Akaroa Treated Wastewater Disposal Options - Drop in Sessions – Questions and Answers

Question	Answer
1. Would the Akaroa wastewater treatment plant still require enhancement if it remained in its current location?	The Council resolved in 2011 to move the treatment plant from its current site, as its location on a site of such cultural and historic significance is an act of particular insensitivity. Therefore, upgrading the treatment plant on its current site has not been considered further.
2. Why is only Takamatua part of this proposal, what about other valleys?	The proposed treatment plant will be on Old Coach Road, near the intersection of State highway 75. Council has already purchased the land and obtained consents for the treatment plant. Any irrigation or land treatment scheme needs to be not too far from the treatment plant, otherwise the capital and operating costs will be prohibitive. On this basis, a distance of 2 km from the treatment plant was chosen for the options assessment.
3. Has it been taken into consideration that mānuka plants don't like being wet, so won't grow well?	Reference: Cook, J.M., Mark, A.F., Shore, B.F. 1980. Response of *Leptospermum scoparium* and *L. ericoides* (Myrtaceae) to waterlogging. New Zealand Journal of Botany 18: 233-246. This study demonstrated that mānuka has adaptations in the stem that produce lenticels and parenchyma tissue that allows air transfer when in waterlogged sites. Therefore it is perfectly adapted to such places and you can find it in abundance in wetlands. The three places it is found doing well in Christchurch exemplify this: Travis Wetland, southern end of Brooklands Lagoon, Charlesworth Wetland.
4. Will the treated wastewater exceed the standard to go into the sea?	The treated wastewater quality will be of a very high standard and after initial mixing and dilution, the concentration of all contaminants are lower than the guideline concentrations for the harbour.
5. In Takamatua effluent from livestock goes into the sea, what's the difference between this and treated wastewater?	Runoff from land is a significant source of contamination in the harbour. The Assessment of Environmental Effects for the proposed discharge of treated wastewater to the harbour found that the proposed Akaroa wastewater treatment plant will produce a high quality treated wastewater which will have very low concentrations of the wastewater parameters that are generally responsible for adverse environmental and public health effects. The results of computer modelling and the subsequent public health risk assessment for the harbour outfall consent application show that under normal viral loads in the community, the infection risk from either contact recreation or shellfish gathering within Akaroa Harbour is very low. Potential adverse effects to marine mammals and other aquatic biota as a result of exposure to contaminants in the treated wastewater are negligible. Recreationalists and other users of Akaroa Harbour will not be adversely affected and their experience enhanced with an improvement in water quality. However, the discharge of treated human wastewater to the harbour is offensive to the Ngāi Tahu parties, and this was one of the reasons the Commissioners gave for declining the consents for the harbour outfall, along with the assessment of alternatives to the harbour discharge being inadequate.
6. Isn't the whole Takamatua area difficult to irrigate?	Irrigating in the Takamatua area would be challenging due to the undulating topography and loess soils. However, based on the findings of the desktop study, we believe it is technically feasible.

Question	Answer
7. Can you graze stock on the land still if it is irrigated? Is there a stand down period of 30 days for stock to graze after irrigating with treated wastewater?	Historically human wastewater has been treated to a level where diseases can potentially be irrigated onto pasture. If cattle graze the irrigated pasture too soon after the irrigation then there is the potential to transfer the diseases from humans to cattle. The main concern was around the beef tape worm (*Taenia saginata*). The withholding period for when stock could not enter a paddock irrigated with human wastewater was typically around 30 days. At Akaroa the proposal is to use an advanced treatment system which will prevent most diseases (and in particular the cysts of the beef tapeworm) from being present in the treated wastewater to be irrigated. This presents the opportunity to consider reducing the withholding time between irrigation and grazing. The use of the land by any type of stock and any withholding requirements will be considered further as options are considered in more detail.
8. Takamatua Stream is low already and lots of springs dried up after earthquakes. What do we do if stream dries up?	The water supply for Akaroa and Takamatua has several sources, including the Takamatua Stream. If the stream dried up, we would rely on the other water sources, and impose water restrictions if they were insufficient. All areas being considered for wastewater irrigation are downstream of the water intake on Takamatua Stream.
9. How many litres per day of wastewater needs to be treated?	The 2041 design flows are: Average winter flow: 290 cubic metres per day (m^3/day) Annual average flow: 357 m^3/day Summer average flow: 561 m^3/day Peak summer flow: 1,011 m^3/day Peak wet weather flow: 1,800 m^3/day
10. Are there any other technical reports that we could have access to for this project?	Yes - please see the Council website for these: http://www.ccc.govt.nz/services/wastewater/wastewater-projects/akaroa-wastewater-scheme/
11. What about barging the wastewater to Christchurch, has this been considered?	No - this is not done anywhere else in the world and would be impractical. There is no ship access to the Christchurch wastewater treatment plant, so the barge would need to discharge the wastewater at Lyttelton. It is over 80 km by sea from Akaroa to Lyttelton. There is no spare capacity in the Lyttelton wastewater system to accept flow from Akaroa and it would be very expensive to upgrade the system to provide additional capacity.
12. What is the best option if you don't consider the cultural issues and which option is cheapest?	There is no simple answer to which option is the best option, as the Council has to weigh up costs, technical feasibility, environmental effects, social effects and cultural effects in deciding which option to pursue. The lowest cost option is Option 4 - subsurface flow wetland and discharge via a coastal infiltration gallery, but all options are within the project budget.
13. If the outfall option had not been culturally sensitive, would the Council have pursued the land disposal options?	The Commissioners may have declined the harbour outfall consents primarily on the grounds of the assessment of alternatives to the harbour discharge being inadequate, so the Council may have had to investigate land disposal options further in any case.

Question	Answer
14. What were the other objections for the consents for the Akaroa wastewater scheme?	In their decision, the Commissioners summarised the submissions. "The submissions in opposition raised the following concerns. These matters are not listed in any particular order: - Potential impacts on mussel farming in the harbour - Effects of construction on recreational activities; - Impacts of odour on amenity, tourism and recreation; - Negative visual impact of the WWTP; - Increase of sedimentation from the discharge and subsequent impact on shellfish; - Proximity of discharge to pāua beds; - Impact of odour on neighbouring landowners and land value; - No evidence biofilters will function adequately; - Discharging wastewater into water without making contact with Papatūānuku (passing over or through land) is culturally offensive to Ngāi Tahu; - There is no firm proposal to reduce the volume of wastewater discharged into the harbour as land based discharge options become available; - Length of consent duration sought does not allow for modernisation in future; and - Properties downwind of the treatment plant may be affected by virus and bacteria aerosols through the oxygenation process." http://ecan.govt.nz/news-and-notices/notices/HearingDecisions/akaroa-decision.pdf
15. Why weren't Ngāi Tahu happy with Option 6 (harbour outfall)?	Ngāi Tahu consider the disposal of human wastewater to the harbour, no matter how well treated, is offensive. Discharge of sewage into Akaroa Harbour is seen as degrading the mauri (life essence) of the coastal environment, which is linked to the health and accessibility of their local food resource.
16. Why couldn't Ngāi Tahu pay the extra for a longer pipeline?	It is the Council's responsibility to provide a wastewater service for Akaroa.
17. Why couldn't a longer outfall be built, out to the heads of Akaroa Harbour?	The option of an outfall beyond the heads of Akaroa Harbour was considered in 2008, and the cost estimate at that time was $28 - 47 million. The pipeline would be 11 km long. The Akaroa Harbour marine chart notes that the Harbour entrance has “generally heavy ground swell” and “Loose seabed, bad holding ground”. The heads of Akaroa Harbour face southward and are expected to experience significant water currents and swells, particularly during bad weather. Outfall construction would involve outfall construction involves a high degree of risk and complexity due to the nature of the environment (changeable sea and weather conditions, and underwater work in near zero visibility). Due to the high cost and technical difficulty, this option was not considered further.
18. Why can’t we swim at Tikao Bay?	Swimming at Tikao Bay is still possible. ECan's website states that the overall risk of illness from swimming in Tikao Bay is low, based on the past three years of monitoring data. http://www.lawa.org.nz/explore-data/canterbury-region/coastal/tikao-bay/

Question	Answer
19. Is there runoff from the Wainui treated wastewater irrigation area?	There is no runoff from the Wainui wastewater irrigation area. Condition 16 of Consent CRC091580 requires that "The discharge shall not result in any wastewater flowing off the irrigation areas." The consent compliance monitoring reports for 2013/14 and 2014/15 (i.e. since the consent was granted) did not identify any breach of this consent condition. http://www.ccc.govt.nz/assets/Documents/The-Council/HYS/2016/april/Akaroa-Wastewater-Appendix-J-Wainui-Wastewater-Scheme-Monitoring-Reports.pdf
20. Tikao Bay has issues with the wastewater system - are there lessons learnt from this?	The Council is not aware of any issues with the Tikao Bay wastewater treatment plant or the wastewater irrigation area. No member of the public has advised Council of any issues, but should do so if they exist.
21. How many properties are at Wainui?	There are approximately 160 houses in Wainui. The Wainui wastewater treatment plant serves 37 houses.
22. Do the Lincoln University trials mean Council have already decided on the land application option?	No. The Council is committed to investigating land disposal options for Duvauchelle and Akaroa. The side agreement to the consent for the existing Akaroa wastewater treatment plant (CRC133179) includes a condition requiring the Council to engage with the parties to the side agreement "To discuss the possibilities and planning for alternative wastewater discharge options and/or wastewater reuse in respect of the Akaroa treatment plant." The Lincoln University lysimeter and field (tree) trials are part of this process.
23. How long is the trial being undertaken by Lincoln University?	The lysimeter trials run for two years and will be complete in June 2016. The irrigation of the trees in the trial plot at Duvauchelle started in December 2016 and the trial should be complete in June 2017.
24. Are the core samples taken for the Lincoln University lysimeter trials representative of Takamatua?	Yes - half the core soil samples were taken from Takamatua Peninsula for the lysimeter trials with the other half coming from the Duvauchelle golf course site.

Question	Answer
25. How will timings of Lincoln University trials work with project timeframes? Isn't it too early to decide on which option for this project?	The Lincoln University trials fit well with the project timeframes. The trials will provide information about: - The depth of treated wastewater that can be sustainably irrigated to the local soils, from lysimeter trials using soil cores taken from Takamatua Peninsula and this will be complete by June 2016. This information will be used to determine the size of the irrigation areas. In the meantime, the annual wastewater irrigation depth of 900 mm at Wainui is being used to size the irrigation areas. This has similar soils and topography to Takamatua. The results of the lysimeter trial may mean that more or less land is required for irrigation, but preliminary results show that at least 500 mm per year can be irrigated. In the worst case of an irrigation depth of 500 mm per year to pasture, 55 hectares of land would be required. The desktop study shows that 60 hectares of land could be suitable for irrigation. - Which native plants cope well with being irrigated with treated wastewater, which will be complete by June 2017. If irrigation to trees is the selected option, there are other tasks that need to be completed before a consent application could be lodged, such as detailed geotechnical investigations, land negotiations and an assessment of environmental effects. We expect these tasks to take at least a year, so the tree trial will be finished before the consent application is lodged. There are already clear differences between the trees being irrigated with treated wastewater and those that aren't, with growth visibly better in the blocks receiving treated wastewater. http://www.kiwiscience.com/BanksPeninsula.html
26. If the treated wastewater quality is not good - would Council stop irrigating?	No – the treated wastewater quality will always be of a high enough quality for irrigation, even when the bypass is operating.
27. Will there be noise pollution from the irrigation spray equipment or the pumps?	The pump station would be designed to meet the noise requirements of the District Plan, which sets noise limits to be met at the property boundary. The sprinklers would not be noisy and would be in keeping with the rural environment.
28. Is there the ability to amend design if the weather conditions change, with global warming etc.?	No allowance has been made for climate change. On the east coast of the South Island the impact of climate change is generally expected to be drier summer conditions with heavier storm events (more intense rainfall over the same duration). This may result in greater localised flooding during the event, but is unlikely to cause any greater infiltration into the wastewater network than already allowed for. In addition, as the Council continues work on reducing infiltration and inflow into the network, any small increases that may be attributed to climate change would likely be offset by decreases in flow from improvements to the network. The net result is that climate change is not expected to affect design flows significantly.
29. Could you combine options e.g. irrigation and harbour outfall?	Yes this is possible, but would be significantly more expensive. The cost of the two options would need to be added together and this would exceed the current project budget. The exception is a combination of irrigation to trees and pasture, which would be a similar cost to either of these as standalone options.

Question	Answer
30. Has the proposal been designed to cope with the amount of water coming in and is it built for a rain event?	The treatment plant has been designed to provide full treatment for most flows. About once or twice a year, during a large storm, the capacity of the treatment plant would be exceeded. The peak flow would receive full primary treatment, UV disinfection and disc filtration, so would be of a slightly lesser quality than from full treatment. In very large storms, overflows from the network would occur, as is the case for wastewater networks around the world.
31. Has anyone physically walked over any of the land before this proposal was put together?	A site walkover of some of the areas has been undertaken by Council staff and its consultants. More detailed investigations would need to be undertaken if a land based option was chosen.
32. If using a k-line irrigation system, how far away from streams would they need to be?	The desktop study assumed a separation distance of 25 metres from waterways. If irrigation is the chosen option, the separation distance would need to be confirmed at the next stage of the project.
33. Some of the proposed land has rivers running through it and we use potable water, so how would this affect us?	A 25 metre set back from waterways shown in Council's GIS (geographical information system) has been used to develop the maps. Other than the water supply bores shown on the maps, there are no consented water takes in any of the areas.
34. Have the pink areas been chosen by aerial?	Yes. LIDAR survey data (from aerial photos) was used to determine land with less than 15 degrees slope.
35. How much time will this process take until we get a decision?	Once consultation closes, Council staff will prepare a report to the Infrastructure Transport and Environment (ITE) committee meeting, summarising the options and feedback from consultation, and recommending a way forward. The ITE committee meeting will be held on 12 July, and the committee will make a recommendation to the Council meeting on 28 July. The Council is to provide a status report to the Environment Court and to the parties on the Council decision, and what that may mean for the progress of the appeal, by 5 August 2016.
36. How much land is actually required?	The amount of land required depends on the option chosen: Option 1: year round irrigation to trees - 29 ha Option 2: year round irrigation to pasture - 38 ha Option 3: summer only irrigation plus wetland or infiltration basin - 17 ha Option 4: subsurface flow wetland - 1.4 ha Option 5: infiltration basin - 1.5 ha Option 6: harbour outfall - no land required
37. How much will each option cost?	Option 1: year round irrigation to trees - $4.5 - 6.1 million Option 2: year round irrigation to pasture - $7.3 million Option 3: summer only irrigation plus wetland or infiltration basin - $4.9 - $5.8 million Option 4: subsurface flow wetland - A$3.6 - 4.0 million Option 5: infiltration basin - $4.3 - 4.8 million Option 6: harbour outfall - $6.7 million
38. How does groundwater infiltration and stormwater inflow affect these options?	Inflow and infiltration has little effect on the size or cost of each of the options.
39. Are the pipe routes to the coastal infiltration gallery (Options 3 – 5) practical?	The pipe routes to the coastal infiltration gallery shown on the map are only indicative and may change. The two routes shown are largely in paper roads, as the Council can build a pipe as of right in a paper road. If an option was chosen that included the coastal infiltration gallery, more consideration of the pipe route would need to be undertaken.

Question	Answer
40. Will there be issues with smell?	Probably not. The wastewater will be very well treated and will not have an offensive or objectionable odour. The wastewater from the bypass treatment is slightly less well treated, so may be more odorous. However, this will be mixed with fully treated wastewater in the storage pond, so the combined wastewater is unlikely to be odorous. If a land based option is chosen, this will be assessed in more detail at the next stage of the project. One option to reduce the risk of odour would be to cover the storage pond and provide odour treatment for any air from the pond.
41. What happens to the solid waste?	The sludge from all Banks Peninsula wastewater treatment plants is tankered to the Christchurch wastewater treatment plant, where it is put in digesters which break convert the sludge to biosolids and produce biogas. The biosolids are then dried and used to remediate the Stockton Mine. The biogas is used for heating and to generate electricity. The sludge from the proposed treatment plant will be managed in the same way, that is transported to the Christchurch Wastewater Treatment Plant - approximately one tanker load per week.
42. Is there information on the size, noise etc. of the new treatment plant?	Consents have already been granted for the new treatment plant. It will meet the requirements of the District Plan for noise. Given the small size of the proposed plant and the enclosure and ventilation of the majority of the equipment, any odours produced are unlikely to be noticeable within approximately 20 metres of the plant during normal operation. For more information, see Sections 4.5.1 and 8.9.4 of the consent application. http://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Scheme-Upgrading-Resource-Consents-Application-and-Assessment-of-Effects-on-the-Environment-AEE-CH2M-Beca-June-2014.pdf
43. Does the current design allow for useable treated wastewater being returned to Akaroa for any of the options?	Yes - treated wastewater could be used in Akaroa for all of the options. The wastewater will be treated to a very high standard and could be used for non-potable reuse, such as toilet flushing water, garden watering, boat washing (but not for drinking). However, a pipe to convey treated wastewater for reuse in Akaroa is not within the current scope of the project.
44. To what extent can we see some demonstration wastewater reuse pipes here?	It would be possible to lay a reuse pipe from the treatment plant to Akaroa, but this isn't currently within the scope of the project.
45. The coastal infiltration gallery option would contravene recreational and cultural issues. Isn't it the same as the outfall pipeline?	The only difference between the coastal infiltration gallery and the outfall pipeline is that the coastal infiltration gallery would result in a diffuse discharge to the harbour. The recreational and cultural effects will be similar for both.
46. Why do you need land so close to the treatment plant?	To minimise the cost of piping and pumping the treated wastewater to the irrigation area. It would be possible for the irrigation area to be further away, but this would be more expensive, and may not be within the current project budget.
47. Could a reticulated wastewater scheme be provided for Takamatua as part of this project, with treated wastewater returned via a third pipe system for reuse?	Providing a reticulated wastewater scheme or a treated wastewater pipe for Takamatua is not part of this project, and is not in the current Long Term Plan. However, the new treatment plant has been designed to include flow from Takamatua in the future.

Question	Answer
48. Why was the decision made to build the treatment plant on the current site at Takapūneke?	The Council does not have access to the original decision. However, the current treatment plant site is out of sight of the main community, relatively close to the urban area and is easy to pump to. When the treatment plant was built in 1960, it is likely that there was no consideration of the cultural or historic significance of the site.
49. What are the anticipated operational costs for each of the options?	Operational costs have not been estimated yet, but based on experience elsewhere, irrigation to land is expected to have the highest operational cost (Options 1 – 3), subsurface flow wetland, infiltration basins and the harbour outfall are expected to have a low operational cost (Options 4 – 6). For more information refer to Section 9.3 of the concept design report. http://www.ccc.govt.nz/assets/Documents/The-Council/HYS/2016/april/Akaroa-Wastewater-Concept-Design-Report-for-Alternatives-to-Harbour-Outfall-CH2M-Beca-May-2016.pdf
50. What are the chances of going back to the Environment Court?	If the Council decides to go ahead with the harbour outfall as the preferred option, then the Council will need to go back to the Environment Court to continue with the appeal to the decline of the harbour outfall consents. It is not possible to determine the likelihood of the Council making that decision.
51. Do you have evidence that the land can handle the irrigation options?	The geotechnical risks are covered in Section 6 of the concept design report, which states: "In relation to the risk of ground instability and erosion, evidence of historical ground movement on sloping terrain on the peninsula is noted. For options involving application of wastewater to land, the risk of future ground movement over and above ground movement that will occur naturally can be managed by a range of measures including the following: · Selection of suitable application sites with a slope of less than 15 degrees · Avoiding applying wastewater when soils are saturated · Avoiding applying wastewater during winter (for pasture irrigation option) · Investigation of site soil profiles and soil moisture holding capacity · Use of a soil moisture water balance model incorporating field data to plan and operate the land irrigation system." http://www.ccc.govt.nz/assets/Documents/The-Council/HYS/2016/april/Akaroa-Wastewater-Concept-Design-Report-for-Alternatives-to-Harbour-Outfall-CH2M-Beca-May-2016.pdf
52. There is local concern of the irrigation system failing, have you considered local and professional advice for this project?	The Council has obtained advice from suitably qualified consultants on the technical feasibility of each of the options. If a land based option is chosen, the Council will be in discussion with landowners about any issues they are aware of associated with their land.
53. Has the impact on land owner's livelihoods also been taken into consideration?	No – this would be a matter that could be investigated at the next stage if a land based option was chosen.

Question	Answer
54. How much weighting will the Council put on local views? We don't want Takamatua to be to Akaroa what Bromley is to Christchurch.	The report to the Infrastructure, Transport and Environment (ITE) Committee on the options for treated wastewater disposal will consider a range of factors, including the views of the local community obtained through this consultation process, as well as cost, environmental effects and cultural effects. It is up to the ITE Committee about how much weight they give to the views of the community in making their decision.
55. We are confused over stormwater and improving what goes into the wastewater system. What happens now and what will happen with each of the options?	There are separate systems for stormwater and wastewater. Stormwater is conveyed to streams and the foreshore at present, and this will continue. Some stormwater does enter the wastewater system, and the Council is undertaking a programme of works to reduce this. Approximately 3 km out of the total 17 km of wastewater pipe replaced recently, as well as other measures to reduce stormwater inflow. This has decreased peak flows to the wastewater treatment plant from 3,000 cubic metres per day to 1,800 cubic metres per day. The next step will be a house to house inspection to identify stormwater pipes connected to the wastewater system and low lying gully traps that may be flooded.
56. What is the process of discharge of wastewater by irrigation?	Irrigation would likely be done by either fixed sprinklers of K-line in pasture areas, by button dripper lines in areas under trees or by subsurface drip irrigation if other options are not viable.
57. How well does land irrigation work in this area?	It is well known that irrigation on to the loess soils of the Port Hills is challenging as the soils do not take a lot of water, that is why proposed irrigation rates are very low and irrigation will only be done in relation to soil moisture deficit.
58. Were some pink areas removed from the maps in the consultation booklet?	No pink areas have been removed from the map.
59. Some areas are always wet - what will be done for these areas?	If the ground is too wet then no irrigation will take place while the ground is saturated.
60. What happens if someone is running a P-Lab and chemicals get flushed through the wastewater system?	This risk has been assessed for the Christchurch wastewater treatment plant and it was found that the risk was low due to the small volume of wastewater that could be contaminated, compared to the total volume of wastewater that is treated. The risk is likely to be similar in Akaroa.
61. When will the treatment plant be built?	If a land application system is selected then construction of the treatment plant will start as soon as access to sufficient land is agreed and all consents are in place.
62. What is the likelihood that compulsory land acquisitions will be made under the Public Works Act?	It is hoped that compulsory purchase will not be necessary and that agreement can be reached with land owners for some other form of long term access to the required land. The Council does however have the option of pursuing compulsory purchase if sufficient land is not available. At this stage it is very difficult to predict the likelihood of this action.
63. Will it be acceptable for the community to have their own legal representation?	People can choose whoever they like to represent them. Further if a land application option is recommended new consents will be required and then there will be a further opportunity to make a submission and present your views to the hearings panel.
64. Can the area above Akaroa be considered instead?	The land above Akaroa could be considered for irrigation but it is generally too steep. Further the Medical Officer off Health would need to approved placement of the treated wastewater into the catchment for the water supply and this approval is unlikely to be given.

Question	Answer
65. What is Ngāi Tahu's main concern?	Ngāi Tahu's main concern is the cultural offensiveness of any wastewater discharge to the harbour no matter how well treated the water is.
66. In the valley we produce food such as walnuts - how will they be affected if they are irrigated by treated wastewater?	Before any decision is made to irrigate any particular parcel of land full consideration will be given to the existing land uses and the impacts of irrigation. If the impacts were not going to be positive then it is unlikely irrigation would proceed.
67. Do all the landowners of the areas identified as possibly suitable for the land based options know about the proposal?	Yes all the land owners have been contacted and are aware that the desk top study completed so far has identified that parts of their property could be suitable for land application of treated wastewater.
68. Why are we wasting time if we don't know how land owners feel about selling land?	It may not be necessary for land owners to sell their land. They could lease the land to Council, or a licence to occupy the land could be agreed.
69. Have enough people indicated they would sell land?	Detailed discussions with land owners have not been completed, however some land owners have indicated that they are interested in irrigation on their land.
70. Do we know what the favoured land sites are?	The preferred sites will be from those sites already identified as possible land irrigation areas. Further investigations and negotiations with landowners are needed before the Council knows which of the areas would be preferred.
71. What happens if people don't want to sell land?	If sufficient land could not be obtained through negotiations with willing land owners (i.e. land owners do not wish to sell their land, or enter into a lease agreement, or licence the Council to occupy their land), then the Council (as a last resort) could seek to compulsorily purchase the land, but it is stressed that this option is not favoured and would not be done lightly.
72. Can you tell us who might be interested in selling land?	Discussions with land owners have not reached that stage yet, but there are some landowners who have expressed an interest in using the treated wastewater to irrigate their land. Some land owners have already indicated that they are not willing to sell their land.
73. Will run-off be a problem considering the clay soils?	For the irrigation options, treated wastewater would be applied to land at rates that meets the assimilative capacity of site vegetation and soils. Generally, sustainable land application systems are operated on a soil moisture deficit basis to ensure that no ponding or runoff to surface waters occurs. Having an appropriately sized storage pond would be essential when soil conditions are unsuitable for irrigation. Therefore, run-off is not expected other than the run-off that already occurs when it rains.
74. Is there a detailed soil map of the area? There are concerns that the clay soil will not be absorbent.	Geotechnical investigation has been carried out both through the high level Tonkin and Taylor soil mapping for the Banks Peninsula settlements (see link below), and through specific site investigations by Dr Mark Yetton on areas to avoid for possible land irrigation. Lincoln University are conducting lysimeter trials on irrigation to soil cores taken from Takamatua Peninsula to determine the sustainable application rate for treated wastewater. Further geotechnical investigations on-site would be required if the Council chooses a land based option. The loess soils and vegetation do absorb water, but the key question is how much can be sustainably applied at a specific site. http://ccc.govt.nz/assets/Documents/The-Council/HYS/2016/april/Akaroa-Wastewater-Appendix-F-Geotechnical-Figures.pdf

Question	Answer
75. What is that risk of shellfish becoming contaminated?	The results of computer modelling and the subsequent public health risk assessment for the harbour outfall consent application show that under normal viral loads in the community, the infection risk from either contact recreation or shellfish gathering within Akaroa Harbour is very low. If discharge is via a coastal infiltration gallery, mixing and dilution will be less than for the mid-harbour outfall option, so there may be a slightly higher public health risk from eating raw shellfish.
76. What studies have been done on shellfish quality?	There is an ongoing shellfish monitoring program at three sites – 200 m from the existing treated wastewater outfall at Takapūneke, in front of Ōnuku Marae and at a site at the end of the proposed outfall in the middle of the harbour. The results of the data to date suggest that the shellfish are safe to eat at each of these sites.
77. How often does the harbour flush out?	Based on the mean tidal volume and the total volume of water in the harbour the harbour is flushed every 3.7 days.
78. Are the owners of Block A on the map interested in selling?	The owners of Block A are not interested in selling their land, but they are interested in irrigating their land with treated wastewater.
79. Why can't you irrigate on the Akaroa Recreation Ground with the treated wastewater?	It would certainly be possible to irrigate the Recreation Ground with the treated wastewater but this use would only use about 3% of the total volume. It would require another pipe from the treatment plant to the Recreation Ground.
80. Is the population of Akaroa expected to grow and has population growth been factored into the designs?	Increased growth in Akaroa (not expected to be large) to 2041 has been factored into the design of the treatment plant, and the future addition of Takamatua properties has also been allowed for in the design.
81. How well tested are the treatment plants?	All treatment plants are required to have their discharges tested on a regular basis. The type of testing required and frequency is set by the conditions of the consent for the discharge from the treatment plant.
82. Have we considered a wastewater treatment system which uses electricity to kill germs e.g. oil rigs + Denmark and then dumped out - e.g. Omni-pure?	There are a number of different package systems available for treatment of wastewater in the confines of ships and oil rigs. The Omni Pure system uses high levels of electricity with sea water to produce chlorine from the seawater to disinfect the waste streams before discharge into the sea. The level of treatment achieved in these systems would not be sufficient for a harbour discharge. Council has opted for standard proven treatment plant technology that is normally used in New Zealand communities to produce high quality treated wastewater.
83. Why did the Green Point sewerage outfall stop?	The outfall at Green Point from the current Akaroa treatment plant on the Takapūneke Reserve is still operating. The consent to discharge from this site does not cease until October 2018.
84. What was the cost for tankering wastewater to Christchurch for treatment?	This cost has not been investigated in detail, however to transport the current average flow of 230 m^3/day, in 12 m^3 tankers would require 4 tankers working 20 hours per day, and at a rate of $120/hour equates to an operating cost of $3.5 million per year without considering peak flows, storage requirements and the environmental impacts of 40 additional truck movements per day.
85. As the Marine Reserve isn't used for food gathering, can the wastewater be discharge there instead?	This would be contrary to the Marine Reserves Act 1971, which states that reserves shall be preserved as far as possible in their natural state. It is unlikely that a consent to discharge treated wastewater into the marine reserve would be granted.

Question	Answer
86. What is a coastal infiltration gallery?	A coastal infiltration gallery is a perforated pipe laid inside gabion baskets filled with rock. This would be buried on the rocky foreshore of the headland of Takamatua Peninsula. It would allow the treated wastewater to discharge in a diffuse way to the harbour.
87. If the treated wastewater is so pure, can there be a compromise with the community and Ngāi Tahu? Could it go on the land at Ōnuku?	The land around the Ōnuku Marae is predominantly covered in bush but is too steep to be appropriate for irrigation of wastewater.
88. Will the Council store treated wastewater in winter?	Yes, all the land based options include ponds for storage of the treated wastewater, to smooth out peak flows, and in the case of irrigation to store wastewater when the ground is too wet for irrigation. The volume of storage depends on which option is chosen but could be up to 40,000 cubic metres.
89. Will there be an issue with smell? (Rolleston has issues with smell)	No there will be no smell with the storage or application to land, due to the very high quality of the treated wastewater. The Rolleston wastewater treatment plant at The Pines uses a different treatment process to what is proposed for Akaroa.
90. How many ponds will there be?	The number of ponds is not known, but if a land based option was chosen, this would be confirmed during the preliminary design.
91. Will Ngāi Tahu be concerned with cultural effect of digging the road?	Ngāi Tahu and the Historic Places Trust are always interested in any excavation works and as a result all the Council contracts include "Accidental Discovery "protocols" that must be followed if anything is discovered during excavations.
92. During construction, what protection will there be for the road?	Any construction in the roadway requires an approved traffic management plan to ensure traffic safety, and the Council has standard requirements for trench construction that ensure the roads are reinstated correctly following construction.
93. What sort of irrigation will there be on land?	There are two main options for irrigation on to land. Under trees "button dripper" lines will be used. On pasture "K-Line" irrigation will be used where possible. Another option is the use of subsurface drip irrigation but this would not be a first choice for cost and operational reasons.
94. Won't there be an issue if there is too much nitrogen, that you can't use hay for stock?	The treatment process proposed to be used in Akaroa removes a lot of the nitrogen so there is only a small proportion left in the treated wastewater, and the rate of application to the land is proposed to be low so nitrogen accumulation, run-off or infiltration will not be an issue. Application rates of treated wastewater are low because the soils in the area are not suited to high application rates.
95. Has consideration been given to the fact that rivers/waterways will get inundated with nitrates which will eventually be an issue?	The streams will not be inundated with nitrogen as the rate of application is such that there will be little or no runoff.
96. How will the grass around the trees be controlled?	The grass around the trees will need to be controlled for a period after planting until the trees are established. Once the trees are well established no further grass control will be necessary, and once the tree canopy becomes established the grass will disappear. The method of controlling the grass would be established at a later stage of the project, if irrigation to trees was the chosen option.
97. Is the New Brighton ocean outfall monitored?	Yes - the pipeline diffuser is inspected periodically. The discharge of treated wastewater through the pipeline is monitored on a weekly basis.

Question	Answer
98. How far out is the New Brighton ocean outfall?	The Christchurch ocean outfall pipe is 3127 metres from the hide tide mark to the end of the diffuser.
99. Will some of the pink areas from the maps be removed after discussions with owners?	Some of the pink areas identified in the desk top study may be removed from further consideration for a range of reasons particularly if there are factors that the Council does not yet know about that would make irrigation non-viable.
100. What happens if there is a problem with the system?	During the detailed design phase extensive risk assessment is carried out to ensure a long term and reliable system. For example we already know that the treatment system will be a dual train system to facilitate maintenance or breakdown. Standby generation will be in place to ensure continuity of power supply. Multiple land parcels would be obtained to ensure land availability should irrigation be the chosen option.
101. What will be the effect on the marine life be? Fishing in the harbour has reduced significantly.	There is not expected to be any impact on marine life for any of the options. There are likely to be a range of reasons for less fish being caught.
102. Where are the treatment plant locations?	The treatment plant site is at the top of Old Coach Road next to the new water supply storage reservoir. The Council has been granted consents for the new treatment plant.
103. Aren't kānuka trees too slow to grow?	No - kānuka (now *Kunzea robusta*) on this part of Banks Peninsula grows at a remarkable rate. In the former Banks Peninsula District Plan there was a height of 6 metres for kānuka to be declared significant at the location being considered here. In discussions with landowners in the area, they considered that this was an unfair imposition upon them as it took only 8 to 10 years for it to reach that height, placing restrictions on their ability to farm. This remarkable growth rate is because of the fertile soils, good rainfall and warmer climate in winter. It is estimated that it would take 4 - 5 years of good conditions for a kānuka canopy to establish.
104. If the public are excluded from flat land, how will people walk to Akaroa?	The issue of public access to walkways on private land will be discussed with the land owners and if there is a wish that these be retained every effort will be made to retain them where they are or to relocate them to appropriate routes.
105. What about composting toilets?	Composting toilets are most suitable in areas remote from reticulated wastewater systems. They are unlikely to be the preferred choice for most home owners in a residential area. Composting toilets only treat part of the wastewater, and a method for treating and disposing of grey water (from sinks, washing machines, dishwashers, showers, baths etc.) also needs to be provided, as grey water is often as contaminated as wastewater from toilets. Due to the small section sizes in Akaroa, it is generally not possible to provide on-site treatment and disposal of wastewater.
106. Wouldn't you need storage? What happens with major weather events?	Yes, the proposals for land application include ponds for storage of the water when the ground is too wet to allow irrigation. The volume of storage depends on which option is chosen but could be up to 40,000 cubic metres.
107. With storage, will that restrict growth?	Storage will not restrict growth of the proposed system. Additional storage could be added at a later date if more storage is required.
108. At what point would the drinking water supply not be taken from the Takamatua Stream?	Water supply would cease to be taken from the Takamatua Stream when the stream flow was so low as to leave less than 0.5 litres/second flow downstream of the intake. A flow of less than this rate would impact on fish passage.

Question	Answer
109. If the Council haven't completed the modelling, how can the Council make a decision?	We believe that there is sufficient information for the Council to make a decision on which option to proceed with. If a land based option is chosen, a new consent application would be required, and this would be accompanied by a detailed Assessment of Environmental Effects.
110. Can the foreshore be safely used by the public if there is a coastal infiltration gallery?	People will still be able to safely access the shore at the coastal infiltration gallery as the treated wastewater discharged will easily meet a contact recreation standard. The water quality at the discharge will also meet the shellfish gathering standard although people may not wish to take shellfish in the area.
111. How many people live and are eating their food at Ōnuku?	There are less than 10 permanently occupied properties at Ōnuku, although the marae does frequently cater for functions involving hundreds of people.
112. If irrigating to trees, will you have large trees?	Initially the trees will be small and will only require a reduced amount of irrigation. Full irrigation would take place once a canopy had formed, which for kānuka is expected to take 4-5 years.
113. When does the consent for the existing Akaroa wastewater treatment plant expire?	The existing consent expires on 8 October 2020.
114. 60 hectares has been identified as possibly suitable for irrigation. What were the selection criteria?	The selection criteria were: • not too far from the new wastewater treatment plant on Old Coach Road (a 2 kilometre radius was used), relatively flat (less than 15 degree slope) • at least 25 metres from a residential area or waterway • property size of at least 1 hectare • not known to have land stability issues.
115. Has the fire department been consulted? There are concerns over the fire hazards with this dry weather.	The NZ Fire Service has been sent the consultation information. Further discussions with the NZ Fire Service about the fire risk and how this is best managed would be undertaken at the next stage of the project, if a land based option is chosen.
116. Takamatua Valley is shown as being flood prone in the District Plan, are you aware of this?	Part of the lower Takamatua Valley are shown as being in a Tsunami Inundation Area in the proposed District Plan (Natural Hazard Planning Map 77 – Stage 3), but this does not affect any of the areas being considered for irrigation. None of the valley area is shown as being in a flood management area in the proposed District Plan.
117. There is a walking track from Takamatua Kingfisher Point between blocks A, B and C – would this still be usable if the land was irrigated? What would happen to the use of Old Coach Rd?	The issue of public access to walkways on private land will be discussed with the land owners and if there is a wish that these be retained every effort will be made to retain them where they are or to relocate them to appropriate routes. Old Coach Road will continue to be used as it is now. There will be some traffic disruption during the construction.
118. Can the pipes be buried under the ground?	All main pipes will be buried. K-line or button drip irrigation pipes would be above ground.
119. Is there cultural significance with any other land?	There is a Silent File over parts of the land that is of significance to the Ōnuku Rūnanga. Early indications are that this will not present any issues, however this aspect will need to be confirmed at the next stage if a land based option is chosen.

Question	Answer
120. Irrigation - what happens when you exceed the storage that is available?	If storage in the pond is exceeded and there was no immediate possibility of land irrigation, then either the pond would be required to overflow to a stream or pumping to the treatment plant would cease and discharge of screened raw sewage would occur to Grehan Stream from the terminal pump station in Akaroa. It is therefore very important that pond sizing is adequate for all situations.
121. In winter, there are many unoccupied houses, so in the wettest time the Akaroa toilets aren't flushing - will this be an issue?	The design of the proposed plant has already taken into account seasonal variations in flow and load. This would also be taken into account for the design of any land based option.
122. Are there other examples on the peninsula with a similar system?	Duvauchelle wastewater treatment is discharged through a 1600 m long outfall to between Ngaio Point and Onawe Peninsula. Consideration is being given to how the Duvauchelle discharge can be removed from the harbour and the treated wastewater applied to land. Both Tikao Bay and Wainui treated wastewater is applied to land by button drip systems under pine trees.
123. Will the water level in the pond fluctuate?	Yes. Generally the pond will be low in summer when irrigation will be possible most of the time and will fill up during winter when irrigation is not possible.
124. Could we re-use this treated wastewater anywhere?	The quality of the proposed treated wastewater will mean that it can be used for garden watering or toilet flushing. In fact one of the options considered was the use of the treated wastewater in a "third pipe" system that would reticulate the treated wastewater to all properties for this very use. However, this option would only use about 20% of the treated wastewater so other options would also be required. It was also very expensive but would be an option at some time in the future.
125. What is the current status of Option 6 (harbour outfall)?	Option 6 (an outfall to the harbour) is still an option being considered by the Council. If the Council did decide on this option, the appeal to the Environment Court (which is currently under directed mediation) would proceed to the Court for the Court to decide.
126. What is in place to ensure there is no risk of pipelines leaking or breaking?	Choice of the right pipe materials is the key factor in pipe robustness. Pipes do leak or break on occasions but modern pipe materials (polyethylene and PVC) are much less prone to breaking and leakage.
127. Will the technical report be peer reviewed?	The draft technical report on land based options was peer reviewed, and the final options report incorporated the recommendations of the peer review. The peer review and the CH2M Beca response to the peer review is available on the Council's website: http://ccc.govt.nz/assets/Documents/The-Council/HYS/2016/april/Akaroa-Wastewater-Appendix-B-Peer-Review-and-Response-to-Peer-Review.pdf

Question	Answer
128. Is there more information available on the dismissed options?	The concept design report for alternatives to the harbour outfall includes discussion of option not progressed in section 3.3: http://ccc.govt.nz/assets/Documents/The-Council/HYS/2016/april/Akaroa-Wastewater-Concept-Design-Report-for-Alternatives-to-Harbour-Outfall-CH2M-Beca-May-2016.pdf There are also further options that were considered in the historical reports on the Council's web site: http://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Options-and-Risk-Analysis-Harrison-Grierson-ecoEng-Golder-Associates-February-2010.pdf http://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Selected-Options-2008-MWH-October-2008.PDF http://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Integrated-Water-Management-Strategy-Part-6-Wastewater-Treatment-Options-MWH-February-2008.PDF