



## ES ADDENDUM: HYDROLOGY

### 11.1 INTRODUCTION

11.1.1 A series of minor changes have been made to the One Horton Heath project as a result of the ongoing consultation on the Wider OPA and OPA Phase 1 planning applications. The purpose of this ES Addendum is to determine whether the proposed changes have the potential to alter the findings set out in Chapter 11: Hydrology of the original ES.

11.1.2 This assessment is supported by:

- A revised Flood Risk Assessment (FRA) and Drainage Strategy for the Wider OPA produced by PFA Consulting Ltd contained in Appendix 11.1 of this ES Addendum;
- A Flood Risk Assessment and Drainage Strategy – Addendum 1 produced by Odyssey contained in Appendix 11.2 of this ES Addendum;
- Flood Risk Assessment and Drainage Strategy - Addendum 2 produced by Odyssey contained in Appendix 11.3 of this ES Addendum;
- A revised Nitrate Neutrality Study – Outline Planning Application produced by Hilson Moran contained in Appendix 11.4 of this ES Addendum; and
- A revised Nitrate Neutrality Study – First Residential Parcel produced by Hilson Moran contained in Appendix 11.5 of this ES Addendum.

11.1.3 For the avoidance of doubt the Water Quality Outline Monitoring and Management Plan produced by Johns Associates contained in Appendix 11.5 of Volume 2 of the original ES remains valid and has not be revised to reflect the updated proposals.

### 11.2 POST SUBMISSION CONSULTATION

#### OPA Phase 1

##### Consultation Responses Received

11.2.1 Following the submission of the full planning application for One Horton Heath First Residential Parcel (F/20/89500) in December 2020 a number of consultation responses have been received relevant to this assessment.



- 11.2.2 The Lead Local Flood Authority (LLFA) provided comments on 5 February 2021 (Ref: SWM/2021/0019). Key points relate to the assessment of surcharged outfalls, lining of permeable pavement areas, location of swales and request for further details of the hydraulic calculations in order to provide a substantive response.
- 11.2.3 The Environment Agency (EA) provided comments on 22 April 2021 (Ref: HA/2021/122890/02-L01) stating they have '*no objection to the proposal as submitted*'.
- 11.2.4 Natural England provided comments on 17 February 2021 and requests further information in relation to a revised nutrient budget calculation in line with the Natural England Solent Nutrients methodology and further assessment of the impacts of sediment loading on the River Itchen SAC.

#### **The Wider OPA**

##### Consultation Responses Received

- 11.2.5 Following the submission of the outline planning application for One Horton Heath (O/20/89498) in December 2020 a number of consultation responses have been received relevant to this assessment.
- 11.2.6 The LLFA provided comments on 5 February 2021 (Ref: SWM/2021/0018). Key points relate to the assessment of surcharged outfalls, the phasing of strategic attenuation features, clarification on climate change allowances used in flood outlines, lining of permeable pavement areas. Notwithstanding these points the LLFA request a condition be attached to the planning permission covering the design and maintenance of surface water drainage.
- 11.2.7 The EA provided comments on 24 February (Ref: HA/2021/122883/01-L01) requiring further information to overcome their objection. Further information requested included clarification of climate change allowances on flood hazards, interaction of surface water drainage features with flood hazards, clarification of watercourse crossings, requirements for floodplain compensation, and further assessment of the effect of urban diffuse runoff on sensitive receiving waters.
- 11.2.8 Natural England provided comments on 10 February 2021 (Ref: 339623) and requests further information in relation to a revised nutrient budget calculation in line with the Natural England Solent Nutrients methodology and further assessment of the impacts of sediment loading on the River Itchen SAC.



### **Supplementary Consultation**

11.2.9 Since the submission of the planning application for OPA Phase 1 and the Wider OPA additional flood risk data has been received on 26 April 2021 from the EA relating to Moorgreen Brook. This flood risk data has been used to clarify the proposed mitigation measures as summarised in the section below.

11.2.10 Following the supplementary consultation the technical documents contained in Appendices 11.1, 11.2, 11.3, 11.4 and 11.5 have been updated to reflect discussions and address the comments in the consultation responses described above. Any additional mitigation measures or clarifications that have the potential to alter the findings of the original assessment are set out in the section below.

## **11.3 REVISED PROPOSALS**

11.3.1 Taking into account the measures set out in the revised technical reports contained in Appendices 11.1, 11.2, 11.3, 11.4 and 11.5 of this ES Addendum and the updated EIA Parameter Plans the revised findings and conclusions are set out below. Those areas not covered by the discussion below indicate that the findings and conclusions in the original ES are still valid.

### **OPA Phase 1**

#### Surface Water Runoff / Drainage

11.3.2 The revised Flood Risk Assessment (FRA) and Drainage Strategy for the Wider OPA contained in Appendix 11.1 includes an assessment of surcharged outfalls on the Strategic SuDS Features which is relevant to OPA Phase 1. It states '*the proposed Strategic SuDS features are all located above the relevant downstream flood levels and so it is not anticipated that there will be any surcharging of the outfalls*'.

11.3.3 The Flood Risk Assessment and Drainage Strategy – Addendum 1 produced by Odyssey contained in Appendix 11.2 of this ES Addendum sets out how OPA Phase 1 addresses the LLFA comments and is supported by updated hydraulic calculations. To summarise Addendum 1:

- Identifies that there is sufficient fall between the outfall and the base of the ditch;
- An assessment of surcharged outfalls has been conducted and concludes '*even with a submerged outfall none of the proposed drainage networks would flood*';



- Clarifies all proposed permeable paving would be lined; and
- Clarifies the positioning of proposed swales;

11.3.4 The Flood Risk Assessment and Drainage Strategy – Addendum 2 produced by Odyssey contained in Appendix 11.3 of this ES Addendum sets out how Water Management Strategy employed in OPA Phase 1 implements two forms of naturalized filtration where feasible and the minimum provision is one form of naturalized filtration. The technical note concludes that water quality treatment standards as required by The SuDS Manual (C753) are exceeded and *‘therefore, it is proposed that the proposed Water Management Strategy satisfies Point i and ii of Policy DM6 of the Eastleigh Local Plan (2016 to 2036)’*.

#### Surface Water Quality

##### *Foul Water Drainage Strategy*

11.3.5 Impacts from foul water drainage will be dealt with through connection of the site to the downstream Southern Water public foul water sewerage system. Due to site’s topography, foul water flows arising from the Proposed Development will be collected in foul sewers and directed to on-site foul water pumping stations. The pumping stations will pump the foul sewage to the public sewer network via a rising main.

11.3.6 Following financial, technical and programme investigations since the submission of the planning applications the preferred point of connection to the public sewerage system has been updated to Allington Lane to the north of the Wider OPA site. This sewerage network drains to Chickenhall Lane Wastewater Treatment Works (WwTW) which is operated by Southern Water and discharges into River Itchen and then into the Solent.

##### *Nutrient Neutrality*

11.3.7 The Nitrate Neutrality Study – First Residential Parcel contained in Appendix 11.5 has been updated to reflect the updated point of connection to the public sewerage system and utilisation of Chickenhall Lane WwTW and comments made by Natural England.

11.3.8 The key amendments to this assessment are:

- Calculation methodology has been refined based on updated assumptions for pre-development agricultural N-losses, occupancy rates and post-development wastewater



discharge volume. The assessment includes a bespoke calculation for the assessment of wastewater N from pre-existing dwellings.

- The wastewater generated by the proposals will be conveyed to Chickenhall WwTW where it will be treated and discharged without any permit concentration limit for TN, with an estimated discharge concentration of 27 mg/l TN.
- After elimination of N-losses from taking arable and pastoral farmland out of production, limiting sewage-related N-loss and the effect of proposed Strategic SuDS features on N removal (denitrification and sedimentation processes) as part of the wider scheme are taken into account the OPA Phase 1 *'equate to a loading of -2,519.0 Kg/TN /yr required to be neutralised at this stage of the OHH development (i.e. a net reduction in N-loss compared to the pre-existing situation).'* On this basis there is no requirement to utilize EBC's own nitrate offsetting scheme for OPA Phase 1.

11.3.9 Taking into account the mitigation measures the study concludes *'the impacts of the FRP and the wider OPA scheme proposals will be fully mitigated and will ensure that they do not detrimentally affect local biodiversity or the conservation status of the downstream European Designated Sites'*.

#### Residual Effects

11.3.10 The assessment of the residual effects of OPA Phase 1 on hydrology as set out in the original assessment remain valid. The only change to the residual effect level taking into account the revised proposals is set out below:

- The cessation of agricultural activities, connection of foul water to a Chickenhall Lane WwTW, and application of a SuDS Management Train to on-site surface water management, reduces the effect of the OPA Phase 1 on nutrient loadings to Negligible. The effect significance of the operation of OPA Phase 1 on downstream nutrient loadings and in the designated sites is assessed as **Neutral** and the effect is considered permanent.



## **The Wider OPA**

### Flood Risk

11.3.11 A revised Flood Risk Assessment (FRA) and Drainage Strategy for the Wider OPA produced by PFA Consulting Ltd contained in Appendix 11.1 of this ES Addendum.

11.3.12 The revised report makes reference to the 1 in 100 year + 45% and 1 in 100 year + 105% events modelled flood levels which is the equivalent to the Higher Central and Upper End climate change allowances. The report states *'all areas of built development and all Strategic SuDS Features are clear of the 1 in 100 year + 45% and 1 in 100 year + 105% flood extents'*.

### *Watercourse Crossings*

11.3.13 The revised report clarifies in respect to ordinary watercourse crossings *'in line with the Landscape and Ecological Mitigation Masterplan it is proposed that opportunities are sought within the development parcels for crossings of ordinary watercourses to be formed from single span structures, clear of the watercourse channels, wherever feasible. Where this is not possible, oversized box culverts should be utilised such that existing bed and bank profiles can be retained or reinstated in order to provide ecological benefits and to maintain the existing hydrological characteristics of the water environment.'*

11.3.14 With respect to the crossings of Main Rivers the revised report clarifies:

- The bridge soffit level should be a minimum of 600mm above the relevant 1 in 100 year + 105% (upper end climate change allowance) flood level.
- The detailed design of this crossing should ensure that the crossing is formed from a single span structure, clear of the watercourse, to allow for access and maintenance.
- As a precautionary measure an assessment has been made of the available space for floodplain storage adjacent to the watercourse crossing to account for if the detailed design of the watercourse crossing impinges on the 1 in 100 year + 105% floodplain. This demonstrates that that direct level-for-level floodplain compensation is achievable in this location if required. Therefore the indicative route of the proposed link road is feasible.



Surface Water Runoff / Drainage

11.3.15 The revised Flood Risk Assessment (FRA) and Drainage Strategy for the Wider OPA contained in Appendix 11.1 includes an assessment of surcharged outfalls on the Strategic SuDS Features. It states *'the proposed Strategic SuDS features are all located above the relevant downstream flood levels and so it is not anticipated that there will be any surcharging of the outfalls'*.

Surface Water Quality

*Foul Water Drainage Strategy*

11.3.16 Due to the topography of the site the foul sewage will be pumped to the point of connection in the public sewer network via a rising main.

11.3.17 As described above in relation to the OPA Phase 1, the preferred point of connection to the public sewerage system has been updated to Allington Lane which drains to Chickenhall Lane Wastewater Treatment Works (WwTW) which is operated by Southern Water and discharges into River Itchen and then into the Solent.

*Nutrient Neutrality*

11.3.18 The Nitrate Neutrality Study contained in Appendix 11.4 has been updated to reflect the updated point of connection to the public sewerage system and utilisation of Chickenhall Lane WwTW and comments made by Natural England.

11.3.19 The key amendments to this assessment which are relevant to both OPA Phase 1 and the Wider OPA are set out in the section above. The study notes that after the effect of proposed Strategic SuDS features on N removal (denitrification and sedimentation processes) are taken into account *'the remaining 1,934.7 kg TN/yr increase in N-loss to the Solent associated with the OHH scheme will be wholly mitigated through EBC's own nitrate offsetting scheme'*.

11.3.20 Taking into account the mitigation measures the study concludes *'the impacts of the proposals will be fully mitigated and will ensure that they do not detrimentally affect local biodiversity or the conservation status of the downstream European Designated Sites.'*



*Surface Water Quality Monitoring*

11.3.21 The revised Flood Risk Assessment (FRA) and Drainage Strategy for the Wider OPA contained in Appendix 11.1 makes references to the adaptive mitigation measures identified in the original ES and the need to implement the Monitoring and Management Plan contained in Appendix 11.5 of Volume 2 of the original ES.

11.3.22 With respect to adaptive mitigation measures the FRA states '*Mitigation measures that could be considered include, but are not limited to, the following:*

- *Removal of the source of the contaminant.*
- *Education / awareness where the source relates to a harmful activity.*
- *Enhanced maintenance / housekeeping.*
- *Additional bioretention areas within development parcels and/or downstream of Strategic SuDS Features, i.e. bioretention swales.*
- *Sand Filters / enhanced filtration.*
- *Mechanical Separators / Proprietary treatment systems.*

11.3.23 Nonetheless the FRA for the Wider OPA concludes '*Provided that good practice is followed and that suitable housekeeping and maintenance of the SuDS Features and wider site are undertaken, based on the Pollution and Mitigation Indices above, it is not envisaged that the monitoring will identify any issues with increased sediment loads.*'.

Residual Effects

11.3.24 The assessment of the residual effects of the Wider OPA on hydrology as set out in the original assessment remain valid. The only change to the residual effect level taking into account the revised proposals is set out below:

- The cessation of agricultural activities, connection of foul water to a Chickenhall Lane WwTW, application of a SuDS Management Train to on-site surface water management, and utilising EBC's own nitrate offsetting scheme reduces the effect of the Wider OPA on nutrient loadings to between Negligible. The effect significance of the operation of the Wider OPA on downstream nutrient loadings and in the designated sites is assessed as **Neutral** and the effect is considered permanent.