
From: Charlotte Hutchison [REDACTED]
Sent: 09 January 2018 14:40
To: Walsh, Jennifer <Jennifer.Walsh@Camden.gov.uk>
Cc: Ian Mayhew [REDACTED]
Subject: RE: 2017/6499/P - Mansfield Bowling Club Condition 6 and 8

Dear Jennifer,

In relation to your email dated 19th December, please find below responses in red to the various requests for additional information on drainage:

- *the “conveyance swale” recommended in FRA for exceedance events – may be replaced by or synonymous with the rain gardens* – The conveyance swale was intended to intercept any excess runoff from the adjacent area of proposed hardstanding should a storm event exceed the capacity of the proposed drainage system inlets (i.e. road gullies or channel drains). It was solely intended as a failsafe measure to prevent ponding on the proposed hardstanding and preventing that runoff from then making its way off-site. The proposed rain gardens will perform exactly the same purpose by temporarily storing flow on the surface before allowing it to filter through vegetation and underlying soils. As the adjacent hardstanding is now proposed to be permeable paving, it is anticipated that the rain gardens will be largely redundant.
- *the microdrainage calculations used to size the design attenuation volumes and calculate discharge rates* – Please find attached the micro-drainage calculations used to design the proposed attenuation volumes.
- *Details of conveyance swales vs rain gardens and design microdrainage calculations - see queries above. See above.*
- *Confirmation that the proposed impermeable area details remain approximately as per original FRA i.e. is being reduced by 600m² to 0.62ha versus existing.* The development proposals have not materially changed since the FRA was prepared and the drainage strategy remains consistent with the requirements of the FRA.
- *Copy of Thames Water drainage approval letter.* A Section 106 application has not yet been submitted to Thames Water as this is a matter for detailed design. However, Thames Water have no grounds to object to any such application on the basis that surface water from the site already drains to the on-site combined

sewer and that the proposed development will half this current rate of discharge and reduce the impermeable area on-site.

- *Details of green roof and rain gardens' attenuation capacity and runoff reduction. Type and make-up of the two features.*

Green Roof – whilst the green roof will inherently attenuate runoff from the roof, it has not been designed to actively store runoff (i.e. there will be no flow controls on the roof outlets). As per the drainage strategy drawing, the green roof is proposed to be an 'intensive green roof' in line with the attached technical summary from Bauder. This proposal will ultimately need to be confirmed the Landscape Architect.

Rain Gardens – As outlined above, the rain gardens will not form part of the active drainage system and only represent a failsafe measure to intercept any potential excess runoff from the adjacent permeable paving. The rain garden design will follow the guidance given in the Ciria SuDS Manual, specifically Figure 18.8 – an annotated extract of which is attached to show how it would be applied within the proposed drainage strategy.

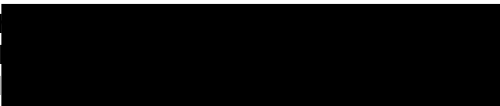
- *Clarification of the modelled storm time duration for 1 in 100 year + 30% climate change, for which the design storage volumes are deemed adequate.* Please refer to the attached micro-drainage calculations which confirm that the proposed attenuation volumes are suitable for the critical duration of a 1 in 100-year return period plus 30% allowance for climate change. As shown, the critical duration in the southern catchment is a 30 minute winter storm whilst in the northern catchment it is a 60 minutes winter storm (both relate to the 1 in 100-year return period plus 30% allowance for climate change as previously advised).
- *Further details of on/off-site exceedance flow paths and volume capture strategy.* Key proposed exceedance flow paths are shown on the proposed drainage strategy drawing and will ensure that all potential exceedance flows will remain on-site, either via ponding in topographic low points or directing flows towards the areas of permeable paving for subsequent capture and storage. It is considered that the volume of any potential exceedance flows on this small site would be negligible, firstly due to the proposed large expanses of permeable paving (the surface filtration capacity of which would not be exceeded given the proposed maintenance regime) and secondly, storage is proposed to be provided in excess of the 1 in 100-year plus 30% climate change critical duration requirement (note from the attached micro-drainage calculations that the maximum water level in the southern permeable paving is 0.283m whereas the sub-base depth is 0.350m therefore providing 13 metres cubed of spare storage; additionally the maximum water level in the northern permeable paving is 0.077m whereas the sub-base depth is 0.150m therefore providing 35.6 metres cubed of spare storage). The surplus storage provision of 48.6 metres cubed within the proposed permeable paving is considered sufficient in mitigation of any potential exceedance flows.

I trust the above is satisfactory.

Many thanks
Charlotte

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