Helensburgh Community Council

Proposed Helensburgh Waterfront Development 18/01614/PP
Response to Applicant's Submission of 21st January

22nd January 2019

1 INTRODUCTION

We apologise to Councillors for the extreme lateness of this submission, but we only received new information from the Planning Officer (updated calculations from Kaya Consulting and new plans for the rock armour protection to the site) earlier this morning, Tuesday 22nd January.

We note that both Kaya Consulting's calculations and the critical section for the south-facing protection have changed since our 16th January meeting with the applicant and their external flooding/drainage consultants.

Our concerns are:

- After the previous PPSL meeting on 19th December, the applicant quickly expressed total confidence in the previous overtopping rate calculations from Dr Kaya and the subsequent drainage measures from Patrick Parsons (as has been noted by the Planning Officer in his Supplementary Report 4). While Dr Kaya's figures have altered yet again, HCC remains skeptical that even these latest figures paint an accurate figure for this exposed site.

  Does the PPSL have more confidence in the successive new (and different) key calculations and revisions that stretch back to a few days before the PPSL Hearing on 19th November?

- A second concern is that Dr Kaya's calculations form the basis of the Patrick Parson Consultancy's work on site flooding and drainage. The figures from the applicant themselves show that the site will be exposed to flooding by 2060, and yet these figures may well be considerable underestimations.

2 BUILDING LOCATION

In order to verify our approach, we have sought advice from Professor Tom Bruce, BSc, MSc, PhD of the University of Edinburgh. Professor Bruce is one of the authors of the EurOtop manual on wave overtopping – the 'bible' on this subject, to which Dr Kaya regularly makes reference.

Prof Bruce's advice was twofold:

1. He confirmed that the definition of total overtopping volume that our Vice Convener had presented to the applicant on December 20th was correct, i.e. that this can be calculated as:

   Total overtopping volume per metre = (mean overtopping rate) x (duration of storm)

   This is the calculation that the applicant termed "misleading and incorrect" in their response of December 21st.

2. We also discussed the "0.25 x wavelength" calculation, which has been used as the basis for the location of the building – the applicant has used a EurOtop equation to say that only 5%

of the splash and spray will hit the building. Prof Bruce was clear that the basis on which this is presented in EurOtop is for a vertical seawall where the overtopping will primarily go vertically upwards with only a small horizontal component. **This particular calculation is not intended for application on a sloping structure, and therefore is not a suitable basis for locating the building only 6.25m from the seawall**.

This means that an alternative formula from the EurOtop manual must be used to calculate splash and spray distribution, as we demonstrated in our memo of 16th January (Section 3). To ensure 95% of the spray does not reach the building, **it has to be moved away from the seawall by an additional 1.05m**.

As an aside, we note that Dr Kaya's response (of 21st Jan) was incorrect – he assumed that the rubble armour equation in EurOtop could not include the 0.5m wave wall, but it can (and we included it).

3 Wave Overtopping Rate

Dr Kaya said on 5th December that the additional 0.5m wave wall would reduce the overtopping rate at the building to a tolerable 0.8 l/s/m, i.e. less than one litre every second over a metre of crest length. This is for the 1-in-200 year storm in 2060.

Curiously, the latest figures that Dr Kaya provided to HCC earlier today are that 0.4 l/s/m, i.e. half that rate, would overtop at the wave wall. **This is inexplicable because, of course, at least as much water has to overtop the wave wall as reaches the building.**

Dr Kaya's latest figures come from the PC-Overtopping tool, which is an industry standard method "to establish overtopping predictions" based on calculations from the older (2007) version of EurOtop. The output is the mean approach to overtopping, to which one standard deviation must be added in the coefficients to provide a "Design or Assessment Approach" as described in the 2018 version of EurOtop, i.e. figures that are appropriate for the basis of a design.

When we do so, the mean overtopping rate at the seawall increases to 0.97 l/s/m. This becomes significant below.

4 Total Wave Overtopping Volume

HCC raised a concern on 20th December that the total overtopping volume had been significantly underestimated – a memo from Patrick Parsons of 7th December said that **560 litres/m** would overtop the armour crest (at 5.4m) without the wave wall, i.e. 560 litres across every metre of the crest during a 2 hour storm.

Dr Kaya's latest figures are that 0.411 l/m would overtop every second of a 1-in-200 year storm in 2060, i.e. **2,959 litres/m** during 2 hours of a storm.

That is a factor of 5x higher than the Patrick Parsons estimate and yet, despite that being the issue that HCC raised, no mention of this discrepancy was made by Dr Kaya.

When we use the Design or Assessment Approach value of 0.97 l/s/m, the figure becomes 6,984 litres/m.

That is a factor of 12x higher than the Patrick Parsons estimate.

Crucially, SEPA signed-off on the original drainage figure from Patrick Parsons on 17th December because it had been phrased as a "conservative" estimate, and yet it is significantly lower than the applicant's most recent figure.

In terms of drainage, Dr Kaya's latest memo says that his figure of 0.411 l/s/m will exceed the capacity of the drainage system in the 1-in-200 year storm in 2060.

The table below contains the drainage figures for calculated overtopping rates:

Overtopping rate per metre of crest	Total overtopping volume per metre of crest in 2 hours	Total overtopping volume over 66m of leisure centre	Drainage required per second
0.411 l/s/m	2,959 l/m	195,307 litres	27.1 l/s
0.97 l/s/m	6,984 l/m	460,944 litres	64.0 l/s

The planned drainage capacity is 10.1 l/s, i.e. between 3 and 6 times less than is required.

Over 2 hours of a storm across the entire car park, with overtopping and rainfall, 1,297,909 litres will have to be drained or stored. **This is almost 10 times the volume of the water filter/storage tank that has been designed below the carpark and therefore the carpark will flood around the leisure centre.**

5 Wave Period

The estimated wave period is fundamental to the applicant's choice of building positioning because they have recommended it be sited back from the wall crest by 6.25m as this is ¼ of the offshore wavelength. (As above, this approach has been discounted by an independent expert). The wavelength is directly proportional to the wave period, and therefore a small change in wave period will affect this calculation, along with the overtopping rates above.

Dr Kaya's memo from 21st January said that he averaged the wave periods of 4.6s, 4.2s and 3.4s to arrive at an average of 4s and hence a wavelength of 26.25m (and therefore ¼ is 6.25m).

In fact, the average of these figures is 4.07s which, rounded correctly to 1 decimal place is 4.1s. An apparently insignificant difference of 0.1s but, if this had been applied:

- **The building should be sited at least 6.56m from the seaward crest, i.e. 26cm further than currently planned.**
- **The overtopping figure above of 0.97 l/s/m becomes 1.17 l/s/m, and the drainage required goes up to 77 l/s.**

This is a hugely significant figure when the applicant has sited the building in this fragile location.

6 Rubble Armour Removal

The applicant submitted new drawings for the sea defences today, 22nd January. The reasoning from the applicant was:

> *"It has been identified that on 4 of the Sectional Drawings, which had been revised in light of the UKCP18 Climate Change Predictions, an erroneous graphic had*

appeared, which could have led to a misunderstanding of our coastal sea defence proposals."

At our meeting with the applicant and Dr Kaya on 16th January, HCC had discussed the inclusion of the rubble boulders at the top of the sea defence. If these boulders were removed (as they have been) Dr Kaya's view was that the seaward crest would now be at the top of the wave wall, rather than at the top of the rubble slope.

Based on Dr Kaya's opinion, therefore, and using the applicant's view that the building should be 6.25m from the "seaward crest" (which is the phrase in EurOtop), **the building must be moved north by an additional 2.2m.**

7 CONCLUSION

It continues to be HCC's concern that, at this stage, we should be discussing the positive features that the community would benefit from in this badly-needed leisure centre, but instead we are discussing why the building is positioned in a way that makes it vulnerable to overtopping. We all need to be confident that due diligence has been exercised to create a robust and durable proposal for the new building and site; especially so given this exposed position. Instead, we remain sceptical about the positioning of the building and the measures in place that must protect the building, pedestrians and vehicles on the entire site.

For example:

- The fundamental basis on which the building has been located so close to the seawall has been questioned by one of the international experts in this field.
- It is difficult to gain confidence when the key parameters for this build keep changing – we were told two days before the November Hearing that the flood defence was only viable until 2030, and an additional wave wall added. We were told today that the drainage is insufficient for the 1-in-200 year event for which the building is required to be designed. We were also told today that the design for the rock armour had to be redrawn and resubmitted.
- The response from the applicant after the December PPSL meeting, at which they were asked how the building's vulnerability would be changed by moving it, singularly failed to answer that question. Dr Kaya was clear to HCC that it depends on the distance and the profile of the landward slope – a longer upward incline would certainly reduce the overtopping that reaches the building.
- The overtopping rate figures from Dr Kaya have changed since the December PPSL, and yet there has been no comparison or explanation as to why this critical number has changed.
- No updated proposal incorporating Dr Kaya's new calculations and showing the impact on flood drainage have been forthcoming from Patrick Parsons.

All of these issues arise from the fragility of the location of the building in putting it right by the seaward defence.

Finally, we offer Professor Bruce's suggestion that an independent external review of the building's vulnerability would answer this uncertainty once and for all, would develop clarify and would allow the process to get on with building this long-awaited project.