Mr Chairman, Members.

Introduce self and principal area of expertise as per evidence.

Earlier this year, I reported to Carey Baptist Grammar School on flood related matters and the North East Link Project. That report was subsequently incorporated into Carey's submission to this Panel Hearing. I will be talking to that report.

Carey’s Bulleen Sports Complex is located on the Yarra River and Koonung Creek floodplain at the top end of what is generally known as the Chandler basin. Use and development since the site was purchased in 1959 has been mindful of the flood risk.

The proposed Project’s southern portal and associated infrastructure are also located within the Chandler basin a short distance upstream and a little further away from the Yarra River and from Koonung Creek than the Campus.

To recap from Carey's submission, there are a number of key flood related issues for the Bulleen Campus.

- Key issue 1 is changes to the characteristics of Yarra River floods, particularly for those events that occur more frequently and are smaller than (i.e. are not as deep as) the 1% Annual Exceedance Probability Yarra River event;
- Key issue 2 is changes to the character of Koonung Creek and the resulting changes to flood characteristics in the reach between Bulleen Road and the Creek’s confluence with the Yarra River;
- Key issue 3 relates to relocation of the Campus access road to the north of its current location.

There are two flooding regimes that need to be considered when assessing the impact of the North East Link on the Bulleen Campus. From the Yarra River and from Koonung Creek. Yarra River flooding is generally driven by regional scale rainfall events and is relatively slow to develop and slower to recede. Koonung Creek flooding on the other hand, occurs very soon after locally heavy rain and rises and falls quickly. Yarra River flood volumes are much larger than equivalent Koonung Creek floods.

Any works that alter the ability of a floodplain or flow path to store or convey water will have an impact on flood characteristics – on flood frequencies, levels, depths, extents, velocities, hazard, durations and rates of rise. An increase in any of those characteristics (and they are inter-related) at Bulleen will affect the likely consequences at the Campus. It is the smaller floods, that family of floods from those that first engage the Campus and access road to around (say) 2m or so higher, that are key. Any changes to their characteristics will, because of the location and geography of the area, have a noticeable impact at the Campus.

Substantial assets at the Bulleen Campus that are water level critical – a 20mm increase in water level near floor level makes a big difference in damage costs.

During a Yarra River flood, the Chandler basin acts like a big bathtub with the waterway area under the Chandler Highway Bridge the outlet or plug hole. How full the basin becomes depends on flood volume. If we put something solid into the floodplain, such as the North East Link portal, walls, additional roads and bunded construction compounds and works areas, the displaced water isn’t just pushed out of the basin. It doesn’t disappear. Water levels rise and other flood characteristics are changed. This will happen for all floods that encroach onto the floodplain.
The bathtub effect is not evident for Koonung Creek floods. This is because the Yarra River channel at the Chandler Highway Bridge is able to pass the flow with only limited upstream ponding as Creek flow volumes are much smaller than for equivalent Yarra River floods. However, the Project will be modifying Koonung Creek and it is these works that will change flood characteristics.

In Technical Report P – Surface Water, GHD has shown, in broad terms, the Project-driven increases in water level across the Campus for the Yarra River and the Koonung Creek 1% flood but not for other (smaller) floods. It is the smaller Yarra River floods and the full range of Koonung Creek floods that are most important to Carey as they affect day to day activities at the Campus.

I note the high and long flood wall recently proposed for construction on the Carey side of a relocated Bulleen Road. This configuration has not been included in the hydraulic modelling. As flood storage is being further reduced, there is likely to be a consequential rise in flood levels. There is potential for substantial negative impact on flooding depths at Carey .... but by how much?

**Slide #9 - Koonung Creek 1%AEP flood afflux (as provided by NELA in July)** This is a plot of the increase in flood levels for the Koonung Creek 1% flood from the draft EES. Green is a reduction in levels, red is an increase in levels. The Campus is covered in red – flood levels are increased. Flood levels are reduced across other parts of the floodplain. That appears to be a benefit to others at Carey’s expense. That is not consistent with the ERPs (Environmental Performance Requirements) and must be considered unacceptable.

In NELP Technical Note No 29 (dated 17 July) it is stated that proposed undergrounding of Koonung creek would have little impact. I disagree very strongly.

**Slides #10 & #11 Koonung Creek, Dunshea oval, score board**

**Slides #12 & #13** Flooding on 10May this year after a very short and sharp storm in the general vicinity of Blackburn. A small flood – approx 2year ARI (50% AEP) event and went from normal levels to flooding like this in 24 minutes. Note rubbish. Took a number of hours to clear up and make ready for use. This is likely to occur more frequently and be worse, especially during the construction period.

I put these photos up as evidence that it is not just the 1% flood that is of major concern for the Campus and that changing the character of Kooning Creek will have an impact on the Campus. An impact that has not as yet been able to be quantified because required information has not been provided.

There is no information and / or modelling results presented for the construction phase of the project, a key issue given that there are four construction compounds shown located upstream of and in close proximity to the Campus on both the Yarra River and Koonung Creek floodplains.

**Slide #14 - proposed construction compounds in close proximity to the Campus.** A flood during the construction period could be expected to result in substantial additional debris, silt, stockpiled excavated material and potentially fuel and oil being deposited on Campus surfaces including in the pool. Clean up efforts could be expected to be more intense and protracted with the results that costs will be higher. Importantly, if a flood was to occur while Koonung Creek works were in progress, impacts could be expected to be very different and more damaging than what has been modelled as the mitigating measures would not be available. As Victoria does not have a definable flood or locally heavy rain season with large floods recorded across the year, it is difficult to see how construction activities could be programmed to avoid the likelihood of flooding.
As stated previously, it is the smaller Yarra River floods and the full range of Koonung Creek floods that are important to day to day operations at the Campus. This is because if the access road is wetted or any of the facilities are threatened with inundation, the Campus is progressively closed down. Key levels and the withdrawal process are documented in a purpose-built Flood Response Plan mandated by Melbourne Water. That Plan is aimed at minimising risk to people, assets at site and the environment.

In summary, there are four main concerns.

- **Concern 1** is the increase in flood damage / loss due to the Campus being flooded more frequently. The direct and lost time / use cost of reinstating the pool to operational condition is significant.

- **Concern 2** is the increase in the time that the Campus will need to be closed down with facilities unavailable for use, including to non-Carey users during weekends. This is a function not only of changes to the flooding characteristics across the Campus but also, and possibly more so, of the location and pavement level of the new access road and its connection to Bulleen Road.

- **Concern 3** is the increase in the frequency and time on average per year that Carey will be unable to deliver teaching and related programs. Direct and indirect costs are substantial.

- **Concern 4** is the increase in construction and compliance costs associated with future development due to an increase in the 1% flood level.

The information provided in the draft EES is not sufficient to enable an assessment of the likely impact of the Project on Carey’s Bulleen Campus and the associated increase in average annual damage costs. For example, there is insufficient information on those floods that are key to operations. Further, information about pavement levels and flood risk along the new access road is not available. It is understood this is because the proposed new access road has not been stamped into the digital elevation model that sits underneath the hydraulic model results. This means that even though that road is shown on flood related figures within the draft EES, none of the information that might be inferred from those figures can be considered correct or reliable. In turn, this means that an assessment of the likelihood of a change to the frequency of the need to close the Campus due to compromised access and egress and the duration of that closure cannot be undertaken. That prevents completion of an assessment of the impact of access road reconfiguration on Campus use.

Overall, current indications are that the flood related impacts of the North East Link Project on the Campus will be negative, on all counts. There are no positives evident. Maybe those negative impacts can be absorbed without materially disadvantaging users of the Campus and its facilities, but information available is not sufficiently complete or comprehensive to enable an informed assessment. For example, in addition to the absence of information for the more frequent floods, the information that has been provided has been dumbed down from specific values and grouped into colour coded ranges. While that does perhaps aid presentation, it does not assist informed assessment as the upper value of each range by necessity becomes the default value for such analyses.

More detailed data was requested from NELA. That request was refused.

The draft EES states that impacts identified (e.g. changes to flood characteristics) will be mitigated within the detailed design phase of the project. However, there is no evidence to support those claims. Water can’t be disappeared. Adding a whole lot of solid infrastructure into the floodplain is going to change flood characteristics. The question is by how much. That question has not yet been answered satisfactorily. In addition, the heavy reliance on the EPRs to resolve identified impacts provides no opportunity for Carey and others to provide comment on the suitability of proposed solution(s).
In view of the inadequacies discussed in my report (included in Carey’s submission) and touched on here today, as well as failure to comply with Melbourne Water key guiding principles and standards, it is clear that the interests of Carey have not been adequately considered and may not be adequately protected. That is unacceptable as it is contrary to the intent of the EPRs.

EPR-B3 provides a commitment to remedy damage resulting from the project. To assist with this for the Bulleen Campus, the likely increase in damage and disruption across the full range of Yarra River and Koonung Creek floods should be quantified and discussed with Carey following final design modelling (for both the construction and operational periods).

In addition and in order that the surface water modelling for the final design (again for both the construction and operational periods) can be undertaken with appropriate regard for existing assets and flood risks at the Bulleen Campus, all flood related EPRs (e.g. EPR-SW6 in particular) should include an obligation on the successful contractor to obtain, from Carey, information on critical levels and areas of concern.

In his evidence on Monday, Mr Fuller acknowledged the requested change to EPR-SW6 along with the concerns raised in relation to Carey’s Bulleen Campus (ref document 147). But he then states that he thinks that EPR-SW6 as amended by the surface water conclave (ref documents 119 & 152) is sufficient.

I disagree. Both of the changes requested to the EPRs are essential to delivering confidence that the North East Link Project will not disadvantage Carey. Unfortunately, that confidence is currently at a very low level.