Applicant: Woodstock Quarries Limited
Record Number/s: CRC214073, CRC214074, CRC214075, CRC214076, CRC214077
Activity Description: Various activities associated with a new landfill proposal

This is the response to Request for Information 1 of 10 June 2021 from Environment Canterbury. The responses in this table correspond to the numbering in the column to the left. The reference to Attachments in this response matches the Attachments that accompany this response.
This part of the response relates to Attachment – Tonkin & Taylor Limited: CRC214073 Landfill Compliance Review Woodstock Quarries Limited letter, dated 31 May 2021.

Item	RFI Comment	Proposed Response
1	The provided information indicates that some of the waste accepted may have some putrescible component and the landfill is likely a hybrid between a normal MSW landfill and a dedicated C&D waste fill. Can the applicant confirm if this assessment is correct? Or provide clarification of the waste types.	The Applicant confirms that the primary waste source will be C&D waste but it is widely accepted that C&D wastes will include some component of potentially putrescible material, being mainly untreated timber, and small quantities of vegetation including grasses. It is proposed that no more than 5% of the waste stream be potentially putrescible. The conditions of Appendix 10 Proposed Conditions of Consent Issue 2 (Attachment 7) has been amended accordingly.
2	The monitoring and contingency measures proposed to monitor groundwater quality (as an indicator of leachate breakout) are lacking in detail, lack a baseline assessment, does not provide an adequate or justified monitoring programme and does not assess a sufficiently broad range of potential contaminants. Please provide information to resolve these matters.	An assessment of groundwater quality for a range of potential contaminants, which includes recommendations for monitoring groundwater is included in Attachment 1 Hydrogeology Report 2. The Conditions of Appendix 10 Proposed Conditions of Consent Issue 2 (Attachment 7) provide details of the proposed monitoring programme for ground water. The Conditions of Appendix 10 Proposed Conditions of Consent Issue 2 (Attachment 7) provide details of the proposed monitoring programme for surface waters.
3	The applicant does not appear to consider the presence of adjacent reserve land as being a potential receiving environment. It is noted that this land could be impacted by dust, litter, noise and (possibly) leachate leakage. Please provide information to justify how the adjacent land will not be adversely affected.	These matters have been addressed throughout the Application documents.

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5	The applicant has not considered the significance of asbestos as a potential contaminant in air. The landfill management plan is lacking in detail regarding how asbestos will be managed. Please provide an updated landfill management plan containing sufficient information to demonstrate how asbestos will be managed.	The Applicant is fully aware of the significance of asbestos in the waste stream and as potential contaminant in the air. The Applicant understands that it will need to comply with the Asbestos Regulations 2016 which are administered by Worksafe NZ. The landfill will be required to have an Asbestos Management Plan. Section 4 of Appendix 10 Draft Landfill Management Plan Issue 2 (Attachment 6) provides updated details of the management of air borne contaminants, with a specific section on asbestos management.
6	It is unclear how containment of activities with the potential to cause contamination will be achieved – for example refuelling/fuel storage, excess leachate volume, bin storage area. Please provide information to resolve these matters	Section 7 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides further details of the environmental controls associated with various on site activities.
7	Reporting and the site walkover discussed a bin lay down area. Please provide further detail and drawings of the proposed bin lay down area, including detail of how any generated stormwater, or leachate, dust will be managed.	Section 7.1 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides further details of the environmental controls associated with the bin laydown area. Drawing C5 of Appendix 2 Drawings Issue 2 (Attachment 8) shows the layout of the bin laydown area.
8	The applicant proposes to recirculate leachate, but has indicated a possibility that there could be treatment and discharge to land outside of the landfill footprint. Please provide further information to clarify this process, proposed treatment and discharge locations along with assessment/justification of how adverse effects will be controlled.	The Applicant is not proposing to construct a leachate treatment facility at this stage. A separate consent would be required for this activity should it be proposed.
9	As is the case at most C&D waste dominant landfill sites, the greatest operational risk is expected to be fire. We do not believe the current The Landfill Management Plan adequately addresses this. Please update to	Section 3 of Appendix 10 Draft Landfill Management Plan Issue 2 (Attachment 6) provides updated details of the management of fire risk management.

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	include specific fire management and control measures.	
10	The suitability of the erosion and sediment control system is largely dependent on the long-term maintenance of the sediment ponds and collection system so that they remain effective, including monitoring and maintenance procedures. The reports all referrer to a site-specific erosion and sediment control plan being prepared for each stage of work, please provide further detail on how the long-term maintenance and monitoring be managed? Including post closure.	The ponds, and other sediment control structures, will be designed and maintained in accordance with Environment Canterbury Erosion & Sediment Control Toolbox For Canterbury. Where the Environment Canterbury Erosion & Sediment Control Toolbox For Canterbury does not cover a particular situation GD05 Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region will be utilised. During the post closure the site will still be subject to meeting conditions of any remaining resource consents and will still be required to have a Management Plan that will include details of maintenance and monitoring.
11	The landfill Bond should address both operational risks (essentially firefighting), as well as closure and aftercare costs. The current Bond condition currently proposed derives from the Kate Valley Bond condition. Some of this wording can be used as many of the clauses are relevant. However, we suggest that in line with recent research and development of the principles of such Bonds elsewhere in New Zealand, the condition can now be streamlined and updated somewhat to provide a tighter scope and better focus on the key issues. The recently proposed Auckland Regional Landfill (ARL) Bond structure is appropriate, with a strong focus in this case on landfill fire risk being a key consideration during the operating phase. The cost of early closure and aftercare could be assessed in the same way as is proposed at ARL.	The Conditions for the proposed Auckland Regional Landfill have been reviewed and the Applicant considers that the bond conditions proposed for the Woodstock Landfill to be far more focused than those associated with the Auckland Regional Landfill. The Applicant considers that the methodologies for calculating the Bond are essentially identical and are consistent with each other.
12	The site proposes receiving C&D wastes (including gypsum containing wall board), and under some conditions may receive organic wastes in the form of municipal wastewater treatment plant sludges. Accordingly, it is possible that the site will produce landfill gas, including odorous hydrogen sulphide (H_2S).	The Applicant recognised at an early stage of the project that the generation of hydrogen sulphide and other odorous VOCs is a possibility and has proposed to install a Landfill Gas (LFG) at a very early stage of the project. This will ensure that any gases, which will be a mixture of mainly methane and other gases, can be captured and destroyed in a flare.

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	The proposal includes provision for the installation of a gas collection system with the control of the landfill gas through either flaring or firing of the gas in a generator. Please provide clarification as to what extent gas generation may occur including how the potential H2S gas will be managed.	
13	In order to quantify the risk of odour impacts a Frequency, Intensity, Duration, Offensiveness and Location (FIDOL) assessment should be prepared in accordance with Schedule 2 of the Canterbury Air Regional Plan (CARP) and the Ministry for the Environment (MfE) Good Practice Guide for Assessing Odour. This should include consideration of meteorological exposure for the nearest sensitive receptors, taking into account any downslope drainage flows from the landfill location.	A preliminary FIDOL assessment is enclosed as Attachment 10. It is noted that the closest property is over 1800 from the site.
14	As the quarry will be operating concurrently with the landfill operations, details of the proposed quarry operation should be provided and reviewed against the rule requirements of the CARP to confirm whether consent is required for this activity. If consent is required, the application should provide a qualitative FIDOL assessment of potential dust effects undertaken in accordance with the Second Schedule of the C A R P and the MfE Good Practice Guide for Assessing Dust. This should take account of local wind conditions that have the potential to propagate dust discharges from the site. If consent is required, consent conditions should also reflect the operation of the quarry in terms of key dust management measures	A preliminary FIDOL assessment is enclosed as Attachment 10. The Applicant advises that the Woodstock Quarry operation is a relatively low volume, but higher than usual value operation. The average production rate is 400 tonnes per day, most of the product has a large particle size (greater than 40mm) and is made to order. The Applicant confirms that it meets the requirements of Rules 7.35 and 7.36 of the Canterbury Regional Air Plan. In addition, Appendix 8 Draft Landfill Management Plan Issue 2 (Attachment 6), provides details of how dust discharges from the quarrying activities will be managed, and meets the requirements of Schedule 2 of the Canterbury Regional Air Plan
15	Section 31 of the AEE application notes that there will be large areas of artesian water pressures under the liner, which will require an underdrain system. In the Geology report Figure 13 it shows water filling the quarry to unknown depth, indicating that the pit void is not self-draining and there is the potential for water to build up in the landfill materials if drainage is ineffective. Please provide clarification on how the impact of artesian water pressures, or high ground water conditions, on the proposed liner system has been	The AEE notes that there will be large areas under the liner that may have artesian water, but as noted in the Geology report it is likely that this artesian water will be due to the release of water within the rock structure as it is excavated. This excavation will occur many years before the landfill liner construction is undertaken. Any groundwater released at the time of excavation will be conveyed the perimeter drainage network, possibly after passing through a temporary sediment control structure.

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	addressed, including if the under-drainage system malfunctions post-closure, in terms of containment of contaminants and long-term stability of the landfill body?	While the extent of the areas of artesian water may be large the expected quantity of groundwater is expected to be small but an underdrainage system will be required to enable the construction of the liner system without the risk of groundwater lifting the liner system. Once the landfill site becomes operational and waste is placed on the liner there will be a greater pressure of waste on the liner than the uplift from any groundwater and there is no risk of uplift of the liner. Once each cell becomes operational the amount of groundwater will diminish rapidly.
16	Section 62 of the AEE application states that fresh greywacke would be suitable for use as a low permeability liner and for capping or drainage layers. This is unlikely to be the case. Possibly the author should be referring to the overlying weathered greywacke which is likely to be more soil-like and may prove suitable as a low permeability layer? If fresh angular greywacke material is proposed for use please clarify how the geosysnthetic liner product will be protected from this angular rock material.	This matter is addressed in Attachment 2 Letter from Geology Consultant. The Applicant confirms that it is intended to use this weathered greywacke for a wide range of uses, which may include the construction of a low permeability layer, either for the liner system or the capping system. The fresh greywacke will be processed into a wide range of aggregates as part of the quarry operation, but some may be used as part of the leachate collection system, as it will be very durable, but the geosynthetic liner will be protected using appropriate protection fabrics.
17	The geology reporting highlights the risk of rockfall both small and large scale. Please provide further clarification on how this will be managed in terms of landfill worker safety, overall slope stability, adopted benching profiles and protection of the landfill liner.	This matter is addressed in Attachment 2 Letter from Geology Consultant. Drawings C2, C3 and C4 of Appendix 2 Drawings Issue 2 (Attachment 8) includes the recommended modifications to the benching profile.
18	Weathered rock is located above the hard greywacke rock, however proposed excavation profiles do not appear to take into consideration this weather rock with the same 10 m high 2 m width benching profiles adopted. Please provide technical justification and analyse for this design.	This matter is addressed in Attachment 4 Letter from Geology Consultant. Drawings C2, C3 and C4 of Appendix 2 Drawings Issue 2 (Attachment 8) includes the recommended modifications to the benching profile.
19	The stripped overburden material is to be stock piled on site for use as capping material. Please provide clarification of the expected volume, location and that	There is only a limited amount of stripped overburden that will be suitable to be used as the final topsoil layer of the capping, and it is to be stored above the proposed landfill footprint.

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	adequate safe stockpile locations have been allowed for as part of the site design.	There are Drawings F3 of Appendix 2 Drawings Issue 2 (Attachment 8) includes details of the location, and expected volumes of proposed stockpile areas.
20	The applicant should provide a clear statement of the key design performance objectives and how these will be met by the design. This needs to include the rationale for the level of containment required for the landfill and how this will be achieved and should address the location, the nature of the underlying geology and potential receptors of any leachate leakage. The Engineering Technical Report describes a Type 1 landfill lining system as a baseline. It needs to be clearly stated why this is considered necessary in relation to risks posed by the landfill. Specific comment should be provided with reference to Section 4.4, Geology, of the WasteMINZ Technical Guidelines.	Section 4.4.1 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides clarification of the proposed liner system. This includes clarification that a Class 1 Type 2 liner system is proposed for the site. The key design objectives for Landfills are provided in some detail in the WasteMINZ Technical Guidelines. The Applicant has decided to adopt the design standards for a Class 1 Landfill for the Woodstock Landfill project to provide a high level of protection to the environment. Appendix 3 Geology Technical Report provides sufficient detail to demonstrate that the siting of the Woodstock Landfill meets all the Geology guidelines for the siting of Class 1 and 2 landfills.
21	The report describes two possible lining systems. Lining system A comprises two polymer coated GCLs with 300 mm of low permeability compacted clay between. Please specify the target permeability for the compacted clay layer, and evidence that the selected permeability could be achieved in this situation without damage to the underlying GCL. Please provide details of examples of where such a lining system has been used successfully.	It is no longer proposed to use polymer coated GCL in the liner system. Section 4.4.1 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides clarification of the proposed liner system, including amendments to the materials to be used.
22	Lining system B comprises 1.5 mm HDPE overlying a polymer coated GCL over compacted general fill. The section on Drawing B4 showing progressive filling of the waste shows a steep fill face, drawn at a slope of 45 degrees and in the order of 40 m high. Please provide details of: a The expected interface friction angle between the HDPE and the polymer coating on the GCL. b How the front face of the fill will be managed (slope, height, etc), recognising the relatively low interface friction surface in the lining system. c Demonstration (calculations) that the internal fill slope shown on Drawing	Drawing B4 of the Application was prepared to provide a graphical representation of how the quarry and landfill would be staged and not a formal engineering drawing. An amended Detail C on Drawing C1 is shown in Appendix 2 Drawings Issue 2 (Attachment 8) and shows the likely internal fill slopes. a. Section 4.4.1 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides clarification of the proposed liner system, including amendments to the materials to be used. It is no longer proposed to use polymer coated GCL.

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	B4 will be stable, particularly given the expected low interface friction surface on the base of the landfill.	b. For each stage of filling a detailed assessment of the stability of the waste placing process will be completed. Considerable research on the failure of landfill internal fill slopes has shown that Construction and Demolition waste has a high level of tensile resistance exerted by fibrous materials such as plastics, etc. and large frictional resistance caused by engagement of large and small wastes, and the slope stability was extremely high. The preliminary design has therefore based on internal fill slopes if 1:3 which is considered to be conservative. For each stage of filling a detailed assessment of the stability of the waste placing process will be completed. Considerable research on the failure of landfill internal fill slopes has shown that Construction and Demolition waste have a high level of tensile resistance exerted by fibrous materials such as plastics, etc. and large frictional resistance caused by engagement of large and small wastes, and the slope stability was extremely high. The preliminary design has therefore based on internal fill slopes if 1:3 which are considered to be conservative.
23	The lining systems described differ from the lining systems recommended in the WasteMINZ Technical Guidelines for a Class 2 landfill or a Class 1 Landfill. Please provide evidence that these alternatives are equivalent to the recommended lining systems for Class 2 or provide a rationale as to why they don't need to be. As part of this, it should be clarified what lining standard is being targeted (Class 1 or Class 2) and why.	Section 4.4.1 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides clarification of the proposed liner system, including the proposed sidewall waterproofing system. Drawings C2, C3 and C4 of Appendix 2 Drawings Issue 2 (Attachment 8) show these details.
24	Section 4 of the Engineering Technical Report only describes proposed lining systems A or B. However, on inspection of the drawings it becomes clear that these lining options are only proposed for the floor of the landfill and that no lining system is proposed on the side slopes. This third option (side slopes) also needs to be described under lining systems with suitable technical justification as to why the sidewall lining	Section 4.4.1 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides clarification of the proposed liner system, including the proposed sidewall waterproofing system. Drawings C2, C3 and C4 of Appendix 2 Drawings (Attachment 8) provides details of the proposed liner system.

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	system that is proposed is considered appropriate in the context of the landfill Class and the performance being targeted in terms of expected leakage rates. This should also take into consideration the weathered and unweathered section of the side slopes that will be exposed during the quarrying.	
25	The geological report describes a high groundwater level surrounding the landfill. Please provide details of the expected groundwater inflow through the unlined side slopes of the landfill and the expected impact of this on the liner system, leachate containment, leachate quantities and the overall design of the leachate management system.	This matter is addressed in Attachment 2 Letter from Geology Consultant
26	No leachate leakage calculations have been provided for the landfill liner system. Both the quantity and quality of leachate seepage are important inputs to determining the potential effect of operating a landfill on the surrounding environment. Please provide details of leachate leakage calculations, identified receptors and contaminant transport modelling as part of the application.	An assessment of leachate leakage rates, identified receptors and contaminant transport modelling is included in Appendix 4A Hydrogeology Report 2 (Attachment 1)
27	There is no information provided regarding the seismic performance of the landfill site. Please provide detail of the seismic environment and the level of expected ground shaking to be provided for in the design. Additionally, describe how the design accommodates the identified seismic conditions and any associated ground movement. This is particularly relevant for interim filling	A detailed Seismic Assessment is included in Appendix 3 Geology Technical Report (pages 73-86). For each stage of filling a detailed assessment of the stability of the waste placing process will be completed.
28	Section 4.5 point 1 describes lining systems having a grade no less than 1.4%. Section 4.2.2 states that the minimum longitudinal floor slope will be 2%. Please clarify what is proposed, recognising that international best practice is typically based on a minimum grade of 2%.	Section 4.5 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides clarification that the basegrades will have a minimum grade of 2%.

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29	File 24734 Drawing 02A Section D01 and Drawing 03, Section K01 shows the fill placed at a slope of approximately 4V:1H with drainage aggregate placed between the fill and the quarry side wall. Please provide further clarification on how this will be constructed. Please also provide information regarding how any leachate collected in this drainage layers against the side wall will be drained from the landfill.	Section 4.5 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides further detail of how the drainage aggregate is placed between the waste and the quarry side wall, and how leachate in this drainage layer is drained from the landfill.
30	The leachate drain systems does not appear to provide adequate protection from fine grain material, that can lead to physical clogging and which will eventually prevent the layer from providing a drainage path for leachate, causing a build-up of leachate in the landfill and potentially leading to short term stability issues and long-term capping settlement and groundwater contamination issues. Please provide technical justification for this design.	The clogging of leachate collection systems has been examined from both field and laboratory studies. The three major mechanisms for the clogging of porous media in landfills are identified as the: (i) growth of biomass, (ii) precipitation of minerals, and (iii) deposition of suspended solids. Some designers have a preference to use a geotextile on the top of the drainage layer but depending on the characteristics of the soils on site this can lead to growth of biomass on the geotextile and lead to significant clogging of the upper layer of the leachate blanket and leave the lower layers clean. The precipitation of minerals can be a problem at sites with calcareous soils, which is not the situation at Woodstock Landfill. Research by Rowe et al has concluded that the clogging of leachate collection systems is significantly affected by the grain size of the drainage blanket, with the larger sizes being less problematic. However, larger grain sizes usually necessitate a thicker protection geotextile. The leachate drainage system is still subject to detailed design, and approval by the Peer Review Panel. Detailed design will be partly driven by the characteristics of the drainage material that are available. The depth of the drainage layer is currently shown as approximately 300mm, but at the conclusion of the detailed design process it may well be different. Similarly, the use of a geotextile between the waste and the leachate collection system is subject to detailed design. The conditions of Appendix 10 Proposed Conditions of Consent Issue 2 (Attachment 7) requires that fine grained material cannot be placed within 3 metres of the liner. This is to ensure that fine grained material is dispersed

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		through the first 3 metres of waste, rather than in the drainage layer, further reducing the risk of clogging.
31	Drawing C03, Section K01 shows leachate drainage aggregate placed on a steep slope (Approx. 1V:1.5H) at the toe of the side wall. Please provide details of how this will be achieved along with any support stability calculations.	Drawing C03, Section K/01 has been amended to show the slope as being 1V:3H, which is accepted as being more appropriate.
32	Capping details are shown on File 24734 Drawing 02, however no dimensions (thicknesses) are shown to allow for technical evaluation. Please provide the proposed capping dimensions and layer material types. The clay layer is specified with a permeability of 2.5 x 10^{-10} m/s. Given that there is likely to be a condition that requires the design to be in accordance with the application, please confirm that this permeability be the specified permeability for the clay cap material? In conjunction with the leakage calculation described in Item 26 above, what cap infiltration details have been adopted in the leakage modelling.	It is no longer proposed to specify a clay layer in the capping with a minimum permeability of 2.5 x 10-10 m/s. Section 4.6 of Appendix 5 Engineering Report provided details of the proposed capping construction and thicknesses, and is reproduced below: *The WasteMINZ Guidelines provide two options for a final cover design based on a soil barrier layer. These are described as, from top to bottom:* *Minimum:* • *150 mm topsoil;* • *600 mm compacted soil (k < 1 x 10^{-7} m/s);* • *Intermediate cover. or* *Enhanced minimum:* • *100 to 150 mm topsoil;* • *300 to 450 mm growth layer;* • *600 to 1000 mm compacted soil layer (k < 1 x 10^{-7} m/s).* WQL will adopt the minimum standard for the final capping layer but plans to apply additional capping up to 2 m thick, to provide an effective barrier and to provide adequate thickness for a wider range of plantings on the final cap surface. Drawing C4 of Appendix 2 Drawings Issue 2 (Attachment 8) also provided details of the proposed Final Cap utilising spoil to provide an enhanced capping system.

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		While the application notes the availability of low permeability material for capping, it is not appropriate to specify that this should be used. The design of the capping requires a balance between creating a barrier between the waste and upper surface and ensuring that there is a growth layer that will support suitable vegetation growth over a wide range of climatic conditions. The design of the capping system will be partially governed by the material that is extracted during the excavation phase and it is premature to specify a particular permeability at this stage as the detailed design has yet to be completed and will be subject to peer review. The conditions of Proposed Conditions of Consent Issue 2 (Attachment 7) have been amended to reflect clarification of the proposed capping construction. Specific leakage modelling has not been completed as part of this application but has referenced data from a range of other sites, and research. While there is a relationship between the permeability of the components of the capping system and leachate generation, leakage rates are primarily related to the design and construction of the liner system (which includes the leachate drainage system).
33	Please provide details of the basis for sizing of the stormwater treatment ponds, and the expected performance of these ponds. What sediment load from the site has been used for determining downstream effects?	Section 4.7.2 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides further details of the sizing of the stormwater treatment ponds. In summary the ponds, and other sediment control structures, will be designed in accordance with Environment Canterbury Erosion & Sediment Control Toolbox For Canterbury. Where the Environment Canterbury Erosion & Sediment Control Toolbox For Canterbury does not cover a particular situation GD05 Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region will be utilised.

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34	Section 7.4.2 states that water for dust suppression will be sourced primarily from the sedimentation ponds on site. Please advise the design demand for water for dust suppression and demonstrate that this quantity of water will be available from the ponds, including consideration of seasonal conditions.	Section 7.4.2 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides further details of the methods of dust control and the expected water demand for dust control. In addition to the sedimentation pond the Applicant expects to construct temporary sediment control structures within the active quarry area, and these will be available as a source of water for dust control. In the event that there is inadequate water for dust control the Applicant may need to apply for a Water Permit to abstract water from the Woodstock Stream. Section 5.2 of the Appendix 10 Draft Landfill Management Plan Issue 2 (Attachment 6) includes details of the management of dust on the site.
35	The proposed stormwater dispersion zone is located in steep terrain, with the potential for overland flow into the down gradient stream. Please clarify how surface erosion will be managed.	Section 4.7.2 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides further details on the design and construction of the discharge of stormwater from the sedimentation ponds and overland flow paths. Surface erosion controls will be designed in accordance with Environment Canterbury Erosion & Sediment Control Toolbox For Canterbury. Where the Environment Canterbury Erosion & Sediment Control Toolbox For Canterbury does not cover a particular situation GD05 Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region will be utilised.
36	The site walkover discussed a low permeability borrow area for final capping material. Please provide a drawings outlining the proposed borrow area including final profiles, expected volume and supporting laboratory data to confirm the suitability of this material.	Section 4.4.1 of the Addendum to Appendix 5 Engineering Report (Attachment 3) provides further details of the low permeability borrow resources. Drawing D5 of Appendix 2 Drawings Issue 2 (Attachment 8) shows the identified location of significant deposits of clays suitable for a compacted clay liner and a low permeability capping layer. It is estimated that there is approximately 60,000 cubic metres of readily available low permeabilty clay resource.

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		Section 4.4.1 of the Addendum to Appendix 5 Engineering Report (Attachment 3) includes the test results of two recent samples of the readily available clay resource.
37	Section 6.1.4 notes that an evaporator may be used for leachate disposal. Please confirm whether this consent application includes a leachate evaporator, with associated assessment of effects, or whether you propose that this will be subject to a separate application at a later date. .	This Application does not include provision for a leachate evaporator.
38	Section 5 notes that LFG destruction will be achieved using a flare or electricity generation. Please confirm whether both of these options are included in this application.	This application is based on the installation of flares as the primary method for destroying LFG. However, in the event that there is adequate LFG a generator for electricity production would also be installed. The conditions of Appendix 10 Proposed Conditions of Consent Issue 2 (Attachment 7) specifies the standards at which enclosed flares and generators will be required to operate.
39	We would expect to see consent conditions that specify the key components of the landfill including the lining system, capping and leachate collection. Currently, a condition requires that detailed designs are forwarded to Canterbury Regional Council. A review/approval process also needs to be specified and consideration given to appointing a peer review panel to provide an overview of the landfill design and operation on behalf of Canterbury Regional Council.	The conditions of Appendix 10 Proposed Conditions of Consent Issue 2 (Attachment 7) now make provision for the appointment of a Peer Review Panel Section 8.2 of the Appendix 10 Draft Landfill Management Plan Issue 2 (Attachment 6) includes details of the role of a Peer Review Panel.