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Flood Risk Assessment & Conceptual Sustainable Drainage Strategy For A Proposed Residential Development At Turner's Pasture Ness Grove, Cheadle, Stoke-on-Trent ST10 1UN

REPORT PREPARED ON BEHALF OF TURNER'S PASTURE LTD

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PLANS

1. Introduction & Aims

Turner's Pasture is located in a residential setting on Ness Grove, Cheadle, Stoke-on-Trent ST10 1UN (see Plan 1). The OS grid reference for the site is SK 013 440. The site is currently an agricultural small holding and comprises residential dwellings and outbuildings surrounded by grassed pasture land. The site is owned by Turner's Pasture Ltd and it is understood that a Planning Application is to be submitted to the Local Authority for the development of 36 residential properties of variable size.

This report is concerned only with the parcel of land edged in red on Plan 1 – the site location plan. This irregular shaped parcel of land has an area of approximately 10,000m^2 (one hectare). Cecilly Brook is located to the west and south of the site and flows in a south easterly direction.

The ground level across the eastern half of the site (close to the entrance off Ness Grove) is typically 160.5m AOD. The land slopes fairly steeply down towards the southwest where ground elevations are typically 158 – 158.5m AOD. A topographical survey plan of the existing site is presented in Appendix 5.

Environment Agency flood maps and other information in Appendix 2 indicate that the site edged in red on the location plan is located largely within Flood Zone 1 (low flooding probability <0.1%), however, the western corner of the site lies within Flood Zone 2 (medium flooding probability 0.1% - 1%). Flood Zone 3 (high flooding probability >1%) overlaps very slightly with the site in the far western corner.

Planning Policy Statement 25 (ref 1) states that planning applications for development proposals of one hectare or greater in Flood Zone 1 and all proposals for new development in Flood Zones 2 and 3 should be accompanied by a Flood Risk Assessment (FRA).

This report therefore seeks to assess the risks of flooding from and to the future site land use (residential housing) with consideration of climate change and to identify how these flood risks will be managed in terms of site's redevelopment. The report will also outline the opportunities to reduce the probability and consequences of flooding and will provide conceptual recommendations for a sustainable urban drainage scheme.

2. Flood Risk Assessment

2.1. Site Flood Zones

Environment Agency flood maps and other information in Appendix 2 indicate that the site edged in red on the location plan is located largely within Flood Zone 1 (low flooding probability <0.1%), however, the western corner of the site comprising proposed plots 19, 20, 21 and part of plot 22 lies within Flood Zone 2 (medium flooding probability 0.1% - 1%). Flood Zone 3 (high flooding probability >1%) overlaps very slightly with the site in the far western corner at the bottom of the rear gardens of proposed plots 19 and 20. The developer should consider a slight modification to the housing layout, in order to avoid flood zone 3 totally.

Plan 2 shows the development proposals for the site with the Flood Zones adjacent to Cecilly Brook superimposed.

2.2. Source Of Flooding

The Environment Agency data presented in Appendix 2 shows that the source of potential flooding of land adjacent to Cecilly Brook is from overtopping of the brook embankments due to heavy rainfall in a 1:100 year event.

Environment Agency records indicate that part of the site (the low lying land adjacent to the brook) was flooded in 1977. A plan provided by Brian Reid Architects in Appendix 5 also shows the approximate extent of site flooding in 1953. This is based on evidence provided by the family residing at Turner's Pasture and shows that the flooding was restricted to the land adjacent to the brook (outside of the proposed residential development zone).

There are no Environment Agency flood defences along this stretch of watercourse affecting the site.

2.3. Predicted Flood Levels & The Impact Of Climate Change

Examination of the node points on the Environment Agency flood map in Appendix 2 would suggest that NODE POINT CB3617 in Cecilly Brook is the location which is most relevant to Turner's Pasture. This Node Point has a predicted flood level of **158.3m.AOD** at the 1% Annual Exceedance Probability (UD_100). The impact of climate change (20% increase in flows) on the predicted flood level has not yet been modeled by the Environment Agency.

In the absence of EA modeling data for the impact of climate change on the brook, a precautionary approach to the establishment of suitable minimum finished floor levels is suggested – subject to the approval of the EA and the Local Authority. It is anticipated that ground levels on the western half of the proposed site will be raised as a matter of course.

Peak Associates would suggest that a suitable precautionary approach to establishing minimum finished levels which take into account climate change would be to take the predicted flood level for an extreme flood in a 1 in 1000 year rainfall event (worst

case scenario) and add a 600mm freeboard allowance for proposed buildings and a 300mm freeboard allowance for roads, parking and pedestrian areas.

The predicted flood level for node point CB3617 in a 1:1000 year event is **158.4m AOD.**

The suggested minimum finished levels for the development are therefore:

(i) Minimum Finished Floor Level for houses = **159m. AOD**
(158.4m AOD + 600mm)

(ii) Minimum level for roads, parking and pedestrian areas = **158.7m. AOD**
(158.4m AOD + 300mm)

2.4. The Sequential & Exception Tests

In accordance with PPS25, it is proposed that there will be no property development or raising of ground levels within the small Flood Zone 3 area on the site - i.e. adjacent to the brook in the far western corner. The 12.5m strip between the brook and the red boundary line at the south west of the development will be set aside for the use of SUDS features (water compatible development) – subject to the approval of the Environment Agency and the Local Authority. The 12.5m strip will also provide more than sufficient access for the EA in order to maintain sections of the brook channel as required.

Residential housing falls in the 'More Vulnerable' classification when referring to table D2 of PPS25. When referring to table D3 of PPS25, it is clear that the development of residential housing is appropriate in both Flood Zones 1 and 2 without the need for the exception test.

It is therefore proposed that, subject to constructing the houses and associated infrastructure at the minimum levels indicated in section 2.3 (with prior approval from the EA and LPA), there will be a zone of property development in Flood Zone 1 and in Flood Zone 2 in the western corner of the site and no property development on Flood Zone 3 (see Plan 2).

2.5. Risk Of Flooding From The Development

The existing site comprises small areas of hardstanding and larger areas of open grassed ground. It is anticipated that the redevelopment of the site will significantly increase the proportion of hardstanding through the construction of access roads, roofs, parking and pedestrian areas. This will inevitably contribute to a net increase in surface water runoff and flow velocity.

The developers of the site therefore have both obligation and opportunity to reduce the impact of the increased surface water runoff on the brook and those sites on the catchment downstream. Peak Associates have therefore provided a conceptual plan for the development of a sustainable drainage system (see section 3 and Plan 3).