

Gareth Webber
Brand Consulting

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Via email:
gareth.webber@brandconsultingltd.co.uk

Date: 22 March 2016

Dear Gareth

BEAM PARK

Further to our meeting of 14 March 2016, it was agreed that we would provide a written response to summarise the key points of the meeting and to provide additional advice that expands on some of the issues raised. Please see the following relating to Flood Risk, the Ecological Environment, the proposed culverting of the River Beam and the Water Framework Directive and Ground Contamination.

1. Flood Risk

1.1. Sequential Test

The site is located within Flood Zone 3 which is classified as having a high risk of flooding. In order for the development to be considered appropriate in this location a Sequential Test should be undertaken as detailed within the Planning Practice Guidance: [Flood Risk and Coastal Change](#). For the site to pass the Sequential Test it must be satisfactorily demonstrated to the local planning authority (LPA) that there are no alternative sites available for this development at a lower risk of flooding. We recommend that you discuss the requirements of the Sequential Test with the London Boroughs of Barking and Dagenham and Havering at the earliest opportunity.

1.2. Fluvial Flood Risk

During our meeting you provided an overview of the proposed masterplan and the proposed strategy for managing flood risk on the site.

The site lies within Flood Zone 3 and our most recent fluvial model, which uses LiDAR derived topography indicates that the vast majority of the site would be inundated by flood water during a 1 in 100 chance in any year flood event, with an added 20% flow to account for climate change.

The strategy that you presented for managing flood risk on site is based on an estimation of the expected flood water storage requirement on the Beam Park site during a worse case flood event. At this stage your calculations rely on several assumptions such as the amount of water that would overtop the Beam Washlands Flood Storage Area if it were to be inundated. The scenario represents a River Thames tide lock and a restricted pump flow rate from the Environment Agency owned pump system.



The estimated required volume of storage is proposed to be provided in a landscaped flood storage area adjacent to the River Beam and 2 connected flood management swales. At this stage, there is no proposal to increase the capacity of the Beam Washlands Flood Storage Area to alleviate flood risk on the Beam Park Site.

We have no objections to the proposed strategy in principle, but there is currently insufficient information to demonstrate whether the assumptions currently made are correct and ultimately whether the strategy will manage flood risk on the Beam Park site to an acceptable level, without increasing offsite flood risk. In addition, the most up to date Climate Change Allowances (as discussed) have not been included in the strategy. We recognise that further work will be done to address the assumptions and account for climate change and we will be happy to provide our position on the strategy once it has been developed and is backed up by appropriate evidence.

In order for us to be in a position to fully support the masterplan and its flood mitigation proposals, it is important that:

- Assumed values such as input flows and required storage volumes etc. are backed up with evidence, such as calculations or modelling to show that they are appropriate.
- Modelling is carried out to demonstrate that the proposed development and its associated flood risk mitigation measures do not result in any increases in off site flood risk, both up and down stream.
- The most up to date climate change guidance is accounted for.
- The flood mitigation strategy is designed for flood events up to and including the 1 in 100 chance in any year event, taking account of the appropriate allowance for climate change.
- If the scheme is reliant on Environment Agency owned assets, such as pumps, then appropriate agreements are put in place before it can be assumed that the assets will be available.
- Appropriate financial agreements are put in place, if required, to secure the use/operation of Environment Agency assets.
- If pumps are required as part of the fluvial flood storage system, details of how a back up system will work to ensure that flood storage is always available as required.
- Comprehensive drawings are submitted to demonstrate how the theoretical flood risk mitigation solutions will be physically realised.

1.3. Finished Floor Levels

For any new developments within Flood Zones 3 and 2, finished floor levels should be set above the 1 in 100 chance in any year flood level, including an appropriate allowance for climate change, to protect people and the property from flooding. During our meeting you explained that the flood risk management proposals included the raising of ground not designated for flood storage, to protect the development from the impacts of flooding. This approach meets the requirements above, subject to demonstration that the flood mitigation proposals will function as intended.

1.4. Surface Water Flood Risk

You presented brief details of the proposed surface water management proposals. You stated that development runoff will be restricted throughout the development via a SuDS management train, and discharge in to the River Beam, via a swale network at Greenfield runoff rates.

We support the above principles, although we are no longer the competent authority on surface water drainage issues and can't provide specific advice on your proposals. You should contact the Lead Local Flood Authority to discuss requirements in more detail.

Please note: If there is to be any interaction or dual purpose between fluvial and surface water systems on site, it is important that you demonstrate that there will always be sufficient storage capacity to contain the volumes of water associated with the peak fluvial flood, even if it coincides with a rainfall/surface water event and the surface water system is saturated.

1.5. Beam Washlands

We briefly discussed the flood storage scheme at Beam Washlands. Your current flood mitigation strategy does not rely on any changes to the Washlands scheme. In case this changes in future, there is potential scope to increase the capacity of the Washlands scheme to reduce flood risk on the Beam Park site, however this would need detailed investigation and feasibility study before we would consider it acceptable. In addition as it is an Environment Agency asset, appropriate agreements (financial or other) would need to be put in place. You would need to demonstrate that any alterations to the Beam Washlands flood storage area do not increase flood risk to any offsite locations, both up or down stream.

1.6. Flood Defence Consent/Environmental Permit

Under the terms of the Water Resources Act 1991, and the Thames Land Drainage Byelaws 1981, the prior consent of the Environment Agency is required for any proposed works or structures, in, under, over or within 8 metres of the top of the bank of the River Beam designated a 'main river'.

Please note that from 6 April 2016, the Flood Defence Consent regime will move into the Environmental Permitting Regulations and become Flood Risk Activity Permits. The charges for the new Permits will be different and some lower risk activities may be Excluded or Exempt from the Permitting Regulations. Please contact PSO-Thames@environment-agency.gov.uk for more details.

2. The Ecological Environment and the Water Framework Directive

Based on the information presented to us, it appears that the proposals will include works that will impact the River Beam channel and the land immediately adjacent to it. If this is the case, then consideration should be given to the requirements of the [Water Framework Directive](#) (WFD) which includes causing no overall deterioration in water quality or the ecological status of any waterbody. The appropriate River Basin Management Plan identifies specific actions required to comply with WFD. These include:

- Maintain existing vegetation and reeds from the A1306 to the A13
- To improve modified habitat
- Vegetation Management
- Protect existing vegetation

In order for your proposals to be considered acceptable you will need to do a 'WFD Assessment' that looks at the impacts of the proposed development on the existing river channel and adjacent areas and then demonstrates how the requirements of the WFD will be met. Where it is not feasible to achieve the appropriate actions as part of the development, compensatory enhancements to the waterbody in a different location may be required and you will need to show that the development will not preclude the WFD actions from being achieved in future.

3. River Beam Culvert

The proposed masterplan includes a new crossing of the River Beam, towards the north of the site. It is currently proposed to use a multiple opening box culvert. As discussed at the meeting, we are against the use of culverts as they are contrary to the principles of creating natural channels and achieving the aims of the WFD. They also carry increased flood risk due to the higher likelihood of debris entrainment and in some cases the changes in hydraulic characteristics of the channel. In order for us to consider the crossing proposals acceptable, a clear span bridge should be used, which conforms to the bridge design criteria provided in Appendix 1. There may be some scope for relaxing the requirements for soffit height if the soffits of existing upstream bridges are lower than the height required by the design guidance, meaning that the proposed bridge would not be a limiting structure in terms of channel flow capacity.

4. Groundwater and Contaminated Land

As discussed in the meeting, due to resource pressure we can now only focus on developments in the highest risk locations with respect to ground contamination. Predominantly this means sites within groundwater Source Protection Zone 1. Please see the general advice provided in Appendix 2.

I hope that the above is useful to you in developing your proposals. If I can be of any further assistance, please don't hesitate to contact me.

Yours sincerely

Nick Beyer
Major Projects Officer

Telephone: 0203 263 8051

E-mail: northlondonplanning@environment-agency.gov.uk

Address: Ergon House, Horseferry Road, London, SW1P 2AL

Appendix 1 – Bridge Design Guidance

Soffits	▪ Road or rail bridge soffit levels and flood spans must normally be 600 mm or more above the design flood level (or the maximum known flood level on minor watercourses) in order to allow floating debris to pass freely through the structure. The soffit level may be further influenced by what is in the vicinity, particularly upstream of the proposed bridge. This requirement may be relaxed on very small watercourses where we don't know the maximum flood level so long as the soffit is above bank level and there is a low risk of damage nearby. ▪ The soffit must be no lower than 300 mm above either of the upstream banktops. If a lower soffit is required on technical grounds, we may require a wider span to compensate. ▪ Footpath and bridleway bridges in large flood plains can be treated differently. It may be more practical to construct a bridge with the soffit 300mm above bank top level and with open handrails, which will be submerged in a flood. A large structure raised above flood level with approach ramps could not be reached during a flood in any case. ▪ Soffit levels on navigable rivers will need to take account of the clearance level required for boats legally using the river. You must ensure the developer consults the relevant navigation authority (Canals and Rivers Trust, ourselves as navigation authority, the county council, or a private company, as appropriate) if bridge works are proposed where they operate.
Bridge span	▪ Developers must provide clear span bridges as a general rule, though in larger rivers this may not be possible. In such cases, design calculations must confirm the capacity of the bridge is maintained. On rivers where a navigation right exists, there may be issues with proposals for piers in the channel. The developer must consult us and the navigation authority, in such cases. ▪ If a multiple span design is needed, a single span covering the normal wetted channel with an approach span on each side (a three span bridge) can sometimes be more appropriate than a two span design which requires a central pier located in the channel.
Afflux	▪ A new bridge must produce no difference in water levels between the upstream and downstream sides (afflux) since this would increase flood risk upstream of the bridge.
Inverts	▪ Soft inverts should be used to allow the natural river bed to be retained. The top of abutment footings of bridges with no solid invert must be set at least 600 mm below the existing bed level. ▪ Solid inverts must be set at least 600 mm below the existing hard bed level to allow for future re-grading. The void up to the existing bed level must be filled a suitable inert material, commonly a clean local gravel. Developers can consider shaping the materials to allow dry weather flow to be concentrated rather than spread over the entire base, to prevent silting.

Parapets	Open parapets/handrails may be appropriate to allow some flow over the deck in case the bridge opening becomes blocked or in an extreme flood event. Developers must consider the safety of bridge users in these circumstances. Although this is the developers responsibility, we must also make them aware of it
Deck design	Service pipes carrying utilities crossing the watercourse must not impinge into the cross section of the bridge opening. It's better to include any necessary pipes in the deck structure, as this allows access to them without disturbing the river. Developers can lay extra ducts into the deck in anticipation of future services being laid.
Ecology	- Developers must consider the choice of materials and their environmental implications for all works affecting a watercourse. They may need surveys to ascertain if any protected species are present, particularly water voles. The results of the surveys must accompany consent applications. - Bridges can provide potential nesting sites for a number of bird and bat species. Nest boxes can be incorporated into the design of new bridges. Our Biodiversity staff will be pleased to advise developers. - Developers must take account of fish, otters and other fauna. They can include flood arches, marginal shelves or wildlife underpasses (commonly a 600 – 1000 mm pipe) in the structure to allow wildlife to move up and downstream. Developers may need to install wildlife proof fencing alongside roads in particular to encourage animals to use these features. - We must consider and propose any suitable ecological features during pre-application discussion, as it's not suitable to impose these features on already approved designs.

Appendix 2 – Contaminated Land Advice

Model procedures and good practice

We recommend that you should:

1. Follow the risk management framework provided in CLR11, Model Procedures for the Management of Land Contamination, when dealing with land affected by contamination.
2. Refer to the [Environment Agency Guiding principles for land contamination](#) for the type of information that is required in order to assess risks to controlled waters from the site. The Local Authority can advise on risk to other receptors, such as human health.
3. Refer to the [contaminated land](#) pages on GOV.UK for more information.]

Waste on site

The CLAIRE Definition of Waste: Development Industry Code of Practice (version 2) provides operators with a framework for determining whether or not excavated material arising from site during remediation and/or land development works are waste or have ceased to be waste. Under the Code of Practice:

- excavated materials that are recovered via a treatment operation can be re-used on-site providing they are treated to a standard such that they fit for purpose and unlikely to cause pollution
- treated materials can be transferred between sites as part of a hub and cluster project
- some naturally occurring clean material can be transferred directly between sites.

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically, and that the permitting status of any proposed on site operations are clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

The Environment Agency recommends that developers should refer to:

- the Definition of Waste: Development Industry Code of Practice on the [CL:AIRE](#) website and;
- The [Environmental regulations](#) page on GOV.UK.

Waste to be taken off site

Contaminated soil that is, or must be, disposed of is waste. Therefore, its handling, transport, treatment and disposal are subject to waste management legislation, which includes:

- Duty of Care Regulations 1991
- Hazardous Waste (England and Wales) Regulations 2005
- Environmental Permitting (England and Wales) Regulations 2010
- The Waste (England and Wales) Regulations 2011

Developers should ensure that all contaminated materials are adequately characterised both chemically and physically in line with British Standard BS EN 14899:2005 'Characterization of Waste - Sampling of Waste Materials - Framework for the Preparation and Application of a Sampling Plan' and that the permitting status of any proposed treatment or disposal activity is clear. If in doubt, the Environment Agency should be contacted for advice at an early stage to avoid any delays.

If the total quantity of waste material to be produced at or taken off site is hazardous waste and is 500kg or greater in any 12 month period the developer will need to register with us as a hazardous waste producer. Refer to the [Hazardous Waste](#) pages on GOV.UK for more information.