



memorandum



TO	Jo Young	FROM	Parviz Namjou
	Stevenson Aggregates Ltd	DATE	5 September 2025
RE	Drury Quarry – Sutton Block Expansion, Auckland Council Further Information Request on Groundwater		

Below is additional information in response to Earthtech's (Auckland Council's Groundwater consultant) second s67 queries dated 22 August 2025 regarding the proposed Drury Quarry – Sutton Block Expansion application.

For ease of reference, the numbered heading corresponds to the row number in the information request table (ET 2025), followed by the requested information, and PDP's response.

76: A - Regional Groundwater Drawdown Predictions

Supplementary Request for Missing Information

Proposed monitoring of shallow and deep groundwater levels to the east of the Sutton Block expansion within the predicted 7.5km zone of dewatering influence. Listing of groundwater monitoring bores in draft consent conditions.

PDP Response:

The distance drawdown plots for the Sutton Block quarry stages (Stages 2 to 5) are presented in the Groundwater and Surface Water Effects Assessment (Technical Report L) (PDP 2025). The predicted drawdown in all farm wells within the zone of influence is presented in Appendix H: Predicted Drawdowns in Farm Wells East of Huna Fault (Stages 2 to 5) (PDP 2025). The methodology is based on the assumption of the uniform aquifer conditions using analytical methods. The distance drawdown plot for Stage 5 is shown in Figure 1 below.

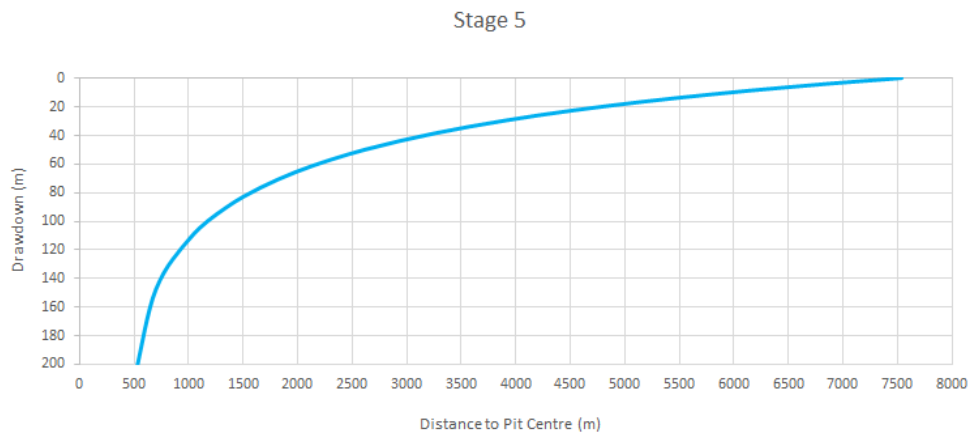


Figure 1: Distance Drawdown Plot for Stage 5

Based on the distance drawdown plot for Stage 5 and predicted drawdowns for Stage 5 for each bore within the zone of influence (as presented in Appendix H, PDP 2025), it is possible to generate the drawdown contour map. However, the Hunua and Drury Quarries monitoring data have shown that the actual groundwater drawdowns in the greywacke do not follow the predicted drawdown contour presented in PDP 2011 and PDP 2012, and only on-going monitoring can accurately identify the drawdown pattern. This is because any sub-surface fracture zones can alter the groundwater drawdown contours.

To the west of the Sutton Block, for the assessment of drawdown effects we have estimated a flat hydraulic gradient within the Hunua greywacke block, which is consistent with the monitoring data collected since 2011. The Sutton Block sump at Stage 5 will be at RL-60m. This is well below both consented Drury Pit (RL-45m) and Hunua Quarry (RL-5m) sumps. The planned partial removal of the Hunua Fault can cause hydraulic interconnection between the groundwater in the Drury and Hunua greywacke blocks as well as the Sutton Block. Therefore, a maximum drawdown has been assumed west of the Sutton Block. It is predicted that the Sutton Block sump causes the groundwater level within the Hunua and Drury blocks to drop down to RL-60m, based on a flat hydraulic gradient observed within these blocks. This equates to about 120m drawdown in the Hunua and Drury Greywacke Blocks.

To the east of the Sutton Block, the extent of the next greywacke block is unknown, so it was conservatively estimated using analytical method. Using this method, the drawdowns for each farm well within the Sutton Block zone of influence are also estimated and presented in Appendix H (PDP 2025). As discussed in Technical Report L (PDP 2025) and highlighted above, these drawdowns in reality are not likely to occur due to compartmental nature of the greywacke. Therefore, no attempt is made to produce a regional groundwater drawdown contour map as part of the conditions. The ongoing monitoring data from all monitoring bores, including the Hunua Quarry and Drury Quarry monitoring bores and those proposed as part of this consent, will be analysed continuously to determine the extent of the zone of influence and to update the potential drawdowns in farm wells as part of the review process proposed in the draft consent conditions.

Earthtech's (2025) has also stated that the Hunua Quarry zone of dewatering extending beyond the northern edge to outside of the 7.5km Sutton Block zone of dewatering influence. Therefore, cumulative drawdown effects from the Hunua Quarry need to be considered for the Sutton Block application.

Ongoing monitoring for the Hunua Quarry occurs in bores HUN12/4, 1218, and 20013, which were drilled down to RL-5m, RL-51m and RL-149.7m respectively in the greywacke close to the northern boundary of the Hunua Quarry zone of influence (Figure 2). This monitoring has shown no drawdown effects as a result of the Hunua Quarry dewatering down to RL20m (note that HUN12/4L is located 800m inside the zone of influence). The new Symonds Hill Pit will be dewatered down to RL-5m (25m more than the previous pit),

but about 1km further away from the northern zone of influence boundary. The lack of any response in the above bores, considering the flat hydraulic gradient, indicates that the northern boundary of the zone of influence for the Hunua Quarry is much closer to the Hunua sump than initially assessed. It is not likely that the northern Hunua Quarry boundary of the zone of influence exceeds the conservative zone of influence predicted for the Sutton Block. Therefore, no interference effects are likely beyond the 7.7km Sutton Block zone of influence. Even if HUN12/4 responds in future to the Symonds Hill Pit, the dominant flow for Sutton Block Stage 5 will be towards the lowest pit (i.e., Sutton Block) due to relatively flat hydraulic gradient in the Hunua greywacke block. This aligns with the conceptual model (PDP 2024).

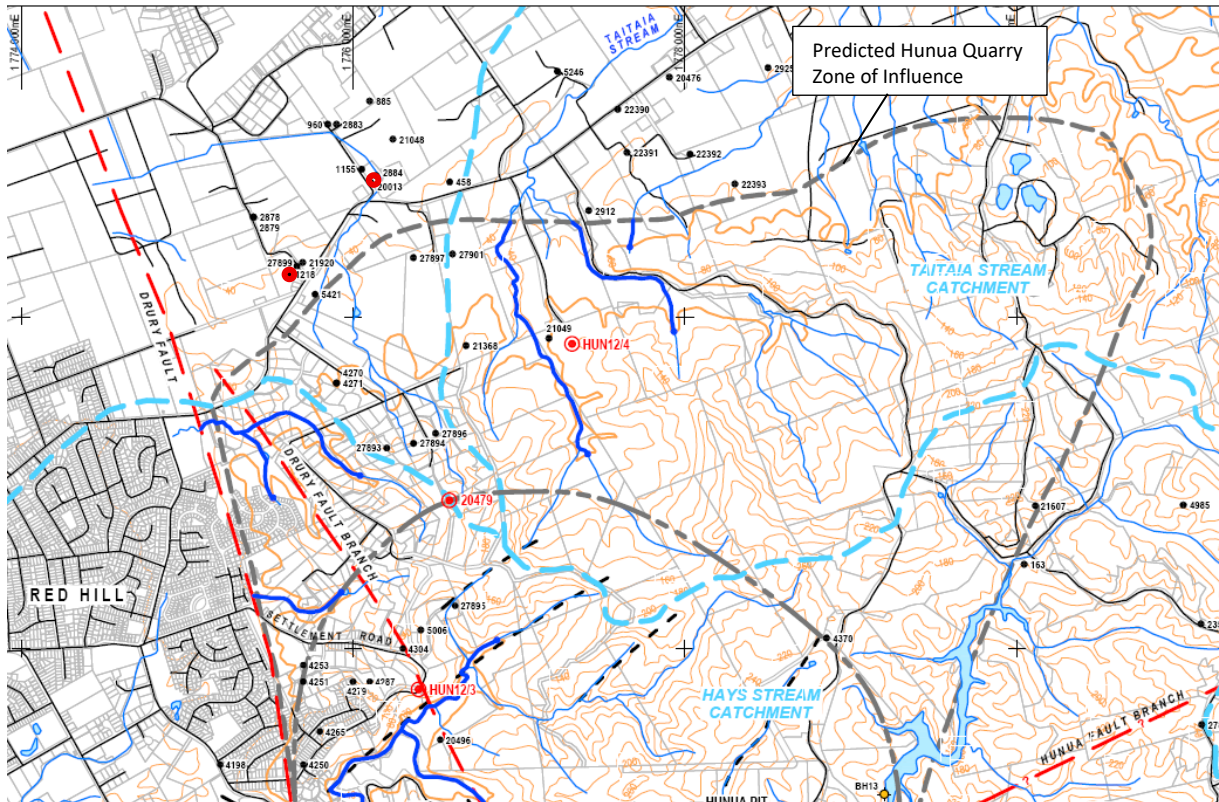


Figure 2: Hunua Quarry Monitoring Bores close to the Northern Zone of Influence Boundary

Despite the conservative drawdown predictions discussed above and in the Technical Report (PDP 2025), we agree with Earthtech’s recommendation that installing an additional monitoring bore east of the Sutton Block or SG12L would enhance the groundwater level monitoring network, particularly given the absence of existing registered groundwater monitoring bores in the eastern area. We have updated Schedule A of the draft consent conditions to require that such a bore (MK1) be drilled if trigger levels in any bores east of the Hunua Fault are exceeded.

Note that it is proposed to augment the Maketu Stream either via the Sutton Block sump (via a pipe) or by drilling an augmentation bore (MK1) within SAL landholdings near E1778418/N5889315. If the augmentation occurs via the bore, this bore (MK1) will be incorporated into the monitoring network regardless of any trigger level exceedance.

It should also be clarified that the proposed MK1 discussed in the Technical Report L (PDP 2025), is not a shallow bore, as the shallow and perched groundwater may not sustain the long-term augmentation flow during summer conditions. Similar to the existing augmentation bore (PH1), MK1 will be drilled into the deep groundwater zone and will be incorporated into the deep groundwater monitoring network (Schedule A). The trigger level in MK1 will be provided in the annual monitoring report (taking into account any in-well drawdown) after its completion using the same analytical method (PDP 2025).

The drawdown as a result of the dewatering at the current estimated location of MK1 is about 100m for Stage 5.

A second shallow monitoring bore (MK1U) will also be drilled if the trigger level in any shallow bores east of the Hunua Bore exceeds.

Note also that the monitoring bores are not limited to a few bores in the vicinity of the Sutton Block (SG11 to SG13) but also include BH103, BH109, BH113-1 and SG6. In addition, all monitoring data from the Hunua Quarry will be incorporated in the quarry stage review process to ensure all regional drawdown effects are as expected and to mitigate any adverse effects on farm wells if required as per proposed draft consent conditions.

The recommended updated Schedule A to the draft consent conditions is shown in the table below:

Schedule A (Update): Recommended Groundwater Monitoring Bores and Trigger Levels

Bore Intake Zone	Bore ID	Map Reference NZTM 2000 (E/N)	Ground Level (m, RL)	Screen Interval (m, RL)	Geol.	Seasonal Variations in Shallow Bores (m)	Predicted Drawdowns (m)	Estimated Pre-Quarry Groundwater Level (m, RL)	Groundwater Level (m, RL) August 2024	Proposed Trigger Level (m, RL)
Deep greywacke bores within Hunua Greywacke Block	SG3L	1776542/5890385	157.38	0 to -5	G	-	121	64	43.95	-60
	SG3U	1776542/5890385	156.35	50-44	G	-	121	64	85.53	-60
	SG7	1777162/5892100	202.34	-3.66 to -11.66	G	-	61	64	48.1	-60
Deep greywacke bores east of Hunua Fault	SG11L	1777712/5890556	222.5	4.5 to -7.5	G	-	200	172.23	166.43	-27.77
	SG12L	1778101/5890213	277	6 to -3	G	-	206	179.46	179.59	-26.54
	SG13	1777736/5889520	249	8 to -1	G	-	145	108.95	102.85	-36.05
	MK1-Deep ²	1778421/5889312	TBC	TBC	G	TBC	100 ³	TBC	TBC	TBC
	BH103	1777212/5888550	128.12	77-71	G	-	78	127.5	96.83	49.5
	BH109	1776798/5888474	81.53	50.03-47.03	G	-	72	79.91	80.33	7.91
	BH113-1	1776744/5888268	115.67	22.47-20.47	G	-	65	100	77.13	35
	22498 (SG6)	1776905/5887425	100	42-20	G	-	47	62	51.23	15
Shallow bores within Hunua Greywacke Blocks	SG1U	1775928/5891217	39.32	24-18	V	1.1	(SV+2)	38.22	38.17	35.15
	SG1L	1775928/5891217	39.17	0 to -5	V	1.98	(SV+2)	28.73	27.84	24.75
Shallow bores East of Hunua Fault	BH113-3	1776744/5888268	115.67	76-74	CM	7.25	(SV+2)	95.52	95.47	86.27
	BH104	1777227/5888410	135.97	107-101	CM	5.57	(SV+2)	123.20	122.84	115.63
	SG11U	1777709, 5890549	222.5	202.94 to 153.5	G	3.45	(SV+2)	172.92	171.87	167.47
	SG12U	1778105, 5890132	277	221 - 212	G	7.18	(SV+2)	224.39	224.01	215.21
	MK1-Shallow ²	1778421/5889312	TBC	TBC	G/CM	TBC	(SV+2)	TBC	TBC	TBC
Shallow bores west of Drury Fault	SG9	1775804/5888767	25	5 to -5	V	1.06	(SV+2)	22.65	22.66	19.59
	SG10	1775488/5888702	26.74	9.74 to -3.26	V	0.91	(SV+2)	24.15	24.15	21.24
	21134	1776144/5887966	26.7	-2 to -33	V	2.83	(SV+2)	22.11	22.29	17.28
	SG4	1775830/5897720	39.34	20 to 9	A/V	1.15	(SV+2)	37.61	37.97	34.46
	SG8	1776311/5888663	52.75	24.75 to 12.75	V	1.47	(SV+2)	39.41	39.43	35.94
	BH03-New	1776243/5888470	46.77	21.77 to 11.77	A	0.52	(SV+2)	31.72	31.92	29.20

- Notes:
- SV (Seasonal Variation) + 2m incorporated into trigger levels for all shallow bores.
 - MK1L (Deep) and MK1U (Shallow) shall be drilled if trigger level in SG12L and SG12U exceeds. MK1L (Deep shall be drilled regardless of the trigger levels in SG12L, if augmentation of the Maketu Stream to be undertaken via a bore.
 - Based on the same analytical method discussed in PDP (2025), excluding any in-well drawdown.

80 C and 81 C – Groundwater Supply Bores

Missing Information

Specific assessment of in-well drawdown effects (incorporating pump depths and water supply demands) on existing water supply bores within the zone of influence.

Identification of potentially affected water supply bore owners, including those with consented takes.

PDP Response

Potentially affected bores and predicted drawdowns for each one are listed as part of the Technical Report L, Appendix H (PDP 2025). The AC database has gone through a few rounds of filtration to remove investigation bores or bores which, based on the past surveys and field investigations, do not exist. However, we have acknowledged that the actual number of bores within the zone of influence could be less than assessed, and some of the bores listed in Appendix H (PDP 2025) may not exist.

Based on the past experience, our view is that door-to-door knocking to locate bores in advance over such a large area (111 km²) does not provide a conclusive outcome, as some bore owners are away or, in some instances, reluctant to share bore information. For example, we have attempted to door-to-door visits to confirm our database for bores surrounding monitoring bore (SG6) as part of the Drury Quarry groundwater consent variation. However, this exercise was not conclusive, as owners either were not home despite repeated attempts to contact them or had no knowledge of the bore depth or pump depth specifications. This process resulted in approximately a 6-month delay in completing the consent application. Therefore, we have adopted a conservative approach by not excluding any bores from our final list of the bores within the zone of influence and have assessed the drawdown at each location.

A similar approach was adopted as part of the Drury Quarry groundwater consent investigations. To address any potential adverse effects on farm wells within the zone of influence, consent conditions were imposed requiring the consent holder to investigate the claim of sudden loss of water (due to drawdowns) from bores within the zone of influence and implement subsequent mitigation measures. A similar approach could be considered for this consent application.

References

Earthtech (2025) S67 Response Letter No. 1 for Drury Quarry, Sutton Block (Bun60449474-Ftaa-2503-1037)

Pattle Delamore Partners (2025), Proposed Sutton Block Expansion Groundwater & Surface Water Effects Assessment, Prepared for Stevenson Aggregates Limited, March 2025.

Pattle Delamore Partners (2020) Hunua Quarry Variation of Consent: Groundwater and Surface Water Effects Assessment, Prepared for Winstone Aggregates. June 2020.

Pattle Delamore Partners Ltd (2012) Stevenson Quarry Groundwater Effects Assessment, prepared for Stevenson Resources Ltd, August 2012.

Pattle Delamore Partners Ltd (2011) Hunua Pit – Effects on Groundwater Resources, Stream Baseflow and Groundwater Users, prepared for Winstone Aggregates, June 2011.

Limitations

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Please contact me if you require any additional information.

Prepared and approved by



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