

As per earlier comms please find below a high level summary of my comments on the submission and in particular how the submission refers to technical documentation provided of which I was a party to some:

1. I have read through the submission and concentrated my efforts around geotechnical issues. What is immediately obvious is that the submission does not quote directly the various technical notes accurately. There seems to have been a concerted effort to 'massage' the information that has been provided by technical experts. One example of this is in their executive summary point 3a. which makes the statement that the school site with mitigation measures is safe. Whilst the technical reports may talk about low risk they do not ever say the site is safe.

Another statement of concern is Bullet point 4, 3b of the executive summary which states 'removal of debris behind the bund is unlikely to be required even for extreme events - four extreme events would need to occur before the bund is filled'. I cannot find this statement in any of the technical documentation which is not surprising as it is immaterial from a geotechnical perspective as the bund does not have to be full to be compromised. I can only assume this has come from a third party interpretation of the geotechnical information which is both misleading and technically incorrect.

These are two examples where the submission interweaves technical findings with their own interpretation. What is of extreme concern to me is in the way that this has been portrayed as the geotechnical advice that has been provided. As a co-author of some of this information I am extremely concerned about this. From a professional perspective I find this to be exceedingly worrying as such I do not endorse the technical findings in their submission.

2. The inference that the site is safe is made in the submission but from the technical reports provided the conclusion is that with mitigation the site may be at low risk, which is not to be construed as safe. The technical statements state there is a low risk - but who accepts the risk is a key question that they pose.

One issue I have with the MWH report is that whilst they talk about the requirement to look at the risk to the school should be a societal one, they have used the GNS risk model which pertains to the annual individual fatality risk of a resident living in the Port Hills which is an inappropriate measure of risk for this site. So, whilst their logic of looking at the GNS 10-6 risk line which is the modelled level of the extent of the hazard is ok from an engineering design perspective, the lack of societal risk calculation makes it impossible to state what the risk is at the school either at present or post mitigation. This should have been done specifically using a societal risk measure for a school. Ideally this should have been presented as an annual individual fatality risk but for a school goer, or as a generic societal risk comment (ie how do you value young school children vs a resident?). It is only then that we can discuss the true risk. Any reference to GNS risk numbers is technically incorrect for this school setting.

3. There is a huge amount of uncertainty around both GNS and MWH modelling for cliff collapse and individual rockfall, as clearly stated in the GNS work. This includes a probabilistic approach to modelling where statistics are used, for example the theoretical boulder size. However, what the earthquakes have told us is that the only certainty is the uncertainty, especially around cliff collapse, and there are a number of examples where boulders did not 'obey the model' and ran out further than expected. Therefore I find the statement that bullet no 5, 3a makes to be incorrect. There may be a very low likelihood of boulders reaching the bund but is certainly not impossible. Likewise with

flyrock, in fact I believe considerable flyrock did enter the site and cannot be discounted in the future. There also seems to be a limitation on the field mapping as I believe that both fly rock and cliff collapse boulders reached the bund site between the buildings at no 124 Main Road. Jan Kupec has more info on this.

4. Whilst, in my opinion the school submission has been written along the lines of not letting the truth get in the way of a good story, fundamentally geotechnically nothing has changed from the original geotechnical advice, ie an engineering option can considerably reduce the life risk to a very low level but will never definitively say the site is safe. Intrinsically this means that someone has to accept this remaining risk. The prelim concept (it is not a final design) in the MWH report makes use of existing scientific data but cannot guarantee the bund will not be impacted by another cliff collapse or rockfall event. It may well be that there is no damage but this cannot be guaranteed. If there is either damage or considerable rockfall behind the bund the risk associated with the bund will have to be re considered (the submission stating that 4 x large events will have to occur before the bund is filled is just plan geotechnical nonsense). This is not just a technical question on how long this can take, it is a larger societal one where logistics and health and safety need to be considered. Considering our lessons learnt from the recent earthquakes, it is relatively easy to impose restrictions (whether they are regulatory like red placards and/or S124 Notices, but very difficult to justify removing them). In fact the school is a classic example, nearly 5 years on from the quakes and there is still no resolution to this. I would therefore say that this site is unique and not like any other area. The geotechnical caucusing rightly stated that this post emergency decision to re-occupy cannot be estimated by their profession as it is not just their role that dictates this process.

5. Another important note to be considered in this situation is that of existing ownership and gaining permission to build a large bund as there are many parties affected including residents both in the red and green zone. It should be noted that the red zone is a voluntary offer for the crown to buy the property. It is my understanding that to date not everyone has accepted this offer and therefore we have the situation where a resident who has existing use rights under the RMA being locked between an unstable cliff and a 4m high bund.

The bottom line is that there are a huge amount of issues (societal and technical), very little of them are purely technical that have to be considered for this engineering proposal to successfully go ahead. One thing I am pretty sure of is that this will be a long process, possibly protracted with potential legal issues, to go through before a bund can be considered and built.

6. I would also like to clarify the Aecom report written by Don Macfarlane. Although Don was part of the original caucusing and drafted up the caucusing minutes, as part of his commitment to the school BOT, he also wrote the report for them. Although this report discusses the key caucusing points discussed, it goes further by providing extra information. This report was therefore never formally signed off by the other members of the caucusing and should not be taken to be endorsed by them.

Please note I have not provided a formal review of the submission but have kept my commentary to a summary of particular points that are of concern to me in my professional capacity.

Best wishes  
Ian