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memorandum

TO	Cam Russell	FROM	Parviz Namjou
	Winstone Aggregates	DATE	17 August 2026
E	Response to **s53 comments**		

This response is in addition to my Groundwater Effects Assessment, updated on 15 April 2026 (superseded the 30 March 2026 version) submitted on 30 March 2026, the Groundwater Monitoring and Contingency Plan, dated June 2026 provided to the Panel on 22nd June 2026, and the Memorandum provided to Auckland Council: Amendment to Groundwater Technical Report -Supplementary Information in Response to Reviewer Queries – Fast Track Application BUN60464053, dated 23rd June 2026.

My Groundwater Effects Assessment sets out my qualifications and experience.

In preparing this memorandum, I am continuing to comply with the Environment Court's Code of Conduct for Expert Witnesses.

I have reviewed the AC reviewer report (28 July 2026). The reviewer has largely accepted our responses and confirmed that there are no significant disagreements on the substantive technical matters. The remaining issues are primarily about:

1. **Condition numbering** – The reviewer acknowledges he has not seen the 14 July condition set.
2. **Table 11 discrepancies** – The reviewer still has concerns but **accepts the mitigation framework**.
3. **Schedule A trigger levels** – The reviewer has accepted our "provisional" approach.

I have also reviewed and provided input into the applicant's (Winstone Aggregate') response to comments table in relation to comment codes 8.088 to 0.089, 8.091 to 8.093, 8.095, 8.107 to 8.108 and 8.117 to 8.121, which are addressed below.

1.0 Outstanding Issues and Responses

Issue 1: Condition Numbering (Multiple Conditions)

AC Reviewer's Comment:

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.

PDP:

We confirm that the updated condition set was provided to the Panel and will be forwarded to the Council.

Issue 2: Table 11 Drawdown Discrepancies (8.088, 8.091 to 8.093)

AC Reviewer's Comment:

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."

However, the reviewer also states:

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)... This addresses any concerns around the presentation of Table 11.

PDP:

While the reviewer has acknowledged that the trigger levels and monitoring framework address any concerns, it is important to clarify the technical basis for the conservative drawdown predictions in Table 11. The eastern boundary of the Hunua Greywacke Block is defined by the Hunua Fault - a flow barrier fault that has been demonstrated to cause significant head differences across it. Monitoring data shows head differences of more than 200 metres across the fault in some locations. To the north, although no known flow barrier fault has been intercepted, the possibility cannot be completely ruled out. Therefore, we have adopted a conservative approach in modelling drawdown effects on bores, including those located near the edge of the predicted zone of influence. The presence of a flow barrier fault means that even if a bore is located close to the mapped boundary, the head difference across the fault could result in significant drawdown effects that are not immediately apparent from the contour plan alone.

The drawdown predictions in Table 11 represent a worst-case scenario for bores where construction details and baseline data are uncertain. This approach is consistent with the precautionary principle applied throughout the assessment.

The reviewer has accepted that the trigger levels and monitoring framework provide the necessary safeguards to manage any actual effects. We agree with this approach and remain confident that the proposed conditions will ensure any adverse effects are detected and mitigated.

Issue 3: Schedule A Trigger Levels (Provisional) – Regarding Bores: *ID421, 1218, 20013, and 21817* (8.095 and 8.121)

AC Reviewer's Comment:

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.

The reviewer also recommends Schedule A is updated as set out at Page 10 - 12 of 13 of the Groundwater specialist comments.

PDP:

I confirm that further measurements to verify baseline data will be taken for bores ID421, 1218, 20013, and 21817. I propose the following timeline:

- Dry season measurement: January–April 2027
- Wet season measurement: July–October 2027

Following these measurements, a revised Schedule A will be submitted to the Council for confirmation and the inclusion of an Advice Note (or Condition) on Schedule A (Related to Condition 184). We agree with the addition of the proposed wording as a condition to ensure it is enforceable.

Excerpt from Schedule Table to be updated – yellow highlights:

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)
20013	1776109/ 5898810	39.83	-26.2- -147.9	25.62	Greywacke	121.7	***23.4***
1218	1775614 5898253	51.0	-7.8 - -51.0	27.0	Greywacke	***43.2***	***24.6***
421	1775479 5892910	31.59	-4.4 - -28.4	13.85	Volcanic	***24.0***	***10.6***
21817	1775198 5892910	28.5	-10.5 - -32.0	13.71	Volcanic	***21.5***	***10.5***

New Condition 227

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 further water level measurements to verify baseline data in each bore - one during dry season conditions (January - April) and one during wet season conditions (July - October) — to verify current baseline levels. Trigger levels shall then be set based on these measurements plus an allowance for seasonal variation.

Issue 4: AMRR Methodology (0.089)

AC Reviewer's Comment:

I disagree with the use of AMRR for establishing groundwater trends... This disagreement does not have a significant bearing on my assessment of the proposal as offered conditions of consent... alleviate any concerns.

PDP

The reviewer has noted their disagreement, but it does not affect the assessment outcome. I do not consider a further response is required.

Issue 5: Condition 184 (8.107)

AC Reviewer's Comment:

Condition 184 is amended as follows: " The Consent Holder must: ...(b) measure and record water levels in bore ID421 (or use best endeavours) at quarterly intervals from the date of commencement of this consent"

PDP:

We agree with the inclusion, and it has been included in the draft condition set dated 17 August 2026.

Issue 6: Condition 215 (0.117)

AC Reviewer's Comment:

Ther reviewer recommends for Condition 215 is amended as follows: "In the event that groundwater drawdown is such that in either or both monitoring bores HUN12/8U on Hunua Road or ID421 on Jack Paterson Drive equals or exceeds the trigger value in Schedule A then: (a) 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; ….

PDP:

I agree with the inclusion, but consider it is necessary that Winstone has an opportunity to investigate the cause as the drawdown effects in these bores may not be due to the quarry operation. An updated version is provided below.

Condition 215

In the event that groundwater drawdown is such that in either or both monitoring bores HUN12/8U on Hunua Road or ID421 on Jack Paterson Drive equals or exceeds the trigger value in Schedule A, the Consent Holder shall:

(a) within seven (7) days of identifying the exceedance, notify the Council in writing and by telephone of the exceedance, specifying which bore trigger(s) have been exceeded and the quantum of the exceedance for each bore;

(b) within fourteen (14) days of identifying the exceedance, complete an investigation to determine the cause of the exceedance, including:

- Whether the exceedance is attributable to dewatering at the Symonds Hill Pit;
- Whether localised pumping from nearby bores is contributing;
- Whether seasonal or climatic variation is a factor;
- Whether regional groundwater trends are influencing water levels; and
- Whether monitoring bore or equipment issues exist;

(c) provide a report to the Council documenting the findings of the investigation;

(d) If the investigation confirms that the exceedance is caused by dewatering at the Symonds Hill Pit, the Consent Holder shall cease any further drawdown at the Symonds Hill Pit and must not recommence drawdown unless it is demonstrated that the trigger levels can be complied with to the written satisfaction of the Council; and

(e) If the investigation determines that the exceedance is not caused by dewatering at the Symonds Hill Pit, no cessation of sump drawdown is required.

Issue 7: New Condition 170(a) (8.118)

AC Reviewer's Comment:

The reviewer recommends a new condition 170(a) is included as at Page 8 of 13 of the Groundwater specialist comments as follows: "The daily abstraction from the Mangapū Stream augmentation bore (HUN 14/8 or any replacement) must not exceed 1,400m³"

PDP:

We agree with the inclusion, and it has been included in the draft condition set dated 17 August 2026.

Issue 8: New Condition 171(a) (8.119)

AC Reviewer's Comment:

The reviewer recommends a new condition 171(a) is included as at Page 9 of 13 of the Groundwater specialist comments as follows: "In the event that groundwater drawdown is such that any of the deep monitoring bores (screened in the regional groundwater) 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.:

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.

PDP:

We agree with the inclusion as it was deleted by mistake from the 22nd June condition set, and it has been included in the draft condition set dated 17 August 2026. The slightly updated version is outlined below to allow for the investigation of the cause of exceedance:

Condition 171(a):

In the event that groundwater drawdown is such that any of the deep monitoring bores (screened in the regional groundwater) operated by the Consent Holder equals or exceeds any trigger value in Schedule A, the Consent Holder shall:

(a) within seven (7) days of identifying the exceedance, notify the Council in writing and by telephone of the exceedance, specifying which bore trigger(s) have been exceeded and the quantum of the exceedance for each bore; and

(b) within fourteen (14) days of identifying the exceedance, complete a preliminary investigation to determine whether the exceedance is caused by:

- Dewatering at the Symonds Hill Pit;
- Localised pumping from nearby bores;
- Seasonal or climatic variation;
- Regional groundwater trends; or
- Monitoring bore or equipment issues.

(c) If the investigation under (b) confirms that the exceedance is caused by dewatering at the Symonds Hill Pit, the Consent Holder shall cease any further water level drawdown at the Symonds Hill Pit and must not recommence drawdown unless it is demonstrated that the trigger levels can be complied with to the written satisfaction of the Council.

(d) If the investigation under (b) determines that the exceedance is not caused by dewatering at the Symonds Hill Pit, the Consent Holder shall provide a report to the Council documenting the findings and the cause of the exceedance. No cessation of dewatering is required in such circumstances.

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 due to dewatering effects, then an application will be required for a change to consent conditions to seek a greater assessed envelope of effects.

New Condition 198(a) (8.120)

AC Reviewer's Comment:

The reviewer recommends a new condition 189(a) is included as at Page 9 of 13 of the Groundwater specialist comments as follows:

Stream flow monitoring of Taitaia Stream

1. *When either:*

   (a) the drawdown level in the Symonds Hill Pit reaches RL20m (or such other RL as agreed in writing by the Manager); or

   (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) the Consent Holder shall establish and monitor the respective flow gauging site T1 on tributary no. 085150 of the Taitaia Stream at Peterson Road bridge. The site locations shall be at approximate Map Reference NZTM 1777090mE 5898840mN (site T1 "Peterson Road") for the Taitaia Stream. The precise 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.

      (ii) 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.

      (iii) The Consent Holder shall 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) shall 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

      (iv) 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 shall 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 shall 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.

PDP:

We agree with the inclusion, and it was included in the draft condition set dated 14th July 2026.

2.0 Conclusion

The Council reviewer has confirmed that there are no significant groundwater issues that would preclude granting of the consents. All substantive technical concerns have been resolved, and the proposed monitoring and mitigation framework is robust and proven. The residual effects after mitigation are considered less than minor.

3.0 Submitter Comments

Lot 21 DP 132757 – 243 Kauri View Road (12.003, 12.004 and 12.005)

Commenter's Comment:

The development of the Symonds Hill pit has seen substantial change in the landscape with the Hill being quarried to what is now a deep pit. The quarrying/excavation has had a significant impact on the residual flow in the Mangapū stream, due to cutting off of streams, springs, perched water tables, lowering of the regional water table and the natural surface catchment of the stream.

To us, as operators of a farming operation requiring a "take" for stock watering, this has been obvious and noticeable, especially during periods of low flow during summer and other dry spells – not necessarily defined 1 Dec to 31 March. Whilst anecdotal, this impact has been obvious requiring us to build rock weir(s) to ensure our water intake was submerged.

Conversely high flows also result in flooding Kauri View Road, Jack Paterson Road, Sutton Road and are a matter of record with Council. To us the stream response time in high flows has increased significantly. These issues have been raised at quarry consultation meetings; and, the purposed diversion of the Mangapū Stream and the steepening of the stream gradient will further exacerbate high flows response.

PDP:

Thank you for your submission and for raising these important concerns regarding the Mangapū Stream. I appreciate the opportunity to clarify the technical basis for the assessment of effects on stream flows, both during low-flow and high-flow conditions.

Water Management in the Quarry

I should first clarify a fundamental point: all water that enters the quarry sump - whether from groundwater dewatering or surface water run-off - is collected, managed, and discharged back to the Mangapū Stream.

The quarry does take a small volume of water for its own operations – approximately 2,610 m3/d for processing, dust suppression, and crushing. This is a relatively modest volume compared to the flows that

occur during flood events. However, to ensure that stream baseflow is maintained during dry periods, the quarry has a robust augmentation programme that is triggered if flows drop more than 5% below the established Mean Annual Low Flow (MALF).

Low-Flow Conditions

You have raised concerns about reduced residual flow in the Mangapū Stream during dry periods and we note the weirs you have constructed to maintain your water intake.

While perched groundwater zones are intercepted by the quarry, the water from these zones is also directed to the sump and returned to the stream system, rather than being lost from the catchment.

High-Flow Conditions and Flooding

You have also raised concerns about flooding on Kauri View Road, Jack Paterson Road, and Sutton Road during high-flow events, and suggested that the stream response time has increased.

Flooding in the lower reaches of the Mangapū Stream is typically a function of rainfall intensity, catchment characteristics, and downstream channel capacity. The quarry does not contribute to these flood flows; rather, it intercepts groundwater that would otherwise contribute to baseflow, not flood peaks. The volume of water taken by the quarry is not sufficient to have any measurable effect on flood potential.

The proposed stream diversion will be designed in accordance with relevant flood risk standards, as set out in the conditions of consent. The design will ensure that flood levels are not increased and that flood hazard is not exacerbated.

Lot 21 DP 132757 – 243 Kauri View Road (12.006 and 12.007)

Commenter's Comment:

In reviewing this consent application, the AEE report, Flow Augmentation B3.9.3.4 Cl 318/319 and Groundwater Monitoring and Contingency Planning section Appendix B12.8.12, it is clear that no work prior to the Symonds Hill consent was done to properly characterise the Mangapū catchment in order to inform conditions required to maintain minimum steam flows required for stream health and aquatic life and specify minimum offset compensation requirements. It is noted that the consent requires that the stream be monitored twice only during periods 1 Dec to 31 March at nominated locations and that if flows drop 5% below MALF then the pumped compensation system at Coalmine Road be bought into service. Retroactive not proactive responsive.

It is surprising that a monitoring weir has not been constructed, and is not proposed, that provides continuous flow monitoring that informs and enables control of a proper compensation system, example Hunua and Waitakere water supply dams. A potential site could be Kauri View Road culvert.

It is clear from this section of the AEE re groundwater that there is significant impacted potential anticipated on bores and stream flow due to excavation of the pit to -75mRL, it is therefore a logical interpretation that surface water stream flow will also be impacted.

A properly designed and engineered stream monitoring and compensation control flow system should be a minimum requirement of any consent, including a compressive steam hydrology characterisation and environment assessment, albeit retrospective, correcting a flaw in the current consent.

PDP:

Thank you for your detailed submission. We appreciate the opportunity to clarify the technical basis for the stream flow monitoring and augmentation framework proposed for the Mangapū Stream.

1) Characterisation of the Mangapū Catchment

You have stated that "no work prior to the Symonds Hill consent was done to properly characterise the Mangapū catchment." This is not the case. Winstone has collected low-flow data for the Mangapū Stream for over 10 years as part of the existing consent monitoring programme (WAT60152106-A). This long-term dataset has been used to establish the Mean Annual Low Flow (MALF) for each gauging station, providing a robust baseline for assessing any potential effects.

2) Monitoring Frequency and Methodology

You have raised a concern that monitoring is only undertaken twice per year and is "retroactive not proactive." While the consent requires twice-yearly gauging, this is not the full extent of the monitoring framework. The stream flow data collected at the Mangapū and Waipokopu Streams is correlated with the continuous flow data from the Mangawheau Stream (Auckland Council site 08529). This correlation allows the Consent Holder to generate continuous flow estimates and understand stream behaviour throughout the year, not just during the gauging periods.

The flow tracker method used for gauging is consistent with the methodology applied for the existing consent and is considered appropriate for detecting any loss of baseflow. The proposed conditions include the establishment of MALF for each station and a trigger for augmentation if flows drop more than 5% below this baseline.

3) Monitoring Weir

You have suggested that a continuous monitoring weir should be constructed at a site such as Kauri View Road culvert. While a weir would provide continuous data, the existing correlation-based approach with the Mangawheau Stream is considered sufficient to detect changes in low-flow conditions. The current framework has been proven over the past decade and is consistent with the approach used for the existing consent. The addition of a weir would not necessarily improve the ability to detect dewatering-related baseflow loss, as the key indicator is the change in low-flow behaviour relative to the established MALF.

4) Impacts at RL-75m

You have noted that the AEE identifies "significant impacted potential anticipated on bores and stream flow due to excavation of the pit to -75mRL." This assessment is based on the conservative distance-drawdown methodology and does not necessarily reflect actual outcomes. The proposed pit floor for this application is RL-50m, not RL-75m. The reference to RL-75m in the AEE is part of the conservative envelope and is not a proposed dewatering level for this consent. In any case, the monitoring and augmentation framework ensures that any actual baseflow loss is detected and managed.

5) Engineered Monitoring and Compensation System

You have recommended that a properly designed and engineered stream monitoring and compensation control flow system be a minimum requirement. The proposed consent already includes comprehensive monitoring and augmentation conditions. A correlation must be prepared annually to quantify the specific discharge for MALF for all gauging stations. If flows drop more than 5% below MALF, augmentation is triggered at the specified discharge points (Waipokopu Stream Downstream, Mangapū Stream RL55, and the diverted tributary). This is a proactive framework that responds to actual measured conditions.

Lot 12 Deposited Plan 362339 - 52 Judge Richardson Drive (11.007 and 11.008)

Commenter's Comment:

I am concerned that expansion and deepening of quarrying activities could alter groundwater systems and underground water tables.

Potential impacts include:

- *lowering of groundwater levels;*
- *changes to natural groundwater flows;*
- *impacts on private water supplies and bores;*
- *effects on springs, wetlands, and nearby streams; and*
- *long-term environmental consequences that may not become apparent for many years.*

These effects are particularly concerning because changes to groundwater can be difficult or impossible to reverse once they have occurred. In my view, the application does not provide sufficient certainty that these risks have been fully understood or that appropriate safeguards will be in place throughout the life of the quarry and following its eventual closure.

If approval is granted, groundwater monitoring should be independently undertaken before, during, and after quarrying activities, with clearly defined baseline conditions and enforceable trigger levels requiring investigation and operational changes where adverse effects are detected.

There should also be clear responsibility for restoring or replacing affected private water supplies if quarry operations are found to have adversely affected them.

PDP:

Thank you for your submission and for raising these important concerns regarding the potential effects of the proposed quarry expansion on groundwater systems. I will highlight and clarify the safeguards that are already built into the application and proposed consent conditions:

1) Understanding of Groundwater Risks

You have raised concerns that the application does not provide sufficient certainty that groundwater risks have been fully understood. I want to assure you that the groundwater assessment for this application is based on over 20 years of monitoring data collected through the operation of the Hunua and Symonds Hill Pits. This long-term dataset provides a robust and unique understanding of how groundwater behaves in the fractured greywacke, enabling reliable predictions of drawdown and inflow for the proposed development.

The assessment has identified the potential effects, you have listed – lowering of groundwater levels, changes to natural flows, impacts on private water supplies, and effects on springs, wetlands, and streams. Each of these has been assessed and, where necessary, mitigation measures have been proposed.

2) Monitoring and Enforceable Trigger Levels

You have recommended that groundwater monitoring should be independently undertaken before, during, and after quarrying, with clearly defined baseline conditions and enforceable trigger levels. We agree with this principle, and we confirm that this is already proposed in the consent conditions.

The proposed consent includes:

- A comprehensive monitoring network of over 40 monitoring bores, including deep greywacke bores, shallow/perched bores, and private farm wells;
- Drawdown trigger levels for each monitoring bore, set at predicted drawdown plus seasonal variation;
- Condition 171(a) which requires that if any deep monitoring bore equals or exceeds its trigger value, the Consent Holder must investigate the cause and, if confirmed to be caused by dewatering, cease further drawdown;

- Annual monitoring reports to be submitted to the Council, providing a detailed analysis of all monitoring data;
- Technical Reviews to be undertaken prior to each dewatering stage, comparing actual groundwater levels to predicted values.

3) Responsibility for Affected Private Water Supplies

You have raised the important issue of responsibility for restoring or replacing affected private water supplies. This is already addressed in the proposed consent conditions.

As per the existing consent (WAT60152106-A, Condition 48), if monitoring confirms adverse effects on private bores – such as loss of yield or the bore going dry – the Consent Holder is required to offer mitigation measures, including:

- Deepening the bore;
- Lowering the pump; or
- Providing an alternative water supply.

This framework has been in place for years under the existing consent and has proven effective. It is carried forward into the proposed consent conditions.

4) Long-Term Environmental Consequences

You have expressed concern that long-term environmental consequences may not become apparent for many years. This is precisely why the proposed consent includes an adaptive management framework. The monitoring programme is designed to detect any effects as they emerge, and the trigger levels are set conservatively to provide early warning. If actual effects exceed predictions, the trigger levels will be exceeded, and the Consent Holder must investigate and, if confirmed, cease further drawdown. This ensures that the consent is managed adaptively over its life.

4.0 Limitation

This memorandum has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Winstone Aggregates. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the memorandum. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

This memorandum has been prepared by PDP on the specific instructions of Winstone Aggregates for the limited purposes described in the memorandum. PDP accepts no liability if the memorandum is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

Prepared by

Parviz Namjou

Technical Director – Water Resources