Appendix H

HABITATS REGULATIONS ASSESSMENT (HRA)

BROXBOURNE BOROUGH AND EAST HERTFORDSHIRE DISTRICT SURFACE WATER MANAGEMENT PLANS

HABITATS REGULATIONS ASSESSMENT SCREENING

March 2017

WSP | PARSONS BRINCKERHOFF

BROXBOURNE BOROUGH AND EAST HERTFORDSHIRE DISTRICT SURFACE WATER MANAGEMENT PLANS

HABITATS REGULATIONS ASSESSMENT SCREENING

Hertfordshire County Council

Confidential

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WSP | Parsons Brinckerhoff
Three White Rose Office Park
Leeds
LS11 0DL
UK

Tel: 01133956200
Fax: +44 113 395 6201
www.wspgroup.com
www.pbworld.com

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ABBREVIATIONS

CEMP	Construction Environmental Management Plan
CFMP	Catchment Flood Management Plan
CIRIA	Construction Industry Research and Information Association
EA	Environment Agency
HCC	Hertfordshire County Council
HRA	Habitat Regulations Assessment
IAQM	Institute of Air Quality Management
IROPI	Imperative Reason of Overriding Public Interest
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
NE	Natural England
PLP	Property Level Protection
PPG	Pollution Prevention Guidelines
SAC	Special Area of Conservation
cSAC	Candidate Special Area of Conservation
SCI	Site of Community Importance
SCC	Southampton City Council
SEA	Strategic Environmental Assessment
SFRA	Strategic Flood Risk Assessment
SPA	Special Protection Area
pSPA	Potential Special Protection Area
SuDS	Sustainable urban Drainage System
SWMP	Surface Water Management Plan

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1 INTRODUCTION AND PURPOSE OF THIS REPORT

1.1 INTRODUCTION

1.1.1 This Screening Report has been prepared by WSP | Parsons Brinckerhoff Ltd. on behalf of Hertfordshire County Council (HCC) as part of the statutory Habitats Regulations Assessment (HRA) of the Broxbourne Borough and East Hertfordshire District Surface Water Management Plans (SWMPs).

1.1.2 It is intended that the SWMPs reflect the principles, aims and objectives of the National Flood and Coastal Erosion Risk Management Strategy for England. The SWMPs will address flooding from surface water, groundwater and ordinary watercourses within Broxbourne Borough and East Hertfordshire District and also provide guidance on other sources of flooding such as flooding from Main Rivers.

1.2 PURPOSE OF THIS REPORT

1.2.1 This report is the first stage in the HRA process, commonly referred to as Screening. It identifies whether or not the Broxbourne Borough and East Hertfordshire District SWMPs are likely to result in significant effects on a European Site either alone or in-combination with other projects and plans, and subsequently whether or not an Appropriate Assessment will be required. Further details on the HRA stages are provided in **Section 2**.

1.3 BACKGROUND TO HABITATS REGULATIONS ASSESSMENT

1.3.1 Under Article 6 of the Habitats Directive, an assessment is required where a plan or project may give rise to significant effects upon a Natura 2000 site.

1.3.2 Natura 2000 is a network of areas designated to conserve natural habitats and species that are rare, endangered, vulnerable or endemic within the European Community. This includes Special Areas of Conservation (SAC), designated under Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) for their habitats and/or species of European importance, and Special Protection Areas (SPA), classified under Directive 2009/147/EC on the Conservation of Wild Birds (the codified version of Directive 79/409/EEC as amended) for rare, vulnerable and regularly occurring migratory bird species and internationally important wetlands.

1.3.3 In addition, it is a matter of law that candidate SACs (cSAC) and Sites of Community Importance (SCI) are considered in this process; furthermore, it is Government policy that sites designated under the 1971 Ramsar Convention for their internationally important wetlands (Ramsar sites) and potential SPA (pSPA) are also considered. Collectively, these sites are referred to in this report as 'European Sites'.

1.3.4 Paragraph 3, Article 6 of the Habitats Directive states that:

→ *'Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to paragraph 4 (see below), the competent national*

authority shall agree to the plan or project only having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public'.

1.3.5 Paragraph 4, Article 6 of the Habitats Directive states that:

- *'If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of social or economic nature, the Member State shall take all compensatory measures to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.'*

1.3.6 The overarching aim of the HRA is to determine, in view of a European Site's conservation objectives and qualifying interests, whether the plan, either in isolation and/or in combination with other plans or projects, would have a significant adverse effect on a European Site. If the Screening (the first stage of the process, see Section 3 for details) concludes that significant adverse effects are likely, then Appropriate Assessment must be undertaken to determine whether there will be adverse effects on a European Site's integrity.

1.4 LEGISLATION AND GUIDANCE

1.4.1 This HRA screening report has drawn upon the following legislation and guidance:

- The Conservation of Habitats and Species Regulations 2010. In 2012, these Regulations were amended to transpose more clearly certain aspects of the Habitats Directive. No fundamental changes to the Regulations were made;
- European Commission, Managing Natura 2000 sites: The provisions of Article 6 of the Habitats Directive 92/43/EEC;
- European Commission, Guidance document on Article 6(4) of the Habitats Directive 92/43/EEC;
- Technical Advice Note 5, Nature Conservation and Planning (2009); and,
- Essential Guide for the Assessment of Plans and Projects under the UK Habitats Regulations (online document accessed August 2016)[1].

1.5 CONSULTATION

1.5.1 The agreed approach with HCC was to identify criteria that could be applied to any actions identified in the SWMP strategy that would in effect ensure that any potential to impact on a European Site was negated at the point that the action was included in the strategy. This effectively meant that these actions were established with the means contained within them to ensure that they had no detrimental impact i.e. there would be no physical modification or consequential impacts on the volume of water entering a European Site and the water quality would not in any way be impacted.

[1] Reference http://www.dtapublications.co.uk

2 THE HABITATS REGULATIONS ASSESSMENT PROCESS

2.1 STAGES IN HRA

2.1.1 This section provides an outline of the stages involved in the HRA and the specific methods that have been used in preparing this report. This report relates to the 'Screening' stage of the HRA process.

2.1.2 The requirements of the Habitats Directive comprise four distinct stages:

- **Stage 1: Screening** is the process which initially identifies the likely impacts of a project or plan on a European Site, either alone or in-combination with other projects or plans. It considers whether these impacts may have a significant effect on the integrity of the site's qualifying habitats and/or species. It is important to note that the burden of evidence is to show, on the basis of objective information that (following the application of proven effective mitigation where applicable), there will be no significant effect. If the effect may be significant, or is not known, that would trigger the need for an Appropriate Assessment. Unless the likelihood of a significant effect can be ruled out on the basis of objective information, and adopting the precautionary principle, then an Appropriate Assessment must be made.
- **Stage 2: Appropriate Assessment** is the detailed consideration of the impact on the integrity of the European Site, in the context of the project or plan (i.e. the SWMP), either alone or in combination with other projects or plans, with respect to the site's conservation objectives and its structure and function. This is to determine whether or not there will be adverse effects on the integrity of the site. This stage also includes the development of mitigation measures to avoid or reduce any possible impacts.
- **Stage 3: Assessment of alternative solutions** is the process which examines alternative ways of achieving the objectives of the project or plan that would avoid adverse impacts on the integrity of the European Site, should avoidance or mitigation measures be unable to cancel out adverse effects.
- **Stage 4: Assessment where no alternative solutions exist and where adverse impacts remain** an assessment is made with regard to whether or not there are alternatives and if not, whether the development is necessary for imperative reasons of overriding public interest (IROPI). If it is, this stage also involves detailed assessment of the compensatory measures needed to protect and maintain the overall coherence of the European Site network.

2.1.3 The following elements of **Stage 1** relating to assessing Likely Significant Effects (LSE) are outlined in the following sections of this report:

- **Section 3** – Identifying the SWMPs
- **Section 4** – Identifying European Sites
- **Section 5** – Screening the SWMPs
- **Section 6** – Identifying Mitigation
- **Section 7** – Conclusions

3 BROXBOURNE BOROUGH AND EAST HERTFORDSHIRE DISTRICT SWMPS

3.1 BACKGROUND AND PURPOSE OF SWMPS

3.1.1 Under the *Flood and Water Management Act 2010* (the Act), HCC became the Lead Local Flood Authority (LLFA) for Hertfordshire[2] responsible for coordinating the management of local flood risk from surface water, groundwater and ordinary watercourses across Broxbourne Borough and East Hertfordshire District.

3.1.2 The Act requires the LLFA to '*develop, maintain, apply and monitor*' a Local Flood Risk Management Strategy (LFRMS). The LFRMS will focus on local flood risk resulting from surface water, groundwater and ordinary watercourse flooding, as well as assess the interaction with Main River flooding. The LFRMS will also explain how this flood risk will be managed by HCC in their role as LLFA.

3.1.3 The LFRMS for Hertfordshire 2013 - 2016 (published February 2013) identified the need for district scale SWMPs. WSP | Parsons Brinckerhoff has undertaken SWMPs for Broxbourne Borough and East Hertfordshire District on behalf of HCC, as LLFA. The study has been undertaken in consultation with key local partners and stakeholders who are responsible for surface water management and drainage in the area, to understand the causes and effects of surface water flooding and agree the most cost effective processes of managing surface water flood risk for the long term.

3.1.4 Potential flood hotspots (areas marked locally as being at greatest risk of surface water flooding) were identified and refined so that key hotspot areas could be taken forward for more detailed analysis involving modelling to assess the baseline flood mechanisms, pathways and extents.

3.1.5 Following baseline hydraulic modelling, a review of the revised flood extents was undertaken to determine the feasibility of various mitigation measures (SWMP measures) for each hotspot location in order to reduce impacts associated with flooding.

3.1.6 A description of the SWMP measures at each hotspot location is summarised in **Table 5-1** and **Table 5-2** (see also **Appendix A-1** and **Appendix A-2**). Measures have been identified as either:

- → SWMP measures comprising '*options'* currently put forward (generally Property Level Protection (PLP) measures)
- → SWMP measures comprising *'recommendations'* for further protection (requiring further modelling and assessment to determine feasibility).

3.1.7 HRA assessment has been undertaken per hotspot based on the measure proposed (i.e. divided into PLP *options* and other *recommendations* for additional protection) this is reflected in **Table 5-1** and **Table 5-2** assessments.

[2] *Flood and Water Management Act 2010* (Section 6 - Other Definitions); (Paragraph 7) "Lead local flood authority" in relation to an area in England means— (a) the unitary authority for the area, or (b) if there is no unitary authority, the county council for the area.

3.1.8 More detail pertaining to the design of the SWMP measure is available in the respective SWMPs and modelling methodology reports for Broxbourne Borough and East Hertfordshire District.

3.1.9 The SWMPs are live documents that should be reviewed approximately every five years, to ensure the implementation of the agreed actions is correct and that any new issues are addressed. A review may be required following any new flood event, when new flood data becomes available, or new modelling techniques are developed, and when there is a change of policy in the catchment.

BROXBOURNE SWMP

3.1.10 The Borough of Broxbourne covers approximately 52 km^2 and has a population of around 96,000. Although Broxbourne contains a densely developed urban north-south corridor along its eastern part, the majority of the borough area lies within the Metropolitan Green Belt.

3.1.11 Much of the Borough's open countryside is also of high landscape value. This includes at Wormley-Hoddesdonpark Woods SAC. The central block of Wormley Wood is thought to be the oldest long-standing high forest woodland in the county.

3.1.12 The Lee Valley Corridor which contains the Lee Valley Ramsar/SPA sub-blocks runs along the eastern edge of the Borough and comprises the historic wetlands of the flood plain (which have been severely disturbed by mineral excavation). Some of the basic wetland characteristics of open water, fen swamp and riverine woodland have regenerated to give a complex of wetland habitats.

3.1.13 The following SWMP mitigation hotspots are identified for the Broxbourne Borough SWMP (as shown in **Table 5-1** and **Figure 4-1**):

- HS9 – Rye House/North Hoddesdon
- HS52 – Cheshunt
- HS55 – Cozens Lane East
- HS62 – Rosedale North, Flamstead End
- HS63 – Rosedale South, Flamstead End

3.1.14 **Appendix A-1** and **Appendix A-2** detail the SWMP Hotspot design considerations, options and recommendations.

EAST HERTFORDSHIRE SWMP

3.1.15 The District of East Hertfordshire covers an area of 477 km^2 with a population of around 143,000. It is predominantly a rural district, including the rivers Lea, Mimram, Beane, Rib, Ash, and Stort.

3.1.16 East Hertfordshire has a dispersed settlement pattern that includes the market towns of Bishop's Stortford, Buntingford, Hertford, Sawbridgeworth and Ware. The southern third of the District lies within the London Metropolitan Green Belt.

3.1.17 The District contains many special landscape, natural and built heritage features which includes Wormley-Hoddesdonpark Woods SAC. The Lee Valley Corridor which contains the Lee Valley Ramsar/SPA

3.1.18 The following SWMP mitigation hotspots are identified for the East Hertfordshire District SWMP (as shown in Table 5-2 and **Figure 4-1**):

- HS1 - Buntingford

- HS40 – Bengeo, Hertford
- HS43 - Hadham Road, Bishop's Stortford
- HS44 - Benhooks Ave, Bishop's Stortford
- HS47 - Raynham Road, Bishop's Stortford
- HS60 - Potter Street, Bishop's Stortford

3.1.19 **Appendix A-1** and **Appendix A-2** detail the SWMP Hotspot design considerations, options and recommendations.

4 IDENTIFYING RELEVANT EUROPEAN SITES

4.1 APPROACH

4.1.1 European Sites (see **Appendix A-3**) both within and outside the Broxbourne Borough and East Hertfordshire District boundaries may be relevant to the HRA screening if they are connected via hydrological links or if mobile species with a significant functional link to European Sites (such as for foraging), are likely to be affected by hotspot mitigation effects within their range. A 10 km buffer of hotspot area perimeters has therefore been applied to screen the HRA assessment to cover these scenarios.

4.1.2 Four European Sites are within a 10 km buffer of hotspot areas and are therefore deemed potentially significant to the HRA screening exercise; these are shown in **Figure 4-1** and described in **Section 4.2** and **Section 4.3** below**.**

4.2 EUROPEAN SITES LOCATED WITHIN BROXBOURNE AND EAST HERTFORDSHIRE

4.2.1 Of the four European Sites identified; three intersect the Broxbourne Borough and East Hertfordshire District boundaries, as detailed in **Table 4-1**, namely;

- Lee Valley, SPA and Ramsar; and
- Wormley Hoddesdonpark Woods, SAC.

4.2.2 With regards to the Lee Valley SPA and Ramsar and Wormley Hoddesdonpark Woods SAC, these designations comprise a number of geographically separated component areas/blocks as shown on **Figure 4-1**.

4.2.3 Summary information on these sites, why they have been designated and their potential to be affected by the actions within the SWMP are set out in **Table 4-1** below.

4.3 EUROPEAN SITES LOCATED OUTSIDE THE BROXBOURNE AND EAST HERTFORDSHIRE BOROUGH BOUNDARIES

4.3.1 The following European Site is located within, or partly within the 10 km SWMP mitigation measure hotspot buffer but lies outside the borough boundaries:

- Epping Forest, SAC.

4.3.2 Summary information on Epping Forest SAC site designation and its potential to be affected by hotspot mitigation actions within the SWMP are set out in **Table 4-2** below.

Figure 4-1 Habitats Directive Sites located within 10km of Broxbourne Borough and East Hertfordshire District SWMP Measure Hotspots

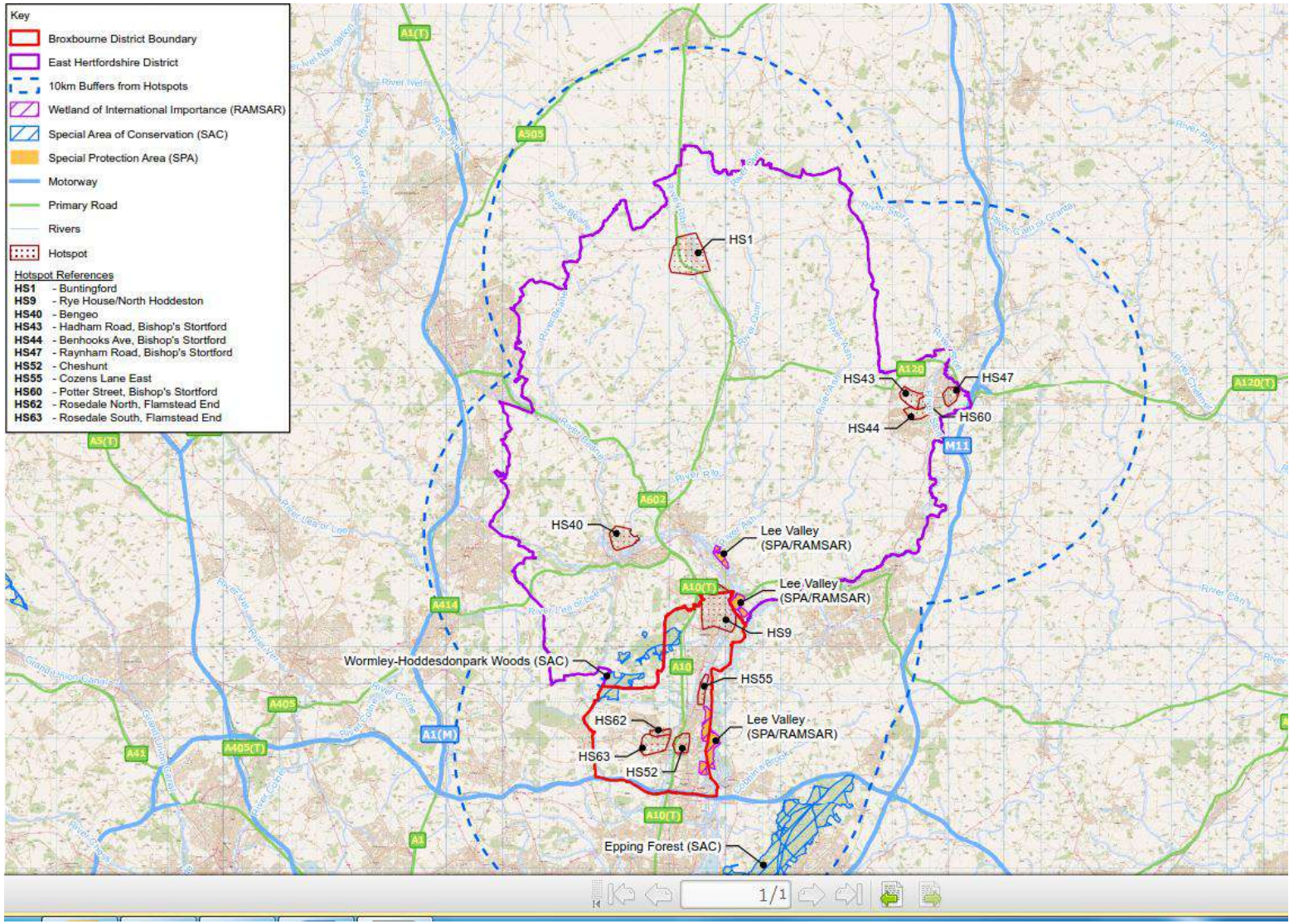

Table 4-1 Summary of European Sites located within the Borough of Broxbourne and East Hertfordshire District

Description including Qualifying Features	Conservation Objectives	Threats (Natura 2000 – Standard Data Form and Site Improvement Plan (SIP))	Summary of Potential Effects arising from the proposed SWMP measures
Lee Valley SPA/Ramsar (UK9012111) <u>Qualifying Features</u> Article 4.1 qualification (79/409/EEC). Over winter the area regularly supports: → (Eurasian bittern or great bittern) *Botaurus stellaris (Europe - breeding*) 6% of the GB population (Five year peak mean for 1992/93 to 1996/97) Article 4.2 qualification (79/409/EEC). Over winter the area regularly supports: → (Northern shoveler, *Anas clypeata* (North-western/Central Europe) 1% of the population (5 year peak mean, 1993/4-1997/8). → (Gadwall) *Anas strepera* (North-western Europe) 1.5% of the population (5 year peak mean, 1993/4-1997/8). <u>Description</u> Area: 447.87 ha Falling within the Broxbourne Borough and East Hertfordshire District boundaries, the Lee Valley SPA is located to the north-east of London, where a series of wetlands and reservoirs occupy about 20 km of the valley. The site comprises embanked water supply reservoirs, sewage treatment lagoons and former gravel pits	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring; → The extent and distribution of the habitats of the qualifying features → The structure and function of the habitats of the qualifying features → The supporting processes on which the habitats of the qualifying features rely → The population of each of the qualifying features, and, → The distribution of the qualifying features within the site. Qualifying Features: → A021 *Botaurus stellaris*; Great bittern (Non-breeding) → A051 *Anas strepera*; Gadwall (Non-breeding) → A056 *Anas clypeata*; Northern shoveler (Non-breeding)	The following High ranking Negative threats pressures and activities with impacts on the site are identified in the Natura 2000 – Standard Data Form: → **H02 - Pollution to groundwater (point sources and diffuse sources)** → K02 - Biocenotic evolution, succession → G01 - Outdoor sports and leisure activities, recreational activities → **J02 – Human induced changes in hydraulic conditions** → F01 - Marine and Freshwater Aquaculture The following are identified in the SIP as currently impacting or threatening the condition of the site features; → **1 Water Pollution - The vegetation and invertebrates provide food for the ducks, while fish provide food for the bitterns; and the habitat mosaic needs to vary from clear open water with abundant aquatic vegetation to moderately eutrophic conditions. Changes in water quality need to be managed to prevent loss of suitable habitat and food sources.** → **2 Hydrological changes - Reservoir levels linked to operational requirements and all water bodies subject to natural fluctuations accounting for abstraction and climatic change.** → 3 Public Access/Disturbance - Areas of the SPA are subject to a range of recreational pressures including watersports, angling and dog walking. This has the potential to affect SPA populations directly or indirectly. → 4 Inappropriate scrub control - The reedbed habitats, muddy fringes, and bankside all provide habitat as part of the mosaic for the SPA birds. Scrub control is necessary	Implementation of the SWMP measures (pre mitigation) has the potential to cause adverse effects on the extent, distribution and structure of habitats which support *Botaurus stellaris*; Great bittern; *Anas strepera*; Gadwall; and *Anas clypeata*; Northern shoveler which are located within the Lee Valley SPA/Ramsar as follows: → Construction phase impacts on surface water or groundwater quality could arise in the vicinity of the construction works from mobilised suspended solids or spillage fuels, lubricants, cements and hydraulic fluids from construction plant if there are inadequate mitigation measures in place. → Construction phase noise and visual disturbance may affect the population and/or distribution of *Botaurus stellaris*; Great bittern; *Anas strepera*; Gadwall; and *Anas clypeata*; Northern shoveler which are located within the Lee Valley SPA/Ramsar. → Construction and operational changes to catchment hydrology, river hydraulics, runoff rates or groundwater levels may result in an alteration of habitat or species distribution in the receiving environment.

Description including Qualifying Features	Conservation Objectives	Threats (Natura 2000 – Standard Data Form and Site Improvement Plan (SIP))	Summary of Potential Effects arising from the proposed SWMP measures
that support a range of man-made, semi-natural and valley bottom habitats. These wetland habitats support wintering wildfowl, in particular Gadwall *Anas strepera* and Shoveler *Anas clypeata*, which occur in numbers of European importance. Areas of reedbed within the site also support significant numbers of wintering Bittern *Botaurus stellaris.*		to ensure these habitats are maintained → 5 Fisheries: Fish stocking - Fish population and species composition needs to be appropriate to ensure suitable habitats including food resource and water quality are maintained for SPA bird species. → 6 Invasive species - Azolla and/or invasive aquatic blanket weeds will adversely affect aquatic habitat (food sources). → 7 Inappropriate cutting/mowing - The reedbed requires rotational management for bittern. This is dependent upon funding availability. → **8 Air Pollution: risk of atmospheric nitrogen deposition - Nitrogen deposition exceeds site relevant critical loads.**	
Wormley Hoddesdonpark Woods SAC (UK0013696) <u>Qualifying Features</u> The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I: → Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli* for which this is one of only two known outstanding localities in the UK. <u>Description</u> Area: 336.47 ha Falling within the Broxbourne and E. Herts boundaries, Wormley Hoddesdonpark Woods in south-east	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; → The extent and distribution of qualifying natural habitats → The structure and function (including typical species) of qualifying natural habitats, and → The supporting processes on which qualifying natural habitats rely Qualifying Features: → H9160. Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	The following High ranking Negative threats pressures and activities with impacts on the site are identified in the Natura 2000 – Standard Data Form: → **G05 - Other human intrusions and disturbances** → K04 - Interspecific floral relations → I02 - Problematic native species → **H04 - Air pollution, air-borne pollutants** → **I01 - Invasive non-native species** The following are identified in the SIP as currently impacting or threatening the condition of the site features; → 1 Disease - Acute Oak Decline (AOD) is present in at least two parts of the site and affects both native oak species, which are key components of this woodland type. Oaks can be killed by AOD within 5 years of symptoms appearing. Research is underway on the causal agents and spread of the disease. Based on current knowledge AOD has the potential in the long-term to cause high oak mortality right across the site. → 2 Invasive species - Several tree and shrub species not native to the site are present. Where they are not being	Implementation of the SWMP measures (pre mitigation) has the potential to cause adverse effects on the extent, distribution and structure of habitats containing hornbeam *Carpinus betulus* and sessile oak *Quercus petraea* located within the Wormley Hoddesdonpark Woods SAC as follows: → Construction phase impacts on surface water or groundwater quality could arise in the vicinity of the construction works from mobilised suspended solids or spillage fuels, lubricants, cements and hydraulic fluids from construction plant if there are inadequate mitigation measures in place. → Construction phase impacts arising from dust deposition on vegetation and/or oxides of nitrogen deposition affecting

Description including Qualifying Features	Conservation Objectives	Threats (Natura 2000 – Standard Data Form and Site Improvement Plan (SIP))	Summary of Potential Effects arising from the proposed SWMP measures
England has large stands of almost pure hornbeam *Carpinus betulus* (former coppice), with sessile oak *Quercus petraea* standards. Areas dominated by bluebell *Hyacinthoides non-scripta* occur, but elsewhere there are stands of great wood-rush *Luzula sylvatica* with carpets of the mosses *Dicranum majus* and *Leucobryum glaucum*. Locally, a bryophyte community more typical of continental Europe occurs, including the mosses *Dicranum montanum*, *D. flagellare* and *D. tauricum*.		actively controlled, they are gradually spreading. The more invasive of these include sycamore, turkey oak, rhododendron and snowberry. → **3 Air Pollution: risk of atmospheric nitrogen deposition - Nitrogen deposition exceeds the site-relevant critical load for ecosystem protection and hence there is a risk of harmful effects, but the sensitive features are currently considered to be in favourable condition on the site. This requires further investigation.** → 4 Deer - Browsing and grazing by deer can reduce tree regeneration (from seedlings or coppice stools) and damage the woodland understorey and ground flora. At this site, deer damage levels are currently only moderate and do not appear to be affecting tree regeneration, habitat structure or species composition greatly. However, subtle damaging effects can be difficult to identify and monitor, and deer populations can increase rapidly. → 5 Vehicles: illicit - Illegal use of restricted byways and bridleways by off-road vehicles causes localised but sometimes severe rutting and soil compaction, damaging the woodland ground flora, shrubs and trees. Fly-tipping damages the ground flora directly and can introduce toxins and alien species. → 6 Forestry and woodland management - The larger woodland units with public access are under appropriate management but some of the smaller, privately-owned units are not. Though it is quite acceptable for a significant proportion of the site to be left as 'minimum intervention' high forest, in some circumstances a lack of active management can lead to adverse effects. These include a reduction in structural and species diversity (particularly in previously coppiced areas), the loss of temporary and permanent open space, the over-shading and deterioration of veteran pollards, and the spread of invasive species. → 7 Public Access/Disturbance - The site is a large, attractive area of ancient woodland with extensive public	sensitive floral communities. → Construction and operational changes to catchment hydrology, river hydraulics, runoff rates or groundwater levels may result in an alteration of habitat or species distribution in the receiving environment. → Construction phase activities such as road haulage or vegetation clearance could result in the propagation or transportation of invasive non-native species.

Description including Qualifying Features	Conservation Objectives	Threats (Natura 2000 – Standard Data Form and Site Improvement Plan (SIP))	Summary of Potential Effects arising from the proposed SWMP measures
		access and close to large urban centres, so it is heavily used by the public for recreational purposes. Sensitive management of access points and routes by the site's main owners has been largely successful in mitigating the potential adverse effects of this high level of use. However, visitor numbers continue to increase, the types of use can change unpredictably and less obvious adverse effects on important flora and fauna could be missed during routine, 'general purpose' monitoring.	

Notes:
Threats highlighted in **bold** are considered to be applicable to the SWMP measures proposed.
Structure is taken to mean the distribution and abundance of habitats in the site.
Function is taken here to mean the capacity of the site to support the flora and fauna populations for which it was designated.

Table 4-2 Summary of European Sites located outside the Borough of Broxbourne and East Hertfordshire District, but within 10km of the their Boundaries

Description including Qualifying Features	Conservation Objectives	Threats (Natura 2000 – Standard Data Form)	Summary of Potential Effects arising from the proposed SWMP measures
Epping Forest SAC (UK0012720) <u>Qualifying Features</u> The site is designated under Article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I: Annex I habitats that are a primary reason for selection of this site → Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*); Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site → Northern Atlantic wet heaths with *Erica tetralix*; and → European dry heaths. Qualifying species: The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II: → Stag beetle *Lucanus cervus* <u>Description</u> Area (ha): 1,604.95	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; → The extent and distribution of qualifying natural habitats and habitats of qualifying species → The structure and function (including typical species) of qualifying natural habitats → The structure and function of the habitats of qualifying species → The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely → The populations of qualifying species, and, → The distribution of qualifying species within the site. Qualifying Features: → H4010. Northern Atlantic wet heaths with *Erica tetralix*; Wet heathland with cross-leaved heath → H4030. European dry heaths → H9120. Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the	The following High ranking Negative threats pressures and activities with impacts on the site are identified in the Natura 2000 – Standard Data Form: → **M02 - Changes in biotic conditions** → **H04 - Air pollution, air-borne pollutants** → G01 - Outdoor sports and leisure activities, recreational activities → **J02 - Human induced changes in hydraulic conditions** → A04 – Grazing The following are identified in the SIP as currently impacting or threatening the condition of the site features; → **1 Air Pollution: impact of atmospheric nitrogen deposition - Nitrogen deposition exceeds site-relevant critical loads for ecosystem protection. Some parts of the site are assessed as in unfavourable condition for reasons linked to air pollution impacts.** → 2 Undergrazing - The quality and diversity of the SAC features requires targeted management best achieved through grazing to: minimise scrub invasion; minimise robust grass domination, and maximise the species diversity of heathland plant communities. → 3 Public Access/Disturbance - Epping Forest is subject to high recreational pressure. There is a high general level of footfall in Epping Forest throughout the year, including periods of significant use, and resulting in a diverse range of impacts which include mountain biking and unmanaged fires. Population and visitor numbers are likely to continue to increase. → 4 Changes in species distributions - Beech tree health and recruitment may not be coping sufficiently with environmental conditions to sustain its presence and representation within the SAC feature. This may be linked to climate change as well as other factors such as air	Implementation of the SWMP measures (pre mitigation) has the potential to cause adverse effects on the extent, distribution and structure of habitats which are located within the Wormley Hoddesdonpark Woods SAC and which contain the following; → Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*); or → Northern Atlantic wet heaths with *Erica tetralix*; or → European dry heaths Potential effects are identified as follows: → Construction phase impacts on surface water or groundwater quality could arise in the vicinity of the construction works from mobilised suspended solids or spillage fuels, lubricants, cements and hydraulic fluids from construction plant if there are inadequate mitigation measures in place. → Construction phase impacts arising from dust deposition on vegetation and/or oxides of nitrogen deposition affecting sensitive floral communities. → Construction and operational changes to catchment hydrology,

Description including Qualifying Features	Conservation Objectives	Threats (Natura 2000 – Standard Data Form)	Summary of Potential Effects arising from the proposed SWMP measures
Epping Forest is a large ancient wood-pasture with habitats of high nature conservation value including ancient semi-natural woodland, old grassland plains, wet and dry heathland and scattered wetland. The semi-natural woodland is particularly extensive but the Forest plains are also a major feature and contain a variety of unimproved acid grasslands. The semi-natural woodlands of Epping Forest include important beech *Fagus sylvatica* forests on acid soils, which are important for a range of rare epiphytic species, including the moss *Zygodon forsteri*. The long history of pollarding, and resultant large number of veteran trees, ensures that the site is also rich in fungi and invertebrates associated with decaying timber. Records of stag beetle *Lucanus cervus* are widespread and frequent. Areas of acidic grassland transitional with heathland are generally dominated by a mixture of fine-leaved grasses. In marshier areas, purple moor-grass *Molinia caerulea* frequently becomes dominant. Broad-leaved herbs typical of acidic grassland and heathland are frequent, including heather *Calluna vulgaris.* The site also contains an example of wet dwarf-shrub heath with both heather and cross-leaved heath *Erica tetralix.*	shrub layer (*Quercion robori-petraeae* or Ilici-Fagenion); Beech forests on acid soils → S1083. *Lucanus cervus*; Stag beetle	quality, recreational pressure and water availability. → **5 Inappropriate water levels - Wet heath is dependent on suitable ground water levels. There is a threat of prolonged drying out through climate change.** → **6 Water Pollution - Surface run-off of poor quality water from roads with elevated levels of pollutants, nutrients and salinity may be affecting wet heath, probably mostly around the edges.** → 7 Invasive species - Heather beetle has locally impacted on some heathland areas. Vigilance is required to survey it and increase awareness of its likely effects and signs of impact. → 8 Disease - Tree diseases such as Phytopthora present a real threat to Beech. → 9 Invasive species - Grey squirrel is not currently known to be significantly affecting tree health or regeneration, but there is a need to retain vigilance and perhaps consider increased awareness of the likely effects and signs of impact.	river hydraulics, runoff rates or groundwater levels may result in an alteration of habitat or species distribution in the receiving environment.

Notes:
Threats highlighted in **bold** are considered to be applicable to the SWMP measures proposed.
Structure is taken to mean the distribution and abundance of habitats in the site.
Function is taken here to mean the capacity of the site to support the flora and fauna populations for which it was designated.

5 SCREENING ASSESSMENT

5.1 OVERVIEW

5.1.1 Impacts arising during construction (such as noise or visual intrusion, and invasive weeds propagation etc.) have the potential to arise – these are addressed separately in **Section 6** through the application of 'post-design' type mitigation.

5.1.2 In terms of the initial screening, the focus has been on the identification of 'design or embedded' type mitigation, principally towards ensuring that operational phase water quality and flow regime issues are adequately addressed.

5.1.3 The SWMPs for Broxbourne Borough and East Hertfordshire District outline a number of flood mitigation measure hotspot *options* and *recommendations* that will be adopted to help reduce and manage flood risk in those areas. These measures are shown and summarised in **Appendix A-1** and **Appendix A-2.**

5.1.4 The European Sites included in the screening assessment are identified in **Table 4-1** and **Table 4-2**. These matrices also detail design based (embedded) mitigation measures.

5.1.5 In making the screening assessment it is noted that:

- None of the proposed SWMP measures will result in land take at, or a reduction of the extent of any European Site.
- None of the proposed SWMP measures require resources from the European Sites.

5.1.6 Consideration is given in **Table 5-1** and **Table 5-2** as to the potential effects of the proposed SWMP measure on water quality and quantity and to any subsequent potential effects including:

- Loss of habitat/extent.
- Disruption to species.
- Loss or damage to populations or habitats or loss of habitat structure or function.
- Reduction in species density or abundance.
- Change to the key elements of the site (such as water quality).

5.1.7 The sections below outline the screening assessment and embedded mitigation of the Broxbourne Borough and East Hertfordshire District SWMPs.

5.2 SCREENING OF THE BROXBOURNE BOROUGH AND EAST HERTFORDSHIRE DISTRICT SWMPS

5.2.1 The screening of the SWMP measures is presented in **Table 5-1** which includes consideration of construction and operational phase mitigation which is expected to be applied to minimise likely effects during the construction and operational phases of the SWMP.

SCREENING - IMPACTS AND INFLUENCES OF THE BROXBOURNE SWMP

5.2.2 Review of the Broxbourne SWMP potential impact types on the identified European Sites and their qualifying features is summarised in **Table 5-1** below.

Table 5-1 Screening - Broxbourne Borough SWMP

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[3] effects on designation features[4] of European site	Description of alternative mitigation type at hotspot[5]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[6]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[7] effects on designation features[8] of European site
(9) Rye House/North Hoddesdon	Wormley Hoddesdon SAC	HS9 is located 1.0 km to the east of the Wormley Hoddesdon SAC. Wormley Hoddesdon SAC is located 2.0 km upstream of HS9.	No surface water hydraulic connectivity.	Property Level Measures (PLM) is suggested as main mitigation.	None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	No likely significant post mitigation effect predicted	Provide attenuation upstream of Ware Road Utilise the highways as preferential flow paths Speed bump/drain leading at key locations to keep water away from properties An attenuation area in the park east of Bridle Way South and formalise a flood	Some of the alternative mitigation measures may need secondary measures from the appended list (**Appendix A-2**), such as swales, filer strips or bio-retention areas	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	No likely significant post mitigation effect predicted.
	Epping Forest SAC	HS9 is located 10.0 km to the north of Epping Forest SAC Epping Forest SAC is located	No hydraulic connectivity.		None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects				Water Quality – No significant effects predicted. Water Quantity - No	

[3] Mitgation considered is proven mitigation (including industry best practice). See **Appendix A-1**, **Appendix A-2** and **Section 6**.
[4] Reference **Table 4-1** and **Table 4-2**.
[5] These measures are for further consideration by HCC and would require further hydraulic assessment prior to determination of suitability.
[6] Water 'quantity' includes consideration of flow volumes over time.
[7] Mitgation considered is proven mitigation (including industry best practice). See **Appendix A-1**, **Appendix A-2** and **Section 6** .
[8] Reference **Table 4-1** and **Table 4-2**.

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[3] effects on designation features[4] of European site	Description of alternative mitigation type at hotspot[5]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[6]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[7] effects on designation features[8] of European site
		on the opposite bank of the River Lee 13.0 km downstream of HS9				predicted.		defence barrier Attenuation in Rye Park ensuring flood depths associated with multiple sources are not increased.		significant effects predicted.	
	Lee Valley SPA/Ramsar	HS9 is located 0.9 km to the west of Lee Valley SPA/Ramsar, however the SPA/Ramsar is located on the opposite bank, surface water flows from this hotspot discharge to the River Lee approximately 2.5km downstream of the designated area via the River Lynch The next designated site is 4.2km downstream	Hydraulic connectivity is a significant distance downstream and any variation in flows will be negligible compared to the flows in the River Lee		None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.				Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	
(52) Cheshunt	Wormley Hoddesdon SAC	HS52 is located 3.4km to the southeast of	No hydraulic connectivity. This area is significantly	Property Level Measures (PLM)	None Required	Water Quality – No significant effects predicted.	No likely significant post mitigation effect predicted.	Measures to keep the flows preferentially along High	None Required	Water Quality – No significant effects	No likely significant post mitigation effect predicted.

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[3] effects on designation features[4] of European site	Description of alternative mitigation type at hotspot[5]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[6]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[7] effects on designation features[8] of European site
		Wormley Hoddesdon SAC	upstream from the hotspot.	A swale alongside Church Lane to convey flows into the New River Infill gaps in a wall of properties to the south of Kilsmore Lane		Water Quantity - No significant effects predicted.		Street. Additional PLM for selected properties on Prospect Road.		predicted. Water Quantity - No significant effects predicted.	
	Epping Forest SAC	HS52 is located 6.4km to the northwest of Epping Forest SAC which is located on the opposite bank of the River Lee	No hydraulic connectivity		None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.			None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	
	Lee Valley SPA/Ramsar	HS52 is located 0.7 km to the west of Lee Valley SPA/Ramsar	Although this hotspot is hydraulically connected, there are limited areas at which this occurs due to the restriction posed by the railway which acts as a barrier to flows.		None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.			None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[3] effects on designation features[4] of European site	Description of alternative mitigation type at hotspot[5]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[6]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[7] effects on designation features[8] of European site
(55) Cozens Lane East	Wormley Hoddesdon SAC	HS55 is located 3.5 km to the southeast of Wormley Hoddesdon SAC	No surface water hydraulic connectivity as all overland flows are intercepted by the New River	Increase the number of, and improve the capacity of, the culverts under the railway	Consideration should be given to the invert level of any variation or new culverts to ensure that low flows are not increased thus maintaining groundwater levels	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	No likely significant post mitigation effect predicted.	A swale parallel to the railway on the upstream face. Measures to keep the flows preferentially along the key highways Attenuation in Wormley Primary School Fields and Broxbourne Junior and Infant School Fields.	None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	No likely significant post mitigation effect predicted.
	Epping Forest SAC	HS55 is located 8.3 km to the north west of Epping Forest SAC which is located on the opposite bank of the River Lee	No hydraulic connectivity.		None required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.			None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[3] effects on designation features[4] of European site	Description of alternative mitigation type at hotspot[5]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[6]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[7] effects on designation features[8] of European site
	Lee Valley SPA/Ramsar	HS55 is located to the northwest of Lee Valley SPA/Ramsar	Connected (via culverting under rail line to the east then via drains)		Consideration should be given to including secondary measures from the appended list (**Appendix A-2**), such as swales, filer strips or bio-retention areas prior to discharge under the railway for additional water quality polishing	Water Quality – No significant effects predicted. Minor beneficial impacts may occur as the potential for mixing with foul flows would be reduced. Water Quantity - No increase in water quantity (Same volumes of water ponding against the railway will be conveyed downstream by new pipes) and these flows are negligible when compared to those within the River Lee (see accompanying technical note **Appendix A-2**)			None Required	Water Quality – No significant effects predicted. Minor beneficial impacts may occur as the potential for mixing with foul flows would be reduced and the swale would provide a degree of polishing. Water Quantity - No decrease in water quantity (Same volumes of water conveyed under the railway and the variation in timing of these flows is negligible when compared to those within the River Lee	

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[3] effects on designation features[4] of European site	Description of alternative mitigation type at hotspot[5]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[6]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[7] effects on designation features[8] of European site
										(see accompanying technical note **Appendix A-2**)	
(62 +63) Rosedale North and Rosedale South	Wormley Hoddesdon SAC	Wormley Hoddesdon SAC is located 2.7 km to the northwest of HS62	No hydraulic connectivity as the Turnsford Brook separates the designated site from the hotspot	Measures to keep preferential water on the key highways and discharge into Rags Brook and PLM for selected properties.	None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	No likely significant post mitigation effect predicted.	Construction of a flood defence wall at Cussons Close, Re-profiling key locations to keep preferential flows on the Rosedale Way and the key spill is in to a watercourse An attenuation pond within the playing fields and to the west of Lieutenant Ellis Way	None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	No likely significant post mitigation effect predicted.
	Epping Forest SAC	Epping Forest SAC is located 7.2 km to the southeast of HS62 which is located on the opposite bank of the River Lee	No hydraulic connectivity		None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.			None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[3] effects on designation features[4] of European site	Description of alternative mitigation type at hotspot[5]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[6]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[7] effects on designation features[8] of European site
	Lee Valley SPA/Ramsar	Lee Valley SPA/Ramsar is located 1.7 km to the east of HS62	Hydraulic connectivity is provided by Raggs Brook (to the north) and College Brook (to the south)		Consideration should be given to including secondary measures from the appended list (**Appendix A-2**), such as swales, filer strips or bio-retention areas	Water Quality – No significant effects predicted. Water Quantity - No increase in overall water quantity in the Raggs Brook (Same volumes of water will be conveyed downstream, however in some areas water will reach the Raggs Brook earlier in the flood event) although these changes in flows are negligible when compared to those within the River Lee (see accompanying technical note **Appendix A-2**)			None Required	Water Quality – No significant effects predicted. Minor beneficial impacts may occur as the potential for mixing with foul flows would be reduced and the swale would provide a degree of polishing. Water Quantity - No decrease in water quantity (Same volumes of water conveyed under the railway and the variation in timing of these flows is negligible when compared to those within the River Lee	

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[3] effects on designation features[4] of European site	Description of alternative mitigation type at hotspot[5]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[6]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[7] effects on designation features[8] of European site
										(see accompanying technical note **Appendix A-2**)	

SCREENING - IMPACTS AND INFLUENCES OF THE EAST HERTFORDSHIRE DISTRICT SWMP

5.2.3 Review of the East Hertfordshire District SWMP potential impact types on the identified European Sites and their qualifying features is summarised in **Table 5-2** below.

Table 5-2 Screening - East Hertfordshire District SWMP

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site[9]	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[10] effects on designation features[11] of European site	Description of alternative mitigation type at hotspot[12]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[13]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[14] effects on designation features[15] of European site
(1) Buntingford	Wormley Hoddesden SAC	Wormley Hoddesden SAC is located 22.0 km south of HS1	No hydraulic connectivity	Property level Measures (PLM) for the following properties : → Building in the south of the Business Park; → Properties along Monks Walk; → Properties along High Street, in	None Required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	No likely post mitigation effect predicted.	Ensure preferential flow path along Station Road Changes to Vicarage Road drainage (inclusion of permeable paving) Upsize the pipes that	None required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	No likely post mitigation effect predicted.
	Epping Forest SAC	Epping Forest SAC is located 32.0 km south of HS1	No hydraulic connectivity		None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.			None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	

[9] Distances are measured from the centre of the hotspots to the centre of the European sites.
[10] Mitgation considered is proven mitigation (including industry best practice). See **Appendix A-1**, **Appendix A-2** and **Section 6** .
[11] Reference **Table 4-1** and **Table 4-2**.
[12] These measures are for further consideration by HCC and would require further hydraulic assessment prior to determination of suitability.
[13] Water 'quantity' includes consideration of flow volumes over time.
[14] Mitgation considered is proven mitigation (including industry best practice). See **Appendix A-1**, **Appendix A-2** and **Section 6** .
[15] Reference **Table 4-1** and **Table 4-2**.

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site[9]	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[10] effects on designation features[11] of European site	Description of alternative mitigation type at hotspot[12]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[13]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[14] effects on designation features[15] of European site
	Lee Valley SPA/Ramsar	Lee Valley SPA/Ramsar 1 is located 17.0 km south of HS1	Connected (via River Rib which discharges to the River Lee)	particular the section between Baldock Road (B1038) and Chapel End; → Properties in the area north of Rib Way, and → Properties off Vicarage Road.	None required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.		drain the area of Newtown to increase drainage into River.	None required	Water Quality – May slightly improve in the River Rib because the mitigation to upsize pipes could reduce the volume of runoff draining through roads and urban surfaces. Water Quantity - No significant effects predicted.	
(40) Bengeo, Hertford	Wormley Hoddesden SAC	Wormley Hoddesden SAC is located 6.5 km south of HS40	No hydraulic connectivity	PLM and a speed bump to reduce flooding of properties downstream by directing the water onto Wadesmill Road.	None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.	Retain waters on the preferential flow path along Watermill Lane Changes to Duncombe Close drainage (potential inclusion of permeable	None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.
	Epping Forest SAC	Epping Forest SAC is located 19.0 km southeast of HS40	No hydraulic connectivity		None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.			None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site[9]	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[10] effects on designation features[11] of European site	Description of alternative mitigation type at hotspot[12]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[13]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[14] effects on designation features[15] of European site
	Lee Valley SPA/Ramsar	Lee Valley SPA/Ramsar 1 is located 5.5 km east of HS40	Connected (via River Rib which discharges to the River Lee)		None required	Water Quality - Measures are not expected to increase pollutants, due to first flush effect (see accompanying Technical Note **Appendix A-2**), although if runoff is encouraged to flow down Wadesmill Road, water from the road will likely spill to the adjacent Bengo Meadows before discharging into the River Rib, which could potentially remove pollutants. Water Quantity - No significant change to water quantity into the River Rib is expected		paving) Increase infiltration upstream Ensure flow paths between properties are maintained Investigate boundary fences	None required	Water Quantity - No significant effects predicted. Water Quantity - No significant change to water quantity. Peak flows may be reduced from the inclusion of infiltration and additional storage, however, the impact of this on flows within the River Rib is expected to be negligible.	

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site[9]	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[10] effects on designation features[11] of European site	Description of alternative mitigation type at hotspot[12]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[13]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[14] effects on designation features[15] of European site
						because runoff diverted to Wadesmill Road will eventually drain back to the river.					
(43) Hadham Road	Wormley Hoddesden SAC	Wormley Hoddesden SAC is located 20.5 km southwest of HS43	No hydraulic connectivity	Measures look to attenuate water within open areas upstream. Some properties will require PLM	None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.	Implement any outstanding measures following the 2012 investigations Encourage deculverting measures Increase attenuation capacity	None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.
	Epping Forest SAC	Epping Forest SAC is located 25.0 km south of HS43	No hydraulic connectivity		None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.			None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	
	Lee Valley SPA/Ramsar	Lee Valley SPA/Ramsar 1 is the closest in distance to HS43; it is located 13.5km southwest of the hotspot.	No hydraulic connectivity		None required	Water Quality – No effects predicted. Water Quantity – No changes in water quantity into the River Stort because upstream attenuation would have			None required	Water Quality – Very minor improvements may result from the removal of culverts. Water Quantity - Potential decrease of water quantity into the River Stort because upstream. However, would have negligible	

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site[9]	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[10] effects on designation features[11] of European site	Description of alternative mitigation type at hotspot[12]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[13]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[14] effects on designation features[15] of European site
						negligible impacts on the River Stort peak flows. As the attenuated volumes will be minor in comparison to the flows in the River Stort and are therefore not expected to have any impact on flows at the River Lee/Stort confluence.				impacts on the River Stort peak flows. As the attenuated volumes will be minor in comparison to the flows in the River Stort and are therefore not expected to have any impact on flows at the River Lee/Stort confluence.	
		Lee Valley SPA/Ramsar 3 is the closest site with potential hydraulic connectivity to HS43; it is located 21km southwest of the hotspot.	Connected (via River Stort which discharges to the River Lee)		None required	Water Quality – No effects predicted. Water Quantity – No changes in water quantity into the River Stort because upstream attenuation would have negligible impacts on the River Stort peak flows. As the attenuated volumes will be	No likely post mitigation effect predicted.		None required	Water Quality – Very minor improvements may result in the removal of culverts. Water Quantity - Potential decrease of water quantity into the River Stort because upstream. However, would have negligible impacts on the River Stort peak flows. As the attenuated volumes will be minor in comparison to the flows in the	No likely post mitigation effect predicted.

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site[9]	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[10] effects on designation features[11] of European site	Description of alternative mitigation type at hotspot[12]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[13]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[14] effects on designation features[15] of European site
						minor in comparison to the flows in the River Stort and are therefore not expected to have any impact on flows at the River Lee/Stort confluence.				River Stort and are therefore not expected to have any impact on flows at the River Lee/Stort confluence.	
(44) Benhooks Avenue	Wormley Hoddesden SAC	Wormley Hoddesden SAC is located 20 km southwest of HS44	No hydraulic connectivity	PLM is suggested as main mitigation, with some areas of attenuation.	None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.	Modification of the highway drainage and include permeable paving where viable, increase preferential flow path to a minor drain	None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.
	Epping Forest SAC	Epping Forest SAC is located 24 km south of HS44	No hydraulic connectivity		None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.			None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	
	Lee Valley SPA/Ramsar	Lee Valley SPA/Ramsar 1 is the closest in distance to HS44; it is located 13 km southwest of the hotspot.	No hydraulic connectivity		None required	Water Quality – No effects predicted. Water Quantity - Potential decrease of			None required	Water Quality – No effects predicted. Water Quantity – No significant overall change in runoff volumes is expected	

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site[9]	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[10] effects on designation features[11] of European site	Description of alternative mitigation type at hotspot[12]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[13]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[14] effects on designation features[15] of European site
						water quantity into the River Stort because upstream would have negligible impacts on the River Stort peak flows. As the attenuated volumes will be minor in comparison to the flows in the River Stort and are therefore not expected to have any impact on flows at the River Lee/Stort confluence.				(i.e. increase in discharge is offset by attenuation) Furthermore, any change that results would be minor in comparison to the flows in the River Stort and are therefore not expected to have any impact on flows at the River Lee/Stort confluence.	
		Lee Valley SPA/Ramsar 3 is the closest site with potential hydraulic connectivity to HS44; it is located 20km southwest of the hotspot.	Connected (via River Stort which discharges to the River Lee)		None required	Water Quality – No effects predicted. Water Quantity - Potential decrease of water quantity into the River Stort because upstream would have negligible impacts on the River Stort peak	No likely post mitigation effect predicted.		None required	Water Quality – No effects predicted. Water Quantity – No significant overall change in runoff volumes is expected (i.e. increase in discharge is offset by attenuation) Furthermore, any change that results would be minor in comparison to the	No likely post mitigation effect predicted.

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site[9]	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[10] effects on designation features[11] of European site	Description of alternative mitigation type at hotspot[12]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[13]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[14] effects on designation features[15] of European site
						flows. As the attenuated volumes will be minor in comparison to the flows in the River Stort and are therefore not expected to have any impact on flows at the River Lee/Stort confluence.				flows in the River Stort and are therefore not expected to have any impact on flows at the River Lee/Stort confluence.	
(47) Raynham Road	Wormley Hoddesden SAC	Wormley Hoddesden SAC is located 22 km southwest of HS47	No hydraulic connectivity	PLP for key properties.	None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.	Upstream attenuation and ensuring flows are contained on the preferential flow path	None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.
	Epping Forest SAC	Epping Forest SAC is located 25.7 km south of HS47	No hydraulic connectivity		None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.		None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site[9]	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[10] effects on designation features[11] of European site	Description of alternative mitigation type at hotspot[12]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[13]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[14] effects on designation features[15] of European site
	Lee Valley SPA/Ramsar	Lee Valley SPA/Ramsar 1 is the closest in distance to HS47; it is located 15 km southwest of the hotspot.	No hydraulic connectivity Connected (via River Stort which discharges to the River Lee)		None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.		None required	Water Quality – No effects predicted. Water Quantity – No significant overall change in runoff volumes is expected (i.e. increase in discharge is offset by attenuation) Furthermore, any change that results would be minor in comparison to the flows in the River Stort and are therefore not expected to have any impact on flows at the River Lee/Stort confluence.	No likely post mitigation effect predicted.

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site[9]	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[10] effects on designation features[11] of European site	Description of alternative mitigation type at hotspot[12]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[13]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[14] effects on designation features[15] of European site
		Lee Valley SPA/Ramsar 3 is the closest site with potential hydraulic connectivity to HS47; it is located 22km southwest of the hotspot.			None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.		None required	Water Quality – No effects predicted. Water Quantity – No significant overall change in runoff volumes is expected (i.e. increase in discharge is offset by attenuation) Furthermore, any change that results would be minor in comparison to the flows in the River Stort and are therefore not expected to have any impact on flows at the River Lee/Stort confluence.	No likely post mitigation effect predicted.
(60) Potter Street	Wormley Hoddesden SAC	Wormley Hoddesden SAC is located 21.0 km southwest of HS60	No hydraulic connectivity	PLP is suggested as main mitigation.	None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.	Extending the PLP to the commercial properties	None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.
	Epping Forest SAC	Epping Forest SAC is located 25.0 km south of HS60	No hydraulic connectivity		None required	Water Quality – No effects predicted.	No likely post mitigation effect		None required	Water Quality – No effects predicted.	No likely post mitigation effect

Hotspot Name and Location	European Site	Location of Hotspot in relation to European site[9]	Hydrological connectivity to European site	Description of mitigation type at hotspot	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity	HRA screening assessment based on the likelihood for significant post mitigation[10] effects on designation features[11] of European site	Description of alternative mitigation type at hotspot[12]	Secondary measures required	Likely significance of effects of SWMP mitigation measure on Water Quality and Water Quantity[13]	Conclusions of HRA screening assessment based on the likelihood for significant post mitigation[14] effects on designation features[15] of European site
						Water Quantity - No significant effects predicted.	predicted.			Water Quantity - No significant effects predicted.	predicted.
	Lee Valley SPA/Ramsar	Lee Valley SPA/Ramsar 1 is the closest in distance to HS60; it is located 13.5 km southwest of the hotspot.	No hydraulic connectivity		None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.		None required	Water Quality – No effects predicted. Water Quantity - No effects predicted.	No likely post mitigation effect predicted.
		Lee Valley SPA/Ramsar 3 is the closest site with potential hydraulic connectivity to HS60; it is located 21km southwest of the hotspot.	Connected (via River Stort which discharges to the River Lee)		None required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	No likely significant post mitigation effect predicted.		None required	Water Quality – No significant effects predicted. Water Quantity - No significant effects predicted.	No likely significant post mitigation effect predicted.

6 MITIGATION

6.1 MITIGATION APPROACH

6.1.1 In preparing this screening assessment, consideration has been given to potential mitigation measures which would be built into the design (embedded mitigation) and thereby serve to avoid adverse effects on the integrity of European Sites.

6.1.2 Embedded design based mitigation is summarised in the screening matrices **Table 5-1** and **Table 5-2**. These matrices also include information relevant to the screening of potential effects (e.g. distances and linkages between the SWMP mitigation site and designated sites) and hence to the requirement and application of any additional post-design mitigation.

6.1.3 All embedded and post-design mitigation measures described within this screening report have been proposed or selected as being proven effective and reliable. They will be provided in a timely manner for an appropriate duration and are guaranteed to be delivered where applicable to the detailed design.

6.1.4 It has been assumed that construction-phase impacts will be appropriately mitigated through the implementation of Construction Environmental Management Plan (CEMP). The CEMP will be developed and agreed with the Local Planning Authority (LPA) prior to construction commencement to avoid, minimise and mitigate the potential adverse effects relating to the construction of the SWMP measures identified in **Appendix A-1** and **Appendix A-2**, and to ensure industry best practice is followed.

6.2 POST DESIGN MITIGATION

CONSTRUCTION PHASE

6.2.1 The CEMP will implement standard pollution prevention mitigation measures which are already proven to be effective in minimising the risk of pollution. As a minimum, pollution prevention measures will be designed with the (now withdrawn) Environment Agency (EA) Pollution Prevention Guidelines (PPGs) and will be used during construction to avoid polluted surface water runoff or dust emissions to European Sites.

6.2.2 Although these guidelines were withdrawn in December 2015, they are still considered relevant and no alternative guidelines have been issued by the EA. In addition, construction will also follow best practice Construction Industry Research and Information Association (CIRIA) guidelines including the SuDS Manual (C753) to ensure potential impacts are adequately and appropriately managed.

6.2.3 The CEMP is expected to include (but not be limited to), the following measures which relate to the key concerns for the protection of the identified European Sites and mitigate potential adverse effects a the proposed SWMP measures;

→ **Air Quality** - To mitigate adverse effects on air quality, construction activities will be undertaken in accordance with the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction. Particular care will be given when planning and implementing measures to minimise emissions from construction site areas adjacent to sensitive sites. Specific construction practices will include but not be limited to the following:

- Avoid stockpiling of loose materials for prolonged periods, particularly during dry periods;
- Damp down of operations that could create dust, such as excavation and material stockpiling, particularly during dry periods. Stockpiles should also be covered to prevent wind blowing loose particles;

- Location of plant and vehicles away from sensitive areas, or housed in closed environments where possible;
- Drop heights kept to a minimum;
- All deliveries to and from site of potentially dusty materials will be covered;
- Minimise exposure time of disturbed surfaces;
- Plant shall be maintained and serviced in accordance with manufacturers recommendations;
- Machines with intermittent use will be shut down in the intervening period between work, or throttled down to a minimum, subsequently reducing volumes of greenhouse and other gas emissions;
- Additional fencing shall be erected around potentially dust generating activities if required;
- Site speed limit set to 10mph;
- Unnecessary vehicle movements and manoeuvring will be avoided.

→ **Surface water and groundwater quality** - The CEMP will include measures to avoid construction phase risk of water pollution through best practice construction methodologies, Consideration will be given to the use of buffer zones around identified areas of particular sensitivity (to avoid establishment of pollution pathways). Specific construction practices will include but not be limited to the following:

- Hotspot site drainage plans will be produced which will indicate the location of all surface and foul water drains, including those outside the site in close proximity to the site boundaries, and the staff will be made aware of these;
- Plant fuel and other hazardous substances / chemicals stored on site will be kept to a minimum, and any that is stored on site will be suitably bunded to contain any possible spillage and secured when not in use. There will be no storage of hazardous substances near open drains;
- Use of drip trays where refuelling occurs;
- The content of containers will be clearly shown;
- Offsite storage of fuel will be the preferred arrangement during excavation works (the most onerous works in term of plant)'
- In case of fuel spillage, the emergency procedures will be applied in response to the incident. The emergency procedures are:
- Stop the work;
- Stop the spillage by disconnecting / isolating the source;
- Mitigation / absorption of the pollutant using the spill kits available on site;
- Enclose the area;
- Inform the relevant authorities and complete any required reporting;
- Prepare and submit a Remediation Plan;
- Undertake the Remedial Works after approval of the Remedial Plan with the relevant authorities.
- All concrete wash-out will be in a controlled area to prevent contamination;
- Minimising time that any waste materials are stored on site and ensuring that all wastes are managed and stored correctly;
- Spill kits will be available on site and their location advertised, and any spillage will be disposed of correctly;
- Training will be given to site operatives during site inductions and via Tool Box Talks on topics including:
- Surface Water pollution prevention measures;
- Materials storage and handling;
- Noise and visual intrusion minimisation; and

- Waste storage.

→ **Noise and vibration** - Best practice measures will be used to minimise adverse effects on sensitive fauna from construction noise. Consideration will also be given to the use of buffer zones around identified areas of particular sensitivity. Specific construction practices will include but not be limited to the following measures:

- The works will be carried out by adopting the principles of best practicable means for control of noise and vibration in accordance with *BS 5228-1:2009+A1:2014 and BS 5228-1:2009+A2:2014 Noise and Vibration Control on Construction and Open Sites*;
- Electric plant will be used wherever possible;
- 'Sound reduced' generators and compressors will be used where available to minimise noise;
- Any cutting of concrete or hard standing will generally be carried out by diamond rotary cutting or by hydraulic breaking; both methods avoid impact on the substrate material, therefore reducing noise and vibration;
- All plant will be effectively silenced and maintained in accordance with manufactures' instructions, and engines will be switched off when not in use;
- Restricting drop heights during lorry loading to the minimum required for safe and efficient operations;
- The selection of plant, equipment and systems of work, including delivery times should ensure both noise and vibration is reduced to a minimum and must be below permitted levels; and
- Location of plant and vehicles away from sensitive areas, or housed in closed environments where possible;
- Machines with intermittent use will be shut down in the intervening period between work, or throttled down to a minimum;
- In order to avoid the sensitive life cycle stage (i.e. over-wintering) of Lee Valley qualifying features *Botaurus stellaris*; Great bittern; *Anas strepera*; Gadwall; and *Anas clypeata*; Northern shoveler. No works will be undertaken within 1 km (see **Table 5-1**) of Lee Valley SPA in the winter period. If the construction programme does not allow for this to be the case, then a site walkover by a competent ecologist will be undertaken prior to construction commencement at any hotspot area where winter construction is programmed to occur within 1 km of Lee Valley SPA. The site walkover will be to determine whether noise intrusion affecting Lee Valley qualifying features is likely. Where noise intrusion cannot be screened out, the site walkover would be followed up with monitoring and modelling to demonstrate whether or not works can be adequately mitigated prior to proceeding. Where noise intrusion to Lee Valley qualifying features is considered likely – site hoarding will be provided to mitigate adverse noise effects to negligible levels. If residual negligible noise intrusion effects cannot be demonstrated at that time - construction works will not proceed.

→ **Visual disturbance** – Potential adverse impacts on European site's species interest features arising from construction phase visual disturbance is unlikely given the existing built up/residential nature of the construction site locations (see **Appendix A-1**). Nevertheless, consideration will be given to the use of buffer zones around identified areas of particular sensitivity which will influence selection of haul routes, use of lighting and use of screening if required. Specific construction practices will include but not be limited to the following measures:

- Lighting required during the construction phase will be limited to working hours and used only when needed;
- Lighting will be directional (where required) and positioned to adequately light the work area, without causing nuisance beyond the site boundaries.
- In order to avoid the sensitive life cycle stage (i.e. over-wintering) of Lee Valley qualifying features *Botaurus stellaris*; Great bittern; *Anas strepera*; Gadwall; and *Anas clypeata*; Northern shoveler, no works will be undertaken within 1 km (see **Table 5-1**) of Lee Valley SPA in the winter period. If the construction programme does not allow for this to be the case, then a site walkover by a competent ecologist will be undertaken prior to construction commencement at any hotspot area where winter construction is programmed to occur within 1 km of Lee Valley SPA. The site walkover will be to

determine whether visual intrusion affecting Lee Valley qualifying features is likely. Where visual intrusion cannot be screened out, the site walkover would be followed up with monitoring and modelling to demonstrate whether or not works can be adequately mitigated prior to proceeding. Where visual intrusion to Lee Valley qualifying features is considered likely – site hoarding will be provided to mitigate adverse visual effects to negligible levels. If residual negligible visual intrusion effects cannot be demonstrated at that time - construction works will not proceed.

→ **Invasive species propagation** – The CEMP will ensure that adequate management measures will be in place to prevent propagation of invasive species into European Sites or their supporting habitats. Specific construction practices will include but not be limited to the following measures:

- Pre-construction habitat surveys of areas affected by construction activities will identify the location(s) of stands of any invasive species;
- Pre-construction treatment of areas affected by invasives will be undertaken as required.

6.2.4 It is expected that the implementation of a robust CEMP will be sufficient to mitigate all potential risks to a residual negligible effect for the construction duration. Construction impacts are not therefore considered further in this screening assessment.

OPERATIONAL PHASE

6.2.5 No direct impacts on European Sites and/or features that are considered functionally linked[16] have been identified as a result of the proposed SWMP measures (see **Table 5-1** and **Table 5-2**).

6.2.6 Given the location and nature of the proposed SWMP measures, the potential operational phase effects identified in **Table 4-1** and **Table 4-2** in relation to European Sites are focussed on indirect impacts associated with water quality and quantity (i.e. water levels, flows/velocities and physical regime).

6.2.7 A key feature of the SWMP design in a number of instances (as identified in **Table 5-1** and **Table 5-2**) is that that there is no hydraulic connectivity between the SWMP measure proposed and any identified European Site (e.g. through attenuation or discharge into water bodies which are not connected hydraulically European Sites).

6.2.8 In addition to hydraulic separation (where it applies), or otherwise (where hydraulic connectivity has been established between the SWMP measure and a European Site feature), surface water run-off attenuation and treatment features (such as swales) have been incorporated into the design (see **Appendix A-1** and **Appendix A-2**) to avoid/minimise the likelihood of significant effects arising through water discharge to sensitive receiving environments. These other operational phase mitigation measures are also identified in **Table 5-1** and **Table 5-2** below (as applicable).

6.2.9 Furthermore, where operational mitigation measures are expected to be required (as described in more detail below), but their exact specification is not known at this stage, proven mitigation measures will be brought forwards (individually or as a combination of measures as required) during the detailed design stage.

6.2.10 Specific operational mitigation will include but not be limited to the measures identified in the Water Mitigation Technical Note contained in **Appendix A-2**.

[16] In accordance with Chapman, C. (2016) 'Natural England Commissioned Report NECR207' Functional linkage is defined as habitat that lies outside of the boundaries of the European Site yet provides ecological support.

7 SUMMARY AND CONCLUSIONS

7.1.1 Under Article 6 of the Habitats Directive, an HRA assessment is required where a plan or project may give rise to significant effects upon a European Site.

7.1.2 Stage 1: HRA Screening is the first stage of the assessment process which initially identifies the likely impacts of a project or plan on a European Site. It considers whether these impacts may have a significant effect on the integrity of the site's qualifying habitats and/or species. If the effect may be significant, or sufficient uncertainty remains, that would trigger the need for an Appropriate Assessment. Unless the likelihood of a significant effect can be ruled out on the basis of objective information, and adopting the precautionary principle, then an Appropriate Assessment must be made.

7.1.3 Four European Sites are identified as requiring HRA screening as a result of the proposed SWMP – these are:

- Lee Valley, SPA and Ramsar; and
- Wormley Hoddesdonpark Woods, SAC.
- Epping Forest, SAC.

7.1.4 In each case, a European Site's qualifying features have been identified together with the potential threats to those qualifying features and to a site's integrity (extent and distribution of habitats; structure and function of habitats; supporting processes on which habitats rely; population and distribution of qualifying features).

7.1.5 In preparing this screening assessment, consideration has been given to potential mitigation measures which would serve to avoid adverse effects on the integrity of European Sites. All mitigation measures have been proposed or selected as being proven effective and reliable, they will be provided in a timely manner for an appropriate duration and are guaranteed to be delivered where applicable to the detailed design.

7.1.6 Construction phase impacts will be appropriately mitigated through the provision of construction phase mitigation, through the implementation of CEMP which will be developed and agreed with the LPA prior to construction commencement.

7.1.7 Given the nature of the proposed SWMP measures, the potential operational phase effects in relation to European Sites are focussed on impacts associated with water quality and quantity (i.e. water levels, flows/velocities and physical regime). No other operational effects are considered likely.

7.1.8 For the operational phase where hydraulic separation between the SWMP measure and a European Site cannot be demonstrated, surface water run-off attenuation and treatment features (such as swales) have been incorporated into the design.

7.1.9 Where further operational mitigation measures are expected to be required, but their exact specification is not known at this stage, a number of additional (proven) mitigation measures has been identified which will be brought forwards during the detailed design stage.

7.1.10 Applicable mitigation has been designed to minimise adverse effects on water quality and quantity and to any subsequent potential effects including:

- Loss of habitat/extent.
- Disruption to species.
- Loss or damage to populations or habitats or loss of habitat structure or function.

- Reduction in species density or abundance.
- Change to the key elements of the site (such as water quality).

7.1.11 With regard to screening for HRA and following mitigation implementation (as described in **Section 6**) the following is noted when considering the SWMP measures either in isolation or in-combination with other plans or projects:

- None of the proposed SWMP measures will result in land take at, or a reduction of the extent of any European Site.
- None of the proposed SWMP measures require resources from the European Sites.
- None of the proposed SWMP measures will result in loss of habitat/extent of the site or species for which it was designated.
- None of the proposed SWMP measures are likely to result in significant disruption to species populations or habitats or loss of habitat structure of function.
- None of the proposed SWMP measures are likely to cause a reduction in species density or abundance.
- None of the proposed SWMP measures are likely to result in a change to the key elements of the site such as water quality.

7.1.12 It is necessary for HRA to consider in-combination effects with other plans and projects. It is noted that in-combination effects would require consideration where the plan or project being assessed may result in an impact, whether significant or not. A conclusion of 'Zero Effects' negates the possibility of in-combination effects. In cases where the plan or project being assessed has no significant impact alone, the in-combination effects arising from the project or plan are also assumed to be non-significant.

7.1.13 It is necessary for HRA to consider in-combination effects with other plans and projects. It is noted that in-combination effects would require consideration where the plan or project being assessed may result in an impact, whether significant or not. A conclusion of 'Zero Pathway to effects' negates the possibility of in-combination effects.

7.1.14 Given the localised nature of the SWMPs other projects would have to be situated in very close proximity and undertaken in the same time, and without their own mitigation packages, in order for the works to contribute to in-combination effects. Therefore, through the working locations, timing and mitigation methods described above, and in consideration of the fact that any project that might act in-combination would also require consent and HRA detailing mitigation where appropriate; it is considered highly unlikely the SWMPs would contribute to significant in-combination effects with other plans or projects.

7.1.15 Following consideration of the potential effects of each of the SWMPs on the European Sites identified in Section 4; no significant (post mitigation) effects are expected to arise as a result of the construction or operation of the SWMPs.

7.1.16 Natural England's opinion and agreement or otherwise is sought with this conclusion.

Appendix A

APPENDIX A-1

SWMP PLANS AND DESCRIPTIONS

Options:

- Property Level Protection (PLP) for properties within the areas shown on the map.

Recommendations:

1) Attenuation of water spilling from the road in the school fields.
2) Further investigation of the flow path between properties from Ware Road to the east would be required. Measures to keep preferential flowpaths along the road or alleyways should be further investigated.
3) Speed bump or high capacity drain at the entrance of Beyers Prospect linked to a swale in the green island between this road and Bridleway North to keep the preferential flowpath along this swale, and reduce water flowing through the properties to the east of Beyers Prospect.
4)Enhance attenuation in the park to retain water from upstream. Ensure preferential flowpath exists by linking a swale with this attenuation area by a pipe under the road.
5)Enhance status of the wall at the underpass as a flood defence barrier.
6) Investigate the installation of high capacity drains at the three junctions of Glenester Close and Bridle Way South. This is expected to reduce flows affecting the properties downstream.
7) Potential attenuation in the park between Dorchester Avenue and Tregelles Road, ensuring preferential flowpath is kept along Tregelles Road and spills into attenuation area.
8) Investigation into blocking the flowpath between these houses.
9) Ensure that preferential flowpath is kept along Middle Field Road and Stanstead Road and directed into Rye Park, where attenuation should be provided.
10) Bund to reduce interaction with the fluvial and surface water flooding to limit the combined depths.

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HOTSPOT 9 - FLOOD OPTIONS (1 IN 30 YEAR)

EAST HERTS AND BROXBOURNE SURFACE WATER MANAGEMENT PLAN

Hertfordshire

WSP | PARSONS BRINCKERHOFF

DRAWN BY	CHECKED BY	APPROVED BY	STATUS	DATE	SCALE	DRAWING NO.	REV.
AWD	AS	JB	FI	31/10/16	NTS	9115-Q-H9-Q0030-OPTIONS	B

Legend

- Model extent
- Hotspot boundary
- Speed bump
- Preferential flowpath
- PLP Zones

Flood depths (1 in 30)

- Below 150mm - not shown
- 150mm - 300mm
- 300mm - 600mm
- 600mm - 900mm
- 900mm - 1200mm
- over 1200mm

Options:

- Property Level Protection (PLP) for properties within the areas shown on the map.

Recommendations:

1) Attenuation of water spilling from the road in the school fields.
2) Further investigation of the flow path between properties from Ware Road to the east would be required. Measures to keep preferential flowpaths along the road or alleyways should be further investigated.
3) Speed bump or high capacity drain at the entrance of Beyers Prospect linked to a swale in the green island between this road and Bridleway North to keep the preferential flowpath along this swale, and reduce water flowing through the properties to the east of Beyers Prospect.
4)Enhance attenuation in the park to retain water from upstream. Ensure preferential flowpath exists by linking a swale with this attenuation area by a pipe under the road.
5)Enhance status of the wall at the underpass as a flood defence barrier.
6) Investigate the installation of high capacity drains at the three junctions of Glenester Close and Bridle Way South. This is expected to reduce flows affecting the properties downstream.
7) Potential attenuation in the park between Dorchester Avenue and Tregelles Road, ensuring preferential flowpath is kept along Tregelles Road and spills into attenuation area.
8) Investigation into blocking the flowpath between these houses.
9) Ensure that preferential flowpath is kept along Middle Field Road and Stanstead Road and directed into Rye Park, where attenuation should be provided.
10) Bund to reduce interaction with the fluvial and surface water flooding to limit the combined depths.

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HOTSPOT 9 - FLOOD OPTIONS (1 IN100CC YEAR)

EAST HERTS AND BROXBOURNE SURFACE WATER MANAGEMENT PLAN

Hertfordshire

WSP | PARSONS BRINCKERHOFF

DRAWN BY	CHECKED BY	APPROVED BY	STATUS	DATE	SCALE	DRAWING NO.	REV.
AWD	AS	JB	FI	31/10/16	NTS	9115-Q-H9-Q0100CC-OPTIONS	B

Legend

- Model extent
- Hotspot boundary
- PLP zones
- Speed bump
- Preferential flowpath
- Raised kerbs/reprofiling
- Wall
- swale

Flood depths

- Below 150mm - not shown
- 150mm - 300mm
- 300mm - 600mm
- 600mm - 900mm
- 900mm - 1200mm
- Over 1200mm

Options:
- Property Level Protection (PLP) for properties within the areas shown on the map.

1)A swale along the side of Church Lane to convey flows from Church Lane and a depression to connect to either the drainage system or the New River given that the swale will provide water quality treatment. This is expected to reduce ponding in Whitefields road.

2) Infill the existing wall at the back entrance to the courtyards located to the south of Kilsmore Lane. This wall is expected to cut the flowpath into the service yards of the shops and remove the ponding.

Recommendations:

3) Investigation into measures to keep preferential flow path on High Street (e.g. speed bumps, reprofiling levels).

4) Potential attenuation area.

5)A site visit, potentially combined with further investigation, should be undertaken to determine preferential flowpath and need for property level protection in Prospect Road.

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HOTSPOT 52 - FLOOD OPTIONS (1 IN 30 YEAR)

EAST HERTS AND BROXBOURNE SURFACE WATER MANAGEMENT PLAN

Hertfordshire

WSP | PARSONS BRINCKERHOFF

DRAWN BY	CHECKED BY	APPROVED BY	STATUS	DATE	SCALE	DRAWING NO.	REV.
AWD	AS	JB	FI	31/10/16	NTS	9115-H52-OPTIONS-Q0030	B

Legend

- Model extent
- Hotspot boundary
- PLP zones
- Speed bump
- Preferential flowpath
- Raised kerbs/reprofiling
- Wall
- swale

Flood depths

- Below 150mm - not shown
- 150mm - 300mm
- 300mm - 600mm
- 600mm - 900mm
- 900mm - 1200mm
- Over 1200mm

Options:
- Property Level Protection (PLP) for properties within the areas shown on the map.

1)A swale along the side of Church Lane to convey flows from Church Lane and a depression to connect to either the drainage system or the New River given that the swale will provide water quality treatment. This is expected to reduce ponding in Whitefields road.

2) Infill the existing wall at the back entrance to the courtyards located to the south of Kilsmore Lane. This wall is expected to cut the flowpath into the service yards of the shops and remove the ponding.

Recommendations:

3) Investigation into measures to keep preferential flow path on High Street (e.g. speed bumps, reprofiling levels).

4) Potential attenuation area.

5)A site visit, potentially combined with further investigation, should be undertaken to determine preferential flowpath and need for property level protection in Prospect Road.

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HOTSPOT 52 - FLOOD OPTIONS (1 IN 100CC YEAR)

EAST HERTS AND BROXBOURNE SURFACE WATER MANAGEMENT PLAN

Hertfordshire

WSP | PARSONS BRINCKERHOFF

DRAWN BY	CHECKED BY	APPROVED BY	STATUS	DATE	SCALE	DRAWING NO.	REV.
AWD	AS	JB	FI	31/10/16	NTS	9115-H52-OPTIONS-Q0100CC	B

Legend

- Model extent
- Hotspot boundary
- Potential location of new culvert
- Increase culvert capacity
- Swale
- Speed bump
- Preferential flowpath
- Raised kerbs/reprofiling

Flood depths

- Below 150mm - not shown
- 150mm - 300mm
- 300mm - 600mm
- 600mm - 900mm
- 900mm - 1200mm
- Over 1200mm

Options:
-Improve capacity of existing culverts crossing the railway at the following locations: Lammasmead, Fairfield Drive, Sorbus Road.
- Potential installation of new pipes in the locations shown in order to reduce the flooding associated with ponding against the railway.
Recommendations:
-Investigation into measures to keep a preferential flow path on the following roads (e.g. via raising kerbs, rills, reprofiling levels):
-Cozens Lane East (speed bump/reprofiling in junction with Sulverfield)
-Cozens Lane East (speed bump/reprofiling in junction with Lammasmead
-Fairfield Drive
-Slipe Lane
Then connecting these into the swale downstream, as shown by the preferential flowpath arrows
1) Potential attenuation Broxbourne Junior Mixed and Infant School fields. A bund to the south of the school fields would retain water that flows down to Windford Drive and result in ponding against the railway.
2) Investigation into building a swale running between Cozens Lane East and the railway. This swale would provide additional attenuation and convey flows into the existing and new culverts under the railway.
3) Further investigation on the flow paths between properties from High Road Wormley to the east would be required. Measures to keep preferential flowpaths along the road or alleyways should be further investigated (e.g. raising kerbs, rills, reprofiling levels).
4) Potential attenuation in Wormley Primary School fields.
5) Potential attenuation in Wormley Primary School fields for water flowing from Cozens Lane East and Windford Drive.
6) Further investigation on the flow paths between properties from this road to the east would be required. Measures to keep preferential flowpaths along the road or alleyways should be further investigated (e.g. raising kerbs, rills, reprofiling levels).

HOTSPOT 55 - OPTIONS (1 IN 30 YEAR)

EAST HERTS AND BROXBOURNE SURFACE WATER MANAGEMENT PLAN

Hertfordshire

WSP | PARSONS BRINCKERHOFF

DRAWN BY	CHECKED BY	APPROVED BY	STATUS	DATE	SCALE	DRAWING NO.	REV.
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Legend

- Model extent
- Hotspot boundary
- Potential location of new culvert
- Increase culvert capacity
- Swale
- Speed bump
- Preferential flowpath
- Raised kerbs/reprofiling

Flood depths

- Below 150mm - not shown
- 150mm - 300mm
- 300mm - 600mm
- 600mm - 900mm
- 900mm - 1200mm
- Over 1200mm

Options:
-Improve capacity of existing culverts crossing the railway at the following locations: Lammasmead, Fairfield Drive, Sorbus Road.
- Potential installation of new pipes in the locations shown in order to reduce the flooding associated with ponding against the railway.
Recommendations:
-Investigation into measures to keep a preferential flow path on the following roads (e.g. via raising kerbs, rills, reprofiling levels):
-Cozens Lane East (speed bump/reprofiling in junction with Sulverfield)
-Cozens Lane East (speed bump/reprofiling in junction with Lammasmead
-Fairfield Drive
-Slipe Lane
Then connecting these into the swale downstream, as shown by the preferential flowpath arrows
1) Potential attenuation Broxbourne Junior Mixed and Infant School fields. A bund to the south of the school fields would retain water that flows down to Windford Drive and result in ponding against the railway.
2) Investigation into building a swale running between Cozens Lane East and the railway. This swale would provide additional attenuation and convey flows into the existing and new culverts under the railway.
3) Further investigation on the flow paths between properties from High Road Wormley to the east would be required. Measures to keep preferential flowpaths along the road or alleyways should be further investigated (e.g. raising kerbs, rills, reprofiling levels).
4) Potential attenuation in Wormley Primary School fields.
5) Potential attenuation in Wormley Primary School fields for water flowing from Cozens Lane East and Windford Drive.
6) Further investigation on the flow paths between properties from this road to the east would be required. Measures to keep preferential flowpaths along the road or alleyways should be further investigated (e.g. raising kerbs, rills, reprofiling levels).

HOTSPOT 55 - OPTIONS (1 IN 100CC YEAR)

EAST HERTS AND BROXBOURNE SURFACE WATER MANAGEMENT PLAN

Hertfordshire

WSP | PARSONS BRINCKERHOFF

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Legend

- Model extent
- Hotspot boundary
- Speed bump
- Swale

Flood depths

- Below 150mm - not shown
- 150mm - 300mm
- 300mm - 600mm
- 600mm - 900mm
- 900mm - 1200mm
- over 1200mm

Options:
1) Ditch parallel to the road to convey surface water to Rags Brook. Ensure that flows from Granby Park Road are diverted into this swale instead of flowing down along Rosedale Way (using a high capacity drain/reprofiling road).
2) Speed bump or other measure to divert flows and keep them along Rosedale Way. Introduce a high capacity drain and culvert to collect this flow.

Fairfields Primary School
LONGFIELD LANE
ROSE CT
RNEY CLOSE
DEBENHAM ROAD
MORETON CLOSE
End
PARADISE
GREENBANK
JACKSONS DR
STOCKWELL L
CROMWELL ROAD
ROSEDALE WAY
B156
BROOKFIELD LANE W
B156
2
38m
Community Centre
Recn Gd
ecn Gd
MAYO
LEAFORIS R
LLERS GROVE
VALENCE
Wheatcroft
1
GRANBY PARK RO
ROSEDALE WAY
HOLLYBUSH WAY
VALENCE DRIVE
CRANLEIGH CL
OAKVIEW CLOSE
FLAMSTEAD END ROAD
MAYBURY AVENUE
Andrew's Lane Primary School
BRAMPTON CLOSE
FAIRLEY WAY
n Ground
ELDERBECK CLOSE
GLAMIS CLOSE
ROSEDALE WAY

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HOTSPOT 62 - FLOOD OPTIONS (1 IN 30 YEAR)

EAST HERTS AND BROXBOURNE SURFACE WATER MANAGEMENT PLAN

Hertfordshire

WSP | PARSONS BRINCKERHOFF

DRAWN BY	CHECKED BY	APPROVED BY	STATUS	DATE	SCALE	DRAWING NO.	REV.
SF	AS	JB	FI	17/10/16	NTS	9115-H62-OPTIONS-Q0030	A

Legend

- Model extent
- Hotspot boundary
- Speed bump
- Swale

Flood depths

- Below 150mm - not shown
- 150mm - 300mm
- 300mm - 600mm
- 600mm - 900mm
- 900mm - 1200mm
- over 1200mm

Options:
1) Ditch parallel to the road to convey surface water to Rags Brook. Ensure that flows from Granby Park Road are diverted into this swale instead of flowing down along Rosedale Way (using a high capacity drain/reprofiling road).
2) Speed bump or other measure to divert flows and keep them along Rosedale Way. Introduce a high capacity drain and culvert to collect this flow.

Fairfields Primary School
LONGFIELD LANE
ROSE CT
RNEY CLOSE
DEBENHAM ROAD
MORETON CLOSE
End
PARADISE
GREENBANK
JACKSONS DR
STOCKWELL L
CROMWELL ROAD
ROSEDALE WAY
B156
BROOKFIELD LANE W
38m
Community Centre
Recn Gd
LEAFORIS R
WELLERS GROVE
VALENCE
VALENCE DRIVE
Wheatcroft
HOLLYBUSH WAY
GRANBY PARK R
ROSEDALE W
BRANLEIGH CL
BRAMPTON CLOSE
SKVIEW CLOSE
FLAMSTEAD END ROAD
MAYBURY AVENUE
Andrew's Lane Primary School
FAIRLEY
ELDERBECK CLOSE
GLAMIS CLOSE
ROSEDALE WAY
1
2

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HOTSPOT 62 - FLOOD OPTIONS (1 IN 100CC YEAR)

EAST HERTS AND BROXBOURNE SURFACE WATER MANAGEMENT PLAN

Hertfordshire

WSP | PARSONS BRINCKERHOFF

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Legend

- Model extent
- Hotspot boundary
- Preferential flowpath
- PLP zones
- Wall
- Raised kerbs/reprofiling

Flood depths

- Below 150mm - not shown
- 150mm - 300mm
- 300mm - 600mm
- 600mm - 900mm
- 900mm - 1200mm
- Over 1200mm

Options:
- PLP in all properties downstream of Rosedale Way within the areas shown on the map.

Recommendations:
1) Obtain topographical survey to confirm whether the flowpath splits at the pedestrian crossing. There is potentially al need for a wall to cut off the flowpath from Goffs Lane to Cussons Close.
2)Investigate measures to keep preferential flow along Rosedale Way, such as:
• Road reprofiling/speed bump on the junction between Westmeade Close and Rosedale Way (by Westmeade Close); and
• Reprofiling of foothpath in order to provide a consistent high level barrier provided by the existing grass landscaping.
These measures may remove the need for property level protection in the properties to the south of Rosedale Way and Westmeade Close.
3) Investigate potential attenuation (e.g. pond) on the playing fields, which would reduce the need for property level protection in the properties downstream of the recreation grounds.
4) Ensure the attenuation area to the west of Lieutenant Ellis Way (B108) operates and is controlled as modelled.

Rosedale
Pavilion
Recreation Ground
Harkness
McGredy
Football Ground
Goffs School
Nursery
Nurseries
South Lodge
Manor
Church
ROSEDALE WAY
ELDERBECK CLOSE
GLAMIS CLOSE
BUSHBARNS
CUSSONS CLOSE
HORNBEAM WAY
HUNTERS REACH
WOLSEY AVE
CLAREMONT
GOFF'S LANE
B156
B158
ROMAN ROAD
CHURCHGATE ROAD
CHURCH LANE
KINGSLEY AVE
BIRCHFIELD ROAD
DEWHURST
BROOMER
WESTMEADE CLOSE
GROVEDALE CLOSE
BONNEY GROVE
1
2
3
4

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HOTSPOT 63 - FLOOD OPTIONS (1 IN 30 YEAR)

EAST HERTS AND BROXBOURNE SURFACE WATER MANAGEMENT PLAN

Hertfordshire

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