

North London Reinforcement Project
Requirement 10 – Surface Water Drainage
Drainage Technical Covering Report: The London
Borough of Haringey

National Grid
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1 INTRODUCTION

1.1 Project Brief

- 1.1.1 This document has been prepared by Arthian Ltd on behalf of Morrison Energy Services (Transmission Networks) Ltd, for National Grid Electricity Transmission plc ('National Grid').
- 1.1.2 This document comprises the Surface Water Drainage Covering Report for the North London Reinforcement Project ('the Project') as required by Schedule 3, Requirement 10: Surface Water Drainage of The National Grid (North London Reinforcement) Development Consent Order 2014 ('the DCO').
- 1.1.3 This report has been prepared to support the formal discharge of Requirement 10 for Stage 5h within the London Borough of Haringey.
- 1.1.4 Requirement 10: Surface Water Drainage of the DCO is as follows:
- (1) No stage of the authorised development shall commence until for that stage, written details of the surface and foul water drainage system (including means of pollution control) have, after consultation with the sewerage and drainage authority, been submitted to and approved by the relevant planning authority.*
- (2) The surface and foul water drainage system must be constructed in general accordance with the details approved in accordance with requirement 10(1) unless otherwise agreed with the relevant planning authority.*
- 1.1.5 This document has been submitted for approval to London Borough of Haringey as the relevant planning authority or authorities for the Project to discharge Requirement 10 for Stage 5h. The appendices attached to this report are those relevant to the planning authority submitted to.
- 1.1.6 This document represents the Drainage Technical Covering Report. Site-specific assessments are appended to this report.

1.2 Overview of the Project

- 1.2.1 The DCO was made by the Secretary of State for Energy and Climate Change for the Project on 16 April 2014, and came into force on 7 May 2014. The DCO provides powers to National Grid to carry out the Project, which comprises the replacement of the existing 275kV overhead line (OHL) with a 400kV OHL from Waltham Cross substation in Epping Forest, through Enfield, and then to Tottenham substation in Haringey. The DCO also contains powers to carry out associated works to the substations at Waltham Cross, Brimsdown and Tottenham.
- 1.2.2 The Project falls within the administrative boundaries of, Epping Forest District Council, Enfield Council, the London Borough of Waltham Forest, and the London Borough of Haringey. The Project is also within the administrative boundaries of the Greater London Authority and Essex County Council, though these are not relevant planning authorities in relation to the Project.
- 1.2.3 The Project includes the following elements:

- Existing 275kV route upgrading to 400kV for 14km from the Waltham Cross substation to Tottenham substation. This would comprise of:
 - The existing 275kV conductor cables (wires) to be removed and replaced (i.e. reconducted) with 400kV wires. This would use the existing pylons.
- An extension to the Waltham Cross substation to provide a new 400kV Gas Insulated Switchgear (GIS) substation and associated OHL entry modifications.
- The replacement of two 275/132 kV Super Grid Transformers (SGTs) at Brimsdown with two new 400/132kV SGTs, located both inside and partially outside the existing Brimsdown substation boundary, with underground cable connections between these new SGTs and the existing substation.
- Works to bypass Tottenham substation, including the construction of a new pylon (VC1R) and cable sealing end (CSE) compound south of the Tottenham substation, and the removal of the existing VC1 pylon.
- Associated works, for example, temporary access roads, highway works temporary construction compounds, scaffolds, work sites and ancillary works.

1.3 Consultation

- 1.4 The LLFA for Stage 5h were consulted on the 3rd of February 2026 with a response received on the 19th of February 2026, and a subsequent meeting was held on the 20th of February. No comments were received from the Officer on the draft document, and they were content with the proposal.

2 REQUIREMENT CONTEXT

- 2.1.1 The proposed Stage 5h works do not include the installation of any significant permanent areas of hardstanding (greater than 50 m²). Accordingly, Section 6 of this report addresses only the temporary impermeable surfaces required to facilitate construction.
- 2.1.2 The proposed Stage 5h works involve the laydown of temporary trackways and within the working area, as described in Section 7 of this report and the supporting site-specific appendices. Certain work areas will also receive material and equipment deliveries by barge.

2.2 References to this document within existing DCO documents

- 2.2.1 Measures to be included within this document are contained within existing DCO documents, which have been certified by Article 44 of the DCO.

- 2.2.2 The Construction Environmental Management Plan (CEMP) sets out measures relating to Flood Risk and Drainage (Section 4.7 of the CEMP). Mitigation measures included in the CEMP on this matter are summarised as follows:

- Install temporary surface water controls including silt fences and sediment traps at discharge points, and swales or shallow bunds to divert clean runoff away from work areas.
- Drainage inspections will be carried out weekly and after heavy rainfall events, with remedial works undertaken immediately if defects are found.
- Minor shallow grading or temporary grips to direct clean runoff away from work areas;
- Use of gravel or crushed stone working surfaces to encourage infiltration and reduce soil compaction;
- Straw-bale barriers or silt-fencing to intercept and filter runoff before it reaches the River Lea corridor;
- Drip trays, spill kits and designated refuelling zones for plant and vehicles (refuelling and fuel storage will be located at least **10 m away from any watercourse** and on impermeable bunded areas); and
- No discharge of untreated water will be permitted into the River Lee Navigation Canal or its tributaries; temporary settlement through vegetated ground or straw-bale filtration if clean water must be discharged.

During flood alerts issued by the Environment Agency:

- Cease works in flood-prone areas.
- Remove plant, equipment, and materials to higher ground.
- Follow the site-specific Flood Response Plan.
- All staff will be briefed on flood evacuation routes and emergency procedures.

2.3 Requirements for Assessment

- 2.3.1 The Order Limits for the Project extend from Waltham Cross, Brimsdown, and Tottenham Substation, covering key substations (4ZM2, 4ZM1R, 4ZM1, ZBC1A to ZBC44) and the laydown area. It involves multiple local authorities, including Epping Forest District Council, London Borough of Enfield, London Borough of Waltham Forest, and London Borough of Haringey.
- 2.3.2 On the Environment Agency (EA) Flood Map for Planning¹, the Scheme is shown to be located across Flood Zones 2 and 3. Additionally, the Project extents cover an area in excess of 1 hectare (ha) and therefore, the application requires a Drainage Strategy to support the Development Consent Order (DCO) application in line with the National Policy Statement (NPS) for Energy (EN-1)², Renewable Energy Infrastructure (EN-3)³ and Electricity Networks Infrastructure (EN-5)⁴. Site-specific Flood Risk Assessments have been produced separately where required.
- 2.3.3 The aim of this report is to assess the potential flood risk to the Project, the impact of the Project on flood risk elsewhere, and the proposed measures which would be incorporated to mitigate the identified risk. This covering report has been prepared in accordance with the guidance contained in the Overarching National Policy Statement for Energy (NPS EN-1) (November 2023), the National Planning Policy Framework (NPPF)⁵ revised in December 2024, and the National Planning Practice Guidance (NPPG)⁶ Flood Risk and Coastal Change.
- 2.3.4 Epping Forest District Council, London Borough of Enfield, London Borough of Waltham Forest and London Borough of Haringey councils in their roles as Lead Local Flood Authority (LLFA) are the regulatory authority and statutory consultee for DCO applications in relation to surface water drainage, and as per Paragraph 1.1.1 of this report, require written details of the surface and foul water drainage system (including means of pollution control) to be submitted and approved by the relevant planning authority.

2.4 Parameters of the assessment

- 2.4.1 Four versions of this report with supporting site-specific Appendices have been produced to support the Project. The table below sets out the scope of the assessment.

Project substage	Scoped in	Scoped out	Total no. of towers	Council Area
Stage 5a - work no 1, 2A, 2B, 3A and 3B	ZBC01	ZBC1A ZBC1B ZBC02 4ZM1 4ZM1R 4ZM2	7 (1 scoped in and 6 scoped out).	Epping Forest District Council

Project substage	Scoped in	Scoped out	Total no. of towers	Council Area
Stage 5b – work no 1	ZBC09 Span ZBC03-04 Span ZBC09-10 ZBC004 – Boat Launch Pad	ZBC03 ZBC04 ZBC05 ZBC06 ZBC07 ZBC08 ZBC10 ZBC11 ZBC12	10 (1 scoped in and 9 scoped out), ZBC004 – Boat Launch Pad (scoped in), and two spans (Span ZBC03-04 and ZBC09-10, both scoped in).	Epping Forest District Council
Stage 5c and 5d – work no 1 and 8	ZBC15 ZBC16 ZBC17 ZBC18 ZBC19 ZBC20 ZBC21 ZBC22 ZBC23 ZBC24 ZBC25 ZBC26 ZBC27 ZBC37 ZBC38 Span ZBC15-16 Span ZBC16-17	ZBC13 ZBC14 ZBC28 ZBC29 ZBC30 ZBC31 ZBC32 ZBC33 ZBC34 ZBC35 ZBC36	26 (15 scoped in and 11 scoped out) and two spans (Span ZBC15-16 and ZBC16-17, both scoped in)	Enfield Council

Project substage	Scoped in	Scoped out	Total no. of towers	Council Area
Stage 5e – work no 1	ZBC39	ZBC40 ZBC41 ZBC42	4 (1 scoped in and 3 scoped out)	London Borough of Waltham Forest
Stage 5h – work no 1	ZBC43	N/A	1	London Borough of Haringey

2.4.2 This report relates specifically to those work areas covered by Stage 5h, within the London Borough of Haringey.

2.4.3 This covering report considers the following national and local policies:

- Overarching National Policy Statement for Energy (EN-1) (2023);
- National Policy Statement for Renewable Energy Infrastructure (EN-3) (2023);
- National Policy Statement for Electricity Networks Infrastructure (EN-5) (2023);
- National Planning Policy Framework (NPPF) (2024);
- National Planning Practice Guidance (NPPG) (2022);
- CIRIA Guidance: The SuDS Manual (C753) (2015); and
- London Borough of Haringey Local Development and Planning Policies.

2.5 Sources of Information

2.5.1 The following sources of information have been reviewed and assessed for the purpose of this assessment [all accessed October 2025]:

- Environment Agency Flood Map for Planning (rivers and sea);
- Environment Agency Risk of Flooding from Surface Water mapping⁷;
- Environment Agency Source Protection Zone mapping;
- Environment Agency Long Term Flood Risk Maps;
- British Geological Survey (BGS) Geology Viewer⁸; and
- Defra MAGIC Map Service⁹.

2.5.2 These sources were used to establish baseline flood risk, geology and hydrogeological conditions, and to inform the site-specific appendices.

3 METHODOLOGY

Covering Report Scope

- 3.1.1 The covering report provides a summary assessment of drainage arrangements across the Stage 5h, consistent with the requirements of Requirement 10 (Surface Water Drainage) of the DCO. It includes, where relevant:
- Hydraulic calculations demonstrating drainage capacity and performance; and
 - An overview of drainage principles and their integration with existing infrastructure.

Scoped-In Appendices

- 3.1.2 The scope for the scoped-in Appendices is as follows:
- Detailed drainage layouts, including pipe sizing, gradients, and invert levels.
 - Specification for drainage components (pipes, manholes, outfalls, attenuation features); and
 - Sustainable Drainage Systems (SuDS) design where applicable, in line with CIRIA SuDS Manual (C753).

Scoped-Out Appendices

- 3.1.3 The scope for the scoped-out Appendices is as follows:
- Scoped-out appendices provide a concise summary confirming that no further assessment is required for those work areas.

Consistency of Approach

- 3.1.4 All appendices have been prepared using a consistent methodology and terminology aligned with the Construction Environmental Management Plan (Requirement 13) and the Drainage Technical Covering Report framework.
- 3.1.5 A list of scoped-in and scoped-out work areas for each Stage are included in Section 2.4.

4 RELEVANT PLANNING POLICY AND GUIDANCE

4.1 Introductions

- 4.1.1 The aim of this section of the covering report is to discuss the main aspects of the local and national planning policies and relevant guidance and legislation that are relevant to the Project.

4.2 UK Legislation

Building Regulations (2010) Part H of Schedule 1 ('Building Regulations Part H')

- 4.2.1 Building Regulations Part H, provide guidance in terms of foul drainage, wastewater treatment systems and cesspools, rainwater drainage, building over sewers, separate systems for surface water and foul waste disposal.
- 4.2.2 In relation to flood risk, Buildings Regulations Part H sets out a hierarchy of where surface water should discharge. This hierarchy should be followed where practicable and is listed below.
- 4.2.3 Infrastructure protocol states that a designer should consider the following in order of preference before finalising a surface water design statement for the development:
- Discharge to SuDS devices, e.g. an adequate soakaway or some other infiltration system;
 - Discharge to a watercourse or where this is not reasonably practicable, and
 - Discharge to a public sewer network.

National Planning Policy

- 4.2.4 The National Policy Statements (NPSs) that are relevant to the Scheme are:
- Overarching National Policy Statement for Energy (EN-1) (November 2023)
 - National Policy Statement for Renewable Energy Infrastructure (EN-3) (November 2023)
 - National Policy Statement for Electricity Networks Infrastructure (EN-5) (November 2023)
- 4.2.5 The NPSs listed above came into effect on 17 January 2024. These NPSs set out the Government's energy policy for the delivery of nationally significant energy infrastructure, the need for new energy infrastructure, and guidance for the determination of an application for a Development Consent Order (DCO).

National Planning Policy Framework

- 4.2.6 The National Planning Policy Framework (NPPF) (February 2025) sets out the Government's planning policies for England and how these are expected to be applied. The National Planning Practice Guidance (NPPG) documents are published and updated to support the NPPF. The flood risk and coastal change PPG was published in 2014 and most recently updated in August 2022.

- 4.2.7 The NPPF sets out the tests needed to ensure people and properties are protected from flooding. The 'sequential test' (Paragraph: 023 Reference ID: 7-023-20220825) is applied to all developments to direct developments to the areas at lowest risk of flooding in preference to those in areas at higher risk. If the sequential test shows that there are no suitable development sites in areas of lower flood risk, then the exception test is applied (Paragraph: 031 Reference ID: 7-031-20220825). The exception test must demonstrate that the development has wider benefits that outweigh flood risk, that the development will be safe for its lifetime and will not increase flood risk elsewhere. The NPPFs also require application of the sequential and exception tests in a manner consistent with the NPPF.
- 4.2.8 The NPPF also ensures that climate change is considered in the long term for flood risk, coastal change, water supply and changes to biodiversity and landscape. Therefore, new developments should be planned to avoid increasing vulnerability arising from the impacts of climate change.
- 4.2.9 The NPPF states that a site-specific Flood Risk Assessment (FRA) is required for the following scenarios:
- All proposals involving sites of 1 hectare or greater in Flood Zone 1;
 - All development in Flood Zones 2 and 3;
 - All proposals involving land within Flood Zone 1, which has been identified by the EA as having critical drainage problems;
 - All proposals involving land within Flood Zone 1 identified in a strategic flood assessment as being at increased flood risk in future; and
 - All proposals involving land within Flood Zone 1 that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

4.3 Local Planning Policy

- 4.3.1 The Enfield Council 'Enfield Plan: Core Strategy 2010 – 2025 (adopted November 2010) contains the following policies relating to flood risk and drainage:

Core Policy 21: Delivering Sustainable Water Supply, Drainage and Sewerage Infrastructure

The Council will work with developers, residents and water supply and sewerage companies to ensure that Enfield's future water resource needs, wastewater treatment and drainage infrastructure are managed effectively in a coordinated manner by:

- *Ensuring that water supply, sewerage and drainage infrastructure is in place in tandem with development, to accommodate the levels of growth anticipated within the Borough. New development may need to be phased to allow the prior completion of necessary infrastructure;*
- *Promoting water conservation and efficiency measures in all new developments, and, where possible, via a retrofitting process in existing developments; and*

- *Ensuring that sustainable drainage measures are incorporated within new developments, wherever possible, as a means to manage surface water runoff.*

Subject to the nature of proposals, developers may need to ascertain the impact of development on existing water supply and wastewater infrastructure. Water and wastewater infrastructure requirements will need to be put in place in tandem with planned growth and prior to the occupation of new development to ensure that additional water resources are provided in a timely and efficient manner and that Enfield's drainage and sewerage infrastructure is sustainable.

In order to improve water quality in the Borough during the life of this Plan, Thames Water Utilities Ltd plan to improve/redevelop Deephams Sewage Treatment Water Works.

The Development Management Document will set out criteria to promote high standards of sustainable design and construction. The Enfield Design Guide Supplementary Planning Document will provide more detailed design advice on methods to effectively manage water.

Core Policy 28: Managing Flood Risk Through Development

The Council will take a risk-based approach to development and flood risk, directing development to areas of lowest risk in accordance with Planning Policy Statement 25: Development and Flood Risk. However:

- *Development of sites in the Central Leaside and North East Enfield Area Action Plan areas that lie within flood zones 2 and 3a, but that contribute to the strategic objectives for change in the Upper Lee Valley, will be supported in principle. These schemes will be expected to comprehensively address flood risk, mitigating the impacts of the development and reducing flood risk overall; and*
- *Redevelopment and intensification of existing industrial sites within the strategic industrial locations will be encouraged, provided that this reduces flood risk overall.*

The Sequential Approach, Exception Test, and all other requirements of PPS25 will still need to be applied to individual developments.

Given that there is likely to be redevelopment within the floodplain, there will be increased emphasis on innovative, flood resistant and resilient design, including a requirement to normally set back development from the watercourse. Sustainable Drainage Systems (SUDS) will be required in all developments, irrespective of the flood risk at individual development sites.

Developments proposed in areas identified as being at risk from surface or groundwater flooding (in level 1 and/or 2 Strategic Flood Risk Assessments and in any subsequent surface water management plans) will be required to demonstrate that further investigation of the extent of risk, and the feasibility of options for prevention or mitigation, have been considered.

Core Policy 29: Flood Management Infrastructure

The Council will continue to work closely with key partners such as the Environment Agency, Thames Water and British Waterways to maintain and enhance the Borough's existing flood defence infrastructure in the medium to long term. The Council will support flood risk management projects, (including the Salmon's Brook Flood Alleviation Scheme), and will require that opportunities for multiple benefits are maximised (for example, resulting in increased biodiversity, access to waterways and recreation).

As details of projects become available, the Core Strategy and/or other development plan documents as appropriate will be reviewed in consultation with the Environment Agency, to ensure their successful delivery (for example by safeguarding the required land). Proposals that compromise the function of existing, or planned, flood risk management infrastructure will normally be resisted.

Opportunities for removal of culverts, river restoration and naturalisation should be considered as part of any development adjacent to a watercourse. Additional culverting and development of river corridors will be resisted. Development behind existing defences will be expected to reduce residual flood risk and works to open spaces within the floodplain or adjacent to watercourses elsewhere should explore opportunities for floodwater storage, river restoration and wetland creation. There may be particular opportunities for such projects in the Lee tributaries.

Innovative responses to flood risk will be encouraged and explored as part of the transformation of Meridian Water and Central Leaside.

- 4.3.2 The Enfield Council 'Development Management Document (DMD) (adopted November 2014) contains the following policies relating to flood risk and drainage:

DMD 59: Avoiding and Reducing Flood Risk

New development must avoid and reduce the risk of flooding, and not increase the risks elsewhere. New development must:

- *Be appropriately located and informed by a site specific Flood Risk*

Assessment (FRA) if proposed in flood risk areas in line with DMD 60 'Assessing Flood Risk';

- *Preserve overland flood and flow routes, where applicable;*
- *Ensure no net loss of flood storage on site, or in exceptional circumstances, provide adequate off site compensatory storage;*
- *Manage surface water as part of all development to reduce run off in line with DMD 60 'Assessing Flood Risk'; and*
- *Prevent the loss of permeable surfaces/areas of soft landscaping, and maximise the use of green infrastructure as potential sources of flood storage.*

Planning permission will only be granted for proposals which have addressed all sources of flood risk and would not be subject to, or result in unacceptable levels of flood risk on site or increase the level of flood risk to third parties.

This policy should be read in conjunction with Core Strategy Policy 28.

DMD 61: Managing Surface Water

A Drainage Strategy will be required for all developments to demonstrate how proposed measures manage surface water as close to its source as possible and follow the drainage hierarchy in the London Plan. All developments must maximise the use of and, where possible, retrofit Sustainable Drainage Systems (SuDS) which meet the following requirements:

Suitability

SuDS measure(s) should be appropriate having regard to the proposed use of site, site conditions/context (including proximity to Source Protection Zones and potential for contamination) and geology.

Quantity

All major developments must achieve greenfield run off rates (for 1 in 1 year and 1 in 100 year events).

All other development should seek to achieve greenfield run off and must maximise the use of SuDS, including at least one 'at source' SuDS measure resulting in a net improvement in water quantity or quality discharging to sewer in-line with any SuDS guidance or requirements.

Quality

Major developments must have regard to best practice and where appropriate follow the SuDS management train by providing a number of treatment phases corresponding to their pollution potential and the environmental sensitivities of the locality.

Measures should be incorporated to maximise opportunities for sustainable development, improve water quality , biodiversity, local amenity and recreation value.

Functionality

The system must be designed to allow for flows that exceed the design capacity to be stored on site or conveyed off-site with minimum impact.

Clear ownership, management and maintenance arrangements must be established.

Other

Where appropriate, developments must incorporate relevant measures identified in the Surface Water Management Plan.

The criteria above must be demonstrated through the submission of a site specific FRA, where one is required, or a Sustainable Design and Construction Statement.

This Policy should be read in conjunction with Core Strategy Policy 28.

DMD 62: Flood Control and Mitigation Measures

Development that increases flood risk to third parties or is not defined as safe in line with Enfield's Strategic Flood Risk Assessment (SFRA) will not be acceptable. All new developments at risk of flooding should be accompanied by appropriate flood mitigation measures. New development should:

- Maintain or provide new or upgraded flood infrastructure at a sufficient standard of protection and/or provide a financial contributions towards measures which reduce and mitigate against flood risk. Where new infrastructure or protection results in a loss of floodplain storage volume this must be compensated for in an appropriate manner;*
- Maintain adequate distances from rivers/watercourses in line with DMD 63 'Protection and Improvement of Watercourses and Flood Defences'.*
- Incorporate flood resilient and flood resistant design measures;*
- Apply appropriate construction techniques to limit the disturbance to natural groundwater flows, such as the use of piled foundations; and*
- Provide flood Warning arrangements and Evacuation Plans.*

Where the development is for essential infrastructure, the measures should ensure that the site is designed to remain operational when floods occur.

The Council will refuse proposals which provide an unacceptable standard of safety.

This Policy should be read in conjunction with Core Strategy Policy 28.

DMD 63: Protection and Improvement of Watercourses and Flood Defences

New development must make space for water and not harm the integrity of flood defences. New development should:

Be set back from main rivers and ordinary watercourses, in the case of the former, maintain a minimum 8 metre buffer strip, which should be free of development and naturalised where feasible;

- Maintain an adequate distance between new development and ordinary watercourses. The distance applied will be determined by having regard to the nature of the development and the type of ordinary watercourse;*
- Adopt a presumption in favour of the removal, where possible, of existing culverts; and*
- Not involve the culverting of main rivers and ordinary watercourses.*

Development on any land required for current and future flood management, which would adversely affect the delivery of flood defence schemes, will be refused.

Development on or adjacent to watercourses must not:

- Result in deterioration in a watercourse; or*
- Prevent its ability to achieve the objectives in the Thames River Basin Management Plan (TRBMP); and*
- Where possible, it should also implement the mitigation measures identified in the RBMP.*

A Water Framework Directive assessment will be required for some works on or adjacent to a watercourse. In these cases, the developer will need to contact the Environment Agency and provide information to demonstrate that the above requirements (2a-c) are met or, to otherwise justify the development.

This Policy should be read in conjunction with Core Strategy policies 28 and 29.

DMD 75: Waterways Waterfront Character and Access to Waterways

All development proposed on or close to the riverside must protect and enhance the waterfront character. Developments should maximise opportunities to provide publicly accessible riverside greenways or shared routes.

Industrial/ commercial development which is exposed to a waterway should address the waterway and create pleasant and interesting views from that waterway. The buildings should take architectural cues from existing heritage features and should provide an attractive, and where possible, active façade to encourage passive surveillance. Public access to the waterfront should be retained or introduced. Access for staff must be maintained as a minimum.

Moorings

Permanent residential or commercial moorings on the River Lee Navigation will be supported provided they meet all of the following criteria:

- *There is no harm to the intrinsic character of the river;*
- *There is no detrimental impact on amenity arising from traffic generation or servicing needs;*
- *There is no adverse impact on water-borne freight or leisure uses;*
- *There is no adverse ecological impact;*
- *There is no increase in flood risk; and*
- *There is no adverse impact on existing or planned water based leisure and recreation uses.*

Freight

Development which maximises transportation of freight by water will be supported.

This policy should be read in conjunction with Core Strategy policies 34 and 35.

4.4 Climate Change

- 4.4.1 NPS EN-1 confirms the need to factor the effects of climate change into any Flood Risk Assessment. Paragraph 4.10.13 of NPS EN-1 advises that the latest UK Climate Projections and associated research and expert guidance (such as the EA's 'Flood Risk Assessments: Climate Change Allowances' Guidance (February 2016; last updated May 2022) should be used to ensure appropriate mitigation or adaptation measures are identified to cover the estimated lifetime of the Scheme. The EA Guidance provides climate change allowances

(predictions of anticipated change), and those relevant to the Scheme are the allowances for:

- Peak river flow; and
- Peak rainfall intensity.

- 4.4.2 Peak river flow allowances show the anticipated changes to peak flow by management catchment. Management catchments are sub-catchments of river basin districts. The range of allowances is based on percentiles. A percentile describes the proportion of possible scenarios that fall below an allowance level. The 50th percentile is the point at which half of the possible scenarios for peak flow fall below it, and half fall above it.
- 4.4.3 The percentiles for each allowance are:
- Central allowance is based on the 50th percentile;
 - Higher central allowance is based on the 70th percentile; and
 - Upper end allowance is based on the 95th percentile.
- 4.4.4 An allowance based on the 50th percentile is exceeded by 50% of the projections in the range. At the 70th percentile it is exceeded by 30%. At the 95th percentile it is exceeded by 5%.
- 4.4.5 The EA Guidance states that Essential Infrastructure Developments should utilise the Higher Central Allowance. However, NPS EN-1 Paragraph 4.10.11 states that “where it is appropriate to apply a credible maximum scenario, the upper end allowance should be utilised”. Given that the credible maximum scenario applies to NSIPs, the NPS therefore requires that the Scheme uses the credible maximum scenario to remain resilient.
- 4.4.6 The Scheme is located in the London Management Catchment. Table 2 overleaf provides the Upper Allowances for the provided 2050’s and 2080’s epochs. The EA define the 2050’s epoch as 2040 to 2069 and the 2080’s epoch as 2070 to 2125. The life expectancy of the Scheme is 60 years therefore the allowances up to 2080 are detailed below.
- 4.4.7 For peak rainfall intensity, the peak rainfall allowances map shows the anticipated changes in peak rainfall intensity. These changes are to be used for site-scale applications, such as drainage design, and for surface water flood mapping in small catchments of less than 5 square kilometres (500 hectares).

Table 3: Peak Rainfall – Upper Allowance (2050’s and 2070’s epoch)

District Management Catchment	Central Allowance		Upper End Allowance	
	2050s	2070s	2050s	2070s
London Management Catchment	20%	25%	40%	40%

- 4.4.8 Climate change allowances have been integrated into this covering report and the site-specific Appendices where applicable to assess site-specific flood risk.

5 SUMMARY OF FLOOD RISK

- 5.1.1 The purpose of this covering report is to assess the potential flood risk to the Project, evaluate whether it would alter flood risk elsewhere, and identify the measures embedded within the design and construction methodology to mitigate any identified risk. A summary of each site / work area within Stages 5h can be found in the site-specific Appendices.

5.2 Tidal Flood Risk

- 5.2.1 Whilst the site within Stage 5h is in close proximity to the River Lea which ultimately discharges into the tidally influenced River Thames, the sites are beyond the limits of the tidal reach of the Thames. Therefore, the site within Stage 5h is considered to have **Negligible** risk of tidal flooding. This conclusion applies to all tower and span locations within the Enfield section of the Project.

5.3 Fluvial Flood Risk

- 5.3.1 According to the Environment Agency's Flood Map for Planning, ZBC43 lies within Flood Zone 2. This zone comprises land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%) in any given year.
- 5.3.2 The site within Stages 5h is covered by the EA's Flood Warning Areas. Site management and Site teams will register with the Environment Agency's Floodline service (tel. 0345 988 1188) and implement the Flood Response Plan contained in the CEMP (Requirement 13).
- 5.3.3 Please see supporting site-specific Appendices for further information on the fluvial flood risk.
- 5.3.4 Further detail on this source of flood risk is provided in the corresponding site-specific appendix.

5.4 Surface Water Flood Risk

- 5.4.1 According to the EA's Long Term Flood Risk Mapping, the site within Stages 5h is shown at 'Very Low' risk of surface water flooding (<0.1% annual probability).

Risk Rating	Site(s)
Very Low	ZBC43

- 5.4.2 Please see supporting site-specific Appendices for further information on the surface water flood risk.
- 5.4.3 Further detail on this source of flood risk is provided in the corresponding site-specific appendix.

5.5 Groundwater Flood Risk

- 5.5.1 Given the close proximity to watercourses and large waterbodies, groundwater levels may be naturally high within the Stage 5h location. Shallow groundwater may therefore be present, fluctuating seasonally, but pose no constraint to the works proposed within Stage 5h given the short term nature of the works.
- 5.5.2 Further detail on this source of flood risk is provided in the corresponding site-specific appendix.

5.6 Sewer Flood Risk

- 5.6.1 According to Thames Water utility asset plans, there is no public sewerage system in close proximity to the site within Stage 5h. Please see supporting site-specific Appendices for further information on the sewer flood risk.
- 5.6.2 Further detail on this source of flood risk is provided in the corresponding site-specific appendix.

5.7 Artificial Sources of Flood Risk (Reservoir / Canal)

- 5.7.1 According to the EA's Long Term Flood Risk Mapping (Reservoirs), the site within Stages 5h is within an area at risk from reservoir flooding both when river levels are normal (dry-day scenario) and when there is also flooding from rivers (wet-day scenario). The EA confirms that reservoir flooding is extremely unlikely, as all large reservoirs are inspected and maintained under the Reservoirs Act 1975 by qualified panel engineers.
- 5.7.2 Many elements of the Project are in close proximity to the River Lea Navigation Canal. The canal is fluviably influenced and joins the River Lea Main River in several locations, therefore please refer to Section 5.3 for further information on the risk to the site from canals.
- 5.7.3 Further detail on this source of flood risk is provided in the corresponding site-specific appendix.

6 EXISTING SURFACE WATER DRAINAGE

- 6.1.1 The Order Limits for the towers included within Stage 5h predominantly comprise undeveloped land with no formal positive surface-water drainage system. Exceptions include existing transmission tower bases, substation areas, and associated access routes where limited engineered drainage may already exist.
- 6.1.2 The Stage 5h is located within the London Borough of Haringey, located across an area that runs parallel to Pymme's Brook (EA Main River).
- 6.1.3 Utility Asset Plans (Thames Water) indicate the public sewerage system is not present in close proximity to the site. Refer to the site-specific Appendices for further information on the location of utilities. Inverts and cover levels were not included for viewing at the time of writing.

6.2 Ground Conditions

- 6.2.1 According to British Geological Survey (BGS) Geology Mapping, the work area within Stages 5h is underlain by superficial deposits of Alluvium (clay, silt, sand

and gravel). The superficial deposits are underlain by bedrock deposits of London Clay Formation (clay, silt and sand).

- 6.2.2 Given the presence of London Clay Formation, it is anticipated that infiltration potential for drainage features is considered to be limited. Therefore, based on the currently available desktop information, surface water within the Stage 5h works area is expected to continue draining via shallow overland flow to adjacent watercourses, consistent with the existing regime.
- 6.2.3 The underlying Source Protection Zones (SPZs) as observed on MAGIC mapping for work area in Stage 5h include Zone II (Outer Protection Zone). Site-specific SPZs are discussed further within each site-specific appendix.

6.3 Existing Foul Drainage

- 6.3.1 There is no evidence of a current positive foul connection within the area proposed for Stage 5 works.

7 DRAINAGE MANAGEMENT PLAN

7.1 Surface Water Drainage

- 7.1.1 This Drainage Technical Covering Report addresses only the temporary impermeable surfaces required to facilitate construction. No permanent drainage infrastructure is proposed as part of the Stage 5h works.
- 7.1.2 The areas of development outlined in Section 6 above require a surface water drainage strategy to manage potential temporary increases in runoff and prevent an increase in flood risk elsewhere. Works for Stage 5h include the laydown of temporary trackway.

7.2 Drainage Hierarchy

- 7.2.1 The recommended surface-water drainage hierarchy, as set out in NPS EN-1 (Paragraph 5.8.15) and the National Planning Practice Guidance: Flood Risk and Coastal Change (Paragraph 056, Reference ID 7-056-20220825), is to:
- 1 Discharge to the ground via infiltration (preferred);
 - 2 Discharge to a watercourse where infiltration is not feasible;
 - 3 Discharge to a surface-water sewer if neither of the above are practicable; and
 - 4 Discharge to a combined sewer only as a last resort.

7.3 Preferred Method of Surface Water Discharge

- 7.3.1 It is considered that considering the temporary nature of the proposals, draining to ground is feasible as per the existing scenario, and therefore discharge to soakaways, watercourses or the public sewer systems will not be required. The vast majority of the Project will comprise natural ground cover post-construction, with limited areas of hardstanding associated with the existing concrete bases serving the transmission towers.
- 7.3.2 As a result of the construction of the temporary trackways, some rainfall will be intercepted by the surface of the trackways before draining to the natural ground.

Intercepted rainfall will drip into the ground along the perimeter of the temporary trackways.

- 7.3.3 Where rainwater drips onto the ground surrounding the trackways, the energy of the flow from the surface of the trackways is likely to be greater than that of the rainfall (especially where rainwater collects along perimeter of the trackways), which could result in the erosion of ground without appropriate mitigation. The erosion of the ground could then result in the formation of rivulets (albeit minor, considering the temporary nature of the trackways) which could increase the speed of runoff throughout the sites).
- 7.3.4 In order to mitigate against the potential erosion, temporary measures will be implemented to ensure there is no increase in surface water runoff as a result of the trackways. The CEMP accompanying the DCO application describes these measures during the construction phase. All temporary drainage measures will be implemented through the Construction Environmental Management Plan (Requirement 13) and maintained until reinstatement.
- 7.3.5 In addition, the construction phase has the potential to result in compaction of soils through repeated use of the temporary trackways and movement of vehicles and heavy plant, thereby reducing the soil's ability to accept surface water runoff. It is recommended that the movement of large vehicles is limited where possible to proposed access tracks in order to reduce the potential for soil compaction to occur, in addition to fitting vehicles with low pressure tyres to further reduce the impact on the underlying soil. It is also recommended that existing access tracks are retained where practicable, that construction traffic is restricted to designated routes, and that soil handling and reinstatement protocols are implemented to minimise compaction and maintain permeability.
- 7.3.6 The aforementioned techniques will discourage soil erosion within the Order Limits whilst maintaining the existing overland flowpaths.

7.4 Event Exceedance

- 7.4.1 Any surface water runoff in excess of the infiltration capacity of the ground may naturally drain into the surrounding watercourses as per the existing scenario.

7.5 Foul Water Discharge

- 7.5.1 No welfare facilities are proposed as part of the works and therefore, consideration of foul water discharge is not required.

7.6 Watercourse Crossings

- 7.6.1 A review of all access and egress routes under Stage 5h has been undertaken.
- 7.6.2 Access tracks will be required across the Scheme. The majority of access routes utilise existing routes, and new routes obtained through temporary laydown / trackway do not introduce any new watercourse crossings as part of the works. Access tracks will adhere to the appropriate 8 m buffer from watercourses, with the layouts designed to avoid watercourse crossings. In some instances, access routes include usage of the waterways for carrying out deliveries to work areas via barge.

- 7.6.3 It is acknowledged that any new watercourse crossings introduced may require Environmental Permits and watercourse consents. Consultation with the EA and LLFA is ongoing to ensure an agreed and proportionate approach to the construction methodologies and regulatory oversight through the DCO process.
- 7.6.4 Based on the current design, no activities within Stages 5h are expected to occur within 8 m of a regulated Main River channel. Accordingly, a Flood Risk Activity Permit (FRAP) is not anticipated to be required. This position will be confirmed through ongoing consultation with the Environment Agency as detailed designs are finalised.

8 POTENTIALLY POLLUTING MATERIALS AND CONSTRUCTION METHODS

- 8.1.1 This section describes the measures for managing water quality risks arising from construction activities and potentially polluting materials. These controls are embedded through the Construction Environmental Management Plan (Requirement 13) and are proportionate to the temporary nature of the works.
- 8.1.2 Where required, temporary drainage infrastructure will be installed in advance of construction works. A robust inspection and maintenance regime will be implemented through the CEMP and maintained for the duration of construction. Records of inspections will be retained for audit under Requirement 10.

8.2 Silt-Laden Runoff

- 8.2.1 Construction activities such as earthworks, temporary grading and movement of heavy plant may generate silt-laden runoff if not appropriately managed. If unmanaged, sediment mobilisation can result in the discharge of silty water to surface watercourses or infiltration to groundwater, potentially degrading water quality and harming aquatic ecology. Runoff may also contain pollutants such as oil, fuel or concrete washings, increasing the risk of contamination. The control measures listed below are designed to prevent silt or sediment entering surface water or groundwater receptors.

Measures to Reduce Sediment

- 8.2.2 Management measures to reduce sediment runoff and deposition into surface water bodies include:
- Install silt fencing and, where appropriate, temporary swales;
 - Control of water at source, and manage runoff from stockpiles through shaping and compaction of material;
 - Provision of designated washout and refuelling zones;
 - Geotextiles used to shield stockpiles, as and when needed;
 - Stockpiles to not be stored within 10m of a surface water feature, waterbody or watercourse;
 - Stockpiles in-situ for extended lengths of time, will be vegetated to reduce erosion and subsequent runoff; and

- Prior to soil stripping, where required, pre-construction drainage will be installed as per specifications provided by the specialist drainage contractor.

8.2.3 All measures will be inspected weekly and following significant rainfall events to confirm effectiveness. These measures are secured through the CEMP.

8.3 Diffuse Pollution Contained in Urban Runoff

8.3.1 Runoff from the temporary trackways may contain low concentrations of hydrocarbons, heavy metals, nutrients, debris and silt. These pollutants may be transported to nearby watercourses (such as the River Lea or the River Lea Navigation Canal) via surface water runoff or infiltrate to ground, potentially affecting surface water and groundwater quality.

Measures to Reduce Hydrocarbons

8.3.2 To reduce the accumulation of hydrocarbons in surface water and potential impacts, the following mitigation measures include:

- Use of oil water separators;
- Use of spill kits (including oil absorbent granules and absorbent pads);
- Refuelling mats, bunded storage tanks and waste bunds to be readily available on site;
- Drip trays and/or absorbent plant nappies to be placed under stationary and/or parked plant; and
- Potential pollutants to not be stored within 10m of a surface water feature, waterbody or watercourse.

8.3.3 Grassed groundcover beneath and surrounding the temporary trackways also helps reduce the mobilisation and transport of pollutants by encouraging infiltration and filtering out particulates.

8.4 Accumulation and Runoff from Access Roads / Spillage Risk

8.4.1 All access roads will be kept free of runoff, mud and other deposits. Any deposits on access roads will be cleared by the contractor, as and when required. Further information will be provided within the CEMP submitted as part of the discharge of Requirement 13 of the DCO.

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

- 9.1.1 This Drainage Technical Covering report should be read in conjunction with the supporting Appendices, which provide a Drainage Assessment for each site / work area included in Stage 5h.
- 9.1.2 Given the temporary nature of the works proposed, it is considered that temporary drainage features throughout the work areas, alongside suitable mitigation measures, should sufficiently address any increased risk to surface water drainage for the duration of the Project.

9.2 Recommendations

- Maintain construction-stage surface water and pollution prevention controls in accordance with the CEMP;
- Inspect and maintain all temporary measures throughout the works and remove them on completion;
- Reinstate the ground to existing levels and vegetation to restore natural infiltrations;
- Monitor weather forecasts daily and suspend ground-disturbing works during or immediately before periods of heavy rainfall; and
- Retain records of inspections, weather monitoring and reinstatement as evidence of Requirement 10 compliance.

Appendix A – ZBC43

¹ <https://flood-map-for-planning.service.gov.uk>

² <https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1>

³ https://assets.publishing.service.gov.uk/media/64252f5f2fa848000cec0f52/NPS_EN-3.pdf

⁴ https://assets.publishing.service.gov.uk/media/64252f852fa848000cec0f53/NPS_EN-5.pdf

⁵ <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

⁶ <https://www.gov.uk/government/collections/planning-practice-guidance>

⁷ <https://check-long-term-flood-risk.service.gov.uk/postcode>

⁸ <https://www.bgs.ac.uk/map-viewers/geoindex-onshore/>

⁹ <https://magic.defra.gov.uk/MagicMap.aspx>