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## **9.0 FLOOD RISK AND WATER QUALITY**

### **9.1 Introduction**

9.1.1 This section of the Environmental Statement considers the proposed development in the context of flooding risk and addresses whether a formal Flood Risk Assessment (FRA) in accordance with the requirements of Planning Policy Statement 25 (PPS 25) – Development and Flood Risk, is required. An appraisal is also presented of on-site activities (during both the construction phase and the operational phase) and the potential effects these may have upon the local water environment. Specifically, it concentrates upon the following potential impacts:

- flood risk issues;
- disturbance of surface water drainage regimes;
- contamination of surface waters by suspended solids or by other pollutants.

9.1.2 The context of the existing hydrological regimes is established and the potential impacts relating to the scheme proposals are appraised.

### **9.2 Baseline Context**

9.2.1 This assessment has primarily involved a desk-study based upon information gleaned from the following sources:

- Environment Agency Flood Zone Mapping;
- consultations with the Environment Agency Flood Risk team;
- consultations with representatives from the Black Sluice Internal Drainage Board.

9.2.2 Reference to the Environment Agency's (EA) floodplain maps has confirmed that the site does not lie within an area at risk from tidal or fluvial flooding, with a statistical return period of more than 1 in 1000 years (i.e. <0.1% probability). Accordingly, it can be categorised as a Zone 1 (Low Probability) Flood Risk Area.

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9.2.3 The EA provides standing guidance relating to the preparation of flood risk assessments for 'Development Greater than 1.0 hectares in Zone 1 (FRA2)'. This guidance confirms that, whilst a flood risk assessment should still be undertaken in support of development proposals, the emphasis of this assessment should be on the management of surface water runoff, as opposed to the sensitivity of the development itself to flooding. This is to ensure that other properties lying within the same hydrological catchment area are not adversely affected by any increased runoff arising from the development. Accordingly, an appropriate Flood Risk Assessment has been submitted to the Environment Agency (the referring letter is included as Appendix 9.1). In the course of consultation with the Environment Agency, the applicant has confirmed that:

- it consulted with both the Environment Agency and the Black Sluice Internal Drainage Board in the preparation of the FRA; and
- the applicant would be responsible for maintaining the surface water drainage infrastructure upon completion of the development.

9.2.4 Discussions with representatives from both North Kesteven District Council and the EA have confirmed that the proposal site does not presently lie within an area that has been subject to a Strategic Flood Risk Assessment. It transpires that the District Council are currently in the process of procuring such an assessment, which will be undertaken over the coming months.

9.2.5 The proposal site does, however, lie within the administrative boundaries of the Black Sluice Internal Drainage Board (IDB). As such, statutory functions relating to 'ordinary watercourses' within this area (land drainage consenting procedures etc.) are the responsibility of the IDB, as opposed to the EA. Figure 9.1 illustrates the strategic 'main river' and 'ordinary watercourses' serving the local area.

9.2.6 Consultations with representatives from the EA and the IDB have confirmed that there is no historical or anecdotal evidence of any flooding in the vicinity of the proposed development site.

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### **9.3 Disturbance of Surface Water Regimes**

- 9.3.1 The proposed development would inevitably create large additional areas of roofs and hardstanding that would be impervious to rainwater. As such, the quantity of surface water run-off from the site would increase above that currently experienced. However, the proposed infrastructure would be designed adopting the principles of Sustainable Urban Drainage (SUDS) and would include specific measures to ensure that the existing surface water drainage regime in the area would not be adversely affected.
- 9.3.2 It is proposed that roof water and runoff from all external hardstandings would be collected in a dedicated system of below-ground pipework. Flows emanating from all access roads, car parks and hardstandings would be discharged into this system via a network of trapped gullies and, if necessary, oil/petrol separators/interceptors and, ultimately, into an on-line attenuation pond constructed along the northern boundary of the development plot. From this location regulated flows would be discharged into the ordinary watercourse which runs adjacent to the site's northern boundary.
- 9.3.3 The attenuation lagoon illustrated on Figure 4.1 has been designed to regulate the post-development runoff attributable to the 1 in 100 year storm event (plus an allowance for climate change) to a 'greenfield' runoff rate equivalent to 3litres/sec/hectare, and would accommodate approximately 1,350 cu.m of water.
- 9.3.4 Regulating the generated runoff in this manner would ensure that the hydrological conditions and related land-drainage systems proximate to the site are not adversely affected by the development.
- 9.3.5 A scheme of 'rainfall harvesting' is also proposed as part of the development, to generate a supply of 'grey water' for use in the renewable energy process and in wash-down activities. This introduction would also serve to reduce the quantity of runoff generated by the development that might otherwise exacerbate any existing flooding problems downstream of the development.
- 9.3.6 It is considered that the detailed design of the surface water drainage systems serving the site could be controlled by a suitably-worded planning condition.

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#### **9.4 Contamination of Surface Water by Suspended Solids or by Other Pollutants**

9.4.1 As noted previously, the proposed facilities would operate under the controls imposed by a PPC permit issued and regulated by the Environment Agency. One important aspect of the permit would be to ensure that there would be no pollution / contamination of the ground or surface waters surrounding the site.

9.4.2 The potential effects on surface water quality which should be considered in light of the development proposals are:

- i) the temporary effects, during construction, of large quantities of suspended solids, entering the off-site land drainage system;
- ii) the potential for oil/fuels/suspended solid contamination, emanating from vehicles using the roads, car parks and hardstandings;
- iii) foul effluent contamination, through a failure of any proprietary pumping facility that may introduced at the site and any resulting surcharge/overspill.

9.4.3 Suspended solids exist in all surface water runoff, to some extent or another. However, during the earthworks phase of a construction project this situation can be exacerbated beyond acceptable limits, without appropriate precautionary measures being implemented.

9.4.4 The sources of these potential pollutants are invariably:

- i) run-off from exposed earthworks formations gathering soil particles, prior to entering the off-site land drainage systems;
- ii) earthmoving equipment and lorries transporting mud from the construction site onto the existing access roads.

9.4.5 Both of the above situations can be effectively managed through good working practices employed by the appointed contractor.

9.4.6 In the case of item i) above, peripheral grips cut around the earthworks operations would intercept contaminated run-off which could, in turn, be diverted to temporary settlement lagoons. Designed with appropriate retention

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periods, these lagoons would allow suspended solids to settle out from the run-off, prior to discharge into any off-site drainage systems.

- 9.4.7 In the longer term, the potential for oil / fuel contamination through vehicles using car parks and hardstandings etc. would be effectively mitigated by the introduction of EA approved oil separators, into the permanent on-site surface water infrastructure. It is important to note, however, that the performance of these facilities is directly related to maintenance. In the event any such separators are not regularly monitored or emptied, then the chances of pollution increase considerably.
- 9.4.8 Foul flows generated by the proposals would be collected in a separate system of below-ground sewerage and discharged off site into the existing drainage system serving the town of Sleaford.
- 9.4.9 Depending upon the final design solution adopted and, in particular, the available depth to the receiving sewer system, it may be necessary to introduce a proprietary pumping station to 'lift' the effluent into the outfall manhole chamber.
- 9.4.10 Foul effluent overspill from any necessary proprietary package pumping facilities could result in contamination of the land drainage system in the area. It would be the intention, however, during the detailed design of the scheme, to introduce appropriate safeguards to ensure that adequate warning was provided regarding any such failures. These would include:
- i) telemetry apparatus providing the maintaining organisation with early warning of system failure;
  - ii) stand-by generator sockets in the event of an electrical failure;
  - iii) appropriate by-pass couplings as part of the facility to facilitate emergency over-pumping to tanker.
- 9.4.11 In light of the above, it can be seen that specific measures and practices would be employed at the site to ensure that the risk of contaminating surface water resources is minimised.

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## **9.5 Conclusions**

- 9.5.1 The proposed development does not lie within an identified area of flood plain and the risks posed to the development from fluvial flooding sources are negligible.
- 9.5.2 Surface water runoff from the proposed buildings and hardstandings would be managed in such a fashion so as to ensure that the resulting flows are regulated to the equivalent 'green field' runoff rate. This, in turn, would ensure there is no adverse disturbance to the existing surface water regime local to the site.
- 9.5.3 The proposed development would not affect the water quality of the surrounding area as a result of the infrastructure that would be installed to service the site and the specific practices employed to manage runoff from the different parts of the development.