Kings Quarry Expansion – Stage 2 Fast Track BUN60450001 / WAT60450003 - Groundwater Diversion and Dewatering

From: *Andy Samaratunga – Senior Specialist, Coastal and Water Allocation, Planning and Resource Consents Department, Auckland Council*

Date: 27 June 2025

Do you support the application (subject to your recommended conditions)? Yes subject to the comments provided below.

Documents Reviewed:

- Report titled "*Kings Quarry Expansion – Stage 2, Fast Track Approval Substantive Application – Pebble Brook Road, Wainui, Assessment of Environmental Effects and Statutory Analysis*", prepared by Barker & Associates), referenced WRK17073, Final Revision 1, dated 24 April 2025 ("the AEE").
- Report titled "*Factual Technical Report – Kings Quarry Groundwater Effects – Numerical Modelling Analysis*", prepared by Williamson Water & Land Advisory (WWLA), Reference: WWLA0931, Rev. 5, dated 26 March 2025.
- Report titled "*Kings Quarry Stage 2 – Pebble Brook Road, Wainui – Geotechnical Report*", prepared by CMW Geosciences, Reference: AKL2023-0190AB Rev.1, dated 20 January 2025.
- Report titled "*Kings Quarry Stage 2 – Ecological Impact Assessment*", prepared by Bioresearches, Version: Final, dated 24 April 2025.

Overall Summary:

The Applicant is seeking consent to take groundwater for dewatering and groundwater diversion during Stage 2 of the Kings Quarry Expansion at Pebble Brook Road, Wainui, and in the long-term for ground dewatering during the quarry operation at the subject site.

The 'Kings Quarry Expansion – Stage 2' involves the expansion of quarry activities to enable for approximately 500,000 tonnes/per year of aggregate extraction in the form of 'Albany Conglomerate' for a period of up to 45 years ("the Project" or "Proposal").

The quarry activities will be undertaken in a staged manner. In the first five years, it is proposed to excavate approximately 6.1ha for the formation of A-Pit. The resulting overburden will be removed and backfilled into the lower sections of the fill site, as the excavation progresses.

The main quarry pit (B-Pit) will be excavated from year 6, and will span to 26.46ha in the 45-year lifetime. 1.2 million BCM of overburden from the B-Pit will be removed and deposited along the haul road in the A-Pit throughout the lifetime, and approximately 8.0 million BCM of rock product will be extracted from the B-Pit overall. The final proposed quarry excavation level is RL 44.0m. The quarry has been designed to vertically avoid the Waitoki Stream to avoid significant stream depletion. A plan of the proposed quarry is shown in Figure 1.

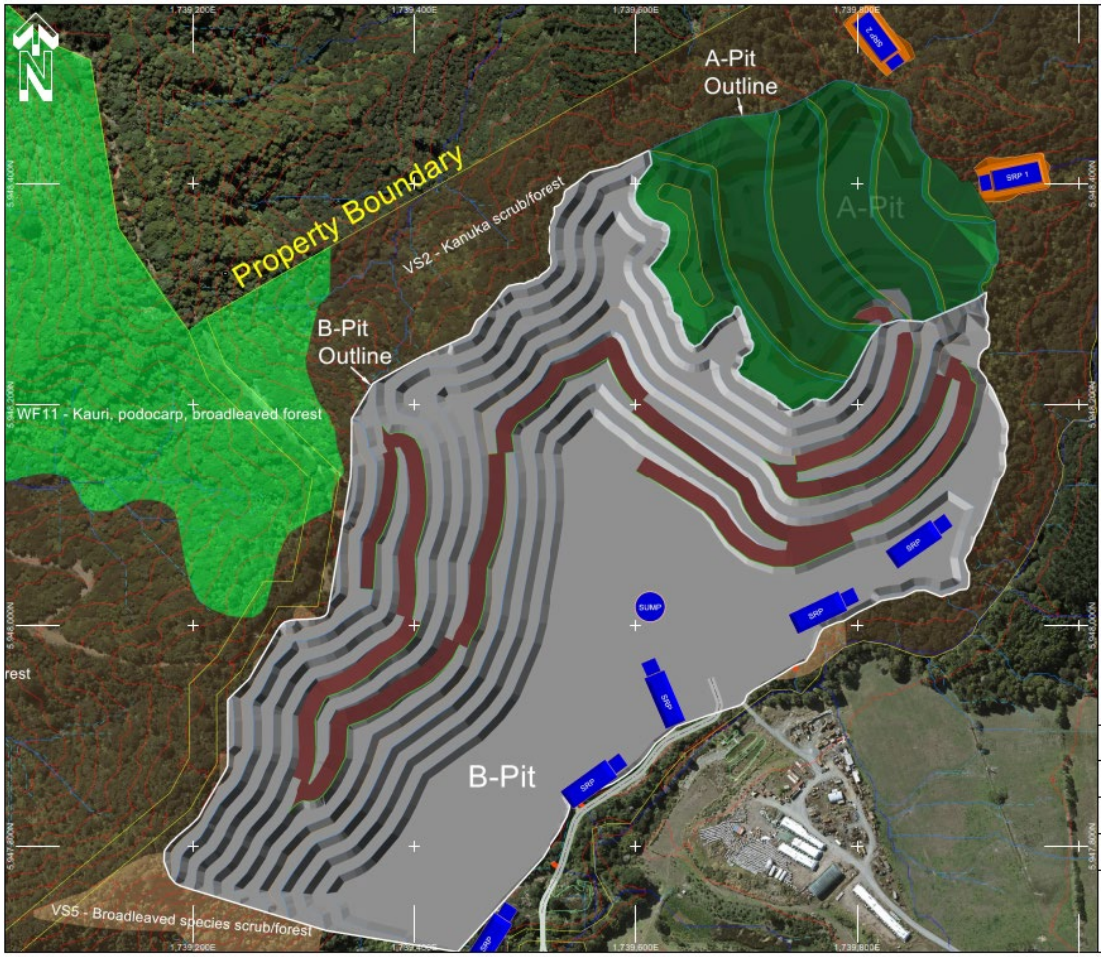


Figure 1: Stage 2 Quarry Extension Plan (Source: Appendix 12 of the AEE)

The AEE states that the proposed extraction of aggregate material will require dewatering and groundwater diversion, and therefore a consent under E7 rules of the Auckland Unitary Plan (Operative in Part) (AUP(OP)) is required. I concur.

Reasons for consent – Ground Dewatering and Diversion

Auckland Unitary Plan (Operative in Part) (AUP(OP))

Chapter E, Standard E7.6.1.10 and Standard E7.6.1.6 provide the permitted activity criteria under the AUP(OP) for the diversion of groundwater associated with any excavation, including a trench or tunnel and dewatering or groundwater level control associated with a groundwater diversion permitted under Standard E7.6.1.10.

The proposed works do not comply with E7.6.1.6 and E7.6.1.10 for the following reasons:

- The works involving take / dewatering may be for a period longer than 30 days and will not only occur during construction (E7.6.1.6 (2) and E7.6.1.6 (3)).
- Diversion of groundwater associated with the excavation does not comply with permitted standards E7.6.1.10 2(a) and 2(b) as the proposed excavation exceeds 1 ha in total area and is greater than 6 m depth below the natural ground level.

Accordingly, consent is required under AUP(OP) Chapter E Rule 7.4.1 (A20) and (A28) as a **Restricted Discretionary Activity**.

National Environmental Standards for Freshwater (NES-F)

The Ecological Management Plan indicates that no wetlands were identified in the Project area. Section 6.2.4 of the Factual Technical Report (FTR) states that a single wetland has been identified within the catchment, located approximately 350 m south of the existing quarry and on the opposite side of the Waitoki Stream; however, groundwater modelling has shown that drawdown from the proposed excavation does not extend to the wetland. On this basis, I consider a consent under Regulation 45a (4) of the NES-F is not required.

Other activities considered

Resource Consent LUC60450002 has been lodged to cover to the Land Use activities related to the proposed works. The effects of the land disturbance activity, except for settlement as a result of groundwater drawdown, will be covered by the land use consent and are not addressed further in this technical memo.

Technical Assessment of Effects

The applicant's hydrogeological consultants WWLA have developed and calibrated a 3D numerical groundwater model to provide an assessment of effects analysis of the anticipated dewatering and groundwater diversion required over the life of the Project, on the surrounding environment, other groundwater users and structures and other assets, the outcomes of which are discussed below.

Evaluation of the depth and extent of drawdown resulting from pit excavations

Section 6.2.1 of FTR indicates the groundwater model has estimated a maximum drawdown of approximately 17.0 m, which occurs at the end of the model run (i.e., at the end of 45-years of operation) in the middle of the proposed excavation area (B-Pit) (see Figure 2). Drawdown outside of the excavation area is limited to a maximum of 7 m, which occurs directly north of the completed quarry. The maximum extent of the 1 m drawdown contour is under 1 km from the middle of the excavation area. The report notes that the area affected by drawdown is constrained by the Waitoki Stream to the east of the quarry due to the stream bed elevation, and tributaries flowing into the stream to the north and south of the quarry, demonstrating that the quarry design strategy of not excavating below the stream level is effective in limiting drawdown and stream dewatering effects.

Assessment of potential depletion effects on streams

The potential depletion of streams within proximity of the Project site is discussed in Section 6.2.3 of the FTR.

> "*The maximum baseflow depletion across the Waitoki Stream catchment is 2.0 L/s during high-flow conditions. During low flow conditions, when the stream is most sensitive to depletion, the maximum depletion rate is 1.3 L/s, approximately 10% of*

MALF. These effects are within allocation limits in the AUP and hence considered to be within the accepted criteria."

It should be noted this calculation has been made from the interception of groundwater only and has not incorporated flows generated by surface run off and therefore, is a conservative estimate.

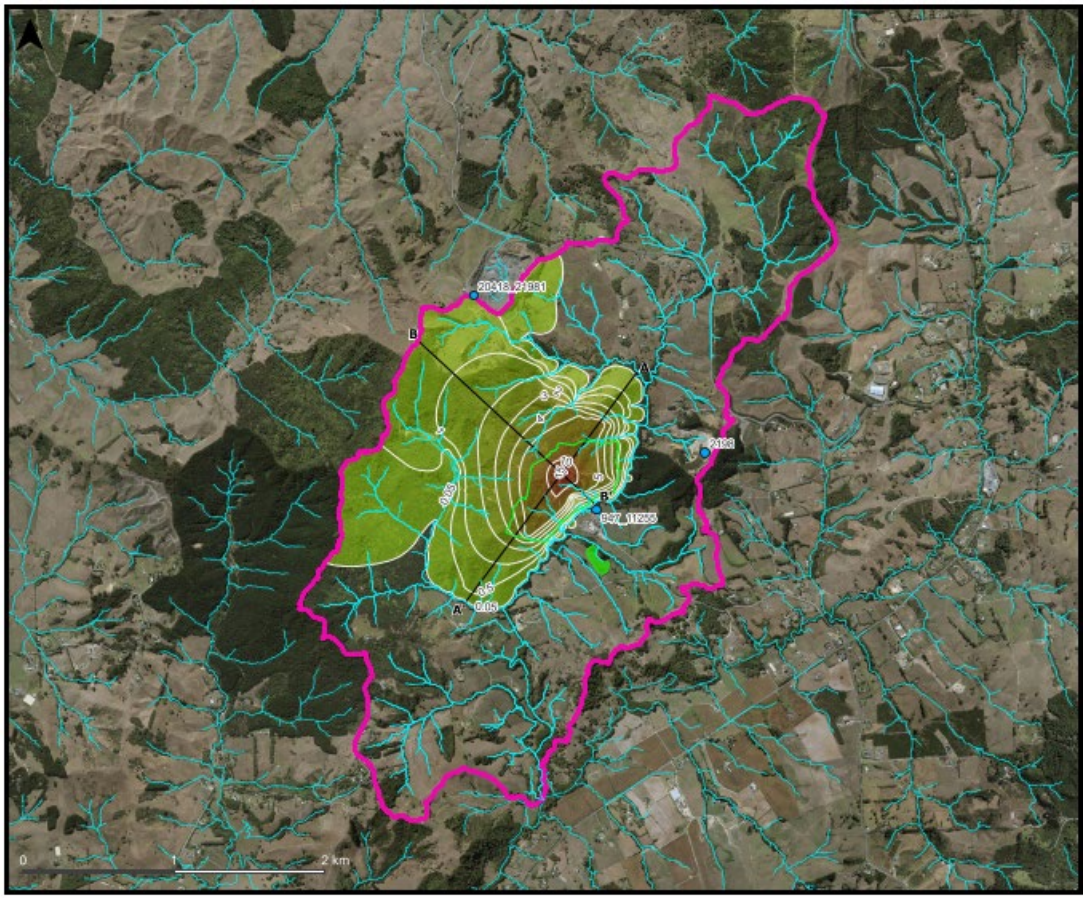


Figure 2: Plan showing the groundwater drawdown contours (Source: FTR, WWLA, March 2025)

Waitoki Tributary Adjacent to Quarry

WWLA provided the following comments on the effects of a tributary of the Waitoki Stream:

"…stream headwaters are supported by shallow groundwater and there is a potential for flow reduction in the stream when a portion of the catchment is affected by the quarry.

This is the case for the unnamed tributary flowing along the northern edge of the proposed quarry area. Model analysis indicates that under natural conditions the permanent section of this stream emerges approximately 95 m upstream of the confluence with the Waitoki Stream. With the full quarry excavation as proposed, the model indicates that the permanent section of the stream will emerge approximately 55 m upstream from the confluence, i.e. a 40 m reduction in the length of the permanent flowing stream. The maximum reduction in baseflow in this reach is predicted to be 0.09 L/s."

WWLA also state that ecological effects are being addressed by Bioresearches Ltd, and that it is presumed the total baseflow depletion for the entire catchment, generally under 2.0 L/s, will not cause harm to aquatic habitat and is within the allocation limits set forth in the AUP(OP). The review of Bioresearches' assessment of ecological effects has been undertaken by others.

Assessment Of Bore Interference Effects On Neighbouring Bores

Section 6.2.2 of the FTR discusses potential interference effects on neighbouring bores. WWLA identified three water bores within 2km of the excavation area. They noted that all three bores were outside the 0.05m maximum drawdown contour, and therefore, concluded that the effects on these bores from the proposed excavation would be negligible.

However, a potential, albeit low, risk of adverse effects on the water quality of the nearest neighbouring bore was identified, as follows:

> *"The closest of these bores is the Farm Bore at 70 Pebble Brook Road (947-11255) which is drilled into the same aquifer that will be intersected by the proposed quarry expansion and has been demonstrated to have a 20 m drawdown at a pumping rate of 20 m^3/day. This level of drawdown has potential to draw the groundwater level below the Waitoki Stream, thereby bypassing the hydraulic barrier it represents under normal conditions and posing a risk that the bore could draw water contaminated by chemicals leached from the quarry."*
>
> *"Given the limited drawdown, low bore production rate (20 m^3/day), and the hydraulic flow barrier of the stream under most conditions, it is considered highly unlikely that bore production or water quality will be affected by the quarry."*

Nonetheless, the Applicant has proffered a consent condition *Water Quality Programme,* which requires the development of a water quality sampling program for the quarry sediment retention ponds, testing for chemicals from explosive materials (including blasting derivatives). In the event of a trigger level exceedance in the retention pond samples, sampling of the Farm Bore, along with sampling of the Waitoki Stream at proposed upstream and downstream monitoring stations will be required.

Should elevated levels of contaminants be identified in the water quality sample from the Farm Bore or from the Waitoki Stream, protocols specified in proffered Condition 5 of the Groundwater Diversion Permit will be followed.

Consolidation Settlement Effects on Adjacent Assets

Potential consolidation settlement effects are discussed in Section 6.2.5 of the FTR, which states:

- *"Settlement can occur where compressible material is dewatered.*
- *In the quarry area the dewatered material will be removed, therefore settlement cannot occur.*
- *The material that may be dewatered because it is outside of the quarry excavation area and within the cone of depression is comprised of Albany Conglomerate, which*

is effectively non-compressible. The area to the north of the quarry is predicted to have up to 7 m of drawdown which is not a risk for land settlement for this type of material. Further to that point, there is no infrastructure in this area to be affected.

- *The access road to the south of the quarry is also underlain by Albany Conglomerate and is predicted to have only 1 m of drawdown in the underlying aquifer."*

Proposed Monitoring

The assessment undertaken by WWLA suggests that the risk of adverse effects from dewatering is low. There is, however, some residual risk due to the sensitive and weathered nature of the Albany Conglomerate, some uncertainty around groundwater levels and a potential risk of impacts on water quality in the neighbouring groundwater bore nearest to the excavation area.

The preparation of a Monitoring and Contingency Plan ('MCP') has been offered as a condition of consent. The AEE states that the MCP will include, at a minimum, the following information:

- *"A monitoring location plan showing the location and type of all monitoring;*
- *Final completed schedules for groundwater, ground surface, building, retaining wall, inclinometer and deformation monitoring programme;*
- *All monitoring data, the identification of Services susceptible to Damage and all building/service condition surveys undertaken to date;*
- *A bar chart showing the timing and frequency of condition surveys, visual inspections and all other monitoring required by this consent, and a sample report template for the required 2 monthly monitoring;*
- *All Alert and Alarm Level triggers; and*
- *Details of the contingency actions to be implemented if Alert or Alarm Levels are exceeded."*

The Applicant also proffered consent conditions that require the establishment of two flow monitoring sites in the Waitoki Stream as part of the Monitoring and Contingency Plan. The recommended downstream location is downgradient from the quarry near the southern end of the Kings Quarry property (NZTM 1739172 5947243) whilst the recommended upstream location is approximately 160 m north of the northern edge of the proposed quarry (NZTM 1740060 5948465). The stream monitoring locations are shown in Figure 23 of the FTR.

As noted above under the subsection *Assessment Of Bore Interference Effects On Neighbouring Bores*, a water quality sampling programme of the quarry sediment retention ponds is also proposed. Under the proffered consent condition, baseline water quality levels for the Waitoki Stream and Farm Bore must be established before the proposed consent is exercised.

WWLA have recommended that monitoring of the be undertaken pre-excavation (to establish the baseline condition), during excavation and post-excavation. Post-excavation monitoring is recommended to continue for at least three months after the quarry operation to verify that groundwater levels stabilise as expected.

I consider the proposed monitoring programme to be suitable.

Applicant's Conclusion

The AEE concludes:

> "*Based on the assessments and conclusions provided by WWLA, the potential adverse effects on groundwater and groundwater related features within the Waitoki catchment are considered to be minor. Also, AEE confirmed that any settlement effects associated with the groundwater drawdown on neighbouring buildings, structures and infrastructure, this is considered to be less than minor given the underlying geology of the Site and surrounding sites which consists of Albany Conglomerate which is effectively non-compressible.*"

Specialist's Conclusions

- Based on the information provided by the Applicant, I consider that the adverse effects on the environment, neighbouring groundwater users, structures and other assets, have been appropriately assessed.
- I agree in principle with the findings and conclusions of the assessment; however, it must be noted that the Council does not have the relevant inhouse software available in order to check the calculations provided.
- The scope of geotechnical and hydrogeological investigations is satisfactory for the proposed works and the risk of encountering unforeseen ground conditions is low.
- Sufficient geotechnical and hydrogeological investigation data is available for groundwater modelling purposes in order to determine the likely ground movement adjacent to the proposed quarry operation.
- Provided the take of groundwater is undertaken in the manner described in the application material and subject to the proposed conditions, I consider that the potential adverse effects of the activity on the environment, including the underlying Kaukapakapa Waitemata Aquifer and the numerous watercourses within the Kings Quarry property, and on other groundwater users, structures and other assets, are to be less than minor.

Statutory Considerations

Other relevant matters

There are no other matters considered relevant and reasonably necessary to consider with respect to the proposed groundwater take during dewatering.

Duration of consent: Section 123

It is considered appropriate to set a term of 35 years for the Restricted Discretionary Activity consent because the ground dewatering and groundwater diversion will continue in the long-term, and any adverse effects on the environment will be less than minor. Although the duration of the Project is for 45 years, 35 years is the maximum duration for a groundwater consent under the RMA.

Recommendation

The assessment in this memo does not identify any reasons to withhold consent, and the aspect of the proposal considered by this memo could be granted consent subject to recommended conditions, for the reason that it is considered that the adverse effects on the environment will be less than minor.

Comments on Conditions Proposed by Applicant:

I agree with the proposed conditions proffered by the Applicant.

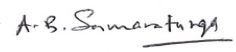
Recommended Additional Conditions:

No additional conditions are proposed.

REVIEW

Technical memo prepared by:

Andy Samaratunga

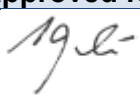


Senior Specialist, Coastal & Water Allocation, Specialist Unit, Planning and Resource Consents

Date: 26 June 2025

Technical memo reviewed and approved for release by:

Marija Jukic



Team Leader, Coastal & Water Allocation, Specialist Unit, Planning and Resource Consents

Date: 27 June 2025