

Technical Specialist Memo - Hunua Quarry Expansion – 489 Hunua Road, Groundwater Assessment

To: Emma Chandler – Lead Planner & Warwick Pascoe - PPL

From: Nick Hazard

Qualifications & Relevant Experience: I hold a Bachelor of Science in Geology and Economics and a Post Graduate diploma in Hydrogeology. I am a member of the International Association of Hydrogeologists, the New Zealand Hydrological Society and the Geological Society of New Zealand. I have prepared expert evidence and technical assessments for resource consent applications and fast-track applications and have appeared as an expert witness before consent authorities on multiple occasions.

Preparation in Accordance with the Code of Conduct: I confirm that I have read the Environment Court Practice Note 2023 – Code of Conduct for Expert Witnesses and have complied with it in the preparation of this memorandum. I also agree to follow the Code when participating in any subsequent processes, such as expert conferencing, directed by the Panel. I confirm that the opinions I have expressed are within my area of expertise and are my own, except where I have stated that I am relying on the work or evidence of others, which I have specified.

Date: 28 July 2026

1.0 APPLICATION DESCRIPTION

Application and property details

Fast-Track project name: Hunua Quarry Expansion

Fast-Track application number: FTAA-2603-1185 (Council Reference BUN60464053)

Site address: 489 Hunua Road, Hunua

2.0 Documents Reviewed

- Assessment of Environmental Effects and Application for Resource Consent, prepared for Winstone Aggregates by Boff Miskell Limited, dated 30 March 2026. (AEE)
- Appendix B12.8.12 Groundwater Monitoring and Contingency Plan (revised 22 June 2026), Winstone Aggregates.
- Appendix B12.4.9a & b Hunua Quarry Development Groundwater Effects Assessment and Drawings
- Appendix B12.4.5a & b Ecological Effects Assessment and Drawings
- Appendix B12.7.8 Resource Consent Technical Assessment Geotechnical.
- Several historical documents relating to prior consents listed in Section 8.0 References, of Appendix B12.4.9a

3.0 Specialist Assessment

The above documents have been reviewed with respect to the taking and using of groundwater, the dewatering of the ground around the quarry and the effects of stream diversion. The application relates to the expansion of the quarry, notably deepening the quarry pit from RL-5m to RL-50m. These activities require consent under the following rules of the Auckland Unitary Plan rev 12 June 2026 (AUP):-

- E7.4.1 (A13) Diverting Surface Water not meeting Permitted Activity A11 is a Discretionary Activity.
- E7.4.1 (A26) The Take and Use of Groundwater not meeting the Permitted Activity A15 is a Discretionary Activity.
- E7.4.1 (A28) The diversion of groundwater caused by any excavation or tunnel not meeting the Permitted Activity A27 is a Restricted Discretionary Activity.

Under the Resource Management (National Environmental Standards for Freshwater) Regulations, consent is required under Regulation 45A (4) where the taking, use, damming or diversion of water within, or within a 100m setback from a natural inland wetland if the activity is for the purpose of quarrying activities, there is a hydrological connection to the wetland and the activity is likely to change the hydrological function of the wetland. Consents required under Regulation 45A (4) have a Discretionary Activity status.

My review has focused on the assessed '*Envelope of Effects*' or the groundwater drawdown cone and the related effects of this groundwater drawdown. The applicant relies heavily on a long history of monitoring to assess the future effects of the proposed expanded pit shell. I concur with this approach.

I agree with the outline of geological characteristics, groundwater flow, the Hunua greywacke block conceptual model, groundwater and surface water interaction and the values for hydraulic conductivity as outlined in Appendix B12.8.12, PDP (2026).

I agree with the assessment of effects outlined in Appendix B12.8.12, PDP (2026) with respect to the groundwater inflow to the quarry pit, the effect on the resource availability, effects on the Watercare dam, effects on stream low flows within shallow groundwater and effects on stream low flows within regional groundwater. Mitigation by way of stream flow augmentation is offered in consent conditions should there be an identified loss of stream base flow due to quarry dewatering.

In respect to the current and future zone of influence (*'Envelope of Effects'*) I agree with the trigger levels provided in Schedule A which correspond generally to Figure 20 *'Symonds Hill Pit Zone of Influence for Dewatering Level at RL-50m and Estimated Drawdown Contours'* from Appendix B12.8.12, PDP (2026).

Discussion in Appendix B12.8.12 outlines existing drawdown effects and states that bores HUN5/2U, HUN4/12 and the Glasgow bore have not been affected by any drawdown based on the AMRR method (*Accumulative Monthly Residual Rainfall*) to justify this viewpoint. I disagree that these bores (*and some others*) have not been affected by dewatering. In my view, based on the available monitoring data, there appears to be some groundwater drawdown taking place, although not significant, in the bores listed above. It is important that groundwater drawdown trends are identified to plan for any mitigation if required. Ongoing monitoring, required by proposed conditions of consent will confirm either way what the drawdown effects are.

I disagree with the use of AMRR for establishing groundwater trends in the Hunua Quarry environment. The methodology was developed for shallow aquifers in Western Australia. Factors such as shallow perched groundwater in the weathered profile and overlying Waitemata Group rocks and soil preclude a direct connection between rainfall infiltration and the underlying deep greywacke aquifers. This increases the complexity of the recharge mechanism and determining a linkage between rainfall and fluctuations in groundwater levels. This disagreement does not have a significant bearing on my assessment of the proposal as offered conditions of consent in particular the ongoing monitoring and the establishment of groundwater level triggers listed in Schedule A of the consent conditions alleviate any concerns.

In respect of effects on neighbouring farm bores I agree with the assessment discussion and support the mitigation offered to bore owners where quarrying related groundwater drawdown affects the ability of any bore owner to access their legal right to water. However, in relation to the assessed *'Envelope of Effects'* in Appendix B12.8.12, PDP (2026) I disagree with the presentation of the drawdown effects presented in Table 11. The drawdown values assigned to 9 of the 20 bores in this table are not consistent with Schedule A and do not provide limits to the extent of groundwater drawdown north of the quarry. Two private bores in particular (ID5421 and LUC60317641) are located on the northern extent of the drawdown limit as shown in Figure 20 Appendix B12.8.12. The bores are expected to experience less than 5m of drawdown using the Figure 20 assessed effects at RL-50m however Table 11 shows these bores having up to 114.9m of drawdown. In contrast bore ID20479 also in Table 11 and located 1.5km closer to the Symonds Hill pit, is indicated to have only 25m of drawdown.

The above matter was raised with PDP. They have stated they are taking a conservative approach and have used the historic drawdown slope, presented as Figure 15, to justify the extent of drawdown in bores where little is known of their construction. However, if the drawdown at bore ID5421 did reach the level stated in Table 11 then there would be significant additional effects on stream baseflow, a likely increase in quarry inflows and groundwater drawdown in bores not addressed in the application. These effects would extend well beyond those presented in Figure 20 and 21.

The significant drawdown prediction in Table 11 is, however, modified by the trigger levels presented in Schedule A and in particular proposed condition 171(a) presented below. This condition provides that if the consent holder is unable to comply with Schedule A trigger levels, then an application will be required for a change to consent conditions to seek a greater assessed envelope of effects. This addresses any concerns around the presentation of Table 11 in Appendix B12.8.12 of the AEE.

The Schedule A provided in the condition set did not specify drawdown trigger levels for four farm bores. I have added in these missing values based on those presented in earlier consent documents. The applicant has agreed to these but has sought for these to be referred to as provisional until such time as new monitoring data is obtained. I have agreed to this and to the addition of an advice note to Schedule A to specify how the trigger levels are to be confirmed.

In respect of the potential adverse effects that could be caused by the proposed stream diversion of Mangapu Stream, condition 63 and 64 (and other related conditions) requiring a Stream Realignment Management Plan (SRMP) requiring design, construction, long term establishment plan and appropriate monitoring to be detailed before commencement provides sufficient confidence that matters of discretion under E7.4.1 (A13) of the AUP will be adequately addressed. Other specialists have assessed the ecological effects.

In respect to the effects on Stevensons Drury Quarry Expansion -Sutton Block (Consent WAT60449477, 60449478, 60449479) I am accepting of the assessment provided and have no concerns that the proposal will affect the operation of Drury Quarry over the life of any consent granted as a result of this application. I concur with the assessed additional effects of the Stevenson Drury Quarry Expansion – Sutton Block presented as Figure 21 in Appendix B12.8.12 of the AEE. Should this occur it will be towards the end of the life of the proposed expansion of both quarries.

The existing monitoring bores are critical in determining that the drawdown effects of the quarry remain within the assessed 'Envelope of Effects'. In my review a key concern was that many of the monitoring bores will not be sufficiently deep enough to monitor the full extent of the drawdown. It is important that replacement bores are constructed ahead of time to enable correlation between the existing bores and their replacements. The concern is that monitoring bores will dry out before a replacement has been drilled. This concern has been addressed by the inclusion of condition 177.

A review of consent conditions offered in the AEE as Appendix B12.7 identified that multiple conditions covering a wide range of monitoring aspects from the three existing consents had not been included. I reviewed all the prior conditions and provided a revised condition set to the applicant for review. These have all been accepted by the applicant with a few minor changes. Most of the additional conditions are reflected in the revised Draft Consent Conditions dated 22 June 2026. Additional discussions with the applicant and a final review of

the conditions identified some additional changes to conditions and incorrect condition references. These are documented below.

4.0 Recommendation

From a groundwater perspective I have not identified any significant issues that would preclude granting of these consents.

Should the Expert Panel choose to grant this application I support the groundwater take and diversion conditions proposed in revised Draft Consent Conditions dated 22 June 2026 but with the inclusion of additional conditions and changes outlined below. The changes presented below have been agreed with the applicant. There are no disagreements. The condition numbers below and the internal references below relate to the revised Draft Consent Condition set dated 22 June 2026.

The only point of difference with the applicant is the reference to a new condition set dated 14 July provided to the panel on the 22nd July 2026. The applicant has responded to my changes with different condition numbers from the 14 July 2026 condition set which I have not sighted.

Condition references within the groundwater conditions are required to be checked before issuing the final condition set.

5.0 Proposed Conditions, amendments and comments

Condition

174	<u>Comment</u>
	Change agreed with the applicant. The applicant states 'Condition number is 177 as per 14th July version'. I have not viewed this condition set and therefore references to condition numbers need to be checked prior to issuing the final condition set. Condition 174 minor amendment as follows:- <i>A Technical Review must be undertaken no less than 3 months prior to commencing each of the two three successive steps of dewatering identified in Condition 174 173. The Review must include an analysis of monitoring data, a comparison of actual groundwater level values to predicted values, and an assessment of any implications these results may have for on-going management of any actual or potential adverse effects as a consequence of dewatering. The Technical Review must provide a more detailed analysis and interpretation of monitoring data than the Annual Monitoring Report required in accordance with Condition 67. The Consent Holder must forward the Technical Review to the Council within one (1) month of the completion of the Review.</i>

	<i>Advice Note: If the Technical Review shows that the effects of the activity are greater than predicted in the application and that monitoring and mitigation provisions of this consent are not adequate for the scale of effects, then Council may review the consent conditions in accordance with the provisions of Condition 70.</i>
181	<u>Comment</u> Agreed with the applicant. (applicant advises it is new condition 184 assumed to be in the condition set 14th July.) Condition 181 should be amended as follows:- <i>Monthly monitoring of bores ID 1218 and 20013 must recommence in the event that groundwater drawdown is detected in bore HUN12/4U or HUN12/4L, and monthly monitoring of bore ID 21817 must recommence in the event that groundwater drawdown is detected in bores ID421, HUN12/8U or HUN12/8L. Monitoring in these private bores is subject to access being available otherwise requirements under condition 177 apply.</i>
182(e)	Minor amendment refer to condition 66 not 67. The applicant states 'Disagree. The correct reference is Condition 70 as per Condition set dated 14th July.' .
184	<u>Comment</u> Agreed with the applicant. (applicant advises it is new condition 187 assumed to be in the condition set 14th July.) The amended condition is as follows:- <i>The Consent Holder must:</i> (a) <i>measure and record water levels in the bores listed in Schedule A (or use best endeavours with respect to the private bores 830, 20013, 20479, and 21474 (Glasgow bore)) at monthly intervals</i> (b) <u>measure and record water levels in bore ID421 (or use best endeavours) at quarterly intervals from the date of commencement of this consent.</u> (c) <i>measure and record the water level from the top of the casing to the nearest 0.01 of a metre (i.e. the nearest centimetre). The bores operated by the Consent Holder must not have been pumped for at least 24 hours prior to the water level measurement being taken; and</i> (d) <i>keep records of each date and corresponding water level for each bore.</i>
186	Condition 186 minor amendment refer to condition 66 not 67. Applicant states 'Disagree. The correct reference is Condition 70 as per Condition set dated 14th July'

187	<u>Comment</u> The applicant states 'Condition numbering references have already been updated as per the Conditions set dated 14th July' Condition 187 minor amendment as follows:- <i>The Consent Holder must include the records required under Conditions 484 182– 485 186 above in the Quarterly and Annual Monitoring Report required by Conditions 66 and 67. The records must include details of the measurement procedure employed, records of rainfall prior to and during the measurement, and the time and corresponding water level measurements within the Symonds Pit Sump.</i>
191	<u>Comment</u> The applicant states 'Agree additional number updates required, however correct referencing as follows:-' '.....under Condition 189 188 to 190 192 to 194 above in the Annual Monitoring Report required by Condition 67-70.' It is assumed the numbering change above is as per the 14th July condition set. For the 22 June condition set Condition 191 should be amended as follows:- <i>That the Consent Holder must include records required under Condition 489 188 to 190 above in the Annual Monitoring Report required by Condition 67. The records must include details of the method, dates and times of the gauging procedure employed, all measurements taken and flow calculations.'</i>
193	<u>Comment</u> Applicant agreed. Condition 193 refers to Hays Stream and Symonds Stream - This should be referred to as Waipokapu, Mangapu.
199-205	<u>Comment</u> Changes to conditions 199 to 205 relating to Augmentation Water Quality are deferred to Andrew Rossack (Council's consultant ecologist), however I do note that condition references in Condition 204 are incorrect as follows:- <i>Monitoring at two-weekly intervals must recommence upon written instruction from AC in the event of a material change in the augmentation flow source or pumping system.</i> <i>If monitoring required by Condition 482 199 identifies an increase in the parameters listed in Condition 485 202 caused by the exercise of this consent, the consent holder must prepare and submit to the Council a mitigation plan outlining mitigation measures to be implemented to address such effects.</i>

206 (a)	<u>Comment</u> Applicant agreed. Condition 206 (a) refers to Hays, Symonds and Waihoihoi Streams.... This should be referred to as Waipokapu, Mangapu and Waihoihoi Streams.
207-211	<u>Comment</u> Applicant agreed. Conditions 207, 208, 209, 210, 211 all refer to Symonds Stream when it should be Mangapu Stream to be consistent.
208	<u>Comment</u> Applicant agreed. Applicant states 'This error was addressed in the 14th July conditions set provided to the Panel 22nd July' Condition 208 has a typo – refers to condition 2019 it should be 177.
215	<u>Comment</u> Applicant agreed. Applicant states 'Agree but should be Condition 219' Condition 215 should be revised as follows:- <i>In the event that groundwater drawdown is such that <u>in either or both</u> monitoring bores HUN12/8U on Hunua Road <u>or ID421 on Jack Paterson Drive</u> equals or exceeds the trigger value in Schedule A then:</i> (a) <i>The Consent Holder must cease any further drawdown at the Symonds Hill Pit and within seven (7) days must notify the Council in writing and by telephone of the exceedance of trigger levels. Drawdown must not recommence without the Council's written approval;</i> (b) <u>Etc etc (a, b, c and d unchanged)</u>
170 (a)	<u>New Condition</u> <u>Comment</u> Agreed with the applicant. Condition 170a <i>The daily abstraction from the Symonds Stream augmentation bore (HUN 14/8 or any replacement) must not exceed 1,400m³.</i>

171 (a)	<u>New Condition</u> <u>Comment</u> Agreed with the applicant. Applicant states ‘<i>This condition seems to have been deleted by mistake. Happy to accept</i>’ <i>Condition 171a</i> <i>In the event that groundwater drawdown is such that any of the deep monitoring bores operated by the Consent Holder equal or exceed any trigger values in Schedule A then the Consent Holder must cease any further water level drawdown at the Symonds Hill Pit and within seven (7) days notify the Council in writing and by telephone of the exceedance of trigger levels. The notification must specify which bore trigger(s) have been exceeded, and the quantum of the exceedance for each bore. The Consent Holder must not recommence drawdown unless it is demonstrated that the trigger levels can be complied with to the written satisfaction of the Council.</i> <i>Advice note: The drawdown trigger levels in Schedule A define a consented “Envelope of Effects”. If the Consent Holder is unable to comply with Schedule A triggers, then an application will be required for a change to consent conditions to seek a greater assessed envelope of effects.</i>
189 (a)	<u>Comment</u> Agreed with the applicant. Applicant states ‘<i>This was included in the 14th July conditions as Condition 202</i>’. <i>Condition 189a</i> <u><i>Stream flow monitoring of Taitaia Stream (Taken from Condition 51 of WAT60152106-A)</i></u> <i>When either:</i> <i>(a) the drawdown level in the Symonds Hill_Pit reaches RL20m (or such other RL as agreed in writing by the Manager); or</i> <i>(b) the groundwater drawdown is such that monitoring bores HUN12/4U and HUN12/4L for the Taitaia Stream (Peterson Road) equal or exceed their trigger values in Schedule A then:</i> <i>(i) the Consent Holder must establish and monitor the respective flow gauging site T1 on tributary no. 085150 of the Taitaia Stream at Peterson Road bridge. The site locations must be at approximate Map Reference NZTM 1777090mE 5898840mN (site T1 "Peterson Road") for the Taitaia Stream. The precise</i>

	<i>locations and monitoring are to be as proposed to and approved in writing by the Manager, after visiting the sites to determine access to, and the suitability of, each location for stream flow measurement.</i> <i>(j) The monitoring must be carried out twice per year. The flow must be measured during dry weather conditions within the period commencing 1 January and ending 30 April of each year. All field measurements and procedures must be in accordance with the National Environmental Monitoring Standards - Water Level v4.0.1 October 2025 (or subsequent versions thereafter), or as agreed in writing with the Council</i> <i>(ii) the Consent Holder must, in consultation with the Manager, engage an expert or experts at the Consent Holder's cost to review stream base flow measurements and records. The expert(s) must assess and report on whether drawdown of groundwater level at the Symonds Hill Pit either has or is likely to have adversely affected baseflow in Tributary 085150 of the Taitaia Stream at Papakura-Clevedon Road; and</i> <i>(iii) if the review and report at (ii) determines that baseflow has or is likely to have been affected by drawdown of groundwater level at the Symonds Hill Pit, then the Consent Holder and the Manager must endeavour to agree an appropriate mitigation regime to be implemented at the Consent Holder's cost. If agreement is not reached within 3 months of receipt of the expert report, then the Consent Holder must implement the determination of the expert review and report. If the Consent Holder does not accept the determination of the expert review and report then the Consent Holder may apply for a change to the consent conditions pursuant to Section 127 of the Resource Management Act 1991.</i>
Schedule A	<u>Comment</u> Trigger levels presented in Schedule A were incomplete in PDP 2026 and in the revised condition set. In particular trigger levels for bores ID20013, ID421, ID21817 and ID1218 are required to complete the groundwater drawdown <i>'Envelope of Effects'</i> and provide the basis for monitoring data to confirm that the extent of assessed effects is not breached. These trigger levels are imperative for the requirements of Conditions 181, 215 and 171 (a). The Trigger levels in bold and underlined below have been added by N Hazard on the basis of historical monitoring data and from historical consent documents which previously provided these trigger levels. The applicant has outlined below that the age of the existing data set may provide unreliable trigger levels and recommends the trigger levels I have

	proposed be provisional until new water level data is obtained. I am accepting of this approach. <u>Applicant Comments</u> <i>Agree with the proposed trigger levels in principle. However, the last reliable water level measurements for bores ID421, 1218, 20013, and 21817 were taken in 2013 - over a decade ago. Local pumping conditions, land use, and groundwater levels may have changed since then. Therefore, I recommend that a new baseline be established before finalising trigger levels. This should include at least one dry season and one wet season measurement (i.e., two measurements approximately six months apart) to account for seasonal variability. Once these new baseline measurements are obtained, trigger levels can be confirmed or adjusted accordingly and incorporated into Schedule A. I have added TBC on trigger levels (or you can add "provisional" if you prefer)</i> <i>Suggested Advice Note (or Condition) on Schedule A (Related to Condition 184):-</i> <u>Advice Note Schedule A</u> <i>Prior to finalising the trigger levels for bores ID421, 1218, 20013, and 21817 in Schedule A, the Consent Holder shall undertake a minimum of two baseline water level measurements in each bore - one during dry season conditions (January - April) and one during wet season conditions (July - October) — to establish current baseline levels. Trigger levels shall then be set based on these measurements plus an allowance for seasonal variation.</i>
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Schedule A – Monitoring Bores and Trigger Levels							
Bore	Map Reference NZTM	Collar Elevation RL(m)	Screen Interval RL(m)	Depth GW (m, RL) Sept 2025	Formation	Screen Length (m)	Drawdown Trigger Values (m, RL)
HUN12/1U	1777118 / 5892865	149.76	135.8 – 129.8	141.42	Greywacke	6	130.21
HUN12/1L	1777122 / 5892866	149.80	17.8-5.8	45.72	Greywacke	12	-66
HUN12/2U	1778103 / 5891943	258.79	226.7-220.7	243.45	Greywacke	6	224.96
HUN12/2L	1778104 / 5891939	259.008	99.5 – 87.5	179.77	Greywacke	12	55.1
HUN12/3U	1776392 / 5895751	100.43	51.2-45.2	58.52	Waitemata	6	43.02
HUN12/3L	1776395 / 5895750	100.53	-30.5- -36.5	28.99	Greywacke	6	-95.2

HUN12/4U	1777313/ 5897789	73.71	44.7-38.7	42.96	Waitemata	6	38.21
HUN12/4L	1777311/ 5897785	73.34	11.5 – 0.5	55.68	Greywacke	12	20
HUN12/5U	1775995 / 5894949	45.63	27.6 – 20.6	28.64	Waitemata	6	18.51
HUN12/5L	1775991 / 5894948	45.72	-46.8 – -52.8	30.54	Greywacke	6	-96
HUN12/6U	1776022 / 5891368	55.67	34.7 – 31.7	35.94	Greywacke	6	28.43
HUN12/6L	1776025 / 5891369	55.86	12.9 – 0.9	34.12	Volcanics	12	27.14
HUN12/7U	1780450 / 5893900	181	30m below ground level		Greywacke		x + SV
HUN12/7L	1780450 / 5893900	181	TBC		Greywacke		x + SV
HUN12/8U	1775555 / 5894902	27.39	22.4 – 19.4	24.56	Scoria / Alluvium	3	21.37
HUN12/8L	1775559 / 5894905	27.44	6.4 - 0.4	22.26	Basalt / Scoria	+6	19.83
HUN05/2L	1778799 / 5894587	142.16	7.16 – 1.16	124.42	Greywacke	+6	6.2
830	1776103 / 5893220	62.12	-3 – -3.4	48.37	Greywacke	31	-66
20013	1776109/ 5898810	39.83	-26.2- -147.9	25.62	Greywacke	121.7	<u>23.4</u> <u>Provisional</u>
1218	1775614 5898253	51.0	-7.8 - -51.0	27.0	Greywacke	<u>43.2</u>	<u>24.6</u> <u>Provisional</u>
421	1775479 5892910	31.59	-4.4 - -28.4	13.85	Volcanic	<u>24.0</u>	<u>10.6</u> <u>Provisional</u>
21817	1775198 5892910	28.5	-10.5 - -32.0	13.71	Volcanic	<u>21.5</u>	<u>10.5</u> <u>Provisional</u>
20479	1776578 / 5896896	127.11	44.3 – 9.7	43.92	Greywacke	34.6	9
21474 (Glasgow)	1779246 / 5894408	194.72	123.2 – 93.3	159.7	Greywacke	29.9	153.19
HUN25/1L	1777654/ 5893543	108.6	1.6 – -4.4	57.1	Greywacke	6	-58
HUN25/1U							