Gloucestershire Residual Waste Project

PLANNING APPLICATION FOR THE DEVELOPMENT OF AN ENERGY FROM WASTE FACILITY, BOTTOM ASH PROCESSING FACILITY AND ASSOCIATED INFRASTRUCTURE ON LAND AT JAVELIN PARK, HARESFIELD, GLOUCESTERSHIRE

Environmental Scoping Report

October 2011

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1.0 INTRODUCTION AND BACKGROUND TO THE PROPOSALS

1.1 Introduction

1.1.1 This document has been prepared to aid a formal request, under Regulation 13 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011, to agree the scope of the Environmental Impact Assessment (EIA) that will be prepared to accompany the planning application for the development of an Energy from Waste (EfW) facility at Javelin Park, Haresfield, Gloucestershire. The location of the site is shown on Figure 1.

1.1.2 This document provides all the information necessary for the relevant planning authority (Gloucestershire County Council) to adopt a Scoping Opinion.

1.1.3 The proposed EfW facility would have a total gross installed electricity generating capacity of approximately 17.2 MW. Electricity would be generated by way of a steam turbine which would be driven through the combustion of residual waste (i.e. waste which is left after re-use, recycling and composting).

1.1.4 Although the scoping process is often regarded as a discrete stage it should continue throughout the development of the EIA. It may be necessary to alter the extent of research required for a particular discipline as the understanding of the magnitude and significance of an impact is established. This is vital to ensure that resources and efforts are focused on the issues that have the potential to cause the most impact.

1.2 Purpose of Scoping

1.2.1 Scoping is the process through which the content and extent of matters to be covered by the EIA are identified by considering the potential impacts that could arise from the construction and operation of the proposed facility.

1.2.2 Only the 'main' or significant effects of the development should be subject to full environmental assessment within the EIA. Circular 02/99: Environmental Impact Assessment states that "*in many cases, only a few of the effects will be significant and will need to be discussed in the Environmental Statement (ES) in any great depth. Other effects may be of little or no significance for the particular development in question and will need only very brief treatment to indicate that their possible relevance has been considered*".

1.2.3 The process of scoping and environmental assessment ensures that mitigation and enhancement measures are identified at an early stage of the design process of a development. It also provides the opportunity for the planning authority and other consultees to ensure areas of the environment that have the potential to be significantly affected by the project are considered within the EIA.

1.2.4 The scoping process also helps to identify potential design constraints at an early stage in the design process. This helps to ensure that environmental protection and sustainability are key factors in the final proposed solution.

1.3 Requirement for EIA

1.3.1 The requirement for EIA is prescribed by European law under Council Directive 99/337/EEC, this has been enacted in United Kingdom law under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 referred to hereafter as the EIA Regulations.

1.3.2 The EIA Regulations prescribe the types of development for which EIA is mandatory (Schedule 1 development) and others which may require an assessment if they have the potential to give rise to significant environmental impacts (Schedule 2 development). The proposed EfW facility is consistent with Schedule 1, Part 10 of the EIA Regulations as follows:

*"**10.** Waste disposal installations for the incineration or chemical treatment (as defined as in Annex IIA to Council Directive 75/442/EEC under heading D9) of non-hazardous waste with a capacity exceeding 100 tonnes per day".*

1.3.3 As such the proposed EfW facility at Javelin Park is deemed to be a Schedule 1 development and therefore EIA is mandatory for this project.

1.4 This Document

1.4.1 Following on from this introduction, Chapter 2.0 of the report briefly describes the site and its surroundings. Chapter 3.0 provides a description of the development and summarises the alternatives that will be considered. Chapter 4.0 outlines the broad principles of the EIA methodology. Chapter 5.0 describes the main environmental issues that could arise through the construction and operation of the proposed development and how they will be assessed. Chapter 6.0 provides details of those bodies / organisations that the applicant

intends to consult when preparing the EIA, finally Chapter 7.0 sets out the conclusions of the report including the proposed structure of the ES.

2.0 THE SITE

2.1 The Site and Site Context

2.1.1 The proposed development site (hereafter referred to as 'the site') is located within the Severn Vale, near the village of Haresfield, Gloucestershire. The approximate centre of the site is at Ordnance Survey National Grid Reference 380040E 210430N and is located within the administrative area of Gloucestershire County Council (GCC) and Stroud District Council (SDC). The location of the site is shown on Figure 1.

2.1.2 The site is approximately 4.5 ha in area and forms the southern part of Javelin Park, a disused former airfield. Javelin Park is subject to a number of extant development consents (described further below) but is currently comprised of derelict ground, hardstanding and vegetated areas. No buildings or above ground structures associated with the former land use remain at the site. A private access road has recently been constructed into Javelin Park to provide access to the B4008. The access road runs along the northern boundary of the site and is not currently accessible to traffic. The development site slopes gradually from east to west with a fall of approximately 1m.

2.1.3 The site is bounded to the north by an undeveloped, derelict area (the northern part of 'Javelin Park'). A garden centre is located to the north of Javelin Park beyond which is Junction 12 of the M5 motorway. The M5 motorway is located approximately 50m from the western boundary and is orientated in a north-south direction.

2.1.4 The eastern boundary of the site is formed by the B4008 beyond which are agricultural fields and one residential property, The Lodge (also referred to as Haresfield Court Lodge), which is approximately 50m from the boundary of the site. The next closest residential property is Hiltmead House, approximately 250 m to the west of the site on the opposite side of the M5 motorway. The village of Haresfield is located approximately 800 m to the east of the site. Agricultural fields bound the site to the south and west.

2.1.5 A small unnamed watercourse flows into the south east corner of the site. It is understood that watercourse was previously culverted beneath Javelin Park and has since been diverted around the southern and western perimeter of the site

in an engineered open channel. The corridor of the watercourse has been landscaped with trees and shrubs.

2.1.6 In 2002 an Outline Planning Permission (S.01/1191) was granted at the site for the development of 45,150 sq ft of B8 distribution warehousing. Subsequently five reserved matters applications have been granted consent. It is understood that none of these planning consents have been implemented to date. However, the outline permission is still extant and as such there remains consent to develop an extensive distribution warehouse scheme at the site. In addition, detailed planning permission has been granted for the aforementioned access road which has now been implemented.

3.0 THE PROPOSED DEVELOPMENT AND ALTERNATIVES

3.1 The Proposed Development

3.1.1 The proposed development is an EfW facility which would process 190,000 tonnes of residual waste per annum and would comprise the following main elements:

- waste reception and tipping hall;
- refuse bunker;
- boiler hall;
- steam turbine;
- control room;
- stack;
- flue gas treatment (FGT) facility;
- bottom ash bunker;
- air cooled condensers;
- bottom ash recycling facility; and
- staff facilities/offices/visitor centre.

3.1.2 The development would also include the following ancillary / infrastructure elements:

- vehicle weighbridges and office;
- site fencing and gates;
- service connections;
- surface water drainage and attenuation features;
- cycle / motorbike store;
- external hardstanding areas for vehicle manoeuvring;
- internal access roads and car parking;
- fire water, ammonia and diesel tanks; and
- new areas of hard and soft landscaping.

3.1.3 The layout of the proposed development is illustrated on Figure 2. As described previously the facility would have an installed electricity generating capacity of 17.2 MW. The facility would also be designed to enable residual heat to be extracted from the generation process for use by local heat users. The facility

includes a bottom ash processing facility which treats and recycles the bottom ash to produce secondary aggregate that is then exported from the site.

3.1.4 The facility would require a new grid connection in order to export electricity offsite. The grid connection would be subject to a separate consenting procedure falling either under S37 of the Electricity Act or permitted development rights and as such will not form part of the planning application. However, on the basis that a new grid connection would be required as part of the project the environmental impact of a grid connection will be considered as part of the EIA, this is discussed further below.

3.1.5 The operation of the proposed facility would comply fully with relevant UK Government and European Union (EU) legislation and policies. The principal processes to be carried out at the facility include the receipt, storage and combustion of non-hazardous residual waste, the generation of electricity and heat, and the use of emissions abatement equipment. In addition, there would also be the temporary storage of process residues on the site.

3.2 Operating Hours

3.2.1 It is proposed that the facility would process waste and generate electricity on a 24-hour basis. Waste would be brought onto the site between the hours of 07.00 and 19.00 seven days a week.

3.2.2 During hours of darkness there would be a need for lighting commensurate with Health and Safety requirements to ensure a safe working environment for operatives on site. The lighting will be designed to minimise light spill by using lanterns which achieve full ‘cut-off’ meaning that all of the light shines down with minimal upwards or sideways spill. Outside of the delivery hours the external lighting would be turned off other than low level lighting required along walking routes and staff parking areas.

3.3 Waste Reception and Handling

3.3.1 Incoming refuse collection and bulk transport vehicles would enter the site and proceed to the weighbridge. After weighing, the vehicles would continue along the internal site road to the enclosed waste reception / tipping hall where vehicles would deposit their waste. Vehicles would exit the tipping hall via a separate exit and leave the site via the weighbridge.

3.3.2 The tipping hall would incorporate 7 tipping bays, each approximately 4 m wide. The entry / exit doors would be equipped with 'rapid closing' vertical folding doors, which would be kept closed when delivery of waste is not taking place.

3.3.3 The refuse bunker would be of a concrete construction and housed within the bunker hall. It would measure approximately 45 m by 20 m and extend approximately 13 m below ground level.

3.3.4 Above the storage bunker overhead travelling cranes and associated mechanical grabs, would be used to mix, stack and load the refuse into the feed chute to the furnace.

3.3.5 Odour and dust in the tipping hall would be controlled by forced draught fans located above the refuse bunker. These fans would draw air from the tipping hall and boiler hall into the furnace to feed the combustion process creating a slight negative pressure which would prevent odours and dust from escaping from the building. Anaerobic conditions within the refuse bunker, which can cause odour, would be prevented by regular mixing of the waste by the crane operators.

3.3.6 Following loading into the feeding chute, the waste would be transferred onto the furnace grate by hydraulically powered feeding units.

3.3.7 Secondary air would be injected from nozzles in the walls of the furnace to control flame height and the directions of air and flame flow. The feed rate to the furnace would be controlled by a combustion control system.

3.4 Combustion Process

3.4.1 The proposed facility would use a moving grate which comprises inclined fixed and moving bars that move the waste from the feed inlet to the residue discharge. The grate movement turns and mixes the waste along the surface of the grate to ensure that all waste is exposed to the combustion process. The start up burners (which typically operate for up to 16 hours during a start up event) would be gas fuelled, fuelled by either low sulphur gas oil or mains gas. There should be only two start-ups per year after planned maintenance activities.

3.4.2 The combustion control system regulates combustion conditions (and thereby minimises the levels of pollutants and particulates in the flue gas before flue treatment) and controls the boiler. The furnace is also fitted with auxiliary burners, fuelled by either low sulphur gas oil or mains gas, which would automatically maintain the temperature above 850°C. Combustion chambers, casings and ducts, and ancillary equipment are maintained under slight negative pressure to prevent the release of gases. The facility would meet the requirements set down in the EU Waste Incineration Directive, which would be reflected in the Environmental Permit.

3.4.3 During operation the temperature in the combustion chamber would be continuously monitored and recorded to demonstrate compliance with the requirements of the Waste Incineration Directive. The combustion control system would be an automated system, including the monitoring of combustion and temperature conditions of the grate, and modification of the waste feed rates, and the control of primary and secondary air.

3.4.4 The hot flue gasses from the furnace would be piped to the boiler where the gasses are used to produce superheated steam that would drive the electricity generation turbine.

3.5 Flue Gas Treatment

3.5.1 Having passed through the boiler system the flue gases generated during the combustion process would be cleaned before being released into the atmosphere. The facility would be served by a flue gas treatment (FGT) system and associated reagent storage silos. The treatment of the flue gasses would include NOx reduction, acid gas scrubbing and the use of fabric filters.

3.5.2 Vehicles would be required to access the FGT plant in order to deliver FGT reagents and export FGT residues. The silos containing the FGT reagents and residues would be located in the western extent of the building and vehicles would access the silos via a dedicated access. FGT reagents and residues would be transferred by sealed pumps into and out of the storage silos.

3.6 Stack

3.6.1 Following cleaning, the flue gases would be released into the atmosphere via the stack. Emissions from the stack would be monitored continuously by an

automatic computerised system and reported in accordance with the Environment Agency's requirements for the operation of the facility. The height of the stack has been determined through air dispersion modelling, and would be 70m high from ground level.

3.7 Bottom Ash

3.7.1 Bottom ash is the burnt-out residue from the combustion process. Ash would be quenched with water as it leaves the combustion chamber to both cool the ash and also reduce potential for fugitive dust to be released. Any water not vaporised in the quenching process would be collected and recycled for continued use in the quenching process. The bottom ash would be deposited into a bunker from where it would be fed, via conveyor, to the bottom ash recycling facility located at the eastern end of the facility.

3.7.2 The bottom ash would be processed (screened and graded) to create a series of standard specification aggregates. The processing would include the crushing of bottom ash, the recovery of metals, final grinding and screening. Once processed, the material is stored as an inert secondary aggregate prior to onward transfer for appropriate re-use applications. Any oversize or reject materials from the processing plant would be categorised and then sent for reuse, recycling or disposal.

3.8 Flue Gas Treatment Residues

3.8.1 FGT residues comprise fine particles of ash and residue from the flue gas treatment process. These materials would be collected in bag filters. It is estimated that the operations would generate approximately 1 tonne of FGT residues per hour, which would be stored in a sealed silo adjacent to the flue gas treatment facility.

3.8.2 Due to the alkaline nature of the FGT residues, they are classified as hazardous waste (in much the same way as cement). The FGT residues would be transported offsite to a suitably Permitted hazardous waste disposal facility. Alternatively the residues may be taken to an appropriate treatment facility where they could be re-used, for example, in the stabilisation of acid wastes.

3.9 Grid Connection

3.9.1 As described above, a connection to the electricity distribution network would be required to enable the export of electricity generated at the site. The grid connection works will not form part of the planning application falling either under Section 37 of the Electricity Act 1989 or under permitted development rights of statutory undertakers.

3.9.2 However, on the basis that export of electricity is an integral part of the scheme it is considered appropriate that the potential environmental impacts associated with grid connection are assessed within the ES.

3.9.3 It is proposed to undertake an environmental assessment of two grid connection options as follows, the connection options are shown on Figure 3:

- Option 1: a connection to Tuffey substation c.6km to the north west of the site, this connection would be via underground cabling for the majority of the distance buried within existing highways carriageway or verge. The route would follow the B4008, the A38 and Cole Avenue.
- Option 2: a tee connection off the existing 33kV Ryeford – Nethrills – Coaley circuit, this connection would comprise an overhead line suspended on newly erected wooden poles.

3.9.4 On the basis that Option 1 would involve burial of cables within existing highways carriageway and verges it is likely that any impacts would be temporary in nature and limited to areas of previously disturbed land. Impacts are likely to be similar in nature to those that arise from minor highways maintenance works and as such implementation of standard best practice construction methods is likely to avoid any significant environmental impacts arising.

3.9.5 Option 2 would involve erection of circa 50 wooden electricity poles along a 5km route and associated overhead cabling works. The majority of the route is across agricultural fields and hedgerows. The erection of the poles would involve some ground disturbance works but this would be localised to the pole locations.

3.9.6 The assessment of the grid routes would be presented as a separate chapter in the ES. The assessment will comprise: a search of publically available environmental databases; inspection of Ordnance Survey mapping and detailed aerial photographs; a Phase 1 habitat survey; and a search of GCC Historic Environment Record.

3.9.7 The landscape and visual impacts of Option 2 will be assessed in line with the methodology described in Chapter 5.0 below.

3.10 Alternatives

3.10.1 The EIA Regulations indicate that the ES should include an outline of the main alternatives considered and the reasons they were discounted, taking into account environmental effects.

3.10.1 With regard to the proposed development the main topic areas where alternatives have been considered include the following:

- Alternative Waste Management Options and Technology Choice.
- Alternative EfW Technologies.
- Alternative Locations / Sites.
- Alternative Design Solutions.

3.10.2 For each of the above topics the ES will provide an explanation of the main alternatives considered and will outline the key reasons why options were discounted or taken forward into the final proposed scheme solution.

4.0 EIA METHOLODOLOGY

4.1 Introduction

4.1.1 This chapter provides a brief description of the approach to environmental assessment process and describes the broad principles that will be applied within each technical assessment. Each technical assessment will follow a similar approach as follows:

- an ***introduction*** describing the basic scope and approach undertaken to the assessment;
- a description of the ***methodology*** applied to the assessment both in terms of any surveys carried out and also the criteria used in the impact assessment, any limitations to the assessments would also be described;
- a presentation of the ***baseline*** conditions relevant to that discipline;
- an ***impact assessment*** that describes the effects that are likely to arise from the proposed development. The assessment will include a description of the nature, extent and significance of these effects. The assessment will take into account mitigation measures that have been incorporated into the development proposals;
- a description of ***mitigation*** measures will be provided, this will include any enhancement or compensation proposed to either further reduce the negative effects of the development or to provide benefits to the local environment; and
- finally each chapter will include a section on the ***residual impacts and conclusions*** of the assessment. This section will describe the residual effects of the development following the implementation of any additional mitigation or enhancement and will summarise the findings of the assessment.

4.2 Baseline for the Environmental Impact Assessment

4.2.1 The assessment will be undertaken with reference to the current baseline conditions at the site i.e. an undeveloped brownfield site. However, as described previously a number of extant consents exist at the site for the development of distribution warehousing units. Thus, in considering factors that

mitigate the effects of the proposed developed, reference will be made to these permissions.

4.2.2 Whilst the proposed development must be considered in relation to its impact on existing environmental conditions, it is entirely appropriate to note within the assessment that a major development has been granted consent at the site. As such it can be considered that the impacts associated with the consented developments were deemed acceptable at the time the permissions were granted.

4.3 Determining Impact Significance

4.3.1 Each technical chapter will include a detailed description of the assessment methodology. This will include a description of any surveys undertaken and the approach undertaken in determining the significance of effects that may arise from the development.

4.3.2 The EIA regulations do not provide definitive methods for the assessment of significance and a variety of methods are employed within EIAs. The method used to assess the effects will be specific to each discipline. In most cases the assessment methods used will be defined by the relevant professional body or by industry best practice guidelines.

4.3.3 When determining the significance of the impacts each of the disciplines will give particular regard to the following elements of the impact:

- status of the impact;
- extent or spatial scale of the impact;
- duration of the impact;
- sensitivity of receptor;
- probability/likelihood of the impact; and
- magnitude of the impact.

4.3.4 The significance of the impact will be established through the evaluation of the above impact elements and will ultimately be determined through professional judgement. The criteria used to define significance will be described within the ES for each discipline.

4.4 Mitigation Measures

4.4.1 Mitigation measures are listed as a requirement under part of both Part I and Part II of Schedule 4 of the EIA Regulations. Part I requires *"a description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment"*. Part II requires *"a description of the measures envisaged in order to avoid, reduce and if possible remedy significant adverse effects".*

4.4.2 The technical design team will take into account environmental impacts that are identified during the environmental assessment process. Where possible the impacts will be reduced or avoided through design changes, these measures will then form part of the project and be taken into account in the EIA.

4.4.3 Mitigation measures will be considered from the outset of the project and will take into account comments received during consultation with key stakeholders. Mitigation and enhancement measures not included in the scheme design and mitigation in the form of management procedures e.g. Landscape Management Plans, will be described within each technical chapter.

4.5 Cumulative Effects

4.5.1 There is no defined methodology in the UK as to how cumulative effects should be assessed. In determining the approach to be adopted to the assessment of cumulative effects reference will be made to the following guidance:

- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission 1999);
- Cumulative Effects Assessment Practitioners Guide (Canadian Environmental Assessment Agency 1999);
- Guidelines for Environmental Impact Assessment (Institute of Environmental Management and Assessment 2006); and
- Environmental Impact Assessment: A guide to good practice and procedures - A consultation paper (Department for Communities and Local Government 2006).

4.5.2 Projects to be considered in the cumulative assessment are major projects that have been granted planning permission and are not yet operational or have yet

to be constructed. Major projects are considered to be developments of 10,000m^2 in size or greater and projects that have been subject to EIA. Projects that fall outside the above criteria will only be included in the assessment if specifically identified by the Planning Authority or other statutory consultees.

4.5.3 The cumulative effect of operational projects are considered to already form part of the baseline and as such would be assessed within each of the discipline chapters.

4.5.4 A search area of 5km will be adopted to identify projects to be included in the cumulative effects assessment. As the assessment develops the search area may be revised if it becomes evident that the spatial extent of likely significant cumulative effects is greater or less than 5km. For many of the disciplines the effects of the development would be more localised than 5km. In such instances some of the effects from the projects identified from the provisional search will be excluded from the assessment.

4.5.5 Information on the scale, type and nature of the projects included within the cumulative assessment will be obtained from the relevant planning authority. Where available this information will be sourced from a project EIA. If environmental information is not available reasonable assumptions will be made on the likely environmental effects of the project. Each technical discipline will consider the likelihood of significant cumulative effects initially through a qualitative assessment and if necessary through quantitative modelling. Where significant cumulative effects are identified these will be clearly reported and if possible mitigation measures will be recommended.

4.5.6 The following planning authorities fall within the 5km buffer from the site and as such have been contacted to identify projects that may be included within the cumulative effects assessment:

- Gloucestershire County Council;
- Stroud District Council;
- Gloucester City Council;
- Tewkesbury Borough Council; and
- Forest of Dean District Council.

4.5.7 Responses have been received from all the above planning authorities. The following projects have been identified for inclusion within the CEA, the locations of the projects are shown on Figure 4:

- Hunts Grove Housing Development: the development of 1,750 houses, a neighbourhood centre including a primary school, employment sites and open spaces and sports pitches;
- Motorway Service Area at Ongers Farm: the development of a northbound and southbound service station located between Junction 11a and 12 of the M5;
- EfW Plant at Moreton Valence Resource Recovery Centre: development of a gasification facility capable of treating 30,000 tonnes per annum of residual waste arisings from the existing operations at the Moreton Valence Resource Recovery Centre; and
- Kingsway Residential Development, Quedgeley, Gloucester: the development of 2,650 houses, employment development, open space and community facilities.

4.5.8 In addition to the above developments and as described above a number of extant consents exist for the development of distribution warehousing at Javelin Park. Those consents which involve development on the northern half of Javelin Park will be considered within the cumulative effects assessment. The extant consents relating to development on the proposed development site for the EfW will not be considered within the cumulative effects assessment as these would not proceed were the proposed development to be constructed.

5.0 SCOPE OF ENVIRONMENTAL IMPACT ASSESSMENT

5.1 Introduction

5.1.1 The ES, which reports the EIA process, will incorporate the information required under Schedule 4 of the EIA regulations. However, it will focus upon those issues where the potential exists for the development to give rise to significant environmental effects. In this regard it must be noted that Schedule 4, Part 1, Paragraph 4 of the EIA Regulations states that environmental statements should include *"a description of the likely **significant** effects of the development upon the environment…."*

5.1.2 A preliminary consideration of potential environmental effects of the development has been undertaken as part of the scoping exercise. This initial assessment has been used to determine whether any issues may be scoped out of the EIA, as noted in the Department for Communities and Local Government, EIA: A Guide to Good Practice and Procedures, *"the scoping process should seek to discount, or 'scope out', those issues where significant effects are unlikely*". Those issues, which are not scoped out as a result of this process form the technical scope of the EIA.

5.1.3 As the project develops and consultation with statutory and non-statutory agencies is undertaken it is possible that more issues may be scoped into the assessment. Where this occurs these issues will be fully reported within the ES. Consultations undertaken to date with relevant stakeholders are summarised in the following sections. These consultations have been used to inform and agree the scope for the various assessments that will inform ES.

5.1.4 This chapter sets out the Applicant's views as to the main environmental issues that could potentially arise as a result of the proposed development. The principal issues have been considered under the following headings:

- Planning Policy Context;
- Traffic and Transportation;
- Landscape and Visual Impact;
- Ecology and Nature Conservation;
- Soils, Geology and Hydrogeology;
- Surface Waters and Flood Risk;

- Noise and Vibration;
- Air Quality;
- Human Health; and
- Archaeology and Heritage.

5.2 Planning Policy Context

5.2.1 A detailed analysis of the proposed development in the context of current relevant planning policies and guidance will be undertaken within the Planning Statement. It is therefore considered unnecessary, and indeed inappropriate, to repeat this exercise within the ES. However, a summary of the key policies forming the planning context will be presented in the ES in order to inform the EIA on the scope of environmental considerations contained in key national, regional & local planning policy.

5.3 Traffic and Transportation

Baseline Conditions

5.3.1 There are two vehicular access points off the B4008 into Javelin Park, both access points are currently gated and not open for public access. The southernmost access is taken from a three-arm roundabout junction, which was purpose built to provide access to the site. The second access is via a ghost island right turn lane and is combined with the Blooms Garden Centre access. This entrance would provide access to the north of the Javelin Park.

5.3.2 The aforementioned B4008 connects Stonehouse to the south east with Gloucester to the north west. The B4008 to the south of Javelin Park lies within the Lorry Management Area as defined on the Advisory Freight Route Network produced by GCC. The Lorry Management Area has been implemented to reduce the environmental impacts of freight on roads within the Cotswolds AONB. As such the B4008 is subject to a weight restriction of 7.5T to the immediate south of the Javelin Park roundabout junction. It is also understood that the B4008 through Stonehouse is the subject of pending environmental improvement works.

5.3.3 To the north of Javelin Park the B4008 forms a grade separated ‘dumb-bell’ junction (Junction 12) arrangement with the M5. The junction was upgraded in

2010 by the Highways Agency to improve queue length and delay times on the north and south bound off slips. The junction was originally laid out as two free flow roundabouts, the junction improvements have included partial signalisation and modifications to the motorway slip roads. These improvements are considered to be working well by the Highways Agency and were developed with due regard to committed development in the area, including Javelin Park.

5.3.4 To the north of the M5 the B4008 continues and joins the A38 at a 5-arm roundabout, referred to as the Cross Keys roundabout. This roundabout junction provides a route connection to Gloucester in the north and the GCC administrative boundary in the south.

5.3.5 It is understood that this roundabout junction is the subject of some minor operational improvements proposals that have been secured through committed development contributions. It should be noted however, these improvements have not been implemented to date, but will need to be taken account of during the assessment process.

5.3.6 To the north of the Cross Keys roundabout, the next notable junction is the signalised junction of Cole Avenue. This junction is currently not included within the scope of the Transport Assessment (TA) but the sensitivity of this junction may result in it needing to be assessed. GCC Highways Department will be consulted to determine if the roundabout should be included in the assessment.

5.3.7 Freight route planning initiatives implemented by GCC would essentially dictate the waste delivery routes. Therefore distribution of arriving and departing traffic would be confined to routes that have already been agreed with GCC as designated lorry routes.

Consultations

5.3.8 An initial scoping meeting has been held with officers of both GCC Highways and the Highways Agency in June 2011 to discuss the principles of the proposed development and the anticipated extent of technical assessment.

5.3.9 This meeting identified that baseline future network traffic data was likely to be available from the GCC SATURN model for the future years of 2016 and 2026 (subject to validation) for the purposes of understanding committed development flows. This data could not subsequently be made available and

therefore an alternative approach was agreed with the highways authorities, based on GCC traffic count data and a review of historical committed development traffic estimates. The results of the baseline approach were agreed with GCC Highways Department in August 2011.

5.3.10 Officers identified that the extent of anticipated network assessment area for any formal TA / ES appraisal of the proposal scheme would likely be confined to the A38 Cross Keys roundabout, M5 J12 and Javelin Park access roundabout.

Assessment Methodology

5.3.11 The impact of operational traffic associated with the proposed development will be considered by way of a TA report. This will include transport related environmental effects. The key findings of the TA will form part of the ES.

5.3.12 The TA represents the technical highways review of the scheme and will include predictions for development related traffic generation and routing options and will assess the ability of the immediate highway network to accommodate development traffic movements via an appraisal of link impact, the operation capacity / safety of key network junctions and environmental impact criteria.

5.3.13 The anticipated assessment methodology underlying the TA / ES appraisal will be based upon a 'first principles' assessment of development demand based on a review of key criteria such as waste input tonnages, vehicle payloads, distribution of waste origins / destinations and site operating criteria. Such an approach is consistent with methodology previously accepted for the assessment of similar schemes at other locations across the UK.

5.3.14 As outlined above the scope of the TA has been the subject of consultation and will be agreed with both officers of GCC Highways Department (the Local Highway Authority) and officers of the Highways Agency (the Strategic Road Authority). Consultation and scoping procedures for transport appraisal are set out in Department for Transport (DfT) document "Guidance on Transport Assessment" and these will be adhered to.

5.3.15 On the basis of the consultation discussions carried out to date and a review of existing baseline conditions, it is considered that the formal TA / ES work would include for the following key highways and transport related issues:

Appraisal of Existing Network:

- Review of the operation of the immediate local highway network, including reference to observed conditions, predicted baseline data and existing local accident history for key network links. It is anticipated that suitable future model data will be provided by GCC highways from the Gloucester SATURN model. Should such data not be available or appropriate, then additional traffic surveys will be required to be undertaken at locations agreed with highways consultees.
- Review of available local public transport services and walking / cycling opportunities within the vicinity of the site.
- Understanding of other committed local development proposals / local highway schemes (including freight management policies) which could impact on the future background operation of the local network.
- Review of traffic demand estimates associated with extant planning approvals for the proposal site and key highways issues raised at the time of consideration of the schemes.

Review of the Proposed Development:

- Review of layout of proposed site access connection to the public highway network via reference to relevant local and national design standards.
- Review of internal site design including vehicle manoeuvring areas, car parking, HGV storage, etc.
- Review of opportunities to provide suitable walking / cycling access to the development scheme.
- Consideration of issues to be included within any staff Travel Plan package.

Estimate of Development Trip Generation:

- Estimate of anticipated daily operational HGV trip generation levels to / from the site via reference to a ‘first principles’ traffic demand model.
- Estimate of staff vehicle trip movements based on proposed shift schedules.

Estimate of Development Trip Distribution / Assignment:

- Estimate of trip distribution / assignment via reference to predicted future waste origins to the site and existing Traffic Regulation Orders on local routes.

Identification of Network Impact:

- Estimate of traffic impact of development proposals via operational assessment of key network links (via an assessment of percentage increase in background traffic levels and relevant DfT link capacity criteria) and, where necessary, junction capacity using appropriate local modelling software (ARCADY, LINSIG, etc).
- Requirement and extent of junction operational assessments to be discussed and agreed with GCC highways / Highways Agency officers following completion of initial review of link impact.
- Impact assessment to be undertaken for future years consistent with traffic data available from the GCC traffic model (i.e. 2016 & 2026). Whilst the TA will consider the highway peak periods, any assessment work deemed necessary as part of the ES will be undertaken during the period of greatest proportional increase of background traffic flows. This period may not coincide with the SATURN model outputs and will therefore be assessed with regard to the automatic traffic count data taken from the local links.

Identification of Traffic Related Environmental Impact:

- Traffic related environmental impacts will be established by comparing predicted development traffic demand levels to key environmental impact thresholds (30% and 10%) as set out in Institute of Environmental Assessment (IEA) document “Guidelines for the Environmental Assessment of Road Traffic”. Should predicted development traffic levels fall above these thresholds then further detailed assessment of the following environmental criteria would be carried out in line with the good practice set out in the IEA Guidelines Document:
    - severance;
    - driver delay;
    - pedestrian delay and amenity;

- accidents and safety; and
- hazardous loads.

- The EIA process will examine two impacts during the construction and operational phase of the development.

5.3.16 Detailed traffic related noise / vibration and air quality issues will be considered in detail in specific noise and air quality sections of the ES.

'Net' Traffic Impact Issues

5.3.17 The TA will include observations of the current traffic conditions and predictions for future traffic generation and how such demand impacts on the immediate highway network via an appraisal of link impact, the operation / safety of key network junctions and environmental impact criteria.

5.3.18 As described above Javelin Park already benefits from an extant planning permission related to storage and distribution warehousing. Such development has not been brought forward to date, but could be developed in future, with associated levels of operational and private vehicle traffic demand.

5.3.19 It is considered that the extant approval represents a material consideration in highways and traffic assessment terms, with the 'net' highways impact of the development scheme being the difference between the proposed levels of development traffic demand and those traffic levels associated with extant approved land uses.

5.3.20 Notwithstanding the above review of 'net' traffic issues, all future network capacity assessments (junction assessments / link assessments) will be carried out on the basis of the full development traffic demand associated with the proposed development.

5.4 Landscape and Visual Impact

Baseline Conditions

5.4.1 As described above the site lies within the southern half of Javelin Park, an undeveloped brownfield site that comprises areas of derelict land, hard standing and limited vegetation cover. Javelin Park lies adjacent to the M5 motorway and is bounded to the north by a large garden centre.

5.4.2 The nearest residential property to the site is The Lodge, approximately 50m to the east, set with dense woodland cover. Further residential properties lie to the east at the edge of Haresfield, approximately 0.7-1km from the site. To the west, beyond the motorway, Hiltmead House lies approximately 250m from the site boundary.

5.4.3 Settlements within 2.5km of the site include Haresfield, Little Haresfield, Colethrop, Standish, Putloe, Moreton Valance and Hardwicke. The southern edge of Gloucester is approximately 2.5km the north.

5.4.4 The Cotswold Way long distance footpath is located approximately 2.3km south east of the site and runs in a north south direction. This footpath includes a number of vantage points including Haresfield Beacon.

5.4.5 The western boundary of the Cotswolds AONB lies approximately 1.3km east of the site. The primary purpose of an AONB is, as set out in the Countryside and Rights of Way Act 2000, "*to conserve and enhance natural beauty*". The landform within the AONB rises steeply up an escarpment from the top of which expansive views are available across the valley of the River Severn to the north and west, this field of view includes the site. The Cotswolds Way National Trail runs along the top of the escarpment.

5.4.6 The landscape character of the site and its surroundings are described in the *Gloucestershire Landscape Character Assessment* (LDA Design 2006). The site lies within landscape character area SV6A: Vale of Berkeley.

5.4.7 In more general terms, the site is set within a very flat and low-lying landscape characterised by a mixture of land cover, including agriculture, settlement and industry. Views over and across this landscape are available from the top of the Cotswolds Escarpment to the east and from the fringes of the Forest of Dean to the west.

5.4.8 Finally, as noted in Chapter 2.0, a number of extant consents exist for the development of distribution warehousing at Javelin Park. If these consents were to be implemented they would change the character of views looking towards the site as well as exerting a localised influence upon landscape character.

Potential Effects

5.4.9 The proposed development would be a conspicuous feature by virtue of its size and scale, but would be experienced in a context where many different features are apparent, some attractive and others unsightly, including:

- the Cotswolds Escarpment;
- the River Severn;
- the M5 motorway;
- industrial development at the edge of Gloucester;
- ribbon development along the A38;
- the Gloucester and Sharpness Canal;
- electricity pylons;
- Gloucester and its suburbs;
- several small villages; and
- agricultural fields and buildings.

5.4.10 Potential effects that could result during the construction and operational period of the development include:

- Construction period:
    - temporary effects upon visual amenity and landscape character resulting from construction activity;
- Operational period:
    - change in the key characteristics of the local landscape due to the influence of the proposed development;
    - change in the visual context of the wider landscape;
    - change in views to and from the Cotswolds AONB;
    - change in view from properties close to the site;
    - change in view from recreational areas/routes; and
    - the presence of the development at a 'gateway' to Gloucester, particularly in views from the M5.

Design

5.4.11 The proposed development would, by virtue of its size, scale and location, be a prominent feature in the local landscape. As such, the development of a high

quality design is a key factor in the reducing the adverse landscape and visual effects. Measures undertaken during the design development phase include reducing the roof height and length of the facility to reduce its prominence in the wider landscape. This has been achieved by ensuring that the building envelope and the architectural solution is volumetrically efficient by minimising unused void space in the building and designing the structure to fit closely to the process technology contained within the building.

5.4.12 The building has also been orientated so the narrowest elevation of the building faces the most sensitive viewpoints. The choice of colour and materials of particular importance to the landscape and visual aspects and as such this has formed an important part of the design development.

5.4.13 A landscape scheme has been designed to provide a high quality visitor experience, provide low level screening to nearby receptors and enhance the biodiversity value of the site.

5.4.14 The landscape design is shown in Figure 2. This retains and promotes the existing watercourse that runs along the southern edge of the site as a key feature. Extensive woodland planting along the site perimeter and soil bunding towards the eastern part of the site would help screen vehicle movements and operational site activities at ground level.

Consultations

5.4.15 Consultations regarding the location of proposed representative viewpoints for inclusion in the assessment have been carried out with the following organisations:

- Gloucestershire County Council;
- Gloucester City Council;
- Forest of Dean District Council;
- Stroud District Council;
- The Cotswolds Conservation Board; and
- Natural England.

5.4.16 A plan was forwarded to the above organisations, which included thirty-one provisional visual assessment viewpoint locations and a computer-generated zone of theoretical visibility (ZTV) for the proposed development.

5.4.17 The responses received from the Cotswolds Conservation Board and from Natural England confirmed that the viewpoint locations suggested were acceptable to those two organisations.

5.4.18 The response from Gloucestershire County Council recommended that the inclusion of more distant viewpoints be rationalised following a site visit and that further viewpoints be considered around the villages of Haresfield and Moreton Valance.

5.4.19 The response from the Forest of Dean District Council recommended that further viewpoints from the edge of Cinderford and from the paths along the River Severn (near Awre and Purton) be considered.

5.4.20 The response from Gloucester City Council recommended that general views from Robins Wood Hill should be considered as well as the proposed view from the top of the hill. In addition the assessment should consider views from within the Country Park, Golf Course and the footpaths that run through the farmland adjacent to the Country Park.

Assessment Methodology

5.4.21 An assessment will be undertaken of the effects of the proposed development upon the landscape fabric of the site itself and upon the surrounding landscape character. The visual effects of the proposed development on nearby residential properties, public rights of way and important recreational areas will also be assessed.

5.4.22 The assessment will be carried out in accordance with guidance provided within *Guidelines for Landscape and Visual Impact Assessment* (The Landscape Institute and Institute of Environmental Management and Assessment 1995 and revised 2002). The proposed methodology is set out in detail in Appendix 1.

5.4.23 The visual impact assessment will include an assessment from a series of representative viewpoint locations. The locations as agreed with consultees are shown in Figure 5.

5.4.24 The LVIA will consider all potential effects arising from the proposed development, including effects arising from:

- night-time lighting;
- the visible plume, comprising mainly of water vapour, emitted from the stack; and
- temporary effects arising during the construction process.

5.4.25 The landscape and visual effects resulting from the proposed grid connection for the development will be considered in a separate chapter of the ES, but following the LVIA methodology as described above.

5.4.26 A series of photomontages will be prepared illustrating the existing and proposed views from a number of the viewpoints included in the LVIA. The existing and proposed night-time view will also be illustrated from a selected number of viewpoints.

5.5 Ecology and Nature Conservation

Baseline Conditions

Designated Sites

5.5.1 There are no statutory ecological designations located within 2km of the site. The following international ecological designations are located within 15km of the site:

- Severn Estuary Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar site – c.6.6km south west;
- Walmore Common SPA and Ramsar site – c.6.6km north west ;
- Cotswolds Beechwoods SAC – c.7.1km north east;
- Rodborough Common SAC – c.8km south east; and
- Wye Valley and Forest of Dean Bat Sites SAC – c.13km west.

5.5.2 Gloucester and Sharpness Canal, a Gloucestershire Key Wildlife Site (KWS), is located approximately 2km to the north west of the site.

Habitat and Species Data

5.5.3 An Extended Phase 1 habitat report was undertaken by RPS in 2010. The report included Phase 1 habitat survey and a desk based study of designated sites and notable species in the vicinity of the site. The findings of the report are summarised in the following paragraphs.

5.5.4 The site comprises expansive areas of open ground and tall ruderal vegetation with ornamental scrub and immature trees on the eastern boundary and large piles of rubble, ballast and soil occupying much of the eastern half of the site. A minor watercourse, the banks of which support neutral grassland and ornamental scrub planting, flows along the southern and western boundary of the site. A short section of drainage ditch runs along the eastern boundary of the site before flowing into a culvert that connects with the watercourse described above. The northern section of the drainage ditch is connected to the highways drainage channel that runs along the B4008.

5.5.5 Two ponds are located approximately 400 m to the north of the site. The northern half of Javelin Park and the garden centre lie between the ponds and proposed development area.

5.5.6 In general the habitats found at the site do not support a particularly diverse or notable assemblage of plants and are limited in terms of structural diversity. As such they are considered to represent limited biodiversity value. However, the minor watercourse and its associated habitats represent an area of greater biodiversity value and also provides a habitat corridor within the wider landscape.

5.5.7 Desk based records indicates that badger, great crested newt (GCN), water vole, slow worm, brown hare, pipistrelle, noctule and brown long-eared bat have been recorded within 2km of the development site. A number of birds of interest have also been recorded within 2km including barn owl, linnet, skylark, song thrush, house sparrow and spotted flycatcher.

5.5.8 The Phase 1 habitat survey recommended that a great crested newt habitat suitability index (HSI) survey and a reptile presence/absence survey were undertaken at the site. Both surveys were undertaken by RPS in 2010, the HSI

surveys were conducted in April 2010 and the reptile surveys were conducted in September and October 2010.

5.5.9 The results of the HSI surveys indicate that the roadside drainage ditch and the drainage ditch located inside the eastern perimeter of the site represent features of poor potential for great crested newts. The balancing ponds to the north of the site were not accessible and as such a full HSI survey was not undertaken of the ponds. However, due to the distance from the site and the poor suitability of the interconnecting habitat it is considered highly unlikely that there is movement of great crested newts between the ponds and the proposed development area.

5.5.10 With regards to the reptile survey a total of 102 artificial refuges were placed across the site and seven visits were undertaken to inspect the refuges during optimum survey conditions. No reptiles were identified during the surveys indicating that the presence of reptiles at the site is unlikely.

Potential Effects

5.5.11 In order to avoid the loss of the features of ecological interest on the site the layout has been designed to reduce impacts on the watercourse and its associated riparian habitats. Retention of this habitat would ensure that this potentially valuable wildlife corridor is retained.

5.5.12 As discussed in Section 5.7 below potential impacts on water quality on the watercourse e.g. pollution from suspended solids or fuels / oils, would be mitigated through the use of best practice construction methods.

5.5.13 Given the low value of the habitats across the majority of the site and the findings of the reptile and the HSI survey the development is considered unlikely to result in significant direct ecological impacts.

5.5.14 The potential for the facility to result in indirect air quality impacts on designated sites remote from the site will be fully assessed, the air quality assessment is discussed further in Section 5.9.

Consultations

5.5.15 The GCC County Ecologist was consulted with regard to the great crested newt and reptile surveys. It was agreed that the survey data was sufficient to confirm that GCNs and reptiles were unlikely to be present at the site. Nevertheless it was proposed that pre-construction surveys should be undertaken to confirm that the baseline at the site has not significantly altered between the assessment undertaken for the EIA and the start of the construction period. GCC also advised that Natural England Standing Advice notes regarding protected species should be reviewed to ensure that all necessary surveys have been conducted.

5.5.16 Natural England has been consulted regarding the proposals and has requested that detailed air quality dispersion modelling is undertaken to assess the potential for indirect air quality impacts on European Sites. Natural England has also requested that other potential impacts on European Sites such as water quality and disturbance are also considered by the impact assessment.

5.5.17 Gloucester Wildlife Trust and Gloucestershire Bat Group have been consulted regarding species records at the site and in the surrounding area.

Assessment Methodology

5.5.18 An ecological impact assessment will be undertaken that will incorporate a full evaluation of ecological interest features within the vicinity of the development and provide an assessment of how the proposals would affect the integrity of these features.

5.5.19 In addition to the surveys undertaken by RPS, breeding bird, bat and badger surveys are being conducted at the site. The existing and additional survey results will provide sufficient information to enable the ecological assessment to be undertaken.

5.5.20 The impact assessment will follow the methodology set out by the Institute of Ecology and Environmental Management (IEEM, 2006). This methodology involves the valuation of ecological receptors identified at the site, characterisation of the impacts that may result from the construction or operation of the facility and determining whether the impacts are likely to result in a significant impact on the integrity of the ecological receptors assessed.

5.5.21 An assessment of indirect impacts from air quality on European Sites within 15km of the proposed stack will be undertaken (refer to Section 5.9 for further details). The results of the modelling will be considered within the Ecology and Nature Conservation chapter of the ES. These results will help to inform a draft Habitats Regulations Screening Opinion that will be used to determine if an Appropriate Assessment of the proposed development is likely to be required under Regulation 21 of the 2010 Conservation of Habitats and Species Regulations.

5.6 Soils, Geology and Hydrogeology

Baseline Conditions

Site History

5.6.1 It is understood that the site was used for agricultural purposes until the late 1930s at which point it was brought into use as part of an RAF airfield. The airfield was used as a military base throughout World War II and was initially named RAF Haresfield and subsequently RAF Moreton Valence. Post-war the site continued to be used as an airfield by Gloster Aircraft Company until 1963. After 1963 the hangers that remained on the site were used for temporary storage and distribution warehouses before being demolished in 2002-2005. The site has remained disused since 2005.

Ground Conditions

5.6.2 The site is underlain by Lower Lias Clay which is firm to very stiff becoming a mudstone at depth (proved to approximately 4.5 – 6 m below ground level (bgl)). The Lower Lias Clay is underlain by marl and mudstone. A small area of sand and gravel (Cheltenham Sand and Gravel unit) is shown on the geological map to the south west of the site.

5.6.3 A number of intrusive ground investigations associated with the extant permissions for distribution warehousing have been undertaken at the site. Investigations indicate that the made ground at the site is up to 2 metres thick. Isolated fragments of asbestos were identified in the southern area of the site with significant quantities of surface Asbestos Containing Materials (ACM) identified to the northeast of the site boundary. The investigations also detected elevated levels of hydrocarbons at the site.

5.6.4 On the basis of the findings of the investigations remediation works were undertaken at the site and a remediation completion report was produced by RPS in 2008. This report documents the removal of ACM from the site and the removal of a number of underground storage tanks and associated hydrocarbon contamination. Contained within the report is correspondence from the EA and the Local Authority stating that they accept that the remedial works have been completed to a standard acceptable to the regulators.

5.6.5 In 2008 RPS, on behalf of GCC, undertook a Phase 1 Desktop Study of the site for the purposes of the Gloucestershire Residual Waste project. Subsequently a Phase 2 Intrusive Site Investigation was undertaken in 2010 to confirm the ground conditions at the site. The investigation involved the following exploratory investigations across the site:

- 10 rotary boreholes – up to 25m in depth;
- 8 window sample boreholes – up to 4m in depth; and
- 15 trial pits.

5.6.6 A series of soil and groundwater samples were recovered for chemical testing and ground gas monitoring was also undertaken. An initial screening level assessment of the site investigation samples confirmed that there were no exceedences of inorganic or organic parameters above their respective Soil Guideline Values (SGVs) or human health Generic Assessment Criteria (GACs) for commercial / industrial end use from. As such the potential risks presented by identified contaminants to human health and controlled waters were considered to be low. The results of the ground gas monitoring indicate that the potential risk from ground gases at the site is also anticipated to be low.

Potential Effects

5.6.7 The site has been subject to extensive ground remediation works and as such identified sources of contamination are understood to have been removed from the site. This was confirmed by the results of the 2010 site intrusive site investigation which indicated that the risks to human health and controlled waters are considered to be low.

5.6.8 Whilst low levels of ground contamination may remain at the site it is considered that through the implementation of the best practice construction techniques the impacts from ground contamination at the site are likely to be negligible.

Consultation

5.6.9 The Stroud District Council Contaminated Land Officer has been consulted on the scope of the assessment and is satisfied with the approach being proposed. The only additional comments related to ensuring that 'Model Procedures for the Management of Contaminated Land (CLR11)' (Environment Agency, 2004) are considered when undertaking the assessment.

Assessment Methodology

5.6.10 The information known to date indicates that impacts on soils, geology and groundwater are unlikely to be significant. Nonetheless given the nature of historic activities at the site it is considered appropriate to present an assessment that documents the: history of the site; investigations and remediation works undertaken to date; and residual risks that could result from the proposed development.

5.6.11 The assessment will be based on the findings of the 2008 Phase 1 Desktop Study, the 2010 Phase 2 Intrusive Site Investigation and the results of previous site investigations associated with the extant planning consents at the site.

5.6.12 The study will assess the risks to human health, controlled waters and flora and will be undertaken in accordance with Planning Policy Statement 23 Planning and Pollution Control.

5.6.13 The chapter will contain a summary of the following information:

- geology and protected geological sites;
- groundwater and hydrogeology;
- contaminated land; and
- geohazards – mining, ground gas, aggressive ground conditions.

5.6.14 The baseline information will be used to prepare a Conceptual Site Model and qualitatively assess the risk using the approach outlined in CIRIA Report C552 Contaminated Land Risk Assessment – A Guide to Good Practice (2001).

5.6.15 Mitigation measures would be identified for any significant impacts including recommendations for the provision of any additional investigation works that may be required in advance of construction.

5.7 Surface Waters and Flood Risk

Baseline Conditions

5.7.1 As described previously a minor watercourse flows along the southern and western boundary of the site within an engineered channel. The water in the channel flows from east to west and discharges into two concrete culverts to the north west of the site which pass beneath the M5 motorway. The watercourse ultimately discharges into the Gloucester and Sharpness Canal located 2 km west of the site.

5.7.2 A highways drainage channel runs along the edge of the B4008 adjacent to the eastern boundary of the site. This drainage channel discharges into an open ditch located within the north eastern corner of the site. This drainage ditch runs in a north-south direction for approximately 75 m adjacent to the eastern boundary of the site, the ditch then enters a 300mm pipe that discharges into the watercourse flowing along the southern boundary of the site.

5.7.3 The former airfield was drained via downpipes, gullies and channel drains to a below ground piped drainage system. The piped system discharged to a culvert that flowed from south to north below the development site. These culverts are understood to have been stopped up.

5.7.4 The Hydrogeological Map of England and Wales indicate the area of development is within a “region underlain by impermeable rocks that are generally without groundwater”. The memoir to the map describes the formation as being Lias, noted as a thick sequence of clays with alternating thin limestone bands. This strata is considered to a ‘non aquifer’ according the Environment Agency’s Groundwater Vulnerability Map of the area.

5.7.5 The Environment Agency’s Flood Map indicates that the development site is located within an area of Planning Policy Statement 25 (PPS25) Flood Zone 1 (Low Probability). PPS25 Flood Zone 1 is land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

5.7.6 PPS25 advises of the requirement for a Flood Risk Assessment (FRA) for any of the following cases:

- any site located within the Environment Agency designated floodplain (i.e. PPS25 Flood Zones 2 and 3; Medium and High Probability respectively);
- non residential development within PPS25 Flood Zone 1 (Low Probability), where the site is in excess of 1ha, or has a development floor space in excess of 1000m^2; and
- residential development in Flood Zone 1, where the site area is greater than 0.5ha or the development comprises more than 10 units.

5.7.7 Although the proposed development is non-residential and the area is situated entirely within an area of PPS25 Flood Zone 1 (Low Probability) the site is in excess of 1ha. The proposal therefore requires an accompanying FRA as detailed above. A Level 2 FRA was undertaken by RPS in 2010 in accordance with PPS25 Practice Guide and Environment Agency guidance. The Level 2 FRA provides a qualitative appraisal of the flood risk posed to the site from tidal, fluvial, groundwater and pluvial sources. As part of this study the baseline conditions of the local drainage ditch/culvert has been investigated.

Potential Impacts

5.7.8 The development would result in an increase in the impermeable area at the site, as such the discharge rate of surface water flows into the adjacent watercourse could increase. In order to mitigate this impact a series of surface water attenuation lagoons have been included as part of the proposed landscaping solution. These lagoons would control the rate at which surface water is discharged into the adjacent watercourse. The ES will consider the impact that the development has on flood risk in line with Planning Policy Statement 25 – Development and Flood Risk.

5.7.9 There is also the potential for the construction and operational phases of the development to result in contamination of surface waters by suspended solids and other pollutants. The control of pollution during the construction phase would be avoided through the implementation of construction best practice measures e.g. use of settlement lagoons, retaining a vegetated buffer adjacent to the watercourse.

5.7.10 During the operational period the facility would be managed under an Environmental Permit which would ensure that all appropriate environmental protection measures are in place to prevent the pollution of surface water resources. As such there is likely to be a negligible risk to water quality during the operational period.

Consultations

5.7.11 The Environmental Agency (EA) has been consulted with regard to the approach to the assessment and the provisional surface water drainage design. The EA has agreed the approach to the Flood Risk Assessment and will advise on the level of attenuation that they would expect to be achieved by the surface water drainage system at the site.

Assessment Methodology

5.7.12 The assessment of potential impacts arising from the proposed development on water resources will be undertaken by analysing interactions between the construction and operational processes on surface water patterns and groundwater characteristics. The assessment will consider the potential impacts on the local surface water systems on and around the site and local water supply and drainage infrastructure.

5.7.13 A quantitative appraisal of the fluvial flood risk from the drainage ditch/culvert will be undertaken to understand the true extent of flood zoning across the development site. A Level 3 Flood Risk Assessment (FRA) will be carried out with particular focus being placed upon the fluvial flood risk associated with the watercourse that flows along the southern and western boundary of the site.

5.7.14 A conceptual drainage strategy will be developed for the site that would attenuate surface water flows prior to being discharged into the watercourse. The discharge rate into the watercourse will be agreed with the Environment Agency and this will inform the size of the attenuation lagoons required.

5.7.15 The assessment will also include an appraisal of on-site activities and the potential effects these may have upon the local water environment. It will specifically concentrate upon the following issues:

- disturbance of surface water drainage regimes;

- contamination of surface waters by suspended solids or by other pollutants; and
- contamination of groundwater.

5.8 Noise and Vibration

Baseline Conditions

5.8.1 The site is located in a semi-rural setting adjacent to the M5 motorway and B4008 road. The closest sensitive receptors to the development site include:

- The Lodge residential property, approximately 50m to the east of the site boundary;
- Hiltmead residential property, approximately 250m to the west of the site on the opposite side of the M5; and
- St Joseph Travellers Park, approximately 450m to the west of the site.

5.8.2 Blooms Garden Centre is located approximately 250m to the north, this is not a residential receptor and as such is not as sensitive to potential noise impacts.

5.8.3 A background noise and vibration survey was been undertaken by RPS in April/May 2010. The surveys comprised two fifteen-day measurements, and four short-term measurements (three 15-minute periods during the daytime) at locations representative of the nearest noise sensitive receptors to the proposed facility. Observations at the monitoring positions indicate that the local noise environment is influenced by noise from road traffic on the M5 motorway, the B4008 and the A38. Noise levels were found to be typical of rural and semi-rural areas near to a major motorway.

5.8.4 In addition to the RPS surveys, UBB has undertaken additional noise surveys along the northern boundary of the site. The results from these surveys are comparable to the results of the surveys undertaken in 2010.

Potential Impacts

5.8.5 The construction works would involve mechanical excavation, use of heavy plant and machinery and piling. Such operations may result in noise and vibration impacts within the local environment. Standard best practice construction mitigation would be implemented and noisy operations would be

restricted to the daytime period i.e. 07.00-19.00. The ES will include an assessment of potential construction noise impacts.

5.8.6 The proposed facility has the potential to result in noise impacts from the operation of process equipment and movement of vehicles around the site. These impacts have been taken into account when designing the layout of the development. Potential impacts have been mitigated through the positioning of noisy plant e.g. the air cooled condensers, away from the boundary of the site closest to The Lodge, the nearest sensitive residential receptor. Earth bunding has also been proposed along the eastern boundary of the site to reduce noise impacts on The Lodge. The ES will include an assessment of operational noise impacts and will predict noise levels that would be experienced at nearest sensitive receptors.

Consultations

5.8.7 The Stroud District Council Environmental Health Officer (EHO) has been consulted on the proposals and the approach to the noise assessment. The EHO has advised that operational noise from the development should not exceed +3dB above background at any residential receptors. The EHO was satisfied with the level of noise monitoring and the general approach to the assessment.

Assessment Methodology

5.8.8 The noise impact assessment will assess the potential impact of noise and vibration from the construction and operation of the proposed development. The assessment will also include impacts associated with traffic movements generated by the development.

5.8.9 The noise assessment will be undertaken with reference to the following guidance documents:

- Planning Policy Guidance Note 24 (PPG24) ‘Planning and Noise: 1994;
- BS4142:1997 ‘Method for rating industrial noise affecting mixed residential and industrial areas';
- BS 8233:1999 ‘Sound insulation and noise reduction for buildings – Code of Practice’;

- World Health Organisation (WHO) Guidelines for Community Noise: April 1999; and
- The Institute of Acoustics (IOA) and the Institute of Environmental Management and Assessment (IEMA) Joint Working Party draft 'Guidelines for Noise Impact Assessment'.

5.8.10 A site specific noise model will be developed to predict operational noise from the development, the assessment will predict noise levels for the daytime (07.00 hours to 23.00 hours) and night time (23.00 hours to 07.00 hours) periods. The representative noise sensitive receptors to be included in the assessment are listed below, and shown on Figure 6:

- The Lodge;
- Blooms Garden Centre;
- Hiltmead House;
- St Joseph's Travellers Park;
- Old Airfield Farm;
- Lindas Home;
- Broadfield Farm;
- Roysten;
- G+M Motors Gloucester; and
- Warren Farm.

5.8.11 In relation to the construction phase the assessment will predict the impact of construction plant and vehicles with reference to the methodology set out in BS:5288.

5.8.12 Noise arising from road traffic will be determined from the traffic figures provided in the TA in accordance with the methodologies provided within `Calculation of Road Traffic Noise' and the Department of Transport – Transport Analysis Guidance: 2006.

5.9 Air Quality and Human Health

Baseline Conditions

5.9.1 Information about the baseline air quality conditions in the surrounding area will be obtained from a number of sources. The sources of available baseline information are described below.

Site Based Monitoring

5.9.2 RPS undertook a review of local air quality data on behalf of GCC in 2010, this identified a lack of monitoring data in the areas surrounding the site. In order to gain a better overview of the background air quality around the facility RPS has undertaken additional monitoring. The air quality monitoring involved:

- passive diffusion tube monitoring for NO_2 and SO_2 at 12 locations which included roadside sites, urban background sites, rural sites and sensitive vegetation habitats; and
- a continuous monitoring station located at Javelin Park.

5.9.3 The continuous monitoring station included the following:

- 1 Beta Attenuation Monitor (BAM) 1020[1] which recorded PM_{10} concentrations automatically for every hour;
- 1 SMART Beta Attenuation Monitor 1020 which recorded $PM_{2.5}$ concentrations automatically for every hour;
- 1 Partisol 2000 sampler which collected monthly air samples onto a filter for laboratory determination of Toxic Organic Micropollutants (TOMPs); and
- 1 Partisol 2000 sampler which collected monthly air samples onto a filter for laboratory determination of metals.

5.9.4 Air quality has been monitored for a period of 8 months. The diffusion tube monitoring started on the 2nd November 2010 and the continuous monitoring on the 28th September 2010.

5.9.5 The results of this site based monitoring will be analysed and corrected to an annual basis. The analysis will take into account of any bias adjustment and compare and moderate the results to the long term annual average at the closest relevant sites.

Automatic Monitoring Data

5.9.6 The closest continuous automatic monitoring stations are located over 40km from the facility. The closest urban background sites are Bristol St Pauls and Harwell monitoring stations.

National NO_2 Diffusion Tube Data

5.9.7 There are 28 locations within 10 km of the site where nitrogen dioxide (NO_2) concentrations are monitored as part of DEFRA's national NO_2 diffusion tube survey.

National Modelling Data

5.9.8 In order to assist Local Authorities with their responsibilities under Local Air Quality Management (LAQM), DEFRA has modelled the background concentration of pollutants throughout the UK on a 1 km by 1 km grid. This model is based on known pollution sources and background measurements. The DEFRA modelling provides concentrations of NO_2, NO_X, SO_2, CO, PM_{10}, $PM_{2.5}$, 1,3-butadiene and Benzene at closest point within 1km of the stack location.

Local Authority Air Quality Data

5.9.9 GCC and the neighbouring areas of Forest of Dean District Council (FDDC) and Tewkesbury Borough Council (TBC) have declared Air Quality Management Areas (AQMA). The only AQMAs within 15 km of the site are located in GCC's area and are over 8 km away from the site. The impact of the emissions from the facility on the AQMAs will be assessed. Within 15 km there are 14 GCC diffusion tube sites that monitor nitrogen dioxide. The closest of these is located in Gloucester city centre.

Volatile Organic Compounds

5.9.10 A variety of VOCs could be released from the proposed facility, of which benzene and 1,3-butadiene are included in the National Air Quality Strategy and monitored at various sites around the UK. The most appropriate representation of results from the national monitoring network will be used for the Air Quality Assessment.

Metals

5.9.11 The closest continuous background monitoring stations for heavy metals are at Walsall, Cardiff and Bristol. Due to the lack of local data, short term monitoring of metals has been carried out at the site for a period of 8 months. The results of the short term on site monitoring will be verified against the regional long term monitoring.

Dioxins and Furans

5.9.12 Dioxins and furans are monitored on a quarterly basis at six background monitoring stations in the UK. As none of these sites are particularly close to the facility the onsite monitoring programme has included sampling of dioxins and furans. The results of this on site monitoring will be verified against the regional long term monitoring sites.

Potential Effects

5.9.13 The impact of EfW facilities on air quality is carefully controlled through European and UK legislation, the proposed facility would comply with the requirements of the Waste Incineration Directive 2000/76/EC (WID) and emissions would be regulated under the terms of an Environmental Permit. As such there are unlikely to be significant potential impacts on human health or the environment. However, the emissions that could arise from the proposed development will be assessed and results presented within the ES.

5.9.14 The delivery of waste and materials to the site would result in an increase in traffic and therefore associated vehicle emissions on local roads. The impact of traffic related vehicle emissions would be assessed as part of the ES.

Assessment Methodology

Stack Emissions

5.9.15 The facility would operate in accordance with the WID, which imposes stringent controls on emissions. However, in order to verify the impact of releases from the stack on local air quality, the dispersion of the pollutants in the atmosphere will be modelled. The resultant ground level concentrations will be compared

with current air quality and with relevant air quality objectives and guidelines. This will be carried out using the following general methodology.

- The relevant air quality objectives and guidelines will be identified from national legislation and Environment Agency guidance documents.
- Current levels of pollutants in the atmosphere will be estimated using publically available monitoring data from national and local databases, including GCC's Local Air Quality Monitoring and Assessment Reports and from the monitoring undertaken specifically for the project.
- Ground level concentrations of pollutants resulting from emissions from traffic and the stack will be predicted, as described in later sections of this methodology.
- The predicted ground level concentrations will be compared with air quality objectives and guidelines in order to assess the impact.

Sensitive Receptors

5.9.16 A number of sensitive receptors have been identified within 2km of the stack. These include residential areas and farms. Table 1 below lists the sensitive receptors which will be considered within the air quality assessment and in the human health impact assessment (described below), these receptor points are illustrated in Figure 7.

Table 1: Sensitive Receptors considered in Air Quality Assessment

Receptor Name	Distance from Stack
Broadfield Farm	800 metres
Chestnut Farm	1300 metres
Colethrop Farm	1700 metres
Gables Farm	1300 metres
Haresfield	1600 metres
Haresfield Court	1300 metres
Hill View Farm	1900 metres
Hiltmead House	300 metres
Old Airfield Farm	600 metres
Little Haresfield	1300 metres
The Lodge	400 metres
Lindas Home	400 metres
Royston	1000 metres

Receptor Name	Distance from Stack
Newhouse Farm	1800 metres
Pool Farm	1900 metres
Putloe	1700 metres
Parkend Farm	900 metres
Road Farm	1100 metres
Round House	1400 metres
St Josephs Travellers Park	500 metres
Summer House Farm	1100 metres
Warren Farm	1100 metres

5.9.17 There are a number of potentially sensitive ecological features located within 10-15km of the site boundary. At all of these sensitive sites the potential impact of emissions to air from the propose facility will be calculated and assessed with reference to appropriate guidelines e.g. UK Air Pollution Control System (APIS) thresholds.

5.9.18 The assessment will take into account the ecological features identified in the Preliminary Assessment of Air Quality Impacts on Statutory Designated Sites (2010) undertaken by RPS to aid the development of the Javelin Park facility. This report identified features within the following distances:

- all habitat features designated by the EC Habitats Directive (90/43/EEC) - SAC's (Special Areas of Conservation), SPA's (Special Protection Areas) and Ramsar sites – within 15km of the plant;
- all habitat features designated by the Wildlife & Countryside Act 1981 - SSSI's (Sites of Special Scientific Interest) – within 10km of the plant; and
- Local Wildlife Sites – Ancient Woodlands, National Nature Reserves, Local Nature Reserves and other local wildlife sites – within 2km of the plant.

5.9.19 The Environment Agency's Technical Guidance Note EPR-H1 states that conservation sites need only be considered where they fall within set distances of the activity:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) or Ramsar sites within 10 km of the installation.

- Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs), Local Nature Reserves (LNRs), local wildlife sites and ancient woodland within 2km of the location of the installation.

5.9.20 The sites located both within and outside of the H1 screening distances have been presented in Table 2 which will be considered within the Air Quality Assessment. For habitat features that encompass a large area (such as Severn Estuary SAC) a number of points have been considered across the habitat. For habitat features that are made up of a number of separate sites, the impact at each individual site that makes up the larger habitat feature (such as Cotswold Beechwoods SAC) has been modelled. The distribution of modelled receptor locations is illustrated on Figure 8.

Table 2: Habitat Receptors considered in Air Quality Assessment

Habitats Receptor	**Approx. Distance from the Plant (km)**
Habitats within the H1 Screening Criteria	
Severn Estuary SPA,SAC & Ramsar	6.6 km south west
Walmore Common SPA, Ramsar	6.6 km north west
Cotswold Beechwoods SAC	7.1 km east
Rodborough Common SAC	8.0 km south east
Glos And Sharpness Canal (Key Wildlife Site)	2 km north
Habitats outside of the H1 Screening Criteria	
Range Farm Fields SSSI	5.3 km north east
Woodchester Park SSSI	8.6 km south
Swift's Hill SSSI	8.2 km south east
Walmore Common SSSI	6.6 km north west
Upper Severn Estuary SSSI	8 km south west
Minchinhampton Common SSSI	10 km south east
Cotswold Commons & Beechwoods SSSI	7.1 km east
Selsley Common SSSI	7.3 km south east
Edge Common SSSI	4.5 km south east
Rodborough Common SSSI	8 km south east
Bull Cross, The Frith & Juniper Hill SSSI	6.7 km south east
Hucclecote Meadows SSSI	8.9 km north east
Frampton Pools SSSI	5.3 km south west
Cotswold Commons and Beechwoods LNR	7.1 km east
Saintbridge Balancing Pond LNR	7.7 km north east

Habitats Receptor	Approx. Distance from the Plant (km)
Barnwood Arboretum LNR	9.4 km north east
Robinswood Hill LNR	5.5 km north east
Alney Island LNR	8.1 km north
Quedgeley Arboretum LNR	3.7 km north
Green Farm Orchard LNR	4.8 km north
Hucclecote Meadows LNR	8.9 km north
Wye Valley and Forest of Dean Bat Sites SAC	13km north west

Guidelines

5.9.21 The guidelines used to assess the significance of air quality impacts are contained within the Environment Agency's Technical Guidance Note EPR-H1 Annex F. This Guidance states that an emission can be considered to be insignificant if the contribution to long term ground level concentrations is less than 1% of the air quality objective and the contribution to short term ground level concentrations is less than 10% of the air quality objective.

5.9.22 Where the emissions of a particular pollutant cannot be screened out as insignificant under the EA guidelines, the predicted concentrations are evaluated further, applying the guidance from Environmental Protection UK (EPUK) in their publication "Development Control: Planning for Air Quality." This recommends the use of descriptors, shown in Table 3 below, to summarise the magnitude of contributions due to the emissions released from the facility and is the method that will be used to define the magnitude of effects within the ES.

Table 3: Summary of Comparison Descriptors

Magnitude of Change	Long Term Change
Large	Increase/decrease >10%
Medium	Increase/decrease 5-10%
Small	Increase/decrease 1-5%
Imperceptible	Increase/decrease <1%

5.9.23 EPUK then recommend the use of the descriptors listed in Table 4 to evaluate the impact of any increase in concentration, utilising the descriptors of magnitude referred to above. It can be seen that any long term impact described as "Insignificant" under the Environment Agency's criteria would be described as

"Imperceptible" under the EPUK system. The following table sets out the EPUK guidance in relation to the long term nitrogen dioxide objective.

Table 4: Summary of Significance Descriptors (NO_2) (Increase with Scheme)

Absolute Concentration in relation to standard	**Small**	**Medium**	**Large**
Above Objective/Limit Value with Scheme (>40 µg/m³)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value with Scheme (36-40 µg/m³) (90%-100% of Objective/Limit Value)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value with Scheme (30-36 µg/m³) (75%-90% of Objective/Limit Value)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value with Scheme (<30 µg/m³) (<75% of Objective/Limit Value)	Negligible	Negligible	Slight Adverse

5.9.24 For other pollutants, the EPUK guidance suggests that the use of similar percentages of the air quality objective may be appropriate.

Dispersion Modelling

5.9.25 Detailed flue gas dispersion modelling will be carried out using the computer model ADMS 4.2, developed and supplied by Cambridge Environmental Research Consultants (CERC). ADMS 4.2 has been used on many occasions for the modelling of emissions for planning, PPC (Pollution Prevention and Control) and Environmental Permitting applications. Air quality assessments utilising ADMS are generally regarded, by the Environment Agency, as employing an acceptable methodology. The computer model would include other emission sources at the site.

5.9.26 Emissions to air from the stack will be characterised using information from the proposed technology suppliers. Emissions will be assessed assuming that the facility would operate at full capacity and would operate at the WID emission limits values for the whole year. It is acknowledged that similar facilities operate

below these emission limits for most of the time, thus the actual average emissions would be lower than those in the dispersion model. In addition, the facility would only operate for around 90% of the year, rather than the entire year, due to necessary stoppages for maintenance. As a result the proposed air dispersion model will be regarded as being conservative.

5.9.27 For particulate matter, it will be assumed that all of the particulate emissions would be below 10 microns, so would all be PM_{10}. For the purpose of the Air Quality Assessment it will be assumed that 33% of the particulates are below 2.5 microns.

5.9.28 The facility would release nitric oxide (NO) and nitrogen dioxide (NO_2) which are together referred to as NO_x. In the atmosphere, NO would be converted to NO_2 in a reaction with ozone which is influenced by solar radiation. As Air Quality Objectives are expressed in terms of NO_2, it is important to be able to assess the conversion rate of NO to NO_2. It is stated in Environment Agency guidance it should be assumed that there will be a conversion rate of 70% over the long term and 35% over the short term.

5.9.29 The impact of local weather conditions will be taken into account by using data from Bristol weather monitoring station, using five years of data (from 2006 to 2010) will be used to ensure that potential fluctuations in weather conditions will be accounted for.

5.9.30 The effects of the local terrain on dispersion will be taken into consideration by using Ordnance Survey Digital Terrain Data.

5.9.31 The presence of adjacent buildings can significantly affect the dispersion of the atmospheric emissions in various ways. It is generally accepted that building effects are only significant for buildings/structures which are taller than one third of the stack height and so these buildings/structures would be included in the model.

Deposition studies

5.9.32 It is important to assess the impact of deposition on the sensitive environmental habitats close to the site. Deposition occurs through two routes.

5.9.33 Dry deposition occurs when material is lost from the plume at the surface of the ground. This is the primary method of deposition for particulate matter. The Environment Agency recommends that the following deposition velocities be used:

- NO_2: 1.5mm/s for grassland and 3mm/s for woodland;
- $NO_{x:}$ 0.15mm/s for grassland and 0.3mm/s for woodland;
- SO_2: 12mm/s for grassland and 24mm/s for woodland; and
- NH_3: 20mm/s for grassland and 30mm/s for woodland.

5.9.34 Wet deposition occurs when pollutants are washed out of the plume by rain. The Environment Agency recommends that wet deposition does not need to be assessment within 15km of the emission point. Therefore, this deposition pathway will not be included as part of the assessment.

5.9.35 The impact of deposition will be assessed using the approach recommended by the Environment Agency. The ground level concentrations predicted by the ADMS modelling will be multiplied with the above deposition velocities to get deposition results in units of µg/m²/s. These deposition results will then be converted into suitable units for comparison with the benchmarks as follows:

- conversion to kg/hectare/year by multiplying by 3600x24x365 (seconds/year), then by 10,000 (m²/hectare) and then dividing by 1,000,000,000 (µg/kg);
- for nitrogen deposition, the deposition rate of NO_2 will be multiplied by 14/46 and the deposition rate of NH_3 will be multiplied by 14/17 to give total deposition in kg of N/he/year; and
- for acid deposition, the deposition rate will be multiplied by the valency (2 for SO_2 and 1 for NO_2) and then divided by the molar mass.

5.9.36 Once the deposition has been calculated for each site, they will be compared with the critical loads published in the UK Air Pollution Information System (APIS) and the impact of the pollutant determined.

Traffic Emissions

5.9.37 The baseline traffic movements at the site will be determined through use of traffic survey data. Traffic generated as a result of the development will be calculated as part of the TA and assigned to local road links.

5.9.38 Where the increase on a particular road link is less than a 1% of the baseline traffic movements the assessment of traffic related air quality impacts will be scoped out of the EIA.

5.9.39 If there is a greater than a 1% increase on the baseline traffic the impact of emissions from traffic associated with the facility will be assessed using the screening method outlined in Chapter 3 of Volume 11 of the Design Manual for Roads and Bridges (DMRB), produced by the Highways Agency. If traffic impacts are considered likely to result in major traffic related air quality impacts the ADMS-Roads software tool will be used to produce a full dispersion model.

Construction Impacts

5.9.40 There would be potential dust emission sources associated with the construction phase primarily during excavation and ground works. The management of dust during such activities is standard in the construction industry and proven mitigation measures exist. As such, it is proposed that the assessment does not include a numerical dust analysis, but alternatively highlights those measures that would be adopted to mitigate the potential for dust to arise.

Human Health

5.9.41 There is no evidence that a well managed modern waste management facility leads to adverse health impacts on the local population. A report undertaken by DEFRA in 2004 “Review of Environmental and Health Effects of Waste Management” examined a large number of papers and studies on health impacts of waste management facilities. The review did not find a link between the current generation of municipal solid waste incinerators and health effects.

5.9.42 The Health Protection Agency has issued a more recent statement on “The Impact on Health of Emissions to Air from Municipal Waste Incinerators” (February 2010). The HPA stated that “Modern, well managed incinerators make only a small contribution to local concentration of air pollutions. It is

possible that such small additions could have an impact on health but such effects, if they exist, are likely to be very small and not detectable.".

5.9.43 The issue of human health arising from emissions from EfW facilities has recently been addressed in two recent planning inquiries for EfW facilities, namely a proposal for an EfW at Rufford Colliery, Nottingham and an EfW at St Dennis, Cornwall. In both instances the Inspector found that there are unlikely to be significant health impacts from modern EfW facilities and that through the Environmental Permitting process air quality standards for the facilities would be set at levels designed to guard against impacts on human health. Nonetheless it is considered appropriate for the ES to address impacts on human heath as this is often a matter of concern to the public.

5.9.44 A Human Health Risk Assessment (HHRA) will be carried out using the Industrial Risk Assessment Program-Human Health (IRAP-h View – Version 4.0). The programme, created by Lakes Environmental, is based on the United States Environment Protection Agency (USEPA) Human Health Risk Assessment Protocol. The health impact assessment will consider the possible effects on human health of key receptors, which are likely to be exposed to the greatest impact from the facility.

5.9.45 The assessment utilises the IRAP-h health impact assessment program to consider the possible pathways of exposure and the accumulation in the environment and food chain.

5.9.46 The outputs of the IRAP assessment will then be assessed using the Environment Agency guidance "Human Health Toxicological Assessment of Contaminants in Soil". This will require two types of assessment:

- For those chemicals with a threshold level for toxicity, a Tolerable Daily Intake (TDI) is defined. This is "an estimate of the amount of a contaminant, expressed on a bodyweight basis that can be ingested daily over a lifetime without appreciable health risk." A Mean Daily Intake (MDI) is also defined, which is the typical intake from background sources. In order to assess the impact of the facility, the predicted intake of a chemical is added to the MDI and compared with the TDI.
- For chemicals without a threshold level for toxicity, an Index Dose (ID) is defined. This is a level of exposure which is associated with a negligible risk

to human health. The predicted intake of a chemical is compared directly with the ID without taking account of background levels.

5.9.47 Chemicals can reach the body either through inhalation or through ingestion (oral) exposure and the body handles chemicals differently depending on the route of exposure. For this reason, different TDI and IDs are defined for inhalation and oral exposure.

5.9.48 The Human Health Risk Assessment will be presented as a separate section of the Air Quality Assessment and summarised within the Air Quality chapter of the ES.

Odour and Dust

5.9.49 It is not anticipated that the proposed operations would give rise to odour or dust impacts. Odour and dust in the tipping hall would be controlled by forced draught fans located above the refuse bunkers. These would draw air from the bunker hall and boiler hall into the furnace to feed the combustion process creating a slight negative pressure which prevents odours and dust escaping from the building. Anaerobic conditions within the refuse bunkers, which can cause odour, would be prevented by regular mixing of the waste by the crane operators. As such a quantitative assessment of odour or dust impacts is not proposed.

Reporting

5.9.50 The full results of the Air Quality Assessment will be included in a detailed technical report, which will form an appendix to the ES. A self-contained chapter for the ES will also be prepared to summarise the results of the air quality assessment.

5.9.51 The Human Health Risk Assessment will be presented as separate chapter within the ES and summarised in a single combined air quality technical appendix.

5.10 Cultural Heritage

Baseline Information

5.10.1 An archaeological desk based assessment was undertaken by RPS in 2011 to identify the potential for archaeological and cultural heritage features at the site and in the surrounding area. The assessment indicates that there are no Scheduled Monuments or statutory designated sites located within the proposed development area. None of the aerial photographs examined as part of the desk based assessment show archaeological features within the proposed development area, other than historical evidence of ridge and furrow features. These features were lost as a result of ground disturbance works associated with the development of the airfield in 1947. There are no records of archaeological remains at the site.

5.10.2 The nearest statutorily protected cultural heritage receptor is The Mount moated site (SAM 32365). This Scheduled Monument is located in Haresfield, approximately 750m east of the site.

5.10.3 A site to the monument has shown it is set on low-lying ground and survives as a square moat enclosing an island measuring roughly 50 m by 48 m, with the internal island raised about 1.5 m above the level of the ground outside of the moat. Within the island a c. 36 m square x 0.5 m high building platform survives. The moat varies in size from approximately c. 10 – 16 m wide and c. 3 – 4 m deep. The site is surrounded by vegetation. The western boundary, which would experience views towards the site, is planted with a stand of mature yew, an evergreen tree species.

5.10.4 The Mount is understood to have been the site of the house of the Manor of Haresfield, held after the Norman Conquest by Durand, Sheriff of Gloucester, and later by the de Bohun family, although it is not known precisely when The Mount was constructed.

5.10.5 There are a number of other designated heritage assets in the landscape including a further three Scheduled Monuments located at distances between 1.7 km and 2.5 km from the development site. The aforementioned RPS baseline report identifies five churches within 3.6 km of the development site that are Grade I or Grade II* listed buildings, only one, St Peter's Haresfield, lies

within 1km of the site. A number of other listed buildings are also located within 1km of the site. The nearest Conservation Area is located at Randwick, approximately 4.3 km to the southeast. The nearest Registered Park and Garden is Frampton Court located approximately 5.1km to the southwest.

Potential Effects

5.10.6 It is evident from the findings of the desk assessment, examination of geotechnical site investigation results and from a site walkover that any below ground remains predating the airfield are highly likely to have been adversely affected by the development of the airfield. As such the potential of the proposed development area to contain remains of archaeological importance is now negligible. On this basis it is considered appropriate to scope out the assessment of impacts on below ground archaeology. In addition the 20th Century structures associated with the former airfield have now been removed. Therefore the development would not have an effect on any structures of cultural heritage interest associated with its former use as an airfield that may have existed at the site.

5.10.7 With regard to The Mount Scheduled Monument the significance of this monument primarily relates to the potential for buried archaeological remains associated with the original medieval occupation of the site as stated in the English Heritage listing description. These archaeological deposits, and potentially preserved waterlogged deposits, could provide information about the local economy and environment during the medieval period.

5.10.8 In terms of the setting of the monument, it is likely that The Mount would have been an important feature within the medieval community, suggested by the number of footpaths converging at the site. The limit of this medieval landscape, however, does not extend far enough to the west to suggest it would suffer significant adverse setting impact by the proposed development. Additionally, the site is on private ground (inaccessible to the public), with substantial tree covering on the internal platform and lines of trees along the western periphery in the direction of the development. As such the setting of the monument and the potential for the monument to inform and educate is unlikely to be significantly impacted by the proposed development.

5.10.9 Nonetheless indirect impacts on the setting of the SAM and other Designated Heritage Assets in the local landscape will be undertaken as part of the ES.

Consultations

5.10.10 The GCC County Archaeologist and English Heritage have been consulted Consultations on the findings of the Desk Based Assessment and the site walkover surveys.

5.10.11 The GCC County Archaeologist has confirmed that on the basis of the evidence presented in the Desk Assessment the overall archaeological potential of the site is considered to be low. As such any further assessment of below ground archaeology can be scoped out of the EIA.

5.10.12 English Heritage has requested that the baseline data included within the Desk Assessment is updated to confirm the presence and location of all cultural heritage features surrounding the site. In addition it was also requested that the cultural heritage gazetteer includes all heritage features up to 2km from the site and all Designated Heritage Assets (i.e. World Heritage Sites, Scheduled Monuments, Listed Buildings, Registered Park and Gardens, Registered Battlefields or Conservation Areas) within 5km of the site.

Assessment Methodology

5.10.13 The archaeological and cultural heritage assessment would be undertaken with reference to the standards and guidance described in the Institute of Field Archaeologists document Standards and Guidance for Archaeological Desk Based Assessments (2008), Planning Policy Statement 5 Planning for the Historic Environment and the EIA Regulations.

5.10.14 The cultural heritage gazetteer contained within the Desk Assessment will be updated to reflect the comments of English Heritage.

5.10.15 It is proposed to undertake an assessment of indirect impacts on the setting of the cultural heritage resources in the local landscape. The assessment will consider impacts on the following local heritage resources:

- Scheduled Ancient Monuments (SAMs);
- Listed Buildings / structures and buildings / structures of historic importance;

- Conservation Areas;
- Registered Parks and Gardens;
- Registered Battlefields; and
- Conservation Areas.

5.10.16 The first stage in the process will be to identify which of the listed heritage features have the potential to be affected. This will be undertaken with reference to a computer generated Zone of Theoretical Visibility (ZTV) and subsequently through site visits. It is considered likely that the most significant effects on setting are likely to occur within 1 km of the site. However, the site visit will identify any cultural heritage assets outside this distance that may warrant assessment.

5.10.17 A series of photomontages will be produced as part of the landscape and visual assessment. It is proposed these photomontages will include a view from, or close to, The Mount Scheduled Monument.

6.0 CONCLUSIONS

6.1 Introduction

6.1.1 It is considered that the development will require an Environmental Impact Assessment under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999.

6.1.2 This scoping report has been undertaken to establish the extent of the EIA that will be required, and ensure that all significant environmental impacts are adequately addressed. The outcome of scoping is that only likely significant impacts associated with the proposed development are carried forward to the assessment stage. On this basis impacts not considered significant will not be assessed any further.

6.2 Consultations

6.2.1 An extensive round of consultations has already been conducted in order to assist in the preparation of the scoping report. Consultations will continue to be undertaken with a range of statutory and non-statutory planning consultees to further inform the EIA process. At this time, it is envisaged that these will comprise:

- Gloucestershire County Council and Stroud District Council (a number of departments including waste planning, highways, landscape, ecology and archaeology / heritage);
- Gloucester City Council, Tewksbury Borough Council and Forest of Dean Borough Council;
- Highways Agency;
- Natural England;
- Environment Agency;
- Cotswolds AONB Conservation Board;
- English Heritage; and
- local wildlife trusts or other interest groups.

6.2.2 It should also be noted that in addition to the technical EIA consultation outlined above a series of stakeholder / community consultation events will be undertaken to inform the public and wider stakeholders of the proposals

6.3 Proposed Contents of the Environmental Statement

6.3.1 The proposed contents and structure of the ES is shown below. It will be produced in three volumes: the first of which is a non-technical summary and the second the main report, which will be bound together with illustrative figures. The third is a series of technical appendices.

VOLUME 1 - NON-TECHNICAL SUMMARY

VOLUME 2 - ENVIRONMENTAL STATEMENT (MAIN REPORT)

1.0 INTRODUCTION

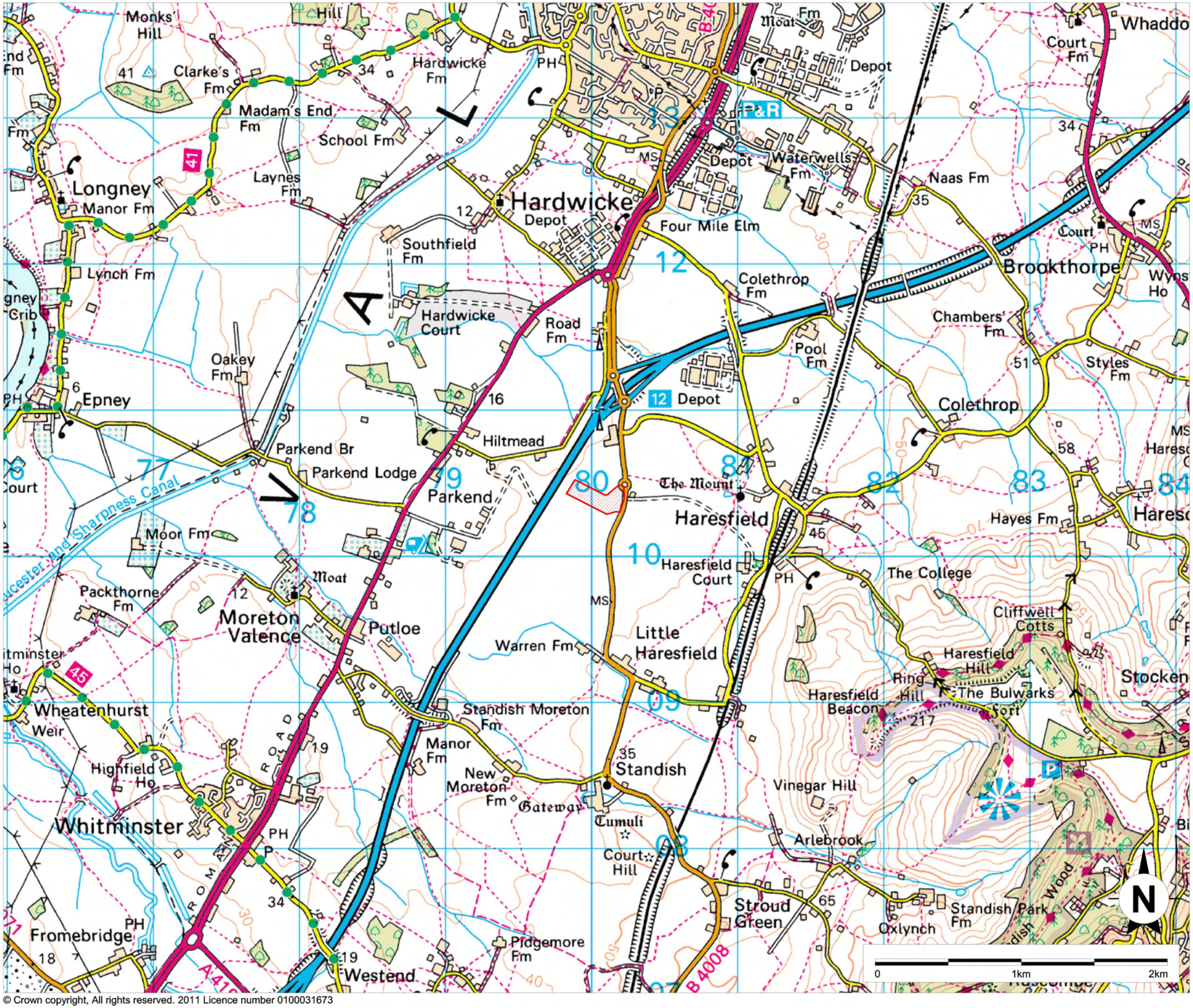
2.0 SCOPE OF THE ENVIRONMENTAL IMPACT ASSESSMENT

3.0 THE NEED FOR THE SCHEME AND ALTERNATIVES CONSIDERED

4.0 PLANNING HISTORY

5.0 SCHEME DESCRIPTION AND CONSTRUCTION METHODS

Figures



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axis

Site Location

Balfour Beatty

urbaser

Gloucestershire County Council
Residual Waste Project
EIA Scoping Report

Figure 1

Site Location Plan

Scale	Date
1:25,000@A3	October 2011

urbaser Balfour Beatty	Gloucestershire County Council Residual Waste Project EIA Scoping Report	Figure 2	Site Layout	Scale 1:1000@A3	Date October 2011

axis

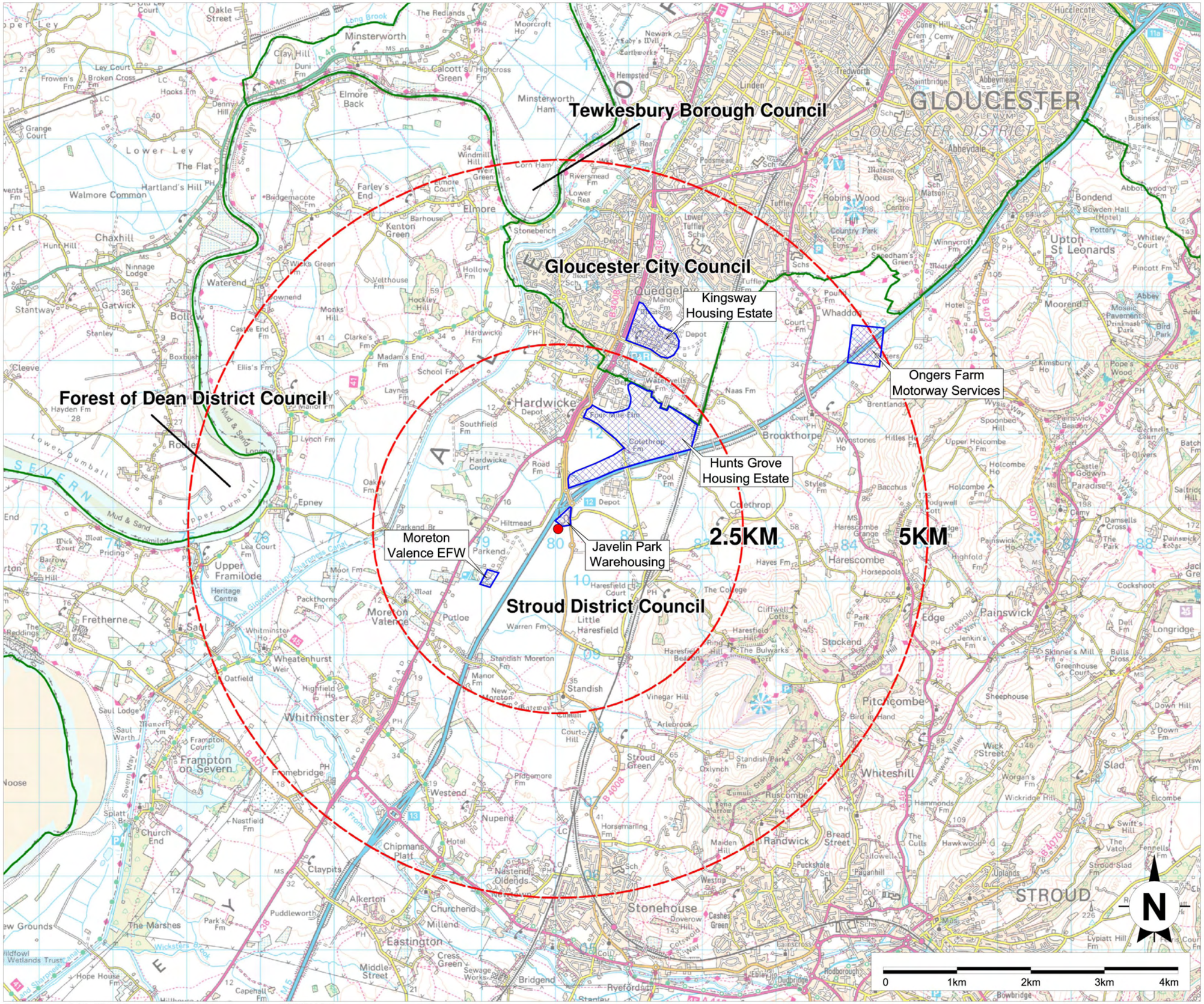
urbaser

Balfour Beatty

Option 1: Tuffley Substaion
Route would be underground within the highways verge.

Option 2: 33kV Ryeford - Nethrills - Coaley
Tee connection.
Route would be above ground on poles.

Gloucestershire County Council Residual Waste Project EIA Scoping Report	
Figure 3	
Grid Connection Options	
Scale 1:25,000@A3	Date October 2011



axis

● Site Location

Balfour Beatty urbaser

Gloucestershire County Council
Residual Waste Project
EIA Scoping Report

Figure 4

Cumulative Effects Assessment
Project Locations

Scale	Date
1:50,000@A3	October 2011

NOTES:

The Zone of Theoretical Visibility (ZTV) has been generated using the Ordnance Survey Landform Panorama dataset, which does not take into account the screening effects of vegetation of other features.

The curvature of the earth's surface has been allowed for in the generation of the ZTV.

The eye height of the observer was set at 2m above ground level.

Refer to the text of the Landscape and Visual Impact Assessment (and Appendices) for further details.

axis

- Site Location
- Area of Outstanding Natural Beauty (AONB)
- National Trail (Cotswold Way)
- Viewpoint Location (location indicated by tip of arrow)
- Theoretical visibility of building and stack (building max. roof height 48m)
- Theoretical visibility of stack only (height 70m)

VIEWPOINT LOCATIONS (photomontages in **bold**)

1. B4008 to the north of the site;
2. B4008 to the south of the site;
3. Footpath to the east of the site;
4. St Peter's Church, Haresfield;
5. Minor road leading to Haresfield Beacon;
6. M5 overbridge south of site;
7. A38, s edge of Gloucester;
8. M5 overbridge east of site;
9. Robins Wood Hill;
10. Colethrop;
11. Brookthorpe;
12. Painswick Beacon;
13. Edge;
14. Maiden Hill;
15. Selsley Common;
16. Lower Green Farm;
17. Standish;
18. Cam Long Down;
19. Whitminster;
20. Frampton on Severn;
21. Newnham;
22. Edge of Littledean;
23. Littledean Hill Road, Cinderford;
24. Old Airfield Farm;
25. A38, Putloe;
26. River Severn, south of Epney;
27. The Gloucester and Sharpness Canal, near Parkend Bridge;
28. Chaxhill;
29. Hiltmead Farm;
30. Field View;
31. Sheep House;
32. Hardwicke;
33. A38 lay-by north of Hardwicke Court;
34. Haresfield Beacon.

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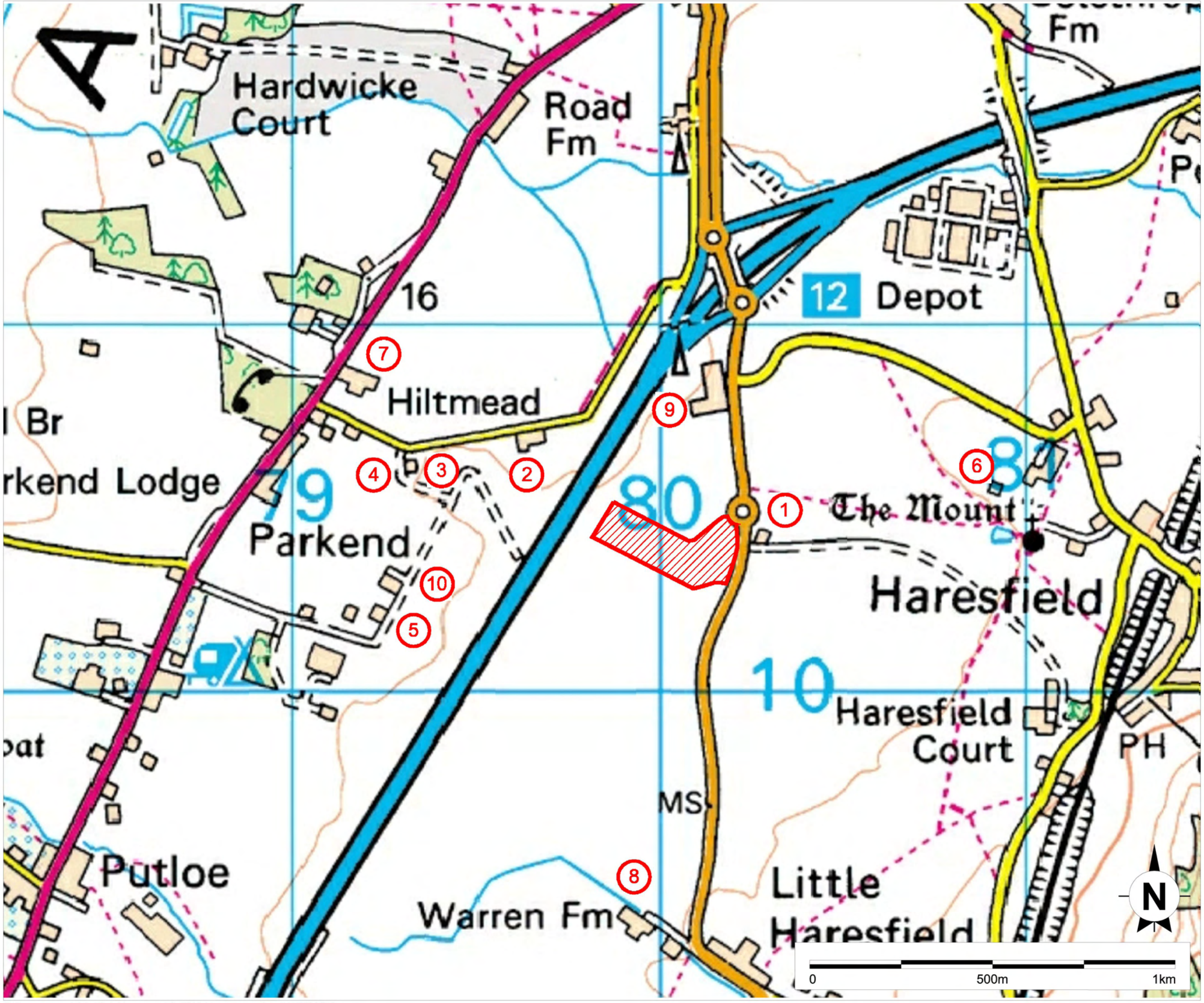
Figure 5

Landscape Viewpoint Locations

Scale	Date
1:100,000@A3	October 2011



axis

Key

Development Site Boundary

1 Receptor

Residential Receptors

1 The Lodge
2 Hiltmead House
3 St Joseph's Travellers Park
4 Lindas Home
5 Old Airfield Farm
6 Royston
7 Broadfield Farm
8 Warren Farm

Commercial Receptors

9 Blooms Garden Centre
10 G+M Motors Gloucester

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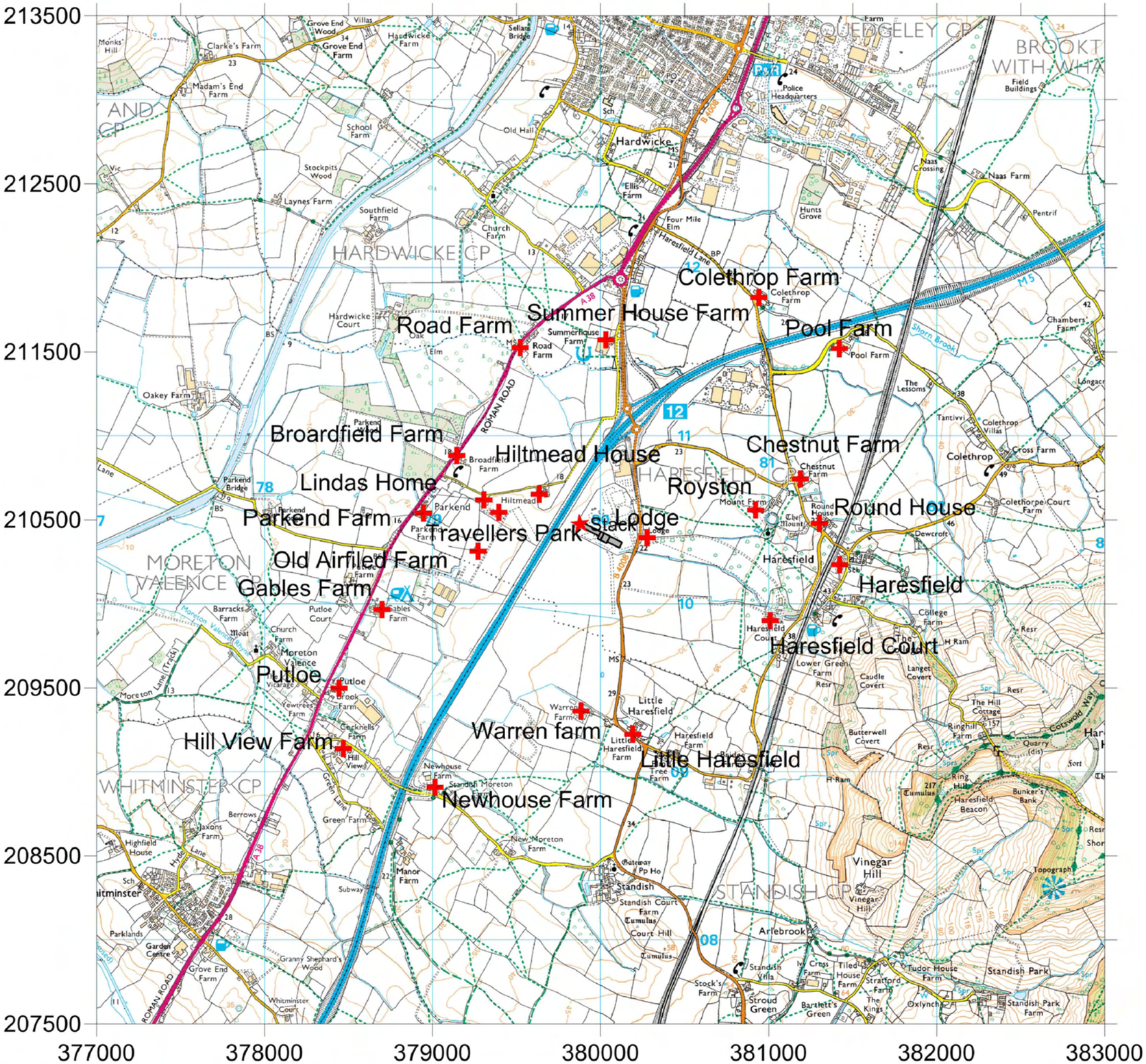
Figure 6

Noise Assessment Receptors

Scale	Date
Not to Scale	September 2011



axis

aveller Receptor Location

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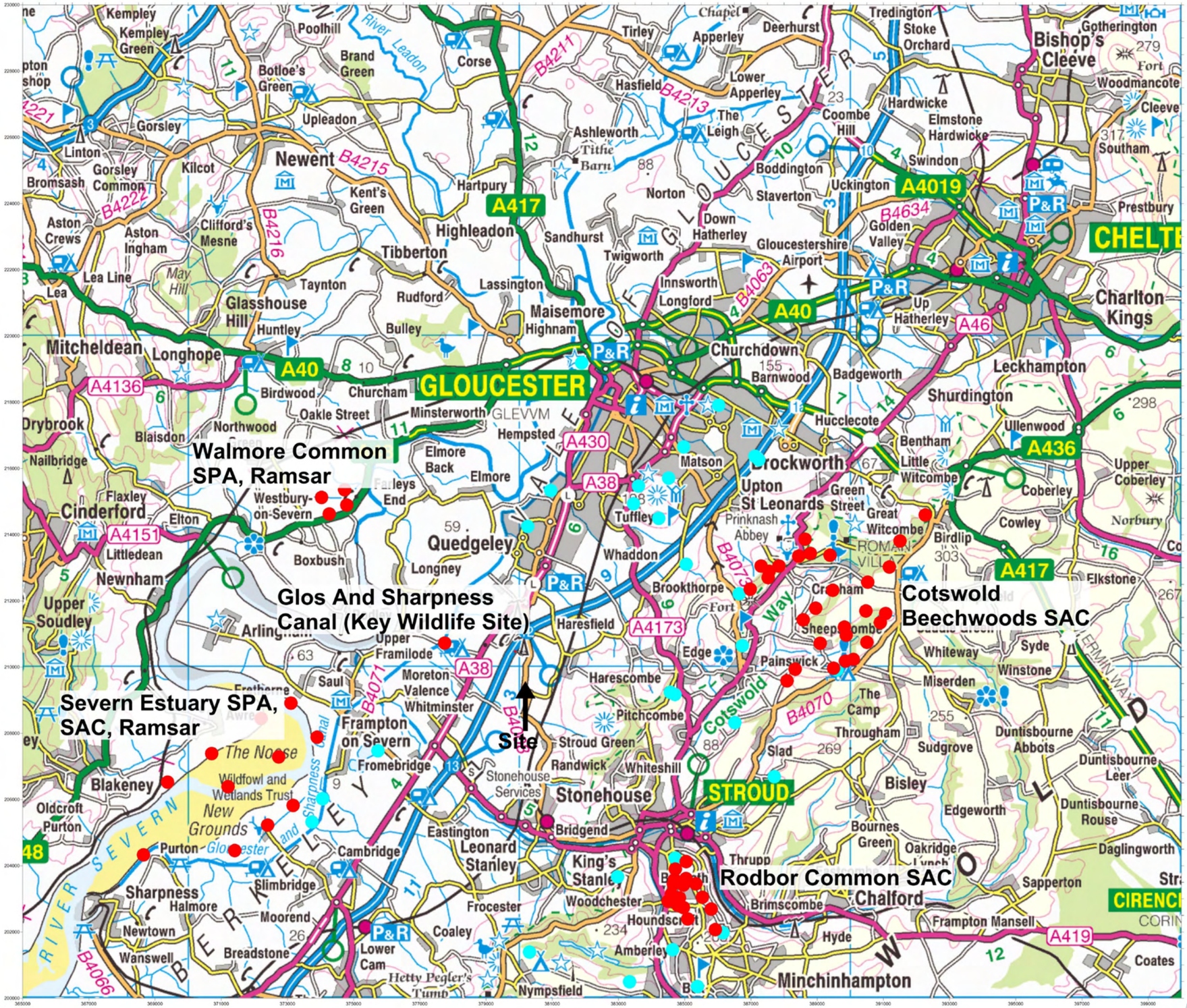
Figure 7

Sensitive Receptors

Scale	Date
1:25,000@A3	October 2011



Environment Agency H1 Criteria Ecological Sites

Non Environment Agency H1 Criteria Ecological Sites

axis

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Figure 8

Ecological Air Quality Receptors

Scale	Date
1:125,000@A3	October 2011

Appendix 1 – Landscape and Visual Impact Assessment

LANDSCAPE AND VISUAL ASSESSMENT METHODOLOGY

1.0 Introduction

1.1 The Assessment aims to establish the following:

- a clear understanding of the site and its setting in respect of landscape character and visual amenity;
- an understanding of the proposed development in terms of how this would relate to landscape character and visual amenity;
- an identification of all potential direct and indirect effects of the proposed development upon the landscape;
- an identification of effects on visual receptors;
- those mitigation measures necessary to reduce/eliminate any potential adverse effect on the landscape or visual amenity arising as a result of the proposed development; and
- a conclusion as to the residual effects of the proposed development.

1.2 The process follows a standard approach, namely:

- the establishment of the baseline conditions, i.e. the character and sensitivity of the landscape, and the type and sensitivity of visual receptors;
- the prediction of the magnitude of impact that the proposed development would bring, allowing for mitigation measures, upon the landscape and upon visual receptors; and
- an assessment of the significance of effect that would occur, by considering the predicted magnitude of change together with the sensitivity of the landscape or sensitivity of visual receptor respectively.

1.3 As stated within the main text, the methodology for Landscape and Visual Assessment is based upon the *Guidelines for Landscape and Visual Impact Assessment* (The Landscape Institute and Institute of Environmental Assessment, 1st Edition, 1995 & 2nd Edition, 2002), often referred to as "*GLVIA*".

1.4 A second document, *Landscape Character Assessment: Guidance for England and Scotland* (Scottish Natural Heritage and The Countryside Agency 2002) deals with landscape character assessment only and references *GLVIA* as the appropriate guidance to be used for landscape and visual impact assessment when carried out

as part of to the Environmental Impact Assessment process. A series of Topic Papers have been produced to accompany this second document, which give further consideration of landscape character assessment and related issues.

1.5 Landscape and visual matters are separate, although closely related and interlinked issues, and are dealt with as such in this report. The methodologies for assessing both are outlined separately below.

2.0 Landscape Assessment

2.1 The landscape assessment considers the potential effects of the proposed development on the landscape as an environmental resource. Physical change to the landscape may also result in changes to the distinctive character of that landscape and other surrounding landscapes and how they are perceived.

2.2 The landscape baseline for the assessment is established by both desk-based and field-based surveys in order to identify, describe and classify the physical and perceived aspects of the landscape within the defined study area. An understanding can then be gained of the individual elements, features and characteristics of the landscape and the way that these interact and combine to form distinct character areas.

2.3 This then allows an assessment to be made of the effects of a proposed development upon these landscape character areas, both in terms of actual physical change and change in character.

Landscape Fabric

2.4 The landscape fabric can be described as the physical elements and combinations of these elements that make up the landscape and which may be affected by the proposed development.

2.5 The sensitivity of the landscape fabric within each landscape character area depends upon the scarcity of its constituent elements and the ease with which these can be replaced. Sensitivity is not absolute and relates to the context of a particular site and in some cases to the type of development proposed. As such, the final allocation of sensitivity is based on professional judgement, guided by the criteria set out below (Table 1).

2.6 As part of the assessment, a commentary is provided describing and justifying the sensitivity level ascribed to each receptor.

Table 1: Landscape Fabric Sensitivity Criteria

Sensitivity Level	Criteria (indicative)
High	*Examples of landscape fabric that could be described as unique; or are nationally scarce features or elements having particularly distinctive characteristics; or mature vegetation with provenance such as ancient woodland or mature parkland trees.*
Moderate to High	*Examples of landscape fabric that are scarce at a regional level; or are locally distinctive; or mature vegetation in good condition.*
Moderate	*Examples of landscape fabric that are locally distinctive or commonplace; or mature vegetation that is in moderate/poor condition or readily replicated.*
Low to Moderate	*Examples of landscape fabric that are regionally and/or nationally ubiquitous; or makes little contribution to local distinctiveness; and poorly maintained vegetation such as gappy hedgerows.*
Low	*Examples of landscape fabric that might be considered to detract from landscape character such as obtrusive man-made artefacts (e.g. power lines, large areas of hard-standing etc).*

Landscape Character

2.7 Landscape character classification is a process of subdividing the landscape into distinct character areas with similar or shared characteristics, distinguishing them from other character areas that have different shared characteristics. Key characteristics can then be identified, which can help to provide understanding of the sensitivity to change of a particular landscape character area.

2.8 The sensitivity of each character area potentially affected by the proposed development has been determined based on the degree to which the landscape is able to accommodate change without unacceptable effects on its character. *Guidelines for Landscape and Visual Impact Assessment* (2002) (*paragraph 7.16*) indicates that the degree to which a particular landscape can accommodate change arising from a particular development will vary with:

- Existing land use;
- The pattern and scale of the landscape;
- Visual enclosure/openness of view and distribution of visual receptors; and
- The value placed on the landscape.

2.9 *Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity* (2004) defines the sensitivity of a landscape to change as being determined by:

- The exact form and nature of the change that is proposed to take place; and
- The particular aspects of the landscape likely to be affected by the change, including aspects of both landscape character sensitivity and visual sensitivity.

2.10 To understand the sensitivity of a landscape to change, the various characteristics/factors that make up a particular landscape character area must be identified and consideration given as to how these will be affected by the proposed development. Consideration is given to factors including:

- Physical components of landscape character, both natural and man-made. For example: landform, land cover, enclosure, settlement pattern, condition/quality;
- Aesthetic components of landscape character such as: scale, pattern, movement, complexity, nature of connections with adjacent landscapes; skyline;
- Visual sensitivity of landscape character to the proposed change; and
- Perceptual components of landscape character (the value of the landscape) including: presence/absence of statutory and non-statutory landscape designations; other designated elements/features; rarity; conservation interest; cultural associations; scenic quality; amenity/recreational function; tranquillity; remoteness; wildness.

2.11 Sensitivity is not absolute and relates to the context of a particular site and in some cases to the type of development proposed. A particular landscape may have some characteristics which exhibit a higher sensitivity and some which exhibit a lower sensitivity. As such, the overall sensitivity to change is the result of professional judgement based upon consideration of the various factors outlined above and the relative weight attached to these (which will vary from landscape to landscape), guided by the criteria set out below (Table 2).

2.12 As part of the assessment a commentary is provided describing and justifying the sensitivity level ascribed to each receptor.

Table 2: Landscape Character Sensitivity Criteria

Sensitivity Level	Criteria (indicative)
High	*Key characteristic(s) of landscape very vulnerable and could be adversely impacted by the development; or areas of very strong positive character that are highly valued by virtue of their scenic quality. The quality of such landscapes is often recognised through protective designations such as National Parks or Areas of Outstanding Natural Beauty (AONBs).*
Moderate to High	*Areas that exhibit a positive character where valued features combine to give an experience of unity, richness and harmony and create a distinctive sense of place likely to be valued at a greater than local level.*
Moderate	*Areas that exhibit positive character but may have some evidence of alteration to/ degradation of/ erosion of features resulting in areas of more mixed character. Can also apply to areas with evidence of degraded character that remain valued by local communities.*
Low to Moderate	*Areas that are relatively bland or neutral in character with few/no notable features; and/or evidence of alteration to/ degradation of /erosion of features.*
Low	*Key characteristic(s) of landscape very robust and will not be adversely impacted by development; or areas that have been subject to substantial alteration, degradation, or erosion of features resulting in generally negative character. Scope for positive enhancement frequently occurs.*

Landscape Effects

2.13 Once the landscape baseline and sensitivity to change have been established, the magnitude of change that would be experienced as a result of the proposed development can be determined. This takes into account whether change is temporary or permanent and also any mitigation measures that have been incorporated into the proposals.

2.14 The degrees of magnitude of change upon the landscape fabric are:

Table 3: Landscape Fabric Magnitude Criteria

Magnitude of Change	Criteria
Very Large	*Permanent removal of, or a significant change to, the characteristics of the landscape element in question that cannot be suitably replaced, reinstated or otherwise mitigated against.*
Large	*Permanent removal of, or a significant change to, the characteristics of the landscape element in question. Limited scope for replacement, reinstatement or other mitigation.*
Medium	*Partial removal of, or moderate changes to the characteristics of the landscape element in question. Also applies to complete removal that can be suitably mitigated against.*
Small	*Small scale changes to a landscape element or loss of/change to a small proportion of an extensive feature. Larger scale losses that can be fully mitigated against through provision of equivalent replacement features.*
Very Small	*Very small scale changes to a landscape element or loss of/change to a small proportion of an extensive feature. The changes can be fully mitigated against through provision of equivalent replacement features.*
Negligible	*Changes to a landscape element that would have no effect of the integrity of the element and that can be fully mitigated against through provision of equivalent replacement features*

2.15 The degrees of magnitude of change upon landscape character are:

Table 4: Landscape Character Magnitude Criteria

Magnitude of Change	Criteria
Very Large	*Fundamental change in the make-up and balance of landscape characteristics over an extensive area. The proposals would be a dominant feature within the landscape.*
Large	*Very obvious change in the balance of landscape characteristics over an extensive area; ranging to particularly intensive change (i.e. a dominating effect) over a more limited area. The proposals would be a prominent feature in the make-up of the character area.*
Medium	*Changes in an extensive area which whilst notable do not alter the balance of the landscape characteristics, ranging to moderate changes in the localised area which whilst obvious do not fundamentally change local character.*
Small	*Limited change in the wider landscape and/or modest/unremarkable change in the localised area.*

Magnitude of Change	Criteria
Very Small	*Very small and unremarkable change in any components of the landscape. The influence of the development upon the underlying landscape characteristics is minimal.*
Negligible	*Change, which whilst occurring, would be virtually imperceptible within the wider landscape.*

3.0 Visual Assessment

3.1 A visual assessment is concerned with the potential effects that may occur resulting from a proposed development upon the population likely to be affected. It assesses the change in visual amenity undergone by specific receptors that would arise from any change in the nature of views experienced.

3.2 The method of determining visual effects is ostensibly the same as landscape impacts. The sensitivity of the visual receptor is identified, as is the magnitude of the impact experienced. These can then be considered together to identify the significance of effect.

3.3 Unless otherwise stated in the main body of the assessment report, the eye height of the viewer is assumed to be 1.8m.

3.4 Whilst different types of visual receptor inherently exhibit different sensitivities, e.g. views from residential properties and/or notable beauty spots are more sensitive than views from, for example, main roads, this is also influenced by what is visible from the receptor in question.

3.5 For example a view from a residential property across an attractive rural landscape is considered to be more sensitive than a view from a similar property towards an industrial estate or motorway corridor.

3.6 Sensitivity is not absolute and relates to the context of a particular site and in some cases to the type of development proposed. As such, the final allocation of sensitivity is based on professional judgement, guided by the criteria set out below (Table 5).

Table 5: Visual Sensitivity Criteria

Sensitivity Level	Criteria (indicative)
High	*Strategic recreational routes and other clearly well used rights of way; important landscape features with physical, cultural or historic attributes; principal views from residential buildings; views from beauty spots and picnic areas.*
Moderate to High	*Principal views from residential properties where mitigating factors occur such as views notably detracted from by existing features; more oblique views from the main windows of properties; views from important landscape features or beauty spots where existing visual detractors are present; views from outdoor recreational areas where the view is part of the visitor experience.*
Moderate	*Other non-strategic footpaths; secondary views from residential buildings, such as from end windows; views from roads or other transport routes where journeys are clearly recreational/tourism related; outdoor recreational areas, where the activities followed are not strongly related to the views available; land accessible to the public away from well trodden footpaths.*
Low to Moderate	*Land accessible to the public away from well trodden footpaths, with little/no evidence of use; views from public buildings/ places of work with obvious outdoor spaces; views from minor rural roads/ other transport routes through rural areas.*
Low	*Views from industrial or commercial buildings or areas; drivers and passengers of vehicles engaged in commercial travel or commuting; views from primarily functional main roads; and views from trains.*

3.7 The classification of the magnitudes of visual change are:

Table 6: Visual Assessment Magnitude Criteria

Magnitude of Change	Criteria
Very Large	*Fundamental change in the character, make-up and balance of the view. The proposals would be dominant; a controlling feature within the view.*
Large	*Very obvious changes in the character, make-up and balance of the view. The proposals would be a prominent feature. The nature of the existing view would change.*
Medium	*Moderate changes in the character, make-up and balance of the view, with the proposals noticeably distinct. This may lead to an overall change in the nature of the view depending upon the type and nature of change.*

Magnitude of Change	Criteria
Small	*The proposals would be visible as a new feature. Change would be limited and would be unlikely to affect the nature of the existing view as a whole.*
Very Small	*Change in the character, make-up and balance of the view, which would be localised in extent, obscure, indistinct or may otherwise be missed by the viewer. No change in the nature of the view would occur.*
Negligible	*Virtually imperceptible change in the view. Whilst theoretically visible, the proposals would be faint, not legible and difficult for the viewer to discern*

3.8 In considering the magnitude of visual effects, a commentary is provided to justify the reasoning for the magnitude criteria selected. Such factors considered may include for example, the potential for weather conditions to restrict views, the principle aspect of the viewpoint/viewer, the proportion of any particular view affected, the potential for the development to attract the eye or to become a focal point in the view to the detraction/benefit of competing visual elements, etc.

4.0 Significance of Effect

4.1 Once sensitivity to change and magnitude of change have been classified, the two are considered to produce an assessment of the significance of effect experienced by the receptor. The assessment matrix used to guide the determination of significance is indicated in Table 7 below.

4.2 Paragraph 7.38 of *GLVIA* states that "*Significance of effect is not absolute and can only be defined in relation to the location of receptor and nature of development. It is for each assessment to determine the assessment criteria and the significance thresholds, using informed and well-reasoned judgement supported by thorough justification for their selection, and explanation as to how the conclusions about significance for each effect assessed have been derived*".

4.3 As such, professional judgement is the principal determinant of significance of effect, with the matrix set out in Table 7 used in a supporting role only. A commentary is provided as part of the assessment, which includes justification of the determination of significance levels where these do not clearly accord with the matrix.

4.4 Paragraph 7.42 of *GLVIA* states that "*In the context of EIA 'significance' varies with the type of project and the topic under assessment. For some topics such as noise, air and water quality, levels of magnitude or scale will be based on established,*

measurable technical thresholds, and the sensitivity of receptors may also be defined in statutory regulations or planning guidance. No such formal guidance exists for the assessment of significance for landscape and visual effects and the assessor must clearly define the criteria used in the assessment for each project, using his or her skill based on professional judgement. The important objective is to identify to whom and to what degree an effect is significant. It may be helpful to define levels or categories of significance (including 'not significant') appropriate to the nature, size and location of the proposed development. Within the framework of an EIA, the levels of significance may need to be consistent with the overall approach applied to the other topics".

4.5 Given this, this assessment considers that where effects of moderate to major significance or greater may occur that such effects would be significant in EIA terms.

4.6 It should be noted that landscape effects may be either **adverse** (negative) or **beneficial** (positive) in nature. If change occurs, with no obvious deterioration or improvement resulting, this can be said to be **neutral** in nature. Effects of negligible significance are considered to be inherently neutral in nature.

Table 7: Assessment Matrix

Magnitude of Change	***Very Large***	*Moderate*	*Moderate to Major*	*Major*	*Major to Substantial*	*Substantial*
	Large	*Minor to Moderate*	*Moderate*	*Moderate to Major*	*Major*	*Major to Substantial*
	Medium	*Minor*	*Minor to Moderate*	*Moderate*	*Moderate to Major*	*Major*
	Small	*Slight to Minor*	*Minor*	*Minor to Moderate*	*Moderate*	*Moderate to Major*
	Very Small	*Slight*	*Slight to Minor*	*Minor*	*Minor to Moderate*	*Moderate*
	Negligible	*Negligible*				
	No Change	*No Effect*				
		Low	***Low to Moderate***	***Moderate***	***Moderate to High***	***High***
		Sensitivity of Receptor				

NB: Grey shading indicates a likely significant effect in EIA terms.

Example: A *large* magnitude of change on a receptor with a *low* sensitivity to change results in an effect of *minor to moderate* significance.