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Technical Note: 001
Date: 9th May 2016
Site: Land adjacent Basford Lane Industrial Estate, Brooklands Way, Leekbrook, Leek
EA Reference: UT/2004/113641/02-L01

HEC RAS Modelling Update with latest climate change increases

Introduction

The Environment Agency model was extended beyond the site during March 2015 by constructing a HEC RAS steady state model from the topographical survey of the watercourse provided by the client. JBA Consulting provided the estimated 1 in 100 year and 1 in 100 year plus climate change (20%) flows for the watercourse at the downstream extent in line with the site.

During October 2015 the report was amended to provide a more detailed drainage strategy which utilised a large pond draining to the adjacent watercourse.

Due to the amended climate change methodology adopted by the Environment Agency on the 19th February 2016 the Agency have requested that the modelling is updated in line with this methodology and the impacts on the development assessed.

Estimated climate change increase

Applying the latest climate change methodology, the following variables have been used.

- The site is located within the Humber Catchment
- The proposed development is commercial, subsequently the vulnerability of the proposed development is low
- The design life is 75 years therefore banding 2070-2115 applies
- As low vulnerability central and higher central bandings to be applied.

Based on the above criteria the climate change increase for the proposed development will range between 20% and 30%.

The 2014 HEC RAS model includes the 1 in 100 year plus climate change (20%) scenario therefore the 1 in 100 year plus climate change (30%) scenario will need to be considered as part of the technical note.

Modelling results for 1 in 100 year plus climate change (30%) scenario

The table overleaf shows the modelled flood levels for the 1 in 100 year plus climate change (20%) and the 1 in 100 year plus climate change (30%) scenarios for each of the cross sections constructed in line with the site.

There is an increase of between 0.03m (30mm) and 0.05m (50mm) within the site. The corresponding flood levels and the flood envelope has been annotated onto the attached drawing referred to as “Appendix F Flood Envelopes 090516”.

The flood envelopes have also be overlaid onto the drainage strategy referred to as “Appendix I Drainage Strategy Drawing 090516”. The 1 in 100 year plus climate change (20%) flood envelope is shown as cyan and the 1 in 100 year plus climate change (30%) envelope is shown red. As can be seen from the drainage strategy drawing the built part of

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the site and the balancing pond is located out of both of the flood envelopes. As such, the impact on the proposed development is considered to be insignificant.

Table 0-1: Water Levels at Key Locations during unobstructed flow

Cross Section Reference	100yr+CC(20%) Water Level (mOD)	100yr+CC Water Level (mOD)	Increase (m)
0	152.88	152.92	0.04
91.25	153.94	153.97	0.03
172.2	155.13	155.17	0.04
297.3	157.35	157.39	0.04
388.2	158.90	158.93	0.03
457.8	160.32	160.37	0.05

Consideration of 1 in 20-year scenario

JBA Consulting did not provide estimated flows for the 1 in 20 year return period. As such, the current model cannot be run to estimate the 1 in 20-year flood levels within the site.

However, as the built development and the proposed balancing pond is located outside of the 1 in 100 year plus climate change (30%) envelope it is safe to assume that it is also outside of the 1 in 20 year envelop and the proposed development will not impact on the functional flood plain.

Conclusion

It is therefore concluded that the additional modelling works requested by the Environment Agency in their response dated 29th April 2016 will not have any significant impact on the proposed development site or adjacent land users.

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