

ENVIRONMENTAL STATEMENT
VOL.1 MAIN TEXT AND FIGURES

**FORT PARKWAY ENERGY, CASTLE BROMWICH, BIRMINGHAM
RENEWABLE ENERGY CENTRE**

ROLTON KILBRIDE



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for the Environmental Impact Assessment prepared on behalf of:

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1 BACKGROUND, INTRODUCTION & CONTEXT

1.1 Background

1.1.1 Rolton Kilbride (the "Applicant") is seeking to obtain planning permission for a proposed Renewable Energy Centre (REC) to generate power and heat for local commercial energy users located within Fort Industrial Park, off Dunlop Way, Castle Bromwich, Birmingham (the "Application Site").

1.1.2 The Application site is located within the administrative area of Birmingham City Council (BCC). The location and context of the Application Site to the wider surroundings is illustrated on **Figure 1.1**, the extent of the Application Site is shown on **Figure 1.2**. The REC is known as Fort Parkway Energy and referred to within this Environmental Statement (ES) as the "Proposed Development".

1.1.3 The Proposed Development would generate up to 8.6 megawatts (MW) gross of electricity - the equivalent of powering over 15,000 homes on a continual basis. The plant is capable of accepting 105,000 tonnes of waste per annum which would otherwise go to landfill.

1.2 The Applicant and EIA Project Team

1.2.1 The Applicant is a collaboration between Rolton Group, a long established, multi-disciplined engineering consultancy with specialisms in clean technologies and Kilbride, which offers expertise in development and infrastructure.

1.2.2 Rolton Kilbride are currently working on a portfolio of other REC projects which include sites in Swindon, Rotherham and Northampton.

1.2.3 This ES has been co-ordinated and managed by Pegasus Group. The consultants who have contributed to the preparation of this ES are referenced in the project directory at the front of this document.

1.3 EIA Process

1.3.1 Environmental Impact Assessment (EIA) is a process, which identifies the potential environmental effects of a development and then seeks to avoid, reduce or offset any adverse effects through mitigation measures. Its key characteristics are that it is:

- Systematic – comprising a sequence of tasks defined both by regulation and by good practice, leading to the use of the information that is gathered to inform decision-making as to whether or not the proposed development should be allowed to proceed;
- Analytical - requiring the application of specialist skills from the environmental sciences;
- Impartial – its aim being to inform the decision maker rather than to promote the project;
- Consultative – with provision being made for obtaining feedback from interested parties including local authorities and statutory agencies;
- Iterative - allowing opportunities for environmental concerns to be addressed during the planning and design of a project; and

- Interactive, whereby the proposals for the key stages of the development are progressively refined in response to environmental as well as technical considerations with a view to minimising the scheme's potential adverse environmental effects and maximising environmental benefits.

1.3.2 The EIA process is an iterative one but the process can be broken down into the following stages which must be followed:

- Site selection and Feasibility;
- Consideration of alternative sites;
- Screening – is an EIA required (unnecessary stage for the Proposed Development);
- Pre-application consultation and Scoping;
- Baseline studies to establish the existing environmental conditions at the site;
- Identification of potential environmental effects;
- Mitigation to avoid or reduce the effects through iterative design process;
- Assessment of residual effects;
- Preparation of Environmental Statement;
- Consideration of application, Environmental Statement and other supporting information by BCC and consultees;
- Determination of Application.

1.4 Need for Environmental Impact Assessment and Scoping

1.4.1 The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 require that a proposed development which falls within the description of a 'Schedule 2 Development' within the meaning of the Regulations, will require an Environmental Impact Assessment (EIA) where the development is likely to have significant effects on the environment by virtue of such factors as its nature, size or location (Regulation 2).

1.4.2 Under the EIA Regulations Scoping is not a mandatory requirement, however, requesting a Scoping Opinion from the local authority can be helpful. Obtaining a Scoping Opinion enables consultation over the content and extent of matters to be included within the ES from all key statutory and non statutory bodies. The Scoping should identify key environmental issues, appropriate surveys and methodologies, potential mitigation and areas of further assessment.

1.4.3 The aim of the Scoping process is to identify key environmental issues at an early stage, to determine which elements of the Proposed Development are likely to cause significant environmental effects and to identify issues that can be 'scoped out' of the assessments.

1.4.4 The Applicant submitted a Scoping Request to BCC in July 2015. The Scoping Request set out the proposed methodology for each of the key environmental issues and requested comments from BCC and other Statutory Consultees on the suitability of the Proposed Development, the proposed methodology and the likely significant effects of

the construction and operational phases of the Proposed Development. The Scoping Request is included in **Appendix 1.1**.

1.4.5 A Scoping Opinion confirming the issues to be covered in the EIA was provided by BCC in September 2015. Within their Scoping Opinion BCC, stated, "it does consider that the Proposed Development falls within Category 3 (a) Schedule 2 for the electricity generation on an area exceeding 0.5 ha or Category 10 (a) for an industrial development on an area exceeding 0.5 hectares. Notwithstanding this, the Local Planning Authority respects the applicant's formal scoping request in any event". The Scoping Opinion can be found in **Appendix 1.2**.

1.4.6 Under the EIA Regulations, proposals which fall within the scope of Schedule 2 development, an EIA is discretionary. This EIA has been produced however, in recognition of the strategic significance of the development and the expected local interest in the proposals. The EIA and this ES have been undertaken and prepared with due regard to the criteria of Schedule 4 of the Regulations. The ES includes an assessment of the predicted effects of the Proposed Development, focussing, as required by the EIA Regulations, on those effects that have the potential to be significant. The content of the ES, as well as the overall approach to the EIA, has also been designed to reflect other requirements of the EIA Regulations as well as widely recognised good practice in EIA.

1.5 The Environmental Statement

1.5.1 The scope and content of the ES is based on the following:

- Review of the baseline situation through existing information, including data, reports, surveys and desk-top studies;
- Consideration of relevant National and Development Plan policies;
- Consideration of potential sensitive receptors;
- Identification of likely significant environmental effects and an evaluation of their duration and magnitude;
- Expert opinion;
- Modelling;
- Use of relevant technical and good practice guidance; and
- Specific consultations with appropriate bodies.

1.6 Structure of Environmental Statement

1.6.1 This ES comprises studies on each of the aspects of the environment identified as likely to be significantly affected by the Proposed Development, which are supported with technical appendices where appropriate. This ES is structured as follows:

- Volume 1: Comprises the written statement and graphic material in the form of figures, drawings and photomontages, which is the main volume of the ES. A breakdown of the contents of each chapter of the written statement is provided below;
- Volume 2: Contains the Technical Appendices to the main volume of the ES;

- Non-Technical Summary which provides a concise summary of the ES.

1.6.2 The chapters in Volume 1 are set out as follows:

- **Chapter 1:** Background, Introduction & Context – to introduce the Proposed Development and set out the EIA Regulations and structure of the ES;
- **Chapter 2:** Site Description – describes the existing site conditions and site context.
- **Chapter 3:** Development Proposals – describes the scheme proposals including issues such as grid connection, construction (to include demolition) and operation;
- **Chapter 4:** Need and Alternatives – explains the need for the project, reasons for site selection, consideration of alternatives and consideration of cumulative issues;
- **Chapter 5:** Air Quality – a detailed assessment which considers road traffic emissions and those from the chimney stack;
- **Chapter 6:** Townscape and Visual Impact – evaluates the likely significant effects of the Proposed Development upon the townscape character of the area (both built-up areas and green spaces) and on the visual amenity of receptors;
- **Chapter 7:** Traffic and Transport – addresses the transport and access issues which could arise on the transport network and which could be attributable to changes in predicted travel demand associated with the Proposed Development;
- **Chapter 8:** Hydrology & Flood Risk – an assessment of the potential effects on water resources, to encompass surface water and groundwater quality, surface water and groundwater resources and flooding issues within the vicinity of the Proposed Development;
- **Chapter 9:** Hydrogeology and Ground Conditions – evaluates issues relating to existing geo-environmental conditions at the Proposed Development;
- **Chapter 10:** Noise - an assessment of the potential noise effects of the Proposed Development during construction (to include demolition) and operation;
- **Chapter 11:** Ecology and Nature Conservation – evaluates the ecological interest of the site and the likely significant effects of the Proposed Development on any sensitive species and habitats;
- **Chapter 12:** Archaeology and Cultural Heritage – an assessment of potential effects upon heritage assets which include below-ground archaeological remains and above ground features such as buildings or earthworks;
- **Chapter 13:** Socio-Economics – considers the socio-economic effects of the Proposed Development and addresses issues such as employment;
- **Chapter 14:** Summary – provides a summary of each of the chapters contained in the ES, including any key issues which are identified and how they will be addressed.

1.7 EIA Methodology

1.7.1 This ES reports the findings of the assessment of the likely significant environmental effects of the scheme. Although each assessment applies a specific series of matrices and decision making tools to assist the assessor in determining the significance of predicted effects identified in the ES, the same general approach of information gathering and assessment has been undertaken throughout the EIA process.

1.7.2 Following the identification of the possible issues, technical assessments were carried out to assess the likely significant effects that are associated with the Proposed Development. In general terms, the technical studies undertaken for each topic area and chapter includes:

- Assessment Approach & Methodology;
- Description of baseline conditions;
- Identification, Description and Evaluation of likely significant environmental effects;
- Determining Significance
- Mitigation;
- Residual effects;
- Cumulative Effects.

Assessment Approach and Methodology

1.7.3 This identifies the study area assessed and explains why this area is appropriate. It also identifies the criteria for assessing and describing significance, whilst confirming what assessments have been carried out and when. The methodology will provide detailed information of any consultation undertaken both pre and post Scoping. It will also include a section on relevant policy and guidance.

Description of Baseline Conditions

1.7.4 Information relating to the existing environmental conditions has been collected. This may include one or all of the following: desk based assessment, information from consultees, public records and other archive sources. Where site surveys have been required the methods of data collection have been discussed and agreed with the relevant consultees. Individual data sources are described in each Chapter.

Identification, Description and Evaluation of Likely Significant Environmental Effects

1.7.5 This section recognises the effects which are likely.

1.7.6 The stated methodology is applied to the scheme design. This section covers the construction (to include demolition) and operation of the Proposed Development. The site receptors are identified at this stage in the process, including human receptors and environmental resources such as flora, fauna, the water environment and cultural heritage.

1.7.7 Conclusions about significance are derived with reference to available information about the project description and the site receptors, and to predictions about the impacts which the development proposed, would have, assuming it is consented, on identified receptors.

1.7.8 In each of the environmental topic chapters, professional judgement is used in combination with relevant guidance to assess the interaction of the receptor’s sensitivity (this may be defined in terms of importance, value, rarity, quality) against the predicted magnitude of change to identify a level of effect.

1.7.9 In general terms, and in order to assist consistent interpretation of the final results of the EIA, receptor sensitivity, magnitude of change and level of effect for each environmental topic are categorised as shown in **Tables 1.1 to 1.4**.

1.7.10 The type of categorisation illustrated in **Table 1.1 to 1.4** provides a guide only, and may be moderated by the individual professional that undertakes the assessment in accordance with judgement and experience. In particular, the divisions between categories of receptor sensitivity, magnitude of change, and level of effect should not be interpreted as definitive.

Determining Significance

1.7.11 Significance reflects the relationship between two factors:

- The magnitude or severity of an effect (i.e. the actual change taking place to the environment); and
- The sensitivity, importance or value of the resource or receptor.

1.7.12 The broad criteria methodology for determining magnitude is set out in **Table 1.1**.

Table 1.1: Degrees of Magnitude and their criteria

Magnitude of Effect	Criteria
High	Total loss or major/substantial alteration to elements/features of the baseline (pre-development) conditions such that the post development character/composition/attributes will be fundamentally changed.
Medium	Loss or alteration to one or more elements/features of the baseline conditions such that post development character/composition/attributes of the baseline will be materially changed.
Low	A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable but the underlying character / composition / attributes of the baseline condition will be similar to the pre-development.
Negligible	Very little change from baseline conditions. Change not material, barely distinguishable or indistinguishable, approximating to a ‘no change’ situation.

Table 1.2: Degrees of sensitivity and their criteria

Sensitivity	Criteria
High	The receptor / resource has little ability to absorb change without fundamentally altering its present character, or is of international or national importance.
Medium	The receptor / resource has moderate capacity to absorb change without significantly altering its present character, or is of high and more than local (but not national or international) importance.
Low	The receptor / resource is tolerant of change without detrimental effect, is of low or local importance.
Negligible	The receptor / resource is can accommodate change without material effect, is of limited importance.

Significance

1.7.13 The significance of an environmental effect is determined by the interaction of magnitude and sensitivity, whereby the effects can be positive or negative (beneficial or adverse). **Table 1.3** shows how magnitude and sensitivity interact to derive significance of effects.

Table 1.3– Establishing the Significance of the Effect

		Sensitivity of Receptor		
		Low	Medium	High
Magnitude of Effect	No Change	Insignificant	Insignificant	Insignificant
	Minimal Change	Negligible –Minor	Minor	Minor - Moderate
	Low	Minor	Minor - Moderate	Moderate
	Medium	Minor - Moderate	Moderate	Moderate - Major
	High	Moderate	Moderate - Major	Major - Substantial

1.7.14 The following definitions of the ‘Significance of Effects’ are used to determine the potential effects of the Proposed Development:

Table 1.4: Significance of Effects Definitions

Major Beneficial	Total gain or major/substantial positive alteration to elements/features of the baseline (pre-development) conditions such that the post development composition/attributes will be fundamentally improved from an environmental perspective
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	on a regional, national or international basis.
Moderate Beneficial	Alteration or gain to one or more elements/features of the baseline conditions such that post development composition/attributes of the baseline will be materially improved, including significant enhancements to the environment of the inner and outer impact areas.
Minor Beneficial	A minor shift away from baseline conditions. Change arising from the gain/alteration will be detectable but the underlying character / composition / attributes of the baseline condition will be similar to the pre-development and the proposals meet the needs of the proposed environment.
Negligible	No or very little change from baseline conditions. Change not material, barely distinguishable or indistinguishable.
Minor Adverse	<p>A minor shift away from baseline conditions. Change arising from the loss/alteration will be detectable but the underlying composition / attributes of the baseline condition will be similar to the pre-development.</p> <p>The proposals incorporate insufficient measures to ensure that the scheme would meet its own needs and not put undue pressure on existing resources and cannot be substantially mitigated because of the scale of the proposal.</p>
Moderate Adverse	<p>Loss or alteration to one or more elements/features of the baseline conditions such that post development composition/ attributes of the baseline will be materially changed.</p> <p>Mitigation would not prevent the scheme from affecting on both inner and outer impact areas in the longer term.</p>
Major Adverse	Total loss or major/substantial alteration to elements/features of the pre-development baseline conditions such that the post-development composition/attributes will be fundamentally changed.

1.7.15 As discussed above the above magnitude, sensitivity and significance criteria are provided as a guide for specialists to categorise the significance of effects. Where discipline specific methodology has been applied that differs from the generic criteria above, this is explained within the given chapter under the Assessment Approach & Methodology section.

1.7.16 The assessment of potential environmental effects, in line with the requirements of the EIA Regulations, establishes whether identified effects are:

- Direct, indirect, secondary and cumulative;
- Positive or negative; (where above effects are also described as:
 - Adverse – detrimental or negative effects on an environmental resource or receptor;
 - Beneficial – advantageous or positive effect on an environmental resource or receptor; or
 - Negligible – a neutral effect on an environmental resource or receptor).
- Short, medium or long term;
- Permanent or temporary.

1.7.17 Most predicted effects will be either positive or negative, and will be described as such. However, in some cases it is appropriate to identify that the interpretation of a change is a matter of 'subjectivity'.

1.7.18 The temporal scope of environmental effects is stated where known. Effects are typically described as:

- Temporary – these are likely to be related to a particular activity and will cease when the activity finishes. The terms 'short-term' and 'long-term' may also be used to provide further clarification;
- Permanent – this typically means an unrecoverable change.

Mitigation

1.7.19 This section identifies any measures required to prevent, reduce or compensate for significant adverse impacts, or enhance positive effects.

1.7.20 It also takes into account the likelihood of the success of the mitigation measures proposed.

1.7.21 Where effects cannot be avoided individual chapters outline appropriate mitigation to reduce these effects or recommend compensatory measures.

Residual Effects

1.7.22 Each of the technical assessments includes a description and evaluation of the residual effects of the development proposed, i.e. those effects which are considered to be significant in terms of the EIA Regulations following the implementation of mitigation measures.

Cumulative Effects

1.7.23 Schedule 4, part 1, paragraph 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 requires that a description of the likely significant effects of the development on the environment should cover cumulative effects.

1.7.24 The main aim of a cumulative assessment is to assess the additional impact of the Proposed Development on the baseline of projects that are either already operational, have planning permission or which are in the planning system.

1.7.25 This may be more relevant to certain technical areas and therefore will be addressed individually in each chapter. Cumulative Issues are considered in further detail within Chapter 4 of Volume 1 of this ES.

1.8 Environmental Statement Availability and Comments

1.8.1 This ES is available for public viewing as a hard copy within BCC offices during normal office hours:

Birmingham City Council
1, Lancaster Circus
Birmingham
B4 7DJ

1.8.2 The ES may be purchased in Volumes, the costs for which are set out below:

- Non-Technical Summary – Free of charge
- Volume 1: Main Volume and Figures - £150
- Volume 2: Technical Appendices - £150

1.8.3 Copies of all documents can be obtained on CD for £15. For copies of any of the above please contact Pegasus Group at the following address:

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Pegasus House
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Tel: 01285 641717
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1.9 Other Documents

1.9.1 A number of other documents have been submitted to BCC as part of or accompanying the planning application. These are set out in the covering letter to the planning application and summarised below:

- Application Forms
- Technical Drawings
- Planning Statement
- Design Statement

- Statement of Community Involvement

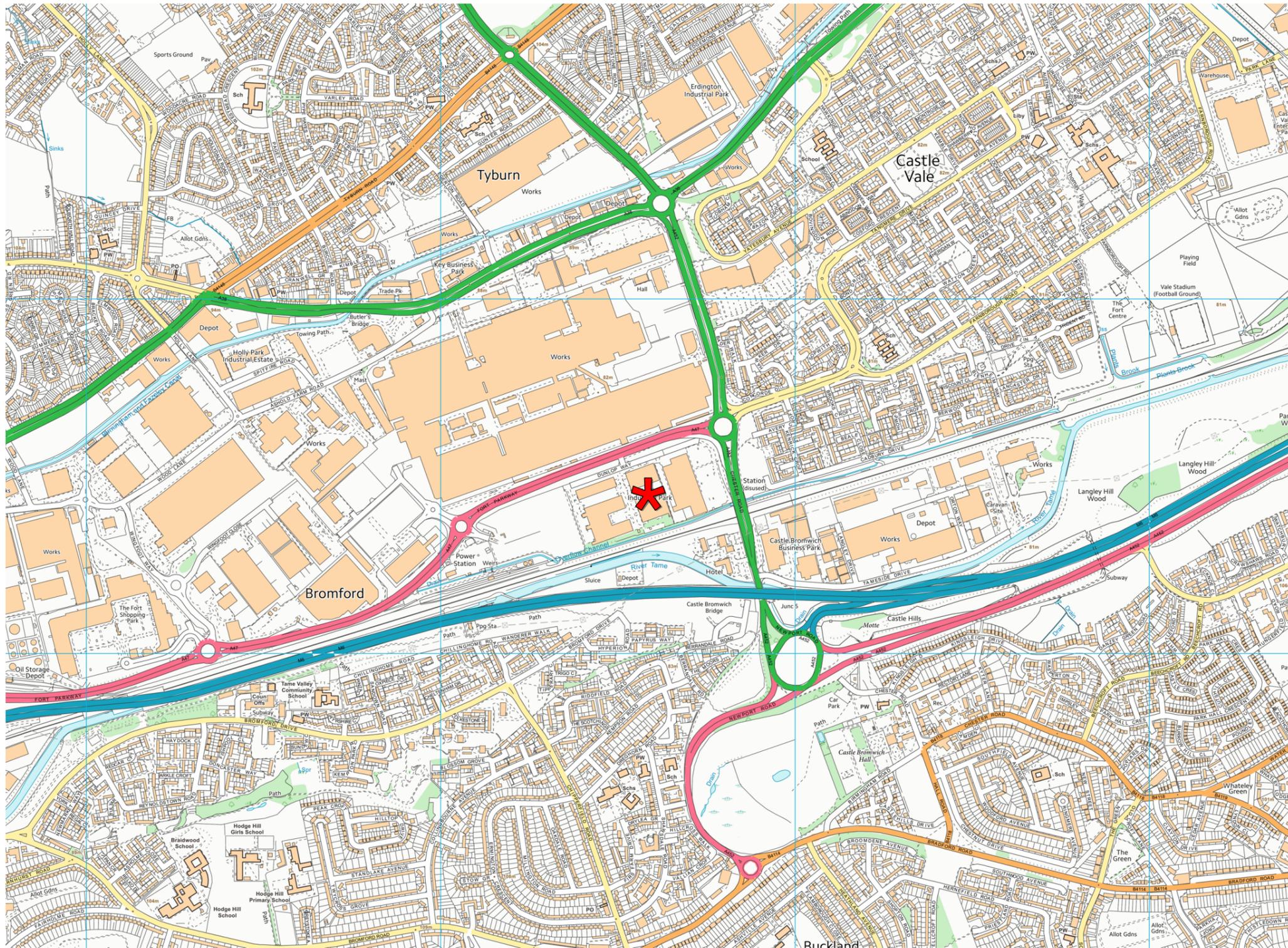
1.10 Pre-Application Consultations with BCC

1.10.1 The Applicants have been engaged in a pre-application consultation process with Birmingham City Council prior to the submission of the planning application. The advice received was broadly supportive of the proposals in principle, including guidance setting out the planning policy context that an application would be judged against and an indication of the documentation necessary to support an application.

1.11 Public Consultation

1.11.1 Public consultation was a fundamental and integral process of the planning application. A well thought out strategy to engage with local stakeholders was carefully delivered from the outset and comprised a press release; residents and press briefings; residents group meetings; a leaflet drop and invitation to a public exhibition where members of the design team as well as air quality and transport consultants were on hand to answer any queries.

1.11.2 The full details of the public consultation strategy and feedback from the events are included within the Statement of Community Involvement which is a separate report submitted with the planning application documentation.

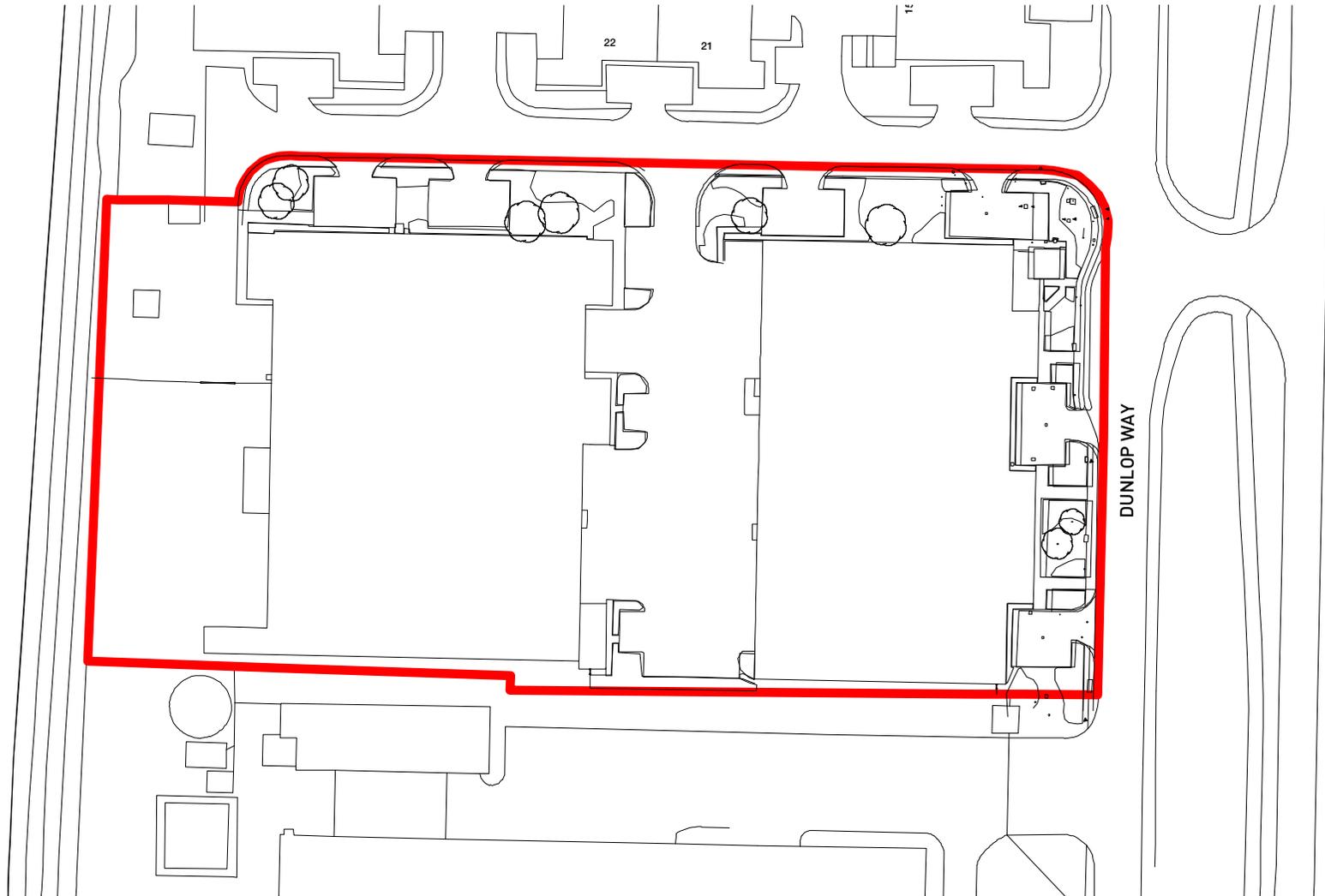


KEY
 Site Location

FIGURE 1.1
Site Context Plan

DRWG No: **K.0168_01** REV: _
 Date: 24/06/2015
 Scale: 1:12,500 @ A3





 APPLICATION BOUNDARY

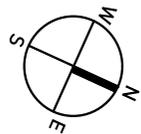


FIGURE 1.2
Site Location Plan

DRWG No: **K.0168_13** REV: **A**

Date: 05/10/2015

Scale: 1:1,250 @ A4

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2 SITE DESCRIPTION

2.1 Site Context and Location

2.1.1 The Application Site is located within Fort Industrial Park, off Dunlop Way in the Castle Bromwich area of Birmingham. The Fort Industrial Park comprises 26 units that comprise single storey industrial / warehouse and trade counter buildings with internal offices, together with service yards and parking. The site is surrounded by a network of motorways, main roads (dual and single carriageway) and other roads.

2.1.2 The Application Site boundary is approximately 1.91ha and includes two single storey business, industrial and storage buildings (use class B1, B2 and B8) containing nine separate units. The units are surrounded by areas of hard standing used for staff car parking.

2.1.3 To the north and west are extensive areas of large industrial units and car storage, including Jaguar Land Rover's Castle Bromwich manufacturing plant. To the east, beyond the A452 dual carriageway, is the residential area of Castle Vale, separated by the mainline railway from further industrial units to the south. To the south is the mainline railway line, a hotel (the Castle Bromwich Inn), an elevated section of the M6 motorway, and areas of residential development, including the parkland associated with castle Bromwich Hall and a number of other areas of green space.

2.1.4 The River Tame lies to the south of the Application Site, between the railway line and the M6 motorway.

2.1.5 The site is owned by Industrial Property Investment Fund which is managed by Legal and General Property (LGP) who is seeking to redevelop part of the Fort Industrial Park to include the introduction of a Renewable Energy Centre that generates power in the form of electricity and / or heat.

2.1.6 A designations and constraints plan of the Application Site and surrounding area is illustrated on **Figure 2.1**.

2.2 Ecological Considerations

2.2.1 The Application Site is dominated by hardstanding and large industrial buildings with small sections of ornamental planting. The features of highest ecological interest are situated directly south and comprise a linear corridor of semi-natural habitats and a tree line beside the railway line embankments.

2.2.2 There are a number of areas of deciduous woodland and woodpasture/parkland Biodiversity Action Plan (BAP) in the vicinity of the Application Site, both of these being on the Priority Habitat Inventory. No areas of Ancient Woodland are adjacent to the site although the nearest is approximately 0.4km southeast.

2.2.3 There are six statutory designated sites for nature conservation within a 5km radius of the Application site. The nearest site, Plantsbrook Reservoirs Local Nature Reserve (LNR) is situated approximately 1.6km to the north. The Tame Valley Wildlife Corridor lies adjacent to the Site boundary, and this area is also designated as a Potential Site of Importance.

2.3 Landscape and Heritage Considerations

2.3.1 The Application Site is not subject to any statutory or non-statutory landscape designations and no designated heritage assets are recorded within the Application Site.

2.3.2 The Grade II* Registered Park and Garden at Castle Bromwich Hall lies approximately 600m to the south-south-east of the Application Site, but is separated by an elevated section of the M6.

2.3.3 The locally listed Fort Dunlop building lies approximately 750m to the west of the Application Site, and there are a number of other Listed Buildings in the local area, notably those in the vicinity of Castle Bromwich Hall and those to the north of the Jaguar plant.

2.4 Land Drainage Features

2.4.1 An overflow channel, known locally as the Dunlop Carrier, runs along the site's southern boundary. The watercourse flows from west to east and drains into the River Tame 1 km east of the site (near Blenheim Close). The Dunlop Carrier is classified as an Ordinary Watercourse. The Erdington Brook (culverted) is a tributary of the Dunlop Carrier and discharges into the Dunlop Carrier approximately 0.6km west of the application site.

2.4.2 The Dunlop Carrier is a straight watercourse with a brick lined channel, approximately 2 – 3m wide. The bank rises steeply either side of the watercourse and its total width is approximately 10 – 12m. The total depth from the top of the bank and river bed is approximately 2.7m. The bank is vegetated and localised stretches of sheet piling are present along its length. The Dunlop Carrier receives runoff from the Erdington area of Birmingham, the Jaguar Land Rover Plant and the Fort Industrial Park.

2.5 Existing Drainage Features

2.5.1 Regarding the site's surface water drainage arrangements it is considered the roof drainage and highway area drain to a private surface water sewer system in the access road. This drains south into the Dunlop Carrier via a twin pipe headwall (to the west of the Sewage Pumping Station on the southern edge of the site).

2.5.2 A 1200mm diameter Severn Trent Water culvert runs adjacent to the western edge of the buildings which drains into the Dunlop Carrier to the east of the Sewage Pumping Station. It is considered this drains the area to the north of the site (including the Jaguar Land Rover Plant).

2.6 Topography

2.6.1 The site is predominately flat with up to a 1m fall from north to south and a gradient of approximately 1:190.

2.6.2 Adjacent to Dunlop Way on the site's northern boundary the levels range between 82.50 - 82.90m Above Ordnance Datum (AOD). Between the two buildings the site levels range between 82.3 – 82.4m AOD. On the southern boundary adjacent to the Dunlop Carrier (watercourse) the site levels range between 81.9 – 82.2m AOD.

2.7 Existing Flood Risk

2.7.1 The site is located in Flood Zone 2 and 3. Flood defences along the River Tame in the vicinity of the site provide protection up to the 1:100 (including an allowance for climate change) flood event.

2.7.2 The topography of the land indicates that any overland flow would be directed into the existing surface water drainage network and local watercourse network. Geological conditions suggest groundwater is present at relatively shallow depths within superficial deposits.

2.7.3 There is an existing off-site sewer network on the site. No incidences of sewer flooding have been recorded in the vicinity of the site.

2.8 Existing Ground Conditions

2.8.1 The British Geological Survey (BGS) geological mapping of the area shows the site is underlain by Mercia Mudstone bedrock. Superficial deposits are also present consisting of River Terrace Deposits (sand and gravel) and Alluvium (clay, silt, sand and gravel).

2.8.2 The BGS borehole records in the site's vicinity identify Made Ground to a depth of approximately 1.8m – 2m, River Terrace Deposits to a depth of between 4.40m – 5.0m and Weathered Mercia Mudstone below this level.

2.8.3 From an inspection of the Environment Agency's Aquifer Designation Map on its website the site's superficial deposits are classified as a 'Secondary A' aquifer. The site's bedrock is classified as a 'Secondary B' aquifer.

2.8.4 From an inspection of the Environment Agency's Groundwater Source Protection Zone Map the site does not fall within a Groundwater Source Protection Zone.

2.8.5 BGS borehole records south of the Dunlop Carrier (watercourse) record groundwater within 5 – 10 feet of ground level (1.5-3m below ground level).

2.9 Existing Services

2.9.1 A public foul sewer runs along the internal access road and receives foul flows from the Fort Industrial Park and development to the north of the site. The sewer drains into a sewage pumping station adjacent to the site's southern border. A rising main runs in a westerly direction.

2.9.2 A 1200mm diameter surface water culvert runs adjacent to the western edge of the buildings within the site and drains into the Dunlop Carrier to the east of the Sewage Pumping Station.

2.9.3 An 18 inch stoneware Foul Sewer is adjacent to the 1200mm surface water culvert. This foul sewer is identified on the site's 1950 title deeds and is marked as an 'unknown pipe' on the site survey.

2.9.4 Water Mains and telecommunication services are also present within the site to serve the existing development.

2.10 Historical Uses of the Site

2.10.1 An Envirocheck report of the site has been completed and information relating to historic uses included as Appendix 9.1 (Phase 1 Detailed Desktop Study).

2.10.2 The earliest historical maps date from 1887 and show the site to be primarily open land with a track or road running north/south across the site and another track

along the northern boundary. By 1952, a drainage ditch or trench is shown in the south of the site and the tracks have been extended to a pumping station just outside the southwest corner of the site. The land appears to have been levelled by the 1960's and a small unidentified building is shown on the eastern boundary, which has been removed by the 1970's, with a pathway built in the south of the site. The first major buildings are not recorded on the site until the early 1980's, with the construction of the Fort Parkway Industrial Estate, consisting of a number of light industrial units. These are the buildings which remain on site to the present day.

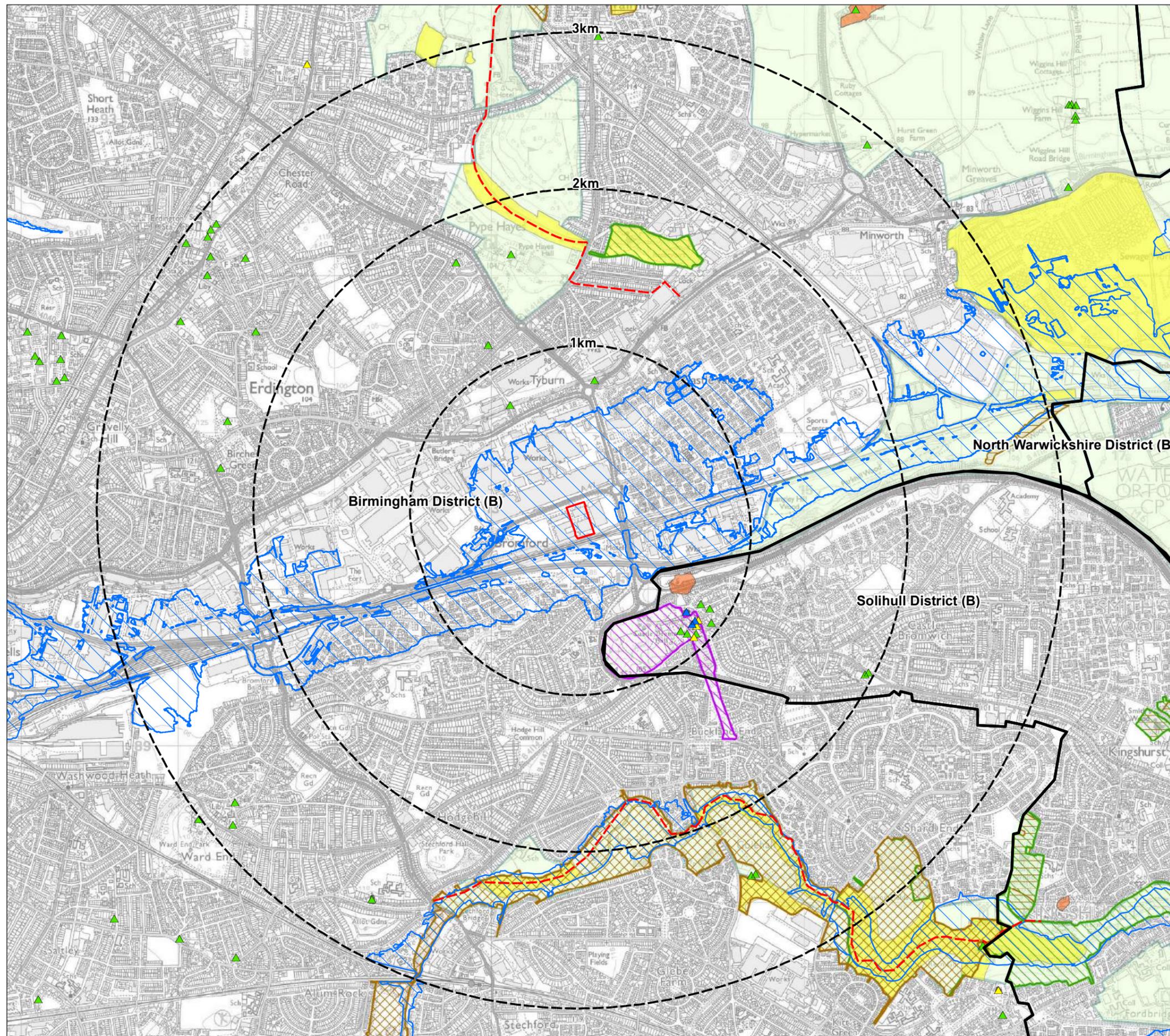
2.11 Site Vehicle Movements

2.11.1 The existing site currently generates a total of 317 daily vehicular trips, 45 of which are HGVs. It also generates 27 and 29 two-way vehicular trips in the AM and PM peak hours respectively.

2.12 Noise Sensitive Receptors

2.12.1 The closest residential receptors are located to the south of the site, beyond the M6 viaduct, along Wanderer Walk, Bromfield Drive and Papyrus Way, with noise levels at these locations principally influenced by road traffic using the M6. These dwellings are approximately 250 metres from the southern site boundary.

2.12.2 The other potentially affected residential properties are located to the east beyond the A452, approximately 300 metres from the eastern site boundary, with the Proposed Development screened from the properties by the existing commercial (B&Q) unit. Noise levels at these dwellings are also principally influenced by road traffic from the M6 and A452 both during the day and night-time periods.



- KEY**
- Site Boundary
 - Local Authority Boundary
 - ▲ Grade I Listed Building
 - ▲ Grade II* Listed Building
 - ▲ Grade II Listed Building
 - SUSTRANS National Route
 - Listed Buildings
 - EA Flood Zone 2
 - Country Park
 - Registered Park / Garden
 - Scheduled Monument
 - Local Nature Reserve (LNR)
 - Ancient Woodland
 - Site of Importance for Nature Conservation (SINC)
 - Green Belt

FIGURE 2.1
Site Constraints Plan

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 Date: 28/10/2015
 Scale: 1:25,000 @ A3



1 Background, Introduction & Context

2 Site Description

3 Development Proposals

4 Need & Alternatives

5 Air Quality

6 Townscape & Visual

7 Traffic & Transportation

8 Hydrology & Flood Risk

9 Hydrogeology & Ground Conditions

10 Noise & Vibration

11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

13 Socio- Economic Impact

14 Summary

3 DEVELOPMENT PROPOSALS

3.1 Background

3.1.1 The Proposed Development includes two separate buildings; 1) a Renewable Energy Centre; and 2) an industrial warehouse building to include storage and offices.

3.1.2 The Renewable Energy Centre (REC) will employ an Advanced Conversion Technology (ACT) which is supported by Government and is part of a number of renewable technologies being deployed in the UK. ACT is a form of gasification process to generate power and heat from Refuse Derived Fuel (RDF) together with other non-recyclable wastes. RDF is a product derived from non-recyclable industrial and commercial waste and when heated to very high temperatures breaks down to provide a gas which is utilised in a boiler to create steam which drives a steam turbine to produce electricity and heat. It is a clean, modern and hi-tech approach to producing energy, with a proven track record.

3.1.3 The development will have the capacity to process up to 105,000 tonnes of waste per annum. As well as the RDF the feed stock will include using non-recyclable residual commercial and industrial waste (CIW) together with an element of construction and demolition (C&D) and potentially municipal solid waste (MSW). The plant will not accept hazardous or clinical waste and initial research has indicated that this material would comprise waste from across the Birmingham area.

3.1.4 The electricity produced from this facility will have a capacity to produce a gross 8.6MW of electricity. Unlike incineration, the technology employed by Fort Parkway Energy will involve a two-stage system, which initially gasifies the waste to produce synthetic gas. This gas is then transferred to a second stage where it burns more efficiently as a fuel than would be the case from a basic waste incineration system. The process allows for efficient control of emissions and improved performance generally as an energy solution. It is classed as ACT as the biomass element of waste qualifies for Contract for Difference (CFD). CFDs provide long-term price stabilisation to low carbon plant, allowing investment to come forward at a lower cost of capital and therefore at a lower cost to consumers but enables advanced renewable technology to be developed.

3.2 Site Layout

3.2.1 The proposed site layout and roof plan is illustrated on **Figure 3.1** and **Figure 3.2** respectively. The existing buildings will be demolished and replaced with the industrial warehouse unit rebuilt to the north of the site on Dunlop Way and the REC will be constructed immediately behind it to the south of the site.

3.2.2 The REC is made up of the following principal elements:

- **A main building** – this will house the majority of the process plant and will have a number of silos to the rear and a flue stack to the east of the building, all waste material will be unloaded inside the building. At its highest point, the main body of the building will be 23m high and 82.3m long x 48.8m wide with a floor area of 4855m²; see REC elevations illustrated on **Figure 3.3**. The flue stack contains a walk around platform for continual air quality monitoring access and consists of a metal framework. The stack will have a height of 55m and a diameter of 2.1m which in comparison to the adjacent Rolls Royce peaking plant is smaller. The Rolls Royce site is larger with an exhaust stack height of 60.4m and 4.5m diameter;

- **Waste Storage Bunker** - Wastes are deposited into an 8m deep waste bunker with a capacity of 820m³ (which has 4 days of waste storage thus complying with fire regulations and stopping build-up of heat from waste gasses) where shredding and separating takes place and any ferrous material is taken out;
- **Turbine Room** – this will be a smaller separate building 15.6m high, with a base of 20m x 11m. A short section of pipe line will connect the main building and the turbine generator building;
- **Air cooled condenser fans** – have a height of 23.4m with a footprint of 27.4m x 11m;
- **Ash bunker** – the fly-ash is stored in a silo measuring 10m x 12m x 5m with a capacity of 600m³. The ash is removed in a safe manner by attaching an umbilical hose to a tanker and can be either reused /recovered or disposed of at licensed landfills. The handling, storage, treatment and reuse/disposal of this material is highly regulated and loaded onto trucks with a front end loader;
- **Fire Water Tank** - a fire water tank would be included next to the south eastern boundary of the site. The tank has a 17m diameter and a height of 6.75m with a 1 million litre capacity;
- **Pump Room** – the pump house is next to the fire water tank and has a height of 3.2m with a footprint of 6.1m x 4.6m; and
- **Technical / Control room and Workshop** – the control room will be located within the eastern side of the building and the workshop within the western side.

3.2.3 In addition, the external site areas will include:

- Two weighbridges (both in and out)
- Site entrance and circulation roads;
- 19 car parking spaces including 2 disabled bays;
- Provision for cycling spaces; and
- Landscaping and Sustainable Urban Drainage Systems (SuDS) – see **Chapter 6** Townscape and Visual and **Chapter 8** Hydrology and Flood Risk for further detail.

3.2.4 The industrial warehouse building has a height of 11.6m, width of 37.83m and length of 49m. The floor area measures 1950m². To the east side of the building are 20 car parking spaces and a gatehouse. The service yard is located west of the building and includes 2 loading bays and 10 car parking spaces. There will be a 2m high paladin boundary fence. The building elevations are illustrated on **Figure 3.4**.

3.2.5 The gatehouse will be a moveable structure and has a height of 4.3m by 5.4m x 5.4m. The floor area measures 29m². The building elevations and floorplan are illustrated on **Figure 3.5**.

3.3 Process Description

3.3.1 The key stages of the REC process are described below.

3.3.2 The plant employs a two stage system that first gasifies the waste to produce a synthetic gas which is then transferred to a second stage where it is oxidised. Changing the waste to a gas fuel, means the combustion environment can be finely controlled, dioxins thoroughly destroyed and Nitrogen Oxides (NOx) emissions minimised which can achieve emissions levels that are compliant with Industrial Emissions Directive (IED) (Directive 2010/75/EU of the European Parliament and the Council on industrial emissions). Key Stages:

Fuel Bunker and Transport System

3.3.3 The waste and fuel bunker hall will be enclosed with fast acting doors and the hall will also be operated slightly below atmospheric pressure to create a negative pressure draw to contain odours. The air from the hall will be taken through the thermal conversion process to allow it to be cleaned before being released through the stack.

3.3.4 Unprocessed waste will be removed from the waste bunker and passed through a shredder before passing across a magnet where metals will be removed (the recovered metal will be collected in a separate skip and periodically collected and sent for further recycling).

3.3.5 An overhead fuel crane will operate on a pre-programmed cycle and move around the bunker to mix the fuel to create a more homogeneous mixture. The crane will then deliver waste automatically to the fuel chute to the gasification unit.

Thermal Conversion

3.3.6 The thermal conversion will take place in two stages. Firstly drying, pyrolysis and gasification of the fuel will be carried out in the gasification unit creating the synthetic gas. From this, the gas passes to the High-temperature Oxidation Unit where there is a complete combustion of Carbon monoxide (CO), Total Organic Carbon (TOC) with a final production of a flue gas with low NOx content. The ash is discharged from the gasification unit at the end and taken for offsite disposal.

Heat Recovery Steam Generator (HRSG)

3.3.7 The HRSG that recovers the energy from the flu gas is connected to the high temperature oxidation unit that combines smoke-tube and water-tube boilers operated to control the outlet flue-gas temperature.

Energy Utilisation System

3.3.8 The boilers will deliver saturated or superheated steam to an energy utilisation system. The system will consist of a turbine with generator and an air cooled vacuum condenser with condensate pumps. Generated electricity will be connected to the Power Company's distribution network. Condensate from the air-cooled condenser will be directed to the feed water tank of the boiler system by condensate pumps.

3.3.9 If required the turbine can be fitted with a suitable extraction point to enable steam, at the appropriate pressure, to be taken from the turbine for use by adjacent consumers.

Flue Gas Cleaning System

3.3.10 Having been generated in the dual stage gasification process and passed through the HRSG, the flue gas will enter a gas cleaning system. This will comprise a bag house filter, a storage silo for lime and activated carbon and a filter dust silo. In simple terms

the lime and activated carbon will be injected at the inlet of the bag house filter and this will adsorb contaminants in the flue gas. The contaminants are in turn filtered out and disposed of off-site, with only clean gases discharged to the atmosphere.

Control and Monitoring System

3.3.11 The plant will be equipped with a control and monitoring system that will provide automatic control of the process during normal operating conditions and gives the opportunity for staff to monitor the different process sections. Of particular importance will be the logging of process details, including emissions.

3.4 Material Delivery and Despatch

3.4.1 On arrival, waste vehicles will report to the weighbridge where waste documentation, waste carrier certificates and transfer notes will be checked to ensure compliance with the Duty of Care Regulations and the sites Environmental Permit. Vehicles containing any non-conforming waste will be quarantined and managed in accordance with the site's Permit. The quantity of waste the vehicles carry will then be assessed by passing them over the weighbridge.

3.4.2 It is anticipated that fuel from the local area would fulfil the requirement to operate the REC. This is however subject to available local contracts and is currently under review.

3.4.3 The waste will be split into three types; Tier 1 from the major waste companies which would account for approximately 60% of the waste entering the plant; Tier 2 would consist of waste from local operators and would account for 30% waste and Tier 3 where 10% of the waste would come from spot market. Economic and contractual obligations will play a large factor in the distance waste is travelled to the site hence by this nature waste will not be transported over long distances. Although waste from Tier 1 would be transported from major waste organisations it would still arrive from the Greater Birmingham area. The tiers represent different size operators as opposed to the distance the waste is brought into the site from, therefore, the distance will be self-limiting owing to transport cost.

3.4.4 It is anticipated that waste will be delivered to the site via refuse collection vehicles (RCVs) which will typically be 18 – 22 tonne vehicle (gross weight), or in large articulated bulk haulage vehicles from nearby waste transfer stations under a Duty of Care Waste Transfer Note.

3.4.5 The REC is expected to generate a total of 66 heavy goods vehicles (HGVs) trips per day which is the equivalent of 33 deliveries per day to site. The industrial warehouse will generate a total of 67 daily vehicular trips, 9 of which are HGVs.

3.4.6 Vehicular access to the REC will utilise the existing access onto the public road network at the priority T-junction that provides access into the Fort Industrial Estate via the private access road. A new priority T-junction will be constructed onto the private access road at the southwest corner of the application site.

3.4.7 Upon entering the site all vehicles will be directed north towards a manned gatehouse where two barriers control access to the site, and one controls egress from it. The two ingress barriers provide separate access for provided for staff and visitors travelling by car to enter/exit the site. Once beyond the barrier, staff and visitors will continue via a segregated route around the perimeter of the HGV Turning Area towards

the car park located on the site's eastern boundary. Users will exit the site via the same route where passing places are located where appropriate intervisibility is afforded.

3.4.8 A separate barrier system will be provided for HGV movements, with separate barriers provided for vehicles entering and exiting the site. A weighbridge will be located in front of each barrier which will be located either side of a security booth. Further details are provided within Chapter 7 Traffic and Transport.

3.5 Grid Connection

3.5.1 The Applicant has submitted a budget quotation request and held discussions with the relevant power network operators in the area regarding the scale of the generation considered, which would typically be connected to the local network. Western Power Distribution (WPD) operates the Distribution Network.

3.5.2 Due to the available capacity of the local networks, it has been indicated by WPD that the maximum generation export capacity that could be afforded to the Fort Industrial Park is considered to be 20,000kVA. Any capacity above this level is likely to require substantial reinforcements back up the distribution network towards the Nechelles Bulk Supply point.

3.5.3 WPD has provided a Budget Estimate for a 10,000kVA generation capacity exporting to its distribution network via a 132,000 volt connection.

3.6 Surface Water Management

3.6.1 The Proposed Development will be served by a new surface water drainage network which will connect into the existing surface water sewer network (which discharges directly to the Dunlop Carrier).

3.6.2 Surface water runoff from the Proposed Development will be intercepted by on-site drainage systems designed to contain the runoff from storms up to the 1 in 100 year return period, including an appropriate allowance for climate change. The storm water is discharged at a reduced flow rate during short duration storm events into the existing private surface water sewer system (and into the Dunlop Carrier).

3.6.3 The development drainage arrangements will incorporate a SuDS feature consisting of a below ground geocellular storage and flow controls.

3.6.4 The onsite drainage systems would be designed in accordance with the relevant national standards and guidance including the SuDS Manual, Building Regulations Part H, BS EN 752:2008, Sewers for Adoption, together with Environment Agency documents such as Rainfall Runoff Management for Developments and the Interim Code of Practice for Sustainable Drainage Systems.

3.7 Design Approach (building materials and colour)

3.7.1 Many industrial parks are designed with a typical 'form follows function' approach. From the outset and in conjunction with advice from BCC City Design team it was deemed

important that the external appearance of the plant should make a statement whilst being appropriate for the area.

3.7.2 In terms of architectural detailing and materials, both follow a similar palette, albeit simplified for the smaller industrial warehouse unit and consist of mainly a coloured cladding system.

3.7.3 Due to the energy plant building being a large mass, it was important to use a cladding system that would achieve the functional needs, as well as aesthetic ones too. A horizontal metal cladding in a dark grey colour has been used for the building base which is a common architectural technique and gives the building a strong base or plinth to sit on. Above that a lighter grey has been specified and finally a white architectural panel to the top third of the building. The concept behind this allows the building to sit and almost blend into the typical overcast skyline of the UK. Key corners and frontages have been wrapped in an aluminium diamond shaped shingle, which helps to give the elevations their own hierarchy. These textured panels add some shadow relief to the elevations helping to break up the building mass. Operational doors, external machinery and part of the stack will be faced in a contrasting Blue coated metal.

3.7.4 Following further advice from BCC City Design team the dark blue architectural panel on the north elevation was toned down using a lighter colour palette.

3.7.5 A tree screening belt was integrated on the southern boundary to screen visible elements from the south.

3.8 Construction (including demolition) Duration

3.8.1 Subject to the grant of planning permission, it is anticipated that the construction of the proposed REC would commence in 2017. Construction on site would last for 24 months, after which there would be a commissioning period. Furthermore, construction would normally take place during the hours of 0700 to 1800 (Monday to Friday) and 0800 to 1300 (Saturday). No construction would take place on Sundays or bank holidays.

3.9 Operating Hours

3.9.1 The REC will operate continuously; 24 hours a day, 7 days per week. Operational staff would be required to operate the Plant on a 3 shift pattern (each of 8 hours). During weekdays the facility will be open for deliveries between the hours of 07:00 and 19:00 and between the hours of 07:00 and 14:00 on Saturdays. There will be no waste received on Sundays. It is expected that HGVs importing and exporting materials from the site will do so evenly throughout the 12 hour period and there is unlikely to be a peak in movements associated with these operations.

3.9.2 Maintenance of the REC would take place twice yearly which would necessitate the ceasing of operations for a two week period in the summer and a week during the winter period. These times would be programmed to coincide with the manufacturer's shutdown periods. Across the resultant 49 weeks of scheduled operation, ad-hoc maintenance and other generation drop-out periods associated with grid-synchronisation and the processing of non-homogenous Refuse Derived Fuel may result in the need for short-term shut-downs. The availability is therefore expected to be approximately 90% (i.e. 44 weeks per annum).

3.9.3 The facility is expected to be available to receive deliveries of waste on weekday and on Saturday mornings. The Plant will operate during Bank Holidays but shall not receive waste deliveries. This is facilitated by the on-site waste storage inside the building which

has been designed to ensure sufficient capacity to continue operations without delivery for up to 3 days.

3.10 Construction and Environmental Management

3.10.1 Environmental control measures will be imposed to minimise adverse environmental effects during construction and the assessments presented in this ES have been undertaken on the basis that these measures will be implemented. A Construction Environmental Management Plan will be prepared and adopted and will include sections on: noise, vibration, air quality, water quality, surface quality (prevention of contamination of ground surface), site transportation and traffic management, visual intrusion and waste management. The appointed contractor will also be required to register with the Considerate Construction Scheme.

3.10.2 Lorries will be fully sheeted over and pass through a wheel washing installations (hose down area) prior to departure.

3.10.3 Waste will be generated during all stages of the construction works. A Site Waste Management Plan will be prepared and all relevant contractors will be required to seek to minimise waste arising at source and, where such waste generation is unavoidable, to maximise its recycling and reuse potential. Recycling of materials will primarily take place off-site where noise and dust are more easily managed.

3.10.4 All construction activities, which have the potential to generate significant amounts of noise and/or vibration and will be undertaken during daytime periods (see Chapter 10 Noise for further information relating to construction noise).

3.11 Scheme Benefits

3.11.1 The benefits of the REC include:

- Proven technology with outstanding operational and environmental performance and very low emissions;
- Conversion of non-recyclable, non-hazardous waste into renewable energy, displacing landfill and fossil fuels;
- Reducing greenhouse gas emissions;
- Job creation across a variety of skills and levels of expertise with employment opportunities for local people;
- Reusing and transforming an existing industrial site and enhancing with landscape planting;
- Production of lower cost renewable energy for local businesses with connections to local energy users via underground cable;
- Clear progression in the transition to a low-carbon economy with grid carbon offset; and
- Compliance with Government policy and the EU Waste Framework Directive to provide sustainable, renewable energy production close to use.

3.12 Employment

3.12.1 The proposed REC will create a number of job opportunities during the construction phase of the development and once operational this will provide up to 20 employment opportunities, which will comprise of 13 FTE's directly employed on site with a further 7

people providing services from local specialist businesses. These will be across a variety of skills and levels of expertise and there will be employment opportunities for local people.

3.12.2 There will be a number of job opportunities created by the proposed industrial warehouse to the front of the site.

3.13 Consents

3.13.1 In addition to planning permission, other consents will be required to enable the Proposed Development to proceed. Of particular importance to this development is the need for an Environmental Permit from the Environment Agency that will control all operations associated with the plant based upon various risk assessments. Information presented in this ES will be used in the preparation of the Permit.

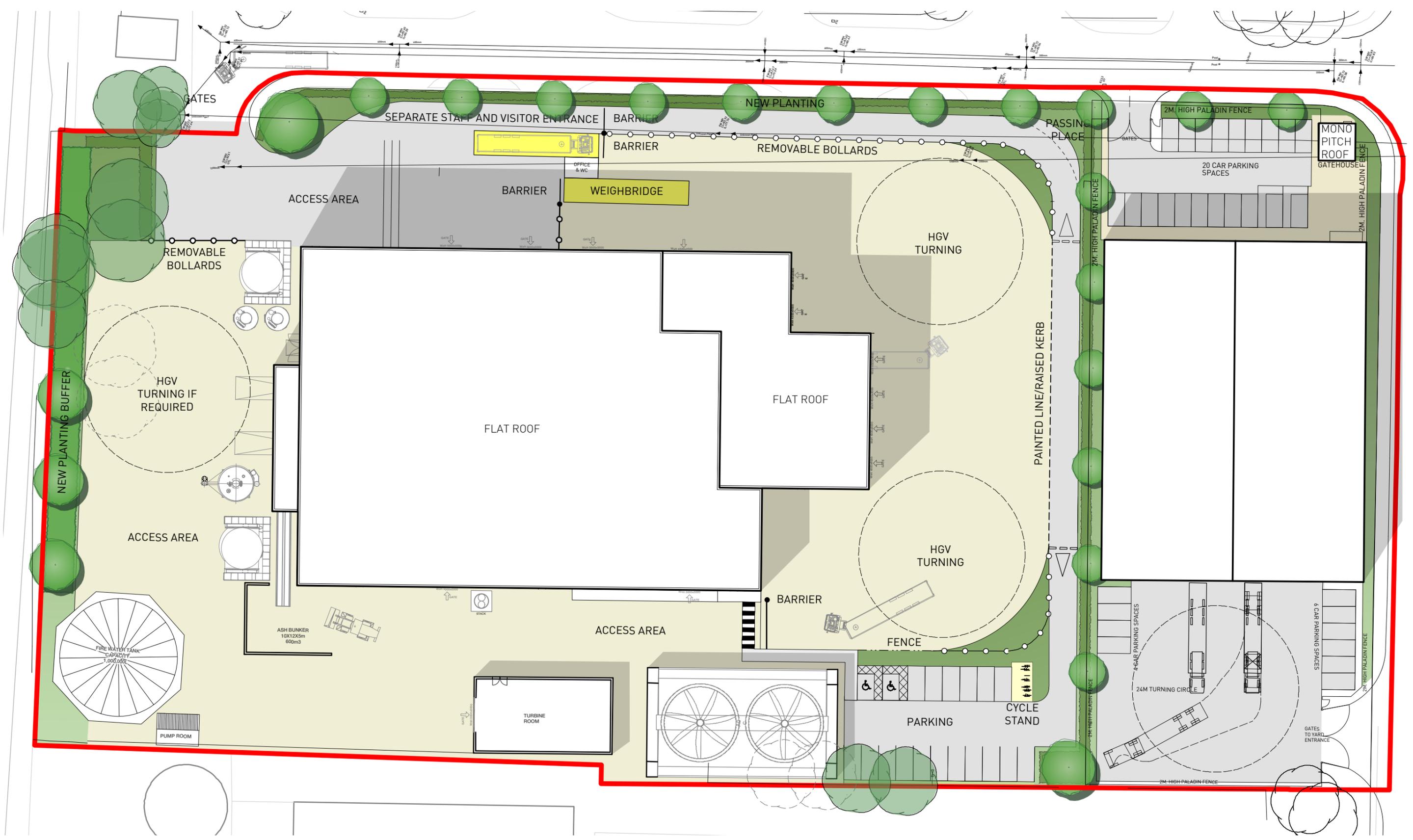


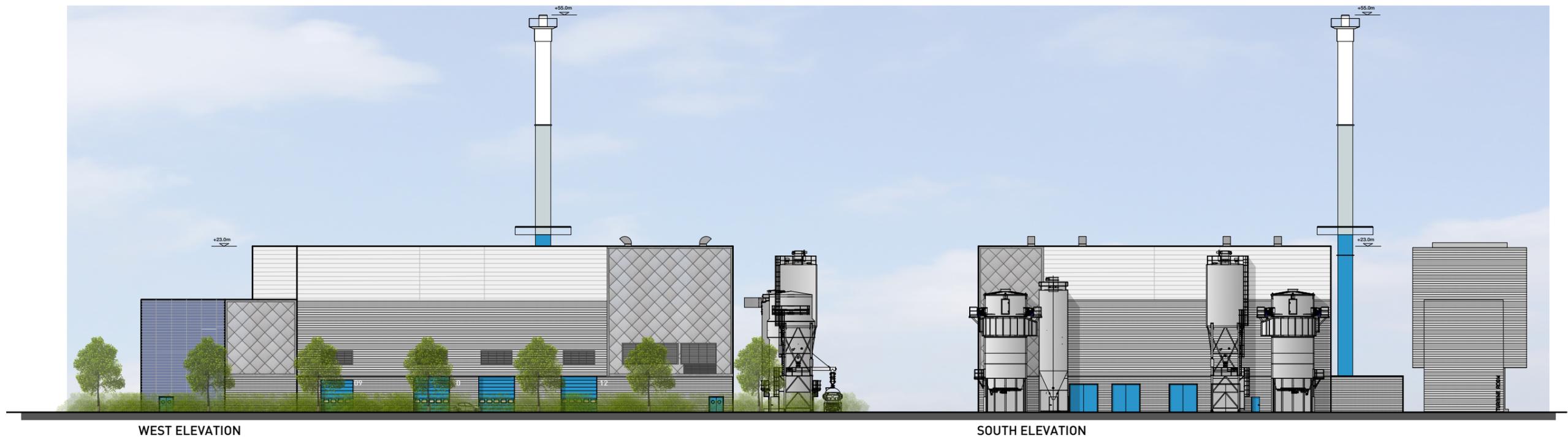
FIGURE 3.2

Roof Plan

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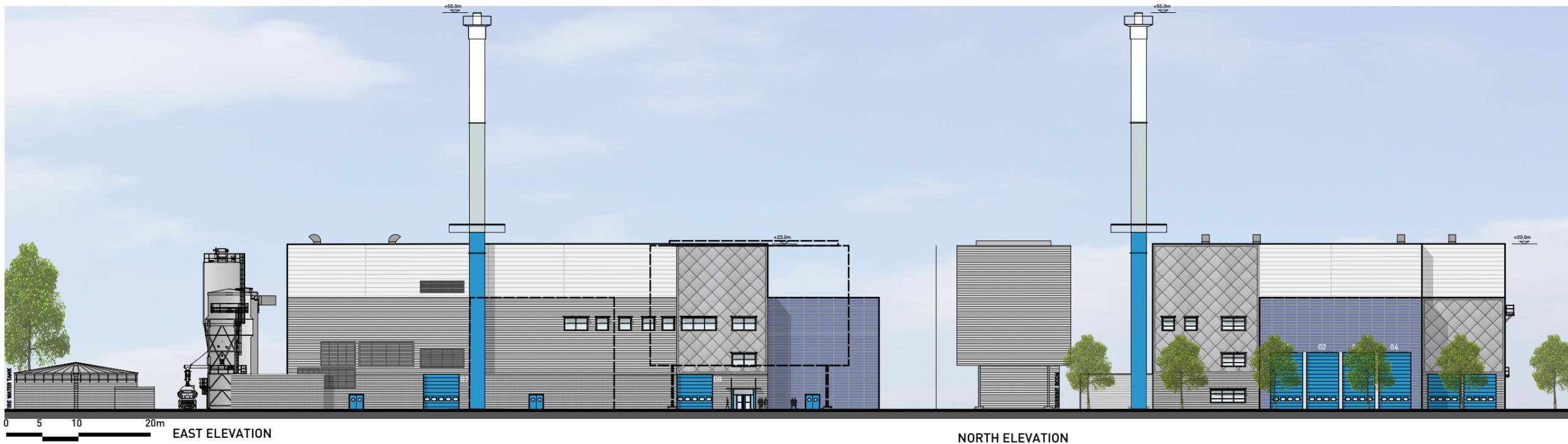
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WEST ELEVATION

SOUTH ELEVATION



EAST ELEVATION

NORTH ELEVATION



Example Image of Aluminium Sotech Optima Shingles

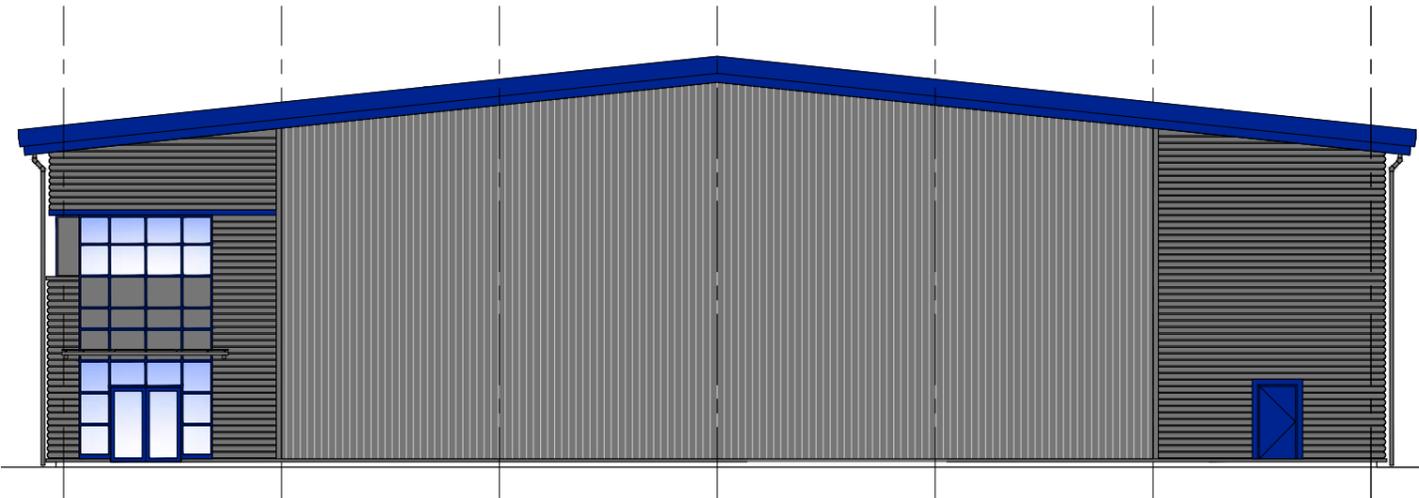
Example Image of Kingspan Architectural Wall Panels in White and Topaz

MATERIALS PALETTE

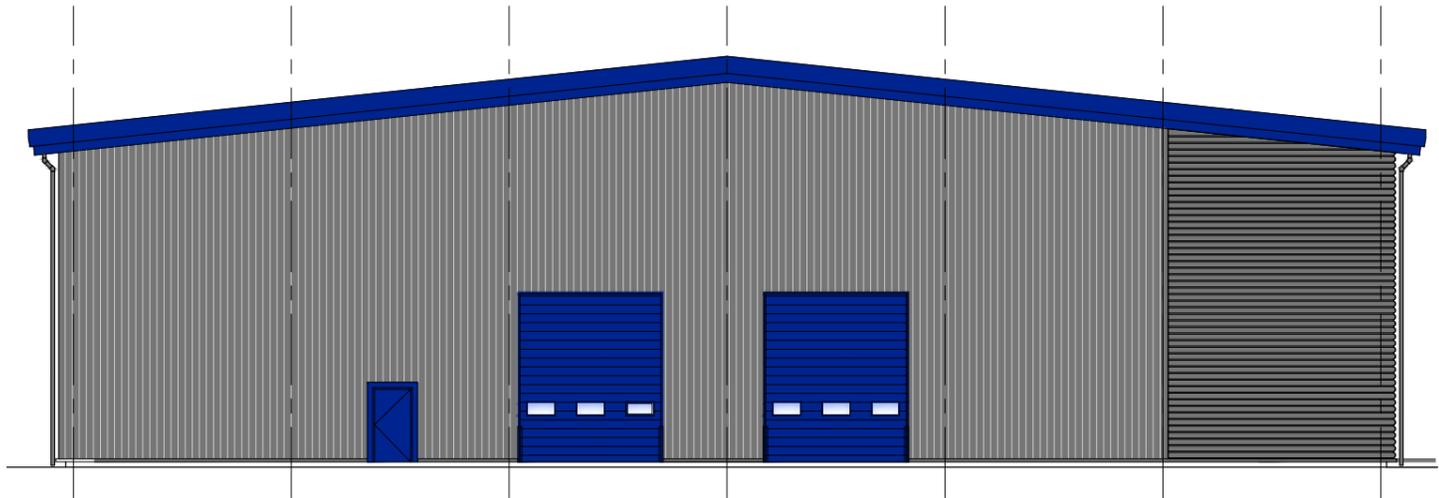
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	Aluminium Sotech Optima Shingles		Horizontal Metal Cladding Panel Ref: Colour Pure Grey RAL 000 55 00		Blue Coated Metal

FIGURE 3.3
Elevations for the REC

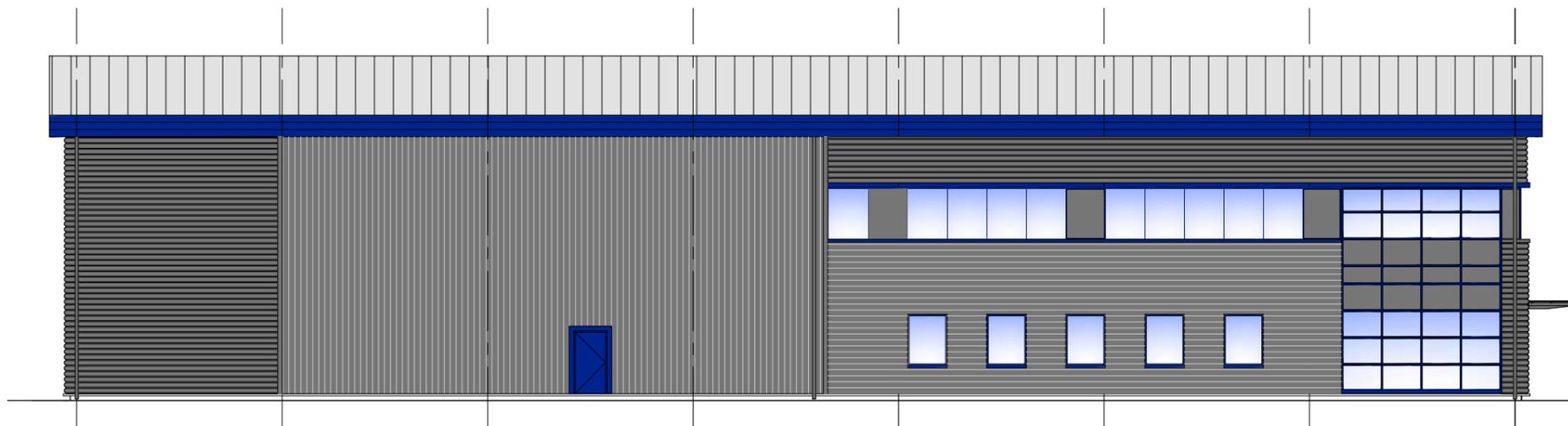
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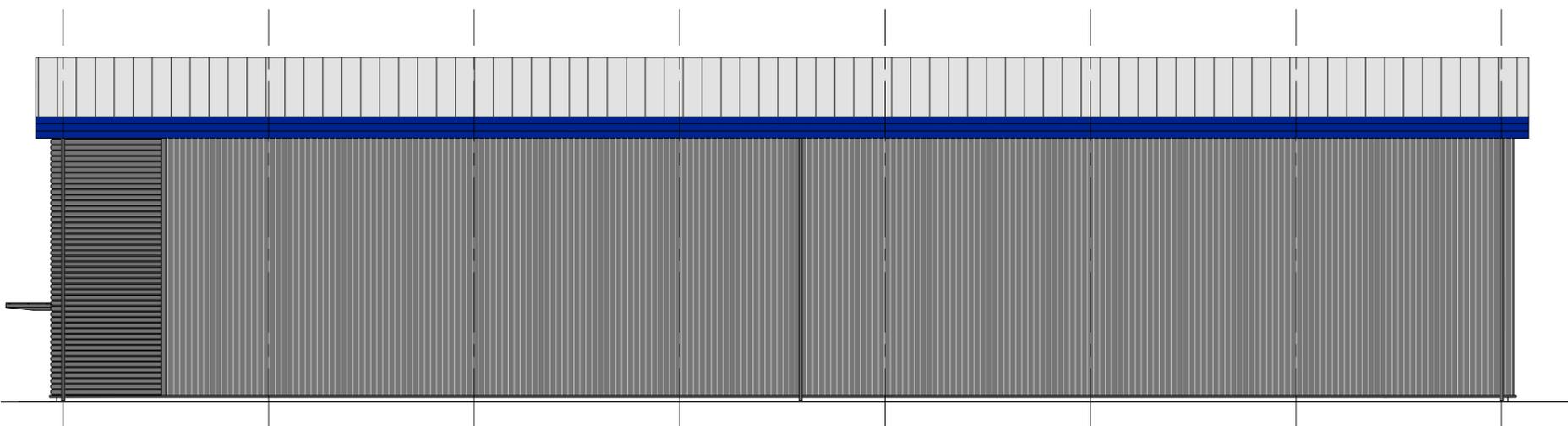
Front Elevation



Rear Elevation



Side Elevation on Dunlop Way



Side Elevation

Schedule of Materials

- Roof - HPS200 Ultra Prefinished Steel Built up Cladding, Colour - Goosewing Grey RAL 7038
- External Walls - Half round profiled steel cladding Low and High level Colour - HPS200 Merlin Grey RAL 180 40 05.
- Vertically spanning built up trapezoidal cladding generally. Colour - HPS200 PURE GREY RAL 000 55 00.
- Eaves Overhang & Fascia - Pre-formed Eaves Colour HPS200 Blue RAL 5002 or equivalent from a standard range.
- Flashing / Feature Band - Colour HPS200 Blue RAL 5002 or equivalent from a standard range.
- Flashing - Colour HPS200 Merlin Grey RAL 180 40 05
- Rain Water Pipe - Colour HPS200 Merlin Grey RAL 180 40 05
- Glazing - Polyester powder coated Aluminium double glazed window/door unit. Colour - Saragasso Blue RAL 5002
- Canopy - Cantilevered Steel & Glass canopy
- Loading Doors - Insulated electrically operated loading doors. Colour - Saragasso Blue RAL 5002
- Fire Exit Doors - Painted Steel door sets. Colour - Saragasso Blue RAL 5003

FIGURE 3.4
Elevations for the Industrial Warehouse & Offices

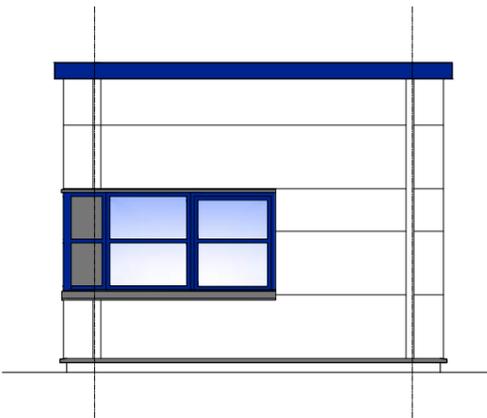
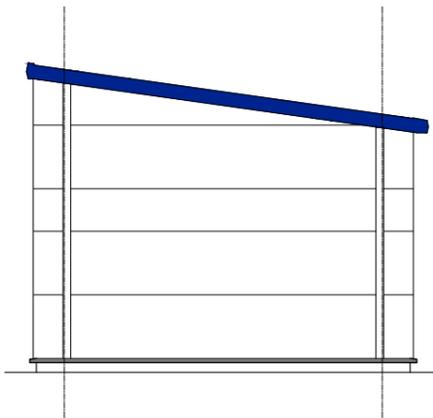
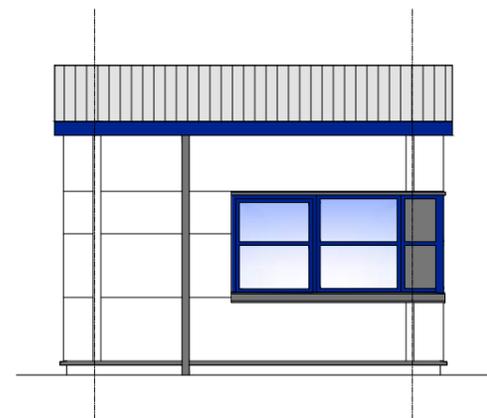
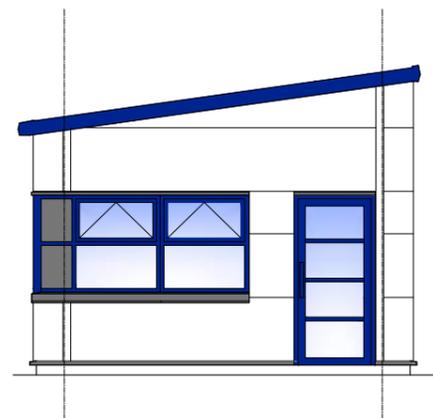
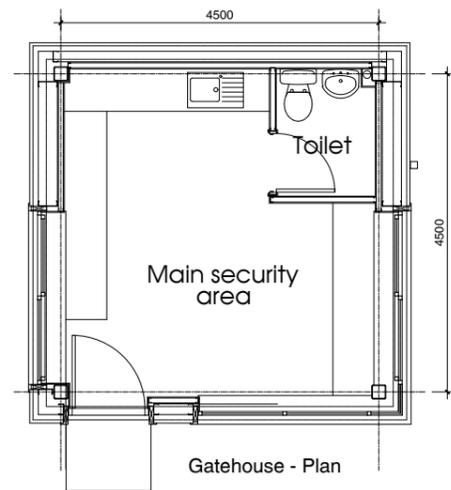
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Schedule of Materials

Roof -	HPS200 Ultra Prefinished Steel Built up Cladding. Colour - Goosewing Grey RAL 7038
External Walls -	Composite Microrib Cladding Laid Horizontally Composite Insulated Panels Colour HPS200 White RAL 9003
Eaves & Soffit -	Colour - Saragasso Blue RAL 5002
Flashing / Feature Band -	Colour HPS200 Blue RAL 5002 or equivalent from a standard range.
Flashing -	Colour - Saragasso Blue RAL 5002
Rain Water Pipe -	Colour HPS200 Merlin Grey RAL 180 40 05
Glazing -	Polyester powder coated Aluminium double glazed window/door unit. Colour - Saragasso Blue RAL 5002

FIGURE 3.5
Elevations and Floorplan
for the Gatehouse

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Date: 18/11/2015
Scale: 1:100 @ A3



1 Background, Introduction & Context

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11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

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14 Summary

4 NEED AND ALTERNATIVES

4.1 Overview of the Need and Waste Management Context

4.1.1 The Waste Management Plan for England (“the WMPE”) was published in December 2013 and sets out where the Government is now in terms of the waste generated in England and how those materials can be managed. It supersedes and records progress made since the publication of the Waste Strategy for England 2007.

4.1.2 Page 10 of the document sets out how the Government are working towards moving beyond our current throwaway society to a ‘zero waste economy’ in which material resources are reused, recycled or recovered wherever possible and only disposed of as the option of last resort.

4.1.3 The Proposed Development is aimed at contributing to sustainable waste management. Waste production has been increasing in quantities over recent years. Traditionally most of this waste has been managed by disposing of it to landfill, waste management is currently undergoing substantial change.

4.1.4 At page 11 the WMPE details how the waste hierarchy in England is enshrined in law through the Waste (England and Wales) Regulations 2011 with top priority given to waste prevention, followed by preparing for re-use, then recycling, other types of recovery (including energy recovery), and last of all disposal (e.g. landfill).

4.1.5 In terms of ‘Other Recovery’, in addition to supporting anaerobic digestion the Government also supports efficient energy recovery from residual waste – of materials which cannot be reused or recycled - to deliver environmental benefits, reduce carbon impact and provide economic opportunities. The Government aims to get the most energy out of waste, not to get the most waste into energy recovery (page 13).

4.1.6 The ‘saved’ policies of the Birmingham Unitary Development Plan (UDP) adopted by Birmingham City Council on 11th November 2005 contains policies that are relevant to the development of the REC at Fort Industrial Park. The principal saved policy in the adopted UDP applicable to a facility such as Fort Parkway Energy is set out a Paragraph 3.67 (Energy from Waste Plants). The Birmingham Development Plan (BDP), formerly the Core Strategy, will set out the statutory framework to guide decisions on development and regeneration in Birmingham up to 2031, the most relevant emerging policies include:

- Policy TP1 (Reducing the City’s Carbon Footprint);
- Policy TP13 (Sustainable Management of the City’s Waste); and
- Policy TP14 (New and existing waste facilities).

4.1.7 The alternative of landfilling waste does not capitalise on the economic value of waste materials and so the REC will provide benefits to the local economy associated with the development of the facility as outlined in Chapter 3. The site is in an established industrial area with the potential to utilise energy created by the Proposed Development. This is important as the UK industry faces unprecedented challenges from overseas manufacturers with lower labour costs but also high energy prices. Maintaining high quality manufacturing employment in Castle Bromwich is clearly beneficial to the local economy and the UK as a whole.

4.2 Consideration of Alternatives

4.2.1 Schedule 4, part 1, paragraph 2 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 requires that *“an outline of the main alternatives studied by the applicant and an indication of the main reasons for this choice, taking into account the environmental effects”* are included within the ES.

4.2.2 Other Legal and General Property (LGP) managed sites were considered early in the feasibility process, however, the principal reason for the selection of the site was its location within an existing site in an industrial area with good access to the primary route network and in close proximity to energy intensive industrial customers.

4.2.3 The design of the Proposed Development has been informed by an iterative process with alternative layouts and elevations considered throughout the process. **Figures 4.1 a – d** illustrate layout options for the REC element of the site prior to the final option taken forward. The drawings demonstrate constraints and opportunities associated with the location of the stack, vehicular movement and access as well as landscaping proposals. It was determined the stack would be more preferable sited to the east of the REC as opposed to the south as this location is further from the railway line.

4.2.4 A series of basic architectural massing techniques were undertaken to help understand how the buildings would best relate to one another and the character of the surrounding area. Due to the split use of the site with the industrial warehouse to the north and REC located behind, this allowed the warehouse to sit at a relative height to the neighbouring industrial units whilst the energy plant stepped up behind.

4.2.5 Following the basic massing exercise the functional and operational requirements of the building were explored. By creating a single central energy plant unit that is served by the ancillary buildings located to the peripheral edges this allowed for vehicular circulation around the building to all facades.

4.2.6 A series of elevation option alternatives were explored and considered throughout the iterative design process. The precursor to the current elevations are illustrated on **Figure 4.2**, this option was tabled at the second pre-application meeting with BCC which included discussions with the City Design team. Following advice from City Design team textured panels were added to the elevations to allow for some shadow relief helping to break up the building mass.

4.3 Site Identification and Feasibility

4.3.1 The Castle Bromwich site was identified to provide the opportunity for power to be supplied to any interested local businesses as well as the opportunity to supply heat in the form of steam and / or hot water if required; and in view of the need for new waste infrastructure within Birmingham City Council area with the plant saving up to 105,000 tonnes of waste going to landfill annually.

4.3.2 The site at Fort Industrial Park was chosen having established:

- Its availability and its size which was suitable for up to a 105,000 tonnes facility;
- Its proximity to energy intensive industrial consumers. It is intended that the proposal will be able to offer low cost secure energy to one or more neighbouring businesses, assisting in securing the future of those companies and their employees;
- Its access through the existing industrial estate which immediately joins the primary route network without the need to go through residential areas.

4.3.3 No other viable site alternatives that met all three criteria were identified.

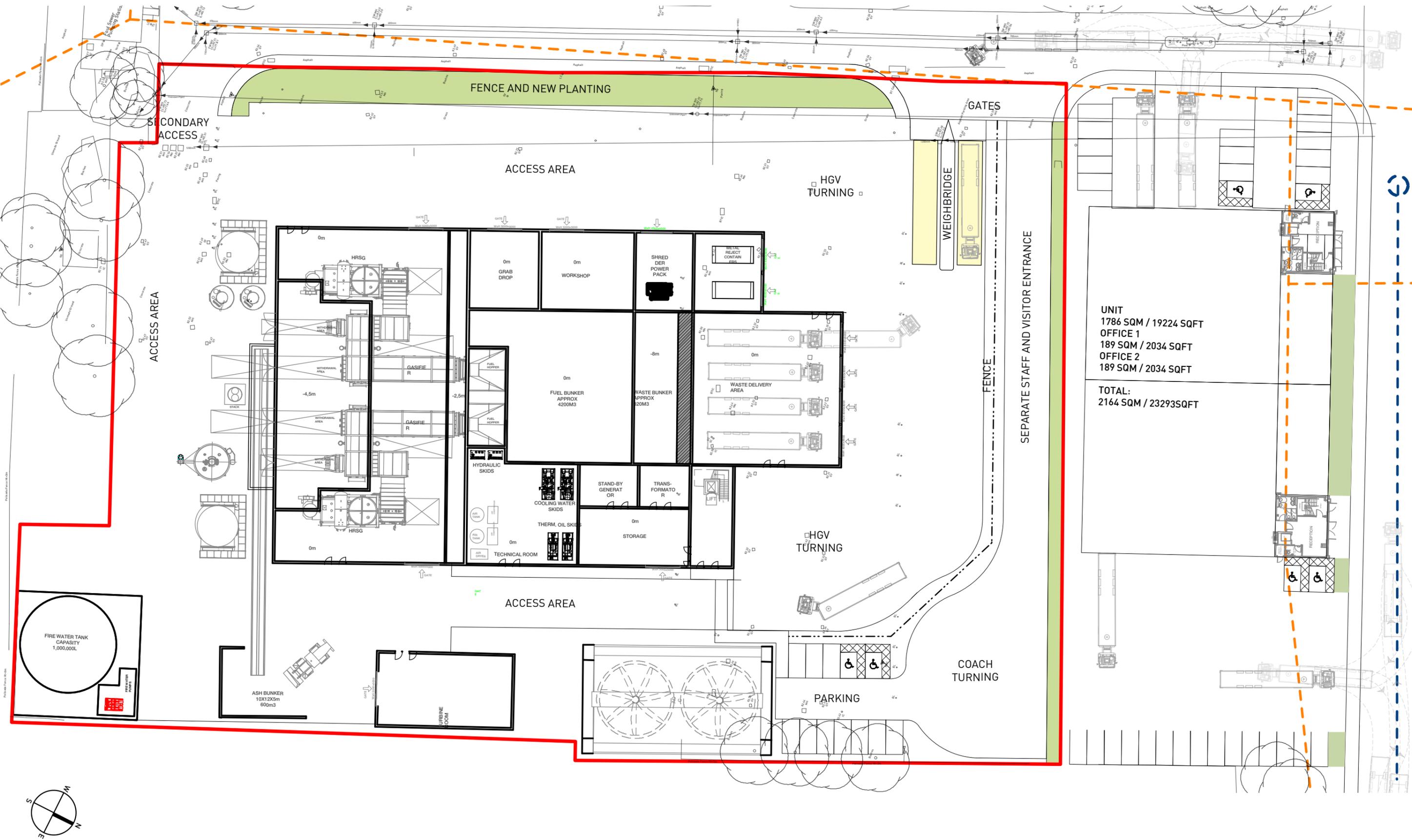
4.4 Cumulative Considerations

4.4.1 Assessment of cumulative effects with other developments which are either operational, under construction / consented or the subject of a full planning application should be considered. BCC identified five sites in their Scoping Opinion to be included within the cumulative assessment. The cumulative sites lie within a 3km radius of the Proposed Development and are listed in **Table 4.1** below and illustrated on **Figure 4.3**.

4.4.2 The assessment of cumulative effects has been undertaken separately within each chapter where considered relevant.

Table 4.1 Development Included within the Cumulative Assessment

Application Reference	Development	Distance from REC
64307005	Public Waste Disposal Facility	1km
2002/04647/PA	Green Waste Recycling Facility	2km
2009/03827/PA	Extension to Green Waste Recycling Facility	0.15km
2012/05409/PA	Anaerobic Digestion and Pyrolysis Energy Plant	2.7km
2014/02762/PA	Aggregate Recycling Facility	2km



UNIT	1786 SQM / 19224 SQFT
OFFICE 1	189 SQM / 2034 SQFT
OFFICE 2	189 SQM / 2034 SQFT
TOTAL:	2164 SQM / 23293SQFT

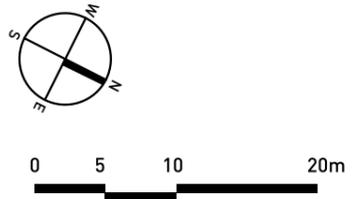


FIGURE 4.1a
Layout Option Drawing

DRWG No: **K.0168_03** REV: **B-1**
 Date: 21/07/2015
 Scale: 1:500 @ A3

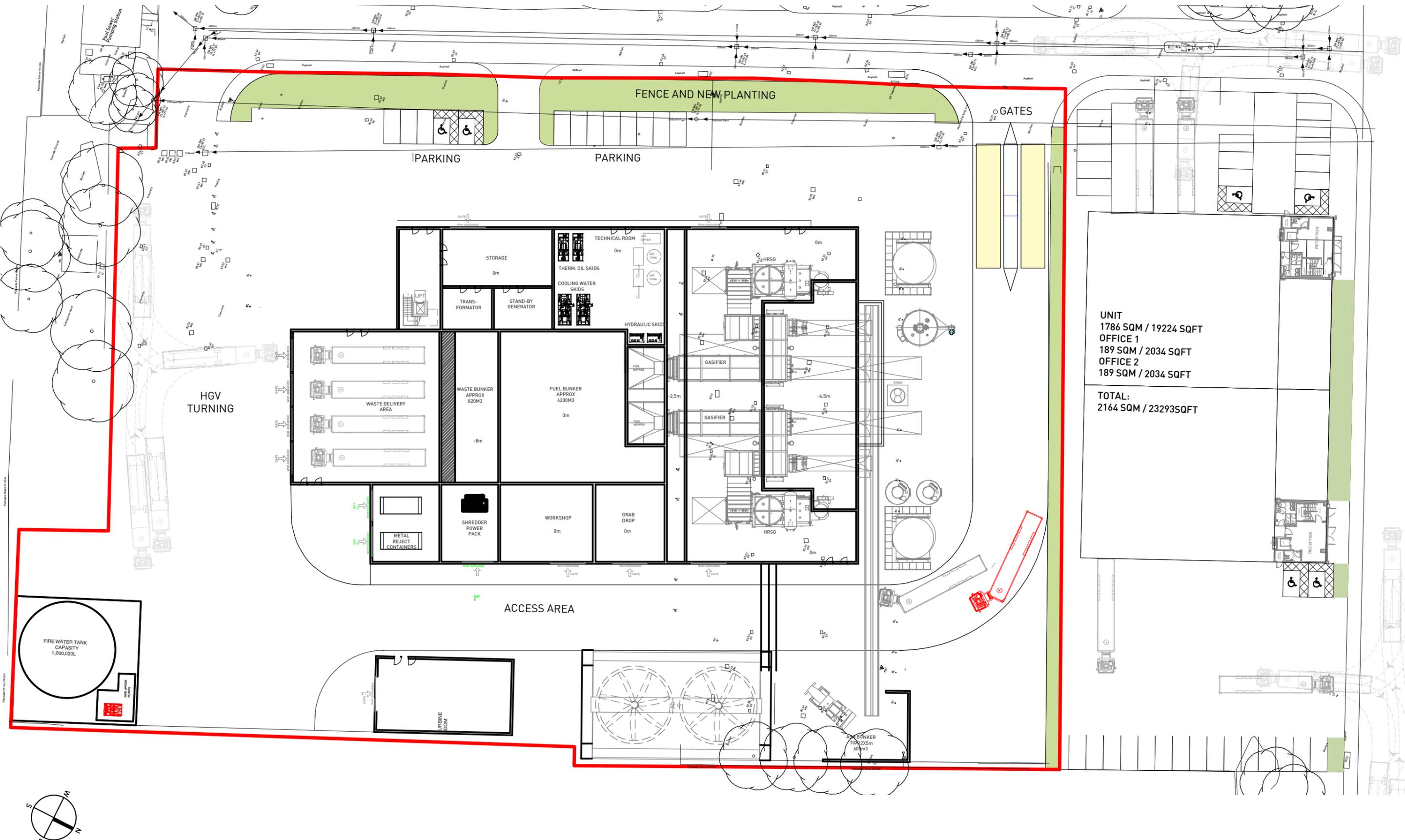


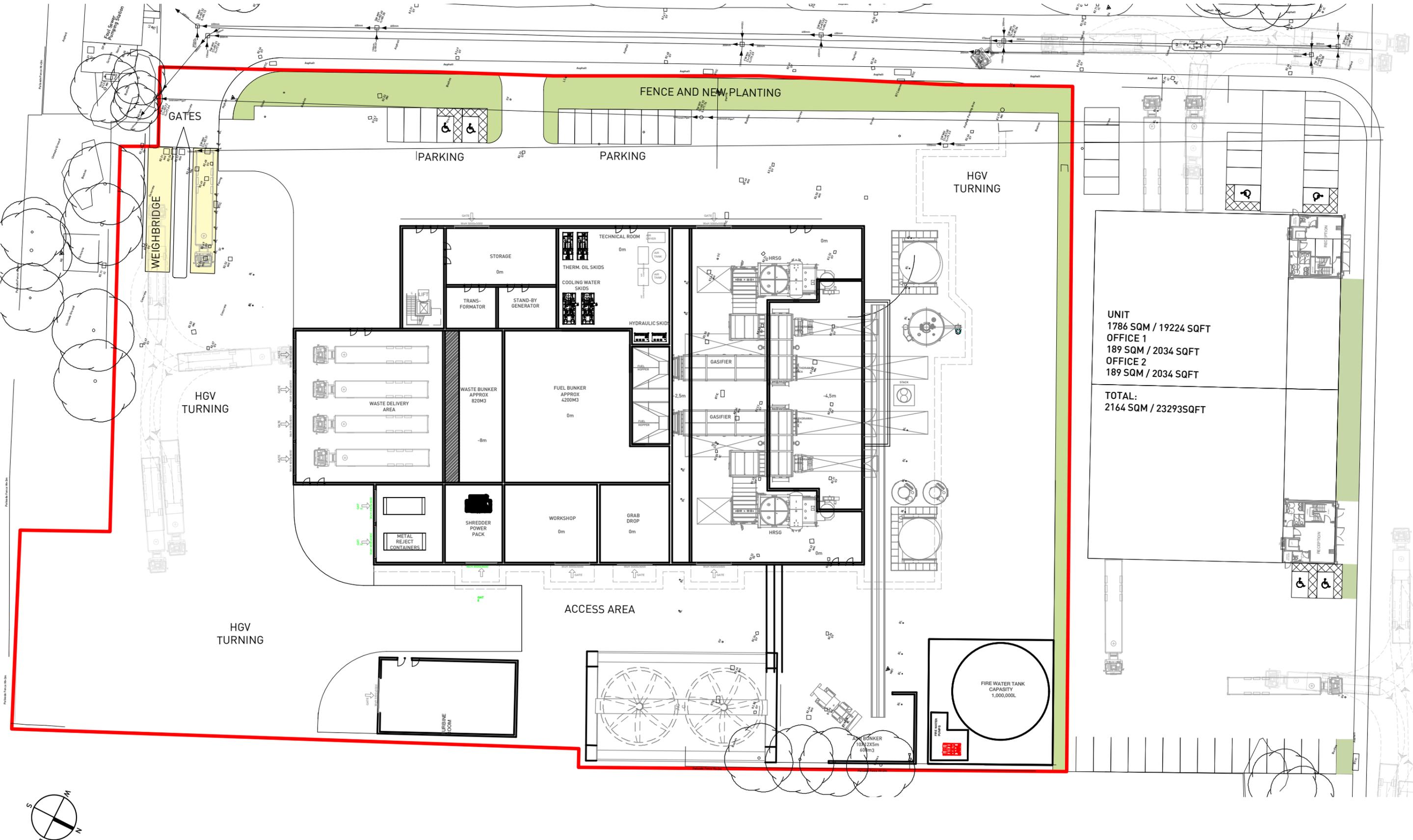
FIGURE 4.1b
Layout Option Drawing

DRWG No: **K.0168_03** REV: **B** Sheet No: **2**

Date: 21/07/2015

Scale: 1:500

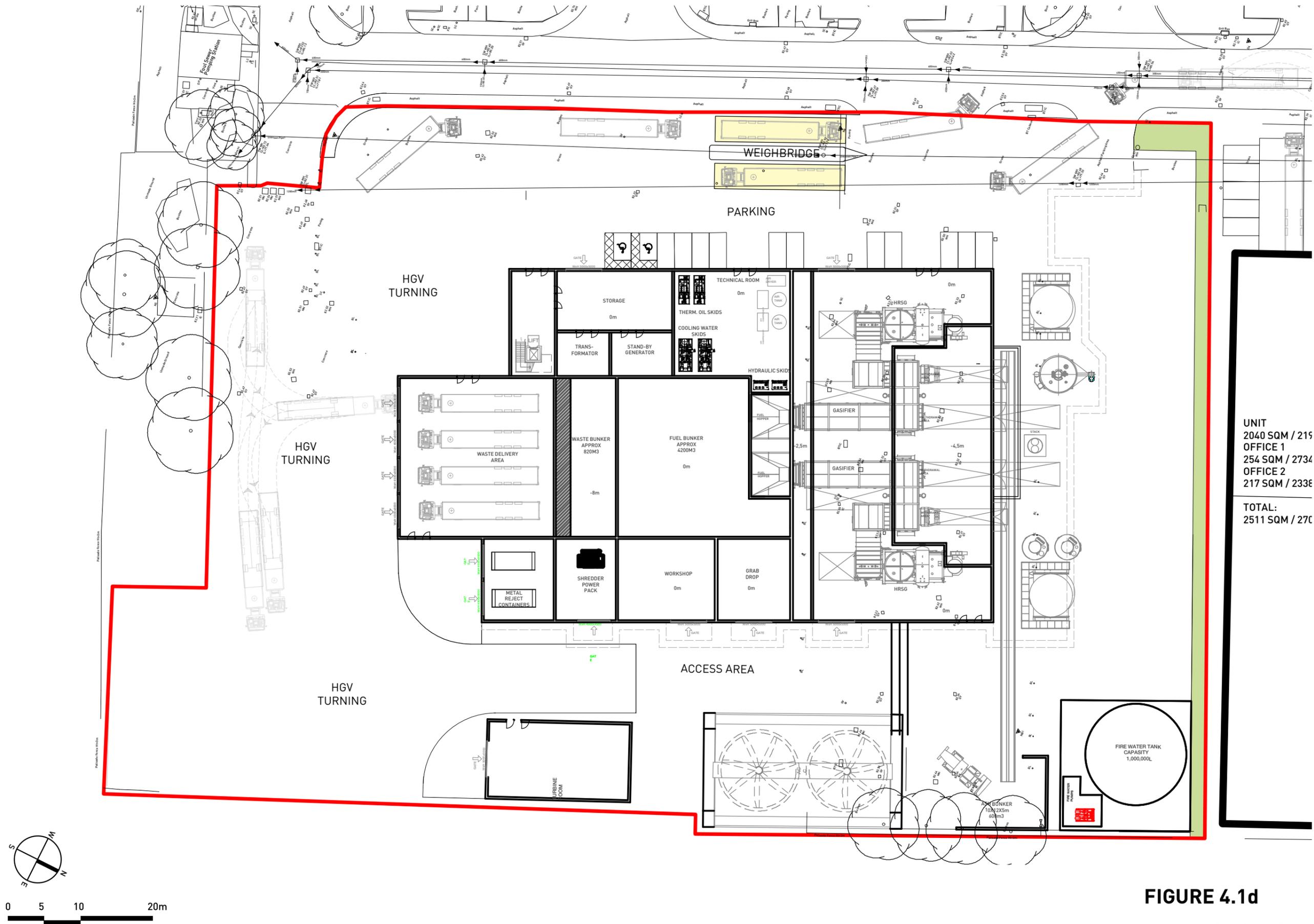
@ A3



UNIT	1786 SQM / 19224 SQFT
OFFICE 1	189 SQM / 2034 SQFT
OFFICE 2	189 SQM / 2034 SQFT
TOTAL:	2164 SQM / 23293SQFT

FIGURE 4.1c
Layout Option Drawing

DRWG No: **K.0168_03** REV: **B-3**
 Date: 21/07/2015
 Scale: 1:500 @ A3



UNIT	2040 SQM / 215
OFFICE 1	254 SQM / 2734
OFFICE 2	217 SQM / 233E
TOTAL:	2511 SQM / 27C

FIGURE 4.1d
Layout Option Drawing

DRWG No: **K.0168_03** REV: **A-4**

Date: 21/07/2015

Scale: 1:500

@ A3



EAST ELEVATION

NORTH ELEVATION



WEST ELEVATION

SOUTH ELEVATION

MATERIALS PALETTE

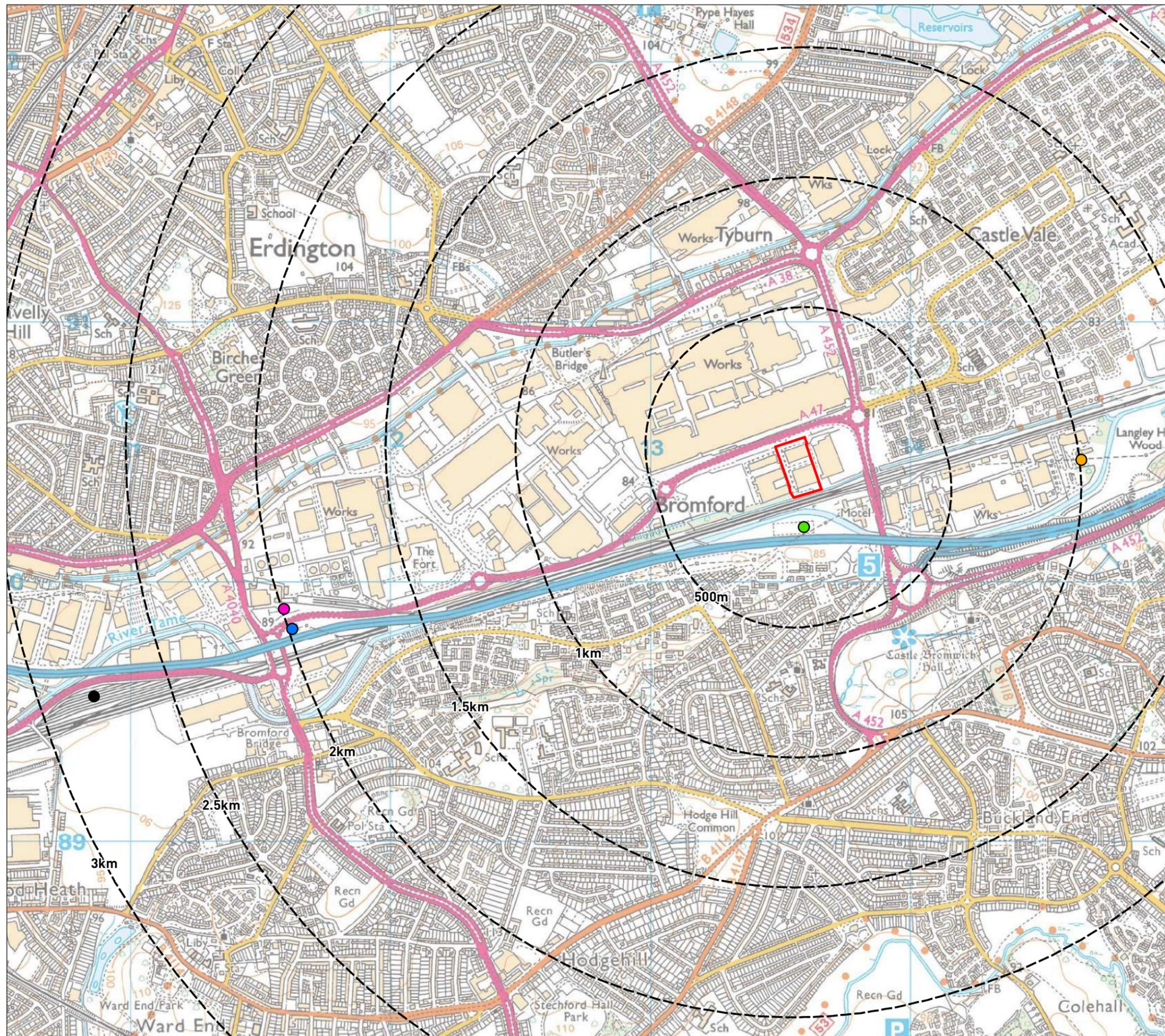


EXTERNAL METALLIC RAINSCREEN CLADDING ENGINEERING BRICK BASE ROLLER SHUTTER DOORS BRISE SOLEIL ALUMINIUM WINDOWS/DOORS ROOF VENTILATION TURRETS



FIGURE 4.2
Elevation Option Drawings

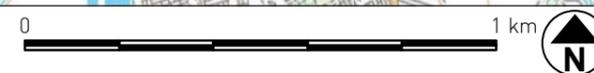
DRWG No: **K.0168_05** REV: **A**
Date: 08/09/2015
Scale: 1:500 @ A3



- KEY**
- Site Boundary
 - 64307005 - Public Waste Disposal Facility
 - 2002/04647/PA - Green Waste Recycling Facility
 - 2009/03827/PA - Extension to Green Waste Recycling Facility
 - 2012/05409/PA - Anerobic Digestion and Pyrolysis Energy Plant
 - 2014/02762/PA - Aggregate Recycling Facility

FIGURE 4.3
Cumulative Sites Plan

DRWG No: **K.0168_14** REV: -
 Date: 06/10/2015
 Scale: 1:15,000 @ A3



1 Background, Introduction & Context

2 Site Description

3 Development Proposals

4 Need & Alternatives

5 Air Quality

6 Townscape & Visual

7 Traffic & Transportation

8 Hydrology & Flood Risk

9 Hydrogeology & Ground Conditions

10 Noise & Vibration

11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

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5 AIR QUALITY

5.1 Introduction

5.1.1 This chapter sets out the air quality assessment for the Proposed Development and primarily focusses on the potential air quality impacts associated with emissions from the stack at the proposed Renewable Energy Centre (REC). The assessment also considers the potential for air quality impacts as a result of dust emissions during construction (including demolition), as well as additional road traffic emissions and odour and bioaerosol emissions during operation.

5.1.2 The incineration, gasification and combustion of waste can give rise to emissions of a number of pollutants with the potential to lead to air quality impacts. These pollutants, which are listed below, form the focus of the assessment.

5.1.3 The pollutants covered in this assessment in terms of human health impacts are:

- nitrogen dioxide (NO₂);
- sulphur dioxide (SO₂);
- fine airborne particulate matter (PM₁₀ and PM_{2.5});
- carbon monoxide (CO);
- hydrogen chloride (HCl);
- hydrogen fluoride (HF);
- Volatile Organic Compounds (VOCs);
- ammonia (NH₃);
- dioxins and furans; and
- the following trace metals:
 - cadmium (Cd);
 - thallium (TI);
 - mercury (Hg);
 - antimony (Sb);
 - arsenic (As);
 - lead (Pb);
 - chromium (Cr);
 - copper (Cu);
 - manganese (Mn);
 - nickel (Ni); and
 - vanadium (V).

5.1.4 In addition, there is a Local Nature Reserve within 2 km of the site. The relevant pollutants with the potential to affect sensitive ecosystems are:

- nitrogen oxides (NO_x);
- ammonia (NH₃);
- sulphur dioxide (SO₂);
- hydrogen fluoride (HF);
- nutrient nitrogen deposition (which is contributed to by nitrogen oxides and ammonia emissions); and
- acid deposition (which is contributed to by nitrogen oxides, ammonia, sulphur dioxide, and hydrogen chloride emissions).

5.1.5 In terms of road traffic emissions, the primary pollutants of concern are nitrogen dioxide and fine particulate matter (PM₁₀ and PM_{2.5}). During construction, concern will be focussed on dust and particulate matter (PM₁₀) emissions. Waste handling during operation could potentially lead to emissions of bioaerosols and odour.

5.1.6 **Appendix 5.1** provides references and **Appendix 5.2** a glossary.

5.2 Assessment Approach

Methodology

Assessment Criteria

Criteria to Protect Human Health

5.2.1 Table 5.1 defines the assessment criteria for human health used in this study. The UK Government's Air Quality Objectives for nitrogen dioxide and PM₁₀ were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The PM_{2.5} objective is to be achieved by 2020. The UK objectives for nitrogen dioxide, PM₁₀ and PM_{2.5} are the same as the EU limit values. The EU limit value for PM_{2.5} is the same as the UK objective, but is to be met by 2015.

Table 5.1: Relevant Air Quality Objectives and Environmental Assessment Levels (EALs) for the Protection of Human Health

Pollutant	Averaging Period	Concentration (µg/m ³)	Number of Periods Allowed to Exceed per Year	AQO *
Nitrogen dioxide	Annual	40	n/a	X
	1 hour	200	18	X
PM ₁₀	Annual	40	n/a	X
	24 hours	50	35	X
PM _{2.5} ^a	Annual	25	n/a	X
SO ₂	24 hours	125	3	X
	1 hour	350	24	X

ENVIRONMENTAL STATEMENT

AIR QUALITY

Pollutant	Averaging Period	Concentration (µg/m³)	Number of Periods Allowed to Exceed per Year	AQO *
	15 minutes	266	35	X
CO	8 hour rolling mean	10 (mg/m ³)	n/a	X
HF	Annual	16	n/a	
	1 hour	160	n/a	
HCl	Annual mean	20 ^c		
	1 hour	750	n/a	
Benzene	Running annual mean	16.25	n/a	X
	Annual mean	5	n/a	X
1,3-butadiene	Annual Mean	2.25 ^b	n/a	
Dimethyl sulphate	1 hour	15.6 ^b	n/a	
Cadmium	Annual	0.005	n/a	X
Thallium	Annual	1 ^c	n/a	
	1hour	30 ^c	n/a	
Mercury	Annual	0.25	n/a	
	1hour	7.5	n/a	
Antimony	Annual	5	n/a	
	1hour	150	n/a	
Arsenic	Annual	0.003	n/a	
Chromium (III)	Annual	5	n/a	
	1hour	150	n/a	
Chromium (VI)	Annual	0.0002	n/a	
	1hour	15 ^c	n/a	
Cobalt	Annual	1 ^c	n/a	
	1hour	30 ^c	n/a	
Copper	Annual	10	n/a	
	1hour	200	n/a	

Pollutant	Averaging Period	Concentration ($\mu\text{g}/\text{m}^3$)	Number of Periods Allowed to Exceed per Year	AQO *
Lead	Annual	0.25	n/a	X
Manganese	Annual	0.15	n/a	
	1hour	1,500	n/a	
Nickel	Annual	0.02	n/a	X
Vanadium	Annual	5	n/a	

* Those EALs which have the status of an air quality objective are indicated in this column.

^a The PM_{2.5} objective, which is to be met by 2020, is not in the 2000 or 2002 Amendment Regulations and there is no requirement for local authorities to meet it. The EU limit value is the same, but is to be met by 2015.

^b TOCs are assessed against the EALs for benzene, 1,3-butadiene and dimethyl sulphate, since these are the most stringent EALs for any VOCs (See paragraph 5.2.4).

^c Long- and short-term EALs for thallium and cobalt, the long-term EAL for HCl and the short-term EAL for chromium (VI) has been calculated from the exposure limits in EH4024, and converted to the respective EAL using guidance in H1 (Environment Agency, 2010a).

5.2.2 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Where there is no air quality objective, the Environment Agency's EALs have been applied. Defra explains where the objectives apply in its Local Air Quality Management Technical Guidance (Defra, 2009). Annual mean objectives and EALs are considered to apply anywhere with residential exposure. The 24-hour objective for PM₁₀ is taken to apply at residential properties as well as the gardens of residential properties. The 1-hour mean objective for nitrogen dioxide, and those EALs for shorter time periods than the annual mean, are taken to apply anywhere where people may spend one hour or more (or fifteen minutes in the case of the 15-minute sulphur dioxide objective).

5.2.3 Where there is no EAL quoted in Environment Agency guidance, one has been derived from the Health and Safety Executive's workplace exposure limits (HSE, 2005). This applies to the short term EAL for chromium VI, and the short- and long-term EALs for thallium and cobalt.

5.2.4 The Industrial Emissions Directive (IED) (Directive 2010/75/EU of the European Parliament and the Council on industrial emissions) specifies a maximum emission of Total Organic Carbon (TOC). In order to assess the potential emissions of TOCs, a worst-case approach has been taken, assuming that all TOCs are Volatile Organic Compounds (VOCs), and that all VOCs are both benzene and 1,3 butadiene with respect to annual mean concentrations, and that all VOCs are dimethyl sulphate with respect to short-term EALs. This situation would not happen in practice and provides an extremely conservative assessment.

5.2.5 There are no assessment criteria for dioxins and furans. The World Health Organisation (WHO, 2000) provides an indicator of the air concentrations above which it considers it necessary to identify and control local emission sources; this value is 0.3 $\mu\text{g}/\text{m}^3$ (300 fg/m^3). In the absence of suitable criteria, the process contributions have been compared against the relevant background concentration, as well as the WHO indicator concentration for which it is considered necessary to identify and control emission sources.

5.2.6 Table 5.1 shows that 18 exceedences of 200 $\mu\text{g}/\text{m}^3$ as a 1-hour mean nitrogen dioxide concentration are allowed before the objective is exceeded. For a typical year with complete data capture, the 19th highest hour is represented by the 99.79th percentile of 1-hour mean concentrations. Thus, comparing the 99.79th percentile of 1-hour mean concentrations with the 200 $\mu\text{g}/\text{m}^3$ standard identifies whether the 1-hour mean nitrogen dioxide objective is exceeded. A similar approach is applied to assessing other short-term objectives with a permitted number of exceedences, as outlined in Table 5.2.

Table 5.2: Equivalent Percentiles to the Air Quality Objectives

Pollutant	Averaging Period	Permitted Exceedences	Equivalent Percentile
NO ₂	1 hour	18 per year	99.79 th
PM ₁₀	24 hour	35 per year	90.4 th
SO ₂	24 hour	3 per year	99.18 th
	1 hour	24 per year	99.7 th
	15 minute	35 per year	99.9 th

Criteria to Protect Ecological Sites

5.2.7 Objectives for the protection of vegetation and ecosystems have been set by the UK Government. These are based on the European Union limit values. The limit values and objectives only apply a) more than 20 km from an agglomeration (about 250,000 people), and b) more than 5 km from Part A industrial sources, motorways and built up areas of more than 5,000 people. These objectives and limit values do not, therefore, strictly apply within the study area, although Birmingham City Council and the Environment Agency require them to be considered. Critical levels and critical loads are the ambient concentrations and deposition fluxes below which significant harmful effects to sensitive ecosystems are unlikely to occur. The critical levels are set at the same concentrations as the objectives. Typically, the potential for exceedences of the critical levels and critical loads is considered in the context of the level of protection afforded to the ecological site as a whole. For example, the level of protection afforded to an internationally-designated site (such as a SAC) is significantly greater than that afforded to a Local Nature Reserve, reflecting the relative sensitivity of the sites as well as their perceived ecological value.

5.2.8 The Air Pollution Information System (APIS) database (APIS, 2015) has been searched to obtain relevant critical levels and critical loads. Where APIS does not provide critical levels for a given pollutant, they have been taken from Table 7 of the EA's H1 guidance (Environment Agency, 2010a). Different critical loads are available for different habitats; and in the case of acidity, different locations. For the Plantsbrook Reservoirs Local Nature Reserve, the lowest nutrient nitrogen critical load for any habitat has been taken, as a worst-case. A site-specific critical load for acid deposition in a wood-pasture and parkland habitat published on the APIS database has been used. The relevant critical levels and critical loads are set out in Table 5.3. The approach currently recommended by APIS for assessing acid deposition only refers to nitrogen and sulphur. In order to account for the acidifying input from hydrogen chloride, the sum of nitrogen, sulphur and chlorine acidity has been assessed directly against the 'N_{max}' values from APIS. This provides a conservative assessment.

Table 5.3: Relevant Assessment Criteria for the Protection of Sensitive Ecosystems at the Plantsbrook Reservoirs Local Nature Reserve ^a

Pollutant	Averaging Period	Species/Habitat	EAL
NH ₃	Annual	All higher plants	3 µg/m ³
NO _x	Annual	All sensitive communities (but does not apply as an objective or limit value within the study area)	30 µg/m ³
	24 hour	All sensitive communities	75 µg/m ³
SO ₂	24 hour	All higher plants	20 µg/m ³
HF	1 hour	All sensitive communities	5 µg/m ³
	15 minute	All sensitive communities	0.5 µg/m ³
Nutrient Nitrogen Deposition Critical Loads	Annual	Plantsbrook Reservoirs Local Nature Reserve	5 kg-N/ha/yr
Acid Deposition Critical Load (N _{max}) ^b	Annual	Plantsbrook Reservoirs Local Nature Reserve	1.8 keq/ha/yr

^a Taken from the Air Pollution Information System (APIS) database (APIS, 2014) and from Table B4 of the EA's H1 Guidance Document (Environment Agency, 2010a).

^b APIS advises that where the total acid nitrogen deposition is greater than the N_{min}, the sum of acid nitrogen and sulphur deposition should be compared against the N_{max} value. In this assessment, the sum of acid nitrogen, sulphur and chlorine deposition has been compared with the N_{max} value. This is more conservative than the approach recommended by APIS.

Screening and Descriptive Criteria

Criteria Issued by the Environment Agency

5.2.9 The Environment Agency has adopted criteria (Environment Agency, 2010a) that allow health-related process contributions ('PC') to be screened out as insignificant regardless of the baseline environmental conditions. The emissions from a process can be considered to be insignificant if:

- the long-term (annual mean) process contribution is <1% of the long-term environmental standard; and
- the short-term (24-hour mean or shorter) process contribution is <10% of the short-term environmental standard.

5.2.10 It should be recognised that these criteria determine when an effect can be screened out as insignificant. They do not imply that effects will necessarily be significant above these levels, but that above these levels there is a potential for significant effects that should be assessed using a detailed assessment methodology, such as detailed

dispersion modelling (as has been carried out for this project in any event), and taking into account background concentrations.

5.2.11 In terms of the potential for ecological impacts on local (as opposed to national or European) wildlife sites, the Environment Agency discounts as insignificant any impacts where the Process Contribution is less than 100% of the long-term or short-term environmental standard (Environment Agency, 2013).

Environmental Protection UK and Institute of Air Quality Management Criteria

5.2.12 While the Environment Agency's criteria may be more relevant to this proposed development, given that the site will be permitted and regulated by the Environment Agency, consideration has also been given to the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance document aimed specifically at planning applications.

5.2.13 The approach developed jointly by EPUK & IAQM (2015), as described in **Appendix 5.3**, is that any change in concentration smaller than 0.5% of the long-term environmental standard will be negligible, regardless of the existing air quality conditions. Where the change in concentration represents more than 0.5% of the standard, existing conditions are taken into consideration when describing the impacts. This is more stringent than the Environment Agency screening criterion of 1% set out above. With respect to changes in short-term concentrations, the guidance explains that:

"Where peak short term concentrations (those averaged over periods of an hour or less) from an elevated source are in the range 10-20% of the relevant Air Quality Assessment Level (AQAL), then their magnitude can be described as small, those in the range 20-50% medium and those above 50% as large. These are the maximum concentrations experienced in any year and the severity of this impact can be described as slight, moderate and substantial respectively, without the need to reference background or baseline concentrations. In most cases, the assessment of impact severity for a proposed development will be governed by the long-term exposure experienced by receptors and it will not be a necessity to define the significance of effects by reference to short-term impacts. The severity of the impact will be substantial when there is a risk that the relevant AQAL for short-term concentrations is approached through the presence of the new source, taking into account the contribution of other local sources".

Approach Used in Assessment

5.2.14 As a first step, the assessment has considered the predicted process contributions using the following criteria:

- is the long-term (annual mean) process contribution less than 0.5% of the long-term environmental standard?; and
- is the short-term (24-hour mean or shorter) process contribution less than 10% of the short-term environmental standard?

5.2.15 Where both of these criteria are met, then the impacts are negligible and thus insignificant. Where these criteria are breached then a more detailed assessment, considering total concentrations, has been undertaken.

Construction Dust Criteria

5.2.16 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management¹ (2014a) has been used. Full details of this approach are provided in **Appendix 5.4**.

Odour Criteria

5.2.17 There are currently no statutory standards in the UK covering the release and subsequent impacts of odours. This is due to complexities involved with measuring and assessing odours against compliance criteria, and the inherently subjective nature of odours.

5.2.18 It is recognised that odours have the potential to pose a nuisance for residents living near to an offensive source of odour. Determination of whether or not an odour constitutes a statutory nuisance in these cases is usually the responsibility of the local planning authority or the Environment Agency. The Environmental Protection Act 1990 (HMSO, 1990) outlines that a local authority can require measures to be taken where any:

“dust, steam, smell or other effluvia arising on an industrial, trade and business premises and being prejudicial to health or a nuisance...” or

“fumes or gases are emitted from premises so as to be prejudicial to health or cause a nuisance”.

5.2.19 Odour can also be controlled under the Statutory Nuisance provisions of Part III of the Environmental Protection Act.

Bioaerosol Criteria

5.2.20 There is currently no guidance relevant to bioaerosol releases from the storage, disposal or thermal treatment of refuse derived fuel (RDF). All current guidance in the UK relates to composting activities, which have a much greater propensity for bioaerosol production than would be expected from RDF.

5.2.21 In 2001, the Environment Agency commissioned a study into the health effects of composting which included close examination of bioaerosols (Environment Agency, 2001). The study examined three major UK composting sites at which bioaerosol monitoring was undertaken for a number of sources at each site during visits at different times of year. The monitoring provided information on the concentration of bioaerosols, measured in colony forming units per cubic metre of air (cfu/m³), and the reduction in concentrations with distance from the source brought about by the dilution and dispersion of microorganisms during transport in air.

5.2.22 The study set out the following threshold limit values for short-term non-occupational exposure to bioaerosols:

- Bacteria = 1000 cfu/m³;
- Fungi – 1000 cfu/m³; and
- Gram-negative Bacteria – 300 cfu/m³.

5.2.23 Although these limit values were not supported by significant scientific evidence, they were accepted as being a conservative estimate of “safe” levels of exposure.

¹ The IAQM is the professional body for air quality practitioners in the UK.

5.2.24 In addition, an Environment Agency position statement on the health effects of bioaerosols from composting (Environment Agency, 2010b) states that bioaerosol concentrations “generally decline to background levels within 250 m” of composting activities. This statement was based on general consensus at the time of publication.

5.2.25 Until new, industry-specific guidance is released, the information and guidance available on bioaerosols from composting remains the only available guidance relating to bioaerosols that is applicable to the waste industry. However, it must be remembered that composting activities will have a much greater propensity for bioaerosol production than would be expected from the handling of RDF.

Approach- Existing Conditions

5.2.26 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority and by Defra. The background concentrations across the study area have also been defined using the national pollution maps published by Defra (2015a), adjusted to local background monitoring data. These cover the whole country on a 1x1 km grid. Further information about background concentrations can be found in **Appendix 5.5**.

Approach- Stack Emissions

Study Area

5.2.27 The study area for consideration of the health impacts of emissions from the stack covers a number of specific receptors and a 2km x 2km area, centred on the proposed development.

5.2.28 The Environment Agency requires an assessment of the impacts of facilities such as this on European ecological sites (SPAs, SACs etc) within 10 km of the facility, of which there are none, and on national and local ecological sites within 2 km of the facility (Environment Agency, 2010a). The only relevant site is the Plantsbrook Reservoirs Local Nature Reserve, which is located approximately 1.6 km north of the proposed development.

Modelling Impacts from the Proposed REC

5.2.29 The impacts of emissions from the proposed REC have been modelled using the ADMS-5.1 dispersion model. ADMS-5.1 is a new generation model that incorporates a state-of-the-art understanding of the dispersion processes within the atmospheric boundary layer.

Receptors

5.2.30 Impacts have been predicted at a number of specific sensitive receptor locations, as well as over a Cartesian grid centred on the Proposed Development. The discrete human and ecological receptors used in the modelling are shown in **Figure 5.1**. The long-term (e.g. annual mean) objectives apply at receptors 1 to 46, while at receptors A to P only the short-term objectives apply. Receptors 1 to 46 have been modelled at heights of 1.5 and 4.5 m to represent ground and first-floor exposure. Receptors A to P (where there is only ground-level exposure) have all been modelled at a height of 1.5 m, while receptor I has also been modelled at heights 4.5 m, 7.5 m, 10.5 m and 13.5 m to represent the first to fourth floors of this hotel building. Receptors 47 to 49 represent the Plantsbrook Reservoirs Local Nature Reserve, and have been modelled at heights of 0 m and 1.5 m. Wherever multiple heights have been modelled, the maximum process contribution at any height at that receptor has been used throughout this assessment.

5.2.31 Impacts have also been predicted across a 2km by 2km square grid, centred on the Proposed Development, with receptors spaced 50m apart across this grid. These receptors have been modelled at a height of 1.5m, to represent ground-level human exposure. The gridded receptors, along with the sensitive receptors that fall within this grid, are shown in **Figure 5.2**.

Meteorology

5.2.32 Five years of hourly-sequential meteorological data (2010 to 2014 inclusive) from Birmingham Airport have been used. Appendix 5.6 provides a wind-rose for each meteorological dataset, and outlines the other meteorological parameters used in the model (such as surface roughness etc.). The maximum predicted process contribution during any year has been reported in the results section of this report.

Building Wake Effects

5.2.33 ADMS-5 has the ability to simulate the entrainment of exhaust plumes into the wake of nearby buildings. In order to ensure that the worst-case building configuration was covered, modelling has been carried out for two scenarios: 1) no buildings included in the model; 2) The main REC building included in the model. **Figure 5.3** shows the building modelled. The maximum predicted concentrations from the two scenarios have been used throughout this assessment.

Terrain Effects

5.2.34 In order to ensure that the impacts of terrain on dispersion are considered, the model has also been run both with and without terrain effects, and the maximum predicted concentrations from any of the scenarios have been used throughout this assessment.

Emissions

5.2.35 The operator has provided data on efflux volumes in Nm^3/s^2 , as well as stack dimensions (there will be two flues of 1 m diameter each within the stack) and the actual release conditions. The information provided by the operator, along with the actual release parameters calculated are set out in Table 5.4. The pollutant emission rates used in the assessment are derived from IED limits, which are set out in Table 5.5. Table 5.6 shows the emission rates entered into the dispersion model (to two significant figures).

Table 5.4: Emission Parameters for the Proposed REC (2 Flues Combined)

Stack Parameter	Value ^b
Exit Velocity (m/s)	21.1
Normalised ² Volume Flow Rate (Nm^3/s) ^a	21.1
Actual Volume Flow Rate (m^3/s) ^a	26.9
Moisture by volume (%)	15.6
Exhaust Temperature ($^{\circ}\text{C}$)	140
Oxygen by dry volume (%)	7
Equivalent Stack Internal Diameter (m)	1.273

² Throughout this report, 'normal' is used to refer to conditions recorded in the absence of moisture, at 11% oxygen, and at 0 degrees Celsius. These are the reference conditions at which the relevant IED emissions limits are expressed.

Stack Height Above Ground-Level (m)	55.0
Stack Location (O.S. x,y)	413617,290420

^a this is the combined efflux rate from the two flues within the stack.

^b rounded numbers are presented here but unrounded numbers were input into the model.

Table 5.5: Air Emission Limit Values

Pollutant	Emissions Averaging Period ^a	Emissions (mg/Nm ³)
Nitrogen Oxides	½ hour average	400
	daily average	200
PM ₁₀	½ hour average	30
	daily average	10
SO ₂	½ hour average	200
	daily average	50
CO	½ hour average	100
	daily average	50
TOC	½ hour average	20
	daily average	10
HCl	½ hour average	60
	daily average	10
HF	½ hour average	4
	daily average	1
Cd and TI	periodic over minimum ½ hour and maximum 8 hours	0.05
Hg	periodic over minimum ½ hour and maximum 8 hours	0.05
Group III metals ^b	periodic over minimum ½ hour and maximum 8 hours	0.5
NH ₃	½ hour average and daily average	10
Dioxins and furans	periodic over minimum 6 hours and maximum 8 hours	0.0000001

^a i.e. the averaging period over which emissions will be measured.

^b Sb + As + Pb + Cr + Co + Cu + Mn + Ni + V

Table 5.6: Modelled Emission Rates (2 Flues Combined)

Pollutant	Concentration Averaging Period ^a	Emissions (g/s) ^b
Nitrogen Oxides	1-hour mean	4.2
	24-hour mean	2.1
	annual mean	2.1 ^c
PM ₁₀	24-hour mean	0.32
	annual mean	0.11
SO ₂	1-hour and 15-minute means	2.1
	annual mean	0.53
CO	rolling 8-hour mean	1.1
TOC	1-hour mean	0.21
	annual mean	0.11
HCl	1-hour mean	0.63
	annual mean	0.11
HF	1-hour mean	0.042
	24-hour and weekly means	0.011
Cd and TI	annual mean	0.00053
Hg	1-hour mean	0.00053
	annual mean	
Group III metals	1-hour mean	0.0053
	annual mean	
NH ₃	1-hour mean	0.11
	annual mean	
Dioxins and furans	Annual mean	0.000000011

^a i.e. the averaging periods set in the air quality objectives and EALs over which concentrations have been predicted.

^b rounded numbers (to two significant figures) are presented here but unrounded numbers were input into the model.

^c This is based on the 200 mg/Nm³ IED limit. A NO_x emission rate of 150 mg/Nm³ has also been modelled, which equates to 1.6 g/s – see paragraph 5.4.25.

5.2.36 For most of the group III metals shown in Table 5.6, when assessing against each of the EALs for each metal in turn, it has been assumed that the total group III metals emission rate is made up entirely of that metal. This is a worst-case approach. In the case of chromium VI, it is not possible to screen out the potential for significant impacts using this method. Therefore, for chromium VI, the more detailed approach set out by the Environment Agency in its Interim Guidance Note for Metals (Environment Agency, 2012) has been used. This includes three steps, with each subsequent step assuming that

chromium VI makes up a successively smaller proportion of total group III metal emissions. Step 3 of the Environment Agency guidance includes some typical emission concentrations for energy from waste plant as set out below:

- mean 0.000035 mg/Nm³;
- minimum 0.000023 mg/Nm³; and
- maximum 0.00013 mg/Nm³.

5.2.37 It is considered that, given the similarity of the proposed facility and its fuel source to those included in the Environment Agency guidance, it is appropriate to use the emission concentrations set out above for chromium VI. The amended mass emission rates for chromium VI from the proposed facility are:

- mean 0.00000037 g/s;
- minimum 0.00000024 g/s; and
- maximum 0.0000014 g/s.

5.2.38 These amended emission rates have been used later in this assessment (See Section 5.4 – Assessment of Likely Significant Effects).

Post-Processing

5.2.39 ADMS-5 has been run to predict the contribution of the proposed facility to annual mean concentrations of the pollutants for which there are annual mean objectives and EALs in Table 5.1, as well as to the 99.79th percentile of 1-hour mean nitrogen oxides concentrations, 90th percentile of 24-hour mean PM₁₀ concentrations, 99.7th percentile of 1-hour mean sulphur dioxide concentrations, 99.9th percentile of 15-minute sulphur dioxide concentrations and 99.18th percentile of 24-hour mean sulphur dioxide concentrations.

5.2.40 The model has been run using the ADMS chemistry module to directly predict the contribution of the Proposed Development to nitrogen dioxide concentrations. To take account of the chemistry in the plume, background concentrations of nitrogen oxides, nitrogen dioxide and ozone have been taken from the rural background Aston Hill site, which forms part of the Automatic Urban and Rural Network (AURN), for 2010 to 2014. In order to determine the process contributions from the proposed plant, the model has been run once with a zero emission rate and once using the emissions shown in Table 5.6. The process contributions have then been calculated by taking the difference between the two scenarios.

5.2.41 The calculation of short-term nitrogen dioxide mean concentrations has been carried out on an hour-by-hour basis. The Aston Hill data have only been used to inform the chemistry routine, and as such, using a rural site (with relatively high ozone concentrations) provides a worst-case assessment. Where relevant, the process contributions to nitrogen dioxide concentrations derived using this method have been added to local background concentrations. Thus, the use of background data from Aston Hill should not be taken to imply that the local background concentrations have been underestimated.

5.2.42 Deposition of pollutants to ecosystems has not been calculated within the dispersion model. Instead, deposition has been calculated from the predicted ambient concentrations

using the following deposition velocities taken from AQTAG06 (Environment Agency, 2011a):

- NO₂ – 0.0015 m/s
- NH₃ – 0.03 m/s
- SO₂ – 0.024 m/s
- HCl – 0.025 m/s

5.2.43 The velocities are applied simply by multiplying a concentration ($\mu\text{g}/\text{m}^3$) by the velocity (m/s) to predict a deposition flux ($\mu\text{g}/\text{m}^2/\text{s}$). Subsequent calculations required to present the data as kg/ha/yr of nitrogen and as keq/ha/yr for acidity follow basic chemical and mathematical rules³.

Approach- Road Traffic Emissions

Impacts

5.2.44 The approach taken in this assessment has been to screen the potential changes in traffic flows as a result of the development against criteria set out in the EPUK & IAQM guidance (EPUK & IAQM, 2015). Where the change in flows as a result of the scheme is below the published screening criteria no further assessment is required. Detailed dispersion modelling is, however, necessary where there is a need to assess total concentrations at a receptor.

Study Area

5.2.45 The impacts of additional road traffic emissions generated as a result of the development have been screened out of the assessment (see paragraphs 5.4.15 to 5.4.18). The road traffic modelling has, therefore, focussed on the area of greatest impact from the stack emissions assessment, where it is necessary to calculate total nitrogen dioxide concentrations.

Modelling

5.2.46 Concentrations have been predicted using the ADMS-Roads dispersion model. Details of the model inputs and the model verification are provided in Appendix 5.5, together with the method used to derive current and future year background nitrogen dioxide concentrations. The air quality modelling has been carried out based on a number of necessary assumptions, detailed further in Appendix 5.5. The main variable for road traffic modelling is the traffic data on which the model is based. Where possible a realistic worst-case approach has been adopted.

Receptors

5.2.47 Impacts have been predicted at selected sensitive receptor locations where the impacts of the stack emissions are greatest, and total concentrations expected to be highest (receptors 20, 21, 22, 24, 25, 26 and 27). Receptors have been modelled at a height of 1.5 m, to represent worst-case ground level human exposure.

³ For example, 1 kg N/ha/yr = 0.071 keq/ha/yr

Approach- Construction Dust

5.2.48 The construction dust assessment considers the potential for impacts within 350m of the site boundary; or within 50m of roads used by construction vehicles. The assessment methodology is that provided by the IAQM (Institute of Air Quality Management, 2014a). This follows a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts. Appendix 5.4 explains the approach in more detail.

Approach- Odour

5.2.49 Odour impact assessment is a challenging and subjective science. There are a number of odour assessment methods and tools that have been developed which are widely used in the UK, including desk-based methods, such as complaints analysis and qualitative risk assessment, through to field odour testing (sniff testing) and dispersion modelling. Each has its advantages and disadvantages and not all assessment methods are appropriate in every case; for example, where a potentially odorous process is proposed rather than existing, then assessment methods such as sniff testing and odour sampling are less relevant than predictive methods such as odour risk assessment.

5.2.50 The approach to assessing the odour impacts from the proposed facility has been to utilise the qualitative risk-assessment approach described in the IAQM guidance on the assessment of odours for planning (IAQM, 2014b).

5.2.51 The odour risk assessment set out in the IAQM guidance follows a Source-Pathway-Receptor approach. This approach describes the concept that, in order for an odour impact (such as annoyance or nuisance) to occur, there must be a source of odour, a pathway to transport the odour to an off-site location, and a receptor (e.g. people) to be affected by the odour.

5.2.52 The risk of odour effects at a given receptor location may be estimated using the following fundamental relationship:

$$\text{Effect} \approx \text{Dose} \times \text{Response}$$

5.2.53 In this relationship, the **dose** is a measure of the likely exposure to odours, in other words the **impact**. The **response** is determined by the sensitivity of the receiving environment and thus the overall **effect** is the result of changes in odour exposure at specific receptors, taking into account their sensitivity to odours.

5.2.54 In order to determine the risk of potential odour effects from the REC, the 'FIDOR' factors for odour exposure have been used. These factors are commonly used in the assessment of odours and are outlined in the IAQM guidance, but are also described in the Environment Agency's H4 guidance document on odour management (Environment Agency, 2011b), as well as Defra's odour guidance for local authorities (Defra, 2010). The FIDOR factors are:

- Frequency – the frequency with which odours are detected;
- Intensity – the intensity of odours detected;

- **Duration** – the duration of exposure to detectable odours;
- **Offensiveness** – the level of pleasantness or unpleasantness of odours; and
- **Receptor** – the sensitivity of the location where odours are detected, and/or the proximity of odour releases to an odour-sensitive location.

5.2.55 Odour emissions from the proposed REC have been assigned a risk-ranking based on the “effect \approx dose x response” relationship, whereby the dose (impact) is determined by the “FIDO” part of FIDOR, and the response is determined by the “R” (receptor sensitivity). The risk of odour effects can therefore be described as:

$$\text{Effect} \approx \text{Impact (FIDO)} \times \text{Receptor Sensitivity (R)}$$

5.2.56 The key factors that will influence the effects of odours are the magnitude of the odour source(s), the effectiveness of the pathway for transporting odours, and the sensitivity of the receptor. The methodology set out in the IAQM guidance document describes in detail a Source-Pathway-Receptor approach to odour risk assessment, and includes tables and matrices to assist in determining the likely risk of odour effects. The IAQM methodology is outlined below. It includes an element of professional judgement.

5.2.57 The assessment examines the source odour potential (source magnitude) of the renewable energy centre, and then identifies the effectiveness of the pathway and receptor sensitivity at sensitive locations.

5.2.58 Table 5.7 describes the risk-rating criteria (high, medium and low) for source odour potential, pathway effectiveness and receptor sensitivity applied in this assessment. This table has been adapted from Table 8 in the IAQM odour guidance.

Table 5.7: Source-Pathway-Receptor Risk Ratings

Source Odour Potential	Pathway Effectiveness	Receptor Sensitivity
<p>Large Source Odour Potential:</p> <p>Large-scale odour source and/or a source with highly unpleasant odours (hedonic tone -2 to -4); no odour control.</p>	<p>Highly Effective Pathway:</p> <p>Very short distance between source and receptor; receptor downwind of source relative to prevailing wind; ground level releases; no obstacle between source and receptor.</p>	<p>High Sensitivity:</p> <p>Highly sensitive receptors e.g. residential properties and schools.</p>
<p>Medium Source Odour Potential:</p> <p>Medium-scale odour source and/or a source with moderately unpleasant odours (hedonic tone 0 to -2); basic odour controls.</p>	<p>Moderately Effective Pathway:</p> <p>Receptor is local to the source; releases are elevated, but compromised by building effects.</p>	<p>Medium Sensitivity:</p> <p>Moderately sensitive receptors e.g. commercial and retail premises, and recreation areas.</p>
<p>Small Source Odour Potential:</p> <p>Small-scale odour source and/or a source with pleasant odours (hedonic tone +4 – 0); best practise odour controls.</p>	<p>Ineffective Pathway:</p> <p>Long distance between source and receptor (>500 m); receptors upwind of source relative to prevailing wind; odour release from stack/high level.</p>	<p>Low Sensitivity:</p> <p>Receptors not sensitive e.g. industrial activities or farms.</p>

5.2.59 The risk ratings for source magnitude and pathway effectiveness (for each receptor) identified using the criteria in Table 5.7 are then combined using the matrix shown in Table 5.8 to estimate an overall risk of odour impact at each specific receptor location.

Table 5.8: Assessment of Risk of Odour Impact at a Specific Receptor Location

Pathway Effectiveness	Source Odour Potential (Source Magnitude)		
	Large	Medium	Small
Highly Effective	High Risk	Medium Risk	Low Risk
Moderately Effective	Medium Risk	Low Risk	Negligible Risk
Ineffective	Low Risk	Negligible Risk	Negligible Risk

5.2.60 The next stage of the risk assessment is to identify the potential odour effect at each receptor location. This is done using the matrix presented in Table 5.9, which combines the overall odour impact risk descriptor for each receptor with the receptor sensitivity determined using the criteria in Table 5.8.

Table 5.9: Assessment of Potential Odour Effect at a Specific Receptor Location

Risk of Odour Impact	Receptor Sensitivity		
	High	Medium	Low
High Risk	Substantial Adverse Effect	Moderate Adverse Effect	Slight Adverse Effect
Medium Risk	Moderate Adverse Effect	Slight Adverse Effect	Negligible Effect
Low Risk	Slight Adverse Effect	Negligible Effect	Negligible Effect
Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

5.2.61 As a final stage of assessment, an overall significance of odour effects is determined, based on professional judgment and taking into account the significance of effect at each specific receptor location.

Approach- Bioaerosols

5.2.62 A Qualitative approach has been taken to the bioaerosol assessment, based upon the likelihood of the generation of bioaerosols, the quantity likely to be generated, the potential for them to be released to the air outside of the facility, and the potential for such releases to lead to significant impacts at the nearest sensitive receptors.

Assessment of Significance

Construction Dust Significance

5.2.63 Guidance from the IAQM (Institute of Air Quality Management, 2014a) is that, with appropriate mitigation in place, the impacts of construction dust will be 'not significant'. The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that impacts will normally be 'not significant'.

Operational Air Quality Impact Significance

5.2.64 There is no official guidance in the UK on how to describe air quality impacts, nor how to assess their significance. While the Environment Agency's H1 guidance (Environment Agency, 2010a) does not set out a method of describing air quality impacts or determining how significant they are, it does set out screening criteria below which impacts can be considered insignificant (see paragraphs 5.2.9 and 5.2.10). These screening criteria have, therefore, been used in this assessment, along with the approach developed jointly by EPUK & IAQM (2015). The EPUK & IAQM approach includes defining descriptors of the impacts at individual receptors, which take account of the percentage change in concentrations relative to the relevant air quality objective, rounded to the nearest whole number, and the absolute concentration relative to the objective. The overall significance of the air quality impacts is determined using professional judgement, taking account of the impact descriptors. Full details of the EPUK/IAQM approach are provided in Appendix 5.3. The approach includes elements of professional judgement, and the experience of the consultants preparing the assessment is set out in **Appendix 5.7**.

5.2.65 It is important to differentiate between the terms impact and effect with respect to the assessment of air quality. The term impact is used to describe a change in pollutant concentration at a specific location. The term effect is used to describe an environmental response resulting from an impact, or series of impacts. Within this chapter, the air quality assessment has used published guidance and criteria described in the following sections

to determine the likely air quality impacts at a number of sensitive locations. The potential significance of effects has then been determined by professional judgement, based on the frequency, duration and magnitude of predicted impacts and their relationship to appropriate air quality objectives.

Operational Odour & Bioaerosol Significance

5.2.66 The IAQM guidance document (IAQM, 2014b) is the only UK odour guidance document which contains a method for estimating the significance of potential odour impacts, and thus its methodology has been followed in determining the significance of potential odour impacts. There is no guidance that sets out how to determine the significance of bioaerosol impacts, thus a professional judgement has been made.

Policy Framework

European Legislation

European Framework Directive on Ambient Air Quality and Cleaner Air for Europe, 2008

5.2.67 The European Union has set limit values (concentrations which must not be exceeded) for a range of air pollutants. These limit values are set out in the EU Framework Directive (2008/50/EC, 2008). Achievement of these values is a national obligation and was required by 2010 for nitrogen dioxide and benzene, by 2005 for all other pollutants apart from PM_{2.5}, which was required by 2015.

Waste Framework Directive, 2008

5.2.68 The Waste Framework Directive (2008/98/EC, 2008) sets out the EU member state obligations for the planning, operation and management of waste sites and processes. With respect to air quality, the Directive states:

“Member States shall take the necessary measures to ensure that waste management is carried out without endangering human health, without harming the environment and, in particular:

without risk to water, air, soil, plants or animals;

without causing nuisance through noise or odours; and

without adversely affecting the countryside or places of special interest.”

European Industrial Emissions Directive, 2010

5.2.69 The Industrial Emissions Directive (IED) (2010/75/EU, 2010) brings together seven existing directives, including the Waste Incineration Directive, into one piece of legislation. The IED sets total emission limit values (ELVs) for a number of pollutants typically emitted during waste incineration. These are nitrogen oxides, carbon monoxide, total dust, hydrogen chloride, hydrogen fluoride, sulphur dioxide, organic substances, trace metals, and dioxins and furans. The design and operation of all new waste incineration facilities must ensure compliance with the ELVs.

National Legislation

The Environmental Permitting Regulations in England and Wales, 2010

5.2.70 The Environmental Permitting Regulations (2010) sets the legislative background for environmental permitting in England and Wales. The Regulations include a

commitment to minimise emissions to air from permitted processes, and include obligations for compliance with all legislated emissions limits for permitted processes, including the IED emission limits for waste incineration processes.

The Environmental Permitting Regulations in England and Wales (Amendment) Regulations, 2013

5.2.71 The requirements of the IED were transposed into UK law on 27th February 2013 by the Environmental Permitting (England and Wales) (Amendment) Regulations (2013). These make any new installation seeking a permit after 28th February 2013 subject to the IED.

The Waste (England and Wales) Regulations 2011

5.2.72 The Waste Framework Directive (2008/98/EC, 2008) and its obligations, including those on air quality, are transposed in English law by The Waste (England and Wales) Regulations (2011).

The UK Air Quality Strategy, 2007

5.2.73 The Air Quality Strategy published by the Department for Environment, Food, and Rural Affairs (Defra) provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment (Defra, 2007). The 'standards' are set as pollutant concentrations below which health effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale.

5.2.74 The Strategy also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives (AQO). Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Clean Air Act 1993 & Environmental Protection Act

5.2.75 Small combustion plant of less than 20MW net rated thermal input are controlled under the Clean Air Act 1993 (HMSO, 1993a). This requires the local authority to approve the chimney height. Plant which are smaller than 366kW have no such requirement. The local authority's approval will, therefore, be required for this facility.

5.2.76 Measures to ensure adequate dispersion of emissions from discharging stacks and vents are included in Technical Guidance Note D1 (Dispersion) (HMSO, 1993b), issued in support of the Environmental Protection Act (HMSO, 1990).

Air Quality (England) Regulations, 2000 and Air Quality (England) (Amendment) Regulations 2002

5.2.77 These Regulations define the air quality objectives for the Local Air Quality Management (LAQM) Regime.

Air Quality Standards Regulations, 2010

5.2.78 The air quality limit values set out in EU Directive (2008/50/EC, 2008) are transposed in English law by the Air Quality Standards Regulations (2010). These impose duties on the Secretary of State relating to achieving the limit values.

National Policies to Protect Ecosystems

5.2.79 The Environment Act (1995) and the Natural Environment and Rural Communities Act (2006) both require the conservation of biodiversity. National planning policy on biodiversity and conservation is set out in the NPPF (National Planning Policy Framework, 2012). This emphasises that the planning system should seek to minimise impacts on biodiversity and provide net gains in biodiversity wherever possible as part of the Government's commitment to halting declines in biodiversity and establishing coherent and resilient ecological networks.

5.2.80 Local planning authorities should set criteria based policies against which proposals for any development on or affecting protected wildlife sites will be judged, making distinctions between different levels of site designation. If significant harm from a development cannot be prevented, adequately mitigated against, or compensated for, then planning permission should be refused.

*National Planning Policy**National Planning Policy Framework, 2012*

5.2.81 The National Planning Policy Framework (NPPF) (2012) sets out planning policy for the UK. It replaces previous Planning Policy Statements, including PPS23 on Planning and Pollution Control.

5.2.82 The NPPF contains advice on when air quality should be a material consideration in development control decisions. Existing, and likely future, air quality should be taken into account, as well as the EU limit values or national objectives for pollutants, the presence of any AQMAs and the appropriateness of both the development for the site, and the site for the development.

5.2.83 The NPPF places a general presumption in favour of sustainable development, stressing the importance of local development plans, and states that the planning system should perform an environmental role to minimise pollution. One of the twelve core planning principles notes that planning should "*contribute to...reducing pollution*". To prevent unacceptable risks from air pollution, planning decisions should ensure that new development is appropriate for its location. The NPPF states that the effects of pollution on health, and the sensitivity of the area and the development, should be taken into account.

5.2.84 The need for compliance with any statutory air quality limit values and objectives is stressed, and the presence of AQMAs must be accounted for in terms of the cumulative effects on air quality from individual sites in local areas. New developments in AQMAs should be consistent with local air quality action plans.

5.2.85 The NPPF also sets out the national planning policy on biodiversity and conservation. This emphasises that the planning system should seek to minimise effects on biodiversity and provide net gains in biodiversity wherever possible as part of the Government's commitment to halting declines in biodiversity and establishing coherent and resilient ecological networks.

Local Planning Policy*Birmingham Development Plan*

5.2.86 The Draft Birmingham Development Plan (Birmingham City Council, 2013) sets out the statutory framework to guide decisions on development and regeneration in Birmingham up to 2031. Policies relevant to energy from waste plant along with relevant saved policies from the Birmingham Unitary Development Plan 2005 (Birmingham City Council, 2005) have been summarised in the Planning Statement which accompanies this ES and forms part of the planning application.

Air Quality Action Plan, 2011

5.2.87 In 2004 the whole of Birmingham City was declared an AQMA for exceedences of the nitrogen dioxide and PM₁₀ objectives. In 2011 the Council produced an Air Quality Management Plan (Birmingham City Council, 2011) for the improvement of air quality within the city. The plan includes actions for the control of industry and emissions from chimneys, but these are not particularly detailed, simply stating that the Council will continue to strictly regulate industrial processes in the city and enforce the provisions of the Clean Air Act.

Guidance Notes*Environment Agency H1 Environmental Risk Assessment Guidance Note, 2010*

5.2.88 The Environment Agency's H1 Environmental Risk Assessment Guidance Note (2010a) provides methods for quantifying the environmental effects of emissions to all media; Annex F of H1 covers Emissions to Air. It contains long- and short-term Environment Assessment Levels (EALs) for releases to air derived from a number of published UK and international sources.

5.2.89 In addition, the Environment Agency's Interim Guidance Note for Metals provides guidance for applicants for environmental permits, on how to consider the air quality effects from Group III metals in stack emissions from incineration and co-incineration plant (Environment Agency, 2012).

Health and Safety Executive, Workplace Exposure Limits, 2005

5.2.90 The Health and Safety Executive's EH40/2005 Workplace exposure limits (HSE, 2005) document contains a list of the workplace exposure limits for substances hazardous to health. For pollutants assessed in this report which have no AQO or EALs, the occupational exposure emissions limits in EH40 have been used, following the advice set out in the EA's H1 guidance.

Odour Guidance*Defra Guidance*

5.2.91 Defra released Odour Guidance for Local Authorities in March 2010 (Defra, 2010). This is a reference document aimed at environmental health practitioners and other

professionals engaged in preventing, investigating and managing odours. The purpose of the guide is:

“...to support local authorities in their regulatory roles in preventing, regulating and controlling odours...”

5.2.92 The guidance outlines tools and methods which may be employed by environmental health practitioners in determining whether there is a statutory nuisance from odours; it covers the fundamentals of odours, the legal framework, assessment methods, mitigation measures and intervention strategies which may be adopted.

Environment Agency Guidance

5.2.93 The Environment Agency has produced a horizontal guidance note (H4) on odour assessment and management (Environment Agency, 2011b), which is designed for operators of Environment Agency-regulated processes (i.e., those which classify as Part A(1) processes under the Pollution Prevention and Control (PPC) regime). The H4 guidance document is primarily aimed at methods to control and manage the release of odours, but also contains a series of recommended assessment methods which can be used to assess potential odour impacts.

Institute of Air Quality Management Guidance

5.2.94 The latest UK guidance on odour was published by the Institute of Air Quality Management (IAQM) in 2014 (IAQM, 2014b). The IAQM guidance sets out assessment methods which may be utilised in the assessment of odours for planning applications. It is the only UK odour guidance document which contains a method for estimating the significance of potential odour impacts.

5.2.95 The IAQM guidance endorses the use of multiple assessment tools for odours, stating that, “best practice is to use a multi-tool approach where practicable”. This is in order to improve the robustness of the assessment conclusions. Only one of the methods outlined in the IAQM guidance could realistically be adopted in this odour assessment.

Bioaerosol Guidance

5.2.96 The limited guidance addressing bioaerosols has been summarised in paragraphs 5.2.20 to 5.2.25.

Scoping Criteria

5.2.97 Birmingham City Council, in its scoping response, stated that *“the local planning authority does not object to the proposed methodology with regard to emissions, odour and construction dust”*. This assessment adheres to that proposed methodology. However, Birmingham City Council’s Regulatory Services department has also stated that:

“In terms of air quality, this will be dealt with by the Environment Agency. The agency will have the responsibility for ensuring that all the air quality regulations applicable have been fully covered which should cover the extra journeys by vehicles to and from the site”.

Limitations to the Assessment

5.2.98 There are many components that contribute to the uncertainty of modelling predictions. The point source model used in the assessment is dependent upon emission rates, flow rates, exhaust temperatures and other parameters for each source, all of which in reality are variable as the plant will operate at different loads at different times. There are then additional uncertainties, as the model is required to simplify real-world conditions

into a series of algorithms. The road traffic emissions model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them.

5.2.99 An important stage in the road traffic modelling process is model verification (this can only be done for the road traffic model), which involves comparing the model output with measured concentrations (see Appendix 5.5). The level of confidence in the verification process is necessarily enhanced when data from an automatic analyser have been used, as has been the case for this assessment (see Appendix 5.5). Predicting pollutant concentrations from road traffic emissions in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to traffic volumes, background pollutant concentrations and vehicle emissions.

5.2.100 Historically, large reductions in nitrogen oxides emissions have been projected, which has led to significant reductions in nitrogen dioxide concentrations from one year to the next being predicted. Over time, it was found that trends in measured concentrations did not reflect the rapid reductions that Defra and the DfT had predicted (Carslaw et al., 2011). This was evident across the UK, although the effect appeared to be greatest in inner London; there was also considerable inter-site variation. Emission projections over the 6 to 8 years prior to 2009 suggested that both annual mean nitrogen oxides and nitrogen dioxide concentrations should have fallen by around 15-25%, whereas monitoring data showed that concentrations remained relatively stable, or even showed a slight increase. Analysis of more recent data for 23 roadside sites in London covering the period 2003 to 2012 showed a weak downward trend of around 5% over the ten years (Carslaw and Rhys-Tyler, 2013), but this still falls short of the improvements that had been predicted at the start of this period. This pattern of no clear, or limited, downward trend is mirrored in the monitoring data assembled for this study, as set out in Paragraph 5.3.5.

5.2.101 The reason for the disparity between the expected concentrations and those measured relates to the on-road performance of modern diesel vehicles. New vehicles registered in the UK have had to meet progressively tighter European type approval emissions categories, referred to as "Euro" standards. While the nitrogen oxides emissions from newer vehicles should be lower than those from equivalent older vehicles, the on-road performance of some modern diesel vehicles has often been no better than that of earlier models. This has been compounded by an increasing proportion of nitrogen dioxide in the nitrogen oxides emissions, i.e. primary nitrogen dioxide, which has a significant effect on roadside concentrations (Carslaw et al., 2011) (Carslaw and Rhys-Tyler, 2013).

5.2.102 Defra has attempted to account for the historical discrepancies in its latest emissions factors published in 2014 and incorporated in the Emission Factor Toolkit v6.0.2 used in this study. The new factors now show only limited reductions in overall vehicle emissions prior to 2014, but project some large improvements thereafter. This is principally because, where previous standards had limited on-road success, the best current evidence is that the 'Euro VI' and 'Euro 6' standards that new vehicles had to comply with from 2013/15⁴ will deliver real improvements, as, for the first time, they will be compliant with the World Harmonized Test Cycle, which better represents real-world driving conditions⁵ and also includes a separate slow-speed cycle for heavy duty vehicles. There is, nevertheless, limited information on whether the full improvements expected are

⁴ Euro VI refers to heavy duty vehicles, while Euro 6 refers to light duty vehicles. The timings for meeting the standards vary with vehicle type and whether the vehicle is a new model or existing model.

⁵ The test cycle for real-world emissions for Euro 6 vehicles will not be implemented until about 2017. However, there is still expected to be a substantial improvement in NOx emissions from Euro 6 vehicles (as compared with Euro 5) from 2015 onwards.

being, and will be, delivered, so there remains some uncertainty as to whether emissions will reduce at the rates set out in Defra's Emission Factors Toolkit (Defra, 2015a).

5.2.103 To account for the remaining uncertainty over future vehicle emissions of nitrogen oxides and nitrogen dioxide, a sensitivity test has been conducted assuming that the future (2018) road traffic emissions per vehicle are unchanged from 2014 values (without emissions reduction). The predictions within this sensitivity test will almost certainly be over-pessimistic, as new Euro VI and Euro 6 vehicles will make up roughly 72% of HDVs and 44% of LDVs on the road in 2018, according to Defra's Emission Factors Toolkit (Defra, 2015a). Future concentrations due to road traffic emissions will therefore be below the 'without emissions reduction' values, but may be above Defra's 'with emissions reduction' values i.e. they will lie between the two sets of values. In this case, it is considered that they are likely to be closer to those derived using the official Defra values than those in the 'no emissions reduction' sensitivity test (see paragraph 5.4.30).

5.2.104 A number of assumptions have also had to be made regarding the stack emissions at the proposed REC. It has been assumed that the facility will operate continuously throughout the year, when the plant is only expected to operate for approximately 93% of the time, at most. A relatively worst-case approach to the conversion of NO_x to NO₂ has also been adopted (see paragraphs 5.2.40, 5.2.41 and 5.4.32). IED emission rates have also been assumed (with the exception of the NO_x emissions), when the gasification technology to be used is actually expected to result in emission rates far lower than these maxima permitted under IED. All of these assumptions ensure that the assessment undertaken is very worst-case, and that the actual impacts of the REC will be less than those shown later on in this chapter.

5.3 Baseline Conditions

Site Description and Context

5.3.1 The Proposed Development site is located within the Fort Industrial Park, in what is already a heavily industrialised area. There are numerous existing facilities with emissions to air, such as the Jaguar Land Rover plant and the Fort Dunlop Power Plant. There is also a very busy local road network, as well as the M6, which will represent a significant source of pollutant emissions. As a result, background pollutant concentrations are high, and there are several areas of poor air quality, in particular close to busy roads.

Baseline Information

Air Quality Review and Assessment

5.3.2 Birmingham City Council has investigated air quality within its area as part of its responsibilities under the LAQM regime. In July 2003 the whole city was declared an AQMA for exceedences of the nitrogen dioxide and PM₁₀ objectives. Objective exceedences mostly occur alongside busy roads in the city.

Local Air Quality Monitoring

5.3.3 Birmingham City Council operates a number of automatic monitoring stations within its area. Two of these are located relatively close to the Proposed Development, some 2km to the west, close to Tyburn Road. These sites operate as part of the AURN network, with data having been downloaded from the Defra website (Defra, 2015a). Data for the years 2009 to 2014 are summarised in Table 5.10 and the monitoring locations are shown in **Figure 5.4**.

Table 5.10: Summary of Nitrogen Dioxide (NO₂) Monitoring (2009-2014) ^a

Site No.	Site Type	Location	2009	2010	2011	2012	2013	2014
Annual Mean (µg/m³)								
BIRT	Roadside	Tyburn Roadside	46.5	50.8	45.2	45.6	46.3	47.3
BIR1	Urban Background	Tyburn	32.0	37.3	34.3	32.3	28.5	29.8
Objective			40					
No. of Hours > 200 µg/m³								
BIRT	Roadside	Tyburn Roadside	0	1	3	1	1	6
BIR1	Urban Background	Tyburn	0	7	4	0	0	0
Objective			18					

^a Exceedences of the objectives are shown in bold.

5.3.4 Annual mean nitrogen dioxide concentrations at the Tyburn Roadside automatic monitor have consistently exceeded the objective over the past six years. Annual mean concentrations at the background monitor have consistently been below the objective, and the hourly objective has not been exceeded in any year at either site.

5.3.5 There are no clear trends in monitoring results for the past six years. This contrasts with the expected decline due to the progressive introduction of new vehicles operating to more stringent standards. The implications of this are discussed in paragraphs 5.2.100 to 5.2.103.

5.3.6 Birmingham City Council undertook a year-long monitoring study in Castle Vale in 2009 (see **Appendix 5.8**) using nitrogen dioxide diffusion tubes. The measured annual mean nitrogen dioxide concentrations are presented in Table 5.11 (the monitoring locations can be seen in **Appendix 5.8**). Measured concentrations throughout the study area were below the objective, and background concentrations were well below it.

Table 5.11: Castle Vale Nitrogen Dioxide (NO₂) Monitoring (2009) ^a

Site No.	Location	Easting	Northing	2009 Annual Mean (µg/m ³)
CV1	Concorde Drive	413874	290737	38.0
CV2	Hurricane Way	414060	290786	32.1
CV3	Sopwith Croft	414082	290911	29.1
CV4	Cosford Crescent	414113	291235	27.7
CV5	Tangmere Drive	414707	291492	29.2
CV6	Davenport Drive	415106	291473	27.9
CV7	Manby Road	414513	291989	29.5
CV8	Manby Road (2)	414121	291624	29.1
CV9	Cadbury Drive	413935	290477	33.7
CV10	Cadbury Drive (2)	414389	290624	29.5

5.3.7 The automatic monitors also measure PM₁₀ and PM_{2.5}. Data for 2009-2014 are presented in Table 5.12. Concentrations have been consistently below the objectives over the past six years. It is surprising that the roadside concentrations are so similar to those measured at the background site.

Table 5.12: Summary of PM₁₀ and PM_{2.5} Monitoring (2009-2014) ^a

Site No.	Site Type	Location	2009	2010	2011	2012	2013	2014
PM₁₀ Annual Mean (µg/m³)								
BIRT	Roadside	Tyburn Roadside	18.8	20.5	23.7	21.8	19.2	19.9
BIR1	Urban Background	Tyburn	20.5	23.8 ^b	23.0	18.6	17.9	19.0
Objective			40					
PM₁₀ No. of Days > 50 µg/m³								
BIRT	Roadside	Tyburn Roadside	9	2	18	13	9	8
BIR1	Urban Background	Tyburn	8	2 ^b (37.7)	18	9	9	6
Objective			35 (50)					
PM_{2.5} Annual Mean (µg/m³)								
BIRT	Roadside	Tyburn Roadside	13.7	14.6	16.6	12.8	16.0	14.0
BIR1	Urban Background	Tyburn	13.6	21.3 ^b	15.6	13.6	17.9	13.5
Objective			25					

^a Exceedences of the objectives are shown in bold.

^b Data capture was 23.4% in 2010, and thus the 90th percentile of daily mean PM₁₀ concentrations is provided in parentheses.

Exceedences of EU Limit Value

5.3.8 The Tyburn roadside AURN monitoring site lies 2 km west of the development site, and concentrations have exceeded the annual mean nitrogen dioxide limit value in each of the past six years (Table 5.10). The national map of roadside annual mean nitrogen dioxide concentrations (Defra, 2015b), used to report exceedences of the limit value to the EU, identifies exceedences of the limit value along Fort Parkway and along Chester Road either side of Fort Parkway, as well as along several other nearby roads. The national maps of roadside PM₁₀ and PM_{2.5} concentrations show no exceedences of the limit values anywhere in the UK. These maps are for 2014 concentrations; detailed maps of predicted future year exceedences are not available.

Background Concentrations

5.3.9 Where necessary, estimated background concentrations in the study area have been determined. In the case of nitrogen dioxide, these have been determined for both 2014 and the opening year 2018 (Table 5.13), and two sets of future-year backgrounds are presented to take into account uncertainty in future year vehicle emission factors. 2014 background concentrations have been assumed to be the same as the lowest measured concentrations from Birmingham City Council's Castle Vale Air Quality Survey undertaken in 2009. This is considered appropriate as it represents a measured background concentration from very close to the development site, and background concentrations are

unlikely to have increased between 2009 and 2014 (the measured annual mean nitrogen dioxide concentration at the Tyburn background automatic monitor was 7% lower in 2014 than it was in 2009 – see Table 5.10), so it is also conservative. This value has been adjusted to calculate the 2018 concentrations, with full details of this adjustment methodology provided in Appendix 5.5.

Table 5.13: Estimated Annual Mean Background NO₂ Concentrations in 2014 and 2018 (µg/m³)

Year	NO ₂
2014	27.7
2018 – Without Reductions in Traffic Emissions ^a	26.6
2018 – With Reductions in Traffic Emissions ^b	23.8
Objective	40

^a This assumes that road vehicle emission factors in 2018 remain the same as in 2014 (See Appendix 5.5).

^b This assumes that road vehicle emission factors reduce between 2014 and 2018 at the current 'official' rates (See Appendix 5.5).

5.3.10 Estimated background concentrations of benzene and 1,3-butadiene in the study area have been determined from Defra's published maps of background concentrations. The data have been taken for the year 2001 since this is the base year for the most recent set of published maps. Table 5.14 shows the maximum background concentrations in the study area, with these maximum values having been used at every receptor location throughout the assessment, rather than the individual gridded values, as a worst-case.

Table 5.14: Annual Mean Background Pollutant Concentrations Taken from Defra's Background Maps (Defra, 2015a) (µg/m³)

Pollutant	Maximum Background Concentration
Benzene	0.731
1,3-butadiene	0.315

5.3.11 Defra has undertaken monitoring of trace elements at a number of locations in the UK since 1976 as part of the UK Urban and Rural Heavy Metals Monitoring Networks. To provide an indication of trace metal concentrations in the study area, measured concentrations of selected heavy metals at the three nearest monitoring sites in 2014 are summarised in Table 5.15 (values are stated to the same number of significant figures as published by Defra). These data have been downloaded from the Defra website (Defra, 2015a). Where background concentrations of these heavy metals have been used in this assessment, the maximum value (in the final column of Table 5.15) has always been used as a worst-case. This is considered very worst-case, as measured concentrations at Walsall Bilston Lane are generally much higher than other sites in the UK.

Table 5.15: Trace Metal Background Concentrations in 2014 (ng/m³)^a

Pollutant	Harwell	Runcorn Weston Point	Walsall Bilston Lane	Maximum
Arsenic	0.63	0.68	1.2	1.2
Cadmium	0.099	0.13	2.5	2.5
Chromium	0.86	1.3	3.8	3.8
Lead	4.6	6.5	57	57
Nickel	2.1	3.5	2	3.5
Manganese	1	1	13	13

^a 1,000 ng = 1 µg

5.4 Assessment of Likely Significant Effects

Construction Phase

5.4.1 The construction works will give rise to a risk of dust impacts during demolition, earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway.

Potential Dust Emission Magnitude

Demolition

5.4.2 The existing industrial units on the site are to be demolished. These are up to around 9 m tall, with a total volume of approximately 65,000 m³, and are mostly constructed of brickwork, steelwork and cladding. The method of demolition has not yet been decided, but crushing and screening on site is likely. Based on the example definitions set out in Table A5.4.1 in Appendix 5.4, the dust emission class for demolition is considered to be *medium*.

Earthworks

5.4.3 The characteristics of the soil at the development site have been defined using the British Geological Survey's UK Soil Observatory website (British Geological Survey, 2015), as set out in Table 5.16. Overall, it is considered that, when dry, this soil only has the potential to be moderately dusty, or even just slightly dusty in the northern half of the site.

Table 5.16: Summary of Soil Characteristics

Category	Record
Northern Half of Site	
Soil layer thickness	Deep
Soil Parent Material Grain Size	Arenaceous ^a - Rudaceous ^b
European Soil Bureau Description	River Terrace Sand/Gravel
Soil Group	Light (silty) to Medium (Silty)
Soil Texture	Sand to Sandy Loam ^c
Southern Half of Site	
Soil layer thickness	Deep
Soil Parent Material Grain Size	Argillic ^d - Arenaceous
European Soil Bureau Description	Riverine Clay and Floodplain Sands and Gravels
Soil Group	All
Soil Texture	Clay to Sandy Loam

^a grain size 0.06 – 2.0 mm.

^b grain size > 2.0 mm.

^c a loam is composed mostly of sand and silt.

^d grain size < 0.06 mm.

5.4.4 The site covers 1.9 ha and most of this will be subject to earthworks, involving the removal of the foundations of the demolished buildings and breaking up of existing paved areas, then excavation, haulage, tipping, stockpiling and landscaping of the topsoil and subsoil. No bunds will be formed. The earthworks will last around 3-4 months and dust will arise mainly from vehicles travelling over unpaved ground and from the handling of dusty materials, such as dry soil. Based on the example definitions set out in Table A5.4.1 in Appendix 5.4, the dust emission class for earthworks is considered to be *medium*.

Construction

5.4.5 Construction will involve the laying of hard pavings and the building of the main REC building along with the industrial warehouse building fronting onto Dunlop Way. These buildings will primarily be constructed of steelwork, reinforced concrete, cladding and sheet roofing. Dust will arise from vehicles travelling over unpaved ground, the handling and storage of dusty materials, and from the cutting of concrete. The construction will take place over a 24-month period. Based on the example definitions set out in Table A5.4.1 in Appendix 5.4, the dust emission class for construction is considered to be *medium*.

Trackout

5.4.6 It is anticipated that there will be approximately 20 outward heavy vehicle movements per day during construction, with vehicles travelling over little more than 10 m of unpaved surface. Based on the example definitions set out in Table A5.4.1 in **Appendix 5.4**, the dust emission class for trackout is considered to be *medium*.

5.4.7 Table 5.17 summarises the dust emission magnitude for the proposed development.

Table 5.17: Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Demolition	Medium
Earthworks	Medium
Construction	Medium
Trackout	Medium

Sensitivity of the Area

5.4.8 This assessment step combines the sensitivity of individual receptors to dust effects with the number of receptors in the area and their proximity to the site. It also considers additional site-specific factors such as topography and screening, and in the case of sensitivity to human health effects, baseline PM₁₀ concentrations.

Sensitivity of the Area to Effects from Dust Soiling

5.4.9 The IAQM guidance explains that residential properties and long-term car parks are 'high' sensitivity receptors to dust soiling, while industrial and commercial premises and short-term car parks are 'medium' sensitivity receptors (see Table A5.4.2 in Appendix 5.4). The nearest residential properties lie over 300 m from the site, while the long-term car park for new cars to the west of the site is over 160 m away (see **Figure 5.5**). Far closer to the site are existing industrial units and associated car parking to the west, and an existing commercial warehouse (B&Q) and its associated short-term car park to the east. Using the matrix set out in Table A5.4.3 in **Appendix 5.4**, the area surrounding the onsite works is of 'low' sensitivity to dust soiling.

5.4.10 Table 5.16 shows that dust emission magnitude for trackout is 'medium' and Table A5.4.3 in **Appendix 5.4** thus explains that there is a risk of material being tracked 200 m from the site exit. The first 200 m that any outbound construction traffic will travel will necessarily be westbound along Fort Parkway. There are no residential properties within 50 m of this stretch of road, and only a few industrial and commercial premises set back at least 10 m from the roads (see **Figure 5.6**). Table A5.4.3 in Appendix 5.4 thus indicates that the area is of 'low' sensitivity to dust soiling due to trackout.

Sensitivity of the Area to any Human Health Effects

5.4.11 Residential properties are also classified as being of 'high' sensitivity to human health effects, while places of work are of 'medium' sensitivity. The matrix in Table A5.4.4 in Appendix 5.4 requires information on the baseline annual mean PM₁₀ concentration in the area. It is considered reasonable to use the measured concentration for 2014 of 19.9 µg/m³ from the Tyburn roadside automatic monitor for this. Using the matrix in Table A5.4.4 in Appendix 5.4, the area surrounding the onsite works is of 'low' sensitivity to human health effects in terms of residential receptors. There are 'medium' sensitivity receptors in terms of nearby places of work within 20 m of the site. Using the matrix in Table A5.4.4 in Appendix 5.4, the surrounding area would be considered to be of 'medium sensitivity' to human health effects. This, however, does not take into account local PM₁₀ concentrations. Taking into account that local PM₁₀ concentrations are likely to be below 24 µg/m³, it is the professional opinion of the consultants completing the assessment that the sensitivity of the area to human health during the demolition phase will be 'low'. The

area surrounding roads along which material may be tracked from the site is also of 'low' sensitivity to human health effects (Table 5.18).

Sensitivity of the Area to any Ecological Effects

5.4.12 The guidance only considers designated ecological sites within 50m to have the potential to be impacted by the construction works. There are no designated ecological sites within 50m of the site boundary or those roads along which material may be tracked, thus ecological impacts will not be considered further.

Table 5.18: Summary of the Area Sensitivity

Source	Sensitivity of the Surrounding Area	
	On-site Works	Trackout
Dust Soiling	Low Sensitivity	Low Sensitivity
Human Health	Low Sensitivity	Low Sensitivity

Risk and Significance

5.4.13 The dust emission magnitudes in Table 5.17 have been combined with the sensitivities of the area in Table 5.18 using the matrix in Table A5.4.6 in Appendix 5.4, in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in Table 5.19. These risk categories have been used to determine the appropriate level of mitigation as set out in the next Section on mitigation.

Table 5.19: Summary of Risk of Impacts Without Mitigation

Source	Dust Soiling	Human Health
Demolition	Low Risk	Low Risk
Earthworks	Low Risk	Low Risk
Construction	Low Risk	Low Risk
Trackout	Low Risk	Low Risk

5.4.14 The IAQM does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant' (Institute of Air Quality Management, 2014a).

Operational Phase

Air Quality Impacts – Road Traffic Emissions

5.4.15 The EPUK & IAQM guidance summarised in Appendix 5.3 sets out screening criteria for traffic generation within an AQMA. It explains that development can be screened out as not requiring a detailed assessment of road traffic impacts on the local area where:

- the development will lead to a change in LDV flows of more than 100 AADT; and
- the development will lead to a change in HDV flows of more than 25 AADT.

5.4.16 The transport assessment work within Chapter 7 demonstrates that, overall, there will be a net reduction in vehicle trips as a result of the Proposed Development going ahead. This is because the proposed uses will generate less total vehicle trips than the current uses on the site. Further details on this can be found in the Transport Assessment Chapter 7 of this ES. Clearly the development can be screened out as not requiring a detailed assessment under the first of the criteria outlined above. HGV trips will, however, increase as a result of the development going ahead.

5.4.17 Trip distribution data used within Chapter 7 Transport Assessment show that HGV flows (2-way) will increase by 30 vehicles per day along Fort Parkway. This is above the second of the screening criteria set out above. However, there are no sensitive receptors along this stretch of Fort Parkway, thus no detailed assessment needs be undertaken. Beyond Fort Parkway, the maximum predicted increase in HGV flows is along the A452, where they will increase by 16 movements per day (6 northbound and 10 southbound). This is below the screening criterion, thus no detailed assessment is required.

5.4.18 The impact of the Proposed Development on air quality in terms of road traffic vehicle trip generation has been screened out as insignificant.

Air Quality Impacts – Stack Emissions

Predicted Concentrations Relevant to Human Health

Screening of Maxima

5.4.19 Table 5.20 sets out the maximum predicted process contribution (PC) anywhere within the Cartesian grid of receptors and at any of the specific sensitive receptors, in any of the meteorological years. For most of the pollutants and averaging periods, the process contribution is less than 0.5% of the long-term EAL or less than 10% of the short-term EAL and the impacts of the facility can thus be discounted as insignificant without having to consider total concentrations (see paragraphs 5.2.9 to 5.2.15 on screening criteria).

Table 5.20: Maximum Predicted Process Contributions in the Study Area ($\mu\text{g}/\text{m}^3$)
a

Pollutant	Averaging Period	Maximum PC		EAL
		PC	% of EAL	
NO ₂	Annual Mean	0.486	1.2%	40
	99.79 th ile of 1-hour Means	11.737	5.9%	200
SO ₂	99.7 th ile of 1-hour Means	1.419	1.1%	350
	99.18 th ile of 24-hour Means	18.768	5.4%	125
	99.9 th ile of 15-minute Means	20.340	7.6%	266
PM ₁₀	Annual Mean	0.038	0.1%	40
	90.4 th ile of 24-hour Means	0.717	1.4%	50
PM _{2.5}	Annual Mean	0.038	0.2%	25
CO	Rolling 8-hour Mean	8.665	0.1%	10,000
HCl	Annual Mean	0.039	0.2%	750

	Max Hourly Mean	7.963	1.1%	20
HF	Annual mean	0.004	0.0%	16
	Max Hourly Mean	0.531	0.3%	160
VOCs (as benzene)	Annual Mean	0.039	0.8%	5
VOCs (as 1,3-butadiene)	Annual Mean	0.039	1.7%	2.25
VOCs (as dimethyl sulphate)	Max Hourly Mean	2.654	17.0%	15.6
Cd	Annual Mean	0.0003	5.9%	0.005
TI	Annual Mean	0.0003	0.0%	1
	Max Hourly Mean	0.0066	0.0%	30
Hg	Annual Mean	0.0003	0.1%	0.5
	Max Hourly Mean	0.0066	0.1%	7.5
Sb	Annual Mean	0.0030	0.1%	5
	Max Hourly Mean	0.0664	0.0%	150
As	Annual Mean	0.0030	99.1%	0.003
Pb	Annual Mean	0.0030	1.2%	0.25
Total group 3 metals as Cr III	Annual Mean	0.0030	0.1%	5
	Max Hourly Mean	0.0664	0.0%	150
Total group 3 metals as Cr VI	Annual Mean	0.0030	1486.7%	0.0002
	Max Hourly Mean	0.0664	0.4%	15
Co	Annual Mean	0.0030	0.3%	1
	Max Hourly Mean	0.0664	0.2%	30
Cu	Annual Mean	0.0030	0.0%	10
	Max Hourly Mean	0.0664	0.0%	200
Mn	Annual Mean	0.0030	2.0%	150
	Max Hourly Mean	0.0664	0.0%	1,500
Ni	Annual Mean	0.0030	14.9%	0.02
V	Annual Mean	0.0030	0.1%	5
	Max Hourly Mean	0.0664	6.6%	1
NH ₃	Annual Mean	0.0595	0.0%	180

	Max Hourly Mean	1.327	0.1%	2,500
Dioxins and furans	Annual Mean	0.000000001	0.2%	0.0000003_b

^a Where the PC as a% of the EAL is more than 0.5% of an annual mean EAL or more than 10% of a short-term EAL, it is shown in bold.

^b This is the WHO indicator concentration (300 fg/m³) above which it would be considered necessary to identify and control emissions.

5.4.20 For annual mean and 1-hour mean VOCs, annual mean cadmium, arsenic, lead, Chromium VI, manganese and nickel, the process contribution exceeds these screening criteria and so the Predicted Environmental Concentration (PEC) has been calculated by adding the local background concentrations (see Tables 5.14 and 5.15), as shown in Table 5.21. Adding the background concentration shows that for every pollutant, with the exception of chromium VI and arsenic, the EAL will be achieved and the potential for significant impacts can thus be discounted. The process contribution to annual mean nitrogen dioxide concentrations also cannot be screened out at this stage, but this is assessed further separately in paragraph 5.4.24 onwards.

Table 5.21: Maximum Predicted Environmental Concentrations in the Study Area (µg/m³)^a

Pollutant	Averaging Period	Maximum PEC		EAL
		PEC	% of EAL	
VOCs (as benzene)	Annual Mean	0.770	15.4%	5
VOCs (as 1,3-butadiene)	Annual Mean	0.354	15.7%	2.25
VOCs (as Dimethyl sulphate) ^b	Max Hourly Mean	2.654	17.0%	15.6
Cd	Annual Mean	0.003	55.9%	0.005
As	Annual Mean	0.004	139.1%	0.003
Pb	Annual Mean	0.060	24.0%	0.25
Total group 3 metals as Cr VI	Annual Mean	0.004	1900.3%	0.0002
Mn	Annual Mean	0.016	10.6%	150
Ni	Annual Mean	0.005	24.9%	0.02

^a Where the PEC exceeds the EAL it is shown in bold.

^b There is no background concentration available for this pollutant and so the background has been assumed to be zero. While this may under-predict the PEC, it is considered highly unlikely that the background concentration could be sufficient for the EAL to be exceeded.

5.4.21 PECs of arsenic and vanadium in Table 5.21 are above the EAL, and thus require further assessment. Environment Agency guidance (Environment Agency, 2012) outlines that the next stage in this further assessment should be undertaken by assuming that each metal comprises 11% of the total heavy metals emissions. This factor has been applied to the process contributions of the plant to the PECs presented in Table 5.22.

Table 5.22: Maximum Predicted Environmental Concentrations in the Study Area ($\mu\text{g}/\text{m}^3$)^a

Pollutant	Averaging Period	Maximum PEC		EAL
		PEC	% of EAL	
As	Annual Mean	0.002	50.9%	0.003
Total group 3 metals as Cr VI	Annual Mean	0.004	1900.0%	0.0002

^a Where the PEC exceeds the EAL it is shown in bold.

5.4.22 Table 5.22 shows that the EAL of arsenic will not be exceeded, and as such the potential for significant impacts from this pollutant can also be discounted. However, concentrations of chromium VI continue to exceed the EAL. The Environment Agency guidance (Environment Agency, 2012) outlines that the next step in assessing concentrations of this pollutant is to consider more a realistic emission rate of chromium VI, as outlined in paragraphs 5.2.36 and 5.2.37. Using the maximum emission rate outlined in paragraph 5.2.37 ($0.00014 \text{ mg}/\text{Nm}^3$), the process contribution of chromium VI is as shown in Table 5.23.

Table 5.23: Maximum Predicted Environmental Concentrations in the Study Area ($\mu\text{g}/\text{m}^3$)^a

Pollutant	Averaging Period	Maximum PC		EAL
		PC	% of EAL	
Cr VI	Annual Mean	0.00000051	0.3%	0.0002

5.4.23 Table 5.23 indicates that the annual mean process contribution to concentrations of chromium VI will be less than 0.5% of the EAL. The impacts of the facility on concentrations of this pollutant can thus be considered insignificant.

5.4.24 The impacts of the facility on concentrations of all pollutants relevant to human health, with the exception of annual mean nitrogen dioxide, have been screened out as insignificant. In considering the annual mean nitrogen dioxide impacts it is useful to see where impacts are greatest, thus a contour plot of the process contribution has been generated, and is shown in **Figure 5.7**. It is clear from this figure that the impacts on nitrogen dioxide concentrations cannot immediately be screened out across an area of Castle Vale.

5.4.25 The technology to be used in the proposed REC has very low NO_x emissions, and is expected to emit significantly less NO_x than the IED limits allow. A sensitivity test has thus been undertaken whereby a lower emission limit of $150 \text{ mg}/\text{Nm}^3$ of NO_x is applied to the plant, rather than the IED limit of $200 \text{ mg}/\text{Nm}^3$. Again a contour plot of the nitrogen dioxide process contribution has been generated for this scenario, and is shown in **Figure 5.8**.

5.4.26 **Figure 5.8** shows that, if an annual mean emission limit of $150 \text{ mg}/\text{Nm}^3$ of NO_x is applied to the facility, using the Environment Agency's screening criteria (1% of the long-term EAL), the process contribution of the plant would be less than $0.4 \mu\text{g}/\text{m}^3$ which is considered insignificant. It is thus recommended that this emission limit be applied by the Environment Agency in the site's permit, which will be adhered to by the site operator. However, following the EPUK and IAQM guidance, even the lesser impacts shown in **Figure 5.8** cannot be screened out as insignificant, thus further assessment of these impacts has been undertaken. It should be noted at this stage though that the proposed facility will

be permitted by the Environment Agency, and thus its guidance may be the most appropriate to follow. The EPUK and IAQM guidance even states that:

“This guidance, of itself, can have no formal or legal status and is not intended to replace other guidance. For example, industrial development regulated by the Environment Agency, and requiring an Environmental Permit, is subject to the Horizontal Guidance Note H1...”

5.4.27 However, for this planning application it has been deemed appropriate to at least consider the EPUK and IAQM guidance, which is specifically aimed at planning applications. The further assessment it requires consists of considering the total concentrations at specific worst-case sensitive receptors, factoring in background concentrations, road traffic contributions and the Proposed Development’s process contribution. Impacts are expected to be worst, and total concentrations highest, at receptors close to the busy A452 (See **Figure 5.8**), thus the seven selected receptors closest to this road have been used in this further assessment. These receptors, along with the modelled road network, are shown in **Figure 5.9**.

5.4.28 The total annual mean nitrogen dioxide concentrations at these receptors, both with and without the Proposed Development, in its year of opening (2018), are detailed in Table 5.24. Table 5.24 also describes the impacts at each receptor using the impact descriptors given in **Appendix 5.3**. Results are presented for two scenarios to reflect current uncertainty in Defra’s future-year vehicle emission factors. Further details of the inputs to the road traffic emissions models, as well as the verification factor applied to the output road-NO_x, are provided in **Appendix 5.5**.

Table 5.24: Predicted Impacts on Annual Mean Nitrogen Dioxide Concentrations in 2018 (µg/m³)^a

Receptor	With ‘Official’ Emissions Reduction ^b				Without Emissions Reduction ^c			
	Without Scheme	With Scheme	% Change ^d	Impact Descriptor	Without Scheme	With Scheme	% Change ^d	Impact Descriptor
20	39.4	39.7	1	Slight Adverse	48.0	48.4	1	Moderate Adverse
21	39.2	39.6	1	Slight Adverse	47.8	48.1	1	Moderate Adverse
22	41.7	42.1	1	Moderate Adverse	50.9	51.3	1	Moderate Adverse
24	41.0	41.3	1	Moderate Adverse	48.7	49.0	1	Moderate Adverse
25	31.8	32.1	1	Negligible	37.6	37.9	1	Slight Adverse
26	29.7	30.0	1	Negligible	34.8	35.0	1	Negligible
27	28.4	28.7	1	Negligible	33.0	33.2	1	Negligible
Objective	40		-	-	40		-	-

^a Exceedences of the objective are shown in bold.

- ^b This assumes that road vehicle emission factors reduce between 2014 and 2018 at the current 'official' rates (See **Appendix 5.5**).
- ^c This assumes that road vehicle emission factors in 2018 remain the same as in 2014 (See **Appendix 5.5**).
- ^d % changes are relative to the objective and have been rounded to the nearest whole number.

5.4.29 In order to determine which of the two scenarios shown in Table 5.24 is likely to be most realistic, total modelled 2018 baseline concentrations (without the process contribution of the Proposed Development) have also been determined for the location of the diffusion tube installed closest to the A452 (tube CV1) during Birmingham City Council's 2009 Castle Vale air quality survey (see **Appendix 5.8**). In 2009 this tube measured an annual mean nitrogen dioxide concentration of 38.0 µg/m³.

5.4.30 Total modelled annual mean nitrogen dioxide concentrations in 2018 at the location of tube CV1 were 35.0 µg/m³ with the 'official' emissions reduction and 41.9 µg/m³ without any reduction in emissions between 2011 and 2018. Bearing in mind that these modelled concentrations are for the future road layout in the area, which would see more traffic passing closer to the location of tube CV1, it is considered that the 'with reduction' results are probably the most realistic. Taking this into account, using the results set out in Table 5.24, it is likely that most local receptors will experience a *negligible* air quality impact as a result of the Proposed Development going ahead, including those closest to the A452 south of Avery Croft. The impact will be *slight adverse* for receptors close to the A452 beyond 100 m north of Tangmere Drive, while those receptors closest to Spitfire Island will experience *moderate adverse* impacts.

5.4.31 In terms of the numbers of properties that will experience adverse impacts, this will likely be limited to just 10 to 15 residences close to the A452 that will experience *slight adverse* impacts, and 15 to 20 residences close to both the A452 and Tangmere Drive that will experience *moderate adverse* impacts. The rest of the properties in Castle Vale, away from these busy roads, will experience *negligible* impacts. Birmingham City Council's 2009 Castle Vale Air Quality Survey (See **Appendix 5.8**) states that there are approximately 3,800 homes in Castle Vale. If a maximum of 35 properties experience adverse impacts, this represents less than 1% of the properties within Castle Vale. The impacts at the remaining 3,765 properties will be *negligible*.

5.4.32 It should also be borne in mind that these impacts are based on modelling that has incorporated a number of worst-case assumptions, and thus the actual process contributions will likely be lower than predicted. These assumptions include:

- assuming constant operation of the plant. In reality, the plant is only expected to operate for approximately 93% of the time, at most; and
- assuming a NO_x to NO₂ conversion rate that would apply at very low background concentrations. The only appropriate available background concentrations of NO_x, NO₂ and O₃ concentrations for use in the dispersion modelling were from Aston Hill, a very rural site in the Shropshire Hills, where background concentrations of NO_x and NO₂ are very low, and O₃ high. Where these conditions occur, there tends to be a higher rate of conversion of NO_x to NO₂, and the model will have applied this higher rate of conversion to the modelled process contributions. In reality, background NO_x and NO₂ concentrations in Castle Bromwich are relatively high, which will make O₃ concentrations low, thus less NO_x will be converted to NO₂, and the NO₂ process contribution will be less than that predicted. It should be recognised that these low background concentrations were only used for the calculation of the NO_x to NO₂ conversion. Local background concentrations were used when calculating total concentrations.

5.4.33 It must also be noted that the A452 has been shown by Defra to be experiencing an exceedance of the limit value for annual mean nitrogen dioxide. Following a recent update to its Pollution Climate Mapping model, and assuming the introduction of a 'Clean Air Zone' in the area, Defra now expects that the limit values will be achieved throughout the West Midlands by 2020 (Defra, 2015c). The additional nitrogen dioxide that the Proposed Development will lead to along this road could slow the achievement of the limit value ever so slightly, but in reality the process contribution is small, and tiny in comparison to the road traffic contribution here. Thus the proposed development is unlikely to have a significant impact on the achievement of the limit values.

Predicted Impacts on Designated Habitats

5.4.34 Table 5.25 sets out the maximum process contributions to the relevant pollutant concentrations at Receptors 47 to 49, which represent the Plantsbrook Reservoirs Local Nature Reserve. All of the process contributions are less than 100% of the EALs and can thus be discounted as insignificant (see Paragraph 5.2.11).

Table 5.25: Maximum Predicted Environmental Concentrations in the Plantsbrook Reservoirs Local Nature Reserve

Pollutant	Averaging Period	Maximum PC		EAL
		PC	% of EAL	
NH ₃	Annual Mean	0.010	0.3%	3
NO _x	Annual Mean	0.149	0.5%	30
	Max 24-hour Mean	1.539	2.1%	75
SO ₂	Annual Mean	0.188	0.9%	20
HF	Max 24-hour Mean	0.035	0.7%	5
	Max Weekly Mean	0.014	2.8%	0.5
Nutrient Nitrogen Deposition ^a	Annual Mean	0.099	2.0%	5
Acid Nitrogen Deposition ^b	Annual Mean	0.066	3.7%	1.8

^a Nutrient nitrogen deposition composed of the nitrogen component of both nitrogen dioxide and ammonia.

^b Acid deposition calculated as the sum of the acidifying potentials from nitrogen dioxide, ammonia, sulphur dioxide and hydrogen chloride.

Odour Impacts

Odour Risk Assessment

Process Description

5.4.35 The Proposed Development will accept up to 105,000 tonnes of RDF per year. This will all be delivered by HGV, which will enter the reception hall through fast-acting doors. These doors will be open for as little time as possible, and the reception hall will be maintained under negative pressure to ensure that the escape of air is kept to an absolute minimum. The delivered waste will be unloaded into the waste bunker within the reception hall.

5.4.36 Unprocessed waste will be removed from the waste bunker and passed through a shredder before passing underneath an overhead magnet where metals will be removed (the recovered metal will be collected in a separate skip and periodically sent for further recycling). The shredded waste will then be conveyed to the adjoining fuel bunker.

5.4.37 Overhead fuel cranes operating on a pre-programmed cycle will move the waste around the fuel bunker to mix the fuel to create a more homogeneous mixture. The cranes will then deliver waste automatically to the fuel delivery chutes serving each gasification unit. From this point onwards the system is sealed, and there should be no escape of gases until they are exhausted from the flues.

5.4.38 The thermal conversion then takes place in two stages. Firstly drying, pyrolysis and gasification of the fuel will be carried out in the gasification unit creating the synthetic gas. The bottom ash produced is discharged from the gasification units and stored in an ash bays before being removed for offsite treatment. This bottom ash is not expected to be especially odorous, and will be stored within the process building. The synthetic gas is passed to the high-temperature oxidation unit, where it is mixed with the air extracted from the reception hall, and there is complete combustion of the synthetic gas.

5.4.39 Having been generated in the dual stage gasification process and passed through the Heat Recovery Steam Generator, the flue-gas will enter a gas cleaning system. This will comprise a bag-house filter, a storage silo for lime and activated carbon and a filter dust silo. In simple terms the lime and activated carbon will be injected at the inlet of the bag house filter and this will absorb acid components in the flue-gas. The activated carbon adsorbs dioxin, organic carbons and heavy metals prior to release to the atmosphere. This released air is highly unlikely to be especially odorous, as most odorous compounds will be destroyed in the combustion process.

Source Odour Potential

5.4.40 The first step of the odour risk assessment is to identify the source odour potential or odour magnitude. This takes into account the scale and nature of the odorous processes; the continuity, intensity and offensiveness of odour releases; and any odour control measures that are used. In essence, it must consider the odour potential of the source with respect to the FIDO part of FIDOR.

5.4.41 The Proposed Development will handle waste, which has the potential to produce highly intense and highly offensive odours. However, the plant will accept a majority of RDF, which will have been well-processed by the time it reaches the facility, and very different to waste handled at a household waste centre, for example. RDF is combustible waste that has been shredded, dried and baled, and will have had most of the potentially odorous organic matter originally mixed in with the waste removed during processing. Some organic matter, and thus odour-generating potential, will undoubtedly remain though, and thus the feedstock for the plant remains a potentially significant odour source.

5.4.42 Organic material is biodegradable, and biodegradation can result in odours being produced. The strength and nature of odours produced is dependent on a number of variables including the volume and composition of the waste, the length of time it has been stored, the influence of temperature and moisture, and mechanical action. Typically, fresh organic matter is less odorous than organic matter that is a number of days or weeks old and has had time for biological breakdown to begin (either aerobic or anaerobic). Conversely, organic matter which has been allowed to significantly biodegrade often becomes less odorous again (e.g. mature compost). Any residual organic matter within the RDF is likely to be at least a few weeks old, and could thus be quite odorous.

5.4.43 The feedstock for the plant is really the only source of odour, but there are three main ways in which odours may be released during the processes undertaken at the

proposed facility. The first will be from the transport of the fuel to the facility, with odours released from the RDF as it is transported by road. The second will be from the process building itself, primarily the reception hall where the waste is stored, shredded and fed into the gasification units. The reception hall will be separate to the section of the building housing the gasifiers, oxidation units and generators; the latter part of the building will be naturally ventilated, as it is not expected to be a potential odour source, as the processes here are entirely sealed. The final potential odour source is the flues themselves, although the gases released here, at 55 m height, are not expected to be especially odorous, and will be released into a good environment for dispersion.

5.4.44 The main potential odour sources and overall source odour potential for the facility are described in Table 5.26.

Table 5.26: Identification of Odour Sources and Overall Odour Source Odour Potential

Odour Source	Description	Frequency and Duration	Intensity and Offensiveness
Transport of Feedstock	The delivery of the RDF feedstock to the facility by HGV.	This will take place between the hours of 7am and 7pm on weekdays and most likely between 7am and 2pm on Saturdays including public holidays, with a total of approximately 33 deliveries per day. This equates to a delivery every 18 minutes on average during these hours.	While most RDF is likely to be fairly benign, there is always the potential for a dirtier batch to produce moderately intense, highly offensive odours. Delivery vehicles will, however, be covered to minimise odorous emissions.
Process Building	Handling of the RDF.	The gasification process will be continuous, so waste will be moved and shredded 24/7.	As outlined above, there is the potential for the RDF to produce moderately intense, highly offensive odours. However, the process building will be maintained under negative pressure, so the potential for these odours to be released will be very low.
Flue Gases	The leftover gases from the combustion process, post-cleaning.	The gasification process will be continuous, so flue gases will be emitted 24/7.	The flue gas is expected to have a low intensity and low offensiveness, as most odorous compounds will be destroyed in the combustion process.
Overall Source Odour Potential	The overall source odour potential of the proposed facility is judged to be Small .		

Pathway Effectiveness

5.4.45 In order to consider the effectiveness of the pathway, it is important to consider receptor locations in terms of their proximity to the odour source(s) and the prevailing wind direction. A worst-case selection of the receptor locations used in the air quality dispersion modelling (receptors A, H, L, 10, 22, 27, and 35) have been selected for use in the odour risk assessment, along with a few additional receptors. These receptor locations are shown in **Figure 5.10**.

5.4.46 Individual wind roses from the Birmingham Airport meteorological station for the years 2010 to 2014, as well as a combined wind rose for the five years, are presented in **Appendix 5.6**. These demonstrate that the prevailing wind in the region is from the south and southwest, with occasional northwest and northeast components. In general, odours will be transported by the wind and will not be detectable at locations upwind of a source. The exception to this is during very light wind conditions when odours may disperse against the wind direction, although typically only for relatively short distances.

5.4.47 The effectiveness of the odour pathway between the proposed facility and the nearby sensitive receptors is summarised in Table 5.27, which draws upon the guidance set out in Table 5.7.

Table 5.27: Effectiveness of Odour Pathway

Receptor		Distance from Source ^a	Direction from Source	% Winds from Source ^b	Pathway Effectiveness ^c
ID	Location				
A	Garden Centre	30 m	30°	4.7	Highly Effective
H	Restaurant	145 m	130°	3.8	Moderately Effective
L	Park	195 m	180°	2.1	Ineffective
10	Residence	740 m	340°	3.8	Ineffective
22	Residence	320 m	30°	4.7	Moderately Effective
27	Residence	300 m	80°	3.2	Moderately Effective
35	Residence	260 m	180°	2.1	Ineffective
R1	Warehouse	20 m	270°	1.1	Moderately Effective
R2	Jaguar	110 m	340°	3.8	Moderately Effective

^a Measured as distance to the boundary of the renewable energy centre.

^b Average wind frequency in each 10° sector is 2.8% across all wind directions.

^c Overall pathway effectiveness is based on professional judgement, taking account of the distance between source and receptor, and frequency of winds with respect to the average.

5.4.48 The pathway to receptor A is clearly highly effective, being a very short distance away and downwind under prevailing wind conditions. Winds towards receptor H are less frequent, albeit not infrequent, and the receptor is considerably further away, thus the pathway is judged to be moderately effective. A similar logic applies for receptors 22, 27 and R2, which will be downwind fairly regularly, but are some distance from the source, and thus the pathway is also judged to be moderately effective. Receptor R1 is very close to the Proposed Development, but will very rarely be downwind, so this pathway is also deemed moderately effective. The pathway to receptors L and 35 are deemed ineffective, as winds placing them downwind from the Proposed Development are not especially

common and they are a relatively large distance away. Receptor 10 will regularly be downwind of the site, but is so far away that the pathway is deemed ineffective. It should also be borne in mind that, for receptors L, 10, 22, 27 and 35 in particular, there are numerous objects between them and the Proposed Development, such as buildings and trees, which will act as barriers to the wind and thus the odorous air, and reduce the effectiveness of the pathway.

Potential Odour Effects

5.4.49 The assessments of the potential odour effects at sensitive receptor locations are presented in Table 5.28. This brings together the source odour potential, effectiveness of pathway and receptor sensitivity identified using the criteria described in Table 5.7, to identify an overall potential for odour effects, using the matrices set out in Table 5.8 and Table 5.9.

Table 5.28: Effectiveness of Odour Pathway

Receptor	Risk of Odour Impact (Dose)			Receptor Sensitivity	Likely Odour Effect
	Source Odour Potential	Effectiveness of Pathway	Risk of Odour Impact		
A	Small	Highly Effective	Low	Medium	Negligible
H	Small	Moderately Effective	Negligible	High	Negligible
L	Small	Ineffective	Negligible	Medium	Negligible
10	Small	Ineffective	Negligible	High	Negligible
22	Small	Moderately Effective	Negligible	High	Negligible
27	Small	Moderately Effective	Negligible	High	Negligible
35	Small	Ineffective	Negligible	High	Negligible
R1	Small	Moderately Effective	Negligible	Low	Negligible
R2	Small	Moderately Effective	Negligible	Low	Negligible

5.4.50 The potential odour effects as set out in Table 5.28 have been identified using the effect \approx dose x response relationship identified in paragraph 5.2.52. The process is described as follows:

1) Identify the impact:

5.4.51 Based on a *small* source odour potential, where the pathway is deemed to be *highly effective*, then the risk of odour impacts (dose) is judged to be *low* (see Table 5.8). Where the effectiveness of the pathway is deemed to be *moderately effective* or *ineffective*, the risk of odour impacts is *negligible*.

2) Consider the response:

5.4.52 Based on the matrix presented in Table 5.9, the odour effects at each receptor are identified as follows: a negligible risk of odour impacts will lead to a negligible odour effect regardless of receptor sensitivity; a low risk of odour impact at a medium sensitivity receptor will also lead to a negligible odour effect, thus all of the effects are *negligible*.

5.4.53 The final stage of the risk assessment is to make an overall judgement as to the likely significance of effects. In this case it is judged that that overall significance of odour effects is insignificant. This conclusion is based on the findings of the risk assessment that have identified a *negligible* or *low* risk of odour effects at all receptor locations, with the resultant odour effects all being *negligible*.

Bioaerosol Impacts

5.4.54 Fundamental to the breakdown of organic waste is microbiological activity, thus the handling of this waste is likely to make airborne significant quantities of those micro-organisms (referred to as bioaerosols). However, the pre-processed RDF handled at the proposed facility is expected to contain very little organic matter (although there will be a smaller proportion of municipal solid waste (MSW)), and thus the potential for bioaerosol generation is low. As described in the odour assessment, the reception hall will be maintained under negative pressure, ensuring that very little air escapes the building. The feedstock itself will be gasified at very high temperatures, which will kill all biological material that enters the furnaces. The gas is then mixed with the air extracted from the reception hall and combusted, which will again kill all biological material in this air. It is thus anticipated that there will be little or no bioaerosols in the flue gas emissions. Combined with the very little air expected to escape from the buildings themselves, it can be concluded that the Proposed Development will not represent a significant source of bioaerosols, and will thus have an insignificant impact on local receptors in terms of bioaerosol concentrations.

5.5 Mitigation and Enhancement

Construction (including demolition)

5.5.1 Measures to mitigate dust emissions will be required during the construction phase of the development in order to reduce impacts upon nearby sensitive receptors.

5.5.2 The site has been identified as a Low Risk site during demolition, earthworks and construction, and Low Risk for trackout, as set out in Table 5.19. Comprehensive guidance has been published by IAQM (Institute of Air Quality Management, 2014a) that describes measures that should be employed, as appropriate, to reduce the impacts. This reflects best practice experience and has been used, together with the professional experience of the consultant and the findings of the dust impact assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in **Appendix 5.9**.

5.5.3 The mitigation measures should be written into a dust management plan (DMP). The DMP may be integrated into a Code of Construction Practice or the Construction Environmental Management Plan, and may require monitoring. Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Operation

5.5.4 The assessment has shown that the Proposed Development will, for the most part, not have a significant impact on local air quality in terms of pollutants from combustion, odours or bioaerosols. No additional mitigation has, therefore, been proposed for the operational impacts.

Good Design and Best Practice Measures

5.5.5 The EPUK & IAQM guidance advises that good design and best practice measures should be considered whether or not more specific mitigation is required. While the guidance is aimed at the operational air quality assessment rather than the assessment of construction dust or operational odour and bioaerosols, it is still useful to note where good design and best practice measures have been applied in terms of minimising these impacts, so they are also covered here. The Proposed Development incorporates the following good design and best practice measures:

- the use of the best available technology for the recovery of energy from waste in terms of emissions to air (gasification);
- the installation of appropriate mitigation in the form of a gas cleaning system for the exhaust air from the combustion process;
- the use of a tall stack to ensure good dispersion of emissions;
- voluntary introduction of a lower annual mean emission rate for nitrogen oxides;
- adherence to the best practice techniques set out in IAQM guidance during the construction phase;
- the use of fast-acting doors to minimise the escape of air during deliveries;
- the use of an extraction system to maintain the reception hall under negative pressure, again minimising the escape of odorous air from the building;
- using the extracted air in the combustion process to destroy odorous compounds and bioaerosols without the need for further abatement such as an odour control unit;
- continuous monitoring of emissions of several pollutants from the stack, allowing immediate identification of any breaches of the emissions limits;
- periodic monitoring of other pollutants to ensure compliance with emissions limits; and
- the introduction of a travel plan to minimise the impact of the scheme on local road traffic flows, and thus air quality.

5.6 Cumulative and In-Combination Effects

5.6.1 Dust impacts will generally only occur within 350 m of a construction site. Only one of the cumulative developments recommended to be considered by Birmingham City Council lies within 700 m of the Proposed Development, this being an application to extend the area of hardstanding at a green waste recycling facility some 100 m south of the Proposed Development. This extension has already been constructed, thus there is no risk of cumulative construction dust impacts.

5.6.2 Given that the impacts of the Proposed Development on concentrations of every pollutant bar nitrogen dioxide have been screened out as insignificant, it is highly unlikely that the Proposed Development would contribute to a significant impact in terms of these pollutants when considered cumulatively with other local developments. The cumulative impacts of other local developments on nitrogen dioxide concentrations would be unlikely to change the impacts described in Table 5.24, and would thus have no effect on the overall conclusions of this assessment.

5.6.3 The assessment has concluded that there is a negligible risk of odour or bioaerosol impacts, thus the contribution of the Proposed Development to any cumulative odour or bioaerosol impacts would also be negligible. This is not to say that other local developments will not have significant odour or bioaerosol impacts, merely that the proposed REC is highly unlikely to contribute to any local effects.

5.7 Summary

Introduction

5.7.1 The impacts of dust and PM₁₀ emissions during the construction (including demolition) phase have been assessed qualitatively following published guidance. The operational impacts of the Proposed Development on air quality, odour and bioaerosol conditions for local receptors have also been assessed. Air quality impacts have been assessed quantitatively using dispersion modelling, while odour impacts have been assessed following a risk assessment technique outlined in published guidance. Bioaerosol impacts have been assessed qualitatively based upon the levels expected to be generated and the likelihood of their being emitted from the proposed facility.

Baseline Conditions

5.7.2 The local area is heavily industrialised, with numerous point sources of emissions to air, as well as having a very busy and congested road network. Local monitoring shows roadside concentrations of nitrogen dioxide to be above the annual mean objective, but away from busy roads concentrations of all pollutants are below the objectives.

Likely Significant Effects

5.7.3 The odour risk assessment has demonstrated that the odour effects on all local receptors will be negligible, thus the Proposed Development is judged to be insignificant in terms of odour effects. The qualitative bioaerosol assessment has also demonstrated that the Proposed Development will have an insignificant effect on local receptors in terms of bioaerosol concentrations.

5.7.4 The impacts of road traffic generated by the Proposed Development have been screened out as insignificant, as the development will lead to less overall traffic being on the local roads than the site's current use, and only very marginally more HGV traffic.

5.7.5 In terms of emissions from the facility's stack, the assessment has demonstrated that these will result in an insignificant change in concentrations at all local sensitive receptor locations for all pollutants and all averaging periods, with the exception of annual mean nitrogen dioxide. Following Environment Agency guidance, the process contribution to annual mean nitrogen dioxide could also be screened out as insignificant, but EPUK and IAQM guidance employs a stricter screening criterion. Following this stricter guidance, the development will still have a *negligible* impact on annual mean nitrogen dioxide concentrations at most local receptors, but will likely have a *slight adverse* impact at 10 to 15 properties and a *moderate adverse* impact at 15 to 20 properties close to the A452. This is less than 1 % of the properties within Castle Vale.

Mitigation and Enhancement

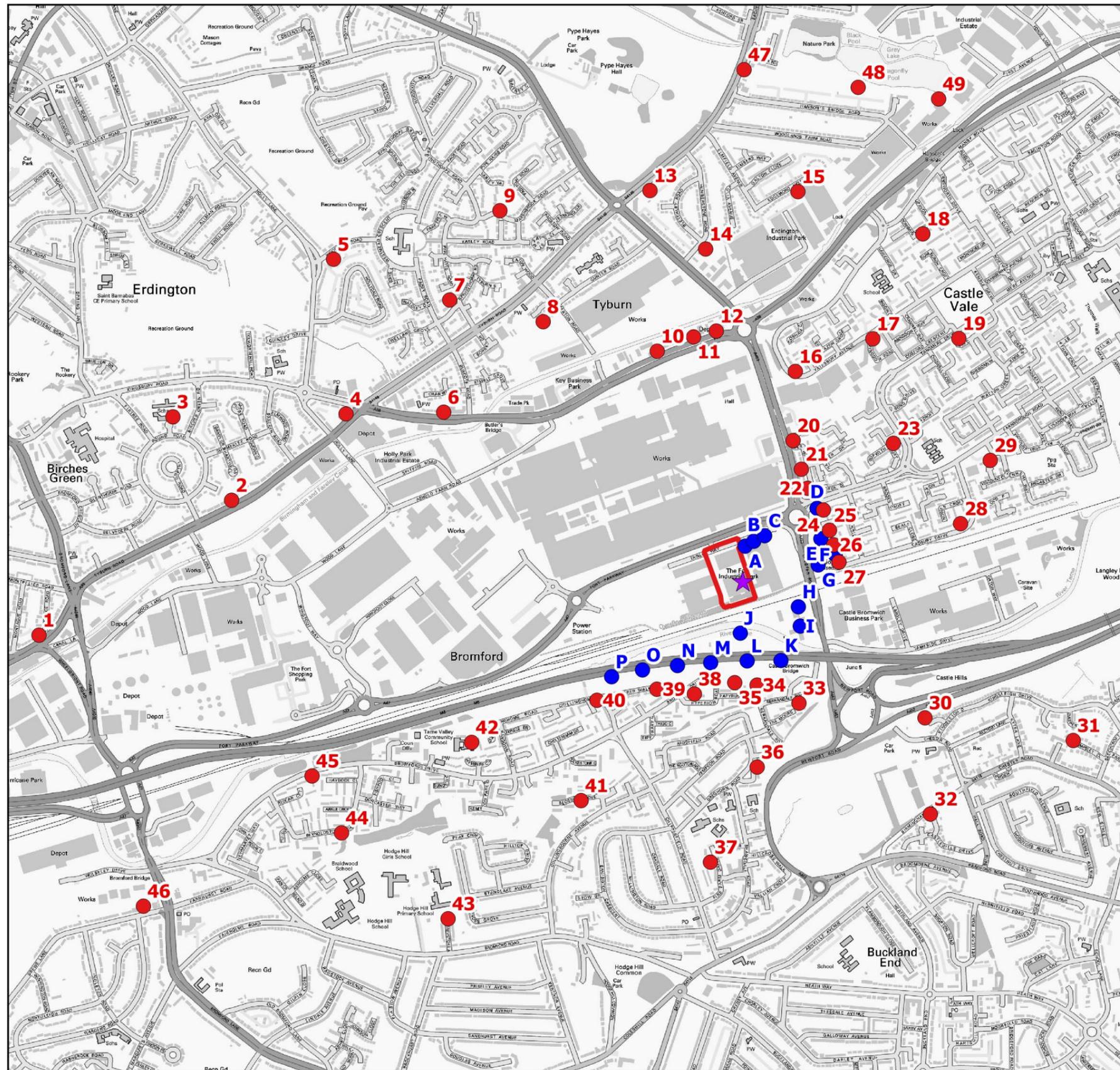
5.7.6 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emission. With these measures in place, it is expected that any residual effects will be 'not significant'. However, the guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be 'not significant'.

5.7.7 No additional mitigation has been proposed for the operational impacts, other than the self-imposed emission limit of 150 mg/Nm³ of NO_x. The pollutant emissions from the proposed facility will most likely be significantly lower than those modelled, as the technology to be employed is very clean.

Conclusion

5.7.8 The assessment has demonstrated that the Proposed Development will not have a significant impact on dust and PM₁₀ levels during construction, provided that the recommended mitigation is applied. Similarly, odour and bioaerosol emissions will be kept to a sufficiently low level that the local effects will be insignificant.

5.7.9 The overall operational air quality impacts of the development are judged to be 'not significant'. This judgement takes account of the uncertainties in future predictions of road traffic emissions, and the worst-case assumptions applied in the dispersion modelling assessment.



- KEY**
- Sensitive Receptor
 - Short-Term Only Sensitive Receptor
 - ★ Stack Location
 - ▭ Proposed Development Boundary

FIGURE 5.1
Sensitive Receptors

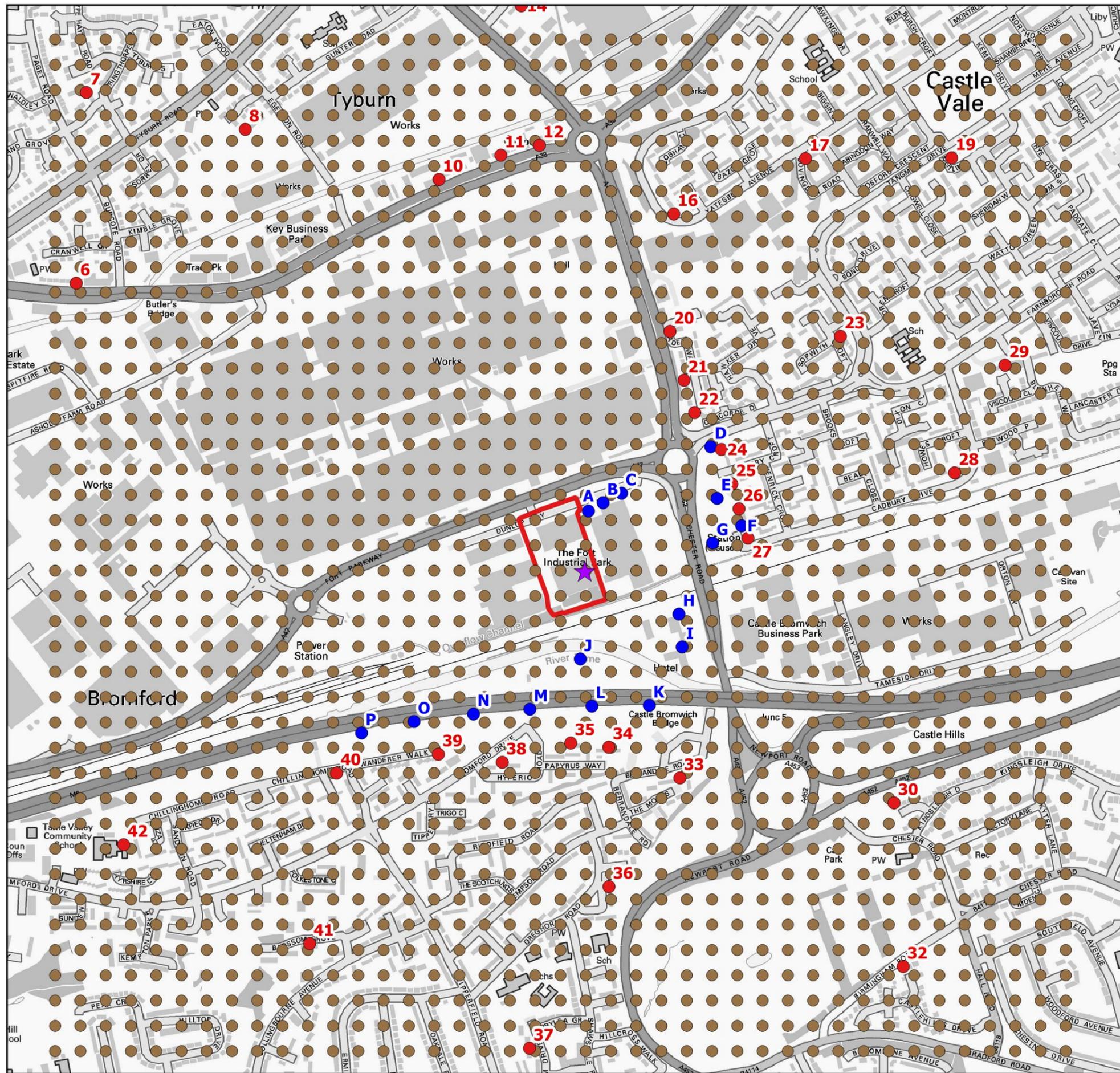
DRWG No: **K.0168_20** REV: _ Sheet No: **1/10**
(J2189_5.1)

Date: 13/09/2015

Scale: 1:15,000

Ⓐ A3





KEY

- Gridded Receptor
- Sensitive Receptor
- Short-Term Only Sensitive Receptor
- ★ Stack Location
- ▭ Proposed Development Boundary

FIGURE 5.2
Gridded & Nearby Sensitive Receptors

DRWG No: **K.0168_20** REV: _ Sheet No: **2/10**
(J2189_5.2)

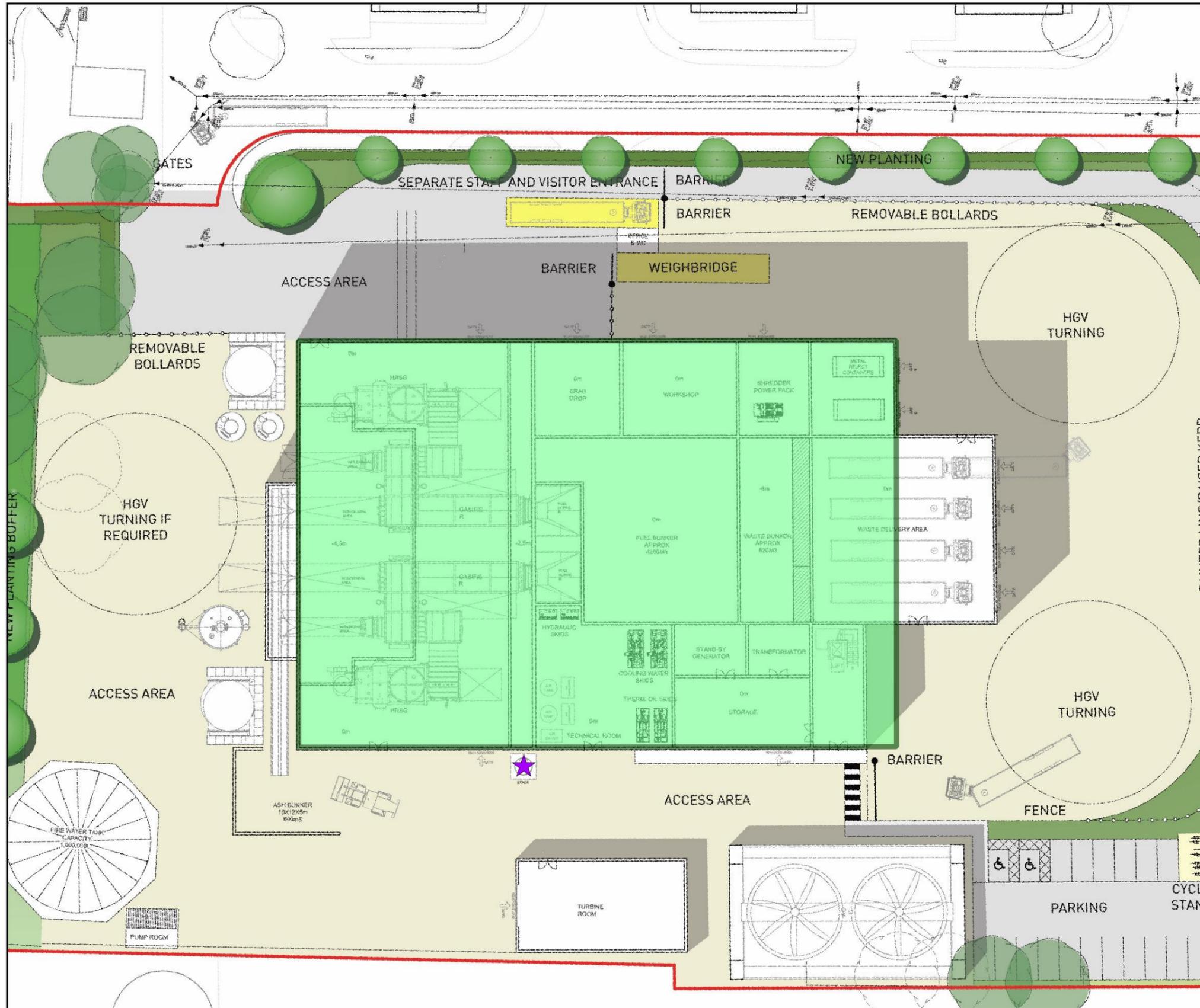
Date: 13/09/2015

Scale: 1:8,000

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0 500m





KEY
 ★ Stack Location
 ■ Modelled Building

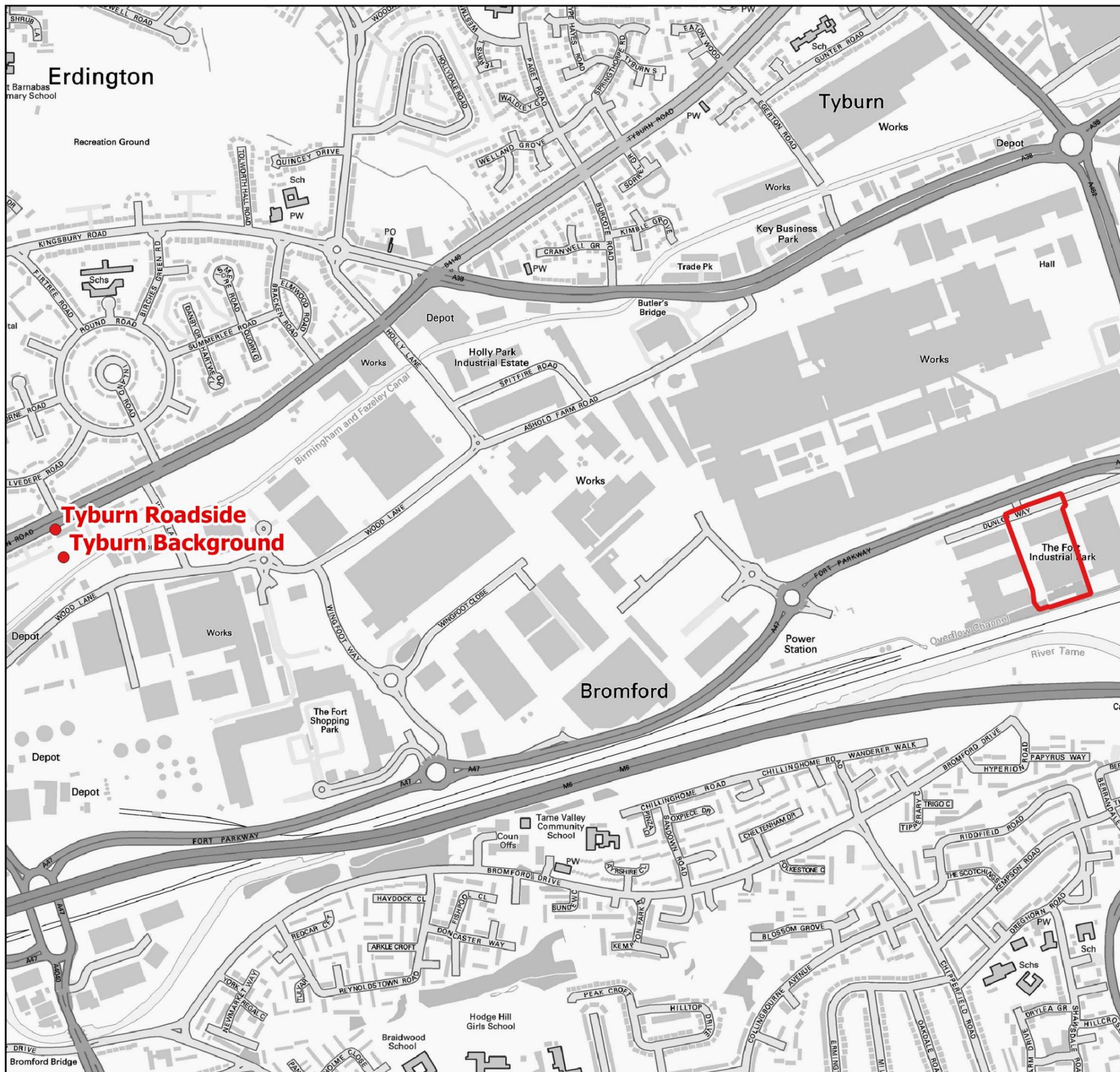
FIGURE 5.3
Modelled Building
(23m Height)

DRWG No: **K.0168_20** REV: _ Sheet No: **3/10**
(J2189_5.3)

Date: 13/09/2015

Scale: 1:500

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KEY

- Automatic Monitor
- Proposed Development Boundary

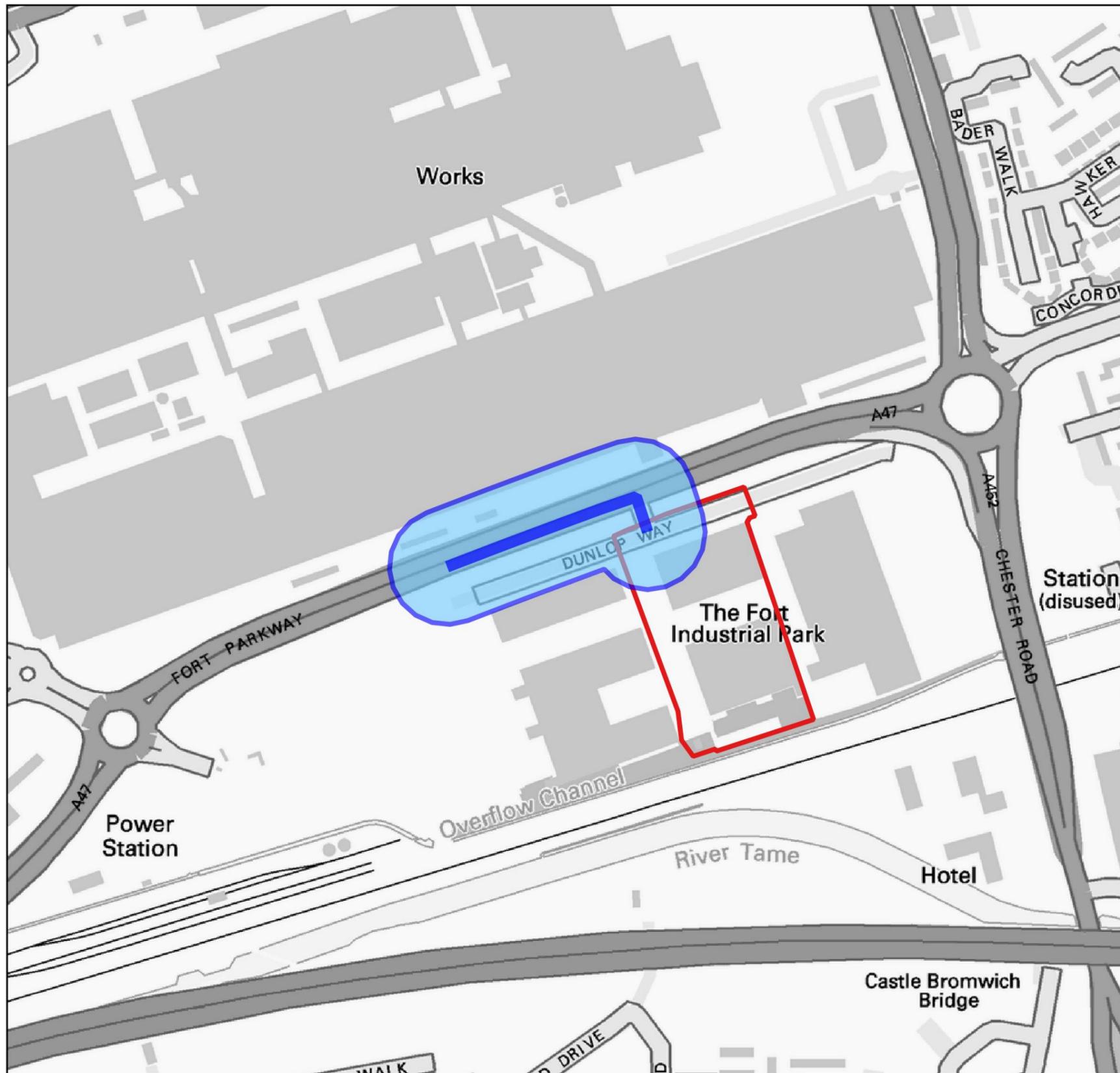
FIGURE 5.4
Tyburn Automatic Monitoring Sites

DRWG No: **K.0168_20** REV: _ Sheet No: **4/10**
(J2189_5.4)

Date: 12/09/2015

Scale: 1:8,000 @ A3





KEY

- 50 m Distance Band Around These Roads
- Roads Along Which Material May Be Tracked
- Proposed Development Boundary

FIGURE 5.6
Roads along which Materials
may be Tracked

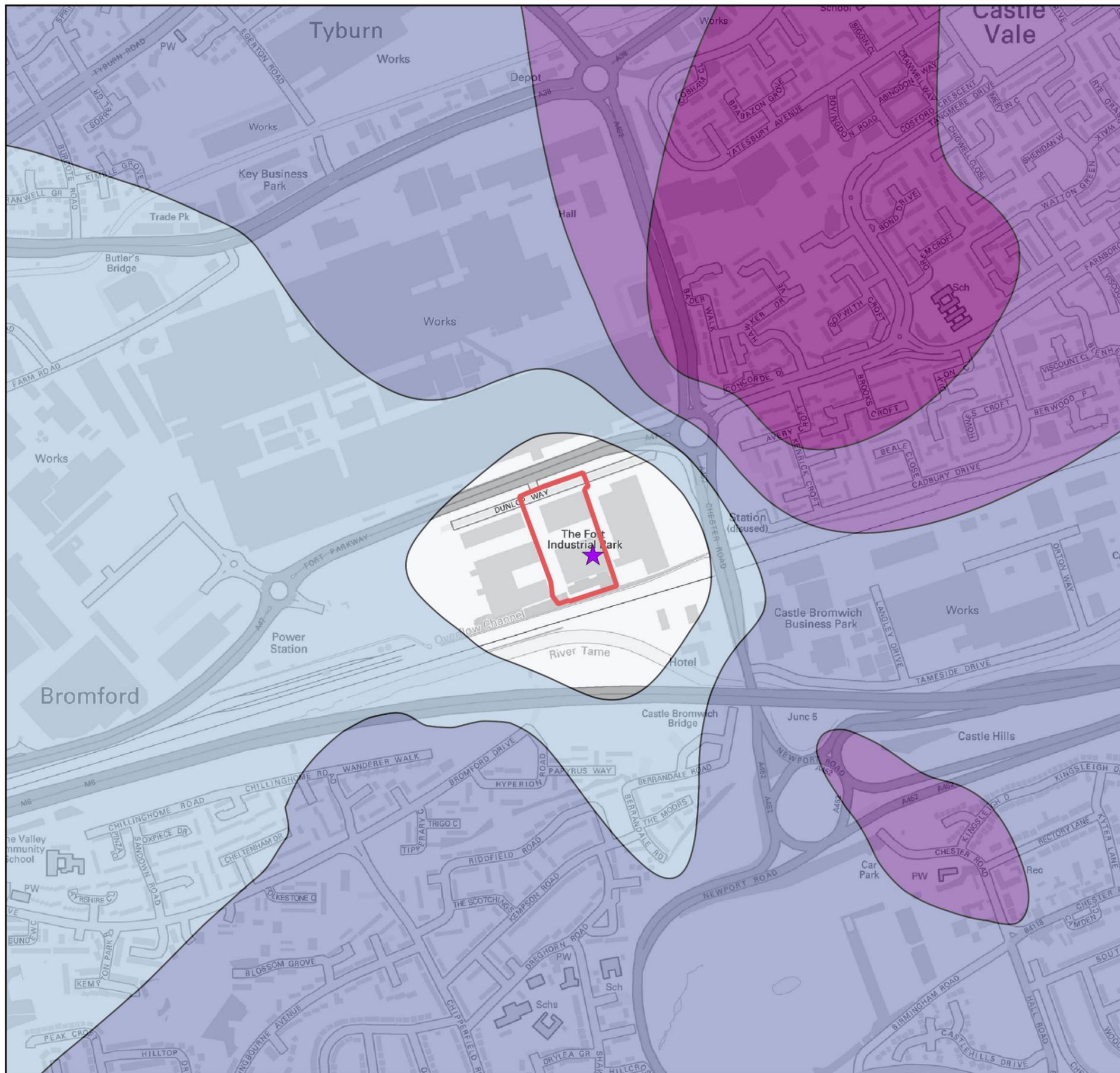
DRWG No: **K.0168_20** REV: _ Sheet No: **6/10**
(J2189_5.6)

Date: 13/09/2015

Scale: 1:8,000

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- KEY**
- Nitrogen Dioxide Process Contribution
- <math>< 0.1 \mu\text{g}/\text{m}^3</math>
 - $0.1 - 0.2 \mu\text{g}/\text{m}^3$
 - $0.2 - 0.3 \mu\text{g}/\text{m}^3$
 - $0.3 - 0.4 \mu\text{g}/\text{m}^3$
 - $0.4 - 0.5 \mu\text{g}/\text{m}^3$
 - Stack Location
 - Proposed Development Boundary

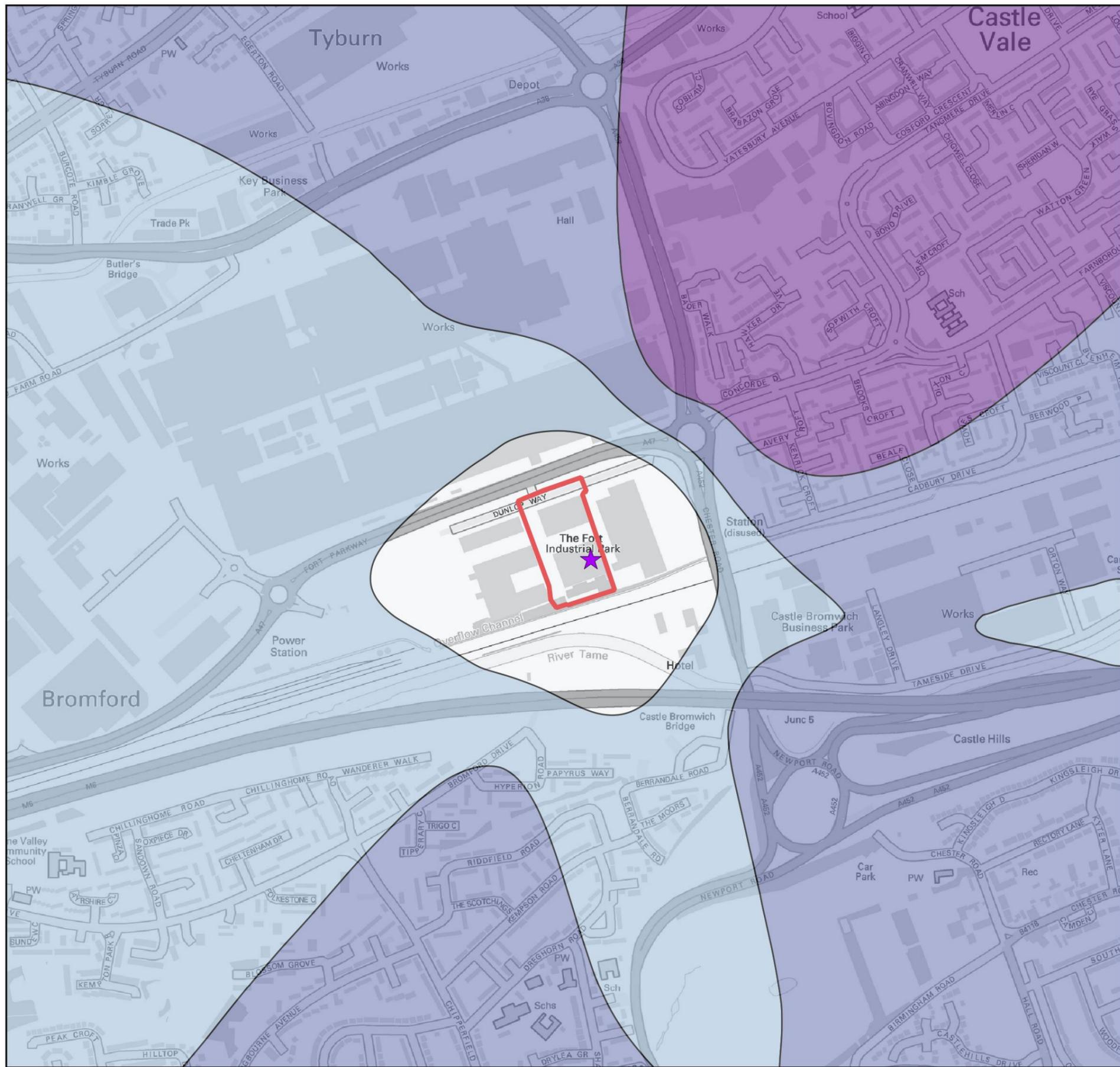
FIGURE 5.7
Nitrogen Dioxide Process Contributions

DRWG No: **K.0168_20** REV: _ Sheet No: **7/10**
(J2189_5.7)

Date: 15/09/2015

Scale: 1:7,500 @ A3





KEY

- Nitrogen Dioxide Process Contribution
- <math><0.1 \mu\text{g}/\text{m}^3</math>
 - $0.1 - 0.2 \mu\text{g}/\text{m}^3$
 - $0.2 - 0.3 \mu\text{g}/\text{m}^3$
 - $0.3 - 0.4 \mu\text{g}/\text{m}^3$
 - $0.4 - 0.5 \mu\text{g}/\text{m}^3$
 - Stack Location
 - Proposed Development Boundary

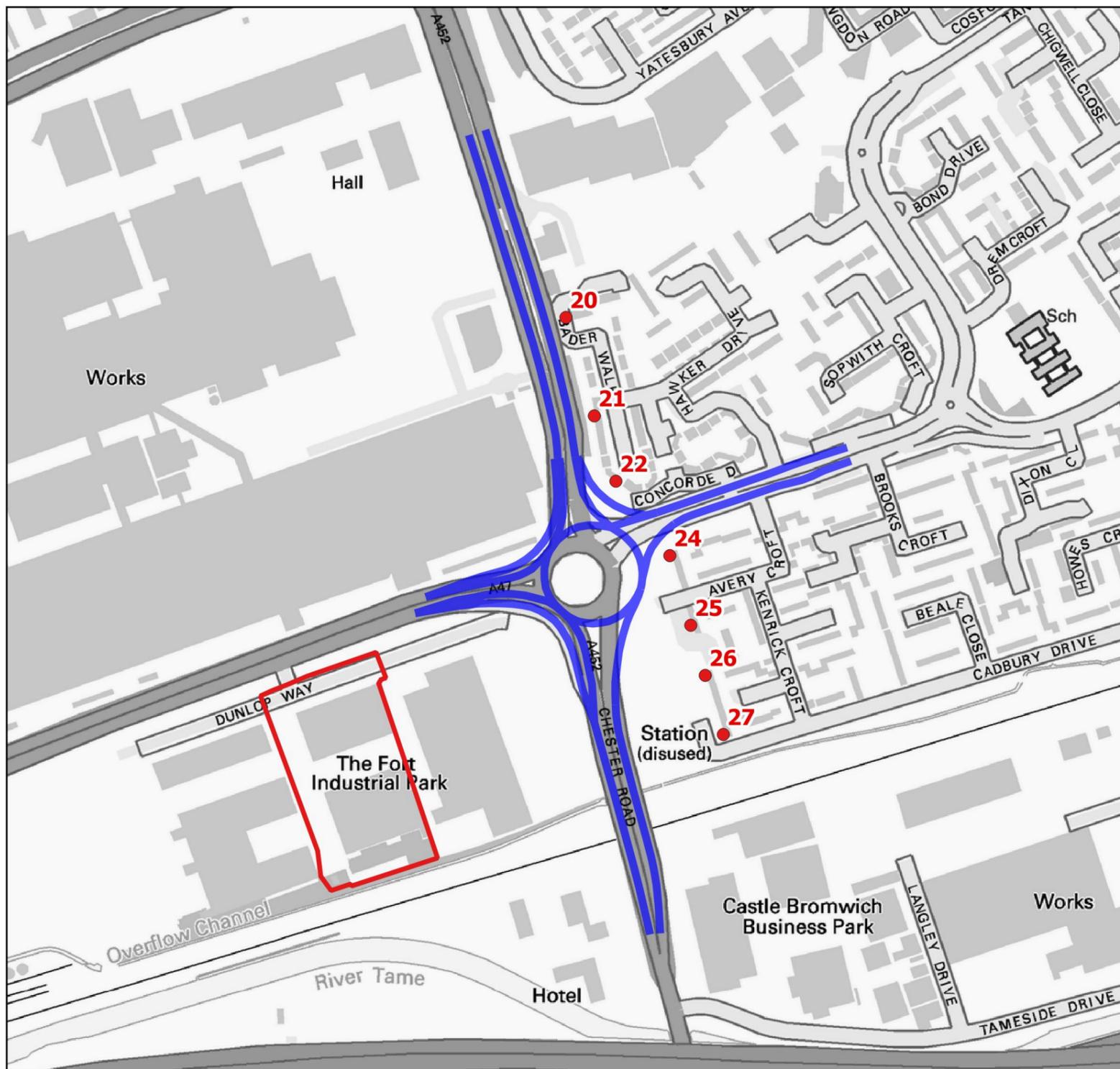
FIGURE 5.8
Nitrogen Dioxide Process Contributions (Reduced)

DRWG No: **K.0168_20** REV: _ Sheet No: **8/10**
(J2189_5.8)

Date: 13/09/2015

Scale: 1:7,500 @ A3





- KEY**
- Selected Sensitive Receptors
 - Modelled Road Network
 - Proposed Development Boundary

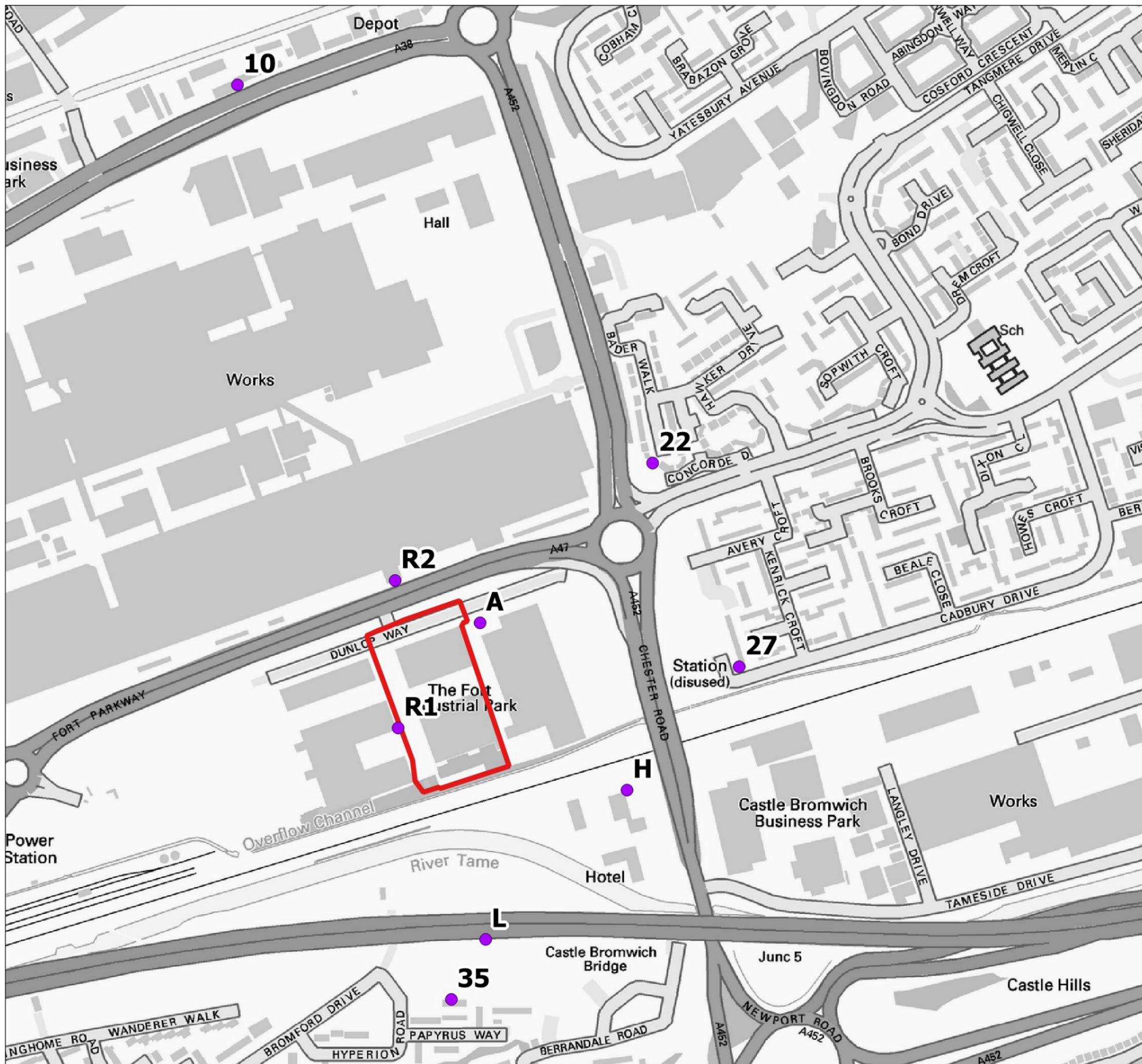
FIGURE 5.9
Selected Sensitive Receptors & Modelled Road Network

DRWG No: **K.0168_20** REV: _ Sheet No: **9/10**
(J2189_5.9)

Date: 13/09/2015

Scale: 1:5,000 @ A3





KEY

- Odour Risk Assessment Receptor
- Proposed Development Boundary

FIGURE 5.10
Odour Risk Assessment
Receptors

DRWG No: **K.0168_20** REV: _ Sheet No: **10/10**
(J2189_5.10)

Date: 13/09/2015

Scale: 1:5,000

@ A3



1 Background, Introduction & Context

2 Site Description

3 Development Proposals

4 Need & Alternatives

5 Air Quality

6 Townscape & Visual

7 Traffic & Transportation

8 Hydrology & Flood Risk

9 Hydrogeology & Ground Conditions

10 Noise & Vibration

11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

13 Socio- Economic Impact

14 Summary

6 LANDSCAPE AND VISUAL

6.1 Introduction

6.1.1 This chapter of the Environmental Statement (ES) considers the likely significant landscape/townscape and visual effects of the Proposed Development. It describes the methods used to assess these effects and determines the baseline conditions currently existing at the Application Site. Mitigation measures are detailed, where required, to prevent, reduce or offset the effects and the residual effects.

6.1.2 A detailed description of the Proposed Development is provided at **Chapter 3** of this ES. For ease of reference the main details of the Proposed Development considered to be of relevance to this assessment are:

- The Application Site covers 1.9 hectares;
- The Proposed Development consists of a main structure of 23m in height; and
- A flue/stack of 55m in height.

6.2 Assessment Approach

6.2.1 The assessment has been carried out with regard to best practice, as outlined in the published guidance:

- Guidelines for Landscape and Visual Impact Assessment (3rd edition) - Landscape Institute/ Institute of Environmental Management and Assessment (2013)
- GLVIA3 Statement of Clarification 1/13 – Landscape Institute (2013)
- An Approach to Landscape Character Assessment – Natural England, October 2014
- The Guidelines for Environmental Impact Assessment - (2004) Institute for Environmental Management and Assessment
- Photography and photomontage in landscape and visual assessment (2011) - Landscape Institute Advise Note 01/11

6.2.2 The study area for the assessment extends to 2km from the Application Site boundary. Whilst there may be the potential for effects of the Proposed Development to extend beyond this limit, it is considered that any such effect is unlikely to be significant as the visual perception of the Proposed Development within the landscape/townscape diminishes with ever increasing distance and the Proposed Development where visible is seen as increasingly smaller component of a wider composite landscape/townscape.

Landscape/Townscape Assessment Methodology

6.2.3 The information collated under the baseline study is analysed and an assessment made to review the effect of the Proposed Development on the landscape/townscape character and townscape elements and features (townscape resource receptors) of the Application Site and its surroundings. The assessment is based on the Proposed Development detailed in the Site Layout Plans provided in **Chapter 3**.

6.2.4 The townscape character assessment sets out the landscape baseline under two categories (GLVIA3, page 71):

- townscape elements and features; and
- landscape/townscape character and key characteristics, including landscape value.

6.2.5 The assessment then identifies landscape/townscape receptors, and assesses the sensitivity of those receptors. The likely effects of the Proposed Development on the receptors is identified and the magnitude of the effects assessed. Combining sensitivity

of the receptor and magnitude of effect leads to an assessment of the significance of landscape/townscape effects arising from the Proposed Development.

6.2.6 The assessment considers the sensitivity of the landscape/townscape character and the magnitude of change which would result from the Proposed Development. The sensitivity of landscape/townscape character is an expression of the landscape's ability to accommodate change. It varies depending on factors such as the existing land use, pattern and scale of the landscape/townscape, the degree of openness, condition, the value placed on the landscape and any designations that may apply. In most cases the landscape/townscape components in the immediate surroundings strongly influence the landscape/townscape character, more so than more distant elements or features. However, at certain viewpoints it is possible to feel a sense of exposure or remoteness due to the absence of nearby features.

6.2.7 Landscape/townscape value is considered in terms of factors such as the condition and quality of the landscape, the scenic quality, the rarity of the landscape in the locality and at a larger scale, the representativeness of the landscape, the recreation or amenity value of the landscape, its perceptual aspects such as wildness or tranquillity, and any associations that may exist between the local landscape and historical people or events. This list is not necessarily exhaustive or definitive. (GLVIA3, page 84).

6.2.8 The landscape/townscape assessment evaluates the effects of the Proposed Development on individual landscape/townscape elements and features, such as topography, notable buildings, water features, trees and hedges which have been identified within the study area in the baseline survey. The assessment considers the sensitivity of these landscape/townscape resources and identifies the magnitude of change that the Proposed Development would create. The sensitivity of an individual landscape/townscape element or feature is a combination of its value and susceptibility, the latter being made up of factors such as its quality, contribution to landscape/townscape character and the degree to which the element can be replaced. An element or feature may be more sensitive in one location than another. Therefore it is not possible to simply place different types of landscape/townscape elements or features into sensitivity bands. Where individual landscape/townscape elements or features have been affected professional judgement has been used to give an objective evaluation of its sensitivity. Justification is given for this evaluation where necessary.

6.2.9 The significance of effects on landscape/townscape character and landscape/townscape elements and features is determined by combining the sensitivity of the landscape character or features with the magnitude of change. Those effects identified as being of major significance may be regarded as significant effects with respect to the Town and Country Planning (Environmental Impact Assessment) Regulations 2011.

6.2.10 Tables 6.1 – 6.6 set out the criteria for measuring the effects of the Proposed Development on the landscape/townscape character and landscape/townscape elements and features (the landscape/townscape resource) of the Application Site and surrounding area together with the definition of significance.

6.2.11 The nature of the effects can be either, adverse or beneficial. Unless otherwise stated the effects of the Proposed Development are assessed to be of an adverse nature.

Thresholds – Landscape Resource and Landscape Character Receptors

6.2.12 Sensitivity of landscape/townscape resource receptors is determined by a combination of the value that is attached to (a) landscape/townscape character, feature or element and the susceptibility of the landscape/townscape character, feature or element to changes that would arise as a result of the Proposed Development – see Pages 88-90 of GLVIA3. Both value and susceptibility are assessed as high, medium or low.

Table 6.1: Sensitivity of Landscape/Townscape Resource Receptors

	Value			
Susceptibility		High	Medium	Low
	High	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

6.2.13 Professional judgement has been used to determine the magnitude of direct physical impacts on individual existing landscape/townscape features as follows:

Table 6.2: Magnitude of Change for Landscape/Townscape Resource Receptors

High	Total loss or major alteration to (an) existing element or feature
Medium	Partial loss or alteration to (an) existing element or feature
Low	Minor loss or alteration to part of (an) existing element or feature
Negligible/No Change	No notable loss or alteration to (an) existing element or feature

6.2.14 Sensitivity of landscape character is determined by a combination of the value that is attached to a landscape/townscape and the susceptibility of the landscape/townscape to changes that would arise as a result of the Proposed Development – see Pages 88-90 of GLVIA3. Both value and susceptibility are assessed as high, medium or low.

Table 6.3: Sensitivity of Landscape/Townscape Character

	Value			
Susceptibility		High	Medium	Low
	High	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

Table 6.4: Criteria for Landscape/Townscape Value

	Criteria
High	<p>Designated areas at an International, Regional, National or Local (including but not limited to World Heritage Sites, National Parks, AONBs, SLAs etc.) and also considered an important component of the country's character, experienced by a high number of people.</p> <p>Landscape condition is good and components are generally maintained to a high standard.</p> <p>In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has an elevated level of tranquillity.</p> <p>Rare or distinctive elements and features are key components that contribute to the character of the area.</p>
Medium	<p>No formal designation but (typically) rural landscapes, important to the setting of villages etc. and also considered to a distinctive component of the regional/county character experienced by a large proportion of its population.</p> <p>Landscape condition is fair and components are generally well maintained.</p> <p>In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has a moderate level of tranquillity.</p> <p>Rare or distinctive elements and features are notable components that contribute to the character of the area.</p>
Low	<p>No formal designations but a landscape of local relevance (including but not limited to public or semi-public open spaces, village greens or allotments) and also green infrastructure and open spaces within residential areas likely to be visited and valued by the local community.</p> <p>Landscape condition may be poor and components poorly maintained or damaged.</p> <p>In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has limited levels of tranquillity.</p> <p>Rare or distinctive elements and features are not notable components that contribute to the character of the area.</p>

Table 6.5: Criteria for Landscape/Townscape Susceptibility

	Criteria
High	<p>Scale of enclosure – landscapes with a low capacity to accommodate the type of development proposed owing to the interactions of topography, vegetation cover, built form etc.</p> <p>Nature of land use – landscapes with no or little existing reference or context to the type of development being proposed.</p> <p>Nature of existing elements – landscapes with components that are not easily replaced or substituted (e.g. ancient woodland, mature trees, historic parkland etc.).</p> <p>Nature of existing features – landscapes where detracting features or major infrastructure is not present or where present has limited influence on the landscape.</p>

	Criteria
Medium	<p>Scale of enclosure – landscapes with a medium capacity to accommodate the type of development proposed owing to the interactions of topography, vegetation cover, built form etc.</p> <p>Nature of land use – landscapes with some existing reference or context to the type of development being proposed.</p> <p>Nature of existing elements – landscapes with components that are easily replaced or substituted.</p> <p>Nature of existing features – landscapes where detracting features or major infrastructure is present and has a noticeable influence on the landscape.</p>
Low	<p>Scale of enclosure – landscapes with a high capacity to accommodate the type of development proposed owing to the interactions of topography, vegetation cover, built form etc.</p> <p>Nature of land use – landscapes with extensive existing reference or context to the type of development being proposed.</p> <p>Nature of existing features – landscapes where detracting features or major infrastructure is present and has a dominating influence on the landscape.</p>

Table 6.6: Criteria for Magnitude of Change for Landscape/Townscape Character

	Criteria
High	Total or major alteration to existing landscape/townscape character
Medium	Partial alteration to existing landscape/townscape character
Low	Minor alteration to part of existing landscape/townscape character
Negligible/No Change	No notable alteration to existing landscape/townscape character/No visible change

Visual Assessment Methodology

6.2.15 The comprehensive visual assessment identifies the visual effects that the Proposed Development would have upon the visual amenity of receptors located within the surrounding landscape and townscape. The visual assessment is based on the Proposed Development detailed in the Site Layout Plans (**see Chapter 3**) and assesses the change in the view that would result if the scheme were to be constructed.

6.2.16 The assessment has examined views which would be observed from public locations and it has also considered views from residential properties where appropriate. Two visual assessments have been made (a) during the construction phase; and (b) during the operational phase. The second visual assessments consider views at Year 5, taking into account vegetation growth during the intervening period (assumed to be 0.3-0.5m per year).

6.2.17 The sensitivity of receptor groups depends on factors such as duration of view, the angle at which they would see the Application Site and the nature of the viewer e.g. resident, tourist or worker. In general residential receptors, tourists, recreational users of public rights of way and public open spaces, and views from recognised vantage points are considered to have a higher sensitivity to change than people travelling along highways or at places of work.

6.2.18 Determining levels of magnitude depends on how prominent, or noticeable, the development would be in the landscape. This is affected by factors such as distance - close (up to 500 metres from the receptor), middle distance (500 metres to 2 km from the receptor), and long distance (over 2 km from the receptor), visual screening, the focus of the view and the nature and scale of other landscape/townscape features within the view.

6.2.19 **Tables 6.7 – 6.9** below set out the criteria and significance thresholds for visual receptors. Effect on visual amenity is determined by the relationship between the sensitivity of the receptor and the magnitude of change that would result from the Proposed Development.

6.2.20 Effects may be adverse, beneficial or neutral. Unless otherwise stated the effects of the Proposed Development are assessed to be of an adverse nature.

Thresholds – Visual Receptors

6.2.21 Sensitivity is determined by a combination of the value that is attached to a view and the susceptibility of the receptor to changes in that view that would arise as a result of the Proposed Development – see Pages 113-114 of GLVIA3. Both value and susceptibility are assessed as high, medium or low.

6.2.22 The value attached to a view includes a recognition of value through formal designations (for example landscape designations), and indicators of value attached to views by visitors (for example inclusion on maps or within guidebooks, provision of facilities, presence of interpretation etc.).

Table 6.7: Criteria for Susceptibility for Visual Receptors

High	Includes occupiers of residential properties in rural areas, and people engaged in recreational activities in the countryside such as using Public Rights of Way.
Medium	Includes occupiers of residential properties in urban areas, people engaged in outdoor sporting activities and people travelling through the landscape on minor roads and trains.
Low	Includes people at place of work e.g. industrial and commercial premises and people travelling through the landscape on A roads and motorways.

Table 6.8: Sensitivity of Visual Receptors

	Value			
		High	Medium	Low
Susceptibility	High	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

Table 6.9: Criteria for Magnitude of Change for Visual Receptors

High	Major change in the view that has a defining influence on the overall view or many visual receptors affected.
Medium	Some change in the view that is clearly visible and forms an important but not defining element in the view.
Low	Some change in the view that is not prominent or few visual receptors affected.
Negligible	No notable change in the view.
No Change	No change in the view as site not visible due to landform etc.

6.2.23 Potential visual receptors of the scheme were identified within 2km of the Proposed Development based on an analysis of publicly available maps and aerial photography, and confirmed by visiting the Application Site and surrounding area. Viewpoints have been selected to represent a range of views and viewer types and are shown on the Photoview Location Plan (**Figure 6.1**) and Photoviews (**Figure 6.2**). Photographs have been taken digitally using a 50mm focal length lens camera. All of the representative viewpoints have been taken at 1.6m above ground level. However, where relevant, assumed views from the upper floors of buildings have been considered. Viewpoints include, where relevant, residential properties, highways, Public Rights of Way (PRoWs) and other places of recreation, and places of work. The baseline data includes:

- Location of viewpoint;
- Nature of visual receptor;
- Sensitivity of visual receptor;
- Number of receptors affected;
- Distance between the receptor and the Proposed Development; and
- Description of the existing view from each viewpoint.

6.2.24 The assessment then provides a description of the predicted change to the view resulting from the Proposed Development.

6.2.25 Photomontages are also provided for a number of the representative viewpoints to show the appearance of the Proposed Development within the existing townscape – see **Figure 6.3**.

6.2.26 The technical methodology for the production of the Photoviews and Photomontages is provided at **Appendix 6.1**.

Assessment of Significance

6.2.27 The significance of effects on landscape/townscape character, landscape/townscape elements and features, and on visual amenity is determined by combining the sensitivity of the receptor with the magnitude of change. Those effects identified as being of major significance may be regarded as significant effects with respect to the Town and Country Planning (Environmental Impact Assessment) Regulations 2011.

Table 6.10: Degree of Significance Threshold for Landscape and Visual Effects

		Magnitude Of Change			
		High	Medium	Low	Negligible/ No Change
Receptor Sensitivity	High	Major	Major	Moderate	Minor/No effect
	Medium	Major	Moderate	Minor	Negligible/No effect
	Low	Moderate	Minor	Negligible	Negligible/No effect

	Significant
	Not Significant

Table 6.11: Definition of Significance Criteria for Landscape/Townscape Character and Landscape/Townscape Features and Elements

Significance	Criteria
Major Adverse Effect	The proposed scheme would result in effects that are at complete/considerable variance with the landform, scale and pattern of the landscape that cannot be fully mitigated; would permanently degrade, diminish or destroy the integrity of valued characteristic features, elements and/or setting; would cause a very high quality landscape of recognised value to be permanently changed and its quality diminished.
Moderate Adverse Effect	The proposed scheme would be out of scale with the landscape or at odds with the local pattern and landform; will leave an adverse impact on a landscape of recognised quality.
Minor Adverse Effect	The proposed scheme would not quite fit into the landform and scale of the landscape; affect an area of recognised landscape quality.
Negligible/No Effect	The proposed scheme would complement the scale, landform and pattern of landscape, maintain existing landscape quality.
Minor Beneficial Effect	The proposed scheme has the potential to improve the landscape quality and character; fit in with the scale, landscape and the pattern of the landscape; enable the restoration of valued characteristic elements or features partially lost through other land uses.
Moderate Beneficial Effect	The proposed scheme would have the potential to fit in very well with the landscape character; improve the quality of the landscape through removal of damage caused by existing lands uses.
Major Beneficial Effect	The proposed scheme would fit in very well with the landscape character and would significantly improve the quality of the landscape through removal of damage caused by existing land uses.

Table 6.12: Definition of Significance Criteria for Visual Effects

Major Adverse Effect	Where the scheme would cause a significant deterioration in the existing view.
Moderate Adverse Effect	Where the scheme would cause a noticeable deterioration in the existing view.
Minor Adverse Effect	Where the scheme would cause a barely perceptible deterioration in the existing view.
Negligible/No Effect	No discernible improvement or deterioration in the existing view.
Minor Beneficial Effect	Where the scheme would cause a barely noticeable improvement in the existing view.
Moderate Beneficial Effect	Where the scheme would cause a noticeable improvement in the existing view.
Major Beneficial Effect	Where the scheme would cause a significant improvement in the existing view.

Policy Framework

National Planning Policy

National Planning Policy Framework

6.2.28 The National Planning Policy Framework, published on the 27th March 2012, sets out Government planning policies for England and how these are expected to be applied.

6.2.29 The NPPF sets out 12 core planning principles, the most relevant of which to this assessment is '**Conserving and enhancing the natural environment**'. These core aims are designed to guide and influence local authorities developing their local plans demonstrating Government commitment to ensure the planning system does everything it can to support sustainable economic growth.

6.2.30 The environmental role of the NPPF states that sustainable development should be achieved by:

"contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use of natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy."

6.2.31 The use of criteria-based policies based upon landscape character assessment is considered as suitable to ensure the protection of locally valued landscapes outside of nationally designated landscapes.

National Planning Policy Guidance

6.2.32 The Government's Planning Practice Guidance website, containing a comprehensive range of guidance of the planning system, went live on 6th March 2014. The guidance should be read alongside the NPPF and is a material consideration in the determination of planning applications. Further details are contained within the Planning Statement that accompanies this application.

Other Relevant National Guidance

6.2.33 Where relevant, reference has also been made to the following guidance documents:

- A design-led approach to infrastructure – The Design Council and The Commission for Architecture and the Built Environment (2012)
- Guidance on Tall Buildings – Historic England and The Commission for Architecture and the Built Environment (2007, and 2014 Update (Consultation Version))

Local Planning Policy

6.2.34 Details of relevant local planning policies are contained in the Planning Statement that accompanies this application. However, the following two Supplementary Planning Guidance documents (SPGs) are considered to be particularly relevant to this assessment

High Places SPG (2003)

6.2.35 The High Places SPG was adopted by Birmingham City Council in March 2003. It analyses the current locations of tall buildings (i.e. those that are significantly higher than their neighbours, or make a recognisable impact on the skyline), and provides guidance as to appropriate (and inappropriate) locations for future tall buildings. Generally, appropriate locations are identified as the central ridge zone, and other key locations such as key arrival points and view terminators. Noted inappropriate locations are city centre Conservation Areas and location where tall buildings would affect the setting of Listed Buildings.

Places for All SPG (2001)

6.2.36 This SPG, adopted in November 2001, is concerned with the need for good design which results in (amongst other things) diversity of land use, ease of movement, and safety and privacy where appropriate.

Scoping Criteria

6.2.37 The following scope for this LVIA/TVIA has been agreed with Birmingham City Council (the LPA) as follows:

Study area

6.2.38 Based on knowledge of the local townscape and particularly the existing large industrial units in the vicinity of the Application Site, a 2km study area to consider effects upon townscape character (both built-up areas and green spaces) and visual amenity has been agreed.

6.2.39 This study area would apply to the TVIA baseline section, assessment of townscape receptors (townscape character areas and designations), and visual receptors (for example people visiting/using designated viewpoints, Public Rights of Way (PRoW), roads and residential areas).

6.2.40 Proposed developments (consented or pipeline) to be considered in combination with the Proposed Development have been agreed with the LPA.

Methodology

6.2.41 The methodology, as detailed above, has been agreed with the LPA.

Local Landscape and Townscape Character

6.2.42 The following published landscape and townscape character assessment have been reviewed as part of the assessment of landscape and townscape character:

- NCA97: Arden

Landscape Features and Elements and Planning Policies

6.2.43 Relevant policies from the Saved Unitary Development Plan Policies and draft Birmingham Development Plan Policies relating to landscape or townscape features and elements have been reviewed. In particular, the Birmingham City Council High Places SPG has been considered.

Visual Receptors and Views

6.2.44 Representative viewpoint locations from which to undertake the assessment of effects on visual amenity have been agreed with the City Design Team of the LPA. The representative viewpoint locations have been identified through desk-based analysis of maps and aerial imagery, the field survey, and discussions with the LPA.

Limitations to the Assessment

6.2.45 The landscape/townscape resource survey work and visual assessment for the Proposed Development was undertaken in September 2015. Deciduous vegetation was therefore in full leaf, but consideration has been given to the effects of reduced leaf cover during the winter months.

6.3 Baseline Conditions

Site Description and Context

Site Description

6.3.1 A detailed site description is provided at **Chapter 3** of this ES. The following features and characteristics of the Application Site and surrounding area are considered to be of particular relevance to this assessment.

6.3.2 The Application Site is not subject to any statutory or non-statutory landscape designation.

6.3.3 The Fort Industrial Park currently comprises 26 units (use class B1, B2 and B8) of industrial / warehouse and trade counter buildings (approximately 10m in height) with offices, service yard and parking. The Application Site includes two single storey business, industrial and storage buildings containing nine separate units. The units are surrounded by areas of hard standing used for staff car parking. These existing buildings would be demolished as part of the Proposed Development, to be replaced with the proposed renewable energy centre.

6.3.4 There are 27 existing deciduous trees and some shrubs within the Application Site, with further trees and shrubs beyond the Application Site boundary to the south, between the Application Site and the railway line. There is also some limited tree cover and grass areas along the western and northern boundaries, the grass areas being crossed by the roads which allow access to the industrial units.

Surrounding Area

6.3.5 To the north of the Application is a single carriageway road, Dunlop Way, which provides access to the Fort Industrial Park and Fort Industrial Estate. Beyond this is a belt of landscaping and trees (approximately 20m wide) and then the A47 dual carriageway, here known as Fort Parkway. To the north of the A47 is the Jaguar Castle Bromwich car plant which occupies an area of approximately 36 hectares, most of this occupied by large-scale industrial buildings of up to approximately 16m in height. Further north still are further industrial areas, the A38 Kingsbury Road dual carriageway, and then the residential areas of Tyburn, Birches Green and Erdington.

6.3.6 To the east of the Application Site is a large B&Q superstore and associated car park, and then the A452/Chester Road dual carriageway. Beyond the dual carriageway is an area of public open space (currently being used for materials storage for the roadworks at Spitfire Island) associated with the Castle Vale residential area, and then the Castle Vale residential area itself. Further east is an area of sports facilities, the Minworth sewage treatment facility, and then the village of Curdworth and the M42 and M6 Toll motorways.

6.3.7 To the south of the Application Site and Castle Vale lies the West Coast Mainline railway. Sandwiched between the railway and the M6 motorway (to the east of the A452) is a further industrial/commercial area, including a large car auction facility and a manufacturing facility. A 5-storey hotel and pub lie between the railway and the M6 to the west of the A452. The M6 motorway is elevated along this section of its route, and this provides visual separation between the Application Site and the residential area of Hodgehill to the south of the motorway.

6.3.8 The River Tame flows through this area on a west to east alignment, flowing through the Park Hall Nature Reserve to the east. This corridor also contains a line of high voltage powerlines, suspended from pylons.

6.3.9 The nearest non-statutory designation of relevance in landscape and visual terms is the Grade II* Registered Park and Garden at Castle Bromwich Hall. The Hall itself is Grade I Registered, as is the nearby church of St Mary and St Margaret. The Registered Park and Garden lies approximately 600m to the south-south-east of the Application Site, but is separated from the Application Site by the elevated section of the M6.

6.3.10 To the west of the Application Site are further industrial/trade counter units, and then a car storage facility used by Jaguar Cars. Beyond this lies a gas turbine electricity-generation plant (with a stack of approximately 60m tall and 4.5m wide), and the former Fort Dunlop tyre factory (see Paragraph 6.3.12 below), now converted to a hotel, retail space and offices of approximately 24m in height. Further west still lies another extensive area of industrial units of varying sizes.

6.3.11 The only Public Right of Way (PRoW) in the vicinity of the Application Site is a short section of public footpath associated with the parkland of Castle Bromwich Hall (which is considered unlikely to be materially affected by the Proposed Development). There are pedestrian walkways associated with many of the roads in the area.

6.3.12 The locally listed Fort Dunlop building lies approximately 750m to the west of the Application Site, and there are a number of other Listed Buildings in the local area, notably those in the vicinity of Castle Bromwich Hall and those to the north of the Jaguar plant.

Baseline Survey Information**Landscape Designations**

6.3.13 There are no landscape-related designations in place on the Application Site or in its immediate environs. The nearest non-statutory designation of relevance in landscape and visual terms is the Grade II* Registered Park and Garden at Castle Bromwich Hall. The Hall itself is Grade I Registered, as is the nearby church of St Mary and St Margaret. The Registered Park and Garden lies approximately 600m to the south-south-east of the Application Site, but is separated from the Application Site by the elevated section of the M6.

Existing Landscape/Townscape Features and Elements**Trees and Vegetation**

6.3.14 There are a number of existing deciduous trees and some shrubs around the perimeter of the Application Site, with further trees and shrubs beyond the Application Site boundary to the south, between the Application Site and the railway line. There is also some limited grass and shrub areas along the western and northern boundaries, the grass and shrub areas being crossed by the roads which allow access to the industrial units. Although not formally surveyed, these trees are considered to be of moderate quality and therefore medium value.

6.3.15 Seven of the existing trees within the Application Site would be retained (in the south-west corner, and adjacent to the proposed car park on the eastern side of the Proposed Development), while 10 existing perimeter trees would be lost. A further 22 new trees would be planted along the southern and western boundaries of the Proposed Development, and along the boundary between the two parts of the Application Site. There would also be further new shrub and hedge planting along the southern and western boundaries, and along the boundary between the two parts of the Application Site. The tree resource within the Application Site is therefore considered to be of medium susceptibility to changes arising from development of the type proposed, resulting in an overall medium sensitivity.

Land Use

6.3.16 The Application Site is currently occupied by a number industrial/trade counter type buildings. It is likely that the specific location provided by the Application Site is not critical for the businesses which occupy these buildings, and there are likely to be a number of alternative locations within the surrounding area. The value of the site in terms of land use is therefore considered to be low.

6.3.17 The Proposed Development comprises an alternative industrial use of the land, and the susceptibility of the land to changes arising from development of the type proposed is therefore considered to be low. The overall sensitivity of the land use is therefore assessed as low.

Topography

6.3.18 The topography of the Application Site, being broadly level at around 82-83m Above Ordnance Datum (AOD), is not atypical for the area and is therefore considered to be of low value. The topography of the Application Site would remain substantially unaltered as a result of the Proposed Development, and the susceptibility to changes arising from development of the type proposed is therefore low. The overall sensitivity of the topography is therefore considered to be low.

PRoWs

6.3.19 There are no PRoWs within the Application Site, and as a result the Proposed Development would have no direct effects on PRoWs. Potential effects on visual amenity experienced by users of the local PRoW network are considered at Paragraph 6.4.19 onwards below.

Watercourses and Waterbodies

6.3.20 There are no watercourses or waterbodies within the Application Site which would be directly affected (in landscape terms) by the Proposed Development. It should be noted, however, that the River Tame flows west to east past the Application Site, on the south side of the railway line which lies adjacent to the southern boundary of the Application Site. Effects on water features and hydrology are considered in more detail in **Chapter 8** of the ES.

Cultural Heritage Assets

6.3.21 There are no cultural heritage or archaeological assets within the Application Site that would be affected (in landscape or visual terms) by the Proposed Development. Effects on Cultural Heritage Assets are considered in more detail in **Chapter 12** of the ES.

Landscape/Townscape CharacterNational Landscape Character Area

6.3.22 National Landscape Character Areas (NCAs) are based on the former Joint Character Areas originally prepared by the former Countryside Agency. NCAs are now managed by Natural England. These NCAs identify a number of key landscape characteristics for each specific area. The Application Site is located within the NCA 97 – Arden (see **Appendix 6.2**).

- **Well-wooded farmland landscape with rolling landform.**
- **Geologically diverse with rocks ranging from the Precambrian to the Jurassic and overlain by superficial Quaternary deposits.**
- **Mature oaks, mostly found within hedgerows, together with ancient woodlands, and plantation woodlands that often date from the time of enclosure. Woodlands include historic coppice bounded by woodbanks.**
- **Narrow, meandering clay river valleys with long river meadows; the River Blythe SSSI lying between the cities of Coventry and Birmingham is a good example of this.**
- **Numerous areas of former wood-pasture with large, old, oak trees often associated with isolated remnants of more extensive heathlands. Village greens/commons have a strong association with remnant lowland heath. Fragmented heathland persists on poorer soils in central and northern areas.**
- **Diverse field patterns, ranging from well hedged, irregular fields and small woodlands that contrast with larger semi regular fields on former deer park estates, such as, Packington Hall and Stoneleigh Park.**

- **Complex and contrasting settlement pattern with some densely populated where traditional settlements have amalgamated to form the major West Midlands conurbation while some settlements remain distinct and relatively well dispersed.**
- **North-eastern industrial area based around former Warwickshire coalfield, with distinctive colliery settlements. North-western area dominated by urban development and associated urban edge landscapes such as managed greenspace, for example allotments, gardens, parks, golf courses (rough areas) and public open spaces; playing fields, churchyards, cemeteries and institutional grounds (schools, hospitals).**
- **Transport infrastructure, the M42, M40, M6 and M5 are major transport corridors that sit within the landscape of this NCA.**
- **Shakespeare's 'Forest of Arden, featured in 'As You Like It, is still reflected through the woodland cover, mature oaks, small ancient woodlands and former wood pasture.'**

6.3.23 The Application Site and its immediate environs fall within the **"major West Midlands conurbation"**, rather than the more rural parts of the NCA, and also within the **"major transport corridor"** of the M6. However there are numerous examples of the noted **"managed greenspace"** within the study area, and combined with the frequent street and domestic garden trees, these provide a relatively green character to many of the residential areas.

Local Landscape/Townscape Character - Author's Own Assessment of Local Landscape/Townscape Character within 2km of the Application Site

Landscape/Townscape Scale

6.3.24 The townscape exhibits a variable scale. The existing built form immediately surrounding the Application Site (particularly to the immediate east, south-east, west and north) comprises large or very scale industrial buildings, typically 2-3 storeys equivalent in height. The refurbished Fort Dunlop building is taller than this, at approximately 24m, while the existing Rolls Royce peaking plant gas turbine power station adjacent to Fort Dunlop includes a stack of approximately 60m tall and 4.5m wide.

6.3.25 Beyond the adjacent industrial areas lie areas of relatively dense residential development, predominantly smaller in scale and made up of one or two storey properties in a mix of detached, semi-detached and terraced arrangements. There are also areas of managed greenspace within the residential areas and these provide some contrast to the housing.

Landform and Enclosure

6.3.26 The local landform is gently undulating, sloping from the approximately 105-115m AOD in Erdington and around Pype Hayes Hall, down to approximately 88m AOD at the River Tame. The land then rises up again to approximately 105m AOD to the west of Castle Bromwich Hall, before dropping down again towards the River Cole.

6.3.27 Any sense of enclosure is generally provided by man-made structures – industrial and commercial buildings, housing, and massive structures such as the elevated section of the M6 motorway to the south of the Application Site. This built form also often serves to emphasise the natural undulations in the topography.

6.3.28 The notable presence of trees and other vegetation, such as those lining the railway to the south of the Application Site, and those spread throughout many of the greenspaces (both managed and unmanaged), also increase the sense of enclosure when close to them.

Townscape Pattern and Complexity

6.3.29 The townscape surrounding the Application Site is of medium to high complexity.

6.3.30 The grain of the industrial/commercial areas to the immediate east, south-east, west and north these industrial areas is generally medium to coarse, the latter arising from the massive scale of some of the industrial buildings such as at the Jaguar car plant to the north of Fort Parkway. The grid-like layout of many of these industrial premises does however reduce the perceived complexity when viewed in aerial imagery.

6.3.31 Residential areas are generally more complex with a finer grain, with complex networks of often sinuous streets providing access to the individual properties. Castle Vale, to the east of the Application Site, and Tyburn (to the north of the Jaguar car plant) has been extensively re-developed over the past two decades, with poor quality housing and concrete tower blocks from the 1960s replaced with terraced houses. The main part of Erdington and Hodgehill are areas of 1930s housing, with Erdington being predominantly short terraces and Hodgehill being mainly pairs of semi-detached properties. Areas of managed greenspace, including trees and small areas of woodland, within the residential districts provide contrast to the pattern formed by the housing.

6.3.32 The different areas are linked together by a network of A-roads, often tree-lined dual-carriageways, with these in turn linking to the main transport corridor formed by the M6 and the West Coast Mainline, both broadly following the course of the River Tame. The A-roads are fed by B-roads and unclassified roads, these then linking to the network of residential streets.

6.3.33 To the east there is a gradual transition from urban to more rural, passing (through) the industrial/commercial area of Minworth, the extensive Minworth sewage treatment plant, and then the distinct settlements of Curdworth, Water Orton, Coleshill and Lea Marston. The strong human influences continue however in the form of the M6, M42 and M6 Toll motorways, and the Hams Hall Distribution Park.

Human Influences

6.3.34 The Application Site and its environs are clearly under strong human influences, whether in the form of built development, transport routes and infrastructure, or managed greenspace.

Skylines

6.3.35 In the immediate vicinity of the Application Site, skylines are generally formed by the large-scale industrial/commercial buildings and the trees that line many of the roads. Within the residential areas, built form and roadside trees still provide the majority of skylines.

6.3.36 High voltage transmission lines, mounted on pylons approximately 62m in height, also break the skyline in some views, together with lighting columns on both sides of the elevated M6 motorway and on the majority of other roads in the area. Near to Fort Dunlop, the refurbished Fort Dunlop building (at approximately 24m tall) stands above most of the surrounding built form, while the stack for the Rolls Royce peaking plant gas turbine power station (at approximately 60m tall and 4.5m wide) is generally seen in the context of the electricity pylons to the south. There are also a number of other stacks within the Jaguar works.

Inter-visibility

6.3.37 Inter-visibility within the local area is generally restricted by the density of built development which often results in skylines being limited to within a few metres of a particular location. The wide, often tree-lined, dual-carriageways allow longer distance views but these are normally restricted to the line of the road.

6.3.38 Areas of greenspace sometimes allow longer distance views, but normally these extend only to the edge of the greenspace where they are curtailed by existing built form on the boundary of the greenspace. Certain routes and locations provide greater levels of inter-visibility, notably the elevated sections of the M6 motorway.

Tranquillity

6.3.39 Being located in an urban/industrial location, adjacent to a major transport corridor, the Application Site and its environs have low levels of tranquillity, with high levels of both noise and movement throughout much of the day.

Summary of Landscape Character

6.3.40 Being part of an existing large-scale industrial landscape within the large West Midlands conurbation, and being outside of any statutory or non-statutory/local landscape designations, the landscape character of the Application Site and its environs is considered to be of low value. With generally limited inter-visibility (due to existing built form surrounding the Application Site, and existing vegetation lining the railway line to the south of the Application Site), and being already occupied by existing industrial development, the susceptibility to changes arising from development of the type proposed is assessed as low.

6.3.41 The overall sensitivity of the local landscape to changes arising from development of the type proposed is therefore assessed as low.

Visual Amenity

Visual Context – Views from the Application Site

6.3.42 Views from the Application Site are generally limited to the surrounding roads and adjacent or nearby built form, with views being curtailed by the built form itself and the trees lining the railway line to the south. Where views from the edge of the Application Site are aligned with roads extending away from the Application Site (notably Dunlop Way and Fort Parkway) there may be longer distance views along these roads.

Visual Context – Views towards the Application Site

6.3.43 Views towards the Application Site are also generally limited to immediately adjacent land and roads by the surrounding built form and by vegetation lining the railway line. Partial views towards the Application Site are however possible from the elevated section of the M6 to the south of railway line.

Views from Public Rights of Way and Public Highways

6.3.44 Views into the Application Site are possible from the nearby Fort Parkway and Dunlop Way (to the north). Partial views are also possible from the elevated section of the M6 to the south of the railway line, and views towards (but not into) the Application Site are possible from Spitfire Island (to the north-east of the B&Q Superstore), and parts of Chester Road (A452) and Tangmere Drive.

6.3.45 Glimpsed, heavily filtered views are likely from trains passing the site on the railway line to the south.

6.4 Assessment of Likely Significant Effects

Landscape/Townscape Assessment – Effects on Landscape/Townscape Features and Elements (Construction Phase (including demolition))

Trees and Vegetation

6.4.1 Ten of the existing trees within the Application Site would be removed as part of the Proposed Development, while seven of the trees would be retained (in the south-west corner, and adjacent to the proposed car park for the REC on the eastern side of the Proposed Development). The existing ornamental shrub planting would also be removed. A total of 22 new trees would be planted along the southern and western boundaries of the Proposed Development, and along the boundary between the two parts of the Application Site. There would also be further new shrub and hedge planting along the southern and western boundaries, and along the boundary between the two parts of the Application Site. The tree and shrub/hedge planting would take place at the end of the construction phase in order to prevent any damage to the new trees from other construction activities.

6.4.2 With a net increase in the number of trees on the Application Site, but with the new trees being smaller than the existing trees at the time of planting, the Proposed Development is assessed as giving rise to a negligible magnitude of change to the tree resource of the Application Site. With medium sensitivity this is assessed as giving rise to a negligible beneficial effect on the tree resource of the Application Site. This is not considered to be significant.

Land Use

6.4.3 The Proposed Development involves a change in land use on the Application site from one form of industrial/trade activity to another form of industrial activity, albeit with taller buildings and the addition of a stack. This is considered to be a medium magnitude of change during the construction phase. With low sensitivity this is assessed as giving rise to a minor effect, which is not considered significant.

Topography

6.4.4 The Proposed Development would not result in notable changes to the topography of the Application Site (as perceived from outside), though there would be some excavation to construct tip bunkers and install some items of equipment. This is considered as giving rise to a negligible magnitude of change (in landscape terms), and with low sensitivity a negligible effect. This is not considered to be significant.

Summary of Effects on Landscape/Townscape Features and Elements (Construction Phase (including demolition))

6.4.5 The construction phase of the Proposed Development would give rise to the following effects on landscape/townscape features and elements:

- Negligible effect on trees and planting;
- Minor effect on land use (in terms of changes to the structures on the Application Site); and
- Negligible effect on topography.

6.4.6 None of these effects are considered to be significant.

Landscape/Townscape Assessment – Effects on Landscape/Townscape Features and Elements (Operational Phase)Trees and Vegetation

6.4.7 The existing and new trees within the Application Site would be managed to maximise their longevity and health throughout the operational phase of the Proposed Development. This ongoing active good management, combined with the successful establishment and development of the proposed new trees, is assessed as giving rise to a low beneficial magnitude of change during the operational phase of the Proposed Development. With medium sensitivity, this is assessed as giving rise to a minor beneficial effect which is not considered to be significant.

Land Use

6.4.8 There would be no further changes to the land use on the Application Site during the operational phase of the Proposed Development.

Topography

6.4.9 There would be no further changes to the topography of the Application Site during the operational phase of the Proposed Development.

Summary of Effects on Landscape/Townscape Features and Elements (Operational Phase)

6.4.10 Once constructed and during the operational phase of the Proposed Development, there would be only very limited effects on landscape/townscape features and elements, this being a minor beneficial effect on the tree resource of the Application Site as the proposed new trees become established and grow. This effect is not considered to be significant.

Landscape/Townscape Assessment – Effects on Landscape/Townscape Character (Construction Phase)National Landscape Character

6.4.11 The scale of the Arden National Character Area (most of which covers rural areas outside of the West Midlands conurbation), the industrial nature of the (immediate) context to the Application Site, and the type and form of the Proposed Development means that there would be only very limited effect on landscape character at the national level. The magnitude of change is therefore assessed as negligible, and with low sensitivity this would result in a negligible effect which is not considered to be significant.

Local Landscape Character

6.4.12 During the construction phase of the Proposed Development, the existing industrial buildings would be demolished and replaced with new buildings and structures, including a 55m stack. The construction phase is expected to last approximately 24 months. Construction activities would include:

- Demolition of the existing buildings and removal of existing trees that are not being retained;
- Movement of materials and plant (construction plant and fixed plant) to and from the Application Site;
- Excavations for footings, tip bunkers etc., and construction of footings;
- Installation of main items of plant;
- Construction of stack;

- Construction of main building around installed plant;
- Construction of roadways, yard surfacing etc.; and
- Tree planting and any other landscaping.

6.4.13 Construction activities would extend over the entire Application Site, appearing as the demolition and rebuilding of the existing industrial buildings with new, larger buildings and other structures, including the stack. Construction plant would also be visible during this period, including (at times) cranes which would be visible above the height of surrounding buildings. Although different to the existing character of the Application Site, the perception of the construction activities would not seem out of character for the locality as there are and have been in recent times a number of other construction projects underway in the local area, including (at the time of the assessment) major works to Spitfire Island and the roads that feed into it.

6.4.14 As the construction phase progresses, the increased height of the new structures and building would become more apparent, though these would continue to be experienced in the context of the existing industrial development that surrounds the Application Site, particularly to the north and west, including a number of existing stacks such as at the Fort Dunlop gas power station and within the Jaguar manufacturing plant.

6.4.15 The construction phase is therefore assessed as giving rise to a high magnitude of change to the character of the Application Site itself, and with low sensitivity to changes arising from development of the type proposed this would give rise to a moderate effect. This effect on the character of the Application Site is not considered to be significant.

6.4.16 In relation to the character of the townscape that surrounds the Application Site, the existing industrial nature of much of the surrounding area means that the magnitude of change is assessed as medium, reducing with distance from the Application Site. With low sensitivity to changes arising from development of the type proposed, the scale of effect would be minor and not significant.

Landscape/Townscape Assessment – Effects on Landscape/Townscape Character (Operational Phase)

National Landscape Character

6.4.17 There would be no further changes to national landscape character during the operational phase of the Proposed Development.

Local Landscape Character

6.4.18 There would be no further changes to local landscape character during the operational phase of the Proposed Development.

Visual Assessment – Effects on Visual Amenity

6.4.19 Based on an analysis of publicly available maps and aerial photography, and confirmed by visiting the Application Site and surrounding area, a series of 26 viewpoints were identified that are considered to be representative of receptors within the study area that might experience a visual effect as a result of the Proposed Development. These viewpoint locations were agreed with Birmingham City Council City Design Team. The viewpoints are not intended to be an exhaustive record of all potential views.

6.4.20 The viewpoints have been categorised as being Distant Views i.e. over 2 km radius from the boundary of the Application Site; Medium Range Views i.e. 500 metres to 2 km from the boundary of the Application Site; and Short Range Views i.e. up to 500m from the Application Site.

6.4.21 The visual assessment has been undertaken with mitigation measures that are an integral part of the Proposed Development considered to be in place.

6.4.22 A detailed assessment of the visual effects of the Proposed Development on the 26 representative viewpoints is provided at **Appendix 6.3**. A summary of the results of this assessment is set out below.

Summary Visual Assessment (Construction Phase (including demolition))

Distant Views

6.4.23 Only one of the 26 representative viewpoints is a long distance view of 2km or greater, this being the view from Water Orton station (VP24). Neither the Application Site nor the Proposed Development would be visible from this location, though views would be possible for train passengers on one side of trains as they travel west and approach the Application Site. The effect for passengers would be at worst minor (and not significant) until they are very close to the Proposed Development (see also VP15).

Medium Range Views

6.4.24 Of the 26 representative viewpoints 16 offer medium distance views of 500m to 2km from the Application Site. The effects on these viewpoints during the construction phase are summarised in **Table 6.13** below:

Table 6.13: Summary of Construction Phase Effects on Medium Distance Representative Viewpoints

Receptor Type	Viewpoint No.	Scale of Effect
Motorway users	VP1	Negligible
Motorway users	VP3	Negligible
Road users (residential street) Occupiers of residential properties	VP8	Negligible
Recreational users of Pype Hayes Park	VP9	No effect
Road users (residential street) Occupiers of residential properties	VP10	No effect
Road users (A-road) Occupiers of residential properties	VP11	No effect
Road users (A-road) Visitors to business premises	VP12	No effect
Road users (A-road) Visitors travelling to the Ravenside retail park	VP13	Negligible

Receptor Type	Viewpoint No.	Scale of Effect
Cyclists and pedestrians using the Project Wagtail path	VP14	No effect
Visitors to the Caste Bromwich Hall Registered Park and Garden	VP16	No effect
Visitors to St Mary and St Margaret's church	VP17	Negligible
Visitors to the graveyard of St Mary and St Margaret's church	VP18	Negligible, increasing to Moderate
Hotel guests and visitors to Castle Bromwich Hall	VP19	No effect
Urban pedestrians	VP20	Negligible
Road users (A-road)	VP21	No effect
Recreational users of Hodge Hill Common	VP25	Negligible

6.4.25 None of the effects on visual amenity as experienced by receptors at these viewpoints are considered to be significant.

Short Range Views

6.4.26 Of the 26 representative viewpoints 9 offer short range views towards the Application Site of less than 500m. The effects on these viewpoints during the construction phase are summarised in **Table 6.14** below:

Table 6.14: Summary of Construction Phase Effects on Short Range Representative Viewpoints

Receptor Type	Viewpoint No.	Scale of Effect
Motorway users	VP2	Negligible, increasing to Minor
Road users (A-road) Urban pedestrians	VP4	Road users: Negligible, increasing to Minor Urban pedestrians: Minor, increasing to Moderate
Road users (A-road) Urban pedestrians Occupiers of residential properties	VP5	Road users: Minor Urban pedestrians and occupiers of residential properties: Minor, increasing to Moderate

Receptor Type	Viewpoint No.	Scale of Effect
Road users (A-road) Urban pedestrians Occupiers of residential properties	VP6	Road users: Minor Urban pedestrians and occupiers of residential properties: Minor, increasing to Moderate
Road users (A-road) Office workers	VP7	Road users: Negligible Office workers: Negligible, increasing to Minor
Hotel guests Office workers Train passengers	VP15	Negligible, increasing to Moderate
Users of urban greenspace Occupiers of residential properties	VP22	Negligible
Users of urban greenspace Occupiers of residential properties	VP23	Negligible
Road users (A-road) Visitors to business premises	VP26	Moderate

6.4.27 None of the effects on visual amenity as experienced by receptors at these viewpoints are considered to be significant.

Summary Visual Assessment (Operational Phase)

6.4.28 The effects on visual amenity experienced during the operational phase of the Proposed Development would be broadly the same as those experienced by the end of the construction phase.

Distant Views

6.4.29 The Proposed Development would not be visible from VP24, though views would be possible for train passengers on one side of trains as they travel west and approach the Proposed Development. The effect for passengers would be at worst minor (and not significant) until they are very close to the Proposed Development (see also VP15).

Medium Range Views

6.4.30 The effects on medium distance viewpoints during the operational phase are summarised in **Table 6.15** below:

Table 6.15: Summary of Operational Phase Effects on Medium Distance Representative Viewpoints

Receptor Type	Viewpoint No.	Scale of Effect
Motorway users	VP1	Negligible
Motorway users	VP3	Negligible
Road users (residential street) Occupiers of residential properties	VP8	Negligible
Recreational users of Pype Hayes Park	VP9	No effect
Road users (residential street) Occupiers of residential properties	VP10	No effect
Road users (A-road) Occupiers of residential properties	VP11	No effect
Road users (A-road) Visitors to business premises	VP12	No effect
Road users (A-road) Visitors travelling to the Ravenside retail park	VP13	Negligible
Cyclists and pedestrians using the Project Wagtail path	VP14	No effect
Visitors to the Caste Bromwich Hall Registered Park and Garden	VP16	No effect
Visitors to St Mary and St Margaret's church	VP17	Negligible
Visitors to the graveyard of St Mary and St Margaret's church	VP18	Moderate
Hotel guests and visitors to Castle Bromwich Hall	VP19	No effect
Urban pedestrians	VP20	Negligible
Road users (A-road)	VP21	No effect
Recreational users of Hodge Hill Common	VP25	Negligible

6.4.31 None of the effects on visual amenity as experienced by receptors at these viewpoints are considered to be significant.

Short Range Views

6.4.32 The effects on short range representative viewpoints during the operational phase are summarised in **Table 6.16** below:

Table 6.16: Summary of Operational Phase Effects on Short Range Representative Viewpoints

Receptor Type	Viewpoint No.	Scale of Effect
Motorway users	VP2	Minor
Road users (A-road) Urban pedestrians	VP4	Road users: Minor Urban pedestrians: Moderate
Road users (A-road) Urban pedestrians Occupiers of residential properties	VP5	Road users: Minor Urban pedestrians and occupiers of residential properties: Moderate
Road users (A-road) Urban pedestrians Occupiers of residential properties	VP6	Road users: Minor Urban pedestrians and occupiers of residential properties: Moderate
Road users (A-road) Office workers	VP7	Road users: Negligible Office workers: Minor
Hotel guests Office workers Train passengers	VP15	Moderate
Users of urban greenspace Occupiers of residential properties	VP22	Negligible
Users of urban greenspace Occupiers of residential properties	VP23	Negligible
Road users (A-road) Visitors to business premises	VP26	Moderate

6.4.33 None of the effects on visual amenity as experienced by receptors at these viewpoints are considered to be significant.

Visual Assessment – Night-Time Effects

6.4.34 There would be very limited external lighting over and above that which is already present on the Application Site and surrounding roads. There would be some additional limited lighting on the proposed stack, as required by the Civil Aviation Authority.

6.4.35 The very limited increase in lighting levels on the Application Site is not considered likely to give rise to any significant effects on night-time visual amenity as experienced from the local area.

6.5 Mitigation and Enhancement

Mitigation by Design

Construction Phase

6.5.1 The construction phase would be expected to last approximately 24 months. There would be a temporary but substantial increase in activities within the Application Site, over and above those associated with existing activities on the Application Site, and also an increase in the number of vehicles entering and leaving the Application Site via the A452 Chester Road and the A47 Fort Parkway.

6.5.2 During the construction phase, the Root Protection Areas of all trees which are to be retained as part of the Proposed Development would be safeguarded by the use of appropriate fencing in line with BS5837:2012.

6.5.3 Where trees are to be removed as part of the Proposed Development, such works would be undertaken outside of the bird nesting season (1st March to 31st July inclusive).

6.5.4 The proposed tree and shrub planting that forms an integral part of the design for the Proposed Development would be undertaken during the first planting season after completion of construction in order to maximise establishment success.

Additional Mitigation

6.5.5 The proposed stack for the plant has been designed to be as narrow as possible. The height of the stack, at 55m, is the minimum that can be used in order to meet the relevant emissions targets as set by the Environment Agency. The stack is lower than the nearby electricity pylons, and also approximately 5m lower and less than half the diameter of the existing stack at the Rolls Royce peaking plant gas turbine power station. Similarly, the main building and other structures within the Proposed Development have been designed to be as small as possible whilst still accommodating the necessary plant and machinery.

6.5.6 The main building and other structures within the Proposed Development would be clad using materials coloured to minimise the visual effects of the buildings and structures. Where the buildings and structures extend above the height of the surrounding existing buildings (such as the B&Q superstore to the east), they would be clad with materials of differing colours in order to reduce the apparent massing of the buildings and structures when seen against the sky – see **Chapter 3** of the ES and the Design and Access Statement which accompanies this application.

Enhancements

6.5.7 The removal of ten existing trees from the Application Site as part of the Proposed Development, and their replacement with 22 new trees together with additional shrub and hedge planting would result in a net increase in the number of trees within the Application Site. This increase in the tree resource is considered to be a small enhancement.

6.6 Cumulative and In-Combination Effects

6.6.1 The Scoping Opinion received from Birmingham City Council identified a number of other developments within the local area which should be considered in terms of Cumulative or In-Combination Effects. These are listed in **Chapter 4** of the ES.

6.6.2 All of these developments were already in existence at the time of the field survey for this assessment, and they are therefore considered to form part of the baseline for the

assessment. No further consideration of cumulative or in-combination landscape and visual effects is therefore considered necessary.

6.7 Summary

Introduction

6.7.1 This landscape and visual impact assessment has assessed the likely effects of the Proposed Development on landscape/townscape character, landscape/townscape features and elements within and in the immediate vicinity of the Proposed Development, and on local visual amenity. The assessment has been undertaken by a Chartered Landscape Architect, with regard to best practice. Particularly the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (2013), as published by IEMA and the Landscape Institute.

Baseline Conditions

6.7.2 The Fort Industrial Park currently comprises 26 units (use class B1, B2 and B8) of industrial / warehouse and trade counter buildings (approximately 10m in height) with offices, service yard and parking. The Application Site includes two single storey business, industrial and storage buildings containing nine separate units. The units are surrounded by areas of hard standing used for staff car parking. These existing buildings would be demolished as part of the Proposed Development, to be replaced with the proposed Renewable Energy Centre.

There are 17 existing trees within the Application Site, together with areas of shrub planting and grass around the perimeter.

6.7.3 The Application Site lies within the Arden National Character Area (NCA97), though this is considered to be of limited usefulness. There are no published landscape character assessments at a more local level.

6.7.4 The wider area is predominantly industrial to the north and west, including the large Jaguar manufacturing plant to the north of the A47 Fort Parkway dual-carriageway. An existing gas turbine power station, with a stack of approximately 60m in height, is located to the west, close to the now refurbished Fort Dunlop building.

6.7.5 To the east is a large B&Q superstore, the A452 Chester Road dual-carriageway and the Castle Vale residential area.

6.7.6 To the south lies the West Coast Mainline railway line, a hotel, pub and small office development, and then an elevated section of the M6 motorway. High voltage transmission lines mounted on 62m pylons broadly follow the line of the motorway, as does the River Tame. Beyond the motorway are the Hodge Hill and Buckland End residential areas.

6.7.7 There are no statutory or non-statutory landscape designations in place on the Application Site. The nearest non-statutory designation of relevance in landscape and visual terms is the Grade II* Registered Park and Garden at Castle Bromwich Hall. The Hall itself is Grade I Registered, as is the nearby church of St Mary and St Margaret. The Registered Park and Garden lies approximately 600m to the south-south-east of the Application Site, but is separated from the Application Site by the elevated section of the M6.

6.7.8 The locally listed Fort Dunlop building lies approximately 750m to the west of the Application Site, and there are a number of other Listed Buildings in the local area, notably those in the vicinity of Castle Bromwich Hall and those to the north of the Jaguar plant.

6.7.9 The only Public Right of Way (PRoW) in the vicinity of the Application Site is a short section of public footpath associated with the parkland of Castle Bromwich Hall. There are pedestrian walkways associated with many of the roads in the area. The Park Hall Nature Reserve lies to the south-east, between the M6 and the railway.

Likely Significant Effects

6.7.10 The assessment has not identified any significant landscape and visual effects which would arise as a result of the Proposed Development.

Mitigation and Enhancement

6.7.11 Mitigation measures (such as minimising the height of the stack and the main building, and the use of cladding of variable colours and shades so as to minimise the perceived massing of the buildings) have been incorporated into the design of the Proposed Development as part of the iterative design process. The measures are therefore an integral part of the development and no further additional mitigation is considered necessary from a landscape and visual perspective.

Conclusion

6.7.12 The Application Site lies outside of any statutory or local/non-statutory landscape designations. The Application Site is currently occupied by a number of industrial/trade counter buildings, set within an industrial context including the large Jaguar manufacturing plant on the north side of Fort Parkway, and the existing Fort Dunlop gas turbine power station to the west of the Application Site.

6.7.13 The Proposed Development would result in the replacement of the existing industrial buildings with a number of other, slightly larger industrial buildings, together with a 55m tall stack. The stack would be shorter than the existing stack at the Rolls Royce power plant and the pylons which line the nearby elevated section of the M6 motorway, and would be seen in the context of a number of other nearby stacks such as those at the Jaguar plant.

6.7.14 The nature of the Proposed Development, together with the context provided by the land uses surrounding the Application Site, would mean that the Proposed Development is considered to be appropriate to the setting and townscape character of the site. The Proposed Development would not result in any significant effects on local landscape or townscape features or elements, and would not have any significant effects on visual amenity as experienced from locations within the local area.



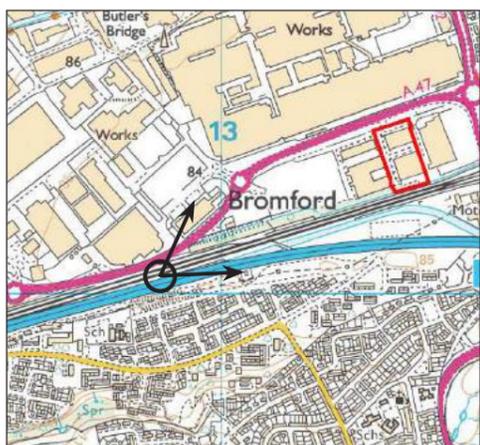
KEY

- Site Boundary
- Viewpoints

FIGURE 6.1
Viewpoint Location Plan

DRWG No: **K.0168_04** REV: **B**
 Date: 18/09/2015
 Scale: 1:25,000 @ A3





Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 08:51
 OS reference : 412801, 290055
 Viewpoint height : 87m
 Approx distance to site : 800m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development hidden from view by intervening built form and vegetation.

VIEWPOINT 1

M6 motorway 'southbound', close to Fort Dunlop, looking east-north-east

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

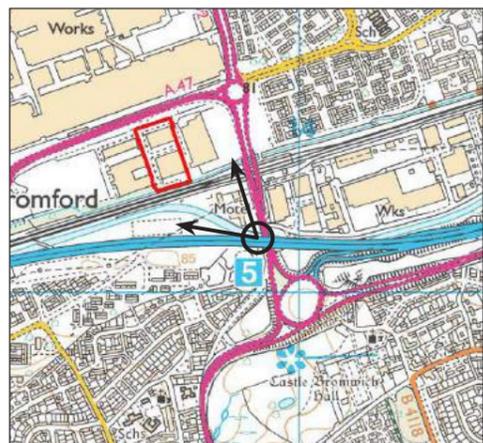
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 08:55
 OS reference : 413883, 290189
 Viewpoint height : 88m
 Approx distance to site : 290m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development predominantly hidden from view by intervening built form.

VIEWPOINT 2

M6 motorway 'northbound' (but taken from 'southbound' hard shoulder), on bridge over A452, looking north-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

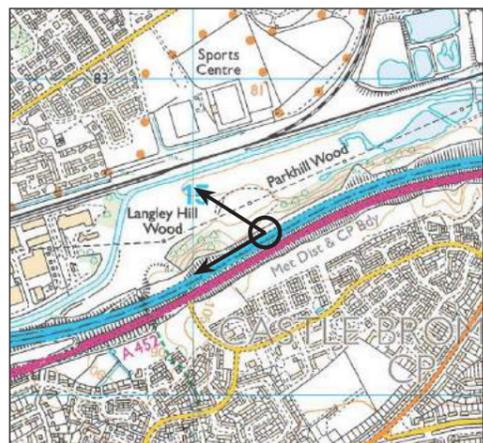
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 08:59
 OS reference : 415215, 290510
 Viewpoint height : 96m
 Approx distance to site : 1.57km
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development hidden from view by intervening vegetation.

VIEWPOINT 3

M6 motorway 'northbound' (but taken from 'south-bound' hard shoulder), due south of Castle Vale sports centre, looking west A452, looking north-west

FIGURE 6.2

Photoviews

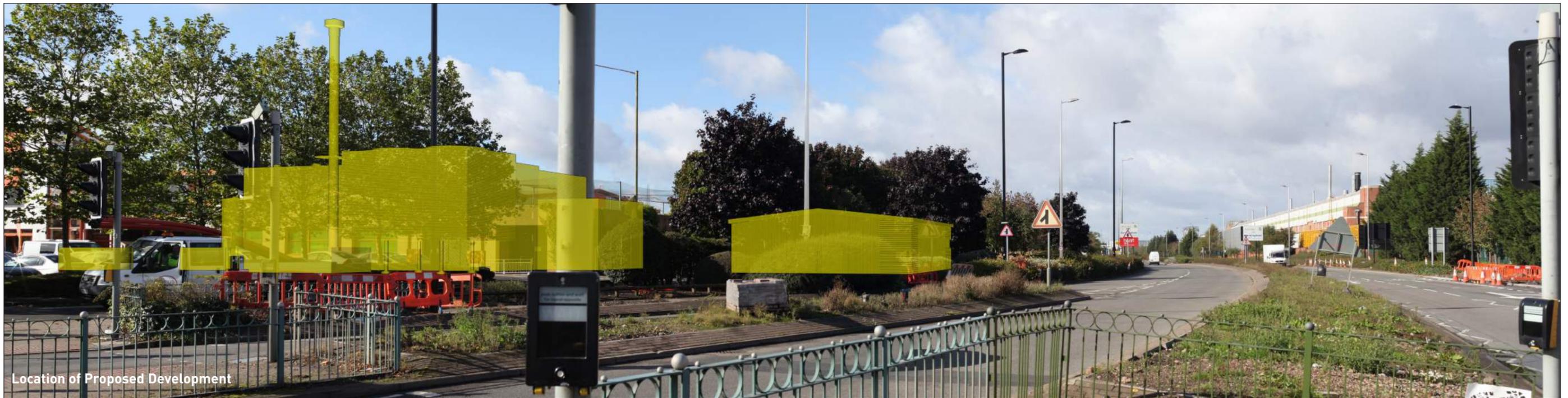
DRWG No: K.0168_11

REV: _

Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 09:22
 OS reference : 413732, 290632
 Viewpoint height : 86m
 Approx distance to site : 160m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development partially hidden from view by intervening built form and vegetation.

VIEWPOINT 4

Spitfire Island to north-east of B&Q Superstore, looking south-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 09:30
 OS reference : 413848, 290715
 Viewpoint height : 88m
 Approx distance to site : 300m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development partially hidden from view by intervening built form and vegetation.

VIEWPOINT 5

Spitfire Island on north side of Tangmere Drive exit, looking south-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

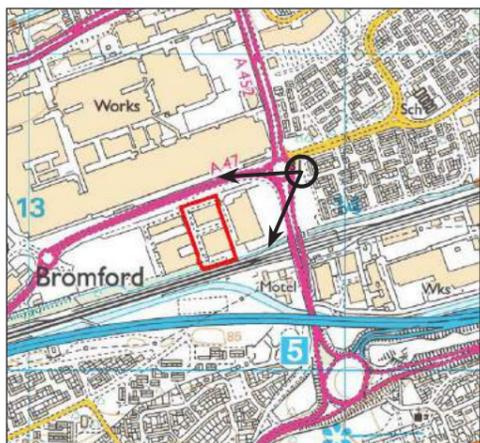
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 09:34
 OS reference : 413875, 290644
 Viewpoint height : 86m
 Approx distance to site : 295m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development partially hidden from view by intervening built form and vegetation.

VIEWPOINT 6

Spitfire Island on south side of Tangmere Drive exit, looking south-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

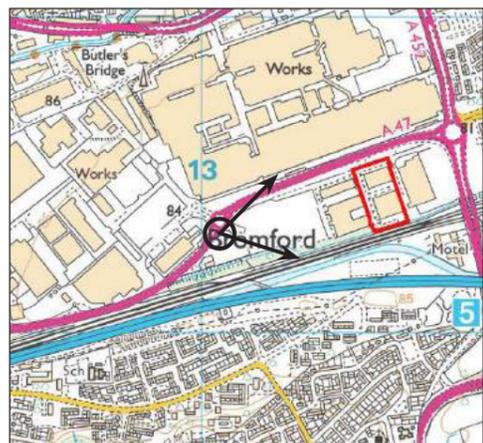
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 10:04
 OS reference : 413083, 290329
 Viewpoint height : 85m
 Approx distance to site : 445m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development predominantly hidden from view by intervening built form.

VIEWPOINT 7

Roundabout on A7 Fort Parkway, adjacent to Fort Dunlop, looking east

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

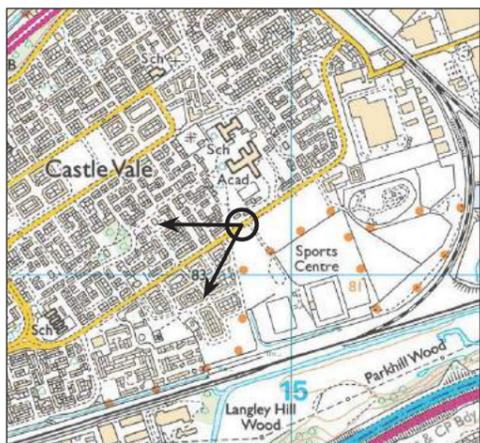
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 10:14
 OS reference : 414864, 291161
 Viewpoint height : 83m
 Approx distance to site : 1.41km
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development hidden from view by intervening built form and vegetation.

VIEWPOINT 8

Farnborough Road, at entrance to Castle Vale Sports Centre, looking west-south-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

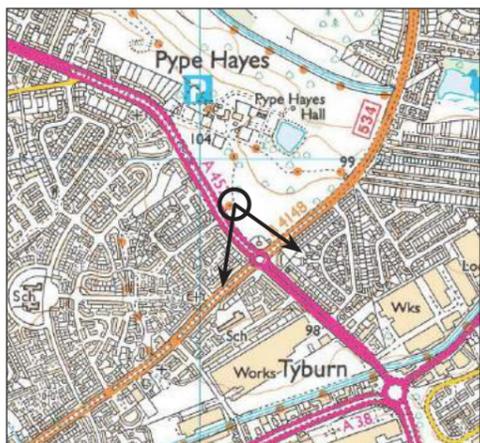
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 10:38
 OS reference : 413132, 291863
 Viewpoint height : 106m
 Approx distance to site : 1.38km
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development hidden from view by intervening topography.

VIEWPOINT 9

Pype Hayes Park, east of A452, looking south-south-east

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

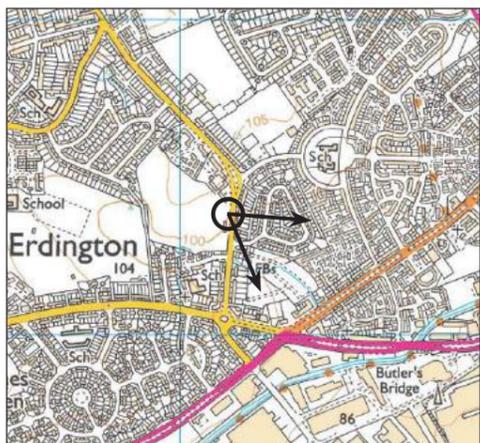
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 02/10/15 @ 10:20
 OS reference : 412156, 291392
 Viewpoint height : 101m
 Approx distance to site : 1.58km
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development hidden from view by intervening built form.

VIEWPOINT 10

Holly Lane, adjacent to area of scrub land, looking south-east

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

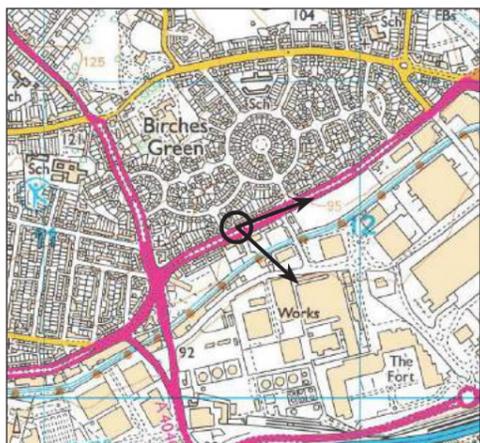
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 11:17
 OS reference : 411621, 290547
 Viewpoint height : 95m
 Approx distance to site : 1.86km
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development hidden from view by intervening built form.

VIEWPOINT 11

A38 Tyburn Road, between Belvedere Road and Inland Road, looking east

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

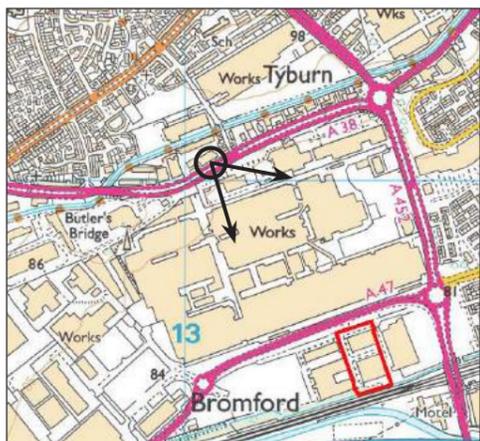
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 11:42
 OS reference : 413092, 291058
 Viewpoint height : 90m
 Approx distance to site : 670m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development hidden from view by intervening built form.

VIEWPOINT 12

A38 Kingsbury Road, close to Jaguar works entrance, looking south-east

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

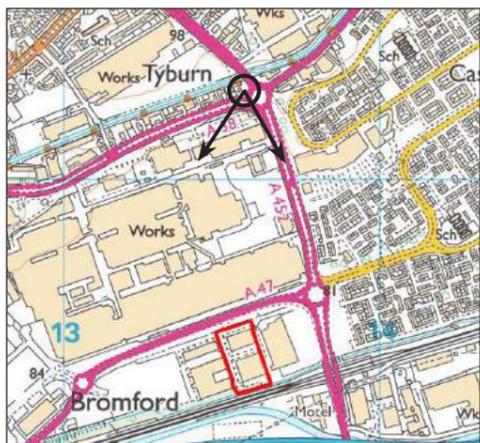
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 11:54
 OS reference : 413585, 291287
 Viewpoint height : 93m
 Approx distance to site : 730m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development partially hidden from view by intervening built form.

VIEWPOINT 13

Roundabout junction of A38 and A452, to north-east of Ravenside Retail Park, looking south

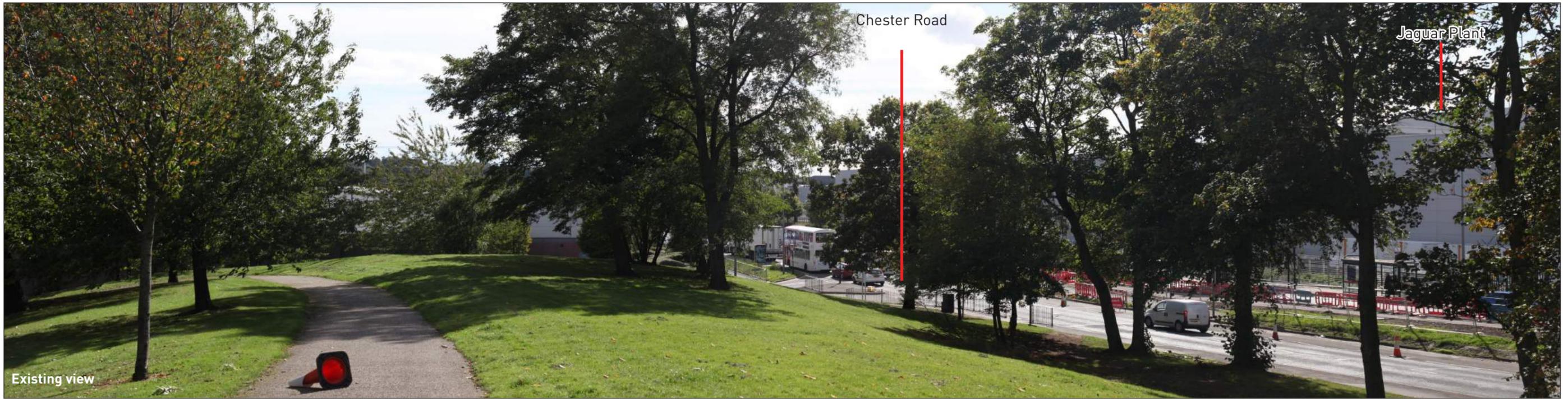
FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

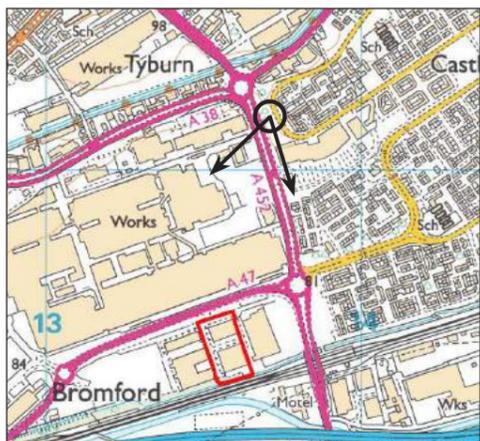
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 12:42
 OS reference : 413709, 291176
 Viewpoint height : 87m
 Approx distance to site : 635m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development hidden from view by intervening built form of the Jaguar manufacturing plant.

VIEWPOINT 14

Project Wagtail cyclepath, to north of Castle Vale Retail Park, looking south-south-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

Date: 29/09/2015

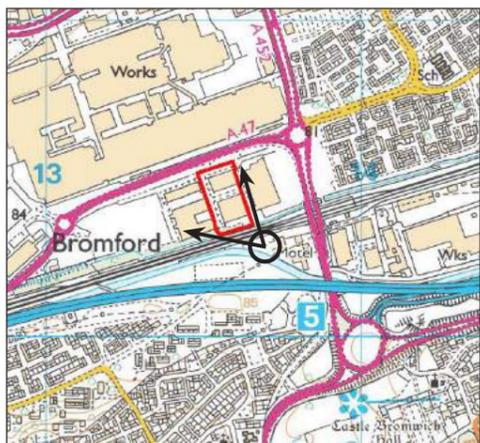


Existing view



Location of Proposed Development

ALIGNMENT NOT POSSIBLE DUE TO INTERVENING VEGETATION



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 13:01
 OS reference : 413692, 290305
 Viewpoint height : 88m
 Approx distance to site : 75m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development would be visible beyond the intervening vegetation which lines the railway.

VIEWPOINT 15

Informal green space to rear of Fort Jester pub/
 Castle Bromwich Inn and offices, looking north-east
 across railway line

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

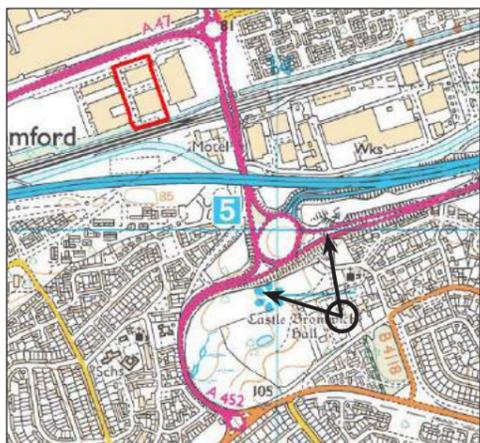
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 02/10/15 @ 10:55
 OS reference : 414169, 289723
 Viewpoint height : 110m
 Approx distance to site : 820m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development hidden from view by intervening built form and vegetation.

VIEWPOINT 16

Registered Park and Garden at Castle Bromwich Hall, looking north-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

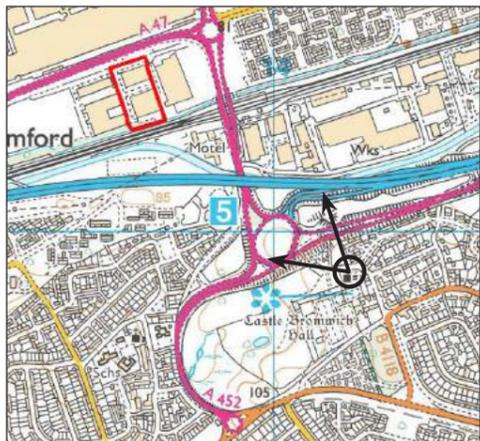
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 13:46
 OS reference : 414230, 289880
 Viewpoint height : 113m
 Approx distance to site : 765m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development unlikely to be visible due to intervening topography, built form and vegetation.

VIEWPOINT 17

St Mary and St Margaret's Church, to north of Castle Bromwich Hall, looking north-west

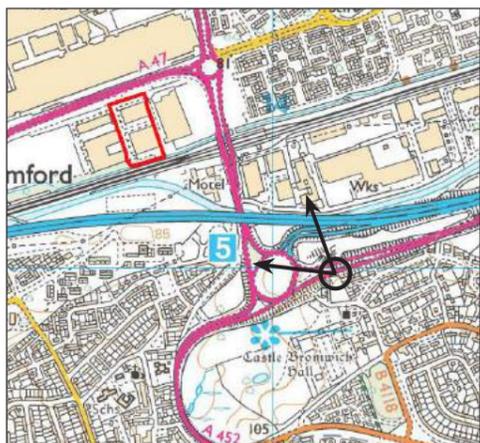
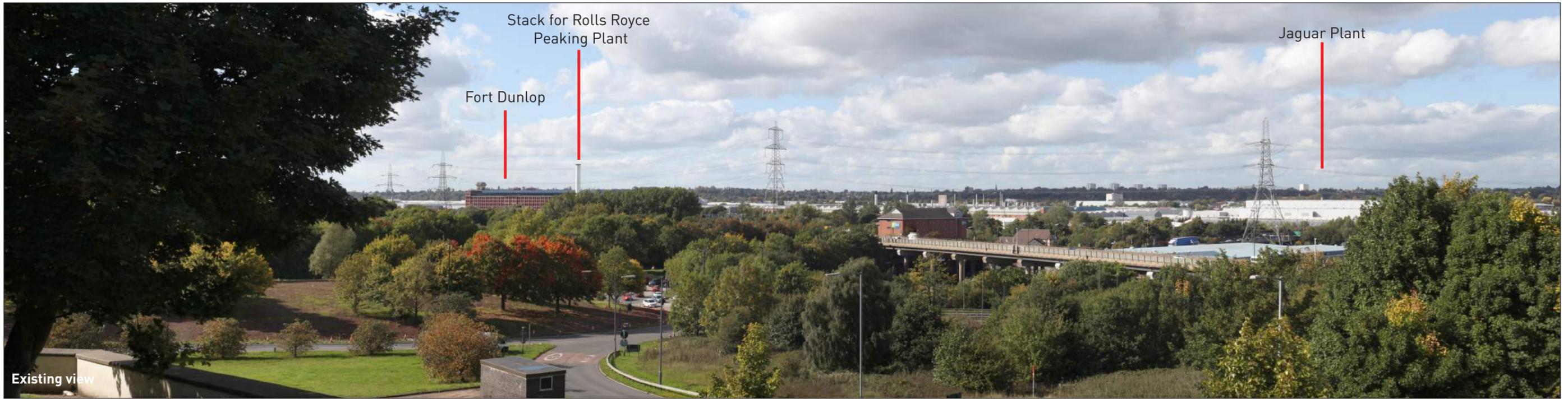
FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

Date: 29/09/2015



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 13:52
 OS reference : 414204, 289987
 Viewpoint height : 104m
 Approx distance to site : 665m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development partially hidden from view by intervening built form.

VIEWPOINT 18

Graveyard of St Mary and St Margaret's Church, to north of Castle Bromwich Hall, looking north-west

**FIGURE 6.2
Photoviews**

DRWG No: K.0168_11

REV: _

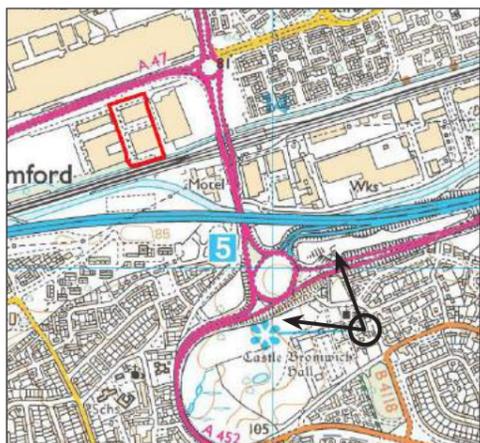
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 14:08
 OS reference : 414299, 289812
 Viewpoint height : 116m
 Approx distance to site : 850m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development not visible due to intervening built form and vegetation.

VIEWPOINT 19

Castle Bromwich Hall, looking north-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

Date: 29/09/2015

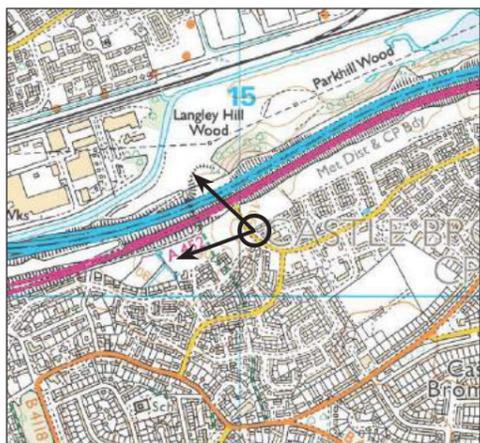


Existing view

Jaguar Plant



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 14:25
 OS reference : 415046, 290223
 Viewpoint height : 105m
 Approx distance to site : 1.4km
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development predominantly hidden from view by intervening vegetation.

VIEWPOINT 20

Footpath adjacent to Parkfield Drive, to south of A452, looking west-north-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

Date: 29/09/2015

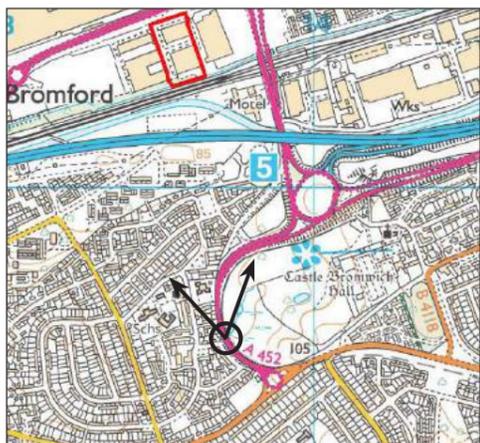


Existing view



Location of Proposed Development

ALIGNMENT NOT POSSIBLE DUE TO INTERVENING VEGETATION



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 14:44
 OS reference : 413721, 289532
 Viewpoint height : 94m
 Approx distance to site : 825m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development hidden from view by intervening built form and vegetation.

VIEWPOINT 21

A452 Newport Road, to south-west of Castle Bromwich Hall, looking north-north-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

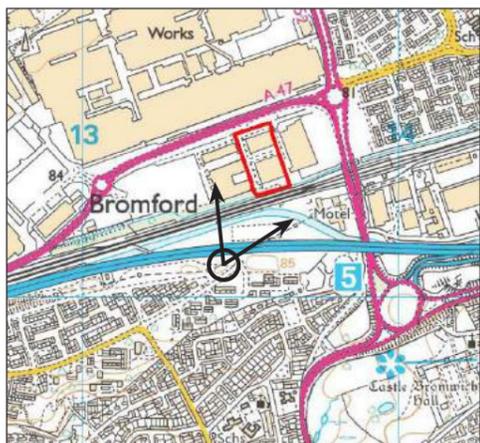
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 14:57
 OS reference : 413447, 290128
 Viewpoint height : 86m
 Approx distance to site : 230m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development predominantly hidden from view by intervening built form and vegetation.

VIEWPOINT 22

Greenspace to north of Bromford Drive, looking north-north-east

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

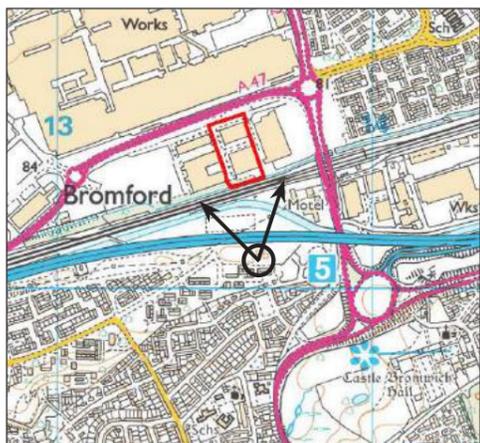
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 15:02
 OS reference : 413629, 290126
 Viewpoint height : 88m
 Approx distance to site : 225m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development predominantly hidden from view by intervening built form and vegetation.

VIEWPOINT 23

Greenspace to north of Papyrus Way, looking north-north-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

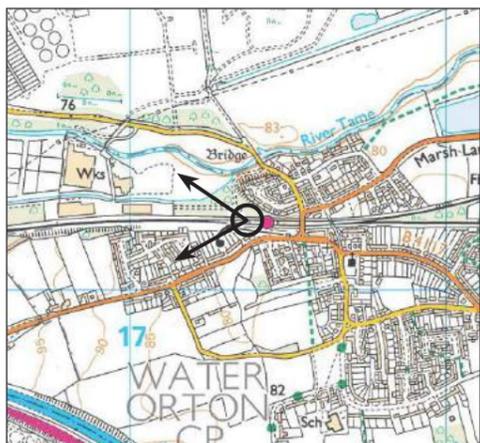
Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 15:49
 OS reference : 417417, 291224
 Viewpoint height : 82m
 Approx distance to site : 3.8km
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development hidden from view by intervening built form and vegetation.

VIEWPOINT 24

Platform of Water Orton railway station, looking west-south-west

FIGURE 6.2

Photoviews

DRWG No: K.0168_11

REV: _

Date: 29/09/2015



Existing view



Location of Proposed Development



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 16:22
 OS reference : 413247, 289072
 Viewpoint height : 110m
 Approx distance to site : 1.3km
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development is likely to be hidden from view by intervening built form and vegetation.

VIEWPOINT 25

Hodge Hill Common, looking north-north-east

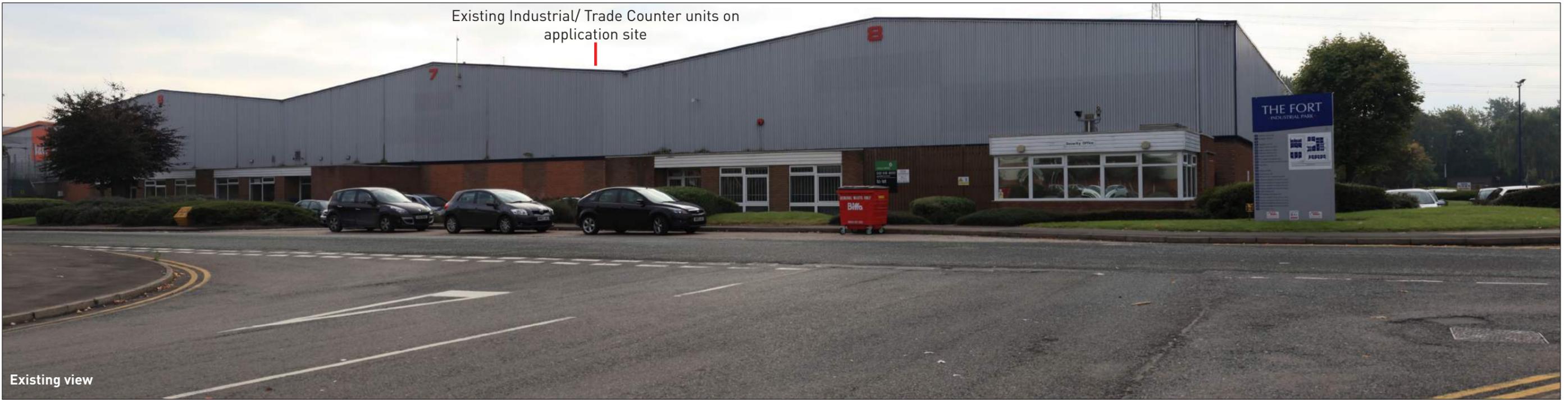
FIGURE 6.2

Photoviews

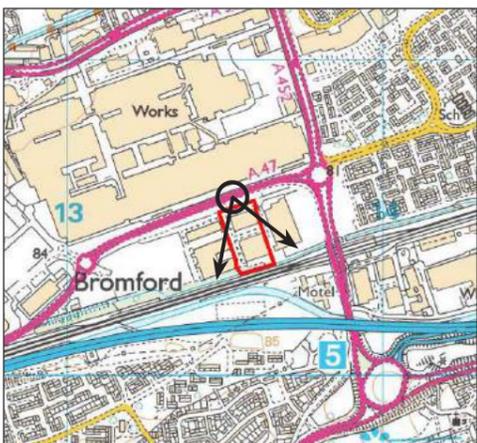
DRWG No: K.0168_11

REV: _

Date: 29/09/2015



Existing view



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 02/10/15 @ 09:55
 OS reference : 413513, 413513
 Viewpoint height : 87m
 Approx distance to site : 15m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



Location of proposed development



Proposed development would replace existing buildings in foreground - see photomontages.

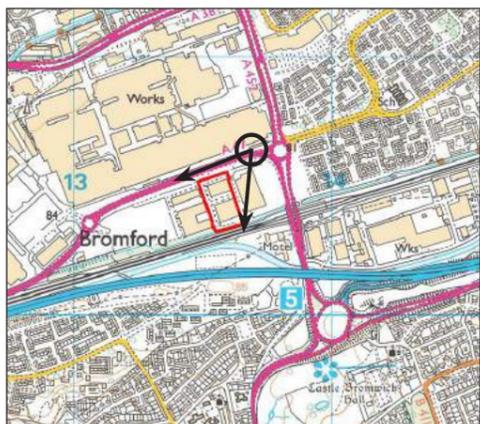
VIEWPOINT 26
 Junction of Fort Parkway and Dunlop Way, looking south-east

FIGURE 6.2
Photoviews

DRWG No: K.0168_11

REV: _

Date: 29/09/2015



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 09:22
 OS reference : 413732, 290632
 Viewpoint height : 86m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



VIEWPOINT 4

Spitfire Island to north-east of B&Q Superstore, looking south-west

FIGURE 6.3
Photomontages

DRWG No: K.0168_16

REV: _

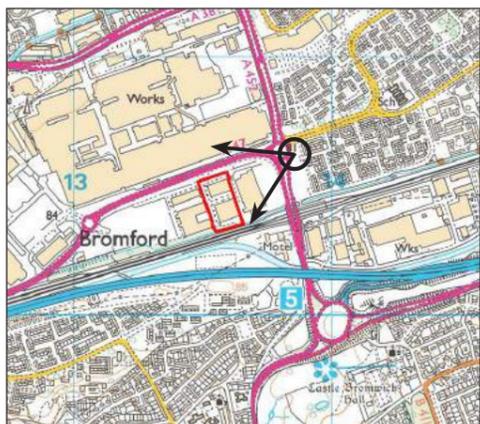
Date: 19/11/2015



Existing view



Photomontage View



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 24/09/15 @ 09:34
 OS reference : 413875, 290644
 Viewpoint height : 86m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)

VIEWPOINT 6

Spitfire Island on south side of Tangmere Drive exit, looking south-west

FIGURE 6.3
Photomontages

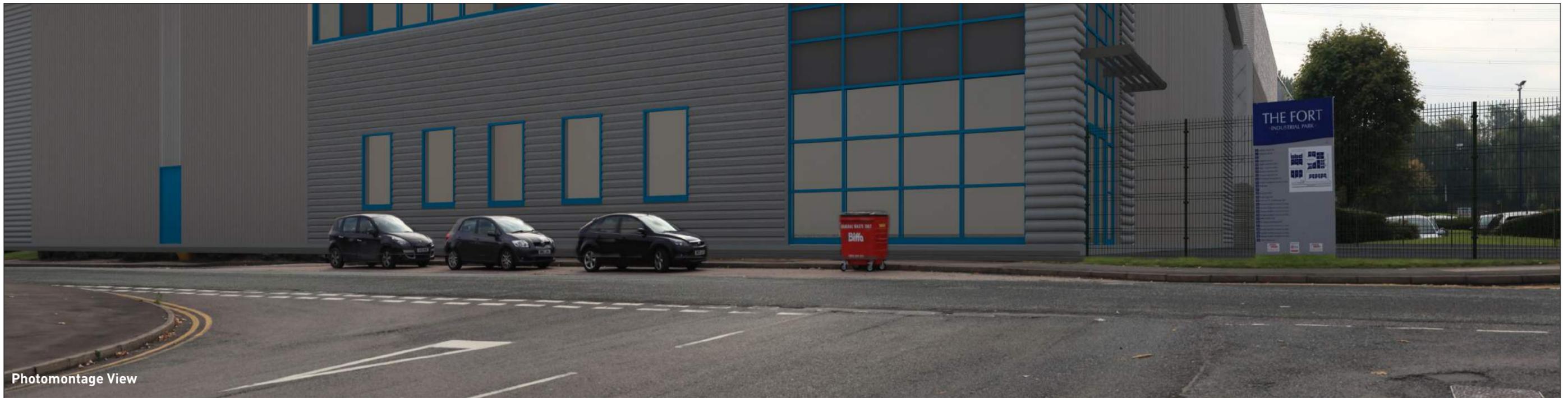
DRWG No: K.0168_16

REV: _

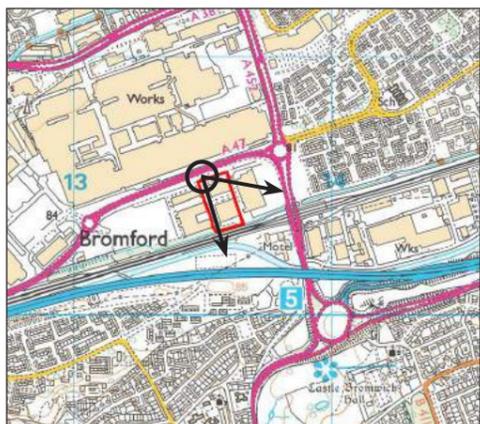
Date: 19/11/2015



Existing view



Photomontage View



Camera make and model: Canon EOS 5D with a fixed 50mm lens.
 Date & time of photography : 02/10/15 @ 09:55
 OS reference : 413513, 290536
 Viewpoint height : 87m
 Recommended Viewing distance : 30cm
 Angle of view : 75°
 Camera height set at 1.5m
 Document dimensions (420mm x 297mm)



VIEWPOINT 26

Junction of Fort Parkway and Dunlop Way, looking south-east

FIGURE 6.3 Photomontages

DRWG No: K.0168_16

REV: _

Date: 19/11/2015

1 Background, Introduction & Context

2 Site Description

3 Development Proposals

4 Need & Alternatives

5 Air Quality

6 Townscape & Visual

7 Traffic & Transportation

8 Hydrology & Flood Risk

9 Hydrogeology & Ground Conditions

10 Noise & Vibration

11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

13 Socio- Economic Impact

14 Summary

7 TRAFFIC AND TRANSPORT

7.1 Introduction

7.1.1 This Chapter of the Environmental Statement (ES) determines the magnitude and significance of the environmental effects associated with the transportation requirements of the Proposed Development.

The context of this Chapter has been informed by the Transport Assessment within Appendix 7.1 of this ES.

7.2 Assessment Approach

Methodology

Assessment of the Site's Travel Credentials

7.2.1 The accessibility credentials of the application site have been considered by way of GIS-based modelling, using centralised travel networks and public transport data to identify the catchment of each mode.

Assessment of the Likely Traffic Effects

7.2.2 The potential effects of development traffic have been considered in terms of the potential change in the current operation of the highway network and the following study area has thus been determined in agreement with the Local Highway Authority and Highways England:

- 1) Fort Parkway;
- 2) A452 North of Spitfire Island;
- 3) Tangmere Drive; and
- 4) A452 South of Spitfire Island.

7.2.3 The geometric characteristics and general maintenance of the network are considered with a view to establishing the suitability of the network in the context of accommodating the types of vehicles anticipated to be visiting the Proposed Development.

Ascertaining Traffic Conditions

7.2.4 The Environmental Impact Assessment (EIA) has sought to take account of existing permitted and future proposed development that may have an effect on baseline traffic demand on the study area highway network. In this respect the following scenarios will form part of the assessment.

Table 7.1: Traffic Flow Scenarios

Scenario	Matrix
2020 Baseline	<p style="text-align: center;">As 2015 Existing +</p> <ul style="list-style-type: none"> - Background Traffic Growth/Committed Development
2020 Baseline + Development	<p style="text-align: center;">As 2020 Baseline +</p> <ul style="list-style-type: none"> - Proposed Development

7.2.5 A forecast of likely traffic flows has been derived from data collected from traffic surveys undertaken on Tuesday 14th July 2015 and AADT data available from the DfT. This is supplemented by data derived from interrogation of the TRICS (v.7.1.1) database, and the predicted traffic generation of the Renewable Energy Centre based upon first principles. Background traffic growth between 2015 and 2020 has been obtained using TEMPRO 6.2.

7.2.6 The magnitude and significance of the forecasted development traffic flows have then been considered in the context of the '2020 Baseline' identified above.

Ascertaining Changes in Highway Capacity

7.2.7 In agreement with the Local Highway Authority and Highways England, the study area highway network has been assessed for the Proposed Development. As part of the assessment a capacity analysis of the Fort Parkway/Dunlop Way Left-in/Left-out priority junction has been undertaken.

7.2.8 The EIA has considered that a junction is nearing its capacity when the Ratio of Flow to Capacity is at 0.85 and that the threshold of capacity exists as 1.00.

Consideration of the Likely Safety Effects

7.2.9 The potential highway safety effects of the calculated development traffic flows has been undertaken with regard to the existing pattern of accidents and with reference to the Institute of Highways and Transportation (IHT) Risk Assessment Matrix.

7.2.10 Within this, the *severity* of a collision is determined by impact speed, the type of vehicles involved in the collision and the protection afforded to victims. The resultant *risks* are categorised within the standard matrix below as 'low', 'medium', 'high', or 'very high'.

Figure 7.1: IHT Risk Assessment Matrix

		Incident frequency			
		>Once a year (Frequent)	Between 1-3 years (Occasional)	Between 4-7 years (Rare)	Between 8-20 years (Very rare)
Severity	Fatal	Very high	High	High	Medium
	Serious	High	High	Medium	Medium
	Slight	High	Medium	Medium	Low
	Damage	Medium	Medium	Low	Low

7.2.11 It is typically accepted that a 'low risk' is immaterial and consideration of mitigation would not be required. Where 'medium risk' ratings are indicated, mitigation is not a pre-requisite but practical solutions should be considered where possible. 'High risk' ratings indicate that mitigation would be desirable whereas a 'very high risk' would require immediate intervention.

7.2.12 Based on the above, an evaluation has been undertaken to establish if the calculated development traffic flows, when considered cumulatively, would lead to an abnormal or unacceptable safety risk. Where any adverse safety impacts are considered likely, appropriate mitigation measures have been identified.

Consideration of the Likely Environmental Effects

7.2.13 The need to consider environmental impacts beyond the highway capacity and safety effects has been determined by reference to the guidance for the Environmental Assessment of Road Traffic (IEA, 1993), which suggests two broad rules to define the need to undertake full environmental impact analysis. These are as follows:

- 1) The Highway links where traffic flows will increase by more than +30% (or where the number of HGVs will increase by more than +30%); or
- 2) Sensitive areas where traffic flows will increase by +10% or more.

7.2.14 In the event that that the EIA process identifies the resultant traffic increases exceed either of the above criteria, the significance of and exposure to the environmental effects of traffic is considered. The environmental effects of traffic include:

- 1) Pedestrian amenity (including severance, fear and intimidation, and delay)
- 2) Driver delay
- 3) Accidents and Safety

Assessment of Significance

7.2.15 Consideration of the significance of the effects is undertaken in compliance with the EIA guidance, as outlined below.

7.2.16 In the context of 'accidents and safety' the guidance suggests that professional judgment would be needed to assess the significance of the impact in the context of existing accident patterns. This Chapter refers the IHT Risk Assessment (mentioned above) to provide an informative to underpin the professional judgment.

7.2.17 In the context of driver delay, it is considered reasonable to assume for simplicity that the magnitude of driver delay effects will correspond with the changes in traffic flow. Categorisation of the magnitude of the effects is summarised in Table 7.2 below.

Table 7.2: Magnitude of Effect based upon Traffic Flow

Sensitivity	Magnitude of Effect
Substantial	Consideration deterioration / improvement in local conditions or circumstances (+/- 90% change in traffic demand).
Moderate	Readily apparent change in conditions (+/- 60-90% change in traffic demand).
Slight	Perceptible change in conditions or circumstances (+/- 30-60% change in traffic demand).
Negligible	Very small perceptible change in conditions or circumstances (+/- 10 – 30% change in traffic demand).
No Impact	No discernible change in conditions (+/- 0 – 10% change in traffic demand).

7.2.18 Receptors are defined in Volume 11 of the Design Manual for Roads & Bridges (DMRB) and the levels for the environmental sensitivity of a receptor are specified therein. A similar approach is adopted herein with four levels of receptor sensitivity assessed: Low, Medium, High and Very High, as shown in Table 7.3. In this respect, the land-use of the receptors have been used to determine each receptor's sensitivity, based upon the typical level of pedestrian activity for that land use.

Table 7.3: Receptor Sensitivity based upon Traffic Flow

Sensitivity	Receptor
Very High	Nationally or internally important site with special sensitivity to increases in road traffic.
High	Regionally important site with special sensitivity to increases in road traffic.
Moderate	Residential (with frontage onto road under consideration), educational, healthcare, leisure public open space or town centre/local centre land-use.
Low	Employment or out of town retail land use, such as a retail park.

7.2.19 In the context of the Proposed Development, receptors within the study area are as follows:

- Receptor 1 - Fort Industrial Park
- Receptor 2 - Castle Vale Residential Area

7.2.20 In this regard, the sensitivity of the industrial park is considered to be 'low' whereas the sensitivity of residential dwellings is categorised as 'moderate'. The significance of the impacts have been considered with a matrix-based approach, similar to that contained within DMRB Chapter 11, such that the impacts are derived from the receptor's environmental sensitivity value in combination with the magnitude of the effect at that receptor. The matrix criteria is set out below.

Table 7.4 Significance Matrix

		Magnitude of Impact (Degree of Change)			
		Negligible	Slight	Moderate	Substantial
Receptor Sensitivity	Very High	Slight Adverse	Moderate Adverse	Substantial Adverse	Substantial Adverse
	High	Slight Adverse	Slight Adverse	Moderate Adverse	Substantial Adverse
	Moderate	Negligible	Slight Adverse	Moderate Adverse	Moderate Adverse
	Low	Negligible	Negligible	Slight Adverse	Moderate Adverse

Policy Framework

7.2.21 The EIA process has been undertaken with due regard to current best practice and current policy, particularly in respect to the National Planning Policy Framework (NPPF) such that the assessment focusses on the following two principle areas of policy;

1) Sustainability

The stated purpose of the NPPF is "to help to achieve sustainable development" (Ministerial Foreword) and NPPF is therefore underpinned by a presumption in favour of sustainable development. In this regard, the economic, social and

environmental credentials of the development proposals will be considered throughout this report, so far as is relevant to transport matters.

2) Cumulative Impact

Paragraph 32 of NPPF states that "development should only be prevented or refused on transport grounds where the residual cumulative impacts of a development are severe" and the report therefore seeks to quantify the magnitude of any transport effects (including highway capacity and safety) in order to inform measures of likely severity.

7.2.22 This Chapter of the ES has been prepared with reference to the requirements and best practice methods advocated by the following documents:

- 1) Planning Practice Guidance (Department for Communities and Local Government, March 2014);
- 2) The National Planning Policy Framework (Department for Communities and Local Government, March 2012);
- 3) Guidelines for the Environmental Assessment of Road Traffic (IEA, 1993); and
- 4) Department for Transport's document entitled 'Design Manual for Roads & Bridges' Volume 11: Environmental Assessment.

Scoping Criteria

7.2.23 In accordance with the requirements of EIA, the assessment of impacts has been undertaken following appropriate consultation with the Local Planning and Highway Authorities. In this way, a *Regulation 13 Request for a Scoping Opinion* was submitted to the Local Planning Authority under cover of a letter prepared by Pegasus Group, dated 28th July 2015.

7.2.24 Birmingham City Council, as the Local Planning Authority, provided their Scoping Opinion by email in a report received by Pegasus Group on 8th September 2015. The transport-related issues relevant to the proposed development are summarised as follows:-

- 1) The EIA Chapter should be based on information provided in the Transport Assessment.
- 2) Supplementary analyses should be provided to identify the magnitude of change for each hour of a typical weekday, from which the significance of the impact may be determined.
- 3) A Travel Plan would be required as part of the mitigation strategy.

Limitation to the Assessment

7.2.25 There are no clear limitations to the assessment provided below. All traffic surveys were conducted on a neutral weekday and the data collected as part of the assessment is considered to be reliable and robust.

7.3 Baseline Conditions

Site Description and Context

7.3.1 The application site comprises an area of 1.9 hectares, located within Fort Industrial Park, off Dunlop Way and the A47 Fort Parkway, approximately 1.5 kilometres to the north of Junction 5 of the M6. The application site is bound by industrial units on all sides with the exception of the southern boundary, which abuts a railway line.

7.3.2 The application site currently accommodates B1/B2/B8 land uses and includes two single storey business, industrial and storage buildings (use class B1, B2 and B8) containing nine separate units. The units are surrounded by areas of hard standing used for staff car parking.

Site Access Road

7.3.3 The site access road accommodates a single lane, two-way carriageway road measuring approximately 8 metres in width and is accessed off Dunlop Way via a priority T-junction. The junction has a kerbed radius of 10 metres and provides visibility in excess of 100 metres in either direction from a 2.4 metre setback distance. The private access road is subject to a 15mph speed limit and is barrier controlled at the northern end. The access road also serves several industrial units located to the west of the application site.

7.3.4 The road is illuminated throughout and accommodates double yellow lines on either side of the carriageway to prevent parking and loading. Footways measuring approximately 1.8 metres in width are accommodated on either side of the carriageway providing a good level of pedestrian access.

7.3.5 It is considered that the geometry of the site access road is of a sufficient standard to accommodate the development proposals and the associated vehicular movements.

Dunlop Way

7.3.6 Dunlop Way forms a vehicular route along the application site's northern boundary. It comprises a single lane two-way carriageway measuring approximately 9 metres in width and footways of 2 metres in width on either side. Dunlop Way provides a link with the A47-Fort Parkway, which runs parallel to the north of the road and can be accessed via a small link accommodating priority T-junctions at either end. The junction with the A47-Fort Parkway to the north of the link takes the form of a left-in/left-out arrangement with the westbound carriageway. Both junctions have a kerb radius of at least 10 metres and provide a good level of visibility.

7.3.7 In the vicinity of the Application site, Dunlop Way accommodates street lighting throughout and is subject to a 30mph speed limit. The carriageway is lined with double yellow lines on either side to prevent parking and loading. However, a parking bay of approximately 35 metres in length is provided to the south of the carriageway adjacent to the site's northern boundary, providing space to accommodate up to five cars.

7.3.8 Dunlop Way appears to have been constructed in accordance with guidance set out in DMRB and Manual for Streets, and is considered to be of a sufficient standard to accommodate the development proposals

Fort Parkway

7.3.9 The A47-Fort Parkway comprises of a two-way dual carriageway, routing between the Spitfire Island roundabout to the east and the A4040 roundabout to the west. Fort Parkway forms the main distributor road to serve the surrounding Fort Industrial Park area and is subject to a 40mph speed limit. The eastbound and westbound carriageways both measure approximately 7.5 metres in width.

7.3.10 Street lit pedestrian footpaths are located on either side of the carriageway and measure approximately 3 metres in width. There are also a number of signalised pelican crossings located along the route, providing safe crossing points for pedestrian users. Pedestrian guardrails are provided in the vicinity of the crossings which accommodate dropped kerbs and tactile paving.

Access by Car

7.3.11 The study area highway network was considered at Section 3.2 of the submitted Transport Assessment (**Appendix 7.1**), wherein a review of the geometric layout of the network was undertaken in the context of the Design Manual for Roads and Bridges (DMRB).

7.3.12 The assessment concluded that the application site is located where it would be able to access a high quality network of roads that provide connectivity to other significant destinations around the region, and made easier by the proximity of the trunk road and motorway network. These roads were determined to be geometrically suitable for use by the types of vehicles anticipated to be associated with the Proposed Development.

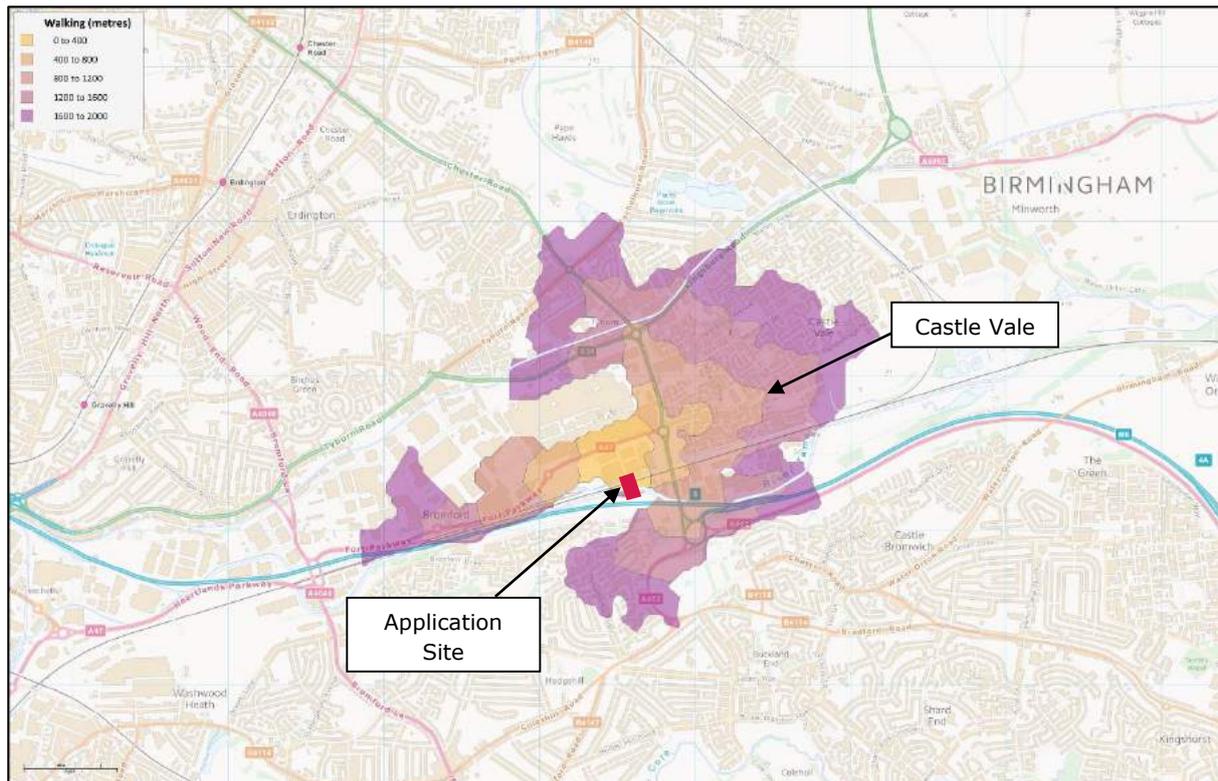
Baseline Survey Information

Access by Foot

7.3.13 The opportunities to travel to the application site by foot have been considered at Section 3.4 of the submitted Transport Assessment (**Appendix 7.1**) wherein the baseline footway infrastructure has been replicated within a GIS accessibility model.

7.3.14 In terms of walking accessibility, a typical walking threshold of 2 kilometres has been assumed, as advocated within IHT Guidance entitled Planning for Journeys on Foot. The resulting analysis is shown in Figure 7.2 below.

Figure 7.2: 2km Walking Catchment



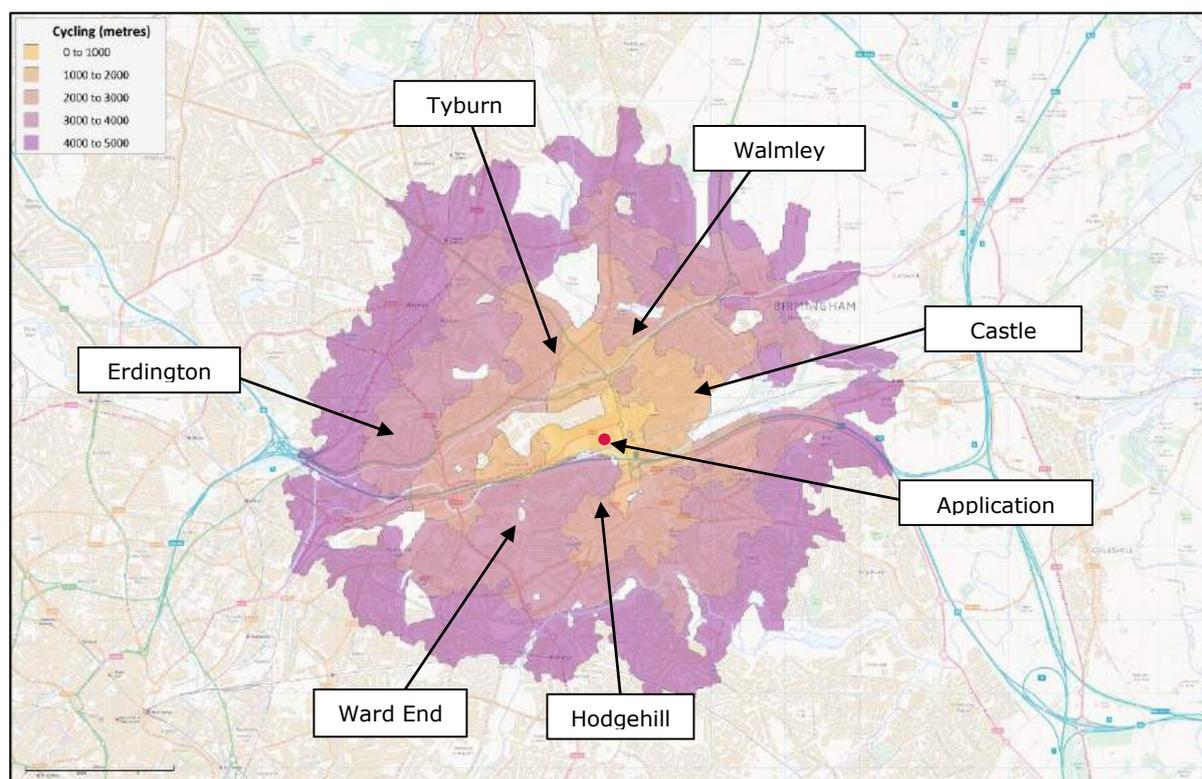
7.3.15 The results of the analysis confirms that a large area of the Fort Industrial Park and the neighbouring Castle Vale residential area is within the walking catchment of the application site. On this basis the Proposed Development is considered to be well placed to encourage and provide for trips to be made by foot, in line with current planning policy.

Access by Bicycle

7.3.16 The opportunities to travel to the application site by bicycle have been considered at Section 3.4 of the submitted Transport Assessment (**Appendix 7.1**) wherein the baseline infrastructure has been replicated within a GIS accessibility model.

7.3.17 In terms of walking accessibility, a typical cycling threshold of 5 kilometres has been assumed. The resulting analysis is shown in Figure 7.3 below.

Figure 7.3: 5km Cycling Catchment



7.3.18 The results of the cycling analysis confirms that all of Fort Industrial Park and the neighbouring residential areas of Castle Vale, Hodgehill, Ward End, Edrington, Walmley Ash and Tyburn are within the cycle catchment of the application site. On this basis the Proposed Development is considered to be well placed to encourage and provide for trips to be made by bicycle, in line with current planning policy.

Access by Public Transport

7.3.19 The opportunities to travel to the application site by bus have been considered at Section 3.5 of the submitted Transport Assessment (**Appendix 7.1**) using an accessibility model supported by bus timetable information.

7.3.20 The analysis considered a reasonable catchment to comprise a threshold inter-mode journey time of 60 minutes, with a maximum of one interchange. This therefore includes the time taken to travel to the bus stop, the time spent on the bus, and the time then to undertake the final part of the journey away from the bus stop from which the passenger alights. The results are replicated in the Figure 7.4 and Figure 7.5.

Figure 7.4: 30 Minute Bus Catchment – AM Peak Period (07:00-09:00)

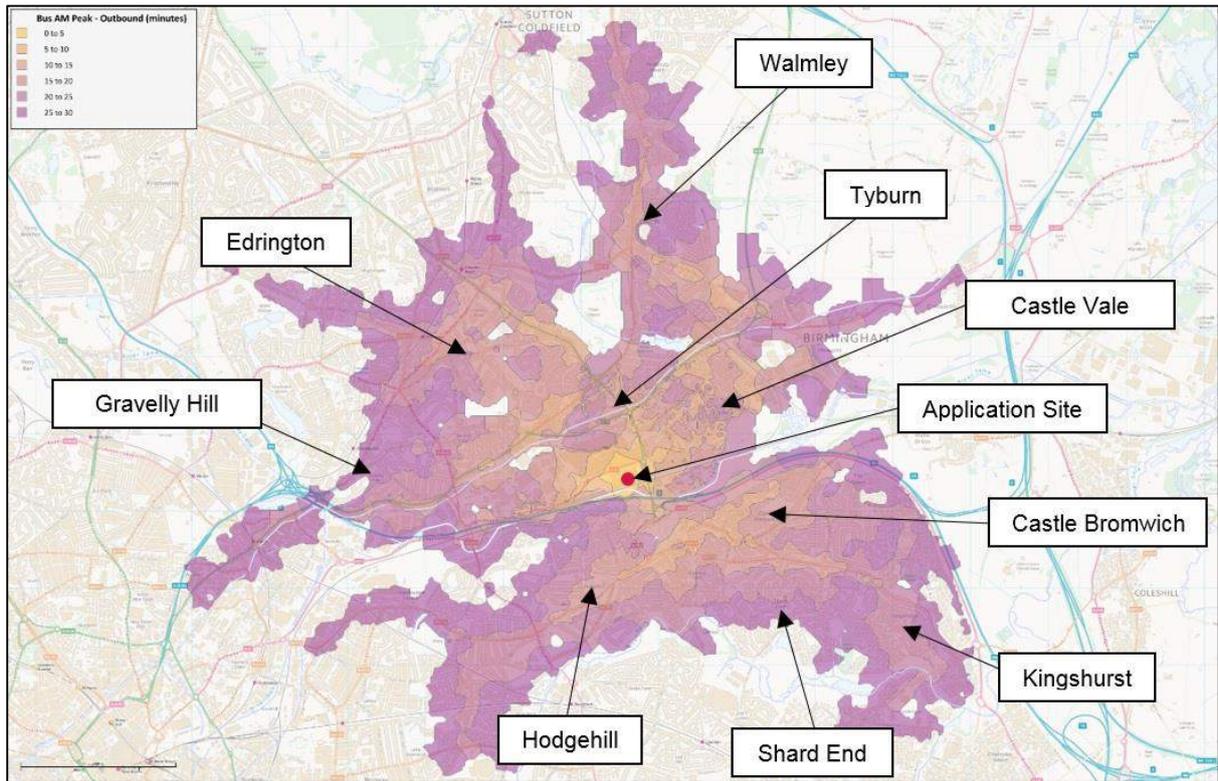
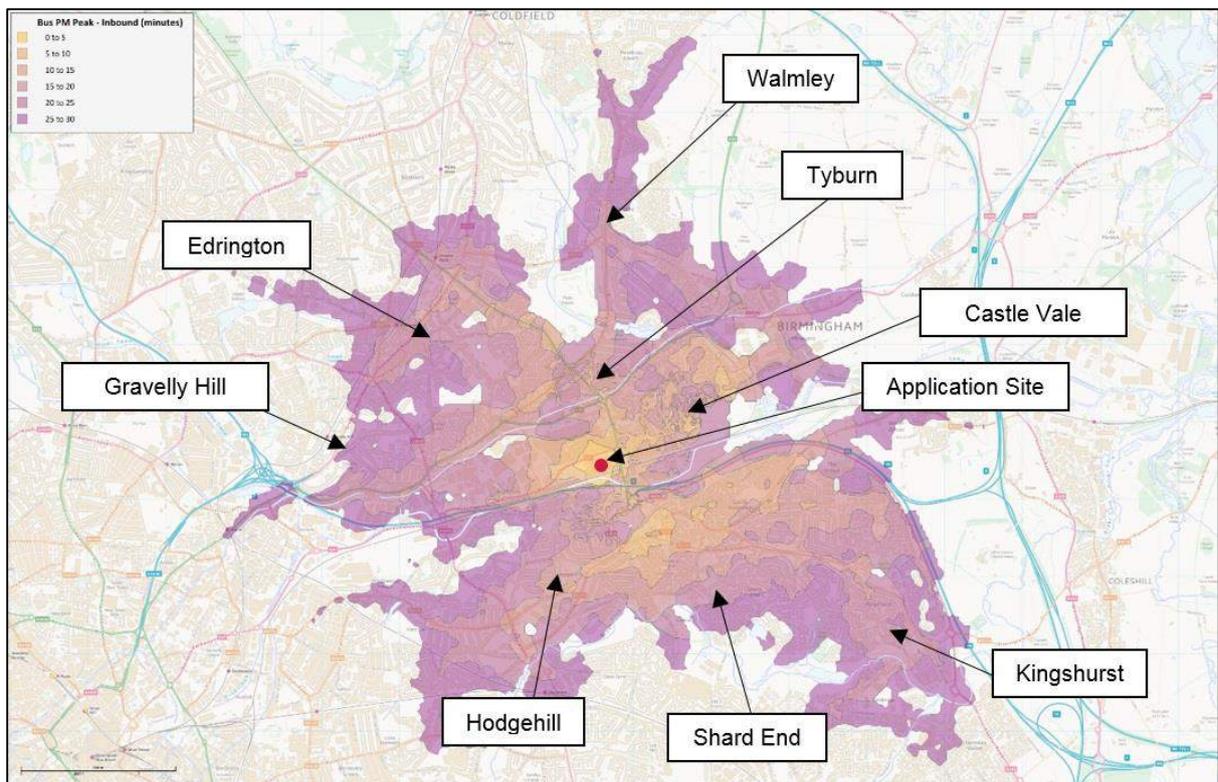


Figure 7.5: 30 Minute Bus Catchment – PM Peak Period (17:00-18:00)



7.3.21 It is evident from the model output that the application site would afford access to a significant geographical catchment by bus. The geographical catchment provides access to the residential areas of Tyburn, Castle Vale, Kinghurst, Shard End, Hodgehill, Gravelly Hill, Edrington, and Walmley.

7.3.22 In view of this, the application site is considered to be well located in respect of bus services. These bus services also enable a significant population catchment to travel to the site by bus.

Highway Safety

7.3.23 The safety risks of the existing study area network are considered within Section 3.6 of the submitted Transport Assessment (**Appendix 7.1**) wherein existing accident records provided on behalf of the Local Highway Authority were provided for the most recent five-year period available.

7.3.24 The data were evaluated in order to establish if there were obvious clusters or patterns of accidents that might be suggestive of a deficiency in the geometry of the highway that might be contributing to an unacceptable safety risk. In this respect, the Transport Assessment review identified that the majority of accidents within the study area have taken place within the vicinity of the Spitfire Island roundabout.

7.3.25 In view that risk increases with exposure the above results should be considered in the context of traffic demand and in this respect, it is to be expected that accidents occur more frequently at those locations that accommodate greater levels of demand.

7.3.26 In the immediate vicinity of the application site there only appear to have been only three Personal Injury Accidents within the last five years, all of which are classified as 'slight' and occurred on the A47 Fort Parkway. None of these accidents indicate an inherent problem with highway design or geometry. It is therefore concluded that, in terms of safety the surrounding highway network can comfortably accommodate the traffic flows generated by the Proposed Development.

Observed Traffic Demand

7.3.27 Observed traffic demand for 2015 has been established through data collected from traffic surveys undertaken on Tuesday 14th July 2015 and AADT traffic data collected from DfT survey sites. A summary of traffic data for the '2015 Observed' scenario is provided in Table 7.5 below:

Table 7.5 2015 Observed Traffic Flows

Link	All Vehicles			HGVs		
	Northbound	Southbound	Total	Northbound	Southbound	Total
A452 North of Spitfire Island	20616	18357	38973	708	481	1189
A452 South of Spitfire Island	23751	22316	46066	1414	1037	2451
Link						
Tangmere Drive	8120	9033	17153	242	164	406
A47 Fort Parkway	12468	12379	24847	563	394	957

Baseline Traffic Demand and Highway Capacity

7.3.28 In agreement with the Local Highway Authority and following discussion with Highways England, the submitted Transport Assessment (**Appendix 7.1**) considers a horizon year development scenario for consented development at 2020, incorporating all committed developments.

7.3.29 Background traffic growth between 2015 and 2020 has been determined using TEMPRO 6.2 and has been obtained by using the following criteria:

- The Birmingham (00CN1)
- Urban Principal Road
- NTM AF09 Dataset
- AM Weekday Peak/PM Weekday Peak

7.3.30 The resulting growth factor of 1.0841 has been used to establish the 2020 Baseline traffic flows.

7.3.31 The data collected represents demand on the network throughout the day. As such, this Chapter has assessed the significance of the impacts at all times of the day. A summary of traffic data for the '2020 Baseline' scenario is provided in Table 7.6 below.

Table 7.6 2020 Baseline Traffic Flows

Link	All Vehicles			HGVs		
	Northbound	Southbound	Total	Northbound	Southbound	Total
A452 North of Spitfire Island	21,272	18,940	40,212	731	497	1,227
A452 South of Spitfire Island	24,506	23,025	47,531	1,459	1,070	2,529
Link	Northbound	Southbound	Total	Northbound	Southbound	Total
Tangmere Drive	8,378	9,320	17,698	250	169	419
A47 Fort Parkway	12,864	12,773	25,637	581	407	988

7.4 Assessment of Likely Significant Effects

Construction

7.4.1 Based on experience of previous developments of a similar size, it is expected that civil and infrastructure works would likely last onsite for a duration of 2 months. The potentially significant construction phase impacts are considered likely to be determined as a result of the following principle activities:

- 1) Daily arrival and departure of construction traffic;
- 2) Onsite activity to demolish the existing development and facilitate construction of buildings and associated infrastructure;
- 3) Export/Import of any residual material during demolition of the site; and
- 4) Delivery of construction materials.

Magnitude of the Effects

7.4.2 It is anticipated that transport related effects will be associated with the demolition of the site, combined with the movements of construction staff. Allowances have therefore been made in order to consider the magnitude and significance of the effects during this period.

7.4.3 Demolition will take place over a couple of weeks and is unlikely to involve earthworks or re-grading. It is therefore considered that vehicular movements associated with the construction phase will not exceed the operational phase of the development. In this respect the magnitude of effects is expected to be lower than the operational phase.

7.4.4 Consequently, the significance of the peak construction phase impacts are acceptable, particularly in light of their temporary nature. Notwithstanding this, mitigation measures are proposed to reduce the magnitude of the effect further and these are identified at Section 7.5 of this Chapter.

Operational Traffic Generation

7.4.5 Section 4.0 of the submitted Transport Assessment (**Appendix 7.1**) sets out the methodologies used to determine the likely trip generation characteristics of the Proposed Development.

7.4.6 The submitted Transport Assessment identifies the development trip generations for the weekday peak hours in line with the scope agreed with the Local Highway Authority and Highways England, providing a comparison with the extant land use.

Magnitude of the Effect

7.4.7 The above trip generations have been considered in relation to the baseline traffic flows identified within Table 7.6 to provide an indicative magnitude of change expected. The results are set out at Table 7.7, below.

Table 7.7: 2020 with Proposed Development

Link	All Vehicles			HGVs		
	Northbound	Southbound	Total	Northbound	Southbound	Total
A452 North of Spitfire Island	21,243	18,921	40,164	737	506	1,243
A452 South of Spitfire Island	24,476	22,990	47,466	1,465	1,079	2,544
Link	Northbound	Southbound	Total	Northbound	Southbound	Total
Tangmere Drive	8,374	9,299	17,672	250	169	419
A47 Fort Parkway	12,796	12,703	25,499	596	423	1,019

7.4.8 The relative impact of the Proposed Development on the baseline traffic flows of the surrounding highway network is provided in Table 7.8 below. Although there is a small increase in HGV movements, this is offset by the much larger reduction in total vehicular movements in comparison with the extant land-use.

Table 7.8: Impact of Proposed Development

Link	All Vehicles			HGVs		
	Northbound	Southbound	Total	Northbound	Southbound	Total
A452 North of Spitfire Island	-29 (0.13%)	-19 (0.10%)	-47 (0.12%)	6 (0.84%)	10 (1.95%)	16 (1.29%)
A452 South of Spitfire Island	-30 (0.12%)	-35 (0.15%)	-65 (0.14%)	6 (0.43%)	9 (0.83%)	15 (0.60%)
Link	Northbound	Southbound	Total	Northbound	Southbound	Total
Tangmere Drive	-5 (0.05%)	-21 (0.23%)	-26 (0.14%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
A47 Fort Parkway	-68 (0.53%)	-69 (0.54%)	-138 (0.53%)	15 (2.58%)	16 (3.93%)	31 (3.14%)

Significance of the Impact

7.4.9 As stated previously within this Chapter, the significance of the effect is determined in combination with the sensitivity of the receptor, as set out at Table 7.4.

7.4.10 In this context, the magnitude of the effects identified above in Table 7.6 above indicate that the significance of the operational traffic effects would be classified as 'Negligible' in respect of receptors identified in Section 7.2.

7.4.11 In the context of highway safety, it is considered that the change in traffic flows would be unlikely to materially or discernibly alter the risk of accident on the network. Consequently, the significance of the operational effects are considered to be acceptable. Notwithstanding this, mitigation measures are proposed to reduce the magnitude of the effect further and these are identified at Section 7.5 of this Chapter.

Summary of Magnitude and Significance

7.4.12 In summary of the above, the magnitude and significance for the calculated impacts is set out in Table 7.9 below.

Table 7.9: Summary of Magnitude and Significance

Impact	Receptor Sensitivity	Direct or Indirect	Positive/Negative	Permanent/Temporary	Magnitude	Significance
Construction						
Receptor 1 Fort Industrial Park	Low	Direct	Positive	Temporary	Negligible	Negligible
Receptor 2 Castle Vale Residential Area	Moderate	Direct	Positive	Temporary	Negligible	Negligible
Operational						
Receptor 1 Fort Industrial Park	Low	Direct	Positive	Permanent	Negligible	Negligible
Receptor 2 Castle Vale Residential Area	Moderate	Direct	Positive	Permanent	Negligible	Negligible

7.5 Mitigation and Enhancement

7.5.1 Notwithstanding the already small and acceptable environmental impacts identified above, it is proposed to mitigate the development traffic effects further through the range of measures as identified below.

Construction Phase

7.5.2 It is proposed that a Construction Traffic Management Plan (CTMP) would be prepared and submitted to the Local Planning Authority prior to the commencement of on-site works. The purpose of the CTMP would be so that appropriate environmental management practices are followed during the construction (and demolition) phase of the project.

7.5.3 Although measures will be identified within the CTMP, it is possible that they may include some or all of the following:

- 1) Wheel washing facilities to prevent the transfer of detritus onto the public highway.
- 2) Appropriate road signage directing construction traffic to the appropriate location and warning drivers and other road users of the presence of construction vehicle traffic.
- 3) A Construction Staff Travel Plan that would seek to minimise the number of car-borne visits to the application site. Notwithstanding the fact that the topography may naturally limit the potential for on-site car parking, a mini-bus collection service may be operated by the appointed contractor.

Operational Phase

7.5.4 Given the application site’s current B1/B2/B8 land use and the resulting impact of the Proposed Development, it is considered that the surrounding highway network is of a suitable standard and will not require further mitigation to accommodate movements associated with the operational phase. The application site’s location on an industrial estate, means the roads within the vicinity of the site all incorporate suitable geometry to accommodate the movements of HGV traffic.

7.5.5 Being located within an established industrial area, the site also provides a high level of accessibility to sustainable means of transport including walking, cycling and public transport, as demonstrated in section 7.3 of this chapter.

Residual Impacts

7.5.6 For simplicity, the benefits afforded by introduction of the above mitigation strategies have not been quantified and indeed it is considered that doing so would not alter the conclusions of this Chapter. Thus, for the purpose of this assessment, the residual impacts are considered to be as follows.

Table 7.10: Summary of Residual Impacts

Impact	Receptor Sensitivity	Direct or Indirect	Positive/Negative	Permanent/Temporary	Magnitude	Significance
Construction						
Receptor 1 Fort Industrial Park	Low	Direct	Positive	Temporary	Negligible	Negligible
Receptor 2 Castle Vale Residential Area	Moderate	Direct	Positive	Temporary	Negligible	Negligible
Operational						
Receptor 1 Fort Industrial Park	Low	Direct	Positive	Permanent	Negligible	Negligible
Receptor 2 Castle Vale Residential Area	Moderate	Direct	Positive	Permanent	Negligible	Negligible

7.6 Cumulative and In-Combination Effects

7.6.1 It is possible that construction of the Proposed Development will occur concurrent to the construction of other nearby schemes. Following scoping discussions with Birmingham City Council requested that number of committed developments were included within the assessment to establish the cumulative effects. It is apparent that most of the schemes listed are already operational and therefore form part of the baseline assessment. For the remaining schemes it is apparent they have, at best, outline planning permission, with limited information from which to gauge the associated impacts and to undertake a comprehensive cumulative assessment.

7.6.2 Nevertheless, confidence may be taken from the results of the analysis contained herein, which identifies a worst-case impact of 'Negligible. This suggests that there is significant scope to accommodate cumulative traffic effects whilst maintaining acceptable thresholds of impact.

7.7 Summary and Conclusion

Introduction

7.7.1 This Chapter of the ES assesses the environmental impacts of the Proposed Development at Fort Industrial Park, Birmingham. The context of this Chapter has been informed by the technical analysis contained within the submitted Transport Assessment contained **Appendix 7.1** of this ES.

7.7.2 This Chapter has considered the environmental impacts of traffic to include pedestrian amenity, highway safety and driver delay in the context of the relative change in traffic flows. Two receptors have been identified within the study area, these being the Fort Parkway Industrial Park and the Castle Vale Residential Area. The sensitivity of these receptors was noted to be 'low' and 'moderate', respectively.

Baseline Conditions

7.7.3 The location of the application site has been considered in the context of existing and future consented infrastructure using GIS-based modelling techniques, which confirm that the site relates well by non-car modes to adjoining residential areas.

7.7.4 Baseline traffic flows have been collected and used as the basis of the environmental impact analysis. Analysis against daily flows is considered reasonable in light of the fact that the trip profile of the site is likely be distributed evenly over the course of the day.

Likely Significant Effects

7.7.5 Operational phase impacts have been determined with reference to the trip generation calculations contained within the submitted Transport Assessment at **Appendix 7.1**.

7.7.6 Construction phase (including demolition) impacts could be generated from the arrival and departure of construction workers and associated HGV traffic. Whilst impacts can be significantly reduced with appropriate mitigation, the construction phase impacts would be, at worst, categorised as 'Negligible'. This is considered to be acceptable, particularly in light of the temporary nature of this phase of development.

7.7.7 Cumulative impacts during construction could arise alongside the construction of adjoining schemes. However, schemes are either already operational and are included within the baseline assessment or insufficient information is available to measure this effect for the remaining schemes. Notwithstanding, an arbitrary quadrupling of construction traffic flows assumed for the Proposed Development will only yield an acceptable 'Moderate Adverse' impact.

Mitigation and Enhancement

7.7.8 Given the application site's current B1/B2/B8 land use and the resulting impact of the Proposed Development, it is considered that the surrounding highway network is of a suitable standard and will not require further mitigation to accommodate movements associated with the operational phase.

7.7.9 For the construction phase it is proposed that a Construction Traffic Management Plan (CTMP) would be prepared and submitted to the Local Planning Authority prior to the commencement of on-site works. The purpose of the CTMP would be so that appropriate environmental management practices are followed during the construction (and demolition) phase of the project

Conclusion

7.7.10 In view of the above, it is the conclusion of this Chapter of the ES that the Proposed Development can be accommodated without any unacceptable detriment to the environmental effects of traffic. Furthermore, it is noted that the inclusion of mitigation measures at both construction and operational phases would reduce the effects and impacts of the development further, providing confidence in the conclusion of this assessment.

1 Background, Introduction & Context

2 Site Description

3 Development Proposals

4 Need & Alternatives

5 Air Quality

6 Townscape & Visual

7 Traffic & Transportation

8 Hydrology & Flood Risk

9 Hydrogeology & Ground Conditions

10 Noise & Vibration

11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

13 Socio- Economic Impact

14 Summary

8 HYDROLOGY AND FLOOD RISK

8.1 Introduction

8.1.1 This chapter of the Environmental Statement (ES) contains an assessment of the likely significant effects that the Proposed Development would have on the water environment and, where necessary, identifies mitigation measures in accordance with relevant legislation, planning policies, guidance, and statutory requirements in respect of hydrology and flood risk.

8.1.2 This chapter includes an assessment of flood risk and complements a Flood Risk Assessment (FRA) document, which includes a surface water drainage strategy. The FRA is reproduced in full in **Appendix 8.1**. A Sustainable Drainage Assessment has also been produced which outlines the proposed surface water management measures for the development and how they follow the philosophy of Sustainable Drainage Systems (SuDS). The Sustainable Drainage Assessment is reproduced in full in **Appendix 8.2**. A SuDS Operation and Maintenance Plan has also been produced which is reproduced in **Appendix 8.3**.

8.2 Assessment Approach

8.2.1 This section outlines: the methodology for the assessment of the effects of the Proposed Development; the policy and legislative framework which constrains the Application Site; and the overall scope of the assessment.

METHODOLOGY

8.2.2 The methodology for the assessment of the significance of the effects of the Proposed Development involves:

- Describing the legislative and policy background to the Proposed Development in the context of the water environment;
- Establishing a baseline for the surface water and groundwater features in the vicinity of the Application Site;
- Identifying and evaluating the likely significant beneficial and adverse effects of the Proposed Development's construction and operation on the water environment;
- Identifying mitigation measures to avoid, reduce or remedy likely significant adverse effects that may arise from the construction or operation of the Proposed Development; and
- Evaluating the residual effects of the Proposed Development after the implementation of the proposed mitigation measures.

8.2.3 The methodology of this chapter draws on the more detailed Flood Risk Assessment (FRA), contained in **Appendix 8.1**.

8.2.4 The spatial scope of this chapter includes the area within the Application Site, as shown on the site location plan within Chapter 1 of this ES. The effect of the Proposed

Development is considered in the context of the wider hydrological system, specifically the Dunlop Carrier and River Tame and the surrounding land.

8.2.5 A desk study and a site walkover has been undertaken to establish the baseline hydrology (surface water), hydrogeology (groundwater), flood hazards, and environmental quality of the Application Site and its immediate vicinity.

8.2.6 The following sources of information have been reviewed to establish the baseline conditions:

- Layout Plan (Drawing Number K.0168_06B-1 Rev M);
- Ordnance Survey 1:25,000 scale Maps;
- Topographical Survey;
- Environment Agency website and online mapping (September 2015);
- Environment Agency consultation response;
- Birmingham City Council Consultation response;
- Multi-Agency Geographic Information for the Countryside (MAGIC) (September 2015);
- British Geological Survey[®] (2015) NERC online mapping;
- Site specific Flood Risk Assessment (FRA) (contained in **Appendix 8.1**);
- Birmingham City Council Level 1 Strategic Flood Risk Assessment (SFRA) (January 2012);
- Birmingham City Council Preliminary Flood Risk Assessment (PFRA) (May 2011); and
- A site walkover was undertaken in August 2015.

8.2.7 A number of standards and guidelines, which provide details of assessment methodologies and mitigation techniques were used in completing this assessment. These include:

- Environment Agency Pollution Prevention Guidelines (Numbers 1, 2, 3, 5, and 6);
- Control of Water Pollution from Construction Sites: Guidance for Consultants and Contractors (CIRIA C532, 2001);
- Environmental Good Practice On Site Guide (3rd Ed.) (CIRIA C692, 2010);
- Control of Water Pollution from Linear Construction Projects (CIRIA C648, 2006);
- The SuDS Manual (CIRIA C697, 2007);
- Designing for Exceedance (CIRA C635, 2006);

- Interim Code of Practice for Sustainable Drainage Systems (National SuDS Working Group, July 2004);
- Non-statutory technical stands for sustainable drainage systems (Environment Agency and DEFRA); and
- Sustainable Drainage: Guide to Design, Adoption and Maintenance (Birmingham City Council 2015).

8.2.8 To assess the significance of the effects of the Proposed Development on the water environment a set of threshold criteria have been established based on the interaction between the value and sensitivity of the receptor and the magnitude of change. The

threshold criteria have been determined based on planning policy and legislation; industry best practice; and professional judgement.

8.2.9 The criteria to assess the value/sensitivity of the receptor are set out in **Table 8.1** and the criteria to assess the magnitude of the effects are set out in **Table 8.2**.

Table 8.1 Assessment of the Value and/or Sensitivity of a Receptor

Value/ Sensitivity	Receptor
High	National or Internationally Designated Area e.g. Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site, or National Nature Reserve.
	Nationally or Internationally protected species.
	Local residents (persons and property).
	Functional floodplain or flood storage area (Flood Zone 3).
	Watercourse, waterbody or wetland with 'Excellent' quality.
	Groundwater resources with 'Good' Quality or Groundwater Source Protection Zone 1 and 2.
Medium	Non statutory sites of regional or local importance e.g. Local Nature Reserve (LNR).
	An area at medium risk of flooding (Flood Zone 2).
	Watercourse, waterbody or wetland with 'Good' or 'Satisfactory' quality.
	An aquifer (Principal or Secondary) or Groundwater Source Protection Zone 3.
Low/ Negligible	An area of low probability of flooding (Flood Zone 1).
	Watercourse, waterbody or wetland with 'Poor' quality or a Heavily Modified Waterbody.
	Unproductive strata.

Table 8.2 Assessment of the Magnitude of the Effect

Magnitude	Criteria
High	<p>Long term or permanent changes to the hydrology (flood risk, flow characteristics of watercourses, and habitat quality) or water quality.</p> <ul style="list-style-type: none"> • Increase/decrease whole catchment risk of flooding. • Significant loss/addition of floodplain storage. • Severe permanent deterioration/improvement of water quality, habitat quality or flow characteristics of a watercourse at a local to regional scale.
Medium	<p>Material short to medium term local changes to hydrology or water quality.</p> <ul style="list-style-type: none"> • Increase/decrease in flood risk affecting the Application Site and its immediate vicinity. • Minor loss/addition of floodplain storage. • Moderate changes to the habitat quality or flow characteristics of a watercourse. • Severe temporary reduction or moderate local scale improvement in the quality of surface water resources.
Low	<p>Measurable but immaterial changes to hydrology or water quality.</p> <ul style="list-style-type: none"> • Minor increase/decrease in flood risk to the Application Site. • Minor changes to habitat quality or flow characteristics of a watercourse. • Minor local scale reduction (reversible with time) or improvement in the quality of surface water.
Negligible	No appreciable effect on hydrology or water quality.

ASSESSMENT OF SIGNIFICANCE

8.2.10 The likely significant environmental effects are rated on a seven point scale (major beneficial, moderate beneficial, minor beneficial, negligible, minor adverse, moderate adverse and major adverse). The scale is derived from the interaction of receptor sensitivity and magnitude of the effect, as detailed in the matrix below (**Table 8.3**). The shading indicates those significance ratings that are deemed to be 'significant' effects. The effects are judged to be direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative.

Table 8.3 Significance of Effects

Magnitude of Effect	<u>Sensitivity of Receptor</u>			
		High	Medium	Low
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor to Moderate	Negligible
Low	Moderate	Minor to Moderate	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

POLICY FRAMEWORK

This section summarises those policies that are directly relevant to hydrology, flood risk and drainage which have been acknowledged in the preparation of this report (**Tables 8.4, 8.5 and 8.6**). Please note that this list is not exhaustive and focuses on the key pieces of legislation and policy. The sustainable use and management of water resources is the key driver behind all legislation and policy detailed below.

Table 8.4 International and European Legislation, Planning Guidance and Policy.

Title	Policy Summary
Water Framework Directive (WFD) [2000/60/EC] (EU, 2000)	Aims for a more integrated approach to water management. It sets the target for all waters, both surface and groundwater, to achieve 'Good' status by 2015. Good status refers to ecological and chemical status for surface waters and both chemical and quantitative status for groundwaters.

Table 8.5 National and Regional Legislation, Planning Guidance and Policy.

Title	Policy Summary
Flood and Water Management Act 2010 (DEFRA)	<p>The Act was established to provide better, more comprehensive management of flood risk.</p> <p>The Act creates Lead Local Flood Authorities (LLFA) at the Unitary Authority and County Council level. The LLFA is responsible for managing the risk of all 'local floods'.</p>
Water Resources Act 1991 (DoE)	<p>The Act sets out the regulatory controls and restrictions that provide protection to the water environment through controls on abstraction, impounding and discharges as well as identifying water quality and drought provisions.</p> <p>It ensures that any works that impact a 'Main River' need to be consented by the Environment Agency.</p>
Land Drainage Act 1991 (DoE)	<p>The Act places the responsibility for the maintenance of ordinary watercourses on the adjacent landowner.</p> <p>The amended Act ensures that any channel works cannot be undertaken without prior authorisation from the LLFA or Internal Drainage Board.</p>
National Planning Policy Framework (NPPF) (DCLG 2012)	<p>The NPPF sets out the government's planning policy on development and flood risk. It highlights the need to avoid inappropriate development in areas at risk of flooding and making development safe from flooding without increasing flood risk elsewhere.</p> <p>The Flood Risk and Coastal Change planning practice guidance to the NPPF was published in March 2014 and sets detailed requirements to fulfil the overarching policies set out in the NPPF.</p>
River Trent Catchment Flood Management Plan (EA 2010)	Catchment Flood Management Plans (CFMP) are the Environment Agency's high level strategic plans for the sustainable management of flood risk. The River Tame is a tributary of the River Trent. The River Trent CFMP recommends the need for further action to reduce flood risk in the Birmingham area.

Table 8.6 Local Legislation, Planning Guidance and Policy.

Title	Policy Summary
Birmingham Unitary Development Plan (Birmingham City Council 2005)	The Birmingham Unitary Development Plan was adopted in 1993 and reviewed in 2005 and remains the Development Plan for Birmingham. Policies contained in paragraphs 3.71 – 3.75 are relevant to this assessment.
Sustainable Management of Urban Rivers and Floodplains (Birmingham City Council 2007)	Birmingham City Council adopted the Sustainable Management of Urban Rivers and Floodplains (SMURF) as a Supplementary Planning Document (SPD) in June 2007. The SMURF provides guidance for development located within river corridors in Birmingham. The policies contained within the SMURF are supplementary to general policies contained within the UDP 2005 and policies relevant are 3, 4, 8 and 9.
Birmingham Development Plan (Birmingham City Council 2013)	The Birmingham Development Plan (BDP) is currently emerging and once adopted will set out the statutory framework to guide decisions on development and regeneration in Birmingham up to 2031. The Pre Submission version of the BDP was published in December 2013. Policy TP6: Management of Flood Risk and Water Resources (including Main Modifications (July 2015) and Modifications Following Pre Submission Consultation (2014)) is relevant to this assessment.

SCOPING CRITERIA

8.2.11 Birmingham City Council's Screening Opinion dated 08/09/15 states "The Local Planning Authority does not object to the proposed methodology".

8.2.12 The scope of this assessment is based on the requirements of the National Planning Policy Statement and the Flood Risk and Coastal Change Planning Practice Guidance. The FRA includes:

- An assessment of the existing surface water drainage arrangements;
- Potential flood hazards affecting the Application Site and the probability of these occurring, including an assessment of which Flood Zone the development falls within;
- Effects of climate change on flood hazards;
- Flood risk vulnerability classification and flood zone compatibility of the Proposed Development;
- Flood risk management measures; and
- An assessment of offsite impacts and residual risks.

LIMITATIONS TO THE ASSESSMENT

8.2.1 The assessment of the significance of the effects of the Proposed Development on the Water Environment is based on the assumption that the baseline data is correct.

8.3 Baseline Conditions

8.3.1 This section describes the Application Site in the context of the hydrological (surface water) and hydrogeological (groundwater) environment; and sets the baseline conditions which the potential effects of the Proposed Development can be assessed against.

SITE DESCRIPTION AND CONTEXT

General

8.3.2 The Application Site is currently a light industrial park consisting of two buildings surrounded by areas of car parking, hard standing and small areas of grass and landscape planting.

8.3.3 The Topographical Survey indicates that adjacent to Dunlop Way on the site's northern boundary the level range between 82.50 - 82.90m Above Ordnance Datum (AOD). Between the two buildings the site levels range between 82.3 – 82.4m AOD. On the southern boundary adjacent to the Dunlop Carrier (watercourse) the site level ranges between 81.9 – 82.2m AOD. The site is predominately flat with an approximate 1m fall from north to south and gradient of 1:190.

Ground Conditions

8.3.4 The British Geological Survey[®] (BGS) NERC (2015) geological mapping of the area shows the underlying bedrock beneath the site is Mercia Mudstone. The mapping also shows that the Application Site is underlain by superficial geology consisting of River Terrace Deposits (sand and gravel) and Alluvium (clay, silt, sand and gravel).

8.3.5 The geological mapping is confirmed by publically available borehole records which are published by BGS[®] NERC (2015) for the site to the east of the Proposed Development. These boreholes identified Made Ground to a depth of approximately 1.8m – 2m, River Terrace Deposits to a depth of between 4.40m – 5.0m and Weathered Mercia Mudstone below this.

8.3.6 From an inspection of the Environment Agency's Aquifer Designation Map on its website the site is underlain by superficial geology classified as a 'Secondary A Aquifer' which are defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. The site's bedrock is classified as a 'Secondary B Aquifer'. This is defined as predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.

8.3.7 The Environment Agency's Water Abstraction Licence map as shown on its website identifies large groundwater abstractions north of the Application Site associated with the Jaguar Land Rover plant and a surface water abstraction associated with the Birmingham and Fazeley Canal.

8.3.8 From an inspection of the Environment Agency's Groundwater Source Protection Zone Map the Application Site does not lie within a groundwater source protection zone.

Drainage

8.3.9 An overflow channel, known locally as the Dunlop Carrier, runs along the site's southern boundary. The watercourse flows from west to east and drains into the River Tame 1 km east of the site (near Blenheim Close). The Dunlop Carrier is a straight watercourse with a brick lined channel approximately 2 – 3m wide. The bank rises steeply either side of the watercourse and its total width is approximately 10 – 12m. The total depth from the top of the bank and river bed is approximately 2.7m. The bank is vegetated

with stretches of sheet piling along its length. The Dunlop Carrier receives runoff from the Erdington area, the Jaguar Land Rover Plant and the Fort Industrial Park. Regarding the site's surface water drainage arrangements it is considered the roof drainage and highway area drain to a private surface water sewer system in the access road and into the Dunlop Carrier.

8.3.10 The Erdington Brook (culverted) is a tributary of the Dunlop Carrier and discharges into the Dunlop Carrier approximately 0.6km west of the Application Site.

8.3.11 The River Tame is located south of the railway line, approximately 0.1km south of the site. The watercourse flows from west to east. Flood defences are present along the River Tame in the form of masonry walls along either bank of the River Tame.

8.3.12 Severn Trent Water is the sewerage and water supply undertaker for the area. A public foul sewer runs within the internal access road and receives foul flows from the Fort Industrial Park and development to the north of the site. The sewer drains into a sewage pumping station on the site's southern border. A rising main runs in a westerly direction.

8.3.13 A 1200mm diameter surface water culvert runs adjacent to the western edge of the buildings which drains into the Dunlop Carrier to the east of the Sewage Pumping Station. It is considered this drains the area to the north of the site (including the Jaguar Land Rover Plant).

Flood Risk

8.3.1 A Flood Risk Assessment (FRA) has been undertaken and is reproduced in **Appendix 8.1**.

8.3.2 Flood hazards affecting the site are summarised in **Table 8.7** and explained in more detail in the FRA. Based on this detailed assessment the pre-development potential flood risk to the site from all sources of flooding is considered to be low.

Table 8.7 Pre-development Potential Flood Risk from All Sources of Flooding.

Flood Source	Potential Risk	Description
Watercourses	Low	The site is located in Flood Zone 2 and 3. The presence of flood defences along the River Tame protect the site up to the 1:100 (including an allowance for climate change) flood event. Based on the available information the site would be affected during the 1:1000 year event.
Surface Water	Low	The topography of the land indicates that any overland flow would be directed into the existing surface water drainage network and the Dunlop Carrier.
Groundwater	Low	The SFRA does identifies groundwater flooding within the local area. Geological conditions suggest groundwater is present at relatively shallow depths within superficial deposits but the risk of emergence is considered to be low.
Overwhelmed Sewers	Low	There is an existing off-site sewer network near the site. No incidences of sewer flooding have been recorded in the vicinity of the site.
Artificial Sources	Low	The site is in an area at risk of reservoir flooding. However, the risk of reservoir flooding is very unlikely.

8.3.3 The Environment Agency's consultation response states that they have no record of flooding in the area. No records of historic flooding are recorded in the SFRA affecting the Application Site. Birmingham City Council have confirmed their historic records are contained in the SFRA and no detailed information was provided.

Environmental Quality

8.3.4 None of the drainage or surface water features in the vicinity of the Application Site are designated for their conservation value on a local, county, national or international level. There are no statutory nature conservation sites within the Application Site's immediate vicinity.

8.3.5 The Environment Agency grades river hydromorphological, chemical and biological quality. The River Tame and Dunlop Carrier are assessed in the same unit within the River Basin Management Plan (RBMP) Humber River Basin District 2009 and this data is reproduced in **Table 8.8**. The Humber River Basin District covers the catchment of the River Trent and the River Tame.

Table 8.8 River Quality (based on Environment Agency data)

River Tame from Confluence of the two arms to River Blythe			Typology Description = Low, Small, Calcareous	
Hydromorphological Status	Current Ecological Quality	Current Chemical Quality	2015 Predicted Ecological Quality	2015 Predicted Chemical Quality
Heavily Modified	Moderate Potential	Fail	Moderate Potential	Fail

8.3.6 The Environment Agency's online mapping records no historic pollution incidents within the immediate vicinity of the Application Site.

BASELINE SURVEY INFORMATION

8.3.7 This assessment is based on desk based sources of information as referenced within the text above and a site walkover was conducted in August 2015.

8.4 Assessment of Likely Significant Effects

8.4.1 This section describes the potential effects of the construction and operation of the development.

8.4.2 It is important to note that no works are proposed that directly affect the Dunlop Carrier channel or its banks.

Construction and Demolition Effects

8.4.3 A phased demolition of the existing industrial units is proposed to facilitate the construction of the Renewable Energy Centre. Materials will be removed from site for reuse, recycling or disposal. Services will be decommissioned, blocked up or removed as appropriate. The demolition works and associated effects on hydrological receptors are included within the assessment below.

Flood Risk

8.4.4 During the construction phase there will be on-going disruption to the Application Site's drainage regime prior to the completion of the surface water drainage system. Due to the built up nature of the existing site the impermeable area of the site will not change significantly during construction and the nature of surface water drainage regime will not change significantly. The re-development of the site will have a minor effect on overland flow routes. However, it is considered overland flow routes will continue to flow towards the Dunlop Carrier on the southern boundary of the site.

8.4.5 The value and/or sensitivity of the Dunlop Carrier is 'Low' and of local residents and property is 'High'. The magnitude of the effect of demolition and construction on surface water flow rates and routes is 'Negligible'. The significance of the effect of the construction of the Proposed Development on surface water runoff rates and volumes and the resultant

flood risk implications in the receiving water bodies without mitigation is considered to be 'Negligible'.

Water Quality

8.4.6 There are a number of substances which could adversely affect surface water quality on the Application Site and its immediate vicinity as a result of construction activities. Potentially polluting construction activities include excavation and groundworks; vehicle operation; machine and plant washing; erosion from temporary vehicle routes and exposed earth; incorrect storage of substances; and accidental spillages. Vandalism of plant and material storage could also be a pollution risk if substances are discharged or if leakage occurs as a result of damage.

8.4.7 Polluting substances could include:

- Fine sediment (e.g. silts and clays);
- Cementitious materials;
- Oil, fuels and chemicals, including lubricants, coolants and hydraulic fluids; and
- Other general wastes including wood, plastics, sewerage and construction aggregate.

8.4.8 These substances may contaminate the underlying ground or downstream watercourses via surface runoff, especially after periods of rainfall.

8.4.9 The significance of the contaminate effects is dependent on the pollution event, the nature of the pollutant, and antecedent conditions. The value and/or sensitivity of the receiving Dunlop Carrier is 'Low'. The magnitude of the above effect could range from 'Medium to Low Adverse'. The effects of potential pollution incidents on Dunlop Carrier without mitigation could therefore range from 'Minor to Moderate Adverse' to 'Minor Adverse'. These affects are considered to be temporary, and reversible with time.

8.4.10 The construction of the Renewable Energy Centre requires deep excavations (8m deep for the waste bunker). This is likely to encounter shallow groundwater within the underlying superficial deposits. The excavations will need to be dewatered to the surface water sewer system or nearby watercourse to facilitate construction works. These waters are likely to contain suspended sediments which can cause siltation, increase turbidity and affect dissolved oxygen levels and habitat quality in the downstream watercourses. The value and/or sensitivity of the receiving Dunlop Carrier is 'Low'. The magnitude of the above effect could range from 'Medium to Low Adverse'. The effects of dewatering activities on Dunlop Carrier without mitigation could therefore range from 'Minor to Moderate Adverse' to 'Minor Adverse'. These affects are considered to be temporary, and reversible with time.

8.4.11 The mobilisation of potentially contaminated material and the potential for pollution of groundwaters as a result of construction activities is not considered further in this

chapter and will be dealt with in more detail in Chapter 9 – Hydrogeology and Ground Conditions.

Operational Effects

Flood Risk

8.4.12 The Proposed Development will marginally increase the impermeable area on the site. This is not considered significant.

8.4.13 The Proposed Development will be served by a new surface water drainage network which will connect into the existing surface water sewer network (which discharges directly to the Dunlop Carrier). This is in keeping with the existing drainage arrangements. The modifications to the drainage system has a 'Negligible' effect on the risk of flooding both onsite and offsite compared with pre development conditions. The value and/or sensitivity of local residents and property is 'High'. Without mitigation the significance of the effect of the Proposed Development on local flood risk is considered to be 'Negligible'.

Water Quality

8.4.14 Plant containing potentially polluting substances (oil, coolants and lubricants) will be provided as part of the Renewable Energy Centre. There is a risk of leakage or spillage of these materials during the routine maintenance of plant.

8.4.15 There is potential for polluting substances to have a detrimental effect on the water quality of the surface water runoff and consequently the receiving water body. These substances include:

- Hydrocarbons from increased HGV movement and leakages;
- Spillages from loaded vehicles and cleaning of vehicles;
- Heavy metals, primarily Zinc, Iron, Lead, Cadmium and Copper originating from fuel combustion emissions and wear down of brakes and tyres;
- Sediment introduced to the Application Site from vehicle movement; and
- De-icer and gritting material during periods of cold weather.

8.4.16 The significance of any pollution incident will be dependent upon the nature of the pollutant, the nature of the incident, the sensitivity of the receiving environment, and the effectiveness of mitigation measures.

8.4.17 The receiving watercourses are not protected under any national or local designations and the Dunlop Carrier is classified as having moderate potential ecological quality. The value and/or sensitivity of the Dunlop Carrier is 'Low'. The magnitude of the above effect could range from 'Medium to Low Adverse'. Therefore the significance of the adverse effects on surface water quality without mitigation could range from 'Minor to

Moderate Adverse' to 'Minor Adverse'. These affects are considered to be temporary, and reversible with time.

8.5 Mitigation and Enhancement

8.5.1 Mitigation measures can be divided into avoidance, reduction, compensation, remediation and enhancement. These methods can be achieved through the physical design of the development, and specific management measures.

Mitigation by Design

8.5.2 The design of the Proposed Development includes mitigation measures which seek to address the main operational effects of the Proposed Development on the water environment.

Flood Risk Mitigation

8.5.3 Surface water runoff from the Proposed Development will be intercepted by on-site drainage systems designed to contain the runoff from storms up to the 1 in 100 year return period, including an appropriate allowance for climate change. The storm water is discharged at a reduced flow rate during short duration storm events into the existing private surface water sewer system (and into the Dunlop Carrier).

8.5.4 The development drainage arrangements will incorporate a SuDS feature consisting of a below ground geocellular storage and flow controls. Details of the outline drainage strategy are contained in the supporting FRA, contained in **Appendix 8.1** and set out on **Figure 8.1**.

8.5.5 Events in exceedance of the design standard of the drainage system will be managed to minimise the residual risk and these measures are outlined in the FRA.

8.5.6 The onsite drainage systems would be designed in accordance with the relevant national standards and guidance including the SuDS Manual, Building Regulations Part H, BS EN 752:2008, Sewers for Adoption, together with Environment Agency documents such as Rainfall Runoff Management for Developments and the Interim Code of Practice for Sustainable Drainage Systems.

Water Quality Mitigation

8.5.7 The surface water drainage system is designed to incorporate pollution control measures. These include the use of deep trapped gullies and bypass separators and/or full retention separators / interceptors. All road areas and other areas that drain to gullies should pass through deep trapped gullies and catchpits to mitigation potential effects of siltation. In accordance with the Environment Agency's Pollution Prevention Guidelines (PPG3) all larger parking areas will pass through an alarmed Class 1 By-Pass Separator before discharging into the downstream drainage system. The HGV turning areas and unloading areas are considered to be at risk of regular contamination and at risk of larger

spills. Subsequently, alarmed Full Retention Class 1 Separators are proposed in these areas.

8.5.8 The waste tipping hall and waste bunker are covered and situated within the main Building. This minimises the potential for rainwater to contaminate waste and minimise leachate volume.

8.5.9 The waste bunker will be a water retaining structure (impermeable to groundwater inflow) with a sump to collect leachate which can be pumped out regularly and disposed of to an appropriately licenced facility.

8.5.10 Any water originating inside the Renewable Energy Centre as a result of cleaning and wash down will be directed into the foul water drainage network under a trade effluent discharge licence.

8.5.11 Foul water from the development will be discharged to onsite foul sewer system and the relevant consents (including trade effluent consent where necessary) from Severn Trent Water will be sought.

8.5.12 Any plant within the Renewable Energy Centre containing potentially polluting substances will be appropriately bunded in accordance with The Control of Pollution (Oil Storage) (England) Regulations 2001.

Additional Mitigation

8.5.13 Additional Mitigation measures are required to mitigate the effects of the construction and operation of the Proposed Development.

Construction Mitigation Measures

8.5.14 Management control mitigation is proposed during the construction phase. Management control measures will include proper supervision of construction activities at all stages of the project using appropriately experienced and qualified staff and supervisors with defined environmental responsibilities and strict adherence to Health and Safety Regulations, Codes of Practice, and consent Conditions as stipulated by the Environment Agency and Birmingham City Council.

8.5.15 Contractors will employ best practice, good housekeeping and adopt the principles set out in the Environment Agency's Pollution Prevention Guidelines (Numbers 1, 3, 5, 6 and 13), CIRIA C532, CIRIA C692, and CIRIA C648.

8.5.16 Waste storage (with segregated waste streams) and concrete washout areas will be designated to minimise areas prone to contamination.

8.5.17 Additional precautions will be taken in any areas where there is increased risk of hydrocarbon/chemical spillage. Any relevant fuels, lubricants or chemicals will be stored in accordance with the appropriate Pollution Prevention Guidelines with an impermeable base and suitable bunding to prevent discharge in the event of spillage and leakage, and the design and location will be in accordance with the Environment Agency's requirements. Drip trays will be utilised under mobile construction plant.

8.5.18 The construction of the drainage system will be phased. This ensures sufficient storage volume is available throughout the construction phase and minimise overland flows.

8.5.19 Effective contingency plans will be put in place to manage the risk associated with accidents and/or unforeseen circumstances. For example, contamination response

procedures (including training on the use and location of spill kits) will be disseminated to the construction personnel. A suitable stock of oil booms, absorbent materials, drain covers and geotextile fencing will be kept onsite. An emergency response plan could be developed based on the Stop-Contain-Notify principal in consultation with the Environment Agency. The plan would include the need for staff training in emergency procedures and the provision of appropriate emergency response equipment.

8.5.20 A drainage plan for the site identifying foul and surface water drainage sewer system will be produced and displayed on site. Drains will be marked (blue for surface water, red for foul) to assist in spill management and general construction activities.

8.5.21 The site will be adequately secured with hoarding and security staff to counteract vandalism, theft and breakage thereby minimising the risk of a pollution incident occurring by this means.

8.5.22 The Dunlop Carrier will be inspected regularly to check for any unforeseen discharges from the development site (changes in colour, transparency, oil sheen or foam build up).

8.5.23 The contractor will provide additional street cleaning facilities as necessary to keep supporting highways clear of mud and prevent sediment contaminating surface runoff. Wheel cleaning facilities, appropriate stockpiling of topsoil, suitable timing of earthwork and earthmoving operations, and dust suppression measures will be used to prevent migration of sediment and other potentially polluting substances.

8.5.24 Dewatering activities will discharge to settlement tanks prior to discharge to surface water sewer to minimise risk of sedimentation in downstream watercourses.

8.5.25 The groundwater inflow into deep excavations will be managed to minimise the volume of inflow (and therefore the volume of water requiring removal). Groundwater management techniques include cut off ditches, or well point dewatering and bunds around excavation to prevent surface water entering the excavation.

8.5.26 Details of environmental monitoring protocols and method statements will be outlined in a Construction Environmental Management Plan.

Operation Mitigation Measures

8.5.27 Proper management and maintenance of the surface water drainage system will reduce the risk of blockages or system failures.

Residual Effects of Construction

8.5.28 Adopting best practice construction site management with adequate contingency planning, and following the principles of pollution prevention guidelines will reduce the risk of water pollution. The residual effect on water quality as a result of construction activities is considered to be between 'Minor Adverse' and 'Negligible'. The risk of an accidental pollution incident can never be completely removed.

8.5.29 The risk of groundwater dewatering activities contaminated downstream watercourse can be managed by reducing the inflow of groundwater and surface water and the use of settlement tanks reduces the risk to 'Minor Adverse' to 'Negligible'.

Residual Effects of Operation

8.5.30 Provision of a surface water drainage system incorporating attenuation and flow controls ensures the Proposed Development has a 'Negligible' effect on local flood risk

compared with the pre-development situation and a 'Minor Beneficial' effect at reducing peak flows during short duration storm events.

8.5.31 The use of interceptors and appropriate designed plant will minimise the residual risk of surface water contamination to 'Minor Adverse' to 'Negligible'.

8.6 Cumulative and In-Combination Effects

8.6.1 The Scoping Opinion issued by Birmingham City Council (pre application reference: 2015/06426/PA) references other developments in the surrounding area whose effects should be considered in combination with the Proposed Development.

8.6.2 These developments are constructed on previously developed land. The redevelopment of these site's will (at worst) result in a 'Negligible' effect on hydrology and flood risk compared with the existing situation i.e. a minor change in impermeable area will result in a minor to negligible change in runoff rates.

8.6.3 With respect to any future development, the application of national planning policy, non-statutory technical standards for sustainable drainage systems and Birmingham City Council's local requirements ensures that the significance of the residual effects of new development on hydrology and flood risk is minimised following the construction of suitably designed surface water drainage system and application of SuDS principles.

8.6.4 Thus, the cumulative effects of several developments in an area should have between 'Negligible' to 'Minor Beneficial' effect on surface water and flood risk provided government planning policy, industry best practice and Environment Agency Guidance are complied with.

8.7 Summary

Introduction

8.7.1 An assessment has been undertaken of the likely significant effects that the Proposed Development would have on the water environment. The effect of the Proposed Development on local flood risk and water quality of nearby watercourses has been assessed and mitigation measures proposed. This assessment is supported by a detailed Flood Risk Assessment.

Baseline Conditions

8.7.2 The Application Site is currently a light industrial park consistent of two buildings surrounded by areas of car parking, hard standing and small areas of grass and landscape planting.

8.7.3 The site is predominately flat with a slight slope south towards the Dunlop Carrier watercourse on its southern boundary.

8.7.4 The Dunlop Carrier is an artificial watercourse which receives runoff from the surrounding urban area.

8.7.5 The site's surface water runoff currently drains to onsite sewers which discharge into the Dunlop Carrier.

Likely Significant Effects

8.7.6 The construction of the Proposed Development will temporarily disrupt the onsite drainage network.

8.7.7 Potentially polluting activities and accidental spillages and leakages may occur during the construction and operation of the Proposed Development which could have an effect on local water quality.

Mitigation and Enhancement

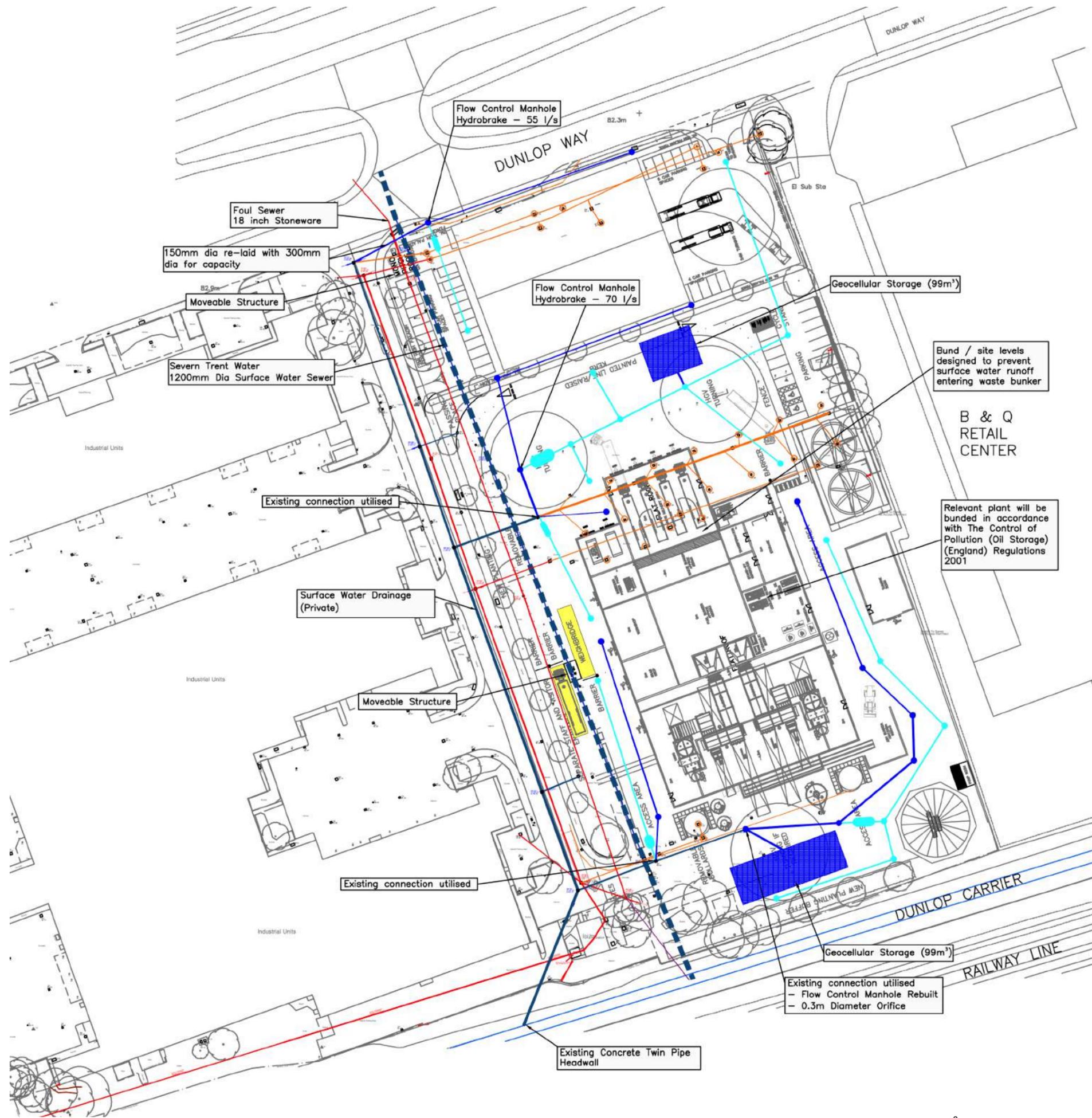
8.7.8 Good site management, adequate contingency planning and implementation of the Environment Agency's pollution prevention guidelines and best practice construction techniques will reduce the risk of a significant water pollution event occurring.

8.7.9 The surface water drainage system will incorporate stormwater storage and will be discharged at a reduced flow rate during short duration intense storm events (e.g. thunderstorms) into the onsite sewer network (and therefore the Dunlop Carrier). The system will provide a degree of flood risk betterment during these storm events.

8.7.10 The surface water drainage system will incorporate specific measures to intercept oil and silt and other pollutants from the site and relevant plant will be designed to minimise pollution risk (e.g. bunded).

Conclusion

8.7.11 Adopting best practice construction site management and provision of a suitably designed surface water drainage system incorporating pollution control and stormwater storage minimises the effect of the Proposed Development on local flood risk and water quality in nearby watercourses.



KEY

- Existing Foul Sewer
- Existing Surface Water Sewer
- Proposed Surface Water Sewer
- Proposed Highway Drain
- Full Retention Separator in accordance with Pollution Prevention Guideline 3 (April 2006)
- Sewers to be abandoned / diverted as part of the development

- NOTES**
- a. Based upon Indicative Drainage Arrangements, PFA Consulting, Drawing Number K111/05 Rev A, November 2015.
 - b. Based upon Topographical Survey, Brunel Surveys, July 2015, Drawing Number 15226-200.
 - c. Based upon Pegasus Design – Proposed Layout, Drawing Number K0168_06-1 Rev M.
 - d. Route of sewers are indicative and based upon the Topographical Survey and site observations.
 - e. Surface water drainage network subject to detailed design.
 - f. Drawing should be read in conjunction with Flood Risk Assessment (PFA Consulting, November 2015).
 - g. Finished floor levels will be set 150 – 300 mm above surrounding ground levels. All sensitive plant will be raised above this level.

FIGURE 8.1
Drainage Plan

DRWG No: **K.0168_21** REV:
 Date: 18/11/2015
 Scale: 1:1,000 @ A3

1 Background, Introduction & Context

2 Site Description

3 Development Proposals

4 Need & Alternatives

5 Air Quality

6 Townscape & Visual

7 Traffic & Transportation

8 Hydrology & Flood Risk

9 Hydrogeology & Ground Conditions

10 Noise & Vibration

11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

13 Socio- Economic Impact

14 Summary

9 HYDROGEOLOGY AND GROUND CONDITIONS

9.1 Introduction

9.1.1 This chapter assesses the potential effects of the development proposals on site soils and underlying groundwater and geology. The assessment is primarily concerned with soils and hydrogeology within the application site, though consideration of off-site effects is also considered as necessary. The assessment addresses the conditions for which are likely to be currently present (Baseline), and assesses the potential effects which could occur during construction and refurbishment of the site (Construction Phase) and once the site is redeveloped (Operational Phase) and will outline mitigation measures to control the predicted effects of the proposals.

9.1.2 The assessment considers the following aspects:

- Anticipated quality of soils and the potential presence of historical contamination.
- Anticipated type and quality of geological features.
- Preliminary assessment of risk associated with development on a potentially contaminated site.

9.2 Assessment Approach

9.2.1 Details on ground conditions associated with the proposed development are taken from the Phase 1 Detailed Desktop Study undertaken by Curtins Consulting in August 2015 as provided in Appendix 9.1.

9.2.2 The Phase 1 Detailed Desktop Study has included the development of a Conceptual Site Model (CSM) providing a depiction of likely sources of contamination, pathways and receptors, resulting in the identification of potential pollutant linkages.

9.2.3 The following data sources have been consulted as part of this assessment:

- British Geological Survey Website
- Envirocheck Report
- Historical ordnance survey mapping of the site and surrounding area
- Environment Agency data
- Local Authority data
- Contemporary Trade Directories entries
- Preliminary Unexploded Ordnance Report

9.2.4 No intrusive site investigations have been undertaken or made available for review at this stage. The assessment assumes that the historical maps reviewed provide a reasonable indication of the potential for ground contamination beneath the site. However, it is possible that ground contamination may exist beneath the site arising from land uses or events not revealed on or adjacent to the site by the available mapping.

9.2.5 This assessment uses the guidance given in the National Planning Policy Framework (NPPF). The NPPF replaced (amongst others) Planning Policy Statement (PPS) 23: Planning and Pollution Control and other Planning Policy Statements and Planning Policy Guidance. Of specific relevance to this assessment, the NPPF states:

- To prevent unacceptable risks from pollution and land instability, planning policies and decisions (*Planning Authorities*) should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

9.2.6 Planning decisions should also ensure that:

- The site is suitable for its use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation.
- After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and
- Adequate site investigation information, prepared by a competent person, is presented.

9.2.7 The assessment methodology is based on the following criteria;

- Consideration of the type of effect only if deemed significant; i.e. the effect will present a risk of a significant degree to a particular receptor/resource being evaluated.
- The probability of the effect occurring.
- The severity of the effect on a particular receptor/resource being evaluated.
- The magnitude of risk being evaluated as Major, Moderate, Minor, Negligible, or Neutral.

9.2.8 The significance of the effects have been considered with a matrix-based approach such that the effects are derived from the receptor's environmental sensitivity value in combination with the magnitude of the effect at that receptor. The matrix criteria is set out below.

Table 9.1: Significance Matrix

Magnitude of Change	Sensitivity of Receptor				
		High	Medium	Low	Negligible
	High	Major	Major	Moderate	Negligible
	Medium	Major	Moderate	Minor to Moderate	Negligible
	Low	Moderate	Minor to Moderate	Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Table 9.2: gives generic criteria for determining levels of magnitude of change on the physical environment.

Table 9.2: Level of Significance Criteria

Significance Criteria	Description of criteria
Major beneficial	Substantial reduction in risk to human and ecological health. Major improvement in onsite and offsite soil and water quality.
Moderate beneficial	Moderate reduction in risk to human and ecological health. Moderate improvement in onsite soil and water quality. Minor improvement to offsite soil and water quality.
Minor beneficial	Minor reduction in risk to human and ecological health. Minor scale improvement to onsite soil or water quality.
Neutral/Not Significant	No change to soil or water quality, or harm caused to any identified receptors.
Minor adverse	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.
Moderate adverse	Chronic damage to Human Health. Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of such ecosystem.

Major Adverse	Short-term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem or organisation forming part of such ecosystem.
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9.2.9 Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risk to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected to the hazardous source by one or several exposure pathways such as direct contact for example. Risks are generally managed by isolating the receptor or intercepting the exposure pathway or by isolating or removing the hazard.

9.2.10 Without the three essential components of a source, pathway and receptor there can be no risk. Therefore the presence of hazard on a site does not necessarily mean there is a risk.

9.2.11 In the risk assessment the consequence of the hazard has been classified as severe or medium or mild or minor and the probability (likelihood) of the circumstances actually occurring classified as high likelihood or likely or low likelihood or unlikely.

9.2.12 For the purposes of the EIA, the assessment of likely significant effects and likely residual effects will be based on significance criteria derived in line with good practice. The criteria consider controlled waters, human health, ecological and property receptors listed in the contaminated land statutory guidance and Environment Agency Model Procedures for the Management of Contaminated Land (CLR11).

9.3 Baseline Conditions

9.3.1 A review of available historical maps for the site has been undertaken as part of the preliminary desk studies.

9.3.2 The earliest historical maps date from 1887 and show the site to be primarily open land with a track or road running north/south across the site and another track along the northern boundary. By 1952, a drainage ditch or trench is shown in the south of the site and the tracks have been extended to a pumping station just outside the southwest corner of the site. The land appears to have been levelled by the 1960's and a small unidentified building is shown on the eastern boundary, which has been removed by the 1970's, with a pathway built in the south of the site. The first major buildings are not recorded on the site until the early 1980's, with the construction of the Fort Parkway Industrial Estate, consisting of a number of light industrial units. These are the buildings which remain on site to the present day.

9.3.3 The earliest historical maps show the surrounding area to be primarily open fields, with the Village of Tyburn and the Birmingham Canal 750m to the north. The main feature is the Birmingham to Derby Railway line and Castle Bromwich Stations on the southern boundary of the site. The Castle Bromwich Corn Mill is located 300m south of the site, beyond which is Castle Bromwich Hall. An overflow channel exists on the southern boundary of the site and looks to provide drainage of the site and area in general. The initial urbanisation of surrounding areas is occurring by the 1930's with various factory buildings, residential areas and an exhibition centre. The south of the site

beyond the railway is largely residential. By the 1940's The Albion Works (car body works) has been constructed immediately north of the site and Fort Dunlop Works tyre factory to the west. The works go through various phases of expansion and demolition up to the present day.

9.3.4 The site is indicated as underlain by artificial Made Ground, superficial deposits of alluvium in the southern half of the site and river terrace deposits in the northern half of the site. The bedrock geology beneath the entire site is recorded as the Mercia Mudstone.

9.3.5 There are three BGS boreholes located on the eastern perimeter of the site which largely supports the above succession and show a 1.8 – 2.0m thickness of Made Ground. River Terrace Deposits are recorded 2.6-3.0m thick and the Mercia Mudstone bedrock is present at 4.4-5.5m below ground level. There are no geological fault lines within 1000m south of the site.

9.3.6 Indicative soil geochemistry mapping by the BGS estimates low concentrations of Arsenic, Lead, Cadmium, and Nickel on site with slightly elevated levels of Chromium.

9.3.7 The Envirocheck Report confirms that there is a very low risk to no hazard from the following ground stability hazards on and around the site; running sands, ground dissolution, compressible ground, landslides and swelling clay. Potential for compressible ground is described as moderate.

9.3.8 The Envirocheck Report confirms that the site is in a low probability radon area. Low areas have less than 1% of homes above the radon action level. The British Geological Survey (BGS) and National Geoscience Information Service assessment suggests that radon protection measures are not required in new dwellings or extensions.

9.3.9 The Envirocheck report confirms that the site is within an area which might not be affected by coal mining activity. The site lies outside a coal mining referral area, and as such, a Coal Authority report has not been obtained.

9.3.10 The 1:100,000 Groundwater Vulnerability Map (Sheet 22) for South Staffordshire and East Shropshire indicates that the site, corresponding with the underlying solid geology, is underlain by a Secondary A aquifer within the superficial deposits and Secondary B aquifers within the solid geology. The site is not within a Source Protection Zone (SPZ).

Secondary A Aquifer – *“permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers”.*

Secondary B Aquifer – *“predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers”.*

9.3.11 There are no groundwater or surface water abstractions recorded on the site. The nearest groundwater abstraction is 609m west of the site at the Jaguar Car Plant. There are no surface water abstractions within 1000m of the site.

9.3.12 The nearest surface water feature is recorded 6m south of the site and appears to be an overflow drainage channel. The River Tame is beyond this approx. 60m from the southern boundary of the site.

9.3.13 Due to the proximity of the River Tame, the site is recorded as being at risk from flooding from rivers without defences and is in Flood Zones 2 and 3.

9.3.14 There are no Pollution incidents, Discharge Consents, Local Authority Pollution Prevention and Control Permits arising from the site.

9.3.15 The site is not situated on a recorded operational or historic landfill site. The nearest site is a historic landfill located 367m to the east. Deposited waste included industrial, commercial and household waste.

9.3.16 The site was initially placed within a high risk area for unexploded ordnance (UXO), as such a Preliminary UXO report has been obtained and is summarised below:

- During WWII the area had a number of primary bombing targets including an aero engine works, rubber factory and Castle Bromwich Airfield. Secondary targets include the railway line.
- No high explosive bomb strikes are recorded on the site, 86 strikes were recorded within 1000m, the nearest being 50m east.
- In accordance with *CIRIA C681 Unexploded Ordnance, a Guide for the Construction Industry on managing UXO risks*, it is recommended that a Detailed UXO Assessment is undertaken prior to ongoing development of the site.

9.3.17 Potential sources of site based contamination are principally associated with historic land uses on the site and surrounding area:

- From the earliest maps dated to the late 1800's the site was open land. Although not normally considered as a potentially contaminative use, land may have been subject to actions such as infilling, fly-tipping and burning.
- The geological map and adjacent boreholes indicate the site is underlain by Made Ground.
- Development of the site itself began in the 1980's, with the construction of light industrial units on the site. Periods of redevelopment on and around the site could contribute to potential sources of contamination in made ground.
- The industrial uses which historically existed within close proximity of the site include chemical works, rubber factory, railway line, and car body manufacturers. The nature and type of contamination may include, amongst others; ash and fill, hydrocarbons (e.g. fuel oils), heavy metals and asbestos.
- The manufacturing industries surrounding the site included a number of WWII bombing targets. A number of bomb strikes were recorded in surrounding areas. The preliminary UXO report identifies the site a medium risk area and recommends a Detailed UXO Report is undertaken.

9.3.18 Potential pathways include the following:

- Ingestion of soils or dust;
- Inhalation of dust;
- Inhalation of vapour or soil gas;
- Dermal contact with soils;

- Dermal contact with perched groundwater;
- Vertical and lateral migration of dissolved phase contamination (leaching);
- Lateral migration of dissolved phase contamination in water flow;
- Transport of non-aqueous phase contaminants (hydrocarbons);
- Uptake of soil pore water by plants; and
- Upward vertical migration of ground gas into buildings.

9.3.19 Potential human health, controlled water and ecological receptors include:

- Site workers and neighbours (Construction Phase);
- Future site workers/residents/employees within the new residential and commercial development and public access area (Operational Phase);
- Future maintenance workers (Operational Phase);
- The Secondary A and Secondary B Aquifers within the superficial deposits and bedrock respectively, underlying the site;
- The nearest surface water feature is an overflow channel and the River Tame.
- Below-ground construction materials.

9.4 Assessment of Likely Significant Effects

Construction Phase

9.4.1 A plausible pollutant linkage has been identified in the conceptual model relating to construction workers (direct contact/ingestion and inhalation) and neighbours (from dust emission) in the short term during the excavation and re-use of potentially made ground during the development of the application site.

9.4.2 Consequently it is recommended that specific precautions are taken to reduce potential exposure in accordance with the principle of 'as low as reasonably practical' (ALARP). This should include appropriate briefings, protective equipment (PPE), sanitary provision and dust suppression as to be detailed within the Construction Environment Management Plan (CEMP) for the proposed development. Details are set out in the mitigation section below.

9.4.3 Without mitigation procedures and accounting for the possibility of contaminants within made ground on site related to the historical land use, during the development, the risk of harm to construction workers during the construction phase is assessed to have a Moderate Adverse Effect.

9.4.4 Without mitigation procedures, the risk of harm to neighbours from dust emissions is assessed to be a Minor Adverse Effect.

9.4.5 The site is underlain by a Secondary A aquifer and within the superficial deposits and a Secondary B Aquifer within the bedrock deposits underlying the site. A potential pollutant linkage exists between contaminants within the perched waters on site and the underlying aquifers. The consequence of onsite pollution of the groundwater therefore

must be considered given the geology beneath the site and the sensitivity of the underlying aquifer.

9.4.6 There are surface water features in close proximity to site including an overflow channel and River Tame to the south of the site. A potential pollutant linkage exists between contaminative material within the shallow soils and made ground material across the site and surface water features within and along the site boundaries.

9.4.7 Without mitigation procedures during development the risk of harm to controlled waters during the construction phase of the development is assessed to have a Moderate Adverse Effect.

9.4.8 A linkage exists with the potential for Unexploded Ordnance. Without mitigations procedures and accounting for the possibility of UXO material in site soils, the risk of harm to human health during the construction phase of the development is assessed to have a Major Adverse Effect.

Operational Phase

9.4.9 Post development of the site during the Operational Phase, a large proportion of the site will be covered with hardstanding, roads or building slabs, which will break most of the plausible linkages to future site workers and users (such as ingestion and dermal contact) in these areas. However a plausible pollutant linkage to future site users will remain in any areas of soft landscaping.

9.4.10 A potential pollutant linkage exists between contaminants in the made ground and shallow soils and maintenance workers, the risks to maintenance workers can be reduced by implementing specific precautions to reduce potential exposure in accordance with the principle of 'as low as reasonably practical' (ALARP). Details are set out in the mitigation section below.

9.4.11 A potential pollutant linkage exists between ground gas generating soils and future site users, if gas can flow or permeate through building envelopes and accumulate within enclosed spaces in the proposed new development buildings. Ground gas monitoring should be undertaken in the areas of proposed buildings. The risks to future site users from ground gas can be mitigated assuming the building foundations provide suitable mitigation for the Characterisation Situation classified for the site as listed in *C665B Assessing Risks Posed by Ground Gases to Buildings* and *BS 8485 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*.

9.4.12 A potential pollutant linkage exists between water supply pipes (and the water within) and potential contaminants in the made ground. The local water supply company should be consulted regarding the pipe material and back fill specification of potable water supply pipes.

9.4.13 Without mitigations procedures and accounting for the possibility of contaminated material in made ground on site, the risk of harm to human health during the operational phase of the development is assessed to have a Moderate Adverse Effect.

9.4.14 A potential pollutant linkage has been identified between contaminants present in the perched water on site and the Secondary A and Secondary B Aquifers within the superficial and bedrock deposits respectively.

9.4.15 A potential pollutant linkage has been identified between potential contaminants present in perched water within granular deposits across the site and within surface water features both on site and along the sites boundary.

9.4.16 Without mitigation procedures during the development the risk of harm to controlled waters during the operational phase of the development is assessed to have a Moderate Adverse Effect.

9.4.17 Without mitigation procedures the effect to ecological receptors (new landscaping) during the operational phase of the development is assessed to have a Minor Adverse Effect.

9.4.18 A potential linkage exists between potentially aggressive contaminants in the made ground and natural soils and below ground concrete used within the new development. The concrete used within the development should be designed in accordance with the concrete classification for the site (assessed using BRE Special Digest 1).

9.4.19 Without mitigation procedures the effect to building materials during the operational phase of the development is assessed to have a Moderate Adverse Effect.

9.4.20 The temporary storage of waste and any licensed or unlicensed discharge from the site may result in the production of potentially mobile contaminants that may unintentionally gain access to ground, which may result in Moderate Adverse Effects on controlled waters and the surrounding environment.

9.4.21 The operation of the site may create dust or airborne contaminants, resulting in Minor Adverse Effects on human health and the environment.

9.5 Mitigation and Enhancement

9.5.1 There is the potential that materials within the made ground may pose a risk to construction workers (direct contact/ingestion and inhalation) and neighbours (from dust emissions) in the short term during the excavation and re-use of made ground materials. During the redevelopment of the site it will be necessary to implement measures to protect construction workers from exposure to any contaminated material which is encountered.

9.5.2 To provide a qualitative assessment of potential contamination, undertake a geo-environmental ground investigation prior to development to provide an assessment of the ground conditions on the application site with respect to geotechnical properties and any potential contamination in the underlying soils and or groundwater.

9.5.3 Appropriate measures to protect construction workers may include training in and enforcement of hygiene procedures, use of personnel protective equipment and the implementation of dust control measures. Mitigation measures that will be used to counter the identified potential effects of construction will be incorporated into the Contractors Method Statements and Health and Safety Plans and the CEMP. These will include:

- Procedures and protocols to prevent construction workers, visitors and neighbours from being exposed to contaminated materials.
- Monitoring of excavation works to identify unforeseen areas of contamination.
- Systems to record and monitor the movement and deposition of waste materials leaving or being transported to other parts of the site.
- Preventing dust generation during excavation and handling of potentially contaminated materials.

9.5.4 If visual or olfactory evidence of contamination is observed during the construction phase the material should be segregated and tested. A suitably qualified person (such as a chemist or environmental scientist) should be responsible for inspecting and testing any material which displays any visual and/or olfactory signs of contamination. Based on the results of testing, the soils will be re-used, treated or disposed of off-site as required. Proposed criteria for the re-use of soils will be included in the earthworks specification for the development.

9.5.5 When the mitigation procedures outlined above are implemented during the development the risk of harm to construction workers and neighbours during construction is Neutral.

9.5.6 A potential pollutant linkage exists between site end users, maintenance workers, new planting and potentially contaminated soils in areas of new landscaping. To mitigate against this linkage it is envisaged during the operational Phase, a large proportion of the site will be covered with hardstanding, roads or building slabs. A clean and inert 300mm thick capping layer underlain with a coloured demarcation geotextile material should be placed over in-situ soils in areas of public access soft landscaping. These cover soils should be validated prior to placement.

9.5.7 When the mitigation procedures outlined above are implemented, the risk of harm to end users, maintenance workers and visitors is Neutral.

9.5.8 Proposed criteria for the re-use of soils and testing frequencies will be included in the earthworks specification for the development. When the mitigation measures outlined are implemented the risk of harm to human health during the operational phase of the development is assessed to be Neutral.

9.5.9 To mitigate against risks from ground gases, building slabs and membranes will be designed to mitigate the Characteristic Situation classification for the site, if found to be required. Ground gas monitoring will be undertaken to classify the gas regime, as described within BS 8485 and C665. When the mitigation measures are implemented the risk of harm to human health during the operational phase of the development is assessed to be Neutral.

9.5.10 A potential pollutant linkage has been identified between contaminants present in the perched water within granular deposits across the site and the underlying Secondary A and Secondary B Aquifers and within surface water features along the sites boundary. The hazard is considered as moderate given the sensitive water resource, however probability of occurrence is considered to be minor due to the site historic use and a large proportion of the site will be covered with hardstanding, roads or building slabs. It is therefore considered that the risk presented to controlled waters during the construction and operational phases of the development is assessed to be Neutral.

9.5.11 The concrete used within the development should be designed in accordance with the concrete classification for the site (assessed using BRE Special Digest 1). When the mitigation measures outlined above are implemented the risk during the operational phase of the development is assessed to be Neutral.

9.5.12 The preliminary UXO reports recommends undertaking a detailed UXO Report. Following any recommendations in the Detailed UXO report during the construction phase of the development, risks to construction workers would be assessed to be Neutral.

9.5.13 Any chemical or fuel stored on site during the operation of the plant would require bunded containers to prevent contamination of the ground and controlled waters. The proposed development would be regulated under an Environmental Permit and would be

subject to regular inspection and record keeping. As a result, no significant effects on geology, soils and contamination are predicted during the operation of the plant, which would be subject to its own operational methodology and risk assessments and no specific mitigation measures are proposed as part of this assessment.

9.6 Cumulative and In-Combination Effects

9.6.1 There are no foreseen significant cumulative and in combination effects during construction or once the facility is operational.

9.7 Summary

Introduction

9.7.1 A qualitative assessment of the effects of the proposed development arising from the ground conditions has been completed. The assessment has considered the extent and methods of foundation construction, the anticipated degree of disturbance of the ground, the final form of the development, and the relevant national and local policies for contaminated land assessment and management.

Baseline Conditions

9.7.2 The baseline ground conditions at the site have been assessed by a Phase 1 Detailed Desktop Study.

Likely Significant Effects

9.7.3 Prior to mitigation, a number of likely significant effects have been identified relating to the risk of the effects of contaminated land on construction workers, end users and controlled waters.

Mitigation and Enhancement

9.7.4 The following mitigation measures have been recommended:

- Undertake a geo-environmental ground investigation prior to development to provide an assessment of the ground conditions on the application site with respect to geotechnical properties and any potential contamination in the underlying soils and or groundwater.
- Application of appropriate measures during the construction phase to protect construction workers and site neighbours from exposure to any contaminated material which may be encountered (e.g. dust control measures, appropriate PPE).
- If piling through the Secondary A aquifer to the Secondary B aquifer within the bedrock is required as part of the development, a foundation works assessment should be completed to the satisfaction of the Environment Agency (EA). The piling technique should be chosen in accordance with the foundation works risk assessment to mitigate risks to controlled waters.
- The stockpiling and testing of material displaying visual or olfactory evidence of contamination during the construction works. Based on the results of subsequent testing, the stockpiled soils should be re-used, treated or disposed off-site.

- A 'clean' and inert 300mm thick cover layer should be placed over in-situ soils in areas of new landscaping. The cover soils should be validated prior to placement.
- Building slabs and membranes should be designed to mitigate the Characteristic Situation classification for the site, ground gas monitoring should be undertaken to classify the gas regime, as described within BS 8485 and C665.
- The concrete used within the proposed development should be designed in accordance with the concrete classification for the site (assessed using BRE Special Digest 1).
- The local water supply company should be consulted regarding the pipe material and backfill specification of potable water supply pipes.
- It is recommended a Detailed Unexploded Ordnance Assessment should be undertaken prior to construction.
- Operation on sealed hard standing would ensure any oils/lubricants or wastes are not able to penetrate into the underlying natural ground and controlled waters.
- Develop systems in line with the plants/facilities Environmental Permit to ensure all potential contamination issues associated with the operation of the facility would have been satisfactorily controlled.

Conclusion

9.7.5 Following the implementation of the recommended mitigation measures the residual effect of the proposed development with respect to all receptors is assessed to be Neutral as either ground contamination sources or transport pathways to receptors will have been removed.

1 Background, Introduction & Context

2 Site Description

3 Development Proposals

4 Need & Alternatives

5 Air Quality

6 Townscape & Visual

7 Traffic & Transportation

8 Hydrology & Flood Risk

9 Hydrogeology & Ground Conditions

10 Noise & Vibration

11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

13 Socio- Economic Impact

14 Summary

10 NOISE

10.1 Introduction

10.1.1 This chapter assesses the likely significant effects of the Proposed Development with respect to noise. In particular, it considers the potential effects of the future operation of the Proposed Development, which would operate on a 24 hour basis.

10.1.2 This assessment comprises the following elements:

- identification of sensitive receptors;
- establishment of baseline conditions;
- establishment of noise design aims for the operation of the site;
- outline assessment of noise and vibration generated during the demolition and construction phase;
- calculation and assessment of noise levels in the operational phase of the Proposed Development (with principal reference to the NPPF, BS 4142 and local authority guidance); and
- where appropriate, indicative proposals for mitigation.

10.1.3 This approach is standard practice for conducting an assessment of noise relating to this type of development.

10.2 Assessment Approach

10.2.1 A description of the noise and vibration units referred to is provided in **Appendix 10.1**.

Principal Standards and Guidance

Construction

10.2.2 BS 5228 Parts 1¹ and 2² provides guidance for assessing noise and vibration during the construction of the development. The standard describes procedures for estimating noise levels from construction activities and vibration attributable to piling activities. It also provides guidance on minimising potential impacts through the use of mitigation and the adoption of Best Practicable Means (BPM) or Best Available Techniques Not Entailing Excessive Cost (BATNEEC).

10.2.3 BPM or BATNEEC both seek to ensure that the contractors adopt best practice measures to reduce noise and vibration from site activities. The use of BPM to control emissions constitutes a ground of defence against charges that a nuisance is being caused under Part III of the Environmental Protection Act.

10.2.4 Whilst BS 5228 does not provide specific guidance with regards acceptable noise levels associated with construction activities, it provides guidance on limits adopted for a

¹ British Standards Institute. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise. BS 5228+A1: 2014.

² British Standards Institute. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration. BS 5228+A1: 2014.

number of previous schemes, which were considered to provide satisfactory levels of noise for construction projects.

10.2.5 Based on this guidance, it is often appropriate to set noise Action Levels to provide an indication of the noise levels that can be generated from construction activities, which should minimise the potential for complaints. A level of 10 dB(A) above the existing ambient (L_{Aeq}) noise level is often specified, subject to a minimum level of 70 dB $L_{Aeq,T}$ for rural areas and 75 dB $L_{Aeq,T}$ within urban areas. By adopting noise limits of this order of magnitude, contractors are generally seen to be adopting best practice to reducing construction noise levels to an acceptable standard.

10.2.6 With regards acceptable levels of vibration, BS 5228 advises that at a Peak Particle Velocity (PPV) level of 0.3 mm/s vibration might just be perceptible within residential environments, with levels of 1.0 mm/s having the potential to cause complaint, but can be tolerated if prior warning is given to residents. At levels of 10 mm/s, the activity would be intolerable for any more than a brief exposure.

10.2.7 BS 7385³ defines criteria for two different types of building structure, brick-built residential and more heavily-built industrial. The standard advises that there is a minimal risk of cosmetic damage (i.e. the formation of hairline cracks on drywalls, plaster or in mortar joints) at the specific guidance levels.

10.2.8 For residential buildings the limit for cosmetic damage varies with frequency and a conservative level of 12.5 mm/s PPV, as defined in BS 7385, has been adopted.

Operation of the Completed Development

British Standard BS 4142

10.2.9 The principal guidance for assessing noise from industrial and commercial noise sources can be found in BS 4142⁴. BS 4142 provides an objective method for rating the magnitude of adverse impacts from industrial and commercial operations and also provides a means of determining noise levels from fixed building services plant installations and prevailing background noise levels on, and around, industrial developments.

10.2.10 BS 4142 is a comparative standard in which the estimated noise levels from the industrial development are compared to the background noise level from other surrounding existing land uses. The Standard relates the magnitude of any adverse impacts to the difference between the Rating Level of the noise being assessed and the background noise level. The background noise level is the L_{A90} noise level, usually measured in the absence of noise from the source being assessed.

10.2.11 The Rating Level of the noise being assessed is defined as its L_{Aeq} noise level (the 'specific noise level'), with the addition of corrections for tonality or should the noise exhibit any particular characteristics. During the daytime, the specified noise levels are determined over a reference time interval of 1 hour, with a reference time period of 15 minutes being adopted at night.

10.2.12 If the Rating Level of the noise being assessed exceeds the background level by 10 dB or more BS 4142 advises that there is an indication of a significant adverse

³ British Standards Institute. Evaluation and Measurement for Vibration in Buildings. Part 2. Guide to Damage Levels from Groundborne Vibration. BS 7385: Part 2. 1993.

⁴ British Standards Institute. Methods for Rating and Assessing Industrial and Commercial Sound. BS 4142. 2014.

impact. A difference between background level and Rating Level of around 5 dB is likely to result in an adverse impact, depending upon the context. The lower the Rating Level is relative to the background noise level, the less likely the specific source would have an adverse impact. Where the Rating level does not exceed the background noise levels, would be an indication of the sound source having a low impact.

World Health Organisation (WHO) Guidelines

10.2.13 The World Health Organisation guidance⁵ provides additional guidance upon potential effects in relation to noise.

10.2.14 The guidance advises:

- few people are moderately annoyed by noise levels of below 50 dB $L_{Aeq,T}$ during the daytime;
- for a good night's sleep, noise levels within bedrooms should not exceed 30 dB $L_{Aeq,T}$, with individual noise events not exceeding 45 dB L_{Amax} ; and
- special attention should be given to noise sources in an environment with low background noise levels and to noise sources with low frequency components.

10.2.15 Assuming an open window provides a reduction in noise levels of between 10 – 15 dB(A), during the night-time the Who guidance indicates that external noise levels should remain below 40 – 45 dB $L_{Aeq,T}$ to maintain the restorative processes of sleep.

10.2.16 The WHO produced additional noise guidance in relation specifically to night-time noise in 2009⁶. This report provides a description of the 'no observed adverse effect level' (NOEL) and advises for night-time noise (which is considered to be the most sensitive period of the day) that this concept is less useful, as the adversity of effects are less clear. Instead, it advises the use of the observed effects thresholds, above which an effect starts to occur or shows itself to be dependent upon the exposure level.

10.2.17 The guidance is presented in terms of external and internal recommendations to minimise any potential adverse effects. Externally, the guidance advises that an average night-time noise level L_{night} (the $L_{Aeq, 8 \text{ hour}}$) of 40 dB is equivalent to the lowest observed adverse effect level and advises this guideline value is recommended for the protection of public health from night-noise. However, below this level there was no change in the small number of awakenings identified and hence a reason for considering that the NOEL was not an appropriate descriptor in noise terms for identifying adverse effects and hence recommend the use of the observed effects threshold as an appropriate descriptor to identify the potential for the onset of adverse effects.

10.2.18 The guidance, however, advises that an external night-time noise level of 30 $L_{Aeq, 8 \text{ hour}}$ would be equivalent to the NOEL, as their research indicated that there were no detectable effects internally, below a level of 32 dB L_{Amax} , with no physical awakenings identified below a level of 42 dB L_{Amax} internally.

⁵ World Health Organisation. Guidelines for Community Noise. 1999. WHO Geneva.

⁶ World Health Organisation. Night Noise Guidelines for Europe. 2009.

Road Traffic

10.2.19 Changes in road traffic noise levels have been considered against the guidance presented in the Design Manual for Roads and Bridges (DMRB)⁷. Whilst not strictly appropriate in this case, as no new roads are proposed outside of the Proposed Development, the guidance provides a methodology to assess potential noise impacts associated with road traffic.

10.2.20 The guidance proposed the following assessment criteria, which have been adopted for the purposes of this assessment to assess potential effects associated with changes in road traffic flows on surrounding roads as a result of this and other committed developments in the surrounding area.

Table 10.1: Classification of Magnitude of Road Traffic Noise Impacts

Noise Change $L_{Aeq, 16\text{ Hour}}$	Magnitude of Impact
Decrease of More than 10	Major Beneficial
Decrease of 5 – 9.9	Moderate Beneficial
Decrease of 3 – 4.9	Minor Beneficial
Decrease of 0.1 – 2.9	Negligible Beneficial (not significant)
0	No Change (not significant)
Increase of 0.1 – 2.9	Negligible Adverse (not significant)
Increase of 3 – 4.9	Minor Adverse
Increase of 5 – 9.9	Moderate Adverse
Increase of More than 10	Major Adverse

10.2.21 Significant effects have been identified when changes in noise levels of more than 3 dB(A) have been identified, i.e. at an impact threshold of minor and above. A 3dB(A) change in noise levels is considered to be the lowest change detectable under normal listening conditions.

Policy Framework

National Planning Policy Framework

10.2.22 The National Planning Policy Framework (NPPF) seeks to simplify the planning system and advises that planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life from new development;
- Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established;
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

⁷ Highways Agency. Design Manual for Roads and Bridges. Volume 11. Section 3. Part 7. HD 213/11 – Revision 1. Noise and Vibration. November 2011.

10.2.23 The accompanying planning policy guidance to the NPPF, published in March 2014, provides a description of a significant adverse impact, as follows:

“The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.”

Local Planning Guidance

10.2.24 Officers at Birmingham City Council were consulted on the requirement for the noise assessment and criteria they would seek to be adopted during July 2015⁸.

10.2.25 The officer consulted advised that they would adopt the guidance within their local Planning Consultation Guidance document⁹.

10.2.26 For noise of an industrial or commercial nature, the guidance makes reference to BS 4142:1997, as the appropriate standard to adopt. They would normally seek to ensure developments are designed to achieve the Lowest Adverse Effects Level (LOAEL), which is described as a Rating Level of 10 dB(A) below the prevailing background noise level for the hours of operation proposed. (Note that the Rating Level in the context of the 1997 version of BS 4142, assumes a single 5 dB(A) penalty should the noise be tonal or characteristic in nature. Following further discussions with officers, it was agreed to adopt this approach within the current assessment).

10.2.27 Further consultation was carried out with officers in respect of the scoping report submitted to BCC¹⁰ to address comments raised and provide additional information in relation to the baseline noise monitoring exercise.

Scoping Criteria

Construction Phase

10.2.28 A Construction Environmental Management Plan will be adopted to minimise potential disturbance to local residents in the surrounding area during the demolition and construction of the Proposed Development.

10.2.29 For construction activities, it is common practice to define a Noise Action Level of 10 dB(A) above the existing ambient L_{Aeq} noise levels (subject to a minimum daytime level of 70 dB $L_{Aeq,T}$ in rural areas) at noise-sensitive properties during the daytime, above which complaints may be expected to be received. Noise levels above this criterion can be considered as a minor adverse impact if the activity is for a short duration (up to a few weeks) or a moderate/high adverse impact if noise levels continue above this limit for a prolonged period.

10.2.30 BS 5228 provides guidance on acceptable levels of vibration associated with construction activities. Based on the information provided within the guidance, a significant adverse impact has been identified where levels of vibration regularly exceed 1 mm/s at vibration sensitive receptors.

⁸ Emails between L Jephson, LFA, and J Dunsford, BCC, 2 July 2015.

⁹ Birmingham City Council. Planning Consultation Guidance No. 1. Noise and Vibration. January 2013.

¹⁰ Emails between L Jephson, LFA, and N Tinsdeall, BCC, 16 & 21 September 2015.

Operational Phase

10.2.31 Based upon the BS 4142 and local planning guidance, the assessment has been based upon noise levels associated with the operation of the Proposed Development achieving a Rating Level of 10 dB(A) below the prevailing background noise levels at noise sensitive receptors. This limits has been considered in light of the former BS 4142 guidance upon which the current local planning guidance is presently based and assumes a single 5 dB(A) penalty should the noise be tonal or characteristic in nature.

Road Traffic

10.2.32 The assessment of potential effects at surrounding noise-sensitive receptors associated with the changes in road traffic on the local road network has been undertaken on the basis of the assessment criteria presented in **Table 10.1**.

10.3 Baseline Conditions

Application Site Description and Context

10.3.1 The Application Site is located within an existing industrial / commercial area to the south of Fort Parkway.

10.3.2 There are existing industrial / commercial units directly to the west and east of the Application Site, with the Jaguar Land Rover plant to the north of Fort Parkway.

10.3.3 The closest residential receptors are located to the south of the site, beyond the M6 viaduct, along Wanderer Walk, Bromfield Drive and Papyrus Way, with noise levels at these locations principally influenced by road traffic using the M6. These dwellings are approximately 250 metres from the southern site boundary.

10.3.4 The other potentially affected residential properties are located to the east beyond the A452, approximately 300 metres from the eastern site boundary, with the Proposed Development screened from the properties by the existing commercial (B&Q) unit. Noise levels at these dwellings are also principally influenced by road traffic from the M6 and A452 both during the day and night-time periods.

Baseline Noise Surveys

10.3.5 In order to ascertain the existing noise environment at noise sensitive receptors surrounding the Application Site and to inform the design of the Proposed Development, a noise monitoring exercise was carried out between 23 – 28 July 2015. The survey comprised an unattended noise survey, carried out at one location representative of the dwellings to the south and east of the Proposed Development, which was supplemented with attended measurements taken at positions adjacent to the dwellings.

10.3.6 The monitoring positions were chosen to enable the typical background noise levels to be determined at the dwellings. A fuller description of the monitoring exercise is provided in **Appendix 10.1**, with the monitoring locations indicated in **Figure 10.1**.

10.3.7 The results of the unattended noise survey are presented fully within **Appendix 10.1**, with a summary of the unattended noise survey provided graphically on **Figure 10.2**.

10.3.8 The results of the unattended and sample noise monitoring have been evaluated using the methodology within BS 4142:2014, to ascertain the existing day and night-time noise levels at the potentially affected receptors, which are presented in **Table 10.2**.

Table 10.2 Period Noise Levels

Location	Period Free-field Noise Levels [dB]				Principal Noise Sources
	L _{Aeq,T}		Typical L _{A90}		
	Daytime	Night-time	Daytime	Night-time	
Dwellings to the South (Papyrus Way, Wanderer Walk, Bromfield Drive)	62	58	59	56	Road traffic noise from traffic travelling along M6
Dwellings to the East (Cadbury Drive)	59	55	53	50	Road traffic noise from traffic travelling along M6

					and A452
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10.4 Assessment of Likely Significant Effects

Construction

10.4.1 Demolition and construction activities would be typical for an industrial development.

10.4.2 The main phases of the redevelopment, identified as giving rise to the greatest potential for adverse effects upon the existing residents of surrounding properties are as follows:

- Demolition of the existing buildings;
- Initial ground works;
- Piling;
- General construction activities; and
- Vehicle movements.

10.4.3 It is anticipated that works would commence on site, with the demolition of the existing units likely to commence in early 2017.

10.4.4 During this stage, plant required on site, would include, excavators fitted with munching and breaking tools and HGV movements. Typical noise levels associated with this type of plant would be of the order of 75 – 85 dB L_{Aeq} at a distance of 10 metres.

10.4.5 Noise levels associated with piling operations are likely to be of the order of 85 – 90 dB L_{Aeq} at a distance of 10 metres, although this would be dependent upon the type of piling required, with noise levels associated with the general construction activities, lower and generally unlikely to exceed a level of 80 dB L_{Aeq} at a distance of 10 metres.

10.4.6 Based upon this source noise level, calculations have been made to assess at what distance a 70 dB L_{Aeq} effect threshold would be exceeded, which would result in a minor adverse effect. The assessment indicates that the limit would be exceeded at a distance of approximately 100 metres as a worst case, with noise levels at the dwellings, which are considerably further from the site, likely to be at least 10 dB(A) lower.

10.4.7 Noise levels associated with the demolition and construction works would therefore remain below 70 dB L_{Aeq} at noise sensitive receptors and result in a negligible effect.

10.4.8 Appropriate site controls would, however, be adopted in line with the requirements of Birmingham City Council, which would further seek to reduce noise levels from site operations.

Changes in Road Traffic Noise Levels on Roads Surrounding the Proposed Development

10.4.9 The Traffic Assessment within Chapter 7 provides details of the existing and future road traffic on roads surrounding the Proposed Development, associated with the existing and Proposed use.

10.4.10 The assessment indicates with the Proposed Development, whilst there would be a slight increase in HGV movements, there would be a slight overall reduction in traffic, compared to the existed permitted development.

10.4.11 An assessment of the with and without development options indicates that there would be No Change in overall road traffic noise levels as a result of the operation of the Proposed Development and thus no adverse effects have been identified.

Noise Associated with the Operation of the Proposed Development

10.4.12 The Proposed Development would be operational on a 24 hour basis, with deliveries made throughout the day between the hours of 07:00 and 19:00 in the week and between the hours of 07:00 and 14:00 on Saturdays.

10.4.13 The majority of the plant on site would be contained within the buildings, which will seek to effectively reduce any noise break out. The construction of the building would be of typical single skinned steel cladding.

10.4.14 Source term noise levels have been provided for the assessment, which were measured at a similar plant currently operating. These source term noise levels, which are presented in **Appendix 10.1**, have been used for the basis of the calculation of noise levels from the operation of the Proposed Development.

10.4.15 There would be regular deliveries made to the site throughout the daytime periods, typically by articulated vehicles, which would tip within the northern part of the building. It is anticipated that there would be 33 deliveries made to the site daily, based upon the annual throughput of the site. These vehicle movements would be distributed evenly throughout the day, resulting in between 3 - 4 deliveries per hour.

10.4.16 Calculations of the operational noise levels have been made using Soundplan, which implements the calculation methodology from ISO 9613. The details of the calculations are provided in **Appendix 10.1**, with the results of the daytime noise levels presented on **Figure 10.3** and summarised for the potentially most affected dwellings in **Table 10.3** below. The site would be operational on a 24 hour basis, with deliveries made only during the daytime periods.

Table 10.3: Calculated Operational Noise Levels

Location	Calculated Façade Noise Level	
	Daytime [dB LAeq, 1 hour]	Night-time [dB LAeq, 15 minute]
Cadbury Drive	32	32
Hyperion Road	33	32
Papyrus Way	35	35
Wanderer Walk	31	31

10.4.17 The calculated noise levels have been assessed against the proposed limits of a Rating Level of 10 dB(A) below the prevailing background noise levels. As indicated previously, a 5 dB(A) penalty has been applied to account for the potential tonal characteristics associated with the operation of the plant, in accordance with the requirements of BCC.

10.4.18 The assessment, is summarised in **Table 10.4** below.

Table 10.4: Assessment of Operational Noise Levels

Location	Rating Level [dB LAeq,T]	Difference re Background (LA90) Noise Level [dB]
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	Daytime	Night-time	Daytime	Night-time
Cadbury Drive	37	37	-16	-13
Hyperion Road	38	37	-21	-19
Papyrus Way	40	40	-19	-16
Wanderer Walk	36	36	-23	-20

10.4.19 The assessment, provided in **Table 10.4**, indicates that noise levels associated with the operation of the Proposed Development would generate Rating Levels at least 10 dB(A) below the background noise levels at the surrounding properties both during the day and night-time periods. The levels are below those which would result in a LOAEL with reference to the BCC guidance and would indicate a negligible impact when considered against the guidance contained in BS 4142.

10.5 Mitigation and Enhancement

Construction

10.5.1 No adverse effects have been identified during the demolition and construction of the Proposed Development. Appropriate site controls would, however, be adopted in accordance with BCC guidelines, which seek to ensure that noise and vibration levels associated with the works are controlled.

Road Traffic Noise

10.5.2 Changes in road traffic noise levels on surrounding roads would result from the operation of the Proposed Development. The assessment indicated that there would be a small reduction in traffic with the Proposed Development and thus not result in any significant adverse effects. Consequently, no additional noise mitigation measures have been identified to be required.

Operation of the Proposed Development

10.5.3 The assessment indicated that with the proposed construction and plant, the operation of the Proposed Development would result in negligible noise impacts at surrounding noise sensitive receptors. Consequently, no additional noise mitigation measures have been identified.

10.6 Cumulative and In-Combination Effects

10.6.1 No cumulative noise effects have been identified within this assessment, associated with other surrounding land uses.

10.7 Summary

Introduction

10.7.1 A noise assessment has been carried out for the Proposed Development.

10.7.2 The assessment has taken account of potential effects during the demolition, construction and operation of the Proposed Development, upon surrounding residential receptors.

Baseline Conditions

10.7.3 Noise surveys have been undertaken to determine the existing noise levels at properties which would be potentially affected by the construction and operation of the Proposed Development.

10.7.4 The surveys indicated that noise levels at the properties are principally influenced by road traffic using the M6 (and A452) throughout the day and night-time periods.

Likely Significant Effects

10.7.5 The Proposed Development is located some distance from the surrounding noise sensitive receptors. An assessment of the noise levels associated with the demolition of the existing buildings and construction of the Proposed Development indicates that noise associated with the works would result in a negligible effect.

10.7.6 Noise levels associated with the operation of the Proposed Development are anticipated to be low and below a level which would result in any significant adverse noise impacts, with noise associated with the operation resulting in a negligible effect at surrounding properties.

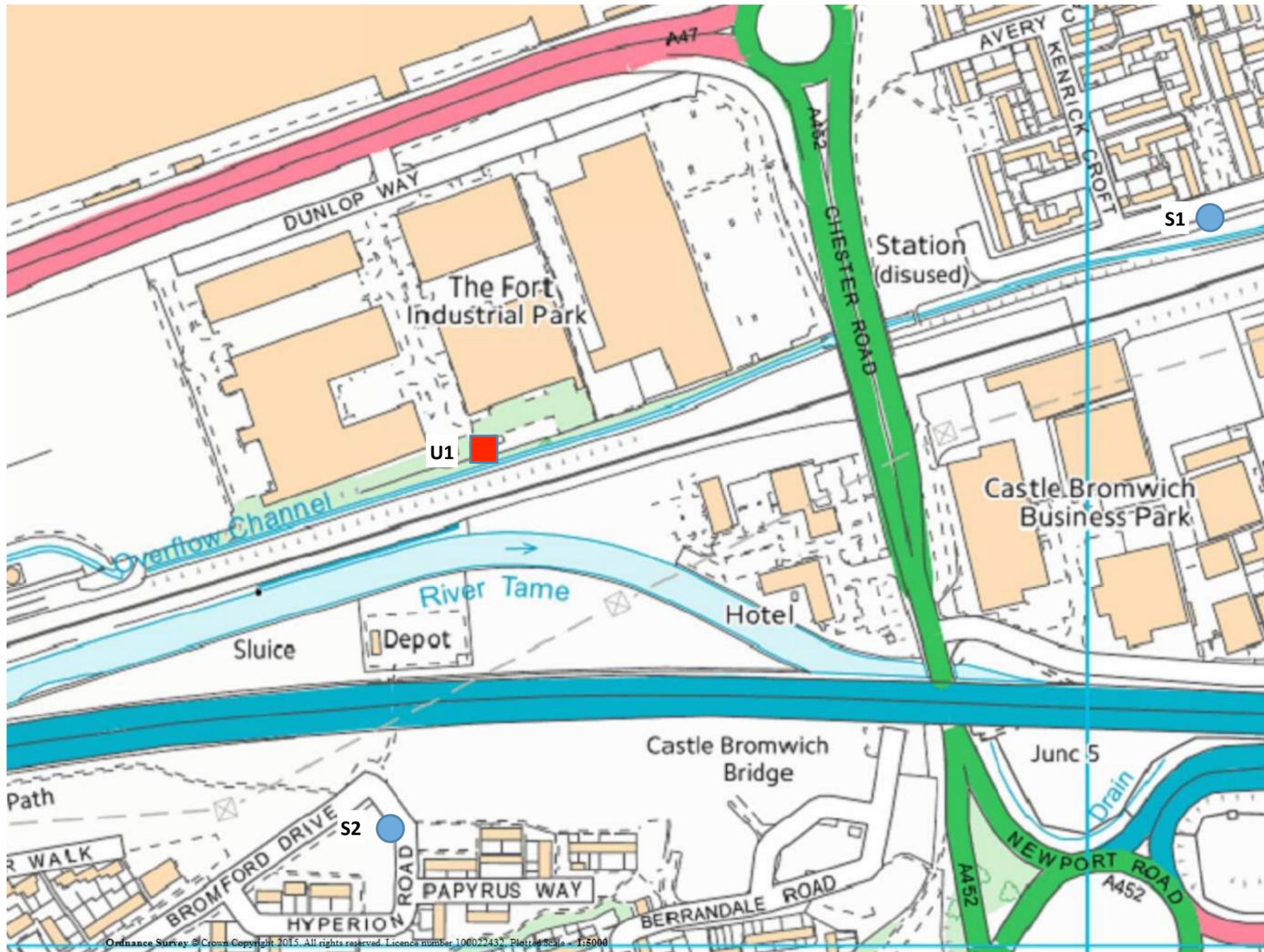
10.7.7 There would be regular deliveries made to the site during the daytime periods. Compared to the existing permitted development there would be an overall reduction in traffic, although the number of HGV movements would increase slightly. This would result in no change in road traffic noise levels on roads surrounding the Proposed Development, with a negligible effect identified.

Mitigation and Enhancement

10.7.8 No additional noise mitigation measures have been identified in addition to those which would be incorporated as standard into the design of the Proposed Development.

Conclusion

10.7.9 In summary, the construction and operation of the Proposed Development would not give rise to any adverse noise impacts at surrounding properties.



KEY
■ Unattended Survey Position
● Attended Survey Position

FIGURE 10.1
Noise Measurement Locations

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 Date: 13/11/2015
 Scale: NTS @ A3



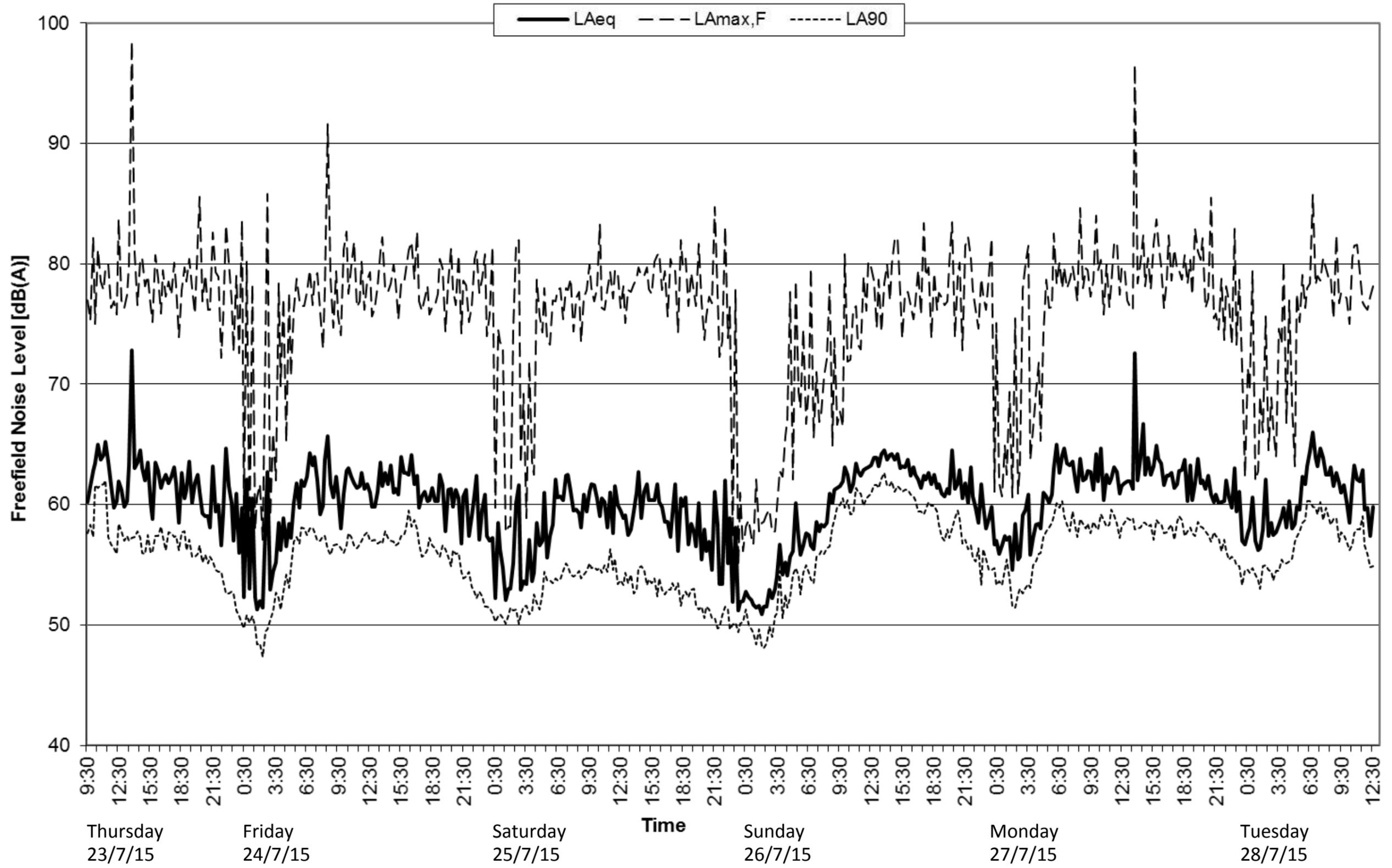


FIGURE 10.2

Unattended Noise Survey Results

DRWG No: **K.0168_21** REV: _ Sheet No: **2/3**

Date: 13/11/2015

Scale: NTS @ A3

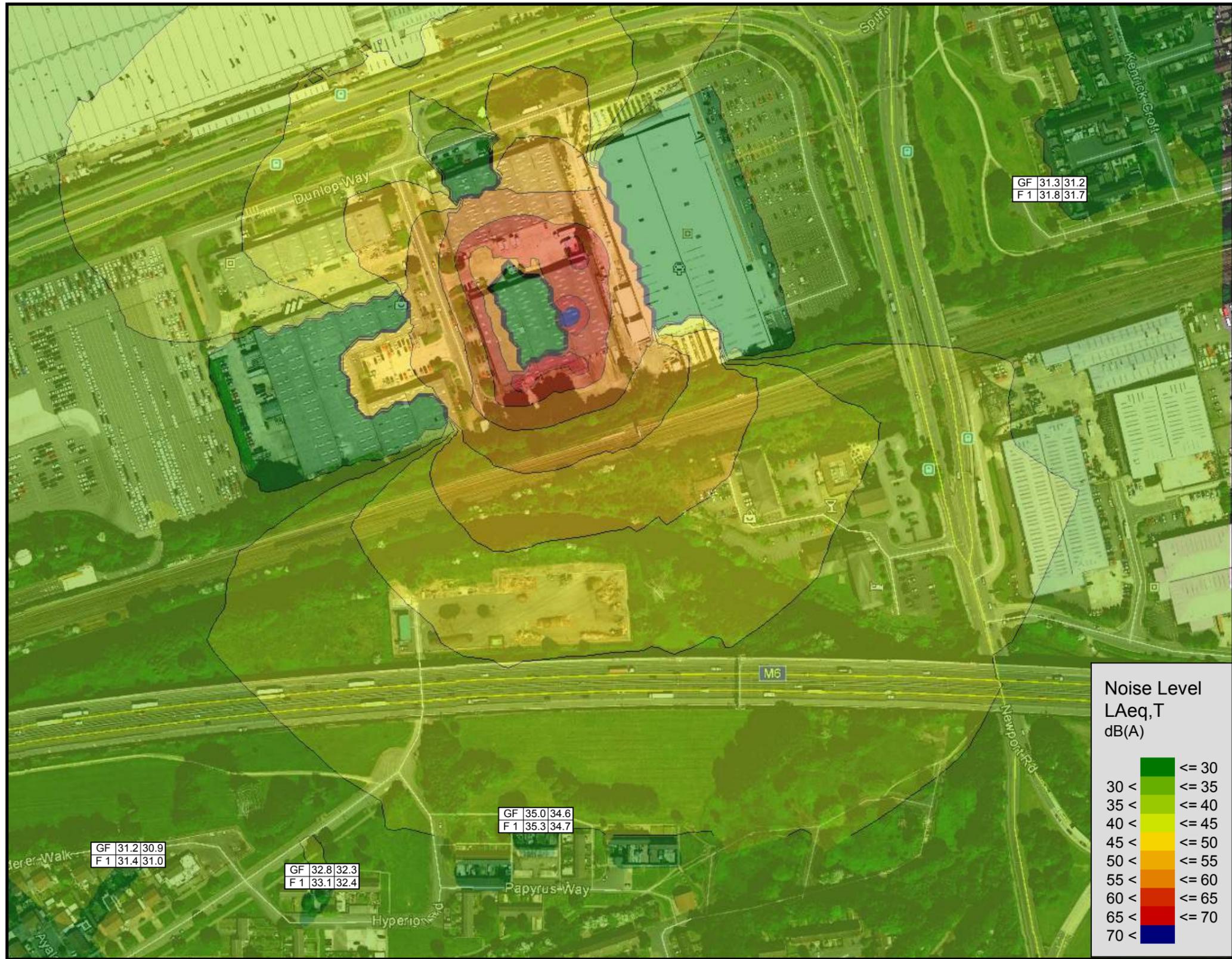


FIGURE 10.3
Calculated Operational Noise Levels

DRWG No: **K.0168_21** REV: _ Sheet No: **3/3**
 Date: 13/11/2015
 Scale: NTS @ A3



1 Background, Introduction & Context

2 Site Description

3 Development Proposals

4 Need & Alternatives

5 Air Quality

6 Townscape & Visual

7 Traffic & Transportation

8 Hydrology & Flood Risk

9 Hydrogeology & Ground Conditions

10 Noise & Vibration

11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

13 Socio- Economic Impact

14 Summary

11 ECOLOGY AND NATURE CONSERVATION

11.1 Introduction

11.1.1 This Environmental Statement (ES) Chapter establishes the likely presence of protected or notable species, identifies statutory and non-statutory designated sites for nature conservation in the vicinity of the Proposed Development and evaluates the overall conservation status of the Application Site. The potential for the Proposed Development to have an effect on designated sites and protected and notable species is explored.

11.1.2 Information has been compiled from a desk study and Extended Phase I habitat survey, enabling the determination of the likely ecological effects of the Proposed Development. The Phase 1 survey area is presented in **Figure 11.1**.

11.2 Assessment Approach

Methodology

11.2.1 This assessment aims to provide an objective and transparent assessment of the ecological effects of the Proposed Development and determine the consequences in the context of legislation and policy guidance.

11.2.2 This assessment has been undertaken in accordance with the principles of the Chartered Institute of Ecology and Environmental Management (CIEEM) 'Guidelines for Ecological Impact Assessment' (IEEM, 2006), which focuses on those activities that could potentially generate significant ecological effects on 'key' ecological resources. The appraisal methodology has been further adapted to reflect the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2011 (as amended).

11.2.3 Reference was made to documents listed in the legislation and policy framework section of this Chapter in order to assess the findings of baseline surveys against known assessment criteria. Where uncertainties exist, professional judgment has been used to inform the ecological assessment and this has been highlighted in the text.

11.2.4 In order to determine the baseline conditions present at, and in the vicinity of, the Application Site in relation to species and habitats and to allow determination of key ecological receptors, a data gathering exercise was initiated as outlined below.

Data Gathering

Desk Study

11.2.5 The desk study comprised data requests from local biological recording organisations and review of readily available on-line resources.

11.2.6 EcoRecord (the biological record centre for Birmingham and the Black Country) and Warwickshire Biological Records Centre (WBRC) were contacted to obtain records of protected and priority species, species of local and national conservation concern and non-statutory designated sites of nature conservation interest from within a 2km radius from the approximate centre of the Application Site (grid reference SP1358790450).

11.2.7 Statutory designated sites of nature conservation interest were identified through a review of the Multi Agency Geographic Information for the Countryside (MAGIC)

website, along with the Joint Nature Conservation Committee (JNCC) and Natural England (NE) websites. The search area comprised a 5km radius around the Application Site.

11.2.8 Reference was also made to Ordnance Survey maps of the wider area using on-line aerial images (www.google.co.uk/maps) in order to determine any features of nature conservation interest in the surrounding landscape.

Extended Phase 1 Habitat Survey

11.2.9 The Extended Phase I habitat survey was carried out on the 2nd April 2014 by Stuart Graham MSc MCIEEM, an experienced field surveyor.

11.2.10 The survey methodology employed was based-upon that outlined in the 'Handbook for Phase 1 Habitat Survey - a Technique for Environmental Audit', JNCC (2010), whereby all habitats within the Application Site are mapped and described using a series of 'target notes' (TN) to provide an overview of the Application Site. This habitat survey method was extended through the additional recording of specific features indicating the presence, or likely presence, of protected species and other species of conservation significance.

11.2.11 The buildings were subject to an external inspection and notes made on any cavity features providing suitable nesting or roosting locations for birds and bats. Building aspect and context, in terms of proximity to suitable foraging and commuting habitats, were also considered as part of the survey.

11.2.12 A ground-based preliminary roost inspection of trees within and immediately adjacent to the Application Site was also undertaken, in order to identify any suitable features for roosting bats such as lifted bark, cavities or splits in the limbs. Bat roost potential was assessed in accordance with the Bat Conservation Trust's (BCT) guidance (Hundt, 2012) with trees categorised as follows:

- Category 1*: Trees with multiple, highly suitable features capable of supporting larger roosts;
- Category 1: trees with definite bat roost potential, supporting fewer features than Category 1* trees or with potential for use by single bats;
- Category 2: trees with no obvious potential, although the tree is of a size and age that elevated surveys may result in cracks or crevices being found: or the tree supports some features which may have limited potential to support bats; and
- Category 3: trees with no roost potential.

11.2.13 The Extended Phase 1 habitat survey area comprised the entire Application Site (see **Figure 11.1**) plus the immediately bordering habitats, where visible from within the Application Site boundary.

11.2.14 On completion of the Extended Phase I Survey it was considered that no other specific field surveys were required.

Assessment of Significance

Zone of Influence

11.2.15 The CIEEM Guidelines require the identification of a 'zone of influence', within which lie ecological areas and resources that may be affected by the Proposed Development. The initial review of ecological resources, together with a review of the

likely activities associated with the Proposed Development, was used to identify a zone of influence for the assessment. Within this, specific study areas were identified for the desk study and field survey required to inform the valuation of ecological resources and the selection of 'key' ecological resources. The zone of influence is varied in accordance with the typical distribution and movements of individual species and the likely mobility of qualifying interests of statutory designated sites.

Receptor Sensitivity

11.2.16 For the purposes of this assessment, receptor sensitivity is synonymous with value as defined in CIEEM guidelines on a scale from International to Less than Local importance, as follows: International; National; Regional/County; District; Local and Less than local or Site, as detailed in Table 11.1. Determination of value and therefore sensitivity on the CIEEM scale is based on professional judgement and consideration of the rarity, status and distribution of the habitat or species in a geographical context. The value given to a receptor does not necessarily relate to the level of legal protection that it receives. Therefore, in this assessment, the value of a receptor has been determined on a contextual basis, taking into account the results of baseline surveys and the value of receptors within the context of the local area.

Table 11.1: Geographical scale of biodiversity value in descending order of importance of biodiversity value in descending order of importance.

Geographic Scale of Value	Definition
International	Valuation beyond a UK scale, typically at European level.
National	England
Regional / County	Midlands
District / Borough	Birmingham
Local / Parish	Castle Bromwich
Less than Local/Site	Of value within the context of the Application Site

Parameters

11.2.17 Potential effects have been described in terms of the parameters detailed in Table 11.2. All of the elements within the table should be taken into account when determining the significance of the resulting affects.

Table 11.2: parameters

Environmental Parameter	Description
Magnitude	The 'size' or amount of the impacts is referred to as the magnitude and is determined on a quantitative basis where possible.
Extent	The area over which an impact occurs. The magnitude and extent of an impact may be synonymous.
Duration	The time over which an impact is expected to last prior to the recovery or replacement of the resource or feature. This can be considered in terms of life cycles of species or regeneration of habitats. The duration of an impact may be longer than the duration of any activity or impact.
Reversibility	Reversible (or temporary) impacts are those that do not last the duration of the proposal. Either spontaneous recovery or effective mitigation is possible. Irreversible (or permanent) impacts will last the duration of the proposed proposal and recovery is not possible within a reasonable timescale.
Timing and frequency	The timing of impacts in relation to important seasonal and/or life cycle constraints has also been evaluated. Similarly, the frequency with which activities and simultaneous impacts would take place can be an important determinant of the impacts on receptors, and has therefore also been assessed and described.

Magnitude of Change

11.2.18 The magnitude of change effected on each receptor can be defined on a scale ranging from high to negligible as detailed in **Table 11.3**.

Table 11.3: Magnitude of Change

Magnitude	Criteria
High	The effect (either on its own or with other proposals) may adversely or positively affect the integrity of a site/population, in terms of the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the population levels of species of interest.
Medium	Integrity of a site would not be adversely or positively affected, but some element of the functioning of part of the site might be affected and the effect on the site/population is likely to be significant in terms of its ability to sustain some part of itself in the long term.
Low	Neither of the above applies, but some minor adverse or beneficial effect is evident on a temporary basis or affects extent of habitat abundant in the local area.

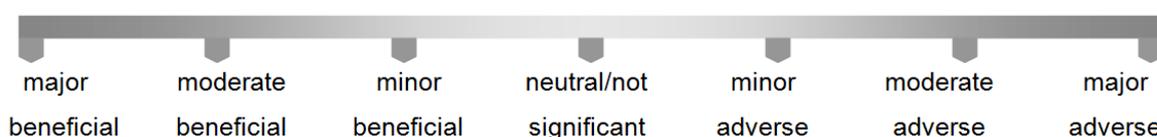
Magnitude	Criteria
Negligible	No observable effect in either direction.

Significance of Effect

11.2.19 The EIA Regulations state that impacts that are likely to have a significant effect require detailed assessment. The likely significance of the effect is determined with reference to the interaction between the magnitude of the potential impact and the value or sensitivity of the ecological receptor, along with other factors such as the likelihood of the impact occurring and its duration.

11.2.20 The following terms (**Diagram 11.1**) are used to qualify the significance of ecological effects.

Diagram 11.1: Significance Scale



11.2.21 A significant effect in the context of this chapter is considered to be any ‘major’ or ‘moderate’ effect on a sensitive ecological receptor, whether beneficial or adverse. For the effect to be significant, the ecological integrity of a sensitive receptor must be influenced in some way. It may be that the effect is large in magnitude or scale, irreversible, has a long-term effect, or coincides with a critical period in a species’ life-cycle.

11.2.22 The scale is derived from the interaction of the receptor sensitivity and magnitude of change of effect as detailed in the matrix set out in **Table 11.4**. The shading indicates those significance ratings that are deemed to be ‘significant’ effects.

Table 11.4: Significance Matrix

Magnitude of Change	Sensitivity of Receptor			
	High International/ National	Medium Regional/ County	Low District/Local	Negligible Less than Local
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor to Moderate	Negligible
Low	Moderate	Minor to Moderate	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

11.2.23 Using the matrix above, a high magnitude effect on a highly sensitive ecological receptor, for example a development likely to lead to chronic pollution of a river falling under multiple European and international designations, would lead to a major adverse effect. In contrast, the temporary removal of a small area of undesigned improved

grassland from an area where this habitat is abundant is likely to lead to a negligible effect on a receptor of negligible sensitivity.

11.2.24 Where the ecological assessment proposes measures to mitigate adverse effects on ecological features, a further assessment of residual ecological effects, taking into account any ecological mitigation recommended, has been undertaken.

Confidence Levels

11.2.25 A level of confidence has been attributed to the assessment of predicted effects in this chapter, particularly in cases where quantitative assessment cannot be made. The criteria for these definitions are set out in **Table 11.5**. Unless otherwise stated, confidence levels are certain/near certain.

Table 11.5: Confidence levels in predicted effects

Confidence level	Description
Certain/Near-certain	Probability estimated at 95% or higher
Probable/Likely	Probability estimated to be above 50% but below 95%
Unlikely	Probability estimated at above 5% but below 50%
Extremely unlikely	Probability estimated at less than 5%

Legislative and Policy Framework

11.2.26 A summary of the key policies and guidelines that are relevant to this assessment is provided below:

- Defra (2011) *Biodiversity 2020: A strategy for England's wildlife and ecosystem services*. Defra. UK;
- Sustainable Development and Addressing Climate Change (2008);
- Institute of Ecology and Environmental Management (2006) *Guidelines for Ecological Impact Assessment in the United Kingdom*. CIEEM, Winchester;
- JNCC (2010) *Handbook for Phase 1 Habitat Survey - a technique for environmental audit*. JNCC, Peterborough; and,
- Hundt, L. (2012). *Bat Surveys: Good Practice Guidelines*, 2nd Edition. Bat Conservation Trust, London.

European Legislation

11.2.27 EC Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 92/43/EEC provides direction from Europe in regard to protection to be afforded to wildlife species and habitats of importance in a European context. The relevant provisions of these directives are transposed into English law primarily through the Conservation of Habitats and Species Regulations 2010 (as amended).

National Legislation and Policy

11.2.28 The following provide national legislation with regards to species and habitats in England:

- The Conservation of Habitats and Species Regulations 2010 (as amended);

- The Wildlife and Countryside Act 1981 (as amended);
- The Countryside and Rights of Way Act 2000;
- The Natural Environment and Rural Communities (NERC) Act 2006;
- The Protection of Badgers Act 1992; and,
- The Hedgerows Regulations 1997.

Local Planning Policy and Guidance

11.2.29 The Unitary Development Plan (UDP) contains policies and proposals that guide development and land use across the City and is the existing Development Plan for Birmingham. This establishes the importance of safeguarding and enhancing the natural environment of the City. This involves the protection of existing area of nature conservation importance and measures to improve the diversity and quality of wildlife habitats throughout the City.

Scoping Criteria

11.2.30 The scope of the assessment as agreed at the scoping stage includes an Extended Phase 1 habitat survey and desk study to establish potential effects on statutory designated and non-statutory designated sites, habitats and protected and priority species.

11.2.31 Accordingly, the Ecology and Nature Conservation Assessment considers the following potential effects (construction includes the demolition of the existing buildings within the Application Site):

- Construction / Operation Phase – Non-statutory designated sites;
- Construction / Operation Phase – Habitats;
- Construction / Operation Phase – Nesting Birds; and,
- Construction / Operation Phase – Bats

Limitations to the Assessment

11.2.32 No limitations have been identified during this assessment.

11.3 Baseline Conditions

Site Description and Context

11.3.1 The Application Site comprises part of the Fort Industrial Park and lies within a heavily urbanised environment within the Castle Bromwich area of Birmingham, approximately 150m north of the M6 motorway.

11.3.2 The Application Site itself is dominated by hardstanding and large industrial buildings with small sections of ornamental planting. The features of highest ecological interest are situated directly south and comprise a linear corridor of semi-natural habitats and a tree line beside the railway line embankments. The River Tame lies c. 54m south. The landscape to the north, east and west comprise extensive areas of large industrial warehouses and residential areas.

Statutory and Non-statutory Designated Sites

11.3.3 The desk study identified six statutory designated sites for nature conservation within a 5km radius of the Application Site. These sites are detailed in **Table 11.6** in order of proximity. The nearest site, Plantsbrook Reservoirs Local Nature Reserve (LNR) is situated c. 1.6km north.

Table 11.6: Statutory designated sites within 5km of the Application Site (LNR: Local Nature Reserve).

Site Name	Distance	Reason for designation
Plantsbrook Reservoirs LNR	c. 1.6km N	Pools and surrounding woodland, wetlands and wildflower meadow.
Kingfisher LNR	c. 2.6km SE	River, wetland habitats (small ponds and man-made lakes), ancient woodland, tall herbs and scrub. Water voles <i>Arvicola amphibious</i> and otters <i>Lutra lutra</i> are present.
Yorks Wood LNR	c. 3.3km SE	Ancient semi-natural woodland.
Babs Mill LNR	c. 3.6km SE	Woodland, wildflower grasslands, River Cole and Babs Mill lake.
Smiths Wood LNR	c. 3.7km SE	Ancient semi-natural woodland on medieval ridge and furrow.
Cole Bank LNR	c. 4.5km SE	Mosaic grassland shrub and wetlands next to the River Cole.

11.3.4 EcoRecord provided information for non-statutory sites within a 2km radius around the approximate center of the Application Site. These are presented in order of proximity within **Table 11.7**.

Table 11.7: Non-statutory designated sites within 2km (*SINC: Sites of Interest for Nature Conservation; SLINC: Sites of Local Importance for Nature Conservation; LWS Local Wildlife Site; pLWS potential Local Wildlife Site*).

Site Name	Distance	Reason for designation
Tame Valley SLINC	c. 56m south	River, floodplain, tall herb, marshy grassland, neutral grassland, woodland and scrub. Previously polluted, but improving river that flows in a modified channel and provides a habitat corridor connecting several wildlife sites.

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Site Name	Distance	Reason for designation
Ecosite 39/18 Castle Bromwich Hall Site (LWS)	0.6km South	An area of wetland adjacent to Castle Bromwich Hall, the site comprises of areas dominated by tufted hair grass <i>Deschampsia cespitosa</i> and false oat grass <i>Arrhenatherum elatius</i> . In the wetter areas, species such as reedmace <i>Typha latifolia</i> and yellow flag iris <i>Iris pseudacorus</i> are present. The main feature of interest is a pond, with marsh arrowgrass <i>Triglochin palustre</i> , brooklime <i>Veronica beccabunga</i> and fool's watercress <i>Apium nodiflorum</i> , whilst there are also records of great crested newt <i>Triturus cristatus</i> .
Ecosite 43/18 St Marys and St Margarets, Churchyard, Castle Bromwich (Nature Conservation Status Ungraded)	0.6km South	Churchyard with overall very low floral diversity, although common bluebell <i>Hyacinthoides non-scripta</i> has been recorded.
Ecosite 65/19 Castle Hills (pLWS)	0.6km South East	Area of semi-improved grassland supporting a good variety of flora including bulbous buttercup <i>Ranunculus bulbosus</i> , pignut <i>Conopodium majus</i> , common vetch <i>Vicia sativa</i> , red campion <i>Silene dioica</i> , hairy tare <i>Vicia hirsute</i> , nettle <i>Urtica dioica</i> and cow parsley <i>Anthriscus sylvestris</i> .
Birmingham and Fazeley Canal SLINC	c. 0.7km north	Canal, neutral grassland, tall herb and scrub. Canal with relatively diverse aquatic flora and associated verges and embankments of rank grassland, tall herb and scrub that allows flora and fauna to penetrate to the heart of the city.
Park Hall SINC	c. 0.8km southeast	Broad-leaved woodland (UK priority habitat (UKPH)), ancient Woodland (UKPH), marshy grassland, lowland meadow (UKPH), ponds (UKPH), river and hedgerows. Area of remnant farmland with a channelised stretch of the River Tame.
Bromford Bridge South Open Space SLINC	c. 1.1km southwest	Secondary oak-dominated woodland with scrub and neutral grassland. The site supports a good diversity of birds.
Hodge Hill Common SINC	c. 1.3km southwest	Lowland dry acid grassland (UKPH) and scrub. The species recorded here include some that are uncommon or rare regionally.

Site Name	Distance	Reason for designation
Plants Brook Reservoirs SINC	c. 1.5km north	Lake, ponds, willow carr, lowland meadow (UKPH), scrub, tall herb and mixed broad-leaved woodland. The pools are favoured by birds including breeding little grebe <i>Tachybaptus ruficollis</i> .
Pype Hayes Park SLINC	c. 1.6km north	Lowland meadow (UKPH), marshy grassland, scrub, tall herb and hedgerow (UKPH).
Pype Hayes Park SINC	c. 1.6km north	Stream, lowland meadow (UKPH), marshy grassland and wet woodland (UKPH). A species-rich area of meadow with a linear strip of woodland.
Project Kingfisher, Cole Valley SINC	c. 1.8km south	Section of the Cole Valley with a number of interesting habitats, interspersed with improved regularly mown grassland. These habitats include areas of unimproved grassland with hawthorn <i>Crataegus monogyna</i> and willow <i>Salix</i> sp. scrub, rush/reed swamp, open water and ruderal vegetation communities.

11.3.5 In addition to the sites listed within **Table 11.7**, The Tame Valley Wildlife Corridor lies adjacent to the Site boundary, and this area is also designated as a Potential Site of Importance, although no information was provided to support this classification.

11.3.6 An area of Ancient Woodland was also present c. 0.4km southeast.

Habitats Baseline

11.3.7 A plan showing the location of habitats within the Application Site and in the immediate vicinity is presented in **Figure 11.1**, target notes (TNs) are presented in **Table 11.8**.

11.3.8 The Application Site was dominated by buildings and surrounding hard standing with smaller areas of amenity grassland and ornamental planting and an area of bare ground with trees along the southern boundary.

11.3.9 The two main buildings (TN2) comprised large industrial blocks with associated single-storey offices. The buildings were all in good condition and the two main buildings had brick cavity wall bases, with metal prefabricated sides above this and metal apex roofs. There were several smaller single story blocks around the edges of these buildings with brick cavity walls and flat roof. A single storey building (foul sewer pumping station) with cavity insulated brick walls and a flat roof was present adjacent to the Application Site (TN3).

11.3.10 The ornamental planting (TN1) was comprised of short intensively managed privet *Ligustrum* sp. An area of bare ground (TN4) within the south of the Application Site supported silver birch *Betula pendula*, cherry *Prunus* sp. and beech *Fagus sylvatica*.

11.3.11 Habitats adjacent to the southern Application Site boundary comprised scattered scrub with trees, and a highly managed overflow channel (the Dunlop Carrier) with concrete-sided banks and earth banks supporting dense bramble *Rubus fruticosus* and ivy *Hedera helix* in areas. A railway line with embankments lined with shrubs was

present to the south of this channel and the River Tame is situated on the far side of the railway, c. 56m south. These habitats are considered to provide a wildlife corridor within an otherwise heavily urbanised landscape, and are designated as the Tame Valley Wildlife Corridor. The river and its floodplain also comprises the Tame Valley Site of Local Importance for Nature Conservation (SLINC).

11.3.12 Further areas adjacent to the Application Site comprised similar habitats, being predominantly large industrial buildings, hard standing and ornamental planting within the Fort Industrial Park.

11.3.13 There were no ponds within or immediately adjacent to the Application Site.

Table 11.8: Target Notes

Target Note	Comments
TN1	Ornamental planting composed of short intensively managed privet <i>Ligustrum sp.</i> bushes, between 40cm and 1m in height.
TN2	Large industrial blocks with associated single-storey offices. The buildings had brick cavity wall bases, with metal prefabricated sides above this and metal apex roofs.
TN3	Single storey building with cavity, insulated brick walls, plastic doors, fascias and soffits and a flat roof.
TN4	Area of bare ground within the south of the Application Site supported silver birch <i>Betula pendula</i> , cherry <i>Prunus sp.</i> and beech <i>Fagus sylvatica</i> .

Protected Species Baseline

11.3.14 The following baseline section incorporates secondary data obtained during desk studies and information gathered through field based survey.

Birds

11.3.15 The Application Site itself predominantly comprises hardstanding and buildings and does not offer favourable habitat for birds.

11.3.16 The areas of low-level ornamental planting within the Application Site offer some interest for birds and provide suitable nesting habitat. However, these bushes were heavily managed and subject to high level of disturbance and are therefore considered unlikely to be used on a regular basis. The trees within the bare ground in the southern extent of the Application Site and the line of trees just beyond the southern boundary provide suitable habitat for nesting birds, although no nesting birds were observed during survey. The Application Site does not provide potential for ground nesting species.

11.3.17 No statutory designated site with ornithological interests was located within a 5km radius of the Application Site.

11.3.18 **Table 11.9** details notable and protected bird species returned within the data search (post 1990 records only). The following conservation priority lists are used:

- Birds listed under the Birds Directive Annex 1, which are the subject of special conservation measures concerning their habitat in order to ensure their survival and reproduction in their area of distribution. As appropriate, Special Protection Areas are to be established to assist conservation measures;

- Species listed under Schedule 1 of the Wildlife and Countryside Act 1981, as amended (WCA);
- Species listed as 'Red' (highest conservation priority) on Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man (BoCC);
- Priority listed species on the UK Biodiversity Action Plan (UK BAP);
- Species listed on the Biodiversity Action Plan (LBAP) for Birmingham and the Black Country; and,
- Species of principal importance for the purpose of conserving biodiversity covered under section 41 (England) of the NERC Act (2006) and therefore need to be taken into consideration by a public body when performing any of its functions with a view to conserving biodiversity.

Table 11.9: Notable bird records within 2km radius of the approximate centre of the Application Site

Species Records		Conservation Status
Merlin	<i>Falco columbarius</i>	Annex 1, S1
Peregrine	<i>Falco peregrinus</i>	Annex 1, S1
Kestrel	<i>Falco tinnunculus</i>	LBAP
Grey partridge	<i>Perdix perdix</i>	S41, UKBAP, LBAP, BoCC - Red
Lapwing	<i>Vanellus vanellus</i>	S41, UKBAP, BoCC - Red,
Green sandpiper	<i>Tringa ochropus</i>	S1
Barn owl	<i>Tyto alba</i>	S1
Skylark	<i>Alauda arvensis</i>	S41, UKBAP, BoCC – Red, LBAP
Kingfisher	<i>Alcedo atthis</i>	Annex ,1 S1
Black redstart	<i>Phoenicurus ochruros</i>	S1, LBAP
Song thrush	<i>Turdus philomelos</i>	S41, UKBAP, LBAP, BoCC - Red
Redwing	<i>Turdus iliacus</i>	S1, BoCC - Red
Fieldfare	<i>Turdus pilaris</i>	S1, BoCC - Red
Spotted flycatcher	<i>Muscicapa striata</i>	S41, UKBAP, LBAP, BoCC - Red
Cetti's warbler	<i>Cettia cetti</i>	S1
Linnet	<i>Carduelis cannabina</i>	S41, UKBAP, BoCC - Red
House sparrow	<i>Passer domesticus</i>	S41, UKBAP, BoCC - Red
Tree sparrow	<i>Passer montanus</i>	S41, UKBAP, LBAP, BoCC - Red
Starling	<i>Sturnus vulgaris</i>	S41, UKBAP, BoCC - Red
Corn bunting	<i>Emberiza calandra</i>	S41, UKBAP, BoCC - Red
Yellowhammer	<i>Emberiza citrinella</i>	S41, UKBAP, BoCC - Red
Reed bunting	<i>Emberiza schoeniclus</i>	S41, UKBAP

11.3.19 The closest bird records were a 2013 fieldfare *Turdus pilaris* record from Castle Vale Retail Park and a 2002 record of black redstart *Phenicurus ochruros* from derelict

buildings by Star City. Records of peregrine falcon *Falco peregrinus* and song thrush *Turdus philomelos* were also present within 1km.

11.3.20 There are also records of breeding peregrine from a location c. 400m from the Application Site; however the buildings present within the Application Site are considered unsuitable for nesting for this species.

Bats

11.3.21 Taking into account the urbanised nature of habitats present together with anticipated lighting levels, the Application Site is considered unlikely to provide high value foraging interest for bats. The ditch, scrub, tree-line and railway embankment adjacent to the southern Application Site boundary provide suitable commuting habitat and the Tame corridor c. 56m south is considered likely to provide a favoured corridor for commuting and foraging bats and to connect favourable habitats including statutory and non-statutory sites designated for wildlife conservation within the wider landscape.

11.3.22 No bat roost potential was identified within the trees within and adjacent to the Application Site (Category 3 trees). The upper sides and roofs of the two main buildings comprised metal sheeting; this would generate very wide temperature fluctuations and any cavities within these roof spaces are unlikely to provide suitable conditions for roosting bats. The single-storey buildings all had flat roofs with no potential entrances to internal cavities and were therefore considered unsuitable as bat roosts.

11.3.23 The record search returned records of at least five bat species within a 2km radius of the Application Site as detailed within **Table 11.10**.

Table 11.10: Bat species records within 2km radius of the approximate centre of the Application Site.

Common name	Latin name	Conservation Status
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	WCA Schedule 5
Pipistrelle	<i>Pipistrellus sp.</i>	UKBAP, WCA Schedule 5
Daubenton's	<i>Myotis daubentonii</i>	WCA Schedule 5
Whiskered bat	<i>Myotis mystacinus</i>	WCA Schedule 5
Serotine	<i>Eptesicus serotinus</i>	WCA Schedule 5
Brown long-eared	<i>Plecotus auritus</i>	UKBAP, WCA Schedule 5

11.3.24 The brown long-eared bat records related to **two** roost sites within the Plants Brook Valley, c. 1.6km north of the Application Site. Records of pipistrelle species were also returned, including four roosts, the nearest of which is c. 0.4km north east of the Application Site.

Badger

11.3.25 Two records of badger *Meles meles* were returned from within 2km of the site.

11.3.26 No signs of badger were identified within or immediately adjacent to the Application Site during habitat survey and the industrial and heavily urbanised landscape is considered of low interest for this species, individuals may frequent the site on occasion.

Hazel Dormouse

11.3.27 No suitable habitat for this species was present within or adjacent to the Application Site and no records were returned within the data search.

Otter and Water Vole

11.3.28 Thirteen records of water vole were returned within the 2km search radius of the approximate centre of the Application Site; records related to Park Hall SINC, the Plants Brook, Pye Hayes, River Cole and the Birmingham and Fazeley Canal. The nearest of these records was situated c. 1.6km northeast from the Birmingham and Fazeley Canal. A single record of a dead otter was returned, from within the Fort Industrial Park (central reservation, Fort Parkway).

11.3.29 No freshwater habitat features suitable for otter or water vole were identified within the Application Site. The highly managed ditch immediately south was unsuitable for water vole along the section adjacent to the Application Site, due to its heavily managed nature and the presence of concrete-sided banks, although other sections of this ditch may be suitable.

11.3.30 The River Tame, c. 56m south, provides suitable habitat for otter and also supports water vole along some sections, such as the extent within the Park Hall.

Reptiles and Amphibians

11.3.31 The records search provided records of common toad *Rana temporaria*, common toad *Bufo bufo*, grass snake *Natrix natrix*, smooth newt *Lissotriton vulgaris*, palmate newt *L. helveticus* and great crested-newt *Triturus cristatus*. The great crested newt records were from Castle Bromwich Hall Site c. 0.6km south and Park Hall Nature Reserve c. 0.8km southeast. The Application Site is separated from these known great crested sites by extensive physical barriers that would prevent dispersal.

11.3.32 The hardstanding surfaces forming the main body of the Application Site are considered unsuitable as habitat for reptiles and amphibian, lacking suitable vegetative cover. The amenity grassland and planting may provide some (albeit low) foraging opportunities and places of shelter individual animals (common species).

11.3.33 No ponds were present within or immediately adjacent to the Application Site and the heavily managed waterway to the south was considered largely unsuitable due to the presence of concrete sites, although common amphibian species may still be present.

Invertebrates

11.3.34 The industrial landscape within the Application Site is generally of limited suitability for invertebrates; however the scrub, tree-line and railway embankment to the south are likely to support a suite of locally occurring species.

11.3.35 Freshwater crayfish *Austropotamobius pallipes* was recorded from Plants Brook Valley, c. 1.5km away. No suitable habitat for this species was present within or immediately adjacent to the Application Site.

11.3.36 A number of moth species of conservation concern were returned from the records search (post 1990 records); cinnabar *Tyria jacobaeae*, grey dagger *Acronicta psi*, mottled rustic *Caradrina Morpheus*, small square-spot *Diarsia rubi*, small phoenix *Ecliptopera silaceata*, garden dart *Euxoa nigricans*, rustic *Hoplodrina blanda*, rosy rustic

Hydaecia micacea, white ermine *Spilosoma lubricipeda*, buff ermine *Spilosoma luteum* and oak hook-tip *Watonalla binaria*.

Other Protected & Priority Species

11.3.37 Hedgehog *Erinaceus europaeus* records were returned within the data search. The Application Site and boundary habitats were considered potentially suitable for hedgehog.

11.3.38 No other species are considered pertinent.

Invasive species

11.3.39 No invasive plant species were identified during habitat survey.

Valuation of Ecological Receptors

11.3.40 The results of the extended Phase 1 habitat survey and desk study were used to inform both the valuation of receptors and the detailed impact assessment.

6.1.1 Having identified the potential ecological resources within the zone of influence, each was then assigned a value as described in the CIEEM (2006) guidance.

6.1.2 Only those ecological resources that it was considered could experience significant effects (i.e. impacts that could adversely affect the integrity of the habitat or the favourable conservation status of a specie's local population), and which were identified as being of sufficient value (i.e. generally District level or above but informed also by professional judgement) to be material to decision making, have been classified as being 'key' ecological resources.

6.1.3 **Table 11.11** presents the evaluation of 'Key' ecological resources, provides the rationale as to why individual receptors have been 'scoped in' or 'scoped out' of detailed impact assessment.

Table 11.11: Valuation of key Ecological Receptors

Ecological receptor	Valuation	Potential Effect Pathways and Rationale for selection of Key Ecological Resources
Statutory designated sites	National	<p>None located within at least 1.6km of the Application Site and all designated for habitats and dependant species.</p> <p>Unlikely to be directly affected and lack of connectivity mean that indirect impacts are also not anticipated.</p> <p>Scoped out of assessment</p>
Non-statutory designated sites	Regional/county	<p>No non-statutory designated sites located within or immediately adjacent to the Application Site. Direct impacts are unlikely to occur.</p> <p>Tame Valley SLINC is located c. 56m from the Application Site with potential for indirect effects through pollution.</p> <p>Scoped into assessment - Tame Valley SLINC only</p>
General habitats	Less than local	<p>Habitats within the Application Site were of low ecological value.</p> <p>Scoped in to the assessment due potential effects on protected or notable species that may utilise such habitats.</p>
Birds	District	<p>The Application Site is likely to support a bird assemblage typical of the urban and industrial habitats in the region, including some of local conservation interest (Eaton <i>et al.</i>, 2009). Peregrine falcon (protected under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) have previously been recorded breeding c. 400m of the Application Site.</p> <p>Potential for disturbance of breeding birds depending of timing of the construction phase.</p> <p>Scoped into assessment</p>
Bats	District	<p>Species assemblage likely present within the Application Site are all common and widespread species.</p>

Ecological receptor	Valuation	Potential Effect Pathways and Rationale for selection of Key Ecological Resources
		<p>All UK bats and their roosts are protected under the Wildlife and Countryside Act 1981 (as amended) and the Habitat Regulations 2010 (as amended), deeming them European Protected Species (EPS). Potential impacts upon bats are therefore scoped in.</p> <p>Potential for disturbance and effects of lighting during construction and operation.</p> <p>Scoped into assessment</p>
Badger	Local	<p>No setts found with the Application Site and habitat considered unsuitable. Impacts are considered unlikely.</p> <p>Scoped out of assessment.</p>
Amphibians	Local	<p>No evidence of amphibians found and habitats within the Application Site were considered unsuitable.</p> <p>Considered in the mitigation section only (precautionary).</p>
Reptiles	Local	<p>No evidence of reptiles found and habitats within the Application Site were considered largely unsuitable.</p> <p>Considered in the mitigation section only (precautionary).</p>
Otter	Local	<p>No evidence of otter found within the Site and effects are considered unlikely.</p> <p>Indirect pollution impacts.</p> <p>Considered in the mitigation section only (precautionary).</p>
Water vole	Local	<p>No evidence of otter found within the Application Site and effects are considered unlikely.</p> <p>Indirect pollution impacts.</p> <p>Considered in the mitigation section only (precautionary).</p>
Hazel dormouse	N/A	<p>No evidence of hazel dormouse found and habitats within the Application Site were considered</p>

Ecological receptor	Valuation	Potential Effect Pathways and Rationale for selection of Key Ecological Resources
		unsuitable. Scoped out of assessment.

Ecological receptor	Valuation	Potential Effect Pathways and Rationale for selection of Key Ecological Resources
Invertebrates	Local	No evidence of protected and notable invertebrates found and habitats within the Application Site were considered unsuitable. Scoped out of assessment.
Other priority species – hedgehog	Local	No evidence of hedgehog found and although potentially present the Proposed Development is unlikely to affect this species. Scoped out of assessment.

11.4 Assessment of Likely Significant Effects

11.4.1 The potential effects of the Proposed Development through the construction including demolition of the existing buildings, and operational phases are discussed below in accordance with the ecological receptors identified in **Table 11.11**. Effects are assessed in the absence of mitigation, compensation and enhancement measures.

11.4.2 The construction including demolition of the existing buildings, and operation of the proposed Renewable Energy Centre and industrial / warehousing building and associated infrastructure may result in a range of effects on ecological receptors which are discussed further in the following section. The potential impacts arising from decommissioning activities are assumed to be equivalent to those of the construction phase and are therefore not presented separately.

Construction

11.4.3 The Application Site currently comprises business, industrial and storage units, these will be demolished and some industrial units rebuilt to the north of the site and the majority of the site would be replaced by the proposed Renewable Energy Centre. Direct land take will comprise largely of buildings and hardstanding but some existing trees and other amenity planting will be lost to enable construction.

11.4.4 Potential construction phase effects associated with the Proposed Development assessed in this Chapter and which are considered to relate to:

- Demolition of existing building and direct land take and loss of habitat to facilitate new buildings and associated infrastructure;
- Disturbance to and fragmentation or severance of potential commuting routes within and adjacent to the Application Site;
- Disturbance (noise and vibration, movement) resulting from demolition activities, plant, vehicles and site workers; and,
- Pollution (including dust, surface water runoff from working areas).

11.4.5 Effects associated with demolition of the existing buildings are likely to be broadly the same as construction effects. Subsequently, demolition effects are considered alongside construction effects.

Non-statutory Designated Sites – Tame Valley SLINC

11.4.6 The Application Site does not form part of any non-statutory designated site and there will be no direct effects on those sites present in the surrounding area.

11.4.7 Tame Valley SLINC is located c. 56m from the Application Site.

11.4.8 The nearest statutory site, Tame Valley SLINC is located c. 56m from the Application Site; the site is noted for its habitats river (River Tame) and associated floodplain with tall herb, marshy grassland, neutral grassland, woodland and scrub vegetation. The river was previously polluted, but now improving and provides a habitat corridor connecting several wildlife sites.

11.4.9 In the absence of mitigation, there may be potential for surface water run-off, as a result of ground disturbance and a temporary increase in site traffic, to indirectly affect the watercourse through localised pollution and sedimentation. Indirect effects on Tame Valley SLINC potentially entail low magnitude of change which is anticipated on a receptor of County/Regional scale and therefore minor/moderate adverse and not significant.

Habitats

11.4.10 Construction works will primarily effect buildings and hardstanding (and a small area of amenity grassland and ornamental planting) which is present within the footprint of the Proposed Development. Habitats within the Application Site were valued as having a Less than local ecological value and the loss is considered to be an effect of low magnitude and not significant.

11.4.11 No off-site construction compounds will be required during the construction of the Proposed Development with all construction activity confined within the Application Site. Habitats immediately adjacent to the southern boundary of the Application Site, comprising scattered scrub with trees and concrete-sided overflow channel (the Dunlop Carrier) will remain intact during the course of the construction stage and protected from encroachment by the existing boundary fence.

11.4.12 Surface water run-off, as a result of ground disturbance and increased site traffic, has the potential to cause localised pollution to surrounding habitats, including the Dunlop Carrier and indirectly to the River Tame. Potential effect on these nearby aquatic habitats was considered under non-statutory designated sites as part of the Tame Valley SLINC.

Birds

6.1.4 No statutory designated sites with bird interest were located within the wider area and no effects are anticipated on such sites. Plants Brook Reservoirs SINC is located approximately 1.5km north of the Application and supports breeding little grebe *Tachybaptus ruficollis*; however, due to the separation and habitat present within the Application Site, there is no potential for effects on birds associated with the SINC.

11.4.13 Construction-related ornithological effects may include temporarily increased levels of noise and disturbance during demolition activities and from movement of vehicles and construction works. The increase in noise and disturbance levels will be less noticeable due to the location of the Application Site, set within an urban and industrial landscape and close to the M6 motorway; these effects are considered to be of low magnitude, taking into account background levels of disturbance.

11.4.14 Displacement effects may occur on some bird species during the construction phase. Habitats within and along the boundaries of the Application Site are likely to

support a range of urban species, including species of local value, which will likely be subject to some level of displacement. Disturbance of species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), in particular peregrine falcon, is considered highly unlikely given the urban and industrialised nature of the Application Site and surrounding areas. The magnitude of effect is considered to be low given the surrounding industrial landscape and effects are therefore considered to be no more than minor adverse and not significant.

11.4.15 Trees, ornamental planting and scrub vegetation within and around the fringes of the Application Site provide limited suitable habitat for nesting birds. Construction works undertaken during the breeding season (generally considered to be March to August inclusive) could lead to temporary disturbance or even damage of nest sites which would be considered minor adverse and not significant.

11.4.16 There are historical records of peregrine falcon breeding within approximately 400m of the Application Site. The precise location should be considered as confidential as the species is afforded protection from disturbance under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). No suitable nest sites were identified within the Application Site; however, depending on the timings of works, construction related activities could potentially disturb this species if nesting close to the Application Site (i.e. within c. 500m). Disturbance to breeding peregrine falcon, although unlikely, could potentially result in an effect of medium magnitude on a receptor of District ecological value resulting in minor to moderate adverse and not significant.

Bats

11.4.17 No statutory or non-statutory designated sites for bat species were located within the wider area and no effects are anticipated on such sites.

11.4.18 The building and trees within the Application were not considered to provide opportunities for roosting bats and no potential for roosts which could support significant aggregations of roosting bats was identified within close proximity to the Application Site. Overall, effects on roosting bats are considered negligible and not significant.

11.4.19 Construction related effects on bats are likely to be limited to temporary disturbance during construction works and reflect the small-scale loss of low value bat habitat (ornamental planting and trees).

11.4.20 The small-scale removal trees and ornamental planting will not result in the severance of commuting routes or habitat fragmentation for bats. The loss of a small amount of low quality (foraging and commuting) bat habitat will be negligible and not significant.

11.4.21 It is anticipated that disturbance effects resulting increased noise or vibrations resulting from construction works would be negligible in magnitude and not significant in the context of surrounding industrial landscape.

11.4.22 The construction of the Proposed Development will likely utilise temporary lighting which can result in short-term displacement effects on bats. Studies have demonstrated that slower flying species such as long-eared bats and *Myotis* species avoid lights. Conversely lighting can attract insects, resulting in adjacent habitats supporting a reduced number of prey items. The Application Site and its surrounding industrial landscape is well lit; therefore, effects of lighting on bats during the construction phase are considered to be negligible, although lighting columns positioned close to more favourable foraging habitat such as those found bordering the southern boundary of the Application Site may reduce foraging and commuting opportunities during hours of operation. In such circumstances, such effects would be small in extent

and temporary, considered to be of low magnitude (as a worst-case scenario) on a receptor valued at the District scale and therefore not significant.

Operation

11.4.23 Operational effects are defined as the abandonment, temporary or permanent, of areas of ecological importance or value due to the presence of the Renewable Energy Centre and industrial / warehousing building or related operational activities. Effects may be either temporary and will disappear with habituation, or permanent (or at least the lifetime of the development)

Non-statutory Designated Sites – Tame Valley SLINC

11.4.24 No potential effects are anticipated upon the habitats associated with Tame Valley SLINC. Once operational, there would be negligible indirect effects from surface water runoff compared to current industrial activities, land use and composition of hardstanding and vegetation cover would be comparable to that existing pre-development.

11.4.25 Effects are assessed to be of negligible magnitude on a receptor of County/Regional ecological value, negligible effect and not significant.

Habitats

11.4.26 There will be no operational effects on habitats over and above those described in the Construction effects section above. Landscape works as part of the Proposed Development will include new ornamental and tree planting which will likely provide a local (Site) habitat enhancement.

11.4.27 Effects are assessed to be of negligible magnitude on a receptor of Less than local ecological value, negligible effect and not significant.

Birds

11.4.28 No operational effects on birds are anticipated. Landscape works as part of the Proposed Development will include new ornamental and tree planting which will likely provide a local (Site) habitat enhancement.

6.1.5 Effects are assessed to be of negligible magnitude on a receptor of District ecological value, negligible effect and not significant.

Bats

11.4.29 During the operational phase of the development, effects are unlikely, given the lack of roost locations within the Application Site and the poor quality foraging habitat that it offers.

11.4.30 Once operational, the Proposed Development will be lit. However, the existing buildings and yards within the Application Site are illuminated by external lighting and located within industrial landscape any increase in lighting within the Application Site itself is likely to be negligible.

11.4.31 Increased light spill into more favourable bat habitat such as those found bordering the southern boundary of the Application Site may reduce foraging and commuting opportunities, although such effects would be limited in extent and considered to be of low magnitude (as a worst-case scenario) on a receptor valued at the District ecological value, minor and not significant.

11.5 Mitigation and Enhancement

11.5.1 No significant effects requiring specific mitigation have been identified as part of this assessment. The Proposed Development is located within an area of poor habitat and biodiversity value, and habitats of greater value. Generally applicable good practice measures will be applied during the construction phase to prevent accidental pollution and to avoid indirect effects on neighbouring habitats.

Mitigation

Non-statutory Designated Sites – Tame Valley SLINC

11.5.2 Standard measures to ensure runoff control, pollution prevention and protection of water courses will be implemented in accordance with Environment Agency Guidance; these measures will safeguard nearby aquatic and terrestrial habitats and the wider water environment, including habitat within the nearby Tame Valley SLINC.

Habitats

11.5.3 Standard measures to ensure runoff control, pollution prevention and protection measures will be implemented in accordance with Environment Agency Guidance; these measures will safeguard nearby aquatic and terrestrial habitats and the wider water environment.

11.5.4 Adjacent habitats, including those to the south of the Application Site comprising scattered scrub with trees will be protected during the demolition of the existing buildings and construction. Retained trees within the vicinity of construction areas will be protected in-line with BS 5837:2012 *Trees in relation to design, demolition and construction*.

Birds

11.5.5 Site clearance works should be undertaken outside of the breeding bird season in so far as reasonably practical. The breeding bird season is generally acknowledged annually as 01st March to 31st August inclusive. Where this cannot be avoided a competent ornithologist/ecologist will be appointed to undertake a pre-site clearance survey to identify the presence of any wild bird nests being built or in use. Only once the appointed ornithologist/ ecologist is satisfied that an offence under Part 1 of the Wildlife and Countryside Act 1981 (as amended) will not occur, may works proceed.

11.5.6 To avoid potential disturbance to Schedule 1 species (namely peregrine falcon), all areas within 500m of construction works will be surveyed in advance of works (if undertaken during the breeding season March to August) to identify nesting locations. If required, a Breeding Bird Protection Plan (BBPP) would be drawn up with the aim of protecting breeding birds from disturbance and ensuring compliance with nature conservation law during the construction phase.

Amphibians and reptiles

11.5.7 A series of Reasonable Avoidance Measures (RAMs) will be implemented during construction to avoid any risk of accidental harm to individual amphibians or reptiles that may be present. RAMs are detailed in full within **Appendix 11.1**.

Water Vole and Otter

11.5.8 There will be no direct impacts upon the nearby watercourses as a result of the Proposed Development. The pollution prevention and control measures will be

implemented in accordance with relevant Environment Agency Guidelines will ensure there is no effects on water vole or otter should they be present in the wider area.

Enhancements

11.5.9 The Proposed Development will include a landscape planting scheme to include shrubs and native trees that will provide foraging and nest potential for birds and other wildlife.

11.6 Installed Cumulative and In-Combination Effects

11.6.1 This Section should consider the cumulative effects on the environmental receptor with regards to the Proposed Development and other third party developments, and any in-combination effects arising from the combined effects. The cumulative assessment includes consideration of other developments as identified during Scoping; developments considered are detailed **Table 11.12**.

Table 11.12 Projects considered as part of the cumulative assessment

Project	Distance & Orientation	Summary
Erection of an Advanced Conversion Technology & Anaerobic Digestion Facility (Application Ref: 2012/05409/PA)	c. 2.3km West	Potential effects were limited to nesting birds and loss of suitable nesting habitat (scrub vegetation). No residual effects following the implementation of mitigation were anticipated and the development was considered to result with an overall biodiversity gain.
Use of site for re-cycling of aggregates (Application Ref: 2014/02762/PA)	c. 2km West	No information found relating to ecology and nature conservation.
Erection of a green waste recycling facility at Bromford Drive. (Application Ref: 2002/04647/PA)	c. 1km West	No information found relating to ecology and nature conservation.
Change of use of land from hardstanding to provide extended area to existing green waste recycling facility at Bromford Drive (Application Ref: 2009/03827/PA)	c. 1km West	The site was considered to have a low to moderate ecological value, primarily based on its function as part of the River Tame Key Wildlife Corridor. Habitats were considered largely unsuitable for protected with the exception of foraging bats and possible occasional use by badger and otter as part of wider territory, although this was considered unlikely. Substantive of compensation planting was proposed to offset habitat loss and achieve a net biodiversity gain.
Development of public waste disposal facility (Application Ref: 64307005)	c. 1km East	No information found relating to ecology and nature conservation.

11.6.2 With the low level impacts predicted in relation to the above identified Projects and the current Proposed Development, no significant in-combination impacts are anticipated.

11.7 Summary

Introduction

11.7.1 This assessment compiles information from a desk study and Extended Phase I habitat survey, enabling the determination of the likely ecological effects of the Proposed Development.

11.7.2 The assessment establishes the likely presence of protected or notable species, identifies statutory designated sites for nature conservation in the vicinity of the Proposed Development and evaluates the overall conservation status of the Application Site. The potential effects on identified ecological receptors including designated sites and protected and notable species is assessed in line with current guidance, and appropriate mitigation and enhancement measures are described.

Baseline Conditions

11.7.3 An Extended Phase 1 habitat survey was undertaken on the Application Site in April 2015. The survey recorded habitats within the Application Site and aimed to establish the presence or potential presence of protected and notable species.

11.7.4 Statutory designated sites were identified within a 5km radius of the Application Site using the Multi Agency Geographic Information for the Countryside (MAGIC) website, along with the Joint Nature Conservation Committee (JNCC) and Natural England (NE) websites. EcoRecord (the biological record centre for Birmingham and the Black Country) provided records of protected and notable species, locally designated sites and habitats within a 2km radius of the site.

11.7.5 The Application Site was dominated by buildings and surrounding hard standing with smaller areas of amenity grassland and ornamental planting and an area of bare ground with trees along the southern boundary. Habitats adjacent to the southern Application Site boundary comprised scattered scrub with trees, and a highly managed overflow channel (the Dunlop Carrier). A railway line with embankments lined with shrubs was present to the south of this channel and the River Tame is situated on the far side of the railway, c. 56m south. The river and its floodplain also comprised the Tame Valley Site of Local Importance for Nature Conservation (SLINC).

11.7.6 No evidence of protected or notable species was found within or Adjacent to the Application Site. The habitats present had the potential to be used by nesting birds and foraging bats.

11.7.7 Overall value of the Application Site to such species is assessed to be low.

Likely Significant Effects

11.7.8 No significant effects are anticipated on statutory or non-statutory designed sites or habitats.

11.7.9 No significant effects are anticipated on protected species, including birds, bats, badger, dormouse, amphibians and reptiles and invertebrates.

Mitigation and Enhancement

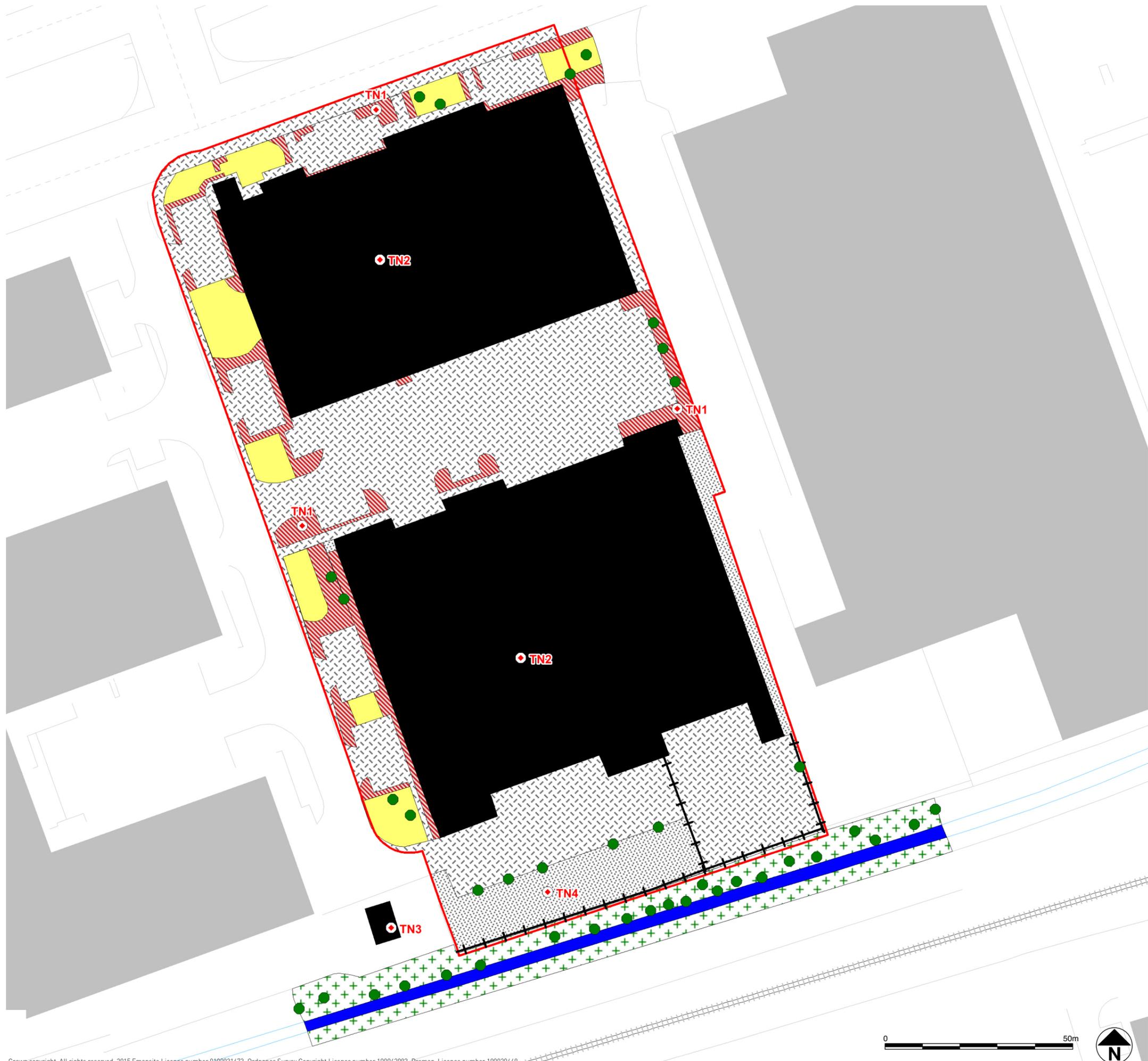
11.7.10 Mitigation and enhancement measures will include the following:

- Pollution prevention and control measures during construction;
- Inclusion of lighting scheme that avoids light spill to habitats adjacent to the south of the Application Site;
- Reasonable Avoidance Measures (RAMs) will be implemented during construction to avoid any risk of accidental harm to individual amphibians or reptiles that may be present; and,
- A Pre-construction nesting bird survey to be undertaken if works commencing during the breeding bird season (generally acknowledged annually as 1st March to 31st August inclusive).

Conclusion

11.7.11 The Proposed Development will have no significant effects on Ecology or Nature Conservation either individually or in combination with other developments.

11.7.12 Residual effects of the Proposed Development will be negligible and not significant in relation to all identified ecological receptors.



KEY

- Site boundary
- ⊙ Target note (TN1-TN4)
- Habitats**
- Amenity grassland
- Ornamental planting
- Scattered scrub
- Wet ditch
- Bare ground
- Hardstanding
- Building
- Fence
- Tree

FIGURE 11.1
Phase 1 Habitat Plan

DRWG No: **K.0168_23** REV: _
 Date: 17/11/2015
 Scale: 1:1,000 @ A3

1 Background, Introduction & Context

2 Site Description

3 Development Proposals

4 Need & Alternatives

5 Air Quality

6 Townscape & Visual

7 Traffic & Transportation

8 Hydrology & Flood Risk

9 Hydrogeology & Ground Conditions

10 Noise & Vibration

11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

13 Socio- Economic Impact

14 Summary

12 ARCHAEOLOGY AND CULTURAL HERITAGE

12.1 Introduction

12.1.1 This Environmental Statement (ES) chapter considers the effects of the Proposed Development on archaeology and cultural heritage and describes: the assessment methodology; the baseline conditions; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed.

12.2 Assessment Approach

Methodology

12.2.1 This assessment has been informed by a Heritage Assessment prepared by Cotswold Archaeology in 2015 (reproduced in **Appendix 12.1**). Cotswold Archaeology is a Registered Organisation with the Chartered Institute for Archaeologists (CIfA).

Scoping Criteria

12.2.2 The proposed scope of this Archaeological and Cultural Heritage Chapter was defined in a Scoping Report submitted to Birmingham City Council in July 2015. This included the proposal that the chapter would be informed by a heritage desk-based assessment and settings assessment, with any requirements for additional survey work from the Birmingham City Council Planning Archaeologist addressed. The Scoping Opinion stated that "*The Local Authority agrees with the proposed methodology*".

12.2.3 A copy of the desk-based assessment was provided to Birmingham City Council for comment by the Archaeological Advisor in July 2015. Advice was received from Ross Brazier, Principal Conservation Officer, who is providing archaeological advice on behalf of the Council. Mr Brazier confirmed that the desk-based assessment provided sufficient information on below-ground archaeology to determine the application. Mr Brazier requested photomontages from designated heritage assets be included in the assessment, specifically Castle Bromwich Grade II* Registered Park, Castle Bromwich Hall Grade I Listed Building and the Grade I Listed Church of Saint Mary and Saint Margaret. These have been produced as part of the LVIA, and are reproduced in **Appendix 12.2**.

Policy Framework

12.2.4 This chapter has been compiled with regard to the following statutory and policy context:

- Ancient Monuments and Archaeological Areas Act 1979
- National Planning Policy Framework 2012 ('the Framework')
- National Planning Practice Guidance 2014 ('the Planning Practice Guidance')
- Birmingham Unitary Development Plan (adopted October 2005) Saved Policies
- Birmingham Development Plan (Draft submitted to the Secretary of State for examination July 2014)
- English Heritage 'Conservation Principles' (2008)

- Historic England 'Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision-Taking in the Historic Environment' (2015)
- Historic England 'Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets' (2015)

The Framework

12.2.5 The principal national guidance on the importance, management and safeguarding of the historic environment resource within the planning process is in the Framework Section 12: Conserving and enhancing the historic environment. The aim of this section is to ensure that Local Planning Authorities, developers and owners of heritage assets adopt a holistic and consistent approach to conserving the historic environment.

12.2.6 The Framework defines the historic environment as 'all aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried, submerged, and landscaped and planted or managed flora' (Annex 2).

12.2.7 Individual aspects of the historic environment are considered heritage assets: 'buildings, monuments, sites, places, areas or landscapes identified as having a degree of significance meriting consideration in planning decisions, because of their heritage interest' (Annex 2). Heritage assets include designated and non-designated sites, and policies within the Framework relate to both the treatment of assets themselves and of their settings, both of which are a material consideration in development decision making.

12.2.8 Key tenets of the Framework are that:

- when considering the impact (effect) of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be;
- significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. As heritage assets are irreplaceable, any harm or loss should require clear and convincing justification. Substantial harm to or loss of a grade II Listed Building, park or garden should be exceptional. Substantial harm to or loss of designated heritage assets of the highest significance, notably scheduled monuments, protected wreck sites, battlefields, grade I and II* Listed Buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional;
- where a proposed development will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal; and
- with regard to non-designated heritage assets a balanced judgement will be required having due regard to the scale of any harm or loss and to the significance of the heritage asset affected.

12.2.9 Local planning authorities are urged to request applicants to describe the significance of any heritage assets affected by a proposed development, including any contribution made by their setting. The level of detail required in the assessment should

be "proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance" (Paragraph 128).

The Planning Practice Guidance

12.2.10 The Planning Practice Guidance provides advice on what may constitute 'substantial harm' to a designated heritage asset. It clarifies that an important consideration is "*whether the adverse impact seriously affects a key element of its architectural or historic interest*". Further, that "*It is the degree of harm to the asset's significance rather than the scale of the development that is to be assessed*".

Local Planning Policy

12.2.11 Current development plan policy is contained within the Birmingham Unitary Development Plan (adopted October 2005) Saved Policies. This includes the following policies:

Listed Buildings

Any development affecting a listed building should preserve or enhance its character. Applications affecting Listed buildings will be considered in light of the following policies:-

- *special regard will be given to the desirability of securing the retention, restoration, maintenance and continued use of the buildings of special architectural or historic interest.*
- *Listed Building Consent will not be granted for the demolition or partial demolition of a Listed Building unless it can be demonstrated that every possible effort has been made to preserve the structure of the building and to continue the present use or to find a suitable alternative use.*
- *the change of use of a listed building should not have a detrimental effect on the character or appearance of the building.*
- *any external or internal alteration or addition to a listed building should not adversely affect its architectural or historic character.*
- *the setting of listed buildings will be preserved and enhanced by the exercise of appropriate control over the design of new development in their vicinity, control over the use of adjacent land, and where appropriate, by the preservation of trees and landscape features.*

The Local List of Buildings of Local Architectural Interest

The Local List includes buildings, structures or features of local architectural, archaeological or historic interest, which do not currently enjoy statutory protection, such as archaeological features or sites, historic parks, gardens and landscapes, and interiors. It is regularly reviewed and updated. The demolition of buildings or destruction of other structures or features on the 'Local List' will be resisted to the extent of the powers available and wherever possible and appropriate, the setting of such buildings will be preserved. Proposals for the demolition, alteration and/or extension of a building on the 'Local List' should ensure that the features of historic or architectural interest are preserved and that all new work and any new buildings are of at least equivalent quality to the original building and make a similar contribution to its setting.

Development affecting Archaeological Remains

Development proposals affecting archaeological remains will be considered in light of the

following policies:-

- *an assessment of the archaeological aspects of development proposals will be required from applicants before planning application is determined. Planning permission will not be granted where the assessment of the archaeological implications is inadequate.*
- *development proposals which will have an adverse effect on scheduled ancient monuments and other nationally important archaeological remains and their setting will not be allowed.*
- *Development adversely affecting other known archaeological remains will be resisted although permission may be granted if the applicant has demonstrated that particular archaeological remains will be satisfactorily preserved either in situ or, where this is not feasible, by record.*
- *where appropriate, Section 106 agreements will be negotiated to protect, enhance and interpret archaeological remains.*

12.2.12 It is anticipated that the Birmingham Unitary Development Plan will be superseded by the Birmingham Development Plan. The Draft Development Plan Document (Birmingham Plan 2031) was submitted to the Secretary of State for examination 1 July 2014. This includes Policy TP12 which emphasises the value of the historic environment (given in full in Appendix 12.1).

Assessment of Significance

12.2.13 Heritage significance is the value of a heritage asset to this and future generations because of its heritage interest. Significance derives not only from a heritage asset's physical fabric, but also from its setting. The setting of a heritage asset is the surrounds in which it is experienced. However, setting is not a heritage asset in its own right, nor is it a heritage designation in its own right. Its importance lies in what it contributes to the significance of the heritage asset. Elements of a setting may make a positive or negative contribution to the significance of an asset, which may affect the ability to appreciate that significance, or may be neutral.

12.2.14 The assessment of value has been guided primarily by the policies and guidance contained in *Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment* (English Heritage 2008). The value of a heritage asset is defined with reference to the following four aspects:

- *Evidential value: derives from "the potential of a place to yield evidence about past human activity" and is primarily associated with physical remains or historic fabric;*
- *Historical value: derives from "the ways in which past people, events and aspects of life can be connected through a place to the present".*
- *Aesthetic value: derives from sensory and intellectual stimulation and including design value, i.e. "aesthetic qualities generated by the conscious design of a building, structure or landscape as a whole"; and*
- *Communal value: derives from "the meanings of a place for the people who relate to it".*

12.2.15 Criteria for assessing heritage value (significance) are set out in Table 12.1

below. As well as considering the principles above, this takes account of paragraph 132 of The Framework which defines heritage assets of the ‘highest significance’ namely: Scheduled Monuments, Protected Wreck Sites, Registered Battlefields, Grade I and II* Listed Buildings, Grade I and II* Registered Parks and Gardens, and World Heritage Sites.

Table 12.1 Significance (value) of heritage assets

Value of resource	Description
High	<p>World Heritage Sites and heritage assets of acknowledged international importance, or that can contribute significantly to acknowledged international research objectives. Historic landscapes of international sensitivity (designated or not) and extremely well preserved historic landscapes with exceptional coherence, time depth, or other critical factor(s).</p> <p>Scheduled Monuments and undesignated assets of Schedulable quality and importance, according to the non-statutory criteria for scheduling ancient monuments utilised by the Secretary of State.</p> <p>Heritage assets or groups of assets that can contribute substantially to acknowledged national research objectives.</p> <p>Historic landscapes exhibiting considerable coherence, time depth or other critical factors and displaying considerable evidential, historic, aesthetic and communal value as identified by Conservation Principles. Grade I and II* Registered Parks/Gardens.</p> <p>Grade I and II* Listed Buildings or other Listed Buildings that can be shown to have exceptional qualities in their fabric or associations not adequately reflected in their Listing grade, or undesignated structures of clear national importance. Conservation Areas containing very important buildings.</p>
Medium	<p>Heritage assets, or groups of assets or landscapes, that contribute to regional research objectives.</p> <p>Historic landscapes exhibiting reasonable coherence, time depth or other critical factors (including degree of preservation) and displaying evidential, historic, aesthetic and communal value as identified by Conservation Principles. Grade II Registered Parks/Gardens.</p> <p>Grade II Listed Buildings or historic buildings which can be shown to be of comparable significance. Conservation Areas containing important buildings which contribute significantly to their historic character, or historic</p>

	townscapes with important historic integrity.
Low	<p>Heritage assets displaying limited evidential, historic, aesthetic or communal value as identified by Conservation Principles.</p> <p>Heritage assets, or groups of assets, that contribute to a limited degree to regional research objectives.</p> <p>Historic landscapes exhibiting limited coherence, time depth or other critical factors.</p> <p>Historic landscapes whose sensitivity is limited by poor preservation and/or poor survival of contextual associations.</p> <p>Locally Listed buildings and unlisted buildings of modest quality in their fabric or historical association.</p>
Negligible	<p>Heritage assets with very little or no surviving archaeological interest.</p> <p>Heritage assets or groups of assets that cannot appreciably contribute to acknowledged regional research objectives.</p> <p>Historic landscapes exhibiting little or no coherence, time depth or other critical factors and displaying evidential, historic, aesthetic and communal value as identified by Conservation Principles.</p> <p>Buildings of no architectural or historical note.</p>
Uncertain	<p>The importance of the resource has not been ascertained.</p> <p>Archaeological resources the importance of which cannot be ascertained.</p> <p>Buildings with some hidden (i.e. inaccessible) potential for historical significance.</p>

Assessment of significance of effect of development

12.2.16 The descriptions of the effect upon archaeological remains are qualitative rather than quantitative, and are followed by recommendations for further survey and mitigation. The measured significance of effect of development is quantified according to the definitions and criteria in Table 12.2 below. This approach directly reflects key concepts in planning policy and heritage guidance with regard to the assessment of development effects upon heritage assets, and is the most appropriate way to define such effects.

12.2.17 The significance of effect can be adverse or beneficial, and is determined using professional judgment including regard for the magnitude of development effect; the

value of the heritage asset; and appropriate mitigation. Effects may be temporary and/or reversible or permanent and irreversible. Key principles that are considered, in accordance with the Framework, are whether the effect comprises substantial harm or total loss, and whether the asset is of such value that change should be exceptional or indeed wholly exceptional. When a significant effect is identified, it may be appropriate to propose suitable mitigation measures in order to remove, reduce or offset the level of effect. What quantifies ‘substantial harm’ is detailed in the section on *The Planning Practice Guidance* above.

Table 12.2 Significance of effect

Significance of Effect	Criteria
Major Adverse	<p>Substantial harm to or total loss of the value of a designated heritage asset (or asset worthy of designation) such that development should not be consented unless substantial public benefit is delivered by the development.</p> <p>Total loss of a non-designated heritage asset of medium value (i.e. which may contribute to regional research objectives) without compensatory mitigation measures agreed with statutory consultees.</p> <p>Harm to a historic landscape designated by virtue of its historic landscape value.</p>
Moderate Adverse	<p>Less than substantial harm to or total loss of the value of a designated heritage asset (or asset worthy of designation) such that the harm should be weighed against the public benefit delivered by the development to determine consent.</p> <p>Total loss of a non-designated heritage asset of medium value (i.e. which may contribute to regional research objectives) with compensatory mitigation measures agreed with statutory consultees.</p> <p>Harm to a non-designated heritage asset, of a greater degree than that perceived of as Minor Adverse, which should be taken into account in determining an application.</p> <p>Harm to a historic landscape type of more than limited significance, and of some rarity.</p>
Minor Adverse	<p>Harm to a non-designated heritage asset that can be adequately compensated through the implementation of a program of industry standard mitigation measures.</p> <p>Harm to a historic landscape type of limited heritage significance, and not of a rare form.</p> <p>Less than substantial harm to the value of a designated</p>

	heritage asset, of a lesser degree than that perceived as Moderate Adverse, but which should still be weighed against the public benefit delivered by the development to determine consent.
Negligible/ Neutral (not significant)	Effect that is nil, imperceptible and not significant.
Minor Beneficial	Development will deliver a positive contribution and / or better reveal the value of a non-designated heritage asset.
Moderate beneficial	Development will deliver a positive contribution and / or better reveal the value of a designated heritage asset (or asset worthy of designation) such that an application should be treated favourably.
Major Beneficial	Development will deliver a positive contribution and / or better reveal the value of a heritage asset of recognised international value such that an application should be treated very favourably.

Limitations to the Assessment

12.2.18 This assessment has been informed by a heritage desk-based assessment, and all required data sources were available. Consultation with the archaeological advisor to the Council (a role provided by the Principal Conservation Officer Mr Brazier) confirmed that this provided sufficient information to inform determination of the application. It is concluded that intrusive archaeological investigation such as trial trenches is not appropriate, nor 'proportionate' as per requirements of Paragraph 128 of the Framework. Thus no appreciable limitations to assessment were encountered.

12.3 Baseline Conditions

Site Description and Context

12.3.1 The Application Site is located within the central area of the Industrial Park. The units within the Application Site are of later 20th-century date and of no heritage significance. No associated basement levels have been identified, but the construction of the buildings is likely to have resulted in significant, if piecemeal, below-ground disturbance.

Baseline Survey Information

Archaeological Resource

12.3.2 A detailed review of the recorded archaeological resource of the Application Site and its vicinity is given in the heritage assessment provided in Appendix 12.1, the relevant parts of which are summarised here.

12.3.3 No designated heritage assets are recorded within the Application Site.

12.3.4 River terrace gravels are mapped extending across much of the study area, including across the Application Site. The surfaces of river terrace gravels are generally considered to have been attractive to early settlement. Recorded prehistoric features in the vicinity comprises a group of Bronze Age burnt mounds c. 300m to the north-east (Fig 12.1, **5**) and a possible burnt mound c. 1.2km to the east (Fig. 12.1, **6**). There is some general limited potential for currently unrecorded prehistoric archaeological remains in the general area, but no specific potential within the Application Site.

12.3.5 Roman period activity in the vicinity appears to have been focused to the south-east of the proposed development site, on higher ground overlooking the River Thames around the medieval Bromwich Castle (Fig. 12.1, **1**), where the remains of a timber building and Roman period finds are recorded.

12.3.6 The site was most likely in agricultural use from the medieval periods onwards and was potentially historically watermeadow. Due to later development no remains of the watermeadows (such as ridge and furrow earthworks) survive. The area of the Application Site was developed as part of an industrial estate in the later 20th-century.

Settings Assessment

12.3.7 Designated heritage assets in the vicinity of the Application Site have been assessed in line with the Historic England Note 3 Guidance *The Setting of Heritage Assets* (see Appendix 12.1). Following a review of all designated heritage assets in the vicinity, the following were identified as potentially sensitive due to potential inter-visibility with the Proposed Development and the potential for designed views (in accordance with step 1 of the Historic England settings guidance):

- Castle Bromwich Grade II* Registered Park and associated Grade I, II* and II Listed Buildings (Fig. 12.1, **2**);
- Grade I Listed Church of St Mary and St Margaret (Fig. 12.1, **3**); and
- Locally Listed Fort Dunlop (Fig. 12.1, **4**).

12.3.8 A detailed assessment of these assets is given in **Appendix 12.1**, the main points of which are summarised below.

12.3.9 Castle Bromwich Grade II* Listed Registered Park includes the Grade I Listed Castle Bromwich Hall and other associated Grade I, II* and II Listed buildings, located c. 570m south-east of the Application Site. Castle Bromwich Grade II* Registered Park and associated Grade I and II* Listed buildings are heritage assets of **high value**. Associated Grade II Listed buildings are heritage assets of **medium value**. The hall is a three-storey red-brick building constructed in the late 16th-century. Associated gardens were also laid out at this time, although there were major changes in the later 17th-century. The current surroundings of the park comprise the residential and industrial suburbs of Birmingham and the M6 runs east/west c. 180m north of the Registered Park. Key designed views include those looking west from the main house along the line of the western avenue, and south along the southern avenue. Views north-west, towards the Application Site, are screened by intervening trees, although an existing Rolls Royce power plant stack was discernible in glimpsed views beyond the trees at the time of the site visit. The Application Site does not contribute to the significance of the Grade II* Registered Park, Castle Bromwich Hall Grade I Listed Building, or associated Listed Buildings. Views in the direction of the Application Site are not key views.

12.3.10 The Grade I Listed Church of St Mary and St Margaret is located adjacent to Castle Bromwich Grade II* Registered Park, c. 570m south-east of the Application Site.

As a Grade I Listed building it is considered to be a heritage asset of **high value**. The current setting of the church includes Castle Bromwich Registered Park and associated Listed buildings to the west and south, residential suburbs to the east, and the M6 Motorway with industrial suburbs beyond to the north. The Application Site does not contribute to the significance of the Grade I Listed Church of St Mary and St Margaret.

12.3.11 Fort Dunlop Locally Listed building is located c. 540m west of the Application Site (Fig. 12.1, 4). This six-storey red-brick building is a distinctive local landmark which was converted in the 21st century. While the façade of the building was retained in the conversion, the loss of the windows presents a markedly different aesthetic form when compared to its original design and, as reflected in its Locally Listed status, it is considered to be a heritage asset of **low value**. The Application Site does not contribute to the significance of Fort Dunlop.

12.4 Assessment of Likely Significant Effects

12.4.1 Any unrecorded below-ground archaeological remains are likely to have been disturbed or removed by the construction of the industrial estate. While a general level of prehistoric and Roman period activity is known in the study area, no specific potential for below-ground prehistoric or Roman archaeological remains within the Application Site has been identified.

12.4.2 The Proposed Development will not be readily discernible from Castle Bromwich Grade II* Registered Park and Garden or from Castle Bromwich Hall Grade I Listed building. Limited views of the stack may be visible, beyond intervening trees, in non-key views looking north-west from the Park (**Appendix 12.2**, Viewpoint 16). However, this would not harm the particular heritage values which combine to form the significance of the hall and grounds. Therefore the significance of effect on this resource of high value would be neutral.

12.4.3 The Proposed Development will not be visible in views looking north-west from the Grade I Listed Church of St Mary and St Margaret (**Appendix 12.2**, Viewpoint 17), although will be visible in views from the associated churchyard to the north (**Appendix 12.2**, Viewpoint 18). This would not harm the particular heritage significance of the building. Therefore the significance of effect on this resource of high value would be neutral.

12.4.4 The Proposed Development will be visible in the vicinity of Fort Dunlop Locally Listed building. However, this would not harm the particular heritage significance of the building. Therefore the significance of effect on this resource of low value would be neutral.

12.5 Mitigation and Enhancement

12.5.1 No adverse effects have been identified and therefore no mitigation or enhancement is proposed.

12.6 Cumulative and In-Combination Effects

12.6.1 No adverse effects on heritage assets have been identified and therefore no assessment of cumulative effects or in-combination effects is necessary.

12.7 Summary

Introduction

12.7.1 This Chapter of the ES has considered the likely significant effects of the Proposed Development in terms of archaeology and cultural heritage.

Baseline Conditions

12.7.2 No heritage assets are recorded within the Application Site and no specific potential for currently unrecorded below-ground archaeological remains has been identified. Construction of the existing industrial units within the Application Site is likely to have disturbed or removed any unrecorded below-ground archaeological remains previously present.

12.7.3 Designated heritage assets in the vicinity include Castle Bromwich Grade II* Registered Park and Garden, Castle Bromwich Hall Grade I Listed Building, the Grade I Listed Church of St Mary and St Margaret, which are heritage assets of high value. They also include Fort Dunlop Locally Listed Building, which is a heritage asset of low value.

Likely Significant Effects

12.7.4 The Proposed Development will not result in any adverse significant effects. The significance of effect on designated heritage assets in the vicinity, including Castle Bromwich Grade II* Registered Park and Garden, Castle Bromwich Hall Grade I Listed Building, the Grade I Listed Church of St Mary and St Margaret, and Fort Dunlop Locally Listed Building will be neutral.

Mitigation and Enhancement

12.7.5 No adverse effects have been identified and therefore no mitigation or enhancement is proposed.

Conclusions (including statute and policy)

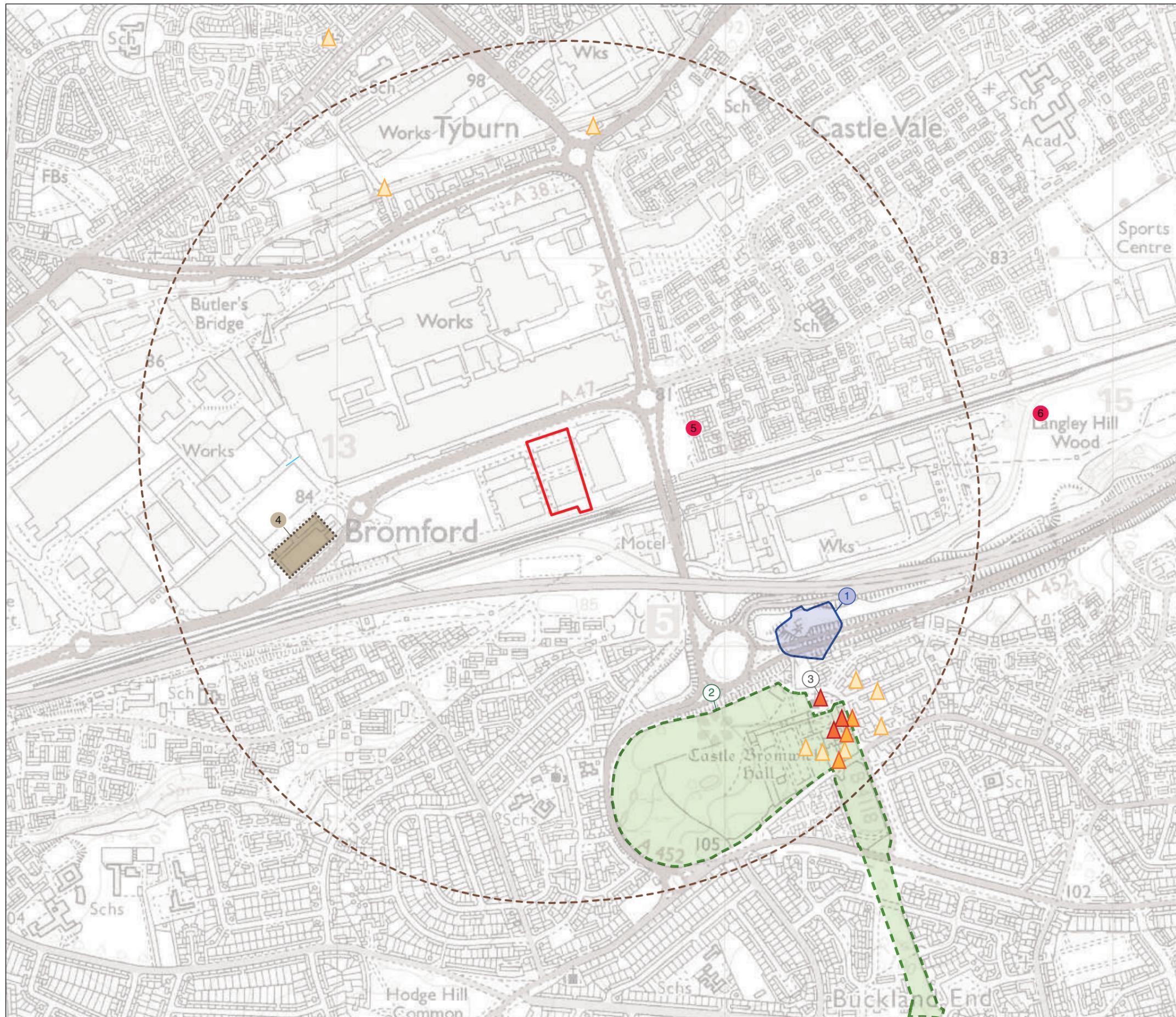
12.7.6 No heritage constraints to development have been identified. The assessment has identified no adverse effects to any known or anticipated heritage asset.

12.7.7 No specific potential for below-ground archaeological remains has been identified and any unrecorded below-ground archaeological remains are likely to have been disturbed or removed by the construction of industrial buildings within the Application Site. It has been agreed with the Council's Principal Conservation Officer that the completed heritage assessment provides a sufficient and 'proportionate' level of information to enable an understanding of the potential effect of the proposal, in accordance with the requirement of paragraph 128 of the Framework.

12.7.8 The Proposed Development will not harm designated heritage assets through alteration to setting. The proposals are thus consistent with the requirements of section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 which requires 'special regard' to be given to the desirability of preserving Listed buildings and their settings. In this regard the proposals are also consistent with the development plan policy for 'Listed Buildings' which requires development to 'preserve or enhance' the character of such buildings. The proposals are consistent with the requirements of Paragraph 132 of the Framework which notes that 'great weight' should be given to the conservation of heritage assets.

12.7.9 Development plan policy regarding archaeological remains states that '*an assessment of the archaeological aspects of development proposals will be required from applicants before planning application is determined. Planning permission will not be granted where the assessment of the archaeological implications is inadequate*'. A copy

of the heritage assessment has been provided to the Council's Principal Conservation Officer, who has agreed that this is suitable and provides proportionate information to determine the application. No known archaeological remains will be affected, and the proposals are consistent with the development plan policy on archaeological remains.



- KEY**
- Site Boundary
 - Study area
 - Scheduled Monument
 - Registered Park and Garden
 - ▲ Grade I Listed Building
 - ▲ Grade II Listed Building
 - ▲ Grade II* Listed Building
 - Locally Listed Building
 - Prehistoric

FIGURE 12.1
Selected Heritage Assets

DRWG No: **K.0168_24** REV: _
 Date: 15/09/2015
 Scale: 1:10,000 @ A3



1 Background, Introduction & Context

2 Site Description

3 Development Proposals

4 Need & Alternatives

5 Air Quality

6 Townscape & Visual

7 Traffic & Transportation

8 Hydrology & Flood Risk

9 Hydrogeology & Ground Conditions

10 Noise & Vibration

11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

13 Socio- Economic Impact

14 Summary

13 SOCIO-ECONOMICS

13.1 Introduction

13.1.1 This chapter establishes the baseline socio-economic conditions and then considers the likely socio-economic effects of the Proposed Development.

13.1.2 The considerations of this chapter are most commonly related to the effects of the Proposed Development upon the human population who will live within the vicinity of the Application Site.

This assessment is made by examining the potential effects on the population anticipated as a result of the Proposed Development and, in turn, assessing the effect that this could have on relevant services and facilities and the economy. The assessment enables consideration to be given to the ability of existing social infrastructure and that proposed by the development and identifies the extent to which additional demands will be placed on existing facilities. Where additional demands will be generated the methods of mitigation are identified and the residual effects assessed.

13.2 Assessment Approach

Methodology

13.2.1 There is no specific guidance available which establishes a methodology for undertaking an Environmental Impact Assessment (EIA) of the socio-economic effects of a proposed development. Accordingly, the approach adopted for this assessment was based on professional experience and best practice, and in consideration of the policy requirements/tests set out within the National Planning Policy Framework (NPPF)¹, and the extant and formerly emerging development plan.

13.2.2 The assessment considers the potential effects of the Proposed Development relative to the future baseline position rather than the current baseline position. This ensures that the potential effects are considered relative to the position that is likely to arise should the Proposed Development not occur.

13.2.3 The baseline information has been collated with reference to the following:

- NPPF²;
- Emerging Birmingham Development Plan³;
- Office of National Statistics (ONS) data (various outputs as individually referenced within this chapter);
- Information obtained from the client with regards the current land use and site characteristics; and
- Evidence used in support of the emerging Birmingham Development Plan⁴.

Assessment of Significance

13.2.4 Given the nature of the socio-economic factors under consideration, it is not considered appropriate to assign a 'sensitivity of receptor' scale in accordance with the generic approach set out within **Chapter 1**. Accordingly, a qualitative assessment of the

¹ March 2012, The National Planning Policy Framework, Department for Communities and Local Government

² *ibid*

³ July 2014, Pre-submission Document and Modifications following Pre-Submission Consultation of the Birmingham Development Plan

⁴ *ibid*

likely significance of socio-economic effects has been carried out and significance rating assigned in accordance with the matrix and associated commentary set out in **Table 13.1**.

Table 13.1: Significance Matrix

Significance	Negative	Neutral	Positive
Major	An undesirable effect of strategic significance or one that runs counter to the objectives of the emerging Development Plan and/or the NPPF	The effects of the development are either neutral or not quantifiable	A desirable effect of strategic significance and one that is required to support the objectives of the emerging Development Plan and/or NPPF
Moderate	An undesirable effect that has more than localised significance or compromises the objectives of the emerging Development Plan and/or the NPPF		A desirable effect that has more than localised significance and will support the objectives of the emerging Development Plan and/or NPPF
Minor	An effect that is localised and undesirable		An effect that is localised and desirable

Legislative and Policy Framework

13.2.5 Guidance on producing EIAs published by the European Commission and UK Government suggests that the possible socio-economic effects that should be considered are those relating to changes in population, such as changes in the demand for housing and services such as schools and recreation facilities.

13.2.6 The NPPF⁵ provides the Government's planning policies for England and how these are expected to be applied. It identifies how local planning authorities should plan for sustainable development within their area and across local boundaries and emphasises the three interdependent roles of sustainable development:

"An economic role – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;

A social role – supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being; and

An environmental role – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently,

⁵ March 2012, The National Planning Policy Framework, Department for Communities and Local Government

minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy”

13.2.7 The NPPF⁶ as a whole defines sustainable development and summarises this in paragraph 9 as:

- **“making it easier for jobs to be created in cities, towns and villages;**
- **moving from a net loss of bio-diversity to achieving net gains for nature;**
- **replacing poor design with better design;**
- **improving the conditions in which people live, work, travel and take leisure; and**
- **widening the choice of high quality homes.”**

13.2.8 The NPPF⁷ requires that Local Planning Authorities have an up-to-date Local Plan in place. These Local Plans should set out the visions and aspirations of local communities and provide for the sustainable development required to support these ambitions.

13.2.9 In Birmingham City, the Council adopted a Unitary Development Plan Review in 2005, prior to the publication of the NPPF. This set out the strategic direction until 2011 and so is now time-expired. Some of the policies were however saved by the Secretary of State in 2008.

13.2.10 A Birmingham Development Plan (BDP) was submitted to the Secretary of State in July 2014 which will replace the saved policies of the Unitary Development Plan Review. The BDP sets out the strategic policies for growth from 2011 to 2031.

13.2.11 As such, assessment of the various socio-economic aspects within this chapter has been considered in the light of the sustainable development objectives of the NPPF⁸ and the strategic objectives of the BDP⁹, and in particular the associated gains that sustainable development can deliver.

Scoping Criteria

13.2.12 The scope and contents of this socio-economic assessment are based on professional experience and best practice.

13.2.13 Consideration has been given only to those socio-economic factors for which there is a potential for likely significant effects or which are relevant to assessing these effects. Different factors are considered in the baseline assessment and during the construction (including demolition) and operational phases of the Proposed Development as identified in **Table 13.2**, owing to the likelihood of effects over these phases. Decommissioning is not included in the scope of this assessment given the longevity of the proposed uses.

Table 13.2: Socio-economic Factors

Factor	Baseline Assessment	Likely Significant Effects during the Construction Phase	Likely Significant Effects during the Operational Phase
Population	✓	The Proposed Development is not	The Proposed Development is not

⁶ March 2012, The National Planning Policy Framework, Department for Communities and Local Government

⁷ ibid

⁸ March 2012, The National Planning Policy Framework, Department for Communities and Local Government

⁹ July 2014, Pre-submission Document and Modifications following Pre-Submission Consultation of the Birmingham Development Plan

Factor	Baseline Assessment	Likely Significant Effects during the Construction Phase	Likely Significant Effects during the Operational Phase
		likely to affect the size of the population	likely to affect the size of the population
Deprivation	✓	Not considered as the effects can only be estimated once the development is complete	✓
Economy	✓	✓	✓
Travel	✓	Not considered as the effects can only be estimated once the development is complete	✓

13.2.14 Consideration has been given to the potential effects at a local, district and where relevant national scale.

Limitations to the Assessment

13.2.15 Baseline information is derived from the latest available statistics, however, there is often a time-lag associated with the publication of this data.

13.3 Baseline Conditions

Site Description and Context

13.3.1 A detailed description of the Application Site and its surrounding context is provided within **Chapter 2** and **Chapter 3** of this ES and therefore this is not repeated. However, the details of the Proposed Development as pertinent to the socio-economic assessment are described below.

13.3.2 This assessment considers the provision of the following aspects of the Proposed Development:

- The provision of circa 20 technical jobs in the operational phase; and
- The offer of competitively priced sustainable energy to local businesses.

13.3.3 The Proposed Development lies within Fort Industrial Park within Tyburn Ward. The Proposed Development will have implications for the Ward and to a lesser extent for Birmingham City. The assessment considers the appropriate area/s in regard to different issues. Some information is only available for the Lower Super Output Area (LSOA), Birmingham 028D or Middle Level Super Output Area (MSOA) Birmingham 028 and these are used in these instances.

13.3.4 Given the range of socio-economic issues, each is considered separately in the following sections, with the baseline established first and then the likely significant effects considered.

Baseline Survey Information

Population

13.3.5 The 2011 Census¹⁰ identified 1,073,045 residents in Birmingham City, of which 25,297 lived within Tyburn Ward. It indicates that the population of the Ward is on average older than that within Birmingham City with a median age of 36.7 years as compared to 35.3 years. This compares with a median age of 39.3 across England.

13.3.6 The latest Mid-Year Population Estimates¹¹ identified that the population of Birmingham City had increased to 1,092,330 in 2013. The 2012 subnational population projections¹² then project a further increase of circa 136,870 persons from 2013 to 2031.

13.3.7 The 2012 subnational population projections¹³ identify the factors that make up the projected population change. Within Birmingham City, all of growth arises from natural change (188,200 arising from births and deaths) with significant levels of net out-migration (51,200 net out-migrants) between 2013 and 2029.

Deprivation

13.3.8 The Index of Multiple Deprivation 2010¹⁴ provides an indication of the average levels of deprivation for LSOAs across England. The Index provides an overall assessment of the average levels of deprivation as well as an assessment against particular domains of deprivation.

13.3.9 The LSOA within which the Application Site lies has very high levels of deprivation, being within the 7% most deprived areas nationally for the overall index. The deprivation is particularly acute with regard to income, employment, health, education and the living environment.

Economy

13.3.10 The emerging Birmingham Development Plan¹⁵ proposes to provide employment for the growing population and reduce existing levels of unemployment by providing an additional 100,000 jobs. To do this, a minimum 5 year reservoir of 96ha of land for employment use, 2 Regional Investment Sites and an 80ha employment site, 270,000sqm of retail floorspace and a minimum of 745,000sqm of office floorspace are proposed.

13.3.11 The 2011 Census¹⁶ identified that there were 488,095 persons whose usual place of work was within Birmingham City, of which 8,300 work within the MSOA (with 3,340 workers living in the MSOA). These persons are employed in the approximately 325¹⁷ businesses which exist in the MSOA of which circa 95% are small (employing less than 50 persons).

13.3.12 The 2014 Annual Survey of Hours and Earnings¹⁸ identified that the median salary of an employed person living in Birmingham City was £25,000 whereas the median salary of someone that worked in Birmingham City was £26,139. This difference reflects the economic base of Birmingham as compared to the surrounding areas and is a contributing factor to the net in-commuting that Birmingham experiences.

13.3.13 Birmingham City has lower economic activity and employment rates than England. Indeed, the 2011 Census identifies that the unemployment rate is 7.12% as compared

¹⁰ Table KS101EW, 2011 Census

¹¹ June 2014, Mid-Year Population Estimates 2013, Office for National Statistics

¹² May 2014, 2012-based Subnational Population Projections for England, Office for National Statistics

¹³ *ibid*

¹⁴ March 2011, English Indices of Deprivation 2010, Department for Communities and Local Government

¹⁵ July 2014, Pre-submission Document and Modifications following Pre-Submission Consultation of the Birmingham Development Plan

¹⁶ May 2014, Table WP101EW, Office for National Statistics

¹⁷ UK Business Counts 2014, ONS (accessed 11th August 2015)

¹⁸ Annual Survey of Hours and Earnings, Office for National Statistics (accessed 11th August 2015)

with 4.38% across England. In Tyburn Ward, the 2011 Census identified 1,476 unemployed people who were seeking work in the week before the Census.

13.3.14 The ONS Claimant Count identified that in July 2015 there were 715 people seeking work in Tyburn Ward claiming Job Seekers Allowance. Of these 40% were looking for a job in the 'sales and customer service' sector and 30% were looking for 'elementary occupations'.

13.3.15 The sectoral breakdown of industry¹⁹ that the residents of Birmingham City work in is broadly reflective of that of England. However, there is a larger proportion of workers employed in the Health and Education sectors (26.96%) as compared to England (22.3%). A total of 25,686 residents²⁰ of Birmingham City (or 6.1% of workers) were employed in the construction sector which compares to 7.7% of the workforce nationally.

13.3.16 The residents of Birmingham City are more likely to be employed in lower value occupations than in England²¹. Indeed, the proportion of residents employed in various service occupations, elementary occupations or as process plant and machine operatives is 40.8% in Birmingham City, as compared to 36.0% in England. In Tyburn Ward, this is even more exaggerated (50.2%).

13.3.17 However, there are also a greater proportion of workers employed in professional occupations in Birmingham City.

13.3.18 The 2011 Census identifies that Tyburn Ward has a greater proportion of residents with no or lower level qualifications (68.3%) than England (51.0%).

Travel

13.3.19 The 2011 Census²² identified that Birmingham City experienced net in-commuting flows, with 166,272 workers commuting in to the area and 101,467 commuting out. Of these commuters the most numerous flows are those to and from Solihull and Sandwell.

13.4 Assessment of Likely Significant Effects

Construction

13.4.1 The Proposed Development is envisaged to become operational in 2018. The socio-economic effects will apply largely once the facility is operational. However, during the construction (including demolition) phase there will be some effects as discussed below.

Economy

13.4.2 The construction of the Proposed Development will generate and support jobs in the construction sector. This construction would go out to tender and so the number of jobs that would be supported is not precisely known.

13.4.3 However, a review of gasification schemes across the UK identifies that for every 1 operational job there are approximately 5 to 6.5 construction jobs generated²³. Given that the Proposed Development envisages 20 operational jobs it is estimated that somewhere in the region of 100 to 130 construction jobs would be generated. Many of these

¹⁹ February 2013, Table KS605EW, Office for National Statistics

²⁰ *ibid*

²¹ *ibid*

²² Neighbourhood Statistics interactive map tool, Office for National Statistics (accessed 6th February 2015)

²³ Welland Bio Power Plant estimated 100 construction jobs to 19 operational jobs; the Hoddesdon Plant estimated 110 construction jobs to 17 operational jobs; the Tyseley Plant estimated 100 construction jobs to 19 operational jobs; the Hull Plant estimated 200 construction jobs to 40 operational jobs; and the East Belfast Plant estimated 130 construction jobs to 20 operational jobs.

construction opportunities are likely to be available to local contractors although the extent will be dependent upon the operational arrangements of the successful tender. Indeed, given the current levels of unemployment locally and the numbers seeking elementary occupations (including in the construction sector) the temporary construction phase is likely to provide employment opportunities for the local community.

13.4.4 The construction workforce are likely to spend some of their disposable income in the area in which they work, although recognising that if local people are employed this income is already likely to be spent in the local economy. Nevertheless, it is likely that there will be some increase in spending in the local economy.

13.4.5 The Proposed Development is considered to have a minor positive effect by providing additional jobs, some of which are likely to provide for the local community's needs, and by increasing the expenditure in local facilities.

Operation

Deprivation

13.4.6 The LSOA suffers from high levels of deprivation with regard to employment and income. The provision of jobs, including some technical and managerial posts at the facility will provide the opportunity to alleviate some of this deprivation.

13.4.7 Furthermore, as a result of the facility providing lower priced sustainable energy to local businesses, there is the opportunity for these businesses to reduce their business costs and thereby invest in growth, potentially providing additional jobs and/or increase wages.

13.4.8 The Proposed Development is therefore considered to have a minor positive effect on deprivation in the local area.

Economy

13.4.9 The Proposed Development is envisaged to provide approximately 20 operation jobs. Based on the average GVA per employed person²⁴ these jobs are estimated to provide an annual GVA impact of circa £2M.

13.4.10 The jobs as well as the local investment in operations and maintenance will also have indirect economic effects by providing employment for local tradesman as well as induced effects including the increased disposable income spent in the local economy. In both regards, there will be finance distributed in the local economy as well as the support for additional jobs (including in retail and as tradesmen).

13.4.11 Applying the average income of people working in Birmingham City to the 20 operational jobs results in an additional £523,000 per annum that can be spent in the local economy in addition to the investment in operations and maintenance.

13.4.12 During the operational phase the Proposed Development would support a range of occupations, including skilled trades, process plant and machine operatives, elementary occupations and some managerial roles. This largely reflects the current breakdown of the occupations of the current residents of Birmingham and reflects the demands of those currently unemployed in the area by providing for some lower value jobs that are unlikely to require higher qualifications.

²⁴ September 2012, Industrial Strategy : UK Sector Analysis, BIS

13.4.13 The provision of jobs and financial investments to the facility will provide for additional expenditure within the local economy as well as providing the opportunity for local employment. This is considered a minor positive effect of the Proposed Development.

Travel

13.4.14 Birmingham City currently experiences net in-commuting flows, as would be expected of a major city. The provision of new jobs without a corresponding number of accommodation units for workers could minimally increase this level of commuting. However, given the current levels of unemployment, the Proposed Development may provide the opportunity for local people to be employed and thereby reduce any additional commuting. Furthermore, given the lack of similar facilities in the locality, it may provide local employment opportunities for residents who currently commute out to access such technical jobs.

13.4.15 In summary, the effects on commuting flows would be at worst an additional 20 flows per day which is minimal in the context of Tyburn Ward or Birmingham City. However, there are likely to be far fewer flows generated and so the Proposed Development is considered to have a negligible effect.

13.5 Mitigation and Enhancement

Mitigation by Design

13.5.1 The Proposed Development provides jobs and sustainable low priced energy for local businesses.

13.5.2 There are no identified negative effects associated with the Proposed Development in terms of socio-economics and so no mitigation has been identified.

Additional Mitigation

13.5.3 No measures of mitigation have been identified as there are no negative effects which need to be addressed.

Enhancements

13.5.4 Given that no mitigation is proposed (in socio-economic terms) there will be no additional enhancements arising from such mitigation.

13.6 Cumulative and In-Combination Effects

13.6.1 The cumulative effects of related developments in close proximity to the Application Site are considered in order to establish whether the Proposed Development would in combination contribute to effects which may need to be mitigated. It has been agreed with the Council that the following proposed related developments should be considered:

- Washwood Heath Freight Yard (2012/05409/PA) – Erection of an Advanced Conversion Technology and Anaerobic Digestion facility comprising of an 8MWe pyrolysis energy from waste plant and 2MWe anaerobic digestion facility plus associated visitor centre and access, parking and landscaping;
- Bromford Lane Site D (2014/02762/PA) – Use of site for the re-cycling of aggregates (Sui-Generis), erection of office cabin, installation of weighbridge and retention of 3 metre high palisade fencing and gates;
- Bromford Drive (2002/04647/PA) – Erection of a green waste recycling facility to include machinery store/mess room, liquor collecting tank, 3m high palisade security fence/gate, six floodlighting columns (one with CCTV) and reconstruction of existing approach road;

- Bromford Green Waste Facility (2009/03827/PA) – Change of use of land to form hardstanding to provide extended area to existing green waste recycling facility; and
- Castle Bromwich Works (64307005) – Development of public waste disposal facility including construction of internal access road and parking.

13.6.2 However, the emerging Birmingham Development Plan provides for 51,100 homes and significant levels of employment land (including the related proposals). The Proposed Development and the related developments should also be viewed in this context.

Deprivation

13.6.3 The Proposed Development and related developments (alongside the proposals for significant areas of new employment land within the Birmingham Development Plan) will provide the opportunity to increase the number of jobs within the local area and across Birmingham. These new jobs will provide the opportunity for local residents to gain employment and for those currently employed to gain employment closer to their homes.

13.6.4 The Proposed Development and related developments will generate a number of elementary roles as well as more professional/technical and managerial roles during both the construction and operational phases. The provision of elementary roles reflects the current demand for jobs in the Ward. All of the jobs generated will also provide the opportunity for household incomes to be increased as people are able to gain employment.

13.6.5 The Proposed and related developments will therefore address the current deprivation relating to income and employment that is experienced. This is therefore considered a minor positive effect.

Economy

13.6.6 The Proposed Development will provide for 20 new jobs once operational. The comparative information is not available for all of the related developments, although the Planning Statement for the Washwood Heath Freight Yard proposal identifies that this will provide for 30 jobs once operational. It is expected that the other related developments will also provide jobs, but as an absolute minimum the Proposed Development and related developments will provide at least 50 jobs.

13.6.7 The provision of a minimum of 50 jobs is estimated to provide an annual GVA impact of almost £6M on the average GVA per employed person²⁵.

13.6.8 The mix of jobs provided across these related developments will align with the identified demand for employment, by providing for elementary jobs. However, these developments will also provide some higher value jobs which will provide choice in the employment market (as well as having a greater impact on the income of the area).

13.6.9 The new employment facilities are also likely to support local trades involved in maintenance and those involved in the local supply chain, as well as providing for a greater disposable income to be spent in the local economy.

13.6.10 Indeed, based on the average income of people employed within Birmingham, the minimum of 50 jobs would provide an additional £1.3M worth of income.

13.6.11 The Proposed Development in combination with the related developments is considered to have a minor to moderate positive effect, depending on the number of jobs that are generated which will affect the area of impact of these developments.

²⁵ September 2012, Industrial Strategy : UK Sector Analysis, BIS

Travel

13.6.12 Birmingham currently experiences net in-commuting flows and the provision of additional jobs without corresponding levels of workers could increase this. However, given the level of unemployment that exists within the area there is an opportunity that those who are currently unemployed could access these new jobs which would not negatively affect the existing commuting flows.

13.6.13 Furthermore, the Birmingham Development Plan seeks to provide for an additional 51,100 homes, which will accommodate workers and thereby provides the opportunity to reduce commuting flows.

13.6.14 Even in a worst case scenario, the Proposed Development and related developments would deliver in excess of 50 jobs (or 50 commuting flows). In the context of Birmingham this is minimal. Furthermore, it is very likely that the additional flows will not be this large as new workers are provided accommodation in Birmingham and those who are currently unemployed access the jobs. Of the flows that do arise a proportion are likely to be undertaken using sustainable modes of transport in any case.

13.6.15 The effects of the Proposed Development and related developments on commuting flows are so small that they are considered a negligible effect.

13.6.16 The cumulative effects of the committed sites are considered positive or neutral and no mitigation is required.

13.7 SummaryIntroduction

13.7.1 This chapter considers the potential socio-economic effects of the Proposed Development during both the construction (including demolition) and operational phases. The analysis focuses on the provision of employment and the effect in terms of the economy within Birmingham City and Tyburn Ward.

13.7.2 There are a wide range of socio-economic issues that exist and which will be affected by the Proposed Development.

Baseline Conditions

13.7.3 Birmingham City is expected to experience population growth. It is expected to see the population age in accordance with national trends.

13.7.4 The area currently experiences a high level of deprivation, particularly related to income and employment.

13.7.5 The area has a high level of unemployment and the majority of workers are employed in lower value occupations. The unemployed within Tyburn that are seeking a job are similarly looking for lower value employment. The level of qualifications is also low. However, the pay across Birmingham City is comparatively higher than the income of residents within the City. Birmingham experiences net in-commuting flows which may reflect this pay differential although is to be expected in a City of this size.

Likely Significant Effects

13.7.6 The key socio-economic effects of the Proposed Development can be summarised as follows:

- Provision of circa 100 to 130 additional jobs during the construction phase in the construction sector;
- Provision of 20 jobs during the operational phase;
- The jobs will include elementary jobs during both the operational and construction phases which responds to the type of jobs being sought by the unemployed in Tyburn Ward currently;
- The provision of a different range of jobs locally which may meet the needs of some local residents;
- Investment in construction, operation and maintenance all of which will provide for indirect effects including generating work for local tradesmen;
- The increase of the local disposable income (for employees of the facility and tradesmen) which will have induced effects on local economy;
- Additional £2M GVA per annum for the local economy;
- The provision of lower priced sustainable energy for local businesses, reducing business costs which may be used to expand or enhance businesses (including new jobs and/or increased wages);
- The above will all address the current deprivation relating to income and employment; and
- Potential minimal increases in commuting flows.

Mitigation and Enhancement

13.7.7 There are no identified negative effects associated with the Proposed Development in socio-economic terms and so no mitigation has been identified.

Conclusion

13.7.8 Overall the Proposed Development is considered to provide for minor positive effects and will contribute to addressing the housing needs of the area.

13.7.9 **Table 13.3** provides a summary of effects, mitigation and residual effects.

Table 13.3: Summary of Effects, Mitigation and Residual Effects.

Receptor / Receiving Environment	Description of Effect	Nature of Effect	Sensitivity Value	Magnitude of Effect	Geographical Importance	Significance of Effects	Mitigation / Enhancement Measures	Residual Effects
Construction								
Economy	Provision of construction jobs to support economy	Direct/ Temporary	N/A	N/A	Local	Minor Positive	N/A	Minor Positive
Operation								
Deprivation	Provision of employment to address current deprivation	Direct/ Permanent	N/A	N/A	Local	Minor Positive	N/A	Minor Positive
Economy	Provision of jobs and investment that will support the local economy	Direct/ Permanent	N/A	N/A	Local	Minor Positive	N/A	Minor Positive
Travel	Provision of jobs which may generate additional flows	Indirect/ Permanent	N/A	N/A	Local	Negligible	N/A	Negligible
Cumulative and In-combination								
Deprivation	Provision of employment to address current deprivation	Direct/ Permanent	N/A	N/A	Local	Minor Positive	N/A	Minor Positive

ENVIRONMENTAL STATEMENT**SOCIO-ECONOMICS**

Economy	Provision of jobs and investment that will support the local economy	Direct/ Permanent	N/A	N/A	Local	Minor to Moderate Positive	N/A	Minor to Moderate Positive
Travel	Provision of jobs which may generate additional flows	Indirect/ Permanent	N/A	N/A	Local	Negligible	N/A	Negligible

1 Background, Introduction & Context

2 Site Description

3 Development Proposals

4 Need & Alternatives

5 Air Quality

6 Townscape & Visual

7 Traffic & Transportation

8 Hydrology & Flood Risk

9 Hydrogeology & Ground Conditions

10 Noise & Vibration

11 Ecology & Nature Conservation

12 Archaeology & Cultural Heritage

13 Socio- Economic Impact

14 Summary

14 SUMMARY

14.1 Background

14.1.1 Rolton Kilbride (the "Applicant") is seeking to obtain planning permission for a proposed Renewable Energy Centre (REC) to generate power and heat for local commercial energy users located within Fort Industrial Park, off Dunlop Way, Castle Bromwich, Birmingham (the "Application Site").

14.1.2 The Application site is located within the administrative area of Birmingham City Council (BCC). The REC is known as Fort Parkway Energy and referred to within this Environmental Statement (ES) as the "Proposed Development".

14.1.3 The Proposed Development would generate up to 8.6 megawatts (MW) gross of electricity - the equivalent of powering over 15,000 homes on a continual basis. The plant is capable of accepting 105,000 tonnes of waste per annum which would otherwise go to landfill.

14.2 The Applicant and EIA Project Team

14.2.1 The Applicant is a collaboration between Rolton Group, a long established, multi-disciplined engineering consultancy with specialisms in clean technologies and Kilbride, which offers expertise in development and infrastructure.

14.2.2 This ES has been co-ordinated and managed by Pegasus Group. The consultants who have contributed to the preparation of this ES are as follows:

- Air Quality – Air Quality Consultants
- Townscape and Visual – Pegasus Group
- Traffic and Transport – Curtins
- Hydrology and Flood Risk – PFA Consulting
- Hydrogeology and Ground Conditions – Curtins
- Noise – L F Acoustics Limited
- Ecology and Nature Conservation – Avian Ecology
- Archaeology and Cultural Heritage – Cotswold Archaeology
- Socio Economics – Pegasus Group

14.3 Need for Environmental Impact Assessment and Scoping

14.3.1 The Town and Country Planning (Environmental Impact Assessment) Regulations 2011 require that a proposed development which falls within the description of a 'Schedule 2 Development' within the meaning of the Regulations, will require an Environmental Impact Assessment (EIA) where the development is likely to have significant effects on the environment by virtue of such factors as its nature, size or location (Regulation 2).

14.3.2 Under the EIA Regulations Scoping is not a mandatory requirement, however, requesting a Scoping Opinion from the local authority can be helpful. Obtaining a Scoping Opinion enables consultation over the content and extent of matters to be included within the ES from all key statutory and non statutory bodies. The Scoping should identify key environmental issues, appropriate surveys and methodologies, potential mitigation and areas of further assessment.

14.3.3 The aim of the Scoping process is to identify key environmental issues at an early stage, to determine which elements of the Proposed Development are likely to cause

significant environmental effects and to identify issues that can be 'scoped out' of the assessments.

14.3.4 The Applicant submitted a Scoping Request to BCC in July 2015. The Scoping Request set out the proposed methodology for each of the key environmental issues and requested comments from BCC and other Statutory Consultees on the suitability of the Proposed Development, the proposed methodology and the likely significant effects of the construction and operational phases of the Proposed Development.

14.3.5 A Scoping Opinion confirming the issues to be covered in the EIA was provided by BCC in September 2015. Within their Scoping Opinion BCC, stated, "it does consider that the Proposed Development falls within Category 3 (a) Schedule 2 for the electricity generation on an area exceeding 0.5 ha or Category 10 (a) for an industrial development on an area exceeding 0.5 hectares. Notwithstanding this, the Local Planning Authority respects the applicant's formal scoping request in any event".

14.3.6 Under the EIA Regulations, proposals which fall within the scope of Schedule 2 development, an EIA is discretionary. This EIA has been produced however, in recognition of the strategic significance of the development and the expected local interest in the proposals. The EIA and this ES have been undertaken and prepared with due regard to the criteria of Schedule 4 of the Regulations. The ES includes an assessment of the predicted effects of the proposed development, focussing, as required by the EIA Regulations, on those effects that have the potential to be significant. The content of the ES, as well as the overall approach to the EIA, has also been designed to reflect other requirements of the EIA Regulations as well as widely recognised good practice in EIA.

14.4 Public Consultation

14.4.1 Public consultation was a fundamental and integral process of the planning application. A well thought out strategy to engage with local stakeholders was carefully delivered from the outset and comprised a press release; residents and press briefings; residents group meetings; a leaflet drop and invitation to a public exhibition where members of the design team as well as air quality and transport consultants were on hand to answer any queries.

14.4.2 The full details of the public consultation strategy and feedback from the events are included within the Statement of Community Involvement which is a separate report and will be submitted with the planning application documentation.

14.5 Site Context and Location

14.5.1 The Application Site is located within Fort Industrial Park, off Dunlop Way in the Castle Bromwich area of Birmingham. The Fort Industrial Park comprises 26 units that comprise single storey industrial / warehouse and trade counter buildings with internal offices, together with service yards and parking. The site is surrounded by a network of motorways, main roads (dual and single carriageway) and other roads.

14.5.2 The Application Site is approximately 1.91ha and includes two single storey business, industrial and storage buildings (use class B1, B2 and B8) containing nine separate units. The units are surrounded by areas of hard standing used for staff car parking.

14.5.3 To the north and west are extensive areas of large industrial units and car storage, including Jaguar Land Rover's Castle Bromwich manufacturing plant. To the east, beyond the A452 dual carriageway, is the residential area of Castle Vale, separated by the mainline railway from further industrial units to the south. To the south is the mainline railway line, a hotel (the Castle Bromwich Inn), an elevated section of the M6 motorway, and areas of

residential development, including the parkland associated with castle Bromwich Hall and a number of other areas of green space.

14.5.4 The Application Site is not subject to any statutory or non-statutory landscape designation. The Grade II* Registered Park and Garden at Castle Bromwich Hall lies approximately 600m to the south-south-east of the Application Site, but is separated by an elevated section of the M6.

14.5.5 The locally listed Fort Dunlop building lies approximately 750m to the west of the Application Site, and there are a number of other Listed Buildings in the local area, notably those in the vicinity of Castle Bromwich Hall and those to the north of the Jaguar plant.

14.5.6 There are no ancient woodlands in close proximity to the Application Site. There are a number of areas of deciduous woodland and woodpasture/parkland BAP in the vicinity of the Application Site, both of these being on the Priority Habitat Inventory.

14.5.7 The River Tame lies to the south of the Application Site, between the railway line and the M6 motorway.

14.5.8 The site is owned by Industrial Property Investment Fund which is managed by Legal and General Property (LGP) who is seeking to redevelop part of the Fort Industrial Park to include the introduction of a Renewable Energy Centre that generates power in the form of electricity and / or heat.

14.5.9 The application site currently comprises business, industrial and storage units (use class B1, B2 and B8), these would be demolished and industrial / warehouse units rebuilt to the north and the majority of the site would be replaced by the proposed Renewable Energy Centre.

14.6 Consideration of Alternatives

14.6.1 Schedule 4, part 1, paragraph 2 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 requires that *"an outline of the main alternatives studied by the applicant and an indication of the main reasons for this choice, taking into account the environmental effects"* are included within the ES.

14.6.2 Other LGP managed sites were considered early in the feasibility process, however, the principal reason for the selection of the site was its location within an existing site in an industrial area with good access to the primary route network and in close proximity to energy intensive industrial customers.

14.6.3 The design of the Proposed Development has been informed by an iterative process with alternative layouts and elevations considered throughout the process. Layout options for the REC element of the site prior to the final option was taken forward demonstrated constraints and opportunities associated with the location of the stack, vehicular movement and access as well as landscaping proposals. It was determined the stack would be more preferable sited to the east of the REC as opposed to the south as this location is further from the railway line.

14.6.4 A series of basic architectural massing techniques were undertaken to help understand how the buildings would best relate to one another and the character of the surrounding area. Due to the split use of the site with the industrial warehouse to the north and REC located behind, this allowed the warehouse to sit at a relative height to the neighbouring industrial units whilst the energy plant stepped up behind.

14.6.5 Following the basic massing exercise the functional and operational requirements of the building were explored. By creating a single central energy plant unit that is served

by the ancillary buildings located to the peripheral edges this allowed for vehicular circulation around the building to all facades.

14.6.6 A series of elevation option alternatives were explored and considered throughout the iterative design process before the design was finalised.

14.7 Site Identification and Feasibility

14.7.1 The Castle Bromwich site was identified to provide the opportunity for power to be supplied to any interested local businesses as well as the opportunity to supply heat in the form of steam and / or hot water if required; and in view of the need for new waste infrastructure within Birmingham City Council area with the plant saving up to 105,000 tonnes of waste going to landfill annually.

14.7.2 The site at Fort Industrial Park was chosen having established:

- Its availability and its size which was suitable for up to a 105,000 tonnes facility;
- Its proximity to energy intensive industrial consumers. It is intended that the proposal will be able to offer low cost secure energy to one or more neighbouring businesses, assisting in securing the future of those companies and their employees;
- Its access through the existing industrial estate which immediately joins the primary route network without the need to go through residential areas.

14.7.3 No other viable site alternatives that met all three criteria were identified

14.8 Cumulative Issues

14.8.1 Schedule 4, part 1, paragraph 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 requires that a description of the likely significant effects of the development on the environment should cover cumulative effects.

14.8.2 The main aim of a cumulative assessment is to assess the additional impact of the development proposed on the baseline of projects that are either already operational, have planning permission or which are in the planning system.

14.8.3 BCC identified five sites in their Scoping Opinion to be included within the cumulative assessment. The sites lie within a 3km radius of the Proposed Development and are as follows:

- Public Waste Disposal Facility (Ref 64307005)
- Green Waste Recycling Facility (Ref 2002/04647/PA)
- Extension to Green Waste Recycling Facility (Ref 2009/03827/PA)
- Anaerobic Digestion and Pyrolysis Energy Plant (Ref 2012/05409/PA)
- Aggregate Recycling Facility (2014/02762/PA)

14.9 Proposed Development

14.9.1 The Proposed Development includes two separate buildings; 1) a Renewable Energy Centre (REC) powered by an Advanced Conversion Technology (ACT) plant to generate power and heat; and 2) an industrial / warehousing building to include storage and offices.

14.9.2 The REC is capable of accepting up to 105,000 tonnes per annum of residual commercial and industrial waste (CIW) together with an element of construction and

demolition (C&D) and potentially municipal solid waste (MSW) as well as Refuse Derived Fuel (RDF). The Facility will not accept hazardous or hazardous clinical waste.

14.9.3 The electricity produced from the REC will have a capacity to produce a gross 8.6MW of electricity. Unlike incineration, the technology employed by Fort Parkway Energy will involve a two-stage system, which initially gasifies the waste to produce synthetic gas. This gas is then transferred to a second stage where it burns more efficiently as a fuel than would be the case from a basic waste incineration system. The process allows for efficient control of emissions and improved performance generally as an energy solution.

14.9.4 The proposed REC is made up of the following principal elements:

- **A main building** – this will house the majority of the process plant and will have a number of silos to the rear and a flue stack to the east of the building, all waste material will be unloaded inside the building. At its highest point, the main body of the building will be 23m high and 82.3m long x 48.8m wide with a floor area of 4,855m². The flue stack contains a walk around platform for continual air quality monitoring access and consists of a metal framework. The stack will have a height of 55m and a diameter of 2.1m which in comparison to the adjacent Rolls Royce peaking plant is smaller. The Rolls Royce site is larger with an exhaust stack height of 60.4m and 4.5m diameter;
- **Waste Storage Bunker** - Wastes are deposited into an 8m deep waste bunker with a capacity of 820m³ (which has 4 days of waste storage thus complying with fire regulations and stopping build-up of heat from waste gasses) where shredding and separating takes place and any ferrous material is taken out;
- **Turbine Room** – this will be a smaller separate building 15.6m high, with a base of 20m x 11m. A short section of pipe line will connect the main building and the turbine generator building;
- **Air cooled condenser fans** – have a height of 23.4m with a footprint of 27.4m x 11m;
- **Ash bunker** – the fly-ash is stored in a silo measuring 10m x 12m x 5m with a capacity of 600m³. The ash is removed in a safe manner by attaching an umbilical hose to a tanker and can be either reused /recovered or disposed of at licensed landfills. The handling, storage, treatment and reuse/disposal of this material is highly regulated and loaded onto trucks with a front end loader;
- **Fire Water Tank** - a fire water tank would be included next to the south eastern boundary of the site. The tank has a 17m diameter and a height of 6.75m with a 1 million litre capacity;
- **Pump Room** – the pump house is next to the fire water tank and has a height of 3.2m with a footprint of 6.1m x 4.6m; and
- **Technical / Control room and Workshop** – the control room will be located within the eastern side of the building and the workshop within the western side.

14.9.5 In addition, the external site areas will include:

- Two weighbridges (both in and out);
- Site entrance and circulation roads;
- 19 car parking spaces including 2 disabled bays;
- Provision for cycling spaces; and
- Landscaping and Sustainable Urban Drainage Systems (SuDS).

14.9.6 The industrial warehouse building has a height of 11.6m, width of 37.83m and length of 49m. The floor area measures 1950m². To the east side of the building are 20 car parking spaces and a gatehouse. The service yard is located west of the building and includes 2 loading bays and 10 car parking spaces. There will be a 2m high paladin boundary fence.

14.9.7 The gatehouse will be a moveable structure and has a height of 4.3m by 5.4m x 5.4m. The floor area measures 29m².

Process Description

14.9.8 The plant employs a two stage system that first gasifies the waste to produce a synthetic gas which is then transferred to a second stage where it is oxidised. Changing the waste to a gas fuel, means the combustion environment can be finely controlled, dioxins thoroughly destroyed and Nitrogen Oxides (NOx) emissions minimised which can achieve emissions levels that are compliant with the Industrial Emissions Directive (IED) (Directive 2010/75/EU of the European Parliament and the Council on industrial emissions).

14.9.9 The key stages of the process are as follows:

- Fuel bunker and transport system;
- Thermal conversion;
- Heat recovery steam generator
- Energy utilisation system;
- Flue gas cleaning system; and
- Control and monitoring system.

14.10 Grid Connection

14.10.1 The Applicant has submitted a budget quotation request and held discussions with the relevant power network operators in the area regarding the scale of the generation considered, which would typically be connected to the local network. Western Power Distribution (WPD) operates the Distribution Network.

14.10.2 Due to the available capacity of the local networks, it has been indicated by WPD that the maximum generation export capacity that could be afforded to the Fort Industrial Park is considered to be 20,000kVA. Any capacity above this level is likely to require substantial reinforcements back up the distribution network towards the Nechelles Bulk Supply point.

14.10.3 WPD has provided a Budget Estimate for a 10,000kVA generation capacity exporting to its distribution network via a 132,000 volt connection.

14.11 Design Approach

14.11.1 Many industrial parks are designed with a typical 'form follows function' approach. From the outset and in conjunction with advice from BCC City Design team it was deemed important that the external appearance of the plant should make a statement whilst being appropriate for the area.

14.11.2 In terms of architectural detailing and materials, both follow a similar palette, albeit simplified for the smaller industrial warehouse unit and consist of mainly a coloured cladding system.

14.11.3 Due to the energy plant building being a large mass, it was important to use a cladding system that would achieve the functional needs, as well as aesthetic ones too. A horizontal metal cladding in a dark grey colour has been used for the building base which is a common architectural technique and gives the building a strong base or plinth to sit on. Above that a lighter grey has been specified and finally a white architectural panel to the top third of the building. The concept behind this allows the building to sit and almost blend into the typical overcast skyline of the UK. Key corners and frontages have been wrapped in an aluminium diamond shaped shingle, which helps to give the elevations their own hierarchy. These textured panels add some shadow relief to the elevations helping to break up the building mass. Operational doors, external machinery and part of the stack will be faced in a contrasting Blue coated metal.

14.11.4 Following advice from BCC the dark blue architectural panel on the north elevation was toned down using a lighter colour palette.

14.11.5 A tree screening belt was integrated on the southern boundary to screen visible elements from the south.

14.12 Construction (including demolition) Duration

14.12.1 Subject to the grant of planning permission, it is anticipated that the construction of the proposed REC would commence in 2017. Construction on site would last for 24 months, after which there would be a commissioning period. Furthermore, construction would normally take place during the hours of 0700 to 1800 (Monday to Friday) and 0800 to 1300 (Saturday). No construction would take place on Sundays or bank holidays.

14.13 Operating Hours

14.13.1 The REC will operate continuously; 24 hours a day, 7 days per week. Operational staff would be required to operate the Plant on a 3 shift pattern (each of 8 hours). During weekdays the facility will be open for deliveries between the hours of 0700 and 1900 and between the hours of 0700 and 1400 on Saturdays. There will be no waste received on Sundays. It is expected that HGVs importing and exporting materials from the site will do so evenly throughout the 12 hour period and there is unlikely to be a peak in movements associated with these operations.

14.14 Construction and Environmental Management

14.14.1 A Construction Environmental Management Plan will be prepared and adopted and will include sections on: noise, vibration, air quality, water quality, surface quality (prevention of contamination of ground surface), site transportation and traffic management, visual intrusion and waste management. The appointed contractor will also be required to register with the Considerate Construction Scheme.

14.14.2 A Site Waste Management Plan will be prepared and all relevant contractors will be required to seek to minimise waste arising at source and, where such waste generation

is unavoidable, to maximise its recycling and reuse potential. Recycling of materials will primarily take place off-site where noise and dust are more easily managed.

14.15 Consents

14.15.1 In addition to planning permission, other consents will be required to enable the Proposed Development to proceed. Of particular importance to this development is the need for an Environmental Permit from the Environment Agency that will control all operations associated with the plant based upon various risk assessments. Information presented in this ES will be used in the preparation of the Permit.

14.16 Scheme Benefits

14.16.1 The benefits of the REC include:

- Proven technology with outstanding operational and environmental performance and very low emissions;
- Conversion of non-recyclable, non-hazardous waste into renewable energy, displacing landfill and fossil fuels;
- Reducing greenhouse gas emissions;
- Job creation across a variety of skills and levels of expertise with employment opportunities for local people;
- Reusing and transforming an existing industrial site and enhancing with landscape planting;
- Production of lower cost renewable energy for local businesses with connections to local energy users via underground cable;
- Clear progression in the transition to a low-carbon economy with grid carbon offset; and
- Compliance with Government policy and the EU Waste Framework Directive to provide sustainable, renewable energy production close to use

14.17 Air Quality

Introduction

14.17.1 The impacts of dust and PM₁₀ (particulate matter) emissions during the construction (including demolition) phase have been assessed qualitatively following published guidance. The operational impacts of the Proposed Development on air quality, odour and bioaerosol conditions for local receptors have also been assessed. Air quality impacts have been assessed quantitatively using dispersion modelling, while odour impacts have been assessed following a risk assessment technique outlined in published guidance. Bioaerosol impacts have been assessed qualitatively based upon the levels expected to be generated and the likelihood of their being emitted from the proposed facility.

Baseline Conditions

14.17.2 The local area is heavily industrialised, with numerous point sources of emissions to air, as well as having a very busy and congested road network. Local monitoring shows roadside concentrations of nitrogen dioxide to be above the annual mean objective, but away from busy roads concentrations of all pollutants are below the objectives.

Likely Significant Effects

14.17.3 The odour risk assessment has demonstrated that the odour effects on all local receptors will be negligible, thus the Proposed Development is judged to be insignificant in terms of odour effects. The qualitative bioaerosol assessment has also demonstrated that the Proposed Development will have an insignificant effect on local receptors in terms of bioaerosol concentrations.

14.17.4 The impacts of road traffic generated by the Proposed Development have been screened out as insignificant, as the development will lead to less overall traffic being on the local roads than the site's current use, and only very marginally more HGV traffic.

14.17.5 In terms of emissions from the facility's stack, the assessment has demonstrated that these will result in an insignificant change in concentrations at all local sensitive receptor locations for all pollutants and all averaging periods, with the exception of annual mean nitrogen dioxide. Following Environment Agency guidance, the process contribution to annual mean nitrogen dioxide could also be screened out as insignificant, but EPUK and IAQM guidance employs a stricter screening criterion. Following this stricter guidance, the development will still have a negligible impact on annual mean nitrogen dioxide concentrations at most local receptors, but will likely have a slight adverse impact at 10 to 15 properties and a moderate adverse impact at 15 to 20 properties close to the A452. This is less than 1 % of the properties within Castle Vale.

Mitigation and Enhancement

14.17.6 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emission. With these measures in place, it is expected that any residual effects will be 'not significant'. However, the guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be 'not significant'.

14.17.7 No additional mitigation has been proposed for the operational impacts, other than the self-imposed emission limit of 150 mg/Nm³ of NO_x (nitrogen oxides). The pollutant emissions from the proposed facility will most likely be significantly lower than those modelled, as the technology to be employed is very clean.

Conclusion

14.17.8 The assessment has demonstrated that the Proposed Development will not have a significant impact on dust and PM₁₀ levels during construction, provided that the recommended mitigation is applied. Similarly, odour and bioaerosol emissions will be kept to a sufficiently low level that the local effects will be insignificant.

14.17.9 The overall operational air quality impacts of the development are judged to be 'not significant'. This judgement takes account of the uncertainties in future predictions of road traffic emissions, and the worst-case assumptions applied in the dispersion modelling assessment.

14.18 Townscape and Visual

Introduction

14.18.1 The townscape and visual impact assessment has assessed the likely effects of the Proposed Development on landscape/townscape character, landscape/townscape features and elements within and in the immediate vicinity of the Proposed Development, and on local visual amenity. The assessment has been undertaken with regard to best practice and the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (2013), as published by IEMA and the Landscape Institute.

Baseline Conditions

14.18.2 The Application Site lies within the Arden National Character Area (NCA97), though this is considered to be of limited usefulness. There are no published landscape character assessments at a more local level.

14.18.3 The wider area is predominantly industrial to the north and west, including the large Jaguar manufacturing plant to the north of the A47 Fort Parkway dual-carriageway. An existing gas turbine power station, with a stack of approximately 60m in height, is located to the west, close to the now refurbished Fort Dunlop building.

14.18.4 To the east is a large B&Q superstore, the A452 Chester Road dual-carriageway and the Castle Vale residential area.

14.18.5 To the south lies the West Coast Mainline railway line, a hotel, pub and small office development, and then an elevated section of the M6 motorway. High voltage transmission lines mounted on 62m pylons broadly follow the line of the motorway, as does the River Tame. Beyond the motorway are the Hodge Hill and Buckland End residential areas.

14.18.6 There are 27 existing trees within the Application Site, together with areas of shrub planting and grass around the perimeter.

14.18.7 There are no statutory or non-statutory landscape designations in place on the Application Site. The nearest non-statutory designation of relevance in landscape and visual terms is the Grade II* Registered Park and Garden at Castle Bromwich Hall. The Hall itself is Grade I Registered, as is the nearby church of St Mary and St Margaret. The Registered Park and Garden lies approximately 600m to the south-south-east of the Application Site, but is separated from the Application Site by the elevated section of the M6.

14.18.8 The locally listed Fort Dunlop building lies approximately 750m to the west of the Application Site, and there are a number of other Listed Buildings in the local area, notably those in the vicinity of Castle Bromwich Hall and those to the north of the Jaguar plant.

14.18.9 The only Public Right of Way (PRoW) in the vicinity of the Application Site is a short section of public footpath associated with the parkland of Castle Bromwich Hall. There are pedestrian walkways associated with many of the roads in the area. The Park Hall Nature Reserve lies to the south-east, between the M6 and the railway.

Likely Significant Effects

14.18.10 The assessment has not identified any significant townscape and visual effects which would arise as a result of the Proposed Development.

Mitigation and Enhancement

14.18.11 Mitigation measures (such as minimising the height of the stack and the main building, and the use of cladding of variable colours and shades so as to minimise the

perceived massing of the buildings) have been incorporated into the design of the Proposed Development as part of the iterative design process. The measures are therefore an integral part of the development and no further additional mitigation is considered necessary from a landscape and visual perspective.

Conclusion

14.18.12 The Application Site lies outside of any statutory or local/non-statutory landscape designations. The Application Site is currently occupied by a number of industrial/trade counter buildings, set within an industrial context including the large Jaguar manufacturing plant on the north side of Fort Parkway, and the existing Fort Dunlop gas turbine power station to the west of the Application Site.

14.18.13 The Proposed Development would result in the replacement of the existing industrial buildings with a number of other, slightly larger industrial buildings, together with a 55m tall stack. The stack would be shorter than the existing stack at the Rolls Royce peaking plant and the pylons which line the nearby elevated section of the M6 motorway, and would be seen in the context of a number of other nearby stacks such as those at the Jaguar plant.

14.18.14 The nature of the Proposed Development, together with the context provided by the land uses surrounding the Application Site, would mean that the Proposed Development is considered to be appropriate to the setting and townscape character of the site. The Proposed Development would not result in any significant effects on local landscape or townscape features or elements, and would not have any significant effects on visual amenity as experienced from locations within the local area.

14.19 Traffic and Transportation

Introduction

14.19.1 The traffic and transport assessment has considered the environmental impacts of traffic to include pedestrian amenity, highway safety and driver delay in the context of the relative change in traffic flows. Two receptors have been identified within the study area, these being the Fort Parkway Industrial Park and the Castle Vale Residential Area. The sensitivity of these receptors was noted to be 'low' and 'moderate', respectively.

Baseline Conditions

14.19.2 The location of the Application Site has been considered in the context of existing and future consented infrastructure using GIS-based modelling techniques, which confirm that the site relates well by non-car modes to adjoining residential areas.

14.19.3 Baseline traffic flows have been collected and used as the basis of the environmental impact analysis. Analysis against daily flows is considered reasonable in light of the fact that the trip profile of the site is likely to be distributed evenly over the course of the day.

Likely Significant Effects

14.19.4 Operational phase impacts have been determined with reference to the trip generation calculations contained within the Transport Assessment which accompanies this ES.

14.19.5 Construction phase (including demolition) impacts could be generated from the arrival and departure of construction workers and associated HGV traffic. Whilst impacts can be significantly reduced with appropriate mitigation, the construction phase impacts

would be, at worst, categorised as 'Negligible'. This is considered to be acceptable, particularly in light of the temporary nature of this phase of development.

14.19.6 Cumulative impacts during construction could arise alongside the construction of adjoining schemes. However, schemes are either already operational and are included within the baseline assessment or insufficient information is available to measure this effect for the remaining schemes. Notwithstanding, an arbitrary quadrupling of construction traffic flows assumed for the Proposed Development will only yield an acceptable 'Moderate Adverse' impact.

Mitigation and Enhancement

14.19.7 Given the application site's current B1/B2/B8 land use and the resulting impact of the Proposed Development, it is considered that the surrounding highway network is of a suitable standard and will not require further mitigation to accommodate movements associated with the operational phase.

14.19.8 For the construction phase it is proposed that a Construction Traffic Management Plan (CTMP) would be prepared and submitted to the Local Planning Authority prior to the commencement of on-site works. The purpose of the CTMP would be so that appropriate environmental management practices are followed during the construction (and demolition) phase of the project

Conclusion

14.19.9 The Proposed Development can be accommodated without any unacceptable detriment to the environmental effects of traffic. It is noted that the inclusion of mitigation measures at both construction and operational phases would reduce the effects and impacts of the development further, providing confidence in the conclusion of the traffic and transport assessment.

14.20 Hydrology and Flood Risk

Introduction

14.20.1 An assessment has been undertaken of the likely significant effects that the Proposed Development would have on the water environment. The effect of the Proposed Development on local flood risk and water quality of nearby watercourses has been

assessed and mitigation measures proposed. This assessment is supported by a detailed Flood Risk Assessment.

Baseline Conditions

14.20.2 The Application Site is currently a light industrial park consistent of two buildings surrounded by areas of car parking, hard standing and small areas of grass and landscape planting.

14.20.3 The site is predominately flat with a slight slope south towards the Dunlop Carrier watercourse on its southern boundary.

14.20.4 The Dunlop Carrier is an artificial watercourse which receives runoff from the surrounding urban area.

14.20.5 The site's surface water runoff currently drains to onsite sewers which discharge into the Dunlop Carrier.

Likely Significant Effects

14.20.6 The construction of the Proposed Development will temporarily disrupt the onsite drainage network.

14.20.7 Potentially polluting activities and accidental spillages and leakages may occur during the construction and operation of the Proposed Development which could have an effect on local water quality.

Mitigation and Enhancement

14.20.8 Good site management, adequate contingency planning and implementation of the Environment Agency's pollution prevention guidelines and best practice construction techniques will reduce the risk of a significant water pollution event occurring.

14.20.9 The surface water drainage system will incorporate stormwater storage and will be discharged at a reduced flow rate during short duration intense storm events (e.g. thunderstorms) into the onsite sewer network (and therefore the Dunlop Carrier). The system will provide a degree of flood risk betterment during these storm events.

14.20.10 The surface water drainage system will incorporate specific measures to intercept oil and silt and other pollutants from the site and relevant plant will be designed to minimise pollution risk (e.g. bunded).

Conclusion

14.20.11 Adopting best practice construction site management and provision of a suitably designed surface water drainage system incorporating pollution control and stormwater storage minimises the effect of the Proposed Development on local flood risk and water quality in nearby watercourses.

14.21 Hydrogeology and Ground Conditions

Introduction

14.21.1 A qualitative assessment of the effects of the Proposed Development arising from the ground conditions has been completed. The assessment has considered the extent and methods of foundation construction, the anticipated degree of disturbance of the

ground, the final form of the development, and the relevant national and local policies for contaminated land assessment and management.

Baseline Conditions

14.21.2 The baseline ground conditions at the site have been assessed by a detailed Phase 1 desktop study.

Likely Significant Effects

14.21.3 Prior to mitigation a number of likely significant effects have been identified relating to the risk of the effects of contaminated land on construction workers, end users and controlled waters.

Mitigation and Enhancement

14.21.4 The following mitigation measures have been recommended:

- Undertake a geo-environmental ground investigation prior to development to provide an assessment of the ground conditions on the application site with respect to geotechnical properties and any potential contamination in the underlying soils and or groundwater.
- Application of appropriate measures during the construction phase to protect construction workers and site neighbours from exposure to any contaminated material which may be encountered (e.g. dust control measures, appropriate PPE).
- The stockpiling and testing of material displaying visual or olfactory evidence of contamination during the construction works. Based on the results of testing, the soils should be re-used, treated or disposed off-site.
- A 'clean' and inert 300mm thick cover layer should be placed over in-situ soils in areas of new landscaping. The cover soils should be validated prior to placement.
- Building slabs and membranes should be designed to mitigate the Characteristic Situation classification for the site, ground gas monitoring should be undertaken to classify the gas regime, as described within BS 8485 and C665.
- If piling through the Secondary A aquifer to the Secondary B aquifer within the bedrock is required as part of the development, a foundation works assessment should be completed to the satisfaction of the Environment Agency (EA). The piling technique should be chosen in accordance with the foundation works risk assessment to mitigate risks to controlled waters.
- The concrete used within the development should be designed in accordance with the concrete classification for the site (assessed using BRE Special Digest 1).
- The local water supply company should be consulted regarding the pipe material and backfill specification of potable water supply pipes.

Conclusion

14.21.5 Once operational the facility would be operating on sealed hard standing which would ensure any oils/lubricants or wastes are not able to penetrate into the underlying natural ground. The impact of the development on controlled groundwater and surface water will be negligible. Systems would be in place in line with the plants/facilities Environmental Permit which would have been developed to ensure all potential

contamination issues associated with the operation of the facility would have been satisfactorily controlled. As such no significant ongoing effects are predicted.

14.22 Noise and Vibration

Introduction

14.22.1 A noise assessment has been carried out for the Proposed Development. The assessment has taken account of potential effects during the demolition, construction and operation of the Proposed Development, upon surrounding residential receptors.

Baseline Conditions

14.22.2 Noise surveys have been undertaken to determine the existing noise levels at properties which would be potentially affected by the construction (including demolition) and operation of the Proposed Development.

14.22.3 The surveys indicated that noise levels at the properties are principally influenced by road traffic using the M6 (and A452) throughout the day and night-time periods.

Likely Significant Effects

14.22.4 The Proposed Development is located some distance from the surrounding noise sensitive receptors. An assessment of the noise levels associated with the demolition of the existing buildings and construction of the Proposed Development indicates that noise associated with the works would result in a negligible effect.

14.22.5 Noise levels associated with the operation of the Proposed Development are anticipated to be low and below a level which would result in any significant adverse noise impacts, with noise associated with the operation resulting in a negligible effect at surrounding properties.

14.22.6 There would be regular deliveries made to the site during the daytime periods. Compared to the existing development there would be an overall reduction in traffic, although the number of HGV movements would increase slightly. This would result in no change in road traffic noise levels on roads surrounding the Proposed Development, with a negligible effect identified.

Mitigation and Enhancement

14.22.7 No additional noise mitigation measures have been identified in addition to those which would be incorporated as standard into the design of the Proposed Development.

Conclusion

14.22.8 In summary, the construction and operation of the Proposed Development would not give rise to any adverse noise impacts at surrounding properties.

14.23 Ecology and Nature Conservation

Introduction

14.23.1 The ecology assessment compiles information from a desk study and Extended Phase I habitat survey, enabling the determination of the likely ecological effects of the Proposed Development.

14.23.2 The assessment establishes the likely presence of protected or notable species, identifies statutory designated sites for nature conservation in the vicinity of the Proposed Development and evaluates the overall conservation status of the Application Site. The potential effects on identified ecological receptors including designated sites and protected and notable species is assessed in line with current guidance, and appropriate mitigation and enhancement measures are described.

Baseline Conditions

14.23.3 An Extended Phase 1 habitat survey was undertaken on the Application Site in April 2015. The survey recorded habitats within the Application Site and aimed to establish the presence or potential presence of protected and notable species.

14.23.4 Statutory designated sites were identified within a 5km radius of the Application Site using the Multi Agency Geographic Information for the Countryside (MAGIC) website, along with the Joint Nature Conservation Committee (JNCC) and Natural England (NE) websites. EcoRecord (the biological record centre for Birmingham and the Black Country) provided records of protected and notable species, locally designated sites and habitats within a 2km radius of the site.

14.23.5 The Application Site was dominated by buildings and surrounding hard standing with smaller areas of amenity grassland and ornamental planting and an area of bare ground with trees along the southern boundary. Habitats adjacent to the southern Application Site boundary comprised scattered scrub with trees, and a highly managed overflow channel (the Dunlop Carrier). A railway line with embankments lined with shrubs was present to the south of this channel and the River Tame is situated on the far side of

the railway, c. 56m south. The river and its floodplain also comprised the Tame Valley Site of Local Importance for Nature Conservation (SLINC).

14.23.6 No evidence of protected or notable species was found within or adjacent to the Application Site. The habitats present had the potential to be used by nesting birds and foraging bats.

14.23.7 The overall value of the Application Site to such species is assessed to be low.

Likely Significant Effects

14.23.8 No significant effects are anticipated on statutory or non-statutory designed sites or habitats. No significant effects are anticipated on protected species, including birds, bats, badger, dormouse, amphibians and reptiles and invertebrates.

Mitigation and Enhancement

14.23.9 Mitigation and enhancement measures will include the following:

- Pollution prevention and control measures during construction;
- Inclusion of lighting scheme that avoids light spill to habitats adjacent to the south of the Application Site;
- Reasonable Avoidance Measures (RAMs) will be implemented during construction to avoid any risk of accidental harm to individual amphibians or reptiles that may be present; and,
- A Pre-construction nesting bird survey to be undertaken if works commencing during the breeding bird season (generally acknowledged annually as 1st March to 31st August inclusive).

Conclusion

14.23.10 The Proposed Development will have no significant effects on Ecology or Nature Conservation either individually or in combination with other developments. Residual effects of the Proposed Development will be negligible and not significant in relation to all identified ecological receptors

14.24 Archaeology and Cultural Heritage

Introduction

14.24.1 The archaeology and cultural heritage assessment has considered the likely significant effects of the Proposed Development.

Baseline Conditions

14.24.2 No heritage assets are recorded within the Application Site and no specific potential for currently unrecorded below-ground archaeological remains has been identified. Construction of the existing industrial units within the Application Site is likely to have disturbed or removed any unrecorded below-ground archaeological remains previously present.

14.24.3 Designated heritage assets in the vicinity include Castle Bromwich Grade II* Registered Park and Garden, Castle Bromwich Hall Grade I Listed Building, the Grade I Listed Church of St Mary and St Margaret, which are heritage assets of high value. They

also include Fort Dunlop Base Stores Locally Listed Building, which is a heritage asset of low value.

Likely Significant Effects

14.24.4 The Proposed Development will not result in any adverse significant effects. The significance of effect on designated heritage assets in the vicinity, including Castle Bromwich Grade II* Registered Park and Garden, Castle Bromwich Hall Grade I Listed Building, the Grade I Listed Church of St Mary and St Margaret, and Fort Dunlop Base Stores Locally Listed Building will be neutral.

Mitigation and Enhancement

14.24.5 No adverse effects have been identified and therefore no mitigation or enhancement is proposed.

Conclusions

14.24.6 No heritage constraints to the Proposed Development have been identified. The assessment has identified no adverse effects to any known or anticipated heritage asset.

14.24.7 No specific potential for below-ground archaeological remains has been identified and any unrecorded below-ground archaeological remains are likely to have been disturbed or removed by the construction of industrial buildings within the Application Site. It has been agreed with the Council's Principal Conservation Officer that the completed heritage assessment provides a sufficient and 'proportionate' level of information to enable an understanding of the potential effect of the proposal, in accordance with the requirement of paragraph 128 of the Framework.

14.24.8 The Proposed Development will not harm designated heritage assets through alteration to setting. The proposals are thus consistent with the requirements of section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 which requires 'special regard' to be given to the desirability of preserving Listed buildings and their settings. In this regard the proposals are also consistent with the development plan policy for 'Listed Buildings' which requires development to 'preserve or enhance' the character of such buildings. The proposals are consistent with the requirements of Paragraph 132 of the Framework which notes that 'great weight' should be given to the conservation of heritage assets.

14.24.9 Development plan policy regarding archaeological remains states that 'an assessment of the archaeological aspects of development proposals will be required from applicants before planning application is determined. Planning permission will not be granted where the assessment of the archaeological implications is inadequate'. A copy of the heritage assessment has been provided to the Council's Principal Conservation Officer, who has agreed that this is suitable and provides proportionate information to determine the application. No known archaeological remains will be affected, and the proposals are consistent with the development plan policy on archaeological remains.

14.25 Socio-Economics

Introduction

14.25.1 The socio economic assessment considers effects of the Proposed Development during both the construction (including demolition) and operational phases. The analysis focuses on the provision of employment and the effect in terms of the economy within Birmingham City and Tyburn Ward.

14.25.2 There are a wide range of socio-economic issues that exist and which will be affected by the Proposed Development.

Baseline Conditions

14.25.3 Birmingham City is expected to experience population growth. It is expected to see the population age in accordance with national trends.

14.25.4 The area currently experiences a high level of deprivation, particularly related to income and employment.

14.25.5 The area has a high level of unemployment and the majority of workers are employed in lower value occupations. The unemployed within Tyburn that are seeking a job are similarly looking for lower value employment. The level of qualifications is also low. However, the pay across Birmingham City is comparatively higher than the income of residents within the City. Birmingham experiences net in-commuting flows which may reflect this pay differential although is to be expected in a City of this size.

Likely Significant Effects

14.25.6 The key socio-economic effects of the Proposed Development can be summarised as follows:

- Provision of circa 100 to 130 additional jobs during the construction phase in the construction sector;
- Provision of 20 jobs during the operational phase;
- The jobs will include elementary jobs during both the operational and construction phases which responds to the type of jobs being sought by the unemployed in Tyburn Ward currently;
- The provision of a different range of jobs locally which may meet the needs of some local residents;
- Investment in construction, operation and maintenance all of which will provide for indirect effects including generating work for local tradesmen;
- The increase of the local disposable income (for employees of the facility and tradesmen) which will have induced effects on local economy;
- Additional £2M GVA per annum for the local economy;
- The provision of lower priced sustainable energy for local businesses, reducing business costs which may be used to expand or enhance businesses (including new jobs and/or increased wages);
- The above will all address the current deprivation relating to income and employment; and
- Potential minimal increases in commuting flows.

Mitigation and Enhancement

14.25.7 There are no identified negative effects associated with the Proposed Development in socio-economic terms and so no mitigation has been identified.

Conclusion

14.25.8 Overall the Proposed Development is considered to provide for minor positive effects and will prevent around 105,000 tonnes of residual waste going to landfill, utilising is as a valuable resource.

14.26 Summary

14.26.1 The technical chapters which make up this ES which assesses the REC at Fort Parkway Energy demonstrate that there are no overriding environmental constraints or planning policies which would preclude the development of the Application Site.

14.26.2 The Planning Statement which forms a separate part of the planning application demonstrates significant weight for both Planning Policy and Waste Policy which demonstrates the need for and benefits of the scheme. The assessment of the proposal against the Development Plan has shown broad compliance with the relevant saved policies contained in the Birmingham Unitary Development Plan. Compliance has also been shown with the emerging policies set out in the Birmingham Development Plan which is currently subject of Examination.

14.26.3 The proposal has also been shown to be in compliance with national strategic level planning policies contained within the National Planning Policy Framework and the National Planning Policy for Waste, and guidance set out in the Waste Management Plan for England and both EN-1 and EN-3. These documents are significant material considerations in the planning process and indicate this proposal is acceptable.

14.26.4 The above considerations demonstrate that upon considering the significant benefits associated with the scheme against the relatively benign impacts, the proposal, on balance, falls well within the scope of acceptability as the benefits would indeed outweigh any limited harm.