

North London Waste Authority
**North London Heat and Power
Project**

Preliminary Environmental
Information Report
Volume 2 Appendix 10.1 Water
Resources and Flood Risk
Assessment Methodology

Issue for Consultation

May 2015

Amec Foster Wheeler E&I UK Ltd

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.





Contents

	Page
Volume 2 Appendix 10.1 Water Resources and Flood Risk Assessment	
Methodology	1
1.1 Introduction	1
1.2 Engagement	1
1.3 Legislation and guidance	4
1.4 Baseline conditions	9
1.5 Construction and operation	10
1.6 Decommissioning	15
1.7 Cumulative effects	16

Volume 2 Appendix 10.1 Water Resources and Flood Risk Assessment Methodology

1.1 Introduction

- 1.1.1 This appendix sets out the methodology for assessing the likely significant effects of the Project on water resources (in terms of surface watercourses, groundwater flow, associated abstractions and discharges, water quality, designated sites, and wetland habitats) and flood risk.
- 1.1.2 This topic assesses effects on groundwater flows and quality as a result of activities at the ground surface, for example pollution of surface runoff. The Ground Conditions and Contamination section (Vol 2 Section 6) assess effects caused by changes to ground structure which could affect groundwater flow pathways and/or remobilise any existing ground contamination.
- 1.1.3 This appendix is divided into the following parts:
- engagement – describing a summary of comments included in the Scoping Opinion and through further stakeholder engagement and how these comments have been addressed;
 - legislation and guidance – detailing requirements of the relevant National Policy Statements (NPS), how these have been addressed and additional guidance relevant to the assessment;
 - methodology for establishing baseline conditions; and
 - methodology for the assessment of construction, operation decommissioning and cumulative effects.

1.2 Engagement

- 1.2.1 Stakeholder engagement has taken place throughout the development of the design and environmental assessment. Vol 2 Appendix 6.1 provides a summary of the stakeholder engagement that has been undertaken in relation to groundwater, including comments on reports issued to the stakeholders and stakeholder consultation meetings.
- 1.2.2 A summary of water resources and flood risk specific engagement is provided in Vol 2 Appendix 10.1 Table 1.

Vol 2 Appendix 10.1 Table 1: Water Resources and Flood Risk technical engagement and scoping responses

No	Organisation (date)	Comment	Update for PEIR/ES
1	Engagement Response: Environment Agency (February 2015)	<p>Issues discussed at Environment Agency (EA) consultation meeting held on the 18 February 2015:</p> <ul style="list-style-type: none"> Consideration required of desire to widen the entrance to the Edmonton EcoPark from Advent Way and the 	<p>A Flood Risk Assessment (FRA) has been undertaken (Vol 2 Appendix 10.2) and considers the proposed expansion of the bridges.</p> <p>Consideration of the requirements of WFD within the Water Resources and Flood Risk assessment includes</p>

No	Organisation (date)	Comment	Update for PEIR/ES
		<p>entrance to the wharf area and to create a new crossing across Enfield Ditch from Lee Park Way that would contradict Water Framework Directive requirement for culverts to be opened up when possible to increase biodiversity.</p> <ul style="list-style-type: none"> • Most of the Application Site is in Flood Risk Zone 1 with some in Zone 2. The Flooding Evacuation Emergency Plan for the Application Site would be approved by the Local Authority Emergency Planners which the EA will then accept. • Each of the three proposed flood management areas within the Application Site would drain to a containment tank that is sufficient to contain surface water and storm water and/or fire water. After a fire or spillage the contained contaminated water could be removed from the Application Site by tanker. Uncontaminated surface water could be attenuated through the storage tanks. • The on-site waste water treatment plant is to be replaced to properly treat contamination captured in the storage tanks before discharging to the environment. <p>The flood risk assessment needs to include the effect of the proposed expansion of the bridges described above.</p>	<p>consideration of the new crossing and entrance widening.</p>
2	Scoping Opinion Secretary of State (November 2014)	<p>Insufficient detail provided when:</p> <ul style="list-style-type: none"> • scoping out the potential effects on water resources; and • identifying that downstream flow regimes would not be significantly affected by the proposed abstraction/discharge rates. 	<p>Further information regarding the surface water regime is provided in the FRA (Vol 2 Appendix 10.2). These aspects have been scoped back in and considered fully in this assessment.</p> <p>Three cooling options remain for the Project and this PEIR includes an assessment of the three possible</p>

No	Organisation (date)	Comment	Update for PEIR/ES
		The proximity of sensitive receptors indicates the potential for significant effects and there remains the potential for water use to exceed expected requirements or licensed limits.	options including water demand and where it would be sourced from. The proposed cooling water options will be discussed further with the EA.
3		Assessment required of potential groundwater pathway for discharge of liquids to surface and coastal waters (including allowances for climate change), including engagement with the Environment Agency to determine the scope of the assessment as the proposed development design progresses.	The impact of climate change over the development lifetime has been considered within the FRA in line with current guidance. Contamination of groundwater (and re-mobilisation of ground contaminants) has been addressed in Vol 2 Section 6 (Ground Conditions and Contamination). Climate change effects are considered within Vol 2 Section 10 (Water Resources and Flood Risk). Designs will be discussed with in the EA through ongoing engagement. The EA has been consulted in preparing the FRA (Vol 2 Appendix 10.2) and Hydrogeological Assessment (Vol 2 Appendix 6.2).
4		Full consideration required of the potential effects of the cooling water connection on local hydrological and hydrogeological resources. This will require: <ul style="list-style-type: none"> • consultation with the Environment Agency regarding positioning of the intake/outfall point; • details of abstraction and outfall rates to be defined and assessed; • agreement with the Environment Agency that the rates are valid and the assessment represents the worst case; and • the rate of mains water use to be clarified. 	A comprehensive assessment of cooling water requirements, the intake/outfall locations, and the effect on the water environment has been undertaken as part of this assessment. Vol 2 Section 10 (Water Resources and Flood Risk) sets out details of proposed abstraction and discharge rates, including mains water, and the proposed intake and outfall points. All three cooling water options have been considered in the assessment, and the options are being discussed with the EA.
5		Flood Risk Assessment (FRA), should form an appendix to the ES and be cross referenced with other ES chapters.	The FRA will form an appendix to the ES (appended to the PEIR as Vol 2 Appendix 10.2) and is referenced in the discussion of flood risk in the water resources assessment.
6	Scoping Response: Secretary of State,	Should review River Basin Management Plan to determine how the Project can contribute to WFD objectives.	WFD requirements have been considered in the water resources assessment. Consideration also given to the River Basin

No	Organisation (date)	Comment	Update for PEIR/ES
	Environment Agency (November 2014)	Consideration required of the requirements of the Water Framework Directive (WFD) including causing no overall deterioration in water quality or the ecological status of any waterbody.	Management Plan (RBMP) and the potential for the development to contribute to WFD objectives.
9	Scoping Response: Environment Agency (November 2014)	Flood risk and surface water should be addressed in line with the requirements of the National Planning Policy Framework (NPPF) and the London Plan Policy 5.13.	A flood risk assessment for the development has been prepared (Vol 2 Appendix 10.2).
10		Flood risk will need to be scoped into the ES if works are proposed to Enfield Ditch to ensure that any negative impact on people or the environment is avoided.	These aspects have been scoped back in and are considered fully in the water resources assessment. The impacts of the Project on flood risk have been assessed within the FRA.
11	Scoping Response: Greater London Authority (January 2015) ¹	The FRA will need to consider the risk of fluvial flooding from the nearby River Lee and Salmon's Brook systems, the risk of surface water flooding and the risk of reservoir flooding from the range of raised reservoirs along the Lee Valley.	The FRA takes into consideration the risks identified by the GLA. The FRA is included as Vol 2 Appendix 10.2.
12		London Plan Policy 5.13 and the associated sustainable drainage hierarchy should be applied to limit surface water discharge to the drainage system. Full consideration required for rainwater harvesting systems.	SUDs has been considered during design development. Surface water runoff would be limited as set out in the FRA, in line with the London Plan and EA guidance.

1.3 Legislation and guidance

1.3.1 This section identifies all of the policy and legislation that is relevant to the assessment of effects on water resources and flood risk, however this assessment addresses the specific issues related to the Project. Where relevant policy and legislation is listed here but not mentioned in the assessment, there are no issues with respect to the development and the requirements of that particular policy/ legislation.

National policy

1.3.2 This section identifies policies, legislation and guidance relevant to the assessment of the effects on water and flood risk. The issues included in

¹ Late scoping consultation responses. The Planning Inspectorate.
<http://infrastructure.planningportal.gov.uk/wp-content/uploads/projects/EN010071/1.%20Pre-Submission/EIA/Scoping/Late%20Response/Late%20responses%20to%20EIA%20scoping%20consultation.pdf> (Accessed March 2015)

these need to be considered in this assessment. Policies and legislation relevant to groundwater and contamination are in Vol 2 Appendix 6.1.

- 1.3.3 The National Policy Statement (NPS) sets out national policy for energy infrastructure. There are two NPSs of direct relevance to the Project. The requirements which are relevant to the water resources and flood risk assessment from EN-1: Overarching National Policy Statement for Energy and EN-3: National Policy Statement for Renewable Energy Infrastructure are listed Vol 2 Appendix 10.1 Table 2 and Vol 2 Appendix 10.1 Table 3.

Vol 2 Appendix 10.1 Table 2: NPS EN-1 requirements

Requirements of NPS EN-1	How the requirement is addressed	Location of where to find further detail
Paragraph 5.15.2 – <i>“Where the project is likely to have effects on the water environment, the applicant should undertake an assessment of the existing status of, and impact of the proposed project on, water quality, water resources and physical characteristics of the water environment as part of the ES.”</i>	Water environment considered within the works plans (see Book of Plans) and Interim CoCP and potential impacts considered as part of water resources and flood risk assessment.	Vol 2 Section 10
Paragraph 5.15.3 of this NPS notes that the Applicant should include the following in the ES.		
<i>“the existing quality of waters affected by the proposed project and the impacts of the proposed project on water quality, noting any relevant existing discharges, proposed new discharges and proposed changes to discharges;”</i>	Water quality is considered within the water resources and flood risk assessment, including consideration of WFD. Existing discharges and proposed discharges have been identified and assessed.	Vol 2 Section 10
<i>“existing water resources affected by the proposed project and the impacts of the proposed project on water resources, noting any relevant existing abstraction rates, proposed new abstraction rates and proposed changes to abstraction rates (including any impact on or use of mains supplies and reference to Catchment Abstraction Management Strategies);”</i>	Existing abstractions and water resources affected by the Project have been considered within the water resources and flood risk assessment.	Vol 2 Section 10
<i>“existing physical characteristics of the water environment (including quantity and dynamics of flow) affected by the proposed project and any impact of physical modifications to these characteristics;”</i>	Considered as part of the water resources and flood risk assessment.	Vol 2 Section 10
<i>“any impacts of the proposed project on water bodies or protected areas under the Water Framework Directive and source protection zones (SPZs) around potable groundwater abstractions.”</i>	Considered within the water resources and flood risk assessment.	Vol 2 Section 10
Paragraph 5.15.4 notes that <i>“activities that discharge to the water environment are subject to pollution control.”</i> The considerations set out in Section 4.10 of this NPS and detailed below on the interface between planning and pollution control therefore apply, and should be considered. These considerations will also apply in an analogous way to the abstraction licensing regime regulating activities that take water from the water environment, and to the control of regimes relating to works to, and structures in, on, or under a controlled water.		

Requirements of NPS EN-1	How the requirement is addressed	Location of where to find further detail
Paragraph 4.10.2 – <i>“Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environments from different sources to the lowest practicable levels. It also ensures that water quality meet standards that guard against impacts to the environment or human health.”</i>	Pollution control is included in the design and detailed in the Interim CoCP. Pollution control risk has been assessed and impacts noted as part of ground conditions and contamination assessment and the water resources and flood risk assessment.	Vol 2 Section 10 and Vol 2 Section 6
Paragraph 4.10.6 – <i>“Applicants are advised to make early contact with relevant regulators including the EA, to discuss their requirements for environmental permits and other consents. This will help ensure count of all relevant environmental considerations and that the relevant regulators are able to provide timely advice and assurance to the IPC. Whenever possible, applicants are encouraged to submit applications for Environmental Permits and other necessary consents at the same time as applying to the IPC for development consent.”</i>	The EA and LB Enfield have been consulted and informed throughout the design of the Project and the assessment.	Section 1.2 of this appendix
Paragraph 4.10.8 – <i>“The relevant pollution control authority is satisfied that potential releases can be adequately regulated under the pollution control framework; the effects of existing sources of pollution in and around the site are not such that the cumulative effects of pollution when the proposed development is added would make that development unacceptable, particularly in relation to statutory environmental limits.”</i>	Considered as part of water resources and flood risk assessment.	Vol 2 Section 10
Paragraph 5.15.6 – A proposal should have <i>“regard to the River Basin Management Plans and meet the requirements of the Water Framework Directive (including Article 4.7) and its daughter directives, including those on priority substances and groundwater. The specific objectives for particular river basins are set out in River Basin Management Plans.”</i>		
Paragraph 5.15.7 – It should be considered <i>“whether appropriate requirements should be attached to any development consent and/or planning obligations entered into to mitigate adverse effects on the water environment.”</i>	Flood risk assessment and hydrogeological risk assessment undertaken. Likely significant effects have been considered as part of the water resources and flood risk assessment.	Vol 2 Appendix 10.2 Vol 2 Appendix 6.2
Paragraph 5.15.8 – It should be considered <i>“whether mitigation measures are needed over and above any which may form part of the project application. A construction management plan may help codify mitigation at that stage.”</i>	Likely significant effects have been considered as part of the water resources and flood risk assessment. The Interim CoCP sets out relevant construction management measures.	Vol 2 Section 10
Paragraph 5.15.9 – <i>“The risk of impacts on the water environment can be reduced through careful design to facilitate adherence to good pollution control practice. For example, designated areas for storage</i>	The water environment has been given due consideration within the design and likely significant effects have been assessed as part of	Vol 2 Section 10

Requirements of NPS EN-1	How the requirement is addressed	Location of where to find further detail
<i>and unloading, with appropriate drainage facilities, should be clearly marked.”</i>	water resources and flood risk assessment.	
Paragraph 5.15.10 – <i>“The impact on local water resources can be minimised through planning and design for the efficient use of water, including water recycling.”</i>	Efficient water use at the Application Site has been considered in the assessment including rainwater harvesting, water efficient appliances and the technology for water cooling.	Vol 2 Section 10

Vol 2 Appendix 10.1 Table 3: NPS EN-3 requirements

Requirements of NPS EN-3	How the requirement is addressed	Location of where to find further detail
Paragraph 2.5.84 notes additional impacts of the design of water cooling systems for EfW generating stations, other than the generic impacts listed in EN-1. These will have additional impacts on water quality, abstraction and discharge. These may include:		
<i>“discharging water at a higher temperature that the receiving water affecting the biodiversity of aquatic flora and fauna;”</i>	Considered within the water resources and flood risk assessment and the ecology assessment.	Vol 2 Section 10 Vol 2 Section 4
<i>“use of resources may reduce the flow of watercourses, affecting the rate at which sediment is deposited, conditions for aquatic flora and potentially affecting migratory fish species (e.g. salmon);”</i>	Considered within the water resources and flood risk assessment and the ecology assessment.	Vol 2 Section 10 Vol 2 Section 4
<i>Fish impingement and/or entrainment – i.e. being taken into the cooling system during abstraction;”</i>	Considered within the water resources and flood risk assessment and the ecology assessment.	Vol 2 Section 10 Vol 2 Section 4
<i>Discharging water containing chemical and anti-fouling treatment of water for use in cooling systems may have adverse impacts on aquatic biodiversity.”</i>	Fish entrainment has been considered in the ecology assessment but scoped out on the basis that the existing abstraction would be re-used for the Project.	
<i>Paragraph 2.5.85 – “Where the project is likely to have effects on water quality or resources the applicant should undertake an assessment as required in EN-1 Section 5.15. The assessment should particularly demonstrate that appropriate measures will be put in place to avoid or minimised adverse impacts of abstraction and discharge of cooling water.”</i>	Considered within the water resources and flood risk assessment.	Vol 2 Section 10
<i>Paragraph 2.5.86 – The applicant should have “demonstrated measures to minimise adverse impacts on water quality and resources as described in EN-1 and EN-3.”</i>		
<i>Paragraph 2.5.87 – “Design of the cooling system should include intake and outfall locations that avoid or minimise adverse impacts. There should also be specific measures to minimise fish impingement and/or</i>		

Requirements of NPS EN-3	How the requirement is addressed	Location of where to find further detail
<i>entrainment and the discharge of excessive heat to receiving waters.”</i>		

Local policy

- 1.3.4 The London Plan: Spatial Development Strategy for Greater London (2011) came into effect on 22 July 2011, and was most recently updated by the Further Alterations to the London Plan in March 2015. Policies contained within the London Plan which are relevant to water resource and flood risk assessment are:
- e. Policy 5.12 Flood Risk Management;
 - f. Policy 5.13 Sustainable Drainage; and
 - g. Policy 5.15 Water Use and Supplies.
- 1.3.5 Enfield Council Core Strategy 2010-2025 Section 8 details the core policies for the Environment Protection for future developments in the Borough of Enfield.
- 1.3.6 Enfield Council Development Management Document (2014) Section 11, details policy on Environmental Protection for future developments in the borough, and also provides guidance on the policies.

Legislative requirements

- 1.3.7 The main legislative framework regarding the water environment and pollution prevention is set by the following Acts and Regulations.
- h. Control of Pollution Act 1974;
 - i. EC Fisheries Directive (78/659/EEC);
 - j. Floods and Water Management Act 2010;
 - k. Land Drainage Act 1991;
 - l. The Groundwater (England and Wales) Regulations 2009;
 - m. The Water Supply (Water Quality) Regulations 2010;
 - n. Water Act 2003²;
 - o. Water Framework Directive (2000/60/EC);
 - p. Water Resources Act 1991 (WRA 1991);
 - q. Wildlife and Countryside Act 1981 and (Amendment) Act 1985 (as amended by the Countryside and Rights of Way Act 2000);
 - r. Floods and Water Management Act (2010); and
 - s. Reservoirs Act (1975)

² Legislation UK (2003), Water Act, Act 2003, Ch 37.

- 1.3.8 Policy guidance and good practice advice regarding the water environment and pollution prevention includes the following:
- Environment Agency (EA) Pollution Prevention Guidance Notes (PPG)³;
 - Guidance from CIRIA;
 - BS6031: 2009 Code of Practice for Earth Works; and
 - Good Practice Guide for Handling Soils (MAFF, 2000).

1.4 Baseline conditions

Current baseline

- 1.4.1 Extensive work has been undertaken in relation to water resources at the Application Site. This work is summarised in Vol 2 Appendix 10.1 Table 4.
- 1.4.2 A map of the current Application Site groundwater monitoring network and further details of each of the Application Site investigations and assessments are detailed in Vol 2 Appendix 6.2 (Hydrogeological Risk Assessment).

Vol 2 Appendix 10.1 Table 4: Investigation work undertaken on and around Edmonton EcoPark.

Date	Relevant baseline data
2011	A review of historical information was undertaken prior to an intrusive geo-environmental investigation which included: <ul style="list-style-type: none"> Soils data from 56 intrusive locations; two groundwater and six ground gas monitoring rounds; and Human health and controlled waters generic risk assessments.
2012	A screening assessment for the source protection zone (SPZ) for nearby public water supply (PWS) boreholes has been undertaken. This study included a conceptual site model and preliminary risk categorisation for anaerobic digestion plant that was proposed at that time (not progressed further).
2013	An assessment was undertaken that considered the engineering constraints to development, including those posed by flood risk. Potential options for managing flood risk and drainage at the Application Site, as well as other engineering and infrastructure issues were considered.
2012-2014	2011-2014 – surface water monitoring Ground Water monitoring was undertaken quarterly during 2012 and 2013, for key potentially polluting substances (PPS) and bi-annually in 2014. Monitoring will be ongoing as part of site protection management plan

- 1.4.3 In addition further desk-based work has been undertaken to gain the most up-to-date information on the baseline. This information is summarised in Vol 2 Appendix 10.1 Table 5.

³ <https://www.gov.uk/government/collections/pollution-prevention-guidance-ppg> (Accessed March 2015)

Vol 2 Appendix 10.1 Table 5: Desk study baseline information sources

Topic	Relevant baseline data
Topography	OS 1:10K and 1: 25K Mapping Flood Risk Assessment (Vol 2 Appendix 10.2)
Surface Waters (including WFD surfacewater bodies)	Environment Agency maps http://maps.environment-agency.gov.uk/wiyby/ Flood Risk Assessment (Vol 2 Appendix 10.2)
Water Quality & Flood Risk	Environment Agency maps http://maps.environment-agency.gov.uk/wiyby/ Flood Risk Assessment (Vol 2 Appendix 10.2)
Groundwater Vulnerability	Environment Agency maps http://maps.environment-agency.gov.uk/wiyby/
Geology	GroundSure EnviroInsight,2015 (Vol 2 Appendix 10.3) Hydrogeological Risk Assessment (Vol 2 Appendix 6.2)
Water Abstractions and Discharges	GroundSure EnviroInsight,2015 (Vol 2 Appendix 10.3)
Designated Sites	GroundSure EnviroInsight,2015 (Vol 2 Appendix 10.3) Site in relation to Environmental Designations Figure (Vol 1 Figure 2.2)

Receptor identification and sensitivity

- 1.4.4 A receptor is considered to be an environmental aspect that could be affected by the proposed development, for example, water quality in a river. Identification has been made of any receptor connected to the Application Site through hydrological connectivity and flood risk. Receptors considered include surface waters, underlying aquifers, local abstractions and discharges, regional water resources and downstream designated sites, people and infrastructure.

Future baseline

- 1.4.5 The future baseline of the Application Site and surroundings considers changes to the baseline due to planned developments in the vicinity of the Application Site which will occur before completion of the Project and which may impact water resources and flood risk.

1.5 Construction and operation

Assessment of Project phases

- 1.5.1 The approach used to assess the likely significant effects on water resources and flood risk does not change between the construction and operational components of the Project. The methodology presented has been applied for all individual phases of the Project.

Assessment area

1.5.2 The assessment area has been defined as:

- the Application Site including the Laydown Area; and
- an additional area of approximately 2km outside the Application Site where receptors are located. In the case of WFD waterbodies this extends to include the full extent of waterbody catchments that intersect or are adjacent to the Application Site boundary.

Assessment method

1.5.3 The assessment has been a staged process. The first stage has involved identifying potential receptors and their sensitivity following determination of the existing hydrological, hydrogeological and ground conditions baseline for the Application Site.

1.5.4 Potential effects of the Project have then been determined primarily using a semi-quantitative approach based on professional judgement, environmental legislation and general guidance related to the water environment. Effects are likely to be most significant where sensitive features are present and there is a clear pathway between the development activity and the receptor.

1.5.5 The key aspects to identifying significant effects are:

- a. understanding the physical characteristics of the Application Site in terms of climate, geology, soils, land use and hydrology;
- b. determining how and where water flows through the system both on the surface and in the subsurface;
- c. locating water supply installations or water dependent ecosystems and understanding their relationship with their hydrological catchments;
- d. understanding how local private water supplies are utilised;
- e. considering how the hydrological environment may change in the future (other than as a result of the Project) – the future baseline; and
- f. integrating this understanding into an assessment of the likely overall sensitivity of the various component parts of the hydrological environment to the development.

1.5.6 The significance of effects is evaluated, following standard methodology, based on the sensitivity of the receptor, and the magnitude of change in water quality, quantity and morphology resulting from the proposed development, assuming all environmental measures identified are implemented.

1.5.7 Sensitivity of hydrological and hydrogeological water features is normally related to the relative importance of the surface water or groundwater feature that might be at risk from effects. Vol 2 Appendix 10.1 Table 6 provides a summary of the criteria used by AMEC in the assessment of water feature sensitivity. The criteria are qualitative, so professional

judgement is required in the assessment. This is based on an assessment of a number of criteria, including:

- the presence of international or national nature conservation designations (where designations relate specifically to water-dependent habitats or interest features);
- the use of the receptor water body for public or private water supply (and as evaluated for water resource status in terms of the Catchment Abstraction Management Strategies, Thames RBMP⁴, Water Resources Management Plan;
- the scale of the water body; and
- the environmental quality of the water body (as evaluated in terms of the WFD status, as reported in the Thames RBMP⁴ or any statutory conservation designations).

1.5.8 The sensitivity of the receptors relevant to this Project are provided within Vol 2 Appendix 10.1 Table 7, and are used to support the assessment in Section 10 of the ES. Identification is made of the receptors relevant to this assessment and the reasoning behind the assigned sensitivity, based on the criteria provided in Vol 2 Appendix 10.1 Table 7.

1.5.9 The magnitude of the effect on the water receptor is independent of the sensitivity of the receptor. This is a qualitative assessment and relies on professional judgement. Vol 2 Appendix 10.1 Table 8 provides examples of how various levels of change have been determined with respect to water features. Where magnitude is considered to be negligible, no perceivable effect would result from the activities. The magnitude of an effect may be adverse, beneficial, temporary or long term.

Vol 2 Appendix 10.1 Table 6: Summary of Sensitivity of water receptors (developed based on professional judgement and expertise)

Sensitivity	Criteria	Examples
Very High	International scale receptor	Conditions supporting sites with international conservation designations (SAC, SPA, Ramsar sites), where the designation is based specifically on aquatic features.
High	National scale receptor Regional scale receptor – high yield/quality	Conditions supporting a water-dependent SSSI. Regional-scale surface water bodies at Good or High WFD Status. Public water supplies. Principal Aquifer.
Medium	Regional scale receptor – medium or low yield/quality Local scale receptor – high yield/quality	Regional-scale water bodies at Moderate WFD Status or below. Local-scale surface water bodies at Good or High WFD Status. Private water supplies. Secondary A Aquifer.

⁴ Environment Agency, Thames River Basin Management Plan. <https://www.gov.uk/government/publications/thames-river-basin-management-plan>. Assessed March 2015

Low	Local scale receptor – medium or low yield/quality	<p>Local-scale water bodies at Moderate WFD Status or below.</p> <p>Small surface water bodies such as drainage ditches and ephemeral ponds that are too small to be classified under WFD and have limited ecological potential due to being artificial or heavily-modified.</p> <p>Secondary B Aquifer; livestock supplies; springs; ponds/lagoons; non-statutory groundwater-dependent conservation sites.</p>
-----	--	--

Vol 2 Appendix 10.1 Table 7: Assigned sensitivity of water receptors (developed based on professional judgement and expertise)

Receptor	Sensitivity	Reasoning
Surface watercourses including Salmon's Brook, River Lee, River Lee Navigation, Enfield Ditch, and downstream watercourses	High	Objective of WFD to achieve good ecological potential by 2027 (Vol 2 Section 10). For the purpose of this assessment (because of the timescales of the construction and operation of the Application Site) the waterbodies and associated watercourses are anticipated to be 'Good' status,
Groundwater in the principal and secondary aquifers underlying the Application Site and by association the PWS abstractions associated with the SPZ in which the Application Site is situated	High	The superficial deposits across the Application Site (Kempton Park Gravels) are designated as a secondary A aquifer, while the lower Chalk is identified as a principal aquifer (Vol 2 Section 10).
Licensed discharge from the Application Site to TWUL Chingford Sewer	Medium	Current discharge from the Application Site to the Chingford Sewer. Local scale receptor with a low yield that discharges to an existing drainage network not classified under WFD, but importance from drainage from the facility Vol 2 Section 10.
Licensed discharge from Henry Group Ltd	Medium	Local scale receptor with importance for drainage from the facility.
Regional water resources (TWUL London Water Resource Zone)	High	The Application Site is located primarily in the inner and partly in the outer zones (Zone 1 and 2) of an EA designated SPZ for groundwater sources to public water supply Vol 2 Section 10.
Foul sewerage network	Low	Local scale receptor that is an existing drainage network not classified under WFD.
People, property and infrastructure	Medium/High	Flood zone 2 and 3 designations Vol 2 Section 10.
Downstream nature conservation sites	High	Walthamstow Reservoirs SSSI, also designated as RAMSAR and SPA located downstream of the Application Site with potential hydrological connectivity Vol 2 Section 10. The designation relates to plant and wildfowl species not aquatic features (that would give it a very high classification).

Vol 2 Appendix 10.1 Table 8: Magnitude of effect criteria (hydrology and hydrogeology) (developed based on professional judgement and expertise)

	Hydrological Definition					
Magnitude of effect	Site runoff regime	Surface water quality	Riverine flow regime	Riverine morphology	Groundwater levels	Groundwater quality
High	Change (>50%) in proportion of site rainfall immediately running off, changing the flood risk or erosion of channels	Change in water quality, changing river status with respect to EQS ⁵ for more than one month	Change in flows >5% resulting in a measurable change in dilution capacity	Change in erosion and deposition, with conservation interests put at risk	Change in groundwater levels leading to an identifiable change in groundwater flow regime and artesian flows	Change in groundwater quality, changing site quality with respect to DWS ⁶ for more than 1% of samples
Medium	Change (10-50%) in proportion of site rainfall immediately running off, changing the flood risk or erosion of channels	Change in water quality, changing site status with respect to short-term EQS, or for less than one month with other EQS	Change in flows between 2-5% resulting in a measurable change in dilution capacity	Some change in deposition and erosion regimes	Change in groundwater levels leading to an identifiable change in groundwater flow regime	Change in groundwater quality, changing site quality with respect to DWS for less than 1% of samples
Low	Small change (<10%) in proportion of site rainfall immediately running off, but no change in flood risk or channel erosion	Measurable short-term change in water quality but no change with respect to EQS	Measurable change in flow of up to 2%	Slight change in bed morphology and sedimentation pattern, minor erosion	Measurable change in groundwater levels, but no appreciable change in groundwater flow regime	Measurable change in groundwater quality, but not changing site status with respect to DWS
Negligible	No significant change in run-off from Application Site	No significant loss in water quality	No increase in flood risk	No significant change in river bed.	No significant change in groundwater	No significant loss in groundwater quality.

⁵ EQS - Environmental Quality Standard, as laid down in relevant EU Directives and national legislation.

⁶ DWS - Drinking Water Standards, laid down in national regulations derived from the EU Drinking Water Directive

- 1.5.10 In some cases information may be available that allows a high level quantitative assessment of the magnitude of effect. For example when considering effect from changes in water usage at a site a new quantity or prescribed limit could be used. In these cases a direct comparison between existing site usage and that at during the operation of the new site can be made (often through volumetric abstractions, discharges, or demands from public water supply).

Significance

- 1.5.11 Magnitude and sensitivity are then combined to determine the significance of a potential effect on a receptor as detailed in Vol 2 Appendix 10.1 Table

Vol 2 Appendix 10.1 Table 9: Significance of effect (developed based on professional judgement and expertise)

		Sensitivity of Receptor			
		Very High	High	Medium	Low
Magnitude of Impact	High	Very Substantial	Substantial	Substantial /Moderate	Moderate
	Medium	Substantial	Substantial /Moderate	Moderate	Moderate/ Slight
	Low	Substantial /Moderate	Moderate	Moderate/ Slight	Slight
	Negligible	Negligible	Negligible	Negligible	Negligible
	Key:	Significant Impact		Not significant Impact	

- 1.5.12 Where the risk of significant effect is assessed to be substantial or greater, mitigation would normally be required to reduce the level of risk to slight or negligible levels. In any situations where it is not possible, or reasonable, to mitigate the effects down to this level, the residual risks would be assessed.

1.6 Decommissioning

- 1.6.1 The approach used for undertaking the assessment of decommissioning of the Application Site is qualitative and based professional judgement and a number of assumptions. It is assumed that the same standard embedded design requirements and guidelines would be in place as are used for the other phases of the Project. Indications have been given of the approach that is likely to be undertaken (e.g. demolition and clearance) and an assessment has been made of any likely significant effects that would arise.

1.7 Cumulative effects

- 1.7.1 Cumulative effects have been considered during both the construction and operation of the Project, using professional judgement and any available information relating to the other developments.
- 1.7.2 Cumulative effects of construction include consideration of construction activities of both the Project and additional sites occurring together. Cumulative effects of operation include consideration of operational activities of both the Project and additional sites occurring together.
- 1.7.3 Information on the scale of the works, the likely activities (e.g. excavations, site clearance), and the type of development planned (e.g. industrial, residential) have all been considered where available.
- 1.7.4 Planning permissions for other developments will be subject to the same standard requirements and best practice measures as the Project.