recorded for 1-2 minutes. We are looking to operate a 'clip on' flow meter for a period to monitor if the issue is with the flow meter (which recently passed 'blue tick' verification). See graphs attached as Appendix 2 showing abstraction discrepancies. From these graphs, it can be seen that the plant is compliant with abstraction, apart from the maximum in L/sec. Veolia are confident this is an anomaly in the reading rather than genuine exceedance and continue to investigate further.
5	*The application indicates that a $1.25 million upgrade staged over the next five years is proposed. Please provide details and information regarding what upgrades are proposed, if storage is being installed (and if so how much) as well as some more structured time frames around these proposals.*	As outlined in **Section 3.3 of the AEE**, storage is proposed as part of the plant upgrade. The details of this upgrade as still being finalised but it is proposed that a 500 m^3 storage reservoir is proposed. The location of the WTP is currently being evaluated and it is likely that a new plant on a new, nearby site will be constructed due to geotechnical limitations on the existing site which limit the ability of the site to allow for increased storage capacity. It is anticipated that work on the upgrade of the plant will commence in January 2022.
6	*Please clarify if the same rate of take will continue once the daily volume reduces or would the instantaneous and hourly rates decrease too? If so, what flow rates are proposed from year 6 above and below minimum flow?*	As outlined in **Section 5.1 of the AEE,** the following is proposed once the upgrade to the WTP, including storage, has been commissioned: • From Year 6 onward, the maximum rates of abstraction of surface water from the Mangaparare Stream shall not exceed 280 m3/day and 3.5 litres/second when flows exceed 501 litres/second in the Mangaroa Stream at the Ohura Town Bridge recorder. • From Year 6 onward, the maximum rates of abstraction of surface water from the Mangaparare Stream shall not exceed 160 m3/day at a maximum rate of 2.0 litres/second when flows are less than 501 litres/second in the Mangaroa Stream at the Ohura Town Bridge recorder

Horizons Information Request / Comment		RDC response
7	*Please justify why five years is requested before the volume is reduced, as the application indicates that funding is secured for years one and two and so the reduction should occur in this timeframe. Taking a further five years is concerning, given the previous consent indicated that work needed to occur to reduce the take.*	Five years is required to enable time for the works necessary to be completed including: • Resolution of leaks detected • Commissioning of the upgrades to the WTP including installation of the 500m^3 storage reservoir
8	*Please provide further information on peak numbers. How many houses are connected, and when the peak population hits? Is it during the winter ski season, high summer or all year around?*	Due to the remote location of Ohura, the population is not affected in a seasonal way. GIS data relating to assets in the RDC system indicates that there are 152 known existing water connections in Ohura. The RDC Rating Department has indicated that properties rated for water in Ohura is 168 and note this number reflects a "property capable of connection not the number that is actually connected" noting also that these are properties "within 100m of a water main and practicably serviceable in the opinion of the Council".
Water Quality		
9	*The leakage assessment is concerning. The current take rate is around 35% of all available water when the stream is at MALF. Leakage of approximately 3 – 4 m3/hour, or 1.1 l/s is significant in a waterway where MALF in the Mangaparare Stream is 12l/s. This equates to nearly a third of the abstraction. Please detail what the intentions are to address this issue. Do you intend to channel some investment towards that area? Veolia have recommended that flow meters are installed in the network. What is the timeframe for this to occur? Is a leak assessment proposed to identify the source?*	As outlined in **Section 3.2 of the AEE** and attached as **Appendix 7**, a Water Loss Analysis was completed in July 2021 which indicated potential leakage within the Ohura water network. This work identified that Zone 2, consisting of Ngarimu Road and adjacent streets in central Ohura, had the largest drop in flowrate through the meter with around 3-4 m^3/hour being lost in this part of the water system. Veolia have since completed detailed, targeted leak detection in Zone 2 and are working with RDC to resolve leakage issues.
10	*From 6 years, the minimum flow take is still going to be approximately 17% of MALF in the Mangaparare Stream.*	Response provided in **Appendix 3**.

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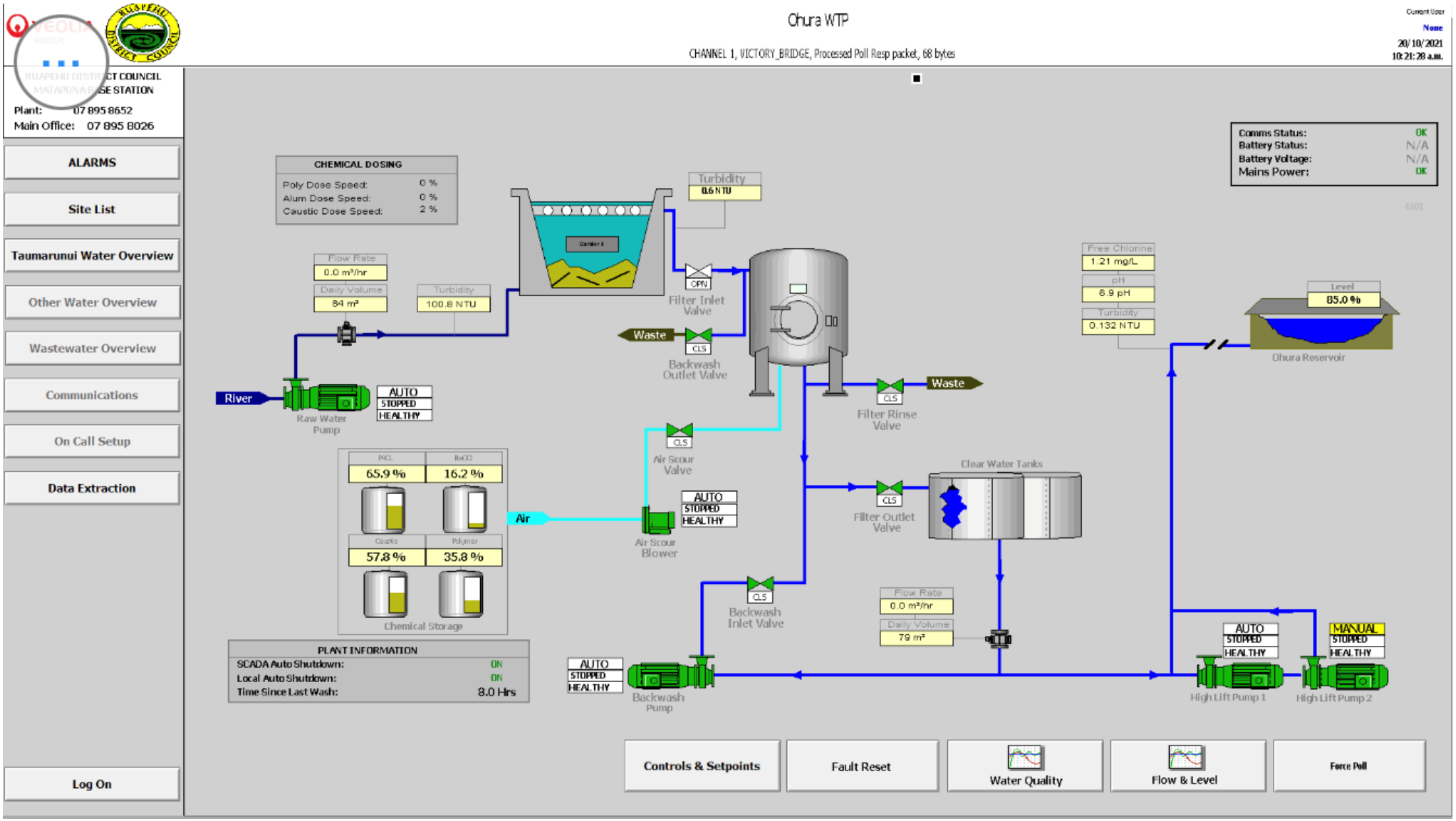
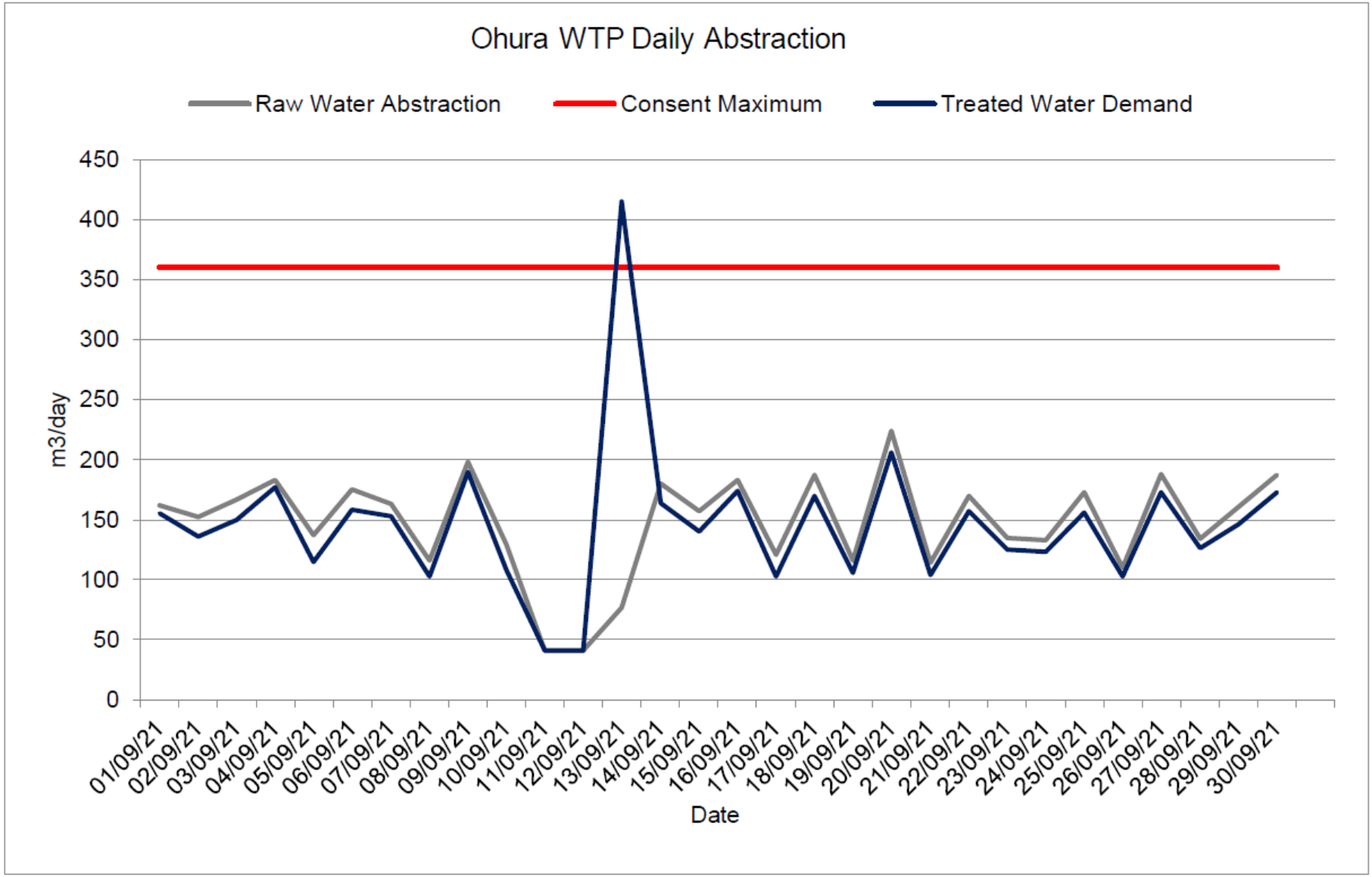
	Please detail what the ongoing environmental effect of this will have on Schedule B values like life supporting capacity or other values (through things like available habitat, temperature, dissolved oxygen, etc.)?	
11	*The application references potentially moving the water take point. Please expand on this. Is this going to be investigated further? Is there any indication of where this could be moved too? What are the proposed timeframes for this to occur?*	The **Executive Summary and Section 3.4.2** both reference the potential relocation of the WTP **not** the water take point.
12	*Please provide further detail in respect of the fish screen installation. What are the specifications regarding mesh size, flow velocity through the mesh? What are the timeframes for the installation of the fish screen?*	Included as **Appendix 1 of the AEE** is the Ecological Monitoring Report from Aquanet Consulting which details the recommendations around the mesh size for the intake screen. Work is currently being undertaken to understand the implications of a reduced mesh size on the functionality of the intake to ensure that the reduction in mesh size does not limit the functionality of the intake. A condition requiring the mesh size reduction is appropriate to ensure this work is completed.
13	*In regards to fish passage for the weir on the Mangaparare Stream, please provide greater detail regarding what sort of remediation is proposed, to pass what fish species and how will it achieve these? Please indicate the timeframes by which this work will occur.*	The existing weir is a consented structure (Consent reference 101865) and the consent is valid until November 2036. Therefore, as outlined in Regulation 60(a) of the NES Freshwater, the fish passage regulations do not apply to existing consented structures. However, as outlined in the application (**Section 7.3 & Section 8.1.3**), as part of the overall upgrade to the WTP, consideration of improvements in fish passage in the Mangaparare Stream are being evaluated. RDC wish to seek guidance from Ngāti Hāua about options for improvement of fish passage in the vicinity of the intake.
14	*14. Are any of the upgrades (under the $1.25m in LTP) likely to significantly improve the water take below minimum flows? I.e. will there be sufficient additional storage to partially or fully offset this take at low flows?*	As outlined in **Section 5.1 of the AEE,** the following is proposed once the upgrade to the WTP, including storage, has been commissioned: • From Year 6 onward, the maximum rates of abstraction of surface water from the Mangaparare Stream shall not exceed 280 m3/day and 3.5 litres/second when flows

Horizons Information Request / Comment		RDC response
		exceed 501 litres/second in the Mangaroa Stream at the Ohura Town Bridge recorder. • From Year 6 onward, the maximum rates of abstraction of surface water from the Mangaparare Stream shall not exceed 160 m3/day at a maximum rate of 2.0 litres/second when flows are less than 501 litres/second in the Mangaroa Stream at the Ohura Town Bridge recorder.

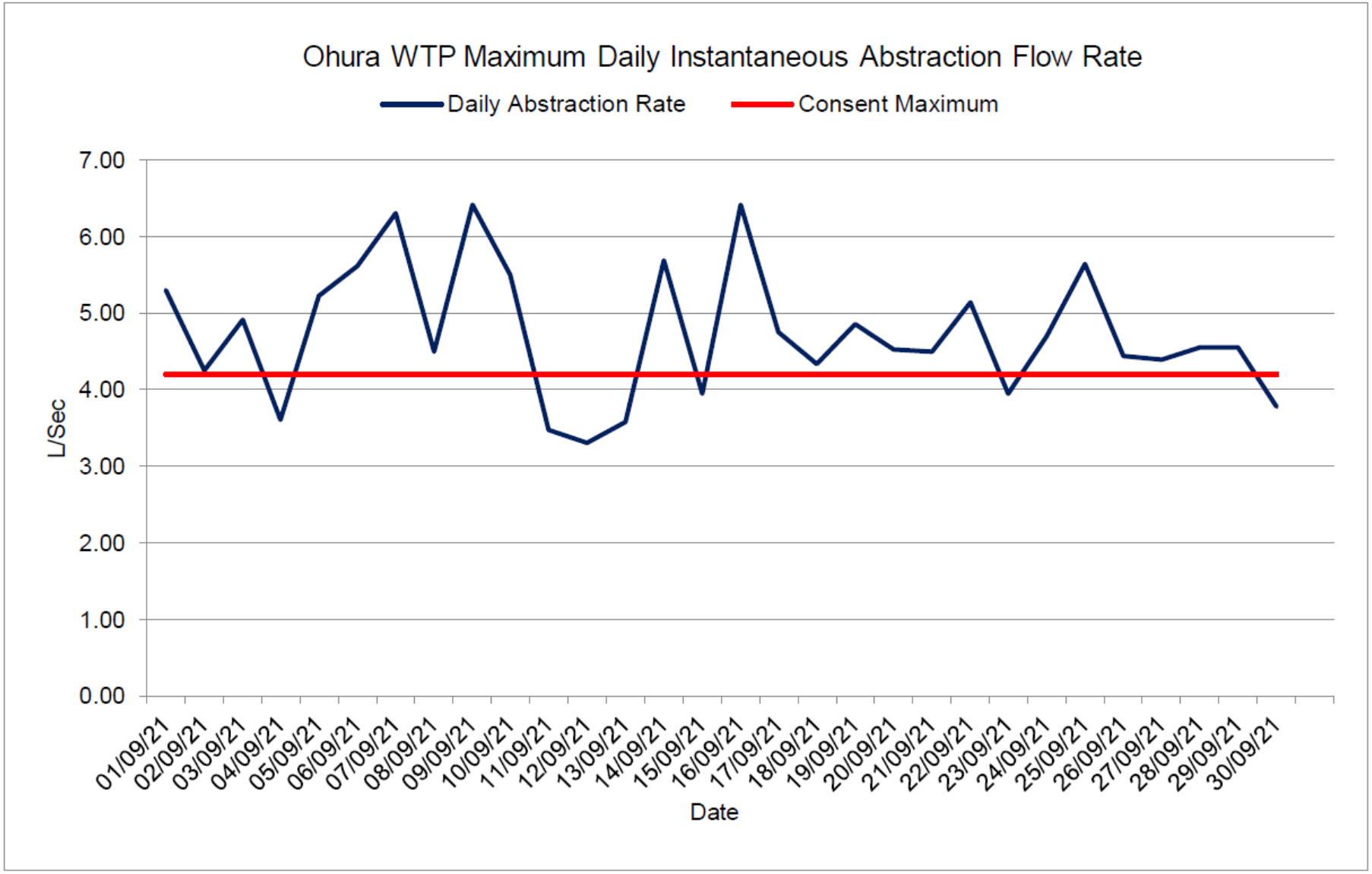
Appendix 1 – SCADA Schematic for the Ohura WTP



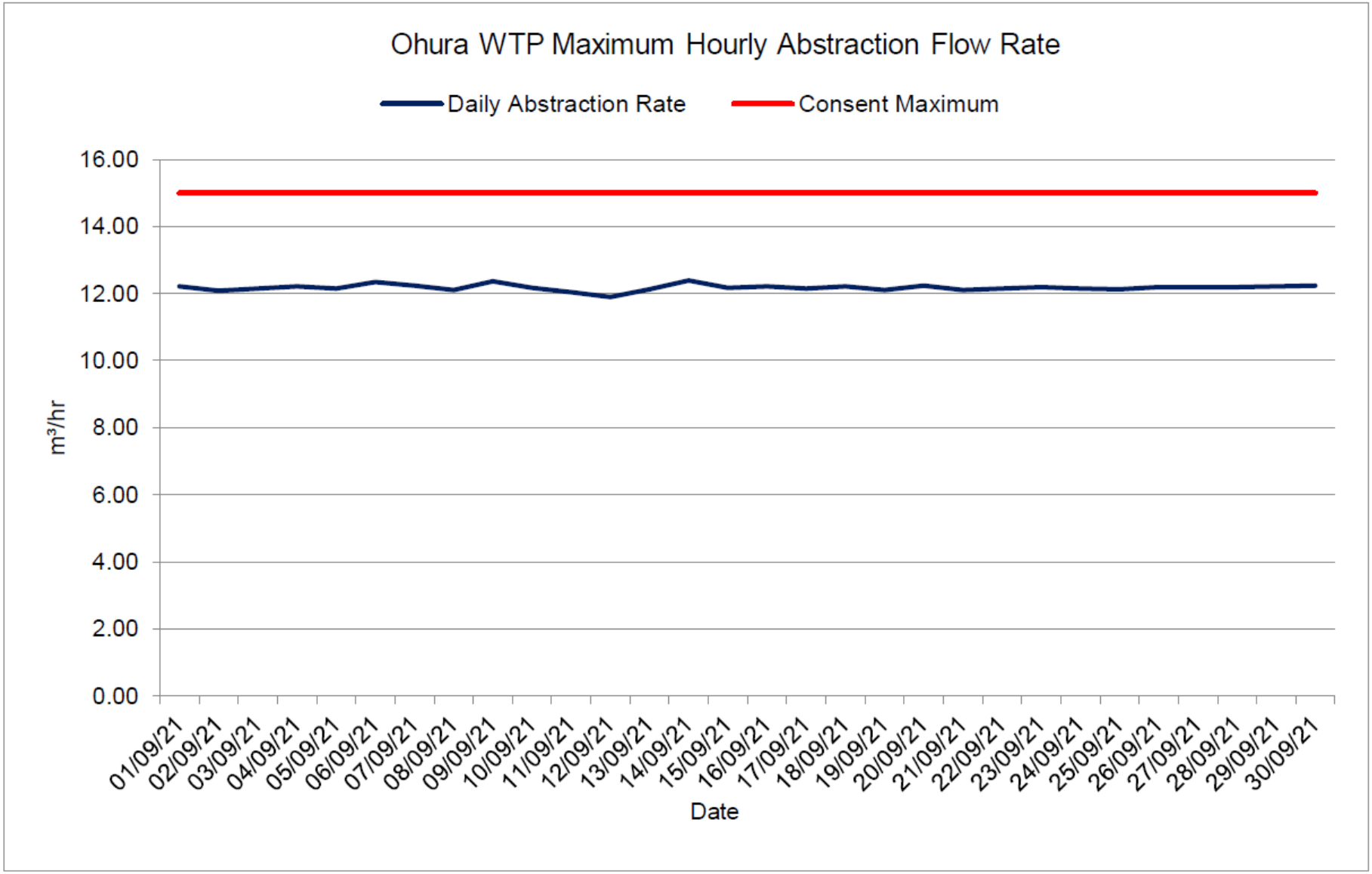
Appendix 2 – Abstraction Discrepancies



Ignoring the spike (Due to SCADA outage), daily abstraction is always below consented value.



This shows the maximum abstraction rate in L/sec for each day. SCADA records minute data for flow in m^3/hr then it is converted to litres/sec in excel. Even if the spike is for one minute then it will record as a failure.



This shows the maximum abstraction rate in m³/hr for each day.

Appendix 3 - Response to Question 10.

Question 10.
From 6 years, the minimum flow take is still going to be approximately 17% of MALF in the Mangaparare Stream. Please detail what the ongoing environmental effect of this will have on Schedule B values like life supporting capacity or other values (through things like available habitat, temperature, dissolved oxygen, etc.)?

1. Habitat availability assessment

Electric fishing surveys undertaken upstream and downstream of the water take in March 2021 identified three fish species (upland bully, crans bully and longfin eel) and Koura[1] in the Mangaparare Stream.

Habitat preference (suitability) curves, which describe the physical conditions (depth, velocity, and substrate size) in which organisms are found, were examined for longfin eel and the two bully species extant in Mangaparare Stream to assess the likely changes in habitat availability from changes in flow (Figure 1).

Depth. The depth preference curves for all three fish species significantly increased with decreasing depth (NB: the very steep curves) (Figure 1). The optimum depth for all three species was ~10cms. During the March 2021 fish surveys and flow gauging, mean stream depth at the downstream site was 45cms and the upstream flow was 11 ± 2.3 L/s (i.e., equivalent to MALF (12 L/s)[2]). Thus, any effects from an abstraction rate of 17% of MALF (appox. 2 L/s) are likely to be negligible. If there are any effects, they are likely to be towards more, rather than less, suitable habitat for the three fish species extant in the Mangaparare Stream.

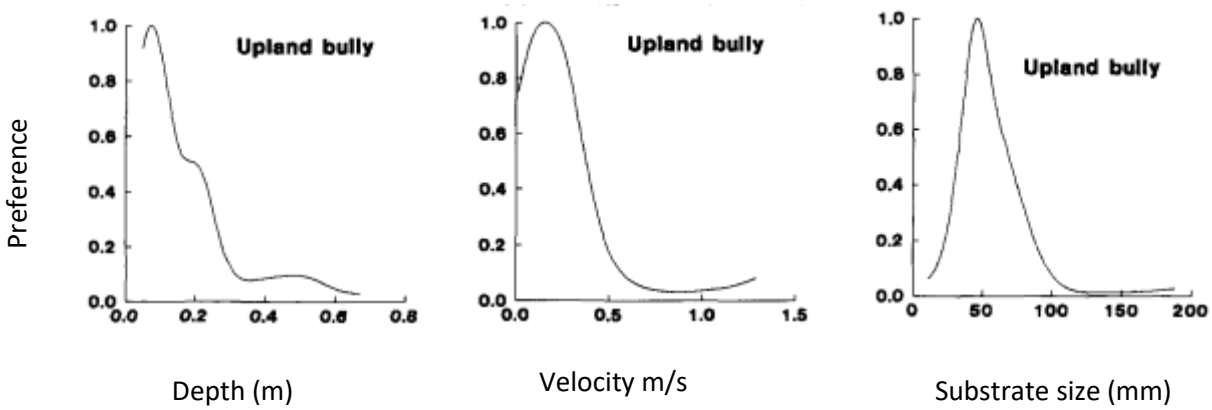
Velocity. The two bully species have an optimum velocity of approx. 0.2m/s. Habitat preference rapidly declined in velocities above 0.2 m/s, while below 0.2 m/s habitat preference remained relatively high (Figure 1). Long fin eels have an optimum velocity above 1 m/s. However, the suitability curve remains rather 'flat' between 0.1m/s and 1m/s indicating only minor changes in habitat preference in this range.

Estimated reduction in mean velocity downstream of the intake due to a take of 2 L/s from a MALF of 12 L/s is between 2 mm/s and 11 mm/s, assuming all the effect of less flow manifesting as change in mean velocity. In reality, there would be a small decrease in wetted area too, meaning that the reduction in mean velocity would not be as great as stated. For the species present, the effect of a 2-11 mm/s change in velocity, on habitat preference of such a small reduction in mean velocity is negligible.

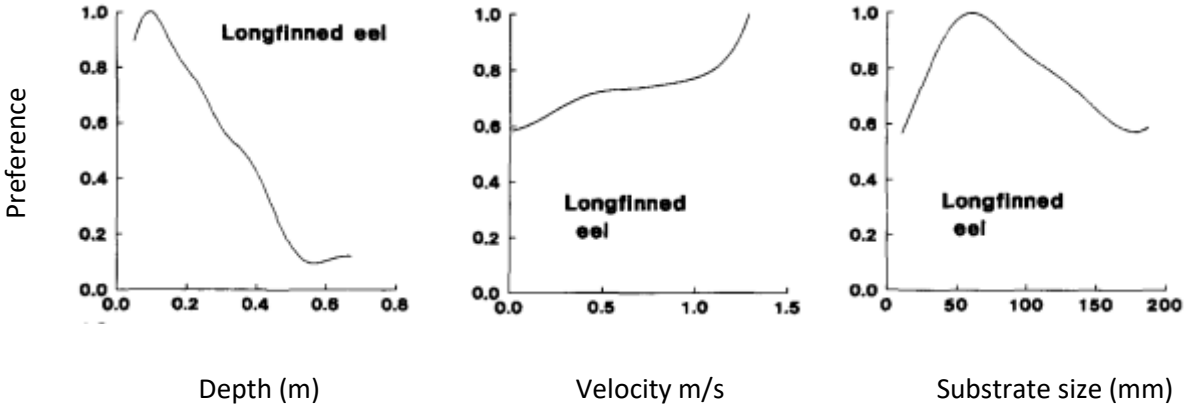
Substrate size The Mangaparare Stream is soft bottom (substrate size less than 2mm [substrate index 2]). No change in substrate size is expected to occur from a change in the low flow water take regime. Substate size is consistent between the upstream and downstream environments and, therefore, will have no bearing on the overall habitat availability.

[1] Ekelund L (2021) Ohura Water Take: summary of ecological monitoring results of the Stream (22 and 23rd of March 2021). Memorandum of understanding.
[2] Watson M (2021). Hydronet memo Revised hydrology of the Mangaparare Stream after gauging 22- March-2021, for Ohura public water supply consent application. Memorandum of understanding. 24 March 2021.

Upland bully



Longfin eel



Crans bully

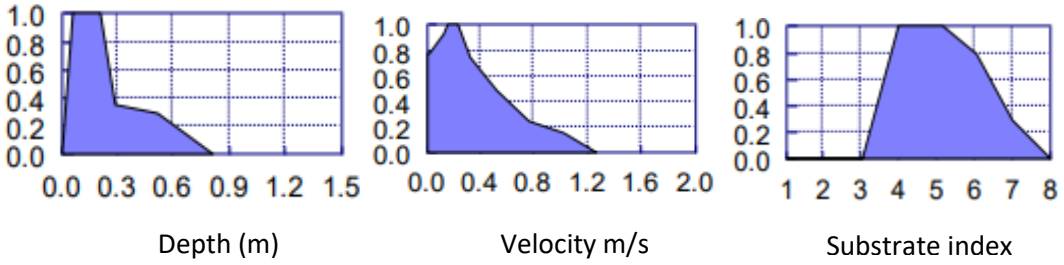


Figure 1. Habitat suitability/preference curves for upland bully, crans bully and longfin eel. Habitat preference curves were taken from Jowett & Richardson (1995)[3], who assessed the habitat preferences of common, riverine New Zealand native from the assessment of 34 different rivers and streams.

[3] Ian G. Jowett & Jody Richardson (1995) Habitat preferences of common, riverine New Zealand native fishes and implications for flow management, New Zealand Journal of Marine and Freshwater Research, 29:1, 13-23, DOI: 10.1080/00288330.1995.9516635

2. Temperature assessment

During the March 23 electric fish surveys, the upstream and downstream water temperatures were 13.2 (9.30am) and 13.7°C (11.00am), respectively. It was a sunny and hot day, and the nearby town of Taumarunui had a day-time high of 18°C. These Mangaparare Stream temperatures are well below the preferred temperatures for crans bully (21°C) and longfin eel elver (24.4°C), and substantially below those water temperatures known to be lethal (>30°C)[4].

3. **Dissolved oxygen assessment**

Dissolved oxygen concentrations in Mangaparare Stream are likely to be driven by the heavy macrophyte presence and diurnal photosynthesis and respiration cycles, which in turn will be driven by nutrient and organic matter run-off from the surrounding farmland and the lack of riparian shading, rather than differences in physical reoxygenation (aeration) rates upstream and downstream of the water take. It should also be noted that the waterfall at the weir structure will be re-oxygenating the water immediately downstream of the take.

Conclusions

Any changes in habitat availability as result of taking water at 17% of MALF are likely to be negligible, if not slightly improve habitat availability for the three extant fish species in the Mangaparare Stream. The temperatures observed in the Ohura Stream during fish surveys are well below those preferred by the longfin eels and crans and upland bully, and substantially below those known to be lethal. Dissolved oxygen concentrations are unlikely to driven by the water take and are in line with core allocation in many other places in the region. Based on the evidence presented, the effects of water abstraction on Mangaparare Stream life supporting capacity are likely to be no more than minor.

[4] Jody Richardson, Jacques A. T. Boubée & David W. West (1994) Thermal tolerance and preference of some native New Zealand freshwater fish, New Zealand Journal of Marine and Freshwater Research, 28:4, 399-407, DOI: 10.1080/00288330.1994.9516630