

10 June 2022 Updated providing summary of actions completed. Words in Red were added by T&T following their review of the minutes of the 21 April meeting.

Item	T&T Comments in letter of 7 April 2022	Update following meeting with T&T on 21 April 2022	Status as at 31 May 2022
1	Main review comments		
2.1	Document consistency		
	Referenced Polyurea to HDPE connection details outlined in Appendix 5 ¹ not carried into Appendix 2 drawings.	Drawings to be amended	Detail of interface added as Detail P of Drawing C04 Fully responded to.
	RFI Response Table referencing coated GCL is not to be included however this still remains on some Appendix 2 drawings.	Drawings to be amended	Coated GCL removed from all Drawings. Fully responded to.
	The Appendix 4A Hydrogeology and initial Appendix 3 Geology report discuss an upper weathered rock layer of 10 to 15m and soil layer which are not taken into account in the slope profiles shown in the Appendix 2 drawings.	See notes of meeting of 21 April 2022 that covers this matter	See updated notes of 10 June 2022 relating to meetings of 21 April and 27 April 2022 with T&T team members. Fully responded to.
	Proposed consent condition 25 referencing Hurunui District Council.	Good spotting, Conditions will be amended	Attachment 7 Proposed Conditions of Consent Issue 3 has been amended to correct this. Fully responded to.
2.2	Confirmation of proposed waste types		
	A clear definition as to whether this will be a Class 1 or Class 2 landfill and the associated waste acceptance criteria.		
	There remains uncertainty as to the waste types to be accepted at the WQL to enable an assessment of required landfill design to be completed. This primarily relates to supporting documents discussing C+D waste with some putrescible component. However, proposed	No further information required	Fully responded to

Item	T&T Comments in letter of 7 April 2022	Update following meeting with T&T on 21 April 2022	Status as at 31 May 2022
	<p>consent conditions describe demolition waste and special waste types. The consent conditions also reference refuse requiring 'daily cover', and the landfill design adopting a Class 1 containment liner.</p> <p>Additionally, while the report discussion focuses on C+D waste the proposed Waste Acceptance Criteria (WAC) outlined in Appendix 8 adopts the Class 1 WAC as defined by the WasteMINZ guidelines Appendix D. Whilst the applicant may intend to operate the facility as a C+D landfill, if it is consented to receive waste with up to Class 1 limits, then it must be designed as a full Class 1 landfill. The applicant needs to be definitive as to the class of landfill that is being constructed and corresponding proposed WAC.</p>		
	<p>ECan raised the potential for emerging contaminants in the proposed waste stream (refer point 4.2 in the officers report). The applicant's response to this focused on MSW (Class 1 landfill) as the principal source of contaminants such as PFAS. This overlooks wastewater treatment plant (WWTP) sludge (which the revised conditions include as a potential waste stream) which is a potential source of PFAS. The application makes no reference to the PFAS National Environmental Management Plan (NEMP, V2., Jan 2020) regarding the disposal of PFAS-containing waste to a landfill. The NEMP provides landfill acceptance criteria for different landfill types. Whilst the PFAS content of proposed waste streams may not be known, the WAC proposed by the applicant needs to reflect those in the NEMP for the landfill design.</p>	<p>WQL is not proposing to take WWTP sludge. Conditions to be amended.</p> <p>WQL will add a condition requiring the LMP to adopt recommendation of Section 14 of the current PFAS NEMP.</p> <p>WQL also notes that WWTP operator will require testing for PFAS before accepting any leachate for disposal, which is a matter outside this consent application.</p>	<p>Attachment 7 Proposed Conditions of Consent Issue 3 has been amended to correct this. Fully responded to.</p> <p>Following discussions with Ecan staff it has been agreed that it is prudent to include Section 14 of the current PFAS NEMP in the Waste Acceptance Criteria. Fully responded to.</p> <p>Fully responded to</p>
	<p>Proposed consent conditions state that C+D waste can be accepted based on visual assessment only – however this overlooks the potential for C+D waste to contain asbestos (and other contaminants) which would render it 'special waste' per the Landfill Management Plan (LMP). The LMP is also not clear on who should assess special waste acceptability or specify testing requirements for acceptance.</p>	<p>C&D waste will either come from a C&D sorting facility, or direct from a demolition site.</p> <p>For demolition waste no demolition contractor will demolish a building that has not undergone an asbestos</p>	

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		<p>investigation and removal programme in accordance with the Asbestos regulations.</p> <p>Construction wastes no longer contain asbestos</p> <p>A C&D sorting facility has obligations to comply with the Asbestos Regulations and WQL will be undertaking regular audits to ensure the sorting facility complies.</p> <p>Discussed the proposal to accept friable and non friable, discussed that all asbestos containing material would be contained within lined trucks or bagged. This appears to conflict Section 5.9 on the LMP, please update to reflect propose activity.</p> <p>Peter to check with Paul as whether there are recommended methodologies for identification of contaminants in the C&D waste stream</p>	<p>Constructive meeting with Peter A and Paul of T&T on 17 May 2022 confirmed that all asbestos would be in lined bins or bagged as compliance with Asbestos Regulations take precedence over Conditions or LMP. Concluded that no changes required to Conditions but Section 5.9 of LMP has been amended. Meeting also concluded that any changes to WAC regarding PFAS is a policy matter for Ecan. Fully responded to.</p>
	<p>The applicant proposes to develop procedures for asbestos management – this needs to be reflected in the consent conditions which also need to clearly state what asbestos is/isn't accepted i.e., friable vs non friable. Also, the LMP indicates that all asbestos containing material, presumably including soil, will need to be bagged. It is not clear whether lined trucks will be required.</p>	<p>No further information required</p>	<p>Fully responded to</p>

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	In terms of groundwater/surface monitoring requirements these have been discussed in the response and are supported by the hydrogeological assessment which indicates a low risk to groundwater/surface water receptors. The proposed ground water monitoring relies on continuous monitoring of underflow prior to the sedimentation pond for pH and conductivity. Consideration may need to be given to adding conditions requiring additional groundwater monitoring.	Agreed that this is an Ecan scientist matter	Fully responded to
2.3	Landfill stability Landfill stability in terms of final and intermediate profiles under static and seismic conditions.		
	<p>The current landfill design arrangement adopts slope and excavation profiles that are generally aggressive (steep) and not typical of NZ landfill construction practices such that we have concerns regarding the expected stability of the landfill. As the proposed final and intermediate slope angles would impact the landfill's ability to contain waste and leachate and this would directly impact the environment. Therefore, the applicant needs to provide suitable technical assessment of the landfill slopes considering intermediate and final profiles for static and seismic load conditions. This should include outlining the adopted design criteria and a basis for the selected criteria. Also, clear assessment needs to be provided of how seismic loading conditions have been developed including supporting calculations and adopted assumptions.</p> <p>Currently proposed consent conditions appear to have adopted the geotechnical criteria based on the Kate Valley landfill consent that were developed from site specific geotechnical investigations and seismic assessment. This includes specific consideration of Kate Valley ground water conditions and defined seismic events. This is not considered appropriate for the WQL landfill.</p>	<p>Agreed that most of this is a matter of detailed design and peer review, and the Application is quite clear that this needs to be done for each stage of the project.</p> <p>However, specific assessment of stability of waste pile for the final front south face, and intermediate faces. Probably best done as a supplementary addendum to the Engineering Report, and an update to the Engineering Addendum.</p> <p>Stability assessment to consider static and seismic loading cases.</p> <p>Update specific conditions of consent.</p>	<p>See updated notes of 10 June 2022 relating to meetings of 21 April and 27 April 2022 with T&T team members.</p> <p>Stability report relating to final south front face and intermediate waste faces, including static and seismic loading cases, included as Attachment 12 of Response to RF12</p> <p>Attachment 7 Proposed Conditions of Consent Issue 3 has been amended to reflect current methodologies. Fully responded to.</p>

Item	T&T Comments in letter of 7 April 2022	Update following meeting with T&T on 21 April 2022	Status as at 31 May 2022
2.4	<p>Landfill leachate and stormwater containment</p> <p>General overall detailing of the WQL and lack of supporting calculations does not provide adequate confidence that the design will prevent leakages of leachate of into the surrounding environment. Additionally, stormwater details to not appear to align with associated reporting. Examples include:</p>		
	Appendix 2 Ref B2 shows a base grade geometry with a 2% longitudinal fall and drawing C3 shows lateral gradients also at 2% which would not be achievable on the proposed base grade and would impact the depth of leachate over the liner which in turn would affect the leachate leakage rate.	Drawing B2 will be amended	Drawing B2 has been amended to show amended basegrades. Fully responded to.
	Drawing C3 detail L shows a geosynthetic drainage composite allowing a drainage path over an anchor trench which is subsequently located beneath the side wall liner.	Good spotting. Drawing C3 will be amended.	Drawing C3 has been amended to correct error. Fully responded to,
	No supporting calculations have been provided to show adequate leachate storage capacity for the final or intermediate containment bunds/tanks.	There is a condition of consent that requires 5 days storage. This is a matter of detailed design and peer review. No further information required	Fully responded to
	<p>Appendix 5 discuss bench drains being utilised for stormwater diversion from landfill operation however details are not included on the bench arrangement sections Drawing C2 or how drains may be safely maintained or even accessed with bench widths of 2 m and 5 m.</p> <p>We also note that it appears that the initial bench arrangement grades stormwater towards to the initial phases of the landfill operation.</p>	Agreed that this needs a bit more work, to clearly define bench widths and overall slopes. Basegrade drawing needs to be amended to clearly show revised contours on cut faces, with bench drainage away from the landfill.	Drawings B1 to B4 have been amended to show revised contours on cut faces, and drainage paths

Item	T&T Comments in letter of 7 April 2022	Update following meeting with T&T on 21 April 2022	Status as at 31 May 2022
	<p>As specifically request by ECan, T+T has reviewed sections relating to leachate leakage rates referencing the Auckland Regional Landfill (ARL) application.</p> <p>The leakage rate for ARL was determined using the HELP model, based on Auckland's rainfall, the specifics of the ARL site and design including capping (intermediate or final), cap slope, waste depth (and type), leachate collection details (layer thickness, permeability, and slope) and lining details, including slope angles. It is inappropriate to take the results of modelling from one landfill and apply the answers to another – without doing some independent modelling. The ARL application also completed some sensitivity analysis for a number of less favourable scenarios.</p> <p>The applicant's discussion does not cover the proportion of base vs side slopes which is important as the landfill can generate a lot more leachate head and hence leakage through "flat" floor areas. At ARL, most of the landfill has side slopes so this will affect the calculated leachate leakage.</p> <p>While the rainfall at Woodstock is likely to be less than Auckland there are too many other factors at play to be able to determine whether an estimate based on ARL is conservative or non-conservative. We would expect to see site specific modelling to confirm this.</p>	<p>Agreed that HELP modelling not necessary but that any modelling based on an absolute upper bound of 10 litres per hectare per day would be acceptable. As discussed following the meeting additional justification to be provided regarding leakage rates to be adopted, whether by calculation or reference to technical papers with justification as to why such numbers are applicable to this case.</p>	<p>See updated notes of 10 June 2022 relating to meetings of 21 April and 27 April 2022 with T&T team members. Engineering Report updated to include updated assessment of leachate leakage rates. Fully responded to.</p>
	<p>In terms of referenced leachate composition data adopted for the assessment outlined in Appendix 5, the information appears to reference mainly NZ Class 1 landfill data and some C+D sites, however it doesn't include the WasteMINZ Guidelines data for Class 1 sites. There is also no discussion provided regarding how adopted parameters for assessment were selected. The adopted parameters do not include some key indicators such as chloride and conductivity.</p>	<p>No further information required.</p>	<p>Fully responded to</p>
2.5	<p>Air quality</p>		

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	In terms of the quarry, there is still very little information in the response describing the quarry operation, which was requested. While the applicant states that they meet Permitted Activity rules 7.35 and 7.36, and that may be the case, there's not enough supporting information to corroborate this, noting that these require a dust management plan for the operation in order to meet the rule requirement.	This has now been completed by Scope and will be included in the Response to Ecan RFI 1	Attachment 14 of WQL Response 2 provides a detailed assessment of the existing and proposed quarry activities in relation to the Canterbury Regional Plans. The assessments concludes that the existing and proposed activities comply with the Regional Plans. Fully responded to.
2.6	Landfill boundary and property boundary		
	<p>We also note that the applicant has only provided record of title for the land parcel legally described as Lot 1 DP 481768 (owner Woodstock Quarries Limited), however the landfill application and proposed landfill footprint extends beyond this property boundary into the neighbouring Lot 2 DP481768 (owner Coal Creek Station Limited).</p> <p>We recommend ECan seek written confirmation from the applicant and legal owner of Lot 2 DP 481768 for the proposed consent application.</p>	Drawings to be amended	Site boundary on all Drawings have been amended not to encroach onto adjacent property. The tops of the quarry wall batters have also been amended to have a minimum of a 25m setback from property boundaries. Fully responded to.
2.6	General response to RFI questions and next steps		
	There are number RFI responses that are deemed either not adequate, not covered or we generally disagree with. At this stage due to the large number of fundamental issues associated with the landfill design or lack of supporting documentation we do not believe it would be efficient or cost effective to review all RFI responses in detail and provide responses or specific requests for further clarification. Some possible options to progress the review are outlined below. We would welcome the opportunity to discuss with you your preferred way forward.		Fully responded to.
2.7.1	Peer reviewer consideration		

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	Given the number and significance of issues associated with the WQL application we suggest that ECan discuss the benefits that an agreed independent peer reviewer may have for the applicant and application process. The peer reviewer would work with WQL and their team to resolve present issues. An application endorsed by an independent peer review should have an improved level of robustness.	Agreed that it is far more constructive to continue present dialogue and exchange of information with the objective of completing a set of documentation that T&T can support and recommend to Ecan.	Separate peer reviewers not required due to constructive input from T&T team members. Fully responded to.
2.7.2	Conclude the application based on the information provided In principle we can prepare and issue our final report based on the information provided to date. Given present information gaps and uncertainties this report would likely conclude that the applicant has not demonstrated that effects on the environment are not more than minor and that there is uncertainty regarding the technical feasibility of the proposal relative to appropriate design standards.	Agreed that it is far more constructive to continue present dialogue and exchange of information with the objective of completing a set of documentation that T&T can support and recommend to Ecan.	Constructive meetings held with various T&T team members. Fully responded to.
2.7.3	Proceed with an ongoing RFI process Provide the applicant a response to the information submitted, including outlining what matters are unresolved and why. This approach would require that more detailed comments be discussed directly with the applicant's technical experts. Based on progress to date the approach is likely to be iterative. Given responses received to date, this approach may be costly and there is a risk that despite the cost, the team may not be able to resolve the outstanding issues.		

Attachments

- 1 Updated notes of minutes of meeting of 21 May 2022 with T&T team members regarding Engineering matters
- 2 Updated notes of minutes of meeting of 27 May 2022 with T&T team members regarding quarry stability matters

MEETING: Woodstock Quarries Ltd – Resource Consent Application

DATE: 21 April 2022 **TIME:** 9.00 am

LOCATION: Tonkin and Taylor, Cashel Street, Christchurch

10 June 2022 Updated providing summary of actions completed

Peter Abernethy	Tonkin and Taylor
Tony Bryce (by Teams)	Tonkin and Taylor
Martin Pinkham	Adderley Projects Ltd

Topic	Discussion	Action	Status as at 10/06/2022
Welcome	Tony Bryce joined the meeting by Teams from Auckland and was available until 11am. Agreed that the first part of meeting would focus on the wider issues, and then Peter and Martin could work through each of the individual RFI items.		
WWTP sludges	Martin confirmed that WWTP sludges would not be accepted, but on site sludges would be.	Proposal and proposed conditions to be amended	Attachment 8 Proposed Conditions of Consent Issue 2 have been amended
Quarry wall stability	T&T concerned that slope design is quite aggressive and needs further work, particularly for the upper weathered zone. They noted that Whitford now has 8m benches following a safety assessment. Agreed that the drawings need to be amended to show the net slope.	Agreed that further meeting with Barry McDowell and Don MacFarlane would be arranged for next week. WQL to amend drawings as required. WQL also to look at safety considerations but that this is outside the resource consent process.	Completed on 27 April 2022 Engineering Report and Drawings updated to reflect this change WQL have noted this and its Site Specific Safety Plan will be developed recognising this issue.
Quarry wall drainage	Tony expressed concern about the potential for water behind the shotcrete and questioned whether drainage of the vertical faces will be required prior to shotcrete application. Tony noted that at Whitford they are shotcreting as they come down the face.	WQL to look at options for draining any seeps and provide further details in Engineering Report. WQL to amend drawings and	WQL have reviewed and concluded that making provision for geocomposite drainage layer behind shotcrete with drains to direct water away operational areas would be good practice. Engineering

Topic	Discussion	Action	Status as at 10/06/2022
	Martin advised that WQL saw no need to shotcrete on the way down and was comfortable that it has a good methodology for safely operating the landfill, shotcrete application and polyurea application working up from the base. There was further discussion on the methodology for placing the drainage material and waste against the quarry walls. It was agreed that the drawings and Engineering Report needs to be amended to reflect the proposed changes	Engineering Report to show revised approach to placing drainage material and waste against the quarry walls	Report and Drawings updated to reflect addition of geocomposite drainage layer and methodology for placing drainage material against quarry walls
Polyurea QA	T&T acknowledged the use of polyurea but felt that appropriate QA processes associated with polyurea would need to put in place. They noted that there are good QA processes for shotcreting.	WQL to discuss with suppliers and applicators and provide further details in Engineering Report	Engineering Report updated with details of proposed QA for application of polyurea
Protection of polyurea	<p>T&T noted that at Whitford a protection geotextile is being used to protect the polyurea from damage. One of the reasons that the benches are so wide is that an anchor trench for the protection geotextile being used.</p> <p>Martin noted that at Tirohia it did not appear that protection fabric was being used, and that a fine drainage material was placed between the polyurea and the waste.</p>	WQL to investigate need for polyurea protection including advice from Tirohia	<p>WQL have reviewed and concluded that providing a protection geotextile over the polyurea would be good practice.</p> <p>Engineering Report and Drawings updated to include protection geotextile</p>

Topic	Discussion	Action	Status as at 10/06/2022
Waste stability	<p>T&T are of the view that the stability of the waste mass needs to be verified as part of the resource consent process. They noted the risk of sliding at the interface between the HDPE and the GCL. Martin clarified that a textured HDPE would be used.</p> <p>Discussed that two key scenarios that need to be addressed:</p> <ol style="list-style-type: none"> 1. The long term stability of the permanent slopes, particularly the south facing front face 2. Short term stability of the intermediate faces, for example cells 8 to 11, which appear to be quite steep. <p>Martin noted that Detail C on Drawing C1 is only a schematic to indicate the proposed cell sequencing.</p> <p>Stability analysis needs to consider Importance Level (T&T tend to use NZTA Bridge Manual for guidance).</p> <p>T&T suggested that analysis should note the recommended FOS and Deformations and may result in amendments to Condition 6 of the Proposed Conditions.</p>	<p>WQL to undertake a stability analysis of the waste pile.</p> <p>Engineering Report and Drawings to be amended.</p> <p>WQL to review Proposed Conditions on completion of stability assessment.</p>	<p>Stability Analysis completed and included as Attachment 12 in Response 2 to Ecan RFI.</p> <p>Addendum to Engineering Report and Drawings updated.</p> <p>Detail C of Drawing C1 has been amended to more closely represent the actual slopes of waste placement.</p> <p>Attachment 8 Proposed Conditions of Consent Issue 2 have been amended</p>
Landfill geometry	<p>Discussion over position of the top of the benches in relation to the property boundaries. Martin noted that the footprint needs to be altered in the southwest corner anyway.</p> <p>Discussion over the falls on the benches, agreed that it is highly desirable that the benches fall away from the operational landfill.</p> <p>The geometry of the individual cells was discussed. T&T are of the view that both lateral and longitudinal falls should be 2%. The basegrade drawing is currently shown as being on one plane. It was agreed that the reconfiguration of the benches would result in the floor of the landfill reducing in size.</p>	<p>WQL to amend the landfill footprint on the drawings (mainly Drawing B1)</p> <p>WQL to review the geometry of the benches to try and get fall away from the operational landfill</p> <p>WQL to amend basegrades and sidewall contours on Drawings.</p>	<p>Drawings updated to reflect change with a 25m setback from property boundary Engineering Report and Drawings updated to reflect this change.</p> <p>Engineering Report and Drawings updated to reflect changes to geometry of benches.</p> <p>Engineering Report and Drawings updated to reflect changes to basegrades.</p>

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	T&T noted that on Drawing C4 the thickness of the capping increased higher up the slope. This is not a good practice, and likely to result in veneer instability of the capping.	WQL to amend Drawings that show capping with a constant thickness.	Drawings updated to reflect changes to capping.
Waste drainage blanket interface /	Discussion over the merits of using a separation fabric between the waste and the drainage blanket. T&T noted that there has been some clogging of the drainage blanket at Kate Valley. Martin noted this had been discussed with the peer reviewers at Kate Valley and the jury was out on the matter. It was agreed that on balance a separation geotextile would be of some benefit because of the high proportion of soil that was likely to come into Woodstock.	WQL to amend drawings to show separation geotextile on top of the drainage blanket.	Engineering Report and Drawings updated to reflect addition of separation geotextile.
Detail drawings	T&T have noted a number of minor errors and inconsistencies in the drawings as noted below: <ul style="list-style-type: none"> The cross sectional drawings do not show the polyurea waterproofing Detail H still shows the liner having coated GCL Detail H would benefit from having further details of the clay permeability and dimensions Some of the details show the leachate drain underneath the liner There are also some inconsistencies between the drawing in the words in the Engineering Report.	WQL to amend drawings and Engineering Report where required.	Engineering Report and Drawings updated to reflect changes to geometry.
Cross referencing	T&T have picked up some inconsistencies in the cross referencing in the Engineering Report and its Addendum	WQL to complete a further cross referencing check	Content of Addendum to Engineering Report have been incorporated into Issue 2 of Engineering Report
	T&T noted that it would have been helpful, but not essential, to have some further details of the potential LFG system	WQL to consider providing further details of the LFG system	Given that the generation of LFG is likely to be very low further details of an LFG system have not been included at this stage.
Leachate composition	Discussion on the various sources of data used to prepare table 6.1 B in the Addendum to the Engineering Report. T&T have concluded that the table is appropriate for further hydrogeological modelling purposes.	WQL to complete hydrogeological modelling based on Table 6.1B	Attachment 1 Hydrogeology Report 2 updated and included in Response 2 to Ecan RFI

Topic	Discussion	Action	Status as at 10/06/2022
Leachate leakage quantities	<p>Tony noted that he felt that the HELP modelling undertaken for ARL was useful. Martin explained that the hydrogeologist and the applicant saw very little benefit in this and really wanted to work with an upper bound number that was beyond any doubt. The 10 litres per hectare per day is 100 times that used by Rowe.</p> <p>T&T noted that they would like to see some commentary on proposed methodologies to be used for the QA for liner construction, as the QA is crucial to ensure the liner performs as modelled.</p>	<p>WQL to complete hydrogeological modelling based on 10 litres per hectare per day. Further justificaition to be provide on the selected leakage rate</p> <p>WQL to provide details of liner construction QA.</p>	<p>Engineering Report updated with justification of leakage rate Attachment 1 Hydrogeology Report 2 updated and included in Response 2 to Ecan RFI</p> <p>Engineering Report updated to include details of liner construction QA. Attachment 8 Proposed Conditions of Consent Issue 2 have been amended to include conditions regarding liner construction QA.</p>
Leachate generation	<p>Discussion on potential leachate generation rates. T&T noted that this can vary significantly and unfortunately many landfill sites are very poor at recording leachate generation rates. T&T agreed that 15% of rainfall would be appropriate for further hydrogeological modelling purposes.</p> <p>There was considerable discussion on the various methodologies that can be employed to divert clean stormwater away from the leachate system.</p>	<p>WQL to complete hydrogeological modelling based on leachate generation of 15% of rainfall.</p> <p>WQL to consider use of HDPE flaps and other methods to reduce leachate generation.</p>	<p>Attachment 1 Hydrogeology Report 2 updated and included in Response 2 to Ecan RFI</p> <p>Engineering Report updated to provide commentary on methodologies for diversion of clean stormwater from the leachate system</p>
RFI	Tony Bryce left the meeting just before 11am due to another commitment. Peter and Martin went through the T&T RFI of 21 May 2021, and the T&T letter of 7 April 2022 and provided comments for each row.	See attachments to these minutes.	

MEETING: Woodstock Quarries Ltd – Resource Consent Application

DATE: 27 April 2022 **TIME:** 12 noon

LOCATION: Tonkin and Taylor, Cashel Street, Christchurch

10 June 2022 Updated providing summary of actions completed

Barry McDowell	Tonkin and Taylor
Don MacFarlane	Geologist
Peter Abernethy	Tonkin and Taylor
Martin Pinkham	Adderley Projects Ltd

AGENDA ITEM	Discussion	Action	Status as at 10/6/2022
Welcome	Martin and Peter noted that purpose of meeting was to reach agreement on an appropriate methodology for the design of the cut quarry faces, which could then feed into the engineering design.		
Cut slope and bench widths	Don had previously sent through a proposed pit slope design with revised bench widths. These were discussed at some length. T&T outlined some of the difficulties that had been identified at the Whitford landfill, and some of the safety issues that needed to be addressed, particularly as the benches needed to be trafficked to enable the lane of geotextile. It was agreed that in general the following methodology would be adopted: <ul style="list-style-type: none"> • 5 metre width for the first two benches from the top • 3.5 metre width for subsequent benches 	Don to update the addendum to the geology report based on his updated analysis and the methodology noted to the left. Some of the Drawings will also need amendment to reflect this change.	Letter from Geology Consultant updated and reviewed by Barry. Included as Attachment 2 of Ecan RFI 2 responses Details from updated letter incorporated into Drawings
Set back from boundary	It was agreed that there are some locations around the perimeter where the proposed landfill is potentially too close to the boundary. There is a risk of fretting of the weathered upper layers resulting in the top of the slope moving back towards the boundary.	Agreed that the drawings would be updated to show a minimum of 25 metres set back of the top of the quarry slope from the boundary.	Engineering Report and Drawings to be updated to reflect this change
Wall treatment methodology	There was discussion over the options of treating the quarry walls from top down as compared to treating them on the way up prior to the waste being placed. It was agreed that the bottom up treatment is the most appropriate as this would minimize	The sketches in the Engineering Report to be updated to show the revised filling methodology.	Engineering Report and Drawings to be updated to reflect this change

AGENDA ITEM	Discussion	Action	Status as at 10/6/2022
	<p>the time that the waterproofing is exposed to the atmosphere. It was also acknowledged that in some cases there would be a considerable time from excavation to the liner system being installed, and at this time there could be some minor failures of the rockface.</p> <p>It was acknowledged that there may be a requirement to do some stabilization on the way down but this would be a temporary measure.</p> <p>There was also some discussion on how the drainage layer and waste would be placed, and there's a lot of merit in loading up the waterproofed face as quickly as possible.</p>	Some other drawings will also need amendment.	Engineering Report and Drawings have been updated to reflect this change
Protection geotextile	T&T noted that a protection geotextile is being used at the Whitford landfill to protect but rock wall waterproofing. This requires the construction of an anchor trench on the upper bench to hold the protection fabric in place. However, it was noted that at the Tirohia Landfill it did not appear that a protection fabric was being used.	WQL to investigate this matter further and come back to T&T with conclusions	WQL have investigated options and concluded that protection geotextile is appropriate. Engineering Report and Drawings have been updated to reflect this change
Drainage behind shotcrete	There was some discussion as to the risk of shotcrete being damaged by a buildup of water behind it. T&T is of the view that a drainage layer, such as Megaflow, with laterals extending down to the floor to ensure that the face is fully drained is required. Don noted that he has seen very little evidence of seeps in the cut rock faces.	WQL to investigate options for providing for future drainage of the rock wall faces	WQL have investigated options and concluded that while the risk is low it is appropriate to provide for the installation of a geocomposite drainage system behind the shotcrete where required. Engineering Report and Drawings have been updated to reflect this change
Drainage layer and waste filling methodology.	It was agreed that there there's a lot of merit in loading up the freshly shotcreted and waterproof faces as quickly as possible.	Amend drainage layer and waste filling sequencing in Engineering Report.	Engineering Report and Drawings have been updated to reflect this change.
Bench geometry	It was agreed that it would be helpful for the benches to slope back, with a drain at the rear, which directed stormwater away from the operational landfill.	Drawings to be amended.	Engineering Report and Drawings have been updated to reflect this change
Meeting	It was agreed that the meeting was very useful and would enable the project to move forward. The meeting closed at 12.55pm. I		